

**DESARROLLO E IMPLANTACIÓN DE UN SISTEMA
INFORMÁTICO PARA LA SIMULACIÓN DEL
FUNCIONAMIENTO DE UNA PLANTA QUÍMICA EN
CONTINUO MEDIANTE INTERPRETACIÓN DE ROLES.**

Grado en Ingeniería Química Industrial

Autor: Lautaro Meroi Bianconi

Tutor: José Juan Macías Hernández

La Laguna, 7 de Septiembre de 2015

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MEMORIA

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1. Introducción / Introduction.

La formación que se brinda a los alumnos en el Grado en Ingeniería Química Industrial se puede dividir en dos grandes bloques: Por un lado está la formación teórica, ya que la titulación está diseñada para cubrir los aspectos técnicos formativos básicos para el desarrollo profesional de los alumnos y, por otro lado, el gran número de prácticas tanto dentro de la Facultad, como fuera de la Universidad, sirven para la formación integral del alumno, reforzando esos conocimientos teóricos. Este proyecto está encaminado a robustecer esta segunda parte formativa, esencial para todo Ingeniero.

En la práctica laboral existen multitud de aspectos que por su naturaleza interdisciplinar no están englobados en ninguna materia y, consecuentemente, suelen ser deficitarios en los recién egresados. Un Ingeniero Químico ha de conocer aspectos de organización del trabajo en una Planta y responder ante situaciones anómalas o emergencias con celeridad y destreza. Igualmente, saber trabajar en equipo es esencial, por lo tanto, es indispensable que los Ingenieros Químicos tengan una formación interdisciplinar y que conozcan la organización industrial.

Para ello, se ha diseñado esta práctica que engloba todos estos aspectos tratados de una forma global y enmarcados en el entorno de una Planta Química.

La manera más eficaz de ejercitarse estos objetivos es en un entorno que reproduzca fielmente una Planta Química, con la seguridad de que un error no acarrearía consecuencias fatales, para que así el equipo de alumnos pueda trabajar sin miedo a provocar una catástrofe. Por lo tanto, esta práctica ha de contener aspectos técnicos e intrínsecos del trabajo de un Ingeniero Químico, como realizar balances o mejoras en el proceso. Además, el hecho de tener que cumplir un programa de fabricación y responder ante situaciones de emergencia en el proceso, refuerza la labor en equipo y la madurez profesional necesaria.

En definitiva, en este proyecto se ha creado un sistema informático que no se centra en simular únicamente una Planta Química, sino que se extiende hasta abarcar la fábrica industrial que la opera en continuo.

The training is provided to students in the Degree in Industrial Chemistry Engineering can be divided into two main groups. On the one hand, there is the theoretical training, since the degree is designed to cover basic technical training for the professional development of students; and on the other hand, the large number of practices - both within the faculty and outside the University - which serve for the integral formation of students, strengthening this theoretical knowledge. This project aims to reinforce this second formative part, essential for any engineer.

In employment practice there are many areas that, by their interdisciplinary nature, are not enshrined in any subject and therefore are often deficient in new graduates. A chemical engineer has to know aspects related to organizing work in a plant, and respond to abnormal or emergency situations with speed and skill. Similarly, team work is essential; therefore, it is necessary for Chemical Engineers to have interdisciplinary training and know more about industrial organization.

To do this, we have designed this practice that encompasses all these issues addressed in a comprehensive manner and framed in the vicinity of a chemical plant.

The most effective way to exercise these goals is in a setting that faithfully reproduces a chemical plant, with the assurance that a mistake will not bring fatal consequences, so that the team of students can work without fear of provoking a catastrophe. Therefore, this practice must contain technical and intrinsic aspects of the work of a chemical engineer, such as making balances or improvements throughout the process. Moreover, the fact that a worker has to comply with a manufacturing program and respond to emergency situations in the process reinforces teamwork and the professional maturity needed.

In short, in this project we have created a computer system that not only focuses on simulating a chemical plant, but also extends as far as including the industrial factory that operates the plant continuously.

2. Objetivos

El Objetivo principal de este proyecto es desarrollar un sistema informático que emule el funcionamiento de una fábrica en continuo que opera una Planta Química. Para ello, deberá estar compuesto por una serie de aplicaciones de software que deberán ser programadas y optimizadas para su correcto funcionamiento en consonancia, además se deberá crear una documentación complementaria que nutra al sistema, como es el caso de la propia simulación de la Planta en estado no-estacionario, los esquemáticos del proceso, un manual de operación para la unidad simulada, etc.

Con la consecución de este trabajo se busca que el autor demuestre que ha adquirido las competencias propias de la titulación de Grado en Ingeniería Química Industrial, ya que para la creación de la documentación complementaria anteriormente mencionada es indispensable el manejo de estos conceptos.

Además, se fija como objetivo final testar el correcto funcionamiento del sistema y su utilidad con los alumnos de último curso de la titulación que estén cursando la asignatura “Simulación y Optimización de Procesos Químicos”

3. Desarrollo

El desarrollo del sistema comenzó con la simulación dinámica de la Planta Química. Para ello, se ha partido de un archivo base generado por el tutor (debido a la alta complejidad de la misma) y se ha procedido a su mejora. En este sentido, se han optimizado variables, se ha añadido instrumentación y se ha adecuado para su posterior uso en el sistema. Además, se ha extraído la información necesaria para la realización del manual de operación como si de una planta real se tratara. Para realizar esto, ha sido necesario adquirir previamente formación en simulación en estado no-estacionario, haciendo uso, entre otros, del manual de tutoriales y aplicaciones de Aspentech para Hysys 3.2. A pesar de que en este sistema se utilizará UniSim, debido a la alta compatibilidad y semejanza entre ambos programas, la información que se encuentra en ese manual de tutoriales es perfectamente aplicable para UniSim prácticamente en su totalidad.

Se ha optado por utilizar la Suite UniSim Desing de la multinacional estadounidense Honeywell por ser con ésta con la que más familiarizados están los alumnos de la titulación debido a que es la que se encuentra instalada en las aulas de informática de la Facultad de Química, además de ser una de las mejores opciones de software para simulación en estado no-estacionario del mercado.

Seguidamente se ha instalado el resto de software básico para el sistema (UniSim OPC Server y ScadaBR) y se ha configurado para su acceso desde cualquier ordenador con conexión a internet, funcionando el pc en el que se encuentra instalado como servidor.

El programa de visualización (ScadaBR) se comunica con el programa de simulación dinámica del proceso mediante una interfaz estándar OPC.

Una vez montado y probado el sistema, se ha procedido a crear la documentación necesaria para su uso. De este modo, extrayendo los datos de la simulación dinámica, se ha generado un manual de operación tratando de darle una apariencia realista para familiarizar a los alumnos con este tipo de documentos. Asimismo, haciendo uso de la utilidad Microsoft Visio se crearon los esquemáticos necesarios, tanto el P&ID que acompaña al manual de operación, como el esquemático que fue usado en el Scada.

Para simular el trabajo de un operario de campo se ha incorporado una imagen aérea de la supuesta Planta, a través de la cual, haciendo clic en la zona que se quiere visitar, se navegará entre los distintos equipos a operar, representados mediante fotos reales.

Para finalizar con la programación del Scada, y darle un aspecto realista para asemejarlo a una interfaz hombre máquina utilizada en la industria, fue necesario estudiar y modificar el documento “common.css”. En este archivo se define y crea la presentación de un documento estructurado escrito en HTML, como es el caso del lenguaje en el que está escrito el ScadaBR, en otras palabras, este documento fija las características estéticas que mostrará el Scada. Las extensión .css viene del inglés “*cascading style sheets*” (Hojas de estilo en cascada). Como Anexo V se ha adjuntado este documento tras la modificación del mismo y en el que se han incorporado anotaciones, recogiendo los aspectos que modifica cada comando que fue alterado.

Debido a la complejidad de este software, las características de un tipo de texto seleccionable estaban establecidas en el archivo dojo.js, por lo que se tuvo que suprimir el elemento “\r\n\tcolor:WindowText;” de la línea 12,368 para que pueda actuar la hoja de estilos sobre todo el contenido que se muestra en el ScadaBR.

4. Medios necesarios.

El sistema funciona desde un ordenador remoto en el que se encuentra instalado todo el software necesario y desde el que se ejecutan los archivos programados para la práctica. Los alumnos se conectarán a través de una URL dada por el profesor encargado y accederán al sistema con un usuario y contraseña asignado para cada rol.

Para la realización de la práctica es necesario contar con una serie de ordenadores conectados a internet desde los cuales trabajarán los alumnos.

Teniendo en cuenta los roles que se describen a lo largo de esta memoria, es necesario disponer como mínimo de 7 ordenadores (uno para cada rol más uno para el profesor). Estos ordenadores no deben estar necesariamente en la misma sala, ya que la práctica se puede realizar virtualmente estando cada alumno en cualquier lugar con conexión a internet. El único requisito para poder trabajar a distancia es que cada alumno tenga instalado un software de comunicación VoIP, como por ejemplo Skype, y disponga de altavoces y micrófono.

5. Descripción de la Instalación

Prácticamente cualquier tipo de industria puede ser simulada, pero se ha elegido por su nivel de complejidad y gran versatilidad, una Planta Desbutanizadora en la que se separa el LPG de una nafta para estabilizarla. La instalación cuenta con una torre de destilación, tanques de almacenamiento, corrientes de reciclo, equipos de bombeo, intercambiadores de calor, etc. La instalación se ha simulado completamente incluyendo todas las bombas, válvulas e instrumentos de campo.

Esta fábrica industrial cuenta con una plantilla de trabajadores (conformada por los alumnos), cada uno con una función definida y distinta a la de cualquier otro, de tal modo que se reproduce a escala una organización típica del trabajo.

La planta funciona en continuo, por lo que parte de la plantilla trabajará a turno mientras que otra parte lo hará a jornada normal. Los puestos a turno implican que para cada puesto existen a lo largo del día distintas personas realizando el mismo trabajo y deben relevarse entre ellos. Los relevos más comunes son los que se realizan tres veces al día, obteniendo tres turnos de 8 horas.

Con el objetivo de hacer operativa la experiencia y no saturar a los alumnos, se ha programado que los días sea de seis horas (se ha ajustado un factor de tiempo de cuatro en la simulación). De este modo, las jornadas pasan de ser de únicamente dos horas. Esto significa que los alumnos a turno rotativo se relevan cada dos horas mientras que los que estén a jornada normal, deberán desempeñar una jornada de dos horas en esas seis horas que durará el día de trabajo.

Un apunte a tener en cuenta por parte de los alumnos es que el factor de tiempo está establecido desde la simulación, por lo tanto, para un flujo de por ejemplo $10 \text{ m}^3/\text{h}$, se obtendrá tras una hora real que han circulado 40m^3 . Será indispensable tener en cuenta este factor para el correcto cumplimiento de los planes de producción.

6. Descripción del Organigrama de trabajo y funciones

Se han desarrollado 6 roles de trabajo, tratando de representar los puestos de trabajo más significativos de una fábrica química. Éstos son:

Operador de Panel.

Depende del Jefe de operaciones, estará en turno rotativo de ocho horas (dos horas para el factor de tiempo dado). Su responsabilidad será la de mantener las condiciones operativas en la Unidad, definidas por el técnico y el programa de fabricación. Sus principales objetivos son la seguridad y la estabilidad de la Planta. Opera desde un ordenador actuando sobre los controladores a través del Scada.

Operador de Campo.

Depende del Jefe de operaciones, estará en turno rotativo de ocho horas (dos horas para el factor de tiempo dado). Su responsabilidad será la de mantener las condiciones operativas en la Unidad, definidas por el técnico, el operador de panel y el programa de fabricación. Sus principales objetivos son la seguridad y la estabilidad de la Planta. Opera la Planta desde la propia instalación actuando sobre los equipos con intervención manual.

Jefe de operaciones o Técnico.

Depende del Jefe de Producción, estará en jornada normal de ocho horas (dos horas para el factor de tiempo dado). Su principal responsabilidad es, además de la seguridad y la estabilidad, la calidad de los productos obtenidos. Supervisará el trabajo tanto de los operarios de Campo como de Panel.

Ingeniero de procesos.

Depende del Jefe de Producción y a jornada normal de ocho horas (dos horas para el factor de tiempo dado) Su responsabilidad radica en el seguimiento de los parámetros técnicos de la Unidad, como rendimientos, balances de materia y energía, etc. Propondrá mejoras técnicas del proceso cuando las considere adecuadas y en caso de problemas en la Planta, colaborará en su resolución.

Técnico de mantenimiento e instrumentación.

Depende del Jefe de Producción y a jornada normal de ocho horas (dos horas para el factor de tiempo dado), además deberá estar localizable por si es requerido ante una situación de emergencia. Su responsabilidad es la de apoyo al Operador e Ingeniero de

Procesos para realizar correcciones que permitan de nuevo el funcionamiento normal. Como ejemplo podemos citar el ajuste de controladores o el remplazo de una válvula defectuosa. Debido a la dificultad técnica para realizar estas operaciones desde el Scada, el profesor ejecutará directamente en la simulación algunas de estas acciones a petición del Técnico de mantenimiento.

[Jefe de producción.](#)

Dependiendo de Dirección y a jornada normal de ocho horas (dos horas para el factor de tiempo dado). Su labor es la de coordinar el trabajo de los Operadores y técnicos para cumplir los planes de fabricación establecidos por la Dirección.

7. Actividades de cada puesto

En este apartado se describen las actividades que se deberán desempeñar en cada puesto de trabajo, además de especificar las herramientas de las que dispone cada operario.

Jefe de operaciones.

- Deberá supervisar los parámetros de la Unidad y obrar en consecuencia para mantener el proceso dentro de condiciones estables y en concordancia con los planes de producción, manteniendo los productos dentro de especificaciones. En caso de que la Planta sufra una actividad anómala, que conlleve una mala separación de los productos, deberá tratar que el producto fuera de especificación no se almacene en los tanques de productos acabados, priorizando siempre la seguridad.
- Será operativamente el Jefe de los Operadores de Campo y Panel y deberá controlar la labor que éstos desempeñan.
- Emitirá órdenes de trabajo.

Herramientas: Dispone de una interfaz dedicada para visualizar el proceso y acceder a Campo. En el caso práctico, podrá acceder tanto a la sección del operador de Campo como a la del operador de Panel.

Operador de Panel.

- Deberá vigilar los parámetros de la Unidad y obrar en consecuencia para mantener el proceso dentro de condiciones estables y en concordancia con los planes de producción, manteniendo los productos dentro de especificaciones. En caso de que la Planta sufra una actividad anómala, deberá actuar según el protocolo establecido en el Manual de operaciones con las modificaciones que el técnico le pueda trasladar.
- Llevará la iniciativa en las relaciones con el Operador de Campo que dependerá del de panel para realizar cuantas actividades sean necesarias.
- Ayudará al operador de campo en todo lo relativo al mantenimiento “en marcha”.

Herramientas: Dispone de una interfaz dedicada para visualizar la unidad y actuar sobre la instrumentación. No podrá acceder a actuar manualmente la unidad.

Operador de Campo.

- Deberá supervisar el correcto funcionamiento de la unidad in situ y en caso de detectar cualquier anomalía, deberá comunicársela al panelista. De este modo, será “los ojos” del operador de Panel en el terreno.
- Se encargará del arranque y parada de bombas, aislamiento de equipos, control manual de válvulas cuando los controladores fallen, etc.
- Se encargará del mantenimiento “en marcha” ayudado por el operario de Panel.
- Será responsabilidad suya cumplimentar los permisos de trabajo y vigilar por el cumplimiento de las normas de seguridad. Además, firmará la autorización de trabajo para reparación de válvulas de control y bombas.

Herramientas: Dispone de una interfaz dedicada para actuar manualmente la Unidad.

Técnico de Mantenimiento.

- Será el responsable del mantenimiento preventivo y correctivo de los equipos e instrumentos que están implementados en el proceso, así como mantener los equipos e instrumentos de reserva.
- Podrá supervisar las tareas encomendadas a los operadores (Campo y Panel). A tal efecto emitirá las órdenes de trabajo relativas al mantenimiento, que deberá seguir para su correcto cumplimiento.
- En caso de avería, será el encargado de reparar o sustituir válvulas de control y bombas, reparar o limpiar intercambiadores, ajustar instrumentación (K, Ti, Td) etc.

Herramientas: Dispone de una interfaz para visualizar el proceso y acceder a Campo. Desde la interfaz del proceso podrá realizar los ajustes de la instrumentación mientras que desde la interfaz de campo podrá realizar algunas actuaciones. Para reparaciones o cambio de equipos deberá emitir una orden de trabajo que será llevada a cabo por el profesor en la simulación. La orden de trabajo no podrá ser emitida hasta que se compruebe que el equipo se encuentra aislado.

Ingeniero de Procesos.

- Se encargará de realizar test operativos de la Unidad, propuestas de mejora basadas en simulaciones del proceso y realizar los balances de materia y energía con el fin de realizar las liquidaciones de la Unidad.

Herramientas: Dispone de un ordenador en el que deberá estar instalado un simulador riguroso de procesos en estado no-estacionario como el UniSim, además de un procesador de texto y una hoja de cálculo. Para tomar datos podrá acceder al mismo entorno al que tiene acceso el Jefe de operaciones.

Jefe de producción

- Su labor es la de informar diariamente del proceso de la Planta a Dirección. Para ello deberá supervisar el trabajo del resto de alumnos y deberá realizar un informe en el que se incluyan todos los incidentes ocurridos en la jornada de trabajo, estado inicial en el que se encontraba la unidad en el momento de la incorporación a su puesto y el estado final a la finalización de su jornada laboral.
- Además, debe coordinar el trabajo de los Operadores y Técnicos para cumplir los planes de fabricación establecidos por la Dirección.

8. Prueba experimental.

Tras finalizar la programación del sistema informático y el material necesario para la realización de la práctica, se realizó una experiencia para testar el buen funcionamiento del conjunto desarrollado.

Para ello se contó con los alumnos de 4º Curso del Grado en Ingeniería Química Industrial, concretamente la prueba se llevó a cabo dentro del marco de la asignatura “Simulación y Optimización de Procesos Químicos”.

La actividad se realizó entre las 15:00h y las 20:30h del 15 de mayo de 2015 en el aula de informática de la Facultad de Química de esta universidad. Un problema técnico, debido a un corte de luz en el emplazamiento en el que está ubicado el servidor, provocó un retraso de 30 minutos en el inicio de la práctica que estaba programada para las 14:30h.

En concordancia con el número de alumnos que participaron en el experimento, se decidió confeccionar la siguiente relación de puestos de trabajo:

- 3 Operadores de Panel.
- 6 Operadores de Campo.
- 1 Jefes de operaciones.
- 1 Ingenieros de procesos.
- 1 Técnico de mantenimiento.
- 1 Jefe de producción.

De este modo, cada dos horas se fueron relevando dos operadores de campo y uno de panel.

A pesar de que la jornada de trabajo de los puestos de Jefe de Operaciones, Ingeniero de procesos, Técnico de mantenimiento y Jefe de producción era de 2 horas cada 6 horas, debido a la gran cantidad de anomalías y emergencias que se fueron sucediendo, los alumnos que desempeñaban estos cargos decidieron estar presentes desde el inicio de la práctica hasta su finalización.

A continuación se enumeran las incidencias provocadas y el momento en el que fueron detectadas por los alumnos:

- **15:20h** – Parada de la bomba P10B.
- 15:33h – Fallo detectado y Bomba P10A arrancada.
- **17:10h** – Forzado fallo en el posicionador de la FV103.
- 17:20h – Error diagnosticado y trabajando por bypass.
- 17:46h – FV103 reparada por mantenimiento.
- **18:38h** – Forzado fallo en el posicionador de la FV102.
- 18:41h – FV102 aislada y trabajando por bypass.
- 18:45h – FV102 reparada por mantenimiento.
- **19:15h** – Válvula de impulsión del E100 cerrada.
- 19:22h – Problema diagnosticado y válvula abierta.

9. Resultados de la prueba experimental.

Tras la realización de esta primera prueba se analizaron los resultados obtenidos en el desarrollo de la misma.

Como se puede observar, los tiempos entre la generación de un fallo hasta su detección y subsanación, comenzaron siendo bastante elevados, lo que generó graves desajustes en la estabilidad de la planta, obligando a los alumnos restablecer el régimen estacionario de la misma resolviendo los incidentes en cadena que iban surgiendo.

Por este motivo, entre las 15:35h y las 17:10h y entre las 17:45h y las 18:38h no se introdujo ninguna avería por parte del profesor para que el equipo de alumnos fuera capaz de alcanzar la estabilidad de la planta y volver a producir productos dentro de especificación.

Sin embargo, después de éstos primeros incidentes, los operarios se familiarizaron con el sistema y como se deduce de los datos, comenzaron a detectar y subsanar las emergencias con gran celeridad, consiguiendo mantener la planta estable y los productos dentro de especificación a pesar de los incidentes.

Las características de estos incidentes y el proceder que adoptaron los alumnos en el desempeño de sus cargos hasta alcanzar la solución de las emergencias se encuentra de detallado en el Informe que entregaron, que se adjunta como Anexo IV.

10. Conclusiones / Conclusions.

Analizando el trabajo realizado durante la elaboración de este TFG se puede observar que se han alcanzado todos los objetivos marcados al inicio del proyecto.

Se ha conseguido desarrollar un sistema totalmente funcional que simula el funcionamiento de una empresa que opera una Planta Química en continuo, además se ha procurado darle un aspecto con gran realismo, emulando el software comercial que hace de enlace hombre-máquina y que se puede encontrar en cualquier gran industria química.

Esta herramienta será de gran utilidad para que los alumnos tomen conciencia de la organización industrial y de los procedimientos típicos de una Planta Química.

De igual modo, mediante estos ejercicios se ejercita el trabajo en equipo, ya que una buena comunicación y división de tareas es indispensable para la realización de la práctica.

En el sistema hay una serie de “errores” intencionados para darle más realismo y dificultad a la planta. Por ejemplo, la bomba DBP20 no cuenta con otra bomba de reserva, o algunas válvulas trabajan muy abiertas o muy cerradas, impidiendo que se opere a ciertas condiciones. A pesar de esto, este sistema es susceptible a recibir mejoras.

Por último, el sistema es capaz de incorporar nuevas simulaciones que enriquezcan la experiencia formativa. Al estar ya programado el sistema y habiéndose comprobado la funcionalidad del mismo, para generar una nueva Planta, será necesario crear la documentación propia de ésta (la simulación en sí, el manual de operaciones, los esquemáticos, etc.) e incorporarla al sistema mediante la creación de los apartados correspondientes en el Scada, así como la conexión entre éste y el simulador para cada uno de los datos extraídos.

Analyzing the work done during the elaboration of this project, it seems to have achieved all the objectives set at the beginning of the project.

It has managed to develop a fully functional system that simulates the operation of a company that operates a continuous chemical plant; also, it has sought to give a realistic appearance, emulating the commercial software that works as the "man-machine-interface" that can be found in any large chemical industry.

This tool will be useful for students to be aware of the industrial organization and procedures typical of a chemical plant.

In the same way, through these exercises teamwork is put into practice, since good communication and assignation of tasks is essential for the fulfilment of the practice.

In the system there are a number of "errors" intended to give more realism and difficulty level. For example, the pump DBP20 does not have another backup pump, or some valves work very open or very closed, preventing it from operating at certain conditions. Despite this, the system is susceptible to receive improvements.

Finally, the system is susceptible to incorporate new simulations that will enrich the learning experience. Due to the system being already programmed and because it has already proven its functionality, to generate a new plant, it will be necessary to create its own documentation (the simulation itself, the operations manual, schematics, etc.) and incorporate it into the system by the creation of relevant sections in the Scada, as well as the connection between it and the simulator for each of the extracted data.

11. Software necesario.

[UniSim Desing R390.](#)

UniSim Desing es la Suite para simulación en estado no-estacionario usada en este proyecto. En el corre la simulación dinámica del proceso, que es el corazón de cálculo de esta práctica. El simulador dinámico actúa como Planta de Procesos y como Sistema

[UniSim OPC Server.](#)

La comunicación entre la interfaz del Scada y el simulador es gestionada y controlada por este programa. UniSim OPC Server es un programa de Simulación que convierte una simulación escrita en UniSim en un servidor de datos OPC. De esta manera, ScadaBR podrá comunicarse con UniSim.

[ScadaBR.](#)

ScadaBR es una aplicación de Scada basada en Java y de código abierto. Los sistemas Scada (Supervisory Control And Data Acquisition) sirven de interfaz entre un operador y un proceso. Una vez configurados los protocolos de comunicación con la simulación, se pueden crear las distintas interfaces para los operadores desde un navegador.

[Notepad++](#)

Es un potente editor de texto y de código fuente libre con soporte para varios lenguajes de programación. Su uso ha sido necesario para modificar la hoja de estilos Common.css del Scada (Anexo II).

[Microsoft Visio.](#)

Este software de dibujo vectorial fue utilizado para la creación de los esquemáticos del proceso. La elección de este programa se debe a su facilidad de operación y a la gran biblioteca de formas prediseñadas dedicadas a la ingeniería.

[Navegador web.](#)

Herramienta indispensable para el desarrollo de la práctica. El acceso remoto al Scada se realiza a través de un navegador web, preferiblemente Firefox o Chrome, por ser éstos los navegadores para los cuales está optimizado ScadaBR.

[Microsoft Word.](#)

Es el software informático para el procesamiento de textos más conocido. Esta aplicación u otra similar será necesaria para realizar los informes de seguimientos, los test de la Unidad, las propuestas de mejora de procesos, planes de producción, en definitiva, cualquier documento de texto.

[Microsoft Excel.](#)

Al igual que el Word, es la aplicación para hojas de cálculo más conocida. Ésta u otra de similares características será necesaria para realizar los cálculos de proceso, gráficas de mantenimiento, cálculos de planes de producción, etc.

[Skype.](#)

Es un software que permite comunicaciones de texto, voz y vídeo sobre Internet (VoIP). El código y protocolo de Skype permanecen cerrados y son privativos de la aplicación, pero los usuarios interesados pueden descargar gratuitamente la aplicación ejecutable del sitio web oficial.

Para esta práctica, este programa será utilizado para simular una radio de comunicación entre trabajadores. Para ello, simplemente se deberá configurar el micrófono desactivado por defecto y para quitar el silencio se tendrá que pulsar la tecla que el usuario desee configurar, de esta manera, el alumno siempre estará a la escucha y en caso de querer ser oído, deberá mantener presionada dicha tecla.

12. Bibliografía.

AspenTech, (2003) HYSYS 3.2 Tutorials & Applications.

AspenTech, (2005) HYSYS 2004.2 Dynamic Modeling.

Cernitz Galán, René E.: Informe Experiencia Simulación Desbutanizadora. Mayo 2015.

CSS Tutorial, disponible en la URL: <http://www.w3schools.com/css/>

CEPSA. Manual de la unidad CADU2 MAE-16. Refinería de S.C. de Tenerife. Septiembre 2004.

Honeywell, (2010) UniSim Design R400 User Guide.

Macías Hernández, J.J., Feliu, J.A.: Connecting a Dynamic Process Simulator (HYSYS) to a Plant in Real Time via OPC Server and Client Compliance. Design and Performance Case Study.

Macías Hernández, J.J., Feliu, J.A.: Design and Implementation of an OPC Server for connecting a Process Simulator. Septiembre 2002.

Macías Hernández, J.J.: Memoria descriptiva de la práctica de simulación de procesos industriales. Febrero 2001.

ScadaBR 0.7 Sistema Open-Source para Supervisão e Controle, Manual de Software. Octubre de 2010.

13. Figuras

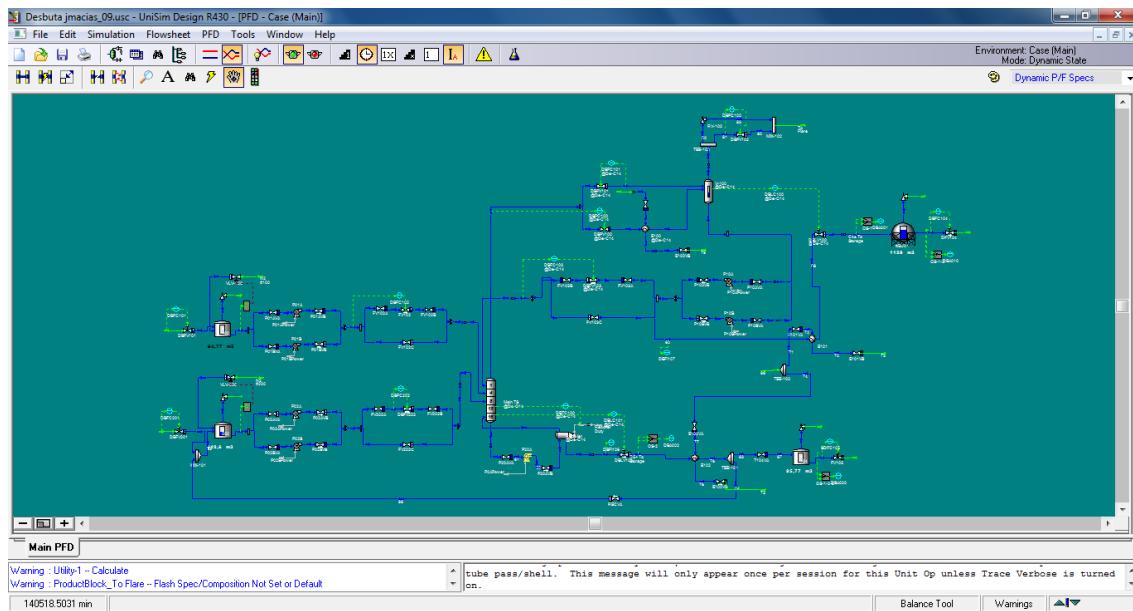


Figura 1. Diagrama de flujo de la Simulación.

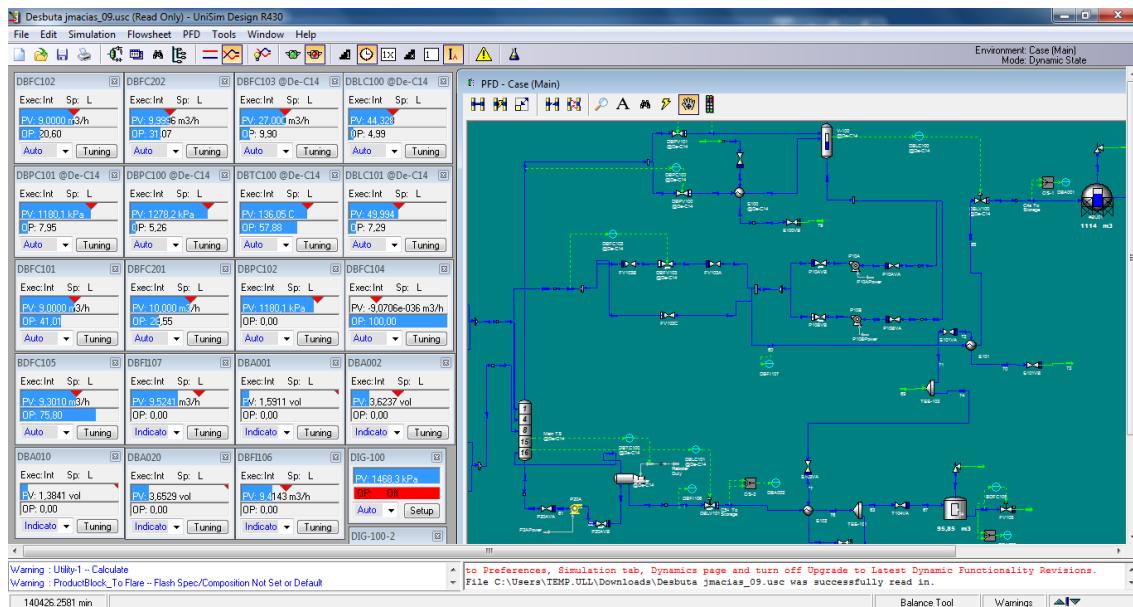


Figura 2. Instrumentación de la Simulación.

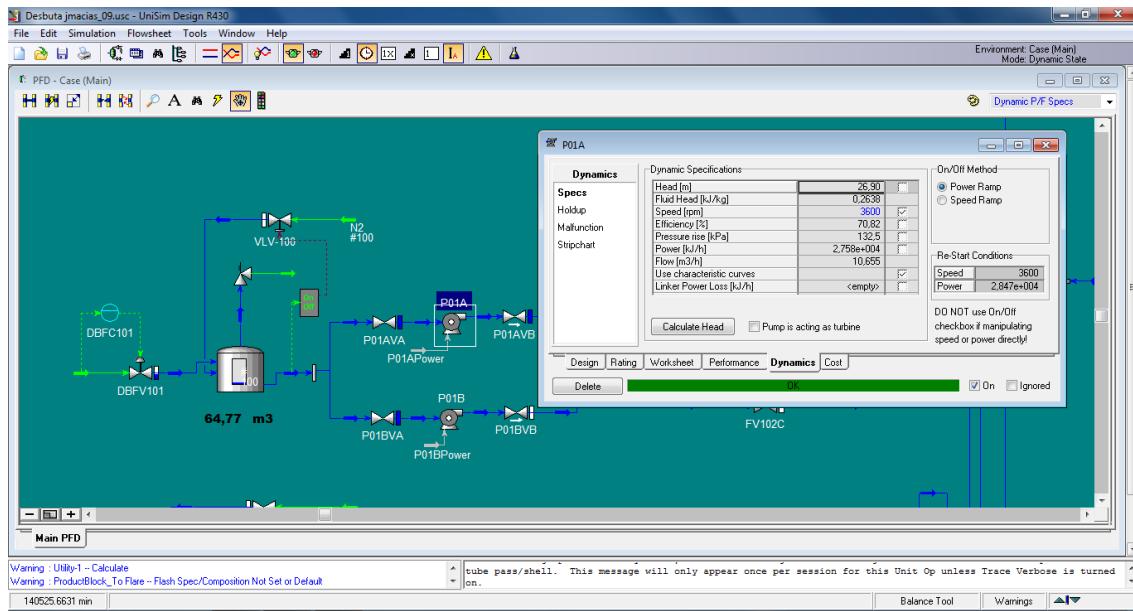


Figura 3. Detalle de la bomba P01A.

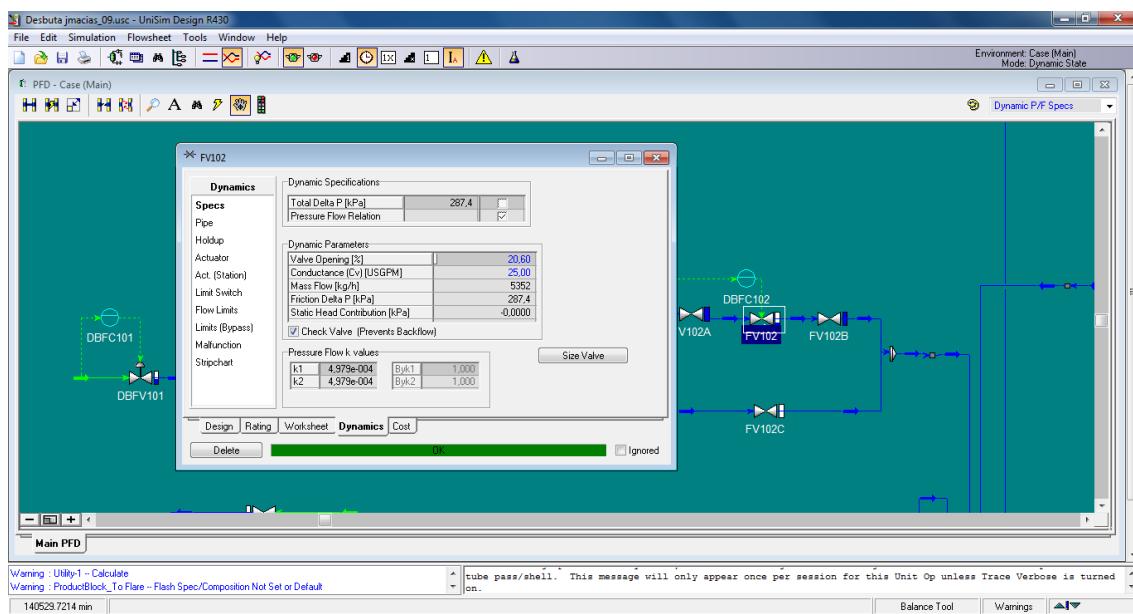


Figura 4. Detalle de la válvula FV102.

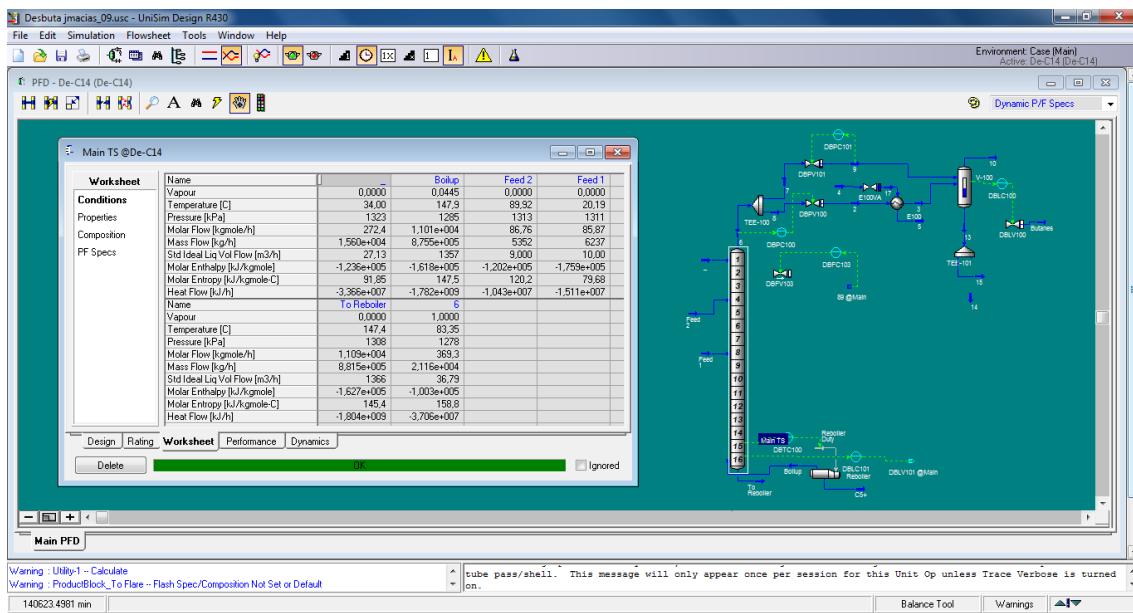


Figura 5. Detalle de la torre.

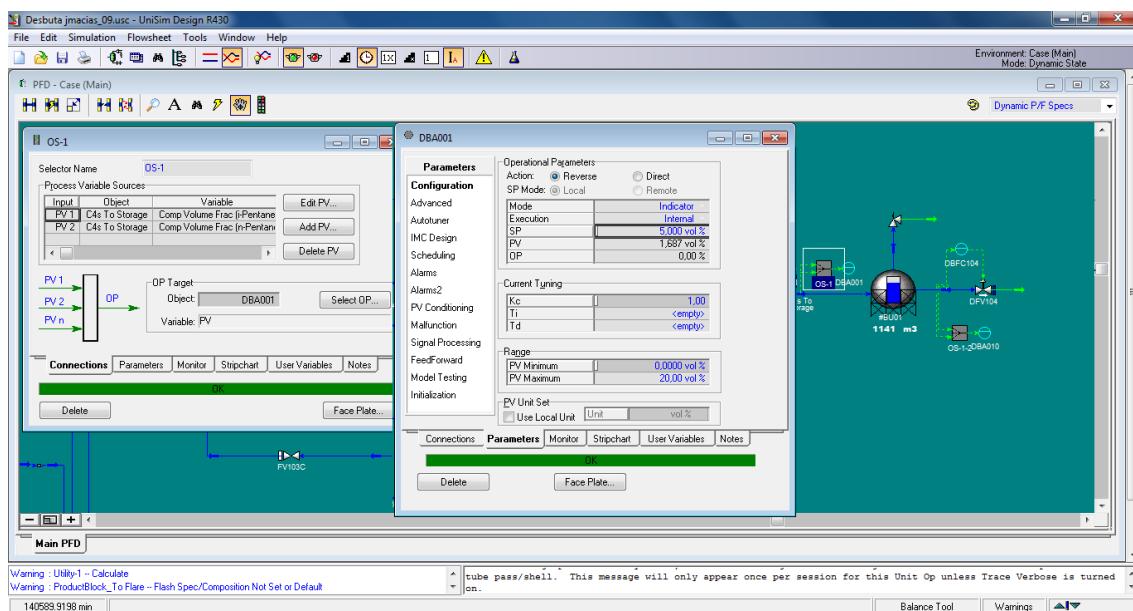


Figura 6. Detalle del analizador DBA001.

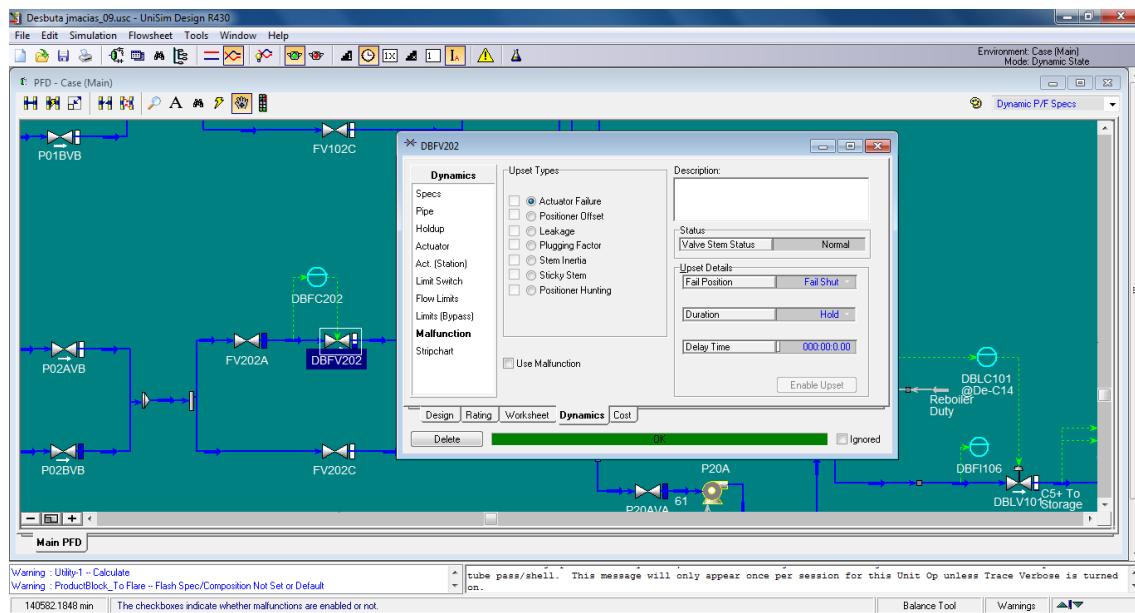


Figura 7. Posibles fallos aplicables a una válvula.

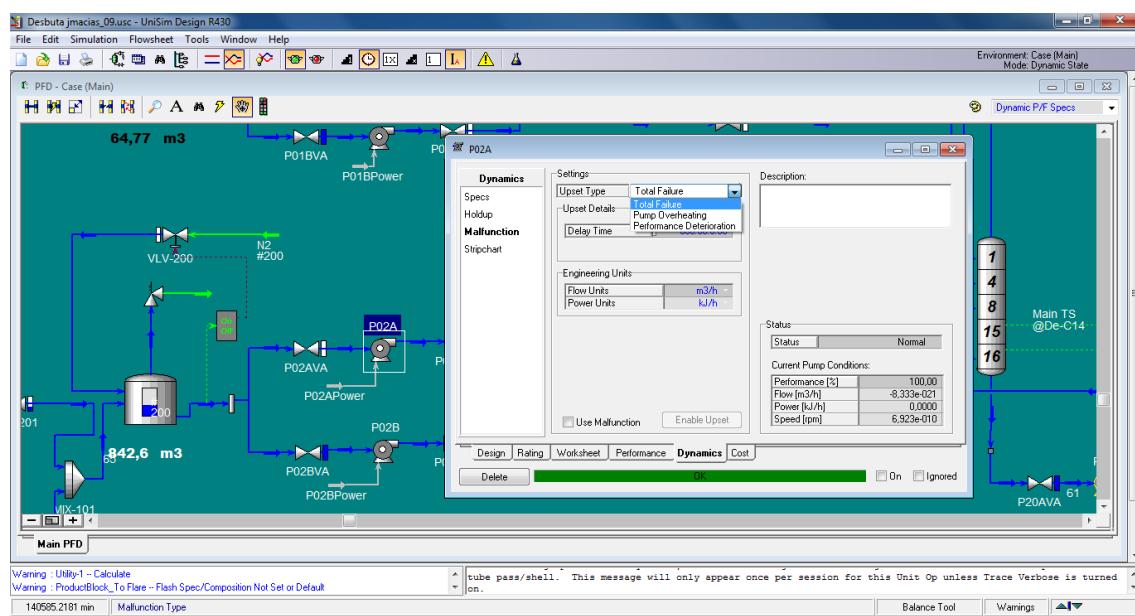


Figura 8. Posibles fallos aplicables a una bomba.

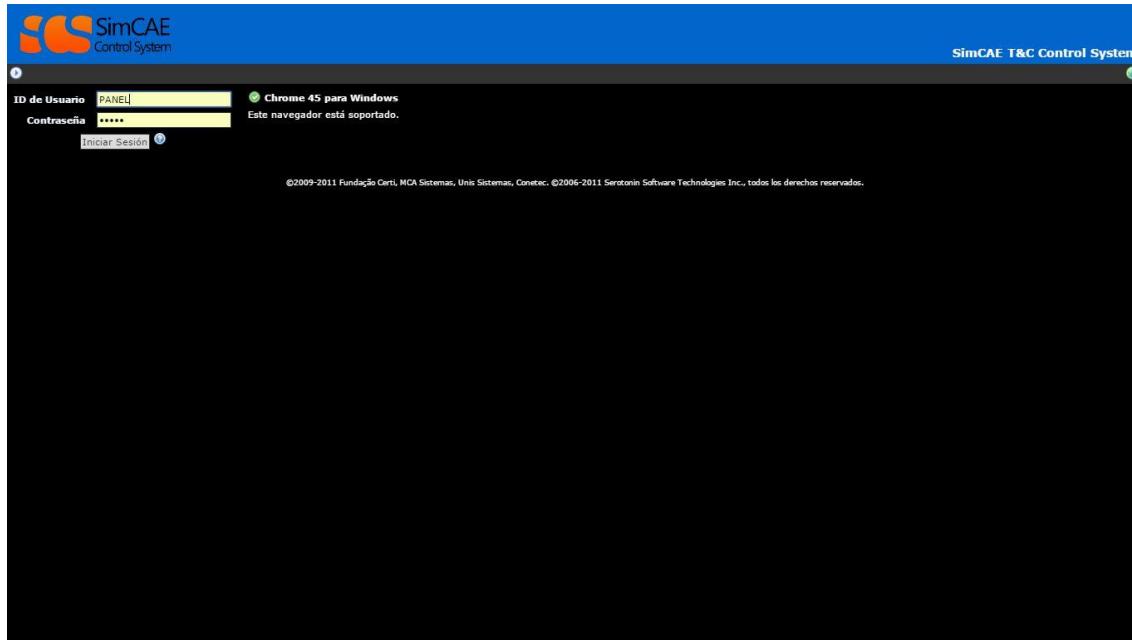


Figura 9. Ventana de ingreso. Usuario de Panel.

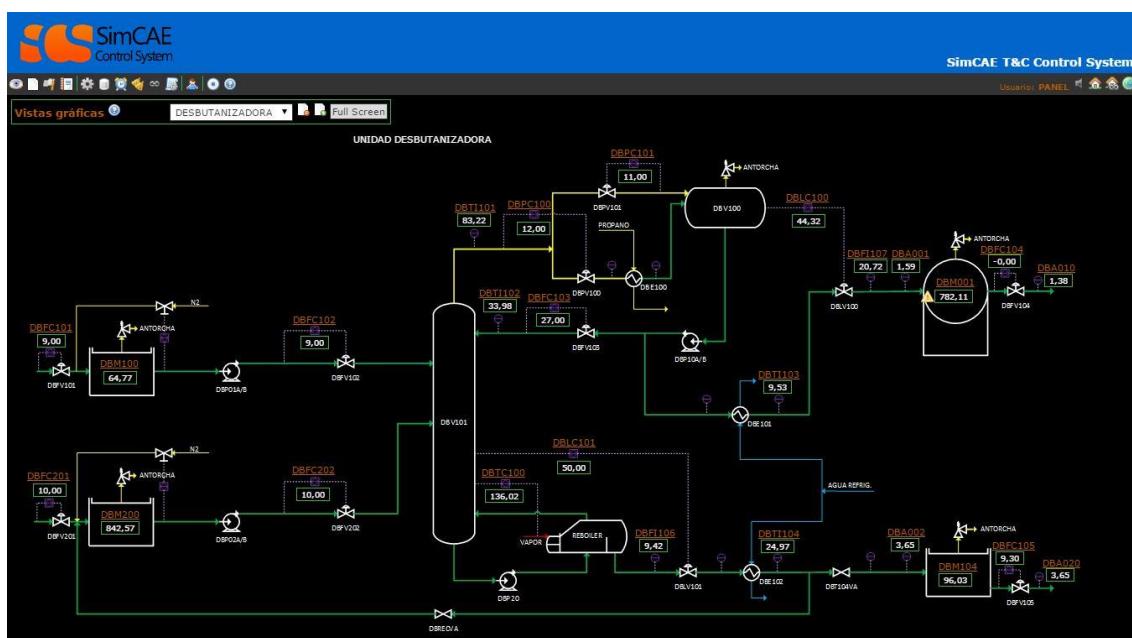


Figura 10. Esquemático principal. Usuario de Panel.

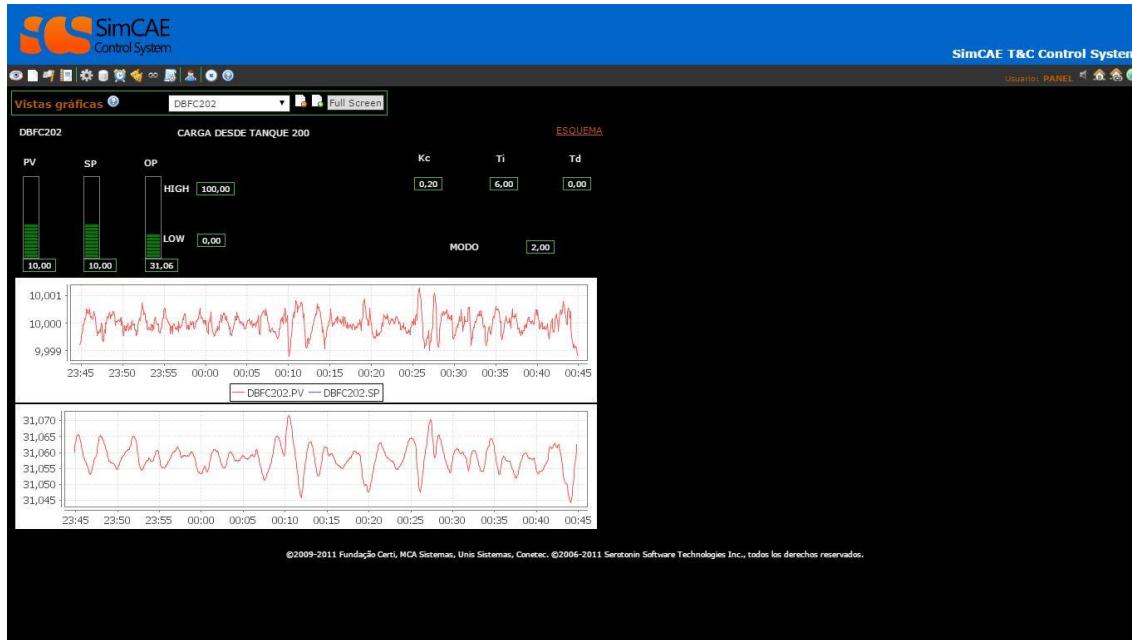


Figura 11. Controlador de la válvula DBFV202. Usuario de Panel.

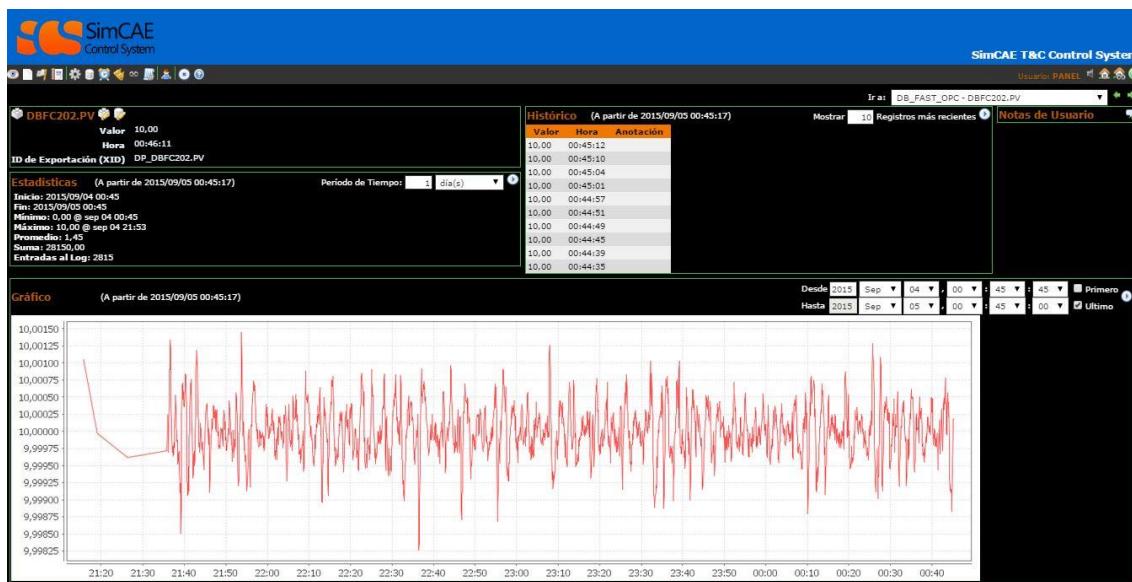


Figura 12. Histórico de DBFV202. Usuario de Panel.

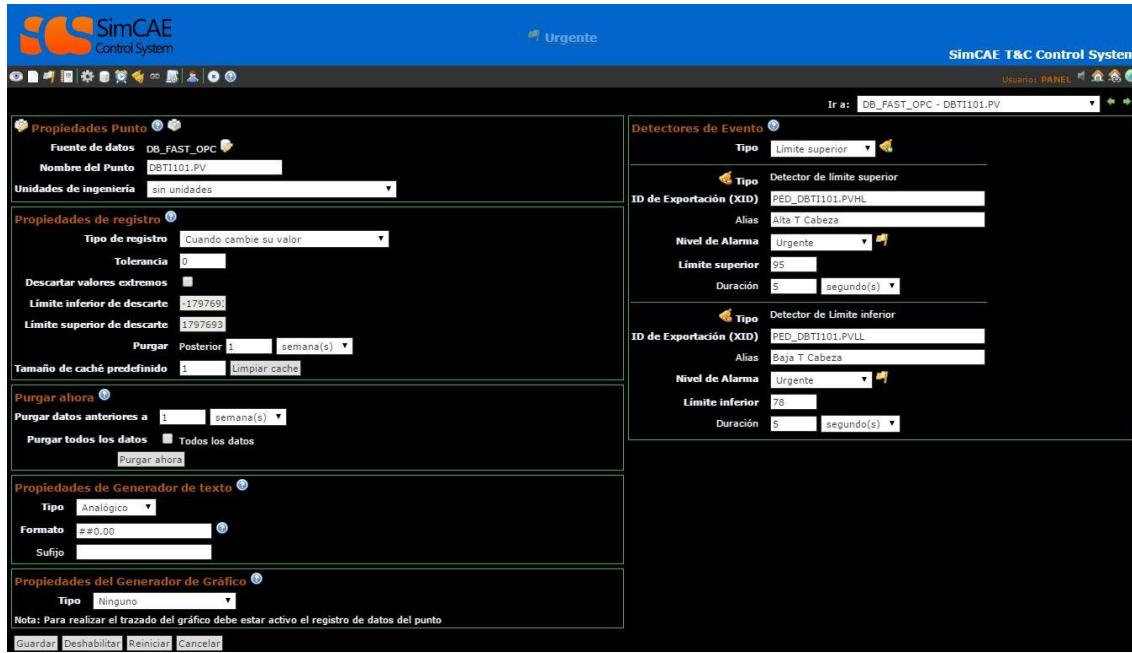


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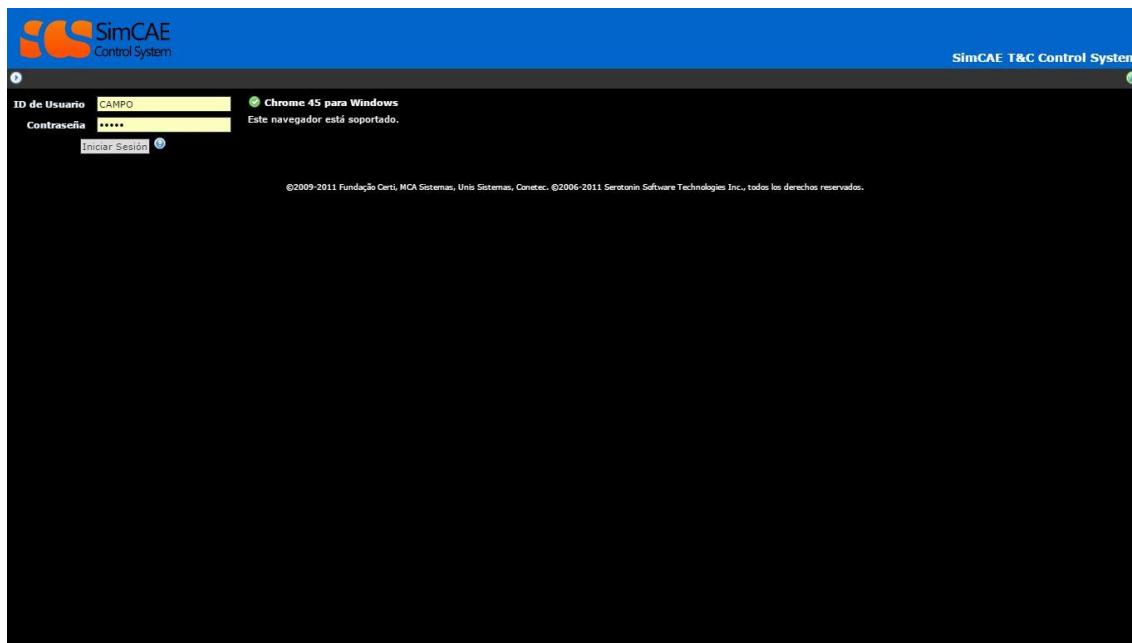


Figura 14. Ventana de ingreso. Usuario de Campo.



Figura 15. Imagen aérea representando la planta simulada. Usuario de Campo.

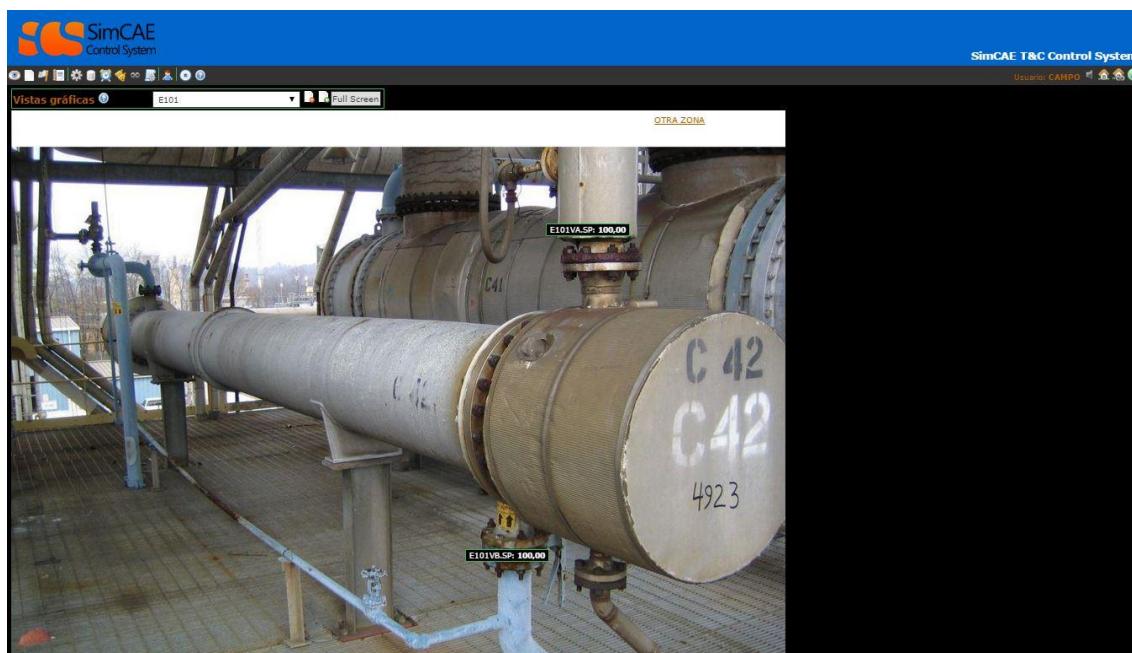


Figura 16. Detalle del intercambiador DBE101. Usuario de Campo.

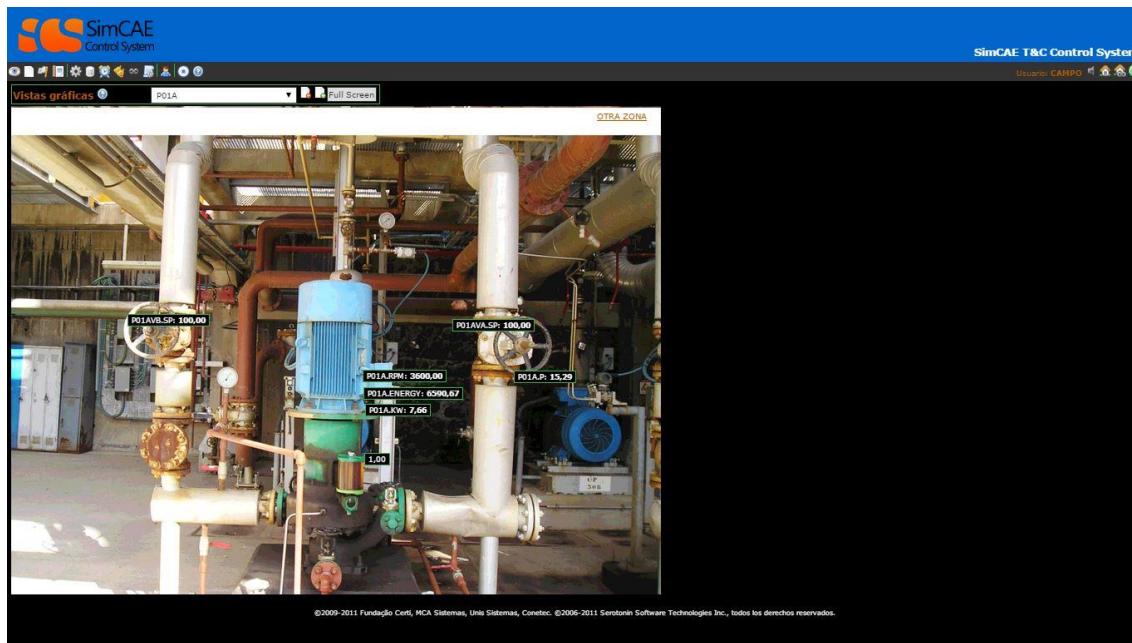


Figura 17. Detalle de la bomba P01A. Usuario de Campo.

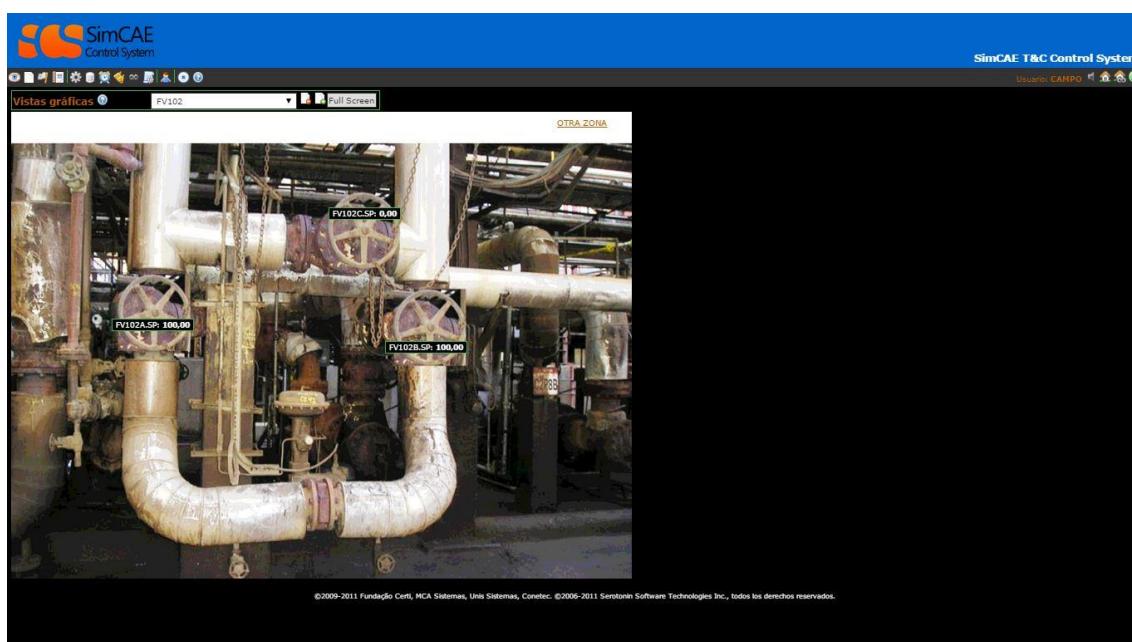


Figura 18. Detalle de la válvula FV102. Usuario de Campo.

14. Anexos

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- Anexo II: Diagrama de equipos e instrumentación.
- Anexo III: Diagrama de la Simulación.
- Anexo IV: Informe de Alumnos, Experiencia Simulación Desbutanizadora.
- Anexo V: Hoja de estilos Common.css.
- Anexo VI: Reporte de la Simulación.

**DESARROLLO E IMPLANTACIÓN DE UN SISTEMA
INFORMÁTICO PARA LA SIMULACIÓN DEL
FUNCIONAMIENTO DE UNA PLANTA QUÍMICA EN
CONTINUO MEDIANTE INTERPRETACIÓN DE ROLES.**

**ANEXO I: MANUAL DE OPERACIONES DE LA UNIDAD
DESBUTANIZADORA**

Grado en Ingeniería Química Industrial

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Tutor: José Juan Macías Hernández

La Laguna, 7 de Septiembre de 2015

Manual de la unidad

DESBUTANIZADORA

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Capítulo I – INTRODUCCIÓN TEÓRICA

1.1 LAS NAFTAS

Las naftas son compuestos derivados del refino de petróleo formados por hidrocarburos desde tres átomos de carbono hasta once.

Usualmente las naftas se diferencian en dos tipos principales;

- Las Naftas ligeras, con un punto de ebullición inicial de 30°C y un punto de ebullición final aproximado de 145°C. Éstas están formadas principalmente por hidrocarburos de menos de seis átomos de carbono.
- Las Naftas pesadas, con un punto de ebullición inicial aproximado de 145°C y un punto de ebullición final de unos 200°C. Éstas están formadas principalmente por hidrocarburos de entre seis y once átomos de carbono.

Esta unidad está diseñada para trabajar con naftas desde ligeras hasta intermedias. En concreto, las corrientes de entrada a la planta tienen compuestos entre tres y ocho átomos de carbono.

1.2 ESTABILIZACIÓN DE LAS NAFTAS

A nivel industrial, los procesos de destilación se llevan a cabo en columnas en las que se establece un flujo bifásico en contracorriente, produciéndose sucesivos equilibrios líquido-vapor en las distintas etapas de contacto (platos) de la torre. Para ello, se cuenta con un reflujo en la cabeza de la torre que condensa los vapores para retornar parte de ellos a la torre.

Para estabilizar la nafta es necesario separarla de los hidrocarburos con un número de átomos de carbono inferiores a cuatro, los LPG (del inglés Liquefied Petroleum Gas). Esto se consigue mediante un proceso de destilación bajo presión.

Para alcanzar las especificaciones de calidad requeridas se dispone principalmente de tres variables a tener en cuenta

1.2.1 Efectos de la temperatura

En el caso de los hidrocarburos, se observa que al aumentar su peso molecular, menor es su presión de vapor y, por tanto, menor será su tendencia a evaporarse a una determinada temperatura. La presión de vapor es una función creciente con la temperatura y propia de cada líquido puro.

Por ello, un aumento de la temperatura consigue un aumento de la presión de vapor de todos los componentes, haciendo que componentes más pesados vaporicen en mayor cantidad y viceversa.

1.2.2 Efectos de la presión

Los efectos de la presión vienen directamente relacionados con el caso anterior.

La presión de vapor de un líquido mide la tendencia de las moléculas que lo componen a evaporarse para formar una fase gaseosa en equilibrio. Cuando se alcanza este equilibrio, el número de moléculas de líquido que vaporizan es igual al número de moléculas que condensa. Por esto, un aumento de la presión conlleva una mayor diferencia con las presiones de vapor de los componentes haciendo que menor cantidad de los compuestos más pesados vaporicen. En el caso de una disminución de la presión, se obtendría el efecto contrario.

1.2.3 Efectos del caudal de reflujo

Un mayor caudal de reflujo produce una mejor separación de los componentes a cambio de un aumento en el consumo de energía y el consiguiente aumento en el gasto económico. De este modo, aumentando el caudal de reflujo se consigue que menos cantidad de hidrocarburos pesados salgan por cabeza y que menos cantidad de los ligeros, salgan por el fondo.

Capítulo II – DESCRIPCIÓN DEL PROCESO

2.1 INTRODUCCIÓN

La Desbutanizadora es la unidad encargada de separar el LPG del resto de los componentes de la nafta para estabilizarla.

Su función es separar los distintos componentes de la corriente de entrada en cortes o fracciones por medio de un proceso de destilación. Los cortes que se obtienen para las corrientes dadas que se tratarán son: **LPG (Propano, i-butano, n-butano, i-buteno) y Nafta estabilizada (i-pentano, n-pentano, n-hexano, n-heptano y n-octano)** La proporción relativa de los mismos será función de la relación entre ambas corrientes de carga a la unidad así como de las condiciones de operación.

Para el seguimiento de la descripción del proceso, ver Anexo II.

2.2 ENTRADA A LA TORRE

Existen dos líneas de carga a la unidad, denominadas Feed 1 y Feed 2 procedentes de los tanques DBT100 y DBT200 respectivamente. La corriente Feed 1 corresponde a una carga de nafta ligera mientras que la Feed 2 a nafta intermedia. La presión de ambos depósitos se mantiene constante con una automática que en caso de una disminución de presión abre una válvula de inyección de nitrógeno. En el caso de sobrepresión la válvula de escape a antorcha se abrirá hasta alcanzar la presión adecuada.

De la impulsión desde los depósitos hacia la torre de destilación se encargan las bombas DBP01A/B para DBT100 y DBP02A/B para DBT200.

Cabe la posibilidad de recibir nafta en la torre por ambas líneas al mismo tiempo. Las proporciones se controlan por medio de las automáticas gobernadas por los medidores de caudal DBFC102 (Feed 1) y DBFC202 (Feed 2).

La corriente Feed 1 entra a la torre por el plato 4 y la corriente Feed 2 lo hace por el plato 8 empezando a contar desde la cabeza de la torre, siendo el plato 16 el último situado en el fondo de la misma.

En la cabeza de la torre (plato 1) se encuentra además de la salida de las fracciones más ligeras, la entrada del reflujo de condensados. Lo mismo ocurre en la base de la torre (plato 16), aquí se encuentra la salida de las fracciones más pesadas y la entrada del producto procedente del Reboiler.

2.3 SALIDA POR CABEZA

La presión de la torre es controlada por la automática DBPV100 mientras que la DBPV101 controla la presión del separador de condensados (DBV100)

Los vapores de cabeza de la torre se enfrián y condensan parcialmente con una corriente de propano líquido a 27°C en el cambiador DBE100. La salida de este intercambiador comunica con la entrada al separador DBV100.

EL LPG condensado se separa de los gases en el botellón de reflujo DBV100 que está provisto de una salida por la parte superior a través de la cual, en caso de sobrepresión se alivian los gases a antorcha. El nivel del botellón es controlado por medio del DBLC100 que gobierna el caudal de sobrante de reflujo a la unidad. Por el fondo del separador salen los condensados impulsados por las DBP10A/B. Parte de esta corriente se recircula a la torre y su caudal es controlado por medio de la automática DBFV103. El resto de la corriente se almacena en la esfera DBBU01 enfriándolo previamente en el intercambiador DBE101 refrigerado por agua a 20°C y analizada su composición mediante el DBA001. El indicador DBFI107 recoge el caudal de LPG enviado a la esfera

2.4 SALIDA POR FONDO

La nafta estabilizada sale por el último plato y es impulsada al reboiler por medio de la bomba DBP20.

El calor que suministra el reboiler está controlado por el DBTC100 que gobierna la temperatura de la torre.

Una salida del reboiler es recirculada a la torre entrando por el mismo plato que salió y en la otra salida se encuentra el DBLC101 que se encarga de controlar el nivel de la torre regulando el caudal de nafta estabilizada enviada a tanque por medio de la DBLV101. Antes de ser almacenada en el tanque DBT104, la nafta es enfriada en el intercambiador DBE102 refrigerado por agua a 20°C y analizada su composición en el DBA002, en caso de no cumplir con las especificaciones requeridas, ésta podrá ser recirculada al tanque DBT200. El indicador DBFI106 muestra el caudal de nafta estabilizada que sale del Reboiler en dirección al tanque de almacenamiento correspondiente antes del reciclo, mientras que el DBFI108 está situado después del mismo.

Capítulo III – RELACIÓN DE EQUIPOS

3.1 CAMBIADORES Y REFRIGERANTES

DESIGNACIÓN	CARCASA	TUBOS
DBE100	Propano	Vapores de cabeza
DBE101	Agua de refrigeración	LPG
DBE 102	Agua de refrigeración	Nafta estabilizada

Tabla 1.

3.2 BOMBAS

DESIGNACIÓN	SERVICIO
DBP01A	Carga de nafta a la unidad Feed 1
DBP01B	Carga de nafta a la unidad Feed 1
DBP02A	Carga de nafta a la unidad Feed 2
DBP02B	Carga de nafta a la unidad Feed 2
DBP10A	Reflujo LPG
DBP10B	Reflujo LPG
DBP20	Reboiler

Tabla 2.

3.3 TORRES Y RECIPIENTES

DESIGNACIÓN	SERVICIO
DBV100	Botellón de reflujo
DBV101	Torre de destilación
Reboiler	Reboiler
DBT100	Tanque Feed 1
DBT200	Tanque Feed 2
DBT104	Tanque nafta estabilizada
DBBU01	Esfera LPG

Tabla 3.

3.4 VÁLVULAS AUTOMÁTICAS

DESIGNACIÓN VÁLVULA	DESIGNACIÓN CONTROLADOR	SERVICIO
DBFV101	DBFC101	Carga DBT100
DBFV201	DBFC201	Carga DBT200
DBFV102	DBFC102	Carga de Feed 1 a DBV101
DBFV202	DBFV202	Carga de Feed 2 a DBV101
DBPV100	DBPC100	Presión cabeza DBV101
DBPV101	DBPC101	Presión DBV100
DBFV103	DBFC103	Caudal de reflujo
DBLV100	DBLC100	Nivel de DBV100
DBLV101	DBLC101	Nivel de DBV101
DBTV100	DBTC100	Temperatura fondo DBV101
DBFV104	DBFC104	Salida de DBBU01
DBFV105	DBFC105	Salida de DBT104

Tabla 4.

3.5 VÁLVULAS DE SEGURIDAD

DESIGNACIÓN	UBICACIÓN / SERVICIO	PRESIÓN DE DESCARGA, kg/cm ²
DBRV100	DBT100, Tanque Feed 1	15
DBRV200	DBT200, Tanque Feed 2	15
DBRV101	DBV100, botellón de reflujo	13
DBRVBU01	DBBU01, Esfera LPG	11.5
DBRV104	DBT104, Tanque nafta estabilizada	2

Tabla 5.

3.6 INDICADORES

DESIGNACIÓN	SERVICIO
DBTI101	Temperatura de salida de cabeza de la torre
DBTI102	Temperatura de entrada de reflujo en la torre
DBTI103	Temperatura de LPG después de DBE101
DBTI104	Temperatura Nafta después de DBE102
DBTI105	Temperatura de LPG antes de DBE101
DBTI106	Temperatura de Nafta antes de DBE102
DBTI107	Temperatura LPG antes de DBE100
DBTI108	Temperatura LPG después de DBE100
DBFI106	Caudal salida del Reboiler hacia tanque
DBFI107	Caudal de entrada a DBBU01
DBFI108	Caudal de entrada a DBT104

Tabla 6.

Capítulo IV – OPERACIONES DE PUESTA EN MARCHA

4.1 INTRODUCCIÓN

Este capítulo proporciona indicaciones generales sobre las operaciones de puesta en marcha de la unidad tras parada general; teniendo en cuenta las condiciones particulares de cada parada, las indicaciones proporcionadas serán complementadas y/o modificadas.

4.2 INSPECCIÓN Y COMPROBACIÓN DE PUESTA A PUNTO

Una vez finalicen los trabajos de mantenimiento en la unidad, se procederá a comprobar que:

- Todas las bridas están correctamente abrochadas.
- Que se han retirado las juntas ciegas que se dispusieron durante la parada.
- Todos los instrumentos de control están dispuestos en sus puntos de anclaje, comprobando que las automáticas están correctamente instaladas.
- La unidad está limpia y sin obstáculos que entorpezcan las maniobras de puesta en marcha.
- Se dispone de agua de refrigeración, aire de instrumentación, electricidad y vapor.
- Los transmisores y analizadores que puedan dañarse durante la vaporización se encuentran bloqueados o aislados.
- Están bloqueadas las salidas a tanques y a la red de fábrica.

4.3 VAPORIZACIÓN

Una vez finalizados los trabajos de mantenimiento y cuando haya terminado la inspección de puesta a punto, se procederá a la vaporización de la unidad, abriendo los venteos y puntos de drenaje de los circuitos y recipientes afectados.

Se comenzará a vaporizar los circuitos de la unidad desde las automáticas y bombas de carga, asegurándose de drenar el condensado. El comienzo de vaporización debe ser gradual, con el fin de evitar golpes de ariete.

Se vaporizará el Reboiler, desalojando todo el condensado por las purgas de las salidas.

El avance de la vaporización se controlará por medio de los indicadores de temperatura y de presión; también mediante la observación de los puntos de venteo y drenaje, así como de la temperatura exterior de los recipientes.

La torre también se vaporizará desde la línea de reflujo y por el fondo.

Desde las impulsiones de las bombas, se vaporizarán los circuitos hasta las automáticas de salida de los productos, teniendo la precaución de tener abiertas las purgas al final de estas líneas al tiempo que se mantienen cerradas las salidas a tanques para evitar el paso de vapor a los mismos.

En el resto de puntos que se precise, se acoplarán mangueras de vapor.

La vaporización durará entre 3 y 4 horas, comprobándose que tras este periodo se ha desalojado el aire de los circuitos de la unidad.

Una vez finalizada la vaporización, se cerrarán la mayoría de las purgas, dejando salir vapor por las que queden abiertas durante, al menos, media hora.

4.4 CARGA DE LA UNIDAD CON GAS

Una vez finalizadas las maniobras de vaporización, comenzará la carga de la unidad con gas. Antes de proceder a la misma, se comprobará el correcto funcionamiento de los indicadores de presión de cabeza de las torres y los botellones de reflujo.

Se cerrarán todas las purgas y venteos de los circuitos y equipos. Se comprobará que los circuitos mantienen presión positiva; de no ser así, se abrirá ligeramente la inyección de vapor, con el fin de mantener la presión.

A continuación se procederá a la gasificación de los circuitos, comprobando que la válvula general de entrada de gas a la unidad se encuentra desbloqueada. Se abrirán las inyecciones de gas al fondo de la torre (por el nivel de fondo), controlando la presión de la red de fábrica.

Al cabo de quince minutos, se cerrará la descarga a la antorcha del DBV100 y se comenzarán a estrangular las inyecciones de vapor que se dejaron abiertas en función de la presión del recipiente, que debe mantener presión positiva, pero nunca superior a la red de gas de fábrica. Si durante la maniobra de gasificación se produjera un descenso de presión, se compensará por medio de las inyecciones de vapor.

Cuando la presión de la torre principal, con todas las inyecciones de vapor cerradas, alcance los $0,5 \text{ kg/cm}^2$, se cerrarán las inyecciones de gas.

4.5 CIRCULACIÓN DE LA UNIDAD

Finalizada la carga de los circuitos con gas, se procederá a comprobar que se han purgado correctamente los puntos bajos de la torre y recipientes, así como que la instrumentación se encuentra en servicio.

4.5.1 Carga con nafta

Una vez se comprueba que los tanques se encuentran preparados, se procederá a cargar la unidad con la corriente Feed 2 por ser ésta la nafta más pesada. Para ello se pondrá en servicio la bomba de carga del tanque DBT200 (DBP02A/B) con la válvula de aspiración abierta y la de impulsión cerrada hasta alcanzar la velocidad de rotación necesaria (3600 rpm). Una vez arrancada correctamente la bomba, se procederá a abrir gradualmente la válvula de impulsión de la misma a la vez que mediante el DBFC202 se comienza a abrir la DBFV202 hasta alcanzar el 50% del nivel de fondo de la torre. Una vez alcanzado éste nivel, se mantendrá un caudal de flujo bajo en circulación.

4.5.2 Circulación caliente

Tras alcanzar el nivel de fondo de la torre, se arrancarán la bomba del Reboiler DBP20 y se encenderá el Reboiler activando la automática DBTIC100. Todo el caudal de nafta sobrante será recirculado al tanque DBT200 mientras se encuentre fuera de especificación.

Cuando se alcance la presión de operación en la torre (12 kg/cm²), se comenzará a poner en marcha el reflujo. Para ello, primero se debe comprobar que el refrigerante esté circulando por el intercambiador DBE100 antes de activar las automáticas DBPV100 y DBPV101.

Cuando se alcance el nivel requerido en el botellón (50%) se comenzará a operar el reflujo poniendo en marcha una de las bombas DBP10A/B de la misma manera que en el caso anterior, para ello también se debe activar la automática DBFV103.

