Cuero Gas Processing Plant
Preliminary Design

Group: ____

LETTER OF TRANSMITTAL

To: Mr. Oilman
Director, Natural Gas Liquids Asset Origination

From: Process Design Group

Date: November 29, 2018

Subject: Cuero Gas Processing Plant

Attached is the final preliminary design report for the development of the Cuero Gas Processing Plant. In this report we have evaluated the feasibility of developing a 200 MMSCFD rich gas processing plant for recovering natural gas liquid at the Eagle Ford Shale gas play located in Cuero, Texas.

In our design we performed an economic analysis for the 25 year project with a planned production schedule to begin mid-year 2021 and achieve full process capability by the year 2024. This plant will be capable of running in an ethane recovery or ethane rejection mode, but for the preliminary design we have only considered ethane recovery.

The preliminary design of the Cuero Gas Processing Plant has been completed and evaluated. We believe our design of this project is technically feasible and is an economically attractive project to pursue.

Executive Summary

The preliminary design of a 200 MMSCFD capacity gas processing plant located in Cuero, Texas is included in the attached report. Based on our design and economic analysis we have come to the conclusion that the proposal for the following plant is both technically feasible and economically attractive, we suggest moving forward with a detailed design.

The design of this plant utilizes a 75 foot demethanizer column for the recovery of natural gas liquid from a feed stream of carbon rich gas. The system proposed will include a propane refrigeration system and will utilize a turbo-expander, several brazed aluminum heat exchangers and multiple compressors in order to separate valuable natural gas liquid from a supply of rich feed gas which is currently valued at $5.00/MMBtu. This process is capable of running in an ethane recovery or rejection mode based on the current economic prices however, our evaluations only consider the design and economics for ethane recovery. The project is evaluated with a 25 year life and is expected to follow a production schedule that involves construction beginning Q4 2020 and start-up occurring mid-year 2021. At start-up the plant will be running at one fourth of the designed capacity and then increases to max capacity by year 2024. This design requires the hiring of 5 operators and we estimate the plant to be running 98% of the time for any given year.

The capital costs estimated for this design cost $61,990,426 and the expected annual operating costs will cost an average of $60,293,934 per year across the entire life of the project. We used a 7 year MACRS depreciation rate, an estimated inflation and escalation rate of 2% per year, an effective tax rate of 35% and considered the minimum rate of return to be 15%. The NPV for this project was found to be $60,942,541 and the DCFROR to be 34%. Both of these show that this is an economically attractive project for the current conditions. The payback period occurs after 3.21 years and the break-even price for purchasing the feed gas is $5.55/MMBtu.

The largest factor affecting the economic viability of this project will be the selling price of natural gas liquid. We analyzed that the process would become economically unattractive if the selling price of NGL drops by 10%.

This process utilizes extremely combustible substances and as such when constructing and operation ensues there should be constant monitoring for the presence of hydrocarbons and physical conditions that could result in an explosion. The process is operated under cryogenic conditions and, as a result, any exposed pipes or equipment should be outfitted with insulation and the operators should have access to cryogenic PPE. The process will be operating at high pressures and requires periodic inspection of the appropriately rated equipment.

This process doesn't produce any harmful byproducts that could affect the environment besides standard industrial emissions. Before construction, consider and plan for any regulatory guidelines with a natural gas producing process.

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Introduction

The recent acquisition of land in the Eagle Ford Shale gas play in South Texas requires us to explore design methods for recovering natural gas liquids. We evaluated the feasibility of a new gas processing plant near Cuero, Texas. This plant will be able to operate with a capacity of 200 million standard cubic feet per day (MMSCFD) of hydrocarbon rich feed gas when fully operational. This project is expected to increase capacity from 50 MMSCFD in year 2021 to operate under its full capacity of 200 MMSCFD by the year 2024. The overall project life evaluated is predicted to be 25 years. Included in our design for this project is a simulation of a demethanizer process and an economic analysis to highlight the feasibility of constructing a new plant to produce natural gas liquids.

Refined natural gas products have the ability to be sold for use in powering cars, homes, businesses and so much more. Our economy relies heavily on natural gas products to power the vast majority of our everyday devices and comforts. Unfortunately, natural gas does not come out of the ground immediately ready for use. A series of refining processes are required to remove compounds that are harmful to the environment and harmful to more expensive downstream refining equipment.

Methane, from a physical standpoint, is a very light hydrocarbon that requires very energy intensive processes to condense. Unfortunately, methane is the single most common component in natural gas in its upstream form. Longer chained hydrocarbons, such as ethane, propane, butane, and beyond are more suitable to be processed into natural gas liquids (NGL). Since liquid petroleum products are more valuable removing the methane from natural gas allows for a more energy dense product stream to be produced for transportation and sale. With further refining, NGL streams can be used to power numerous processes, or can be converted into ethylene or other chemicals for use in plastics or other petroleum products.

One of the most important parts to make natural gas a valuable commodity is removing the methane from the feed gas. We used the Ortloff gas subcooled process (GSP) for this process which involves the use of a turbo-expander, a cold-separator, and a demethanizer column to create a mostly methane residue gas stream from the top of the tower and the bottom product is our NGL stream containing the heavier longer-chained hydrocarbons like ethane, propane, butane, etc. The process of removing the methane from the NGL requires cryogenic conditions in a demethanizer column. We can run our process in an ethane-recovery form or an ethane rejection form based on the current price of ethane but, for the purposes of our project we assumed that the system would only be run with ethane-recovery.

The feed gas and residue gas are both worth $5.00/MMBtu and the NGL is sold by composition in the following table:

Table 1: Stream Component Prices

Component	$/gallon
Ethane	0.60
Propane	1.00
i-Butane	1.35
n-Butane	1.25
Pentane+	1.50

The goals for this project are to design and assess the technical feasibility of the process that factors in safety and environmental regulations while minimizing capital and operating expenses and maximizing the quantity and quality of NGL produced, and to make the process an economically attractive option. The target product for our process is a Y-Grade NGL mixture with less than 0.5% liquid volume methane when handling 200 MMSCFD of rich feed gas. We evaluated our project to find the most economically viable option given the standards of NGL we want to produce. We also considered the option of foregoing the construction of this gas processing plant for selling the rich gas feed as provided at the $5.00/MMBtu.

Design Basis

The Cuero gas processing plant has a 200 million standard cubic feet per day (MMSCFD) feed gas capacity. The simulation designed using Aspen Hysys V.10 utilized the Peng-Robinson equations of state which was developed with a focus on natural gas systems. The best alternative to the Peng-Robinson EOS is the SRK EOS since Peng-Robinson has better behavior near the critical point. This is vital for the modeling of this gas processing plant since the basis of this separations process is condensing the heavier components of the rich gas feed stream [1]. The expected production per day is set to follow Table 2 below for the coming years:

Table 2: Production Rates By Year

Year	Production, MMSCFD
2021	50
2022	100
2023	120
2024	200
2025 and beyond	200

The feed gas and residue gas are each worth $5.00/MMBtu and NGL is sold based on the composition of hydrocarbons (see Table 1).

The plant is expected to operate with a service factor of 98% over the course of the 25 year evaluation life. Construction is set to begin in the fourth quarter of 2020 with startup taking place mid-year 2021. The current plans have been evaluated with the plant increasing to the full designed capacity starting in year 2024.

The plant is designed to be supplied with an inlet gas fed through a slug catcher, amine unit and mole sieve to remove any CO_2 and water in the stream. These units were designed and implemented previously and as a result fall outside the scope of our work. The feed gas coming in to our system is expected to be 900 psig, 80°F, and comprised of the following:

Table 3: Feed Gas Composition

Component	Mole %
Nitrogen	0.124
Carbon Dioxide	0.100
Methane	81.522
Ethane	12.170
Propane	3.550
i-Butane	0.761
n-Butane	1.014
i-Pentane	0.304
n-Pentane	0.202
Hexanes+	0.253

We expect to produce residue gas at 950 psig between 40°F and 120°F. It is to only have a maximum of 2.0% by volume carbon dioxide, 0.1% by volume of oxygen, and 4.5% by volume of non-hydrocarbons. The Y-Grade NGL mixture is to be produced at 1,300 psig between 40°F and 120°F. It is to only have a maximum of 1.5% by liquid volume of ethane, 0.5% by liquid volume of methane, and 1200 parts per million by weight of sulfur.

The utilities to power the equipment drives will cost $0.085 per kilowatt-hour. We have designed our process with the assumption that we won't have access to cooling water, steam, nitrogen, or utility air. We expect to only have access to utility water as well as instrument air at pressures between 100 psig and 120 psig. The site at Cuero, Texas will have an ambient temperature of 100°F and the elevation is 400 ft above sea level.

Our simulation for this process was completed in Aspen HYSYS version 10 and we used the Peng-Robinson fluid package to model our liquids because of the system's high concentration of hydrocarbons.

After our feed gas leaves the 3 cold box brazed aluminum heat exchangers at the beginning of the process, the feed has been cooled from the propane refrigeration system, as well as by the top and bottoms products of the tower to a temperature of -56°F. After leaving the cold separator, the vapor leaves and is split into two streams. Some of the feed is expanded through the turbo-expander, where its pressure is dropped to 210 psia and -141°F before entering the tower at the top stage. The other half of the feed exchanges heat with the top product from the tower, which cools the feed to -112°F before entering the top stage of the tower. The liquid leaving the cold separator enters an expansion valve which decreases the temperature and pressure to -120°F and 210 psia before entering the tower at the sixth stage from the top.

The top product, our residue gas stream, leaves the tower at -145°F and 260 psia with flow rate of 7.17 MMlb/day before exchanging heat with one of the streams from the cold separator, causing the product stream to be warmed to -100°F. This stream then exchanges heat with the rich gas feed stream (the third heat exchanger in the cold box) and is warmed to -41°F. The stream then enters the compressor side of the turbo-expander and is compressed from 257

psia to 338 psia and is heated to -2°F. The stream now enters the final compressor before it can leave as the residue gas product. This compressor compresses the stream to the exiting pressure of 965 psia.

The bottoms product of the tower (what will become the NGL stream) leaves at 46°F and 280 psia at a rate of 0.936 MMgal/day. This stream then enters a pump to increase the pressure to 380 psia so that the stream is no longer saturated. Liquids allow for better heat exchange, so this stream is then put through a heat exchanger that exchanges heat with the initial feed gas (the first heat exchanger of the cold box) and is warmed to 72°F. The final step for this stream is to be put through a pump to increase its pressure to 1,315 psia.

A refrigeration cycle is used to cool the inlet feed. This takes place in the second heat exchanger of the cold box. The propane enters this exchanger at -33°F, cooling the feed stream from 71°F to -33°F. The propane is then compressed before being sent through a Joule-Thomson valve to be sent into the cold box heat exchanger at -41°F again, completing the refrigeration cycle.

These key values are important to keep in mind throughout the system, because they represent the operating targets for the design of our system, and dictate operating costs throughout the process because the parameters affect the necessary duties and sizes of equipment needed.

Technical Discussion

Design Philosophy

The core design of the Cuero Gas Processing Plant is based around optimizing the balance between the cold separator, V-101, the demethanizer distillation tower, T-101, and the compressors C-101, C-102, C-103, and C-201. Each piece of equipment affects the others significantly and greatly influences the overall economics of the process. The ideal process chosen relies on a cold separator temperature low enough to allow sufficient ethane recovery at the bottom of the demethanizer tower and ensuring the compressor duties remain economically attractive.

Cold Separator Temperature

Deciding on an optimal cold separator temperature requires a balance between the propane refrigeration system and its compressor C-201, the performance of the turbo-expander, the compressor C-103, and the achievable separation in the demethanizer tower. Adjusting the cold separator temperature was accomplished by modifying two variables, the flow rate of propane through the refrigeration system and the exit temperature in E-102. To achieve a greater chilling capacity to be used on the rich gas we require a greater propane flow rate through E-102, a higher stream 19 temperature exiting E-103, or a combination of the two. A warmer cold separator temperature closer to 0°F requires less duty from the propane refrigeration compressor and produces a higher vapor flow rate exiting the separator. These are the positive results with a higher cold separator temperature as less energy is required by C-201 and the higher vapor flow rate generates more power from the turbine of the turbo-expander, C-101. The more power generated by the C-101 will reduce the additional power required by C-103 to compress the residue gas stream. Conversely, the performance of the demethanizer column suffers from higher temperatures and results in a lower ethane recovery for the NGL bottoms product (stream 14). Also, a higher vapor flow rate requires a larger cold separator. This prevents entrainment by keeping the vapor velocity low. The high temperature cold separator option improves the operating costs but penalizes the value of the products being produced.

The other extreme for the cold separator temperature range has the opposite effect on the operating costs and product values. A cold separator temperature near -50°F suits the demethanizer performance better however, it requires more duty from both compressors C-103 and C-201 since they would both need to compress a higher volume of gas. The increased propane compressor duty would simply be a result of requiring a higher mass flow rate to provide a greater chilling capacity required for E-102. Similarly, C-201 would require more duty because of a higher flow rate of stream 19 exiting E-103 which would be at a greater temperature and consequently, a lower density. Again the value of the products produced must be compared to the operating cost of the equipment. Overall, we found a trend of diminishing returns in the

column's ethane recovery and more proportional increases in the compressor duty demanded while the cold separator temperature dropped.

Side Reboiler

In an attempt to further reduce the duty required by the propane refrigeration system a side reboiler off of the demethanizer was simulated in Aspen HYSYS. The side reboiler in our simulation immediately caused issues to become increasingly more apparent. A flow rate conundrum as well as temperature and composition crosses also came into effect.

The flow rate conundrum starts with a lower cold separator temperature allowing an increased side draw flow rate. A higher flow rate allows the side draw feeding the side reboiler to absorb more heat from the rich gas stream in a heat exchanger. However, since the cold separator temperature was lowered in order to achieve that higher side draw flow rate the rich gas must now be cooled more. Thus, the higher flow rate of the side draw made possible by a lower cold separator temperature is negated by the fact that the rich gas needs to be cooled more before going into the cold separator.

In addition, the side draw would ideally be drawing liquid from one of the coldest stages on the upper portion of the column (see Table 4) and then returning it at a stage lower down the column where it is warmer to match temperature except this disrupts the columns performance greatly. The stages higher up the column have an increasing methane composition so taking a purified liquid and returning it further down the column ultimately means less separation efficiency as well as reductions in the overall separation achievable. If we were to avoid crossing the column composition profile then there will be a disruption in temperature. Returning the side draw to a stage higher up the column where the compositions more closely match means the temperature difference between that stage and the side draw post reboiler will be higher. Adding a relatively warm stream to the middle of the cryogenic column skews the temperature profile and again, the separation achievable i.e. ethane recovery suffers.

Table 4: T-101, Demethanizer Column Profile

	Liquid Molar Composition		Temperature
Stage	Methane	Ethane	°F
1	0.661	0.278	-145.0
2	0.649	0.288	-143.5
3	0.624	0.311	-140.8
4	0.576	0.354	-135.7
5	0.505	0.413	-127.5
6	0.395	0.395	-112.8
7	0.316	0.463	-95.9
8	0.187	0.587	-55.5
9	0.083	0.696	-8.7
10	0.030	0.733	20.7

Perhaps the biggest issue with the side draw is that no matter the temperature in the cold separator the side draw flow rate remains extremely low. The rich gas stream flows at a rate up to 200 MMSCFD or 439,200 lbm/hr while the side draw flow rates generated were two orders of magnitude lower. So essentially no matter the cold separator temperature the side draw is severely limited in its ability to absorb heat and chill the rich gas purely based on the differences in flow rates. In the best cases the side draw chilled the Rich Gas by 0.5°F. Investing in extra equipment and more importantly compromising the demethanizer column performance were ruled against the best interest of the gas processing plant. Ultimately, we elected for no side reboiler in our design.

Addition of P-101 A/B

In efforts to utilize integrated heat sources to condition the feed, the bottoms product from T-101, was used in heat exchanger E-101. The heat exchanger was configured with the 80°F rich gas stream and the bottoms product, stream 15, as the inlets. The issue arose when stream 16 exiting the heat exchanger partially vaporized. Stream 16 is our NGL product which needs to be pumped to 1,300 psi. With vapor being produced in this stream it compromises our ability to increase the pressure with a pump. Realizing this issue and wanting to avoid adding additional condensers or compressors the solution came from increasing the pressure of stream 14 by 100 psi prior to heat exchanger E-101. By doing this, the previously saturated liquid bottoms product from T-101 became subcooled. Now, instead of vaporizing with a temperature increase, stream 15 remains a liquid after exiting the heat exchanger. P-101 requires only 100 hp to increase the pressure of stream 14 by 100 psi. This pressure increase only raises the temperature of the stream by 1.5°F allowing the stream to maintain plenty of ability to absorb the remaining heat since the temperature difference compared to the stream 1 is nearly unchanged.

We evaluated the option of opting for the inexpensive pump, to gain more heat transfer in E-101, against increasing the propane refrigerant flow rate. It became very apparent that an increased propane flow rate had far greater financial penalty. A higher propane flow rate would require most notable more compressor duty from C-201. Over the lifetime of the project a 100 hp centrifugal pump is significantly cheaper to operate and maintain compared to even a small capacity increase in the designed propane refrigeration system.

Propane Refrigeration Minimum Pressure

At the point of lowest pressure in the propane refrigeration system (immediately prior to C-201) we still maintain a positive pressure in order to prevent leaks into the system. If there was a portion of the propane system in vacuum then the ambient atmosphere might have the opportunity to seep inwards. This would cause two main issues, one being that introducing an oxidizer in the form of oxygen, into a system with hydrocarbons is a major combustion concern. Secondly, non-condensable components like nitrogen can enter the system and collect in the air cooled condenser. This is a negative consequence since any gas that can't condense occupies effective surface area in the condenser which reduces the ability of the condenser to condense the propane required for refrigeration. Taking these two points into consideration the propane compressor, C-201, and the Joule-Thomson valve are designed to maintain a positive pressure at all points in the system.

T-101 Tower Number and Type of Trays

As part of achieving an optimal balance between capital and operating cost the distillation tower, T-101, was analyzed under multiple configurations. Seen on figure 1 below, the ethane recovery and number of stages are closely related. In order to achieve the best ethane recovery an increasing number of stages are required. Conveniently, with a greater number of stages the reboiler duty decreases due to the decreased liquid traffic. We settled at an optimum balance of 10 theoretical stages for our HYSYS simulation. Beyond that, the reboiler duty does not change significantly but neither does the ethane recovery. Furthermore, the greater number of trays continues to increase capital costs with relatively no benefits for a more valuable product or lower operating costs.

Since the project is planned to start at a lower capacity, the column must be capable of running in a wide range of conditions. Most notably the column hydraulics must be suitable at the extremes of 50 and 200 MMSCFD of rich gas feed. At the lower end of the spectrum, weeping of liquid down through the trays is the biggest concern. Oppositely at higher flow rates, jet flooding is a concern where the vapor velocity up through the trays is too high. Both phenomena result in negative consequences such as poor separation due to mass transfer between stages that is not intended. To solve this issue we designed the column to operate with bubble cap trays. Bubble cap trays will prevent weeping at the lowest flow rates and also reduce flooding at higher flow rates.

Given that Aspen HYSYS can simulate 100% tray efficiencies the 10 theoretical trays found is the most optimistic case possible. In reality though, cryogenic distillation columns operate with low tray efficiencies often in the range of 0.3 to 0.4 [2]. Choosing 0.33 as our actual tray efficiencies means the tower to be constructed will actually require 30 trays. This is taken into consideration when sizing and costing the tower and the trays.

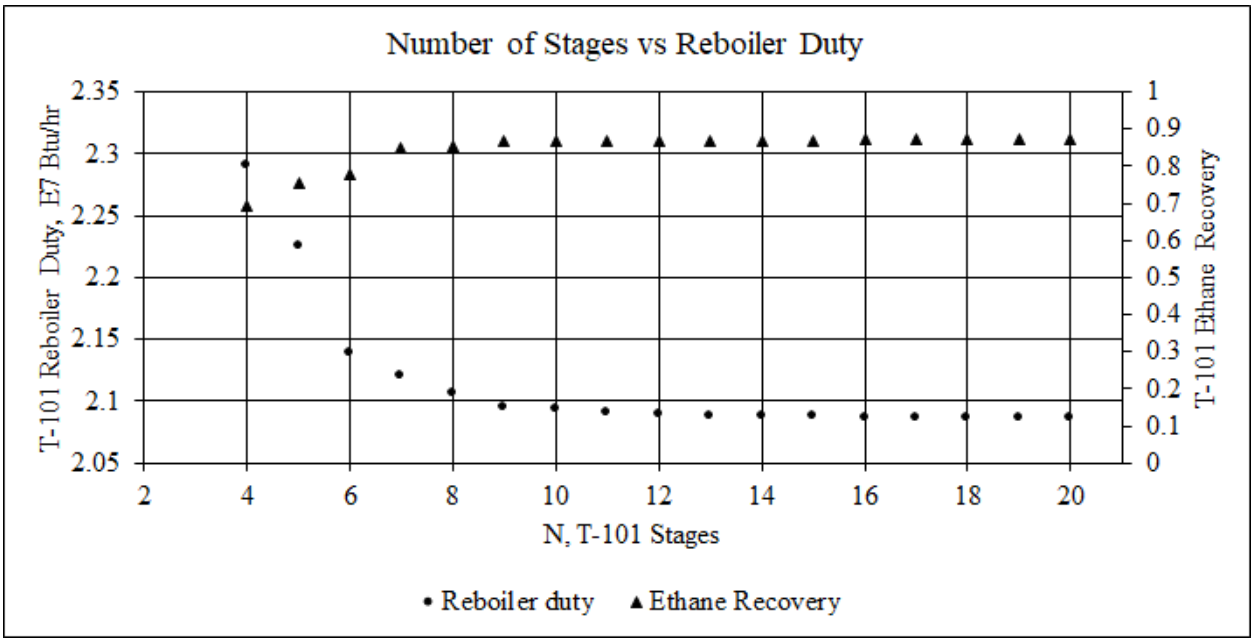

Figure 1: Number of Stages vs. Reboiler Duty for the Demethanizer

T-101 Section Diameters

With column hydraulics and economic factors dictating the design of the demethanizer column. We elected to design ours like many in industry, with two sections each at different diameters. With increased vapor traffic occurring in the higher stages of the column a larger diameter is required to prevent the entrainment of liquid upwards. The larger diameter means that at a given vapor flow rate the velocity of the vapor will be lower. This will help prevent flooding in the column. At the middle and the bottom of T-101 the vapor flow rates are less so a smaller diameter can be used. The upper section of the column designed has a diameter of 8 feet whilst the lower section of the column has a diameter of 6.5 feet. Sizing the column in this fashion lowers the capital cost of the column overall since excess material is not being used in the lower portion of the column where it is not necessarily required.