4.6 OPERACIONES FINALES DE PUESTA EN MARCHA

Se continuará subiendo la temperatura de salida del Reboiler hasta alcanzar el valor de consigna fijado, una vez alcanzada la presión y temperatura de operación de la torre se procederá a alimentar la misma con la corriente Feed 1 junto con la Feed 2 que ya estaba circulando. Una vez que los productos estén de acuerdo a especificación, se comenzará

a enviarlos a los tanques asignados a medida que se va cerrando el reciclo hacia el tanque DBT200.

Capítulo V – PARADA GENERAL DE LA UNIDAD

5.1 INTRODUCCIÓN

Este capítulo proporciona indicaciones generales sobre la parada de la unidad para mantenimiento; según las condiciones particulares de cada parada, las indicaciones proporcionadas serán complementadas y/o modificadas.

5.2 PARADA GENERAL DE LA UNIDAD

A modo orientativo, se recogen algunas de las principales maniobras y recomendaciones a realizar para la parada de la unidad:

- Antes de comenzar las maniobras de parada, se solicitará que se dispongan los correspondientes servicios contra incendios.
- Comunicar la maniobra de parada al Jefe de Operaciones para que tome las medidas oportunas.
- Se cortará la entrada de calor al Reboiler manteniendo todos los intercambiadores en funcionamiento.
- Se pararán las bombas de carga y se cerrarán las válvulas de impulsión para evitar fugas.
- Desde que se observe que los productos dejen de estar dentro de especificación, se enviará todo el contenido de la unidad al tanque DBT200 a través del reciclo dispuesto para este fin.

- Una vez se vacíe el botellón de reflujo se parará la bomba aparejada.
- La bomba DBP20 seguirá en funcionamiento mientras quede producto en la torre.
- A medida que la instalación se vaya vaciando, se podrá proceder a cerrar la entrada de refrigerante en los intercambiadores que se hayan quedado sin carga de producto.
- Tras vaciar completamente la instalación de hidrocarburos, comenzar el lavado de la unidad con agua.
- Comenzar las maniobras para la vaporización de los circuitos de la unidad con el fin de dejar la unidad en condiciones de seguridad para su inspección y/o mantenimiento.
- Finalizado el lavado con agua, proceder con la vaporización. Por lo general la vaporización de la unidad dura 12 horas. Si se precisara realizar trabajos en el interior de torres o botellones, una vez aislados, serán nuevamente vaporizados durante 24 horas más.
- Una vez finalizada la vaporización, se procederá al aislamiento de circuitos con juntas ciegas.

Capítulo VI – OPERACIONES BÁSICAS DE MANTENIMIENTO

6.1 PARADA DE UNA BOMBA EN MAL FUNCIONAMIENTO

Para proceder a parar una bomba primero se debe arrancar la bomba de reserva con la impulsión cerrada y aspiración abierta hasta que alcance las revoluciones de operación (3600 rpm). Cuando se alcance esta velocidad de rotación, se comenzará a abrir la impulsión gradualmente a medida que se va cerrando la impulsión de la bomba que se desea parar. Una vez abierta completamente la impulsión de la bomba de reserva y cerrado la impulsión de la bomba a parar, se procederá a desconectar esta bomba, aislarla cerrando la aspiración y finalmente se podrá proceder a la reparación o sustitución de la misma.

En el caso de la bomba DBP20, para poder proceder a su reparación o sustitución se deberá parar la planta ya que no se dispone de bomba de reserva.

6.2 AISLAMIENTO DE UNA AUTOMÁTICA EN MAL FUNCIONAMIENTO

En el caso de que una Válvula automática esté funcionando de manera errónea y sea necesario su reparación o sustitución, se deberá aislar la misma, para ello se procederá abriendo gradualmente el bypass a medida que se va cerrando la automática hasta controlar el caudal completamente con la válvula manual y cerrar la automática. Una vez hecho esto se aislará cerrando las válvulas que se encuentran antes y después de la automática y se podrá proceder a las tareas de mantenimiento en la misma.

En el caso de las automáticas que no están provistas de bypass (DBPV100, DBPV101, DBLV100 y DBLV101) se deberá parar la planta para proceder a tareas de mantenimiento en ellas o aislar la zona a trabajar en los casos en los que sea posible asegurando que no circula producto a través de ella.

Capítulo VII – EMERGENCIAS

7.1 INTRODUCCIÓN

En caso de producirse una situación de emergencia, una vez determinadas las causas, se llevarán a cabo las maniobras y cambios necesarios para posibilitar una operación segura de la unidad y, si fuera preciso, pararla.

Si hubiera que parar la unidad, las primeras maniobras que se deben realizar son las de apagado del Reboiler y corte de la carga a la unidad.

En caso de emergencia probablemente descarguen algunas de las válvulas de seguridad de la unidad a antorcha.

7.2 EMERGENCIAS

A continuación se enumeran algunas de las situaciones de emergencia que pueden surgir así como las recomendaciones para solventarlas.

7.2.1 Fallo total de corriente

En caso de fallo de corriente se tendrá que:

- Los amperajes de las bombas marcarán cero.
- Se producirá una descarga a la antorcha.

Las consecuencias de un fallo de corriente son:

- Parada de todos los equipos y servicios de accionamiento eléctrico.

Las operaciones a realizar son:

- En el Reboiler: Cortar el suministro de calor al reboiler por medio del DBTC100.
- En el resto de la unidad: Bloquear las impulsiones de todas las bombas, para evitar retrocesos de producto. Bloquear las salidas de productos a tanques y a otras unidades.

7.2.2 Fallo de agua de refrigeración

En caso de fallo del agua de refrigeración se tendrá que:

- Aumentará la temperatura de la nafta estabilizada y del LPG a tanques.

Las operaciones a realizar son:

- Proceder a la parada de la unidad en caso de no poder recuperar el caudal de refrigerante inmediatamente.

7.2.3 Fallo de la corriente de propano para refrigeración

En caso de fallo del propano de refrigeración se tendrá que:

- El intercambiador DBE100 dejará de estar operativo.
- Se vaciará el nivel del botellón de reflujo DBV100 (DBLC100)
- Cavitarán las bombas DBP10A/B
- Disminuirá el caudal de reflujo a la cabeza de la torre principal (DBFC103).
- Se producirá una rápida subida de temperatura en la torre (DBTC100).

Las operaciones a realizar son:

- Bajar la marcha del reboiler hasta que el intercambiador DBE100 vuelva a estar operativo.
- Bajar la marcha de la unidad disminuyendo el caudal de entrada de nafta a la torre.
- Poner la unidad a recircular hacia el tanque DBT200.
- Cerrar el caudal de salida de LPG para controlar el nivel del botellón de reflujo DBV100.
- En caso de no recuperar la corriente de refrigeración, proceder a la parada de la unidad de acuerdo con el procedimiento establecido.

7.2.4 Fallo total de las bombas de reflujo de la torre

En caso de fallo total de las bombas de reflujo se tendrá que:

- Disminuirá el caudal de reflujo a la cabeza de la torre principal (DBFC103).
- Se producirá una rápida subida de temperatura en la torre (DBTC100).
- Bajarán la presión de los manómetros de impulsión de las DBP10A/B.
- Bajarán los amperajes de las DBP10A/B.
- Subirá el nivel del botellón de reflujo DBV100 (DBLC100).

Las operaciones a realizar son:

- Apagar el reboiler hasta que se consiga volver a arrancar alguna de las DBP10A/B.
- Bajar la marcha disminuyendo el caudal de entrada de nafta a la torre.
- Poner la unidad a recircular hacia el tanque DBT200.
- Aumentar el caudal de salida de LPG para controlar el nivel del botellón de reflujo DBV100.

- En caso de no poder volver a arrancar las DBP10A/B, proceder a la parada de la unidad de acuerdo con el procedimiento establecido.

7.2.5 Fallo de carga a la unidad

Esta emergencia se puede producir por la propia carga a la unidad o bien por fallo de las bombas de carga o de las automáticas. Se tendrá que:

- Baja el nivel (DBLC101) de fondo de la torre.
- Los manómetros de impulsión de las bombas bajarán.
- En caso de fallo de las bombas de carga, los amperajes de las bombas bajarán.

Objetivo de las operaciones a realizar:

Si el fallo en carga estuviera motivado por una avería en la bomba de carga en servicio, debe tratarse de arrancar, lo más rápido posible, la bomba de reserva. En caso de no poder ponerse en servicio la bomba de reserva se procedería a apagar el Reboiler y dejar la unidad recirculando.

Las operaciones a realizar son:

- En caso de fallo de alguna de las bombas de carga, intentar arrancar la bomba de reserva. De no ser posible, proceder a parada de la unidad.
- En caso de fallo de las automáticas de carga (DBFV102 y DBFV202), proceder a abrir el bypass correspondiente (DBFV102C y DBFV202C) y controlar el caudal de entrada con éste hasta la reparación o sustitución de la válvula causante del error.

7.2.6 Fallo total de la bomba de fondo (DBP20) de la torre

En caso de fallo total de la bomba de fondo de la torre principal se tendrá que:

- Se producirá una rápida subida del nivel de fondo de la torre (DBLC101).
- Bajará el caudal de salida de nafta estabilizada.
- Se observará una caída en la presión que marca el manómetro de impulsión de la bomba.
- El amperímetro de la bomba marcarán cero.

Objetivo de las maniobras a realizar:

Apagar el reboiler, cortar la carga a la torre y evitar el envío de productos fuera de especificación a tanques. En caso de no poder arrancar la bomba, proceder a parada de la unidad.

Las operaciones a realizar son:

- Proceder al apagado del Reboiler.
- Parar las bombas de carga a la unidad y cerrar las válvulas correspondientes.
- Desviar los productos al tanque DBT200.
- Proceder a la parada de la unidad según protocolo establecido.

7.2.7 Fallo total de aire de instrumentos a la unidad

En caso de fallo de aire de instrumentación a la unidad se tendrá que:

- Bajará la presión de aire de instrumentación.
- Las automáticas comenzarán a abrir o cerrar.

Las operaciones a realizar son:

- Si no se puede restablecer el aire de instrumentos a la unidad, proceder a parada de acuerdo con el protocolo establecido.

7.2.8 Fallo de vapor a la unidad

En caso de que se produzca un fallo en el aporte de vapor a la unidad, se tendrá que:

- El Reboiler dejará de calentar.
- Comenzará a disminuir la temperatura de la torre (DBTC100).
- Bajará la presión en cabeza de la torre (DBPC100).
- Se perderá el nivel del botellón de reflujo.
- La nafta saldrá de especificación al no poderse separar las fracciones más ligeras.

Las operaciones a realizar son:

- Si no fuera posible restablecer las condiciones operativas, poner la unidad en recirculación y, en caso necesario, proceder a la parada de la unidad.

Capítulo VIII – ANÁLISIS Y CONTROL DE PRODUCTOS

8.1 INTRODUCCIÓN

Para el control del proceso y para asegurar la calidad de los productos, se dispone de analizadores en línea.

8.2 RELACIÓN DE PUNTOS DE MUESTREO

PUNTO DE MUESTREO	DESCRIPCIÓN
DBA001	% de C5s en LPG a DBBU01
DBA002	% de C4s en Nafta a DBT104
DBA010	% de C5s en DBBU01
DBA020	% de C4s en DBT104

Tabla 7.

8.3 ANALIZADORES EN LÍNEA Y MEDIDAS A TOMAR

En la unidad se dispone de cuatro analizadores en línea que permiten un seguimiento y control en continuo.

- DBA001: Indica la proporción de pentanos en el sobrante de reflujo de LPG antes de ser almacenado. En el caso de que se quiera disminuir se actuará en la torre; aumentando el reflujo de cabeza, bajando la temperatura del fondo de la torre o aumentando la presión. En caso contrario, se actuará sobre los mencionados parámetros a la inversa.

- DBA002: Indica la proporción de butanos en la corriente de nafta estabilizada antes de ser almacenada. Si se precisa reducir el porcentaje, se aumentará la temperatura de la estabilizadora o bien se reducirá la presión de la torre. En caso contrario, actuar a la inversa.
- DBA010: Indica la proporción de pentanos en el LPG almacenado. En el caso de que se quiera disminuir se actuará de igual manera que en el caso del DBA001, hasta conseguir un porcentaje de pentanos lo suficientemente bajo para que diluya el LPG fuera de especificación.
- DBA002: Indica la proporción de butanos en la nafta estabilizada almacenada. Si se precisa reducir el porcentaje, se actuará de igual manera que en el caso del DBA002, hasta conseguir un porcentaje de butanos lo suficientemente bajo para que diluya la Nafta fuera de especificación.

Las proporciones admitidas por debajo de las cuales los productos se considerarán dentro de especificación están fijadas en un 5% para ambas corrientes. (Por debajo de un 5% en volumen de pentanos en la corriente de LPG y por debajo de un 5% en volumen de butanos en la corriente de nafta estabilizada.

Capítulo IX – CONDICIONES DE OPERACIÓN

9.1 INTRODUCCIÓN

Las condiciones de operación de la unidad están supeditadas, en gran medida, a la proporción entre las naftas y la cantidad de las mismas que se procese.

Para una relación de caudales volumétricos Feed 1 / Feed 2 de 0.9 y un caudal total de carga de 19 m³/h se obtienen los siguientes parámetros de operación más significativos:

- Marcha promedio: 450 m³/día
- Torre principal:
 - Temperatura de fondo: 146.7°C
 - Temperatura de cabeza: 83.23°C
 - Presión de cabeza: 12 kg/cm²

9.2 VARIABLES CRÍTICAS

A continuación se relacionan, desde el punto de vista de la calidad y seguridad, los valores de operación de las variables críticas fijados para las especificaciones de fabricación antes mencionadas.

9.2.1 Presión de impulsión de las bombas de carga

DBP01A/B: 1.35 kg/cm²

DBP02A/B: 1.69 kg/cm²

9.2.2 Presión de impulsión de las bombas de reflujo

DBP10A/B: 5.65 kg/cm²

9.2.3 Presión de impulsión de la bomba de fondo

DBP20: 0.37 kg/cm²

9.2.4 Set Point del controlador de temperatura de la torre

DBTC100: 137.5°C

9.2.5 Set Point del controlador de nivel de la torre

DBLC101: 50%

9.2.6 Set Point de los controladores de las automáticas de carga

DBFC102: 9.0 m³/h

DBFC202: 10.0 m³/h

9.2.7 Set Point del controlador de presión de la torre

DBPC100: 12 kg/cm²

9.2.8 Set Point del controlador de presión del botellón de reflujo

DBPC101: 11 kg/cm²

9.2.10 Set Point del controlador de nivel del botellón de reflujo

DBLC100: 50%

9.2.11 Set Point del controlador de caudal de reflujo

DBFC103: 27 m³/h

9.3 RESTO DE VARIABLES

Toda la información complementaria se encuentra recogida en el Anexo V.

Seguidamente se relacionan los equipos principales con la página del anexo en la que se encuentran.

9.3.1 Cambiadore s y refrigerantes.

DESIGNACIÓN	Página en Anexo V
DBE100	156
DBE101	136
DBE 102	138

Tabla 8.

9.3.2 Bombas

DESIGNACIÓN	Página en Anexo V
DBP01A	73
DBP01B	75
DBP02A	77
DBP02B	78
DBP10A	71
DBP10B	70
DBP20	68

Tabla 9.

9.3.3 Torres y recipientes.

DESIGNACIÓN	Página en Anexo V
DBV100	163
DBV101	161
Reboiler	140
DBT100	126
DBT200	128
DBT104	131
DBBU01	130

Tabla 10.

**DESARROLLO E IMPLANTACIÓN DE UN SISTEMA
INFORMÁTICO PARA LA SIMULACIÓN DEL
FUNCIONAMIENTO DE UNA PLANTA QUÍMICA EN
CONTINUO MEDIANTE INTERPRETACIÓN DE ROLES.**

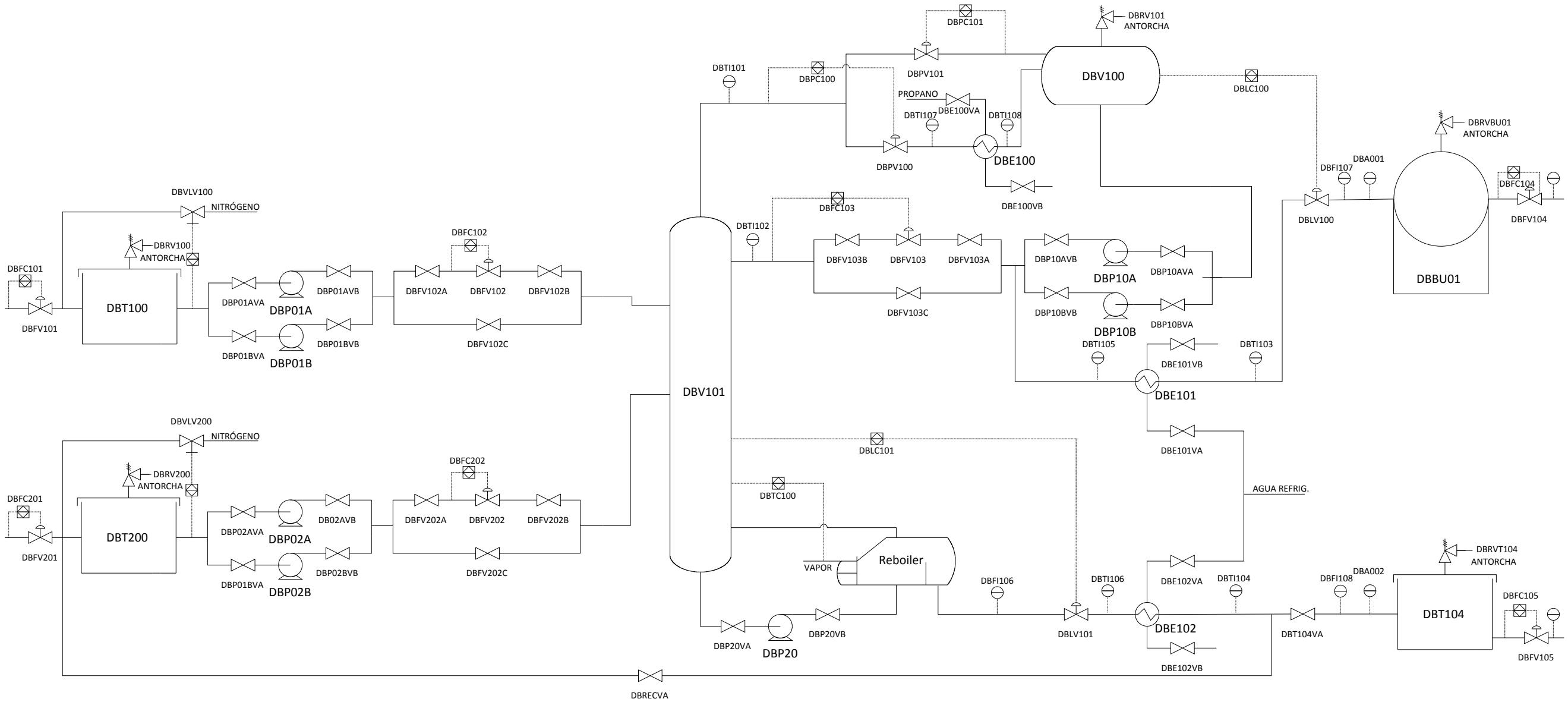
ANEXO II: DIAGRAMA DE EQUIPOS E INSTRUMENTACIÓN

Grado en Ingeniería Química Industrial

Autor: Lautaro Meroi Bianconi

Tutor: José Juan Macías Hernández

La Laguna, 7 de Septiembre de 2015



DESARROLLO E IMPLANTACIÓN DE UN SISTEMA INFÓRMATICO PARA LA SIMULACIÓN DE UNA PLANTA QUÍMICA EN CONTÍNUO MEDIANTE INTERPRETACIÓN DE ROLES

	Fecha	Autor	 Universidad de La Laguna	ESCUELA TÉCNICA SUPERIOR INGENIERÍA CIVIL E INDUSTRIAL GRADO EN INGENIERÍA QUÍMICA INDUSTRIAL
Dibujado	06-2015	Lautaro		
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Escala:
S/E

TÍTULO:

ANEXO II

**DESARROLLO E IMPLANTACIÓN DE UN SISTEMA
INFORMÁTICO PARA LA SIMULACIÓN DEL
FUNCIONAMIENTO DE UNA PLANTA QUÍMICA EN
CONTINUO MEDIANTE INTERPRETACIÓN DE ROLES.**

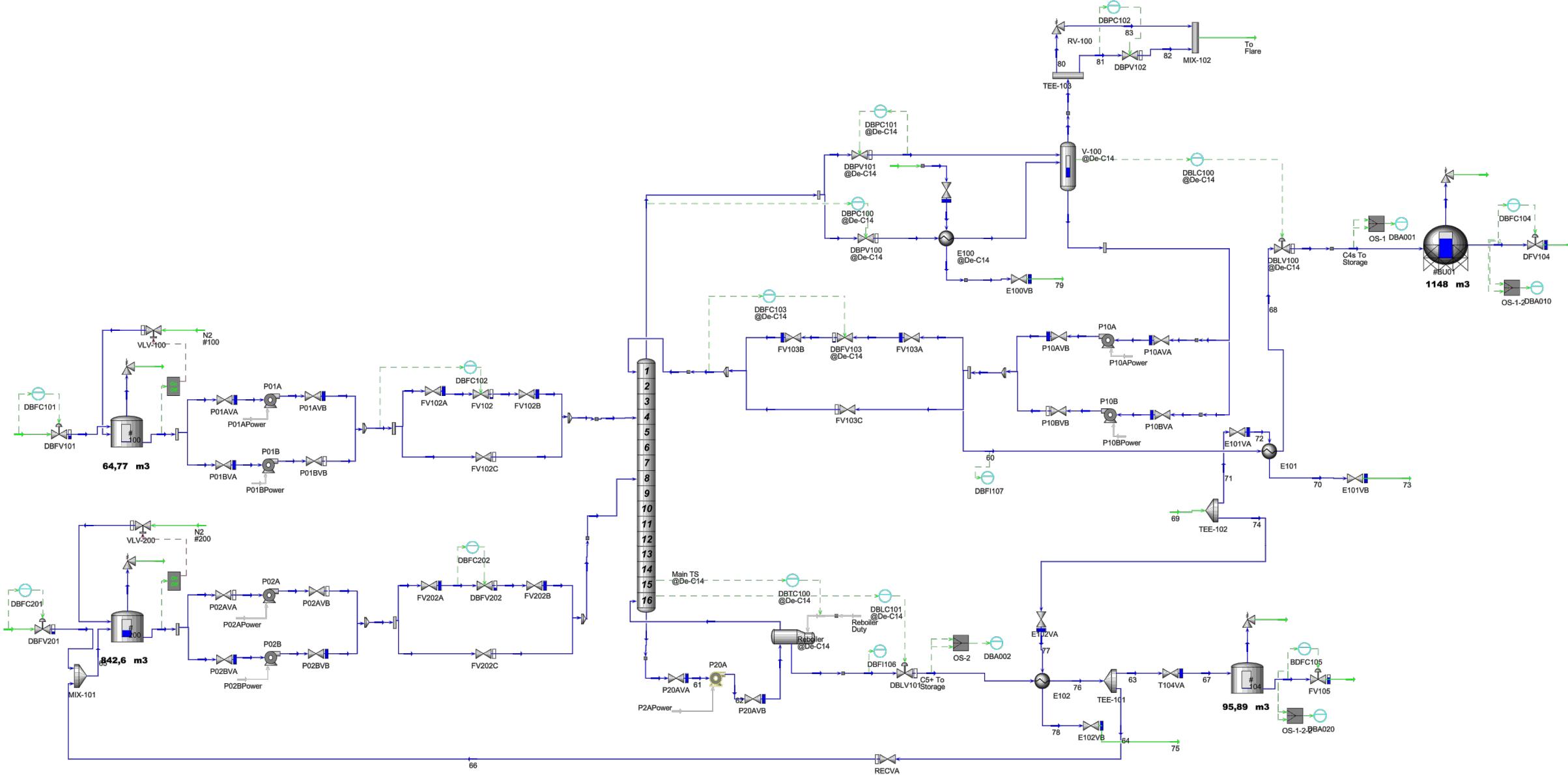
ANEXO III: DIAGRAMA DE LA SIMULACIÓN

Grado en Ingeniería Química Industrial

Autor: Lautaro Meroi Bianconi

Tutor: José Juan Macías Hernández

La Laguna, 7 de Septiembre de 2015



**DESARROLLO E IMPLANTACIÓN DE UN SISTEMA INFÓRMATICO PARA LA
SIMULACIÓN DE UNA PLANTA QUÍMICA EN CONTINUO MEDIANTE INTERPRETACIÓN
DE ROLES**

	Fecha	Autor	 Universidad de La Laguna	ESCUELA TÉCNICA SUPERIOR INGENIERÍA CIVIL E INDUSTRIAL GRADO EN INGENIERÍA QUÍMICA INDUSTRIAL
Dibujado	06-2015	Lautaro		
Comprobado	09-2015	Meroi Bianconi		

Escala:
S/E

TÍTULO:
Diagrama de la Simulación

ANEXO III

**DESARROLLO E IMPLANTACIÓN DE UN SISTEMA
INFORMÁTICO PARA LA SIMULACIÓN DEL
FUNCIONAMIENTO DE UNA PLANTA QUÍMICA EN
CONTINUO MEDIANTE INTERPRETACIÓN DE ROLES.**

**ANEXO IV: INFORME DE ALUMNOS, EXPERIENCIA
SIMULACIÓN DESBUTANIZADORA**

Reproducido con autorización del autor.

Autor: Cernitz Galán, René Eduardo.

Grado en Ingeniería Química Industrial

Autor: Lautaro Meroi Bianconi

Tutor: José Juan Macías Hernández

La Laguna, 7 de Septiembre de 2015

PROCEDIMIENTO DE OPERACIÓN DURANTE LA JORNADA DE SIMULACIÓN

15 h. Incorporación del primer turno de trabajo al entorno SimCAE. Turno de mañana:

JEFE DE PLANTA: Lorena

JEFE DE PROCESOS: Eduardo B.

JEFE DE INGENIERÍA: René Cernitz

OPERARIO DE PANEL: Eduardo A.

OPERARIOS DE CAMPO: Cristina y Beatriz

15:05 h. Ejecución del informe inicial del proceso para su posterior análisis. El entorno opera a un tiempo 4 veces el real

15:24 h. Salta alarma de fallo. Se observa que el caudal de reflujo no está entrando de nuevo a la torre por cabeza

15:33 h. Se evalúa que la bomba DBP10A en servicio falla y se procede a arrancar la bomba de reserva DBP10B

15:48 h. Salta alarma del analizador de composición de fondo DBA002 por alcanzar máximo en la composición de butano en la corriente

15:55 h. Salta alarma del reboiler, que está operando en manual, porque la temperatura de operación cae por debajo de la mínima

15:56 h. Se procede a abrir la válvula de fondo para recirculación a tanque (20 producto – 80 a reciclo)

16:02 h. Salta alarma de nivel bajo de torre en DBLC101. Se cierra parcialmente la válvula de fondo para retener el condensado.

16:05 h. El JEFE DE INGENIERÍA finaliza la programación de alarmas en todos los instrumentos

16:14 h. Apertura de la válvula fondo porque el nivel de líquido está sobrepasando los valores normales

16:26 h. Se observa que desde el inicio no ha variado el caudal de entrada de LPG a la esfera. Esto se debe a que la presión atmosférica es mayor que la presión interna de la esfera.

16:32 h. Se sigue aumentando el nivel de fondo de forma manual

16:41 h. El producto a esfera se encuentra fuera de especificación. Se aumenta el reflujo de la torre

16:54 h. Incorporación del segundo turno de trabajo al entorno y comunicación de incidencias.
Turno de tarde:

JEFE DE PLANTA, JEFE DE PROCESOS y JEFE DE INGENIERÍA: continúan operando

OPERARIO DE PANEL: Álex

OPERARIOS DE CAMPO: Marta y Andrea

Los operarios de campo comunican que no es viable que dos operarios trabajen simultáneamente sobre el mismo equipo, concretamente en la regulación de las válvulas que activan la recirculación a tanque de naftas intermedias y cierran el paso al tanque de almacenamiento de nafta estabilizada. La modificación del valor de apertura de una de las válvulas desajusta los valores alcanzados en la complementaria de manera abrupta y no permite avanzar en la operación.

17:00 h. Se valora el estado de la obtención de producto. Se observa que según el valor de la composición de fondo se necesitarán 4 horas para restablecerlo según las especificaciones

17:11 h. Se implementa un nuevo fallo. Saltan las alarmas de aviso de recirculación baja en cabeza, bajo nivel de líquido y aumento de temperatura de la torre

Se disminuye la temperatura de operación del reboiler

Salta la alarma de composición máxima en cabeza

17:15 h. Se observa que el nivel de la torre es superior al recomendado

Se diagnostica un fallo de instrumentación en la válvula automática de reflujo. Muestra que está totalmente abierta y realmente no hay caudal circulando a través de ella. Es necesario reparar la válvula antes de que se vaya mantenimiento.

17:20 h. Se baja el nivel fondo de torre y se reduce levemente el caudal de carga de alimentación

Se enfriá el fondo porque hay mucho reflujo y esto saca de especificación los productos rápidamente). Se cierra manualmente el reflujo y se recircula al tanque de carga el producto fuera de especificación.

17:23 h. El valor de la temperatura de fondo es muy alto (indica 167°C)

17:31 h. Se observa que la temperatura del reboiler ha bajado demasiado (indica 107°C)

17:35 h. Se observa que la recirculación es alta en cabeza y el caudal a esfera sigue estando a cero

17:36 h. Se aumenta el reflujo porque el fondo ya está cerrado. Se necesita un nivel fondo de torre a 50 así que se baja la temperatura para que evapore menos y quede más líquido en el fondo

17:40 h. El nivel de la torre ha pasado a ser alto. Se cierra la válvula al 5% pero la torre está inundada así que tarda en responder. Finalmente, empieza a bajar el nivel.

Se requiere arreglar la válvula automática porque los cambios que se están produciendo en la regulación del caudal son muy bruscos, pasando de caer el flujo sobre fondo a de nuevo inundar la torre.

Se aísla la válvula para que intervenga mantenimiento.

17:46 h. Mantenimiento repara la válvula automática. Se pone de nuevo en operación

18:02 h. El control de temperatura del reboiler es inestable. Se ha inundado el sistema de reflujo que está a máxima operación. Se disminuyen ambas cargas y el caudal del reflujo

18:12 h. El nivel de la torre disminuye muy rápidamente

Para restablecer la torre se decide operar con prudencia disminuyendo la carga de entrada hasta hallar un valor en el cual se pueda estabilizar el proceso para conseguir la especificación de producto en el fondo. En cuanto se consiga se configurará la recirculación para mandar el producto a tanque de carga.

18:27 h. Como consecuencia se empieza a vaciar la torre. Se aumenta ligeramente el reciclo. Se ajusta la cabeza de la torre a reflujo total (ya que están saliendo 16 m³ y entran 12 m³ y se va a vaciar la torre).

18:35 h. Se comienza a aumentar la temperatura

18:39 h. Se genera un nuevo fallo. La válvula automática que regula la carga de nafta ligera se rompe. Se activa el bypass y se aísla la válvula hasta ahora en servicio.

18:41 h. Se redacta una orden de trabajo para que mantenimiento intervenga.

18:45 h. Mantenimiento viene a reparar la válvula

18:48 h. La torre ya se encuentra destilando según especificaciones. Se abre la válvula a tanque de producto al 50%

19:07 h. Incorporación del tercer turno de trabajo al entorno y comunicación de incidencias.
Turno de noche:

JEFE DE PLANTA, JEFE DE PROCESOS y JEFE DE INGENIERÍA: continúan operando

OPERARIO DE PANEL: Aida

OPERARIOS DE CAMPO: Almudena y Suleima

Incidencias de campo: la regulación de apertura de las válvulas y bombas han de ser progresivas para mantener un control y que la planta opere lo más estable posible.

19:15 h. Salta una alarma por un nuevo fallo. Revisión de todas las alarmas. Se observa que el reflujo está entrando a mayor temperatura de la debida.

La impulsión del intercambiador de propano no está al 100% sino que ha bajado al 10%. Este cambio simula un caso de ensuciamiento en el intercambiador y sería necesario llevar la planta parada. Debería disminuirse la carga de trabajo para que el reboiler aporte menos calor y la capacidad de refrigeración sea suficiente. Se limpiaría el intercambiador y luego se reanuda la marcha.

19:31 h. El producto de cabeza se encuentra fuera de especificación. Para finalizar se actúa para recuperarla. En cuanto se resuelvan los problemas se van desactivando las alarmas.

19:46 h. Se disminuye la temperatura del reboiler ligeramente, por medio de control manual para disminuir la temperatura de cabeza

19:59 h. Los cambios para entrar en especificación no se ven tan rápido porque hay que tener en cuenta el volumen de la torre y también el volumen del botellón, que necesitan ser depurados. Los 40 m³ totales en un régimen de operación de 10 m³/h tardarán 4 h en ser renovados.

20:09 h. Se cambia en panel el valor OP de 60 a 75 °C (T del reboiler) para limitar un poco el rango de trabajo y que en caso de aumento de temperatura no se desestabilice tanto

20:12 h. Se cambia el valor SP (T del reboiler) de 130 a 134 °C. La composición en cabeza sigue acercándose al valor deseado

Cuando la planta esté más o menos estabilizada se pasa a control automático.

Se acelera la simulación para poder apreciar los resultados

20:20 h. Ejecución del informe final para observar el estado de la planta

APORTACIONES PARA LAS CONDICIONES ÓPTIMAS DE OPERACIÓN Y EL DISEÑO DE LA PLANTA

Hay una modificación que recomienda el departamento de ingeniería: el analizador de fondo debe estar antes de la válvula de reflujo.

Se analiza la operatividad de la válvula que controla la recirculación del fondo de la torre. Tiene distintos rangos de operación según trabaje con el circuito que va a tanque de carga o a tanque de producto. Esto causa la inestabilidad que se apreciaba anteriormente al operar en manual. Se sugiere como posibles soluciones poner una bomba con mayor presión de trabajo o una válvula con ganancia diferente a la instalada actualmente.

Otra apreciación importante en el diseño de la planta es que las válvulas instaladas están trabajando o muy abiertas o muy cerradas. Esto significa que o bien, la válvula es muy grande, o muy pequeña. Tampoco se han diseñado para las condiciones de operación ni tienen en cuenta las curvas características porque casi todas son lineales.

El ajuste de los lazos de control, estando estable la planta, se debe hacer con Ziegler-Nichols en lazo cerrado, cambiando la ganancia estática.

Se observa que la temperatura que más afecta a la operación de la torre no es la del reboiler sino una en fondo de torre que está en equilibrio con las condiciones del reboiler.

Es recomendable añadir una bomba de reserva para impulsar la corriente de producto del fondo de la torre en caso de avería de la única que hay, que está en servicio.

BALANCE DE MATERIA Y ENERGIA

En el balance de materia de la unidad se considera como volumen de control las entradas principales de Nafta, tanto ligera (DBFC101) como Media (DBFC201). Además, no se considera el consumo de agua de refrigeración.

Por otro lado, las salidas de la unidad comprenden las válvulas de descarga del tanque de Nafta Estabilizada (DBM104) y la esfera de LPG (DBM001). No se considera las salidas de gases por venteo.

La acumulación de materia en la unidad en dos tanques de almacenamiento de la materia prima, para la Nafta Ligera (DBM100) y para la Nafta Media (DBM200), y en los dos tanque de producto, LPG (DBM001) y Nafta Estabilizada (DBM104). No se consideran las acumulaciones (holdups) en la torre y botellón de reflujo. A continuación se muestra un resumen del Balance de Materia de la unidad desde las 15:15:01 hasta 20:19:57 del día 15/05/2015.

Balance Materia		
Streams	Total	
Inlets		
DBFC101 (Naft. Lig.)	45,603	m3
DBFC201 (Naft. Med.)	50,67	m3
Aqua Refrig.	N/D	m3
Oulets		
DBFC104 (LPG)	0,05	m3
DBFC105 (Naft. Estab.)	3,89E-03	m3
Aqua Refrig.	N/D	m3
Accumulation		
DBM100 (NL Tank)	17,41	m3
DBM200 (NM Tank)	77,83	m3
DBM001 (LPG Sphere)	137,53	m3
DBM104 (Nestab. Tank)	116,78	m3
Torre	N/D	
Botellón Reflujo	N/D	

Tabla 1. Balance de Materia Unidad Desbutanizadora

El la variación del caudal de alimentación a la torre permite que exista una acumulación en los tanques de alimentación y de producto.

En cuanto al balance de energía se tiene el consumo de las bombas y el duty del reboiler, por otro lado no contamos con datos energéticos de los condensadores. Por lo que el balance solo presenta consumos energéticos.

BALANCE DE ENERGÍA				
Equipo	Potencia Media		Energía	
Duty P01A	6449,96	kCal/h	3,27E+04	kCal
Duty P01B	3441,81	kCal/h	1,74E+04	kCal
Duty P02A	3441,81	kCal/h	1,74E+04	kCal
Duty P02B	0,00	kCal/h	0,00E+00	kCal
Duty P10A	12465,71	kCal/h	6,32E+04	kCal
Duty P10B	12498,11	kCal/h	6,33E+04	kCal
Duty P20A	5297,04	kCal/h	2,68E+04	kCal
Duty Reboiler	203898384,91	kCal/h	1,03E+09	kCal
Duty Condenser	N/D	kCal/h	N/D	kCal
TOTAL			1,03E+09	kCal
Tiempo de Operación	5,067	h		
Desde	15:15:01		15/05/2015	
Hasta	20:19:57			

Tabla 2: Balance de Energía Unidad Desbutanizadora

Evaluación Cualitativa durante el periodo de operación de la unidad desbutanizadora (15:15:01 hasta 20:19:57 del día 15/05/2015)

A lo largo del tiempo de operación, la unidad presentó diferentes eventos, tales como fallos de equipos, instrumentación, paradas por mantenimiento, entre otras mencionadas anteriormente, por lo que la estabilidad de la unidad en términos energéticos y de la calidad de los productos se vio comprometida durante los periodos en el que se registraron dichos eventos. Sin embargo, se pueden analizar los datos en los cuales las oscilaciones en las variables de proceso no fueron importantes, es decir, períodos de tiempo en el que la planta mostró cierto comportamiento estacionario dentro de los parámetros requeridos por la unidad.

Esta evaluación se realizará interpretando los gráficos para diferentes variables de procesos en períodos de estabilidad de la unidad, con el objetivo de determinar de manera aproximada los valores óptimos de operación de la unidad y tendencias en cuanto a la calidad de los productos.

El primer gráfico que se muestra a continuación muestra la Calidad de la Nafta Estabilizada en términos del porcentaje de Ligeros (Butanos) frente a la temperatura de fondo de la torre, y a diferentes caudales de reflujo de cabeza.

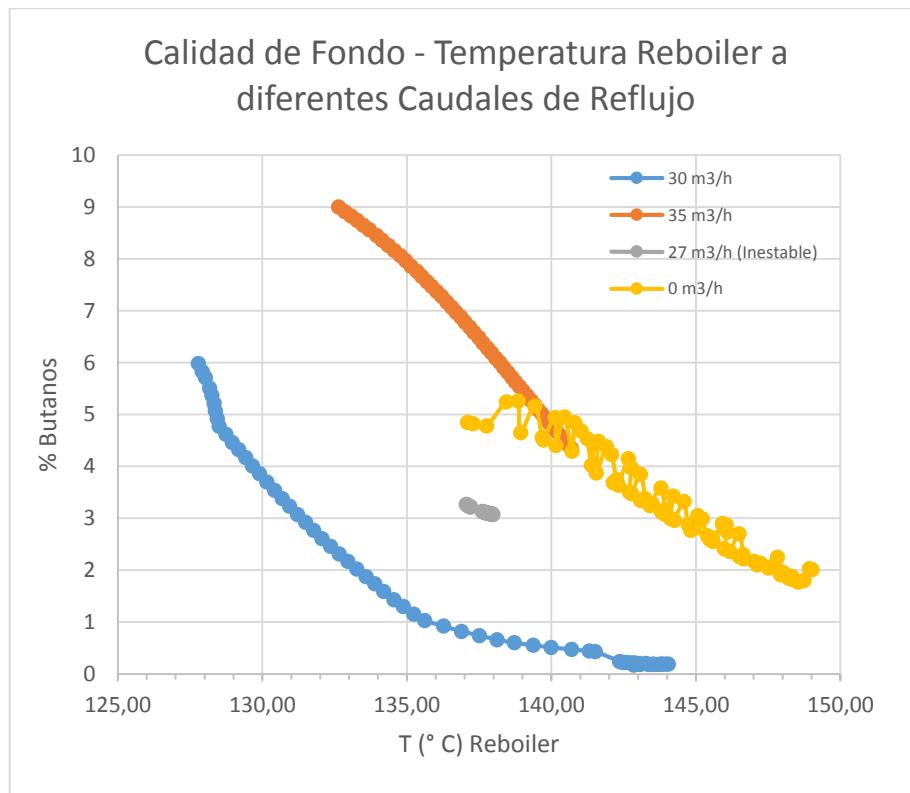


Fig. 1: Calidad de la Nafta Estabilizada frente a la $T_{REBOILER}$ a diferentes $Q_{REFLUIO}$

El gráfico muestra que la temperatura más favorable a la disminución de ligeros en la nafta estabilizada (<5%) es aproximadamente 450 °C y con un reflujo cercano a 30 m3/h.

En otro grafico complementa al anterior, al mostrar la calidad del producto en cabeza (Destilado), es decir, el LPG, cuyo porcentaje de pentanos debe ser menor a 5 %.

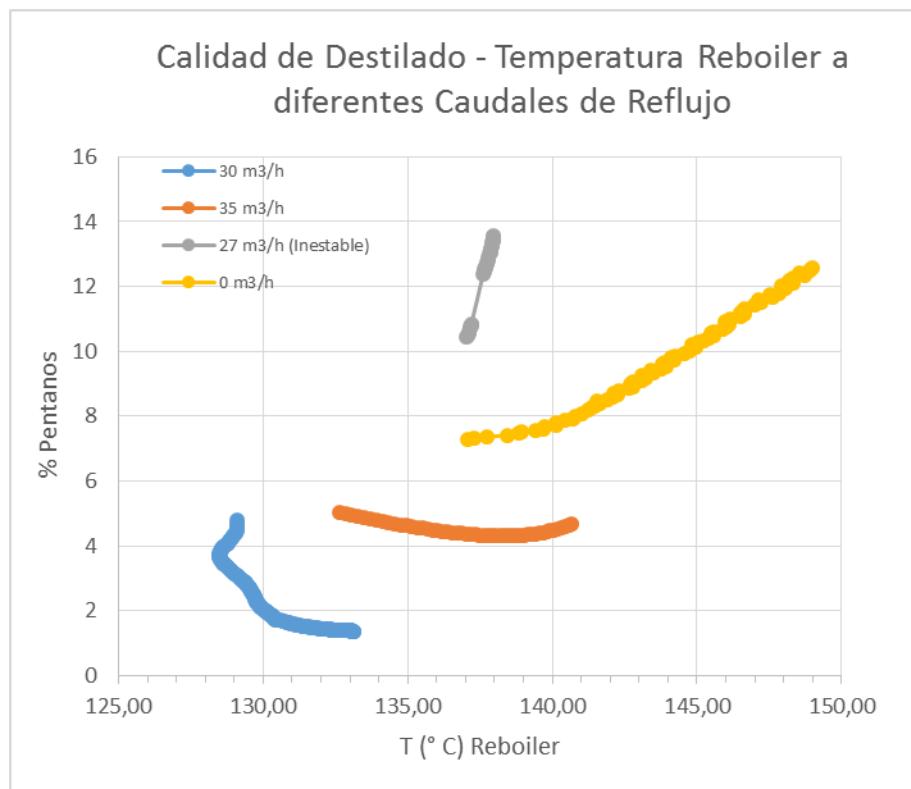


Fig. 2: Calidad del LPG frente a la $T_{REBOILER}$ a diferentes $Q_{REFLUJO}$

En este grafico confirmamos lo mencionado para la Fig. 1., a pesar de no disponer de datos a temperaturas cercanas a 145 °C podemos deducir que la tendencia en la calidad se mantendrá inferior al 5% en pentanos.

Un último grafico que nos permite inferir el caudal óptimo de reflujo en la unidad es el de variación del caudal frente a la calidad de fondo y destilado.

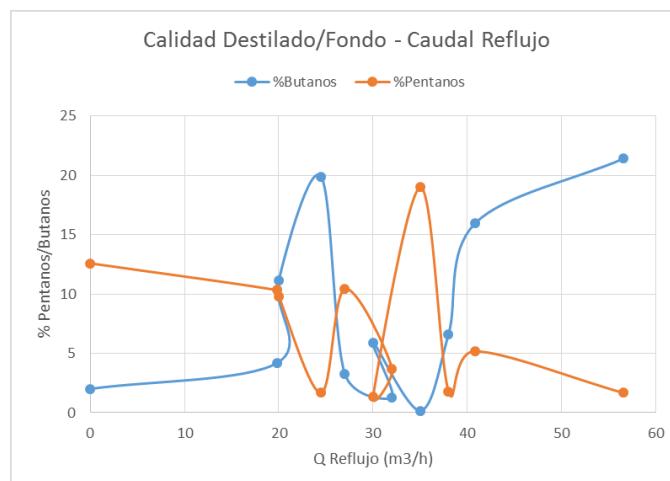


Fig 3. : Calidad Destilado/Fondo - $Q_{REFLUJO}$

En este grafico observamos que en el rango [20-40] m³/h de reflujo una serie de oscilaciones que no permiten deducir una zona de caudal de reflujo óptimo de separación, esto se debe a que durante la operación en ese rango de tiempo ocurrieron grandes variaciones en la temperatura de fondo, lo que ocasionó alteraciones en la separación. A pesar de estas oscilaciones podemos llegar a una aproximación de caudal óptimo simplificando los puntos anómalos y trazando una tendencia aproximada.

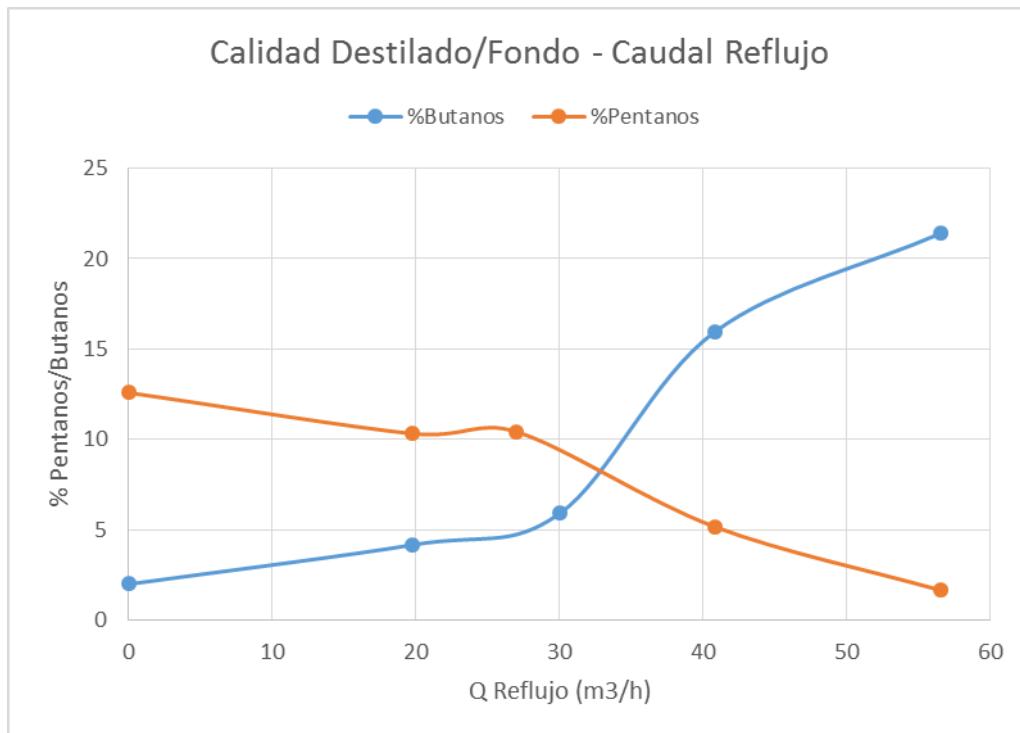


Fig 3.1 : Calidad Destilado/Fondo - Q_{REFLUJO} (Sin Oscilaciones)

Vemos que el punto óptimo de caudal de reflujo se encuentra en torno al 30 m³/h. Visto este y los gráficos anteriores podemos deducir que; en un gráfico más riguroso (más puntos) y con datos no anómalos la intercepción entre las dos curvas de calidad debería situarse más cercana al 5% y al 30 m³/h de reflujo.

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ANEXO V: HOJA DE ESTILOS COMMON.CSS

Grado en Ingeniería Química Industrial

Autor: Lautaro Meroi Bianconi

Tutor: José Juan Macías Hernández

La Laguna, 7 de Septiembre de 2015

```
/*
Mango - Open Source M2M - http://mango.serotoninsoftware.com
Copyright (C) 2006-2011 Serotonin Software Technologies Inc.
@author Matthew Lohbihler

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GNU General Public License for more details.

You should have received a copy of the GNU General Public License
along with this program. If not, see <http://www.gnu.org/licenses/>.

*/
html > body {
    font-family: Verdana, Arial, Helvetica, sans-serif;
    font-size: 11px;
    color: #FFFFFF; /* Color de texto cuerpo */
    background-color: #000000; /* Color de fondo */
    margin: 0px;
    padding: 0px;
}
a, a:visited, a:link, .link {
    color: #bb5d00; /* Color de URLs */
    /*color: #414042;*/
    font-family: Verdana, Arial, Helvetica, sans-serif;
    text-decoration: underline;
    font-size: 11px;
}
a:hover {
    color: #F07800;
    /*color: #39B54A;*/
    font-family: Verdana, Arial, Helvetica, sans-serif;
    text-decoration: underline;
    font-size: 11px;
}
a.titleLink, a.titleLink:visited, a.titleLink:link {
    font-size: 11px;
    font-weight: bold;
}
a.titleLink:hover {
    font-size: 11px;
    font-weight: bold;
}
.bigTitle {
    font-family: Verdana, Arial, Helvetica, sans-serif;
    color: #333333;
    font-size: 16px;
    font-weight: bold;
}
.smallTitle {
    font-family: Verdana, Arial, Helvetica, sans-serif;
    color: #bb5d00; /*Color de titulos de tablas*/
    /*color: #414042;*/
    font-size: 13px;
    font-weight: bold;
}
.projectTitle {
    font-family: Verdana, Arial, Helvetica, sans-serif;
    /*color: #bb5d00;*/
    color: #FFFFFF !important; /* Color de título de logo ""SimCAE T&C"" */
    font-size: 14px;
    font-weight: bold;
}
.titlePadding {
    padding: 3px 3px 0px 3px;
```

```
}

.copyTitle {
    color: #bb5d00;
    /*color: #414042;*/
    font-size: 10px;
}

.bodyCopy {
    font-family: Verdana, Arial, Helvetica, sans-serif;
    color: #333333;
    font-size: 11px;
}

.footer {
    font-family: Verdana, Arial, Helvetica, sans-serif;
    color: #FFFFFF; /* Color de pie de página */
    font-size: 9px;
}

.ptr {
    cursor: pointer;
}

/***
 * Header styles
 */
#_header__alarmLevelText {
    font-weight: bold;
    font-size: 14px;
    color: #FFFFFF /* Color de texto de alarma*/
}
#mainHeader {
    padding-top: 5px;
    background-color: #0066cc; /* Color de cabecera */
    padding-left: 5px;
}
#subHeader {
    background-color: #333333; /* Color de barra de herramientas */
    padding: 3px;
}

/***
 * List cell styles.
 */
.rowHeader td, .smRowHeader td, .row td, .smRow td, .rowAlt td, .smRowAlt td, .rowAlt2 td {
    font-family: Verdana, Arial, Helvetica, sans-serif;
    font-size: 11px;
}
.rowHeader td, .smRowHeader td {
    font-weight: bold;
    color: #000000; /* Color de títulos de tablas */
    background-color: #F07800; /* Color de fondo de títulos de tablas */
    /*background-color: #424041;*/
    text-align: center;
    white-space: nowrap;
}
.rowHeader td {
    padding: 3px 10px 3px 10px;
}
.smRowHeader td {
    padding: 2px 3px 2px 3px;
}
.a.rowHeaderLink, a.rowHeaderLink:visited, a.rowHeaderLink:link, a.rowHeaderLink:hover {
    color: #FFFFFF; /* Color de títulos de tablas "ordenables" */
    text-decoration: underline;
}
.row td, .smRow td, .rowAlt td, .smRowAlt td, .rowAlt2 td {
    color: #000000; /* Color de texto de tablas */
}
.row td, .rowAlt td, .rowAlt2 td {
    padding: 3px;
}
```

```
}

.smRow td, .smRowAlt td {
    padding: 0px 3px 0px 3px;
}
.row td, .smRow td {
    background-color: #F0F0F0; /* Color de fondo de las tablas */
}
.rowAlt td, .smRowAlt td {
    background-color: #DCDCDC; /* Segundo color de fondo de tablas */
}
.rowAlt2 td {
    background-color: #FFFFFF;
}

.borderDiv, .borderDivPadded {
    /*border: 1px solid #F07800;*/
    border: 1px solid #39B54A; /* Color de marcos "verdes" */
}
.borderDivPadded {
    padding: 3px;
}
.marR {
    margin-right: 5px;
}
.marB {
    margin-bottom: 5px;
}

/***
 * Form styles
 */
.formLabel, .formLabelRequired, .formField, .formError, select, input, textarea {
    font-family: Verdana, Arial, Helvetica, sans-serif;
    font-size: 11px;
}
.formLabel, .formLabelRequired {
    color: #F0F8FF; /* Color de texto de algunos cuadros */
    padding-right: 10px;
    text-align: right;
    white-space: nowrap;
    padding-top: 5px;
    vertical-align: top;
}
.formLabelRequired, .formError {
    font-weight: bold;
}
.formField {
    padding: 2px;
    color: #F0F8FF;
}
.formError {
    color: #FF0000; /* Color de texto "error" */
    padding-left: 10px;
}
select, input, textarea {
    color: #333333; /* Color de texto de items seleccionables */
    /*border: 1px solid #F07800;*/
    border: 1px solid #333333;
    padding: 2px;
}
input[type="checkbox"], input[type="radio"] {
    /*color: #F07800;*/
    color: #39B54A;
    border: 0;
}
.formVeryShort {
    width: 30px;
}
.formShort {
```

```
width: 50px;
}

.formLong {
    width: 250px;
}
.formDisabled {
    border: 1px solid #D0D0D0; /* Cuadros configuración HTTP */
}
input[type="submit"], input[type="button"] {
    overflow: visible;
}

/***
 * View styles
 */
.controlsDiv {
    position: absolute;
    visibility: hidden;
    left: 0;
    top: -1px;
    z-index: 1;
    margin: 1px 0px 1px 0px;
    padding: 0;
    background-color: #FFFFFF;
}
.controlsDiv table {
    list-style: none;
    margin: 0;
    padding: 0;
    background-color: #FFFFFF;
}
.controlsDiv td {
    list-style: none;
    margin: 1px;
    padding: 0;
    background-color: #F8BB00; /*Color de los pequeños recuadros emergentes de las cajas de datos*/
    /*background-color: #1A1A1A;*/
    width: 16px;
    height: 16px;
}
.controlsDiv td div, .controlContent {
    padding: 1px 5px 1px 5px;
    margin: 0px;
    background: #F8BB00; /*Color de los recuadros emergentes de las cajas de datos*/
    /*background: #1A1A1A; */
    white-space: nowrap;
    text-align: left;
    font-size: 10px;
    font-weight: normal;
    /*border: 1px solid #F07800;*/
    border: 1px solid #39B54A;
    position: absolute;
    visibility: hidden;
    left: 15px;
    top: 0px;
}
.labelDiv, .windowDiv {
    position: absolute;
    padding: 1px 5px 1px 5px;
    margin: 0px;
    background: #F8BB00; /*color de fondo de las pestañas emergentes al pasar el ratón sobre los iconos de páginas*/
    /*background: #FFFFFF;*/
    color: #000000; /*color de las letras de estas pestañas emergentes*/
    white-space: nowrap;
    text-align: left;
    font-size: 10px;
```

```
font-weight: normal;
z-index: 20;
}
.labelDiv {
  border: 1px solid #F07800;
  /*border: 1px solid #39B54A;*/
}
.windowDiv {
  border: 1px outset #F07800;
  /*border: 1px outset #39B54A;*/
}
.labelDiv a, .windowDiv a {
  font-size: 10px;
}
.imageDiv {
  z-index:10;
  left:18px;
  position:absolute;
  padding:0px;
  margin:0px;
  /*background: #F8BB00;*/
  background: #FFFFFF;
  white-space:nowrap;
  /*border: 1px solid #F07800;*/
  border: 1px solid #39B54A;
}
.ovrflw {
  background:inherit;
  background:expression(this.parentNode.style.background);
  color:inherit;
  color:expression(this.parentNode.style.color);
  font:inherit;
  font:expression(this.parentNode.style.font);
  width:300px;
  border-width:0 1px 0 1px;
  border-style:solid;
  /*border-color:#F07800;*/
  border-color:#39B54A;
}
#viewContent {
  position:relative;
  margin: 0px;
  padding: 0px;
}
#viewContent img {
  display: block;
  margin: 0px;
  padding: 0px;
}
.componentMin {
  background-color: #F8BB00;
  /*background-color: #FFFFFF;*/
  top:0px;
  left:0px;
  margin:0px;
  padding:0px;
  width:16px;
  height:16px;
}
.componentInput {
  font-family: Verdana, Arial, Helvetica, sans-serif;
  font-size: 10px;
  color: #333333;
  /*border: 1px solid #F07800;*/
  border: 1px solid #39B54A;
  padding: 1px;
}
.simpleRenderer, .simpleRenderer2 {
  /*border: 1px solid #F07800;*/
  border: 1px solid #39B54A;
  padding:1px 5px 1px 5px;
```

```
margin: 0px;
/*background: #F8BB00;*/
background: #000000; /*Color de las cajas de datos*/
white-space: nowrap;
text-align: left;
font-size: 10px;
font-weight: normal;
}
.simpleRenderer {
line-height: 16px;
}
.infoData {
color: #FF0000;
}
.horzSeparator {
height: 1px;
background: #699D2E;
padding: 0px;
}
.viewChangeBkgd {
background: #D8E2CC;
}

/***
 * Absmiddle workaround
 */
span.absmiddle img {
padding: 0;
margin: 0;
vertical-align: middle;
/* display: inline-block; */
display: inline;
}

/***
 * Documentation float pane style overrides.
 */
html > body .dojoFloatingPaneTitleBar {
background-color: #424041;
}
html > body .dojoFloatingPaneCloseIcon {
background-image: url(../images/cross_doc.png);
cursor: pointer;
}
html > body .dojoFloatingPaneClient {
font-family: Verdana, Arial, Helvetica, sans-serif;
font-size: 10px;
}
html > body .dojoFloatingPaneClient p, #help p {
color: #FFFFFF; /* Color Ayuda */
padding: 0px;
margin: 0px 0px 10px 0px;
}
#help h1 {
color: #bb5d00; /* Títulos Ayuda */
/*color: #FFFFFF; */
font-size: 15px;
font-weight: bold;
padding: 0px;
margin: 20px 0px 10px 0px;
}
html > body .dojoFloatingPaneClient h1, #help h2 {
padding: 0px;
margin: 0px 0px 10px 0px;
font-size: 13px;
font-weight: bold;
}
html > body .dojoFloatingPaneClient img, #help img {
vertical-align: bottom;
```

```
}

/***
 * Common tree styling
 */

html > body .dojoTreeNodeLabelSelected {
    /*background-color: #F07800;*/
    background-color: #39B54A;
    color: #FFFFFF;
    padding: 2px 3px 3px 2px;
}

/***
 * Styles for weekly 15 minute interval schedules.
 */
.qoff {
    /*background-color: #B4CE96;*/
    background-color: #FF4000;
}
.qon {
    /*background-color: #699D2E;*/
    background-color: #B4CE96;
}
.qreg {
    border: 1px solid #699D2E;
}
.qhlt {
    border: 1px solid #FF9D2E;
}
.hreg {
    border: 1px solid #FFFFFF;
}
.hhlt {
    border: 1px solid #FF9D2E;
}
```

**DESARROLLO E IMPLANTACIÓN DE UN SISTEMA
INFORMÁTICO PARA LA SIMULACIÓN DEL
FUNCIONAMIENTO DE UNA PLANTA QUÍMICA EN
CONTINUO MEDIANTE INTERPRETACIÓN DE ROLES.**

ANEXO VI: REPORTE DE LA SIMULACIÓN

Grado en Ingeniería Química Industrial

Autor: Lautaro Meroi Bianconi

Tutor: José Juan Macías Hernández

La Laguna, 7 de Septiembre de 2015

1	Honeywell Company Name Not Available Calgary, Alberta CANADA		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc		
2			Unit Set:	SI		
3			Date/Time:	Friday Sep 4 2015, 16:44:21		
4	Spreadsheet: OptimizerSpreadsheet					
5						
6	CONNECTIONS					
7	Imported Variables					
8						
9	Cell	Object	Variable Description			
10	B5	Energy Stream: Reboiler Duty	Heat Flow			
11	D1	Column Sub-Flowsheet: De-C14	Spec Value (Reflux Ratio)			
12	D5	Material Stream: C4s To Storage	Mass Flow			
13	Exported Variables' Formula Results					
14	Cell	Object	Variable Description			
15	B1	B1:	Value			
16	B2	B2:	5.972e+006 Btu/hr			
17	B3	B3:	<empty>			
18	B6	B6:	7.500e-004			
19	B7	B7:	Energy			
20	B9	B9:	4479 Btu/hr			
21	D2	D2:	<empty>			
22	D3	D3:	10.00			
23	D6	D6:	<empty>			
24	D7	D7:	<empty>			
25	D9	D9:	<empty>			
26	PARAMETERS					
27	Browsable Variables					
28	Cell	Visible Name	Variable Description	Variable Type		
29	B1	B1:	Energy	<empty>		
30	B2	B2:	---	0.0015		
31	B3	B3:	---	<empty>		
32	B6	B6:	---	7.500e-004		
33	B7	B7:	Energy	4479 Btu/hr		
34	B9	B9:	---	<empty>		
35	D2	D2:	---	10.00		
36	D3	D3:	---	<empty>		
37	D6	D6:	---	<empty>		
38	D7	D7:	---	<empty>		
39	D9	D9:	---	<empty>		
40	User Variables					
41	STATUS					
42	OK					
43	NOTES					
44	Description					
45						
46	Column Sub-Flowsheet: De-C14					
47						
48	CONNECTIONS					
49						
50	Inlet Stream					
51						
52	STREAM NAME	Stage	FROM UNIT OPERATION			
53	Reboiler Duty	Reboiler				
54	Feed 2	4_Main TS	Mixer	MIX-100-2-2		
55	Feed 1	8_Main TS	Mixer	MIX-100-2-2-2		
56	4					
57		1_Main TS	Mixer	MIX-100-2		
58	Outlet Stream					
59						
60	STREAM NAME	Stage	TO UNIT OPERATION			
61	C5+	Reboiler	Valve	DBLV101		
62	5		Valve	E100VB		
63	Butanes		Tank	#BU01		
64	To Reboiler	16_Main TS	Valve	P20AVA		
65	10	V-100	Tee	TEE-103		
66	15		Valve	P10BVA		
67	14		Valve	P10AVA		
68	MONITOR					
69	Honeywell International Inc.	UniSim Design (R430 build 18059)		Page 1 of 170		

1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>			Case Name: C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc											
2				Unit Set: SI											
3				Date/Time: Friday Sep 4 2015, 16:44:21											
4	Column Sub-Flowsheet: De-C14 (continued)														
5	MONITOR														
6	Specifications Summary														
7		Specified Value	Current Value	Wt. Error	Wt. Tol.	Abs. Tol.	Active	Estimate	Used						
8	C5's in Top	1.798e-002 *	---	---	0.0100 *	0.0010 *	On	On	On						
9	Reflux Ratio	---	---	---	0.0100 *	0.0100 *	Off	On	Off						
10	Reflux Rate	---	---	---	0.0100 *	1.000 kgmole/h *	Off	On	Off						
11	Btms Prod Rate	---	75.63 kgmole/h	---	0.0100 *	1.000 kgmole/h *	Off	On	Off						
12	TEE-100 - 7	---	---	---	0.0100 *	0.0010 *	On	On	On						
13	TEE-100 - 8	---	---	---	0.0100 *	0.0010 *	On	On	On						
14	TEE-101 - 14	---	---	---	0.0100 *	0.0010 *	On	On	On						
15	Heat Balance	0.0000 kJ/h	---	---	0.0100 *	1.000 kJ/h *	On	Off	On						
16	UA	4.184e+005 kJ/C-h	---	---	0.0100 *	1.000 kJ/C-h *	On	Off	On						
17	TEE-101 - 15	---	---	---	0.0100 *	0.0010 *	Off	On	Off						
18	15 Stream Spec	25.00 C *	---	---	0.0100 *	0.0010 C *	On	On	On						
19	SPECS														
20	Column Specification Parameters														
21	C5's in Top														
22	Fixed / Ranged:	Fixed	Primary / Alternate:	Primary	Lower Bound:	---	Upper Bound:	---							
23	Stage:		Flow Basis:	Mole Fraction	Phase:	Liquid									
24	Components:	i-Pentane		n-Pentane											
25	Reflux Ratio														
26	Fixed / Ranged:	Fixed	Primary / Alternate:	Primary	Lower Bound:	---	Upper Bound:	---							
27	Stage:		Flow Basis:	Molar	Liquid Specification:	---									
28	Reflux Rate														
29	Fixed / Ranged:	Fixed	Primary / Alternate:	Primary	Lower Bound:	---	Upper Bound:	---							
30	Stage:		Flow Basis:	Molar	Liquid Specification:	---									
31	Btms Prod Rate														
32	Fixed / Ranged:	Fixed	Primary / Alternate:	Primary	Lower Bound:	---	Upper Bound:	---							
33	Stream:	C5+ @De-C14	Flow Basis:	Molar											
34	TEE-100 - 7														
35	Fixed / Ranged:	Fixed	Primary / Alternate:	Primary	Lower Bound:	---	Upper Bound:	---							
36	Stage:	TEE-100	Stream:	7 @De-C14											
37	TEE-100 - 8														
38	Fixed / Ranged:	Fixed	Primary / Alternate:	Primary	Lower Bound:	---	Upper Bound:	---							
39	Stage:	TEE-100	Stream:	8 @De-C14											
40	TEE-101 - 14														
41	Fixed / Ranged:	Fixed	Primary / Alternate:	Primary	Lower Bound:	---	Upper Bound:	---							
42	Stage:	TEE-101	Stream:	14 @De-C14											
43	Heat Balance														
44	Fixed / Ranged:	Fixed	Primary / Alternate:	Primary	Lower Bound:	---	Upper Bound:	---							
45	Stage:														
46	UA														
47	Fixed / Ranged:	Fixed	Primary / Alternate:	Primary	Lower Bound:	---	Upper Bound:	---							
48	Stage:														
49	15 Stream Spec														
50	Fixed / Ranged:	Fixed	Primary / Alternate:	Primary	Lower Bound:	---	Upper Bound:	---							
51	Stage:														
52	Honeywell International Inc.														
53	UniSim Design (R430 build 18059)														
54	Printed by:	alu0100514599													
55	* Specified by user.														
56															
57															
58															
59															
60															
61															
62															
63															
64															
65															
66															
67															
68															
69															

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc							
2		Unit Set:	SI							
3		Date/Time:	Friday Sep 4 2015, 16:44:21							
4	Column Sub-Flowsheet: De-C14 (continued)									
5	SUBCOOLING									
6	Degrees of Subcooling									
7	Subcool to									
8	User Variables									
9	CONDITIONS									
10	Name	89	2	3	4					
11	Vapour	0.0000	0.0000	0.0000	0.0000					
12	Temperature (C)	34.0037	89.9199	20.1941	27.0000	*				
13	Pressure (kPa)	1323.4556	1313.1475	1311.4327	1180.0567	*				
14	Molar Flow (kgmole/h)	272.3873	86.7631	85.8731	2072.7845					
15	Mass Flow (kg/h)	15602.8661	5351.6186	6236.5679	91403.5793					
16	Std Ideal Liq Vol Flow (m3/h)	27.1326	9.0000	10.0000	180.3978					
17	Molar Enthalpy (kJ/kgmole)	-1.236e+005	-1.202e+005	-1.759e+005	-1.198e+005					
18	Molar Entropy (kJ/kgmole-C)	91.87	120.2	79.68	91.25					
19	Heat Flow (kJ/h)	-3.3659e+07	-1.0427e+07	-1.5109e+07	-2.4830e+08					
20	Name	To Reboiler	10	C5+	14					
21	Vapour	0.0000	1.0000	0.0000	0.0000					
22	Temperature (C)	147.4069	81.6832	147.8989	33.4840					
23	Pressure (kPa)	1307.7499	1179.4850	1296.7479	1184.6514					
24	Molar Flow (kgmole/h)	11088.8091	0.0000	75.6336	370.0731					
25	Mass Flow (kg/h)	881530.3921	0.0000	6031.3023	21198.4957					
26	Std Ideal Liq Vol Flow (m3/h)	1365.9406	0.0000	9.3371	36.8631					
27	Molar Enthalpy (kJ/kgmole)	-1.627e+005	-1.003e+005	-1.630e+005	-1.236e+005					
28	Molar Entropy (kJ/kgmole-C)	145.3	159.4	145.9	91.66					
29	Heat Flow (kJ/h)	-1.8044e+09	-1.4079e-29	-1.2327e+07	-4.5758e+07					
30	Name	15	5	C4s To Storage	Reboiler Duty					
31	Vapour	0.0000	0.3017	0.0000	---					
32	Temperature (C)	33.4840	24.0490	20.7036	---					
33	Pressure (kPa)	1184.6514	929.3346	585.9045	---					
34	Molar Flow (kgmole/h)	-0.0000	2072.7739	97.0089	---					
35	Mass Flow (kg/h)	-0.0000	91403.1123	5556.8553	---					
36	Std Ideal Liq Vol Flow (m3/h)	-0.0000	180.3968	9.6631	---					
37	Molar Enthalpy (kJ/kgmole)	-1.236e+005	-1.156e+005	-1.254e+005	---					
38	Molar Entropy (kJ/kgmole-C)	91.66	105.3	85.91	---					
39	Heat Flow (kJ/h)	5.4719e-05	-2.3968e+08	-1.2168e+07	9.7106e+06	*				
40	PROPERTIES									
41	Name	89	2	3	4	To Reboiler				
42	Molecular Weight	57.28	61.68	72.63	44.10	79.50				
43	Molar Density (kgmole/m3)	9.727	8.125	8.621	11.11	6.205				
44	Mass Density (kg/m3)	557.2	501.2	626.1	490.1	493.2				
45	Act. Volume Flow (m3/h)	28.00	10.68	9.961	186.5	1787				
46	Mass Enthalpy (kJ/kg)	-2157	-1948	-2423	-2717	-2047				
47	Mass Entropy (kJ/kg-C)	1.604	1.948	1.097	2.069	1.828				
48	Heat Capacity (kJ/kgmole-C)	141.5	182.5	160.8	126.4	252.0				
49	Mass Heat Capacity (kJ/kg-C)	2.471	2.959	2.214	2.867	3.170				
50	Lower Heating Value (kJ/kgmole)	---	---	---	2.045e+006	---				
51	Mass Lower Heating Value (kJ/kg)	---	---	---	4.637e+004	---				
52	Phase Fraction [Vol. Basis]	0.0000	0.0000	0.0000	0.0000	0.0000				
53	Phase Fraction [Mass Basis]	0.0000	0.0000	0.0000	0.0000	0.0000				
54	Partial Pressure of CO2 (kPa)	---	0.0000	0.0000	---	---				
55	Cost Based on Flow (Cost/s)	0.0000	0.0000	0.0000	0.0000	0.0000				
56	Act. Gas Flow (ACT_m3/h)	---	---	---	---	---				
57	Avg. Liq. Density (kgmole/m3)	10.04	9.640	8.587	11.49	8.118				
58	Specific Heat (kJ/kgmole-C)	141.5	182.5	160.8	126.4	252.0				
59	Std. Gas Flow (STD_m3/h)	6440	2051	2030	4.901e+004	2.622e+005				

1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc					
2			Unit Set:	SI					
3			Date/Time:	Friday Sep 4 2015, 16:44:21					
4	Column Sub-Flowsheet: De-C14 (continued)								
5	PROPERTIES								
6	Name	89	2	3	4	To Reboiler			
7	Std. Ideal Liq. Mass Density (kg/m3)	575.1	594.6	623.7	506.7	645.4			
8	Act. Liq. Flow (m3/s)	7.779e-003	2.966e-003	2.767e-003	0.0518	0.4964			
9	Z Factor	5.328e-002	5.354e-002	6.237e-002	4.255e-002	6.028e-002			
10	Watson K	13.57	13.33	13.12	14.70	12.92			
11	User Property	---	---	---	---	---			
12	Cp/(Cp - R)	1.062	1.048	1.055	1.070	1.034			
13	Cp/Cv	1.292	1.306	1.230	1.406	1.034			
14	Heat of Vap. (kJ/kgmole)	1.576e+004	1.767e+004	2.567e+004	1.419e+004	2.300e+004			
15	Kinematic Viscosity (cSt)	0.2631	0.1975	0.3934	0.2000	0.1921			
16	Liq. Mass Density (Std. Cond) (kg/m3)	577.9	598.7	629.2	507.7	648.9			
17	Liq. Vol. Flow (Std. Cond) (m3/h)	27.00	8.939	9.912	180.0	1358			
18	Liquid Fraction	1.000	1.000	1.000	1.000	1.000			
19	Molar Volume (m3/kgmole)	0.1028	0.1231	0.1160	8.997e-002	0.1612			
20	Mass Heat of Vap. (kJ/kg)	275.2	286.4	353.4	321.8	289.3			
21	Phase Fraction [Molar Basis]	0.0000	0.0000	0.0000	0.0000	0.0000			
22	Surface Tension (dyne/cm)	9.954	5.404	14.71	6.666	4.342			
23	Thermal Conductivity (W/m-K)	0.0872	6.993e-002	0.1026	9.374e-002	6.382e-002			
24	Viscosity (cP)	0.1466	9.899e-002	0.2463	9.803e-002	9.473e-002			
25	Partial Pressure of H2S (kPa)	0.0000	0.0000	0.0000	0.0000	0.0000			
26	Cv (Semi-Ideal) (kJ/kgmole-C)	133.2	174.2	152.5	118.1	243.7			
27	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.326	2.824	2.100	2.679	3.065			
28	Cv (kJ/kgmole-C)	109.5	139.8	130.7	89.91	243.7			
29	Mass Cv (kJ/kg-C)	1.912	2.266	1.800	2.039	3.065			
30	Cv (Ent. Method) (kJ/kgmole-C)	---	---	---	---	---			
31	Mass Cv (Ent. Method) (kJ/kg-C)	---	---	---	---	---			
32	Cp/Cv (Ent. Method)	---	---	---	---	---			
33	Reid VP at 37.8 C (kPa)	458.1	345.5	234.1	---	99.59			
34	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	27.00	8.939	9.912	180.0	1358			
35	Name	10	C5+	14	15	5			
36	Molecular Weight	57.28	79.74	57.28	57.28	44.10			
37	Molar Density (kgmole/m3)	0.5120	6.189	9.731	9.731	1.381			
38	Mass Density (kg/m3)	29.33	493.5	557.4	557.4	60.91			
39	Act. Volume Flow (m3/h)	2.741e-034	12.22	38.03	-4.548e-011	1501			
40	Mass Enthalpy (kJ/kg)	-1751	-2044	-2159	-2159	-2622			
41	Mass Entropy (kJ/kg-C)	2.782	1.830	1.600	1.600	2.388			
42	Heat Capacity (kJ/kgmole-C)	122.6	252.7	141.4	141.4	112.2			
43	Mass Heat Capacity (kJ/kg-C)	2.141	3.169	2.469	2.469	2.545			
44	Lower Heating Value (kJ/kgmole)	---	---	---	---	2.045e+006			
45	Mass Lower Heating Value (kJ/kg)	---	---	---	---	4.637e+004			
46	Phase Fraction [Vol. Basis]	1.000	0.0000	0.0000	0.0000	0.9139			
47	Phase Fraction [Mass Basis]	1.000	0.0000	0.0000	0.0000	0.3017			
48	Partial Pressure of CO2 (kPa)	---	0.0000	---	---	---			
49	Cost Based on Flow (Cost/s)	0.0000	0.0000	0.0000	0.0000	0.0000			
50	Act. Gas Flow (ACT_m3/h)	2.741e-034	---	---	---	---			
51	Avg. Liq. Density (kgmole/m3)	10.04	8.100	10.04	10.04	11.49			
52	Specific Heat (kJ/kgmole-C)	122.6	252.7	141.4	141.4	112.2			
53	Std. Gas Flow (STD_m3/h)	3.318e-033	1788	8750	-1.046e-008	4.901e+004			
54	Std. Ideal Liq. Mass Density (kg/m3)	575.1	645.9	575.1	575.1	506.7			
55	Act. Liq. Flow (m3/s)	0.0000	3.395e-003	1.056e-002	-1.263e-014	3.589e-002			
56	Z Factor	0.7808	5.985e-002	4.775e-002	4.775e-002	---			
57	Watson K	13.57	12.92	13.57	13.57	14.70			
58	User Property	---	---	---	---	---			
59	Cp/(Cp - R)	1.073	1.034	1.062	1.062	1.080			
60	Cp/Cv	1.197	1.034	1.293	1.293	1.050			
61	Heat of Vap. (kJ/kgmole)	1.634e+004	2.317e+004	1.632e+004	1.632e+004	1.499e+004			
62	Kinematic Viscosity (cSt)	0.3283	0.1922	0.2641	0.2641	---			
63	Liq. Mass Density (Std. Cond) (kg/m3)	577.9	649.5	577.9	577.9	507.7			
64	Honeywell International Inc.	UniSim Design (R430 build 18059)			Page 4 of 170				
65	Licensed to: Company Name Not Available	Printed by: alu0100514599			* Specified by user.				

1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc					
2			Unit Set:	SI					
3			Date/Time:	Friday Sep 4 2015, 16:44:21					
4	Column Sub-Flowsheet: De-C14 (continued)								
5	PROPERTIES								
11	Name	10	C5+	14	15	5			
12	Liq. Vol. Flow (Std. Cond) (m3/h)	1.391e-035	9.285	36.68	-4.386e-011	180.0			
13	Liquid Fraction	0.0000	1.000	1.000	1.000	0.6983			
14	Molar Volume (m3/kgmole)	1.953	0.1616	0.1028	0.1028	0.7239			
15	Mass Heat of Vap. (kJ/kg)	285.3	290.5	284.9	284.9	339.9			
16	Phase Fraction [Molar Basis]	1.0000	0.0000	0.0000	0.0000	0.3017			
17	Surface Tension (dyne/cm)	---	4.348	10.01	10.01	7.013			
18	Thermal Conductivity (W/m-K)	2.254e-002	6.384e-002	8.738e-002	8.738e-002	---			
19	Viscosity (cP)	9.629e-003	9.487e-002	0.1472	0.1472	---			
20	Partial Pressure of H2S (kPa)	0.0000	0.0000	0.0000	0.0000	0.0000			
21	Cv (Semi-Ideal) (kJ/kgmole-C)	114.3	244.4	133.1	133.1	103.9			
22	Mass Cv (Semi-Ideal) (kJ/kg-C)	1.996	3.065	2.324	2.324	2.357			
23	Cv (kJ/kgmole-C)	102.4	244.4	109.3	109.3	106.9			
24	Mass Cv (kJ/kg-C)	1.788	3.065	1.909	1.909	2.424			
25	Cv (Ent. Method) (kJ/kgmole-C)	102.6	---	---	---	---			
26	Mass Cv (Ent. Method) (kJ/kg-C)	1.790	---	---	---	---			
27	Cp/Cv (Ent. Method)	1.196	---	---	---	---			
28	Reid VP at 37.8 C (kPa)	458.0	98.37	458.1	458.1	---			
29	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	1.391e-035	9.285	36.68	-4.386e-011	180.0			
30	Name	C4s To Storage							
31	Molecular Weight	57.28							
32	Molar Density (kgmole/m3)	9.983							
33	Mass Density (kg/m3)	571.8							
34	Act. Volume Flow (m3/h)	9.718							
35	Mass Enthalpy (kJ/kg)	-2190							
36	Mass Entropy (kJ/kg-C)	1.500							
37	Heat Capacity (kJ/kgmole-C)	136.0							
38	Mass Heat Capacity (kJ/kg-C)	2.374							
39	Lower Heating Value (kJ/kgmole)	---							
40	Mass Lower Heating Value (kJ/kg)	---							
41	Phase Fraction [Vol. Basis]	0.0000							
42	Phase Fraction [Mass Basis]	0.0000							
43	Partial Pressure of CO2 (kPa)	0.0000							
44	Cost Based on Flow (Cost/s)	0.0000							
45	Act. Gas Flow (ACT_m3/h)	---							
46	Avg. Liq. Density (kgmole/m3)	10.04							
47	Specific Heat (kJ/kgmole-C)	136.0							
48	Std. Gas Flow (STD_m3/h)	2294							
49	Std. Ideal Liq. Mass Density (kg/m3)	575.1							
50	Act. Liq. Flow (m3/s)	2.699e-003							
51	Z Factor	2.402e-002							
52	Watson K	13.57							
53	User Property	---							
54	Cp/(Cp - R)	1.065							
55	Cp/Cv	1.295							
56	Heat of Vap. (kJ/kgmole)	1.892e+004							
57	Kinematic Viscosity (cSt)	0.2896							
58	Liq. Mass Density (Std. Cond) (kg/m3)	577.9							
59	Liq. Vol. Flow (Std. Cond) (m3/h)	9.615							
60	Liquid Fraction	1.000							
61	Molar Volume (m3/kgmole)	0.1002							
62	Mass Heat of Vap. (kJ/kg)	330.3							
63	Phase Fraction [Molar Basis]	0.0000							
64	Surface Tension (dyne/cm)	11.47							
65	Thermal Conductivity (W/m-K)	9.187e-002							
66	Viscosity (cP)	0.1656							
67	Partial Pressure of H2S (kPa)	0.0000							
68	Cv (Semi-Ideal) (kJ/kgmole-C)	127.7							

1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc							
2			Unit Set:	SI							
3			Date/Time:	Friday Sep 4 2015, 16:44:21							
4	Column Sub-Flowsheet: De-C14 (continued)										
5	PROPERTIES										
6	Name	C4s To Storage									
7	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.229									
8	Cv (kJ/kgmole-C)	105.0									
9	Mass Cv (kJ/kg-C)	1.834									
10	Cv (Ent. Method) (kJ/kgmole-C)	---									
11	Mass Cv (Ent. Method) (kJ/kg-C)	---									
12	Cp/Cv (Ent. Method)	---									
13	Reid VP at 37.8 C (kPa)	458.1									
14	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	9.615									
15	STATUS										
16	OK										
17	NOTES										
18	Description										
19	Valve: FV102										
20	CONNECTIONS										
21	Inlet Stream										
22	STREAM NAME	FROM UNIT OPERATION									
23	20	Valve	FV102A								
24	Outlet Stream										
25	STREAM NAME	TO UNIT OPERATION									
26	37	Valve	FV102B								
27	PARAMETERS										
28	Physical Properties										
29	Pressure Drop:	287.4 kPa									
30	User Variables										
31	CONDITIONS										
32	Name	20	37								
33	Vapour	0.0000	0.0000								
34	Temperature (C)	90.0379	89.9199								
35	Pressure (kPa)	1600.6087	1313.2046								
36	Molar Flow (kgmole/h)	86.7631	86.7631								
37	Mass Flow (kg/h)	5351.6186	5351.6186								
38	Std Ideal Liq Vol Flow (m3/h)	9.0000	9.0000								
39	Molar Enthalpy (kJ/kgmole)	-1.202e+005	-1.202e+005								
40	Molar Entropy (kJ/kgmole-C)	120.1	120.2								
41	Heat Flow (kJ/h)	-1.0427e+007	-1.0427e+007								
42	Properties										
43	Name	20	37								
44	Molecular Weight	61.68	61.68								
45	Molar Density (kgmole/m3)	8.151	8.125								
46	Mass Density (kg/m3)	502.8	501.2								
47	Act. Volume Flow (m3/h)	10.64	10.68								
48	Mass Enthalpy (kJ/kg)	-1948	-1948								
49	Honeywell International Inc.	UniSim Design (R430 build 18059)			Page 6 of 170						
50	Licensed to: Company Name Not Available										
51	Printed by: alu0100514599										
52	* Specified by user.										

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21

Valve: FV102 (continued)

PROPERTIES

11	Name	20	37		
12	Mass Entropy (kJ/kg-C)	1.946	1.948		
13	Heat Capacity (kJ/kgmole-C)	181.4	182.5		
14	Mass Heat Capacity (kJ/kg-C)	2.941	2.959		
15	Lower Heating Value (kJ/kgmole)	---	---		
16	Mass Lower Heating Value (kJ/kg)	---	---		
17	Phase Fraction [Vol. Basis]	0.0000	0.0000		
18	Phase Fraction [Mass Basis]	0.0000	0.0000		
19	Partial Pressure of CO2 (kPa)	---	---		
20	Cost Based on Flow (Cost/s)	0.0000	0.0000		
21	Act. Gas Flow (ACT_m3/h)	---	---		
22	Avg. Liq. Density (kgmole/m3)	9.640	9.640		
23	Specific Heat (kJ/kgmole-C)	181.4	182.5		
24	Std. Gas Flow (STD_m3/h)	2051	2051		
25	Std. Ideal Liq. Mass Density (kg/m3)	594.6	594.6		
26	Act. Liq. Flow (m3/s)	2.957e-003	2.966e-003		
27	Z Factor	6.503e-002	5.354e-002		
28	Watson K	13.33	13.33		
29	User Property	---	---		
30	Cp/(Cp - R)	1.048	1.048		
31	Cp/Cv	1.298	1.306		
32	Heat of Vap. (kJ/kgmole)	1.640e+004	1.767e+004		
33	Kinematic Viscosity (cSt)	0.1971	0.1975		
34	Liq. Mass Density (Std. Cond) (kg/m3)	598.7	598.7		
35	Liq. Vol. Flow (Std. Cond) (m3/h)	8.939	8.939		
36	Liquid Fraction	1.000	1.000		
37	Molar Volume (m3/kgmole)	0.1227	0.1231		
38	Mass Heat of Vap. (kJ/kg)	265.9	286.4		
39	Phase Fraction [Molar Basis]	0.0000	0.0000		
40	Surface Tension (dyne/cm)	5.393	5.404		
41	Thermal Conductivity (W/m-K)	6.988e-002	6.993e-002		
42	Viscosity (cP)	9.911e-002	9.899e-002		
43	Partial Pressure of H2S (kPa)	0.0000	0.0000		
44	Cv (Semi-Ideal) (kJ/kgmole-C)	173.1	174.2		
45	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.806	2.824		
46	Cv (kJ/kgmole-C)	139.7	139.8		
47	Mass Cv (kJ/kg-C)	2.265	2.266		
48	Cv (Ent. Method) (kJ/kgmole-C)	---	---		
49	Mass Cv (Ent. Method) (kJ/kg-C)	---	---		
50	Cp/Cv (Ent. Method)	---	---		
51	Reid VP at 37.8 C (kPa)	345.5	345.5		
52	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	8.939	8.939		

STATUS

OK

NOTES

Description

Valve: DBFV202

CONNECTIONS

Inlet Stream

1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc										
2			Unit Set:	SI										
3			Date/Time:	Friday Sep 4 2015, 16:44:21										
4	Valve: DBFV202 (continued)													
5	CONNECTIONS													
6	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">STREAM NAME</th> <th colspan="3">FROM UNIT OPERATION</th> <th></th> </tr> </thead> <tbody> <tr> <td>Feed 1</td> <td>Valve</td> <td></td> <td></td> <td>FV202A</td> </tr> </tbody> </table>				STREAM NAME	FROM UNIT OPERATION				Feed 1	Valve			FV202A
STREAM NAME	FROM UNIT OPERATION													
Feed 1	Valve			FV202A										
7	Outlet Stream													
8	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">STREAM NAME</th> <th colspan="3">TO UNIT OPERATION</th> <th></th> </tr> </thead> <tbody> <tr> <td>49</td> <td>Valve</td> <td></td> <td></td> <td>FV202B</td> </tr> </tbody> </table>				STREAM NAME	TO UNIT OPERATION				49	Valve			FV202B
STREAM NAME	TO UNIT OPERATION													
49	Valve			FV202B										
9	PARAMETERS													
10	Physical Properties													
11	Pressure Drop:	53.89 kPa												
12	User Variables													
13	CONDITIONS													
14	Name	Feed 1	49											
15	Vapour	0.0000	0.0000											
16	Temperature (C)	20.1734	20.1941											
17	Pressure (kPa)	1365.3860	1311.4948											
18	Molar Flow (kgmole/h)	85.8731	85.8731											
19	Mass Flow (kg/h)	6236.5679	6236.5679											
20	Std Ideal Liq Vol Flow (m3/h)	10.0000	10.0000											
21	Molar Enthalpy (kJ/kgmole)	-1.759e+005	-1.759e+005											
22	Molar Entropy (kJ/kgmole-C)	79.66	79.68											
23	Heat Flow (kJ/h)	-1.5109e+07	-1.5109e+07											
24	PROPERTIES													
25	Name	Feed 1	49											
26	Molecular Weight	72.63	72.63											
27	Molar Density (kgmole/m3)	8.623	8.621											
28	Mass Density (kg/m3)	626.2	626.1											
29	Act. Volume Flow (m3/h)	9.959	9.961											
30	Mass Enthalpy (kJ/kg)	-2423	-2423											
31	Mass Entropy (kJ/kg-C)	1.097	1.097											
32	Heat Capacity (kJ/kgmole-C)	160.8	160.8											
33	Mass Heat Capacity (kJ/kg-C)	2.214	2.214											
34	Lower Heating Value (kJ/kgmole)	---	---											
35	Mass Lower Heating Value (kJ/kg)	---	---											
36	Phase Fraction [Vol. Basis]	0.0000	0.0000											
37	Phase Fraction [Mass Basis]	0.0000	0.0000											
38	Partial Pressure of CO2 (kPa)	---	---											
39	Cost Based on Flow (Cost/s)	0.0000	0.0000											
40	Act. Gas Flow (ACT_m3/h)	---	---											
41	Avg. Liq. Density (kgmole/m3)	8.587	8.587											
42	Specific Heat (kJ/kgmole-C)	160.8	160.8											
43	Std. Gas Flow (STD_m3/h)	2030	2030											
44	Std. Ideal Liq. Mass Density (kg/m3)	623.7	623.7											
45	Act. Liq. Flow (m3/s)	2.766e-003	2.767e-003											
46	Z Factor	6.493e-002	6.237e-002											
47	Watson K	13.12	13.12											
48	User Property	---	---											
49	Cp/(Cp - R)	1.055	1.055											
50	Cp/Cv	1.230	1.230											
51	Heat of Vap. (kJ/kgmole)	2.535e+004	2.567e+004											
52	Kinematic Viscosity (cSt)	0.3934	0.3934											
53	Liq. Mass Density (Std. Cond) (kg/m3)	629.2	629.2											
54	Liq. Vol. Flow (Std. Cond) (m3/h)	9.912	9.912											
55	Liquid Fraction	1.000	1.000											

1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc			
2			Unit Set:	SI			
3			Date/Time:	Friday Sep 4 2015, 16:44:21			
4	Valve: DBFV202 (continued)						
5	PROPERTIES						
6	Name	Feed 1	49				
7	Molar Volume (m ³ /kgmole)	0.1160	0.1160				
8	Mass Heat of Vap. (kJ/kg)	349.1	353.4				
9	Phase Fraction [Molar Basis]	0.0000	0.0000				
10	Surface Tension (dyne/cm)	14.71	14.71				
11	Thermal Conductivity (W/m-K)	0.1026	0.1026				
12	Viscosity (cP)	0.2464	0.2463				
13	Partial Pressure of H ₂ S (kPa)	0.0000	0.0000				
14	C _v (Semi-Ideal) (kJ/kgmole-C)	152.5	152.5				
15	Mass C _v (Semi-Ideal) (kJ/kg-C)	2.100	2.100				
16	C _v (kJ/kgmole-C)	130.7	130.7				
17	Mass C _v (kJ/kg-C)	1.800	1.800				
18	C _v (Ent. Method) (kJ/kgmole-C)	---	---				
19	Mass C _v (Ent. Method) (kJ/kg-C)	---	---				
20	Cp/C _v (Ent. Method)	---	---				
21	Reid VP at 37.8 C (kPa)	234.1	234.1				
22	Liq. Vol. Flow - Sum(Std. Cond) (m ³ /h)	9.912	9.912				
23	STATUS						
24	OK						
25	NOTES						
26							
27							
28	Description						
29							
30							
31							
32							
33							
34							
35							
36							
37	Valve: DBLV101						
38							
39	CONNECTIONS						
40							
41							
42	Inlet Stream						
43							
44	STREAM NAME	FROM UNIT OPERATION					
45	C5+	Material Stream					
46	Outlet Stream						
47							
48	STREAM NAME	TO UNIT OPERATION					
49	C5+ To Storage	Heat Exchanger					
50	PARAMETERS						
51							
52	Physical Properties						
53							
54	Pressure Drop:	761.8 kPa					
55	User Variables						
56							
57	CONDITIONS						
58							
59	Name	C5+	C5+ To Storage				
60	Vapour	0.0000	0.4183				
61	Temperature (C)	147.8989	109.4184				
62	Pressure (kPa)	1296.7479	534.9466				
63	Molar Flow (kgmole/h)	75.6336	75.6336				
64	Mass Flow (kg/h)	6031.3023	6031.3023				
65	Std Ideal Liq Vol Flow (m ³ /h)	9.3371	9.3371				
66	Molar Enthalpy (kJ/kgmole)	-1.630e+005	-1.630e+005				
67	Molar Entropy (kJ/kgmole-C)	145.9	147.6				
68	Heat Flow (kJ/h)	-1.2327e+007	-1.2327e+007				
69	Honeywell International Inc.	UniSim Design (R430 build 18059)					

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
4			

Valve: DBLV101 (continued)

PROPERTIES

11	Name	C5+	C5+ To Storage		
12	Molecular Weight	79.74	79.74		
13	Molar Density (kgmole/m3)	6.189	0.4427		
14	Mass Density (kg/m3)	493.5	35.31		
15	Act. Volume Flow (m3/h)	12.22	170.8		
16	Mass Enthalpy (kJ/kg)	-2044	-2044		
17	Mass Entropy (kJ/kg-C)	1.830	1.851		
18	Heat Capacity (kJ/kgmole-C)	252.7	198.5		
19	Mass Heat Capacity (kJ/kg-C)	3.169	2.490		
20	Lower Heating Value (kJ/kgmole)	---	---		
21	Mass Lower Heating Value (kJ/kg)	---	---		
22	Phase Fraction [Vol. Basis]	0.0000	0.9616		
23	Phase Fraction [Mass Basis]	0.0000	0.3913		
24	Partial Pressure of CO2 (kPa)	0.0000	---		
25	Cost Based on Flow (Cost/s)	0.0000	0.0000		
26	Act. Gas Flow (ACT_m3/h)	---	---		
27	Avg. Liq. Density (kgmole/m3)	8.100	8.100		
28	Specific Heat (kJ/kgmole-C)	252.7	198.5		
29	Std. Gas Flow (STD_m3/h)	1788	1788		
30	Std. Ideal Liq. Mass Density (kg/m3)	645.9	645.9		
31	Act. Liq. Flow (m3/s)	3.395e-003	1.823e-003		
32	Z Factor	5.985e-002	---		
33	Watson K	12.92	12.92		
34	User Property	---	---		
35	Cp/(Cp - R)	1.034	1.044		
36	Cp/Cv	1.034	1.031		
37	Heat of Vap. (kJ/kgmole)	2.317e+004	2.844e+004		
38	Kinematic Viscosity (cSt)	0.1922	---		
39	Liq. Mass Density (Std. Cond) (kg/m3)	649.5	649.5		
40	Liq. Vol. Flow (Std. Cond) (m3/h)	9.285	9.285		
41	Liquid Fraction	1.000	0.5817		
42	Molar Volume (m3/kgmole)	0.1616	2.259		
43	Mass Heat of Vap. (kJ/kg)	290.5	356.7		
44	Phase Fraction [Molar Basis]	0.0000	0.4183		
45	Surface Tension (dyne/cm)	4.348	8.381		
46	Thermal Conductivity (W/m-K)	6.384e-002	---		
47	Viscosity (cP)	9.487e-002	---		
48	Partial Pressure of H2S (kPa)	0.0000	0.0000		
49	Cv (Semi-Ideal) (kJ/kgmole-C)	244.4	190.2		
50	Mass Cv (Semi-Ideal) (kJ/kg-C)	3.065	2.385		
51	Cv (kJ/kgmole-C)	244.4	192.6		
52	Mass Cv (kJ/kg-C)	3.065	2.415		
53	Cv (Ent. Method) (kJ/kgmole-C)	---	---		
54	Mass Cv (Ent. Method) (kJ/kg-C)	---	---		
55	Cp/Cv (Ent. Method)	---	---		
56	Reid VP at 37.8 C (kPa)	98.37	98.37		
57	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	9.285	9.288		

STATUS

OK

NOTES

Description

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc		
2		Unit Set:	SI		
3		Date/Time:	Friday Sep 4 2015, 16:44:21		
4	Valve: P10AVA				
5	CONNECTIONS				
6	Inlet Stream				
7	STREAM NAME	FROM UNIT OPERATION			
8	14	Material Stream			
9	Outlet Stream				
10	STREAM NAME	TO UNIT OPERATION			
11	2	Pump			
12	PARAMETERS				
13	Physical Properties				
14	Pressure Drop:	0.8062 kPa			
15	User Variables				
16	CONDITIONS				
17	Name	14	2		
18	Vapour	0.0000	0.0000		
19	Temperature (C)	33.4840	33.4841		
20	Pressure (kPa)	1184.6514	1183.8452		
21	Molar Flow (kgmole/h)	370.0731	370.0731		
22	Mass Flow (kg/h)	21198.4957	21198.4957		
23	Std Ideal Liq Vol Flow (m3/h)	36.8631	36.8631		
24	Molar Enthalpy (kJ/kgmole)	-1.236e+005	-1.236e+005		
25	Molar Entropy (kJ/kgmole-C)	91.66	91.66		
26	Heat Flow (kJ/h)	-4.5758e+07	-4.5758e+07		
27	PROPERTIES				
28	Name	14	2		
29	Molecular Weight	57.28	57.28		
30	Molar Density (kgmole/m3)	9.731	9.731		
31	Mass Density (kg/m3)	557.4	557.4		
32	Act. Volume Flow (m3/h)	38.03	38.03		
33	Mass Enthalpy (kJ/kg)	-2159	-2159		
34	Mass Entropy (kJ/kg-C)	1.600	1.600		
35	Heat Capacity (kJ/kgmole-C)	141.4	141.4		
36	Mass Heat Capacity (kJ/kg-C)	2.469	2.469		
37	Lower Heating Value (kJ/kgmole)	---	---		
38	Mass Lower Heating Value (kJ/kg)	---	---		
39	Phase Fraction [Vol. Basis]	0.0000	0.0000		
40	Phase Fraction [Mass Basis]	0.0000	0.0000		
41	Partial Pressure of CO2 (kPa)	---	---		
42	Cost Based on Flow (Cost/s)	0.0000	0.0000		
43	Act. Gas Flow (ACT_m3/h)	---	---		
44	Avg. Liq. Density (kgmole/m3)	10.04	10.04		
45	Specific Heat (kJ/kgmole-C)	141.4	141.4		
46	Std. Gas Flow (STD_m3/h)	8750	8750		
47	Std. Ideal Liq. Mass Density (kg/m3)	575.1	575.1		
48	Act. Liq. Flow (m3/s)	1.056e-002	1.056e-002		
49	Z Factor	4.775e-002	4.772e-002		
50	Watson K	13.57	13.57		
51	User Property	---	---		
52	Cp/(Cp - R)	1.062	1.062		
53	Cp/Cv	1.293	1.293		
54	Heat of Vap. (kJ/kgmole)	1.632e+004	1.632e+004		
55	Kinematic Viscosity (cSt)	0.2641	0.2641		
56	Liq. Mass Density (Std. Cond) (kg/m3)	577.9	577.9		

1	Honeywell Company Name Not Available Calgary, Alberta CANADA		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc			
2			Unit Set:	SI			
3			Date/Time:	Friday Sep 4 2015, 16:44:21			
4	Valve: P10AVA (continued)						
5	PROPERTIES						
6	Name	14	2				
7	Liq. Vol. Flow (Std. Cond) (m ³ /h)	36.68	36.68				
8	Liquid Fraction	1.000	1.000				
9	Molar Volume (m ³ /kgmole)	0.1028	0.1028				
10	Mass Heat of Vap. (kJ/kg)	284.9	285.0				
11	Phase Fraction [Molar Basis]	0.0000	0.0000				
12	Surface Tension (dyne/cm)	10.01	10.01				
13	Thermal Conductivity (W/m-K)	8.738e-002	8.738e-002				
14	Viscosity (cP)	0.1472	0.1472				
15	Partial Pressure of H ₂ S (kPa)	0.0000	0.0000				
16	C _v (Semi-Ideal) (kJ/kgmole-C)	133.1	133.1				
17	Mass C _v (Semi-Ideal) (kJ/kg-C)	2.324	2.324				
18	C _v (kJ/kgmole-C)	109.3	109.3				
19	Mass C _v (kJ/kg-C)	1.909	1.909				
20	C _v (Ent. Method) (kJ/kgmole-C)	---	---				
21	Mass C _v (Ent. Method) (kJ/kg-C)	---	---				
22	C _p /C _v (Ent. Method)	---	---				
23	Reid VP at 37.8 C (kPa)	458.1	458.1				
24	Liq. Vol. Flow - Sum(Std. Cond) (m ³ /h)	36.68	36.68				
25	STATUS						
26	OK						
27	NOTES						
28							
29							
30							
31							
32							
33							
34							
35							
36	Description						
37							
38							
39							
40	Valve: P10BVA						
41							
42	CONNECTIONS						
43							
44	Inlet Stream						
45							
46	STREAM NAME	FROM UNIT OPERATION					
47	15	Material Stream					
48	Outlet Stream						
49							
50	STREAM NAME	TO UNIT OPERATION					
51	3	Pump					
52	PARAMETERS						
53							
54	Physical Properties						
55							
56	Pressure Drop:	-1.847e-020 kPa					
57	User Variables						
58							
59	CONDITIONS						
60							
61	Name	15	3				
62	Vapour	0.0000	0.0000				
63	Temperature (C)	33.4840	33.4840				
64	Pressure (kPa)	1184.6514	1184.6514				
65	Molar Flow (kgmole/h)	-0.0000	-0.0000				
66	Mass Flow (kg/h)	-0.0000	-0.0000				
67	Std Ideal Liq Vol Flow (m ³ /h)	-0.0000	-0.0000				
68	Molar Enthalpy (kJ/kgmole)	-1.236e+005	-1.236e+005				
69	Honeywell International Inc.	UniSim Design (R430 build 18059)		Page 12 of 170			

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
4			

Valve: P10BVA (continued)

CONDITIONS

11	Molar Entropy (kJ/kgmole-C)	91.66	91.66		
12	Heat Flow (kJ/h)	5.4719e-05	2.7359e-05		

PROPERTIES

15	Name	15	3		
16	Molecular Weight	57.28	57.28		
17	Molar Density (kgmole/m3)	9.731	9.731		
18	Mass Density (kg/m3)	557.4	557.4		
19	Act. Volume Flow (m3/h)	-4.548e-011	-2.274e-011		
20	Mass Enthalpy (kJ/kg)	-2159	-2159		
21	Mass Entropy (kJ/kg-C)	1.600	1.600		
22	Heat Capacity (kJ/kgmole-C)	141.4	141.4		
23	Mass Heat Capacity (kJ/kg-C)	2.469	2.469		
24	Lower Heating Value (kJ/kgmole)	---	---		
25	Mass Lower Heating Value (kJ/kg)	---	---		
26	Phase Fraction [Vol. Basis]	0.0000	0.0000		
27	Phase Fraction [Mass Basis]	0.0000	0.0000		
28	Partial Pressure of CO2 (kPa)	---	---		
29	Cost Based on Flow (Cost/s)	0.0000	0.0000		
30	Act. Gas Flow (ACT_m3/h)	---	---		
31	Avg. Liq. Density (kgmole/m3)	10.04	10.04		
32	Specific Heat (kJ/kgmole-C)	141.4	141.4		
33	Std. Gas Flow (STD_m3/h)	-1.046e-008	-5.232e-009		
34	Std. Ideal Liq. Mass Density (kg/m3)	575.1	575.1		
35	Act. Liq. Flow (m3/s)	-1.263e-014	-6.316e-015		
36	Z Factor	4.775e-002	4.775e-002		
37	Watson K	13.57	13.57		
38	User Property	---	---		
39	Cp/(Cp - R)	1.062	1.062		
40	Cp/Cv	1.293	1.293		
41	Heat of Vap. (kJ/kgmole)	1.632e+004	1.632e+004		
42	Kinematic Viscosity (cSt)	0.2641	0.2641		
43	Liq. Mass Density (Std. Cond) (kg/m3)	577.9	577.9		
44	Liq. Vol. Flow (Std. Cond) (m3/h)	-4.386e-011	-2.193e-011		
45	Liquid Fraction	1.000	1.000		
46	Molar Volume (m3/kgmole)	0.1028	0.1028		
47	Mass Heat of Vap. (kJ/kg)	284.9	284.9		
48	Phase Fraction [Molar Basis]	0.0000	0.0000		
49	Surface Tension (dyne/cm)	10.01	10.01		
50	Thermal Conductivity (W/m-K)	8.738e-002	8.738e-002		
51	Viscosity (cP)	0.1472	0.1472		
52	Partial Pressure of H2S (kPa)	0.0000	0.0000		
53	Cv (Semi-Ideal) (kJ/kgmole-C)	133.1	133.1		
54	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.324	2.324		
55	Cv (kJ/kgmole-C)	109.3	109.3		
56	Mass Cv (kJ/kg-C)	1.909	1.909		
57	Cv (Ent. Method) (kJ/kgmole-C)	---	---		
58	Mass Cv (Ent. Method) (kJ/kg-C)	---	---		
59	Cp/Cv (Ent. Method)	---	---		
60	Reid VP at 37.8 C (kPa)	458.1	458.1		
61	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	-4.386e-011	-2.193e-011		

STATUS

OK

NOTES

Description

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1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
4	Valve: P10BVA (continued)		
5	NOTES		
6	Description		
7	Valve: P10AVB		
8	CONNECTIONS		
9	Inlet Stream		
10	STREAM NAME	FROM UNIT OPERATION	
11	7	Pump	P10A
12	Outlet Stream		
13	STREAM NAME	TO UNIT OPERATION	
14	8	Mixer	MIX-100
15	PARAMETERS		
16	Physical Properties		
17	Pressure Drop:	0.8047 kPa	
18	User Variables		
19	CONDITIONS		
20	Name	7	8
21	Vapour	0.0000	0.0000
22	Temperature (C)	33.9491	33.9492
23	Pressure (kPa)	1738.0757	1737.2709
24	Molar Flow (kgmole/h)	370.0731	370.0731
25	Mass Flow (kg/h)	21198.4957	21198.4957
26	Std Ideal Liq Vol Flow (m3/h)	36.8631	36.8631
27	Molar Enthalpy (kJ/kgmole)	-1.236e+005	-1.236e+005
28	Molar Entropy (kJ/kgmole-C)	91.73	91.73
29	Heat Flow (kJ/h)	-4.5730e+007	-4.5730e+007
30	PROPERTIES		
31	Name	7	8
32	Molecular Weight	57.28	57.28
33	Molar Density (kgmole/m3)	9.749	9.749
34	Mass Density (kg/m3)	558.4	558.4
35	Act. Volume Flow (m3/h)	37.96	37.96
36	Mass Enthalpy (kJ/kg)	-2157	-2157
37	Mass Entropy (kJ/kg-C)	1.601	1.601
38	Heat Capacity (kJ/kgmole-C)	141.1	141.1
39	Mass Heat Capacity (kJ/kg-C)	2.463	2.463
40	Lower Heating Value (kJ/kgmole)	---	---
41	Mass Lower Heating Value (kJ/kg)	---	---
42	Phase Fraction [Vol. Basis]	0.0000	0.0000
43	Phase Fraction [Mass Basis]	0.0000	0.0000
44	Partial Pressure of CO2 (kPa)	---	---
45	Cost Based on Flow (Cost/s)	0.0000	0.0000
46	Act. Gas Flow (ACT_m3/h)	---	---
47	Avg. Liq. Density (kgmole/m3)	10.04	10.04
48	Specific Heat (kJ/kgmole-C)	141.1	141.1
49	Std. Gas Flow (STD_m3/h)	8750	8750
50	Std. Ideal Liq. Mass Density (kg/m3)	575.1	575.1
51	Act. Liq. Flow (m3/s)	1.054e-002	1.055e-002
52	Z Factor	6.983e-002	6.979e-002

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21

Valve: P10AVB (continued)

PROPERTIES

11	Name	7	8		
12	Watson K	13.57	13.57		
13	User Property	---	---		
14	Cp/(Cp - R)	1.063	1.063		
15	Cp/Cv	1.289	1.289		
16	Heat of Vap. (kJ/kgmole)	1.411e+004	1.412e+004		
17	Kinematic Viscosity (cSt)	0.2631	0.2631		
18	Liq. Mass Density (Std. Cond) (kg/m3)	577.9	577.9		
19	Liq. Vol. Flow (Std. Cond) (m3/h)	36.68	36.68		
20	Liquid Fraction	1.000	1.000		
21	Molar Volume (m3/kgmole)	0.1026	0.1026		
22	Mass Heat of Vap. (kJ/kg)	246.4	246.4		
23	Phase Fraction [Molar Basis]	0.0000	0.0000		
24	Surface Tension (dyne/cm)	9.960	9.960		
25	Thermal Conductivity (W/m-K)	8.722e-002	8.722e-002		
26	Viscosity (cP)	0.1469	0.1469		
27	Partial Pressure of H2S (kPa)	0.0000	0.0000		
28	Cv (Semi-Ideal) (kJ/kgmole-C)	132.8	132.8		
29	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.318	2.318		
30	Cv (kJ/kgmole-C)	109.5	109.5		
31	Mass Cv (kJ/kg-C)	1.911	1.911		
32	Cv (Ent. Method) (kJ/kgmole-C)	---	---		
33	Mass Cv (Ent. Method) (kJ/kg-C)	---	---		
34	Cp/Cv (Ent. Method)	---	---		
35	Reid VP at 37.8 C (kPa)	458.1	458.1		
36	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	36.68	36.68		

STATUS

OK

NOTES

Description

Valve: P10BVB

CONNECTIONS

Inlet Stream

53	STREAM NAME	FROM UNIT OPERATION
54	6	Pump

Outlet Stream

57	STREAM NAME	TO UNIT OPERATION
58	9	Mixer

PARAMETERS

Physical Properties

63	Pressure Drop:	-552.6 kPa	
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User Variables

CONDITIONS

68	Name	6	9	
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69	Honeywell International Inc.	UniSim Design (R430 build 18059)	Page 15 of 170
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1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2			Unit Set:	SI
3			Date/Time:	Friday Sep 4 2015, 16:44:21
4	Valve: P10BVB (continued)			
5	CONDITIONS			
6	Vapour	0.0004	0.0004	
7	Temperature (C)	29.3221	33.9492	
8	Pressure (kPa)	1184.6514	1737.2709	
9	Molar Flow (kgmole/h)	-0.0000	-0.0000	
10	Mass Flow (kg/h)	-0.0000	-0.0000	
11	Std Ideal Liq Vol Flow (m3/h)	-0.0000	-0.0000	
12	Molar Enthalpy (kJ/kgmole)	-1.272e+005	-1.236e+005	
13	Molar Entropy (kJ/kgmole-C)	90.15	91.73	
14	Heat Flow (kJ/h)	2.4626e-28	1.6762e-04	
15	PROPERTIES			
16	Name	6	9	
17	Molecular Weight	58.43	57.28	
18	Molar Density (kgmole/m3)	9.654	9.729	
19	Mass Density (kg/m3)	564.0	557.3	
20	Act. Volume Flow (m3/h)	-2.005e-034	-1.394e-010	
21	Mass Enthalpy (kJ/kg)	-2178	-2157	
22	Mass Entropy (kJ/kg-C)	1.543	1.601	
23	Heat Capacity (kJ/kgmole-C)	140.9	141.1	
24	Mass Heat Capacity (kJ/kg-C)	2.412	2.463	
25	Lower Heating Value (kJ/kgmole)	---	---	
26	Mass Lower Heating Value (kJ/kg)	---	---	
27	Phase Fraction [Vol. Basis]	7.056e-003	2.352e-003	
28	Phase Fraction [Mass Basis]	2.351e-004	3.712e-004	
29	Partial Pressure of CO2 (kPa)	---	---	
30	Cost Based on Flow (Cost/s)	0.0000	0.0000	
31	Act. Gas Flow (ACT_m3/h)	---	---	
32	Avg. Liq. Density (kgmole/m3)	9.982	10.04	
33	Specific Heat (kJ/kgmole-C)	140.9	141.1	
34	Std. Gas Flow (STD_m3/h)	-4.577e-032	-3.207e-008	
35	Std. Ideal Liq. Mass Density (kg/m3)	583.2	575.1	
36	Act. Liq. Flow (m3/s)	-5.530e-038	-3.864e-014	
37	Z Factor	---	---	
38	Watson K	13.42	13.57	
39	User Property	---	---	
40	Cp/(Cp - R)	1.063	1.063	
41	Cp/Cv	1.109	1.210	
42	Heat of Vap. (kJ/kgmole)	2.564e+004	1.412e+004	
43	Kinematic Viscosity (cSt)	---	---	
44	Liq. Mass Density (Std. Cond) (kg/m3)	583.7	577.9	
45	Liq. Vol. Flow (Std. Cond) (m3/h)	-1.937e-034	-1.345e-010	
46	Liquid Fraction	0.9996	0.9996	
47	Molar Volume (m3/kgmole)	0.1036	0.1028	
48	Mass Heat of Vap. (kJ/kg)	438.8	246.4	
49	Phase Fraction [Molar Basis]	0.0004	0.0004	
50	Surface Tension (dyne/cm)	10.75	9.960	
51	Thermal Conductivity (W/m-K)	---	---	
52	Viscosity (cP)	---	---	
53	Partial Pressure of H2S (kPa)	0.0000	0.0000	
54	Cv (Semi-Ideal) (kJ/kgmole-C)	132.6	132.8	
55	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.270	2.318	
56	Cv (kJ/kgmole-C)	127.1	116.6	
57	Mass Cv (kJ/kg-C)	2.175	2.036	
58	Cv (Ent. Method) (kJ/kgmole-C)	---	---	
59	Mass Cv (Ent. Method) (kJ/kg-C)	---	---	
60	Cp/Cv (Ent. Method)	---	---	
61	Reid VP at 37.8 C (kPa)	514.6	458.1	
62	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	-1.937e-034	-1.345e-010	
63	Honeywell International Inc.			
64	UniSim Design (R430 build 18059)			
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1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
4	Valve: P10BVB (continued)		
5	STATUS		
6	OK		
7	NOTES		
8			
9	Description		
10			
11	Valve: FV103A		
12	CONNECTIONS		
13	Inlet Stream		
14			
15	STREAM NAME	FROM UNIT OPERATION	
16	12	Tee	TEE-100
17	Outlet Stream		
18			
19	STREAM NAME	TO UNIT OPERATION	
20	17	Valve	DBFV103
21	PARAMETERS		
22			
23	Physical Properties		
24			
25	Pressure Drop:	0.4360 kPa	
26	User Variables		
27			
28	CONDITIONS		
29			
30	Name	12	17
31	Vapour	0.0000	0.0000
32	Temperature (C)	33.9492	33.9492
33	Pressure (kPa)	1737.2709	1736.8350
34	Molar Flow (kgmole/h)	272.3873	272.3873
35	Mass Flow (kg/h)	15602.8662	15602.8661
36	Std Ideal Liq Vol Flow (m3/h)	27.1326	27.1326
37	Molar Enthalpy (kJ/kgmole)	-1.236e+005	-1.236e+005
38	Molar Entropy (kJ/kgmole-C)	91.73	91.73
39	Heat Flow (kJ/h)	-3.3659e+07	-3.3659e+07
40	PROPERTIES		
41			
42	Name	12	17
43	Molecular Weight	57.28	57.28
44	Molar Density (kgmole/m3)	9.749	9.748
45	Mass Density (kg/m3)	558.4	558.4
46	Act. Volume Flow (m3/h)	27.94	27.94
47	Mass Enthalpy (kJ/kg)	-2157	-2157
48	Mass Entropy (kJ/kg-C)	1.601	1.601
49	Heat Capacity (kJ/kgmole-C)	141.1	141.1
50	Mass Heat Capacity (kJ/kg-C)	2.463	2.463
51	Lower Heating Value (kJ/kgmole)	---	---
52	Mass Lower Heating Value (kJ/kg)	---	---
53	Phase Fraction [Vol. Basis]	0.0000	0.0000
54	Phase Fraction [Mass Basis]	0.0000	0.0000
55	Partial Pressure of CO2 (kPa)	---	---
56	Cost Based on Flow (Cost/s)	0.0000	0.0000
57	Act. Gas Flow (ACT_m3/h)	---	---
58	Avg. Liq. Density (kgmole/m3)	10.04	10.04

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21

Valve: FV103A (continued)

PROPERTIES

11	Name	12	17		
12	Specific Heat (kJ/kgmole-C)	141.1	141.1		
13	Std. Gas Flow (STD_m3/h)	6440	6440		
14	Std. Ideal Liq. Mass Density (kg/m3)	575.1	575.1		
15	Act. Liq. Flow (m3/s)	7.762e-003	7.762e-003		
16	Z Factor	6.979e-002	6.978e-002		
17	Watson K	13.57	13.57		
18	User Property	---	---		
19	Cp/(Cp - R)	1.063	1.063		
20	Cp/Cv	1.289	1.289		
21	Heat of Vap. (kJ/kgmole)	1.412e+004	1.412e+004		
22	Kinematic Viscosity (cSt)	0.2631	0.2631		
23	Liq. Mass Density (Std. Cond) (kg/m3)	577.9	577.9		
24	Liq. Vol. Flow (Std. Cond) (m3/h)	27.00	27.00		
25	Liquid Fraction	1.000	1.000		
26	Molar Volume (m3/kgmole)	0.1026	0.1026		
27	Mass Heat of Vap. (kJ/kg)	246.4	246.5		
28	Phase Fraction [Molar Basis]	0.0000	0.0000		
29	Surface Tension (dyne/cm)	9.960	9.960		
30	Thermal Conductivity (W/m-K)	8.722e-002	8.722e-002		
31	Viscosity (cP)	0.1469	0.1469		
32	Partial Pressure of H2S (kPa)	0.0000	0.0000		
33	Cv (Semi-Ideal) (kJ/kgmole-C)	132.8	132.8		
34	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.318	2.318		
35	Cv (kJ/kgmole-C)	109.5	109.5		
36	Mass Cv (kJ/kg-C)	1.911	1.911		
37	Cv (Ent. Method) (kJ/kgmole-C)	---	---		
38	Mass Cv (Ent. Method) (kJ/kg-C)	---	---		
39	Cp/Cv (Ent. Method)	---	---		
40	Reid VP at 37.8 C (kPa)	458.1	458.1		
41	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	27.00	27.00		

STATUS

OK

NOTES

Description

Valve: FV103B

CONNECTIONS

Inlet Stream

58	STREAM NAME	FROM UNIT OPERATION
59	16	Valve DBFV103

Outlet Stream

62	STREAM NAME	TO UNIT OPERATION
63	18	Mixer MIX-100-2

PARAMETERS

Physical Properties

68	Pressure Drop:	0.4369 kPa
69	Honeywell International Inc.	UniSim Design (R430 build 18059) Page 18 of 170

1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2			Unit Set:	SI
3			Date/Time:	Friday Sep 4 2015, 16:44:21
4	Valve: FV103B (continued)			
5	User Variables			
6	CONDITIONS			
7	Name	16	18	
8	Vapour	0.0000	0.0000	
9	Temperature (C)	34.0036	34.0037	
10	Pressure (kPa)	1323.8926	1323.4556	
11	Molar Flow (kgmole/h)	272.3873	272.3873	
12	Mass Flow (kg/h)	15602.8661	15602.8661	
13	Std Ideal Liq Vol Flow (m3/h)	27.1326	27.1326	
14	Molar Enthalpy (kJ/kgmole)	-1.236e+005	-1.236e+005	
15	Molar Entropy (kJ/kgmole-C)	91.87	91.87	
16	Heat Flow (kJ/h)	-3.3659e+007	-3.3659e+007	
17	PROPERTIES			
18	Name	16	18	
19	Molecular Weight	57.28	57.28	
20	Molar Density (kgmole/m3)	9.727	9.727	
21	Mass Density (kg/m3)	557.2	557.2	
22	Act. Volume Flow (m3/h)	28.00	28.00	
23	Mass Enthalpy (kJ/kg)	-2157	-2157	
24	Mass Entropy (kJ/kg-C)	1.604	1.604	
25	Heat Capacity (kJ/kgmole-C)	141.5	141.5	
26	Mass Heat Capacity (kJ/kg-C)	2.471	2.471	
27	Lower Heating Value (kJ/kgmole)	---	---	
28	Mass Lower Heating Value (kJ/kg)	---	---	
29	Phase Fraction [Vol. Basis]	0.0000	0.0000	
30	Phase Fraction [Mass Basis]	0.0000	0.0000	
31	Partial Pressure of CO2 (kPa)	---	---	
32	Cost Based on Flow (Cost/s)	0.0000	0.0000	
33	Act. Gas Flow (ACT_m3/h)	---	---	
34	Avg. Liq. Density (kgmole/m3)	10.04	10.04	
35	Specific Heat (kJ/kgmole-C)	141.5	141.5	
36	Std. Gas Flow (STD_m3/h)	6440	6440	
37	Std. Ideal Liq. Mass Density (kg/m3)	575.1	575.1	
38	Act. Liq. Flow (m3/s)	7.779e-003	7.779e-003	
39	Z Factor	0.0533	5.328e-002	
40	Watson K	13.57	13.57	
41	User Property	---	---	
42	Cp/(Cp - R)	1.062	1.062	
43	Cp/Cv	1.292	1.292	
44	Heat of Vap. (kJ/kgmole)	1.576e+004	1.576e+004	
45	Kinematic Viscosity (cSt)	0.2631	0.2631	
46	Liq. Mass Density (Std. Cond) (kg/m3)	577.9	577.9	
47	Liq. Vol. Flow (Std. Cond) (m3/h)	27.00	27.00	
48	Liquid Fraction	1.000	1.000	
49	Molar Volume (m3/kgmole)	0.1028	0.1028	
50	Mass Heat of Vap. (kJ/kg)	275.1	275.2	
51	Phase Fraction [Molar Basis]	0.0000	0.0000	
52	Surface Tension (dyne/cm)	9.954	9.954	
53	Thermal Conductivity (W/m-K)	0.0872	0.0872	
54	Viscosity (cP)	0.1466	0.1466	
55	Partial Pressure of H2S (kPa)	0.0000	0.0000	
56	Cv (Semi-Ideal) (kJ/kgmole-C)	133.2	133.2	
57	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.326	2.326	
58	Cv (kJ/kgmole-C)	109.5	109.5	
59	Mass Cv (kJ/kg-C)	1.912	1.912	
60	Cv (Ent. Method) (kJ/kgmole-C)	---	---	
61	Mass Cv (Ent. Method) (kJ/kg-C)	---	---	
62	Honeywell International Inc.			
63	UniSim Design (R430 build 18059)			
64	Page 19 of 170			

1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc		
2			Unit Set:	SI		
3			Date/Time:	Friday Sep 4 2015, 16:44:21		
4	Valve: FV103B (continued)					
5	PROPERTIES					
6	Name	16	18			
7	Cp/Cv (Ent. Method)	---	---			
8	Reid VP at 37.8 C (kPa)	458.1	458.1			
9	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	27.00	27.00			
10	STATUS					
11	OK					
12	NOTES					
13	Description					
14	Valve: FV103C					
15	CONNECTIONS					
16	Inlet Stream					
17	STREAM NAME	FROM UNIT OPERATION				
18	13	Tee	TEE-100			
19	Outlet Stream					
20	STREAM NAME	TO UNIT OPERATION				
21	19	Mixer	MIX-100-2			
22	PARAMETERS					
23	Physical Properties					
24	Pressure Drop:	413.8 kPa				
25	User Variables					
26	CONDITIONS					
27	Name	13	19			
28	Vapour	0.0000	0.0000			
29	Temperature (C)	33.9492	34.0037			
30	Pressure (kPa)	1737.2709	1323.4556			
31	Molar Flow (kgmole/h)	0.0000	-0.0000			
32	Mass Flow (kg/h)	0.0000	-0.0000			
33	Std Ideal Liq Vol Flow (m3/h)	0.0000	-0.0000			
34	Molar Enthalpy (kJ/kgmole)	-1.236e+005	-1.236e+005			
35	Molar Entropy (kJ/kgmole-C)	91.73	91.87			
36	Heat Flow (kJ/h)	-1.7946e-28	2.3205e-06			
37	PROPERTIES					
38	Name	13	19			
39	Molecular Weight	57.28	57.28			
40	Molar Density (kgmole/m3)	9.749	9.727			
41	Mass Density (kg/m3)	558.4	557.2			
42	Act. Volume Flow (m3/h)	1.490e-034	-1.931e-012			
43	Mass Enthalpy (kJ/kg)	-2157	-2157			
44	Mass Entropy (kJ/kg-C)	1.601	1.604			
45	Heat Capacity (kJ/kgmole-C)	141.1	141.5			
46	Mass Heat Capacity (kJ/kg-C)	2.463	2.471			
47	Lower Heating Value (kJ/kgmole)	---	---			
48	Mass Lower Heating Value (kJ/kg)	---	---			
49	Honeywell International Inc.					
50	UniSim Design (R430 build 18059)					
51	Page 20 of 170					
52	* Specified by user.					

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
4			
5			

Valve: FV103C (continued)

PROPERTIES

11	Name	13	19
12	Phase Fraction [Vol. Basis]	0.0000	0.0000
13	Phase Fraction [Mass Basis]	0.0000	0.0000
14	Partial Pressure of CO2 (kPa)	---	---
15	Cost Based on Flow (Cost/s)	0.0000	0.0000
16	Act. Gas Flow (ACT_m3/h)	---	---
17	Avg. Liq. Density (kgmole/m3)	10.04	10.04
18	Specific Heat (kJ/kgmole-C)	141.1	141.5
19	Std. Gas Flow (STD_m3/h)	3.434e-032	-4.440e-010
20	Std. Ideal Liq. Mass Density (kg/m3)	575.1	575.1
21	Act. Liq. Flow (m3/s)	4.138e-038	-5.363e-016
22	Z Factor	6.979e-002	5.328e-002
23	Watson K	13.57	13.57
24	User Property	---	---
25	Cp/(Cp - R)	1.063	1.062
26	Cp/Cv	1.289	1.292
27	Heat of Vap. (kJ/kgmole)	1.412e+004	1.576e+004
28	Kinematic Viscosity (cSt)	0.2631	0.2631
29	Liq. Mass Density (Std. Cond) (kg/m3)	577.9	577.9
30	Liq. Vol. Flow (Std. Cond) (m3/h)	1.439e-034	-1.861e-012
31	Liquid Fraction	1.000	1.000
32	Molar Volume (m3/kgmole)	0.1026	0.1028
33	Mass Heat of Vap. (kJ/kg)	246.4	275.2
34	Phase Fraction [Molar Basis]	0.0000	0.0000
35	Surface Tension (dyne/cm)	9.960	9.954
36	Thermal Conductivity (W/m-K)	8.722e-002	0.0872
37	Viscosity (cP)	0.1469	0.1466
38	Partial Pressure of H2S (kPa)	0.0000	0.0000
39	Cv (Semi-Ideal) (kJ/kgmole-C)	132.8	133.2
40	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.318	2.326
41	Cv (kJ/kgmole-C)	109.5	109.5
42	Mass Cv (kJ/kg-C)	1.911	1.912
43	Cv (Ent. Method) (kJ/kgmole-C)	---	---
44	Mass Cv (Ent. Method) (kJ/kg-C)	---	---
45	Cp/Cv (Ent. Method)	---	---
46	Reid VP at 37.8 C (kPa)	458.1	458.1
47	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	1.439e-034	-1.861e-012

STATUS

OK

NOTES

Description

Valve: DBFV101

CONNECTIONS

Inlet Stream

64	STREAM NAME	FROM UNIT OPERATION
65	22	

Outlet Stream

66	STREAM NAME	TO UNIT OPERATION
67		

68	Honeywell International Inc.	UniSim Design (R430 build 18059)	Page 21 of 170
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1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
4	Valve: DBFV101 (continued)		
5	CONNECTIONS		
6	Carga Ligera	Tank	# 100
7	PARAMETERS		
8	Physical Properties		
9	Pressure Drop:	72.51 kPa	
10	User Variables		
11	CONDITIONS		
12	Name	22	Carga Ligera
13	Vapour	0.0000	0.0000
14	Temperature (C)	89.9000 *	89.8710
15	Pressure (kPa)	1572.3228 *	1499.8107
16	Molar Flow (kgmole/h)	86.7631	86.7631
17	Mass Flow (kg/h)	5351.6175	5351.6175
18	Std Ideal Liq Vol Flow (m3/h)	9.0000	9.0000
19	Molar Enthalpy (kJ/kgmole)	-1.202e+005	-1.202e+005
20	Molar Entropy (kJ/kgmole-C)	120.0	120.0
21	Heat Flow (kJ/h)	-1.0429e+07	-1.0429e+07
22	PROPERTIES		
23	Name	22	Carga Ligera
24	Molecular Weight	61.68	61.68
25	Molar Density (kgmole/m3)	8.152	8.146
26	Mass Density (kg/m3)	502.8	502.4
27	Act. Volume Flow (m3/h)	10.64	10.65
28	Mass Enthalpy (kJ/kg)	-1949	-1949
29	Mass Entropy (kJ/kg-C)	1.946	1.946
30	Heat Capacity (kJ/kgmole-C)	181.4	181.7
31	Mass Heat Capacity (kJ/kg-C)	2.941	2.945
32	Lower Heating Value (kJ/kgmole)	---	---
33	Mass Lower Heating Value (kJ/kg)	---	---
34	Phase Fraction [Vol. Basis]	0.0000	0.0000
35	Phase Fraction [Mass Basis]	0.0000	0.0000
36	Partial Pressure of CO2 (kPa)	---	---
37	Cost Based on Flow (Cost/s)	0.0000	0.0000
38	Act. Gas Flow (ACT_m3/h)	---	---
39	Avg. Liq. Density (kgmole/m3)	9.640	9.640
40	Specific Heat (kJ/kgmole-C)	181.4	181.7
41	Std. Gas Flow (STD_m3/h)	2051	2051
42	Std. Ideal Liq. Mass Density (kg/m3)	594.6	594.6
43	Act. Liq. Flow (m3/s)	2.956e-003	2.959e-003
44	Z Factor	0.0639	0.0610
45	Watson K	13.33	13.33
46	User Property	---	---
47	Cp/(Cp - R)	1.048	1.048
48	Cp/Cv	1.299	1.301
49	Heat of Vap. (kJ/kgmole)	1.652e+004	1.684e+004
50	Kinematic Viscosity (cSt)	0.1973	0.1974
51	Liq. Mass Density (Std. Cond) (kg/m3)	598.7	598.7
52	Liq. Vol. Flow (Std. Cond) (m3/h)	8.939	8.939
53	Liquid Fraction	1.000	1.000
54	Molar Volume (m3/kgmole)	0.1227	0.1228
55	Mass Heat of Vap. (kJ/kg)	267.9	273.1
56	Phase Fraction [Molar Basis]	0.0000	0.0000
57	Surface Tension (dyne/cm)	5.406	5.409
58	Thermal Conductivity (W/m-K)	6.994e-002	6.996e-002
59	Honeywell International Inc. UniSim Design (R430 build 18059)		
60	Licensed to: Company Name Not Available		
61	Printed by: alu0100514599		
62	* Specified by user.		

1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc			
2			Unit Set:	SI			
3			Date/Time:	Friday Sep 4 2015, 16:44:21			
4	Valve: DBFV101 (continued)						
5	PROPERTIES						
6	Name	22	Carga Ligera				
7	Viscosity (cP)	9.921e-002	9.918e-002				
8	Partial Pressure of H2S (kPa)	0.0000	0.0000				
9	Cv (Semi-Ideal) (kJ/kgmole-C)	173.1	173.3				
10	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.806	2.810				
11	Cv (kJ/kgmole-C)	139.7	139.7				
12	Mass Cv (kJ/kg-C)	2.264	2.264				
13	Cv (Ent. Method) (kJ/kgmole-C)	---	---				
14	Mass Cv (Ent. Method) (kJ/kg-C)	---	---				
15	Cp/Cv (Ent. Method)	---	---				
16	Reid VP at 37.8 C (kPa)	345.5	345.5				
17	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	8.939	8.939				
18	STATUS						
19	OK						
20	NOTES						
21	Description						
22	Valve: VLV-100						
23	CONNECTIONS						
24	Inlet Stream						
25	STREAM NAME	FROM UNIT OPERATION					
26	N2 #100						
27	Outlet Stream						
28	STREAM NAME	TO UNIT OPERATION					
29	25	Tank	# 100				
30	PARAMETERS						
31	Physical Properties						
32	Pressure Drop:	58.97 kPa					
33	User Variables						
34	CONDITIONS						
35	Name	N2 #100	25				
36	Vapour	1.0000	1.0000				
37	Temperature (C)	25.0000 *	24.8510				
38	Pressure (kPa)	1523.2895 *	1464.3154				
39	Molar Flow (kgmole/h)	0.0000	0.0000				
40	Mass Flow (kg/h)	0.0000	0.0000				
41	Std Ideal Liq Vol Flow (m3/h)	0.0000	0.0000				
42	Molar Enthalpy (kJ/kgmole)	-114.2	-114.6				
43	Molar Entropy (kJ/kgmole-C)	125.2	125.6				
44	Heat Flow (kJ/h)	-1.4985e-33	-6.3050e-15				
45	PROPERTIES						
46	Name	N2 #100	25				
47	Molecular Weight	28.01	28.01				
48	Molar Density (kgmole/m3)	0.6182	0.5935				
49	Honeywell International Inc.	UniSim Design (R430 build 18059)					
50	Licensed to: Company Name Not Available	Printed by: alu0100514599					
51							
52	* Specified by user.						

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
4	Valve: VLV-100 (continued)		
5	PROPERTIES		
6	Name	N2 #100	25
7	Mass Density (kg/m3)	17.32	16.62
8	Act. Volume Flow (m3/h)	2.123e-035	9.267e-017
9	Mass Enthalpy (kJ/kg)	-4.076	-4.092
10	Mass Entropy (kJ/kg-C)	4.470	4.482
11	Heat Capacity (kJ/kgmole-C)	29.95	29.92
12	Mass Heat Capacity (kJ/kg-C)	1.069	1.068
13	Lower Heating Value (kJ/kgmole)	0.0000	---
14	Mass Lower Heating Value (kJ/kg)	0.0000	---
15	Phase Fraction [Vol. Basis]	1.000	1.000
16	Phase Fraction [Mass Basis]	1.000	1.000
17	Partial Pressure of CO2 (kPa)	---	---
18	Cost Based on Flow (Cost/s)	0.0000	0.0000
19	Act. Gas Flow (ACT_m3/h)	2.123e-035	9.267e-017
20	Avg. Liq. Density (kgmole/m3)	28.79	28.79
21	Specific Heat (kJ/kgmole-C)	29.95	29.92
22	Std. Gas Flow (STD_m3/h)	3.103e-034	1.300e-015
23	Std. Ideal Liq. Mass Density (kg/m3)	806.4	806.4
24	Act. Liq. Flow (m3/s)	0.0000	0.0000
25	Z Factor	0.9940	0.9959
26	Watson K	6.415	6.415
27	User Property	---	---
28	Cp/(Cp - R)	1.384	1.385
29	Cp/Cv	1.428	1.427
30	Heat of Vap. (kJ/kgmole)	3669	5214
31	Kinematic Viscosity (cSt)	1.072	1.116
32	Liq. Mass Density (Std. Cond) (kg/m3)	---	---
33	Liq. Vol. Flow (Std. Cond) (m3/h)	---	---
34	Liquid Fraction	0.0000	0.0000
35	Molar Volume (m3/kgmole)	1.618	1.685
36	Mass Heat of Vap. (kJ/kg)	131.0	186.1
37	Phase Fraction [Molar Basis]	1.0000	1.0000
38	Surface Tension (dyne/cm)	---	---
39	Thermal Conductivity (W/m-K)	2.653e-002	2.648e-002
40	Viscosity (cP)	1.857e-002	1.855e-002
41	Partial Pressure of H2S (kPa)	0.0000	0.0000
42	Cv (Semi-Ideal) (kJ/kgmole-C)	21.64	21.61
43	Mass Cv (Semi-Ideal) (kJ/kg-C)	0.7724	0.7712
44	Cv (kJ/kgmole-C)	20.97	20.96
45	Mass Cv (kJ/kg-C)	0.7486	0.7483
46	Cv (Ent. Method) (kJ/kgmole-C)	20.97	21.77
47	Mass Cv (Ent. Method) (kJ/kg-C)	0.7485	0.7770
48	Cp/Cv (Ent. Method)	1.428	1.375
49	Reid VP at 37.8 C (kPa)	---	---
50	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	0.0000	0.0000
51	STATUS		
52	OK		
53	NOTES		
54			
55			
56	Description		
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69	Honeywell International Inc.	UniSim Design (R430 build 18059)	Page 24 of 170

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
4	Valve: P01AVA		
5	CONNECTIONS		
6	Inlet Stream		
7	STREAM NAME	FROM UNIT OPERATION	
8	28	Tee	TEE-100-2
9	Outlet Stream		
10	STREAM NAME	TO UNIT OPERATION	
11	26	Pump	P01A
12	PARAMETERS		
13	Physical Properties		
14	Pressure Drop:	5.702e-002 kPa	
15	User Variables		
16	CONDITIONS		
17	Name	28	26
18	Vapour	0.0000	0.0000
19	Temperature (C)	89.8582	89.8582
20	Pressure (kPa)	1468.2945	1468.2374
21	Molar Flow (kgmole/h)	86.7631	86.7631
22	Mass Flow (kg/h)	5351.6186	5351.6186
23	Std Ideal Liq Vol Flow (m3/h)	9.0000	9.0000
24	Molar Enthalpy (kJ/kgmole)	-1.202e+005	-1.202e+005
25	Molar Entropy (kJ/kgmole-C)	120.0	120.0
26	Heat Flow (kJ/h)	-1.0429e+07	-1.0429e+07
27	PROPERTIES		
28	Name	28	26
29	Molecular Weight	61.68	61.68
30	Molar Density (kgmole/m3)	8.143	8.143
31	Mass Density (kg/m3)	502.3	502.3
32	Act. Volume Flow (m3/h)	10.66	10.66
33	Mass Enthalpy (kJ/kg)	-1949	-1949
34	Mass Entropy (kJ/kg-C)	1.946	1.946
35	Heat Capacity (kJ/kgmole-C)	181.8	181.8
36	Mass Heat Capacity (kJ/kg-C)	2.947	2.947
37	Lower Heating Value (kJ/kgmole)	---	---
38	Mass Lower Heating Value (kJ/kg)	---	---
39	Phase Fraction [Vol. Basis]	0.0000	0.0000
40	Phase Fraction [Mass Basis]	0.0000	0.0000
41	Partial Pressure of CO2 (kPa)	---	---
42	Cost Based on Flow (Cost/s)	0.0000	0.0000
43	Act. Gas Flow (ACT_m3/h)	---	---
44	Avg. Liq. Density (kgmole/m3)	9.640	9.640
45	Specific Heat (kJ/kgmole-C)	181.8	181.8
46	Std. Gas Flow (STD_m3/h)	2051	2051
47	Std. Ideal Liq. Mass Density (kg/m3)	594.6	594.6
48	Act. Liq. Flow (m3/s)	2.960e-003	2.960e-003
49	Z Factor	5.974e-002	5.974e-002
50	Watson K	13.33	13.33
51	User Property	---	---
52	Cp/(Cp - R)	1.048	1.048
53	Cp/Cv	1.302	1.302
54	Heat of Vap. (kJ/kgmole)	1.698e+004	1.698e+004
55	Kinematic Viscosity (cSt)	0.1974	0.1974
56	Liq. Mass Density (Std. Cond) (kg/m3)	598.7	598.7

1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc			
2			Unit Set:	SI			
3			Date/Time:	Friday Sep 4 2015, 16:44:21			
4	Valve: P01AVA (continued)						
5	PROPERTIES						
6	Name	28	26				
7	Liq. Vol. Flow (Std. Cond) (m ³ /h)	8.939	8.939				
8	Liquid Fraction	1.000	1.000				
9	Molar Volume (m ³ /kgmole)	0.1228	0.1228				
10	Mass Heat of Vap. (kJ/kg)	275.3	275.3				
11	Phase Fraction [Molar Basis]	0.0000	0.0000				
12	Surface Tension (dyne/cm)	5.410	5.410				
13	Thermal Conductivity (W/m-K)	6.996e-002	6.996e-002				
14	Viscosity (cP)	9.916e-002	9.916e-002				
15	Partial Pressure of H ₂ S (kPa)	0.0000	0.0000				
16	C _v (Semi-Ideal) (kJ/kgmole-C)	173.5	173.5				
17	Mass C _v (Semi-Ideal) (kJ/kg-C)	2.812	2.812				
18	C _v (kJ/kgmole-C)	139.7	139.7				
19	Mass C _v (kJ/kg-C)	2.264	2.264				
20	C _v (Ent. Method) (kJ/kgmole-C)	---	---				
21	Mass C _v (Ent. Method) (kJ/kg-C)	---	---				
22	C _p /C _v (Ent. Method)	---	---				
23	Reid VP at 37.8 C (kPa)	345.5	345.5				
24	Liq. Vol. Flow - Sum(Std. Cond) (m ³ /h)	8.939	8.939				
25	STATUS						
26	OK						
27	NOTES						
28							
29							
30	Description						
31							
32	Valve: P01AVB						
33							
34	CONNECTIONS						
35							
36	Inlet Stream						
37							
38							
39							
40							
41							
42	Outlet Stream						
43							
44							
45							
46	STREAM NAME	FROM UNIT OPERATION					
47	27	Pump					
48							
49							
50	STREAM NAME	TO UNIT OPERATION					
51	32	Mixer					
52							
53	PARAMETERS						
54							
55	Physical Properties						
56	Pressure Drop:	5.697e-002 kPa					
57							
58	User Variables						
59							
60	CONDITIONS						
61	Name	27	32				
62	Vapour	0.0000	0.0000				
63	Temperature (C)	90.0379	90.0379				
64	Pressure (kPa)	1600.7226	1600.6657				
65	Molar Flow (kgmole/h)	86.7631	86.7631				
66	Mass Flow (kg/h)	5351.6186	5351.6186				
67	Std Ideal Liq Vol Flow (m ³ /h)	9.0000	9.0000				
68	Molar Enthalpy (kJ/kgmole)	-1.202e+005	-1.202e+005				
69	Honeywell International Inc.	UniSim Design (R430 build 18059)					
	Page 26 of 170						

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
4			

Valve: P01AVB (continued)

CONDITIONS

11	Molar Entropy (kJ/kgmole-C)	120.1	120.1		
12	Heat Flow (kJ/h)	-1.0427e+07	-1.0427e+07		

PROPERTIES

15	Name	27	32		
16	Molecular Weight	61.68	61.68		
17	Molar Density (kgmole/m3)	8.151	8.151		
18	Mass Density (kg/m3)	502.8	502.8		
19	Act. Volume Flow (m3/h)	10.64	10.64		
20	Mass Enthalpy (kJ/kg)	-1948	-1948		
21	Mass Entropy (kJ/kg-C)	1.946	1.946		
22	Heat Capacity (kJ/kgmole-C)	181.4	181.4		
23	Mass Heat Capacity (kJ/kg-C)	2.941	2.941		
24	Lower Heating Value (kJ/kgmole)	---	---		
25	Mass Lower Heating Value (kJ/kg)	---	---		
26	Phase Fraction [Vol. Basis]	0.0000	0.0000		
27	Phase Fraction [Mass Basis]	0.0000	0.0000		
28	Partial Pressure of CO2 (kPa)	---	---		
29	Cost Based on Flow (Cost/s)	0.0000	0.0000		
30	Act. Gas Flow (ACT_m3/h)	---	---		
31	Avg. Liq. Density (kgmole/m3)	9.640	9.640		
32	Specific Heat (kJ/kgmole-C)	181.4	181.4		
33	Std. Gas Flow (STD_m3/h)	2051	2051		
34	Std. Ideal Liq. Mass Density (kg/m3)	594.6	594.6		
35	Act. Liq. Flow (m3/s)	2.957e-003	2.957e-003		
36	Z Factor	6.504e-002	6.503e-002		
37	Watson K	13.33	13.33		
38	User Property	---	---		
39	Cp/(Cp - R)	1.048	1.048		
40	Cp/Cv	1.298	1.298		
41	Heat of Vap. (kJ/kgmole)	1.640e+004	1.640e+004		
42	Kinematic Viscosity (cSt)	0.1971	0.1971		
43	Liq. Mass Density (Std. Cond) (kg/m3)	598.7	598.7		
44	Liq. Vol. Flow (Std. Cond) (m3/h)	8.939	8.939		
45	Liquid Fraction	1.000	1.000		
46	Molar Volume (m3/kgmole)	0.1227	0.1227		
47	Mass Heat of Vap. (kJ/kg)	265.9	265.9		
48	Phase Fraction [Molar Basis]	0.0000	0.0000		
49	Surface Tension (dyne/cm)	5.393	5.393		
50	Thermal Conductivity (W/m-K)	6.988e-002	6.988e-002		
51	Viscosity (cP)	9.911e-002	9.911e-002		
52	Partial Pressure of H2S (kPa)	0.0000	0.0000		
53	Cv (Semi-Ideal) (kJ/kgmole-C)	173.1	173.1		
54	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.806	2.806		
55	Cv (kJ/kgmole-C)	139.7	139.7		
56	Mass Cv (kJ/kg-C)	2.265	2.265		
57	Cv (Ent. Method) (kJ/kgmole-C)	---	---		
58	Mass Cv (Ent. Method) (kJ/kg-C)	---	---		
59	Cp/Cv (Ent. Method)	---	---		
60	Reid VP at 37.8 C (kPa)	345.5	345.5		
61	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	8.939	8.939		

STATUS

OK

NOTES

Description

69	Honeywell International Inc.	UniSim Design (R430 build 18059)	Page 27 of 170
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1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
4	Valve: P01AVB (continued)		
5	NOTES		
6	Description		
7	Valve: P01BVA		
8	CONNECTIONS		
9	Inlet Stream		
10	STREAM NAME	FROM UNIT OPERATION	
11	29	Tee	TEE-100-2
12	Outlet Stream		
13	STREAM NAME	TO UNIT OPERATION	
14	30	Pump	P01B
15	PARAMETERS		
16	Physical Properties		
17	Pressure Drop:	3.942e-027 kPa	
18	User Variables		
19	CONDITIONS		
20	Name	29	30
21	Vapour	0.0000	0.0000
22	Temperature (C)	89.8582	89.8582
23	Pressure (kPa)	1468.2945	1468.2945
24	Molar Flow (kgmole/h)	-0.0000	-0.0000
25	Mass Flow (kg/h)	-0.0000	-0.0000
26	Std Ideal Liq Vol Flow (m3/h)	-0.0000	-0.0000
27	Molar Enthalpy (kJ/kgmole)	-1.202e+005	-1.202e+005
28	Molar Entropy (kJ/kgmole-C)	120.0	120.0
29	Heat Flow (kJ/h)	1.3991e-11	7.0012e-12
30	PROPERTIES		
31	Name	29	30
32	Molecular Weight	61.68	61.68
33	Molar Density (kgmole/m3)	8.143	8.143
34	Mass Density (kg/m3)	502.3	502.3
35	Act. Volume Flow (m3/h)	-1.429e-017	-7.153e-018
36	Mass Enthalpy (kJ/kg)	-1949	-1949
37	Mass Entropy (kJ/kg-C)	1.946	1.946
38	Heat Capacity (kJ/kgmole-C)	181.8	181.8
39	Mass Heat Capacity (kJ/kg-C)	2.947	2.947
40	Lower Heating Value (kJ/kgmole)	---	---
41	Mass Lower Heating Value (kJ/kg)	---	---
42	Phase Fraction [Vol. Basis]	0.0000	0.0000
43	Phase Fraction [Mass Basis]	0.0000	0.0000
44	Partial Pressure of CO2 (kPa)	---	---
45	Cost Based on Flow (Cost/s)	0.0000	0.0000
46	Act. Gas Flow (ACT_m3/h)	---	---
47	Avg. Liq. Density (kgmole/m3)	9.640	9.640
48	Specific Heat (kJ/kgmole-C)	181.8	181.8
49	Std. Gas Flow (STD_m3/h)	-2.752e-015	-1.377e-015
50	Std. Ideal Liq. Mass Density (kg/m3)	594.6	594.6
51	Act. Liq. Flow (m3/s)	-3.971e-021	-1.987e-021
52	Z Factor	5.974e-002	5.974e-002

1	Honeywell Company Name Not Available Calgary, Alberta CANADA		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2			Unit Set:	SI
3			Date/Time:	Friday Sep 4 2015, 16:44:21

Valve: P01BVA (continued)

PROPERTIES

11	Name	29	30		
12	Watson K	13.33	13.33		
13	User Property	---	---		
14	Cp/(Cp - R)	1.048	1.048		
15	Cp/Cv	1.302	1.302		
16	Heat of Vap. (kJ/kgmole)	1.698e+004	1.698e+004		
17	Kinematic Viscosity (cSt)	0.1974	0.1974		
18	Liq. Mass Density (Std. Cond) (kg/m3)	598.7	598.7		
19	Liq. Vol. Flow (Std. Cond) (m3/h)	-1.199e-017	-6.001e-018		
20	Liquid Fraction	1.000	1.000		
21	Molar Volume (m3/kgmole)	0.1228	0.1228		
22	Mass Heat of Vap. (kJ/kg)	275.3	275.3		
23	Phase Fraction [Molar Basis]	0.0000	0.0000		
24	Surface Tension (dyne/cm)	5.410	5.410		
25	Thermal Conductivity (W/m-K)	6.996e-002	6.996e-002		
26	Viscosity (cP)	9.916e-002	9.916e-002		
27	Partial Pressure of H2S (kPa)	0.0000	0.0000		
28	Cv (Semi-Ideal) (kJ/kgmole-C)	173.5	173.5		
29	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.812	2.812		
30	Cv (kJ/kgmole-C)	139.7	139.7		
31	Mass Cv (kJ/kg-C)	2.264	2.264		
32	Cv (Ent. Method) (kJ/kgmole-C)	---	---		
33	Mass Cv (Ent. Method) (kJ/kg-C)	---	---		
34	Cp/Cv (Ent. Method)	---	---		
35	Reid VP at 37.8 C (kPa)	345.5	345.5		
36	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	-1.199e-017	-6.001e-018		

STATUS

OK

NOTES

Description

Valve: P01BVB

CONNECTIONS

Inlet Stream

53	STREAM NAME	FROM UNIT OPERATION
54	31	Pump

Outlet Stream

57	STREAM NAME	TO UNIT OPERATION
58	33	Mixer

PARAMETERS

Physical Properties

63	Pressure Drop:	-132.4 kPa	
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User Variables

CONDITIONS

68	Name	31	33	
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69	Honeywell International Inc.	UniSim Design (R430 build 18059)	Page 29 of 170
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1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2			Unit Set:	SI
3			Date/Time:	Friday Sep 4 2015, 16:44:21
4	Valve: P01BVB (continued)			
5	CONDITIONS			
6	Vapour	0.0000	0.0000	
7	Temperature (C)	86.1120	90.0379	
8	Pressure (kPa)	1468.2945	1600.6657	
9	Molar Flow (kgmole/h)	-0.0000	-0.0000	
10	Mass Flow (kg/h)	-0.0000	-0.0000	
11	Std Ideal Liq Vol Flow (m3/h)	-0.0000	-0.0000	
12	Molar Enthalpy (kJ/kgmole)	-1.212e+005	-1.202e+005	
13	Molar Entropy (kJ/kgmole-C)	118.0	120.1	
14	Heat Flow (kJ/h)	4.7093e-29	1.5224e-09	
15	PROPERTIES			
16	Name	31	33	
17	Molecular Weight	61.78	61.68	
18	Molar Density (kgmole/m3)	8.229	8.151	
19	Mass Density (kg/m3)	508.4	502.8	
20	Act. Volume Flow (m3/h)	-4.720e-035	-1.554e-015	
21	Mass Enthalpy (kJ/kg)	-1962	-1948	
22	Mass Entropy (kJ/kg-C)	1.910	1.946	
23	Heat Capacity (kJ/kgmole-C)	178.6	181.4	
24	Mass Heat Capacity (kJ/kg-C)	2.891	2.941	
25	Lower Heating Value (kJ/kgmole)	---	---	
26	Mass Lower Heating Value (kJ/kg)	---	---	
27	Phase Fraction [Vol. Basis]	0.0000	0.0000	
28	Phase Fraction [Mass Basis]	0.0000	0.0000	
29	Partial Pressure of CO2 (kPa)	---	---	
30	Cost Based on Flow (Cost/s)	0.0000	0.0000	
31	Act. Gas Flow (ACT_m3/h)	---	---	
32	Avg. Liq. Density (kgmole/m3)	9.651	9.640	
33	Specific Heat (kJ/kgmole-C)	178.6	181.4	
34	Std. Gas Flow (STD_m3/h)	-9.184e-033	-2.995e-013	
35	Std. Ideal Liq. Mass Density (kg/m3)	596.3	594.6	
36	Act. Liq. Flow (m3/s)	-1.311e-038	-4.317e-019	
37	Z Factor	5.973e-002	6.503e-002	
38	Watson K	13.30	13.33	
39	User Property	---	---	
40	Cp/(Cp - R)	1.049	1.048	
41	Cp/Cv	1.297	1.298	
42	Heat of Vap. (kJ/kgmole)	1.899e+004	1.640e+004	
43	Kinematic Viscosity (cSt)	0.2016	0.1971	
44	Liq. Mass Density (Std. Cond) (kg/m3)	599.4	598.7	
45	Liq. Vol. Flow (Std. Cond) (m3/h)	-4.004e-035	-1.305e-015	
46	Liquid Fraction	1.000	1.000	
47	Molar Volume (m3/kgmole)	0.1215	0.1227	
48	Mass Heat of Vap. (kJ/kg)	307.3	265.9	
49	Phase Fraction [Molar Basis]	0.0000	0.0000	
50	Surface Tension (dyne/cm)	5.826	5.393	
51	Thermal Conductivity (W/m-K)	7.183e-002	6.988e-002	
52	Viscosity (cP)	0.1025	9.911e-002	
53	Partial Pressure of H2S (kPa)	0.0000	0.0000	
54	Cv (Semi-Ideal) (kJ/kgmole-C)	170.3	173.1	
55	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.757	2.806	
56	Cv (kJ/kgmole-C)	137.8	139.7	
57	Mass Cv (kJ/kg-C)	2.230	2.265	
58	Cv (Ent. Method) (kJ/kgmole-C)	---	---	
59	Mass Cv (Ent. Method) (kJ/kg-C)	---	---	
60	Cp/Cv (Ent. Method)	---	---	
61	Reid VP at 37.8 C (kPa)	373.9	345.5	
62	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	-4.004e-035	-1.305e-015	
63	Honeywell International Inc.			
64	UniSim Design (R430 build 18059)			
65	Page 30 of 170			
66	* Specified by user.			

1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc		
2			Unit Set:	SI		
3			Date/Time:	Friday Sep 4 2015, 16:44:21		
4	Valve: P01BVB (continued)					
5	STATUS					
6	OK					
7	NOTES					
8						
9	Description					
10						
11	Valve: FV102A					
12	CONNECTIONS					
13	Inlet Stream					
14						
15	STREAM NAME	FROM UNIT OPERATION				
16	35	Tee	TEE-100-3			
17	Outlet Stream					
18						
19	STREAM NAME	TO UNIT OPERATION				
20	20	Valve	FV102			
21	PARAMETERS					
22	Physical Properties					
23	Pressure Drop:	5.697e-002 kPa				
24	User Variables					
25	CONDITIONS					
26	Name	35	20			
27	Vapour	0.0000	0.0000			
28	Temperature (C)	90.0379	90.0379			
29	Pressure (kPa)	1600.6657	1600.6087			
30	Molar Flow (kgmole/h)	86.7631	86.7631			
31	Mass Flow (kg/h)	5351.6186	5351.6186			
32	Std Ideal Liq Vol Flow (m3/h)	9.0000	9.0000			
33	Molar Enthalpy (kJ/kgmole)	-1.202e+005	-1.202e+005			
34	Molar Entropy (kJ/kgmole-C)	120.1	120.1			
35	Heat Flow (kJ/h)	-1.0427e+07	-1.0427e+07			
36	PROPERTIES					
37	Name	35	20			
38	Molecular Weight	61.68	61.68			
39	Molar Density (kgmole/m3)	8.151	8.151			
40	Mass Density (kg/m3)	502.8	502.8			
41	Act. Volume Flow (m3/h)	10.64	10.64			
42	Mass Enthalpy (kJ/kg)	-1948	-1948			
43	Mass Entropy (kJ/kg-C)	1.946	1.946			
44	Heat Capacity (kJ/kgmole-C)	181.4	181.4			
45	Mass Heat Capacity (kJ/kg-C)	2.941	2.941			
46	Lower Heating Value (kJ/kgmole)	---	---			
47	Mass Lower Heating Value (kJ/kg)	---	---			
48	Phase Fraction [Vol. Basis]	0.0000	0.0000			
49	Phase Fraction [Mass Basis]	0.0000	0.0000			
50	Partial Pressure of CO2 (kPa)	---	---			
51	Cost Based on Flow (Cost/s)	0.0000	0.0000			
52	Act. Gas Flow (ACT_m3/h)	---	---			
53	Avg. Liq. Density (kgmole/m3)	9.640	9.640			

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21

Valve: FV102A (continued)

PROPERTIES

11	Name	35	20		
12	Specific Heat (kJ/kgmole-C)	181.4	181.4		
13	Std. Gas Flow (STD_m3/h)	2051	2051		
14	Std. Ideal Liq. Mass Density (kg/m3)	594.6	594.6		
15	Act. Liq. Flow (m3/s)	2.957e-003	2.957e-003		
16	Z Factor	6.503e-002	6.503e-002		
17	Watson K	13.33	13.33		
18	User Property	---	---		
19	Cp/(Cp - R)	1.048	1.048		
20	Cp/Cv	1.298	1.298		
21	Heat of Vap. (kJ/kgmole)	1.640e+004	1.640e+004		
22	Kinematic Viscosity (cSt)	0.1971	0.1971		
23	Liq. Mass Density (Std. Cond) (kg/m3)	598.7	598.7		
24	Liq. Vol. Flow (Std. Cond) (m3/h)	8.939	8.939		
25	Liquid Fraction	1.000	1.000		
26	Molar Volume (m3/kgmole)	0.1227	0.1227		
27	Mass Heat of Vap. (kJ/kg)	265.9	265.9		
28	Phase Fraction [Molar Basis]	0.0000	0.0000		
29	Surface Tension (dyne/cm)	5.393	5.393		
30	Thermal Conductivity (W/m-K)	6.988e-002	6.988e-002		
31	Viscosity (cP)	9.911e-002	9.911e-002		
32	Partial Pressure of H2S (kPa)	0.0000	0.0000		
33	Cv (Semi-Ideal) (kJ/kgmole-C)	173.1	173.1		
34	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.806	2.806		
35	Cv (kJ/kgmole-C)	139.7	139.7		
36	Mass Cv (kJ/kg-C)	2.265	2.265		
37	Cv (Ent. Method) (kJ/kgmole-C)	---	---		
38	Mass Cv (Ent. Method) (kJ/kg-C)	---	---		
39	Cp/Cv (Ent. Method)	---	---		
40	Reid VP at 37.8 C (kPa)	345.5	345.5		
41	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	8.939	8.939		

STATUS

OK

NOTES

Description

Valve: FV102B

CONNECTIONS

Inlet Stream

58	STREAM NAME	FROM UNIT OPERATION
59	37	Valve FV102

Outlet Stream

62	STREAM NAME	TO UNIT OPERATION
63	39	Mixer MIX-100-2-2

PARAMETERS

Physical Properties

68	Pressure Drop:	5.714e-002 kPa
69	Honeywell International Inc.	UniSim Design (R430 build 18059)

1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2			Unit Set:	SI
3			Date/Time:	Friday Sep 4 2015, 16:44:21
4	Valve: FV102B (continued)			
5	User Variables			
6	CONDITIONS			
7	Name	37	39	
8	Vapour	0.0000	0.0000	
9	Temperature (C)	89.9199	89.9199	
10	Pressure (kPa)	1313.2046	1313.1475	
11	Molar Flow (kgmole/h)	86.7631	86.7631	
12	Mass Flow (kg/h)	5351.6186	5351.6186	
13	Std Ideal Liq Vol Flow (m3/h)	9.0000	9.0000	
14	Molar Enthalpy (kJ/kgmole)	-1.202e+005	-1.202e+005	
15	Molar Entropy (kJ/kgmole-C)	120.2	120.2	
16	Heat Flow (kJ/h)	-1.0427e+007	-1.0427e+007	
17	PROPERTIES			
18	Name	37	39	
19	Molecular Weight	61.68	61.68	
20	Molar Density (kgmole/m3)	8.125	8.125	
21	Mass Density (kg/m3)	501.2	501.2	
22	Act. Volume Flow (m3/h)	10.68	10.68	
23	Mass Enthalpy (kJ/kg)	-1948	-1948	
24	Mass Entropy (kJ/kg-C)	1.948	1.948	
25	Heat Capacity (kJ/kgmole-C)	182.5	182.5	
26	Mass Heat Capacity (kJ/kg-C)	2.959	2.959	
27	Lower Heating Value (kJ/kgmole)	---	---	
28	Mass Lower Heating Value (kJ/kg)	---	---	
29	Phase Fraction [Vol. Basis]	0.0000	0.0000	
30	Phase Fraction [Mass Basis]	0.0000	0.0000	
31	Partial Pressure of CO2 (kPa)	---	---	
32	Cost Based on Flow (Cost/s)	0.0000	0.0000	
33	Act. Gas Flow (ACT_m3/h)	---	---	
34	Avg. Liq. Density (kgmole/m3)	9.640	9.640	
35	Specific Heat (kJ/kgmole-C)	182.5	182.5	
36	Std. Gas Flow (STD_m3/h)	2051	2051	
37	Std. Ideal Liq. Mass Density (kg/m3)	594.6	594.6	
38	Act. Liq. Flow (m3/s)	2.966e-003	2.966e-003	
39	Z Factor	5.354e-002	5.354e-002	
40	Watson K	13.33	13.33	
41	User Property	---	---	
42	Cp/(Cp - R)	1.048	1.048	
43	Cp/Cv	1.306	1.306	
44	Heat of Vap. (kJ/kgmole)	1.767e+004	1.767e+004	
45	Kinematic Viscosity (cSt)	0.1975	0.1975	
46	Liq. Mass Density (Std. Cond) (kg/m3)	598.7	598.7	
47	Liq. Vol. Flow (Std. Cond) (m3/h)	8.939	8.939	
48	Liquid Fraction	1.000	1.000	
49	Molar Volume (m3/kgmole)	0.1231	0.1231	
50	Mass Heat of Vap. (kJ/kg)	286.4	286.4	
51	Phase Fraction [Molar Basis]	0.0000	0.0000	
52	Surface Tension (dyne/cm)	5.404	5.404	
53	Thermal Conductivity (W/m-K)	6.993e-002	6.993e-002	
54	Viscosity (cP)	9.899e-002	9.899e-002	
55	Partial Pressure of H2S (kPa)	0.0000	0.0000	
56	Cv (Semi-Ideal) (kJ/kgmole-C)	174.2	174.2	
57	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.824	2.824	
58	Cv (kJ/kgmole-C)	139.8	139.8	
59	Mass Cv (kJ/kg-C)	2.266	2.266	
60	Cv (Ent. Method) (kJ/kgmole-C)	---	---	
61	Mass Cv (Ent. Method) (kJ/kg-C)	---	---	
62	Honeywell International Inc.			
63	UniSim Design (R430 build 18059)			
64	Page 33 of 170			
65	* Specified by user.			