Description of the Process

The Cuero Gas Processing Plant is fed 200 MMSCFD of a rich gas stream at 915 psia and 80°F with the expected composition shown on Table 3. This stream then flows through the brazed aluminum heat exchangers, E-101 and E-102. After the first, the stream is cooled to 70.9°F utilizing the NGL product stream from the bottom of the demethanizer. The second heat exchanger, E-102, exchanges heat with our propane refrigeration system, cooling the rich gas stream to -33°F, and partially condenses the stream to a vapor fraction of 0.801. The rich gas stream then continues across a valve which drops the pressure from 912 psia to 812 psia and the temperature cools to -40°F. Next, our rich gas stream is cooled by the top product stream flowing through E-103, bringing the temperature down to -56.1°F with a vapor fraction of 0.686. The partial liquid stream is flash separated through V-101, separating the liquid and vapor components. The rich liquid stream flows from the separator at 1.34 MMgal/day through a proportional valve which drops the pressure and temperature to 210 psia and -120°F while partially vaporizing the stream to have a vapor fraction of 0.454. This stream enters the demethanizer at tray 6. The vapor stream from V-101 flows at a rate of 6.34 MMlb/day and is then split into two different streams. The first of which flows at a rate of 4.76 MMlb/day and is expanded via the turboexpander, C-101, decreasing the pressure and temperature to 210 psia and -141°F. This stream is then fed to our demethanizer at the top of the column, tray 1. The second stream flows at a rate of 1.59 MMlb/day and exchanges heat with our top residue gas stream through E-104. This stream then enters the demethanizer at tray 1 with a temperature of -112°F.

The top tray of the demethanizer runs at -145°F and 260 psia while the bottom tray runs at 20.7°F and 280 psia. This profile allows us to separate 97.8% of our methane from the rich feed gas. Leaving the demethanizer we have two streams, the top product vapor stream flowing at 7.17 MMlb/day, -145°F and 260 psia. The composition of the top residue gas stream is shown in Table 5 below:

Table 5: Residue Gas Composition

Component	Mole %
Nitrogen	0.149
Carbon Dioxide	0.055
Methane	97.842
Ethane	1.919
Propane	0.033

This residue gas stream flows through E-104 to cool down the cold separated rich vapor stream and leaves the heat exchanger at -101°F. Next, the stream flows through E-103 to cool down an earlier portion of the rich gas stream, this causes the residue gas to heat up to -41°F before entering a knock out drum. Then the residue vapor stream enters the compressor side of the turbo expander, C-102, and is compressed to a pressure of 338 psia and a temperature of -2.29°F. Then it is sent through the centrifugal compressor, C-103, and is compressed to 965 psia

and 166°F. We then use the air cooler, E-105, to cool this stream to the desired temperature of 120°F. At this point the residue gas product leaves our system.

The bottom LNG product stream comes out of the demethanizer at 0.936 MMgal/day as a liquid at 45.7°F and 280 psia. This stream is sent through centrifugal pump, P-101, in to E-101 increasing the pressure to 380 psia. This stream then cools down the rich gas feed stream and leaves E-101 at 72°F. We send this stream through another centrifugal pump, P-102, to prepare the stream to be sold or distributed. The final temperature and pressure of our NGL stream is 88.3°F and 1315 psia and the composition of our NGL product is shown in Table 6 below.

Table 6: Natural Gas Liquid Composition

Component	Mole %
Carbon Dioxide	0.321
Methane	0.823
Ethane	62.859
Propane	20.940
i-Butane	4.520
n-Butane	6.026
i-Pentane	1.807
n-Pentane	1.201
Hexanes+	1.504

We utilize a propane refrigeration cycle to cool our rich feed gas stream. The propane system contains an estimated 700,000 gallons of propane. The wholesale price of propane at the time of purchase will be $0.906/gal [3]. The propane flows at 3.25 MMgal/day through the system. This cycle starts just before E-102 which is responsible for cooling the feed gas stream. This propane stream enters E-102 as a partial liquid with a vapor fraction of 0.567 and has a pressure and temperature of 19 psia and -33.1°F. It flows through E-102 and leaves as a gas at 15.9 psia and -40.7°F. We send this gas through a knockout drum and into the first stage of our 4 stage centrifugal compressor, C-201. The gas stream has a pressure and temperature of 40.4 psia and 36.5°F, 106 psia and 119°F, 250 psia and 198°F, and 267 psia and 206°F for stages 1-4 respectively. We then pass this stream through an air cooler, E-201 to cool the propane to 127°F in order to condense the gas into a saturated liquid. The liquid propane then flows across a Joule-Thomson valve dropping the pressure and temperature down to the 19 psia and -33.1°F that was mentioned earlier, completing the refrigeration cycle.

A PFD of our design process, as well as a material stream table, can be seen on the following pages:

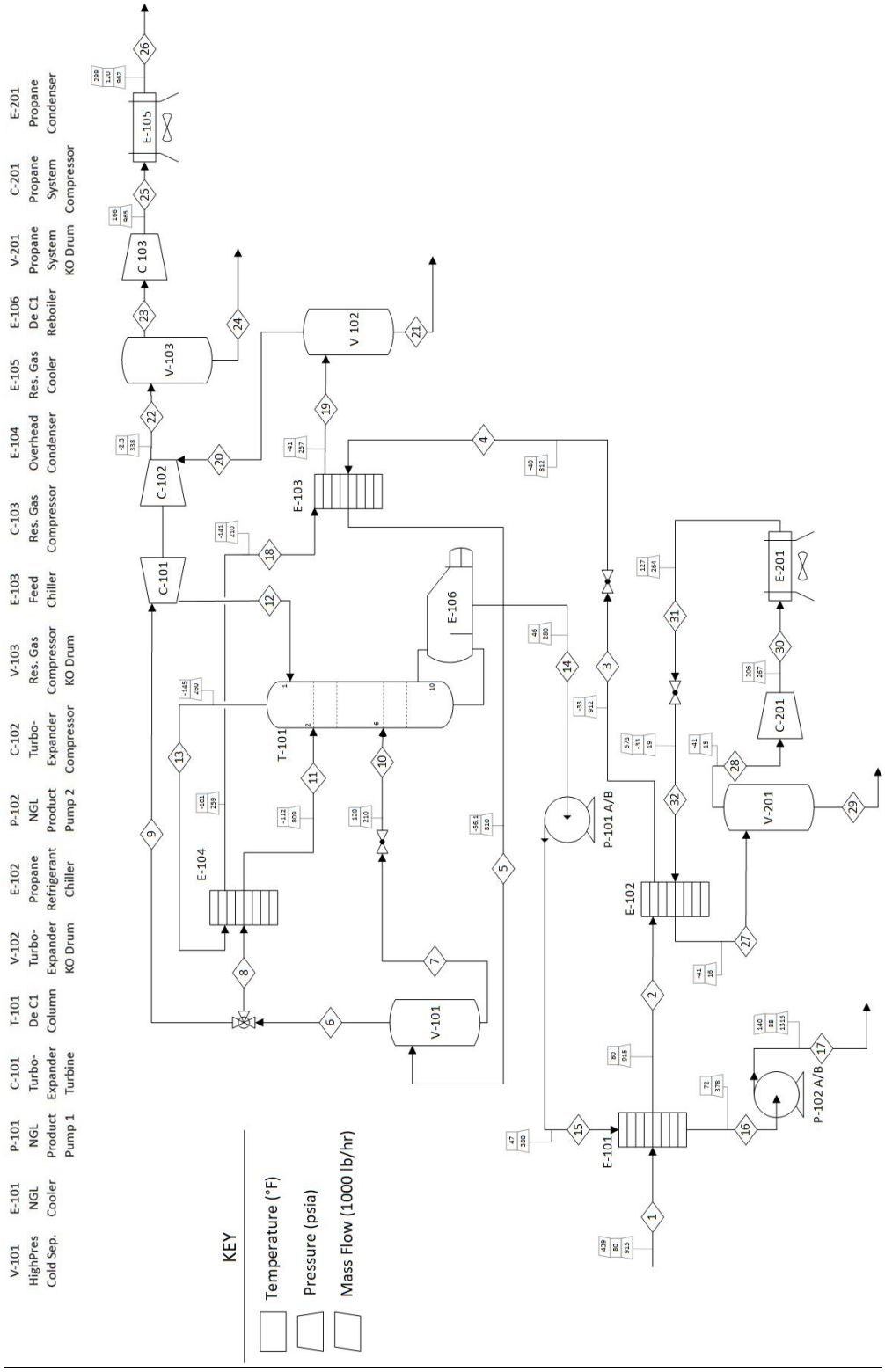

Figure 2: Process Flow Diagram

Table 7: Material Stream Data

Stream Number	Unit	1	2	3	4	5	6	7	8
Stream Description		Feed / Rich Gas	Feed Exiting NGL Cooler	Chilled Feed	Feed Exiting JT Valve	Feed to Phase Sep.	Cold Sep Vapor	Cold Sep. Liquid	Cold Sep. Vapor to Condenser
Phase Fraction (Vapour Phase)		1.00	1.00	0.80	0.80	0.69	1.00	0.00	1.00
Phase Fraction (Liquid Phase)		<empty>	<empty>	0.20	0.20	0.31	0.00	1.00	0.00
Phase Fraction (Overall)		1.00	1.00	0.80	0.80	0.69	1.00	0.00	1.00
Pressure	*psia*	915	913	912	812	810	810	810	810
Temperature	*F*	80.0	70.9	-33.0	-40.0	-56.1	-56.1	-56.1	-56.1
Phase Enthalpy (Overall)	*Btu/lbmole*	-34,674	-34,791	-36,767	-36,767	-37,225	-35,001	-42,077	-35,001
Mass Flow	*lb/hr*	439,153	439,153	439,153	439,153	439,153	264,206	174,947	66,052
Component Mass Flow									
Carbon Dioxide	*lb/hr*	966	966	966	966	966	570	396	143
Ethane	*lb/hr*	80,366	80,366	80,366	80,366	80,366	34,016	46,350	8,504
Water	*lb/hr*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
i-Butane	*lb/hr*	9,714	9,714	9,714	9,714	9,714	1,019	8,694	255
i-Pentane	*lb/hr*	4,817	4,817	4,817	4,817	4,817	191	4,626	47.8
Methane	*lb/hr*	287,216	287,216	287,216	287,216	287,216	219,708	67,507	54,927
n-Butane	*lb/hr*	12,943	12,943	12,943	12,943	12,943	1,025	11,918	256
n-Hexane	*lb/hr*	4,788	4,788	4,788	4,788	4,788	56.7	4,731	14.2
n-Pentane	*lb/hr*	3,201	3,201	3,201	3,201	3,201	97.2	3,103	24.3
Nitrogen	*lb/hr*	763	763	763	763	763	681	82.1	170
Propane	*lb/hr*	34,379	34,379	34,379	34,379	34,379	6,841	27,537	1,710
Actual Volume Flow	*USGPH*	832,602	807,350	432,872	497,142	409,873	356,110	53,686	89,027
Mass Density	*lb/ft3*	3.95	4.07	7.59	6.61	8.01	5.55	24.4	5.55
Heat Flow	*Btu/hr*	-761,482,392	-764,059,755	-807,436,229	-807,436,229	-817,506,124	-527,076,035	-290,438,573	-131,769,009

9	10	11	12	13	14	15	16
Cold Sep. Vapor to Turbine	Liquid Feed to Column	Vapor Feed to Column	Expanded Feed to Column	Demethanizer Vapor Product	Demethanizer Liquid Product	Pumped NGL Product	Heated NGL Product
1.00	0.45	<empty>	0.88	1.00	0.00	<empty>	<empty>
0.00	0.55	1.00	0.12	<empty>	1.00	1.00	1.00
1.00	0.45	0.00	0.88	1.00	0.00	0.00	0.00
810	210	809	210	260	280	380	378
-56.1	-120	-112	-141	-145	45.7	47.2	72.0
-35,001	-42,077	-37,142	-35,466	-34,514	-48,561	-48,529	-47,831
198,155	174,947	66,052	198,155	298,758	140,395	140,395	140,395
428	396	143	428	444	522	522	522
25,512	46,350	8,504	25,512	10,541	69,825	69,825	69,825
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
765	8,694	255	765	8	9,705	9,705	9,705
143	4,626	47.8	143.3	0.184	4,817	4,817	4,817
164,781	67,507	54,927	164,781	286,728	488	488	488
769	11,918	256	769	4.55	12,939	12,939	12,939
42.5	4,731	14.2	42.5	0.00	4,788	4,788	4,788
72.9	3,103	24.3	72.9	0.05	3,201	3,201	3,201
511	82.1	170	511	763	0.00	0.00	0.00
5,131	27,537	1,710	5,131	269	34,110	34,110	34,110
267,082	376,334	26,746	1,021,394	1,383,830	35,531	35,526	37,728
5.55	3.48	18.5	1.45	1.62	29.6	29.6	27.8
-395,307,026	-290,438,573	-139,827,969	-400,558,000	-630,468,109	-179,393,913	-179,276,718	-176,699,355

Technical Issues and Design Practices

Our simulation uses the Peng-Robinson fluid package because the system consists primarily of hydrocarbons. We assumed the processing plant will have a service factor of 98%. For the feed gas supplied to our system we assumed the pressure and temperature will be 900 psig and 80°F. Our process is cryogenic, for this reason we elected to use stainless steel for any part of our process that is at risk of reaching -40°F or below. For the parts of our process that do not operate cryogenically we believe carbon steel would be the best option, e.g. after the compression of our residue gas. We used brazed aluminum heat exchangers for our system. These heat exchangers have an overall heat transfer coefficient of 150 Btu/(hr*ft^2*°F) for gas/gas interactions and a coefficient of 200 Btu/(hr*ft^2*°F) for gas/phase interactions according to an article by John Polasek [4]. They are a commonly used option for this type of plant and are capable of handling the cryogenic conditions encountered with our process. We elected to use centrifugal compressors for all of the streams needing to be compressed. We have a very high volume of gas flowing through our system and centrifugal compressors are capable of performing under high flow rates. We used the similar reasoning when evaluating the pumps used in our liquid streams.

The basic purpose of each piece of equipment is as follows. Heat exchangers E-101, E-102, and E-103 are used to chill stream 1, the rich gas feed, prior to entering V-101, the cold separator. V-101 is used to perform a quick, bulk separation of the heavier components from the rich gas feed. This reduces the necessary column stages to achieve the desired separation since methane is easily separated from the majority of the heavier components present in the feed. Performing this preliminary division allows the respective streams to enter the column at different locations based on their compositions. The liquid leaving V-101 passes through a Joule-Thomson valve prior to entering T-101 in order to reduce the pressure and as a result, the temperature. The vapor leaving V-101 splits into two streams, streams 8 and 9. Stream 9 goes to a turbo-expander which extracts work via a reduction in pressure while stream 8 is condensed in E-104. Both resulting streams enter T-101 where the final separation is achieved. The bottom product of T-101 is sent to P-101 which increases the pressure to a value that doesn't allow the NGL stream to boil in E-101, where it can absorb energy and cool the feed stream. After E-101 the NGL is pumped to its final pressure via P-102. The top product of T-101, i.e. the residue gas is used in E-104 for condensing one of the feed streams in to the column. After condensing a feed stream, the top product then enters E-103 where it cools the rich gas feed stream. The residue gas is then sent through the knockout drum V-102 to catch any liquid present before entering the compression side of our turbo-expander, C-102. Passing through another knockout drum, V-103, the residue gas is then compressed further with C-103 then cooled by air cooler E-105 to reach the desired final state.

The propane refrigeration cycle has four main components. The compressor to increase the pressure of our gas, followed by an air cooler to condense the propane in to a saturated liquid. Then after condensing, a Joule-Thomson valve drops the pressure and the temperature prior to

being fed in to the evaporator, E-102. After being vaporized in E-102 the propane then enters V-201 to complete the cycle.

The major pieces of equipment and their costing information are listed in the tables below:

Table 8.1: Major Equipment Summary Demethanizer - Unit 10

Compressors	
C-102	**C-103**
Single stage	Single stage
Stainless steel	Carbon steel
75% efficient	75% efficient
Power = 2058 hp	Power = 9482 hp
Discharge pressure = 338 psia	Discharge pressure = 964.7psia
Drives	
D-101 (not shown on PFD)	**D-102 (not shown on PFD)**
Electric explosion proof	Electric explosion proof
W = 7135 kW	W = 187 kW
93% efficient	92.4% efficient
D-103 (not shown on PFD)	**D-104 (not shown on PFD)**
Electric explosion proof	Electric explosion proof
W = 75 kW	W = 372 kW
91.7% efficient	92.4% efficient
Heat Exchangers	
E-101	**E-102**
A = 726 ft²	A = 18731 ft²
Brazed aluminum	Brazed aluminum
Max pressure rating = 1006 psia	Max pressure rating = 1004 psia
E-103	**E-104**
A = 2601 ft²	A = 890 ft²
Brazed aluminum	Brazed aluminum
Max pressure rating = 893 psia	Max pressure rating = 891 psia
E-105	
A = 7620 ft²	
Carbon steel	
Max pressure rating = 1061 psia	
Pumps	
P-101 A/B	**P-102 A/B**
Centrifugal/electric drive	Centrifugal/electric drive
Carbon steel	Carbon steel
Power = 100 Bhp	Power = 500 Bhp
75% efficient	75 % efficient
Discharge pressure = 380 psia	Discharge pressure = 1315 psia

Table 8.2: Major Equipment Summary Demethanizer - Unit 100 *(continued)*

Tower
T-101
Stainless steel
Bubble cap trays
Feeds on trays 1 and 6
24-in tray spacing
Column height = 75 ft
Diameter = 8 ft, 6.33 ft
Max pressure rating = 330 psia

Turbine
C-101
Stainless steel
Power = 2058 hp
75 % efficient
Pressure differential = 600 psi

Vessels

V-101
Vertical
Stainless steel
With demister
Height = 24 ft
Diameter = 6 ft
Max pressure rating = 875 psig

V-102
Vertical
Stainless steel
With demister
Height = 34 ft
Diameter = 8.5 ft
Max pressure rating = 293 psig

V-103
Vertical
Carbon steel
With demister
Height = 34 ft
Diameter = 8.5 ft
Max pressure rating = 373 psig

Table 9: Major Equipment Summary Propane Refrigeration - Unit 200

Compressors	
C-201	
Number of stages = 4	
Stainless steel	
75 % efficient	
Power = 19225 hp	
Discharge pressure = 267 psia	
Drives	
D-201 (not shown on PFD)	**D-202 (not shown on PFD)**
Electric explosion proof	Electric explosion proof
W = 14,424 kW	W = 8,930 kW
93% efficient	93% efficient
Heat Exchangers	
E-201	
A = 34047 ft²	
Carbon steel	
Max pressure rating = 317 psia	
Vessels	
V-201	
Horizontal	
Stainless steel	
With demister	
Length = 34.5 ft	
Diameter = 11.5 ft	
Max pressure rating = 51 psig	

Safety

The demethanizer system must be run at cryogenic conditions to allow light gases such as ethane to remain in a liquid form for separation of the methane. It is important to insulate cryogenic piping, vessels, and the demethanizer tower to prevent atmospheric conditions from warming the fluid and increasing energy costs, but also to protect employees from cold burns [5]. Cryogenic conditions require special alloys for the materials of construction because carbon steel and other standard materials can become brittle and break under pressure at cryogenic temperatures. It is required that cryogenic PPE is available whenever working around the equipment, such as loose fitting cryogenically rated gloves and a full face shield.

This process operates under high pressures especially in areas dealing with the final pressurization of product streams. It is very important that appropriate materials are used that can withstand appropriate pressures where applicable. It is also imperative that the equipment is structurally sound and inspected periodically and that the operating conditions do not exceed the

maximum rated pressures. Under high pressures, our material could explode and ignite, leading to possible serious injury or fatality [6].

The process utilizes extremely combustible substances and is required to operate anaerobically, it should be constantly monitored for leaks and oxygen infiltration as well as other potential oxidizers.

Another important factor when prioritizing safety is to make sure that systems are built based on their design pressure rather than operating pressure. This helps to prevent the equipment from being overworked and helps prevent loss of containment of potentially dangerous gases and chemicals at high pressures and extremely high or low temperatures.

Loss Prevention

To ensure the longevity of the gas processing plant's most expensive and critical equipment proper housing should be considered. Since the compressors will not be spared they should be covered to keep them in the safest operating conditions possible. Also, isolation can help keep these pieces of equipment cleaner than if exposed to the rest of the plant environment. This could become important when performing routine inspections. If the equipment is kept clean any leaks or cracks could be more easily spotted and appropriate action taken sooner to prevent further damage or environmental hazards.

Environmental

This process produces a residue gas and NGL, both of which are being sold or distributed. No environmentally harmful byproducts are intended to be produced. Any utilities that are required to run this system do not pose a serious threat to greenhouse gas emissions. We will need to have systems in-place to measure our greenhouse gas output and will need to report them to environmental regulators. This should not be a new procedure for our company as other parts of this plant have already been designed to follow current regulations. This particular part of the process will not produce any special or hazardous materials that are unique from the rest of the facility. For this reason, the demethanizer portion will not require specific permits or reports that are unique from other parts of the refinery. In the case of a major accident we will create procedures to limit any potential impact on the environment.