1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc			
2			Unit Set:	SI			
3			Date/Time:	Friday Sep 4 2015, 16:44:21			
4	Valve: FV102B (continued)						
5	PROPERTIES						
6	Name	37	39				
7	Cp/Cv (Ent. Method)	---	---				
8	Reid VP at 37.8 C (kPa)	345.5	345.5				
9	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	8.939	8.939				
10	STATUS						
11	OK						
12	NOTES						
13							
14							
15	Description						
16							
17							
18							
19							
20							
21							
22							
23							
24	Valve: FV102C						
25							
26	CONNECTIONS						
27							
28	Inlet Stream						
29							
30	STREAM NAME	FROM UNIT OPERATION					
31	36	Tee					
32		TEE-100-3					
33	Outlet Stream						
34							
35	STREAM NAME	TO UNIT OPERATION					
36	38	Mixer					
37	PARAMETERS						
38							
39	Physical Properties						
40							
41	Pressure Drop:	287.5 kPa					
42	User Variables						
43							
44	CONDITIONS						
45							
46	Name	36	38				
47	Vapour	0.0000	0.0000				
48	Temperature (C)	90.0379	89.9199				
49	Pressure (kPa)	1600.6657	1313.1475				
50	Molar Flow (kgmole/h)	0.0000	-0.0000				
51	Mass Flow (kg/h)	0.0000	-0.0000				
52	Std Ideal Liq Vol Flow (m3/h)	0.0000	-0.0000				
53	Molar Enthalpy (kJ/kgmole)	-1.202e+005	-1.202e+005				
54	Molar Entropy (kJ/kgmole-C)	120.1	120.2				
55	Heat Flow (kJ/h)	-1.0139e-28	2.2304e-06				
56	PROPERTIES						
57							
58	Name	36	38				
59	Molecular Weight	61.68	61.68				
60	Molar Density (kgmole/m3)	8.151	8.125				
61	Mass Density (kg/m3)	502.8	501.2				
62	Act. Volume Flow (m3/h)	1.035e-034	-2.284e-012				
63	Mass Enthalpy (kJ/kg)	-1948	-1948				
64	Mass Entropy (kJ/kg-C)	1.946	1.948				
65	Heat Capacity (kJ/kgmole-C)	181.4	182.5				
66	Mass Heat Capacity (kJ/kg-C)	2.941	2.959				
67	Lower Heating Value (kJ/kgmole)	---	---				
68	Mass Lower Heating Value (kJ/kg)	---	---				

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
4			

Valve: FV102C (continued)

PROPERTIES

11	Name	36	38
12	Phase Fraction [Vol. Basis]	0.0000	0.0000
13	Phase Fraction [Mass Basis]	0.0000	0.0000
14	Partial Pressure of CO2 (kPa)	---	---
15	Cost Based on Flow (Cost/s)	0.0000	0.0000
16	Act. Gas Flow (ACT_m3/h)	---	---
17	Avg. Liq. Density (kgmole/m3)	9.640	9.640
18	Specific Heat (kJ/kgmole-C)	181.4	182.5
19	Std. Gas Flow (STD_m3/h)	1.995e-032	-4.388e-010
20	Std. Ideal Liq. Mass Density (kg/m3)	594.6	594.6
21	Act. Liq. Flow (m3/s)	2.875e-038	-6.345e-016
22	Z Factor	6.503e-002	5.354e-002
23	Watson K	13.33	13.33
24	User Property	---	---
25	Cp/(Cp - R)	1.048	1.048
26	Cp/Cv	1.298	1.306
27	Heat of Vap. (kJ/kgmole)	1.640e+004	1.767e+004
28	Kinematic Viscosity (cSt)	0.1971	0.1975
29	Liq. Mass Density (Std. Cond) (kg/m3)	598.7	598.7
30	Liq. Vol. Flow (Std. Cond) (m3/h)	8.692e-035	-1.912e-012
31	Liquid Fraction	1.000	1.000
32	Molar Volume (m3/kgmole)	0.1227	0.1231
33	Mass Heat of Vap. (kJ/kg)	265.9	286.4
34	Phase Fraction [Molar Basis]	0.0000	0.0000
35	Surface Tension (dyne/cm)	5.393	5.404
36	Thermal Conductivity (W/m-K)	6.988e-002	6.993e-002
37	Viscosity (cP)	9.911e-002	9.899e-002
38	Partial Pressure of H2S (kPa)	0.0000	0.0000
39	Cv (Semi-Ideal) (kJ/kgmole-C)	173.1	174.2
40	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.806	2.824
41	Cv (kJ/kgmole-C)	139.7	139.8
42	Mass Cv (kJ/kg-C)	2.265	2.266
43	Cv (Ent. Method) (kJ/kgmole-C)	---	---
44	Mass Cv (Ent. Method) (kJ/kg-C)	---	---
45	Cp/Cv (Ent. Method)	---	---
46	Reid VP at 37.8 C (kPa)	345.5	345.5
47	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	8.692e-035	-1.912e-012

STATUS

OK

NOTES

Description

Valve: DBFV201

CONNECTIONS

Inlet Stream

64	STREAM NAME	FROM UNIT OPERATION
65	22-2	

Outlet Stream

66	STREAM NAME	TO UNIT OPERATION
67		

68	Honeywell International Inc.	UniSim Design (R430 build 18059)	Page 35 of 170
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1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
4	Valve: DBFV201 (continued)		
5	CONNECTIONS		
6	Carga Densa	Mixer	MIX-101
7	PARAMETERS		
8	Physical Properties		
9	Pressure Drop:	163.1 kPa	
10	User Variables		
11	CONDITIONS		
12	Name	22-2	Carga Densa
13	Vapour	0.0000	0.0000
14	Temperature (C)	20.0000 *	20.0627
15	Pressure (kPa)	1376.1897 *	1213.0821
16	Molar Flow (kgmole/h)	85.8730	85.8730
17	Mass Flow (kg/h)	6236.5611	6236.5611
18	Std Ideal Liq Vol Flow (m3/h)	10.0000	10.0000
19	Molar Enthalpy (kJ/kgmole)	-1.760e+005	-1.760e+005
20	Molar Entropy (kJ/kgmole-C)	79.56	79.63
21	Heat Flow (kJ/h)	-1.5111e+07	-1.5111e+07
22	PROPERTIES		
23	Name	22-2	Carga Densa
24	Molecular Weight	72.63	72.63
25	Molar Density (kgmole/m3)	8.625	8.620
26	Mass Density (kg/m3)	626.4	626.0
27	Act. Volume Flow (m3/h)	9.956	9.962
28	Mass Enthalpy (kJ/kg)	-2423	-2423
29	Mass Entropy (kJ/kg-C)	1.096	1.096
30	Heat Capacity (kJ/kgmole-C)	160.7	160.8
31	Mass Heat Capacity (kJ/kg-C)	2.213	2.214
32	Lower Heating Value (kJ/kgmole)	---	---
33	Mass Lower Heating Value (kJ/kg)	---	---
34	Phase Fraction [Vol. Basis]	0.0000	0.0000
35	Phase Fraction [Mass Basis]	0.0000	0.0000
36	Partial Pressure of CO2 (kPa)	---	---
37	Cost Based on Flow (Cost/s)	0.0000	0.0000
38	Act. Gas Flow (ACT_m3/h)	---	---
39	Avg. Liq. Density (kgmole/m3)	8.587	8.587
40	Specific Heat (kJ/kgmole-C)	160.7	160.8
41	Std. Gas Flow (STD_m3/h)	2030	2030
42	Std. Ideal Liq. Mass Density (kg/m3)	623.7	623.7
43	Act. Liq. Flow (m3/s)	2.766e-003	2.767e-003
44	Z Factor	6.546e-002	5.772e-002
45	Watson K	13.12	13.12
46	User Property	---	---
47	Cp/(Cp - R)	1.055	1.055
48	Cp/Cv	1.230	1.231
49	Heat of Vap. (kJ/kgmole)	2.529e+004	2.624e+004
50	Kinematic Viscosity (cSt)	0.3940	0.3938
51	Liq. Mass Density (Std. Cond) (kg/m3)	629.2	629.2
52	Liq. Vol. Flow (Std. Cond) (m3/h)	9.912	9.912
53	Liquid Fraction	1.000	1.000
54	Molar Volume (m3/kgmole)	0.1159	0.1160
55	Mass Heat of Vap. (kJ/kg)	348.2	361.3
56	Phase Fraction [Molar Basis]	0.0000	0.0000
57	Surface Tension (dyne/cm)	14.73	14.72
58	Thermal Conductivity (W/m-K)	0.1026	0.1026
59	Honeywell International Inc. UniSim Design (R430 build 18059)		
60	Licensed to: Company Name Not Available		
61	Printed by: alu0100514599		
62	* Specified by user.		

1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc		
2			Unit Set:	SI		
3			Date/Time:	Friday Sep 4 2015, 16:44:21		
4	Valve: DBFV201 (continued)					
5	PROPERTIES					
6	Name	22-2	Carga Densa			
7	Viscosity (cP)	0.2468	0.2465			
8	Partial Pressure of H2S (kPa)	0.0000	0.0000			
9	Cv (Semi-Ideal) (kJ/kgmole-C)	152.4	152.5			
10	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.098	2.100			
11	Cv (kJ/kgmole-C)	130.7	130.7			
12	Mass Cv (kJ/kg-C)	1.799	1.799			
13	Cv (Ent. Method) (kJ/kgmole-C)	---	---			
14	Mass Cv (Ent. Method) (kJ/kg-C)	---	---			
15	Cp/Cv (Ent. Method)	---	---			
16	Reid VP at 37.8 C (kPa)	234.1	234.1			
17	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	9.912	9.912			
18	STATUS					
19	OK					
20	NOTES					
21	Description					
22	Valve: VLV-200					
23	CONNECTIONS					
24	Inlet Stream					
25	STREAM NAME	FROM UNIT OPERATION				
26	N2 #200					
27	Outlet Stream					
28	STREAM NAME	TO UNIT OPERATION				
29	25-2	Tank	# 200			
30	PARAMETERS					
31	Physical Properties					
32	Pressure Drop:	365.5 kPa				
33	User Variables					
34	CONDITIONS					
35	Name	N2 #200	25-2			
36	Vapour	1.0000	1.0000			
37	Temperature (C)	25.0000 *	58.3826			
38	Pressure (kPa)	1523.2895 *	1157.7837			
39	Molar Flow (kgmole/h)	0.0000	0.0000			
40	Mass Flow (kg/h)	0.0000	0.0000			
41	Std Ideal Liq Vol Flow (m3/h)	0.0000	0.0000			
42	Molar Enthalpy (kJ/kgmole)	-114.2	-3.034e+004			
43	Molar Entropy (kJ/kgmole-C)	125.2	140.0			
44	Heat Flow (kJ/h)	-9.2875e-33	-6.8057e-12			
45	PROPERTIES					
46	Name	N2 #200	25-2			
47	Molecular Weight	28.01	36.03			
48	Molar Density (kgmole/m3)	0.6182	0.4303			
49	Honeywell International Inc.	UniSim Design (R430 build 18059)				
50	Licensed to: Company Name Not Available	Printed by: alu0100514599				
51				* Specified by user.		
52						

1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc		
2			Unit Set:	SI		
3			Date/Time:	Friday Sep 4 2015, 16:44:21		
4	Valve: VLV-200 (continued)					
5	PROPERTIES					
6	Name	N2 #200	25-2			
7	Mass Density (kg/m3)	17.32	15.50			
8	Act. Volume Flow (m3/h)	1.316e-034	5.213e-016			
9	Mass Enthalpy (kJ/kg)	-4.076	-842.2			
10	Mass Entropy (kJ/kg-C)	4.470	3.885			
11	Heat Capacity (kJ/kgmole-C)	29.95	50.66			
12	Mass Heat Capacity (kJ/kg-C)	1.069	1.406			
13	Lower Heating Value (kJ/kgmole)	0.0000	---			
14	Mass Lower Heating Value (kJ/kg)	0.0000	---			
15	Phase Fraction [Vol. Basis]	1.000	1.000			
16	Phase Fraction [Mass Basis]	1.000	1.000			
17	Partial Pressure of CO2 (kPa)	---	---			
18	Cost Based on Flow (Cost/s)	0.0000	0.0000			
19	Act. Gas Flow (ACT_m3/h)	1.316e-034	5.213e-016			
20	Avg. Liq. Density (kgmole/m3)	28.79	19.44			
21	Specific Heat (kJ/kgmole-C)	29.95	50.66			
22	Std. Gas Flow (STD_m3/h)	1.923e-033	5.303e-015			
23	Std. Ideal Liq. Mass Density (kg/m3)	806.4	700.2			
24	Act. Liq. Flow (m3/s)	0.0000	0.0000			
25	Z Factor	0.9940	0.9762			
26	Watson K	6.415	8.987			
27	User Property	---	---			
28	Cp/(Cp - R)	1.384	1.196			
29	Cp/Cv	1.428	1.234			
30	Heat of Vap. (kJ/kgmole)	3669	1.901e+004			
31	Kinematic Viscosity (cSt)	1.072	1.093			
32	Liq. Mass Density (Std. Cond) (kg/m3)	---	---			
33	Liq. Vol. Flow (Std. Cond) (m3/h)	---	---			
34	Liquid Fraction	0.0000	0.0000			
35	Molar Volume (m3/kgmole)	1.618	2.324			
36	Mass Heat of Vap. (kJ/kg)	131.0	527.6			
37	Phase Fraction [Molar Basis]	1.0000	1.0000			
38	Surface Tension (dyne/cm)	---	---			
39	Thermal Conductivity (W/m-K)	2.653e-002	2.594e-002			
40	Viscosity (cP)	1.857e-002	1.695e-002			
41	Partial Pressure of H2S (kPa)	0.0000	0.0000			
42	Cv (Semi-Ideal) (kJ/kgmole-C)	21.64	42.35			
43	Mass Cv (Semi-Ideal) (kJ/kg-C)	0.7724	1.175			
44	Cv (kJ/kgmole-C)	20.97	41.07			
45	Mass Cv (kJ/kg-C)	0.7486	1.140			
46	Cv (Ent. Method) (kJ/kgmole-C)	20.97	---			
47	Mass Cv (Ent. Method) (kJ/kg-C)	0.7485	---			
48	Cp/Cv (Ent. Method)	1.428	---			
49	Reid VP at 37.8 C (kPa)	---	---			
50	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	0.0000	0.0000			
51	STATUS					
52	OK					
53	NOTES					
54						
55						
56	Description					
57						
58						
59						
60						
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64						
65						
66						
67						
68						
69	Honeywell International Inc.	UniSim Design (R430 build 18059)		Page 38 of 170		
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1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
4	Valve: P02AVA		
5	CONNECTIONS		
6	Inlet Stream		
7	STREAM NAME	FROM UNIT OPERATION	
8	28-2	Tee	TEE-100-2-2
9	Outlet Stream		
10	STREAM NAME	TO UNIT OPERATION	
11	40	Pump	P02A
12	PARAMETERS		
13	Physical Properties		
14	Pressure Drop:	19.21 kPa	
15	User Variables		
16	CONDITIONS		
17	Name	28-2	40
18	Vapour	0.0000	0.0000
19	Temperature (C)	20.0678	89.8871
20	Pressure (kPa)	1200.1315	1180.9237
21	Molar Flow (kgmole/h)	0.0000	-0.0000
22	Mass Flow (kg/h)	0.0000	-0.0000
23	Std Ideal Liq Vol Flow (m3/h)	0.0000	-0.0000
24	Molar Enthalpy (kJ/kgmole)	-1.760e+005	-1.636e+005
25	Molar Entropy (kJ/kgmole-C)	79.63	117.4
26	Heat Flow (kJ/h)	-1.0488e-29	1.3318e-14
27	PROPERTIES		
28	Name	28-2	40
29	Molecular Weight	72.63	72.63
30	Molar Density (kgmole/m3)	8.620	7.512
31	Mass Density (kg/m3)	626.0	545.5
32	Act. Volume Flow (m3/h)	6.915e-036	-1.084e-020
33	Mass Enthalpy (kJ/kg)	-2423	-2252
34	Mass Entropy (kJ/kg-C)	1.096	1.617
35	Heat Capacity (kJ/kgmole-C)	160.8	196.3
36	Mass Heat Capacity (kJ/kg-C)	2.214	2.704
37	Lower Heating Value (kJ/kgmole)	---	---
38	Mass Lower Heating Value (kJ/kg)	---	---
39	Phase Fraction [Vol. Basis]	0.0000	0.0000
40	Phase Fraction [Mass Basis]	0.0000	0.0000
41	Partial Pressure of CO2 (kPa)	---	---
42	Cost Based on Flow (Cost/s)	0.0000	0.0000
43	Act. Gas Flow (ACT_m3/h)	---	---
44	Avg. Liq. Density (kgmole/m3)	8.587	8.587
45	Specific Heat (kJ/kgmole-C)	160.8	196.3
46	Std. Gas Flow (STD_m3/h)	1.409e-033	-1.925e-018
47	Std. Ideal Liq. Mass Density (kg/m3)	623.7	623.7
48	Act. Liq. Flow (m3/s)	1.921e-039	-3.011e-024
49	Z Factor	5.711e-002	5.208e-002
50	Watson K	13.12	13.12
51	User Property	---	---
52	Cp/(Cp - R)	1.055	1.044
53	Cp/Cv	1.231	1.246
54	Heat of Vap. (kJ/kgmole)	2.632e+004	2.643e+004
55	Kinematic Viscosity (cSt)	0.3938	0.2430
56	Liq. Mass Density (Std. Cond) (kg/m3)	629.2	629.2

1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc			
2			Unit Set:	SI			
3			Date/Time:	Friday Sep 4 2015, 16:44:21			
4	Valve: P02AVA (continued)						
5	PROPERTIES						
6	Name	28-2	40				
7	Liq. Vol. Flow (Std. Cond) (m ³ /h)	6.880e-036	-9.398e-021				
8	Liquid Fraction	1.000	1.000				
9	Molar Volume (m ³ /kgmole)	0.1160	0.1331				
10	Mass Heat of Vap. (kJ/kg)	362.4	363.9				
11	Phase Fraction [Molar Basis]	0.0000	0.0000				
12	Surface Tension (dyne/cm)	14.72	7.576				
13	Thermal Conductivity (W/m-K)	0.1026	0.0783				
14	Viscosity (cP)	0.2465	0.1326				
15	Partial Pressure of H ₂ S (kPa)	0.0000	0.0000				
16	C _v (Semi-Ideal) (kJ/kgmole-C)	152.5	188.0				
17	Mass C _v (Semi-Ideal) (kJ/kg-C)	2.100	2.589				
18	C _v (kJ/kgmole-C)	130.7	157.5				
19	Mass C _v (kJ/kg-C)	1.799	2.169				
20	C _v (Ent. Method) (kJ/kgmole-C)	---	---				
21	Mass C _v (Ent. Method) (kJ/kg-C)	---	---				
22	C _{p/Cv} (Ent. Method)	---	---				
23	Reid VP at 37.8 C (kPa)	234.1	234.1				
24	Liq. Vol. Flow - Sum(Std. Cond) (m ³ /h)	6.880e-036	-9.398e-021				
25	STATUS						
26	OK						
27	NOTES						
28							
29							
30							
31							
32							
33							
34							
35							
36	Description						
37							
38							
39							
40	Valve: P02AVB						
41							
42	CONNECTIONS						
43							
44	Inlet Stream						
45							
46	STREAM NAME	FROM UNIT OPERATION					
47	42	Pump					
48	Outlet Stream						
49							
50	STREAM NAME	TO UNIT OPERATION					
51	44	Mixer					
52	PARAMETERS						
53							
54	Physical Properties						
55							
56	Pressure Drop:	-184.5 kPa					
57	User Variables						
58							
59	CONDITIONS						
60							
61	Name	42	44				
62	Vapour	0.0000	0.0000				
63	Temperature (C)	89.8940	20.1733				
64	Pressure (kPa)	1180.9237	1365.4481				
65	Molar Flow (kgmole/h)	-0.0000	-0.0000				
66	Mass Flow (kg/h)	-0.0000	-0.0000				
67	Std Ideal Liq Vol Flow (m ³ /h)	-0.0000	-0.0000				
68	Molar Enthalpy (kJ/kgmole)	-1.636e+005	-1.759e+005				
69	Honeywell International Inc.	UniSim Design (R430 build 18059)					
	Page 40 of 170						
	Licensed to: Company Name Not Available						
	Printed by: alu0100514599						
	* Specified by user.						

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
4			

Valve: P02AVB (continued)

CONDITIONS

11	Molar Entropy (kJ/kgmole-C)	117.3	79.66		
12	Heat Flow (kJ/h)	9.3695e-29	1.4939e-07		

PROPERTIES

15	Name	42	44		
16	Molecular Weight	72.63	72.63		
17	Molar Density (kgmole/m3)	7.532	8.623		
18	Mass Density (kg/m3)	547.0	626.2		
19	Act. Volume Flow (m3/h)	-7.604e-035	-9.847e-014		
20	Mass Enthalpy (kJ/kg)	-2252	-2423		
21	Mass Entropy (kJ/kg-C)	1.615	1.097		
22	Heat Capacity (kJ/kgmole-C)	195.7	160.8		
23	Mass Heat Capacity (kJ/kg-C)	2.694	2.214		
24	Lower Heating Value (kJ/kgmole)	---	---		
25	Mass Lower Heating Value (kJ/kg)	---	---		
26	Phase Fraction [Vol. Basis]	0.0000	0.0000		
27	Phase Fraction [Mass Basis]	0.0000	0.0000		
28	Partial Pressure of CO2 (kPa)	---	---		
29	Cost Based on Flow (Cost/s)	0.0000	0.0000		
30	Act. Gas Flow (ACT_m3/h)	---	---		
31	Avg. Liq. Density (kgmole/m3)	8.587	8.587		
32	Specific Heat (kJ/kgmole-C)	195.7	160.8		
33	Std. Gas Flow (STD_m3/h)	-1.354e-032	-2.008e-011		
34	Std. Ideal Liq. Mass Density (kg/m3)	623.7	623.7		
35	Act. Liq. Flow (m3/s)	-2.112e-038	-2.735e-017		
36	Z Factor	5.194e-002	6.493e-002		
37	Watson K	13.12	13.12		
38	User Property	---	---		
39	Cp/(Cp - R)	1.044	1.055		
40	Cp/Cv	1.246	1.230		
41	Heat of Vap. (kJ/kgmole)	2.643e+004	2.535e+004		
42	Kinematic Viscosity (cSt)	0.2428	0.3934		
43	Liq. Mass Density (Std. Cond) (kg/m3)	629.2	629.2		
44	Liq. Vol. Flow (Std. Cond) (m3/h)	-6.611e-035	-9.800e-014		
45	Liquid Fraction	1.000	1.000		
46	Molar Volume (m3/kgmole)	0.1328	0.1160		
47	Mass Heat of Vap. (kJ/kg)	363.9	349.1		
48	Phase Fraction [Molar Basis]	0.0000	0.0000		
49	Surface Tension (dyne/cm)	7.575	14.71		
50	Thermal Conductivity (W/m-K)	7.829e-002	0.1026		
51	Viscosity (cP)	0.1328	0.2464		
52	Partial Pressure of H2S (kPa)	0.0000	0.0000		
53	Cv (Semi-Ideal) (kJ/kgmole-C)	187.4	152.5		
54	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.580	2.100		
55	Cv (kJ/kgmole-C)	157.0	130.7		
56	Mass Cv (kJ/kg-C)	2.162	1.800		
57	Cv (Ent. Method) (kJ/kgmole-C)	---	---		
58	Mass Cv (Ent. Method) (kJ/kg-C)	---	---		
59	Cp/Cv (Ent. Method)	---	---		
60	Reid VP at 37.8 C (kPa)	234.1	234.1		
61	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	-6.611e-035	-9.800e-014		

STATUS

OK

NOTES

Description

69	Honeywell International Inc.	UniSim Design (R430 build 18059)	Page 41 of 170
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1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
4	Valve: P02AVB (continued)		
5	NOTES		
6	Description		
7	Valve: P02BVA		
8	CONNECTIONS		
9	Inlet Stream		
10	STREAM NAME	FROM UNIT OPERATION	
11	29-2	Tee	TEE-100-2-2
12	Outlet Stream		
13	STREAM NAME	TO UNIT OPERATION	
14	41	Pump	P02B
15	PARAMETERS		
16	Physical Properties		
17	Pressure Drop:	6.213e-002 kPa	
18	User Variables		
19	CONDITIONS		
20	Name	29-2	41
21	Vapour	0.0000	0.0000
22	Temperature (C)	20.0678	20.0679
23	Pressure (kPa)	1200.1315	1200.0694
24	Molar Flow (kgmole/h)	85.8731	85.8731
25	Mass Flow (kg/h)	6236.5679	6236.5679
26	Std Ideal Liq Vol Flow (m3/h)	10.0000	10.0000
27	Molar Enthalpy (kJ/kgmole)	-1.760e+005	-1.760e+005
28	Molar Entropy (kJ/kgmole-C)	79.63	79.63
29	Heat Flow (kJ/h)	-1.5111e+007	-1.5111e+007
30	PROPERTIES		
31	Name	29-2	41
32	Molecular Weight	72.63	72.63
33	Molar Density (kgmole/m3)	8.620	8.620
34	Mass Density (kg/m3)	626.0	626.0
35	Act. Volume Flow (m3/h)	9.962	9.962
36	Mass Enthalpy (kJ/kg)	-2423	-2423
37	Mass Entropy (kJ/kg-C)	1.096	1.096
38	Heat Capacity (kJ/kgmole-C)	160.8	160.8
39	Mass Heat Capacity (kJ/kg-C)	2.214	2.214
40	Lower Heating Value (kJ/kgmole)	---	---
41	Mass Lower Heating Value (kJ/kg)	---	---
42	Phase Fraction [Vol. Basis]	0.0000	0.0000
43	Phase Fraction [Mass Basis]	0.0000	0.0000
44	Partial Pressure of CO2 (kPa)	---	---
45	Cost Based on Flow (Cost/s)	0.0000	0.0000
46	Act. Gas Flow (ACT_m3/h)	---	---
47	Avg. Liq. Density (kgmole/m3)	8.587	8.587
48	Specific Heat (kJ/kgmole-C)	160.8	160.8
49	Std. Gas Flow (STD_m3/h)	2030	2030
50	Std. Ideal Liq. Mass Density (kg/m3)	623.7	623.7
51	Act. Liq. Flow (m3/s)	2.767e-003	2.767e-003
52	Z Factor	5.711e-002	5.711e-002

1	Honeywell Company Name Not Available Calgary, Alberta CANADA		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2			Unit Set:	SI
3			Date/Time:	Friday Sep 4 2015, 16:44:21

Valve: P02BVA (continued)

PROPERTIES

11	Name	29-2	41		
12	Watson K	13.12	13.12		
13	User Property	---	---		
14	Cp/(Cp - R)	1.055	1.055		
15	Cp/Cv	1.231	1.231		
16	Heat of Vap. (kJ/kgmole)	2.632e+004	2.632e+004		
17	Kinematic Viscosity (cSt)	0.3938	0.3938		
18	Liq. Mass Density (Std. Cond) (kg/m3)	629.2	629.2		
19	Liq. Vol. Flow (Std. Cond) (m3/h)	9.912	9.912		
20	Liquid Fraction	1.000	1.000		
21	Molar Volume (m3/kgmole)	0.1160	0.1160		
22	Mass Heat of Vap. (kJ/kg)	362.4	362.4		
23	Phase Fraction [Molar Basis]	0.0000	0.0000		
24	Surface Tension (dyne/cm)	14.72	14.72		
25	Thermal Conductivity (W/m-K)	0.1026	0.1026		
26	Viscosity (cP)	0.2465	0.2465		
27	Partial Pressure of H2S (kPa)	0.0000	0.0000		
28	Cv (Semi-Ideal) (kJ/kgmole-C)	152.5	152.5		
29	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.100	2.100		
30	Cv (kJ/kgmole-C)	130.7	130.7		
31	Mass Cv (kJ/kg-C)	1.799	1.799		
32	Cv (Ent. Method) (kJ/kgmole-C)	---	---		
33	Mass Cv (Ent. Method) (kJ/kg-C)	---	---		
34	Cp/Cv (Ent. Method)	---	---		
35	Reid VP at 37.8 C (kPa)	234.1	234.1		
36	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	9.912	9.912		

STATUS

OK

NOTES

Description

Valve: P02BVB

CONNECTIONS

Inlet Stream

53	STREAM NAME	FROM UNIT OPERATION
54	43	Pump

Outlet Stream

57	STREAM NAME	TO UNIT OPERATION
58	45	Mixer

PARAMETERS

Physical Properties

63	Pressure Drop:	6.211e-002 kPa	
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User Variables

CONDITIONS

68	Name	43	45	
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69	Honeywell International Inc.	UniSim Design (R430 build 18059)	Page 43 of 170
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1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc					
2		Unit Set:	SI					
3		Date/Time:	Friday Sep 4 2015, 16:44:21					
4	Valve: P02BVB (continued)							
5	CONDITIONS							
6	Vapour	0.0000	0.0000					
7	Temperature (C)	20.1733	20.1733					
8	Pressure (kPa)	1365.5102	1365.4481					
9	Molar Flow (kgmole/h)	85.8731	85.8731					
10	Mass Flow (kg/h)	6236.5679	6236.5679					
11	Std Ideal Liq Vol Flow (m3/h)	10.0000	10.0000					
12	Molar Enthalpy (kJ/kgmole)	-1.759e+005	-1.759e+005					
13	Molar Entropy (kJ/kgmole-C)	79.66	79.66					
14	Heat Flow (kJ/h)	-1.5109e+07	-1.5109e+07					
15	PROPERTIES							
16	Name	43	45					
17	Molecular Weight	72.63	72.63					
18	Molar Density (kgmole/m3)	8.623	8.623					
19	Mass Density (kg/m3)	626.2	626.2					
20	Act. Volume Flow (m3/h)	9.959	9.959					
21	Mass Enthalpy (kJ/kg)	-2423	-2423					
22	Mass Entropy (kJ/kg-C)	1.097	1.097					
23	Heat Capacity (kJ/kgmole-C)	160.8	160.8					
24	Mass Heat Capacity (kJ/kg-C)	2.214	2.214					
25	Lower Heating Value (kJ/kgmole)	---	---					
26	Mass Lower Heating Value (kJ/kg)	---	---					
27	Phase Fraction [Vol. Basis]	0.0000	0.0000					
28	Phase Fraction [Mass Basis]	0.0000	0.0000					
29	Partial Pressure of CO2 (kPa)	---	---					
30	Cost Based on Flow (Cost/s)	0.0000	0.0000					
31	Act. Gas Flow (ACT_m3/h)	---	---					
32	Avg. Liq. Density (kgmole/m3)	8.587	8.587					
33	Specific Heat (kJ/kgmole-C)	160.8	160.8					
34	Std. Gas Flow (STD_m3/h)	2030	2030					
35	Std. Ideal Liq. Mass Density (kg/m3)	623.7	623.7					
36	Act. Liq. Flow (m3/s)	2.766e-003	2.766e-003					
37	Z Factor	6.494e-002	6.493e-002					
38	Watson K	13.12	13.12					
39	User Property	---	---					
40	Cp/(Cp - R)	1.055	1.055					
41	Cp/Cv	1.230	1.230					
42	Heat of Vap. (kJ/kgmole)	2.535e+004	2.535e+004					
43	Kinematic Viscosity (cSt)	0.3934	0.3934					
44	Liq. Mass Density (Std. Cond) (kg/m3)	629.2	629.2					
45	Liq. Vol. Flow (Std. Cond) (m3/h)	9.912	9.912					
46	Liquid Fraction	1.000	1.000					
47	Molar Volume (m3/kgmole)	0.1160	0.1160					
48	Mass Heat of Vap. (kJ/kg)	349.1	349.1					
49	Phase Fraction [Molar Basis]	0.0000	0.0000					
50	Surface Tension (dyne/cm)	14.71	14.71					
51	Thermal Conductivity (W/m-K)	0.1026	0.1026					
52	Viscosity (cP)	0.2464	0.2464					
53	Partial Pressure of H2S (kPa)	0.0000	0.0000					
54	Cv (Semi-Ideal) (kJ/kgmole-C)	152.5	152.5					
55	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.100	2.100					
56	Cv (kJ/kgmole-C)	130.7	130.7					
57	Mass Cv (kJ/kg-C)	1.800	1.800					
58	Cv (Ent. Method) (kJ/kgmole-C)	---	---					
59	Mass Cv (Ent. Method) (kJ/kg-C)	---	---					
60	Cp/Cv (Ent. Method)	---	---					
61	Reid VP at 37.8 C (kPa)	234.1	234.1					
62	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	9.912	9.912					

1	Honeywell Company Name Not Available Calgary, Alberta CANADA		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc		
2			Unit Set:	SI		
3			Date/Time:	Friday Sep 4 2015, 16:44:21		
4	Valve: P02BVB (continued)					
5	STATUS					
6	OK					
7	NOTES					
8						
9	Description					
10						
11	Valve: FV202A					
12	CONNECTIONS					
13	Inlet Stream					
14	STREAM NAME					
15	FROM UNIT OPERATION					
16	47	Tee	TEE-100-3-2			
17	Outlet Stream					
18	STREAM NAME					
19	TO UNIT OPERATION					
20	Feed 1	Valve	DBFV202			
21	PARAMETERS					
22	Physical Properties					
23	Pressure Drop:	6.211e-002 kPa				
24	User Variables					
25	CONDITIONS					
26	Name	47	Feed 1			
27	Vapour	0.0000	0.0000			
28	Temperature (C)	20.1733	20.1734			
29	Pressure (kPa)	1365.4481	1365.3860			
30	Molar Flow (kgmole/h)	85.8731	85.8731			
31	Mass Flow (kg/h)	6236.5679	6236.5679			
32	Std Ideal Liq Vol Flow (m3/h)	10.0000	10.0000			
33	Molar Enthalpy (kJ/kgmole)	-1.759e+005	-1.759e+005			
34	Molar Entropy (kJ/kgmole-C)	79.66	79.66			
35	Heat Flow (kJ/h)	-1.5109e+07	-1.5109e+07			
36	PROPERTIES					
37	Name	47	Feed 1			
38	Molecular Weight	72.63	72.63			
39	Molar Density (kgmole/m3)	8.623	8.623			
40	Mass Density (kg/m3)	626.2	626.2			
41	Act. Volume Flow (m3/h)	9.959	9.959			
42	Mass Enthalpy (kJ/kg)	-2423	-2423			
43	Mass Entropy (kJ/kg-C)	1.097	1.097			
44	Heat Capacity (kJ/kgmole-C)	160.8	160.8			
45	Mass Heat Capacity (kJ/kg-C)	2.214	2.214			
46	Lower Heating Value (kJ/kgmole)	---	---			
47	Mass Lower Heating Value (kJ/kg)	---	---			
48	Phase Fraction [Vol. Basis]	0.0000	0.0000			
49	Phase Fraction [Mass Basis]	0.0000	0.0000			
50	Partial Pressure of CO2 (kPa)	---	---			
51	Cost Based on Flow (Cost/s)	0.0000	0.0000			
52	Act. Gas Flow (ACT_m3/h)	---	---			
53	Avg. Liq. Density (kgmole/m3)	8.587	8.587			

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
4			

Valve: FV202A (continued)

PROPERTIES

11	Name	47	Feed 1		
12	Specific Heat (kJ/kgmole-C)	160.8	160.8		
13	Std. Gas Flow (STD_m3/h)	2030	2030		
14	Std. Ideal Liq. Mass Density (kg/m3)	623.7	623.7		
15	Act. Liq. Flow (m3/s)	2.766e-003	2.766e-003		
16	Z Factor	6.493e-002	6.493e-002		
17	Watson K	13.12	13.12		
18	User Property	---	---		
19	Cp/(Cp - R)	1.055	1.055		
20	Cp/Cv	1.230	1.230		
21	Heat of Vap. (kJ/kgmole)	2.535e+004	2.535e+004		
22	Kinematic Viscosity (cSt)	0.3934	0.3934		
23	Liq. Mass Density (Std. Cond) (kg/m3)	629.2	629.2		
24	Liq. Vol. Flow (Std. Cond) (m3/h)	9.912	9.912		
25	Liquid Fraction	1.000	1.000		
26	Molar Volume (m3/kgmole)	0.1160	0.1160		
27	Mass Heat of Vap. (kJ/kg)	349.1	349.1		
28	Phase Fraction [Molar Basis]	0.0000	0.0000		
29	Surface Tension (dyne/cm)	14.71	14.71		
30	Thermal Conductivity (W/m-K)	0.1026	0.1026		
31	Viscosity (cP)	0.2464	0.2464		
32	Partial Pressure of H2S (kPa)	0.0000	0.0000		
33	Cv (Semi-Ideal) (kJ/kgmole-C)	152.5	152.5		
34	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.100	2.100		
35	Cv (kJ/kgmole-C)	130.7	130.7		
36	Mass Cv (kJ/kg-C)	1.800	1.800		
37	Cv (Ent. Method) (kJ/kgmole-C)	---	---		
38	Mass Cv (Ent. Method) (kJ/kg-C)	---	---		
39	Cp/Cv (Ent. Method)	---	---		
40	Reid VP at 37.8 C (kPa)	234.1	234.1		
41	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	9.912	9.912		

STATUS

OK

NOTES

Description

Valve: FV202B

CONNECTIONS

Inlet Stream

58	STREAM NAME	FROM UNIT OPERATION
59	49	Valve DBFV202

Outlet Stream

62	STREAM NAME	TO UNIT OPERATION
63	51	Mixer MIX-100-2-2-2

PARAMETERS

Physical Properties

68	Pressure Drop:	6.212e-002 kPa
69	Honeywell International Inc.	UniSim Design (R430 build 18059) Page 46 of 170

1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2			Unit Set:	SI
3			Date/Time:	Friday Sep 4 2015, 16:44:21
4	Valve: FV202B (continued)			
5	User Variables			
6	CONDITIONS			
7	Name	49	51	
8	Vapour	0.0000	0.0000	
9	Temperature (C)	20.1941	20.1941	
10	Pressure (kPa)	1311.4948	1311.4327	
11	Molar Flow (kgmole/h)	85.8731	85.8731	
12	Mass Flow (kg/h)	6236.5679	6236.5679	
13	Std Ideal Liq Vol Flow (m3/h)	10.0000	10.0000	
14	Molar Enthalpy (kJ/kgmole)	-1.759e+005	-1.759e+005	
15	Molar Entropy (kJ/kgmole-C)	79.68	79.68	
16	Heat Flow (kJ/h)	-1.5109e+007	-1.5109e+007	
17	PROPERTIES			
18	Name	49	51	
19	Molecular Weight	72.63	72.63	
20	Molar Density (kgmole/m3)	8.621	8.621	
21	Mass Density (kg/m3)	626.1	626.1	
22	Act. Volume Flow (m3/h)	9.961	9.961	
23	Mass Enthalpy (kJ/kg)	-2423	-2423	
24	Mass Entropy (kJ/kg-C)	1.097	1.097	
25	Heat Capacity (kJ/kgmole-C)	160.8	160.8	
26	Mass Heat Capacity (kJ/kg-C)	2.214	2.214	
27	Lower Heating Value (kJ/kgmole)	---	---	
28	Mass Lower Heating Value (kJ/kg)	---	---	
29	Phase Fraction [Vol. Basis]	0.0000	0.0000	
30	Phase Fraction [Mass Basis]	0.0000	0.0000	
31	Partial Pressure of CO2 (kPa)	---	---	
32	Cost Based on Flow (Cost/s)	0.0000	0.0000	
33	Act. Gas Flow (ACT_m3/h)	---	---	
34	Avg. Liq. Density (kgmole/m3)	8.587	8.587	
35	Specific Heat (kJ/kgmole-C)	160.8	160.8	
36	Std. Gas Flow (STD_m3/h)	2030	2030	
37	Std. Ideal Liq. Mass Density (kg/m3)	623.7	623.7	
38	Act. Liq. Flow (m3/s)	2.767e-003	2.767e-003	
39	Z Factor	6.237e-002	6.237e-002	
40	Watson K	13.12	13.12	
41	User Property	---	---	
42	Cp/(Cp - R)	1.055	1.055	
43	Cp/Cv	1.230	1.230	
44	Heat of Vap. (kJ/kgmole)	2.567e+004	2.567e+004	
45	Kinematic Viscosity (cSt)	0.3934	0.3934	
46	Liq. Mass Density (Std. Cond) (kg/m3)	629.2	629.2	
47	Liq. Vol. Flow (Std. Cond) (m3/h)	9.912	9.912	
48	Liquid Fraction	1.000	1.000	
49	Molar Volume (m3/kgmole)	0.1160	0.1160	
50	Mass Heat of Vap. (kJ/kg)	353.4	353.4	
51	Phase Fraction [Molar Basis]	0.0000	0.0000	
52	Surface Tension (dyne/cm)	14.71	14.71	
53	Thermal Conductivity (W/m-K)	0.1026	0.1026	
54	Viscosity (cP)	0.2463	0.2463	
55	Partial Pressure of H2S (kPa)	0.0000	0.0000	
56	Cv (Semi-Ideal) (kJ/kgmole-C)	152.5	152.5	
57	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.100	2.100	
58	Cv (kJ/kgmole-C)	130.7	130.7	
59	Mass Cv (kJ/kg-C)	1.800	1.800	
60	Cv (Ent. Method) (kJ/kgmole-C)	---	---	
61	Mass Cv (Ent. Method) (kJ/kg-C)	---	---	
62	Honeywell International Inc.			
63	UniSim Design (R430 build 18059)			
64	Page 47 of 170			
65	* Specified by user.			

1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc			
2			Unit Set:	SI			
3			Date/Time:	Friday Sep 4 2015, 16:44:21			
4	Valve: FV202B (continued)						
5	PROPERTIES						
6	Name	49	51				
7	Cp/Cv (Ent. Method)	---	---				
8	Reid VP at 37.8 C (kPa)	234.1	234.1				
9	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	9.912	9.912				
10	STATUS						
11	OK						
12	NOTES						
13							
14							
15	Description						
16							
17							
18							
19							
20							
21							
22							
23							
24	Valve: FV202C						
25							
26	CONNECTIONS						
27							
28							
29	Inlet Stream						
30							
31	STREAM NAME	FROM UNIT OPERATION					
32	48	Tee					
33							
34	Outlet Stream						
35	STREAM NAME	TO UNIT OPERATION					
36	50	Mixer					
37	PARAMETERS						
38							
39	Physical Properties						
40							
41	Pressure Drop:	54.02 kPa					
42	User Variables						
43							
44	CONDITIONS						
45							
46	Name	48	50				
47	Vapour	0.0000	0.0000				
48	Temperature (C)	20.1733	20.1941				
49	Pressure (kPa)	1365.4481	1311.4327				
50	Molar Flow (kgmole/h)	0.0000	-0.0000				
51	Mass Flow (kg/h)	0.0000	-0.0000				
52	Std Ideal Liq Vol Flow (m3/h)	0.0000	-0.0000				
53	Molar Enthalpy (kJ/kgmole)	-1.759e+005	-1.759e+005				
54	Molar Entropy (kJ/kgmole-C)	79.66	79.68				
55	Heat Flow (kJ/h)	-2.9500e-29	3.3261e-06				
56	PROPERTIES						
57							
58	Name	48	50				
59	Molecular Weight	72.63	72.63				
60	Molar Density (kgmole/m3)	8.623	8.621				
61	Mass Density (kg/m3)	626.2	626.1				
62	Act. Volume Flow (m3/h)	1.945e-035	-2.193e-012				
63	Mass Enthalpy (kJ/kg)	-2423	-2423				
64	Mass Entropy (kJ/kg-C)	1.097	1.097				
65	Heat Capacity (kJ/kgmole-C)	160.8	160.8				
66	Mass Heat Capacity (kJ/kg-C)	2.214	2.214				
67	Lower Heating Value (kJ/kgmole)	---	---				
68	Mass Lower Heating Value (kJ/kg)	---	---				

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
4			

Valve: FV202C (continued)

PROPERTIES

11	Name	48	50
12	Phase Fraction [Vol. Basis]	0.0000	0.0000
13	Phase Fraction [Mass Basis]	0.0000	0.0000
14	Partial Pressure of CO2 (kPa)	---	---
15	Cost Based on Flow (Cost/s)	0.0000	0.0000
16	Act. Gas Flow (ACT_m3/h)	---	---
17	Avg. Liq. Density (kgmole/m3)	8.587	8.587
18	Specific Heat (kJ/kgmole-C)	160.8	160.8
19	Std. Gas Flow (STD_m3/h)	3.964e-033	-4.470e-010
20	Std. Ideal Liq. Mass Density (kg/m3)	623.7	623.7
21	Act. Liq. Flow (m3/s)	5.402e-039	-6.091e-016
22	Z Factor	6.493e-002	6.237e-002
23	Watson K	13.12	13.12
24	User Property	---	---
25	Cp/(Cp - R)	1.055	1.055
26	Cp/Cv	1.230	1.230
27	Heat of Vap. (kJ/kgmole)	2.535e+004	2.567e+004
28	Kinematic Viscosity (cSt)	0.3934	0.3934
29	Liq. Mass Density (Std. Cond) (kg/m3)	629.2	629.2
30	Liq. Vol. Flow (Std. Cond) (m3/h)	1.935e-035	-2.182e-012
31	Liquid Fraction	1.000	1.000
32	Molar Volume (m3/kgmole)	0.1160	0.1160
33	Mass Heat of Vap. (kJ/kg)	349.1	353.4
34	Phase Fraction [Molar Basis]	0.0000	0.0000
35	Surface Tension (dyne/cm)	14.71	14.71
36	Thermal Conductivity (W/m-K)	0.1026	0.1026
37	Viscosity (cP)	0.2464	0.2463
38	Partial Pressure of H2S (kPa)	0.0000	0.0000
39	Cv (Semi-Ideal) (kJ/kgmole-C)	152.5	152.5
40	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.100	2.100
41	Cv (kJ/kgmole-C)	130.7	130.7
42	Mass Cv (kJ/kg-C)	1.800	1.800
43	Cv (Ent. Method) (kJ/kgmole-C)	---	---
44	Mass Cv (Ent. Method) (kJ/kg-C)	---	---
45	Cp/Cv (Ent. Method)	---	---
46	Reid VP at 37.8 C (kPa)	234.1	234.1
47	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	1.935e-035	-2.182e-012

STATUS

OK

NOTES

Description

Valve: DFV104

CONNECTIONS

Inlet Stream

64	STREAM NAME	FROM UNIT OPERATION
65	54	Tank #BU01

Outlet Stream

68	STREAM NAME	TO UNIT OPERATION
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69	Honeywell International Inc.	UniSim Design (R430 build 18059)	Page 49 of 170
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1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc		
2		Unit Set:	SI		
3		Date/Time:	Friday Sep 4 2015, 16:44:21		
4	Valve: DFV104 (continued)				
5	CONNECTIONS				
6	55				
7	PARAMETERS				
8	Physical Properties				
9	Pressure Drop:	-81.99 kPa			
10	User Variables				
11	CONDITIONS				
12	Name	54	55		
13	Vapour	0.0000	0.0644		
14	Temperature (C)	42.0883	42.6396 *		
15	Pressure (kPa)	558.6995	640.6908 *		
16	Molar Flow (kgmole/h)	-0.0000	-0.0000		
17	Mass Flow (kg/h)	-0.0000	-0.0000		
18	Std Ideal Liq Vol Flow (m3/h)	-0.0000	-0.0000		
19	Molar Enthalpy (kJ/kgmole)	-1.219e+005	-1.218e+005		
20	Molar Entropy (kJ/kgmole-C)	96.70	100.6		
21	Heat Flow (kJ/h)	1.0716e-29	1.0704e-29		
22	PROPERTIES				
23	Name	54	55		
24	Molecular Weight	57.06	57.56		
25	Molar Density (kgmole/m3)	9.515	2.977		
26	Mass Density (kg/m3)	542.9	171.4		
27	Act. Volume Flow (m3/h)	-9.235e-036	-2.952e-035		
28	Mass Enthalpy (kJ/kg)	-2137	-2116		
29	Mass Entropy (kJ/kg-C)	1.695	1.748		
30	Heat Capacity (kJ/kgmole-C)	146.3	144.0		
31	Mass Heat Capacity (kJ/kg-C)	2.565	2.502		
32	Lower Heating Value (kJ/kgmole)	---	---		
33	Mass Lower Heating Value (kJ/kg)	---	---		
34	Phase Fraction [Vol. Basis]	0.0000	0.7046		
35	Phase Fraction [Mass Basis]	0.0000	5.733e-002		
36	Partial Pressure of CO2 (kPa)	---	---		
37	Cost Based on Flow (Cost/s)	0.0000	0.0000		
38	Act. Gas Flow (ACT_m3/h)	---	---		
39	Avg. Liq. Density (kgmole/m3)	10.06	10.06		
40	Specific Heat (kJ/kgmole-C)	146.3	144.0		
41	Std. Gas Flow (STD_m3/h)	-2.078e-033	-2.078e-033		
42	Std. Ideal Liq. Mass Density (kg/m3)	574.2	578.9		
43	Act. Liq. Flow (m3/s)	-2.565e-039	-2.422e-039		
44	Z Factor	0.0224	---		
45	Watson K	13.58	13.48		
46	User Property	---	---		
47	Cp/(Cp - R)	1.060	1.061		
48	Cp/Cv	1.060	1.008		
49	Heat of Vap. (kJ/kgmole)	2.005e+004	3.541e+004		
50	Kinematic Viscosity (cSt)	0.2483	---		
51	Liq. Mass Density (Std. Cond) (kg/m3)	576.8	579.6		
52	Liq. Vol. Flow (Std. Cond) (m3/h)	-8.693e-036	-8.727e-036		
53	Liquid Fraction	1.000	0.9356		
54	Molar Volume (m3/kgmole)	0.1051	0.3359		
55	Mass Heat of Vap. (kJ/kg)	351.3	615.2		
56	Phase Fraction [Molar Basis]	0.0000	0.0644		
57	Surface Tension (dyne/cm)	8.964	9.161		
58	Thermal Conductivity (W/m-K)	8.404e-002	---		
59	Honeywell International Inc. UniSim Design (R430 build 18059)				
60	Licensed to: Company Name Not Available				
61	Printed by: alu0100514599				
62	* Specified by user.				

1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc			
2			Unit Set:	SI			
3			Date/Time:	Friday Sep 4 2015, 16:44:21			
4	Valve: DFV104 (continued)						
5	PROPERTIES						
6	Name	54	55				
7	Viscosity (cP)	0.1348	---				
8	Partial Pressure of H2S (kPa)	0.0000	0.0000				
9	Cv (Semi-Ideal) (kJ/kgmole-C)	138.0	135.7				
10	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.419	2.358				
11	Cv (kJ/kgmole-C)	138.0	142.8				
12	Mass Cv (kJ/kg-C)	2.419	2.481				
13	Cv (Ent. Method) (kJ/kgmole-C)	---	---				
14	Mass Cv (Ent. Method) (kJ/kg-C)	---	---				
15	Cp/Cv (Ent. Method)	---	---				
16	Reid VP at 37.8 C (kPa)	479.1	531.3				
17	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	-8.693e-036	-8.736e-036				
18	STATUS						
19	OK						
20	NOTES						
21	Description						
22	Valve: FV105						
23	CONNECTIONS						
24	Inlet Stream						
25	STREAM NAME	FROM UNIT OPERATION					
26	56	Tank # 104					
27	Outlet Stream						
28	STREAM NAME	TO UNIT OPERATION					
29	59						
30	PARAMETERS						
31	Physical Properties						
32	Pressure Drop:	5.267 kPa					
33	User Variables						
34	CONDITIONS						
35	Name	56	59				
36	Vapour	0.0000	0.0000				
37	Temperature (C)	24.9656	24.9647				
38	Pressure (kPa)	204.6589	199.3915 *				
39	Molar Flow (kgmole/h)	75.4237	75.4237				
40	Mass Flow (kg/h)	6004.5373	6004.5372				
41	Std Ideal Liq Vol Flow (m3/h)	9.3003	9.3003				
42	Molar Enthalpy (kJ/kgmole)	-1.883e+005	-1.883e+005				
43	Molar Entropy (kJ/kgmole-C)	75.11	75.11				
44	Heat Flow (kJ/h)	-1.4205e+007	-1.4205e+007				
45	PROPERTIES						
46	Name	56	59				
47	Molecular Weight	79.61	79.61				
48	Molar Density (kgmole/m3)	8.036	8.036				
49	Honeywell International Inc.	UniSim Design (R430 build 18059)					
50	Licensed to: Company Name Not Available	Printed by: alu0100514599					
51				* Specified by user.			
52							

1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc		
2			Unit Set:	SI		
3			Date/Time:	Friday Sep 4 2015, 16:44:21		
4	Valve: FV105 (continued)					
5	PROPERTIES					
6	Name	56	59			
7	Mass Density (kg/m3)	639.7	639.7			
8	Act. Volume Flow (m3/h)	9.386	9.386			
9	Mass Enthalpy (kJ/kg)	-2366	-2366			
10	Mass Entropy (kJ/kg-C)	0.9435	0.9435			
11	Heat Capacity (kJ/kgmole-C)	175.4	175.4			
12	Mass Heat Capacity (kJ/kg-C)	2.203	2.203			
13	Lower Heating Value (kJ/kgmole)	---	---			
14	Mass Lower Heating Value (kJ/kg)	---	---			
15	Phase Fraction [Vol. Basis]	0.0000	0.0000			
16	Phase Fraction [Mass Basis]	0.0000	0.0000			
17	Partial Pressure of CO2 (kPa)	---	---			
18	Cost Based on Flow (Cost/s)	0.0000	0.0000			
19	Act. Gas Flow (ACT_m3/h)	---	---			
20	Avg. Liq. Density (kgmole/m3)	8.110	8.110			
21	Specific Heat (kJ/kgmole-C)	175.4	175.4			
22	Std. Gas Flow (STD_m3/h)	1783	1783			
23	Std. Ideal Liq. Mass Density (kg/m3)	645.6	645.6			
24	Act. Liq. Flow (m3/s)	2.607e-003	2.607e-003			
25	Z Factor	1.028e-002	1.001e-002			
26	Watson K	12.92	12.92			
27	User Property	---	---			
28	Cp/(Cp - R)	1.050	1.050			
29	Cp/Cv	1.215	1.215			
30	Heat of Vap. (kJ/kgmole)	3.143e+004	3.149e+004			
31	Kinematic Viscosity (cSt)	0.4118	0.4118			
32	Liq. Mass Density (Std. Cond) (kg/m3)	649.2	649.2			
33	Liq. Vol. Flow (Std. Cond) (m3/h)	9.248	9.248			
34	Liquid Fraction	1.000	1.000			
35	Molar Volume (m3/kgmole)	0.1244	0.1244			
36	Mass Heat of Vap. (kJ/kg)	394.8	395.5			
37	Phase Fraction [Molar Basis]	0.0000	0.0000			
38	Surface Tension (dyne/cm)	16.06	16.06			
39	Thermal Conductivity (W/m-K)	0.1077	0.1077			
40	Viscosity (cP)	0.2635	0.2635			
41	Partial Pressure of H2S (kPa)	0.0000	0.0000			
42	Cv (Semi-Ideal) (kJ/kgmole-C)	167.1	167.1			
43	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.099	2.099			
44	Cv (kJ/kgmole-C)	144.4	144.4			
45	Mass Cv (kJ/kg-C)	1.813	1.813			
46	Cv (Ent. Method) (kJ/kgmole-C)	---	---			
47	Mass Cv (Ent. Method) (kJ/kg-C)	---	---			
48	Cp/Cv (Ent. Method)	---	---			
49	Reid VP at 37.8 C (kPa)	99.84	99.84			
50	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	9.248	9.248			
51	STATUS					
52	OK					
53	NOTES					
54						
55						
56	Description					
57						
58						
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67						
68						
69	Honeywell International Inc.	UniSim Design (R430 build 18059)		Page 52 of 170		
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1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
4	Valve: P20AVA		
5	CONNECTIONS		
6	Inlet Stream		
7	STREAM NAME	FROM UNIT OPERATION	
8	To Reboiler	Material Stream	To Reboiler
9	Outlet Stream		
10	STREAM NAME	TO UNIT OPERATION	
11	61	Pump	P20A
12	PARAMETERS		
13	Physical Properties		
14	Pressure Drop:	23.42 kPa	
15	User Variables		
16	CONDITIONS		
17	Name	To Reboiler	61
18	Vapour	0.0000	0.0015
19	Temperature (C)	147.4069	147.3053
20	Pressure (kPa)	1307.7499	1284.3254
21	Molar Flow (kgmole/h)	11088.8091	11088.8091
22	Mass Flow (kg/h)	881530.3921	881530.4579
23	Std Ideal Liq Vol Flow (m3/h)	1365.9406	1365.9406
24	Molar Enthalpy (kJ/kgmole)	-1.627e+005	-1.627e+005
25	Molar Entropy (kJ/kgmole-C)	145.3	145.3
26	Heat Flow (kJ/h)	-1.8044e+009	-1.8044e+009
27	PROPERTIES		
28	Name	To Reboiler	61
29	Molecular Weight	79.50	79.50
30	Molar Density (kgmole/m3)	6.205	6.102
31	Mass Density (kg/m3)	493.2	485.1
32	Act. Volume Flow (m3/h)	1787	1817
33	Mass Enthalpy (kJ/kg)	-2047	-2047
34	Mass Entropy (kJ/kg-C)	1.828	1.828
35	Heat Capacity (kJ/kgmole-C)	252.0	251.8
36	Mass Heat Capacity (kJ/kg-C)	3.170	3.167
37	Lower Heating Value (kJ/kgmole)	---	---
38	Mass Lower Heating Value (kJ/kg)	---	---
39	Phase Fraction [Vol. Basis]	0.0000	1.827e-002
40	Phase Fraction [Mass Basis]	0.0000	1.363e-003
41	Partial Pressure of CO2 (kPa)	---	---
42	Cost Based on Flow (Cost/s)	0.0000	0.0000
43	Act. Gas Flow (ACT_m3/h)	---	---
44	Avg. Liq. Density (kgmole/m3)	8.118	8.118
45	Specific Heat (kJ/kgmole-C)	252.0	251.8
46	Std. Gas Flow (STD_m3/h)	2.622e+005	2.622e+005
47	Std. Ideal Liq. Mass Density (kg/m3)	645.4	645.4
48	Act. Liq. Flow (m3/s)	0.4964	0.4956
49	Z Factor	6.028e-002	---
50	Watson K	12.92	12.92
51	User Property	---	---
52	Cp/(Cp - R)	1.034	1.034
53	Cp/Cv	1.034	1.167
54	Heat of Vap. (kJ/kgmole)	2.300e+004	2.315e+004
55	Kinematic Viscosity (cSt)	0.1921	---
56	Liq. Mass Density (Std. Cond) (kg/m3)	648.9	648.9

1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc			
2			Unit Set:	SI			
3			Date/Time:	Friday Sep 4 2015, 16:44:21			
4	Valve: P20AVA (continued)						
5	PROPERTIES						
6	Name	To Reboiler	61				
7	Liq. Vol. Flow (Std. Cond) (m3/h)	1358	1358				
8	Liquid Fraction	1.000	0.9985				
9	Molar Volume (m3/kgmole)	0.1612	0.1639				
10	Mass Heat of Vap. (kJ/kg)	289.3	291.2				
11	Phase Fraction [Molar Basis]	0.0000	0.0015				
12	Surface Tension (dyne/cm)	4.342	4.352				
13	Thermal Conductivity (W/m-K)	6.382e-002	---				
14	Viscosity (cP)	9.473e-002	---				
15	Partial Pressure of H2S (kPa)	0.0000	0.0000				
16	Cv (Semi-Ideal) (kJ/kgmole-C)	243.7	243.5				
17	Mass Cv (Semi-Ideal) (kJ/kg-C)	3.065	3.063				
18	Cv (kJ/kgmole-C)	243.7	215.7				
19	Mass Cv (kJ/kg-C)	3.065	2.713				
20	Cv (Ent. Method) (kJ/kgmole-C)	---	---				
21	Mass Cv (Ent. Method) (kJ/kg-C)	---	---				
22	Cp/Cv (Ent. Method)	---	---				
23	Reid VP at 37.8 C (kPa)	99.59	99.59				
24	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	1358	1358				
25	STATUS						
26	OK						
27	NOTES						
28							
29							
30	Description						
31							
32							
33							
34							
35							
36	Valve: P20AVB						
37							
38							
39	CONNECTIONS						
40	Inlet Stream						
41							
42	STREAM NAME	FROM UNIT OPERATION					
43	62	Pump					
44	Outlet Stream						
45							
46	STREAM NAME	TO UNIT OPERATION					
47	1	Reboiler					
48	PARAMETERS						
49							
50	Physical Properties						
51							
52	Pressure Drop:	23.43 kPa					
53	User Variables						
54							
55	CONDITIONS						
56	Name	62	1				
57	Vapour	0.0000	0.0000				
58	Temperature (C)	147.4636	147.4488				
59	Pressure (kPa)	1320.1724	1296.7436				
60	Molar Flow (kgmole/h)	11088.8091	11088.8091				
61	Mass Flow (kg/h)	881530.3921	881530.3921				
62	Std Ideal Liq Vol Flow (m3/h)	1365.9406	1365.9406				
63	Molar Enthalpy (kJ/kgmole)	-1.627e+005	-1.627e+005				
64	Honeywell International Inc.						
65	UniSim Design (R430 build 18059)						
66	Page 54 of 170						
67	Licensed to: Company Name Not Available						
68	Printed by: alu0100514599						
69	* Specified by user.						

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
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4			

Valve: P20AVB (continued)

CONDITIONS

11	Molar Entropy (kJ/kgmole-C)	145.3	145.3		
12	Heat Flow (kJ/h)	-1.8043e+09	-1.8043e+09		

PROPERTIES

15	Name	62	1		
16	Molecular Weight	79.50	79.50		
17	Molar Density (kgmole/m3)	6.203	6.204		
18	Mass Density (kg/m3)	493.2	493.2		
19	Act. Volume Flow (m3/h)	1788	1787		
20	Mass Enthalpy (kJ/kg)	-2047	-2047		
21	Mass Entropy (kJ/kg-C)	1.828	1.828		
22	Heat Capacity (kJ/kgmole-C)	251.8	252.0		
23	Mass Heat Capacity (kJ/kg-C)	3.168	3.170		
24	Lower Heating Value (kJ/kgmole)	---	---		
25	Mass Lower Heating Value (kJ/kg)	---	---		
26	Phase Fraction [Vol. Basis]	0.0000	0.0000		
27	Phase Fraction [Mass Basis]	0.0000	0.0000		
28	Partial Pressure of CO2 (kPa)	---	---		
29	Cost Based on Flow (Cost/s)	0.0000	0.0000		
30	Act. Gas Flow (ACT_m3/h)	---	---		
31	Avg. Liq. Density (kgmole/m3)	8.118	8.118		
32	Specific Heat (kJ/kgmole-C)	251.8	252.0		
33	Std. Gas Flow (STD_m3/h)	2.622e+005	2.622e+005		
34	Std. Ideal Liq. Mass Density (kg/m3)	645.4	645.4		
35	Act. Liq. Flow (m3/s)	0.4965	0.4965		
36	Z Factor	6.085e-002	5.977e-002		
37	Watson K	12.92	12.92		
38	User Property	---	---		
39	Cp/(Cp - R)	1.034	1.034		
40	Cp/Cv	1.034	1.034		
41	Heat of Vap. (kJ/kgmole)	2.292e+004	2.307e+004		
42	Kinematic Viscosity (cSt)	0.1920	0.1920		
43	Liq. Mass Density (Std. Cond) (kg/m3)	648.9	648.9		
44	Liq. Vol. Flow (Std. Cond) (m3/h)	1358	1358		
45	Liquid Fraction	1.000	1.000		
46	Molar Volume (m3/kgmole)	0.1612	0.1612		
47	Mass Heat of Vap. (kJ/kg)	288.3	290.2		
48	Phase Fraction [Molar Basis]	0.0000	0.0000		
49	Surface Tension (dyne/cm)	4.337	4.339		
50	Thermal Conductivity (W/m-K)	6.379e-002	0.0638		
51	Viscosity (cP)	9.468e-002	0.0947		
52	Partial Pressure of H2S (kPa)	0.0000	0.0000		
53	Cv (Semi-Ideal) (kJ/kgmole-C)	243.5	243.7		
54	Mass Cv (Semi-Ideal) (kJ/kg-C)	3.063	3.065		
55	Cv (kJ/kgmole-C)	243.5	243.7		
56	Mass Cv (kJ/kg-C)	3.063	3.065		
57	Cv (Ent. Method) (kJ/kgmole-C)	---	---		
58	Mass Cv (Ent. Method) (kJ/kg-C)	---	---		
59	Cp/Cv (Ent. Method)	---	---		
60	Reid VP at 37.8 C (kPa)	99.59	99.59		
61	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	1358	1358		

STATUS

OK

NOTES

Description

69	Honeywell International Inc.	UniSim Design (R430 build 18059)	Page 55 of 170
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1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
4	Valve: P20AVB (continued)		
5	NOTES		
6	Description		
7	Valve: RECVA		
8	CONNECTIONS		
9	Inlet Stream		
10	STREAM NAME	FROM UNIT OPERATION	
11	64	Tee	TEE-101
12	Outlet Stream		
13	STREAM NAME	TO UNIT OPERATION	
14	66	Mixer	MIX-101
15	PARAMETERS		
16	Physical Properties		
17	Pressure Drop:	-964.3 kPa	
18	User Variables		
19	CONDITIONS		
20	Name	64	66
21	Vapour	0.0000	0.0000
22	Temperature (C)	22.0732	20.0627
23	Pressure (kPa)	248.7386	1213.0821
24	Molar Flow (kgmole/h)	-0.0000	0.0000
25	Mass Flow (kg/h)	-0.0000	0.0000
26	Std Ideal Liq Vol Flow (m3/h)	-0.0000	0.0000
27	Molar Enthalpy (kJ/kgmole)	-1.854e+005	-1.760e+005
28	Molar Entropy (kJ/kgmole-C)	73.54	79.63
29	Heat Flow (kJ/h)	5.5496e-28	-3.9560e-11
30	PROPERTIES		
31	Name	64	66
32	Molecular Weight	78.12	72.63
33	Molar Density (kgmole/m3)	8.204	8.620
34	Mass Density (kg/m3)	640.9	626.0
35	Act. Volume Flow (m3/h)	-3.648e-034	2.608e-017
36	Mass Enthalpy (kJ/kg)	-2374	-2423
37	Mass Entropy (kJ/kg-C)	0.9413	1.096
38	Heat Capacity (kJ/kgmole-C)	171.0	160.8
39	Mass Heat Capacity (kJ/kg-C)	2.189	2.214
40	Lower Heating Value (kJ/kgmole)	---	---
41	Mass Lower Heating Value (kJ/kg)	---	---
42	Phase Fraction [Vol. Basis]	0.0000	0.0000
43	Phase Fraction [Mass Basis]	0.0000	0.0000
44	Partial Pressure of CO2 (kPa)	---	---
45	Cost Based on Flow (Cost/s)	0.0000	0.0000
46	Act. Gas Flow (ACT_m3/h)	---	---
47	Avg. Liq. Density (kgmole/m3)	8.219	8.587
48	Specific Heat (kJ/kgmole-C)	171.0	160.8
49	Std. Gas Flow (STD_m3/h)	-7.076e-032	5.316e-015
50	Std. Ideal Liq. Mass Density (kg/m3)	642.1	623.7
51	Act. Liq. Flow (m3/s)	-1.013e-037	7.244e-021
52	Z Factor	1.235e-002	5.772e-002

1	Honeywell Company Name Not Available Calgary, Alberta CANADA		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2			Unit Set:	SI
3			Date/Time:	Friday Sep 4 2015, 16:44:21

Valve: RECVA (continued)

PROPERTIES

11	Name	64	66		
12	Watson K	12.94	13.12		
13	User Property	---	---		
14	Cp/(Cp - R)	1.051	1.055		
15	Cp/Cv	1.219	1.231		
16	Heat of Vap. (kJ/kgmole)	3.064e+004	2.624e+004		
17	Kinematic Viscosity (cSt)	0.4108	0.3938		
18	Liq. Mass Density (Std. Cond) (kg/m3)	645.8	629.2		
19	Liq. Vol. Flow (Std. Cond) (m3/h)	-3.620e-034	2.595e-017		
20	Liquid Fraction	1.000	1.000		
21	Molar Volume (m3/kgmole)	0.1219	0.1160		
22	Mass Heat of Vap. (kJ/kg)	392.2	361.3		
23	Phase Fraction [Molar Basis]	0.0000	0.0000		
24	Surface Tension (dyne/cm)	16.10	14.72		
25	Thermal Conductivity (W/m-K)	0.1075	0.1026		
26	Viscosity (cP)	0.2633	0.2465		
27	Partial Pressure of H2S (kPa)	0.0000	0.0000		
28	Cv (Semi-Ideal) (kJ/kgmole-C)	162.7	152.5		
29	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.082	2.100		
30	Cv (kJ/kgmole-C)	140.3	130.7		
31	Mass Cv (kJ/kg-C)	1.796	1.799		
32	Cv (Ent. Method) (kJ/kgmole-C)	---	---		
33	Mass Cv (Ent. Method) (kJ/kg-C)	---	---		
34	Cp/Cv (Ent. Method)	---	---		
35	Reid VP at 37.8 C (kPa)	112.3	234.1		
36	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	-3.620e-034	2.595e-017		

STATUS

OK

NOTES

Description

Valve: T104VA

CONNECTIONS

Inlet Stream

53	STREAM NAME	FROM UNIT OPERATION
54	63	Tee TEE-101

Outlet Stream

57	STREAM NAME	TO UNIT OPERATION
58	67	Tank # 104

PARAMETERS

Physical Properties

63	Pressure Drop:	7.578e-003 kPa	
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User Variables

CONDITIONS

68	Name	63	67	
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69	Honeywell International Inc.	UniSim Design (R430 build 18059)	Page 57 of 170
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1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2			Unit Set:	SI
3			Date/Time:	Friday Sep 4 2015, 16:44:21
4	Valve: T104VA (continued)			
5	CONDITIONS			
6	Vapour	0.0000	0.0000	
7	Temperature (C)	24.9529	24.9258	
8	Pressure (kPa)	248.7386	248.7310	
9	Molar Flow (kgmole/h)	75.5077	75.5077	
10	Mass Flow (kg/h)	6021.2638	6021.2638	
11	Std Ideal Liq Vol Flow (m3/h)	9.3216	9.3216	
12	Molar Enthalpy (kJ/kgmole)	-1.886e+005	-1.886e+005	
13	Molar Entropy (kJ/kgmole-C)	75.04	75.03	
14	Heat Flow (kJ/h)	-1.4242e+07	-1.4242e+07	
15	PROPERTIES			
16	Name	63	67	
17	Molecular Weight	79.74	79.74	
18	Molar Density (kgmole/m3)	8.028	8.028	
19	Mass Density (kg/m3)	640.1	640.2	
20	Act. Volume Flow (m3/h)	9.406	9.406	
21	Mass Enthalpy (kJ/kg)	-2365	-2365	
22	Mass Entropy (kJ/kg-C)	0.9411	0.9409	
23	Heat Capacity (kJ/kgmole-C)	175.6	175.6	
24	Mass Heat Capacity (kJ/kg-C)	2.202	2.202	
25	Lower Heating Value (kJ/kgmole)	---	---	
26	Mass Lower Heating Value (kJ/kg)	---	---	
27	Phase Fraction [Vol. Basis]	0.0000	0.0000	
28	Phase Fraction [Mass Basis]	0.0000	0.0000	
29	Partial Pressure of CO2 (kPa)	---	---	
30	Cost Based on Flow (Cost/s)	0.0000	0.0000	
31	Act. Gas Flow (ACT_m3/h)	---	---	
32	Avg. Liq. Density (kgmole/m3)	8.100	8.100	
33	Specific Heat (kJ/kgmole-C)	175.6	175.6	
34	Std. Gas Flow (STD_m3/h)	1785	1785	
35	Std. Ideal Liq. Mass Density (kg/m3)	645.9	645.9	
36	Act. Liq. Flow (m3/s)	2.613e-003	2.613e-003	
37	Z Factor	0.0125	0.0125	
38	Watson K	12.92	12.92	
39	User Property	---	---	
40	Cp/(Cp - R)	1.050	1.050	
41	Cp/Cv	1.214	1.214	
42	Heat of Vap. (kJ/kgmole)	3.094e+004	3.094e+004	
43	Kinematic Viscosity (cSt)	0.4127	0.4128	
44	Liq. Mass Density (Std. Cond) (kg/m3)	649.5	649.5	
45	Liq. Vol. Flow (Std. Cond) (m3/h)	9.270	9.270	
46	Liquid Fraction	1.000	1.000	
47	Molar Volume (m3/kgmole)	0.1246	0.1246	
48	Mass Heat of Vap. (kJ/kg)	388.0	388.0	
49	Phase Fraction [Molar Basis]	0.0000	0.0000	
50	Surface Tension (dyne/cm)	16.09	16.09	
51	Thermal Conductivity (W/m-K)	0.1078	0.1078	
52	Viscosity (cP)	0.2642	0.2642	
53	Partial Pressure of H2S (kPa)	0.0000	0.0000	
54	Cv (Semi-Ideal) (kJ/kgmole-C)	167.3	167.3	
55	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.098	2.098	
56	Cv (kJ/kgmole-C)	144.6	144.6	
57	Mass Cv (kJ/kg-C)	1.813	1.813	
58	Cv (Ent. Method) (kJ/kgmole-C)	---	---	
59	Mass Cv (Ent. Method) (kJ/kg-C)	---	---	
60	Cp/Cv (Ent. Method)	---	---	
61	Reid VP at 37.8 C (kPa)	98.37	98.37	
62	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	9.270	9.270	

1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc		
2			Unit Set:	SI		
3			Date/Time:	Friday Sep 4 2015, 16:44:21		
4	Valve: T104VA (continued)					
5	STATUS					
6	OK					
7	NOTES					
8						
9	Description					
10						
11	Valve: E101VA					
12	CONNECTIONS					
13	Inlet Stream					
14						
15	STREAM NAME	FROM UNIT OPERATION				
16	71	Tee	TEE-102			
17	Outlet Stream					
18						
19	STREAM NAME	TO UNIT OPERATION				
20	72	Heat Exchanger	E101			
21	PARAMETERS					
22	Physical Properties					
23	Pressure Drop:	1.613 kPa				
24	User Variables					
25	CONDITIONS					
26	Name	71	72			
27	Vapour	0.0000	0.0000			
28	Temperature (C)	20.0002	20.0005			
29	Pressure (kPa)	395.5245	393.9112			
30	Molar Flow (kgmole/h)	1225.7841	1225.7841			
31	Mass Flow (kg/h)	22082.6244	22082.6244			
32	Std Ideal Liq Vol Flow (m3/h)	22.1272	22.1272			
33	Molar Enthalpy (kJ/kgmole)	-2.866e+005	-2.866e+005			
34	Molar Entropy (kJ/kgmole-C)	52.39	52.39			
35	Heat Flow (kJ/h)	-3.5131e+08	-3.5131e+08			
36	PROPERTIES					
37	Name	71	72			
38	Molecular Weight	18.02	18.02			
39	Molar Density (kgmole/m3)	56.13	56.13			
40	Mass Density (kg/m3)	1011	1011			
41	Act. Volume Flow (m3/h)	21.84	21.84			
42	Mass Enthalpy (kJ/kg)	-1.591e+004	-1.591e+004			
43	Mass Entropy (kJ/kg-C)	2.908	2.908			
44	Heat Capacity (kJ/kgmole-C)	77.72	77.72			
45	Mass Heat Capacity (kJ/kg-C)	4.314	4.314			
46	Lower Heating Value (kJ/kgmole)	0.0000	0.0000			
47	Mass Lower Heating Value (kJ/kg)	0.0000	0.0000			
48	Phase Fraction [Vol. Basis]	0.0000	0.0000			
49	Phase Fraction [Mass Basis]	0.0000	0.0000			
50	Partial Pressure of CO2 (kPa)	---	---			
51	Cost Based on Flow (Cost/s)	0.0000	0.0000			
52	Act. Gas Flow (ACT_m3/h)	---	---			
53	Avg. Liq. Density (kgmole/m3)	55.40	55.40			

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
4			

Valve: E101VA (continued)

PROPERTIES

11	Name	71	72		
12	Specific Heat (kJ/kgmole-C)	77.72	77.72		
13	Std. Gas Flow (STD_m3/h)	2.898e+004	2.898e+004		
14	Std. Ideal Liq. Mass Density (kg/m3)	998.0	998.0		
15	Act. Liq. Flow (m3/s)	6.066e-003	6.066e-003		
16	Z Factor	2.891e-003	2.879e-003		
17	Watson K	---	---		
18	User Property	---	---		
19	Cp/(Cp - R)	1.120	1.120		
20	Cp/Cv	1.144	1.144		
21	Heat of Vap. (kJ/kgmole)	3.885e+004	3.885e+004		
22	Kinematic Viscosity (cSt)	0.9907	0.9907		
23	Liq. Mass Density (Std. Cond) (kg/m3)	1015	1015		
24	Liq. Vol. Flow (Std. Cond) (m3/h)	21.76	21.76		
25	Liquid Fraction	1.000	1.000		
26	Molar Volume (m3/kgmole)	1.782e-002	1.782e-002		
27	Mass Heat of Vap. (kJ/kg)	2156	2157		
28	Phase Fraction [Molar Basis]	0.0000	0.0000		
29	Surface Tension (dyne/cm)	72.96	72.96		
30	Thermal Conductivity (W/m-K)	0.6034	0.6034		
31	Viscosity (cP)	1.002	1.002		
32	Partial Pressure of H2S (kPa)	0.0000	0.0000		
33	Cv (Semi-Ideal) (kJ/kgmole-C)	69.40	69.40		
34	Mass Cv (Semi-Ideal) (kJ/kg-C)	3.852	3.852		
35	Cv (kJ/kgmole-C)	67.95	67.95		
36	Mass Cv (kJ/kg-C)	3.772	3.772		
37	Cv (Ent. Method) (kJ/kgmole-C)	---	---		
38	Mass Cv (Ent. Method) (kJ/kg-C)	---	---		
39	Cp/Cv (Ent. Method)	---	---		
40	Reid VP at 37.8 C (kPa)	---	---		
41	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	21.76	21.76		

STATUS

OK

NOTES

Description

Valve: E101VB

CONNECTIONS

Inlet Stream

58	STREAM NAME	FROM UNIT OPERATION	
59	70	Heat Exchanger	E101

Outlet Stream

62	STREAM NAME	TO UNIT OPERATION	
63	73		

PARAMETERS

Physical Properties

68	Pressure Drop:	1.617 kPa	
69	Honeywell International Inc.	UniSim Design (R430 build 18059)	Page 60 of 170

1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2			Unit Set:	SI
3			Date/Time:	Friday Sep 4 2015, 16:44:21
4	Valve: E101VB (continued)			
5	User Variables			
6	CONDITIONS			
7	Name	70	73	
8	Vapour	0.0000	0.0000	
9	Temperature (C)	21.9399	21.9356	
10	Pressure (kPa)	201.0088	199.3915 *	
11	Molar Flow (kgmole/h)	1226.3933	1226.3933	
12	Mass Flow (kg/h)	22093.5980	22093.5980	
13	Std Ideal Liq Vol Flow (m3/h)	22.1382	22.1382	
14	Molar Enthalpy (kJ/kgmole)	-2.865e+005	-2.865e+005	
15	Molar Entropy (kJ/kgmole-C)	52.90	52.90	
16	Heat Flow (kJ/h)	-3.5131e+008	-3.5131e+008	
17	PROPERTIES			
18	Name	70	73	
19	Molecular Weight	18.02	18.02	
20	Molar Density (kgmole/m3)	56.05	56.05	
21	Mass Density (kg/m3)	1010	1010	
22	Act. Volume Flow (m3/h)	21.88	21.88	
23	Mass Enthalpy (kJ/kg)	-1.590e+004	-1.590e+004	
24	Mass Entropy (kJ/kg-C)	2.936	2.936	
25	Heat Capacity (kJ/kgmole-C)	77.71	77.71	
26	Mass Heat Capacity (kJ/kg-C)	4.314	4.314	
27	Lower Heating Value (kJ/kgmole)	7.730e-314	7.736e-314	
28	Mass Lower Heating Value (kJ/kg)	4.291e-315	4.294e-315	
29	Phase Fraction [Vol. Basis]	7.905e-323	0.0000	
30	Phase Fraction [Mass Basis]	7.905e-323	0.0000	
31	Partial Pressure of CO2 (kPa)	---	---	
32	Cost Based on Flow (Cost/s)	0.0000	0.0000	
33	Act. Gas Flow (ACT_m3/h)	---	---	
34	Avg. Liq. Density (kgmole/m3)	55.40	55.40	
35	Specific Heat (kJ/kgmole-C)	77.71	77.71	
36	Std. Gas Flow (STD_m3/h)	2.900e+004	2.900e+004	
37	Std. Ideal Liq. Mass Density (kg/m3)	998.0	998.0	
38	Act. Liq. Flow (m3/s)	6.078e-003	6.078e-003	
39	Z Factor	1.462e-003	1.450e-003	
40	Watson K	12.80	12.80	
41	User Property	---	---	
42	Cp/(Cp - R)	1.120	1.120	
43	Cp/Cv	1.145	1.145	
44	Heat of Vap. (kJ/kgmole)	4.002e+004	4.003e+004	
45	Kinematic Viscosity (cSt)	0.9470	0.9471	
46	Liq. Mass Density (Std. Cond) (kg/m3)	1015	1015	
47	Liq. Vol. Flow (Std. Cond) (m3/h)	21.77	21.77	
48	Liquid Fraction	1.000	1.000	
49	Molar Volume (m3/kgmole)	1.784e-002	1.784e-002	
50	Mass Heat of Vap. (kJ/kg)	2222	2222	
51	Phase Fraction [Molar Basis]	0.0000	0.0000	
52	Surface Tension (dyne/cm)	72.63	72.63	
53	Thermal Conductivity (W/m-K)	0.6064	0.6064	
54	Viscosity (cP)	0.9561	0.9562	
55	Partial Pressure of H2S (kPa)	0.0000	0.0000	
56	Cv (Semi-Ideal) (kJ/kgmole-C)	69.40	69.40	
57	Mass Cv (Semi-Ideal) (kJ/kg-C)	3.852	3.852	
58	Cv (kJ/kgmole-C)	67.87	67.87	
59	Mass Cv (kJ/kg-C)	3.767	3.767	
60	Cv (Ent. Method) (kJ/kgmole-C)	---	---	
61	Mass Cv (Ent. Method) (kJ/kg-C)	---	---	
62	Honeywell International Inc.			
63	UniSim Design (R430 build 18059)			
64	Page 61 of 170			
65	Licensed to: Company Name Not Available			
66	Printed by: alu0100514599			
67	* Specified by user.			
68				

1	Honeywell Company Name Not Available Calgary, Alberta CANADA		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc		
2			Unit Set:	SI		
3			Date/Time:	Friday Sep 4 2015, 16:44:21		
4	Valve: E101VB (continued)					
5	PROPERTIES					
6	Name	70	73			
7	Cp/Cv (Ent. Method)	---	---			
8	Reid VP at 37.8 C (kPa)	---	---			
9	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	21.77	21.77			
10	STATUS					
11	OK					
12	NOTES					
13						
14						
15	Description					
16						
17	Valve: E102VA					
18	CONNECTIONS					
19	Inlet Stream					
20						
21	STREAM NAME	FROM UNIT OPERATION				
22	74	Tee	TEE-102			
23	Outlet Stream					
24						
25	STREAM NAME	TO UNIT OPERATION				
26	77	Heat Exchanger	E102			
27	PARAMETERS					
28	Physical Properties					
29	Pressure Drop:	6.504e-002 kPa				
30	User Variables					
31	CONDITIONS					
32	Name	74	77			
33	Vapour	0.0000	0.0000			
34	Temperature (C)	20.0002	20.0002			
35	Pressure (kPa)	395.5245	395.4595			
36	Molar Flow (kgmole/h)	1230.5849	1230.5849			
37	Mass Flow (kg/h)	22169.1110	22169.1110			
38	Std Ideal Liq Vol Flow (m3/h)	22.2138	22.2138			
39	Molar Enthalpy (kJ/kgmole)	-2.866e+005	-2.866e+005			
40	Molar Entropy (kJ/kgmole-C)	52.39	52.39			
41	Heat Flow (kJ/h)	-3.5269e+08	-3.5269e+08			
42	PROPERTIES					
43	Name	74	77			
44	Molecular Weight	18.02	18.02			
45	Molar Density (kgmole/m3)	56.13	56.13			
46	Mass Density (kg/m3)	1011	1011			
47	Act. Volume Flow (m3/h)	21.92	21.92			
48	Mass Enthalpy (kJ/kg)	-1.591e+004	-1.591e+004			
49	Mass Entropy (kJ/kg-C)	2.908	2.908			
50	Heat Capacity (kJ/kgmole-C)	77.72	77.72			
51	Mass Heat Capacity (kJ/kg-C)	4.314	4.314			
52	Lower Heating Value (kJ/kgmole)	0.0000	0.0000			
53	Mass Lower Heating Value (kJ/kg)	0.0000	0.0000			
54	Honeywell International Inc.					
55	UniSim Design (R430 build 18059)					
56	Page 62 of 170					
57	* Specified by user.					

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
4			

Valve: E102VA (continued)

PROPERTIES

11	Name	74	77		
12	Phase Fraction [Vol. Basis]	0.0000	0.0000		
13	Phase Fraction [Mass Basis]	0.0000	0.0000		
14	Partial Pressure of CO2 (kPa)	---	---		
15	Cost Based on Flow (Cost/s)	0.0000	0.0000		
16	Act. Gas Flow (ACT_m3/h)	---	---		
17	Avg. Liq. Density (kgmole/m3)	55.40	55.40		
18	Specific Heat (kJ/kgmole-C)	77.72	77.72		
19	Std. Gas Flow (STD_m3/h)	2.910e+004	2.910e+004		
20	Std. Ideal Liq. Mass Density (kg/m3)	998.0	998.0		
21	Act. Liq. Flow (m3/s)	6.090e-003	6.090e-003		
22	Z Factor	2.891e-003	2.891e-003		
23	Watson K	---	---		
24	User Property	---	---		
25	Cp/(Cp - R)	1.120	1.120		
26	Cp/Cv	1.144	1.144		
27	Heat of Vap. (kJ/kgmole)	3.885e+004	3.885e+004		
28	Kinematic Viscosity (cSt)	0.9907	0.9907		
29	Liq. Mass Density (Std. Cond) (kg/m3)	1015	1015		
30	Liq. Vol. Flow (Std. Cond) (m3/h)	21.85	21.85		
31	Liquid Fraction	1.000	1.000		
32	Molar Volume (m3/kgmole)	1.782e-002	1.782e-002		
33	Mass Heat of Vap. (kJ/kg)	2156	2156		
34	Phase Fraction [Molar Basis]	0.0000	0.0000		
35	Surface Tension (dyne/cm)	72.96	72.96		
36	Thermal Conductivity (W/m-K)	0.6034	0.6034		
37	Viscosity (cP)	1.002	1.002		
38	Partial Pressure of H2S (kPa)	0.0000	0.0000		
39	Cv (Semi-Ideal) (kJ/kgmole-C)	69.40	69.40		
40	Mass Cv (Semi-Ideal) (kJ/kg-C)	3.852	3.852		
41	Cv (kJ/kgmole-C)	67.95	67.95		
42	Mass Cv (kJ/kg-C)	3.772	3.772		
43	Cv (Ent. Method) (kJ/kgmole-C)	---	---		
44	Mass Cv (Ent. Method) (kJ/kg-C)	---	---		
45	Cp/Cv (Ent. Method)	---	---		
46	Reid VP at 37.8 C (kPa)	---	---		
47	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	21.85	21.85		

STATUS

OK

NOTES

Description

Valve: E102VB

CONNECTIONS

Inlet Stream

64	STREAM NAME	FROM UNIT OPERATION
65	78	Heat Exchanger

Outlet Stream

68	STREAM NAME	TO UNIT OPERATION
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69	Honeywell International Inc.	UniSim Design (R430 build 18059)	Page 63 of 170
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1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc		
2		Unit Set:	SI		
3		Date/Time:	Friday Sep 4 2015, 16:44:21		
4	Valve: E102VB (continued)				
5	CONNECTIONS				
6	75				
7	PARAMETERS				
8	Physical Properties				
9	Pressure Drop:	1.652 kPa			
10	User Variables				
11	CONDITIONS				
12	Name	78	75		
13	Vapour	0.0000	0.0000		
14	Temperature (C)	40.3210	40.3248		
15	Pressure (kPa)	201.0433	199.3915 *		
16	Molar Flow (kgmole/h)	1230.8064	1230.8064		
17	Mass Flow (kg/h)	22173.1014	22173.1014		
18	Std Ideal Liq Vol Flow (m3/h)	22.2178	22.2178		
19	Molar Enthalpy (kJ/kgmole)	-2.850e+005	-2.850e+005		
20	Molar Entropy (kJ/kgmole-C)	57.60	57.60		
21	Heat Flow (kJ/h)	-3.5081e+08	-3.5081e+08		
22	PROPERTIES				
23	Name	78	75		
24	Molecular Weight	18.02	18.02		
25	Molar Density (kgmole/m3)	55.27	55.27		
26	Mass Density (kg/m3)	995.7	995.7		
27	Act. Volume Flow (m3/h)	22.27	22.27		
28	Mass Enthalpy (kJ/kg)	-1.582e+004	-1.582e+004		
29	Mass Entropy (kJ/kg-C)	3.197	3.197		
30	Heat Capacity (kJ/kgmole-C)	77.75	77.75		
31	Mass Heat Capacity (kJ/kg-C)	4.316	4.316		
32	Lower Heating Value (kJ/kgmole)	2.167e-315	2.031e-315		
33	Mass Lower Heating Value (kJ/kg)	1.203e-316	1.127e-316		
34	Phase Fraction [Vol. Basis]	7.905e-323	0.0000		
35	Phase Fraction [Mass Basis]	7.905e-323	0.0000		
36	Partial Pressure of CO2 (kPa)	---	---		
37	Cost Based on Flow (Cost/s)	0.0000	0.0000		
38	Act. Gas Flow (ACT_m3/h)	---	---		
39	Avg. Liq. Density (kgmole/m3)	55.40	55.40		
40	Specific Heat (kJ/kgmole-C)	77.75	77.75		
41	Std. Gas Flow (STD_m3/h)	2.910e+004	2.910e+004		
42	Std. Ideal Liq. Mass Density (kg/m3)	998.0	998.0		
43	Act. Liq. Flow (m3/s)	6.186e-003	6.186e-003		
44	Z Factor	1.396e-003	1.384e-003		
45	Watson K	12.72	12.72		
46	User Property	---	---		
47	Cp/(Cp - R)	1.120	1.120		
48	Cp/Cv	1.156	1.156		
49	Heat of Vap. (kJ/kgmole)	4.002e+004	4.003e+004		
50	Kinematic Viscosity (cSt)	0.6502	0.6502		
51	Liq. Mass Density (Std. Cond) (kg/m3)	1015	1015		
52	Liq. Vol. Flow (Std. Cond) (m3/h)	21.85	21.85		
53	Liquid Fraction	1.000	1.000		
54	Molar Volume (m3/kgmole)	1.809e-002	1.809e-002		
55	Mass Heat of Vap. (kJ/kg)	2222	2222		
56	Phase Fraction [Molar Basis]	0.0000	0.0000		
57	Surface Tension (dyne/cm)	69.44	69.44		
58	Thermal Conductivity (W/m-K)	0.6319	0.6319		

1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc			
2			Unit Set:	SI			
3			Date/Time:	Friday Sep 4 2015, 16:44:21			
4	Valve: E102VB (continued)						
5	PROPERTIES						
6	Name	78	75				
7	Viscosity (cP)	0.6475	0.6474				
8	Partial Pressure of H2S (kPa)	0.0000	0.0000				
9	Cv (Semi-Ideal) (kJ/kgmole-C)	69.43	69.43				
10	Mass Cv (Semi-Ideal) (kJ/kg-C)	3.854	3.854				
11	Cv (kJ/kgmole-C)	67.27	67.27				
12	Mass Cv (kJ/kg-C)	3.734	3.734				
13	Cv (Ent. Method) (kJ/kgmole-C)	---	---				
14	Mass Cv (Ent. Method) (kJ/kg-C)	---	---				
15	Cp/Cv (Ent. Method)	---	---				
16	Reid VP at 37.8 C (kPa)	---	---				
17	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	21.85	21.85				
18	STATUS						
19	OK						
20	NOTES						
21	Description						
22	Valve: E100VB						
23	CONNECTIONS						
24	Inlet Stream						
25	STREAM NAME	FROM UNIT OPERATION					
26	5	Material Stream					
27	Outlet Stream						
28	STREAM NAME	TO UNIT OPERATION					
29	79						
30	PARAMETERS						
31	Physical Properties						
32	Pressure Drop:	43.48 kPa					
33	User Variables						
34	CONDITIONS						
35	Name	5	79				
36	Vapour	0.3017	0.3139				
37	Temperature (C)	24.0490	22.2014				
38	Pressure (kPa)	929.3346	885.8571 *				
39	Molar Flow (kgmole/h)	2072.7739	2072.7739				
40	Mass Flow (kg/h)	91403.1123	91403.1123				
41	Std Ideal Liq Vol Flow (m3/h)	180.3968	180.3968				
42	Molar Enthalpy (kJ/kgmole)	-1.156e+005	-1.156e+005				
43	Molar Entropy (kJ/kgmole-C)	105.3	105.4				
44	Heat Flow (kJ/h)	-2.3968e+008	-2.3968e+008				
45	PROPERTIES						
46	Name	5	79				
47	Molecular Weight	44.10	44.10				
48	Molar Density (kgmole/m3)	1.381	1.276				
49	Honeywell International Inc.	UniSim Design (R430 build 18059)					
50	Licensed to: Company Name Not Available	Printed by: alu0100514599					
51				* Specified by user.			
52							

1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc		
2			Unit Set:	SI		
3			Date/Time:	Friday Sep 4 2015, 16:44:21		
4	Valve: E100VB (continued)					
5	PROPERTIES					
6	Name	5	79			
7	Mass Density (kg/m3)	60.91	56.25			
8	Act. Volume Flow (m3/h)	1501	1625			
9	Mass Enthalpy (kJ/kg)	-2622	-2622			
10	Mass Entropy (kJ/kg-C)	2.388	2.391			
11	Heat Capacity (kJ/kgmole-C)	112.2	110.6			
12	Mass Heat Capacity (kJ/kg-C)	2.545	2.509			
13	Lower Heating Value (kJ/kgmole)	2.045e+006	2.045e+006			
14	Mass Lower Heating Value (kJ/kg)	4.637e+004	4.637e+004			
15	Phase Fraction [Vol. Basis]	0.9139	0.9223			
16	Phase Fraction [Mass Basis]	0.3017	0.3139			
17	Partial Pressure of CO2 (kPa)	---	---			
18	Cost Based on Flow (Cost/s)	0.0000	0.0000			
19	Act. Gas Flow (ACT_m3/h)	---	---			
20	Avg. Liq. Density (kgmole/m3)	11.49	11.49			
21	Specific Heat (kJ/kgmole-C)	112.2	110.6			
22	Std. Gas Flow (STD_m3/h)	4.901e+004	4.901e+004			
23	Std. Ideal Liq. Mass Density (kg/m3)	506.7	506.7			
24	Act. Liq. Flow (m3/s)	3.589e-002	3.506e-002			
25	Z Factor	---	---			
26	Watson K	14.70	14.70			
27	User Property	---	---			
28	Cp/(Cp - R)	1.080	1.081			
29	Cp/Cv	1.050	1.051			
30	Heat of Vap. (kJ/kgmole)	1.499e+004	1.513e+004			
31	Kinematic Viscosity (cSt)	---	---			
32	Liq. Mass Density (Std. Cond) (kg/m3)	507.7	507.7			
33	Liq. Vol. Flow (Std. Cond) (m3/h)	180.0	180.0			
34	Liquid Fraction	0.6983	0.6861			
35	Molar Volume (m3/kgmole)	0.7239	0.7840			
36	Mass Heat of Vap. (kJ/kg)	339.9	343.2			
37	Phase Fraction [Molar Basis]	0.3017	0.3139			
38	Surface Tension (dyne/cm)	7.013	7.231			
39	Thermal Conductivity (W/m-K)	---	---			
40	Viscosity (cP)	---	---			
41	Partial Pressure of H2S (kPa)	0.0000	0.0000			
42	Cv (Semi-Ideal) (kJ/kgmole-C)	103.9	102.3			
43	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.357	2.321			
44	Cv (kJ/kgmole-C)	106.9	105.3			
45	Mass Cv (kJ/kg-C)	2.424	2.387			
46	Cv (Ent. Method) (kJ/kgmole-C)	---	---			
47	Mass Cv (Ent. Method) (kJ/kg-C)	---	---			
48	Cp/Cv (Ent. Method)	---	---			
49	Reid VP at 37.8 C (kPa)	---	---			
50	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	180.0	180.0			
51	STATUS					
52	OK					
53	NOTES					
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56	Description					
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69	Honeywell International Inc.	UniSim Design (R430 build 18059)		Page 66 of 170		
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1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
4	Valve: DBPV102		
5	CONNECTIONS		
6	Inlet Stream		
7	STREAM NAME	FROM UNIT OPERATION	
8	81	Tee	TEE-103
9	Outlet Stream		
10	STREAM NAME	TO UNIT OPERATION	
11	82	Mixer	MIX-102
12	PARAMETERS		
13	Physical Properties		
14	Pressure Drop:	735.5 kPa	
15	User Variables		
16	CONDITIONS		
17	Name	81	82
18	Vapour	1.0000	1.0000
19	Temperature (C)	84.8206	72.9714
20	Pressure (kPa)	1180.0603	444.5578
21	Molar Flow (kgmole/h)	0.0000	0.0000
22	Mass Flow (kg/h)	0.0000	0.0000
23	Std Ideal Liq Vol Flow (m3/h)	0.0000	0.0000
24	Molar Enthalpy (kJ/kgmole)	-9.966e+004	-9.966e+004
25	Molar Entropy (kJ/kgmole-C)	162.0	169.2
26	Heat Flow (kJ/h)	-1.3986e-29	-1.3986e-29
27	PROPERTIES		
28	Name	81	82
29	Molecular Weight	57.65	57.65
30	Molar Density (kgmole/m3)	0.5300	0.1679
31	Mass Density (kg/m3)	30.56	9.680
32	Act. Volume Flow (m3/h)	2.648e-034	8.358e-034
33	Mass Enthalpy (kJ/kg)	-1729	-1729
34	Mass Entropy (kJ/kg-C)	2.809	2.935
35	Heat Capacity (kJ/kgmole-C)	124.3	111.2
36	Mass Heat Capacity (kJ/kg-C)	2.156	1.929
37	Lower Heating Value (kJ/kgmole)	---	---
38	Mass Lower Heating Value (kJ/kg)	---	---
39	Phase Fraction [Vol. Basis]	1.000	1.000
40	Phase Fraction [Mass Basis]	1.000	1.000
41	Partial Pressure of CO2 (kPa)	---	---
42	Cost Based on Flow (Cost/s)	0.0000	0.0000
43	Act. Gas Flow (ACT_m3/h)	2.648e-034	8.358e-034
44	Avg. Liq. Density (kgmole/m3)	10.03	10.03
45	Specific Heat (kJ/kgmole-C)	124.3	111.2
46	Std. Gas Flow (STD_m3/h)	3.318e-033	3.318e-033
47	Std. Ideal Liq. Mass Density (kg/m3)	578.1	578.1
48	Act. Liq. Flow (m3/s)	0.0000	0.0000
49	Z Factor	0.7481	0.9201
50	Watson K	13.51	13.51
51	User Property	---	---
52	Cp/(Cp - R)	1.072	1.081
53	Cp/Cv	1.190	1.112
54	Heat of Vap. (kJ/kgmole)	1.950e+004	3.070e+004
55	Kinematic Viscosity (cSt)	0.3220	0.9197
56	Liq. Mass Density (Std. Cond) (kg/m3)	579.9	579.9

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
4			

Valve: DBPV102 (continued)

PROPERTIES

11	Name	81	82		
12	Liq. Vol. Flow (Std. Cond) (m3/h)	1.395e-035	1.395e-035		
13	Liquid Fraction	0.0000	0.0000		
14	Molar Volume (m3/kgmole)	1.887	5.956		
15	Mass Heat of Vap. (kJ/kg)	338.3	532.6		
16	Phase Fraction [Molar Basis]	1.0000	1.0000		
17	Surface Tension (dyne/cm)	---	---		
18	Thermal Conductivity (W/m-K)	2.288e-002	2.061e-002		
19	Viscosity (cP)	9.838e-003	8.903e-003		
20	Partial Pressure of H2S (kPa)	0.0000	0.0000		
21	Cv (Semi-Ideal) (kJ/kgmole-C)	116.0	102.9		
22	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.012	1.785		
23	Cv (kJ/kgmole-C)	104.5	100.0		
24	Mass Cv (kJ/kg-C)	1.812	1.735		
25	Cv (Ent. Method) (kJ/kgmole-C)	103.8	100.1		
26	Mass Cv (Ent. Method) (kJ/kg-C)	1.800	1.736		
27	Cp/Cv (Ent. Method)	1.198	1.111		
28	Reid VP at 37.8 C (kPa)	497.8	497.8		
29	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	1.395e-035	1.395e-035		

STATUS

OK

NOTES

Description

Pump: P20A

CONNECTIONS

Inlet Stream

46	Stream Name	From Unit Operation
47	61	Valve P20AVA

Outlet Stream

50	Stream Name	To Unit Operation
51	62	Valve P20AVB

Energy Stream

54	Stream Name	From Unit Operation
55	P2APower	Pump P20A

PARAMETERS

58	Adiabatic Efficiency (%):	65.32	Delta P:	35.85 kPa	Duty:	34.81 kW
59	Enable Slurry Pump	0	Impeller Diameter	1.000 m	Solid Mass Fraction	0.0000
60	Head Derating Factor	1.0000	Efficiency Derating Factor	1.0000	Solid Particle MedianSize	0.0000 mm

CURVES

63	Delta P:	35.85 kPa	Duty:	34.81 kW
64	Coefficient A:	0.0000	Coefficient B:	0.0000 Coefficient C: 0.0000

65	Parameter Preferences	Units for Delta P:	Flow Basis	ActVolFlow	Units for Flow: m3/h
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User Variables

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1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2			Unit Set:	SI
3			Date/Time:	Friday Sep 4 2015, 16:44:21
4	Pump: P20A (continued)			
5	CONDITIONS			
6	Name	61	62	P2APower
7	Vapour	0.0015	0.0000	---
8	Temperature (C)	147.3053	147.4636	---
9	Pressure (kPa)	1284.3254	1320.1724	---
10	Molar Flow (kgmole/h)	11088.8091	11088.8091	---
11	Mass Flow (kg/h)	881530.4579	881530.3921	---
12	Std Ideal Liq Vol Flow (m3/h)	1365.9406	1365.9406	---
13	Molar Enthalpy (kJ/kgmole)	-1.627e+005	-1.627e+005	---
14	Molar Entropy (kJ/kgmole-C)	145.3	145.3	---
15	Heat Flow (kJ/h)	-1.8044e+009	-1.8043e+009	1.2531e+005
16	PROPERTIES			
17	Name	61	62	
18	Molecular Weight	79.50	79.50	
19	Molar Density (kgmole/m3)	6.102	6.203	
20	Mass Density (kg/m3)	485.1	493.2	
21	Act. Volume Flow (m3/h)	1817	1788	
22	Mass Enthalpy (kJ/kg)	-2047	-2047	
23	Mass Entropy (kJ/kg-C)	1.828	1.828	
24	Heat Capacity (kJ/kgmole-C)	251.8	251.8	
25	Mass Heat Capacity (kJ/kg-C)	3.167	3.168	
26	Lower Heating Value (kJ/kgmole)	---	---	
27	Mass Lower Heating Value (kJ/kg)	---	---	
28	Phase Fraction [Vol. Basis]	1.827e-002	0.0000	
29	Phase Fraction [Mass Basis]	1.363e-003	0.0000	
30	Partial Pressure of CO2 (kPa)	---	---	
31	Cost Based on Flow (Cost/s)	0.0000	0.0000	
32	Act. Gas Flow (ACT_m3/h)	---	---	
33	Avg. Liq. Density (kgmole/m3)	8.118	8.118	
34	Specific Heat (kJ/kgmole-C)	251.8	251.8	
35	Std. Gas Flow (STD_m3/h)	2.622e+005	2.622e+005	
36	Std. Ideal Liq. Mass Density (kg/m3)	645.4	645.4	
37	Act. Liq. Flow (m3/s)	0.4956	0.4965	
38	Z Factor	---	6.085e-002	
39	Watson K	12.92	12.92	
40	User Property	---	---	
41	Cp/(Cp - R)	1.034	1.034	
42	Cp/Cv	1.167	1.034	
43	Heat of Vap. (kJ/kgmole)	2.315e+004	2.292e+004	
44	Kinematic Viscosity (cSt)	---	0.1920	
45	Liq. Mass Density (Std. Cond) (kg/m3)	648.9	648.9	
46	Liq. Vol. Flow (Std. Cond) (m3/h)	1358	1358	
47	Liquid Fraction	0.9985	1.000	
48	Molar Volume (m3/kgmole)	0.1639	0.1612	
49	Mass Heat of Vap. (kJ/kg)	291.2	288.3	
50	Phase Fraction [Molar Basis]	0.0015	0.0000	
51	Surface Tension (dyne/cm)	4.352	4.337	
52	Thermal Conductivity (W/m-K)	---	6.379e-002	
53	Viscosity (cP)	---	9.468e-002	
54	Partial Pressure of H2S (kPa)	0.0000	0.0000	
55	Cv (Semi-Ideal) (kJ/kgmole-C)	243.5	243.5	
56	Mass Cv (Semi-Ideal) (kJ/kg-C)	3.063	3.063	
57	Cv (kJ/kgmole-C)	215.7	243.5	
58	Mass Cv (kJ/kg-C)	2.713	3.063	
59	Cv (Ent. Method) (kJ/kgmole-C)	---	---	
60	Mass Cv (Ent. Method) (kJ/kg-C)	---	---	
61	Cp/Cv (Ent. Method)	---	---	
62	Reid VP at 37.8 C (kPa)	99.59	99.59	

1	Honeywell Company Name Not Available Calgary, Alberta CANADA		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc							
2			Unit Set:	SI							
3			Date/Time:	Friday Sep 4 2015, 16:44:21							
4	Pump: P20A (continued)										
5	PROPERTIES										
6	Name	61	62								
7	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	1358	1358								
8	STATUS										
9	Vapour in inlet stream										
10	NOTES										
11	Description										
12	Pump: P10B										
13	CONNECTIONS										
14	Inlet Stream										
15	Stream Name	From Unit Operation									
16	3	Valve	P10BVA								
17	Outlet Stream										
18	Stream Name	To Unit Operation									
19	6	Valve	P10BVB								
20	Energy Stream										
21	Stream Name	From Unit Operation									
22	P10BPower	Pump	P10B								
23	PARAMETERS										
24	Adiabatic Efficiency (%):	67.50	Delta P:	-1.710e-013 kPa	Duty:	0.0000 kW					
25	Enable Slurry Pump	0	Impeller Diameter	1.000 m	Solid Mass Fraction	0.0000					
26	Head Derating Factor	1.0000	Efficiency Derating Factor	1.0000	Solid Particle MedianSize	0.0000 mm					
27	CURVES										
28	Delta P:	-1.710e-013 kPa		Duty:	0.0000 kW						
29	Coefficient A:	0.0000	Coefficient B:	0.0000	Coefficient C:	0.0000					
30	Parameter Preferences	Units for Delta P:		Flow Basis	ActVolFlow	Units for Flow: m3/h					
31	User Variables										
32	CONDITIONS										
33	Name	3	6	P10BPower							
34	Vapour	0.0000	0.0004	---							
35	Temperature (C)	33.4840	29.3221	---							
36	Pressure (kPa)	1184.6514	1184.6514	---							
37	Molar Flow (kgmole/h)	-0.0000	-0.0000	---							
38	Mass Flow (kg/h)	-0.0000	-0.0000	---							
39	Std Ideal Liq Vol Flow (m3/h)	-0.0000	-0.0000	---							
40	Molar Enthalpy (kJ/kgmole)	-1.236e+005	-1.272e+005	---							
41	Molar Entropy (kJ/kgmole-C)	91.66	90.15	---							
42	Heat Flow (kJ/h)	2.7359e-05	2.4626e-28	0.0000e-01							
43	PROPERTIES										
44	Name	3	6								
45	Molecular Weight	57.28	58.43								
46	Molar Density (kgmole/m3)	9.731	9.654								
47	Mass Density (kg/m3)	557.4	564.0								
48	Honeywell International Inc.	UniSim Design (R430 build 18059)			Page 70 of 170						
49	Licensed to: Company Name Not Available										
50	Printed by: alu0100514599										
51	* Specified by user.										

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
4			

Pump: P10B (continued)

PROPERTIES

11	Name	3	6			
12	Act. Volume Flow (m3/h)	-2.274e-011	-2.005e-034			
13	Mass Enthalpy (kJ/kg)	-2159	-2178			
14	Mass Entropy (kJ/kg-C)	1.600	1.543			
15	Heat Capacity (kJ/kgmole-C)	141.4	140.9			
16	Mass Heat Capacity (kJ/kg-C)	2.469	2.412			
17	Lower Heating Value (kJ/kgmole)	---	---			
18	Mass Lower Heating Value (kJ/kg)	---	---			
19	Phase Fraction [Vol. Basis]	0.0000	7.056e-003			
20	Phase Fraction [Mass Basis]	0.0000	2.351e-004			
21	Partial Pressure of CO2 (kPa)	---	---			
22	Cost Based on Flow (Cost/s)	0.0000	0.0000			
23	Act. Gas Flow (ACT_m3/h)	---	---			
24	Avg. Liq. Density (kgmole/m3)	10.04	9.982			
25	Specific Heat (kJ/kgmole-C)	141.4	140.9			
26	Std. Gas Flow (STD_m3/h)	-5.232e-009	-4.577e-032			
27	Std. Ideal Liq. Mass Density (kg/m3)	575.1	583.2			
28	Act. Liq. Flow (m3/s)	-6.316e-015	-5.530e-038			
29	Z Factor	4.775e-002	---			
30	Watson K	13.57	13.42			
31	User Property	---	---			
32	Cp/(Cp - R)	1.062	1.063			
33	Cp/Cv	1.293	1.109			
34	Heat of Vap. (kJ/kgmole)	1.632e+004	2.564e+004			
35	Kinematic Viscosity (cSt)	0.2641	---			
36	Liq. Mass Density (Std. Cond) (kg/m3)	577.9	583.7			
37	Liq. Vol. Flow (Std. Cond) (m3/h)	-2.193e-011	-1.937e-034			
38	Liquid Fraction	1.000	0.9996			
39	Molar Volume (m3/kgmole)	0.1028	0.1036			
40	Mass Heat of Vap. (kJ/kg)	284.9	438.8			
41	Phase Fraction [Molar Basis]	0.0000	0.0004			
42	Surface Tension (dyne/cm)	10.01	10.75			
43	Thermal Conductivity (W/m-K)	8.738e-002	---			
44	Viscosity (cP)	0.1472	---			
45	Partial Pressure of H2S (kPa)	0.0000	0.0000			
46	Cv (Semi-Ideal) (kJ/kgmole-C)	133.1	132.6			
47	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.324	2.270			
48	Cv (kJ/kgmole-C)	109.3	127.1			
49	Mass Cv (kJ/kg-C)	1.909	2.175			
50	Cv (Ent. Method) (kJ/kgmole-C)	---	---			
51	Mass Cv (Ent. Method) (kJ/kg-C)	---	---			
52	Cp/Cv (Ent. Method)	---	---			
53	Reid VP at 37.8 C (kPa)	458.1	514.6			
54	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	-2.193e-011	-1.937e-034			

STATUS

OK

NOTES

Description

Pump: P10A

CONNECTIONS

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1	Honeywell Company Name Not Available Calgary, Alberta CANADA			Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc												
2				Unit Set:	SI												
3				Date/Time:	Friday Sep 4 2015, 16:44:21												
4	Pump: P10A (continued)																
5	Inlet Stream																
6	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr><th style="width: 30%;">Stream Name</th><th colspan="5">From Unit Operation</th></tr> </thead> <tbody> <tr><td>2</td><td>Valve</td><td></td><td></td><td></td><td>P10AVA</td></tr> </tbody> </table>					Stream Name	From Unit Operation					2	Valve				P10AVA
Stream Name	From Unit Operation																
2	Valve				P10AVA												
7	Outlet Stream																
8	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr><th style="width: 30%;">Stream Name</th><th colspan="5">To Unit Operation</th></tr> </thead> <tbody> <tr><td>7</td><td>Valve</td><td></td><td></td><td></td><td>P10AVB</td></tr> </tbody> </table>					Stream Name	To Unit Operation					7	Valve				P10AVB
Stream Name	To Unit Operation																
7	Valve				P10AVB												
9	Energy Stream																
10	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr><th style="width: 30%;">Stream Name</th><th colspan="5">From Unit Operation</th></tr> </thead> <tbody> <tr><td>P10APower</td><td>Pump</td><td></td><td></td><td></td><td>P10A</td></tr> </tbody> </table>					Stream Name	From Unit Operation					P10APower	Pump				P10A
Stream Name	From Unit Operation																
P10APower	Pump				P10A												
11	PARAMETERS																
12	Adiabatic Efficiency (%):	74.93	Delta P:	554.2 kPa	Duty: 14.92 kW												
13	Enable Slurry Pump	0	Impeller Diameter	1.000 m	Solid Mass Fraction 0.0000												
14	Head Derating Factor	1.0000	Efficiency Derating Factor	1.0000	Solid Particle MedianSize 0.0000 mm												
15	CURVES																
16	Delta P:	554.2 kPa	Duty:	14.92 kW													
17	Coefficient A:	0.0000	Coefficient B:	0.0000	Coefficient C: 0.0000												
18	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr><th style="width: 20%;">Parameter Preferences</th><th style="width: 20%;">Units for Delta P:</th><th style="width: 20%;">Flow Basis</th><th style="width: 20%;">ActVolFlow</th><th style="width: 20%;">Units for Flow:</th></tr> </thead> <tbody> <tr><td></td><td></td><td></td><td></td><td>m3/h</td></tr> </tbody> </table>					Parameter Preferences	Units for Delta P:	Flow Basis	ActVolFlow	Units for Flow:					m3/h		
Parameter Preferences	Units for Delta P:	Flow Basis	ActVolFlow	Units for Flow:													
				m3/h													
19	User Variables																
20	CONDITIONS																
21	Name	2	7	P10APower													
22	Vapour	0.0000	0.0000	---													
23	Temperature (C)	33.4841	33.9491	---													
24	Pressure (kPa)	1183.8452	1738.0757	---													
25	Molar Flow (kgmole/h)	370.0731	370.0731	---													
26	Mass Flow (kg/h)	21198.4957	21198.4957	---													
27	Std Ideal Liq Vol Flow (m3/h)	36.8631	36.8631	---													
28	Molar Enthalpy (kJ/kgmole)	-1.236e+005	-1.236e+005	---													
29	Molar Entropy (kJ/kgmole-C)	91.66	91.73	---													
30	Heat Flow (kJ/h)	-4.5758e+07	-4.5730e+07	5.3711e+04													
31	PROPERTIES																
32	Name	2	7														
33	Molecular Weight	57.28	57.28														
34	Molar Density (kgmole/m3)	9.731	9.749														
35	Mass Density (kg/m3)	557.4	558.4														
36	Act. Volume Flow (m3/h)	38.03	37.96														
37	Mass Enthalpy (kJ/kg)	-2159	-2157														
38	Mass Entropy (kJ/kg-C)	1.600	1.601														
39	Heat Capacity (kJ/kgmole-C)	141.4	141.1														
40	Mass Heat Capacity (kJ/kg-C)	2.469	2.463														
41	Lower Heating Value (kJ/kgmole)	---	---														
42	Mass Lower Heating Value (kJ/kg)	---	---														
43	Phase Fraction [Vol. Basis]	0.0000	0.0000														
44	Phase Fraction [Mass Basis]	0.0000	0.0000														
45	Partial Pressure of CO2 (kPa)	---	---														
46	Cost Based on Flow (Cost/s)	0.0000	0.0000														
47	Act. Gas Flow (ACT_m3/h)	---	---														
48	Avg. Liq. Density (kgmole/m3)	10.04	10.04														
49	Specific Heat (kJ/kgmole-C)	141.4	141.1														
50	Std. Gas Flow (STD_m3/h)	8750	8750														
51	Std. Ideal Liq. Mass Density (kg/m3)	575.1	575.1														
52	Act. Liq. Flow (m3/s)	1.056e-002	1.054e-002														
53	Z Factor	4.772e-002	6.983e-002														
54	Honeywell International Inc.																
55	UniSim Design (R430 build 18059)																
56	Page 72 of 170																

1	Honeywell Company Name Not Available Calgary, Alberta CANADA		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2			Unit Set:	SI
3			Date/Time:	Friday Sep 4 2015, 16:44:21

Pump: P10A (continued)

PROPERTIES

11	Name	2	7		
12	Watson K	13.57	13.57		
13	User Property	---	---		
14	Cp/(Cp - R)	1.062	1.063		
15	Cp/Cv	1.293	1.289		
16	Heat of Vap. (kJ/kgmole)	1.632e+004	1.411e+004		
17	Kinematic Viscosity (cSt)	0.2641	0.2631		
18	Liq. Mass Density (Std. Cond) (kg/m3)	577.9	577.9		
19	Liq. Vol. Flow (Std. Cond) (m3/h)	36.68	36.68		
20	Liquid Fraction	1.000	1.000		
21	Molar Volume (m3/kgmole)	0.1028	0.1026		
22	Mass Heat of Vap. (kJ/kg)	285.0	246.4		
23	Phase Fraction [Molar Basis]	0.0000	0.0000		
24	Surface Tension (dyne/cm)	10.01	9.960		
25	Thermal Conductivity (W/m-K)	8.738e-002	8.722e-002		
26	Viscosity (cP)	0.1472	0.1469		
27	Partial Pressure of H2S (kPa)	0.0000	0.0000		
28	Cv (Semi-Ideal) (kJ/kgmole-C)	133.1	132.8		
29	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.324	2.318		
30	Cv (kJ/kgmole-C)	109.3	109.5		
31	Mass Cv (kJ/kg-C)	1.909	1.911		
32	Cv (Ent. Method) (kJ/kgmole-C)	---	---		
33	Mass Cv (Ent. Method) (kJ/kg-C)	---	---		
34	Cp/Cv (Ent. Method)	---	---		
35	Reid VP at 37.8 C (kPa)	458.1	458.1		
36	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	36.68	36.68		

STATUS

OK

NOTES

Description

Pump: P01A

CONNECTIONS

Inlet Stream

53	Stream Name	From Unit Operation
54	26	Valve P01AVA

Outlet Stream

57	Stream Name	To Unit Operation
58	27	Valve P01AVB

Energy Stream

61	Stream Name	From Unit Operation
62	P01APower	Pump P01A

PARAMETERS

65	Adiabatic Efficiency (%):	70.82	Delta P:	132.5 kPa	Duty:	7.660 kW
66	Enable Slurry Pump	0	Impeller Diameter	1.000 m	Solid Mass Fraction	0.0000
67	Head Derating Factor	1.0000	Efficiency Derating Factor	1.0000	Solid Particle MedianSize	0.0000 mm

CURVES

69	Honeywell International Inc.	UniSim Design (R430 build 18059)	Page 73 of 170
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1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc			
2			Unit Set:	SI			
3			Date/Time:	Friday Sep 4 2015, 16:44:21			
4	Pump: P01A (continued)						
5	CURVES						
6	10 Delta P: 132.5 kPa Duty: 7.660 kW 11 Coefficient A: 0.0000 Coefficient B: 0.0000 Coefficient C: 0.0000 Parameter Preferences Units for Delta P: Flow Basis ActVolFlow Units for Flow: m3/h						
7	User Variables						
8	CONDITIONS						
9	Name	26	27	P01APower			
10	Vapour	0.0000	0.0000	---			
11	Temperature (C)	89.8582	90.0379	---			
12	Pressure (kPa)	1468.2374	1600.7226	---			
13	Molar Flow (kgmole/h)	86.7631	86.7631	---			
14	Mass Flow (kg/h)	5351.6186	5351.6186	---			
15	Std Ideal Liq Vol Flow (m3/h)	9.0000	9.0000	---			
16	Molar Enthalpy (kJ/kgmole)	-1.202e+005	-1.202e+005	---			
17	Molar Entropy (kJ/kgmole-C)	120.0	120.1	---			
18	Heat Flow (kJ/h)	-1.0429e+007	-1.0427e+007	2.7575e+004			
19	PROPERTIES						
20	Name	26	27				
21	Molecular Weight	61.68	61.68				
22	Molar Density (kgmole/m3)	8.143	8.151				
23	Mass Density (kg/m3)	502.3	502.8				
24	Act. Volume Flow (m3/h)	10.66	10.64				
25	Mass Enthalpy (kJ/kg)	-1949	-1948				
26	Mass Entropy (kJ/kg-C)	1.946	1.946				
27	Heat Capacity (kJ/kgmole-C)	181.8	181.4				
28	Mass Heat Capacity (kJ/kg-C)	2.947	2.941				
29	Lower Heating Value (kJ/kgmole)	---	---				
30	Mass Lower Heating Value (kJ/kg)	---	---				
31	Phase Fraction [Vol. Basis]	0.0000	0.0000				
32	Phase Fraction [Mass Basis]	0.0000	0.0000				
33	Partial Pressure of CO2 (kPa)	---	---				
34	Cost Based on Flow (Cost/s)	0.0000	0.0000				
35	Act. Gas Flow (ACT_m3/h)	---	---				
36	Avg. Liq. Density (kgmole/m3)	9.640	9.640				
37	Specific Heat (kJ/kgmole-C)	181.8	181.4				
38	Std. Gas Flow (STD_m3/h)	2051	2051				
39	Std. Ideal Liq. Mass Density (kg/m3)	594.6	594.6				
40	Act. Liq. Flow (m3/s)	2.960e-003	2.957e-003				
41	Z Factor	5.974e-002	6.504e-002				
42	Watson K	13.33	13.33				
43	User Property	---	---				
44	Cp/(Cp - R)	1.048	1.048				
45	Cp/Cv	1.302	1.298				
46	Heat of Vap. (kJ/kgmole)	1.698e+004	1.640e+004				
47	Kinematic Viscosity (cSt)	0.1974	0.1971				
48	Liq. Mass Density (Std. Cond) (kg/m3)	598.7	598.7				
49	Liq. Vol. Flow (Std. Cond) (m3/h)	8.939	8.939				
50	Liquid Fraction	1.000	1.000				
51	Molar Volume (m3/kgmole)	0.1228	0.1227				
52	Mass Heat of Vap. (kJ/kg)	275.3	265.9				
53	Phase Fraction [Molar Basis]	0.0000	0.0000				
54	Surface Tension (dyne/cm)	5.410	5.393				
55	Thermal Conductivity (W/m-K)	6.996e-002	6.988e-002				
56	Viscosity (cP)	9.916e-002	9.911e-002				
57	Partial Pressure of H2S (kPa)	0.0000	0.0000				
58	Cv (Semi-Ideal) (kJ/kgmole-C)	173.5	173.1				
59	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.812	2.806				

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2			Unit Set:	SI		
3			Date/Time:	Friday Sep 4 2015, 16:44:21		
4	Pump: P01A (continued)					
5	PROPERTIES					
6	Name	26	27			
7	Cv (kJ/kgmole-C)	139.7	139.7			
8	Mass Cv (kJ/kg-C)	2.264	2.265			
9	Cv (Ent. Method) (kJ/kgmole-C)	---	---			
10	Mass Cv (Ent. Method) (kJ/kg-C)	---	---			
11	Cp/Cv (Ent. Method)	---	---			
12	Reid VP at 37.8 C (kPa)	345.5	345.5			
13	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	8.939	8.939			
14	STATUS					
15	OK					
16	NOTES					
17	Description					
18	Pump: P01B					
19	CONNECTIONS					
20	Inlet Stream					
21	Stream Name	From Unit Operation				
22	30	Valve	P01BVA			
23	Outlet Stream					
24	Stream Name	To Unit Operation				
25	31	Valve	P01BVB			
26	Energy Stream					
27	Stream Name	From Unit Operation				
28	P01BPower	Pump	P01B			
29	PARAMETERS					
30	Adiabatic Efficiency (%):	67.50	Delta P:	9.172e-016 kPa Duty: 0.0000 kW		
31	Enable Slurry Pump	0	Impeller Diameter	1.000 m Solid Mass Fraction 0.0000		
32	Head Derating Factor	1.0000	Efficiency Derating Factor	1.0000 Solid Particle MedianSize 0.0000 mm		
33	CURVES					
34	Delta P:	9.172e-016 kPa	Duty:	0.0000 kW		
35	Coefficient A:	0.0000	Coefficient B:	0.0000 Coefficient C: 0.0000		
36	Parameter Preferences	Units for Delta P:	Flow Basis	ActVolFlow Units for Flow: m3/h		
37	User Variables					
38	CONDITIONS					
39	Name	30	31	P01BPower		
40	Vapour	0.0000	0.0000	---		
41	Temperature (C)	89.8582	86.1120	---		
42	Pressure (kPa)	1468.2945	1468.2945	---		
43	Molar Flow (kgmole/h)	-0.0000	-0.0000	---		
44	Mass Flow (kg/h)	-0.0000	-0.0000	---		
45	Std Ideal Liq Vol Flow (m3/h)	-0.0000	-0.0000	---		
46	Molar Enthalpy (kJ/kgmole)	-1.202e+005	-1.212e+005	---		
47	Molar Entropy (kJ/kgmole-C)	120.0	118.0	---		
48	Heat Flow (kJ/h)	7.0012e-12	4.7093e-29	0.0000e-01		
49	Honeywell International Inc.					
50	UniSim Design (R430 build 18059)					
51	Page 75 of 170					

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
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4			

Pump: P01B (continued)

PROPERTIES

11	Name	30	31
12	Molecular Weight	61.68	61.78
13	Molar Density (kgmole/m3)	8.143	8.229
14	Mass Density (kg/m3)	502.3	508.4
15	Act. Volume Flow (m3/h)	-7.153e-018	-4.720e-035
16	Mass Enthalpy (kJ/kg)	-1949	-1962
17	Mass Entropy (kJ/kg-C)	1.946	1.910
18	Heat Capacity (kJ/kgmole-C)	181.8	178.6
19	Mass Heat Capacity (kJ/kg-C)	2.947	2.891
20	Lower Heating Value (kJ/kgmole)	---	---
21	Mass Lower Heating Value (kJ/kg)	---	---
22	Phase Fraction [Vol. Basis]	0.0000	0.0000
23	Phase Fraction [Mass Basis]	0.0000	0.0000
24	Partial Pressure of CO2 (kPa)	---	---
25	Cost Based on Flow (Cost/s)	0.0000	0.0000
26	Act. Gas Flow (ACT_m3/h)	---	---
27	Avg. Liq. Density (kgmole/m3)	9.640	9.651
28	Specific Heat (kJ/kgmole-C)	181.8	178.6
29	Std. Gas Flow (STD_m3/h)	-1.377e-015	-9.184e-033
30	Std. Ideal Liq. Mass Density (kg/m3)	594.6	596.3
31	Act. Liq. Flow (m3/s)	-1.987e-021	-1.311e-038
32	Z Factor	5.974e-002	5.973e-002
33	Watson K	13.33	13.30
34	User Property	---	---
35	Cp/(Cp - R)	1.048	1.049
36	Cp/Cv	1.302	1.297
37	Heat of Vap. (kJ/kgmole)	1.698e+004	1.899e+004
38	Kinematic Viscosity (cSt)	0.1974	0.2016
39	Liq. Mass Density (Std. Cond) (kg/m3)	598.7	599.4
40	Liq. Vol. Flow (Std. Cond) (m3/h)	-6.001e-018	-4.004e-035
41	Liquid Fraction	1.000	1.000
42	Molar Volume (m3/kgmole)	0.1228	0.1215
43	Mass Heat of Vap. (kJ/kg)	275.3	307.3
44	Phase Fraction [Molar Basis]	0.0000	0.0000
45	Surface Tension (dyne/cm)	5.410	5.826
46	Thermal Conductivity (W/m-K)	6.996e-002	7.183e-002
47	Viscosity (cP)	9.916e-002	0.1025
48	Partial Pressure of H2S (kPa)	0.0000	0.0000
49	Cv (Semi-Ideal) (kJ/kgmole-C)	173.5	170.3
50	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.812	2.757
51	Cv (kJ/kgmole-C)	139.7	137.8
52	Mass Cv (kJ/kg-C)	2.264	2.230
53	Cv (Ent. Method) (kJ/kgmole-C)	---	---
54	Mass Cv (Ent. Method) (kJ/kg-C)	---	---
55	Cp/Cv (Ent. Method)	---	---
56	Reid VP at 37.8 C (kPa)	345.5	373.9
57	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	-6.001e-018	-4.004e-035

STATUS

OK

NOTES

Description

1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc		
2			Unit Set:	SI		
3			Date/Time:	Friday Sep 4 2015, 16:44:21		
4	Pump: P02A					
5	CONNECTIONS					
6	Inlet Stream					
7	Stream Name	From Unit Operation				
8	40	Valve				
9	Outlet Stream					
10	Stream Name	To Unit Operation				
11	42	Valve				
12	Energy Stream					
13	Stream Name	From Unit Operation				
14	P02APower	Pump				
15	PARAMETERS					
16	Adiabatic Efficiency (%):	67.50	Delta P:	1.173e-015 kPa		
17	Enable Slurry Pump	0	Impeller Diameter	1.000 m		
18	Head Derating Factor	1.0000	Efficiency Derating Factor	1.0000		
19	CURVES					
20	Delta P:	1.173e-015 kPa	Duty:	0.0000 kW		
21	Coefficient A:	0.0000	Coefficient B:	0.0000		
22	Coefficient C:	0.0000				
23	Parameter Preferences		Units for Delta P:	Flow Basis		
24			ActVolFlow	Units for Flow:		
25	User Variables					
26	CONDITIONS					
27	Name	40	42	P02APower		
28	Vapour	0.0000	0.0000	---		
29	Temperature (C)	89.8871	89.8940	---		
30	Pressure (kPa)	1180.9237	1180.9237	---		
31	Molar Flow (kgmole/h)	-0.0000	-0.0000	---		
32	Mass Flow (kg/h)	-0.0000	-0.0000	---		
33	Std Ideal Liq Vol Flow (m3/h)	-0.0000	-0.0000	---		
34	Molar Enthalpy (kJ/kgmole)	-1.636e+005	-1.636e+005	---		
35	Molar Entropy (kJ/kgmole-C)	117.4	117.3	---		
36	Heat Flow (kJ/h)	1.3318e-14	9.3695e-29	0.0000e-01		
37	PROPERTIES					
38	Name	40	42			
39	Molecular Weight	72.63	72.63			
40	Molar Density (kgmole/m3)	7.512	7.532			
41	Mass Density (kg/m3)	545.5	547.0			
42	Act. Volume Flow (m3/h)	-1.084e-020	-7.604e-035			
43	Mass Enthalpy (kJ/kg)	-2252	-2252			
44	Mass Entropy (kJ/kg-C)	1.617	1.615			
45	Heat Capacity (kJ/kgmole-C)	196.3	195.7			
46	Mass Heat Capacity (kJ/kg-C)	2.704	2.694			
47	Lower Heating Value (kJ/kgmole)	---	---			
48	Mass Lower Heating Value (kJ/kg)	---	---			
49	Phase Fraction [Vol. Basis]	0.0000	0.0000			
50	Phase Fraction [Mass Basis]	0.0000	0.0000			
51	Partial Pressure of CO2 (kPa)	---	---			
52	Cost Based on Flow (Cost/s)	0.0000	0.0000			
53	Act. Gas Flow (ACT_m3/h)	---	---			
54	Avg. Liq. Density (kgmole/m3)	8.587	8.587			
55	Specific Heat (kJ/kgmole-C)	196.3	195.7			
56	Std. Gas Flow (STD_m3/h)	-1.925e-018	-1.354e-032			
57	Std. Ideal Liq. Mass Density (kg/m3)	623.7	623.7			

1	Honeywell Company Name Not Available Calgary, Alberta CANADA		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc			
2			Unit Set:	SI			
3			Date/Time:	Friday Sep 4 2015, 16:44:21			
4	Pump: P02A (continued)						
5	PROPERTIES						
6	Name	40	42				
7	Act. Liq. Flow (m ³ /s)	-3.011e-024	-2.112e-038				
8	Z Factor	5.208e-002	5.194e-002				
9	Watson K	13.12	13.12				
10	User Property	---	---				
11	Cp/(Cp - R)	1.044	1.044				
12	Cp/Cv	1.246	1.246				
13	Heat of Vap. (kJ/kgmole)	2.643e+004	2.643e+004				
14	Kinematic Viscosity (cSt)	0.2430	0.2428				
15	Liq. Mass Density (Std. Cond) (kg/m ³)	629.2	629.2				
16	Liq. Vol. Flow (Std. Cond) (m ³ /h)	-9.398e-021	-6.611e-035				
17	Liquid Fraction	1.000	1.000				
18	Molar Volume (m ³ /kgmole)	0.1331	0.1328				
19	Mass Heat of Vap. (kJ/kg)	363.9	363.9				
20	Phase Fraction [Molar Basis]	0.0000	0.0000				
21	Surface Tension (dyne/cm)	7.576	7.575				
22	Thermal Conductivity (W/m-K)	0.0783	7.829e-002				
23	Viscosity (cP)	0.1326	0.1328				
24	Partial Pressure of H ₂ S (kPa)	0.0000	0.0000				
25	Cv (Semi-Ideal) (kJ/kgmole-C)	188.0	187.4				
26	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.589	2.580				
27	Cv (kJ/kgmole-C)	157.5	157.0				
28	Mass Cv (kJ/kg-C)	2.169	2.162				
29	Cv (Ent. Method) (kJ/kgmole-C)	---	---				
30	Mass Cv (Ent. Method) (kJ/kg-C)	---	---				
31	Cp/Cv (Ent. Method)	---	---				
32	Reid VP at 37.8 C (kPa)	234.1	234.1				
33	Liq. Vol. Flow - Sum(Std. Cond) (m ³ /h)	-9.398e-021	-6.611e-035				
34	STATUS						
35	OK						
36	NOTES						
37	Description						
38	Pump: P02B						
39	CONNECTIONS						
40	Inlet Stream						
41	Stream Name		From Unit Operation				
42	41	Valve					
43	Outlet Stream						
44	Stream Name		To Unit Operation				
45	43	Valve					
46	Energy Stream						
47	Stream Name		From Unit Operation				
48	P02BPower	Pump					
49	PARAMETERS						
50	Adiabatic Efficiency (%):	70.63	Delta P:	165.4 kPa	Duty: 7.754 kW		
51	Enable Slurry Pump	0	Impeller Diameter	1.000 m	Solid Mass Fraction 0.0000		
52	Honeywell International Inc.						
53	UniSim Design (R430 build 18059)						
54	Page 78 of 170						

1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2			Unit Set:	SI
3			Date/Time:	Friday Sep 4 2015, 16:44:21
4	Pump: P02B (continued)			
5	Head Derating Factor	1.0000	Efficiency Derating Factor	1.0000
6	CURVES			
7	Delta P:	165.4 kPa	Duty:	7.754 kW
8	Coefficient A:	0.0000	Coefficient B:	0.0000
9	Coefficient C:	0.0000		
10	Parameter Preferences	Units for Delta P:	Flow Basis	ActVolFlow
11				Units for Flow: m3/h
12	User Variables			
13	CONDITIONS			
14	Name	41	43	P02BPower
15	Vapour	0.0000	0.0000	---
16	Temperature (C)	20.0679	20.1733	---
17	Pressure (kPa)	1200.0694	1365.5102	---
18	Molar Flow (kgmole/h)	85.8731	85.8731	---
19	Mass Flow (kg/h)	6236.5679	6236.5679	---
20	Std Ideal Liq Vol Flow (m3/h)	10.0000	10.0000	---
21	Molar Enthalpy (kJ/kgmole)	-1.760e+005	-1.759e+005	---
22	Molar Entropy (kJ/kgmole-C)	79.63	79.66	---
23	Heat Flow (kJ/h)	-1.5111e+007	-1.5109e+007	2.7915e+004
24	PROPERTIES			
25	Name	41	43	
26	Molecular Weight	72.63	72.63	
27	Molar Density (kgmole/m3)	8.620	8.623	
28	Mass Density (kg/m3)	626.0	626.2	
29	Act. Volume Flow (m3/h)	9.962	9.959	
30	Mass Enthalpy (kJ/kg)	-2423	-2423	
31	Mass Entropy (kJ/kg-C)	1.096	1.097	
32	Heat Capacity (kJ/kgmole-C)	160.8	160.8	
33	Mass Heat Capacity (kJ/kg-C)	2.214	2.214	
34	Lower Heating Value (kJ/kgmole)	---	---	
35	Mass Lower Heating Value (kJ/kg)	---	---	
36	Phase Fraction [Vol. Basis]	0.0000	0.0000	
37	Phase Fraction [Mass Basis]	0.0000	0.0000	
38	Partial Pressure of CO2 (kPa)	---	---	
39	Cost Based on Flow (Cost/s)	0.0000	0.0000	
40	Act. Gas Flow (ACT_m3/h)	---	---	
41	Avg. Liq. Density (kgmole/m3)	8.587	8.587	
42	Specific Heat (kJ/kgmole-C)	160.8	160.8	
43	Std. Gas Flow (STD_m3/h)	2030	2030	
44	Std. Ideal Liq. Mass Density (kg/m3)	623.7	623.7	
45	Act. Liq. Flow (m3/s)	2.767e-003	2.766e-003	
46	Z Factor	5.711e-002	6.494e-002	
47	Watson K	13.12	13.12	
48	User Property	---	---	
49	Cp/(Cp - R)	1.055	1.055	
50	Cp/Cv	1.231	1.230	
51	Heat of Vap. (kJ/kgmole)	2.632e+004	2.535e+004	
52	Kinematic Viscosity (cSt)	0.3938	0.3934	
53	Liq. Mass Density (Std. Cond) (kg/m3)	629.2	629.2	
54	Liq. Vol. Flow (Std. Cond) (m3/h)	9.912	9.912	
55	Liquid Fraction	1.000	1.000	
56	Molar Volume (m3/kgmole)	0.1160	0.1160	
57	Mass Heat of Vap. (kJ/kg)	362.4	349.1	
58	Phase Fraction [Molar Basis]	0.0000	0.0000	
59	Surface Tension (dyne/cm)	14.72	14.71	
60	Thermal Conductivity (W/m-K)	0.1026	0.1026	
61	Viscosity (cP)	0.2465	0.2464	
62	Partial Pressure of H2S (kPa)	0.0000	0.0000	

1	Honeywell Company Name Not Available Calgary, Alberta CANADA		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc							
2			Unit Set:	SI							
3			Date/Time:	Friday Sep 4 2015, 16:44:21							
4	Pump: P02B (continued)										
5	PROPERTIES										
6	Name	41	43								
7	Cv (Semi-Ideal) (kJ/kgmole-C)	152.5	152.5								
8	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.100	2.100								
9	Cv (kJ/kgmole-C)	130.7	130.7								
10	Mass Cv (kJ/kg-C)	1.799	1.800								
11	Cv (Ent. Method) (kJ/kgmole-C)	---	---								
12	Mass Cv (Ent. Method) (kJ/kg-C)	---	---								
13	Cp/Cv (Ent. Method)	---	---								
14	Reid VP at 37.8 C (kPa)	234.1	234.1								
15	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	9.912	9.912								
16	STATUS										
17	OK										
18	NOTES										
19	Description										
20	PID Controller: DBFC102										
21	Process Variable				Output						
22	OBJECT	VARIABLE			OBJECT						
23	Material Stream: 34	Std Ideal Liq Vol Flow		Valve:	FV102						
24	Configuration										
25	Minimum: 0.0000 m3/h *	Maximum: 16.67 m3/h *		Control Action:	Reverse						
26	Operational Parameters										
27	SP: 9.000 m3/h *	PV: 9.000 m3/h	OP: 20.60	Controller Mode:	Auto	Execution: Internal					
28	Tuning										
29	Kp: 0.2000 *	Ti: 0.1000 minutes *	Td: ---								
30	Surge Control Parameters										
31	Parameter A: ---	Parameter B: ---	Parameter C: ---	Parameter D: ---							
32	Control Line: ---	Backup Line: ---	Quick Opening: ---								
33	Alarms										
34	Signal Type: PV Signal	Value: 9.000 m3/h *	Alarm Group:	AlarmGroup#1							
35	Level Alarms										
36		Limit		Priority							
37	Low Low	---		High							
38	Low	---		Low							
39	High	---		Low							
40	High High	---		High							
41	Dead Band: ---	Status: ---		Normal							
42	Deviation Alarms										
43		Limit		Priority							
44	Deviation Low	---		Low							
45	Deviation High	---		Low							
46	Deviation Min: ---	Deviation Max: ---	Dead Band: ---	Status: ---	Normal						
47	Rate Alarms										
48		Limit		Priority							
49	Rate Low	---		Low							
50	Rate High	---		Low							
51	Honeywell International Inc. UniSim Design (R430 build 18059) Page 80 of 170										
52	Licensed to: Company Name Not Available Printed by: alu0100514599 * Specified by user.										

1	Honeywell Company Name Not Available Calgary, Alberta CANADA		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta_jmacias_09.usc		
2			Unit Set:	SI		
3			Date/Time:	Friday Sep 4 2015, 16:44:21		
4	PID Controller: DBFC102 (continued)					
5	Rate Min:	---	Rate Max:	---	Dead Band:	---
6	Status: Normal					
7	PV Conditioning					
8	Sample PV Every: ---					
9	Calculate Raw PV for Flow					
10	Calculate Raw PV	No	Type	Direct	Scaling Factor	1.000 *
11	Bias (%)	0.00 *	Square Root	Yes	MW or Density	MW
12	Apply Compensation			Reference		PV
13	No	Molecular Weight		18.00 *		61.68
14	No	Mass Density		997.1 kg/m3 *		502.8 kg/m3
15	No	Pressure		101.3 kPa *		1601 kPa
16	No	Temperature		25.00 C *		90.04 C
17	SP Ramping					
18	Target SP:	9.000 m3/h *	Ramp Duration:			5.000 minutes *
19	User Variables					
20	STATUS					
21	OK					
22	NOTES					
23						
24	Description					
25						
26	PID Controller: DBFC202					
27						
28	Process Variable					
29	Output					
30	OBJECT		VARIABLE		OBJECT	
31	Material Stream:	Feed 1	Std Ideal Liq Vol Flow	Valve:		DBFV202
32	Configuration					
33	Minimum:	0.0000 m3/h *	Maximum:	25.00 m3/h *	Control Action:	Reverse
34	Operational Parameters					
35	SP:	10.00 m3/h *	PV:	10.00 m3/h	OP:	31.05
36	Kp:	0.2000 *	Ti:	0.1000 minutes *	Td:	---
37	Tuning					
38	Surge Control Parameters					
39	Parameter A:	---	Parameter B:	---	Parameter C:	---
40	Control Line:	---	Backup Line:	---	Quick Opening:	---
41	Alarms					
42	Signal Type:	PV Signal	Value:	10.00 m3/h *	Alarm Group:	AlarmGroup#1
43	Level Alarms					
44			Limit		Priority	
45	Low Low		---			High
46	Low		---			Low
47	High		---			Low
48	High High		---			High
49	Dead Band:	---	Status:			Normal
50	Deviation Alarms					
51			Limit		Priority	
52	Deviation Low		---			Low
53	Deviation High		---			Low
54	Honeywell International Inc.		UniSim Design (R430 build 18059)			Page 81 of 170

1	Honeywell Company Name Not Available Calgary, Alberta CANADA		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta_jmacias_09.usc							
2			Unit Set:	SI							
3			Date/Time:	Friday Sep 4 2015, 16:44:21							
4	PID Controller: DBFC202 (continued)										
5	Deviation Min:	---	Deviation Max:	---	Dead Band:	---	Status:	Normal			
6	Rate Alarms										
7			Limit		Priority						
8	Rate Low		---		Low						
9	Rate High		---		Low						
10	Rate Min:	---	Rate Max:	---	Dead Band:	---	Status:	Normal			
11	PV Conditioning										
12	Sample PV Every: ---										
13	Calculate Raw PV for Flow										
14	Calculate Raw PV	No	Type	Direct	Scaling Factor	1.000 *					
15	Bias (%)	0.00 *	Square Root	Yes	MW or Density	MW					
16	Apply Compensation			Reference		PV					
17		No	Molecular Weight	18.00 *		72.63					
18		No	Mass Density	997.1 kg/m3 *		626.2 kg/m3					
19		No	Pressure	101.3 kPa *		1365 kPa					
20		No	Temperature	25.00 C *		20.17 C					
21	SP Ramping										
22	Target SP:	10.00 m3/h *	Ramp Duration:	5.000 minutes *							
23	User Variables										
24	STATUS										
25	OK										
26	NOTES										
27	Description										
28											
29	PID Controller: DBFC101										
30											
31	Process Variable						Output				
32											
33	OBJECT		VARIABLE		OBJECT						
34	Material Stream:	22	Std Ideal Liq Vol Flow	Valve:		DBFV101					
35	Configuration										
36											
37	Minimum: 0.0000 m3/h *						Control Action: Reverse				
38											
39	Operational Parameters										
40											
41	SP:	9.000 m3/h *	PV:	9.000 m3/h	OP:	41.01	Controller Mode:	Auto	Execution: Internal		
42	Tuning										
43	Kp:	0.2000 *	Ti:	0.1000 minutes *	Td:	---					
44											
45	Surge Control Parameters										
46											
47	Parameter A:	---	Parameter B:	---	Parameter C:	---	Parameter D:	---	---		
48	Control Line:	---	Backup Line:	---	Quick Opening:	---					
49	Alarms										
50											
51	Signal Type:	PV Signal	Value:	9.000 m3/h *	Alarm Group:		AlarmGroup#1				
52	Level Alarms										
53											
54	Limit			Priority							
55	Low Low		---	High							
56	Low		---	Low							
57	High		---	Low							
58	High High		---	High							
59	Honeywell International Inc.						UniSim Design (R430 build 18059)				
60	Page 82 of 170										

1	Honeywell Company Name Not Available Calgary, Alberta CANADA			Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc		
2				Unit Set:	SI		
3				Date/Time:	Friday Sep 4 2015, 16:44:21		
4	PID Controller: DBFC101 (continued)						
5	Dead Band:	---	Status:	Normal			
6	Deviation Alarms						
7		Limit	Priority				
8	Deviation Low	---	Low				
9	Deviation High	---	Low				
10	Deviation Min:	---	Deviation Max:	---	Dead Band:	---	Status: Normal
11	Rate Alarms						
12		Limit	Priority				
13	Rate Low	---	Low				
14	Rate High	---	Low				
15	Rate Min:	---	Rate Max:	---	Dead Band:	---	Status: Normal
16	PV Conditioning						
17	Sample PV Every: ---						
18	Calculate Raw PV for Flow						
19	Calculate Raw PV	No	Type	Direct	Scaling Factor	1.000 *	
20	Bias (%)	0.00 *	Square Root	Yes	MW or Density	MW	
21	Apply Compensation			Reference	PV		
22	No	Molecular Weight		18.00 *	61.68		
23	No	Mass Density		997.1 kg/m3 *	502.8 kg/m3		
24	No	Pressure		101.3 kPa *	1572 kPa		
25	No	Temperature		25.00 C *	89.90 C		
26	SP Ramping						
27	Target SP:	9.000 m3/h *	Ramp Duration:		5.000 minutes *		
28	User Variables						
29	STATUS						
30	OK						
31	NOTES						
32							
33	Description						
34							
35	PID Controller: DBA002						
36							
37	Process Variable						
38							
39	OBJECT	VARIABLE	OBJECT				
40	Selector Block:	OS-2	Output Value				
41	Configuration						
42	Minimum:	0.0000 vol % *	Maximum:	20.00 vol % *	Control Action:	Reverse	
43	Operational Parameters						
44	SP:	9.244 vol % *	PV:	3.022 vol %	OP:	0.00	Controller Mode: Indicator Execution: Internal
45	Tuning						
46	Kp:	1.000 *	Ti:	---	Td:	---	---
47	Surge Control Parameters						
48	Parameter A:	---	Parameter B:	---	Parameter C:	---	Parameter D: ---
49	Control Line:	---	Backup Line:	---	Quick Opening:	---	
50	Alarms						
51	Signal Type:	PV Signal	Value:	3.022 vol % *	Alarm Group:	AlarmGroup#1	
52	Level Alarms						
53	Honeywell International Inc.	UniSim Design (R430 build 18059)					Page 83 of 170

1	Honeywell Company Name Not Available Calgary, Alberta CANADA			Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc					
2				Unit Set:	SI					
3				Date/Time:	Friday Sep 4 2015, 16:44:21					
4	PID Controller: DBA002 (continued)									
5										
6										
7										
8										
9			Limit		Priority					
10	Low Low		---		High					
11	Low		---		Low					
12	High		---		Low					
13	High High		---		High					
14	Dead Band:		---		Status:		Normal			
15	Deviation Alarms									
16			Limit		Priority					
17	Deviation Low		---		Low					
18	Deviation High		---		Low					
19	Deviation Min:	---	Deviation Max:	---	Dead Band:	---	Status:			
20	Rate Alarms									
21			Limit		Priority					
22	Rate Low		---		Low					
23	Rate High		---		Low					
24	Rate Min:	---	Rate Max:	---	Dead Band:	---	Status:			
25	PV Conditioning									
26										
27	Sample PV Every: ---									
28	Calculate Raw PV for Flow									
29	Calculate Raw PV	No	Type	Direct	Scaling Factor	1.000 *				
30	Bias (%)	0.00 *	Square Root	Yes	MW or Density	MW				
31	Apply Compensation			Reference	PV					
32	No	Molecular Weight		18.00 *	---					
33	No	Mass Density		997.1 kg/m3 *	---					
34	No	Pressure		101.3 kPa *	---					
35	No	Temperature		25.00 C *	---					
36	SP Ramping									
37										
38	Target SP:	9.244 vol % *	Ramp Duration:		5.000 minutes *					
39	User Variables									
40										
41	STATUS									
42										
43	OK									
44	NOTES									
45										
46										
47	Description									
48										
49										
50	PID Controller: DBFC201									
51										
52										
53	Process Variable				Output					
54										
55	OBJECT		VARIABLE		OBJECT					
56	Material Stream:	22-2	Std Ideal Liq Vol Flow		Valve:	DBFV201				
57	Configuration									
58										
59	Minimum:	0.0000 m3/h *	Maximum:	16.67 m3/h *	Control Action:	Reverse				
60	Operational Parameters									
61										
62	SP:	10.00 m3/h *	PV:	10.00 m3/h	OP:	28.55	Controller Mode: Auto Execution: Internal			
63	Tuning									
64										
65	Kp:	0.2000 *	Ti:	0.1000 minutes *	Td:	---				
66	Surge Control Parameters									
67										
68	Parameter A:	---	Parameter B:	---	Parameter C:	---	Parameter D: ---			
69	Honeywell International Inc.	UniSim Design (R430 build 18059)				Page 84 of 170				

 Honeywell Company Name Not Available Calgary, Alberta CANADA			Case Name: C:\Users\TEMP.ULL\Downloads\Desbuta_jmacias_09.usc	
			Unit Set: SI	
			Date/Time: Friday Sep 4 2015, 16:44:21	
PID Controller: DBFC201 (continued)				
Control Line:		---	Backup Line:	---
			Quick Opening:	---
Alarms				
Signal Type:		PV Signal	Value:	10.00 m3/h *
			Alarm Group:	AlarmGroup#1
Level Alarms				
		Limit		Priority
Low Low		---		High
Low		---		Low
High		---		Low
High High		---		High
Dead Band:		---	Status:	Normal
Deviation Alarms				
		Limit		Priority
Deviation Low		---		Low
Deviation High		---		Low
Deviation Min:		---	Deviation Max:	---
		Dead Band:	---	Status:
				Normal
Rate Alarms				
		Limit		Priority
Rate Low		---		Low
Rate High		---		Low
Rate Min:		---	Rate Max:	---
		Dead Band:	---	Status:
				Normal
PV Conditioning				
Sample PV Every: ---				
Calculate Raw PV for Flow				
Calculate Raw PV		No	Type	Direct
		0.00 *	Square Root	Scaling Factor
				1.000 *
Bias (%)		0.00 *	Yes	MW or Density
				MW
Apply Compensation		Reference		PV
No		Molecular Weight		18.00 *
No		Mass Density		997.1 kg/m3 *
No		Pressure		101.3 kPa *
No		Temperature		25.00 C *
SP Ramping				
Target SP:		10.00 m3/h *	Ramp Duration:	5.000 minutes *
User Variables				
STATUS				
OK				
NOTES				
Description				
PID Controller: DBFC104				
Process Variable				Output
OBJECT		VARIABLE	OBJECT	
Material Stream:		54	Std Ideal Liq Vol Flow	Valve:
Configuration				
Minimum:		0.0000 m3/h *	Maximum:	33.33 m3/h *
			Control Action:	Reverse
Operational Parameters				
SP:		8.950 m3/h *	PV:	732e-036 m3/h
			OP:	100.00
			Controller Mode:	Auto
			Execution:	Internal
Tuning				

1	Honeywell Company Name Not Available Calgary, Alberta CANADA			Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc			
2				Unit Set:	SI			
3				Date/Time:	Friday Sep 4 2015, 16:44:21			
4	PID Controller: DBFC104 (continued)							
5	Tuning							
6	Kp:	0.1000 *	Ti:	0.2000 minutes *	Td:	---		
7	Surge Control Parameters							
8	Parameter A:	---	Parameter B:	---	Parameter C:	---		
9	Control Line:	---	Backup Line:	---	Quick Opening:	---		
10	Alarms							
11	Signal Type:	PV Signal	Value:	-8.732e-036 m3/h *	Alarm Group:	AlarmGroup#1		
12	Level Alarms							
13			Limit		Priority			
14	Low Low		---		High			
15	Low		---		Low			
16	High		---		Low			
17	High High		---		High			
18	Dead Band:	---	Status:		Normal			
19	Deviation Alarms							
20			Limit		Priority			
21	Deviation Low		---		Low			
22	Deviation High		---		Low			
23	Deviation Min:	---	Deviation Max:	---	Dead Band:	---		
24	Rate Min:	---	Rate Max:	---	Status:	Normal		
25	Rate Alarms							
26			Limit		Priority			
27	Rate Low		---		Low			
28	Rate High		---		Low			
29	Rate Min:	---	Rate Max:	---	Dead Band:	---		
30	PV Conditioning							
31	Sample PV Every: ---							
32	Calculate Raw PV for Flow							
33	Calculate Raw PV	No	Type	Direct	Scaling Factor	1.000 *		
34	Bias (%)	0.00 *	Square Root	Yes	MW or Density	MW		
35	Apply Compensation			Reference	PV			
36	No	Molecular Weight		18.00 *		57.06		
37	No	Mass Density		997.1 kg/m3 *		542.9 kg/m3		
38	No	Pressure		101.3 kPa *		558.7 kPa		
39	No	Temperature		25.00 C *		42.09 C		
40	SP Ramping							
41	Target SP:	8.950 m3/h *	Ramp Duration:		5.000 minutes *			
42	User Variables							
43	STATUS							
44	OK							
45	NOTES							
46								
47								
48								
49								
50								
51								
52								
53								
54								
55								
56								
57								
58	Description							
59								
60								
61	PID Controller: BDFC105							
62								
63	Process Variable				Output			
64	OBJECT		VARIABLE		OBJECT			
65	Material Stream:	56	Std Ideal Liq Vol Flow	Valve:		FV105		
66	Configuration							
67								
68								
69	Honeywell International Inc.	UniSim Design (R430 build 18059)				Page 86 of 170		

1	Honeywell Company Name Not Available Calgary, Alberta CANADA		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta_jmacias_09.usc							
2			Unit Set:	SI							
3			Date/Time:	Friday Sep 4 2015, 16:44:21							
4	PID Controller: BDPC105 (continued)										
5	Minimum:	0.0000 m3/h *	Maximum:	16.67 m3/h *	Control Action:	Reverse					
6	Operational Parameters										
7	SP:	9.300 m3/h *	PV:	9.300 m3/h	OP:	75.68					
8	Controller Mode:	Auto	Execution:	Internal							
9	Tuning										
10	Kp:	0.1000 *	Ti:	0.1833 minutes *	Td:	---					
11	Surge Control Parameters										
12	Parameter A:	---	Parameter B:	---	Parameter C:	---					
13	Parameter D:	---	Control Line:	---	Backup Line:	---					
14	Quick Opening:	---	Alarms								
15	Signal Type:	PV Signal	Value:	9.300 m3/h *	Alarm Group:	AlarmGroup#1					
16	Level Alarms										
17			Limit	Priority							
18	Low Low		---	High							
19	Low		---	Low							
20	High		---	Low							
21	High High		---	High							
22	Dead Band:	---	Status:	Normal							
23	Deviation Alarms										
24			Limit	Priority							
25	Deviation Low		---	Low							
26	Deviation High		---	Low							
27	Deviation Min:	---	Deviation Max:	---	Dead Band:	---					
28			Status:	Normal							
29	Rate Alarms										
30			Limit	Priority							
31	Rate Low		---	Low							
32	Rate High		---	Low							
33	Rate Min:	---	Rate Max:	---	Dead Band:	---					
34			Status:	Normal							
35	PV Conditioning										
36	Sample PV Every: ---										
37	Calculate Raw PV for Flow										
38	Calculate Raw PV	No	Type	Direct	Scaling Factor	1.000 *					
39	Bias (%)	0.00 *	Square Root	Yes	MW or Density	MW					
40	Apply Compensation			Reference	PV						
41	No	Molecular Weight		18.00 *	79.61						
42	No	Mass Density		997.1 kg/m3 *	639.7 kg/m3						
43	No	Pressure		101.3 kPa *	204.7 kPa						
44	No	Temperature		25.00 C *	24.97 C						
45	SP Ramping										
46	Target SP:	9.300 m3/h *	Ramp Duration:	5.000 minutes *							
47	User Variables										
48	STATUS										
49	OK										
50	NOTES										
51											
52											
53											
54											
55											
56											
57											
58											
59											
60											
61											
62	Description										
63											
64											
65	PID Controller: DBFI106										
66											
67											
68	Process Variable		Output								
69	Honeywell International Inc.		UniSim Design (R430 build 18059)		Page 87 of 170						

1	Honeywell Company Name Not Available Calgary, Alberta CANADA			Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc											
2				Unit Set:	SI											
3				Date/Time:	Friday Sep 4 2015, 16:44:21											
4	PID Controller: DBFI106 (continued)															
5																
6																
7																
8																
9																
10	Process Variable			Output												
11	OBJECT		VARIABLE	OBJECT												
12	Material Stream: C5+ Std Ideal Liq Vol Flow															
13																
14	Configuration															
15	Minimum:	0.0000 m3/h *	Maximum:	30.00 m3/h *	Control Action:	Reverse										
16																
17	Operational Parameters															
18	SP:	13.57 m3/h *	PV:	9.336 m3/h	OP:	0.00	Controller Mode: Indicator Execution: Internal									
19																
20	Kp:	1.000 *	Ti:	---	Td:	---										
21	Surge Control Parameters															
22	Parameter A:	---	Parameter B:	---	Parameter C:	---	Parameter D: ---									
23	Control Line:	---	Backup Line:	---	Quick Opening:	---										
24																
25	Alarms															
26	Signal Type:	PV Signal	Value:	9.336 m3/h *	Alarm Group:	AlarmGroup#1										
27	Level Alarms															
28				Limit	Priority											
29	Low Low	---	---	---	High											
30	Low	---	---	---	Low											
31	High	---	---	---	Low											
32	High High	---	---	---	High											
33	Dead Band:	---	Status:	Normal												
34	Deviation Alarms															
35				Limit	Priority											
36	Deviation Low	---	---	---	Low											
37	Deviation High	---	---	---	Low											
38	Deviation Min:	---	Deviation Max:	---	Dead Band:	---	Status: Normal									
39	Rate Alarms															
40				Limit	Priority											
41	Rate Low	---	---	---	Low											
42	Rate High	---	---	---	Low											
43	Rate Min:	---	Rate Max:	---	Dead Band:	---	Status: Normal									
44	PV Conditioning															
45																
46																
47	Sample PV Every: ---															
48	Calculate Raw PV for Flow															
49	Calculate Raw PV	No	Type	Direct	Scaling Factor	1.000 *										
50	Bias (%)	0.00 *	Square Root	Yes	MW or Density	MW										
51	Apply Compensation			Reference	PV											
52	No	Molecular Weight		18.00 *	79.74											
53	No	Mass Density		997.1 kg/m3 *	493.5 kg/m3											
54	No	Pressure		101.3 kPa *	1297 kPa											
55	No	Temperature		25.00 C *	147.9 C											
56	SP Ramping															
57																
58	Target SP:	13.57 m3/h *	Ramp Duration:	5.000 minutes *												
59	User Variables															
60																
61	STATUS															
62																
63	OK															
64	NOTES															
65																
66																
67	Description															
68																
69	Honeywell International Inc.	UniSim Design (R430 build 18059)				Page 88 of 170										

1	Honeywell Company Name Not Available Calgary, Alberta CANADA			Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc						
2				Unit Set:	SI						
3				Date/Time:	Friday Sep 4 2015, 16:44:21						
4	PID Controller: DBFI106 (continued)										
5	NOTES										
6	PID Controller: DBFI107										
7	Process Variable				Output						
8	OBJECT		VARIABLE	OBJECT							
9	Material Stream:		60	Liq Vol Flow @Std Cond							
10	Configuration										
11	Minimum:	0.0000 m3/h *	Maximum:	20.00 m3/h *	Control Action:	Reverse					
12	Operational Parameters										
13	SP:	13.76 m3/h *	PV:	9.677 m3/h	OP:	0.00					
14	Tuning										
15	Kp:	1.000 *	Ti:	---	Td:	---					
16	Surge Control Parameters										
17	Parameter A:	---	Parameter B:	---	Parameter C:	---					
18	Control Line:	---	Backup Line:	---	Quick Opening:	---					
19	Alarms										
20	Signal Type:	PV Signal	Value:	9.677 m3/h *	Alarm Group:	AlarmGroup#1					
21	Level Alarms										
22			Limit	Priority							
23	Low Low		---	High							
24	Low		---	Low							
25	High		---	Low							
26	High High		---	High							
27	Dead Band:		---	Status:							
28	Deviation Alarms										
29			Limit	Priority							
30	Deviation Low		---	Low							
31	Deviation High		---	Low							
32	Deviation Min:	---	Deviation Max:	---	Dead Band:	---					
33	Rate Alarms										
34			Limit	Priority							
35	Rate Low		---	Low							
36	Rate High		---	Low							
37	Rate Min:	---	Rate Max:	---	Dead Band:	---					
38	PV Conditioning										
39	Sample PV Every: ---										
40	Calculate Raw PV for Flow										
41	Calculate Raw PV	No	Type	Direct	Scaling Factor	1.000 *					
42	Bias (%)	0.00 *	Square Root	Yes	MW or Density	MW					
43	Apply Compensation		Reference		PV						
44	No	Molecular Weight		18.00 *	57.28						
45	No	Mass Density		997.1 kg/m3 *	558.4 kg/m3						
46	No	Pressure		101.3 kPa *	1737 kPa						
47	No	Temperature		25.00 C *	33.95 C						
48	SP Ramping										
49	Target SP:	13.76 m3/h *	Ramp Duration:	5.000 minutes *							
50	User Variables										
51	Honeywell International Inc.										
52	UniSim Design (R430 build 18059)										
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54	* Specified by user.										
55	Licensed to: Company Name Not Available										
56	Printed by: alu0100514599										

1	Honeywell Company Name Not Available Calgary, Alberta CANADA			Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc			
2				Unit Set:	SI			
3				Date/Time:	Friday Sep 4 2015, 16:44:21			
4	PID Controller: DBFI107 (continued)							
5								
6	STATUS							
7	OK							
8								
9	NOTES							
10								
11								
12								
13								
14								
15	Description							
16								
17								
18	PID Controller: DBPC102							
19								
20								
21	Process Variable				Output			
22	OBJECT		VARIABLE		OBJECT			
23	Material Stream:		81	Pressure	Valve:	DBPV102		
24	Configuration							
25								
26								
27	Minimum:	101.3 kPa *	Maximum:	1572 kPa *	Control Action:	Direct		
28	Operational Parameters							
29								
30	SP:	1229 kPa *	PV:	1180 kPa	OP:	0.00		
31	Controller Mode: Auto Execution: Internal							
32	Tuning							
33	Kp:	1.000 *	Ti:	3.000 minutes *	Td:	---		
34	Surge Control Parameters							
35								
36	Parameter A:	---	Parameter B:	---	Parameter C:	---		
37	Control Line:	---	Backup Line:	---	Quick Opening:	---		
38	Alarms							
39								
40	Signal Type:	PV Signal	Value:	1180 kPa *	Alarm Group:	AlarmGroup#1		
41	Level Alarms							
42			Limit		Priority			
43	Low Low		---		High			
44	Low		---		Low			
45	High		---		Low			
46	High High		---		High			
47	Dead Band:		---		Status:			
48	Deviation Alarms							
49			Limit		Priority			
50	Deviation Low		---		Low			
51	Deviation High		---		Low			
52	Deviation Min:	---	Deviation Max:	---	Dead Band:	---		
53	Rate Alarms							
54			Limit		Priority			
55	Rate Low		---		Low			
56	Rate High		---		Low			
57	Rate Min:	---	Rate Max:	---	Dead Band:	---		
58	PV Conditioning							
59								
60	Sample PV Every: ---							
61	Calculate Raw PV for Flow							
62	Calculate Raw PV	No	Type	Direct	Scaling Factor	1.000 *		
63	Bias (%)	0.00 *	Square Root	Yes	MW or Density	MW		
64	Apply Compensation			Reference	PV			
65	No	Molecular Weight		18.00 *	57.65			
66	No	Mass Density		997.1 kg/m3 *	30.56 kg/m3			
67	No	Pressure		101.3 kPa *	1180 kPa			
68	No	Temperature		25.00 C *	84.82 C			
69	Honeywell International Inc.	UniSim Design (R430 build 18059)				Page 90 of 170		