Economic Analysis

Capital Cost Estimates

To estimate capital costs, we made use of the correlations in Appendix A of Turton et al [7]. Using Equation A.1:

$$log_{10}C_p^\circ = K_1 + K_2 log_{10}(A) + K_3[log_{10}(A)]^2$$

The "*K*" values for the equation can be found in Table A.1 of the textbook. The "A" represents the capacity of the equipment and C_p^o represents the purchased cost of the equipment for carbon steel. To find the pressure factor, F_P, for each piece of equipment, we used equation A.3:

$$log_{10}F_P = C_1 + C_2 log_{10}(P) + C_3[log_{10}(P)]^2$$

The *P* represents the design pressure in units of barg and the "*C"* values are given in Table A.2 of the textbook.

To factor in the necessary materials of construction, we made use of equation A.4:

$$C_{BM} = C_p^\circ F_{BM} = C_p^\circ(B_1 + B_2 F_M F_P)$$

Where F_M is the material factor which can be found using Table A.3 and Figure A.18, F_P is the pressure factor, C_p^o is the purchased cost of the equipment for carbon steel, F_{BM} is the bare module factor, and the *"B"* values which can be found using Table A.6 and Figure A.19.

Costing the trays involved using the following equation:

$$C_{BM} = C_p^\circ F_{BM} N F_q$$

For our column, *N*=30 which is the number of trays and F_q is equal to 1 because our tower has greater than 20 trays.

It is important to note that the textbook costing values are given in 2001 dollars. These can be escalated to the year 2018 using CEPCI factors (2018 has a factor of 605.2 and 2001 has a factor of 397) and then escalated to 2020 (the year of construction) using the 2% escalation factor. Contingency and fees were factored in by increasing our capital cost by 3% to account for fees and 15% to account for contingency.

The methods used to size our equipment prior to costing can be found in the Appendix. The air coolers were the only piece of equipment which required special methods to estimate their size. The air coolers were sized using an article and spreadsheet from CheGuide [8]. In order to size the brazed aluminum heat exchangers, we made use of an article by John Polasek stating the overall heat transfer coefficient, U, for brazed aluminum heat exchangers to be 150 Btu/(hr*ft^2*°F) for gas/gas heat transfer and 200 Btu/(hr*ft^2*°F) for gas/phase heat transfer [4].

The following table shows the capital cost value for each piece of equipment in 2018 dollars:

Table 10: Equipment Capital Costs

	Equipment	Total Cost
HEX	E-101	$ 14,428.29
	E-102	$ 169,108.13
	E-103	$ 51,667.31
	E-104	$ 17,686.10
Air coolers	E-105	$ 498,600.04
	E-201	$ 1,135,261.52
Pumps	P-101 A/B	$ 125,502.76
	P-102 A/B	$ 638,766.18
Expander	C-101	$ 1,948,082.57
Compressors	C-102	$ 3,946,988.13
	C-103	$ 10,548,844.38
	C-201	$ 26,044,919.47
Pump Drives	D-101 A/B	$ 167,075.77
	D-102 A/B	$ 450,774.55
Fan Drive	D-103	$ 154,315.47
Compressor Drives	D-103	$ 491,699.46
	D-201	$ 484,298.80
Fan Drive	D-202	$ 493,455.68
Separator	V-101	$ 1,652,391.61
	V-102	$ 1,795,400.55
	V-103	$ 802,669.46
	V-201	$ 767,418.75
Tower	T-100	$ 7,862,154.57
Trays		$ 5,106,094.97
		Total Capital Cost
		$ 60,261,509.52

Revenue and Operating Expense Estimates

Revenue Generation and Raw Material Costs

The Cuero Gas Processing Plant can be simplified down to a simple material balance with three streams; the Rich Gas feed stream and the two product streams, Residue Gas and NGL. The value of Rich Gas and the Residue Gas are identical and each is valued based on their higher heating value (HHV) at a price of $5.00/MMBtu. This value is estimated to escalate at a rate of 2% each year for the life of the project. Using this estimated pricing, the HHV obtained from Aspen HYSYS, and the yearly flow rates; we are able to generate the raw material cost of the feed and the potential value of the Residue Gas. For the NGL product stream the provided pricing guide in Table 1 is utilized. The value of the NGL stream can be estimated using the pricing guide, the NGL stream component fractions and the total NGL flow rate. Likewise with the Rich Gas feed and Residue Gas the values in the NGL pricing guide are inflated and escalated to account for market fluctuations.

Based on a simple cost analysis comparing just the value of the feed to the value of the product streams this process could potentially be economically attractive. However, this strictly takes into account that the value of the products are higher than the feed. The true technical feasibility and economic attractiveness is decided from further simulation and a complete analysis of all potential economic factors.

Compressor Operating Costs

The compressors designed are to be powered by electric motors. To estimate the operating cost of our compressors via electric motors, we combined the total horsepower required by all of our compressors, sized the compressor accordingly, and then calculated the size and necessary output of the electric motor needed to operate the compressor. The total horsepower needed to power the propane compressor, C-201, is 19,225 hp. The capital cost for this compressor is $21,988,113 and we estimate the yearly operating costs to be roughly $11,000,000 depending on the plants throughput capacity. The electric motor to provide this power costs $408,863. For the residue gas compressor, C-103, an electric drive is also used. This compressor costs $8,905,736 to buy and roughly $5,000,000 to operate yearly. The electric motor to provide this compressor power costs $415,111.

Pump Operating Costs

The two pumps sized for the pressurization of the NGL product stream are both driven by electrical motors. These motors are estimated to have high efficiencies of 91.7% and 92.4% for P-101 and P-102 respectively. Utilizing these efficiencies, the ultimate kilowatts drawn by each pump was found. With the hours of operation per year and the $0.085/kW-hr price of electricity

we generated an estimated yearly operation cost starting at roughly $500,000 in 2021. The $0.085/kW-hr price of electricity was escalated each year of the project in order to better accurately represent the economics of operating over the 25 year life time of the project.

Reboiler Operating Costs

The distillation tower for this gas processing requires the use of a reboiler to facilitate the desired separation of methane from the heavier products in NGL. At the optimal configuration under the 200 MMSCFD, 6162 kW of power is required to be supplied to the reboiler to drive out the last remaining methane in the NGL stream. This power is assumed to be 100% converted to thermal energy in a kettle reboiler via electrical heating elements. Thus, based on the $0.085 kW-hr price and escalation, the reboiler energy requirement was costed to be $1,250,000 starting in 2021.

Air Cooler Operating Costs

The air coolers seen in the PFD as E-105 and E-201 are both driven by electric motors. Taking into account the brake horsepower and efficiencies of the motors, approximately $8,000,000 per year is required to operate the fans.

Operator Labor Costs

Labor costs for the Cuero Gas Processing Plant were based on hiring 5 operators. According to Turton the 2016 hourly wage for such workers was $32.17/hr. Each operator is expected to work a schedule as follows: 49 weeks per year working 5 8-hour shifts per week. This means that there are a total of 1,225 shifts to provide pay for. Wages, about $350,000 total per year for all operators, are adjusted to account for escalation over the entire course of the project.

Additional wages we accounted for include supervisory, administrative, and laboratory roles. The supervisory role covers the management required to oversee various actions such as but not limited to shift scheduling and maintenance planning. Administrative roles provide the necessary bookkeeping and ensures the gas plant can maintain a steady supply of feed gas as well as a source to sell our Residue gas and NGL products to. The laboratory position provides quality control testing for the feed and products to verify specifications are met within the tolerances. The laboratory position also performs emissions testing for our various pieces of equipment to ensure the gas plant operates within regulations. These additional labor costs per year can be seen on the cash flow document in the Appendix.

DCFROR and NPV Analysis

To evaluate this project, we used a tax rate of 35%, a minimum rate of return of 15%, a project evaluation life of 25 years, and assumed inflation and escalation were both 2% per year. Using the IRS Publication 946 [9], we determined that all of our equipment would depreciate based on 7 year MACRS rates. In our analysis we estimated worst-case scenarios to gauge how economical the process would be at the lowest point. The two design parameters that most dramatically affect the NPV and DCFROR of the project include the selling price of NGL and the cost of raw materials. These two variables, when increased or decreased by 10% respectively, had the potential to make the project's NPV practically double, or in the case of the decrease in selling price of NGL, can provide a negative NPV for the project, meaning that the project is economically unattractive.

The cash flow table for the project is shown on the following page:

With this cash flow table, we calculated the discounted payback period to be 3.24 years. The breakeven price of the feed gas was determined to be $5.55/MMBtu. We are purchasing the feed gas for $5.00/MMBtu, so if the market price increases above $5.55/MMBtu, the process will not be profitable. Other important observations that can be made about this table include that the NPV of the current project assuming a minimum interest rate of 15% is $61,990,426 with a discounted cash flow rate of return (DCFROR) of 35%. These indicate that the project is economically attractive.

Sensitivity Analysis

After completion of the cash flow table, we wanted to observe how different variables involved in the economics of the project would affect the attractiveness of the project. In order to do this, we decided to look at 4 different variables: capital costs, NGL selling price, raw materials costs, and other operating costs. These specific parameters were chosen because many of the costs or projections used are based on estimation methods for costing equipment from the textbook written by Turton et al. (capital costs and other operating costs) or they are projections for the future that have the potential to fluctuate in either direction throughout the life of the project (raw materials cost and NGL selling price). We decided to increase and decrease each of these parameters by 10% in separate case studies to determine which parameter had the largest effect on the DCFROR of the project. It was important to keep in mind that the project has a minimum rate of return of 15%. The tornado chart below summarizes our findings:

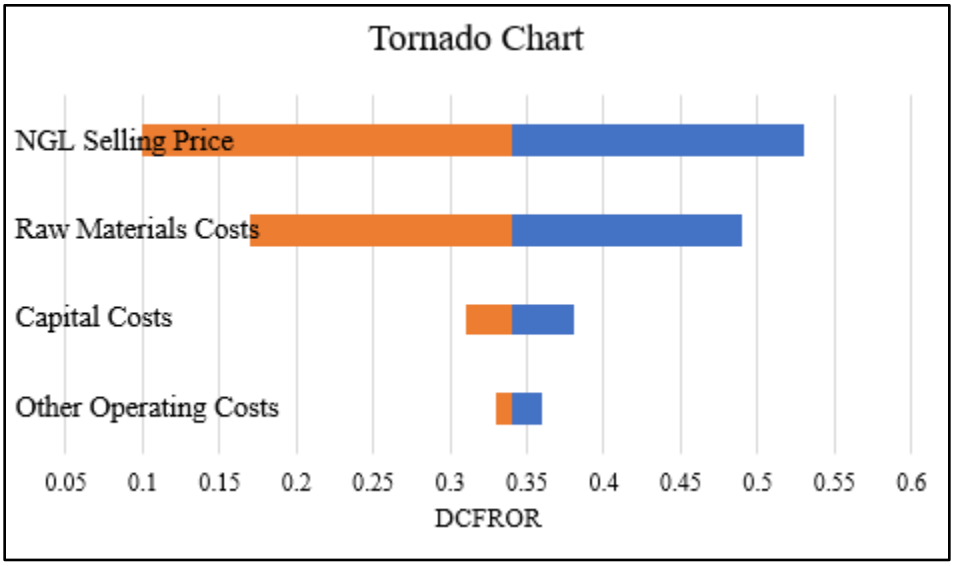

Figure 3: Tornado Sensitivity Analysis Chart

Our simulated project before the sensitivity analysis has a DCFROR of 0.34 (or 34%). Because our minimum rate of return is 15%, the project is found to be economically attractive. Based on the tornado chart we generated, it is noted that the variable that is most impactful to the

DCFROR is the selling price of the NGL stream. When the selling price of the NGL stream is reduced by 10%, the DCFROR is lowered from 34% down to 10%. This is considerable because it provides a lower rate of return than the minimum rate of return for this project, 15%. On the other hand, if the selling price of the NGL increases by 10%, the DCFROR becomes 53%, which makes this project extremely attractive.

The raw materials cost had the second largest impact on the DCFROR, with a 10% increase in cost causing the DCFROR to lower to 17% (which is still higher than the minimum rate of return of 15%) and a 10% decrease in cost causes the DCFROR to increase to 49%. Capital costs and other operating costs had the two lowest impacts on the projects DCFROR. A 10% increase in capital costs lowered the DCFROR to 31% and a 10% decrease in capital costs increased the DCFROR to 38%. A 10% increase in other operating costs lowered the DCFROR to 33% and a 10% increased the DCFROR to 36%. Other operating costs includes operating costs not related to raw material purchasing such as the utility costs to power the drives running the equipment, labor costs, maintenance fees, supplies, and other overhead costs.

This sensitivity analysis showed that the main area of concern for advancing this project is potential fluctuations in NGL selling price, because a 10% decrease in the projected selling price makes the project economically unattractive. This, however, was the only scenario that lowered the project's DCFROR below the minimum rate of return of 15%. It will be very important throughout the project life to make sure that product is being made and sold as efficiently as possible, and to make sure that the market selling price for the NGL stream does not lower to an extent that would cause the process to become economically unattractive. The next most impactful variable was our raw material cost. The projected cost of raw materials are is $5.00/MMBtu, but this price can fluctuate in the future based on the market and our suppliers. For these two reasons, it is very important to keep close tabs on the market price for feed gas. The breakeven price for the feed gas was determined to be $5.55/MMBtu. To lower the opportunity for raw material prices to financially hurt the project's value, the market for feed gas must be closely monitored so that if a supplier's price increases or a competitor's price lowers, adjustments can be made to positively impact the project's value.

Capital costs and other operating costs did not have as large of an impact on the economic attractiveness of the project, but both factors must be considered and improved upon continuously throughout the project's life to improve potential financial gain. Closely monitoring the capital investment and operation of the compressors will be the most important because they make up the majority of the expenses for both categories. Any improvements in these areas to reduce cost or improve efficiency will have a large impact on the economic output of the project.

Conclusions

After close analysis, it was determined that the project is both technically feasible and economically attractive. We recommend moving the project plans to the next phase to create a detailed design.

From our technical analysis we have determined that this process is technically feasible. Our Aspen HYSYS simulation reached convergence and all required duties, flow rates, temperatures, pressures, and other physical parameters were reasonable and achievable. Cryogenic and high pressure conditions are required within the system, so affected pieces of equipment require stainless steel, rather than carbon steel as the material of construction. With these conditions in mind, all necessary safety procedures for working with cryogenic and high pressure hydrocarbons must be strictly enforced to prevent potentially fatal and destructive consequences. Our design focuses around a 75 foot demethanizer tower capable of running at the cryogenic conditions necessary for the separation of methane from a rich gas stream in order to produce natural gas liquid. The process we have designed includes a turbo-expander, 2 centrifugal compressors, 4 brazed aluminum heat exchangers, 2 air coolers, 2 sets of pumps, and 4 separation vessels.

Based on our analysis, we believe this design is economically attractive. Our economic evaluations were based on the assumptions of a 35% tax rate, escalation and inflation rates valued at 2% per year and an estimated project life of 25 years. We calculated the total capital cost for our equipment to be $61,990,426 and evaluated our yearly operating costs based around a feed gas price of $5.00/MMBtu. We depreciated our equipment following a 7 year MACRS depreciation basis. We found the discounted cash flow rate of return, DCFROR, and net present value, NPV, to be 35% and $60,942,541. Since the DCFROR is above the estimated minimum rate of return, MROR, of 15% and the NPV greater than 0 we suggest moving forward with the project according to the current conditions. In our sensitivity analysis, we found the two biggest economic factors affecting the attractiveness of this project are the selling price of NGL and the raw material cost of our feed gas.

For all of these reasons we would suggest moving forward with this project.

Recommendations

Overall, our general recommendation is to move forward with the detailed design and construction of the Cuero Gas Process Plant. The difference between forgoing the plant construction and moving forward with the project is too great.

After performing the preliminary design for the Cuero Gas Processing Plant several recommendations concerning operating and capital costs have surfaced. Firstly, the most notable yearly expense one might recognize when analyzing our operating cost is our compressor drive utility costs. More specifically drive D-201 for C-201, our propane refrigeration compressor. The high power required by this compressor can be reduced with the addition of an economizer. The economizer would separate vapor and liquid prior to the heat exchanger E-102. Without vapor occupying space in E-102, more efficient heat transfer can occur for the same area. Additionally, the vapor bypassing the heat exchanger would re-enter the compressor at a lower temperature and making it easier to compress it to the pressure desired. The addition of an economizer would increase capital costs due to added complexity but it would reduce operating costs as the project moves forward. The reduced operating costs would most definitely affect the NPV more since it is a cost incurred every year of the project life.

Another recommendation that could potentially reduce operating costs would be in applying heat integration to the reboiler of the demethanizer column, T-101. Taking an already available heat source, like the feed gas at 80°F, could potentially supply enough energy to operate the reboiler and eliminate at least part of the need for energy via electrical utilities. This would reduce operating costs but increase the complexity of the system. It would require more infrastructure and attention, especially during start up.

To reduce operating costs even further, variable speed drives could be purchased for the operation of the pumps and air cooler fans. Since the plant operates for three years at a reduced flow rate, running these drives at the fixed speed designed for 200 MMSCFD causes unnecessary power consumption. Another option, for the pumps in particular, could be to size them in a fashion that allows the changing of impellers to alter the flow to the desired rate. This would reduce unnecessary working of the fluid and allow the pumps to operate at their most efficient points. The offset of buying more expensive equipment for the 3 years of operating cost savings would likely still be economical.

For a capital cost reduction, E-101 could be sized and bought as a standard carbon steel shell and tube heat exchanger. As of now the design proposed has E-101 as a compact brazed aluminum heat exchanger. The more traditional shell and tube style heat exchanger could potentially provide a less expensive capital cost.

Lastly, to reduce the operating cost of the air coolers obtaining access to cooling water to replace or supplement the air coolers would be significantly beneficial. The cooling water system would have a higher capital cost as it would include a basin and cooling tower of its own. However, the inexpensive cost of operating pumps to move the cooling water paired with the increased efficiency of water cooling towers would greatly outweigh the expensive operation of the fan drives.

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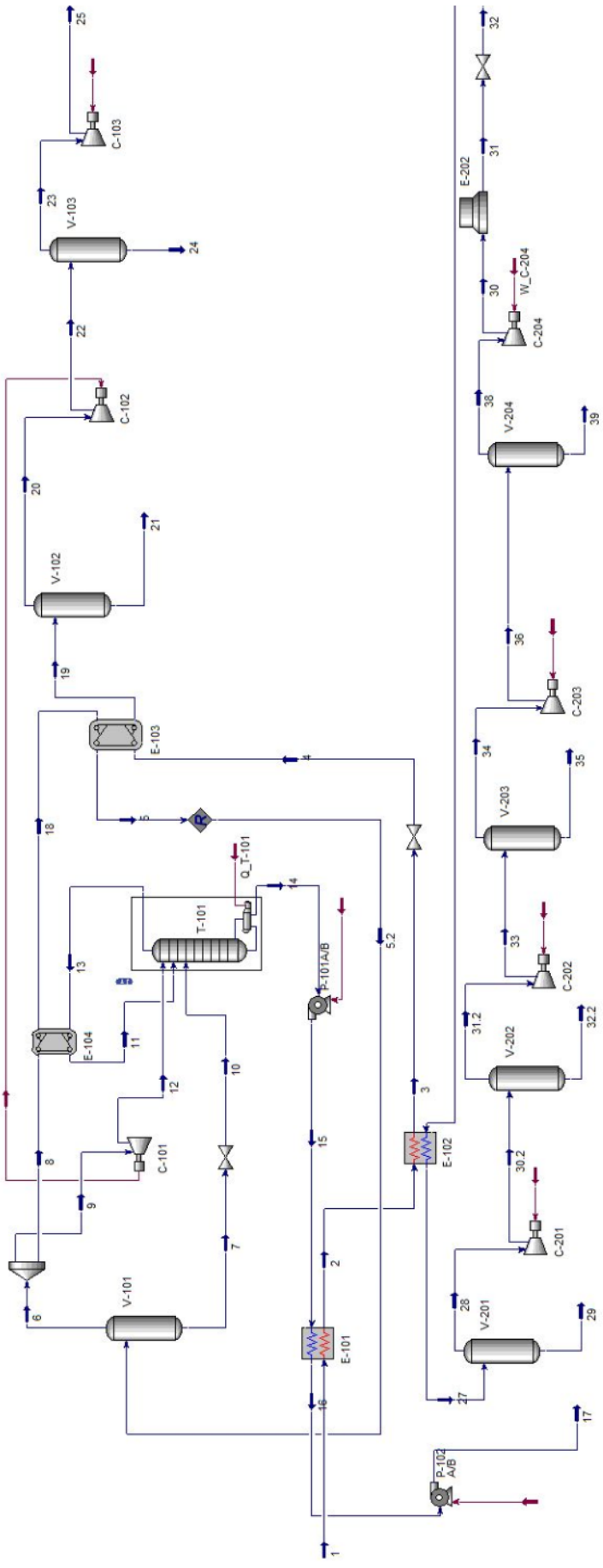
Appendices


C-103
V-103
C-102
V-102
E-103
E-104
T-101
Q_T-101
P-101A/B
C-101
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P-102 A/B
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W_C-204
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Drive for Residue Gas Air Cooler Costing

BHp = 217 hp

10% oversize → 238 BHp

Standard motor size 250 hp motor

250 hp (.746 kw/hp) = 186.5 kW

electric explosion proof

$C_p^\circ = 10^{\wedge}(K_1 + K_2 \log(A) + K_3 \log(A)^2)$

= 5G973.73

F_{Bm} = 1.5

C_{Bm} = $ 85460.61

Utility Costing

$\frac{186.5\,kw}{.924} * 24 * 365 * .98 = 1,732,754 \frac{kw\text{-}hr}{yr}$

$1,732,754 \frac{kw\text{-}hr}{yr} \left(\frac{\$.085}{kw\text{-}hr}\right) =$ $ 147,284/yr

Air Cooler E-105 for Residue Gas

$K_1 = 4.0336$ $A = 708.5\ m^2$ from CheGuide

$K_2 = 0.2341$

$K_3 = 0.0497$

$C_p^\circ = 10^{(K_1 + K_2 \log(A) + K_3 \log(A)^2)}$

$= 127247.5$

$C_{BM} = C_p^\circ (B_1 + B_2 F_m F_p)$

$B_1 = 0.96$

$B_2 = 1.21$

$F_p = 1$

$F_m = 1$

$C_{BM} = \underline{\$\ 276,127}$

NGL Product Value Calculation

Component	$/gal
C2	0.60
C3	1.00
i-C4	1.35
n-C4	1.25
C5+	1.50

Case 1

USGPH : 3.69×10^4 gal/hr

Component fraction

C2	0.6036
C3	0.2068
i-C4	0.0530
n-C4	0.0681
C5+	0.0237 + 0.0156 + 0.0222 = 0.0615

$(3.69 \times 10^4 \text{ gal/hr}) * (.60 \$/\text{gal} \cdot .6036 + 1.00 \$/\text{gal} \cdot .2068 + 1.35 \$/\text{gal} \cdot .0530 + 1.25 \$/\text{gal} \cdot .0681 + 1.5 \$/\text{gal} \cdot .0615) = 30{,}147.24 \frac{\$}{\text{hr}}$

$(\$30{,}147.24/\text{hr}) * (24 \text{ hr/day}) * (365 \text{ days/yr}) * (.98) = \underline{\$258{,}808{,}026/\text{yr}}$

Heat Exchanger E-102 Sizing Calculation

$Q = U A \Delta T_{lm}$

case 1

Q = cold duty from Hysys = 4.34×10^7 Btu/hr

ΔT_{lm} = 11.58 °F from Hysys

$U = 200 \frac{Btu}{hr\ ft^2\ °F}$ from [

$$A = \frac{Q}{U \Delta T_{lm}} = \frac{4.34 \times 10^7\ Btu/hr}{200 \frac{Btu}{hr\ ft^2\ °F} * 11.58\ °F}$$

$A = 18730\ ft^2$

Costing

Price per square foot $5

$18750\ ft^2 (\$5 / ft^2) = \underline{\$93652.85}$

Pump P-101 A/B Costing Calculation

Ghp = 46 hp

Bhp = 46 + 46·4 = 50.6 hp

10% oversize

55.7 hp = 41.5 Kw

round up to 75 Kw for use of electric motor drive

$K_1 = 3.3892$ $F_p = 1$ (P < 10 barg) $B_1 = 1.89$

$K_2 = 0.0536$

$K_3 = 0.1538$ $F_m = 1$ (cast iron) $B_2 = 1.35$

$C_p^\circ = 10\text{^}(K_1 + K_2 \log(A) + K_3 \log(A)^2)$

$C_{BM} = C_p^\circ (B_1 + B_2 F_m F_p) = \$\ 34752$

Pump P-101 A/B Utility Cost

$\frac{75\,KW}{\eta} * 24 * 365 * .98 = 643860\ kw\text{-}hr/\eta$

$643860\ kw\text{-}hr/\eta \left(\frac{\$.085}{kw\text{-}hr}\right) = \$54728.10/yr/\eta$

$\eta = 91.7\%$

$(\$54728.10/yr)/.917 = \underline{\$59{,}681.68/yr}$

Pump P-101 A/B Driver Costing

75 KW drive

electric explosion proof

$K_1 = 2.4604$

$K_2 = 1.4191$

$K_3 = -.1798$

$C_p^\circ = 10^\wedge (K_1 + K_2 \log(A) + K_3 \log(A)^2) = \$\ 30842.44$

$F_{Bm} = 1.5$ Turton

$C_{Bm} = C_p^\circ F_{Bm} = \underline{\$\ 46263.66}$

Residue Gas Value Calculation

$5/MMBtu given

Hysys higher heating value: 2.356×10^4 Btu/lb

Flow rate: 2.987×10^5 lb/hr

$(2.356 \times 10^4 \text{ Btu/lb}) * (2.987 \times 10^5 \text{ lb/hr}) = 7.0374 \times 10^9 \text{ Btu/hr}$

$(7.0374 \times 10^9 \text{ Btu/hr}) * (\$5 / 1{,}000{,}000 \text{ Btu}) = \$35{,}187 / \text{hr}$

$(\$35{,}187/\text{hr}) * (24 \text{ hr/day}) * (365 \text{ days/yr}) * (.98) = \underline{\$302{,}073{,}357/\text{yr}}$

Rich Gas Feed Value Calculation

Higher heating value : 2.295×10^4 Btu/lb

Valued at $5/MMBtu

Flowing at 4.392×10^5 lb/hr (200 MMSCFD)

$(2.295 \times 10^4 \text{ Btu/lb}) * (4.392 \times 10^5 \text{ lb/hr}) = 1.007964 \times 10^{10} \frac{\text{Btu}}{\text{hr}}$

$(1.007964 \times 10^{10} \text{ Btu/hr}) * (\$5/1{,}000{,}000 \text{ Btu}) = \$50{,}398.20/\text{hr}$

$(\$50{,}398.20/\text{hr}) \cdot 24 \cdot 365 \cdot .98 = \underline{\$432{,}658{,}467/\text{yr}}$

Column T-101 Sizing & Costing

Top section diameter : 8ft

Bottom section diameter : 6.5ft

Ideal volume : $\frac{\pi (8ft)^2}{4}(10ft) + \frac{\pi (6.5ft)^2}{4}(12ft)$

$= 900\ ft^3 = 25.5\ m^3$

$\varepsilon = 0.33$ volume : $900ft^3/.33 = 2730\ ft^3 = 77.4\ m^3$

$K_1 = 3.4974$
$K_2 = 0.4485$
$K_3 = 0.1074$

$C_p^\circ = 10\text{^}\left(K_1 + K_2 \log(A) + K_3 \log(A)^2\right)$

$= 21,913$ ideal or $53,411$ $\varepsilon = .33$

$$F_p = \frac{17.62(8ft)}{2[850 - .6(17.62 barg)]} + 0.00315 \Big/ 0.0063$$

$F_p = 13.827$

$C_{BM} = C_p^\circ (B_1 + B_2 F_m F_p)$

$F_m = 3.15$

$C_{BM} = \$1,786,379$ ideal

$B_1 = 2.25$

$B_2 = 1.82$

$C_{BM} = \underline{\$\ 4,354,097}$ $\varepsilon = .33$

Costing the Trays Calculations

Top of T-101	Bottom of T-101
ideal $N = 4$	ideal $N = 6$
$\varepsilon = .33$ $N = 12$	$\varepsilon = .33$ $N = 18$
$D = 8ft$	$D = 6.5ft$
Area = $45.24ft^2$ or $4.205m^2$	Area = $24.36ft^2$ or $2.264m^2$

Bubble cap trays installed

Assume K's as equal to valve trays

$K_1 = 3.3322$
$K_2 = 0.4838$
$K_3 = 0.3434$

$F_{Bm} = 1.8$ via Frg A.19 in Turton

$F_q = 10\text{^}(.4771 + .08516\log(N) - .3473\log(N)^2)$ N = number of trays

$C_{BM} = 10\text{^}(K_1 + K_2\log(A) + K_3\log(A)^2) * N * F_{Bm} * F_q$

Top of T-101	Bottom of T-101
ideal $460,632	ideal $513,658
$\varepsilon = .33$ $2,182,769	$\varepsilon = .33$ $2,127,991

Turbo- Expander Turbine Costing

$$\log(C_p^\circ) = K_1 + K_2 \log(A) + K_3 \log(A)^2$$

$K_1 = 2.7051$

$K_2 = 1.4398$

$K_3 = -0.1776$

Case 1 $A = 1526$ KW

$C_p^\circ = 308,178.52$

$F_p = 1$

$F_{Bm} = 3.5$

$C_{Bm} = 308,178.52 * 3.5$

$= \underline{\$\ 1,078,624.81}$

Sizing Separator V-101 Horizontally

$$D = \left[(-) * \left(Q_v / \left(K * \left((\rho_L - \rho_v) / \rho_v \right)^{1/2} \right) \right) / \left((\pi/4) * \left(\frac{L}{D} \right) \right) \right]$$

$$D = \left[\left(\frac{.5}{.5} \right) * \left(13.11 \frac{ft^3}{s} / \left(.25 * \left((2432 \, lb/ft^3 - 5.56 \, lb/ft^3) / 5.56 \, lb/ft^3 \right)^{1/2} \right) \right) / \left((\pi/4) * (4) \right) \right]$$

$D = 10$ ft rounded up

or

$$D = \left(Q_L * t_L / \left((\pi/4) * (1 - f_a) * \left(\frac{L}{D} \right) \right) \right)^{1/3}$$

$$D = \left(2.02 \frac{ft^3}{s} * 8 min * \frac{60 sec}{min} / \left((\pi/4) * (1 - .5) * (4) \right) \right)^{1/3}$$

$D = 9$ ft rounded up

Turbo-Expander Compressor Costing

$K_1 = 2.2897$ $A = 1526\,kW$

$K_2 = 1.3604$

$K_3 = -.1027$

$$\log(C_p^\circ) = K_1 + K_2 \log(A) + K_3 \log(A)^2$$

$C_p^\circ = 380,149.57$

$F_{Bm} = 5.75$ stainless steel

$C_{Bm} = C_p^\circ F_{Bm}$

$= \underline{\$\ 2,185,860}$

Sizing Separator V-101 with Mist Extractor Vertically

$$D = \sqrt{\frac{4 Q_v}{\pi v_t}}$$

$$v_t = K \sqrt{\frac{\rho_L - \rho_v}{\rho_v}}$$

$K = .43 - .023 \ln(P)$ P in psia

$$D = \left[4 \cdot 13.11 \frac{ft^3}{s} \Big/ \pi \left((.43 - .023 \ln(795 + 14.7)) \left(\frac{24.32 \frac{lb}{ft^3} - 5.56 \frac{lb}{ft^3}}{5.56 \frac{lb}{ft^3}} \right)^{1/2} \right) \right]^{1/2}$$

(Q_v; psig; ρ_L; ρ_v)

D = 6 ft rounded up

(with out mist extractor K = 0.20 since entrainment is serious)

(D = 6.5 ft rounded up)

Case Study Variables

State	19 - Temperature °F	27 - Molar Flow lbmole/hr	5 - Temperature °F	Ethane Recovery %
2021	-40		-56.00	
2022	-40		-56.00	
2023	-40		-56.00	
Case 1	-40	13,000	-56.53	87.03
Case 2	-40	12,670	-53.70	85.97
Case 3	-40	12,330	-50.67	84.78
Case 4	-40	12,000	-47.44	83.44
Case 5	-40	11,670	-43.99	81.94
Case 6	-40	11,340	-40.31	80.27
Case 7	-40	11,000	-36.41	78.41
Case 8	-40	10,670	-32.26	76.35
Case 9	-40	10,340	-27.86	74.09
Case 10	-40	10,000	-23.21	71.63
Case 11	-43	13,000	-55.33	86.60
Case 12	-43	12,670	-52.37	85.46
Case 13	-43	12,330	-49.24	84.20
Case 14	-43	12,000	-45.91	82.79
Case 15	-43	11,670	-42.35	81.21
Case 16	-43	11,340	-38.57	79.45
Case 17	-43	11,000	-34.55	77.49
Case 18	-43	10,670	-30.28	75.34
Case 19	-43	10,340	-25.75	72.99
Case 20	-43	10,000	-20.96	70.43
Case 21	-46	13,000	-54.05	86.13
Case 22	-46	12,670	-50.99	84.91
Case 23	-46	12,330	-47.77	83.59
Case 24	-46	12,000	-44.33	82.10
Case 25	-46	11,670	-40.67	80.43
Case 26	-46	11,340	-36.77	78.58
Case 27	-46	11,000	-32.63	76.53
Case 28	-46	10,670	-28.23	74.28
Case 29	-46	10,340	-23.57	71.83
Case 30	-46	10,000	-18.64	69.17
Case 31	-49	13,000	-52.73	85.63
Case 32	-49	12,670	-49.57	84.34
Case 33	-49	12,330	-46.25	82.93
Case 34	-49	12,000	-42.70	81.36
Case 35	-49	11,670	-38.92	79.61
Case 36	-49	11,340	-34.91	77.67
Case 37	-49	11,000	-30.64	75.53
Case 38	-49	10,670	-26.11	73.18
Case 39	-49	10,340	-21.31	70.62
Case 40	-49	10,000	-16.23	67.86
Case 41	-52	13,000	-51.37	85.09
Case 42	-52	12,670	-48.10	83.72
Case 43	-52	12,330	-44.67	82.25
Case 44	-52	12,000	-41.01	80.59
Case 45	-52	11,670	-37.12	78.75
Case 46	-52	11,340	-32.98	76.71
Case 47	-52	11,000	-28.59	74.47
Case 48	-52	10,670	-23.92	72.02
Case 49	-52	10,340	-18.98	69.36
Case 50	-52	10,000	-13.74	66.49
Case 51	-55	13,000	-49.96	84.53
Case 52	-55	12,670	-46.58	83.08
Case 53	-55	12,330	-43.04	81.52
Case 54	-55	12,000	-39.27	79.78
Case 55	-55	11,670	-35.26	77.84
Case 56	-55	11,340	-30.99	75.71
Case 57	-55	11,000	-26.46	73.36
Case 58	-55	10,670	-21.66	70.80
Case 59	-55	10,340	-16.57	68.04
Case 60	-55	10,000	-11.17	65.07

Case Study Variables

State	19 - Temperature °F	27 - Molar Flow lbmole/hr	5 - Temperature °F	Ethane Recovery %
Case 61	-58	13,000	-48.50	83.94
Case 62	-58	12,670	-45.00	82.39
Case 63	-58	12,330	-41.35	80.75
Case 64	-58	12,000	-37.47	78.92
Case 65	-58	11,670	-33.33	76.89
Case 66	-58	11,340	-28.93	74.65
Case 67	-58	11,000	-24.27	72.20
Case 68	-58	10,670	-19.32	69.54
Case 69	-58	10,340	-14.07	66.67
Case 70	-58	10,000	-8.50	63.60
Case 71	-61	13,000	-47.00	83.31
Case 72	-61	12,670	-43.37	81.67
Case 73	-61	12,330	-39.61	79.94
Case 74	-61	12,000	-35.60	78.01
Case 75	-61	11,670	-31.34	75.88
Case 76	-61	11,340	-26.80	73.54
Case 77	-61	11,000	-21.99	70.98
Case 78	-61	10,670	-16.89	68.22
Case 79	-61	10,340	-11.47	65.24
Case 80	-61	10,000	-5.73	62.07
Case 81	-64	13,000	-45.44	82.64
Case 82	-64	12,670	-41.68	80.90
Case 83	-64	12,330	-37.80	79.08
Case 84	-64	12,000	-33.67	77.06
Case 85	-64	11,670	-29.27	74.82
Case 86	-64	11,340	-24.60	72.38
Case 87	-64	11,000	-19.64	69.72
Case 88	-64	10,670	-14.37	66.84
Case 89	-64	10,340	-8.79	63.75
Case 90	-64	10,000	-2.86	60.48
Case 91	-67	13,000	-43.82	81.93
Case 92	-67	12,670	-39.93	80.09
Case 93	-67	12,330	-35.93	78.17
Case 94	-67	12,000	-31.67	76.05
Case 95	-67	11,670	-27.13	73.71
Case 96	-67	11,340	-22.31	71.15
Case 97	-67	11,000	-17.20	68.39
Case 98	-67	10,670	-11.76	65.40
Case 99	-67	10,340	-6.00	62.21
Case 100	-67	10,000	0.12	58.84
Case 101	-70	13,000	-42.15	81.18
Case 102	-70	12,670	-38.12	79.23
Case 103	-70	12,330	-33.99	77.22
Case 104	-70	12,000	-29.59	74.99
Case 105	-70	11,670	-24.91	72.54
Case 106	-70	11,340	-19.94	69.88
Case 107	-70	11,000	-14.66	67.00
Case 108	-70	10,670	-9.05	63.90
Case 109	-70	10,340	-3.10	60.61
Case 110	-70	10,000	3.23	57.14

Raw Material Cost $/yr.	Hourly Revenue $/hr	Yearly Revenue $/yr.	Reboiler $/yr.	Reboiler Duty kW	
$54,082,308.42	**$16,329**	$70,090,601	$1,122,959	5.241e6 Btu/hr	
$216,329,234	**$32,658**	$280,362,403	$2,241,214	1.048e7 Btu/hr	
$259,595,080	**$39,190**	$336,434,884	$2,690,312	1.258e7 Btu/hr	
$432,658,467	$65,316	$560,724,806	$4,496,100		6162
$432,658,467	$65,267	$560,307,824	$4,347,431		5958
$432,658,467	$65,195	$559,689,818	$4,191,527		5744
$432,658,467	$65,087	$558,759,972	$4,037,933		5534
$432,658,467	$64,989	$557,921,662	$3,887,599		5328
$432,658,467	$64,848	$556,706,979	$3,740,852		5127
$432,658,467	$64,735	$555,737,137	$3,597,982		4931
$432,658,467	$64,574	$554,358,861	$3,459,334		4741
$432,658,467	$64,418	$553,015,382	$3,325,241		4557
$432,658,467	$64,249	$551,568,777	$3,196,035		4380
$432,658,467	$65,304	$560,619,408	$4,439,216		6084
$432,658,467	$65,239	$560,063,112	$4,277,501		5862
$432,658,467	$65,129	$559,115,806	$4,122,136		5649
$432,658,467	$65,043	$558,377,539	$3,969,904		5440
$432,658,467	$64,942	$557,514,502	$3,820,844		5236
$432,658,467	$64,809	$556,370,055	$3,675,546		5037
$432,658,467	$64,660	$555,091,048	$3,534,265		4843
$432,658,467	$64,508	$553,786,675	$3,397,345		4656
$432,658,467	$64,340	$552,344,630	$3,265,111		4475
$432,658,467	$64,140	$550,630,712	$3,137,867		4300
$432,658,467	$65,287	$560,476,140	$4,369,213		5988
$432,658,467	$65,183	$559,580,585	$4,207,359		5766
$432,658,467	$65,095	$558,826,676	$4,053,261		5555
$432,658,467	$64,991	$557,934,076	$3,902,229		5348
$432,658,467	$64,880	$556,984,344	$3,754,513		5145
$432,658,467	$64,746	$555,835,212	$3,610,717		4948
$432,658,467	$64,595	$554,535,575	$3,471,084		4757
$432,658,467	$64,424	$553,070,688	$3,335,953		4572
$432,658,467	$64,252	$551,591,342	$3,205,663		4393
$432,658,467	$64,059	$549,936,965	$3,080,660		4222
$432,658,467	$65,242	$560,092,784	$4,299,447		5892
$432,658,467	$65,156	$559,352,371	$4,137,710		5670
$432,658,467	$65,062	$558,547,108	$3,984,719		5461
$432,658,467	$64,937	$557,474,403	$3,834,832		5255
$432,658,467	$64,820	$556,465,342	$3,688,644		5055
$432,658,467	$64,691	$555,357,430	$3,546,412		4860
$432,658,467	$64,529	$553,972,141	$3,408,488		4671
$432,658,467	$64,366	$552,568,914	$3,275,199		4488
$432,658,467	$64,170	$550,884,738	$3,146,867		4313
$432,658,467	$63,963	$549,105,410	$3,023,949		4144
$432,658,467	$65,223	$559,925,251	$4,229,930		5797
$432,658,467	$65,115	$559,001,213	$4,068,361		5575
$432,658,467	$65,016	$558,150,452	$3,916,526		5367
$432,658,467	$64,882	$556,997,440	$3,767,961		5164
$432,658,467	$64,760	$555,949,179	$3,623,251		4965
$432,658,467	$64,607	$554,636,087	$3,482,647		4773
$432,658,467	$64,449	$553,279,380	$3,346,483		4586
$432,658,467	$64,264	$551,690,334	$3,215,133		4406
$432,658,467	$64,089	$550,190,461	$3,089,034		4233
$432,658,467	$63,860	$548,229,033	$2,967,994		4067
$432,658,467	$65,170	$559,469,177	$4,160,667		5702
$432,658,467	$65,062	$558,543,719	$3,999,315		5481
$432,658,467	$64,958	$557,653,456	$3,848,604		5274
$432,658,467	$64,829	$556,548,173	$3,701,535		5073
$432,658,467	$64,690	$555,347,415	$3,558,361		4876
$432,658,467	$64,534	$554,008,748	$3,419,440		4686
$432,658,467	$64,361	$552,522,638	$3,285,105		4502
$432,658,467	$64,182	$550,993,119	$3,155,696		4325
$432,658,467	$63,968	$549,153,152	$3,031,672		4155
$432,658,467	$63,748	$547,267,806	$2,912,815		3992

Raw Material Cost $/yr.	Hourly Revenue $/hr	Yearly Revenue $/yr.	Reboiler $/yr.	Reboiler Duty kW
$432,658,467	$65,138	$559,197,370	$4,091,660	5607
$432,658,467	$65,007	$558,067,967	$3,930,605	5387
$432,658,467	$64,898	$557,134,883	$3,781,179	5182
$432,658,467	$64,766	$556,004,651	$3,635,559	4982
$432,658,467	$64,630	$554,834,241	$3,493,985	4788
$432,658,467	$64,462	$553,392,571	$3,356,810	4600
$432,658,467	$64,274	$551,775,782	$3,224,452	4419
$432,658,467	$64,091	$550,209,038	$3,097,211	4244
$432,658,467	$63,865	$548,268,934	$2,975,061	4077
$432,658,467	$63,626	$546,216,030	$2,858,422	3917
$432,658,467	$65,090	$558,781,629	$4,022,940	5513
$432,658,467	$64,950	$557,579,436	$3,862,126	5293
$432,658,467	$64,844	$556,671,555	$3,714,164	5090
$432,658,467	$64,708	$555,502,170	$3,570,059	4892
$432,658,467	$64,553	$554,171,925	$3,430,148	4701
$432,658,467	$64,379	$552,682,886	$3,294,776	4515
$432,658,467	$64,204	$551,178,104	$3,164,285	4336
$432,658,467	$63,990	$549,342,371	$3,039,169	4165
$432,658,467	$63,784	$547,569,360	$2,919,192	4000
$432,658,467	$63,522	$545,323,238	$2,804,823	3844
$432,658,467	$65,037	$558,327,114	$3,954,507	5419
$432,658,467	$64,922	$557,345,076	$3,794,114	5199
$432,658,467	$64,779	$556,118,251	$3,647,573	4999
$432,658,467	$64,624	$554,783,072	$3,505,045	4803
$432,658,467	$64,476	$553,511,348	$3,366,857	4614
$432,658,467	$64,302	$552,021,904	$3,233,452	4431
$432,658,467	$64,106	$550,334,215	$3,105,116	4255
$432,658,467	$63,883	$548,423,369	$2,981,852	4086
$432,658,467	$63,656	$546,477,806	$2,864,100	3925
$432,658,467	$63,397	$544,248,458	$2,752,033	3771
$432,658,467	$64,989	$557,921,662	$3,886,559	5326
$432,658,467	$64,860	$556,806,493	$3,726,488	5107
$432,658,467	$64,717	$555,584,985	$3,581,425	4908
$432,658,467	$64,566	$554,287,864	$3,440,534	4715
$432,658,467	$64,403	$552,889,486	$3,304,133	4528
$432,658,467	$64,199	$551,133,115	$3,172,574	4348
$432,658,467	$63,998	$549,410,245	$3,046,362	4175
$432,658,467	$63,772	$547,470,906	$2,925,274	4009
$432,658,467	$63,538	$545,458,292	$2,809,790	3851
$432,658,467	$63,278	$543,228,545	$2,700,091	3700
$432,658,467	$64,932	$557,425,289	$3,818,411	5233
$432,658,467	$64,779	$556,118,830	$3,659,257	5015
$432,658,467	$64,655	$555,050,102	$3,515,744	4818
$432,658,467	$64,478	$553,534,225	$3,376,554	4627
$432,658,467	$64,305	$552,047,732	$3,242,001	4443
$432,658,467	$64,115	$550,416,259	$3,112,415	4265
$432,658,467	$63,892	$548,496,601	$2,988,312	4095
$432,658,467	$63,677	$546,652,541	$2,869,447	3932
$432,658,467	$63,406	$544,331,266	$2,756,287	3777
$432,658,467	$63,135	$542,002,307	$2,648,958	3630