1	Honeywell Company Name Not Available Calgary, Alberta CANADA			Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc			
2				Unit Set:	SI			
3				Date/Time:	Friday Sep 4 2015, 16:44:21			
4	PID Controller: DBPC102 (continued)							
5								
6	SP Ramping							
7	Target SP:	1229 kPa *	Ramp Duration:	5.000 minutes *				
8								
9	User Variables							
10								
11	STATUS							
12								
13	OK							
14								
15	NOTES							
16								
17								
18								
19								
20	Description							
21								
22								
23								
24	PID Controller: DBA001							
25								
26	Process Variable				Output			
27	OBJECT			VARIABLE	OBJECT			
28	Selector Block:	OS-1		Output Value				
29	Configuration							
30								
31	Minimum:	0.0000 vol % *	Maximum:	20.00 vol % *	Control Action:	Reverse		
32								
33	Operational Parameters							
34								
35	SP:	5.000 vol % *	PV:	1.695 vol %	OP:	0.00 Controller Mode: Indicator Execution: Internal		
36	Tuning							
37								
38	Kp:	1.000 *	Ti:	---	Td:	---		
39	Surge Control Parameters							
40								
41	Parameter A:	---	Parameter B:	---	Parameter C:	---		
42	Control Line:	---	Backup Line:	---	Quick Opening:	---		
43	Alarms							
44								
45	Signal Type:	PV Signal	Value:	1.695 vol % *	Alarm Group:	AlarmGroup#1		
46	Level Alarms							
47				Limit	Priority			
48	Low Low			---	High			
49	Low			---	Low			
50	High			---	Low			
51	High High			---	High			
52	Dead Band:	---	Status:		Normal			
53	Deviation Alarms							
54				Limit	Priority			
55	Deviation Low			---	Low			
56	Deviation High			---	Low			
57	Deviation Min:	---	Deviation Max:	---	Dead Band:	---		
58	Rate Alarms							
59				Limit	Priority			
60	Rate Low			---	Low			
61	Rate High			---	Low			
62	Rate Min:	---	Rate Max:	---	Dead Band:	---		
63	PV Conditioning							
64								
65	Sample PV Every: ---							
66	Calculate Raw PV for Flow							
67	Calculate Raw PV	No	Type	Direct	Scaling Factor	1.000 *		
68	Bias (%)	0.00 *	Square Root	Yes	MW or Density	MW		
69	Honeywell International Inc.	UniSim Design (R430 build 18059)			Page 91 of 170			

1	Honeywell Company Name Not Available Calgary, Alberta CANADA		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc							
2			Unit Set:	SI							
3			Date/Time:	Friday Sep 4 2015, 16:44:21							
4	PID Controller: DBA001 (continued)										
5											
6											
7											
8											
9	Apply Compensation		Reference	PV							
10	No	Molecular Weight	18.00 *	---							
11	No	Mass Density	997.1 kg/m3 *	---							
12	No	Pressure	101.3 kPa *	---							
13	No	Temperature	25.00 C *	---							
14	SP Ramping										
15											
16	Target SP:	5.000 vol % *	Ramp Duration:	5.000 minutes *							
17	User Variables										
18											
19	STATUS										
20											
21	OK										
22	NOTES										
23											
24											
25	Description										
26											
27											
28	PID Controller: DBA010										
29											
30											
31	Process Variable				Output						
32	OBJECT		VARIABLE	OBJECT							
33	Selector Block:		OS-1-2	Output Value							
34	Configuration										
35											
36	Minimum:	0.0000 vol % *	Maximum:	20.00 vol % *	Control Action:	Reverse					
37	Operational Parameters										
38											
39	SP:	20.00 vol % *	PV:	1.384 vol %	OP:	0.00					
40	Controller Mode: Indicator Execution: Internal										
41	Tuning										
42											
43	Kp:	1.000 *	Ti:	---	Td:	---					
44	Surge Control Parameters										
45											
46	Parameter A:	---	Parameter B:	---	Parameter C:	---					
47	Parameter D:	---	Backup Line:	---	Quick Opening:	---					
48	Alarms										
49											
50	Signal Type:	PV Signal	Value:	1.384 vol % *	Alarm Group:	AlarmGroup#1					
51	Level Alarms										
52			Limit	Priority							
53	Low Low		---	High							
54	Low		---	Low							
55	High		---	Low							
56	High High		---	High							
57	Dead Band:		---	Status:							
58	Deviation Alarms										
59			Limit	Priority							
60	Deviation Low		---	Low							
61	Deviation High		---	Low							
62	Deviation Min:	---	Deviation Max:	---	Dead Band:	---					
63	Rate Alarms										
64			Limit	Priority							
65	Rate Low		---	Low							
66	Rate High		---	Low							
67	Rate Min:	---	Rate Max:	---	Dead Band:	---					
68	PV Conditioning										
69	Honeywell International Inc. UniSim Design (R430 build 18059)										

1	Honeywell Company Name Not Available Calgary, Alberta CANADA		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta_jmacias_09.usc					
2			Unit Set:	SI					
3			Date/Time:	Friday Sep 4 2015, 16:44:21					
4	PID Controller: DBA010 (continued)								
5									
6	PV Conditioning								
7	Sample PV Every: ---								
8	Calculate Raw PV for Flow								
9	Calculate Raw PV	No	Type	Direct	Scaling Factor	1.000 *			
10	Bias (%)	0.00 *	Square Root	Yes	MW or Density	MW			
11	Apply Compensation			Reference		PV			
12	No	Molecular Weight		18.00 *		---			
13	No	Mass Density		997.1 kg/m3 *		---			
14	No	Pressure		101.3 kPa *		---			
15	No	Temperature		25.00 C *		---			
16	SP Ramping								
17	Target SP:	20.00 vol % *	Ramp Duration:			5.000 minutes *			
18	User Variables								
19	STATUS								
20	OK								
21	NOTES								
22									
23	Description								
24									
25	PID Controller: DBA020								
26									
27	Process Variable								
28	Output								
29	OBJECT	VARIABLE		OBJECT					
30	Selector Block:	OS-1-2-2	Output Value						
31	Configuration								
32									
33	Operational Parameters								
34	SP:	20.00 vol % *	PV:	3.474 vol %	OP:	0.00			
35					Controller Mode:	Indicator			
36					Execution:	Internal			
37	Tuning								
38	Kp:	1.000 *	Ti:	---	Td:	---			
39	Surge Control Parameters								
40	Parameter A:	---	Parameter B:	---	Parameter C:	---			
41	Control Line:	---	Backup Line:	---	Quick Opening:	---			
42	Alarms								
43	Signal Type:	PV Signal	Value:	3.474 vol % *	Alarm Group:	AlarmGroup#1			
44	Level Alarms								
45			Limit		Priority				
46	Low Low		---		High				
47	Low		---		Low				
48	High		---		Low				
49	High High		---		High				
50	Dead Band:	---	Status:		Normal				
51	Deviation Alarms								
52			Limit		Priority				
53	Deviation Low		---		Low				
54	Deviation High		---		Low				
55	Deviation Min:	---	Deviation Max:	---	Dead Band:	---			
56					Status:	Normal			
57	Rate Alarms								
58	Honeywell International Inc.		UniSim Design (R430 build 18059)			Page 93 of 170			

1	Honeywell Company Name Not Available Calgary, Alberta CANADA		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc			
2			Unit Set:	SI			
3			Date/Time:	Friday Sep 4 2015, 16:44:21			
4	PID Controller: DBA020 (continued)						
5			Limit	Priority			
6	Rate Low		---	Low			
7	Rate High		---	Low			
8	Rate Min: ---		Rate Max: ---	Dead Band: ---	Status: Normal		
9	PV Conditioning						
10	Sample PV Every: ---						
11	Calculate Raw PV for Flow						
12	Calculate Raw PV	No	Type	Direct	Scaling Factor 1.000 *		
13	Bias (%)	0.00 *	Square Root	Yes	MW or Density MW		
14	Apply Compensation			Reference	PV		
15	No	Molecular Weight		18.00 *	---		
16	No	Mass Density		997.1 kg/m3 *	---		
17	No	Pressure		101.3 kPa *	---		
18	No	Temperature		25.00 C *	---		
19	SP Ramping						
20	Target SP:	20.00 vol % *	Ramp Duration:	5.000 minutes *			
21	User Variables						
22	STATUS						
23	OK						
24	NOTES						
25							
26	Description						
27							
28	Relief valve: RV-100						
29							
30	CONNECTIONS						
31	Inlet Stream						
32	STREAM NAME		FROM UNIT OPERATION				
33	80	Tee	TEE-103				
34	Outlet Stream						
35	STREAM NAME		TO UNIT OPERATION				
36	83	Mixer	MIX-102				
37	PARAMETERS						
38	Set Pressure	1317 kPa *	Full Open Pressure	1327 kPa *			
39	User Variables						
40	CONDITIONS						
41	Name	80	83				
42	Vapour	1.0000	1.0000				
43	Temperature (C)	84.8206	26.6579				
44	Pressure (kPa)	1180.0603	444.5578				
45	Molar Flow (kgmole/h)	0.0000	0.0000				
46	Mass Flow (kg/h)	0.0000	0.0000				
47	Std Ideal Liq Vol Flow (m3/h)	0.0000	0.0000				
48	Molar Enthalpy (kJ/kgmole)	-9.966e+004	-3.488e+004				
49	Molar Entropy (kJ/kgmole-C)	162.0	148.1				
50	Heat Flow (kJ/h)	0.0000e-01	0.0000e-01				
51	Honeywell International Inc.						
52	UniSim Design (R430 build 18059)						
53	Page 94 of 170						

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
4			

Relief valve: RV-100 (continued)

PROPERTIES

11	Name	80	83
12	Molecular Weight	57.65	37.69
13	Molar Density (kgmole/m3)	0.5300	0.1821
14	Mass Density (kg/m3)	30.56	6.863
15	Act. Volume Flow (m3/h)	0.0000	0.0000
16	Mass Enthalpy (kJ/kg)	-1729	-925.6
17	Mass Entropy (kJ/kg-C)	2.809	3.930
18	Heat Capacity (kJ/kgmole-C)	124.3	52.21
19	Mass Heat Capacity (kJ/kg-C)	2.156	1.385
20	Lower Heating Value (kJ/kgmole)	---	---
21	Mass Lower Heating Value (kJ/kg)	---	---
22	Phase Fraction [Vol. Basis]	1.000	1.000
23	Phase Fraction [Mass Basis]	1.000	1.000
24	Partial Pressure of CO2 (kPa)	---	---
25	Cost Based on Flow (Cost/s)	0.0000	0.0000
26	Act. Gas Flow (ACT_m3/h)	0.0000	0.0000
27	Avg. Liq. Density (kgmole/m3)	10.03	17.70
28	Specific Heat (kJ/kgmole-C)	124.3	52.21
29	Std. Gas Flow (STD_m3/h)	0.0000	0.0000
30	Std. Ideal Liq. Mass Density (kg/m3)	578.1	667.0
31	Act. Liq. Flow (m3/s)	0.0000	0.0000
32	Z Factor	0.7481	0.9793
33	Watson K	13.51	9.778
34	User Property	---	---
35	Cp/(Cp - R)	1.072	1.189
36	Cp/Cv	1.190	1.211
37	Heat of Vap. (kJ/kgmole)	1.950e+004	1.986e+004
38	Kinematic Viscosity (cSt)	0.3220	2.012
39	Liq. Mass Density (Std. Cond) (kg/m3)	579.9	---
40	Liq. Vol. Flow (Std. Cond) (m3/h)	0.0000	---
41	Liquid Fraction	0.0000	0.0000
42	Molar Volume (m3/kgmole)	1.887	5.491
43	Mass Heat of Vap. (kJ/kg)	338.3	526.9
44	Phase Fraction [Molar Basis]	1.0000	1.0000
45	Surface Tension (dyne/cm)	---	---
46	Thermal Conductivity (W/m-K)	2.288e-002	2.222e-002
47	Viscosity (cP)	9.838e-003	1.381e-002
48	Partial Pressure of H2S (kPa)	0.0000	0.0000
49	Cv (Semi-Ideal) (kJ/kgmole-C)	116.0	43.89
50	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.012	1.165
51	Cv (kJ/kgmole-C)	104.5	43.11
52	Mass Cv (kJ/kg-C)	1.812	1.144
53	Cv (Ent. Method) (kJ/kgmole-C)	103.8	43.14
54	Mass Cv (Ent. Method) (kJ/kg-C)	1.800	1.145
55	Cp/Cv (Ent. Method)	1.198	1.210
56	Reid VP at 37.8 C (kPa)	497.8	---
57	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	0.0000	0.0000

STATUS

OK

NOTES

Description

1	Honeywell Company Name Not Available Calgary, Alberta CANADA		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc		
2			Unit Set:	SI		
3			Date/Time:	Friday Sep 4 2015, 16:44:21		
4	Relief valve: RV100					
5	CONNECTIONS					
6	Inlet Stream					
7	STREAM NAME	FROM UNIT OPERATION				
8	21	Tank	# 100			
9	Outlet Stream					
10	STREAM NAME	TO UNIT OPERATION				
11	23					
12	PARAMETERS					
13	Set Pressure	1572 kPa *	Full Open Pressure	1670 kPa *		
14	User Variables					
15	CONDITIONS					
16	Name	21	23			
17	Vapour	1.0000	1.0000			
18	Temperature (C)	24.8510 *	84.2019			
19	Pressure (kPa)	1461.8859	395.5245 *			
20	Molar Flow (kgmole/h)	0.0000	0.0000			
21	Mass Flow (kg/h)	0.0000	0.0000			
22	Std Ideal Liq Vol Flow (m3/h)	0.0000	0.0000			
23	Molar Enthalpy (kJ/kgmole)	-114.6	-9.425e+004			
24	Molar Entropy (kJ/kgmole-C)	125.6	178.4			
25	Heat Flow (kJ/h)	0.0000e-01	0.0000e-01			
26	PROPERTIES					
27	Name	21	23			
28	Molecular Weight	28.01	59.24			
29	Molar Density (kgmole/m3)	0.5935	0.1429			
30	Mass Density (kg/m3)	16.62	8.466			
31	Act. Volume Flow (m3/h)	0.0000	0.0000			
32	Mass Enthalpy (kJ/kg)	-4.092	-1591			
33	Mass Entropy (kJ/kg-C)	4.482	3.012			
34	Heat Capacity (kJ/kgmole-C)	29.92	116.3			
35	Mass Heat Capacity (kJ/kg-C)	1.068	1.963			
36	Lower Heating Value (kJ/kgmole)	---	---			
37	Mass Lower Heating Value (kJ/kg)	---	---			
38	Phase Fraction [Vol. Basis]	1.000	1.000			
39	Phase Fraction [Mass Basis]	1.000	1.000			
40	Partial Pressure of CO2 (kPa)	---	---			
41	Cost Based on Flow (Cost/s)	0.0000	0.0000			
42	Act. Gas Flow (ACT_m3/h)	0.0000	0.0000			
43	Avg. Liq. Density (kgmole/m3)	28.79	9.881			
44	Specific Heat (kJ/kgmole-C)	29.92	116.3			
45	Std. Gas Flow (STD_m3/h)	0.0000	0.0000			
46	Std. Ideal Liq. Mass Density (kg/m3)	806.4	585.3			
47	Act. Liq. Flow (m3/s)	0.0000	0.0000			
48	Z Factor	0.9942	0.9314			
49	Watson K	6.415	13.44			
50	User Property	---	---			
51	Cp/(Cp - R)	1.385	1.077			
52	Cp/Cv	1.427	1.102			
53	Heat of Vap. (kJ/kgmole)	5217	2.138e+004			
54	Kinematic Viscosity (cSt)	1.116	1.064			
55	Liq. Mass Density (Std. Cond) (kg/m3)	---	589.5			
56	Liq. Vol. Flow (Std. Cond) (m3/h)	---	0.0000			
57	Liquid Fraction	0.0000	0.0000			
58	Honeywell International Inc.					
59	UniSim Design (R430 build 18059)					
60	Page 96 of 170					
61	* Specified by user.					

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
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Relief valve: RV100 (continued)

PROPERTIES

11	Name	21	23		
12	Molar Volume (m ³ /kgmole)	1.685	6.997		
13	Mass Heat of Vap. (kJ/kg)	186.2	360.9		
14	Phase Fraction [Molar Basis]	1.0000	1.0000		
15	Surface Tension (dyne/cm)	---	---		
16	Thermal Conductivity (W/m-K)	2.648e-002	0.0214		
17	Viscosity (cP)	1.855e-002	9.007e-003		
18	Partial Pressure of H ₂ S (kPa)	0.0000	0.0000		
19	Cv (Semi-Ideal) (kJ/kgmole-C)	21.61	108.0		
20	Mass Cv (Semi-Ideal) (kJ/kg-C)	0.7712	1.823		
21	Cv (kJ/kgmole-C)	20.96	105.6		
22	Mass Cv (kJ/kg-C)	0.7484	1.782		
23	Cv (Ent. Method) (kJ/kgmole-C)	20.94	105.6		
24	Mass Cv (Ent. Method) (kJ/kg-C)	0.7475	1.784		
25	Cp/Cv (Ent. Method)	1.429	1.101		
26	Reid VP at 37.8 C (kPa)	---	416.1		
27	Liq. Vol. Flow - Sum(Std. Cond.) (m ³ /h)	0.0000	0.0000		

STATUS

OK

NOTES

Description

Relief valve: RV200

CONNECTIONS

Inlet Stream

44	STREAM NAME	FROM UNIT OPERATION	
45	21-2	Tank	# 200

Outlet Stream

48	STREAM NAME	TO UNIT OPERATION	
49	23-2		

PARAMETERS

52	Set Pressure	1180 kPa *	Full Open Pressure	1200 kPa *
----	--------------	------------	--------------------	------------

User Variables

CONDITIONS

57	Name	21-2	23-2		
58	Vapour	1.0000	1.0000		
59	Temperature (C)	58.3826 *	54.7352		
60	Pressure (kPa)	1154.9757	395.5245 *		
61	Molar Flow (kgmole/h)	0.0000	0.0000		
62	Mass Flow (kg/h)	0.0000	0.0000		
63	Std Ideal Liq Vol Flow (m ³ /h)	0.0000	0.0000		
64	Molar Enthalpy (kJ/kgmole)	-3.034e+004	-3.034e+004		
65	Molar Entropy (kJ/kgmole-C)	140.0	148.7		
66	Heat Flow (kJ/h)	0.0000e-01	0.0000e-01		

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
4			

Relief valve: RV200 (continued)

PROPERTIES

11	Name	21-2	23-2			
12	Molecular Weight	36.03	36.03			
13	Molar Density (kgmole/m3)	0.4303	0.1465			
14	Mass Density (kg/m3)	15.50	5.277			
15	Act. Volume Flow (m3/h)	0.0000	0.0000			
16	Mass Enthalpy (kJ/kg)	-842.2	-842.2			
17	Mass Entropy (kJ/kg-C)	3.885	4.128			
18	Heat Capacity (kJ/kgmole-C)	50.66	49.42			
19	Mass Heat Capacity (kJ/kg-C)	1.406	1.372			
20	Lower Heating Value (kJ/kgmole)	---	---			
21	Mass Lower Heating Value (kJ/kg)	---	---			
22	Phase Fraction [Vol. Basis]	1.000	1.000			
23	Phase Fraction [Mass Basis]	1.000	1.000			
24	Partial Pressure of CO2 (kPa)	---	---			
25	Cost Based on Flow (Cost/s)	0.0000	0.0000			
26	Act. Gas Flow (ACT_m3/h)	0.0000	0.0000			
27	Avg. Liq. Density (kgmole/m3)	19.44	19.44			
28	Specific Heat (kJ/kgmole-C)	50.66	49.42			
29	Std. Gas Flow (STD_m3/h)	0.0000	0.0000			
30	Std. Ideal Liq. Mass Density (kg/m3)	700.2	700.2			
31	Act. Liq. Flow (m3/s)	0.0000	0.0000			
32	Z Factor	0.9738	0.9905			
33	Watson K	8.987	8.987			
34	User Property	---	---			
35	Cp/(Cp - R)	1.196	1.202			
36	Cp/Cv	1.233	1.215			
37	Heat of Vap. (kJ/kgmole)	1.901e+004	1.870e+004			
38	Kinematic Viscosity (cSt)	1.093	3.133			
39	Liq. Mass Density (Std. Cond) (kg/m3)	---	---			
40	Liq. Vol. Flow (Std. Cond) (m3/h)	---	---			
41	Liquid Fraction	0.0000	0.0000			
42	Molar Volume (m3/kgmole)	2.324	6.827			
43	Mass Heat of Vap. (kJ/kg)	527.6	519.0			
44	Phase Fraction [Molar Basis]	1.0000	1.0000			
45	Surface Tension (dyne/cm)	---	---			
46	Thermal Conductivity (W/m-K)	2.594e-002	2.519e-002			
47	Viscosity (cP)	1.695e-002	1.654e-002			
48	Partial Pressure of H2S (kPa)	0.0000	0.0000			
49	Cv (Semi-Ideal) (kJ/kgmole-C)	42.35	41.10			
50	Mass Cv (Semi-Ideal) (kJ/kg-C)	1.175	1.141			
51	Cv (kJ/kgmole-C)	41.07	40.67			
52	Mass Cv (kJ/kg-C)	1.140	1.129			
53	Cv (Ent. Method) (kJ/kgmole-C)	41.03	40.70			
54	Mass Cv (Ent. Method) (kJ/kg-C)	1.139	1.130			
55	Cp/Cv (Ent. Method)	1.235	1.214			
56	Reid VP at 37.8 C (kPa)	---	---			
57	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	0.0000	0.0000			

STATUS

OK

NOTES

Description

1	Honeywell Company Name Not Available Calgary, Alberta CANADA		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc		
2			Unit Set:	SI		
3			Date/Time:	Friday Sep 4 2015, 16:44:21		
4	Relief valve: RVBU01					
5	CONNECTIONS					
6	Inlet Stream					
7	STREAM NAME	FROM UNIT OPERATION				
8	52	Tank	#BU01			
9	Outlet Stream					
10	STREAM NAME	TO UNIT OPERATION				
11	53					
12	PARAMETERS					
13	Set Pressure	1229 kPa *	Full Open Pressure	1278 kPa *		
14	User Variables					
15	CONDITIONS					
16	Name	52	53			
17	Vapour	1.0000	0.0000			
18	Temperature (C)	27.1676	29.0492			
19	Pressure (kPa)	505.2180	395.5245 *			
20	Molar Flow (kgmole/h)	0.0000	0.0000			
21	Mass Flow (kg/h)	0.0000	0.0000			
22	Std Ideal Liq Vol Flow (m3/h)	0.0000	0.0000			
23	Molar Enthalpy (kJ/kgmole)	-7.384e+004	-1.243e+005			
24	Molar Entropy (kJ/kgmole-C)	154.1	90.20			
25	Heat Flow (kJ/h)	0.0000e-01	0.0000e-01			
26	PROPERTIES					
27	Name	52	53			
28	Molecular Weight	47.99	57.13			
29	Molar Density (kgmole/m3)	0.2181	9.791			
30	Mass Density (kg/m3)	10.47	559.4			
31	Act. Volume Flow (m3/h)	0.0000	0.0000			
32	Mass Enthalpy (kJ/kg)	-1539	-2176			
33	Mass Entropy (kJ/kg-C)	3.210	1.579			
34	Heat Capacity (kJ/kgmole-C)	78.10	140.0			
35	Mass Heat Capacity (kJ/kg-C)	1.627	2.451			
36	Lower Heating Value (kJ/kgmole)	---	---			
37	Mass Lower Heating Value (kJ/kg)	---	---			
38	Phase Fraction [Vol. Basis]	1.000	0.0000			
39	Phase Fraction [Mass Basis]	1.000	0.0000			
40	Partial Pressure of CO2 (kPa)	---	---			
41	Cost Based on Flow (Cost/s)	0.0000	0.0000			
42	Act. Gas Flow (ACT_m3/h)	0.0000	---			
43	Avg. Liq. Density (kgmole/m3)	12.47	10.05			
44	Specific Heat (kJ/kgmole-C)	78.10	140.0			
45	Std. Gas Flow (STD_m3/h)	0.0000	0.0000			
46	Std. Ideal Liq. Mass Density (kg/m3)	598.4	573.9			
47	Act. Liq. Flow (m3/s)	0.0000	0.0000			
48	Z Factor	0.9278	1.608e-002			
49	Watson K	12.24	13.58			
50	User Property	---	---			
51	Cp/(Cp - R)	1.119	1.063			
52	Cp/Cv	1.161	1.063			
53	Heat of Vap. (kJ/kgmole)	3.237e+004	2.444e+004			
54	Kinematic Viscosity (cSt)	0.9387	0.2730			
55	Liq. Mass Density (Std. Cond) (kg/m3)	514.4	575.7			
56	Liq. Vol. Flow (Std. Cond) (m3/h)	0.0000	0.0000			
57	Liquid Fraction	0.0000	1.000			
58	Honeywell International Inc.					
59	UniSim Design (R430 build 18059)					
60	Page 99 of 170					
61	Licensed to: Company Name Not Available					
62	Printed by: alu0100514599					
63	* Specified by user.					

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2			Unit Set:	SI			
3			Date/Time:	Friday Sep 4 2015, 16:44:21			
4	Relief valve: RVBU01 (continued)						
5	PROPERTIES						
6	Name	52	53				
7	Molar Volume (m ³ /kgmole)	4.585	0.1021				
8	Mass Heat of Vap. (kJ/kg)	674.6	427.8				
9	Phase Fraction [Molar Basis]	1.0000	0.0000				
10	Surface Tension (dyne/cm)	---	10.38				
11	Thermal Conductivity (W/m·K)	1.881e-002	8.842e-002				
12	Viscosity (cP)	9.824e-003	0.1527				
13	Partial Pressure of H ₂ S (kPa)	0.0000	0.0000				
14	C _v (Semi-Ideal) (kJ/kgmole-C)	69.79	131.7				
15	Mass C _v (Semi-Ideal) (kJ/kg-C)	1.454	2.305				
16	C _v (kJ/kgmole-C)	67.25	131.7				
17	Mass C _v (kJ/kg-C)	1.401	2.305				
18	C _v (Ent. Method) (kJ/kgmole-C)	---	---				
19	Mass C _v (Ent. Method) (kJ/kg-C)	---	---				
20	C _p /C _v (Ent. Method)	---	---				
21	Reid VP at 37.8 C (kPa)	2992	492.0				
22	Liq. Vol. Flow - Sum(Std. Cond.) (m ³ /h)	0.0000	0.0000				
23	STATUS						
24	OK						
25	NOTES						
26							
27							
28	Description						
29							
30							
31	Relief valve: RV104						
32							
33							
34	CONNECTIONS						
35							
36	Inlet Stream						
37							
38	STREAM NAME	FROM UNIT OPERATION					
39	57	Tank # 104					
40	Outlet Stream						
41							
42	STREAM NAME	TO UNIT OPERATION					
43	58						
44	PARAMETERS						
45							
46	Set Pressure	199.4 kPa *	Full Open Pressure	219.0 kPa *			
47	User Variables						
48							
49	CONDITIONS						
50							
51	Name	57	58				
52	Vapour	0.5100	0.0000				
53	Temperature (C)	22.2056	24.9918				
54	Pressure (kPa)	197.1984	395.5245 *				
55	Molar Flow (kgmole/h)	0.0000	0.0000				
56	Mass Flow (kg/h)	0.0000	0.0000				
57	Std Ideal Liq Vol Flow (m ³ /h)	0.0000	0.0000				
58	Molar Enthalpy (kJ/kgmole)	-1.678e+005	-1.882e+005				
59	Molar Entropy (kJ/kgmole-C)	109.4	75.11				
60	Heat Flow (kJ/h)	0.0000e-01	0.0000e-01				
61							
62							
63							
64							
65							
66							
67							
68							
69	Honeywell International Inc.	UniSim Design (R430 build 18059)		Page 100 of 170			

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
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Relief valve: RV104 (continued)

PROPERTIES

11	Name	57	58
12	Molecular Weight	75.15	79.55
13	Molar Density (kgmole/m3)	0.1720	8.044
14	Mass Density (kg/m3)	12.92	639.9
15	Act. Volume Flow (m3/h)	0.0000	0.0000
16	Mass Enthalpy (kJ/kg)	-2233	-2366
17	Mass Entropy (kJ/kg-C)	1.456	0.9442
18	Heat Capacity (kJ/kgmole-C)	146.7	175.2
19	Mass Heat Capacity (kJ/kg-C)	1.952	2.202
20	Lower Heating Value (kJ/kgmole)	---	---
21	Mass Lower Heating Value (kJ/kg)	---	---
22	Phase Fraction [Vol. Basis]	0.9895	0.0000
23	Phase Fraction [Mass Basis]	0.4809	0.0000
24	Partial Pressure of CO2 (kPa)	---	---
25	Cost Based on Flow (Cost/s)	0.0000	0.0000
26	Act. Gas Flow (ACT_m3/h)	---	---
27	Avg. Liq. Density (kgmole/m3)	8.704	8.552
28	Specific Heat (kJ/kgmole-C)	146.7	175.2
29	Std. Gas Flow (STD_m3/h)	0.0000	0.0000
30	Std. Ideal Liq. Mass Density (kg/m3)	634.5	645.5
31	Act. Liq. Flow (m3/s)	0.0000	0.0000
32	Z Factor	---	1.983e-002
33	Watson K	13.00	12.92
34	User Property	---	---
35	Cp/(Cp - R)	1.060	1.050
36	Cp/Cv	1.040	1.214
37	Heat of Vap. (kJ/kgmole)	2.935e+004	2.959e+004
38	Kinematic Viscosity (cSt)	---	0.4113
39	Liq. Mass Density (Std. Cond) (kg/m3)	637.9	649.1
40	Liq. Vol. Flow (Std. Cond) (m3/h)	0.0000	0.0000
41	Liquid Fraction	0.4900	1.000
42	Molar Volume (m3/kgmole)	5.815	0.1243
43	Mass Heat of Vap. (kJ/kg)	390.5	372.0
44	Phase Fraction [Molar Basis]	0.5100	0.0000
45	Surface Tension (dyne/cm)	16.06	16.04
46	Thermal Conductivity (W/m-K)	---	0.1076
47	Viscosity (cP)	---	0.2632
48	Partial Pressure of H2S (kPa)	0.0000	0.0000
49	Cv (Semi-Ideal) (kJ/kgmole-C)	138.4	166.9
50	Mass Cv (Semi-Ideal) (kJ/kg-C)	1.841	2.098
51	Cv (kJ/kgmole-C)	141.0	144.3
52	Mass Cv (kJ/kg-C)	1.876	1.814
53	Cv (Ent. Method) (kJ/kgmole-C)	---	---
54	Mass Cv (Ent. Method) (kJ/kg-C)	---	---
55	Cp/Cv (Ent. Method)	---	---
56	Reid VP at 37.8 C (kPa)	128.9	100.5
57	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	0.0000	0.0000

STATUS

OK

NOTES

Description

1	Honeywell Company Name Not Available Calgary, Alberta CANADA		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc		
2			Unit Set:	SI		
3			Date/Time:	Friday Sep 4 2015, 16:44:21		
4	Mixer: MIX-100					
5	CONNECTIONS					
6	Inlet Stream					
7	STREAM NAME	FROM UNIT OPERATION				
8	8	Valve	P10AVB			
9	9	Valve	P10BVB			
10	Outlet Stream					
11	STREAM NAME	TO UNIT OPERATION				
12	11	Tee	TEE-100			
13	PARAMETERS					
14	User Variables					
15	CONDITIONS					
16	Name	8	9	11		
17	Vapour	0.0000	0.0004	0.0000		
18	Temperature (C)	33.9492	33.9492	33.9492		
19	Pressure (kPa)	1737.2709	1737.2709	1737.2709		
20	Molar Flow (kgmole/h)	370.0731	-0.0000	370.0731		
21	Mass Flow (kg/h)	21198.4957	-0.0000	21198.4957		
22	Std Ideal Liq Vol Flow (m3/h)	36.8631	-0.0000	36.8631		
23	Molar Enthalpy (kJ/kgmole)	-1.236e+005	-1.236e+005	-1.236e+005		
24	Molar Entropy (kJ/kgmole-C)	91.73	91.73	91.73		
25	Heat Flow (kJ/h)	-4.5730e+07	1.6762e-04	-4.5730e+07		
26	PROPERTIES					
27	Name	8	9	11		
28	Molecular Weight	57.28	57.28	57.28		
29	Molar Density (kgmole/m3)	9.749	9.729	9.749		
30	Mass Density (kg/m3)	558.4	557.3	558.4		
31	Act. Volume Flow (m3/h)	37.96	-1.394e-010	37.96		
32	Mass Enthalpy (kJ/kg)	-2157	-2157	-2157		
33	Mass Entropy (kJ/kg-C)	1.601	1.601	1.601		
34	Heat Capacity (kJ/kgmole-C)	141.1	141.1	141.1		
35	Mass Heat Capacity (kJ/kg-C)	2.463	2.463	2.463		
36	Lower Heating Value (kJ/kgmole)	---	---	---		
37	Mass Lower Heating Value (kJ/kg)	---	---	---		
38	Phase Fraction [Vol. Basis]	0.0000	2.352e-003	0.0000		
39	Phase Fraction [Mass Basis]	0.0000	3.712e-004	0.0000		
40	Partial Pressure of CO2 (kPa)	---	---	---		
41	Cost Based on Flow (Cost/s)	0.0000	0.0000	0.0000		
42	Act. Gas Flow (ACT_m3/h)	---	---	---		
43	Avg. Liq. Density (kgmole/m3)	10.04	10.04	10.04		
44	Specific Heat (kJ/kgmole-C)	141.1	141.1	141.1		
45	Std. Gas Flow (STD_m3/h)	8750	-3.207e-008	8750		
46	Std. Ideal Liq. Mass Density (kg/m3)	575.1	575.1	575.1		
47	Act. Liq. Flow (m3/s)	1.055e-002	-3.864e-014	1.055e-002		
48	Z Factor	6.979e-002	---	6.979e-002		
49	Watson K	13.57	13.57	13.57		
50	User Property	---	---	---		
51	Cp/(Cp - R)	1.063	1.063	1.063		
52	Cp/Cv	1.289	1.210	1.289		
53	Heat of Vap. (kJ/kgmole)	1.412e+004	1.412e+004	1.412e+004		
54	Kinematic Viscosity (cSt)	0.2631	---	0.2631		
55	Liq. Mass Density (Std. Cond) (kg/m3)	577.9	577.9	577.9		
56	Liq. Vol. Flow (Std. Cond) (m3/h)	36.68	-1.345e-010	36.68		
57	Liquid Fraction	1.000	0.9996	1.000		
58	Honeywell International Inc. UniSim Design (R430 build 18059)					
59	Page 102 of 170					
60	* Specified by user.					

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
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Mixer: MIX-100 (continued)

PROPERTIES

11	Name	8	9	11		
12	Molar Volume (m ³ /kgmole)	0.1026	0.1028	0.1026		
13	Mass Heat of Vap. (kJ/kg)	246.4	246.4	246.4		
14	Phase Fraction [Molar Basis]	0.0000	0.0004	0.0000		
15	Surface Tension (dyne/cm)	9.960	9.960	9.960		
16	Thermal Conductivity (W/m-K)	8.722e-002	---	8.722e-002		
17	Viscosity (cP)	0.1469	---	0.1469		
18	Partial Pressure of H ₂ S (kPa)	0.0000	0.0000	0.0000		
19	C _v (Semi-Ideal) (kJ/kgmole-C)	132.8	132.8	132.8		
20	Mass C _v (Semi-Ideal) (kJ/kg-C)	2.318	2.318	2.318		
21	C _v (kJ/kgmole-C)	109.5	116.6	109.5		
22	Mass C _v (kJ/kg-C)	1.911	2.036	1.911		
23	C _v (Ent. Method) (kJ/kgmole-C)	---	---	---		
24	Mass C _v (Ent. Method) (kJ/kg-C)	---	---	---		
25	C _p /C _v (Ent. Method)	---	---	---		
26	Reid VP at 37.8 C (kPa)	458.1	458.1	458.1		
27	Liq. Vol. Flow - Sum(Std. Cond) (m ³ /h)	36.68	-1.345e-010	36.68		

STATUS

OK

NOTES

Description

Mixer: MIX-100-2

CONNECTIONS

Inlet Stream

STREAM NAME	FROM UNIT OPERATION
18	Valve FV103B
19	Valve FV103C

Outlet Stream

STREAM NAME	TO UNIT OPERATION
89	Material Stream -

PARAMETERS

User Variables

CONDITIONS

57	Name	18	19	89	
58	Vapour	0.0000	0.0000	0.0000	
59	Temperature (C)	34.0037	34.0037	34.0037	
60	Pressure (kPa)	1323.4556	1323.4556	1323.4556	
61	Molar Flow (kgmole/h)	272.3873	-0.0000	272.3873	
62	Mass Flow (kg/h)	15602.8661	-0.0000	15602.8661	
63	Std Ideal Liq Vol Flow (m ³ /h)	27.1326	-0.0000	27.1326	
64	Molar Enthalpy (kJ/kgmole)	-1.236e+005	-1.236e+005	-1.236e+005	
65	Molar Entropy (kJ/kgmole-C)	91.87	91.87	91.87	
66	Heat Flow (kJ/h)	-3.3659e+007	2.3205e-006	-3.3659e+007	

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
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Mixer: MIX-100-2 (continued)

PROPERTIES

11	Name	18	19	89		
12	Molecular Weight	57.28	57.28	57.28		
13	Molar Density (kgmole/m3)	9.727	9.727	9.727		
14	Mass Density (kg/m3)	557.2	557.2	557.2		
15	Act. Volume Flow (m3/h)	28.00	-1.931e-012	28.00		
16	Mass Enthalpy (kJ/kg)	-2157	-2157	-2157		
17	Mass Entropy (kJ/kg-C)	1.604	1.604	1.604		
18	Heat Capacity (kJ/kgmole-C)	141.5	141.5	141.5		
19	Mass Heat Capacity (kJ/kg-C)	2.471	2.471	2.471		
20	Lower Heating Value (kJ/kgmole)	---	---	---		
21	Mass Lower Heating Value (kJ/kg)	---	---	---		
22	Phase Fraction [Vol. Basis]	0.0000	0.0000	0.0000		
23	Phase Fraction [Mass Basis]	0.0000	0.0000	0.0000		
24	Partial Pressure of CO2 (kPa)	---	---	---		
25	Cost Based on Flow (Cost/s)	0.0000	0.0000	0.0000		
26	Act. Gas Flow (ACT_m3/h)	---	---	---		
27	Avg. Liq. Density (kgmole/m3)	10.04	10.04	10.04		
28	Specific Heat (kJ/kgmole-C)	141.5	141.5	141.5		
29	Std. Gas Flow (STD_m3/h)	6440	-4.440e-010	6440		
30	Std. Ideal Liq. Mass Density (kg/m3)	575.1	575.1	575.1		
31	Act. Liq. Flow (m3/s)	7.779e-003	-5.363e-016	7.779e-003		
32	Z Factor	5.328e-002	5.328e-002	5.328e-002		
33	Watson K	13.57	13.57	13.57		
34	User Property	---	---	---		
35	Cp/(Cp - R)	1.062	1.062	1.062		
36	Cp/Cv	1.292	1.292	1.292		
37	Heat of Vap. (kJ/kgmole)	1.576e+004	1.576e+004	1.576e+004		
38	Kinematic Viscosity (cSt)	0.2631	0.2631	0.2631		
39	Liq. Mass Density (Std. Cond) (kg/m3)	577.9	577.9	577.9		
40	Liq. Vol. Flow (Std. Cond) (m3/h)	27.00	-1.861e-012	27.00		
41	Liquid Fraction	1.000	1.000	1.000		
42	Molar Volume (m3/kgmole)	0.1028	0.1028	0.1028		
43	Mass Heat of Vap. (kJ/kg)	275.2	275.2	275.2		
44	Phase Fraction [Molar Basis]	0.0000	0.0000	0.0000		
45	Surface Tension (dyne/cm)	9.954	9.954	9.954		
46	Thermal Conductivity (W/m-K)	0.0872	0.0872	0.0872		
47	Viscosity (cP)	0.1466	0.1466	0.1466		
48	Partial Pressure of H2S (kPa)	0.0000	0.0000	0.0000		
49	Cv (Semi-Ideal) (kJ/kgmole-C)	133.2	133.2	133.2		
50	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.326	2.326	2.326		
51	Cv (kJ/kgmole-C)	109.5	109.5	109.5		
52	Mass Cv (kJ/kg-C)	1.912	1.912	1.912		
53	Cv (Ent. Method) (kJ/kgmole-C)	---	---	---		
54	Mass Cv (Ent. Method) (kJ/kg-C)	---	---	---		
55	Cp/Cv (Ent. Method)	---	---	---		
56	Reid VP at 37.8 C (kPa)	458.1	458.1	458.1		
57	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	27.00	-1.861e-012	27.00		

STATUS

OK

NOTES

Description

1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc		
2			Unit Set:	SI		
3			Date/Time:	Friday Sep 4 2015, 16:44:21		
4	Mixer: MIX-100-3					
5	CONNECTIONS					
6	Inlet Stream					
7	STREAM NAME	FROM UNIT OPERATION				
8	32	Valve	P01AVB			
9	33	Valve	P01BVB			
10	Outlet Stream					
11	STREAM NAME	TO UNIT OPERATION				
12	34	Tee	TEE-100-3			
13	PARAMETERS					
14	User Variables					
15	CONDITIONS					
16	Name	32	33	34		
17	Vapour	0.0000	0.0000	0.0000		
18	Temperature (C)	90.0379	90.0379	90.0379		
19	Pressure (kPa)	1600.6657	1600.6657	1600.6657		
20	Molar Flow (kgmole/h)	86.7631	-0.0000	86.7631		
21	Mass Flow (kg/h)	5351.6186	-0.0000	5351.6186		
22	Std Ideal Liq Vol Flow (m3/h)	9.0000	-0.0000	9.0000		
23	Molar Enthalpy (kJ/kgmole)	-1.202e+005	-1.202e+005	-1.202e+005		
24	Molar Entropy (kJ/kgmole-C)	120.1	120.1	120.1		
25	Heat Flow (kJ/h)	-1.0427e+07	1.5224e-09	-1.0427e+07		
26	PROPERTIES					
27	Name	32	33	34		
28	Molecular Weight	61.68	61.68	61.68		
29	Molar Density (kgmole/m3)	8.151	8.151	8.151		
30	Mass Density (kg/m3)	502.8	502.8	502.8		
31	Act. Volume Flow (m3/h)	10.64	-1.554e-015	10.64		
32	Mass Enthalpy (kJ/kg)	-1948	-1948	-1948		
33	Mass Entropy (kJ/kg-C)	1.946	1.946	1.946		
34	Heat Capacity (kJ/kgmole-C)	181.4	181.4	181.4		
35	Mass Heat Capacity (kJ/kg-C)	2.941	2.941	2.941		
36	Lower Heating Value (kJ/kgmole)	---	---	---		
37	Mass Lower Heating Value (kJ/kg)	---	---	---		
38	Phase Fraction [Vol. Basis]	0.0000	0.0000	0.0000		
39	Phase Fraction [Mass Basis]	0.0000	0.0000	0.0000		
40	Partial Pressure of CO2 (kPa)	---	---	---		
41	Cost Based on Flow (Cost/s)	0.0000	0.0000	0.0000		
42	Act. Gas Flow (ACT_m3/h)	---	---	---		
43	Avg. Liq. Density (kgmole/m3)	9.640	9.640	9.640		
44	Specific Heat (kJ/kgmole-C)	181.4	181.4	181.4		
45	Std. Gas Flow (STD_m3/h)	2051	-2.995e-013	2051		
46	Std. Ideal Liq. Mass Density (kg/m3)	594.6	594.6	594.6		
47	Act. Liq. Flow (m3/s)	2.957e-003	-4.317e-019	2.957e-003		
48	Z Factor	6.503e-002	6.503e-002	6.503e-002		
49	Watson K	13.33	13.33	13.33		
50	User Property	---	---	---		
51	Cp/(Cp - R)	1.048	1.048	1.048		
52	Cp/Cv	1.298	1.298	1.298		
53	Heat of Vap. (kJ/kgmole)	1.640e+004	1.640e+004	1.640e+004		
54	Kinematic Viscosity (cSt)	0.1971	0.1971	0.1971		
55	Liq. Mass Density (Std. Cond) (kg/m3)	598.7	598.7	598.7		
56	Liq. Vol. Flow (Std. Cond) (m3/h)	8.939	-1.305e-015	8.939		
57	Liquid Fraction	1.000	1.000	1.000		
58	Honeywell International Inc.					
59	UniSim Design (R430 build 18059)					
60	Page 105 of 170					
61	* Specified by user.					

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
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Mixer: MIX-100-3 (continued)

PROPERTIES

11	Name	32	33	34		
12	Molar Volume (m ³ /kgmole)	0.1227	0.1227	0.1227		
13	Mass Heat of Vap. (kJ/kg)	265.9	265.9	265.9		
14	Phase Fraction [Molar Basis]	0.0000	0.0000	0.0000		
15	Surface Tension (dyne/cm)	5.393	5.393	5.393		
16	Thermal Conductivity (W/m-K)	6.988e-002	6.988e-002	6.988e-002		
17	Viscosity (cP)	9.911e-002	9.911e-002	9.911e-002		
18	Partial Pressure of H ₂ S (kPa)	0.0000	0.0000	0.0000		
19	Cv (Semi-Ideal) (kJ/kgmole-C)	173.1	173.1	173.1		
20	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.806	2.806	2.806		
21	Cv (kJ/kgmole-C)	139.7	139.7	139.7		
22	Mass Cv (kJ/kg-C)	2.265	2.265	2.265		
23	Cv (Ent. Method) (kJ/kgmole-C)	---	---	---		
24	Mass Cv (Ent. Method) (kJ/kg-C)	---	---	---		
25	Cp/Cv (Ent. Method)	---	---	---		
26	Reid VP at 37.8 C (kPa)	345.5	345.5	345.5		
27	Liq. Vol. Flow - Sum(Std. Cond) (m ³ /h)	8.939	-1.305e-015	8.939		

STATUS

OK

NOTES

Description

Mixer: MIX-100-2-2

CONNECTIONS

Inlet Stream

44	STREAM NAME	FROM UNIT OPERATION	
45	39	Valve	FV102B
46	38	Valve	FV102C

Outlet Stream

49	STREAM NAME	TO UNIT OPERATION	
50	2	Material Stream	Feed 2

PARAMETERS

User Variables

CONDITIONS

57	Name	39	38	2	
58	Vapour	0.0000	0.0000	0.0000	
59	Temperature (C)	89.9199	89.9199	89.9199	
60	Pressure (kPa)	1313.1475	1313.1475	1313.1475	
61	Molar Flow (kgmole/h)	86.7631	-0.0000	86.7631	
62	Mass Flow (kg/h)	5351.6186	-0.0000	5351.6186	
63	Std Ideal Liq Vol Flow (m ³ /h)	9.0000	-0.0000	9.0000	
64	Molar Enthalpy (kJ/kgmole)	-1.202e+005	-1.202e+005	-1.202e+005	
65	Molar Entropy (kJ/kgmole-C)	120.2	120.2	120.2	
66	Heat Flow (kJ/h)	-1.0427e+07	2.2304e-06	-1.0427e+07	

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
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Mixer: MIX-100-2-2 (continued)

PROPERTIES

11	Name	39	38	2		
12	Molecular Weight	61.68	61.68	61.68		
13	Molar Density (kgmole/m3)	8.125	8.125	8.125		
14	Mass Density (kg/m3)	501.2	501.2	501.2		
15	Act. Volume Flow (m3/h)	10.68	-2.284e-012	10.68		
16	Mass Enthalpy (kJ/kg)	-1948	-1948	-1948		
17	Mass Entropy (kJ/kg-C)	1.948	1.948	1.948		
18	Heat Capacity (kJ/kgmole-C)	182.5	182.5	182.5		
19	Mass Heat Capacity (kJ/kg-C)	2.959	2.959	2.959		
20	Lower Heating Value (kJ/kgmole)	---	---	---		
21	Mass Lower Heating Value (kJ/kg)	---	---	---		
22	Phase Fraction [Vol. Basis]	0.0000	0.0000	0.0000		
23	Phase Fraction [Mass Basis]	0.0000	0.0000	0.0000		
24	Partial Pressure of CO2 (kPa)	---	---	0.0000		
25	Cost Based on Flow (Cost/s)	0.0000	0.0000	0.0000		
26	Act. Gas Flow (ACT_m3/h)	---	---	---		
27	Avg. Liq. Density (kgmole/m3)	9.640	9.640	9.640		
28	Specific Heat (kJ/kgmole-C)	182.5	182.5	182.5		
29	Std. Gas Flow (STD_m3/h)	2051	-4.388e-010	2051		
30	Std. Ideal Liq. Mass Density (kg/m3)	594.6	594.6	594.6		
31	Act. Liq. Flow (m3/s)	2.966e-003	-6.345e-016	2.966e-003		
32	Z Factor	5.354e-002	5.354e-002	5.354e-002		
33	Watson K	13.33	13.33	13.33		
34	User Property	---	---	---		
35	Cp/(Cp - R)	1.048	1.048	1.048		
36	Cp/Cv	1.306	1.306	1.306		
37	Heat of Vap. (kJ/kgmole)	1.767e+004	1.767e+004	1.767e+004		
38	Kinematic Viscosity (cSt)	0.1975	0.1975	0.1975		
39	Liq. Mass Density (Std. Cond) (kg/m3)	598.7	598.7	598.7		
40	Liq. Vol. Flow (Std. Cond) (m3/h)	8.939	-1.912e-012	8.939		
41	Liquid Fraction	1.000	1.000	1.000		
42	Molar Volume (m3/kgmole)	0.1231	0.1231	0.1231		
43	Mass Heat of Vap. (kJ/kg)	286.4	286.4	286.4		
44	Phase Fraction [Molar Basis]	0.0000	0.0000	0.0000		
45	Surface Tension (dyne/cm)	5.404	5.404	5.404		
46	Thermal Conductivity (W/m-K)	6.993e-002	6.993e-002	6.993e-002		
47	Viscosity (cP)	9.899e-002	9.899e-002	9.899e-002		
48	Partial Pressure of H2S (kPa)	0.0000	0.0000	0.0000		
49	Cv (Semi-Ideal) (kJ/kgmole-C)	174.2	174.2	174.2		
50	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.824	2.824	2.824		
51	Cv (kJ/kgmole-C)	139.8	139.8	139.8		
52	Mass Cv (kJ/kg-C)	2.266	2.266	2.266		
53	Cv (Ent. Method) (kJ/kgmole-C)	---	---	---		
54	Mass Cv (Ent. Method) (kJ/kg-C)	---	---	---		
55	Cp/Cv (Ent. Method)	---	---	---		
56	Reid VP at 37.8 C (kPa)	345.5	345.5	345.5		
57	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	8.939	-1.912e-012	8.939		

STATUS

OK

NOTES

Description

1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc		
2			Unit Set:	SI		
3			Date/Time:	Friday Sep 4 2015, 16:44:21		
4	Mixer: MIX-100-3-2					
5	CONNECTIONS					
6	Inlet Stream					
7	STREAM NAME	FROM UNIT OPERATION				
8	44	Valve	P02AVB			
9	45	Valve	P02BVB			
10	Outlet Stream					
11	STREAM NAME	TO UNIT OPERATION				
12	46	Tee	TEE-100-3-2			
13	PARAMETERS					
14	User Variables					
15	CONDITIONS					
16	Name	44	45	46		
17	Vapour	0.0000	0.0000	0.0000		
18	Temperature (C)	20.1733	20.1733	20.1733		
19	Pressure (kPa)	1365.4481	1365.4481	1365.4481		
20	Molar Flow (kgmole/h)	-0.0000	85.8731	85.8731		
21	Mass Flow (kg/h)	-0.0000	6236.5679	6236.5679		
22	Std Ideal Liq Vol Flow (m3/h)	-0.0000	10.0000	10.0000		
23	Molar Enthalpy (kJ/kgmole)	-1.759e+005	-1.759e+005	-1.759e+005		
24	Molar Entropy (kJ/kgmole-C)	79.66	79.66	79.66		
25	Heat Flow (kJ/h)	1.4939e-07	-1.5109e+07	-1.5109e+07		
26	PROPERTIES					
27	Name	44	45	46		
28	Molecular Weight	72.63	72.63	72.63		
29	Molar Density (kgmole/m3)	8.623	8.623	8.623		
30	Mass Density (kg/m3)	626.2	626.2	626.2		
31	Act. Volume Flow (m3/h)	-9.847e-014	9.959	9.959		
32	Mass Enthalpy (kJ/kg)	-2423	-2423	-2423		
33	Mass Entropy (kJ/kg-C)	1.097	1.097	1.097		
34	Heat Capacity (kJ/kgmole-C)	160.8	160.8	160.8		
35	Mass Heat Capacity (kJ/kg-C)	2.214	2.214	2.214		
36	Lower Heating Value (kJ/kgmole)	---	---	---		
37	Mass Lower Heating Value (kJ/kg)	---	---	---		
38	Phase Fraction [Vol. Basis]	0.0000	0.0000	0.0000		
39	Phase Fraction [Mass Basis]	0.0000	0.0000	0.0000		
40	Partial Pressure of CO2 (kPa)	---	---	---		
41	Cost Based on Flow (Cost/s)	0.0000	0.0000	0.0000		
42	Act. Gas Flow (ACT_m3/h)	---	---	---		
43	Avg. Liq. Density (kgmole/m3)	8.587	8.587	8.587		
44	Specific Heat (kJ/kgmole-C)	160.8	160.8	160.8		
45	Std. Gas Flow (STD_m3/h)	-2.008e-011	2030	2030		
46	Std. Ideal Liq. Mass Density (kg/m3)	623.7	623.7	623.7		
47	Act. Liq. Flow (m3/s)	-2.735e-017	2.766e-003	2.766e-003		
48	Z Factor	6.493e-002	6.493e-002	6.493e-002		
49	Watson K	13.12	13.12	13.12		
50	User Property	---	---	---		
51	Cp/(Cp - R)	1.055	1.055	1.055		
52	Cp/Cv	1.230	1.230	1.230		
53	Heat of Vap. (kJ/kgmole)	2.535e+004	2.535e+004	2.535e+004		
54	Kinematic Viscosity (cSt)	0.3934	0.3934	0.3934		
55	Liq. Mass Density (Std. Cond) (kg/m3)	629.2	629.2	629.2		
56	Liq. Vol. Flow (Std. Cond) (m3/h)	-9.800e-014	9.912	9.912		
57	Liquid Fraction	1.000	1.000	1.000		
58	Honeywell International Inc.					
59	UniSim Design (R430 build 18059)					
60	Page 108 of 170					
61	Licensed to: Company Name Not Available					
62	Printed by: alu0100514599					
63	* Specified by user.					

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
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Mixer: MIX-100-3-2 (continued)

PROPERTIES

11	Name	44	45	46		
12	Molar Volume (m ³ /kgmole)	0.1160	0.1160	0.1160		
13	Mass Heat of Vap. (kJ/kg)	349.1	349.1	349.1		
14	Phase Fraction [Molar Basis]	0.0000	0.0000	0.0000		
15	Surface Tension (dyne/cm)	14.71	14.71	14.71		
16	Thermal Conductivity (W/m-K)	0.1026	0.1026	0.1026		
17	Viscosity (cP)	0.2464	0.2464	0.2464		
18	Partial Pressure of H ₂ S (kPa)	0.0000	0.0000	0.0000		
19	Cv (Semi-Ideal) (kJ/kgmole-C)	152.5	152.5	152.5		
20	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.100	2.100	2.100		
21	Cv (kJ/kgmole-C)	130.7	130.7	130.7		
22	Mass Cv (kJ/kg-C)	1.800	1.800	1.800		
23	Cv (Ent. Method) (kJ/kgmole-C)	---	---	---		
24	Mass Cv (Ent. Method) (kJ/kg-C)	---	---	---		
25	Cp/Cv (Ent. Method)	---	---	---		
26	Reid VP at 37.8 C (kPa)	234.1	234.1	234.1		
27	Liq. Vol. Flow - Sum(Std. Cond) (m ³ /h)	-9.800e-014	9.912	9.912		

STATUS

OK

NOTES

Description

Mixer: MIX-100-2-2-2

CONNECTIONS

Inlet Stream

44	STREAM NAME	FROM UNIT OPERATION	
45	51	Valve	FV202B
46	50	Valve	FV202C

Outlet Stream

49	STREAM NAME	TO UNIT OPERATION	
50	3	Material Stream	Feed 1

PARAMETERS

User Variables

CONDITIONS

57	Name	51	50	3	
58	Vapour	0.0000	0.0000	0.0000	
59	Temperature (C)	20.1941	20.1941	20.1941	
60	Pressure (kPa)	1311.4327	1311.4327	1311.4327	
61	Molar Flow (kgmole/h)	85.8731	-0.0000	85.8731	
62	Mass Flow (kg/h)	6236.5679	-0.0000	6236.5679	
63	Std Ideal Liq Vol Flow (m ³ /h)	10.0000	-0.0000	10.0000	
64	Molar Enthalpy (kJ/kgmole)	-1.759e+005	-1.759e+005	-1.759e+005	
65	Molar Entropy (kJ/kgmole-C)	79.68	79.68	79.68	
66	Heat Flow (kJ/h)	-1.5109e+07	3.3261e-06	-1.5109e+07	

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
4			

Mixer: MIX-100-2-2-2 (continued)

PROPERTIES

11	Name	51	50	3_		
12	Molecular Weight	72.63	72.63	72.63		
13	Molar Density (kgmole/m3)	8.621	8.621	8.621		
14	Mass Density (kg/m3)	626.1	626.1	626.1		
15	Act. Volume Flow (m3/h)	9.961	-2.193e-012	9.961		
16	Mass Enthalpy (kJ/kg)	-2423	-2423	-2423		
17	Mass Entropy (kJ/kg-C)	1.097	1.097	1.097		
18	Heat Capacity (kJ/kgmole-C)	160.8	160.8	160.8		
19	Mass Heat Capacity (kJ/kg-C)	2.214	2.214	2.214		
20	Lower Heating Value (kJ/kgmole)	---	---	---		
21	Mass Lower Heating Value (kJ/kg)	---	---	---		
22	Phase Fraction [Vol. Basis]	0.0000	0.0000	0.0000		
23	Phase Fraction [Mass Basis]	0.0000	0.0000	0.0000		
24	Partial Pressure of CO2 (kPa)	---	---	0.0000		
25	Cost Based on Flow (Cost/s)	0.0000	0.0000	0.0000		
26	Act. Gas Flow (ACT_m3/h)	---	---	---		
27	Avg. Liq. Density (kgmole/m3)	8.587	8.587	8.587		
28	Specific Heat (kJ/kgmole-C)	160.8	160.8	160.8		
29	Std. Gas Flow (STD_m3/h)	2030	-4.470e-010	2030		
30	Std. Ideal Liq. Mass Density (kg/m3)	623.7	623.7	623.7		
31	Act. Liq. Flow (m3/s)	2.767e-003	-6.091e-016	2.767e-003		
32	Z Factor	6.237e-002	6.237e-002	6.237e-002		
33	Watson K	13.12	13.12	13.12		
34	User Property	---	---	---		
35	Cp/(Cp - R)	1.055	1.055	1.055		
36	Cp/Cv	1.230	1.230	1.230		
37	Heat of Vap. (kJ/kgmole)	2.567e+004	2.567e+004	2.567e+004		
38	Kinematic Viscosity (cSt)	0.3934	0.3934	0.3934		
39	Liq. Mass Density (Std. Cond) (kg/m3)	629.2	629.2	629.2		
40	Liq. Vol. Flow (Std. Cond) (m3/h)	9.912	-2.182e-012	9.912		
41	Liquid Fraction	1.000	1.000	1.000		
42	Molar Volume (m3/kgmole)	0.1160	0.1160	0.1160		
43	Mass Heat of Vap. (kJ/kg)	353.4	353.4	353.4		
44	Phase Fraction [Molar Basis]	0.0000	0.0000	0.0000		
45	Surface Tension (dyne/cm)	14.71	14.71	14.71		
46	Thermal Conductivity (W/m-K)	0.1026	0.1026	0.1026		
47	Viscosity (cP)	0.2463	0.2463	0.2463		
48	Partial Pressure of H2S (kPa)	0.0000	0.0000	0.0000		
49	Cv (Semi-Ideal) (kJ/kgmole-C)	152.5	152.5	152.5		
50	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.100	2.100	2.100		
51	Cv (kJ/kgmole-C)	130.7	130.7	130.7		
52	Mass Cv (kJ/kg-C)	1.800	1.800	1.800		
53	Cv (Ent. Method) (kJ/kgmole-C)	---	---	---		
54	Mass Cv (Ent. Method) (kJ/kg-C)	---	---	---		
55	Cp/Cv (Ent. Method)	---	---	---		
56	Reid VP at 37.8 C (kPa)	234.1	234.1	234.1		
57	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	9.912	-2.182e-012	9.912		

STATUS

OK

NOTES

Description

1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2			Unit Set:	SI
3			Date/Time:	Friday Sep 4 2015, 16:44:21
4	Mixer: MIX-101			
5	CONNECTIONS			
6	Inlet Stream			
7	STREAM NAME		FROM UNIT OPERATION	
8	Carga Densa	Valve		DBFV201
9	66	Valve		RECVA
10	Outlet Stream			
11	STREAM NAME		TO UNIT OPERATION	
12	65	Tank		# 200
13	PARAMETERS			
14	User Variables			
15	CONDITIONS			
16	Name	Carga Densa	66	65
17	Vapour	0.0000	0.0000	0.0000
18	Temperature (C)	20.0627	20.0627	20.0627
19	Pressure (kPa)	1213.0821	1213.0821	1213.0821
20	Molar Flow (kgmole/h)	85.8730	0.0000	85.8730
21	Mass Flow (kg/h)	6236.5611	0.0000	6236.5611
22	Std Ideal Liq Vol Flow (m3/h)	10.0000	0.0000	10.0000
23	Molar Enthalpy (kJ/kgmole)	-1.760e+005	-1.760e+005	-1.760e+005
24	Molar Entropy (kJ/kgmole-C)	79.63	79.63	79.63
25	Heat Flow (kJ/h)	-1.5111e+07	-3.9560e-11	-1.5111e+07
26	PROPERTIES			
27	Name	Carga Densa	66	65
28	Molecular Weight	72.63	72.63	72.63
29	Molar Density (kgmole/m3)	8.620	8.620	8.620
30	Mass Density (kg/m3)	626.0	626.0	626.0
31	Act. Volume Flow (m3/h)	9.962	2.608e-017	9.962
32	Mass Enthalpy (kJ/kg)	-2423	-2423	-2423
33	Mass Entropy (kJ/kg-C)	1.096	1.096	1.096
34	Heat Capacity (kJ/kgmole-C)	160.8	160.8	160.8
35	Mass Heat Capacity (kJ/kg-C)	2.214	2.214	2.214
36	Lower Heating Value (kJ/kgmole)	---	---	---
37	Mass Lower Heating Value (kJ/kg)	---	---	---
38	Phase Fraction [Vol. Basis]	0.0000	0.0000	0.0000
39	Phase Fraction [Mass Basis]	0.0000	0.0000	0.0000
40	Partial Pressure of CO2 (kPa)	---	---	---
41	Cost Based on Flow (Cost/s)	0.0000	0.0000	0.0000
42	Act. Gas Flow (ACT_m3/h)	---	---	---
43	Avg. Liq. Density (kgmole/m3)	8.587	8.587	8.587
44	Specific Heat (kJ/kgmole-C)	160.8	160.8	160.8
45	Std. Gas Flow (STD_m3/h)	2030	5.316e-015	2030
46	Std. Ideal Liq. Mass Density (kg/m3)	623.7	623.7	623.7
47	Act. Liq. Flow (m3/s)	2.767e-003	7.244e-021	2.767e-003
48	Z Factor	5.772e-002	5.772e-002	5.772e-002
49	Watson K	13.12	13.12	13.12
50	User Property	---	---	---
51	Cp/(Cp - R)	1.055	1.055	1.055
52	Cp/Cv	1.231	1.231	1.231
53	Heat of Vap. (kJ/kgmole)	2.624e+004	2.624e+004	2.624e+004
54	Kinematic Viscosity (cSt)	0.3938	0.3938	0.3938
55	Liq. Mass Density (Std. Cond) (kg/m3)	629.2	629.2	629.2
56	Liq. Vol. Flow (Std. Cond) (m3/h)	9.912	2.595e-017	9.912
57	Liquid Fraction	1.000	1.000	1.000
58	Honeywell International Inc.			
59	UniSim Design (R430 build 18059)			
60	Page 111 of 170			
61	Licensed to: Company Name Not Available			
62	Printed by: alu0100514599			
63	* Specified by user.			

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
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Mixer: MIX-101 (continued)

PROPERTIES

11	Name	Carga Densa	66	65		
12	Molar Volume (m ³ /kgmole)	0.1160	0.1160	0.1160		
13	Mass Heat of Vap. (kJ/kg)	361.3	361.3	361.3		
14	Phase Fraction [Molar Basis]	0.0000	0.0000	0.0000		
15	Surface Tension (dyne/cm)	14.72	14.72	14.72		
16	Thermal Conductivity (W/m-K)	0.1026	0.1026	0.1026		
17	Viscosity (cP)	0.2465	0.2465	0.2465		
18	Partial Pressure of H ₂ S (kPa)	0.0000	0.0000	0.0000		
19	Cv (Semi-Ideal) (kJ/kgmole-C)	152.5	152.5	152.5		
20	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.100	2.100	2.100		
21	Cv (kJ/kgmole-C)	130.7	130.7	130.7		
22	Mass Cv (kJ/kg-C)	1.799	1.799	1.799		
23	Cv (Ent. Method) (kJ/kgmole-C)	---	---	---		
24	Mass Cv (Ent. Method) (kJ/kg-C)	---	---	---		
25	Cp/Cv (Ent. Method)	---	---	---		
26	Reid VP at 37.8 C (kPa)	234.1	234.1	234.1		
27	Liq. Vol. Flow - Sum(Std. Cond) (m ³ /h)	9.912	2.595e-017	9.912		

STATUS

OK

NOTES

Description

Mixer: MIX-102

CONNECTIONS

Inlet Stream

44	STREAM NAME	FROM UNIT OPERATION	
45	83	Relief valve	RV-100
46	82	Valve	DBPV102

Outlet Stream

49	STREAM NAME	TO UNIT OPERATION	
50	To Flare		

PARAMETERS

User Variables

CONDITIONS

57	Name	83	82	To Flare	
58	Vapour	1.0000	1.0000	1.0000	
59	Temperature (C)	26.6579	72.9714	72.9714	
60	Pressure (kPa)	444.5578	444.5578	444.5578 *	
61	Molar Flow (kgmole/h)	0.0000	0.0000	0.0000	
62	Mass Flow (kg/h)	0.0000	0.0000	0.0000	
63	Std Ideal Liq Vol Flow (m ³ /h)	0.0000	0.0000	0.0000	
64	Molar Enthalpy (kJ/kgmole)	-3.488e+004	-9.966e+004	-9.966e+004	
65	Molar Entropy (kJ/kgmole-C)	148.1	169.2	169.2	
66	Heat Flow (kJ/h)	0.0000e-01	-1.3986e-29	-1.3986e-29	

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
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Mixer: MIX-102 (continued)

PROPERTIES

11	Name	83	82	To Flare		
12	Molecular Weight	37.69	57.65	57.65		
13	Molar Density (kgmole/m3)	0.1821	0.1679	0.1679		
14	Mass Density (kg/m3)	6.863	9.680	9.680		
15	Act. Volume Flow (m3/h)	0.0000	8.358e-034	8.358e-034		
16	Mass Enthalpy (kJ/kg)	-925.6	-1729	-1729		
17	Mass Entropy (kJ/kg-C)	3.930	2.935	2.935		
18	Heat Capacity (kJ/kgmole-C)	52.21	111.2	111.2		
19	Mass Heat Capacity (kJ/kg-C)	1.385	1.929	1.929		
20	Lower Heating Value (kJ/kgmole)	---	---	---		
21	Mass Lower Heating Value (kJ/kg)	---	---	---		
22	Phase Fraction [Vol. Basis]	1.000	1.000	1.000		
23	Phase Fraction [Mass Basis]	1.000	1.000	1.000		
24	Partial Pressure of CO2 (kPa)	---	---	---		
25	Cost Based on Flow (Cost/s)	0.0000	0.0000	0.0000		
26	Act. Gas Flow (ACT_m3/h)	0.0000	8.358e-034	8.358e-034		
27	Avg. Liq. Density (kgmole/m3)	17.70	10.03	10.03		
28	Specific Heat (kJ/kgmole-C)	52.21	111.2	111.2		
29	Std. Gas Flow (STD_m3/h)	0.0000	3.318e-033	3.318e-033		
30	Std. Ideal Liq. Mass Density (kg/m3)	667.0	578.1	578.1		
31	Act. Liq. Flow (m3/s)	0.0000	0.0000	0.0000		
32	Z Factor	0.9793	0.9201	0.9201		
33	Watson K	9.778	13.51	13.51		
34	User Property	---	---	---		
35	Cp/(Cp - R)	1.189	1.081	1.081		
36	Cp/Cv	1.211	1.112	1.112		
37	Heat of Vap. (kJ/kgmole)	1.986e+004	3.070e+004	3.070e+004		
38	Kinematic Viscosity (cSt)	2.012	0.9197	0.9197		
39	Liq. Mass Density (Std. Cond) (kg/m3)	---	579.9	579.9		
40	Liq. Vol. Flow (Std. Cond) (m3/h)	---	1.395e-035	1.395e-035		
41	Liquid Fraction	0.0000	0.0000	0.0000		
42	Molar Volume (m3/kgmole)	5.491	5.956	5.956		
43	Mass Heat of Vap. (kJ/kg)	526.9	532.6	532.6		
44	Phase Fraction [Molar Basis]	1.0000	1.0000	1.0000		
45	Surface Tension (dyne/cm)	---	---	---		
46	Thermal Conductivity (W/m-K)	2.222e-002	2.061e-002	2.061e-002		
47	Viscosity (cP)	1.381e-002	8.903e-003	8.903e-003		
48	Partial Pressure of H2S (kPa)	0.0000	0.0000	0.0000		
49	Cv (Semi-Ideal) (kJ/kgmole-C)	43.89	102.9	102.9		
50	Mass Cv (Semi-Ideal) (kJ/kg-C)	1.165	1.785	1.785		
51	Cv (kJ/kgmole-C)	43.11	100.0	100.0		
52	Mass Cv (kJ/kg-C)	1.144	1.735	1.735		
53	Cv (Ent. Method) (kJ/kgmole-C)	43.14	100.1	100.1		
54	Mass Cv (Ent. Method) (kJ/kg-C)	1.145	1.736	1.736		
55	Cp/Cv (Ent. Method)	1.210	1.111	1.111		
56	Reid VP at 37.8 C (kPa)	---	497.8	497.8		
57	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	0.0000	1.395e-035	1.395e-035		

STATUS

OK

NOTES

Description

1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc		
2			Unit Set:	SI		
3			Date/Time:	Friday Sep 4 2015, 16:44:21		
4	Tee: TEE-100					
5	CONNECTIONS					
6	Inlet Stream					
7	STREAM NAME	FROM UNIT OPERATION				
8	11	Mixer	MIX-100			
9	Outlet Stream					
10	STREAM NAME	TO UNIT OPERATION				
11	12	Valve	FV103A			
12	13	Valve	FV103C			
13	60	Heat Exchanger	E101			
14	PARAMETERS					
15		Flow Ratios	Dynamic Valve Openings			
16	12	---	0.0000 *			
17	13	---	0.0000 *			
18	60	---	0.0000 *			
19	Valve Control: Multiple Stream					
20	User Variables					
21	CONDITIONS					
22	Name	11	12	13		
23	Vapour	0.0000	0.0000	0.0000		
24	Temperature (C)	33.9492	33.9492	33.9492		
25	Pressure (kPa)	1737.2709	1737.2709	1737.2709		
26	Molar Flow (kgmole/h)	370.0731	272.3873	0.0000		
27	Mass Flow (kg/h)	21198.4957	15602.8662	0.0000		
28	Std Ideal Liq Vol Flow (m3/h)	36.8631	27.1326	0.0000		
29	Molar Enthalpy (kJ/kgmole)	-1.236e+005	-1.236e+005	-1.236e+005		
30	Molar Entropy (kJ/kgmole-C)	91.73	91.73	91.73		
31	Heat Flow (kJ/h)	-4.5730e+007	-3.3659e+007	-1.7946e-28		
32	PROPERTIES					
33	Name	11	12	13		
34	Molecular Weight	57.28	57.28	57.28		
35	Molar Density (kgmole/m3)	9.749	9.749	9.749		
36	Mass Density (kg/m3)	558.4	558.4	558.4		
37	Act. Volume Flow (m3/h)	37.96	27.94	1.490e-034		
38	Mass Enthalpy (kJ/kg)	-2157	-2157	-2157		
39	Mass Entropy (kJ/kg-C)	1.601	1.601	1.601		
40	Heat Capacity (kJ/kgmole-C)	141.1	141.1	141.1		
41	Mass Heat Capacity (kJ/kg-C)	2.463	2.463	2.463		
42	Lower Heating Value (kJ/kgmole)	---	---	---		
43	Mass Lower Heating Value (kJ/kg)	---	---	---		
44	Phase Fraction [Vol. Basis]	0.0000	0.0000	0.0000		
45	Phase Fraction [Mass Basis]	0.0000	0.0000	0.0000		
46	Partial Pressure of CO2 (kPa)	---	---	---		
47	Cost Based on Flow (Cost/s)	0.0000	0.0000	0.0000		
48	Act. Gas Flow (ACT_m3/h)	---	---	---		
49	Avg. Liq. Density (kgmole/m3)	10.04	10.04	10.04		
50	Specific Heat (kJ/kgmole-C)	141.1	141.1	141.1		
51	Std. Gas Flow (STD_m3/h)	8750	6440	3.434e-032		
52	Std. Ideal Liq. Mass Density (kg/m3)	575.1	575.1	575.1		
53	Act. Liq. Flow (m3/s)	1.055e-002	7.762e-003	4.138e-038		
54	Z Factor	6.979e-002	6.979e-002	6.979e-002		
55	Watson K	13.57	13.57	13.57		
56	User Property	---	---	---		
57	Honeywell International Inc.					
58	UniSim Design (R430 build 18059)					
59	Page 114 of 170					

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
4			

Tee: TEE-100 (continued)

PROPERTIES

11	Name	11	12	13	60	
12	Cp/(Cp - R)	1.063	1.063	1.063	1.063	
13	Cp/Cv	1.289	1.289	1.289	1.289	
14	Heat of Vap. (kJ/kgmole)	1.412e+004	1.412e+004	1.412e+004	1.412e+004	
15	Kinematic Viscosity (cSt)	0.2631	0.2631	0.2631	0.2631	
16	Liq. Mass Density (Std. Cond) (kg/m3)	577.9	577.9	577.9	577.9	
17	Liq. Vol. Flow (Std. Cond) (m3/h)	36.68	27.00	1.439e-034	9.682	
18	Liquid Fraction	1.000	1.000	1.000	1.000	
19	Molar Volume (m3/kgmole)	0.1026	0.1026	0.1026	0.1026	
20	Mass Heat of Vap. (kJ/kg)	246.4	246.4	246.4	246.4	
21	Phase Fraction [Molar Basis]	0.0000	0.0000	0.0000	0.0000	
22	Surface Tension (dyne/cm)	9.960	9.960	9.960	9.960	
23	Thermal Conductivity (W/m-K)	8.722e-002	8.722e-002	8.722e-002	8.722e-002	
24	Viscosity (cP)	0.1469	0.1469	0.1469	0.1469	
25	Partial Pressure of H2S (kPa)	0.0000	0.0000	0.0000	0.0000	
26	Cv (Semi-Ideal) (kJ/kgmole-C)	132.8	132.8	132.8	132.8	
27	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.318	2.318	2.318	2.318	
28	Cv (kJ/kgmole-C)	109.5	109.5	109.5	109.5	
29	Mass Cv (kJ/kg-C)	1.911	1.911	1.911	1.911	
30	Cv (Ent. Method) (kJ/kgmole-C)	---	---	---	---	
31	Mass Cv (Ent. Method) (kJ/kg-C)	---	---	---	---	
32	Cp/Cv (Ent. Method)	---	---	---	---	
33	Reid VP at 37.8 C (kPa)	458.1	458.1	458.1	458.1	
34	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	36.68	27.00	1.439e-034	9.682	

STATUS

OK

NOTES

Description

Tee: TEE-100-2

CONNECTIONS

Inlet Stream

51	STREAM NAME	FROM UNIT OPERATION
52	24	# 100

Outlet Stream

55	STREAM NAME	TO UNIT OPERATION
56	28	P01AVA
57	29	P01BVA

PARAMETERS

60		Flow Ratios	Dynamic Valve Openings
61	28	---	0.0000 *
62	29	---	0.0000 *

Valve Control: Multiple Stream

User Variables

1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2			Unit Set:	SI
3			Date/Time:	Friday Sep 4 2015, 16:44:21
6	Tee: TEE-100-2 (continued)			
7	CONDITIONS			
8	Name	24	28	29
11	Vapour	0.0000	0.0000	0.0000
12	Temperature (C)	89.8556	89.8582	89.8582
13	Pressure (kPa)	1468.2945	1468.2945	1468.2945
14	Molar Flow (kgmole/h)	86.7631	86.7631	-0.0000
15	Mass Flow (kg/h)	5351.6186	5351.6186	-0.0000
16	Std Ideal Liq Vol Flow (m3/h)	9.0000	9.0000	-0.0000
17	Molar Enthalpy (kJ/kgmole)	-1.202e+005	-1.202e+005	-1.202e+005
18	Molar Entropy (kJ/kgmole-C)	120.0	120.0	120.0
19	Heat Flow (kJ/h)	-1.0429e+07	-1.0429e+07	1.3991e-11
21	PROPERTIES			
22	Name	24	28	29
23	Molecular Weight	61.68	61.68	61.68
24	Molar Density (kgmole/m3)	8.142	8.143	8.143
25	Mass Density (kg/m3)	502.2	502.3	502.3
26	Act. Volume Flow (m3/h)	10.66	10.66	-1.429e-017
27	Mass Enthalpy (kJ/kg)	-1949	-1949	-1949
28	Mass Entropy (kJ/kg-C)	1.946	1.946	1.946
29	Heat Capacity (kJ/kgmole-C)	181.8	181.8	181.8
30	Mass Heat Capacity (kJ/kg-C)	2.947	2.947	2.947
31	Lower Heating Value (kJ/kgmole)	---	---	---
32	Mass Lower Heating Value (kJ/kg)	---	---	---
33	Phase Fraction [Vol. Basis]	0.0000	0.0000	0.0000
34	Phase Fraction [Mass Basis]	0.0000	0.0000	0.0000
35	Partial Pressure of CO2 (kPa)	---	---	---
36	Cost Based on Flow (Cost/s)	0.0000	0.0000	0.0000
37	Act. Gas Flow (ACT_m3/h)	---	---	---
38	Avg. Liq. Density (kgmole/m3)	9.640	9.640	9.640
39	Specific Heat (kJ/kgmole-C)	181.8	181.8	181.8
40	Std. Gas Flow (STD_m3/h)	2051	2051	-2.752e-015
41	Std. Ideal Liq. Mass Density (kg/m3)	594.6	594.6	594.6
42	Act. Liq. Flow (m3/s)	2.960e-003	2.960e-003	-3.971e-021
43	Z Factor	5.975e-002	5.974e-002	5.974e-002
44	Watson K	13.33	13.33	13.33
45	User Property	---	---	---
46	Cp/(Cp - R)	1.048	1.048	1.048
47	Cp/Cv	1.302	1.302	1.302
48	Heat of Vap. (kJ/kgmole)	1.698e+004	1.698e+004	1.698e+004
49	Kinematic Viscosity (cSt)	0.1974	0.1974	0.1974
50	Liq. Mass Density (Std. Cond) (kg/m3)	598.7	598.7	598.7
51	Liq. Vol. Flow (Std. Cond) (m3/h)	8.939	8.939	-1.199e-017
52	Liquid Fraction	1.000	1.000	1.000
53	Molar Volume (m3/kgmole)	0.1228	0.1228	0.1228
54	Mass Heat of Vap. (kJ/kg)	275.3	275.3	275.3
55	Phase Fraction [Molar Basis]	0.0000	0.0000	0.0000
56	Surface Tension (dyne/cm)	5.411	5.410	5.410
57	Thermal Conductivity (W/m-K)	6.996e-002	6.996e-002	6.996e-002
58	Viscosity (cP)	9.916e-002	9.916e-002	9.916e-002
59	Partial Pressure of H2S (kPa)	0.0000	0.0000	0.0000
60	Cv (Semi-Ideal) (kJ/kgmole-C)	173.5	173.5	173.5
61	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.813	2.812	2.812
62	Cv (kJ/kgmole-C)	139.7	139.7	139.7
63	Mass Cv (kJ/kg-C)	2.265	2.264	2.264
64	Cv (Ent. Method) (kJ/kgmole-C)	---	---	---
65	Mass Cv (Ent. Method) (kJ/kg-C)	---	---	---
66	Cp/Cv (Ent. Method)	---	---	---
67	Reid VP at 37.8 C (kPa)	345.5	345.5	345.5
68	Honeywell International Inc. UniSim Design (R430 build 18059)			
69	Licensed to: Company Name Not Available Printed by: alu0100514599 Page 116 of 170			
	* Specified by user.			