Turbine C-101 hp	**Turbine Cost $**	**Compressor C-102 hp**	**C-102 Cost $**	**C-103 hp**	Stage 1 C-201 **hp**	Stage 2 C-202 **hp**	Stage 3 C-203 **hp**
				2,378			
				4,739			
				5,748			
2,047	$1,078,857	2,047	$2,185,860	9,525	5,850	6,641	6,239
2,165	$1,097,431	2,165	$2,273,821	9,429	5,700	6,471	6,079
2,283	$1,114,815	2,283	$2,359,763	9,334	5,550	6,301	5,919
2,401	$1,131,123	2,401	$2,443,810	9,240	5,400	6,131	5,759
2,521	$1,146,705	2,521	$2,527,451	9,146	5,250	5,961	5,600
2,642	$1,161,483	2,642	$2,610,026	9,054	5,101	5,791	5,440
2,765	$1,175,629	2,765	$2,692,252	8,961	4,951	5,620	5,280
2,890	$1,189,175	2,890	$2,774,140	8,869	4,801	5,450	5,120
3,016	$1,202,053	3,016	$2,855,063	8,778	4,651	5,280	4,960
3,145	$1,214,495	3,145	$2,936,313	8,686	4,501	5,110	4,800
2,096	$1,086,722	2,096	$2,222,640	9,382	5,850	6,641	6,239
2,217	$1,105,231	2,217	$2,311,935	9,283	5,700	6,471	6,079
2,336	$1,122,267	2,336	$2,397,740	9,188	5,550	6,301	5,919
2,455	$1,138,254	2,455	$2,481,670	9,093	5,400	6,131	5,759
2,576	$1,153,533	2,576	$2,565,199	9,000	5,250	5,961	5,600
2,698	$1,168,028	2,698	$2,647,671	8,907	5,101	5,791	5,440
2,822	$1,181,905	2,822	$2,729,797	8,814	4,951	5,620	5,280
2,947	$1,195,093	2,947	$2,810,944	8,721	4,801	5,450	5,120
3,075	$1,207,833	3,075	$2,892,420	8,629	4,651	5,280	4,960
3,206	$1,220,135	3,206	$2,974,194	8,537	4,501	5,110	4,800
2,148	$1,094,831	2,148	$2,261,276	9,235	5,850	6,641	6,239
2,270	$1,112,954	2,270	$2,350,390	9,136	5,700	6,471	6,079
2,389	$1,129,511	2,389	$2,435,346	9,041	5,550	6,301	5,919
2,509	$1,145,189	2,509	$2,519,167	8,946	5,400	6,131	5,759
2,631	$1,160,176	2,631	$2,602,590	8,852	5,250	5,961	5,600
2,754	$1,174,398	2,754	$2,684,967	8,759	5,101	5,791	5,440
2,879	$1,188,014	2,879	$2,766,999	8,665	4,951	5,620	5,280
3,006	$1,201,058	3,006	$2,848,698	8,572	4,801	5,450	5,120
3,135	$1,213,556	3,135	$2,930,071	8,479	4,651	5,280	4,960
3,267	$1,225,626	3,267	$3,011,740	8,387	4,501	5,110	4,800
2,200	$1,102,706	2,200	$2,299,517	9,088	5,850	6,641	6,239
2,324	$1,120,598	2,324	$2,389,175	8,988	5,700	6,471	6,079
2,443	$1,136,687	2,443	$2,473,289	8,893	5,550	6,301	5,919
2,564	$1,152,060	2,564	$2,556,993	8,798	5,400	6,131	5,759
2,687	$1,166,757	2,687	$2,640,305	8,704	5,250	5,961	5,600
2,811	$1,180,707	2,811	$2,722,579	8,610	5,101	5,791	5,440
2,937	$1,194,066	2,937	$2,804,511	8,516	4,951	5,620	5,280
3,065	$1,206,864	3,065	$2,886,111	8,422	4,801	5,450	5,120
3,196	$1,219,221	3,196	$2,968,008	8,328	4,651	5,280	4,960
3,330	$1,231,147	3,330	$3,050,173	8,234	4,501	5,110	4,800
2,253	$1,110,501	2,253	$2,338,098	8,940	5,850	6,641	6,239
2,377	$1,127,888	2,377	$2,426,864	8,839	5,700	6,471	6,079
2,498	$1,143,792	2,498	$2,511,558	8,744	5,550	6,301	5,919
2,620	$1,158,862	2,620	$2,595,140	8,649	5,400	6,131	5,759
2,743	$1,173,160	2,743	$2,677,668	8,554	5,250	5,961	5,600
2,868	$1,186,848	2,868	$2,759,846	8,459	5,101	5,791	5,440
2,996	$1,200,058	2,996	$2,842,323	8,365	4,951	5,620	5,280
3,126	$1,212,707	3,126	$2,924,445	8,270	4,801	5,450	5,120
3,258	$1,224,825	3,258	$3,006,221	8,176	4,651	5,280	4,960
3,393	$1,236,521	3,393	$3,088,264	8,080	4,501	5,110	4,800
2,306	$1,118,075	2,306	$2,376,290	8,791	5,850	6,641	6,239
2,432	$1,135,241	2,432	$2,465,590	8,690	5,700	6,471	6,079
2,553	$1,150,701	2,553	$2,549,457	8,594	5,550	6,301	5,919
2,676	$1,165,478	2,676	$2,632,924	8,499	5,400	6,131	5,759
2,800	$1,179,503	2,800	$2,715,347	8,403	5,250	5,961	5,600
2,927	$1,193,034	2,927	$2,798,068	8,308	5,101	5,791	5,440
3,056	$1,205,988	3,056	$2,880,426	8,213	4,951	5,620	5,280
3,187	$1,218,395	3,187	$2,962,432	8,117	4,801	5,450	5,120
3,321	$1,230,367	3,321	$3,044,704	8,021	4,651	5,280	4,960
3,458	$1,241,917	3,458	$3,127,216	7,925	4,501	5,110	4,800

Turbine C-101 hp	Turbine Cost $	Compressor C-102 hp	C-102 Cost $	C-103 hp	Stage 1 C-201 hp	Stage 2 C-202 hp	Stage 3 C-203 hp
2,359	$1,125,436	2,359	$2,414,105	8,642	5,850	6,641	6,239
2,486	$1,142,259	2,486	$2,503,240	8,540	5,700	6,471	6,079
2,609	$1,157,541	2,609	$2,587,676	8,443	5,550	6,301	5,919
2,732	$1,171,916	2,732	$2,670,356	8,347	5,400	6,131	5,759
2,858	$1,185,783	2,858	$2,753,333	8,251	5,250	5,961	5,600
2,986	$1,199,054	2,986	$2,835,938	8,155	5,101	5,791	5,440
3,116	$1,211,760	3,116	$2,918,184	8,059	4,951	5,620	5,280
3,249	$1,224,021	3,249	$3,000,695	7,962	4,801	5,450	5,120
3,385	$1,235,846	3,385	$3,083,446	7,865	4,651	5,280	4,960
3,524	$1,247,248	3,524	$3,166,411	7,767	4,501	5,110	4,800
2,413	$1,132,725	2,413	$2,452,255	8,491	5,850	6,641	6,239
2,542	$1,149,334	2,542	$2,541,906	8,388	5,700	6,471	6,079
2,665	$1,164,193	2,665	$2,625,530	8,291	5,550	6,301	5,919
2,790	$1,178,402	2,790	$2,708,762	8,195	5,400	6,131	5,759
2,917	$1,191,998	2,917	$2,791,615	8,098	5,250	5,961	5,600
3,046	$1,205,011	3,046	$2,874,099	8,001	5,101	5,791	5,440
3,178	$1,217,565	3,178	$2,956,849	7,904	4,951	5,620	5,280
3,313	$1,229,672	3,313	$3,039,836	7,806	4,801	5,450	5,120
3,450	$1,241,261	3,450	$3,122,440	7,707	4,651	5,280	4,960
3,591	$1,252,512	3,591	$3,205,844	7,607	4,501	5,110	4,800
2,467	$1,139,812	2,467	$2,490,034	8,340	5,850	6,641	6,239
2,598	$1,156,212	2,598	$2,580,197	8,235	5,700	6,471	6,079
2,722	$1,170,779	2,722	$2,663,697	8,138	5,550	6,301	5,919
2,848	$1,184,712	2,848	$2,746,809	8,041	5,400	6,131	5,759
2,976	$1,198,045	2,976	$2,829,544	7,943	5,250	5,961	5,600
3,107	$1,210,904	3,107	$2,912,542	7,845	5,101	5,791	5,440
3,241	$1,223,303	3,241	$2,995,778	7,747	4,951	5,620	5,280
3,377	$1,235,169	3,377	$3,078,622	7,647	4,801	5,450	5,120
3,517	$1,246,689	3,517	$3,162,271	7,547	4,651	5,280	4,960
3,660	$1,257,785	3,660	$3,246,087	7,445	4,501	5,110	4,800
2,522	$1,146,831	2,522	$2,528,141	8,187	5,850	6,641	6,239
2,654	$1,162,901	2,654	$2,618,123	8,081	5,700	6,471	6,079
2,780	$1,177,297	2,780	$2,702,166	7,983	5,550	6,301	5,919
2,907	$1,190,956	2,907	$2,785,151	7,885	5,400	6,131	5,759
3,037	$1,204,128	3,037	$2,868,397	7,787	5,250	5,961	5,600
3,169	$1,216,732	3,169	$2,951,258	7,688	5,101	5,791	5,440
3,305	$1,228,974	3,305	$3,034,963	7,588	4,951	5,620	5,280
3,443	$1,240,685	3,443	$3,118,258	7,487	4,801	5,450	5,120
3,585	$1,252,047	3,585	$3,202,327	7,385	4,651	5,280	4,960
3,731	$1,263,059	3,731	$3,287,116	7,281	4,501	5,110	4,800
2,577	$1,153,656	2,577	$2,565,882	8,033	5,850	6,641	6,239
2,712	$1,169,637	2,712	$2,657,028	7,926	5,700	6,471	6,079
2,838	$1,183,636	2,838	$2,740,274	7,827	5,550	6,301	5,919
2,967	$1,197,133	2,967	$2,823,781	7,728	5,400	6,131	5,759
3,098	$1,210,045	3,098	$2,906,892	7,629	5,250	5,961	5,600
3,233	$1,222,583	3,233	$2,990,854	7,528	5,101	5,791	5,440
3,370	$1,234,575	3,370	$3,074,397	7,427	4,951	5,620	5,280
3,510	$1,246,129	3,510	$3,158,127	7,324	4,801	5,450	5,120
3,655	$1,257,408	3,655	$3,243,183	7,220	4,651	5,280	4,960
3,802	$1,268,184	3,802	$3,327,770	7,114	4,501	5,110	4,800

Stage 4

C-204 hp	C-201 BHP	V-101 psig	6 - Vapor Q ft3/s	6 - Vapor Density lb/ft3	7 - Liquid Q ft3/s	7 - Liquid Density lb/ft3
	4820					
	9640.28					
	11124.7					
495	19276.30624	795	13.11	5.56	2.02	24.32
482	18783.07204	795	13.90	5.47	1.86	24.70
469	18289.92946	795	14.70	5.37	1.72	25.08
457	17796.67789	795	15.51	5.28	1.58	25.45
444	17304.41821	795	16.33	5.18	1.45	25.82
431	16812.249	795	17.16	5.09	1.32	26.19
419	16317.96718	795	18.00	5.00	1.21	26.56
406	15824.67588	795	18.86	4.91	1.09	26.93
393	15331.37339	795	19.74	4.82	0.98	27.30
381	14838.15926	795	20.63	4.74	0.88	27.67
495	19276.30624	795	13.44	5.52	1.95	24.48
482	18783.07204	795	14.26	5.42	1.80	24.87
469	18289.92946	795	15.06	5.33	1.65	25.24
457	17796.67789	795	15.87	5.23	1.52	25.62
444	17304.41821	795	16.70	5.14	1.39	25.99
431	16812.249	795	17.54	5.05	1.27	26.36
419	16317.96718	795	18.39	4.96	1.15	26.73
406	15824.67588	795	19.26	4.87	1.04	27.10
393	15331.37339	795	20.15	4.78	0.93	27.47
381	14838.15926	795	21.05	4.70	0.83	27.84
495	19276.30624	795	13.79	5.48	1.88	24.65
482	18783.07204	795	14.62	5.38	1.73	25.04
469	18289.92946	795	15.43	5.29	1.59	25.41
457	17796.67789	795	16.25	5.19	1.46	25.79
444	17304.41821	795	17.08	5.10	1.34	26.16
431	16812.249	795	17.92	5.01	1.22	26.53
419	16317.96718	795	18.79	4.92	1.10	26.90
406	15824.67588	795	19.67	4.83	0.99	27.27
393	15331.37339	795	20.56	4.74	0.89	27.64
381	14838.15926	795	21.48	4.66	0.78	28.01
495	19276.30624	795	14.14	5.44	1.82	24.81
482	18783.07204	795	14.98	5.34	1.67	25.21
469	18289.92946	795	15.79	5.24	1.53	25.58
457	17796.67789	795	16.62	5.15	1.40	25.95
444	17304.41821	795	17.46	5.06	1.28	26.33
431	16812.249	795	18.32	4.97	1.16	26.70
419	16317.96718	795	19.19	4.88	1.05	27.07
406	15824.67588	795	20.08	4.79	0.94	27.44
393	15331.37339	795	20.99	4.70	0.84	27.81
381	14838.15926	795	21.92	4.62	0.74	28.18
495	19276.30624	795	14.50	5.40	1.75	24.98
482	18783.07204	795	15.35	5.30	1.61	25.37
469	18289.92946	795	16.17	5.20	1.47	25.75
457	17796.67789	795	17.00	5.11	1.35	26.12
444	17304.41821	795	17.85	5.02	1.23	26.50
431	16812.249	795	18.71	4.93	1.11	26.87
419	16317.96718	795	19.60	4.84	1.00	27.24
406	15824.67588	795	20.50	4.75	0.89	27.61
393	15331.37339	795	21.42	4.66	0.79	27.98
381	14838.15926	795	22.36	4.58	0.69	28.36
495	19276.30624	795	14.86	5.35	1.69	25.15
482	18783.07204	795	15.72	5.25	1.55	25.54
469	18289.92946	795	16.54	5.16	1.41	25.92
457	17796.67789	795	17.38	5.07	1.29	26.29
444	17304.41821	795	18.24	4.97	1.17	26.67
431	16812.249	795	19.12	4.88	1.06	27.04
419	16317.96718	795	20.01	4.80	0.95	27.41
406	15824.67588	795	20.92	4.71	0.84	27.79
393	15331.37339	795	21.86	4.62	0.74	28.16
381	14838.15926	795	22.81	4.54	0.65	28.54

Stage 4

C-204 hp	C-201 BHP	V-101 psig	6 - Vapor Q ft3/s	6 - Vapor Density lb/ft3	7 - Liquid Q ft3/s	7 - Liquid Density lb/ft3
495	19276.30624	795	15.22	5.31	1.63	25.32
482	18783.07204	795	16.09	5.21	1.49	25.71
469	18289.92946	795	16.92	5.12	1.36	26.09
457	17796.67789	795	17.77	5.02	1.24	26.46
444	17304.41821	795	18.64	4.93	1.12	26.84
431	16812.249	795	19.53	4.84	1.01	27.21
419	16317.96718	795	20.43	4.76	0.90	27.58
406	15824.67588	795	21.36	4.67	0.80	27.96
393	15331.37339	795	22.30	4.58	0.70	28.34
381	14838.15926	795	23.28	4.50	0.60	28.72
495	19276.30624	795	15.59	5.27	1.57	25.49
482	18783.07204	795	16.47	5.17	1.43	25.89
469	18289.92946	795	17.31	5.07	1.30	26.26
457	17796.67789	795	18.17	4.98	1.18	26.63
444	17304.41821	795	19.05	4.89	1.07	27.01
431	16812.249	795	19.94	4.80	0.96	27.38
419	16317.96718	795	20.86	4.71	0.85	27.76
406	15824.67588	795	21.80	4.63	0.75	28.14
393	15331.37339	795	22.76	4.54	0.65	28.52
381	14838.15926	795	23.75	4.46	0.56	28.91
495	19276.30624	795	15.96	5.22	1.51	25.65
482	18783.07204	795	16.85	5.12	1.37	26.06
469	18289.92946	795	17.70	5.03	1.25	26.43
457	17796.67789	795	18.57	4.94	1.13	26.81
444	17304.41821	795	19.46	4.85	1.02	27.18
431	16812.249	795	20.37	4.76	0.91	27.56
419	16317.96718	795	21.30	4.67	0.80	27.94
406	15824.67588	795	22.25	4.59	0.70	28.32
393	15331.37339	795	23.23	4.50	0.61	28.70
381	14838.15926	795	24.23	4.42	0.52	29.10
495	19276.30624	795	16.33	5.18	1.45	25.82
482	18783.07204	795	17.24	5.08	1.31	26.23
469	18289.92946	795	18.10	4.99	1.19	26.61
457	17796.67789	795	18.98	4.90	1.08	26.98
444	17304.41821	795	19.88	4.81	0.96	27.36
431	16812.249	795	20.80	4.72	0.86	27.74
419	16317.96718	795	21.74	4.63	0.76	28.12
406	15824.67588	795	22.71	4.55	0.66	28.50
393	15331.37339	795	23.70	4.46	0.56	28.89
381	14838.15926	795	24.72	4.38	0.47	29.29
495	19276.30624	795	16.71	5.14	1.39	25.99
482	18783.07204	795	17.63	5.04	1.26	26.40
469	18289.92946	795	18.51	4.95	1.14	26.78
457	17796.67789	795	19.40	4.86	1.02	27.16
444	17304.41821	795	20.31	4.77	0.91	27.53
431	16812.249	795	21.24	4.68	0.81	27.91
419	16317.96718	795	22.20	4.59	0.71	28.30
406	15824.67588	795	23.18	4.51	0.61	28.69
393	15331.37339	795	24.19	4.42	0.52	29.08
381	14838.15926	795	25.23	4.33	0.43	29.49

Vertical Separator Diameter		Horizontal Separator Diameter	
With mist extractor ft	Without mist extractor ft	Drop out time ft	Holdup and Surge time ft
6.0	6.5	10.0	9.0
6.0	6.5	10.5	8.5
6.0	6.5	10.5	8.5
6.0	6.5	10.5	8.0
6.0	6.5	10.5	8.0
6.5	7.0	11.0	7.5
6.5	7.0	11.0	7.5
6.5	7.0	11.0	7.0
6.5	7.0	11.0	7.0
6.5	7.0	11.0	6.5
6.0	6.5	10.0	8.5
6.0	6.5	10.5	8.5
6.0	6.5	10.5	8.0
6.0	6.5	10.5	8.0
6.0	6.5	10.5	8.0
6.5	7.0	11.0	7.5
6.5	7.0	11.0	7.5
6.5	7.0	11.0	7.0
6.5	7.0	11.0	7.0
6.5	7.0	11.0	6.5
6.0	6.5	10.5	8.5
6.0	6.5	10.5	8.5
6.0	6.5	10.5	8.0
6.0	6.5	10.5	8.0
6.5	7.0	11.0	7.5
6.5	7.0	11.0	7.5
6.5	7.0	11.0	7.0
6.5	7.0	11.0	7.0
6.5	7.0	11.0	6.5
6.5	7.0	11.0	6.5
6.0	6.5	10.5	8.5
6.0	6.5	10.5	8.0
6.0	6.5	10.5	8.0
6.0	6.5	10.5	8.0
6.5	7.0	11.0	7.5
6.5	7.0	11.0	7.5
6.5	7.0	11.0	7.0
6.5	7.0	11.0	7.0
6.5	7.0	11.0	6.5
6.5	7.0	11.0	6.5
6.0	6.5	10.5	8.5
6.0	6.5	10.5	8.0
6.0	6.5	10.5	8.0
6.5	7.0	11.0	7.5
6.5	7.0	11.0	7.5
6.5	7.0	11.0	7.0
6.5	7.0	11.0	7.0
6.5	7.0	11.0	6.5
6.5	7.0	11.0	6.5
6.5	7.5	11.0	6.0
6.0	6.5	10.5	8.5
6.0	6.5	10.5	8.0
6.0	6.5	10.5	8.0
6.5	7.0	11.0	7.5
6.5	7.0	11.0	7.5
6.5	7.0	11.0	7.0
6.5	7.0	11.0	7.0
6.5	7.0	11.0	6.5
6.5	7.0	11.0	6.5
7.0	7.5	11.0	6.0