1	Honeywell Company Name Not Available Calgary, Alberta CANADA		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc		
2			Unit Set:	SI		
3			Date/Time:	Friday Sep 4 2015, 16:44:21		
4	Tee: TEE-100-2 (continued)					
5	PROPERTIES					
6	Name	24	28	29		
7	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	8.939	8.939	-1.199e-017		
8	STATUS					
9	OK					
10	NOTES					
11						
12						
13						
14						
15						
16						
17						
18						
19	Description					
20						
21						
22	Tee: TEE-100-3					
23						
24						
25	CONNECTIONS					
26						
27	Inlet Stream					
28						
29	STREAM NAME	FROM UNIT OPERATION				
30	34	Mixer	MIX-100-3			
31	Outlet Stream					
32						
33	STREAM NAME	TO UNIT OPERATION				
34	35	Valve	FV102A			
35	36	Valve	FV102C			
36	PARAMETERS					
37						
38		Flow Ratios	Dynamic Valve Openings			
39	35		0.0000 *			
40	36		0.0000 *			
41						
42	Valve Control: Multiple Stream					
43	User Variables					
44						
45	CONDITIONS					
46						
47	Name	34	35	36		
48	Vapour	0.0000	0.0000	0.0000		
49	Temperature (C)	90.0379	90.0379	90.0379		
50	Pressure (kPa)	1600.6657	1600.6657	1600.6657		
51	Molar Flow (kgmole/h)	86.7631	86.7631	0.0000		
52	Mass Flow (kg/h)	5351.6186	5351.6186	0.0000		
53	Std Ideal Liq Vol Flow (m3/h)	9.0000	9.0000	0.0000		
54	Molar Enthalpy (kJ/kgmole)	-1.202e+005	-1.202e+005	-1.202e+005		
55	Molar Entropy (kJ/kgmole-C)	120.1	120.1	120.1		
56	Heat Flow (kJ/h)	-1.0427e+07	-1.0427e+07	-1.0139e-28		
57	PROPERTIES					
58						
59	Name	34	35	36		
60	Molecular Weight	61.68	61.68	61.68		
61	Molar Density (kgmole/m3)	8.151	8.151	8.151		
62	Mass Density (kg/m3)	502.8	502.8	502.8		
63	Act. Volume Flow (m3/h)	10.64	10.64	1.035e-034		
64	Mass Enthalpy (kJ/kg)	-1948	-1948	-1948		
65	Mass Entropy (kJ/kg-C)	1.946	1.946	1.946		
66	Heat Capacity (kJ/kgmole-C)	181.4	181.4	181.4		
67	Mass Heat Capacity (kJ/kg-C)	2.941	2.941	2.941		
68	Lower Heating Value (kJ/kgmole)	---	---	---		

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
4			

6 Tee: TEE-100-3 (continued)

7 PROPERTIES

11	Name	34	35	36		
12	Mass Lower Heating Value (kJ/kg)	---	---	---		
13	Phase Fraction [Vol. Basis]	0.0000	0.0000	0.0000		
14	Phase Fraction [Mass Basis]	0.0000	0.0000	0.0000		
15	Partial Pressure of CO2 (kPa)	---	---	---		
16	Cost Based on Flow (Cost/s)	0.0000	0.0000	0.0000		
17	Act. Gas Flow (ACT_m3/h)	---	---	---		
18	Avg. Liq. Density (kgmole/m3)	9.640	9.640	9.640		
19	Specific Heat (kJ/kgmole-C)	181.4	181.4	181.4		
20	Std. Gas Flow (STD_m3/h)	2051	2051	1.995e-032		
21	Std. Ideal Liq. Mass Density (kg/m3)	594.6	594.6	594.6		
22	Act. Liq. Flow (m3/s)	2.957e-003	2.957e-003	2.875e-038		
23	Z Factor	6.503e-002	6.503e-002	6.503e-002		
24	Watson K	13.33	13.33	13.33		
25	User Property	---	---	---		
26	Cp/(Cp - R)	1.048	1.048	1.048		
27	Cp/Cv	1.298	1.298	1.298		
28	Heat of Vap. (kJ/kgmole)	1.640e+004	1.640e+004	1.640e+004		
29	Kinematic Viscosity (cSt)	0.1971	0.1971	0.1971		
30	Liq. Mass Density (Std. Cond) (kg/m3)	598.7	598.7	598.7		
31	Liq. Vol. Flow (Std. Cond) (m3/h)	8.939	8.939	8.692e-035		
32	Liquid Fraction	1.000	1.000	1.000		
33	Molar Volume (m3/kgmole)	0.1227	0.1227	0.1227		
34	Mass Heat of Vap. (kJ/kg)	265.9	265.9	265.9		
35	Phase Fraction [Molar Basis]	0.0000	0.0000	0.0000		
36	Surface Tension (dyne/cm)	5.393	5.393	5.393		
37	Thermal Conductivity (W/m-K)	6.988e-002	6.988e-002	6.988e-002		
38	Viscosity (cP)	9.911e-002	9.911e-002	9.911e-002		
39	Partial Pressure of H2S (kPa)	0.0000	0.0000	0.0000		
40	Cv (Semi-Ideal) (kJ/kgmole-C)	173.1	173.1	173.1		
41	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.806	2.806	2.806		
42	Cv (kJ/kgmole-C)	139.7	139.7	139.7		
43	Mass Cv (kJ/kg-C)	2.265	2.265	2.265		
44	Cv (Ent. Method) (kJ/kgmole-C)	---	---	---		
45	Mass Cv (Ent. Method) (kJ/kg-C)	---	---	---		
46	Cp/Cv (Ent. Method)	---	---	---		
47	Reid VP at 37.8 C (kPa)	345.5	345.5	345.5		
48	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	8.939	8.939	8.692e-035		

50 STATUS

51 OK

52 NOTES

55 Description

59 Tee: TEE-100-2-2

61 CONNECTIONS

63 Inlet Stream

65	STREAM NAME	FROM UNIT OPERATION	
66	24-2	Tank	# 200

67 Outlet Stream

69	Honeywell International Inc.	UniSim Design (R430 build 18059)	Page 118 of 170
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1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc		
2			Unit Set:	SI		
3			Date/Time:	Friday Sep 4 2015, 16:44:21		
4	Tee: TEE-100-2-2 (continued)					
5	CONNECTIONS					
6	STREAM NAME		TO UNIT OPERATION			
7	28-2	Valve	P02AVA			
8	29-2	Valve	P02BVA			
9	PARAMETERS					
10			Flow Ratios			
11	28-2	---	0.0000 *			
12	29-2	---	0.0000 *			
13						
14	Valve Control: Multiple Stream					
15	User Variables					
16	CONDITIONS					
17	Name	24-2	28-2	29-2		
18	Vapour	0.0000	0.0000	0.0000		
19	Temperature (C)	20.0851	20.0678	20.0678		
20	Pressure (kPa)	1200.1315	1200.1315	1200.1315		
21	Molar Flow (kgmole/h)	85.8731	0.0000	85.8731		
22	Mass Flow (kg/h)	6236.5679	0.0000	6236.5679		
23	Std Ideal Liq Vol Flow (m3/h)	10.0000	0.0000	10.0000		
24	Molar Enthalpy (kJ/kgmole)	-1.760e+005	-1.760e+005	-1.760e+005		
25	Molar Entropy (kJ/kgmole-C)	79.65	79.63	79.63		
26	Heat Flow (kJ/h)	-1.5111e+07	-1.0488e-29	-1.5111e+07		
27	PROPERTIES					
28	Name	24-2	28-2	29-2		
29	Molecular Weight	72.63	72.63	72.63		
30	Molar Density (kgmole/m3)	8.618	8.620	8.620		
31	Mass Density (kg/m3)	625.9	626.0	626.0		
32	Act. Volume Flow (m3/h)	9.964	6.915e-036	9.962		
33	Mass Enthalpy (kJ/kg)	-2423	-2423	-2423		
34	Mass Entropy (kJ/kg-C)	1.097	1.096	1.096		
35	Heat Capacity (kJ/kgmole-C)	160.8	160.8	160.8		
36	Mass Heat Capacity (kJ/kg-C)	2.215	2.214	2.214		
37	Lower Heating Value (kJ/kgmole)	---	---	---		
38	Mass Lower Heating Value (kJ/kg)	---	---	---		
39	Phase Fraction [Vol. Basis]	0.0000	0.0000	0.0000		
40	Phase Fraction [Mass Basis]	0.0000	0.0000	0.0000		
41	Partial Pressure of CO2 (kPa)	---	---	---		
42	Cost Based on Flow (Cost/s)	0.0000	0.0000	0.0000		
43	Act. Gas Flow (ACT_m3/h)	---	---	---		
44	Avg. Liq. Density (kgmole/m3)	8.587	8.587	8.587		
45	Specific Heat (kJ/kgmole-C)	160.8	160.8	160.8		
46	Std. Gas Flow (STD_m3/h)	2030	1.409e-033	2030		
47	Std. Ideal Liq. Mass Density (kg/m3)	623.7	623.7	623.7		
48	Act. Liq. Flow (m3/s)	2.768e-003	1.921e-039	2.767e-003		
49	Z Factor	5.712e-002	5.711e-002	5.711e-002		
50	Watson K	13.12	13.12	13.12		
51	User Property	---	---	---		
52	Cp/(Cp - R)	1.055	1.055	1.055		
53	Cp/Cv	1.231	1.231	1.231		
54	Heat of Vap. (kJ/kgmole)	2.632e+004	2.632e+004	2.632e+004		
55	Kinematic Viscosity (cSt)	0.3938	0.3938	0.3938		
56	Liq. Mass Density (Std. Cond) (kg/m3)	629.2	629.2	629.2		
57	Liq. Vol. Flow (Std. Cond) (m3/h)	9.912	6.880e-036	9.912		
58	Liquid Fraction	1.000	1.000	1.000		
59	Molar Volume (m3/kgmole)	0.1160	0.1160	0.1160		

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
4			

Tee: TEE-100-2-2 (continued)

PROPERTIES

11	Name	24-2	28-2	29-2		
12	Mass Heat of Vap. (kJ/kg)	362.4	362.4	362.4		
13	Phase Fraction [Molar Basis]	0.0000	0.0000	0.0000		
14	Surface Tension (dyne/cm)	14.72	14.72	14.72		
15	Thermal Conductivity (W/m-K)	0.1026	0.1026	0.1026		
16	Viscosity (cP)	0.2465	0.2465	0.2465		
17	Partial Pressure of H2S (kPa)	0.0000	0.0000	0.0000		
18	Cv (Semi-Ideal) (kJ/kgmole-C)	152.5	152.5	152.5		
19	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.100	2.100	2.100		
20	Cv (kJ/kgmole-C)	130.7	130.7	130.7		
21	Mass Cv (kJ/kg-C)	1.800	1.799	1.799		
22	Cv (Ent. Method) (kJ/kgmole-C)	---	---	---		
23	Mass Cv (Ent. Method) (kJ/kg-C)	---	---	---		
24	Cp/Cv (Ent. Method)	---	---	---		
25	Reid VP at 37.8 C (kPa)	234.1	234.1	234.1		
26	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	9.912	6.880e-036	9.912		

STATUS

OK

NOTES

Description

Tee: TEE-100-3-2

CONNECTIONS

Inlet Stream

43	STREAM NAME	FROM UNIT OPERATION	
44	46	Mixer	MIX-100-3-2

Outlet Stream

47	STREAM NAME	TO UNIT OPERATION	
48	47	Valve	FV202A
49	48	Valve	FV202C

PARAMETERS

	Flow Ratios	Dynamic Valve Openings
53	47	---
54	48	---

56 Valve Control: Multiple Stream

User Variables

CONDITIONS

61	Name	46	47	48	
62	Vapour	0.0000	0.0000	0.0000	
63	Temperature (C)	20.1733	20.1733	20.1733	
64	Pressure (kPa)	1365.4481	1365.4481	1365.4481	
65	Molar Flow (kgmole/h)	85.8731	85.8731	0.0000	
66	Mass Flow (kg/h)	6236.5679	6236.5679	0.0000	
67	Std Ideal Liq Vol Flow (m3/h)	10.0000	10.0000	0.0000	
68	Molar Enthalpy (kJ/kgmole)	-1.759e+005	-1.759e+005	-1.759e+005	

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1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc	
2		Unit Set:	SI	
3		Date/Time:	Friday Sep 4 2015, 16:44:21	
4				
5				

Tee: TEE-100-3-2 (continued)

CONDITIONS

Molar Entropy	(kJ/kgmole-C)	79.66	79.66	79.66	
Heat Flow	(kJ/h)	-1.5109e+07	-1.5109e+07	-2.9500e-29	

PROPERTIES

Name	46	47	48		
Molecular Weight	72.63	72.63	72.63		
Molar Density	(kgmole/m3)	8.623	8.623	8.623	
Mass Density	(kg/m3)	626.2	626.2	626.2	
Act. Volume Flow	(m3/h)	9.959	9.959	1.945e-035	
Mass Enthalpy	(kJ/kg)	-2423	-2423	-2423	
Mass Entropy	(kJ/kg-C)	1.097	1.097	1.097	
Heat Capacity	(kJ/kgmole-C)	160.8	160.8	160.8	
Mass Heat Capacity	(kJ/kg-C)	2.214	2.214	2.214	
Lower Heating Value	(kJ/kgmole)	---	---	---	
Mass Lower Heating Value	(kJ/kg)	---	---	---	
Phase Fraction [Vol. Basis]		0.0000	0.0000	0.0000	
Phase Fraction [Mass Basis]		0.0000	0.0000	0.0000	
Partial Pressure of CO2	(kPa)	---	---	---	
Cost Based on Flow	(Cost/s)	0.0000	0.0000	0.0000	
Act. Gas Flow	(ACT_m3/h)	---	---	---	
Avg. Liq. Density	(kgmole/m3)	8.587	8.587	8.587	
Specific Heat	(kJ/kgmole-C)	160.8	160.8	160.8	
Std. Gas Flow	(STD_m3/h)	2030	2030	3.964e-033	
Std. Ideal Liq. Mass Density	(kg/m3)	623.7	623.7	623.7	
Act. Liq. Flow	(m3/s)	2.766e-003	2.766e-003	5.402e-039	
Z Factor		6.493e-002	6.493e-002	6.493e-002	
Watson K		13.12	13.12	13.12	
User Property		---	---	---	
Cp/(Cp - R)		1.055	1.055	1.055	
Cp/Cv		1.230	1.230	1.230	
Heat of Vap.	(kJ/kgmole)	2.535e+004	2.535e+004	2.535e+004	
Kinematic Viscosity	(cSt)	0.3934	0.3934	0.3934	
Liq. Mass Density (Std. Cond)	(kg/m3)	629.2	629.2	629.2	
Liq. Vol. Flow (Std. Cond)	(m3/h)	9.912	9.912	1.935e-035	
Liquid Fraction		1.000	1.000	1.000	
Molar Volume	(m3/kgmole)	0.1160	0.1160	0.1160	
Mass Heat of Vap.	(kJ/kg)	349.1	349.1	349.1	
Phase Fraction [Molar Basis]		0.0000	0.0000	0.0000	
Surface Tension	(dyne/cm)	14.71	14.71	14.71	
Thermal Conductivity	(W/m-K)	0.1026	0.1026	0.1026	
Viscosity	(cP)	0.2464	0.2464	0.2464	
Partial Pressure of H2S	(kPa)	0.0000	0.0000	0.0000	
Cv (Semi-Ideal)	(kJ/kgmole-C)	152.5	152.5	152.5	
Mass Cv (Semi-Ideal)	(kJ/kg-C)	2.100	2.100	2.100	
Cv	(kJ/kgmole-C)	130.7	130.7	130.7	
Mass Cv	(kJ/kg-C)	1.800	1.800	1.800	
Cv (Ent. Method)	(kJ/kgmole-C)	---	---	---	
Mass Cv (Ent. Method)	(kJ/kg-C)	---	---	---	
Cp/Cv (Ent. Method)		---	---	---	
Reid VP at 37.8 C	(kPa)	234.1	234.1	234.1	
Liq. Vol. Flow - Sum(Std. Cond)	(m3/h)	9.912	9.912	1.935e-035	

STATUS

OK

NOTES

Description

Honeywell International Inc.	UniSim Design (R430 build 18059)	Page 121 of 170
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1	Honeywell Company Name Not Available Calgary, Alberta CANADA		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc					
2			Unit Set:	SI					
3			Date/Time:	Friday Sep 4 2015, 16:44:21					
6	Tee: TEE-100-3-2 (continued)								
7									
8	NOTES								
9	Description								
10									
11	Tee: TEE-101								
12									
13	CONNECTIONS								
14	Inlet Stream								
15									
16	STREAM NAME	FROM UNIT OPERATION							
17	76	Heat Exchanger							
18	Outlet Stream								
19									
20	STREAM NAME	TO UNIT OPERATION							
21	63	Valve							
22	64	Valve							
23	PARAMETERS								
24									
25	Flow Ratios		Dynamic Valve Openings						
26	63	---							
27	64	---							
28									
29									
30									
31									
32									
33	Valve Control: Multiple Stream								
34	User Variables								
35									
36	CONDITIONS								
37									
38	Name	76	63	64					
39	Vapour	0.0000	0.0000	0.0000					
40	Temperature (C)	24.9529	24.9529	22.0732					
41	Pressure (kPa)	248.7386	248.7386	248.7386					
42	Molar Flow (kgmole/h)	75.5077	75.5077	-0.0000					
43	Mass Flow (kg/h)	6021.2638	6021.2638	-0.0000					
44	Std Ideal Liq Vol Flow (m3/h)	9.3216	9.3216	-0.0000					
45	Molar Enthalpy (kJ/kgmole)	-1.886e+005	-1.886e+005	-1.854e+005					
46	Molar Entropy (kJ/kgmole-C)	75.04	75.04	73.54					
47	Heat Flow (kJ/h)	-1.4242e+07	-1.4242e+07	5.5496e-28					
48	PROPERTIES								
49									
50	Name	76	63	64					
51	Molecular Weight	79.74	79.74	78.12					
52	Molar Density (kgmole/m3)	8.028	8.028	8.204					
53	Mass Density (kg/m3)	640.1	640.1	640.9					
54	Act. Volume Flow (m3/h)	9.406	9.406	-3.648e-034					
55	Mass Enthalpy (kJ/kg)	-2365	-2365	-2374					
56	Mass Entropy (kJ/kg-C)	0.9411	0.9411	0.9413					
57	Heat Capacity (kJ/kgmole-C)	175.6	175.6	171.0					
58	Mass Heat Capacity (kJ/kg-C)	2.202	2.202	2.189					
59	Lower Heating Value (kJ/kgmole)	---	---	---					
60	Mass Lower Heating Value (kJ/kg)	---	---	---					
61	Phase Fraction [Vol. Basis]	1.210e-321	0.0000	0.0000					
62	Phase Fraction [Mass Basis]	1.210e-321	0.0000	0.0000					
63	Partial Pressure of CO2 (kPa)	---	---	---					
64	Cost Based on Flow (Cost/s)	0.0000	0.0000	0.0000					
65	Act. Gas Flow (ACT_m3/h)	---	---	---					
66	Avg. Liq. Density (kgmole/m3)	8.100	8.100	8.219					
67	Specific Heat (kJ/kgmole-C)	175.6	175.6	171.0					
68	Std. Gas Flow (STD_m3/h)	1785	1785	-7.076e-032					
69	Honeywell International Inc.	UniSim Design (R430 build 18059)							

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
4			

Tee: TEE-101 (continued)

PROPERTIES

11	Name	76	63	64		
12	Std. Ideal Liq. Mass Density (kg/m3)	645.9	645.9	642.1		
13	Act. Liq. Flow (m3/s)	2.613e-003	2.613e-003	-1.013e-037		
14	Z Factor	0.0125	0.0125	1.235e-002		
15	Watson K	12.92	12.92	12.94		
16	User Property	---	---	---		
17	Cp/(Cp - R)	1.050	1.050	1.051		
18	Cp/Cv	1.214	1.214	1.219		
19	Heat of Vap. (kJ/kgmole)	3.094e+004	3.094e+004	3.064e+004		
20	Kinematic Viscosity (cSt)	0.4127	0.4127	0.4108		
21	Liq. Mass Density (Std. Cond) (kg/m3)	649.5	649.5	645.8		
22	Liq. Vol. Flow (Std. Cond) (m3/h)	9.270	9.270	-3.620e-034		
23	Liquid Fraction	1.000	1.000	1.000		
24	Molar Volume (m3/kgmole)	0.1246	0.1246	0.1219		
25	Mass Heat of Vap. (kJ/kg)	388.0	388.0	392.2		
26	Phase Fraction [Molar Basis]	0.0000	0.0000	0.0000		
27	Surface Tension (dyne/cm)	16.09	16.09	16.10		
28	Thermal Conductivity (W/m-K)	0.1078	0.1078	0.1075		
29	Viscosity (cP)	0.2642	0.2642	0.2633		
30	Partial Pressure of H2S (kPa)	0.0000	0.0000	0.0000		
31	Cv (Semi-Ideal) (kJ/kgmole-C)	167.3	167.3	162.7		
32	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.098	2.098	2.082		
33	Cv (kJ/kgmole-C)	144.6	144.6	140.3		
34	Mass Cv (kJ/kg-C)	1.813	1.813	1.796		
35	Cv (Ent. Method) (kJ/kgmole-C)	---	---	---		
36	Mass Cv (Ent. Method) (kJ/kg-C)	---	---	---		
37	Cp/Cv (Ent. Method)	---	---	---		
38	Reid VP at 37.8 C (kPa)	98.37	98.37	112.3		
39	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	9.270	9.270	-3.620e-034		

STATUS

OK

NOTES

Description

Tee: TEE-102

CONNECTIONS

Inlet Stream

56	STREAM NAME	FROM UNIT OPERATION
57	69	

Outlet Stream

60	STREAM NAME	TO UNIT OPERATION
61	71	Valve
62	74	Valve

PARAMETERS

65		Flow Ratios	Dynamic Valve Openings
66	71	---	---
67	74	---	---

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc					
2		Unit Set:	SI					
3		Date/Time:	Friday Sep 4 2015, 16:44:21					
4	Tee: TEE-102 (continued)							
5	PARAMETERS							
6	Valve Control: Multiple Stream							
7	User Variables							
8								
9	CONDITIONS							
10								
11	Name	69	71	74				
12	Vapour	0.0000	0.0000	0.0000				
13	Temperature (C)	20.0000 *	20.0002	20.0002				
14	Pressure (kPa)	395.5245 *	395.5245	395.5245				
15	Molar Flow (kgmole/h)	2456.3691	1225.7841	1230.5849				
16	Mass Flow (kg/h)	44251.7354	22082.6244	22169.1110				
17	Std Ideal Liq Vol Flow (m3/h)	44.3410	22.1272	22.2138				
18	Molar Enthalpy (kJ/kgmole)	-2.866e+005	-2.866e+005	-2.866e+005				
19	Molar Entropy (kJ/kgmole-C)	52.39	52.39	52.39				
20	Heat Flow (kJ/h)	-7.0401e+008	-3.5131e+008	-3.5269e+008				
21	PROPERTIES							
22								
23	Name	69	71	74				
24	Molecular Weight	18.02	18.02	18.02				
25	Molar Density (kgmole/m3)	56.13	56.13	56.13				
26	Mass Density (kg/m3)	1011	1011	1011				
27	Act. Volume Flow (m3/h)	43.76	21.84	21.92				
28	Mass Enthalpy (kJ/kg)	-1.591e+004	-1.591e+004	-1.591e+004				
29	Mass Entropy (kJ/kg-C)	2.908	2.908	2.908				
30	Heat Capacity (kJ/kgmole-C)	77.72	77.72	77.72				
31	Mass Heat Capacity (kJ/kg-C)	4.314	4.314	4.314				
32	Lower Heating Value (kJ/kgmole)	0.0000	0.0000	0.0000				
33	Mass Lower Heating Value (kJ/kg)	0.0000	0.0000	0.0000				
34	Phase Fraction [Vol. Basis]	0.0000	0.0000	0.0000				
35	Phase Fraction [Mass Basis]	0.0000	0.0000	0.0000				
36	Partial Pressure of CO2 (kPa)	---	---	---				
37	Cost Based on Flow (Cost/s)	0.0000	0.0000	0.0000				
38	Act. Gas Flow (ACT_m3/h)	---	---	---				
39	Avg. Liq. Density (kgmole/m3)	55.40	55.40	55.40				
40	Specific Heat (kJ/kgmole-C)	77.72	77.72	77.72				
41	Std. Gas Flow (STD_m3/h)	5.808e+004	2.898e+004	2.910e+004				
42	Std. Ideal Liq. Mass Density (kg/m3)	998.0	998.0	998.0				
43	Act. Liq. Flow (m3/s)	1.216e-002	6.066e-003	6.090e-003				
44	Z Factor	2.891e-003	2.891e-003	2.891e-003				
45	Watson K	---	---	---				
46	User Property	---	---	---				
47	Cp/(Cp - R)	1.120	1.120	1.120				
48	Cp/Cv	1.144	1.144	1.144				
49	Heat of Vap. (kJ/kgmole)	3.885e+004	3.885e+004	3.885e+004				
50	Kinematic Viscosity (cSt)	0.9907	0.9907	0.9907				
51	Liq. Mass Density (Std. Cond) (kg/m3)	1015	1015	1015				
52	Liq. Vol. Flow (Std. Cond) (m3/h)	43.61	21.76	21.85				
53	Liquid Fraction	1.000	1.000	1.000				
54	Molar Volume (m3/kgmole)	1.782e-002	1.782e-002	1.782e-002				
55	Mass Heat of Vap. (kJ/kg)	2156	2156	2156				
56	Phase Fraction [Molar Basis]	0.0000	0.0000	0.0000				
57	Surface Tension (dyne/cm)	72.96	72.96	72.96				
58	Thermal Conductivity (W/m-K)	0.6034	0.6034	0.6034				
59	Viscosity (cP)	1.002	1.002	1.002				
60	Partial Pressure of H2S (kPa)	0.0000	0.0000	0.0000				
61	Cv (Semi-Ideal) (kJ/kgmole-C)	69.40	69.40	69.40				
62	Mass Cv (Semi-Ideal) (kJ/kg-C)	3.852	3.852	3.852				
63	Cv (kJ/kgmole-C)	67.95	67.95	67.95				
64	Honeywell International Inc.							
65	UniSim Design (R430 build 18059)							
66	Page 124 of 170							
67	* Specified by user.							
68	Licensed to: Company Name Not Available							
69	Printed by: alu0100514599							

1	Honeywell Company Name Not Available Calgary, Alberta CANADA		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc							
2			Unit Set:	SI							
3			Date/Time:	Friday Sep 4 2015, 16:44:21							
4	Tee: TEE-102 (continued)										
5	PROPERTIES										
6	Name	69	71	74							
7	Mass Cv (kJ/kg-C)	3.772	3.772	3.772							
8	Cv (Ent. Method) (kJ/kgmole-C)	---	---	---							
9	Mass Cv (Ent. Method) (kJ/kg-C)	---	---	---							
10	Cp/Cv (Ent. Method)	---	---	---							
11	Reid VP at 37.8 C (kPa)	---	---	---							
12	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	43.61	21.76	21.85							
13	STATUS										
14	OK										
15	NOTES										
16											
17											
18	Description										
19											
20											
21											
22											
23											
24											
25											
26											
27											
28	Tee: TEE-103										
29											
30	CONNECTIONS										
31											
32	Inlet Stream										
33											
34	STREAM NAME	FROM UNIT OPERATION									
35	10	Material Stream									
36	Outlet Stream										
37											
38	STREAM NAME	TO UNIT OPERATION									
39	80	Relief valve									
40	81	Valve									
41	PARAMETERS										
42											
43		Flow Ratios		Dynamic Valve Openings							
44	80	---		---							
45	81	---		---							
46											
47	Valve Control: Multiple Stream										
48	User Variables										
49											
50	CONDITIONS										
51											
52	Name	10	80	81							
53	Vapour	1.0000	1.0000	1.0000							
54	Temperature (C)	81.6832	84.8206	84.8206							
55	Pressure (kPa)	1179.4850	1180.0603	1180.0603							
56	Molar Flow (kgmole/h)	0.0000	0.0000	0.0000							
57	Mass Flow (kg/h)	0.0000	0.0000	0.0000							
58	Std Ideal Liq Vol Flow (m3/h)	0.0000	0.0000	0.0000							
59	Molar Enthalpy (kJ/kgmole)	-1.003e+005	-9.966e+004	-9.966e+004							
60	Molar Entropy (kJ/kgmole-C)	159.4	162.0	162.0							
61	Heat Flow (kJ/h)	-1.4079e-29	0.0000e-01	-1.3986e-29							
62	PROPERTIES										
63											
64	Name	10	80	81							
65	Molecular Weight	57.28	57.65	57.65							
66	Molar Density (kgmole/m3)	0.5120	0.5300	0.5300							
67	Mass Density (kg/m3)	29.33	30.56	30.56							
68	Act. Volume Flow (m3/h)	2.741e-034	0.0000	2.648e-034							

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
4			

Tee: TEE-103 (continued)

PROPERTIES

11	Name	10	80	81		
12	Mass Enthalpy (kJ/kg)	-1751	-1729	-1729		
13	Mass Entropy (kJ/kg-C)	2.782	2.809	2.809		
14	Heat Capacity (kJ/kgmole-C)	122.6	124.3	124.3		
15	Mass Heat Capacity (kJ/kg-C)	2.141	2.156	2.156		
16	Lower Heating Value (kJ/kgmole)	---	---	---		
17	Mass Lower Heating Value (kJ/kg)	---	---	---		
18	Phase Fraction [Vol. Basis]	1.000	1.000	1.000		
19	Phase Fraction [Mass Basis]	1.000	1.000	1.000		
20	Partial Pressure of CO2 (kPa)	---	---	---		
21	Cost Based on Flow (Cost/s)	0.0000	0.0000	0.0000		
22	Act. Gas Flow (ACT_m3/h)	2.741e-034	0.0000	2.648e-034		
23	Avg. Liq. Density (kgmole/m3)	10.04	10.03	10.03		
24	Specific Heat (kJ/kgmole-C)	122.6	124.3	124.3		
25	Std. Gas Flow (STD_m3/h)	3.318e-033	0.0000	3.318e-033		
26	Std. Ideal Liq. Mass Density (kg/m3)	575.1	578.1	578.1		
27	Act. Liq. Flow (m3/s)	0.0000	0.0000	0.0000		
28	Z Factor	0.7808	0.7481	0.7481		
29	Watson K	13.57	13.51	13.51		
30	User Property	---	---	---		
31	Cp/(Cp - R)	1.073	1.072	1.072		
32	Cp/Cv	1.197	1.190	1.190		
33	Heat of Vap. (kJ/kgmole)	1.634e+004	1.950e+004	1.950e+004		
34	Kinematic Viscosity (cSt)	0.3283	0.3220	0.3220		
35	Liq. Mass Density (Std. Cond) (kg/m3)	577.9	579.9	579.9		
36	Liq. Vol. Flow (Std. Cond) (m3/h)	1.391e-035	0.0000	1.395e-035		
37	Liquid Fraction	0.0000	0.0000	0.0000		
38	Molar Volume (m3/kgmole)	1.953	1.887	1.887		
39	Mass Heat of Vap. (kJ/kg)	285.3	338.3	338.3		
40	Phase Fraction [Molar Basis]	1.0000	1.0000	1.0000		
41	Surface Tension (dyne/cm)	---	---	---		
42	Thermal Conductivity (W/m-K)	2.254e-002	2.288e-002	2.288e-002		
43	Viscosity (cP)	9.629e-003	9.838e-003	9.838e-003		
44	Partial Pressure of H2S (kPa)	0.0000	0.0000	0.0000		
45	Cv (Semi-Ideal) (kJ/kgmole-C)	114.3	116.0	116.0		
46	Mass Cv (Semi-Ideal) (kJ/kg-C)	1.996	2.012	2.012		
47	Cv (kJ/kgmole-C)	102.4	104.5	104.5		
48	Mass Cv (kJ/kg-C)	1.788	1.812	1.812		
49	Cv (Ent. Method) (kJ/kgmole-C)	102.6	103.8	103.8		
50	Mass Cv (Ent. Method) (kJ/kg-C)	1.790	1.800	1.800		
51	Cp/Cv (Ent. Method)	1.196	1.198	1.198		
52	Reid VP at 37.8 C (kPa)	458.0	497.8	497.8		
53	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	1.391e-035	0.0000	1.395e-035		

STATUS

OK

NOTES

Description

Tank: # 100

CONNECTIONS

Inlet Stream

1	Honeywell Company Name Not Available Calgary, Alberta CANADA		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc									
2			Unit Set:	SI									
3			Date/Time:	Friday Sep 4 2015, 16:44:21									
4	Tank: # 100 (continued)												
5	Inlet Stream												
6	Stream Name		From Unit Operation										
7	Carga Ligera		Valve:	DBFV101									
8	25		Valve:	VLV-100									
9	Outlet Stream												
10	Stream Name		To Unit Operation										
11	21		Relief valve:	RV100									
12	24		Tee:	TEE-100-2									
13	Energy Stream												
14	Stream Name		From Unit Operation										
15													
16	PARAMETERS												
17	Vessel Volume:	1155 m3 *	Level SP:	5.61 % *	Liquid Volume:	64.77 m3							
18	Vessel Pressure:	1462 kPa	Pressure Drop:	0.0000 kPa *	Duty:	0.0000 kJ/h Heat Transfer Mode: Normal							
19	User Variables												
20	CONDITIONS												
21	Name	Carga Ligera	25	24	21								
22	Vapour	0.0000	1.0000	0.0000	1.0000								
23	Temperature (C)	89.8710	24.8510	89.8556	24.8510 *								
24	Pressure (kPa)	1499.8107	1464.3154	1468.2945	1461.8859								
25	Molar Flow (kgmole/h)	86.7631	0.0000	86.7631	0.0000								
26	Mass Flow (kg/h)	5351.6175	0.0000	5351.6186	0.0000								
27	Std Ideal Liq Vol Flow (m3/h)	9.0000	0.0000	9.0000	0.0000								
28	Molar Enthalpy (kJ/kgmole)	-1.202e+005	-114.6	-1.202e+005	-114.6								
29	Molar Entropy (kJ/kgmole-C)	120.0	125.6	120.0	125.6								
30	Heat Flow (kJ/h)	-1.0429e+007	-6.3050e-15	-1.0429e+007	0.0000e-01								
31	PROPERTIES												
32	Name	Carga Ligera	25	24	21								
33	Molecular Weight	61.68	28.01	61.68	28.01								
34	Molar Density (kgmole/m3)	8.146	0.5935	8.142	0.5935								
35	Mass Density (kg/m3)	502.4	16.62	502.2	16.62								
36	Act. Volume Flow (m3/h)	10.65	9.267e-017	10.66	0.0000								
37	Mass Enthalpy (kJ/kg)	-1949	-4.092	-1949	-4.092								
38	Mass Entropy (kJ/kg-C)	1.946	4.482	1.946	4.482								
39	Heat Capacity (kJ/kgmole-C)	181.7	29.92	181.8	29.92								
40	Mass Heat Capacity (kJ/kg-C)	2.945	1.068	2.947	1.068								
41	Lower Heating Value (kJ/kgmole)	---	---	---	---								
42	Mass Lower Heating Value (kJ/kg)	---	---	---	---								
43	Phase Fraction [Vol. Basis]	0.0000	1.000	0.0000	1.000								
44	Phase Fraction [Mass Basis]	0.0000	1.000	0.0000	1.000								
45	Partial Pressure of CO2 (kPa)	---	---	---	---								
46	Cost Based on Flow (Cost/s)	0.0000	0.0000	0.0000	0.0000								
47	Act. Gas Flow (ACT_m3/h)	---	9.267e-017	---	0.0000								
48	Avg. Liq. Density (kgmole/m3)	9.640	28.79	9.640	28.79								
49	Specific Heat (kJ/kgmole-C)	181.7	29.92	181.8	29.92								
50	Std. Gas Flow (STD_m3/h)	2051	1.300e-015	2051	0.0000								
51	Std. Ideal Liq. Mass Density (kg/m3)	594.6	806.4	594.6	806.4								
52	Act. Liq. Flow (m3/s)	2.959e-003	0.0000	2.960e-003	0.0000								
53	Z Factor	0.0610	0.9959	5.975e-002	0.9942								
54	Watson K	13.33	6.415	13.33	6.415								
55	User Property	---	---	---	---								
56	Cp/(Cp - R)	1.048	1.385	1.048	1.385								
57	Cp/Cv	1.301	1.427	1.302	1.427								

1	Honeywell Company Name Not Available Calgary, Alberta CANADA		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc	
2			Unit Set:	SI	
3			Date/Time:	Friday Sep 4 2015, 16:44:21	

Tank: # 100 (continued)

PROPERTIES

11	Name	Carga Ligera	25	24	21	
12	Heat of Vap. (kJ/kgmole)	1.684e+004	5214	1.698e+004	5217	
13	Kinematic Viscosity (cSt)	0.1974	1.116	0.1974	1.116	
14	Liq. Mass Density (Std. Cond) (kg/m3)	598.7	---	598.7	---	
15	Liq. Vol. Flow (Std. Cond) (m3/h)	8.939	---	8.939	---	
16	Liquid Fraction	1.000	0.0000	1.000	0.0000	
17	Molar Volume (m3/kgmole)	0.1228	1.685	0.1228	1.685	
18	Mass Heat of Vap. (kJ/kg)	273.1	186.1	275.3	186.2	
19	Phase Fraction [Molar Basis]	0.0000	1.0000	0.0000	1.0000	
20	Surface Tension (dyne/cm)	5.409	---	5.411	---	
21	Thermal Conductivity (W/m-K)	6.996e-002	2.648e-002	6.996e-002	2.648e-002	
22	Viscosity (cP)	9.918e-002	1.855e-002	9.916e-002	1.855e-002	
23	Partial Pressure of H2S (kPa)	0.0000	0.0000	0.0000	0.0000	
24	Cv (Semi-Ideal) (kJ/kgmole-C)	173.3	21.61	173.5	21.61	
25	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.810	0.7712	2.813	0.7712	
26	Cv (kJ/kgmole-C)	139.7	20.96	139.7	20.96	
27	Mass Cv (kJ/kg-C)	2.264	0.7483	2.265	0.7484	
28	Cv (Ent. Method) (kJ/kgmole-C)	---	21.77	---	20.94	
29	Mass Cv (Ent. Method) (kJ/kg-C)	---	0.7770	---	0.7475	
30	Cp/Cv (Ent. Method)	---	1.375	---	1.429	
31	Reid VP at 37.8 C (kPa)	345.5	---	345.5	---	
32	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	8.939	0.0000	8.939	0.0000	

STATUS

35	OK
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NOTES

38	
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Description

41	
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Tank: # 200

CONNECTIONS

Inlet Stream

49	Stream Name	From Unit Operation
50	25-2	Valve: VLV-200
51	65	Mixer: MIX-101

Outlet Stream

54	Stream Name	To Unit Operation
55	21-2	Relief valve: RV200
56	24-2	Tee: TEE-100-2-2

Energy Stream

60	Stream Name	From Unit Operation
61		

PARAMETERS

64	Vessel Volume: 2200 m3 *	Level SP: 38.30 % *	Liquid Volume: 842.6 m3
65	Vessel Pressure: 1155 kPa	Pressure Drop: 0.0000 kPa *	Duty: 0.0000 kJ/h Heat Transfer Mode: Normal

User Variables

69	Honeywell International Inc.	UniSim Design (R430 build 18059)	Page 128 of 170
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1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc					
2			Unit Set:	SI					
3			Date/Time:	Friday Sep 4 2015, 16:44:21					
4	Tank: # 200 (continued)								
5	CONDITIONS								
6	Name	25-2	65	24-2	21-2				
7	Vapour	1.0000	0.0000	0.0000	1.0000				
8	Temperature (C)	58.3826	20.0627	20.0851	58.3826 *				
9	Pressure (kPa)	1157.7837	1213.0821	1200.1315	1154.9757				
10	Molar Flow (kgmole/h)	0.0000	85.8730	85.8731	0.0000				
11	Mass Flow (kg/h)	0.0000	6236.5611	6236.5679	0.0000				
12	Std Ideal Liq Vol Flow (m3/h)	0.0000	10.0000	10.0000	0.0000				
13	Molar Enthalpy (kJ/kgmole)	-3.034e+004	-1.760e+005	-1.760e+005	-3.034e+004				
14	Molar Entropy (kJ/kgmole-C)	140.0	79.63	79.65	140.0				
15	Heat Flow (kJ/h)	-6.8057e-12	-1.5111e+07	-1.5111e+07	0.0000e-01				
16	PROPERTIES								
17	Name	25-2	65	24-2	21-2				
18	Molecular Weight	36.03	72.63	72.63	36.03				
19	Molar Density (kgmole/m3)	0.4303	8.620	8.618	0.4303				
20	Mass Density (kg/m3)	15.50	626.0	625.9	15.50				
21	Act. Volume Flow (m3/h)	5.213e-016	9.962	9.964	0.0000				
22	Mass Enthalpy (kJ/kg)	-842.2	-2423	-2423	-842.2				
23	Mass Entropy (kJ/kg-C)	3.885	1.096	1.097	3.885				
24	Heat Capacity (kJ/kgmole-C)	50.66	160.8	160.8	50.66				
25	Mass Heat Capacity (kJ/kg-C)	1.406	2.214	2.215	1.406				
26	Lower Heating Value (kJ/kgmole)	---	---	---	---				
27	Mass Lower Heating Value (kJ/kg)	---	---	---	---				
28	Phase Fraction [Vol. Basis]	1.000	0.0000	0.0000	1.000				
29	Phase Fraction [Mass Basis]	1.000	0.0000	0.0000	1.000				
30	Partial Pressure of CO2 (kPa)	---	---	---	---				
31	Cost Based on Flow (Cost/s)	0.0000	0.0000	0.0000	0.0000				
32	Act. Gas Flow (ACT_m3/h)	5.213e-016	---	---	0.0000				
33	Avg. Liq. Density (kgmole/m3)	19.44	8.587	8.587	19.44				
34	Specific Heat (kJ/kgmole-C)	50.66	160.8	160.8	50.66				
35	Std. Gas Flow (STD_m3/h)	5.303e-015	2030	2030	0.0000				
36	Std. Ideal Liq. Mass Density (kg/m3)	700.2	623.7	623.7	700.2				
37	Act. Liq. Flow (m3/s)	0.0000	2.767e-003	2.768e-003	0.0000				
38	Z Factor	0.9762	5.772e-002	5.712e-002	0.9738				
39	Watson K	8.987	13.12	13.12	8.987				
40	User Property	---	---	---	---				
41	Cp/(Cp - R)	1.196	1.055	1.055	1.196				
42	Cp/Cv	1.234	1.231	1.231	1.233				
43	Heat of Vap. (kJ/kgmole)	1.901e+004	2.624e+004	2.632e+004	1.901e+004				
44	Kinematic Viscosity (cSt)	1.093	0.3938	0.3938	1.093				
45	Liq. Mass Density (Std. Cond) (kg/m3)	---	629.2	629.2	---				
46	Liq. Vol. Flow (Std. Cond) (m3/h)	---	9.912	9.912	---				
47	Liquid Fraction	0.0000	1.000	1.000	0.0000				
48	Molar Volume (m3/kgmole)	2.324	0.1160	0.1160	2.324				
49	Mass Heat of Vap. (kJ/kg)	527.6	361.3	362.4	527.6				
50	Phase Fraction [Molar Basis]	1.0000	0.0000	0.0000	1.0000				
51	Surface Tension (dyne/cm)	---	14.72	14.72	---				
52	Thermal Conductivity (W/m-K)	2.594e-002	0.1026	0.1026	2.594e-002				
53	Viscosity (cP)	1.695e-002	0.2465	0.2465	1.695e-002				
54	Partial Pressure of H2S (kPa)	0.0000	0.0000	0.0000	0.0000				
55	Cv (Semi-Ideal) (kJ/kgmole-C)	42.35	152.5	152.5	42.35				
56	Mass Cv (Semi-Ideal) (kJ/kg-C)	1.175	2.100	2.100	1.175				
57	Cv (kJ/kgmole-C)	41.07	130.7	130.7	41.07				
58	Mass Cv (kJ/kg-C)	1.140	1.799	1.800	1.140				
59	Cv (Ent. Method) (kJ/kgmole-C)	---	---	---	41.03				
60	Mass Cv (Ent. Method) (kJ/kg-C)	---	---	---	1.139				
61	Cp/Cv (Ent. Method)	---	---	---	1.235				
62	Reid VP at 37.8 C (kPa)	---	234.1	234.1	---				

1	Honeywell Company Name Not Available Calgary, Alberta CANADA		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc							
2			Unit Set:	SI							
3			Date/Time:	Friday Sep 4 2015, 16:44:21							
4	Tank: # 200 (continued)										
5	PROPERTIES										
6	Name	25-2	65	24-2	21-2						
7	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	0.0000	9.912	9.912	0.0000						
8	STATUS										
9	OK										
10	NOTES										
11											
12											
13											
14											
15											
16											
17											
18											
19	Description										
20											
21											
22	Tank: #BU01										
23											
24											
25	CONNECTIONS										
26											
27	Inlet Stream										
28											
29	Stream Name	From Unit Operation									
30	C4s To Storage	Material Stream:									
31											
32	Outlet Stream										
33	Stream Name	To Unit Operation									
34	52	Relief valve:									
35	54	Valve:									
36											
37	Energy Stream										
38											
39	Stream Name	From Unit Operation									
40											
41	PARAMETERS										
42											
43	Vessel Volume:	1560 m3 *	Level SP:	74.17 % *	Liquid Volume:	1157 m3					
44	Vessel Pressure:	505.2 kPa	Pressure Drop:	0.0000 kPa *	Duty:	0.0000 kJ/h Heat Transfer Mode: Normal					
45	User Variables										
46											
47	CONDITIONS										
48											
49	Name	C4s To Storage	54	52							
50	Vapour	0.0000	0.0000	1.0000							
51	Temperature (C)	20.7036	42.0883	27.1676							
52	Pressure (kPa)	585.9045	558.6995	505.2180							
53	Molar Flow (kgmole/h)	97.0089	-0.0000	0.0000							
54	Mass Flow (kg/h)	5556.8553	-0.0000	0.0000							
55	Std Ideal Liq Vol Flow (m3/h)	9.6631	-0.0000	0.0000							
56	Molar Enthalpy (kJ/kgmole)	-1.254e+005	-1.219e+005	-7.384e+004							
57	Molar Entropy (kJ/kgmole-C)	85.91	96.70	154.1							
58	Heat Flow (kJ/h)	-1.2168e+007	1.0716e-29	0.0000e-01							
59	PROPERTIES										
60											
61	Name	C4s To Storage	54	52							
62	Molecular Weight	57.28	57.06	47.99							
63	Molar Density (kgmole/m3)	9.983	9.515	0.2181							
64	Mass Density (kg/m3)	571.8	542.9	10.47							
65	Act. Volume Flow (m3/h)	9.718	-9.235e-036	0.0000							
66	Mass Enthalpy (kJ/kg)	-2190	-2137	-1539							
67	Mass Entropy (kJ/kg-C)	1.500	1.695	3.210							
68	Heat Capacity (kJ/kgmole-C)	136.0	146.3	78.10							
69	Honeywell International Inc. UniSim Design (R430 build 18059)										

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
4			

Tank: #BU01 (continued)

PROPERTIES

11	Name	C4s To Storage	54	52		
12	Mass Heat Capacity (kJ/kg-C)	2.374	2.565	1.627		
13	Lower Heating Value (kJ/kgmole)	---	---	---		
14	Mass Lower Heating Value (kJ/kg)	---	---	---		
15	Phase Fraction [Vol. Basis]	0.0000	0.0000	1.000		
16	Phase Fraction [Mass Basis]	0.0000	0.0000	1.000		
17	Partial Pressure of CO2 (kPa)	0.0000	---	---		
18	Cost Based on Flow (Cost/s)	0.0000	0.0000	0.0000		
19	Act. Gas Flow (ACT_m3/h)	---	---	0.0000		
20	Avg. Liq. Density (kgmole/m3)	10.04	10.06	12.47		
21	Specific Heat (kJ/kgmole-C)	136.0	146.3	78.10		
22	Std. Gas Flow (STD_m3/h)	2294	-2.078e-033	0.0000		
23	Std. Ideal Liq. Mass Density (kg/m3)	575.1	574.2	598.4		
24	Act. Liq. Flow (m3/s)	2.699e-003	-2.565e-039	0.0000		
25	Z Factor	2.402e-002	0.0224	0.9278		
26	Watson K	13.57	13.58	12.24		
27	User Property	---	---	---		
28	Cp/(Cp - R)	1.065	1.060	1.119		
29	Cp/Cv	1.295	1.060	1.161		
30	Heat of Vap. (kJ/kgmole)	1.892e+004	2.005e+004	3.237e+004		
31	Kinematic Viscosity (cSt)	0.2896	0.2483	0.9387		
32	Liq. Mass Density (Std. Cond) (kg/m3)	577.9	576.8	514.4		
33	Liq. Vol. Flow (Std. Cond) (m3/h)	9.615	-8.693e-036	0.0000		
34	Liquid Fraction	1.000	1.000	0.0000		
35	Molar Volume (m3/kgmole)	0.1002	0.1051	4.585		
36	Mass Heat of Vap. (kJ/kg)	330.3	351.3	674.6		
37	Phase Fraction [Molar Basis]	0.0000	0.0000	1.0000		
38	Surface Tension (dyne/cm)	11.47	8.964	---		
39	Thermal Conductivity (W/m-K)	9.187e-002	8.404e-002	1.881e-002		
40	Viscosity (cP)	0.1656	0.1348	9.824e-003		
41	Partial Pressure of H2S (kPa)	0.0000	0.0000	0.0000		
42	Cv (Semi-Ideal) (kJ/kgmole-C)	127.7	138.0	69.79		
43	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.229	2.419	1.454		
44	Cv (kJ/kgmole-C)	105.0	138.0	67.25		
45	Mass Cv (kJ/kg-C)	1.834	2.419	1.401		
46	Cv (Ent. Method) (kJ/kgmole-C)	---	---	---		
47	Mass Cv (Ent. Method) (kJ/kg-C)	---	---	---		
48	Cp/Cv (Ent. Method)	---	---	---		
49	Reid VP at 37.8 C (kPa)	458.1	479.1	2992		
50	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	9.615	-8.693e-036	0.0000		

STATUS

OK

NOTES

Description

Tank: # 104

CONNECTIONS

Inlet Stream

67	Stream Name	From Unit Operation
68	67	Valve: T104VA
69	Honeywell International Inc.	UniSim Design (R430 build 18059) Page 131 of 170

1	Honeywell Company Name Not Available Calgary, Alberta CANADA		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc																
2			Unit Set:	SI																
3			Date/Time:	Friday Sep 4 2015, 16:44:21																
4	Tank: # 104 (continued)																			
5	Outlet Stream																			
6	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Stream Name</th><th colspan="4">To Unit Operation</th></tr> </thead> <tbody> <tr> <td>57</td><td>Relief valve:</td><td colspan="3">RV104</td></tr> <tr> <td>56</td><td>Valve:</td><td colspan="3">FV105</td></tr> </tbody> </table>					Stream Name	To Unit Operation				57	Relief valve:	RV104			56	Valve:	FV105		
Stream Name	To Unit Operation																			
57	Relief valve:	RV104																		
56	Valve:	FV105																		
7	Energy Stream																			
8	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Stream Name</th><th colspan="4">From Unit Operation</th></tr> </thead> <tbody> <tr> <td></td><td></td><td></td><td></td><td></td></tr> </tbody> </table>					Stream Name	From Unit Operation													
Stream Name	From Unit Operation																			
9	PARAMETERS																			
10	<table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td>Vessel Volume:</td><td>1500 m3 *</td><td>Level SP:</td><td>6.40 % *</td><td>Liquid Volume:</td><td>95.93 m3</td></tr> <tr> <td>Vessel Pressure:</td><td>197.2 kPa</td><td>Pressure Drop:</td><td>0.0000 kPa *</td><td>Duty:</td><td>0.0000 kJ/h Heat Transfer Mode: Normal</td></tr> </tbody> </table>					Vessel Volume:	1500 m3 *	Level SP:	6.40 % *	Liquid Volume:	95.93 m3	Vessel Pressure:	197.2 kPa	Pressure Drop:	0.0000 kPa *	Duty:	0.0000 kJ/h Heat Transfer Mode: Normal			
Vessel Volume:	1500 m3 *	Level SP:	6.40 % *	Liquid Volume:	95.93 m3															
Vessel Pressure:	197.2 kPa	Pressure Drop:	0.0000 kPa *	Duty:	0.0000 kJ/h Heat Transfer Mode: Normal															
11	User Variables																			
12	CONDITIONS																			
13	Name	67	56	57																
14	Vapour	0.0000	0.0000	0.5100																
15	Temperature (C)	24.9258	24.9656	22.2056																
16	Pressure (kPa)	248.7310	204.6589	197.1984																
17	Molar Flow (kgmole/h)	75.5077	75.4237	0.0000																
18	Mass Flow (kg/h)	6021.2638	6004.5373	0.0000																
19	Std Ideal Liq Vol Flow (m3/h)	9.3216	9.3003	0.0000																
20	Molar Enthalpy (kJ/kgmole)	-1.886e+005	-1.883e+005	-1.678e+005																
21	Molar Entropy (kJ/kgmole-C)	75.03	75.11	109.4																
22	Heat Flow (kJ/h)	-1.4242e+07	-1.4205e+07	0.0000e-01																
23	PROPERTIES																			
24	Name	67	56	57																
25	Molecular Weight	79.74	79.61	75.15																
26	Molar Density (kgmole/m3)	8.028	8.036	0.1720																
27	Mass Density (kg/m3)	640.2	639.7	12.92																
28	Act. Volume Flow (m3/h)	9.406	9.386	0.0000																
29	Mass Enthalpy (kJ/kg)	-2365	-2366	-2233																
30	Mass Entropy (kJ/kg-C)	0.9409	0.9435	1.456																
31	Heat Capacity (kJ/kgmole-C)	175.6	175.4	146.7																
32	Mass Heat Capacity (kJ/kg-C)	2.202	2.203	1.952																
33	Lower Heating Value (kJ/kgmole)	---	---	---																
34	Mass Lower Heating Value (kJ/kg)	---	---	---																
35	Phase Fraction [Vol. Basis]	0.0000	0.0000	0.9895																
36	Phase Fraction [Mass Basis]	0.0000	0.0000	0.4809																
37	Partial Pressure of CO2 (kPa)	---	---	---																
38	Cost Based on Flow (Cost/s)	0.0000	0.0000	0.0000																
39	Act. Gas Flow (ACT_m3/h)	---	---	---																
40	Avg. Liq. Density (kgmole/m3)	8.100	8.110	8.443																
41	Specific Heat (kJ/kgmole-C)	175.6	175.4	146.7																
42	Std. Gas Flow (STD_m3/h)	1785	1783	0.0000																
43	Std. Ideal Liq. Mass Density (kg/m3)	645.9	645.6	634.5																
44	Act. Liq. Flow (m3/s)	2.613e-003	2.607e-003	0.0000																
45	Z Factor	0.0125	1.028e-002	---																
46	Watson K	12.92	12.92	13.00																
47	User Property	---	---	---																
48	Cp/(Cp - R)	1.050	1.050	1.060																
49	Cp/Cv	1.214	1.215	1.040																
50	Heat of Vap. (kJ/kgmole)	3.094e+004	3.143e+004	2.935e+004																
51	Kinematic Viscosity (cSt)	0.4128	0.4118	---																
52	Liq. Mass Density (Std. Cond) (kg/m3)	649.5	649.2	637.9																
53	Liq. Vol. Flow (Std. Cond) (m3/h)	9.270	9.248	0.0000																

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
4			

7 Tank: # 104 (continued)

10 PROPERTIES

11	Name	67	56	57		
12	Liquid Fraction	1.000	1.000	0.4900		
13	Molar Volume (m3/kgmole)	0.1246	0.1244	5.815		
14	Mass Heat of Vap. (kJ/kg)	388.0	394.8	390.5		
15	Phase Fraction [Molar Basis]	0.0000	0.0000	0.5100		
16	Surface Tension (dyne/cm)	16.09	16.06	16.06		
17	Thermal Conductivity (W/m-K)	0.1078	0.1077	---		
18	Viscosity (cP)	0.2642	0.2635	---		
19	Partial Pressure of H2S (kPa)	0.0000	0.0000	0.0000		
20	Cv (Semi-Ideal) (kJ/kgmole-C)	167.3	167.1	138.4		
21	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.098	2.099	1.841		
22	Cv (kJ/kgmole-C)	144.6	144.4	141.0		
23	Mass Cv (kJ/kg-C)	1.813	1.813	1.876		
24	Cv (Ent. Method) (kJ/kgmole-C)	---	---	---		
25	Mass Cv (Ent. Method) (kJ/kg-C)	---	---	---		
26	Cp/Cv (Ent. Method)	---	---	---		
27	Reid VP at 37.8 C (kPa)	98.37	99.84	128.9		
28	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	9.270	9.248	0.0000		

29 STATUS

30 OK

32 NOTES

35 Description

38 Digital Pt: DIG-100

41	Process Variable		Output
42	OBJECT	VARIABLE	OBJECT
43	Material Stream:	24	Pressure Valve: VLV-100
44			

45 Faceplate PV Configuration

47	Minimum :	---	Maximum:	---
48 Operational Parameters				
50	PV:	1468 kPa	Threshold:	1474 kPa * Deadband: 50.00 kPa *
51	OP is ON When:	PV <= Threshold	Digital Point Mode:	Auto

52 User Variables

54 OP Alarms

56	Current OP:	Off	Alarm Group:	AlarmGroup#1
57	Alarm Type:	None	Priority:	Low
58	OP Normal State:	On	Status:	Normal
59	Custom Text for OP OFF State:	OFF	Custom Text for OP ON State:	ON

60 STATUS

62 OK

64 NOTES

66 Description

1	Honeywell Company Name Not Available Calgary, Alberta CANADA			Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc							
2				Unit Set:	SI							
3				Date/Time:	Friday Sep 4 2015, 16:44:21							
4	Digital Pt: DIG-100-2											
5	Process Variable			Output								
6	OBJECT		VARIABLE	OBJECT								
7	Material Stream:	24-2	Pressure	Valve:	VLV-200							
8	Faceplate PV Configuration											
9	Minimum :	---	Maximum:	---								
10	Operational Parameters											
11	PV:	1200 kPa	Threshold:	1082 kPa *	Deadband:	50.00 kPa *						
12	OP is ON When:	PV <= Threshold		Digital Point Mode:								
13	User Variables											
14	OP Alarms											
15	Current OP:	Off	Alarm Group:	AlarmGroup#1								
16	Alarm Type:	None	Priority:	Low								
17	OP Normal State:	On	Status:	Normal								
18	Custom Text for OP OFF State:	OFF	Custom Text for OP ON State:	ON								
19	STATUS											
20	OK											
21	NOTES											
22												
23	Description											
24												
25	Selector Block: OS-2											
26												
27	CONNECTIONS											
28	Process Variable			Output								
29	INPUT	OBJECT	VARIABLE	OBJECT	VARIABLE							
30	PV 1	Material StreamC5+ To Storage	Comp Volume Frac (n-Butane)	PID Controller: DBA002	PV							
31	PV 2	Material StreamC5+ To Storage	Comp Volume Frac (i-Butane)									
32	PV 3	Material StreamC5+ To Storage	Comp Volume Frac (i-Butene)									
33	PARAMETERS											
34	Gain:	100.0000 *	Bias:	0.000000 *	Mode:	Sum						
35	MONITOR											
36	Input	Input Object	Input Value	Output Value								
37	PV 1	Material Stream: C5+ To Storage	0.0254		3.0220 vol %							
38	PV 2	Material Stream: C5+ To Storage	0.0030									
39	PV 3	Material Stream: C5+ To Storage	0.0018									
40	User Variables											
41												
42	STATUS											
43	OK											
44	NOTES											
45												
46												
47												
48	Description											
49												
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69	Honeywell International Inc.	UniSim Design (R430 build 18059)			Page 134 of 170							
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	Printed by: alu0100514599											
	* Specified by user.											

1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>			Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc			
2				Unit Set:	SI			
3				Date/Time:	Friday Sep 4 2015, 16:44:21			
4	Selector Block: OS-1							
5	CONNECTIONS							
6	Process Variable			Output				
7	INPUT	OBJECT	VARIABLE	OBJECT	VARIABLE			
8	PV 1	Material StreamC4s To Storage	Comp Volume Frac (i-Pentane)	PID Controller:	DBA001	PV		
9	PV 2	Material StreamC4s To Storage	Comp Volume Frac (n-Pentane)					
10	PARAMETERS							
11	Gain:	100.0000 *	Bias:	0.000000 *	Mode:	Sum		
12	MONITOR							
13	Input	Input Object		Input Value	Output Value			
14	PV 1	Material Stream:	C4s To Storage	0.0111	1.6952 vol %			
15	PV 2	Material Stream:	C4s To Storage	0.0059				
16	User Variables							
17	STATUS							
18	OK							
19	NOTES							
20								
21	Description							
22								
23								
24	Selector Block: OS-1-2							
25	CONNECTIONS							
26	Process Variable			Output				
27	INPUT	OBJECT	VARIABLE	OBJECT	VARIABLE			
28	PV 1	Material Stream:	54	Comp Volume Frac (i-Pentane)	PID Controller:	DBA010		
29	PV 2	Material Stream:	54	Comp Volume Frac (n-Pentane)				
30	PARAMETERS							
31	Gain:	100.0000 *	Bias:	0.000000 *	Mode:	Sum		
32	MONITOR							
33	Input	Input Object		Input Value	Output Value			
34	PV 1	Material Stream:	54	0.0090	1.3841 vol %			
35	PV 2	Material Stream:	54	0.0048				
36	User Variables							
37	STATUS							
38	OK							
39	NOTES							
40								
41	Description							
42								
43								
44								
45								
46								
47								
48								
49								
50	Input	Input Object		Input Value	Output Value			
51	PV 1	Material Stream:	54	0.0090	1.3841 vol %			
52	PV 2	Material Stream:	54	0.0048				
53	User Variables							
54	STATUS							
55	OK							
56	NOTES							
57								
58	Description							
59								
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69	Honeywell International Inc.	UniSim Design (R430 build 18059)				Page 135 of 170		
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1	Honeywell Company Name Not Available Calgary, Alberta CANADA		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc					
2			Unit Set:	SI					
3			Date/Time:	Friday Sep 4 2015, 16:44:21					
4	Heat Exchanger: E101 (continued)								
5	CONDITIONS								
6	Name	60	68	72	70				
7	Vapour	0.0000	0.0000	0.0000	0.0000				
8	Temperature (C)	33.9492	20.4498	20.0005	21.9399				
9	Pressure (kPa)	1737.2709	1714.8423	393.9112	201.0088				
10	Molar Flow (kgmole/h)	97.6858	97.0089	1225.7841	1226.3933				
11	Mass Flow (kg/h)	5595.6295	5556.8553	22082.6244	22093.5980				
12	Std Ideal Liq Vol Flow (m3/h)	9.7305	9.6631	22.1272	22.1382				
13	Molar Enthalpy (kJ/kgmole)	-1.236e+005	-1.254e+005	-2.866e+005	-2.865e+005				
14	Molar Entropy (kJ/kgmole-C)	91.73	85.55	52.39	52.90				
15	Heat Flow (kJ/h)	-1.2071e+07	-1.2168e+07	-3.5131e+08	-3.5131e+08				
16	PROPERTIES								
17	Name	60	68	72	70				
18	Molecular Weight	57.28	57.28	18.02	18.02				
19	Molar Density (kgmole/m3)	9.749	10.04	56.13	56.05				
20	Mass Density (kg/m3)	558.4	574.9	1011	1010				
21	Act. Volume Flow (m3/h)	10.02	9.666	21.84	21.88				
22	Mass Enthalpy (kJ/kg)	-2157	-2190	-1.591e+004	-1.590e+004				
23	Mass Entropy (kJ/kg-C)	1.601	1.493	2.908	2.936				
24	Heat Capacity (kJ/kgmole-C)	141.1	135.0	77.72	77.71				
25	Mass Heat Capacity (kJ/kg-C)	2.463	2.357	4.314	4.314				
26	Lower Heating Value (kJ/kgmole)	---	---	0.0000	7.730e-314				
27	Mass Lower Heating Value (kJ/kg)	---	---	0.0000	4.291e-315				
28	Phase Fraction [Vol. Basis]	0.0000	7.510e-322	0.0000	7.905e-323				
29	Phase Fraction [Mass Basis]	0.0000	7.510e-322	0.0000	7.905e-323				
30	Partial Pressure of CO2 (kPa)	---	---	---	---				
31	Cost Based on Flow (Cost/s)	0.0000	0.0000	0.0000	0.0000				
32	Act. Gas Flow (ACT_m3/h)	---	---	---	---				
33	Avg. Liq. Density (kgmole/m3)	10.04	10.04	55.40	55.40				
34	Specific Heat (kJ/kgmole-C)	141.1	135.0	77.72	77.71				
35	Std. Gas Flow (STD_m3/h)	2310	2294	2.898e+004	2.900e+004				
36	Std. Ideal Liq. Mass Density (kg/m3)	575.1	575.1	998.0	998.0				
37	Act. Liq. Flow (m3/s)	2.783e-003	2.685e-003	6.066e-003	6.078e-003				
38	Z Factor	6.979e-002	0.0700	2.879e-003	1.462e-003				
39	Watson K	13.57	13.57	---	12.80				
40	User Property	---	---	---	---				
41	Cp/(Cp - R)	1.063	1.066	1.120	1.120				
42	Cp/Cv	1.289	1.287	1.144	1.145				
43	Heat of Vap. (kJ/kgmole)	1.412e+004	1.421e+004	3.885e+004	4.002e+004				
44	Kinematic Viscosity (cSt)	0.2631	0.2897	0.9907	0.9470				
45	Liq. Mass Density (Std. Cond) (kg/m3)	577.9	577.9	1015	1015				
46	Liq. Vol. Flow (Std. Cond) (m3/h)	9.682	9.615	21.76	21.77				
47	Liquid Fraction	1.000	1.000	1.000	1.000				
48	Molar Volume (m3/kgmole)	0.1026	9.964e-002	1.782e-002	1.784e-002				
49	Mass Heat of Vap. (kJ/kg)	246.4	248.0	2157	2222				
50	Phase Fraction [Molar Basis]	0.0000	0.0000	0.0000	0.0000				
51	Surface Tension (dyne/cm)	9.960	11.49	72.96	72.63				
52	Thermal Conductivity (W/m-K)	8.722e-002	9.196e-002	0.6034	0.6064				
53	Viscosity (cP)	0.1469	0.1665	1.002	0.9561				
54	Partial Pressure of H2S (kPa)	0.0000	0.0000	0.0000	0.0000				
55	Cv (Semi-Ideal) (kJ/kgmole-C)	132.8	126.7	69.40	69.40				
56	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.318	2.212	3.852	3.852				
57	Cv (kJ/kgmole-C)	109.5	104.9	67.95	67.87				
58	Mass Cv (kJ/kg-C)	1.911	1.831	3.772	3.767				
59	Cv (Ent. Method) (kJ/kgmole-C)	---	---	---	---				
60	Mass Cv (Ent. Method) (kJ/kg-C)	---	---	---	---				
61	Cp/Cv (Ent. Method)	---	---	---	---				
62	Reid VP at 37.8 C (kPa)	458.1	458.1	---	---				

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21

Heat Exchanger: E102 (continued)

PROPERTIES

11	Name	C5+ To Storage	76	77	78	
12	Molecular Weight	79.74	79.74	18.02	18.02	
13	Molar Density (kgmole/m3)	0.4427	8.028	56.13	55.27	
14	Mass Density (kg/m3)	35.31	640.1	1011	995.7	
15	Act. Volume Flow (m3/h)	170.8	9.406	21.92	22.27	
16	Mass Enthalpy (kJ/kg)	-2044	-2365	-1.591e+004	-1.582e+004	
17	Mass Entropy (kJ/kg-C)	1.851	0.9411	2.908	3.197	
18	Heat Capacity (kJ/kgmole-C)	198.5	175.6	77.72	77.75	
19	Mass Heat Capacity (kJ/kg-C)	2.490	2.202	4.314	4.316	
20	Lower Heating Value (kJ/kgmole)	---	---	0.0000	2.167e-315	
21	Mass Lower Heating Value (kJ/kg)	---	---	0.0000	1.203e-316	
22	Phase Fraction [Vol. Basis]	0.9616	1.210e-321	0.0000	7.905e-323	
23	Phase Fraction [Mass Basis]	0.3913	1.210e-321	0.0000	7.905e-323	
24	Partial Pressure of CO2 (kPa)	---	---	---	---	
25	Cost Based on Flow (Cost/s)	0.0000	0.0000	0.0000	0.0000	
26	Act. Gas Flow (ACT_m3/h)	---	---	---	---	
27	Avg. Liq. Density (kgmole/m3)	8.100	8.100	55.40	55.40	
28	Specific Heat (kJ/kgmole-C)	198.5	175.6	77.72	77.75	
29	Std. Gas Flow (STD_m3/h)	1788	1785	2.910e+004	2.910e+004	
30	Std. Ideal Liq. Mass Density (kg/m3)	645.9	645.9	998.0	998.0	
31	Act. Liq. Flow (m3/s)	1.823e-003	2.613e-003	6.090e-003	6.186e-003	
32	Z Factor	---	0.0125	2.891e-003	1.396e-003	
33	Watson K	12.92	12.92	---	12.72	
34	User Property	---	---	---	---	
35	Cp/(Cp - R)	1.044	1.050	1.120	1.120	
36	Cp/Cv	1.031	1.214	1.144	1.156	
37	Heat of Vap. (kJ/kgmole)	2.844e+004	3.094e+004	3.885e+004	4.002e+004	
38	Kinematic Viscosity (cSt)	---	0.4127	0.9907	0.6502	
39	Liq. Mass Density (Std. Cond) (kg/m3)	649.5	649.5	1015	1015	
40	Liq. Vol. Flow (Std. Cond) (m3/h)	9.285	9.270	21.85	21.85	
41	Liquid Fraction	0.5817	1.000	1.000	1.000	
42	Molar Volume (m3/kgmole)	2.259	0.1246	1.782e-002	1.809e-002	
43	Mass Heat of Vap. (kJ/kg)	356.7	388.0	2156	2222	
44	Phase Fraction [Molar Basis]	0.4183	0.0000	0.0000	0.0000	
45	Surface Tension (dyne/cm)	8.381	16.09	72.96	69.44	
46	Thermal Conductivity (W/m-K)	---	0.1078	0.6034	0.6319	
47	Viscosity (cP)	---	0.2642	1.002	0.6475	
48	Partial Pressure of H2S (kPa)	0.0000	0.0000	0.0000	0.0000	
49	Cv (Semi-Ideal) (kJ/kgmole-C)	190.2	167.3	69.40	69.43	
50	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.385	2.098	3.852	3.854	
51	Cv (kJ/kgmole-C)	192.6	144.6	67.95	67.27	
52	Mass Cv (kJ/kg-C)	2.415	1.813	3.772	3.734	
53	Cv (Ent. Method) (kJ/kgmole-C)	---	---	---	---	
54	Mass Cv (Ent. Method) (kJ/kg-C)	---	---	---	---	
55	Cp/Cv (Ent. Method)	---	---	---	---	
56	Reid VP at 37.8 C (kPa)	98.37	98.37	---	---	
57	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	9.288	9.270	21.85	21.85	

STATUS

OK

NOTES

Description

1	Honeywell Company Name Not Available Calgary, Alberta CANADA			Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc			
2				Unit Set:	SI			
3				Date/Time:	Friday Sep 4 2015, 16:44:21			
4	Reboiler: Reboiler @ De-C14							
5	CONNECTIONS							
6	Inlet		Outlet		Energy			
7	Name	From Oper	Name	To Oper	Name	To Oper		
8	1	Valve: P20AVB	Boilup @ De-C14	Tray Section: TS @ De-C14	Reboiler Duty @ De-C14	Reboiler: Reboiler @ De-C14		
9			C5+ @ De-C14	Material Stream: C5+				
10	PARAMETERS							
11	Vessel Volume:	19.63 m3	Pressure Drop:	0.0000 kPa *	Duty:	9.7106e+06 kJ/h *		
12	Level SP:	99.90 % *	Liquid Volume:			19.62 m3		
13	PROPERTIES							
14	1							
15			Overall	Vapour Phase	Liquid Phase	Liquid Phase		
16	Vapour/Phase Fraction		0.0000	0.0000	1.0000	0.0000		
17	Temperature (C)		147.4	147.4	147.4	147.4		
18	Pressure (kPa)		1297	1297	1297	1297		
19	Molar Flow (kgmole/h)		1.109e+004	0.0000	1.109e+004	0.0000		
20	Mass Flow (kg/h)		8.815e+005	0.0000	8.815e+005	0.0000		
21	Std Ideal Liq Vol Flow (m3/h)		1366	0.0000	1366	0.0000		
22	Molar Enthalpy (kJ/kgmole)		-1.627e+005	-1.627e+005	-1.627e+005	-1.627e+005		
23	Mass Enthalpy (kJ/kg)		-2047	-2047	-2047	-2047		
24	Molar Entropy (kJ/kgmole-C)		145.3	145.3	145.3	145.3		
25	Mass Entropy (kJ/kg-C)		1.828	1.828	1.828	1.828		
26	Heat Flow (kJ/h)		-1.804e+009	0.0000	-1.804e+009	0.0000		
27	Molar Density (kgmole/m3)		6.204	0.4952	6.204	6.204		
28	Mass Density (kg/m3)		493.2	39.37	493.2	493.2		
29	Std Ideal Liq Mass Density (kg/m3)		645.4	645.4	645.4	645.4		
30	Liq Mass Density @ Std Cond (kg/m3)		648.9	648.9	648.9	648.9		
31	Molar Heat Capacity (kJ/kgmole-C)		252.0	252.0	252.0	252.0		
32	Mass Heat Capacity (kJ/kg-C)		3.170	3.170	3.170	3.170		
33	Thermal Conductivity (W/m-K)		0.0638	2.641e-002	0.0638	0.0638		
34	Viscosity (cP)		0.0947	1.016e-002	0.0947	0.0947		
35	Surface Tension (dyne/cm)		4.339	---	4.339	4.339		
36	Molecular Weight		79.50	79.50	79.50	79.50		
37	Z Factor		5.977e-002	0.7488	5.977e-002	5.977e-002		
38	Boilup @ De-C14							
39			Overall	Vapour Phase	Liquid Phase	Liquid Phase		
40	Vapour/Phase Fraction		0.0445	0.0445	0.9555	0.0000		
41	Temperature (C)		147.9	147.9	147.9	147.9		
42	Pressure (kPa)		1285	1285	1285	1285		
43	Molar Flow (kgmole/h)		1.101e+004	490.0	1.052e+004	0.0000		
44	Mass Flow (kg/h)		8.755e+005	3.634e+004	8.392e+005	0.0000		
45	Std Ideal Liq Vol Flow (m3/h)		1357	57.49	1299	0.0000		
46	Molar Enthalpy (kJ/kgmole)		-1.618e+005	-1.371e+005	-1.630e+005	-1.629e+005		
47	Mass Enthalpy (kJ/kg)		-2036	-1848	-2044	-2044		
48	Molar Entropy (kJ/kgmole-C)		147.4	179.9	145.9	146.0		
49	Mass Entropy (kJ/kg-C)		1.855	2.426	1.830	1.831		
50	Heat Flow (kJ/h)		-1.782e+009	-6.716e+007	-1.715e+009	0.0000		
51	Molar Density (kgmole/m3)		4.073	0.4882	6.189	6.188		
52	Mass Density (kg/m3)		323.8	36.21	493.5	493.4		
53	Std Ideal Liq Mass Density (kg/m3)		645.4	632.1	645.9	645.9		
54	Liq Mass Density @ Std Cond (kg/m3)		648.9	635.1	649.5	649.5		
55	Molar Heat Capacity (kJ/kgmole-C)		249.6	181.7	252.7	252.6		
56	Mass Heat Capacity (kJ/kg-C)		3.139	2.450	3.169	3.168		
57	Thermal Conductivity (W/m-K)		---	0.0272	6.384e-002	6.382e-002		
58	Honeywell International Inc.							
59	UniSim Design (R430 build 18059)							
60	Page 140 of 170							

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
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Reboiler: Reboiler @ De-C14 (continued)

Boilup @ De-C14

11	Viscosity (cP)	Overall	Vapour Phase	Liquid Phase	Liquid Phase	Solid Phase
12	Surface Tension (dyne/cm)	---	1.038e-002	9.487e-002	9.484e-002	0.2668
13	Molecular Weight	4.348	---	4.348	4.347	---
14	Z Factor	79.50	74.17	79.74	79.73	79.73
15		---	0.7516	0.0593	0.0593	1.257e-002

C5+ @ De-C14

18		Overall	Vapour Phase	Liquid Phase	Liquid Phase	Solid Phase
19	Vapour/Phase Fraction	0.0000	0.0000	1.0000	0.0000	0.0000
20	Temperature (C)	147.9	147.9	147.9	147.9	147.9
21	Pressure (kPa)	1297	1297	1297	1297	1297
22	Molar Flow (kgmole/h)	75.63	0.0000	75.63	0.0000	0.0000
23	Mass Flow (kg/h)	6031	0.0000	6031	0.0000	0.0000
24	Std Ideal Liq Vol Flow (m3/h)	9.337	0.0000	9.337	0.0000	0.0000
25	Molar Enthalpy (kJ/kgmole)	-1.630e+005	-1.371e+005	-1.630e+005	-1.629e+005	-1.629e+005
26	Mass Enthalpy (kJ/kg)	-2044	-1848	-2044	-2044	-2044
27	Molar Entropy (kJ/kgmole-C)	145.9	179.9	145.9	146.0	146.0
28	Mass Entropy (kJ/kg-C)	1.830	2.426	1.830	1.831	1.831
29	Heat Flow (kJ/h)	-1.233e+007	0.0000	-1.233e+007	0.0000	0.0000
30	Molar Density (kgmole/m3)	6.189	0.4882	6.189	6.188	29.19
31	Mass Density (kg/m3)	493.5	36.21	493.5	493.4	2327
32	Std Ideal Liq Mass Density (kg/m3)	645.9	632.1	645.9	645.9	645.9
33	Liq Mass Density @ Std Cond (kg/m3)	649.5	635.1	649.5	649.5	649.5
34	Molar Heat Capacity (kJ/kgmole-C)	252.7	181.7	252.7	252.6	252.6
35	Mass Heat Capacity (kJ/kg-C)	3.169	2.450	3.169	3.168	3.168
36	Thermal Conductivity (W/m-K)	6.384e-002	0.0272	6.384e-002	6.382e-002	6.382e-002
37	Viscosity (cP)	9.487e-002	1.038e-002	9.487e-002	9.484e-002	0.2667
38	Surface Tension (dyne/cm)	4.348	---	4.348	4.347	---
39	Molecular Weight	79.74	74.17	79.74	79.73	79.73
40	Z Factor	5.985e-002	0.7587	5.985e-002	5.986e-002	1.269e-002

Inlet Stream Properties

43		1				
44	Vapour Fraction	0.0000				
45	Temperature (C)	147.4				
46	Pressure (kPa)	1297				
47	Molar Flow (kgmole/h)	1.109e+004				
48	MassFlow (kg/h)	8.815e+005				
49	Std Ideal Liq Vol Flow (m3/h)	1366				
50	HeatFlow (kJ/h)	-1.804e+009				

Outlet Stream Properties

53		Boilup	C5+			
54	Vapour Fraction	0.0445	0.0000			
55	Temperature (C)	147.9	147.9			
56	Pressure (kPa)	1285	1297			
57	Molar Flow (kgmole/h)	1.101e+004	75.63			
58	MassFlow (kg/h)	8.755e+005	6031			
59	Std Ideal Liq Vol Flow (m3/h)	1357	9.337			
60	HeatFlow (kJ/h)	-1.782e+009	-1.233e+007			

STATUS

OK

NOTES

Description

1	Honeywell Company Name Not Available Calgary, Alberta CANADA			Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc						
2				Unit Set:	SI						
3				Date/Time:	Friday Sep 4 2015, 16:44:21						
4	Reboiler: Reboiler @De-C14 (continued)										
5	NOTES										
6											
7	PID Controller: DBLC101 @De-C14										
8											
9	Process Variable				Output						
10	OBJECT		VARIABLE	OBJECT							
11	Tray Section: Main TS @De-C14		Total Liquid Volume Percent (16__Main TS)	Valve:	DBLV101						
12	Configuration										
13											
14	Minimum:	0.00 % *	Maximum:	100.00 % *	Control Action:	Direct					
15	Operational Parameters										
16	SP:	50.00 % *	PV:	50.00 %	OP:	7.20					
17	Controller Mode:		Auto	Execution:	Internal						
18	Tuning										
19	Kp:	3.000 *	Ti:	5.000 minutes *	Td:	---					
20	Surge Control Parameters										
21	Parameter A:	---	Parameter B:	---	Parameter C:	---					
22	Control Line:	---	Backup Line:	---	Quick Opening:	---					
23	Alarms										
24	Signal Type:	PV Signal	Value:	50.00 % *	Alarm Group:	AlarmGroup#1					
25	Level Alarms										
26	Limit		Priority								
27	Low Low		---	High							
28	Low		---	Low							
29	High		---	Low							
30	High High		---	High							
31	Dead Band:	---	Status:	Normal							
32	Deviation Alarms										
33	Limit		Priority								
34	Deviation Low		---	Low							
35	Deviation High		---	Low							
36	Deviation Min:	---	Deviation Max:	---	Dead Band:	---					
37	Status:		Normal								
38	Rate Alarms										
39	Limit		Priority								
40	Rate Low		---	Low							
41	Rate High		---	Low							
42	Rate Min:	---	Rate Max:	---	Dead Band:	---					
43	Status:		Normal								
44	PV Conditioning										
45	Sample PV Every: ---										
46	Calculate Raw PV for Flow										
47	Calculate Raw PV	No	Type	Direct	Scaling Factor	1.000 *					
48	Bias (%)	0.00 *	Square Root	Yes	MW or Density	MW					
49	Apply Compensation			Reference	PV						
50	No	Molecular Weight		18.00 *	---						
51	No	Mass Density		997.1 kg/m3 *	---						
52	No	Pressure		101.3 kPa *	---						
53	No	Temperature		25.00 C *	---						
54	SP Ramping										
55	Target SP:	50.00 % *	Ramp Duration:	5.000 minutes *							
56	User Variables										
57											
58											
59											
60											
61											
62											
63											
64											
65											
66											
67											
68											
69	Honeywell International Inc.	UniSim Design (R430 build 18059)			Page 142 of 170						

1	Honeywell Company Name Not Available Calgary, Alberta CANADA			Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc			
2				Unit Set:	SI			
3				Date/Time:	Friday Sep 4 2015, 16:44:21			
4	PID Controller: DBLC101 @De-C14 (continued)							
5								
6	STATUS							
7	OK							
8								
9	NOTES							
10								
11								
12								
13								
14								
15	Description							
16								
17								
18	PID Controller: DBLC100 @De-C14							
19								
20								
21	Process Variable				Output			
22	OBJECT			VARIABLE		OBJECT		
23	Separator:		V-100 @De-C14	Liquid Percent Level	Valve:	DBLV100 @De-C14		
24	Configuration							
25								
26								
27	Minimum:	0.00 % *	Maximum:	100.00 % *	Control Action:	Direct		
28	Operational Parameters							
29								
30	SP:	44.33 % *	PV:	44.33 %	OP:	5.05		
31	Controller Mode: Auto Execution: Internal							
32	Tuning							
33	Kp:	3.000 *	Ti:	5.000 minutes *	Td:	---		
34	Surge Control Parameters							
35								
36	Parameter A:	---	Parameter B:	---	Parameter C:	---		
37	Control Line:	---	Backup Line:	---	Quick Opening:	---		
38	Alarms							
39								
40	Signal Type:	PV Signal	Value:	44.33 % *	Alarm Group:	AlarmGroup#1		
41	Level Alarms							
42				Limit	Priority			
43	Low Low			---	High			
44	Low			---	Low			
45	High			---	Low			
46	High High			---	High			
47	Dead Band:	0.20 % *	Status:	Normal				
48	Deviation Alarms							
49				Limit	Priority			
50	Deviation Low			---	Low			
51	Deviation High			---	Low			
52	Deviation Min:	---	Deviation Max:	---	Dead Band:	---		
53	Rate Alarms							
54				Limit	Priority			
55	Rate Low			---	Low			
56	Rate High			---	Low			
57	Rate Min:	---	Rate Max:	---	Dead Band:	---		
58	PV Conditioning							
59								
60	Sample PV Every: ---							
61	Calculate Raw PV for Flow							
62	Calculate Raw PV	No	Type	Direct	Scaling Factor	1.000 *		
63	Bias (%)	0.00 *	Square Root	Yes	MW or Density	MW		
64	Apply Compensation			Reference	PV			
65	No	Molecular Weight		18.00 *	---			
66	No	Mass Density		997.1 kg/m3 *	---			
67	No	Pressure		101.3 kPa *	---			
68	No	Temperature		25.00 C *	---			
69	Honeywell International Inc.	UniSim Design (R430 build 18059)				Page 143 of 170		

1	Honeywell Company Name Not Available Calgary, Alberta CANADA			Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc				
2				Unit Set:	SI				
3				Date/Time:	Friday Sep 4 2015, 16:44:21				
4	PID Controller: DBLC100 @De-C14 (continued)								
5									
6	SP Ramping								
7	Target SP:	44.33 % *	Ramp Duration:	5.000 minutes *					
8									
9	User Variables								
10									
11	STATUS								
12	OK								
13									
14	NOTES								
15									
16									
17	Description								
18									
19									
20									
21	PID Controller: DBPC100 @De-C14								
22									
23									
24									
25									
26	Process Variable				Output				
27	OBJECT			VARIABLE	OBJECT				
28	Material Stream:	6 @De-C14		Pressure	Valve:	DBPV100 @De-C14			
29	Configuration								
30	Minimum:	101.3 kPa *	Maximum:	1600 kPa *	Control Action:	Direct			
31									
32	Operational Parameters								
33	SP:	1278 kPa *	PV:	1278 kPa	OP:	5.23			
34	Controller Mode:	Auto	Execution:	Internal					
35	Tuning								
36	Kp:	3.000 *	Ti:	3.000 minutes *	Td:	---			
37									
38	Surge Control Parameters								
39	Parameter A:	---	Parameter B:	---	Parameter C:	---			
40	Control Line:	---	Backup Line:	---	Quick Opening:	---			
41	Alarms								
42	Signal Type:	PV Signal	Value:	1278 kPa *	Alarm Group:	AlarmGroup#1			
43	Level Alarms								
44	Limit			Priority					
45	Low Low	---		---	High				
46	Low	---		---	Low				
47	High	---		---	Low				
48	High High	---		---	High				
49	Dead Band:	0.80 % *	Status:	Normal					
50	Deviation Alarms								
51	Limit			Priority					
52	Deviation Low	---		---	Low				
53	Deviation High	---		---	Low				
54	Deviation Min:	---	Deviation Max:	---	Dead Band:	---			
55	Status:			Normal					
56	Rate Alarms								
57	Limit			Priority					
58	Rate Low	---		---	Low				
59	Rate High	---		---	Low				
60	Rate Min:	---	Rate Max:	---	Dead Band:	---			
61	Status:			Normal					
62	PV Conditioning								
63	Sample PV Every: ---								
64	Calculate Raw PV for Flow								
65	Calculate Raw PV	No	Type	Direct	Scaling Factor	1.000 *			
66	Bias (%)	0.00 *	Square Root	Yes	MW or Density	MW			
67	Honeywell International Inc.	UniSim Design (R430 build 18059)			Page 144 of 170				
68	Licensed to: Company Name Not Available	Printed by: alu0100514599			* Specified by user.				