Vertical Separator Diameter		Horizontal Separator Diameter	
With mist extractor ft	Without mist extractor ft	Drop out time ft	Holdup and Surge time ft
6.0	6.5	10.5	8.0
6.0	6.5	10.5	8.0
6.0	6.5	11.0	7.5
6.5	7.0	11.0	7.5
6.5	7.0	11.0	7.0
6.5	7.0	11.0	7.0
6.5	7.0	11.0	7.0
6.5	7.0	11.0	6.5
6.5	7.5	11.0	6.0
7.0	7.5	11.5	6.0
6.0	6.5	10.5	8.0
6.0	6.5	10.5	8.0
6.5	7.0	11.0	7.5
6.5	7.0	11.0	7.5
6.5	7.0	11.0	7.0
6.5	7.0	11.0	7.0
6.5	7.0	11.0	6.5
6.5	7.0	11.0	6.5
7.0	7.5	11.0	6.0
7.0	7.5	11.5	6.0
6.0	6.5	10.5	8.0
6.0	6.5	11.0	7.5
6.5	7.0	11.0	7.5
6.5	7.0	11.0	7.5
6.5	7.0	11.0	7.0
6.5	7.0	11.0	7.0
6.5	7.0	11.0	6.5
6.5	7.5	11.0	6.0
7.0	7.5	11.5	6.0
7.0	7.5	11.5	5.5
6.0	6.5	10.5	8.0
6.5	7.0	11.0	7.5
6.5	7.0	11.0	7.5
6.5	7.0	11.0	7.0
6.5	7.0	11.0	7.0
6.5	7.0	11.0	6.5
6.5	7.0	11.0	6.5
7.0	7.5	11.0	6.0
7.0	7.5	11.5	6.0
7.0	7.5	11.5	5.5
6.0	6.5	10.5	8.0
6.5	7.0	11.0	7.5
6.5	7.0	11.0	7.5
6.5	7.0	11.0	7.0
6.5	7.0	11.0	7.0
6.5	7.0	11.0	6.5
6.5	7.5	11.0	6.5
7.0	7.5	11.0	6.0
7.0	7.5	11.5	5.5
7.0	7.5	11.5	5.5

Vertical Separator Cost		Horizontal Separator Cost		
With mist extractor	Without mist extractor	Drop out time	Holdup and Surge time	V-102
$	$	$	$	psig
$915,102	$1,167,933	$3,663,253	$2,640,903	242.3
$915,102	$1,167,933	$4,274,696	$2,219,104	242.3
$915,102	$1,167,933	$4,274,696	$2,219,104	242.3
$915,102	$1,167,933	$4,274,696	$1,850,102	242.3
$915,102	$1,167,933	$4,274,696	$1,850,102	242.3
$1,167,933	$1,471,521	$4,960,734	$1,529,149	242.3
$1,167,933	$1,471,521	$4,960,734	$1,529,149	242.3
$1,167,933	$1,471,521	$4,960,734	$1,251,761	242.3
$1,167,933	$1,471,521	$4,960,734	$1,251,761	242.3
$1,167,933	$1,471,521	$4,960,734	$1,013,716	242.3
$915,102	$1,167,933	$3,663,253	$2,219,104	242.3
$915,102	$1,167,933	$4,274,696	$2,219,104	242.3
$915,102	$1,167,933	$4,274,696	$1,850,102	242.3
$915,102	$1,167,933	$4,274,696	$1,850,102	242.3
$915,102	$1,167,933	$4,274,696	$1,850,102	242.3
$1,167,933	$1,471,521	$4,960,734	$1,529,149	242.3
$1,167,933	$1,471,521	$4,960,734	$1,529,149	242.3
$1,167,933	$1,471,521	$4,960,734	$1,251,761	242.3
$1,167,933	$1,471,521	$4,960,734	$1,251,761	242.3
$1,167,933	$1,471,521	$4,960,734	$1,013,716	242.3
$915,102	$1,167,933	$4,274,696	$2,219,104	242.3
$915,102	$1,167,933	$4,274,696	$2,219,104	242.3
$915,102	$1,167,933	$4,274,696	$1,850,102	242.3
$915,102	$1,167,933	$4,274,696	$1,850,102	242.3
$1,167,933	$1,471,521	$4,960,734	$1,529,149	242.3
$1,167,933	$1,471,521	$4,960,734	$1,529,149	242.3
$1,167,933	$1,471,521	$4,960,734	$1,251,761	242.3
$1,167,933	$1,471,521	$4,960,734	$1,251,761	242.3
$1,167,933	$1,471,521	$4,960,734	$1,013,716	242.3
$1,167,933	$1,471,521	$4,960,734	$1,013,716	242.3
$915,102	$1,167,933	$4,274,696	$2,219,104	242.3
$915,102	$1,167,933	$4,274,696	$1,850,102	242.3
$915,102	$1,167,933	$4,274,696	$1,850,102	242.3
$915,102	$1,167,933	$4,274,696	$1,850,102	242.3
$1,167,933	$1,471,521	$4,960,734	$1,529,149	242.3
$1,167,933	$1,471,521	$4,960,734	$1,529,149	242.3
$1,167,933	$1,471,521	$4,960,734	$1,251,761	242.3
$1,167,933	$1,471,521	$4,960,734	$1,251,761	242.3
$1,167,933	$1,471,521	$4,960,734	$1,013,716	242.3
$1,167,933	$1,471,521	$4,960,734	$1,013,716	242.3
$915,102	$1,167,933	$4,274,696	$2,219,104	242.3
$915,102	$1,167,933	$4,274,696	$1,850,102	242.3
$915,102	$1,167,933	$4,274,696	$1,850,102	242.3
$1,167,933	$1,471,521	$4,960,734	$1,529,149	242.3
$1,167,933	$1,471,521	$4,960,734	$1,529,149	242.3
$1,167,933	$1,471,521	$4,960,734	$1,251,761	242.3
$1,167,933	$1,471,521	$4,960,734	$1,251,761	242.3
$1,167,933	$1,471,521	$4,960,734	$1,013,716	242.3
$1,167,933	$1,471,521	$4,960,734	$1,013,716	242.3
$1,167,933	$1,832,859	$4,960,734	$811,042	242.3
$915,102	$1,167,933	$4,274,696	$2,219,104	242.3
$915,102	$1,167,933	$4,274,696	$1,850,102	242.3
$915,102	$1,167,933	$4,274,696	$1,850,102	242.3
$1,167,933	$1,471,521	$4,960,734	$1,529,149	242.3
$1,167,933	$1,471,521	$4,960,734	$1,529,149	242.3
$1,167,933	$1,471,521	$4,960,734	$1,251,761	242.3
$1,167,933	$1,471,521	$4,960,734	$1,251,761	242.3
$1,167,933	$1,471,521	$4,960,734	$1,013,716	242.3
$1,167,933	$1,471,521	$4,960,734	$1,013,716	242.3
$1,471,521	$1,832,859	$4,960,734	$811,042	242.3

Vertical Separator Cost		Horizontal Separator Cost		
With mist extractor	Without mist extractor	Drop out time	Holdup and Surge time	V-102
$	$	$	$	psig
$915,102	$1,167,933	$4,274,696	$1,850,102	242.3
$915,102	$1,167,933	$4,274,696	$1,850,102	242.3
$915,102	$1,167,933	$4,960,734	$1,529,149	242.3
$1,167,933	$1,471,521	$4,960,734	$1,529,149	242.3
$1,167,933	$1,471,521	$4,960,734	$1,251,761	242.3
$1,167,933	$1,471,521	$4,960,734	$1,251,761	242.3
$1,167,933	$1,471,521	$4,960,734	$1,251,761	242.3
$1,167,933	$1,471,521	$4,960,734	$1,013,716	242.3
$1,167,933	$1,832,859	$4,960,734	$811,042	242.3
$1,471,521	$1,832,859	$5,727,555	$811,042	242.3
$915,102	$1,167,933	$4,274,696	$1,850,102	242.3
$915,102	$1,167,933	$4,274,696	$1,850,102	242.3
$1,167,933	$1,471,521	$4,960,734	$1,529,149	242.3
$1,167,933	$1,471,521	$4,960,734	$1,529,149	242.3
$1,167,933	$1,471,521	$4,960,734	$1,251,761	242.3
$1,167,933	$1,471,521	$4,960,734	$1,251,761	242.3
$1,167,933	$1,471,521	$4,960,734	$1,013,716	242.3
$1,167,933	$1,471,521	$4,960,734	$1,013,716	242.3
$1,471,521	$1,832,859	$4,960,734	$811,042	242.3
$1,471,521	$1,832,859	$5,727,555	$811,042	242.3
$915,102	$1,167,933	$4,274,696	$1,850,102	242.3
$915,102	$1,167,933	$4,960,734	$1,529,149	242.3
$1,167,933	$1,471,521	$4,960,734	$1,529,149	242.3
$1,167,933	$1,471,521	$4,960,734	$1,529,149	242.3
$1,167,933	$1,471,521	$4,960,734	$1,251,761	242.3
$1,167,933	$1,471,521	$4,960,734	$1,251,761	242.3
$1,167,933	$1,471,521	$4,960,734	$1,013,716	242.3
$1,167,933	$1,832,859	$4,960,734	$811,042	242.3
$1,471,521	$1,832,859	$5,727,555	$811,042	242.3
$1,471,521	$1,832,859	$5,727,555	$640,010	242.3
$915,102	$1,167,933	$4,274,696	$1,850,102	242.3
$1,167,933	$1,471,521	$4,960,734	$1,529,149	242.3
$1,167,933	$1,471,521	$4,960,734	$1,529,149	242.3
$1,167,933	$1,471,521	$4,960,734	$1,251,761	242.3
$1,167,933	$1,471,521	$4,960,734	$1,251,761	242.3
$1,167,933	$1,471,521	$4,960,734	$1,013,716	242.3
$1,167,933	$1,471,521	$4,960,734	$1,013,716	242.3
$1,471,521	$1,832,859	$4,960,734	$811,042	242.3
$1,471,521	$1,832,859	$5,727,555	$811,042	242.3
$1,471,521	$1,832,859	$5,727,555	$640,010	242.3
$915,102	$1,167,933	$4,274,696	$1,850,102	242.3
$1,167,933	$1,471,521	$4,960,734	$1,529,149	242.3
$1,167,933	$1,471,521	$4,960,734	$1,529,149	242.3
$1,167,933	$1,471,521	$4,960,734	$1,251,761	242.3
$1,167,933	$1,471,521	$4,960,734	$1,251,761	242.3
$1,167,933	$1,471,521	$4,960,734	$1,013,716	242.3
$1,167,933	$1,832,859	$4,960,734	$1,013,716	242.3
$1,471,521	$1,832,859	$4,960,734	$811,042	242.3
$1,471,521	$1,832,859	$5,727,555	$640,010	242.3
$1,471,521	$1,832,859	$5,727,555	$640,010	242.3

20 - Vapor Q ft3/s	20 - Vapor Density lb/ft3	21 - Liquid Q ft3/s	21 - Liquid Density lb/ft3	Vertical Sep. Diameter With mist extractor ft
81.15	1.02	0.00	1.02	8.5
81.26	1.02	0.00	1.02	8.5
81.38	1.03	0.00	1.03	8.5
81.52	1.03	0.00	1.03	8.5
81.67	1.03	0.00	1.03	8.5
81.85	1.03	0.00	1.03	8.5
82.04	1.04	0.00	1.04	8.5
82.25	1.04	0.00	1.04	8.5
82.48	1.04	0.00	1.04	8.5
82.74	1.05	0.00	1.05	8.5
80.44	1.03	0.00	1.03	8.5
80.56	1.03	0.00	1.03	8.5
80.68	1.04	0.00	1.04	8.5
80.83	1.04	0.00	1.04	8.5
80.99	1.04	0.00	1.04	8.5
81.17	1.04	0.00	1.04	8.5
81.36	1.05	0.00	1.05	8.5
81.58	1.05	0.00	1.05	8.5
81.82	1.06	0.00	1.06	8.5
82.09	1.06	0.00	1.06	8.5
79.73	1.04	0.00	1.04	8.5
79.85	1.05	0.00	1.05	8.5
79.98	1.05	0.00	1.05	8.5
80.13	1.05	0.00	1.05	8.5
80.30	1.05	0.00	1.05	8.5
80.48	1.06	0.00	1.06	8.5
80.69	1.06	0.00	1.06	8.5
80.92	1.06	0.00	1.06	8.5
81.16	1.07	0.00	1.07	8.5
81.43	1.07	0.00	1.07	8.5
79.02	1.05	0.00	1.05	8.5
79.15	1.06	0.00	1.06	8.5
79.28	1.06	0.00	1.06	8.5
79.44	1.06	0.00	1.06	8.5
79.61	1.06	0.00	1.06	8.5
79.80	1.07	0.00	1.07	8.5
80.01	1.07	0.00	1.07	8.5
80.25	1.08	0.00	1.08	8.5
80.50	1.08	0.00	1.08	8.5
80.78	1.09	0.00	1.09	8.5
78.31	1.07	0.00	1.07	8.5
78.44	1.07	0.00	1.07	8.5
78.58	1.07	0.00	1.07	8.5
78.74	1.07	0.00	1.07	8.5
78.92	1.08	0.00	1.08	8.5
79.12	1.08	0.00	1.08	8.5
79.34	1.08	0.00	1.08	8.5
79.58	1.09	0.00	1.09	8.5
79.84	1.09	0.00	1.09	8.5
80.12	1.10	0.00	1.10	8.5
77.59	1.08	0.00	1.08	8.5
77.73	1.08	0.00	1.08	8.5
77.88	1.08	0.00	1.08	8.5
78.05	1.09	0.00	1.09	8.5
78.23	1.09	0.00	1.09	8.5
78.43	1.09	0.00	1.09	8.5
78.66	1.10	0.00	1.10	8.5
78.91	1.10	0.00	1.10	8.5
79.17	1.11	0.00	1.11	8.5
79.46	1.11	0.00	16.34	8.5

20 - Vapor Q ft3/s	20 - Vapor Density lb/ft3	21 - Liquid Q ft3/s	21 - Liquid Density lb/ft3	Vertical Sep. Diameter With mist extractor ft
76.88	1.09	0.00	1.09	8.5
77.02	1.09	0.00	1.09	8.5
77.18	1.09	0.00	1.09	8.5
77.35	1.10	0.00	1.10	8.5
77.54	1.10	0.00	1.10	8.5
77.75	1.11	0.00	1.11	8.5
77.98	1.11	0.00	1.11	8.5
78.23	1.12	0.00	1.12	8.5
78.51	1.12	0.00	17.58	8.5
78.80	1.13	0.00	21.15	8.5
76.16	1.10	0.00	1.10	8.5
76.31	1.10	0.00	1.10	8.5
76.47	1.11	0.00	1.11	8.5
76.65	1.11	0.00	1.11	8.5
76.84	1.11	0.00	1.11	8.5
77.06	1.12	0.00	1.12	8.5
77.30	1.12	0.00	1.12	8.5
77.56	1.13	0.00	18.16	8.5
77.84	1.13	0.00	21.29	8.5
78.14	1.14	0.00	23.36	8.5
75.44	1.11	0.00	1.11	8.5
75.60	1.12	0.00	1.12	8.5
75.76	1.12	0.00	1.12	8.5
75.95	1.12	0.00	1.12	8.5
76.15	1.13	0.00	1.13	8.5
76.37	1.13	0.00	1.13	8.5
76.62	1.14	0.00	18.64	8.5
76.88	1.14	0.00	21.43	8.5
77.17	1.15	0.00	23.42	8.5
77.47	1.16	0.00	25.12	8.5
74.72	1.13	0.00	1.13	8.5
74.88	1.13	0.00	1.13	8.5
75.05	1.13	0.00	1.13	8.5
75.24	1.14	0.00	1.14	8.5
75.45	1.14	0.00	1.14	8.5
75.68	1.15	0.00	19.07	8.5
75.93	1.15	0.00	21.59	8.5
76.20	1.16	0.00	23.49	8.5
76.49	1.16	0.00	25.14	8.5
76.80	1.17	0.00	26.65	8.5
74.00	1.14	0.00	1.14	8.5
74.17	1.14	0.00	1.14	8.5
74.34	1.15	0.00	1.15	8.5
74.54	1.15	0.00	1.15	8.5
74.75	1.16	0.00	19.46	8.5
74.99	1.16	0.00	21.77	8.5
75.24	1.17	0.00	23.58	8.5
75.52	1.17	0.00	25.18	8.5
75.81	1.18	0.00	26.65	8.5
76.12	1.19	0.00	28.04	8.5

Vertical Sep. Diameter Without mist extractor ft	Horizontal Separator Diameter Drop out time ft	 Holdup and Surge time ft	Vertical Sep. Cost With mist extractor $
10.0	11.0	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.5	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.5	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.5	0.0	$994,301
10.0	11.5	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.5	0.0	$994,301
10.0	11.5	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.5	0.0	$994,301
10.0	11.5	0.0	$994,301
10.0	11.5	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.0	0.0	$994,301
10.0	11.5	0.0	$994,301
10.0	11.5	0.0	$994,301
10.0	11.5	0.0	$994,301

Vertical Sep. Diameter	Horizontal Separator Diameter		Vertical Sep. Cost
Without mist extractor	Drop out time	Holdup and Surge time	With mist extractor
ft	ft	ft	$
	10.0	11.0	0.0	$994,301
	10.0	11.0	0.0	$994,301
	10.0	11.0	0.0	$994,301
	10.0	11.0	0.0	$994,301
	10.0	11.0	0.0	$994,301
	10.0	11.0	0.0	$994,301
	10.0	11.5	0.0	$994,301
	10.0	11.5	0.0	$994,301
	10.0	11.5	0.0	$994,301
	10.0	11.5	0.0	$994,301
	9.5	11.0	0.0	$994,301
	10.0	11.0	0.0	$994,301
	10.0	11.0	0.0	$994,301
	10.0	11.0	0.0	$994,301
	10.0	11.0	0.0	$994,301
	10.0	11.0	0.0	$994,301
	10.0	11.5	0.0	$994,301
	10.0	11.5	0.0	$994,301
	10.0	11.5	0.0	$994,301
	10.0	11.5	0.0	$994,301
	9.5	11.0	0.0	$994,301
	9.5	11.0	0.0	$994,301
	10.0	11.0	0.0	$994,301
	10.0	11.0	0.0	$994,301
	10.0	11.0	0.0	$994,301
	10.0	11.5	0.0	$994,301
	10.0	11.5	0.0	$994,301
	10.0	11.5	0.0	$994,301
	10.0	11.5	0.0	$994,301
	10.0	11.5	0.0	$994,301
	9.5	11.0	0.0	$994,301
	9.5	11.0	0.0	$994,301
	9.5	11.0	0.0	$994,301
	10.0	11.0	0.0	$994,301
	10.0	11.0	0.0	$994,301
	10.0	11.5	0.0	$994,301
	10.0	11.5	0.0	$994,301
	10.0	11.5	0.0	$994,301
	10.0	11.5	0.0	$994,301
	10.0	11.5	0.0	$994,301
	10.0	11.5	0.0	$994,301
	10.0	12.0	0.0	$994,301

Vertical Sep. Cost		Horizontal Separator Cost			
Without mist extractor	Drop out time	Holdup and Surge time		V-103	23 - Vapor Q
$	$	$		psig	ft3/s
$1,700,206	$1,730,862	#NUM!		322.7	67.5
$1,700,206	$1,730,862			327.7	66.91
$1,700,206	$1,730,862			332.7	66.34
$1,700,206	$1,730,862			337.8	65.79
$1,700,206	$1,730,862			343.0	65.25
$1,700,206	$1,730,862			348.2	64.74
$1,700,206	$1,730,862			353.6	64.23
$1,700,206	$1,730,862			359.0	63.75
$1,700,206	$1,730,862			364.5	63.28
$1,700,206	$1,991,606			370.1	62.82
$1,700,206	$1,730,862			325.6	66.52
$1,700,206	$1,730,862			330.8	65.92
$1,700,206	$1,730,862			336.0	65.36
$1,700,206	$1,730,862			341.2	64.81
$1,700,206	$1,730,862			346.5	64.28
$1,700,206	$1,730,862			351.8	63.77
$1,700,206	$1,730,862			357.3	63.28
$1,700,206	$1,730,862			362.8	62.79
$1,700,206	$1,730,862			368.4	62.33
$1,700,206	$1,991,606			374.2	61.88
$1,700,206	$1,730,862			328.7	65.53
$1,700,206	$1,730,862			334.1	64.93
$1,700,206	$1,730,862			339.3	64.38
$1,700,206	$1,730,862			344.6	63.84
$1,700,206	$1,730,862			350.0	63.31
$1,700,206	$1,730,862			355.5	62.81
$1,700,206	$1,730,862			361.1	62.32
$1,700,206	$1,730,862			366.7	61.84
$1,700,206	$1,991,606			372.5	61.38
$1,700,206	$1,991,606			378.4	60.93
$1,700,206	$1,730,862			332.0	64.53
$1,700,206	$1,730,862			337.5	63.94
$1,700,206	$1,730,862			342.8	63.39
$1,700,206	$1,730,862			348.2	62.86
$1,700,206	$1,730,862			353.7	62.34
$1,700,206	$1,730,862			359.3	61.84
$1,700,206	$1,730,862			365.0	61.36
$1,700,206	$1,730,862			370.8	60.88
$1,700,206	$1,991,606			376.7	60.43
$1,700,206	$1,991,606			382.8	59.98
$1,700,206	$1,730,862			335.3	63.54
$1,700,206	$1,730,862			340.9	62.95
$1,700,206	$1,730,862			346.4	62.41
$1,700,206	$1,730,862			351.9	61.88
$1,700,206	$1,730,862			357.5	61.37
$1,700,206	$1,730,862			363.3	60.87
$1,700,206	$1,730,862			369.1	60.39
$1,700,206	$1,991,606			375.1	59.93
$1,700,206	$1,991,606			381.1	59.47
$1,700,206	$1,991,606			387.3	59.03
$1,700,206	$1,730,862			338.8	62.54
$1,700,206	$1,730,862			344.5	61.96
$1,700,206	$1,730,862			350.1	61.42
$1,700,206	$1,730,862			355.7	60.9
$1,700,206	$1,730,862			361.5	60.4
$1,700,206	$1,730,862			367.4	59.91
$1,700,206	$1,730,862			373.4	59.43
$1,700,206	$1,991,606			379.5	58.96
$1,700,206	$1,991,606			385.7	58.51
$1,700,206	$1,991,606			392.1	58.07

Vertical Sep. Cost		Horizontal Separator Cost			
Without mist extractor	Drop out time	Holdup and Surge time	V-103	23 - Vapor Q	
$	$	$	psig	ft3/s	
$1,700,206	$1,730,862		342.3	61.55	
$1,700,206	$1,730,862		348.2	60.97	
$1,700,206	$1,730,862		353.9	60.44	
$1,700,206	$1,730,862		359.7	59.92	
$1,700,206	$1,730,862		365.6	59.42	
$1,700,206	$1,730,862		371.6	58.93	
$1,700,206	$1,991,606		377.8	58.46	
$1,700,206	$1,991,606		384.0	58	
$1,700,206	$1,991,606		390.4	57.55	
$1,700,206	$1,991,606		397.0	57.11	
$1,431,429	$1,730,862		346.0	60.55	
$1,700,206	$1,730,862		352.1	59.98	
$1,700,206	$1,730,862		357.9	59.45	
$1,700,206	$1,730,862		363.8	58.94	
$1,700,206	$1,730,862		369.9	58.44	
$1,700,206	$1,730,862		376.0	57.96	
$1,700,206	$1,991,606		382.3	57.49	
$1,700,206	$1,991,606		388.8	57.03	
$1,700,206	$1,991,606		395.4	56.59	
$1,700,206	$1,991,606		402.1	56.15	
$1,431,429	$1,730,862		349.8	59.55	
$1,431,429	$1,730,862		356.0	58.98	
$1,700,206	$1,730,862		362.0	58.46	
$1,700,206	$1,730,862		368.1	57.96	
$1,700,206	$1,730,862		374.3	57.46	
$1,700,206	$1,991,606		380.6	56.98	
$1,700,206	$1,991,606		387.1	56.52	
$1,700,206	$1,991,606		393.7	56.06	
$1,700,206	$1,991,606		400.5	55.61	
$1,700,206	$1,991,606		407.5	55.18	
$1,431,429	$1,730,862		353.7	58.56	
$1,431,429	$1,730,862		360.2	57.99	
$1,431,429	$1,730,862		366.3	57.47	
$1,700,206	$1,730,862		372.5	56.97	
$1,700,206	$1,730,862		378.9	56.48	
$1,700,206	$1,991,606		385.4	56	
$1,700,206	$1,991,606		392.1	55.54	
$1,700,206	$1,991,606		398.9	55.08	
$1,700,206	$1,991,606		405.9	54.64	
$1,700,206	$1,991,606		413.1	54.2	
$1,431,429	$1,730,862		357.8	57.55	
$1,431,429	$1,730,862		364.5	56.99	
$1,431,429	$1,730,862		370.7	56.48	
$1,700,206	$1,730,862		377.1	55.98	
$1,700,206	$1,991,606		383.7	55.49	
$1,700,206	$1,991,606		390.4	55.02	
$1,700,206	$1,991,606		397.2	54.56	
$1,700,206	$1,991,606		404.3	54.1	
$1,700,206	$1,991,606		411.5	53.66	
$1,700,206	$2,281,400		419.0	53.21	

23 - Vapor Density lb/ft3	24 - Liquid Q ft3/s	24 - Liquid Density lb/ft3	Vertical Sep. Diameter With mist extractor ft
1.229	0	1.229	8.5
1.243	0	1.243	8.5
1.258	0	1.258	8.5
1.274	0	1.274	8.5
1.29	0	1.29	8.5
1.306	0	1.306	8.5
1.324	0	1.324	8.5
1.342	0	1.342	8.5
1.36	0	1.36	8.5
1.38	0	1.38	8.5
1.249	0	1.249	8.5
1.264	0	1.264	8.5
1.279	0	1.28	8.5
1.295	0	1.295	8.5
1.312	0	1.312	8.5
1.329	0	1.329	8.5
1.347	0	1.347	8.5
1.366	0	1.366	8.5
1.385	0	1.385	8.5
1.406	0	1.406	8.5
1.269	0	1.269	8.5
1.285	0	1.285	8.5
1.301	0	1.301	8.5
1.318	0	1.318	8.5
1.335	0	1.335	8.5
1.353	0	1.353	8.5
1.372	0	1.372	8.5
1.391	0	1.391	8.5
1.411	0	1.411	8.5
1.433	0	1.433	8.5
1.291	0	1.291	8.5
1.307	0	1.307	8.5
1.324	0	1.324	8.5
1.341	0	1.341	8.5
1.359	0	1.359	8.5
1.378	0	1.378	8.5
1.397	0	1.397	8.5
1.417	0	1.417	8.5
1.439	0	1.439	8.5
1.461	0	1.461	8.5
1.313	0	1.313	8.5
1.33	0	1.33	8.5
1.347	0	1.347	8.5
1.365	0	1.365	8.5
1.384	0	1.384	8
1.403	0	1.403	8
1.424	0	1.424	8
1.445	0	1.445	8
1.467	0	1.467	8
1.49	0	1.49	8.5
1.336	0	1.336	8
1.354	0	1.354	8
1.372	0	1.372	8
1.391	0	1.391	8
1.41	0	1.41	8
1.43	0	1.43	8
1.451	0	1.451	8
1.474	0	1.474	8
1.497	0	1.497	8
1.521	0	1.521	8

23 - Vapor Density lb/ft3	24 - Liquid Q ft3/s	24 - Liquid Density lb/ft3	Vertical Sep. Diameter With mist extractor ft
1.36	0	1.36	8
1.379	0	1.379	8
1.397	0	1.397	8
1.417	0	1.417	8
1.437	0	1.437	8
1.458	0	1.458	8
1.48	0	1.48	8
1.503	0	1.503	8
1.528	0	1.528	8
1.553	0	1.553	8
1.385	0	1.385	8
1.404	0	1.404	8
1.424	0	1.424	8
1.444	0	1.444	8
1.465	0	1.465	8
1.487	0	1.487	8
1.511	0	1.511	8
1.535	0	1.535	8
1.56	0	1.56	8
1.587	0	1.587	8
1.411	0	1.411	8
1.431	0	1.431	8
1.452	0	1.452	8
1.473	0	1.473	8
1.495	0	1.495	8
1.518	0	1.518	8
1.542	0	1.542	8
1.568	0	1.568	8
1.594	0	1.594	8
1.623	0	1.623	8
1.437	0	1.437	8
1.459	0	1.459	8
1.48	0	1.48	8
1.502	0	1.502	8
1.526	0	1.526	8
1.55	0	1.55	8
1.575	0	1.575	8
1.602	0	1.602	8
1.63	0	1.63	8
1.66	0	1.66	8
1.466	0	1.466	8
1.488	0	1.488	8
1.511	0	1.511	8
1.534	0	1.534	8
1.558	0	1.558	8
1.583	0	1.583	8
1.61	0	1.61	8
1.638	0	1.638	8
1.668	0	1.668	8
1.699	0	1.699	8

Vertical Sep. Diameter	Horizontal Separator Diameter		Vertical Sep. Cost
Without mist extractor	Drop out time	Holdup and Surge time	With mist extractor
ft	ft	ft	$
9.5	11.5	0	$444,522
9.5	11.5	0	$444,522
9.5	11.5	0	$444,522
9.5	11.5	0	$444,522
9.5	11.5	0	$444,522
9.5	12	0	$444,522
9.5	12	0	$444,522
9.5	12	0	$444,522
9.5	12	0	$444,522
9.5	12	0	$444,522
9.5	11.5	0	$444,522
9.5	11.5	0	$444,522
9.5	11.5	0	$444,522
9.5	11.5	0	$444,522
9.5	12	0	$444,522
9.5	12	0	$444,522
9.5	12	0	$444,522
9.5	12	0	$444,522
9.5	12	0	$444,522
9.5	12	0	$444,522
9.5	11.5	0	$444,522
9.5	11.5	0	$444,522
9.5	11.5	0	$444,522
9.5	12	0	$444,522
9.5	12	0	$444,522
9.5	12	0	$444,522
9.5	12	0	$444,522
9.5	12	0	$444,522
9.5	12.5	0	$444,522
9.5	11.5	0	$444,522
9.5	11.5	0	$444,522
9.5	11.5	0	$444,522
9.5	12	0	$444,522
9.5	12	0	$444,522
9.5	12	0	$444,522
9.5	12	0	$444,522
9.5	12	0	$444,522
9.5	12	0	$444,522
9.5	12.5	0	$444,522
9.5	11.5	0	$444,522
9.5	11.5	0	$444,522
9.5	12	0	$444,522
9.5	12	0	$444,522
9.5	12	0	$367,710
9.5	12	0	$367,710
9.5	12	0	$367,710
9.5	12	0	$367,710
9.5	12.5	0	$367,710
9.5	12.5	0	$444,522
9.5	11.5	0	$367,710
9.5	12	0	$367,710
9.5	12	0	$367,710
9.5	12	0	$367,710
9.5	12	0	$367,710
9.5	12	0	$367,710
9.5	12	0	$367,710
9.5	12	0	$367,710
9.5	12.5	0	$367,710
9.5	12.5	0	$367,710

Vertical Sep. Diameter	Horizontal Separator Diameter		Vertical Sep. Cost
Without mist extractor	Drop out time	Holdup and Surge time	With mist extractor
ft	ft	ft	$
9.5	11.5	0	$367,710
9.5	12	0	$367,710
9.5	12	0	$367,710
9.5	12	0	$367,710
9.5	12	0	$367,710
9.5	12	0	$367,710
9.5	12	0	$367,710
9.5	12.5	0	$367,710
9.5	12.5	0	$367,710
9.5	12.5	0	$367,710
9.5	12	0	$367,710
9.5	12	0	$367,710
9.5	12	0	$367,710
9.5	12	0	$367,710
9.5	12	0	$367,710
9.5	12	0	$367,710
9.5	12.5	0	$367,710
9.5	12.5	0	$367,710
9.5	12.5	0	$367,710
9.5	12.5	0	$367,710
9.5	12	0	$367,710
9.5	12	0	$367,710
9.5	12	0	$367,710
9.5	12	0	$367,710
9.5	12	0	$367,710
9.5	12	0	$367,710
9.5	12.5	0	$367,710
9.5	12.5	0	$367,710
9.5	12.5	0	$367,710
9.5	12.5	0	$367,710
9.5	12	0	$367,710
9.5	12	0	$367,710
9.5	12	0	$367,710
9.5	12	0	$367,710
9.5	12	0	$367,710
9.5	12.5	0	$367,710
9.5	12.5	0	$367,710
9.5	12.5	0	$367,710
9.5	12.5	0	$367,710
9.5	13	0	$367,710
9.5	12	0	$367,710
9.5	12	0	$367,710
9.5	12	0	$367,710
9.5	12	0	$367,710
9.5	12	0	$367,710
9.5	12.5	0	$367,710
9.5	12.5	0	$367,710
9.5	12.5	0	$367,710
9.5	12.5	0	$367,710
9.5	13	0	$367,710

Vertical Sep. Cost		Horizontal Separator Cost		
Without mist extractor	Drop out time	Holdup and Surge time	V-201	28 - Vapor Q
$	$	$	psig	ft3/s
$635,693	$862,404		1.204	1067.0
$635,693	$862,404		1.204	1040.0
$635,693	$862,404		1.204	1013.0
$635,693	$862,404		1.204	985.4
$635,693	$862,404		1.204	958.0
$635,693	$986,277		1.204	930.7
$635,693	$986,277		1.204	903.3
$635,693	$986,277		1.204	876.0
$635,693	$986,277		1.204	848.7
$635,693	$986,277		1.204	821.3
$635,693	$862,404		1.204	1067.0
$635,693	$862,404		1.204	1040.0
$635,693	$862,404		1.204	1013.0
$635,693	$862,404		1.204	985.4
$635,693	$986,277		1.204	958.0
$635,693	$986,277		1.204	930.7
$635,693	$986,277		1.204	903.3
$635,693	$986,277		1.204	876.0
$635,693	$986,277		1.204	848.7
$635,693	$986,277		1.204	821.3
$635,693	$862,404		1.204	1067.0
$635,693	$862,404		1.204	1040.0
$635,693	$862,404		1.204	1013.0
$635,693	$986,277		1.204	985.4
$635,693	$986,277		1.204	958.0
$635,693	$986,277		1.204	930.7
$635,693	$986,277		1.204	903.3
$635,693	$986,277		1.204	876.0
$635,693	$986,277		1.204	848.7
$635,693	$1,123,372		1.204	821.3
$635,693	$862,404		1.204	1067.0
$635,693	$862,404		1.204	1040.0
$635,693	$862,404		1.204	1013.0
$635,693	$986,277		1.204	985.4
$635,693	$986,277		1.204	958.0
$635,693	$986,277		1.204	930.7
$635,693	$986,277		1.204	903.3
$635,693	$986,277		1.204	876.0
$635,693	$986,277		1.204	848.7
$635,693	$1,123,372		1.204	821.3
$635,693	$862,404		1.204	1067.0
$635,693	$862,404		1.204	1040.0
$635,693	$986,277		1.204	1013.0
$635,693	$986,277		1.204	985.4
$635,693	$986,277		1.204	958.0
$635,693	$986,277		1.204	930.7
$635,693	$986,277		1.204	903.3
$635,693	$986,277		1.204	876.0
$635,693	$1,123,372		1.204	848.7
$635,693	$1,123,372		1.204	821.3
$635,693	$862,404		1.204	1067.0
$635,693	$986,277		1.204	1040.0
$635,693	$986,277		1.204	1013.0
$635,693	$986,277		1.204	985.4
$635,693	$986,277		1.204	958.0
$635,693	$986,277		1.204	930.7
$635,693	$986,277		1.204	903.3
$635,693	$986,277		1.204	876.0
$635,693	$1,123,372		1.204	848.7
$635,693	$1,123,372		1.204	821.3

Vertical Sep. Cost	Horizontal Separator Cost			
Without mist extractor	Drop out time	Holdup and Surge time	V-201	28 - Vapor Q
$	$	$	psig	ft3/s
$635,693	$862,404		1.204	1067.0
$635,693	$986,277		1.204	1040.0
$635,693	$986,277		1.204	1013.0
$635,693	$986,277		1.204	985.4
$635,693	$986,277		1.204	958.0
$635,693	$986,277		1.204	930.7
$635,693	$986,277		1.204	903.3
$635,693	$1,123,372		1.204	876.0
$635,693	$1,123,372		1.204	848.7
$635,693	$1,123,372		1.204	821.3
$635,693	$986,277		1.204	1067.0
$635,693	$986,277		1.204	1040.0
$635,693	$986,277		1.204	1013.0
$635,693	$986,277		1.204	985.4
$635,693	$986,277		1.204	958.0
$635,693	$986,277		1.204	930.7
$635,693	$1,123,372		1.204	903.3
$635,693	$1,123,372		1.204	876.0
$635,693	$1,123,372		1.204	848.7
$635,693	$1,123,372		1.204	821.3
$635,693	$986,277		1.204	1067.0
$635,693	$986,277		1.204	1040.0
$635,693	$986,277		1.204	1013.0
$635,693	$986,277		1.204	985.4
$635,693	$986,277		1.204	958.0
$635,693	$986,277		1.204	930.7
$635,693	$1,123,372		1.204	903.3
$635,693	$1,123,372		1.204	876.0
$635,693	$1,123,372		1.204	848.7
$635,693	$1,123,372		1.204	821.3
$635,693	$986,277		1.204	1067.0
$635,693	$986,277		1.204	1040.0
$635,693	$986,277		1.204	1013.0
$635,693	$986,277		1.204	985.4
$635,693	$986,277		1.204	958.0
$635,693	$1,123,372		1.204	930.7
$635,693	$1,123,372		1.204	903.3
$635,693	$1,123,372		1.204	876.0
$635,693	$1,123,372		1.204	848.7
$635,693	$1,274,669		1.204	821.3
$635,693	$986,277		1.204	1067.0
$635,693	$986,277		1.204	1040.0
$635,693	$986,277		1.204	1013.0
$635,693	$986,277		1.204	985.4
$635,693	$986,277		1.204	958.0
$635,693	$1,123,372		1.204	930.7
$635,693	$1,123,372		1.204	903.3
$635,693	$1,123,372		1.204	876.0
$635,693	$1,123,372		1.204	848.7
$635,693	$1,274,669		1.204	821.3

28 - Vapor Density lb/ft3	29 - Liquid Q ft3/s	29 - Liquid Density lb/ft3	Vertical Sep. Diameter With mist extractor ft
0.1492	0	36.17	16.5
0.1492	0	36.17	16.0
0.1492	0	36.17	16.0
0.1492	0	36.17	16.0
0.1492	0	36.17	15.5
0.1492	0	36.17	15.5
0.1492	0	36.17	15.0
0.1492	0	36.17	15.0
0.1492	0	36.17	14.5
0.1492	0	36.17	14.5
0.1492	0	36.17	16.5
0.1492	0	36.17	16.0
0.1492	0	36.17	16.0
0.1492	0	36.17	16.0
0.1492	0	36.17	15.5
0.1492	0	36.17	15.5
0.1492	0	36.17	15.0
0.1492	0	36.17	15.0
0.1492	0	36.17	14.5
0.1492	0	36.17	14.5
0.1492	0	36.17	16.5
0.1492	0	36.17	16.0
0.1492	0	36.17	16.0
0.1492	0	36.17	16.0
0.1492	0	36.17	15.5
0.1492	0	36.17	15.5
0.1492	0	36.17	15.0
0.1492	0	36.17	15.0
0.1492	0	36.17	14.5
0.1492	0	36.17	14.5
0.1492	0	36.17	16.5
0.1492	0	36.17	16.0
0.1492	0	36.17	16.0
0.1492	0	36.17	16.0
0.1492	0	36.17	15.5
0.1492	0	36.17	15.5
0.1492	0	36.17	15.0
0.1492	0	36.17	15.0
0.1492	0	36.17	14.5
0.1492	0	36.17	14.5
0.1492	0	36.17	16.5
0.1492	0	36.17	16.0
0.1492	0	36.17	16.0
0.1492	0	36.17	16.0
0.1492	0	36.17	15.5
0.1492	0	36.17	15.5
0.1492	0	36.17	15.0
0.1492	0	36.17	15.0
0.1492	0	36.17	14.5
0.1492	0	36.17	14.5
0.1492	0	36.17	16.5
0.1492	0	36.17	16.0
0.1492	0	36.17	16.0
0.1492	0	36.17	16.0
0.1492	0	36.17	15.5
0.1492	0	36.17	15.5
0.1492	0	36.17	15.0
0.1492	0	36.17	15.0
0.1492	0	36.17	14.5
0.1492	0	36.17	14.5

28 - Vapor Density lb/ft3	29 - Liquid Q ft3/s	29 - Liquid Density lb/ft3	Vertical Sep. Diameter With mist extractor ft
0.1492	0	36.17	16.5
0.1492	0	36.17	16.0
0.1492	0	36.17	16.0
0.1492	0	36.17	16.0
0.1492	0	36.17	15.5
0.1492	0	36.17	15.5
0.1492	0	36.17	15.0
0.1492	0	36.17	15.0
0.1492	0	36.17	14.5
0.1492	0	36.17	14.5
0.1492	0	36.17	16.5
0.1492	0	36.17	16.0
0.1492	0	36.17	16.0
0.1492	0	36.17	16.0
0.1492	0	36.17	15.5
0.1492	0	36.17	15.5
0.1492	0	36.17	15.0
0.1492	0	36.17	15.0
0.1492	0	36.17	14.5
0.1492	0	36.17	14.5
0.1492	0	36.17	16.5
0.1492	0	36.17	16.0
0.1492	0	36.17	16.0
0.1492	0	36.17	16.0
0.1492	0	36.17	15.5
0.1492	0	36.17	15.5
0.1492	0	36.17	15.0
0.1492	0	36.17	15.0
0.1492	0	36.17	14.5
0.1492	0	36.17	14.5
0.1492	0	36.17	16.5
0.1492	0	36.17	16.0
0.1492	0	36.17	16.0
0.1492	0	36.17	16.0
0.1492	0	36.17	15.5
0.1492	0	36.17	15.5
0.1492	0	36.17	15.0
0.1492	0	36.17	15.0
0.1492	0	36.17	14.5
0.1492	0	36.17	14.5
0.1492	0	36.17	16.5
0.1492	0	36.17	16.0
0.1492	0	36.17	16.0
0.1492	0	36.17	16.0
0.1492	0	36.17	15.5
0.1492	0	36.17	15.5
0.1492	0	36.17	15.0
0.1492	0	36.17	15.0
0.1492	0	36.17	14.5
0.1492	0	36.17	14.5