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
4			

PID Controller: DBPC100 @De-C14 (continued)

9	Apply Compensation		Reference	PV
10	No	Molecular Weight	18.00 *	57.28
11	No	Mass Density	997.1 kg/m3 *	32.42 kg/m3
12	No	Pressure	101.3 kPa *	1278 kPa
13	No	Temperature	25.00 C *	83.34 C

SP Ramping

16	Target SP:	1278 kPa *	Ramp Duration:	5.000 minutes *
----	------------	------------	----------------	-----------------

User Variables

STATUS

OK

NOTES

Description

PID Controller: DBPC101 @De-C14

31	Process Variable		Output	
32	OBJECT	VARIABLE	OBJECT	
33	Material Stream:	9 @De-C14	Pressure	Valve: DBPV101 @De-C14

Configuration

37	Minimum:	101.3 kPa *	Maximum:	1600 kPa *	Control Action:	Reverse
----	----------	-------------	----------	------------	-----------------	---------

Operational Parameters

40	SP:	1180 kPa *	PV:	1180 kPa	OP:	7.96	Controller Mode:	Auto	Execution:	Internal
----	-----	------------	-----	----------	-----	------	------------------	------	------------	----------

Tuning

43	Kp:	2.000 *	Ti:	3.000 minutes *	Td:	---
----	-----	---------	-----	-----------------	-----	-----

Surge Control Parameters

46	Parameter A:	---	Parameter B:	---	Parameter C:	---	Parameter D:	---
47	Control Line:	---	Backup Line:	---	Quick Opening:	---		---

Alarms

50	Signal Type:	PV Signal	Value:	1180 kPa *	Alarm Group:	AlarmGroup#1
----	--------------	-----------	--------	------------	--------------	--------------

Level Alarms

52		Limit	Priority
53	Low Low	---	High
54	Low	---	Low
55	High	---	Low
56	High High	---	High

57	Dead Band:	0.80 % *	Status:	Normal
----	------------	----------	---------	--------

Deviation Alarms

59		Limit	Priority
60	Deviation Low	---	Low
61	Deviation High	---	Low

62	Deviation Min:	---	Deviation Max:	---	Dead Band:	---	Status:	Normal
----	----------------	-----	----------------	-----	------------	-----	---------	--------

Rate Alarms

64		Limit	Priority
65	Rate Low	---	Low
66	Rate High	---	Low

67	Rate Min:	---	Rate Max:	---	Dead Band:	---	Status:	Normal
----	-----------	-----	-----------	-----	------------	-----	---------	--------

PV Conditioning

69	Honeywell International Inc.	UniSim Design (R430 build 18059)	Page 145 of 170
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1	Honeywell Company Name Not Available Calgary, Alberta CANADA			Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc							
2				Unit Set:	SI							
3				Date/Time:	Friday Sep 4 2015, 16:44:21							
4	PID Controller: DBPC101 @De-C14 (continued)											
5												
6	PV Conditioning											
7												
8	Sample PV Every: ---											
9												
10	Calculate Raw PV for Flow											
11												
12	Calculate Raw PV	No	Type	Direct	Scaling Factor	1.000 *						
13	Bias (%)	0.00 *	Square Root	Yes	MW or Density	MW						
14	Apply Compensation			Reference		PV						
15		No	Molecular Weight		18.00 *	57.28						
16		No	Mass Density		997.1 kg/m3 *	29.35 kg/m3						
17		No	Pressure		101.3 kPa *	1180 kPa						
18		No	Temperature		25.00 C *	81.69 C						
19	SP Ramping											
20												
21	Target SP:	1180 kPa *	Ramp Duration:	5.000 minutes *								
22	User Variables											
23												
24	STATUS											
25												
26	OK											
27	NOTES											
28												
29												
30	Description											
31												
32												
33	PID Controller: DBFC103 @De-C14											
34												
35												
36	Process Variable				Output							
37												
38	OBJECT		VARIABLE		OBJECT							
39	Material Stream:	89	Std Liq Vol Flow Spec		Valve:	DBFV103 @De-C14						
40	Configuration											
41												
42	Minimum:	0.0000 m3/h *	Maximum:	60.00 m3/h *	Control Action:	Reverse						
43	Operational Parameters											
44												
45	SP:	27.00 m3/h *	PV:	27.00 m3/h	OP:	9.91	Controller Mode: Auto Execution: Internal					
46	Tuning											
47												
48	Kp:	0.1000 *	Ti:	1.667e-002 minutes *	Td:	0.0000 minutes *						
49	Surge Control Parameters											
50												
51	Parameter A:	---	Parameter B:	---	Parameter C:	---	Parameter D: ---					
52	Control Line:	---	Backup Line:	---	Quick Opening:	---						
53	Alarms											
54												
55	Signal Type:	PV Signal	Value:	27.00 m3/h *	Alarm Group:	AlarmGroup#1						
56	Level Alarms											
57				Limit								
58	Low Low			---								
59	Low			---								
60	High			---								
61	High High			---								
62	Dead Band:	---	Status:									
63	Deviation Alarms											
64				Limit								
65	Deviation Low			---								
66	Deviation High			---								
67	Deviation Min:	---	Deviation Max:	---	Dead Band:	---	Status: Normal					
68	Rate Alarms											
69	Honeywell International Inc. UniSim Design (R430 build 18059) Page 146 of 170											

1	Honeywell Company Name Not Available Calgary, Alberta CANADA		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc								
2			Unit Set:	SI								
3			Date/Time:	Friday Sep 4 2015, 16:44:21								
4	PID Controller: DBTC100 @ De-C14 (continued)											
5			Limit	Priority								
6	Deviation Low		---	Low								
7	Deviation High		---	Low								
8	Deviation Min: ---		Deviation Max: ---	Dead Band: ---	Status: ---	Normal						
9	Rate Alarms											
10			Limit	Priority								
11	Rate Low		---	Low								
12	Rate High		---	Low								
13	Rate Min: ---		Rate Max: ---	Dead Band: ---	Status: ---	Normal						
14	PV Conditioning											
15	Sample PV Every: ---											
16	Calculate Raw PV for Flow											
17	Calculate Raw PV	No	Type	Direct	Scaling Factor	1.000 *						
18	Bias (%)	0.00 *	Square Root	Yes	MW or Density	MW						
19	Apply Compensation			Reference	PV							
20	No	Molecular Weight		18.00 *	---							
21	No	Mass Density		997.1 kg/m3 *	---							
22	No	Pressure		101.3 kPa *	---							
23	No	Temperature		25.00 C *	---							
24	SP Ramping											
25	Target SP:	137.0 C *	Ramp Duration:		5.000 minutes *							
26	User Variables											
27	STATUS											
28	OK											
29	NOTES											
30												
31	Description											
32												
33	Valve: DBFV103 @ De-C14											
34	CONNECTIONS											
35	Inlet Stream											
36	STREAM NAME		FROM UNIT OPERATION									
37	17	Valve	FV103A									
38	Outlet Stream											
39	STREAM NAME		TO UNIT OPERATION									
40	16	Valve	FV103B									
41	PARAMETERS											
42	Physical Properties											
43	Pressure Drop:	412.9 kPa										
44	User Variables											
45	CONDITIONS											
46	Name	17	16									
47	Vapour	0.0000	0.0000									
48	Temperature (C)	33.9492	34.0036									
49	Pressure (kPa)	1736.8350	1323.8926									
50	Honeywell International Inc.	UniSim Design (R430 build 18059)			Page 148 of 170							
51	Licensed to: Company Name Not Available			Printed by: alu0100514599								
52												
53	* Specified by user.											

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
4			

Valve: DBFV103 @De-C14 (continued)

CONDITIONS

11	Molar Flow (kgmole/h)	272.3873	272.3873		
12	Mass Flow (kg/h)	15602.8661	15602.8661		
13	Std Ideal Liq Vol Flow (m3/h)	27.1326	27.1326		
14	Molar Enthalpy (kJ/kgmole)	-1.236e+005	-1.236e+005		
15	Molar Entropy (kJ/kgmole-C)	91.73	91.87		
16	Heat Flow (kJ/h)	-3.3659e+07	-3.3659e+07		

PROPERTIES

19	Name	17	16		
20	Molecular Weight	57.28	57.28		
21	Molar Density (kgmole/m3)	9.748	9.727		
22	Mass Density (kg/m3)	558.4	557.2		
23	Act. Volume Flow (m3/h)	27.94	28.00		
24	Mass Enthalpy (kJ/kg)	-2157	-2157		
25	Mass Entropy (kJ/kg-C)	1.601	1.604		
26	Heat Capacity (kJ/kgmole-C)	141.1	141.5		
27	Mass Heat Capacity (kJ/kg-C)	2.463	2.471		
28	Lower Heating Value (kJ/kgmole)	---	---		
29	Mass Lower Heating Value (kJ/kg)	---	---		
30	Phase Fraction [Vol. Basis]	0.0000	0.0000		
31	Phase Fraction [Mass Basis]	0.0000	0.0000		
32	Partial Pressure of CO2 (kPa)	---	---		
33	Cost Based on Flow (Cost/s)	0.0000	0.0000		
34	Act. Gas Flow (ACT_m3/h)	---	---		
35	Avg. Liq. Density (kgmole/m3)	10.04	10.04		
36	Specific Heat (kJ/kgmole-C)	141.1	141.5		
37	Std. Gas Flow (STD_m3/h)	6440	6440		
38	Std. Ideal Liq. Mass Density (kg/m3)	575.1	575.1		
39	Act. Liq. Flow (m3/s)	7.762e-003	7.779e-003		
40	Z Factor	6.978e-002	0.0533		
41	Watson K	13.57	13.57		
42	User Property	---	---		
43	Cp/(Cp - R)	1.063	1.062		
44	Cp/Cv	1.289	1.292		
45	Heat of Vap. (kJ/kgmole)	1.412e+004	1.576e+004		
46	Kinematic Viscosity (cSt)	0.2631	0.2631		
47	Liq. Mass Density (Std. Cond) (kg/m3)	577.9	577.9		
48	Liq. Vol. Flow (Std. Cond) (m3/h)	27.00	27.00		
49	Liquid Fraction	1.000	1.000		
50	Molar Volume (m3/kgmole)	0.1026	0.1028		
51	Mass Heat of Vap. (kJ/kg)	246.5	275.1		
52	Phase Fraction [Molar Basis]	0.0000	0.0000		
53	Surface Tension (dyne/cm)	9.960	9.954		
54	Thermal Conductivity (W/m-K)	8.722e-002	0.0872		
55	Viscosity (cP)	0.1469	0.1466		
56	Partial Pressure of H2S (kPa)	0.0000	0.0000		
57	Cv (Semi-Ideal) (kJ/kgmole-C)	132.8	133.2		
58	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.318	2.326		
59	Cv (kJ/kgmole-C)	109.5	109.5		
60	Mass Cv (kJ/kg-C)	1.911	1.912		
61	Cv (Ent. Method) (kJ/kgmole-C)	---	---		
62	Mass Cv (Ent. Method) (kJ/kg-C)	---	---		
63	Cp/Cv (Ent. Method)	---	---		
64	Reid VP at 37.8 C (kPa)	458.1	458.1		
65	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	27.00	27.00		

STATUS

OK

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1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc		
2			Unit Set:	SI		
3			Date/Time:	Friday Sep 4 2015, 16:44:21		
4	Valve: DBFV103 @De-C14 (continued)					
5	NOTES					
6	Description					
7	Valve: DBPV101 @De-C14					
8	CONNECTIONS					
9	Inlet Stream					
10	STREAM NAME	FROM UNIT OPERATION				
11	7 @ De-C14	Tee	TEE-100			
12	Outlet Stream					
13	STREAM NAME	TO UNIT OPERATION				
14	9 @ De-C14	Separator	V-100			
15	PARAMETERS					
16	Physical Properties					
17	Pressure Drop:	100.7 kPa				
18	User Variables					
19	CONDITIONS					
20	Name	7 @ De-C14	9 @ De-C14			
21	Vapour	0.9996	1.0000			
22	Temperature (C)	83.4414	81.6892			
23	Pressure (kPa)	1280.7990	1180.0606			
24	Molar Flow (kgmole/h)	3.1442	3.1442			
25	Mass Flow (kg/h)	180.1039	180.1039			
26	Std Ideal Liq Vol Flow (m3/h)	0.3132	0.3132			
27	Molar Enthalpy (kJ/kgmole)	-1.003e+005	-1.003e+005			
28	Molar Entropy (kJ/kgmole-C)	158.8	159.4			
29	Heat Flow (kJ/h)	-3.1541e+005	-3.1541e+005			
30	PROPERTIES					
31	Name	7 @ De-C14	9 @ De-C14			
32	Molecular Weight	57.28	57.28			
33	Molar Density (kgmole/m3)	0.5675	0.5124			
34	Mass Density (kg/m3)	32.51	29.35			
35	Act. Volume Flow (m3/h)	5.540	6.137			
36	Mass Enthalpy (kJ/kg)	-1751	-1751			
37	Mass Entropy (kJ/kg-C)	2.773	2.782			
38	Heat Capacity (kJ/kgmole-C)	125.2	122.6			
39	Mass Heat Capacity (kJ/kg-C)	2.185	2.141			
40	Lower Heating Value (kJ/kgmole)	---	---			
41	Mass Lower Heating Value (kJ/kg)	---	---			
42	Phase Fraction [Vol. Basis]	1.000	1.000			
43	Phase Fraction [Mass Basis]	0.9996	1.000			
44	Partial Pressure of CO2 (kPa)	---	---			
45	Cost Based on Flow (Cost/s)	0.0000	0.0000			
46	Act. Gas Flow (ACT_m3/h)	---	6.137			
47	Avg. Liq. Density (kgmole/m3)	10.04	10.04			
48	Specific Heat (kJ/kgmole-C)	125.2	122.6			
49	Std. Gas Flow (STD_m3/h)	74.34	74.34			
50	Std. Ideal Liq. Mass Density (kg/m3)	575.1	575.1			

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
4			

Valve: DBPV101 @De-C14 (continued)

PROPERTIES

11	Name	7 @De-C14	9 @De-C14		
12	Act. Liq. Flow (m ³ /s)	4.286e-008	0.0000		
13	Z Factor	---	0.7807		
14	Watson K	13.57	13.57		
15	User Property	---	---		
16	Cp/(Cp - R)	1.071	1.073		
17	Cp/Cv	1.215	1.197		
18	Heat of Vap. (kJ/kgmole)	1.593e+004	1.634e+004		
19	Kinematic Viscosity (cSt)	---	0.3281		
20	Liq. Mass Density (Std. Cond) (kg/m ³)	577.9	577.9		
21	Liq. Vol. Flow (Std. Cond) (m ³ /h)	0.3116	0.3116		
22	Liquid Fraction	4.127e-004	0.0000		
23	Molar Volume (m ³ /kgmole)	1.762	1.952		
24	Mass Heat of Vap. (kJ/kg)	278.1	285.2		
25	Phase Fraction [Molar Basis]	0.9996	1.0000		
26	Surface Tension (dyne/cm)	4.945	---		
27	Thermal Conductivity (W/m-K)	---	2.254e-002		
28	Viscosity (cP)	---	9.629e-003		
29	Partial Pressure of H ₂ S (kPa)	0.0000	0.0000		
30	Cv (Semi-Ideal) (kJ/kgmole-C)	116.8	114.3		
31	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.040	1.996		
32	Cv (kJ/kgmole-C)	103.0	102.4		
33	Mass Cv (kJ/kg-C)	1.798	1.788		
34	Cv (Ent. Method) (kJ/kgmole-C)	---	102.5		
35	Mass Cv (Ent. Method) (kJ/kg-C)	---	1.790		
36	Cp/Cv (Ent. Method)	---	1.196		
37	Reid VP at 37.8 C (kPa)	458.0	458.0		
38	Liq. Vol. Flow - Sum(Std. Cond) (m ³ /h)	0.3116	0.3116		

STATUS

OK

NOTES

Description

Valve: DBPV100 @De-C14

CONNECTIONS

Inlet Stream

55	STREAM NAME	FROM UNIT OPERATION
56	8 @De-C14	Tee TEE-100

Outlet Stream

59	STREAM NAME	TO UNIT OPERATION
60	2 @De-C14	Heat Exchanger E100

PARAMETERS

Physical Properties

65	Pressure Drop:	53.66 kPa
----	----------------	-----------

User Variables

1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2			Unit Set:	SI
3			Date/Time:	Friday Sep 4 2015, 16:44:21
4	Valve: DBPV100 @ De-C14 (continued)			
5	CONDITIONS			
6	Name	8 @De-C14	2 @De-C14	
7	Vapour	0.9996	1.0000	
8	Temperature (C)	83.4414	82.4786	
9	Pressure (kPa)	1280.7990	1227.1408	
10	Molar Flow (kgmole/h)	366.2583	366.2583	
11	Mass Flow (kg/h)	20980.0259	20980.0259	
12	Std Ideal Liq Vol Flow (m3/h)	36.4832	36.4832	
13	Molar Enthalpy (kJ/kgmole)	-1.003e+005	-1.003e+005	
14	Molar Entropy (kJ/kgmole-C)	158.8	159.1	
15	Heat Flow (kJ/h)	-3.6742e+07	-3.6742e+07	
16	PROPERTIES			
17	Name	8 @De-C14	2 @De-C14	
18	Molecular Weight	57.28	57.28	
19	Molar Density (kgmole/m3)	0.5675	0.5378	
20	Mass Density (kg/m3)	32.51	30.81	
21	Act. Volume Flow (m3/h)	645.4	681.0	
22	Mass Enthalpy (kJ/kg)	-1751	-1751	
23	Mass Entropy (kJ/kg-C)	2.773	2.778	
24	Heat Capacity (kJ/kgmole-C)	125.2	123.8	
25	Mass Heat Capacity (kJ/kg-C)	2.185	2.161	
26	Lower Heating Value (kJ/kgmole)	---	---	
27	Mass Lower Heating Value (kJ/kg)	---	---	
28	Phase Fraction [Vol. Basis]	1.000	1.000	
29	Phase Fraction [Mass Basis]	0.9996	1.000	
30	Partial Pressure of CO2 (kPa)	---	---	
31	Cost Based on Flow (Cost/s)	0.0000	0.0000	
32	Act. Gas Flow (ACT_m3/h)	---	681.0	
33	Avg. Liq. Density (kgmole/m3)	10.04	10.04	
34	Specific Heat (kJ/kgmole-C)	125.2	123.8	
35	Std. Gas Flow (STD_m3/h)	8660	8660	
36	Std. Ideal Liq. Mass Density (kg/m3)	575.1	575.1	
37	Act. Liq. Flow (m3/s)	4.992e-006	0.0000	
38	Z Factor	---	0.7717	
39	Watson K	13.57	13.57	
40	User Property	---	---	
41	Cp/(Cp - R)	1.071	1.072	
42	Cp/Cv	1.215	1.205	
43	Heat of Vap. (kJ/kgmole)	1.593e+004	1.615e+004	
44	Kinematic Viscosity (cSt)	---	0.3147	
45	Liq. Mass Density (Std. Cond) (kg/m3)	577.9	577.9	
46	Liq. Vol. Flow (Std. Cond) (m3/h)	36.30	36.30	
47	Liquid Fraction	4.127e-004	0.0000	
48	Molar Volume (m3/kgmole)	1.762	1.859	
49	Mass Heat of Vap. (kJ/kg)	278.1	281.9	
50	Phase Fraction [Molar Basis]	0.9996	1.0000	
51	Surface Tension (dyne/cm)	4.945	---	
52	Thermal Conductivity (W/m-K)	---	0.0227	
53	Viscosity (cP)	---	9.694e-003	
54	Partial Pressure of H2S (kPa)	0.0000	0.0000	
55	Cv (Semi-Ideal) (kJ/kgmole-C)	116.8	115.5	
56	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.040	2.016	
57	Cv (kJ/kgmole-C)	103.0	102.7	
58	Mass Cv (kJ/kg-C)	1.798	1.793	
59	Cv (Ent. Method) (kJ/kgmole-C)	---	102.8	
60	Mass Cv (Ent. Method) (kJ/kg-C)	---	1.794	
61	Cp/Cv (Ent. Method)	---	1.204	
62	Reid VP at 37.8 C (kPa)	458.0	458.0	

1	Honeywell Company Name Not Available Calgary, Alberta CANADA		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc			
2			Unit Set:	SI			
3			Date/Time:	Friday Sep 4 2015, 16:44:21			
4	Valve: DBPV100 @De-C14 (continued)						
5	PROPERTIES						
6	Name	8 @De-C14	2 @De-C14				
7	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	36.30	36.30				
8	STATUS						
9	OK						
10	NOTES						
11							
12							
13	Description						
14							
15	Valve: DBLV100 @De-C14						
16	CONNECTIONS						
17	Inlet Stream						
18							
19	STREAM NAME	FROM UNIT OPERATION					
20	68	Heat Exchanger					
21							
22	Outlet Stream						
23							
24	STREAM NAME	TO UNIT OPERATION					
25	Butanes @De-C14	Material Stream					
26							
27	PARAMETERS						
28							
29	Physical Properties						
30							
31	Pressure Drop:	1129 kPa					
32	User Variables						
33							
34							
35	CONDITIONS						
36							
37	Name	68	Butanes @De-C14				
38	Vapour	0.0000	0.0000				
39	Temperature (C)	20.4498	20.7036				
40	Pressure (kPa)	1714.8423	585.9045				
41	Molar Flow (kgmole/h)	97.0089	97.0089				
42	Mass Flow (kg/h)	5556.8553	5556.8553				
43	Std Ideal Liq Vol Flow (m3/h)	9.6631	9.6631				
44	Molar Enthalpy (kJ/kgmole)	-1.254e+005	-1.254e+005				
45	Molar Entropy (kJ/kgmole-C)	85.55	85.91				
46	Heat Flow (kJ/h)	-1.2168e+07	-1.2168e+07				
47	PROPERTIES						
48							
49	Name	68	Butanes @De-C14				
50	Molecular Weight	57.28	57.28				
51	Molar Density (kgmole/m3)	10.04	9.983				
52	Mass Density (kg/m3)	574.9	571.8				
53	Act. Volume Flow (m3/h)	9.666	9.718				
54	Mass Enthalpy (kJ/kg)	-2190	-2190				
55	Mass Entropy (kJ/kg-C)	1.493	1.500				
56	Heat Capacity (kJ/kgmole-C)	135.0	136.0				
57	Mass Heat Capacity (kJ/kg-C)	2.357	2.374				
58	Lower Heating Value (kJ/kgmole)	---	---				
59	Mass Lower Heating Value (kJ/kg)	---	---				
60	Phase Fraction [Vol. Basis]	7.510e-322	0.0000				
61	Phase Fraction [Mass Basis]	7.510e-322	0.0000				
62							
63							
64							
65							
66							
67							
68							
69	Honeywell International Inc.	UniSim Design (R430 build 18059)					

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21

Valve: DBLV100 @De-C14 (continued)

PROPERTIES

11	Name	68	Butanes @De-C14		
12	Partial Pressure of CO2 (kPa)	---	---		
13	Cost Based on Flow (Cost/s)	0.0000	0.0000		
14	Act. Gas Flow (ACT_m3/h)	---	---		
15	Avg. Liq. Density (kgmole/m3)	10.04	10.04		
16	Specific Heat (kJ/kgmole-C)	135.0	136.0		
17	Std. Gas Flow (STD_m3/h)	2294	2294		
18	Std. Ideal Liq. Mass Density (kg/m3)	575.1	575.1		
19	Act. Liq. Flow (m3/s)	2.685e-003	2.699e-003		
20	Z Factor	0.0700	2.402e-002		
21	Watson K	13.57	13.57		
22	User Property	---	---		
23	Cp/(Cp - R)	1.066	1.065		
24	Cp/Cv	1.287	1.295		
25	Heat of Vap. (kJ/kgmole)	1.421e+004	1.892e+004		
26	Kinematic Viscosity (cSt)	0.2897	0.2896		
27	Liq. Mass Density (Std. Cond) (kg/m3)	577.9	577.9		
28	Liq. Vol. Flow (Std. Cond) (m3/h)	9.615	9.615		
29	Liquid Fraction	1.000	1.000		
30	Molar Volume (m3/kgmole)	9.964e-002	0.1002		
31	Mass Heat of Vap. (kJ/kg)	248.0	330.3		
32	Phase Fraction [Molar Basis]	0.0000	0.0000		
33	Surface Tension (dyne/cm)	11.49	11.47		
34	Thermal Conductivity (W/m-K)	9.196e-002	9.187e-002		
35	Viscosity (cP)	0.1665	0.1656		
36	Partial Pressure of H2S (kPa)	0.0000	0.0000		
37	Cv (Semi-Ideal) (kJ/kgmole-C)	126.7	127.7		
38	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.212	2.229		
39	Cv (kJ/kgmole-C)	104.9	105.0		
40	Mass Cv (kJ/kg-C)	1.831	1.834		
41	Cv (Ent. Method) (kJ/kgmole-C)	---	---		
42	Mass Cv (Ent. Method) (kJ/kg-C)	---	---		
43	Cp/Cv (Ent. Method)	---	---		
44	Reid VP at 37.8 C (kPa)	458.1	458.1		
45	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	9.615	9.615		

STATUS

OK

NOTES

Description

Valve: E100VA @De-C14

CONNECTIONS

Inlet Stream

62	STREAM NAME	FROM UNIT OPERATION
63	4 @De-C14	Material Stream

Outlet Stream

66	STREAM NAME	TO UNIT OPERATION
67	17 @De-C14	Heat Exchanger

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
4	Valve: E100VA @ De-C14 (continued)		
5	PARAMETERS		
6	Physical Properties		
7	Pressure Drop:	102.7 kPa	
8	User Variables		
9	CONDITIONS		
10	Name	4 @ De-C14	17 @ De-C14
11	Vapour	0.0000	0.0000
12	Temperature (C)	27.0000	26.9760
13	Pressure (kPa)	1180.0567	1077.3387
14	Molar Flow (kgmole/h)	2072.7845	2072.7845
15	Mass Flow (kg/h)	91403.5793	91403.5793
16	Std Ideal Liq Vol Flow (m3/h)	180.3978	180.3978
17	Molar Enthalpy (kJ/kgmole)	-1.198e+005	-1.198e+005
18	Molar Entropy (kJ/kgmole-C)	91.25	91.28
19	Heat Flow (kJ/h)	-2.4830e+008	-2.4830e+008
20	PROPERTIES		
21	Name	4 @ De-C14	17 @ De-C14
22	Molecular Weight	44.10	44.10
23	Molar Density (kgmole/m3)	11.11	11.11
24	Mass Density (kg/m3)	490.1	489.7
25	Act. Volume Flow (m3/h)	186.5	186.6
26	Mass Enthalpy (kJ/kg)	-2717	-2717
27	Mass Entropy (kJ/kg-C)	2.069	2.070
28	Heat Capacity (kJ/kgmole-C)	126.4	126.7
29	Mass Heat Capacity (kJ/kg-C)	2.867	2.873
30	Lower Heating Value (kJ/kgmole)	2.045e+006	2.045e+006
31	Mass Lower Heating Value (kJ/kg)	4.637e+004	4.637e+004
32	Phase Fraction [Vol. Basis]	0.0000	0.0000
33	Phase Fraction [Mass Basis]	0.0000	0.0000
34	Partial Pressure of CO2 (kPa)	---	---
35	Cost Based on Flow (Cost/s)	0.0000	0.0000
36	Act. Gas Flow (ACT_m3/h)	---	---
37	Avg. Liq. Density (kgmole/m3)	11.49	11.49
38	Specific Heat (kJ/kgmole-C)	126.4	126.7
39	Std. Gas Flow (STD_m3/h)	4.901e+004	4.901e+004
40	Std. Ideal Liq. Mass Density (kg/m3)	506.7	506.7
41	Act. Liq. Flow (m3/s)	0.0518	5.185e-002
42	Z Factor	4.255e-002	3.888e-002
43	Watson K	14.70	14.70
44	User Property	---	---
45	Cp/(Cp - R)	1.070	1.070
46	Cp/Cv	1.406	1.409
47	Heat of Vap. (kJ/kgmole)	1.419e+004	1.451e+004
48	Kinematic Viscosity (cSt)	0.2000	0.2001
49	Liq. Mass Density (Std. Cond) (kg/m3)	507.7	507.7
50	Liq. Vol. Flow (Std. Cond) (m3/h)	180.0	180.0
51	Liquid Fraction	1.000	1.000
52	Molar Volume (m3/kgmole)	8.997e-002	9.005e-002
53	Mass Heat of Vap. (kJ/kg)	321.8	329.1
54	Phase Fraction [Molar Basis]	0.0000	0.0000
55	Surface Tension (dyne/cm)	6.666	6.669
56	Thermal Conductivity (W/m-K)	9.374e-002	9.376e-002
57	Viscosity (cP)	9.803e-002	0.0980
58	Partial Pressure of H2S (kPa)	0.0000	0.0000
59	Cv (Semi-Ideal) (kJ/kgmole-C)	118.1	118.4

1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc					
2			Unit Set:	SI					
3			Date/Time:	Friday Sep 4 2015, 16:44:21					
4	Valve: E100VA @De-C14 (continued)								
5	PROPERTIES								
6	Name	4 @De-C14	17 @De-C14						
7	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.679	2.684						
8	Cv (kJ/kgmole-C)	89.91	89.92						
9	Mass Cv (kJ/kg-C)	2.039	2.039						
10	Cv (Ent. Method) (kJ/kgmole-C)	---	---						
11	Mass Cv (Ent. Method) (kJ/kg-C)	---	---						
12	Cp/Cv (Ent. Method)	---	---						
13	Reid VP at 37.8 C (kPa)	---	---						
14	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	180.0	180.0						
15	STATUS								
16	OK								
17	NOTES								
18									
19	Description								
20									
21	Heat Exchanger: E100 @De-C14								
22									
23	CONNECTIONS								
24									
25									
26	Tube Side								
27									
28	Inlet	Outlet	Inlet	Outlet					
29	Name	2 @De-C14	Name	3 @De-C14	Name	17 @De-C14			
30	From Op.	DBPV100 Valve	To Op.	Separator V-100	From Op.	Valve E100VA			
31	Temp	82.48 C	Temp	32.06 C	Temp	26.98 C			
32									
33									
34	Shell Side								
35									
36									
37									
38									
39									
40	PARAMETERS								
41									
42	Calculated By the Column								
43									
44	Tube Side DeltaP: ---	Shell Side DeltaP: ---		Passes: ---					
45	UA: 4.184e+005 kJ/C-h *	Tolerance: 1.0000e-04							
46	Tube Side Data								
47	Heat Transfer Coefficient	166475.89 kJ/h-m2-C	Heat Transfer Coefficient	166475.89 kJ/h-m2-C					
48	Tube Pressure Drop	---	Shell Pressure Drop	---					
49	Fouling	0.00000 C-h-m2/kJ	Fouling	0.00000 C-h-m2/kJ					
50	Tube Length	1.00 m *	Shell Passes	1					
51	Tube O.D.	20.00 mm	Shell Series	1					
52	Tube Thickness	2.0000 mm	Shell Parallel	1					
53	Tube Pitch	50.0000 mm	Baffle Type	Single					
54	Orientation	Horizontal	Baffle Cut(%Area)	20.00					
55	Passes Per Shell	1 *	Baffle Orientation	Horizontal					
56	Tubes Per Shell	80 *	Spacing	800.0000 mm					
57	Layout Angle	Triangular (30 degrees)	Diameter	530.0259 mm					
58	TEMA Type	A E L	Area	5.03 m2					
59	User Variables								
60									
61	CONDITIONS								
62									
63	Name	2 @De-C14	3 @De-C14	17 @De-C14	5 @De-C14				
64	Vapour	1.0000	0.0000	0.0000	0.3017				
65	Temperature (C)	82.4786	32.0639	26.9760	24.0491				
66	Pressure (kPa)	1227.1408	1190.4537	1077.3387	929.3346				
67	Molar Flow (kgmole/h)	366.2583	366.2577	2072.7845	2072.7739				
68	Mass Flow (kg/h)	20980.0259	20979.9627	91403.5793	91403.1123				
69	Honeywell International Inc.	UniSim Design (R430 build 18059)			Page 156 of 170				

1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc					
2			Unit Set:	SI					
3			Date/Time:	Friday Sep 4 2015, 16:44:21					
4	Heat Exchanger: E100 @ De-C14 (continued)								
5	CONDITIONS								
6	Std Ideal Liq Vol Flow (m3/h)	36.4832	36.4831	180.3978	180.3968				
7	Molar Enthalpy (kJ/kgmole)	-1.003e+005	-1.238e+005	-1.198e+005	-1.156e+005				
8	Molar Entropy (kJ/kgmole-C)	159.1	91.01	91.28	105.3				
9	Heat Flow (kJ/h)	-3.6742e+07	-4.5360e+07	-2.4830e+08	-2.3968e+08				
10	PROPERTIES								
11	Name	2 @ De-C14	3 @ De-C14	17 @ De-C14	5 @ De-C14				
12	Molecular Weight	57.28	57.28	44.10	44.10				
13	Molar Density (kgmole/m3)	0.5378	9.763	11.11	1.381				
14	Mass Density (kg/m3)	30.81	559.3	489.7	60.91				
15	Act. Volume Flow (m3/h)	681.0	37.51	186.6	1501				
16	Mass Enthalpy (kJ/kg)	-1751	-2162	-2717	-2622				
17	Mass Entropy (kJ/kg-C)	2.778	1.589	2.070	2.388				
18	Heat Capacity (kJ/kgmole-C)	123.8	140.7	126.7	112.2				
19	Mass Heat Capacity (kJ/kg-C)	2.161	2.457	2.873	2.545				
20	Lower Heating Value (kJ/kgmole)	---	---	2.045e+006	2.045e+006				
21	Mass Lower Heating Value (kJ/kg)	---	---	4.637e+004	4.637e+004				
22	Phase Fraction [Vol. Basis]	1.000	2.619e-322	0.0000	0.9139				
23	Phase Fraction [Mass Basis]	1.000	2.619e-322	0.0000	0.3017				
24	Partial Pressure of CO2 (kPa)	---	---	---	---				
25	Cost Based on Flow (Cost/s)	0.0000	0.0000	0.0000	0.0000				
26	Act. Gas Flow (ACT_m3/h)	681.0	---	---	---				
27	Avg. Liq. Density (kgmole/m3)	10.04	10.04	11.49	11.49				
28	Specific Heat (kJ/kgmole-C)	123.8	140.7	126.7	112.2				
29	Std. Gas Flow (STD_m3/h)	8660	8660	4.901e+004	4.901e+004				
30	Std. Ideal Liq. Mass Density (kg/m3)	575.1	575.1	506.7	506.7				
31	Act. Liq. Flow (m3/s)	0.0000	1.042e-002	5.185e-002	3.589e-002				
32	Z Factor	0.7717	4.805e-002	3.888e-002	---				
33	Watson K	13.57	13.57	14.70	14.70				
34	User Property	---	---	---	---				
35	Cp/(Cp - R)	1.072	1.063	1.070	1.080				
36	Cp/Cv	1.205	1.293	1.409	1.050				
37	Heat of Vap. (kJ/kgmole)	1.615e+004	1.630e+004	1.451e+004	1.499e+004				
38	Kinematic Viscosity (cSt)	0.3147	0.2668	0.2001	---				
39	Liq. Mass Density (Std. Cond) (kg/m3)	577.9	577.9	507.7	507.7				
40	Liq. Vol. Flow (Std. Cond) (m3/h)	36.30	36.30	180.0	180.0				
41	Liquid Fraction	0.0000	1.000	1.000	0.6983				
42	Molar Volume (m3/kgmole)	1.859	0.1024	9.005e-002	0.7239				
43	Mass Heat of Vap. (kJ/kg)	281.9	284.5	329.1	339.9				
44	Phase Fraction [Molar Basis]	1.0000	0.0000	0.0000	0.3017				
45	Surface Tension (dyne/cm)	---	10.17	6.669	7.013				
46	Thermal Conductivity (W/m-K)	0.0227	8.789e-002	9.376e-002	---				
47	Viscosity (cP)	9.694e-003	0.1492	0.0980	---				
48	Partial Pressure of H2S (kPa)	0.0000	0.0000	0.0000	0.0000				
49	Cv (Semi-Ideal) (kJ/kgmole-C)	115.5	132.4	118.4	103.9				
50	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.016	2.312	2.684	2.357				
51	Cv (kJ/kgmole-C)	102.7	108.8	89.92	106.9				
52	Mass Cv (kJ/kg-C)	1.793	1.900	2.039	2.424				
53	Cv (Ent. Method) (kJ/kgmole-C)	102.8	---	---	---				
54	Mass Cv (Ent. Method) (kJ/kg-C)	1.794	---	---	---				
55	Cp/Cv (Ent. Method)	1.204	---	---	---				
56	Reid VP at 37.8 C (kPa)	458.0	458.1	---	---				
57	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	36.30	36.30	180.0	180.0				
58	STATUS								
59	OK								
60									
61									
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68									
69	Honeywell International Inc.	UniSim Design (R430 build 18059)			Page 157 of 170				

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc	
2		Unit Set:	SI	
3		Date/Time:	Friday Sep 4 2015, 16:44:21	
4	Heat Exchanger: E100 @ De-C14 (continued)			
5	NOTES			
6	Description			
7	Tee: TEE-100 @ De-C14			
8	CONNECTIONS			
9	Inlet Stream			
10	STREAM NAME	FROM UNIT OPERATION		
11	6 @ De-C14	Tray Section	Main TS	
12	Outlet Stream			
13	STREAM NAME	TO UNIT OPERATION		
14	7 @ De-C14	Valve	DBPV101	
15	8 @ De-C14	Valve	DBPV100	
16	PARAMETERS			
17		Flow Ratios	Dynamic Valve Openings	
18	7 @ De-C14	---	0.0000 *	
19	8 @ De-C14	---	0.0000 *	
20	Valve Control: Multiple Stream			
21	User Variables			
22	CONDITIONS			
23	Name	6 @ De-C14	7 @ De-C14	8 @ De-C14
24	Vapour	1.0000	0.9996	0.9996
25	Temperature (C)	83.3443	83.4414	83.4414
26	Pressure (kPa)	1278.1237	1280.7990	1280.7990
27	Molar Flow (kgmole/h)	369.4025	3.1442	366.2583
28	Mass Flow (kg/h)	21160.1288	180.1039	20980.0259
29	Std Ideal Liq Vol Flow (m3/h)	36.7964	0.3132	36.4832
30	Molar Enthalpy (kJ/kgmole)	-1.003e+005	-1.003e+005	-1.003e+005
31	Molar Entropy (kJ/kgmole-C)	158.8	158.8	158.8
32	Heat Flow (kJ/h)	-3.7057e+07	-3.1541e+05	-3.6742e+07
33	PROPERTIES			
34	Name	6 @ De-C14	7 @ De-C14	8 @ De-C14
35	Molecular Weight	57.28	57.28	57.28
36	Molar Density (kgmole/m3)	0.5660	0.5675	0.5675
37	Mass Density (kg/m3)	32.42	32.51	32.51
38	Act. Volume Flow (m3/h)	652.7	5.540	645.4
39	Mass Enthalpy (kJ/kg)	-1751	-1751	-1751
40	Mass Entropy (kJ/kg-C)	2.773	2.773	2.773
41	Heat Capacity (kJ/kgmole-C)	125.1	125.2	125.2
42	Mass Heat Capacity (kJ/kg-C)	2.183	2.185	2.185
43	Lower Heating Value (kJ/kgmole)	---	---	---
44	Mass Lower Heating Value (kJ/kg)	---	---	---
45	Phase Fraction [Vol. Basis]	1.000	1.000	1.000
46	Phase Fraction [Mass Basis]	1.000	0.9996	0.9996
47	Partial Pressure of CO2 (kPa)	---	---	---
48	Cost Based on Flow (Cost/s)	0.0000	0.0000	0.0000
49	Act. Gas Flow (ACT_m3/h)	652.7	---	---
50	Avg. Liq. Density (kgmole/m3)	10.04	10.04	10.04

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21

Tee: TEE-100 @ De-C14 (continued)

PROPERTIES

11	Name	6 @De-C14	7 @De-C14	8 @De-C14		
12	Specific Heat (kJ/kgmole-C)	125.1	125.2	125.2		
13	Std. Gas Flow (STD_m3/h)	8734	74.34	8660		
14	Std. Ideal Liq. Mass Density (kg/m3)	575.1	575.1	575.1		
15	Act. Liq. Flow (m3/s)	0.0000	4.286e-008	4.992e-006		
16	Z Factor	0.7619	---	---		
17	Watson K	13.57	13.57	13.57		
18	User Property	---	---	---		
19	Cp/(Cp - R)	1.071	1.071	1.071		
20	Cp/Cv	1.215	1.215	1.215		
21	Heat of Vap. (kJ/kgmole)	1.594e+004	1.593e+004	1.593e+004		
22	Kinematic Viscosity (cSt)	0.3012	---	---		
23	Liq. Mass Density (Std. Cond) (kg/m3)	577.9	577.9	577.9		
24	Liq. Vol. Flow (Std. Cond) (m3/h)	36.61	0.3116	36.30		
25	Liquid Fraction	0.0000	4.127e-004	4.127e-004		
26	Molar Volume (m3/kgmole)	1.767	1.762	1.762		
27	Mass Heat of Vap. (kJ/kg)	278.3	278.1	278.1		
28	Phase Fraction [Molar Basis]	1.0000	0.9996	0.9996		
29	Surface Tension (dyne/cm)	---	4.945	4.945		
30	Thermal Conductivity (W/m-K)	2.287e-002	---	---		
31	Viscosity (cP)	9.765e-003	---	---		
32	Partial Pressure of H2S (kPa)	0.0000	0.0000	0.0000		
33	Cv (Semi-Ideal) (kJ/kgmole-C)	116.8	116.8	116.8		
34	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.038	2.040	2.040		
35	Cv (kJ/kgmole-C)	102.9	103.0	103.0		
36	Mass Cv (kJ/kg-C)	1.797	1.798	1.798		
37	Cv (Ent. Method) (kJ/kgmole-C)	---	---	---		
38	Mass Cv (Ent. Method) (kJ/kg-C)	---	---	---		
39	Cp/Cv (Ent. Method)	---	---	---		
40	Reid VP at 37.8 C (kPa)	458.0	458.0	458.0		
41	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	36.61	0.3116	36.30		

STATUS

OK

NOTES

Description

Tee: TEE-101 @ De-C14

CONNECTIONS

Inlet Stream

58	STREAM NAME	FROM UNIT OPERATION	
59	13 @De-C14	Separator	V-100

Outlet Stream

62	STREAM NAME	TO UNIT OPERATION	
63	14 @De-C14	Material Stream	14
64	15 @De-C14	Material Stream	15

PARAMETERS

67	14 @De-C14	Flow Ratios	Dynamic Valve Openings
68	14 @De-C14	---	0.0000 *

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1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc			
2		Unit Set:	SI			
3		Date/Time:	Friday Sep 4 2015, 16:44:21			
4	Tee: TEE-101 @ De-C14 (continued)					
5	PARAMETERS					
6	15 @De-C14	---	0.0000 *			
7	Valve Control: Multiple Stream					
8	User Variables					
9	CONDITIONS					
10	Name	13 @De-C14	14 @De-C14	15 @De-C14		
11	Vapour	0.0000	0.0000	0.0000		
12	Temperature (C)	33.4846	33.4840	33.4840		
13	Pressure (kPa)	1184.6514	1184.6514	1184.6514		
14	Molar Flow (kgmole/h)	370.0731	370.0731	-0.0000		
15	Mass Flow (kg/h)	21198.4957	21198.4957	-0.0000		
16	Std Ideal Liq Vol Flow (m3/h)	36.8631	36.8631	-0.0000		
17	Molar Enthalpy (kJ/kgmole)	-1.236e+005	-1.236e+005	-1.236e+005		
18	Molar Entropy (kJ/kgmole-C)	91.66	91.66	91.66		
19	Heat Flow (kJ/h)	-4.5758e+07	-4.5758e+07	5.4719e-05		
20	PROPERTIES					
21	Name	13 @De-C14	14 @De-C14	15 @De-C14		
22	Molecular Weight	57.28	57.28	57.28		
23	Molar Density (kgmole/m3)	9.731	9.731	9.731		
24	Mass Density (kg/m3)	557.4	557.4	557.4		
25	Act. Volume Flow (m3/h)	38.03	38.03	-4.548e-011		
26	Mass Enthalpy (kJ/kg)	-2159	-2159	-2159		
27	Mass Entropy (kJ/kg-C)	1.600	1.600	1.600		
28	Heat Capacity (kJ/kgmole-C)	141.4	141.4	141.4		
29	Mass Heat Capacity (kJ/kg-C)	2.469	2.469	2.469		
30	Lower Heating Value (kJ/kgmole)	---	---	---		
31	Mass Lower Heating Value (kJ/kg)	---	---	---		
32	Phase Fraction [Vol. Basis]	0.0000	0.0000	0.0000		
33	Phase Fraction [Mass Basis]	0.0000	0.0000	0.0000		
34	Partial Pressure of CO2 (kPa)	---	---	---		
35	Cost Based on Flow (Cost/s)	0.0000	0.0000	0.0000		
36	Act. Gas Flow (ACT_m3/h)	---	---	---		
37	Avg. Liq. Density (kgmole/m3)	10.04	10.04	10.04		
38	Specific Heat (kJ/kgmole-C)	141.4	141.4	141.4		
39	Std. Gas Flow (STD_m3/h)	8750	8750	-1.046e-008		
40	Std. Ideal Liq. Mass Density (kg/m3)	575.1	575.1	575.1		
41	Act. Liq. Flow (m3/s)	1.056e-002	1.056e-002	-1.263e-014		
42	Z Factor	4.775e-002	4.775e-002	4.775e-002		
43	Watson K	13.57	13.57	13.57		
44	User Property	---	---	---		
45	Cp/(Cp - R)	1.062	1.062	1.062		
46	Cp/Cv	1.293	1.293	1.293		
47	Heat of Vap. (kJ/kgmole)	1.632e+004	1.632e+004	1.632e+004		
48	Kinematic Viscosity (cSt)	0.2641	0.2641	0.2641		
49	Liq. Mass Density (Std. Cond) (kg/m3)	577.9	577.9	577.9		
50	Liq. Vol. Flow (Std. Cond) (m3/h)	36.68	36.68	-4.386e-011		
51	Liquid Fraction	1.000	1.000	1.000		
52	Molar Volume (m3/kgmole)	0.1028	0.1028	0.1028		
53	Mass Heat of Vap. (kJ/kg)	284.9	284.9	284.9		
54	Phase Fraction [Molar Basis]	0.0000	0.0000	0.0000		
55	Surface Tension (dyne/cm)	10.01	10.01	10.01		
56	Thermal Conductivity (W/m-K)	8.738e-002	8.738e-002	8.738e-002		
57	Viscosity (cP)	0.1472	0.1472	0.1472		
58	Partial Pressure of H2S (kPa)	0.0000	0.0000	0.0000		
59	Cv (Semi-Ideal) (kJ/kgmole-C)	133.1	133.1	133.1		

1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc		
2			Unit Set:	SI		
3			Date/Time:	Friday Sep 4 2015, 16:44:21		
4	Tee: TEE-101 @De-C14 (continued)					
5	PROPERTIES					
6	Name	13 @De-C14	14 @De-C14	15 @De-C14		
7	Mass Cv (Semi-Ideal) (kJ/kg-C)	2.324	2.324	2.324		
8	Cv (kJ/kgmole-C)	109.4	109.3	109.3		
9	Mass Cv (kJ/kg-C)	1.909	1.909	1.909		
10	Cv (Ent. Method) (kJ/kgmole-C)	---	---	---		
11	Mass Cv (Ent. Method) (kJ/kg-C)	---	---	---		
12	Cp/Cv (Ent. Method)	---	---	---		
13	Reid VP at 37.8 C (kPa)	458.1	458.1	458.1		
14	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	36.68	36.68	-4.386e-011		
15	STATUS					
16	OK					
17	NOTES					
18	Description					
19	Separator: V-100 @De-C14					
20	CONNECTIONS					
21	Inlet Stream					
22	Stream Name	From Unit Operation				
23	9 @De-C14	Valve:	DBPV101 @De-C14			
24	3 @De-C14	Heat Exchanger:	E100 @De-C14			
25	Outlet Stream					
26	Stream Name	To Unit Operation				
27	10 @De-C14	Material Stream:	10			
28	13 @De-C14	Tee:	TEE-101 @De-C14			
29	Energy Stream					
30	Stream Name	From Unit Operation				
31						
32	PARAMETERS					
33	Vessel Volume:	9.425 m3	Level SP:	42.79 % *		
34	Liquid Volume:	4.033 m3				
35	Vessel Pressure:	1179 kPa	Pressure Drop:	0.0000 kPa *		
36	Duty:	0.0000 kJ/h	Heat Transfer Mode:	Normal		
37	User Variables					
38	CONDITIONS					
39	Name	9 @De-C14	3 @De-C14	13 @De-C14		
40	Vapour	1.0000	0.0000	0.0000		
41	Temperature (C)	81.6892	32.0639	33.4846		
42	Pressure (kPa)	1180.0606	1190.4537	1184.6514		
43	Molar Flow (kgmole/h)	3.1442	366.2577	370.0731		
44	Mass Flow (kg/h)	180.1039	20979.9627	21198.4957		
45	Std Ideal Liq Vol Flow (m3/h)	0.3132	36.4831	36.8631		
46	Molar Enthalpy (kJ/kgmole)	-1.003e+005	-1.238e+005	-1.236e+005		
47	Molar Entropy (kJ/kgmole-C)	159.4	91.01	91.66		
48	Heat Flow (kJ/h)	-3.1541e+005	-4.5360e+007	-4.5758e+007		
49	Honeywell International Inc.					
50	UniSim Design (R430 build 18059)					
51	Page 161 of 170					
52	* Specified by user.					
53	Licensed to: Company Name Not Available					
54	Printed by: alu0100514599					

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
4			

Separator: V-100 @De-C14 (continued)

PROPERTIES

11	Name	9 @De-C14	3 @De-C14	13 @De-C14	10 @De-C14	
12	Molecular Weight	57.28	57.28	57.28	57.28	
13	Molar Density (kgmole/m3)	0.5124	9.763	9.731	0.5120	
14	Mass Density (kg/m3)	29.35	559.3	557.4	29.33	
15	Act. Volume Flow (m3/h)	6.137	37.51	38.03	2.741e-034	
16	Mass Enthalpy (kJ/kg)	-1751	-2162	-2159	-1751	
17	Mass Entropy (kJ/kg-C)	2.782	1.589	1.600	2.782	
18	Heat Capacity (kJ/kgmole-C)	122.6	140.7	141.4	122.6	
19	Mass Heat Capacity (kJ/kg-C)	2.141	2.457	2.469	2.141	
20	Lower Heating Value (kJ/kgmole)	---	---	---	---	
21	Mass Lower Heating Value (kJ/kg)	---	---	---	---	
22	Phase Fraction [Vol. Basis]	1.000	2.619e-322	0.0000	1.000	
23	Phase Fraction [Mass Basis]	1.000	2.619e-322	0.0000	1.000	
24	Partial Pressure of CO2 (kPa)	---	---	---	---	
25	Cost Based on Flow (Cost/s)	0.0000	0.0000	0.0000	0.0000	
26	Act. Gas Flow (ACT_m3/h)	6.137	---	---	2.741e-034	
27	Avg. Liq. Density (kgmole/m3)	10.04	10.04	10.04	10.04	
28	Specific Heat (kJ/kgmole-C)	122.6	140.7	141.4	122.6	
29	Std. Gas Flow (STD_m3/h)	74.34	8660	8750	3.318e-033	
30	Std. Ideal Liq. Mass Density (kg/m3)	575.1	575.1	575.1	575.1	
31	Act. Liq. Flow (m3/s)	0.0000	1.042e-002	1.056e-002	0.0000	
32	Z Factor	0.7807	4.805e-002	4.775e-002	0.7808	
33	Watson K	13.57	13.57	13.57	13.57	
34	User Property	---	---	---	---	
35	Cp/(Cp - R)	1.073	1.063	1.062	1.073	
36	Cp/Cv	1.197	1.293	1.293	1.197	
37	Heat of Vap. (kJ/kgmole)	1.634e+004	1.630e+004	1.632e+004	1.634e+004	
38	Kinematic Viscosity (cSt)	0.3281	0.2668	0.2641	0.3283	
39	Liq. Mass Density (Std. Cond) (kg/m3)	577.9	577.9	577.9	577.9	
40	Liq. Vol. Flow (Std. Cond) (m3/h)	0.3116	36.30	36.68	1.391e-035	
41	Liquid Fraction	0.0000	1.000	1.000	0.0000	
42	Molar Volume (m3/kgmole)	1.952	0.1024	0.1028	1.953	
43	Mass Heat of Vap. (kJ/kg)	285.2	284.5	284.9	285.3	
44	Phase Fraction [Molar Basis]	1.0000	0.0000	0.0000	1.0000	
45	Surface Tension (dyne/cm)	---	10.17	10.01	---	
46	Thermal Conductivity (W/m-K)	2.254e-002	8.789e-002	8.738e-002	2.254e-002	
47	Viscosity (cP)	9.629e-003	0.1492	0.1472	9.629e-003	
48	Partial Pressure of H2S (kPa)	0.0000	0.0000	0.0000	0.0000	
49	Cv (Semi-Ideal) (kJ/kgmole-C)	114.3	132.4	133.1	114.3	
50	Mass Cv (Semi-Ideal) (kJ/kg-C)	1.996	2.312	2.324	1.996	
51	Cv (kJ/kgmole-C)	102.4	108.8	109.4	102.4	
52	Mass Cv (kJ/kg-C)	1.788	1.900	1.909	1.788	
53	Cv (Ent. Method) (kJ/kgmole-C)	102.5	---	---	102.3	
54	Mass Cv (Ent. Method) (kJ/kg-C)	1.790	---	---	1.786	
55	Cp/Cv (Ent. Method)	1.196	---	---	1.198	
56	Reid VP at 37.8 C (kPa)	458.0	458.1	458.1	458.0	
57	Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	0.3116	36.30	36.68	1.391e-035	

STATUS

OK

NOTES

Description

1	Honeywell Company Name Not Available Calgary, Alberta CANADA	Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc
2		Unit Set:	SI
3		Date/Time:	Friday Sep 4 2015, 16:44:21
4			
5			

Tray Section: Main TS @De-C14

Vapour Draws Summary

11	Name:	Name:	Name:
12	Tray Number		
13	Temperature (C)		
14	Pressure (kPa)		
15	Mass Flow (kg/h)		
16	Molar Flow (kgmole/h)		
17	Liquid Volume Flow (m3/h)		
18	Molar Enthalpy (kJ/kgmole)		
19	Mass Enthalpy (kJ/kg)		
20	Heat Flow (kJ/h)		
21	Molecular Weight		
22	Molar Entropy (kJ/kgmole-C)		
23	Mass Entropy (kJ/kg-C)		
24	Molar Density (kgmole/m3)		
25	Mass Density (kg/m3)		
26	Std Liq Mass Den (kg/m3)		
27	Molar Heat Cap (kJ/kgmole-C)		
28	Mass Heat Cap (kJ/kg-C)		
29	Thermal Cond (W/m-K)		
30	Viscosity (cP)		
31	Surface Tension (dyne/cm)	---	---
32	Z Factor		

Liquid Draws Summary

35	Name:	Name:	Name:
36	Tray Number		
37	Temperature (C)		
38	Pressure (kPa)		
39	Mass Flow (kg/h)		
40	Molar Flow (kgmole/h)		
41	Liquid Volume Flow (m3/h)		
42	Molar Enthalpy (kJ/kgmole)		
43	Mass Enthalpy (kJ/kg)		
44	Heat Flow (kJ/h)		
45	Molecular Weight		
46	Molar Entropy (kJ/kgmole-C)		
47	Mass Entropy (kJ/kg-C)		
48	Molar Density (kgmole/m3)		
49	Mass Density (kg/m3)		
50	Std Liq Mass Den (kg/m3)		
51	Molar Heat Cap (kJ/kgmole-C)		
52	Mass Heat Cap (kJ/kg-C)		
53	Thermal Cond (W/m-K)		
54	Viscosity (cP)		
55	Surface Tension (dyne/cm)		
56	Z Factor		

Water Draws Summary

59	Name:	Name:	Name:
60	Tray Number		
61	Temperature (C)		
62	Pressure (kPa)		
63	Mass Flow (kg/h)		
64	Molar Flow (kgmole/h)		
65	Water Volume Flow (m3/h)		
66	Molar Enthalpy (kJ/kgmole)		
67	Mass Enthalpy (kJ/kg)		
68	Heat Flow (kJ/h)		

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5		CANADA	

Tray Section: Main TS @ De-C14 (continued)

Water Draws Summary

11		Name:	Name:	Name:
12	Molecular Weight			
13	Molar Entropy	(kJ/kgmole-C)		
14	Mass Entropy	(kJ/kg-C)		
15	Molar Density	(kgmole/m3)		
16	Mass Density	(kg/m3)		
17	Std Liq Mass Den	(kg/m3)		
18	Molar Heat Cap	(kJ/kgmole-C)		
19	Mass Heat Cap	(kJ/kg-C)		
20	Thermal Cond	(W/m-K)		
21	Viscosity	(cP)		
22	Surface Tension	(dyne/cm)		
23	Z Factor			

User Variables

1 Main TS

Tray :

28		Liquid	Vapour	Feed :	_ @De-C14	Feed :
29	Temperature (C)	83.34	145.3		34.00	
30	Pressure (kPa)	1279	1312		1323	
31	Mass Flow (kg/h)	2.282e+004	2.116e+004		1.560e+004	
32	Molar Flow (kgmole/h)	394.7	369.4		272.4	
33	Liquid Volume Flow (m3/h)	39.48	36.80		27.13	
34	Molar Enthalpy (kJ/kgmole)	-1.175e+005	-1.003e+005		-1.236e+005	
35	Mass Enthalpy (kJ/kg)	-2032	-1751		-2157	
36	Heat Flow (kJ/h)	-4.636e+007	-3.706e+007		-3.366e+007	
37	Molecular Weight	57.82	57.28		57.28	
38	Molar Entropy (kJ/kgmole-C)	146.6	158.8		91.87	
39	Mass Entropy (kJ/kg-C)	2.535	2.773		1.604	
40	Molar Density (kgmole/m3)	8.414	0.5659		9.727	
41	Mass Density (kg/m3)	486.5	32.41		557.2	
42	Std Liq Mass Den (kg/m3)	580.7	577.9		577.9	
43	Molar Heat Cap (kJ/kgmole-C)	177.1	209.5		141.5	
44	Mass Heat Cap (kJ/kg-C)	3.063	3.657		2.471	
45	Thermal Cond (W/m-K)	6.812e-002	2.633e-002		0.0872	
46	Viscosity (cP)	9.524e-002	1.027e-002		0.1466	
47	Surface Tension (dyne/cm)	4.955	---		9.954	
48	Z Factor	5.127e-002	0.6662		5.328e-002	

2 Main TS

Tray :

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2			Unit Set:	SI
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Tray Section: Main TS @De-C14 (continued)

2__Main TS

Tray :

	Liquid	Vapour	Feed :	Feed :
12	Viscosity (cP)	0.0951	1.027e-002	
13	Surface Tension (dyne/cm)	4.942	---	
14	Z Factor	5.142e-002	0.6662	

3__Main TS

Tray :

	Liquid	Vapour	Feed :	Feed :
18	Temperature (C)	87.44	145.3	
19	Pressure (kPa)	1280	1312	
20	Mass Flow (kg/h)	2.263e+004	2.832e+004	
21	Molar Flow (kgmole/h)	383.8	487.2	
22	Liquid Volume Flow (m3/h)	38.81	48.88	
23	Molar Enthalpy (kJ/kgmole)	-1.214e+005	-1.024e+005	
24	Mass Enthalpy (kJ/kg)	-2058	-1762	
25	Heat Flow (kJ/h)	-4.657e+007	-4.988e+007	
26	Molecular Weight	58.98	58.12	
27	Molar Entropy (kJ/kgmole-C)	146.6	157.6	
28	Mass Entropy (kJ/kg-C)	2.485	2.712	
29	Molar Density (kgmole/m3)	8.268	0.5659	
30	Mass Density (kg/m3)	487.6	32.89	
31	Std Liq Mass Den (kg/m3)	586.1	582.2	
32	Molar Heat Cap (kJ/kgmole-C)	180.9	209.5	
33	Mass Heat Cap (kJ/kg-C)	3.067	3.604	
34	Thermal Cond (W/m-K)	6.789e-002	2.633e-002	
35	Viscosity (cP)	9.513e-002	1.027e-002	
36	Surface Tension (dyne/cm)	4.938	---	
37	Z Factor	5.163e-002	0.6662	

4__Main TS

Tray :

	Liquid	Vapour	Feed : Feed 2 @De-C14	Feed :
41	Temperature (C)	90.02	145.3	89.92
42	Pressure (kPa)	1280	1312	1313
43	Mass Flow (kg/h)	2.822e+004	2.819e+004	5352
44	Molar Flow (kgmole/h)	471.5	480.8	86.76
45	Liquid Volume Flow (m3/h)	48.10	48.47	9.000
46	Molar Enthalpy (kJ/kgmole)	-1.242e+005	-1.039e+005	-1.202e+005
47	Mass Enthalpy (kJ/kg)	-2075	-1773	-1948
48	Heat Flow (kJ/h)	-5.854e+007	-4.997e+007	-1.043e+007
49	Molecular Weight	59.84	58.64	61.68
50	Molar Entropy (kJ/kgmole-C)	146.6	157.9	120.2
51	Mass Entropy (kJ/kg-C)	2.449	2.693	1.948
52	Molar Density (kgmole/m3)	8.166	0.5659	8.125
53	Mass Density (kg/m3)	488.7	33.18	501.2
54	Std Liq Mass Den (kg/m3)	589.7	584.5	598.7
55	Molar Heat Cap (kJ/kgmole-C)	183.4	209.5	182.5
56	Mass Heat Cap (kJ/kg-C)	3.065	3.573	2.959
57	Thermal Cond (W/m-K)	6.781e-002	2.633e-002	6.993e-002
58	Viscosity (cP)	9.527e-002	1.027e-002	9.899e-002
59	Surface Tension (dyne/cm)	4.934	---	5.404
60	Z Factor	5.192e-002	0.6662	5.354e-002

5__Main TS

Tray :

	Liquid	Vapour	Feed :	Feed :
64	Temperature (C)	91.65	145.3	
65	Pressure (kPa)	1281	1312	
66	Mass Flow (kg/h)	2.820e+004	2.842e+004	
67	Molar Flow (kgmole/h)	467.6	481.7	
68	Liquid Volume Flow (m3/h)	47.95	48.76	

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Tray Section: Main TS @De-C14 (continued)

5__Main TS

Tray :

	Liquid	Vapour	Feed :	Feed :
12 Molar Enthalpy (kJ/kgmole)	-1.274e+005	-1.069e+005		
13 Mass Enthalpy (kJ/kg)	-2113	-1812		
14 Heat Flow (kJ/h)	-5.959e+007	-5.151e+007		
15 Molecular Weight	60.31	59.00		
16 Molar Entropy (kJ/kgmole-C)	146.6	156.3		
17 Mass Entropy (kJ/kg-C)	2.430	2.650		
18 Molar Density (kgmole/m3)	8.101	0.5659		
19 Mass Density (kg/m3)	488.6	33.38		
20 Std Liq Mass Den (kg/m3)	591.2	585.7		
21 Molar Heat Cap (kJ/kgmole-C)	185.2	209.5		
22 Mass Heat Cap (kJ/kg-C)	3.070	3.551		
23 Thermal Cond (W/m-K)	0.0677	2.633e-002		
24 Viscosity (cP)	9.529e-002	1.027e-002		
25 Surface Tension (dyne/cm)	4.913	---		
26 Z Factor	5.213e-002	0.6662		

6__Main TS

Tray :

	Liquid	Vapour	Feed :	Feed :
30 Temperature (C)	93.71	145.3		
31 Pressure (kPa)	1281	1312		
32 Mass Flow (kg/h)	2.813e+004	2.841e+004		
33 Molar Flow (kgmole/h)	461.3	477.9		
34 Liquid Volume Flow (m3/h)	47.63	48.61		
35 Molar Enthalpy (kJ/kgmole)	-1.309e+005	-1.100e+005		
36 Mass Enthalpy (kJ/kg)	-2147	-1850		
37 Heat Flow (kJ/h)	-6.038e+007	-5.256e+007		
38 Molecular Weight	60.98	59.45		
39 Molar Entropy (kJ/kgmole-C)	146.6	155.2		
40 Mass Entropy (kJ/kg-C)	2.404	2.611		
41 Molar Density (kgmole/m3)	8.016	0.5659		
42 Mass Density (kg/m3)	488.8	33.38		
43 Std Liq Mass Den (kg/m3)	593.5	587.2		
44 Molar Heat Cap (kJ/kgmole-C)	187.4	209.5		
45 Mass Heat Cap (kJ/kg-C)	3.074	3.524		
46 Thermal Cond (W/m-K)	6.758e-002	2.633e-002		
47 Viscosity (cP)	9.537e-002	1.027e-002		
48 Surface Tension (dyne/cm)	4.893	---		
49 Z Factor	5.241e-002	0.6662		

7__Main TS

Tray :

	Liquid	Vapour	Feed :	Feed :
53 Temperature (C)	96.64	145.3		
54 Pressure (kPa)	1282	1312		
55 Mass Flow (kg/h)	2.778e+004	2.833e+004		
56 Molar Flow (kgmole/h)	447.7	471.5		
57 Liquid Volume Flow (m3/h)	46.75	48.29		
58 Molar Enthalpy (kJ/kgmole)	-1.349e+005	-1.131e+005		
59 Mass Enthalpy (kJ/kg)	-2174	-1883		
60 Heat Flow (kJ/h)	-6.038e+007	-5.335e+007		
61 Molecular Weight	62.04	60.09		
62 Molar Entropy (kJ/kgmole-C)	146.6	154.9		
63 Mass Entropy (kJ/kg-C)	2.363	2.577		
64 Molar Density (kgmole/m3)	7.894	0.5659		
65 Mass Density (kg/m3)	489.7	34.00		
66 Std Liq Mass Den (kg/m3)	597.2	589.5		
67 Molar Heat Cap (kJ/kgmole-C)	190.6	209.5		
68 Mass Heat Cap (kJ/kg-C)	3.073	3.486		

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Tray Section: Main TS @De-C14 (continued)

7__Main TS

Tray :

	Liquid	Vapour	Feed :	Feed :
12	Thermal Cond (W/m-K)	6.743e-002	2.633e-002	
13	Viscosity (cP)	9.564e-002	1.027e-002	
14	Surface Tension (dyne/cm)	4.880	---	
15	Z Factor	5.282e-002	0.6662	

8__Main TS

Tray :

	Liquid	Vapour	Feed : Feed 1 @De-C14	Feed :
19	Temperature (C)	101.9	145.3	20.19
20	Pressure (kPa)	1283	1312	1311
21	Mass Flow (kg/h)	3.922e+004	2.798e+004	6237
22	Molar Flow (kgmole/h)	609.1	458.0	85.87
23	Liquid Volume Flow (m3/h)	65.16	47.41	10.00
24	Molar Enthalpy (kJ/kgmole)	-1.405e+005	-1.165e+005	-1.759e+005
25	Mass Enthalpy (kJ/kg)	-2183	-1907	-2423
26	Heat Flow (kJ/h)	-8.560e+007	-5.335e+007	-1.511e+007
27	Molecular Weight	64.39	61.10	72.63
28	Molar Entropy (kJ/kgmole-C)	146.6	156.1	79.68
29	Mass Entropy (kJ/kg-C)	2.276	2.555	1.097
30	Molar Density (kgmole/m3)	7.667	0.5659	8.621
31	Mass Density (kg/m3)	493.6	34.57	626.1
32	Std Liq Mass Den (kg/m3)	605.5	593.1	629.2
33	Molar Heat Cap (kJ/kgmole-C)	196.5	209.5	160.8
34	Mass Heat Cap (kJ/kg-C)	3.052	3.429	2.214
35	Thermal Cond (W/m-K)	6.725e-002	2.633e-002	0.1026
36	Viscosity (cP)	9.739e-002	1.027e-002	0.2463
37	Surface Tension (dyne/cm)	4.920	---	14.71
38	Z Factor	5.365e-002	0.6662	6.237e-002

9__Main TS

Tray :

	Liquid	Vapour	Feed :	Feed :
42	Temperature (C)	106.1	145.3	
43	Pressure (kPa)	1283	1312	
44	Mass Flow (kg/h)	3.960e+004	3.319e+004	
45	Molar Flow (kgmole/h)	603.2	533.5	
46	Liquid Volume Flow (m3/h)	65.31	55.82	
47	Molar Enthalpy (kJ/kgmole)	-1.434e+005	-1.190e+005	
48	Mass Enthalpy (kJ/kg)	-2184	-1912	
49	Heat Flow (kJ/h)	-8.648e+007	-6.346e+007	
50	Molecular Weight	65.65	62.21	
51	Molar Entropy (kJ/kgmole-C)	146.6	156.5	
52	Mass Entropy (kJ/kg-C)	2.233	2.515	
53	Molar Density (kgmole/m3)	7.519	0.5659	
54	Mass Density (kg/m3)	493.6	35.20	
55	Std Liq Mass Den (kg/m3)	609.9	597.6	
56	Molar Heat Cap (kJ/kgmole-C)	201.1	209.5	
57	Mass Heat Cap (kJ/kg-C)	3.064	3.367	
58	Thermal Cond (W/m-K)	6.695e-002	2.633e-002	
59	Viscosity (cP)	0.0967	1.027e-002	
60	Surface Tension (dyne/cm)	4.858	---	
61	Z Factor	5.412e-002	0.6662	

10__Main TS

Tray :

	Liquid	Vapour	Feed :	Feed :
65	Temperature (C)	111.1	145.3	
66	Pressure (kPa)	1284	1312	
67	Mass Flow (kg/h)	4.021e+004	3.356e+004	
68	Molar Flow (kgmole/h)	599.2	527.5	

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Tray Section: Main TS @De-C14 (continued)

10 Main TS

Tray :

11	Liquid	Vapour	Feed :	Feed :
12	Liquid Volume Flow (m ³ /h)	65.79	55.97	
13	Molar Enthalpy (kJ/kgmole)	-1.464e+005	-1.220e+005	
14	Mass Enthalpy (kJ/kg)	-2182	-1917	
15	Heat Flow (kJ/h)	-8.774e+007	-6.434e+007	
16	Molecular Weight	67.10	63.62	
17	Molar Entropy (kJ/kgmole-C)	146.6	157.5	
18	Mass Entropy (kJ/kg-C)	2.184	2.476	
19	Molar Density (kgmole/m ³)	7.349	0.5659	
20	Mass Density (kg/m ³)	493.1	36.00	
21	Std Liq Mass Den (kg/m ³)	614.6	602.8	
22	Molar Heat Cap (kJ/kgmole-C)	206.8	209.5	
23	Mass Heat Cap (kJ/kg-C)	3.081	3.293	
24	Thermal Cond (W/m-K)	6.656e-002	2.633e-002	
25	Viscosity (cP)	9.575e-002	1.027e-002	
26	Surface Tension (dyne/cm)	4.772	---	
27	Z Factor	5.468e-002	0.6662	

11 Main TS

Tray :

30	Liquid	Vapour	Feed :	Feed :
31	Temperature (C)	116.5	145.3	
32	Pressure (kPa)	1284	1312	
33	Mass Flow (kg/h)	4.104e+004	3.418e+004	
34	Molar Flow (kgmole/h)	598.2	523.6	
35	Liquid Volume Flow (m ³ /h)	66.63	56.45	
36	Molar Enthalpy (kJ/kgmole)	-1.493e+005	-1.253e+005	
37	Mass Enthalpy (kJ/kg)	-2177	-1920	
38	Heat Flow (kJ/h)	-8.933e+007	-6.560e+007	
39	Molecular Weight	68.60	65.27	
40	Molar Entropy (kJ/kgmole-C)	146.6	159.1	
41	Mass Entropy (kJ/kg-C)	2.136	2.437	
42	Molar Density (kgmole/m ³)	7.172	0.5659	
43	Mass Density (kg/m ³)	492.1	36.94	
44	Std Liq Mass Den (kg/m ³)	619.3	608.5	
45	Molar Heat Cap (kJ/kgmole-C)	212.9	209.5	
46	Mass Heat Cap (kJ/kg-C)	3.104	3.209	
47	Thermal Cond (W/m-K)	6.614e-002	2.633e-002	
48	Viscosity (cP)	0.0946	1.027e-002	
49	Surface Tension (dyne/cm)	4.665	---	
50	Z Factor	5.528e-002	0.6662	

12 Main TS

Tray :

53	Liquid	Vapour	Feed :	Feed :
54	Temperature (C)	121.7	145.3	
55	Pressure (kPa)	1285	1312	
56	Mass Flow (kg/h)	4.196e+004	3.500e+004	
57	Molar Flow (kgmole/h)	599.2	522.5	
58	Liquid Volume Flow (m ³ /h)	67.65	57.29	
59	Molar Enthalpy (kJ/kgmole)	-1.518e+005	-1.286e+005	
60	Mass Enthalpy (kJ/kg)	-2168	-1919	
61	Heat Flow (kJ/h)	-9.097e+007	-6.719e+007	
62	Molecular Weight	70.03	66.99	
63	Molar Entropy (kJ/kgmole-C)	146.6	161.0	
64	Mass Entropy (kJ/kg-C)	2.093	2.403	
65	Molar Density (kgmole/m ³)	7.006	0.5659	
66	Mass Density (kg/m ³)	490.6	37.91	
67	Std Liq Mass Den (kg/m ³)	623.5	614.1	
68	Molar Heat Cap (kJ/kgmole-C)	219.1	209.5	

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Tray Section: Main TS @De-C14 (continued)

12 Main TS

Tray :

	Liquid	Vapour	Feed :	Feed :
12 Mass Heat Cap	(kJ/kg-C)	3.129	3.127	
13 Thermal Cond	(W/m-K)	6.575e-002	2.633e-002	
14 Viscosity	(cP)	9.344e-002	1.027e-002	
15 Surface Tension	(dyne/cm)	4.551	---	
16 Z Factor		5.587e-002	0.6662	

13 Main TS

Tray :

	Liquid	Vapour	Feed :	Feed :
20 Temperature	(C)	126.5	145.3	
21 Pressure	(kPa)	1286	1312	
22 Mass Flow	(kg/h)	4.275e+004	3.593e+004	
23 Molar Flow	(kgmole/h)	599.2	523.6	
24 Liquid Volume Flow	(m3/h)	68.49	58.31	
25 Molar Enthalpy	(kJ/kgmole)	-1.538e+005	-1.315e+005	
26 Mass Enthalpy	(kJ/kg)	-2156	-1916	
27 Heat Flow	(kJ/h)	-9.217e+007	-6.883e+007	
28 Molecular Weight		71.34	68.62	
29 Molar Entropy	(kJ/kgmole-C)	146.6	163.2	
30 Mass Entropy	(kJ/kg-C)	2.055	2.378	
31 Molar Density	(kgmole/m3)	6.858	0.5659	
32 Mass Density	(kg/m3)	489.2	38.83	
33 Std Liq Mass Den	(kg/m3)	627.2	619.1	
34 Molar Heat Cap	(kJ/kgmole-C)	225.0	209.5	
35 Mass Heat Cap	(kJ/kg-C)	3.153	3.053	
36 Thermal Cond	(W/m-K)	6.546e-002	2.633e-002	
37 Viscosity	(cP)	9.251e-002	1.027e-002	
38 Surface Tension	(dyne/cm)	4.445	---	
39 Z Factor		5.642e-002	0.6662	

14 Main TS

Tray :

	Liquid	Vapour	Feed :	Feed :
43 Temperature	(C)	131.1	145.3	
44 Pressure	(kPa)	1286	1312	
45 Mass Flow	(kg/h)	4.300e+004	3.671e+004	
46 Molar Flow	(kgmole/h)	591.3	523.6	
47 Liquid Volume Flow	(m3/h)	68.46	59.15	
48 Molar Enthalpy	(kJ/kgmole)	-1.556e+005	-1.338e+005	
49 Mass Enthalpy	(kJ/kg)	-2140	-1908	
50 Heat Flow	(kJ/h)	-9.201e+007	-7.003e+007	
51 Molecular Weight		72.72	70.12	
52 Molar Entropy	(kJ/kgmole-C)	146.6	165.9	
53 Mass Entropy	(kJ/kg-C)	2.015	2.366	
54 Molar Density	(kgmole/m3)	6.717	0.5659	
55 Mass Density	(kg/m3)	488.4	39.68	
56 Std Liq Mass Den	(kg/m3)	631.1	623.6	
57 Molar Heat Cap	(kJ/kgmole-C)	230.7	209.5	
58 Mass Heat Cap	(kJ/kg-C)	3.172	2.988	
59 Thermal Cond	(W/m-K)	6.522e-002	2.633e-002	
60 Viscosity	(cP)	9.208e-002	1.027e-002	
61 Surface Tension	(dyne/cm)	4.365	---	
62 Z Factor		5.697e-002	0.6662	

15 Main TS

Tray :

	Liquid	Vapour	Feed :	Feed :
66 Temperature	(C)	137.0	145.3	
67 Pressure	(kPa)	1287	1312	
68 Mass Flow	(kg/h)	4.205e+004	3.697e+004	

1	 <p>Company Name Not Available Calgary, Alberta CANADA</p>		Case Name:	C:\Users\TEMP.ULL\Downloads\Desbuta jmacias_09.usc		
2			Unit Set:	SI		
3			Date/Time:	Friday Sep 4 2015, 16:44:21		
4	Tray Section: Main TS @De-C14 (continued)					
5	15 Main TS					
6	Tray :					
7	Liquid	Vapour	Feed :	Feed :		
8	561.4	515.7				
9	66.32	59.12				
10	-1.580e+005	-1.355e+005				
11	52	51				
12	Molar Flow (kgmole/h)	561.4	515.7			
13	Liquid Volume Flow (m3/h)	66.32	59.12			
14	Molar Enthalpy (kJ/kgmole)	-1.580e+005	-1.355e+005			
15	Mass Enthalpy (kJ/kg)	-2110	-1890			
16	Heat Flow (kJ/h)	-8.871e+007	-6.987e+007			
17	Molecular Weight	74.90	71.69			
18	Molar Entropy (kJ/kgmole-C)	146.6	170.4			
19	Mass Entropy (kJ/kg-C)	1.957	2.377			
20	Molar Density (kgmole/m3)	6.533	0.5659			
21	Mass Density (kg/m3)	489.4	40.57			
22	Std Liq Mass Den (kg/m3)	637.2	628.1			
23	Molar Heat Cap (kJ/kgmole-C)	238.0	209.5			
24	Mass Heat Cap (kJ/kg-C)	3.178	2.922			
25	Thermal Cond (W/m-K)	6.453e-002	2.633e-002			
26	Viscosity (cP)	9.264e-002	1.027e-002			
27	Surface Tension (dyne/cm)	4.327	---			
28	Z Factor	5.776e-002	0.6662			
29	16 Main TS					
30	Tray :					
31	Liquid	Vapour	Feed : Boilup @De-C14	Feed :		
32	147.4	145.3	147.9			
33	1308	1312	1285			
34	8.815e+005	3.602e+004	8.755e+005			
35	1.109e+004	485.7	1.101e+004			
36	1366	56.98	1357			
37	-1.627e+005	-1.371e+005	-1.618e+005			
38	-2047	-1848	-2036			
39	-1.804e+009	-6.657e+007	-1.782e+009			
40	79.50	74.15	79.50			
41	145.3	179.8	147.4			
42	1.828	2.425	1.855			
43	6.205	0.5659	4.073			
44	493.2	41.96	323.8			
45	648.9	635.1	648.9			
46	252.0	209.5	249.6			
47	3.170	2.825	3.139			
48	6.382e-002	2.633e-002	---			
49	9.473e-002	1.027e-002	---			
50	4.342	---	4.348			
51	6.028e-002	0.6662	---			
52	STATUS					
53	OK					
54	NOTES					
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69	Honeywell International Inc.	UniSim Design (R430 build 18059)	Page 170 of 170			
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