Vertical Sep. Diameter Without mist extractor ft	Horizontal Separator Diameter Drop out time ft	 Holdup and Surge time ft	Vertical Sep. Cost With mist extractor $
19.0	11.5	0.0	$1,992,987
18.5	11.0	0.0	$1,792,260
18.5	11.0	0.0	$1,792,260
18.0	10.5	0.0	$1,792,260
18.0	10.5	0.0	$1,608,063
17.5	10.0	0.0	$1,608,063
17.5	10.0	0.0	$1,439,334
17.0	9.5	0.0	$1,439,334
17.0	9.0	0.0	$1,285,058
16.5	9.0	0.0	$1,285,058
19.0	11.5	0.0	$1,992,987
18.5	11.0	0.0	$1,792,260
18.5	11.0	0.0	$1,792,260
18.0	10.5	0.0	$1,792,260
18.0	10.5	0.0	$1,608,063
17.5	10.0	0.0	$1,608,063
17.5	10.0	0.0	$1,439,334
17.0	9.5	0.0	$1,439,334
17.0	9.0	0.0	$1,285,058
16.5	9.0	0.0	$1,285,058
19.0	11.5	0.0	$1,992,987
18.5	11.0	0.0	$1,792,260
18.5	11.0	0.0	$1,792,260
18.0	10.5	0.0	$1,792,260
18.0	10.5	0.0	$1,608,063
17.5	10.0	0.0	$1,608,063
17.5	10.0	0.0	$1,439,334
17.0	9.5	0.0	$1,439,334
17.0	9.0	0.0	$1,285,058
16.5	9.0	0.0	$1,285,058
19.0	11.5	0.0	$1,992,987
18.5	11.0	0.0	$1,792,260
18.5	11.0	0.0	$1,792,260
18.0	10.5	0.0	$1,792,260
18.0	10.5	0.0	$1,608,063
17.5	10.0	0.0	$1,608,063
17.5	10.0	0.0	$1,439,334
17.0	9.5	0.0	$1,439,334
17.0	9.0	0.0	$1,285,058
16.5	9.0	0.0	$1,285,058
19.0	11.5	0.0	$1,992,987
18.5	11.0	0.0	$1,792,260
18.5	11.0	0.0	$1,792,260
18.0	10.5	0.0	$1,792,260
18.0	10.5	0.0	$1,608,063
17.5	10.0	0.0	$1,608,063
17.5	10.0	0.0	$1,439,334
17.0	9.5	0.0	$1,439,334
17.0	9.0	0.0	$1,285,058
16.5	9.0	0.0	$1,285,058
19.0	11.5	0.0	$1,992,987
18.5	11.0	0.0	$1,792,260
18.5	11.0	0.0	$1,792,260
18.0	10.5	0.0	$1,792,260
18.0	10.5	0.0	$1,608,063
17.5	10.0	0.0	$1,608,063
17.5	10.0	0.0	$1,439,334
17.0	9.5	0.0	$1,439,334
17.0	9.0	0.0	$1,285,058
16.5	9.0	0.0	$1,285,058

Vertical Sep. Diameter Without mist extractor ft	Horizontal Separator Diameter Drop out time ft	 Holdup and Surge time ft	Vertical Sep. Cost With mist extractor $
19.0	11.5	0.0	$1,992,987
18.5	11.0	0.0	$1,792,260
18.5	11.0	0.0	$1,792,260
18.0	10.5	0.0	$1,792,260
18.0	10.5	0.0	$1,608,063
17.5	10.0	0.0	$1,608,063
17.5	10.0	0.0	$1,439,334
17.0	9.5	0.0	$1,439,334
17.0	9.0	0.0	$1,285,058
16.5	9.0	0.0	$1,285,058
19.0	11.5	0.0	$1,992,987
18.5	11.0	0.0	$1,792,260
18.5	11.0	0.0	$1,792,260
18.0	10.5	0.0	$1,792,260
18.0	10.5	0.0	$1,608,063
17.5	10.0	0.0	$1,608,063
17.5	10.0	0.0	$1,439,334
17.0	9.5	0.0	$1,439,334
17.0	9.0	0.0	$1,285,058
16.5	9.0	0.0	$1,285,058
19.0	11.5	0.0	$1,992,987
18.5	11.0	0.0	$1,792,260
18.5	11.0	0.0	$1,792,260
18.0	10.5	0.0	$1,792,260
18.0	10.5	0.0	$1,608,063
17.5	10.0	0.0	$1,608,063
17.5	10.0	0.0	$1,439,334
17.0	9.5	0.0	$1,439,334
17.0	9.0	0.0	$1,285,058
16.5	9.0	0.0	$1,285,058
19.0	11.5	0.0	$1,992,987
18.5	11.0	0.0	$1,792,260
18.5	11.0	0.0	$1,792,260
18.0	10.5	0.0	$1,792,260
18.0	10.5	0.0	$1,608,063
17.5	10.0	0.0	$1,608,063
17.5	10.0	0.0	$1,439,334
17.0	9.5	0.0	$1,439,334
17.0	9.0	0.0	$1,285,058
16.5	9.0	0.0	$1,285,058
19.0	11.5	0.0	$1,992,987
18.5	11.0	0.0	$1,792,260
18.5	11.0	0.0	$1,792,260
18.0	10.5	0.0	$1,792,260
18.0	10.5	0.0	$1,608,063
17.5	10.0	0.0	$1,608,063
17.5	10.0	0.0	$1,439,334
17.0	9.5	0.0	$1,439,334
17.0	9.0	0.0	$1,285,058
16.5	9.0	0.0	$1,285,058

Vertical Sep. Cost	Horizontal Separator Cost	
Without mist extractor	Drop out time	Holdup and Surge time
$	$	$
$3,285,520	$425,000	
$2,984,318	$376,471	
$2,984,318	$376,471	
$2,705,773	$332,278	
$2,705,773	$332,278	
$2,448,547	$292,137	
$2,448,547	$292,137	
$2,211,360	$255,779	
$2,211,360	$222,944	
$1,992,987	$222,944	
$3,285,520	$425,000	
$2,984,318	$376,471	
$2,984,318	$376,471	
$2,705,773	$332,278	
$2,705,773	$332,278	
$2,448,547	$292,137	
$2,448,547	$292,137	
$2,211,360	$255,779	
$2,211,360	$222,944	
$1,992,987	$222,944	
$3,285,520	$425,000	
$2,984,318	$376,471	
$2,984,318	$376,471	
$2,705,773	$332,278	
$2,705,773	$332,278	
$2,448,547	$292,137	
$2,448,547	$292,137	
$2,211,360	$255,779	
$2,211,360	$222,944	
$1,992,987	$222,944	
$3,285,520	$425,000	
$2,984,318	$376,471	
$2,984,318	$376,471	
$2,705,773	$332,278	
$2,705,773	$332,278	
$2,448,547	$292,137	
$2,448,547	$292,137	
$2,211,360	$255,779	
$2,211,360	$222,944	
$1,992,987	$222,944	
$3,285,520	$425,000	
$2,984,318	$376,471	
$2,984,318	$376,471	
$2,705,773	$332,278	
$2,705,773	$332,278	
$2,448,547	$292,137	
$2,448,547	$292,137	
$2,211,360	$255,779	
$2,211,360	$222,944	
$1,992,987	$222,944	
$3,285,520	$425,000	
$2,984,318	$376,471	
$2,984,318	$376,471	
$2,705,773	$332,278	
$2,705,773	$332,278	
$2,448,547	$292,137	
$2,448,547	$292,137	
$2,211,360	$255,779	
$2,211,360	$222,944	
$1,992,987	$222,944	

Vertical Sep. Cost	Horizontal Separator Cost	
Without mist extractor	**Drop out time**	**Holdup and Surge time**
$	**$**	**$**
$3,285,520	$425,000	
$2,984,318	$376,471	
$2,984,318	$376,471	
$2,705,773	$332,278	
$2,705,773	$332,278	
$2,448,547	$292,137	
$2,448,547	$292,137	
$2,211,360	$255,779	
$2,211,360	$222,944	
$1,992,987	$222,944	
$3,285,520	$425,000	
$2,984,318	$376,471	
$2,984,318	$376,471	
$2,705,773	$332,278	
$2,705,773	$332,278	
$2,448,547	$292,137	
$2,448,547	$292,137	
$2,211,360	$255,779	
$2,211,360	$222,944	
$1,992,987	$222,944	
$3,285,520	$425,000	
$2,984,318	$376,471	
$2,984,318	$376,471	
$2,705,773	$332,278	
$2,705,773	$332,278	
$2,448,547	$292,137	
$2,448,547	$292,137	
$2,211,360	$255,779	
$2,211,360	$222,944	
$1,992,987	$222,944	
$3,285,520	$425,000	
$2,984,318	$376,471	
$2,984,318	$376,471	
$2,705,773	$332,278	
$2,705,773	$332,278	
$2,448,547	$292,137	
$2,448,547	$292,137	
$2,211,360	$255,779	
$2,211,360	$222,944	
$1,992,987	$222,944	
$3,285,520	$425,000	
$2,984,318	$376,471	
$2,984,318	$376,471	
$2,705,773	$332,278	
$2,705,773	$332,278	
$2,448,547	$292,137	
$2,448,547	$292,137	
$2,211,360	$255,779	
$2,211,360	$222,944	
$1,992,987	$222,944	

				Case Study Variables	
State	**NGL**	**Res. Gas.**	**Total**	**19 - Temperature**	**27 - Molar Flow**
	$/hr	$/hr	$/hr	**F**	**lbmole/hr**
Case 1	$ 30,147.24	$ 35,168.76	$ 65,316.00	-40	1.30E+04
Case 2	$ 29,995.16	$ 35,272.27	$ 65,267.43	-40	1.27E+04
Case 3	$ 29,800.21	$ 35,395.23	$ 65,195.44	-40	1.23E+04
Case 4	$ 29,578.89	$ 35,508.24	$ 65,087.13	-40	1.20E+04
Case 5	$ 29,329.31	$ 35,660.17	$ 64,989.48	-40	1.17E+04
Case 6	$ 29,045.76	$ 35,802.23	$ 64,847.98	-40	1.13E+04
Case 7	$ 28,742.32	$ 35,992.70	$ 64,735.01	-40	1.10E+04
Case 8	$ 28,401.02	$ 36,173.44	$ 64,574.46	-40	1.07E+04
Case 9	$ 28,014.95	$ 36,403.02	$ 64,417.97	-40	1.03E+04
Case 10	$ 27,606.81	$ 36,642.65	$ 64,249.46	-40	1.00E+04
Case 11	$ 30,097.43	$ 35,206.29	$ 65,303.72	-43	1.30E+04
Case 12	$ 29,909.78	$ 35,329.15	$ 65,238.92	-43	1.27E+04
Case 13	$ 29,695.70	$ 35,432.88	$ 65,128.58	-43	1.23E+04
Case 14	$ 29,477.28	$ 35,565.30	$ 65,042.58	-43	1.20E+04
Case 15	$ 29,215.49	$ 35,726.56	$ 64,942.05	-43	1.17E+04
Case 16	$ 28,911.34	$ 35,897.40	$ 64,808.74	-43	1.13E+04
Case 17	$ 28,591.11	$ 36,068.65	$ 64,659.75	-43	1.10E+04
Case 18	$ 28,229.43	$ 36,278.39	$ 64,507.81	-43	1.07E+04
Case 19	$ 27,831.55	$ 36,508.29	$ 64,339.84	-43	1.03E+04
Case 20	$ 27,391.93	$ 36,748.26	$ 64,140.19	-43	1.00E+04
Case 21	$ 30,023.92	$ 35,263.12	$ 65,287.04	-46	1.30E+04
Case 22	$ 29,815.96	$ 35,366.76	$ 65,182.72	-46	1.27E+04
Case 23	$ 29,595.84	$ 35,499.06	$ 65,094.90	-46	1.23E+04
Case 24	$ 29,359.32	$ 35,631.60	$ 64,990.92	-46	1.20E+04
Case 25	$ 29,078.07	$ 35,802.23	$ 64,880.29	-46	1.17E+04
Case 26	$ 28,773.19	$ 35,973.25	$ 64,746.44	-46	1.13E+04
Case 27	$ 28,430.89	$ 36,164.16	$ 64,595.05	-46	1.10E+04
Case 28	$ 28,050.24	$ 36,374.17	$ 64,424.41	-46	1.07E+04
Case 29	$ 27,638.38	$ 36,613.71	$ 64,252.09	-46	1.03E+04
Case 30	$ 27,176.33	$ 36,883.05	$ 64,059.38	-46	1.00E+04
Case 31	$ 29,941.68	$ 35,300.70	$ 65,242.38	-49	1.30E+04
Case 32	$ 29,723.25	$ 35,432.88	$ 65,156.13	-49	1.27E+04
Case 33	$ 29,497.03	$ 35,565.30	$ 65,062.33	-49	1.23E+04
Case 34	$ 29,230.21	$ 35,707.17	$ 64,937.38	-49	1.20E+04
Case 35	$ 28,951.10	$ 35,868.74	$ 64,819.84	-49	1.17E+04
Case 36	$ 28,622.14	$ 36,068.65	$ 64,690.78	-49	1.13E+04
Case 37	$ 28,260.33	$ 36,269.09	$ 64,529.42	-49	1.10E+04
Case 38	$ 27,867.00	$ 36,498.96	$ 64,365.96	-49	1.07E+04
Case 39	$ 27,430.89	$ 36,738.90	$ 64,169.78	-49	1.03E+04
Case 40	$ 26,944.44	$ 37,018.08	$ 63,962.52	-49	1.00E+04
Case 41	$ 29,856.11	$ 35,366.76	$ 65,222.87	-52	1.30E+04
Case 42	$ 29,625.35	$ 35,489.88	$ 65,115.23	-52	1.27E+04
Case 43	$ 29,384.53	$ 35,631.60	$ 65,016.13	-52	1.23E+04
Case 44	$ 29,108.22	$ 35,773.60	$ 64,881.82	-52	1.20E+04
Case 45	$ 28,795.71	$ 35,964.00	$ 64,759.71	-52	1.17E+04
Case 46	$ 28,462.08	$ 36,144.68	$ 64,606.76	-52	1.13E+04
Case 47	$ 28,083.86	$ 36,364.86	$ 64,448.72	-52	1.10E+04
Case 48	$ 27,659.26	$ 36,604.37	$ 64,263.62	-52	1.07E+04
Case 49	$ 27,215.24	$ 36,873.67	$ 64,088.91	-52	1.03E+04
Case 50	$ 26,707.08	$ 37,153.35	$ 63,860.43	-52	1.00E+04
Case 51	$ 29,765.34	$ 35,404.40	$ 65,169.74	-55	1.30E+04
Case 52	$ 29,525.17	$ 35,536.77	$ 65,061.94	-55	1.27E+04
Case 53	$ 29,260.28	$ 35,697.96	$ 64,958.24	-55	1.23E+04
Case 54	$ 28,969.98	$ 35,859.51	$ 64,829.49	-55	1.20E+04
Case 55	$ 28,649.70	$ 36,039.92	$ 64,689.62	-55	1.17E+04
Case 56	$ 28,293.39	$ 36,240.29	$ 64,533.68	-55	1.13E+04
Case 57	$ 27,890.50	$ 36,470.08	$ 64,360.57	-55	1.10E+04
Case 58	$ 27,463.13	$ 36,719.28	$ 64,182.41	-55	1.07E+04
Case 59	$ 26,979.08	$ 36,989.00	$ 63,968.08	-55	1.03E+04
Case 60	$ 26,459.60	$ 37,288.86	$ 63,748.46	-55	1.00E+04

				Case Study Variables	
State	**NGL**	**Res. Gas.**	**Total**	**19 - Temperature**	**27 - Molar Flow**
	$/hr	$/hr	$/hr	**F**	**lbmole/hr**
Case 61	$ 29,667.53	$ 35,470.55	$ 65,138.08	-58	1.30E+04
Case 62	$ 29,403.48	$ 35,603.04	$ 65,006.52	-58	1.27E+04
Case 63	$ 29,133.45	$ 35,764.38	$ 64,897.83	-58	1.23E+04
Case 64	$ 28,830.86	$ 35,935.32	$ 64,766.17	-58	1.20E+04
Case 65	$ 28,494.44	$ 36,135.40	$ 64,629.84	-58	1.17E+04
Case 66	$ 28,116.58	$ 36,345.33	$ 64,461.91	-58	1.13E+04
Case 67	$ 27,698.13	$ 36,575.44	$ 64,273.57	-58	1.10E+04
Case 68	$ 27,246.43	$ 36,844.64	$ 64,091.07	-58	1.07E+04
Case 69	$ 26,740.86	$ 37,124.22	$ 63,865.08	-58	1.03E+04
Case 70	$ 26,191.87	$ 37,434.08	$ 63,625.95	-58	1.00E+04
Case 71	$ 29,562.07	$ 35,527.58	$ 65,089.65	-61	1.30E+04
Case 72	$ 29,280.24	$ 35,669.38	$ 64,949.61	-61	1.27E+04
Case 73	$ 29,003.77	$ 35,840.09	$ 64,843.86	-61	1.23E+04
Case 74	$ 28,676.98	$ 36,030.66	$ 64,707.64	-61	1.20E+04
Case 75	$ 28,321.69	$ 36,231.00	$ 64,552.69	-61	1.17E+04
Case 76	$ 27,928.72	$ 36,450.52	$ 64,379.24	-61	1.13E+04
Case 77	$ 27,494.03	$ 36,709.92	$ 64,203.95	-61	1.10E+04
Case 78	$ 27,010.52	$ 36,979.60	$ 63,990.12	-61	1.07E+04
Case 79	$ 26,494.73	$ 37,288.86	$ 63,783.59	-61	1.03E+04
Case 80	$ 25,922.57	$ 37,599.38	$ 63,521.95	-61	1.00E+04
Case 81	$ 29,442.86	$ 35,593.85	$ 65,036.71	-64	1.30E+04
Case 82	$ 29,157.93	$ 35,764.38	$ 64,922.31	-64	1.27E+04
Case 83	$ 28,853.34	$ 35,926.07	$ 64,779.41	-64	1.23E+04
Case 84	$ 28,517.23	$ 36,106.65	$ 64,623.88	-64	1.20E+04
Case 85	$ 28,139.72	$ 36,336.03	$ 64,475.74	-64	1.17E+04
Case 86	$ 27,726.80	$ 36,575.44	$ 64,302.24	-64	1.13E+04
Case 87	$ 27,270.39	$ 36,835.26	$ 64,105.65	-64	1.10E+04
Case 88	$ 26,768.27	$ 37,114.80	$ 63,883.07	-64	1.07E+04
Case 89	$ 26,231.83	$ 37,424.61	$ 63,656.44	-64	1.03E+04
Case 90	$ 25,631.72	$ 37,765.04	$ 63,396.75	-64	1.00E+04
Case 91	$ 29,329.31	$ 35,660.17	$ 64,989.48	-67	1.30E+04
Case 92	$ 29,028.72	$ 35,830.86	$ 64,859.58	-67	1.27E+04
Case 93	$ 28,715.34	$ 36,001.95	$ 64,717.29	-67	1.23E+04
Case 94	$ 28,354.69	$ 36,211.50	$ 64,566.19	-67	1.20E+04
Case 95	$ 27,962.10	$ 36,441.20	$ 64,403.30	-67	1.17E+04
Case 96	$ 27,517.76	$ 36,680.96	$ 64,198.71	-67	1.13E+04
Case 97	$ 27,047.49	$ 36,950.54	$ 63,998.03	-67	1.10E+04
Case 98	$ 26,512.44	$ 37,259.68	$ 63,772.12	-67	1.07E+04
Case 99	$ 25,947.79	$ 37,589.89	$ 63,537.68	-67	1.03E+04
Case 100	$ 25,337.37	$ 37,940.58	$ 63,277.95	-67	1.00E+04
Case 101	$ 29,205.10	$ 35,726.56	$ 64,931.66	-70	1.30E+04
Case 102	$ 28,872.83	$ 35,906.64	$ 64,779.47	-70	1.27E+04
Case 103	$ 28,548.33	$ 36,106.65	$ 64,654.98	-70	1.23E+04
Case 104	$ 28,171.21	$ 36,307.20	$ 64,478.41	-70	1.20E+04
Case 105	$ 27,758.73	$ 36,546.53	$ 64,305.25	-70	1.17E+04
Case 106	$ 27,299.59	$ 36,815.63	$ 64,115.21	-70	1.13E+04
Case 107	$ 26,796.50	$ 37,095.10	$ 63,891.60	-70	1.10E+04
Case 108	$ 26,252.18	$ 37,424.61	$ 63,676.79	-70	1.07E+04
Case 109	$ 25,661.21	$ 37,745.19	$ 63,406.40	-70	1.03E+04
Case 110	$ 25,018.59	$ 38,116.53	$ 63,135.11	-70	1.00E+04

26 - Molar Flow	26 - Higher Heating Value	T-101 C2 Recovery	17 - Actual Volume Flow
lbmole/hr	Btu/lbmole	%	USGPH
1.83E+04	3.85E+05	86.98	3.69E+04
1.83E+04	3.86E+05	85.97	3.66E+04
1.83E+04	3.86E+05	84.78	3.63E+04
1.84E+04	3.87E+05	83.44	3.59E+04
1.84E+04	3.87E+05	81.94	3.55E+04
1.85E+04	3.88E+05	80.27	3.51E+04
1.85E+04	3.89E+05	78.41	3.46E+04
1.86E+04	3.90E+05	76.35	3.40E+04
1.86E+04	3.91E+05	74.09	3.34E+04
1.87E+04	3.92E+05	71.63	3.27E+04
1.83E+04	3.85E+05	86.6	3.68E+04
1.83E+04	3.86E+05	85.46	3.65E+04
1.83E+04	3.86E+05	84.2	3.61E+04
1.84E+04	3.87E+05	82.79	3.57E+04
1.84E+04	3.88E+05	81.21	3.53E+04
1.85E+04	3.89E+05	79.45	3.48E+04
1.85E+04	3.89E+05	77.49	3.43E+04
1.86E+04	3.90E+05	75.34	3.37E+04
1.87E+04	3.91E+05	72.99	3.31E+04
1.87E+04	3.92E+05	70.43	3.24E+04
1.83E+04	3.86E+05	86.13	3.66E+04
1.83E+04	3.86E+05	84.91	3.63E+04
1.84E+04	3.87E+05	83.59	3.60E+04
1.84E+04	3.87E+05	82.1	3.56E+04
1.85E+04	3.88E+05	80.43	3.51E+04
1.85E+04	3.89E+05	78.58	3.46E+04
1.86E+04	3.90E+05	76.53	3.40E+04
1.86E+04	3.91E+05	74.28	3.34E+04
1.87E+04	3.92E+05	71.83	3.28E+04
1.88E+04	3.93E+05	69.17	3.20E+04
1.83E+04	3.86E+05	85.63	3.65E+04
1.83E+04	3.86E+05	84.34	3.62E+04
1.84E+04	3.87E+05	82.94	3.58E+04
1.84E+04	3.88E+05	81.36	3.54E+04
1.85E+04	3.88E+05	79.61	3.49E+04
1.85E+04	3.89E+05	77.67	3.44E+04
1.86E+04	3.90E+05	75.53	3.38E+04
1.87E+04	3.91E+05	73.18	3.31E+04
1.87E+04	3.92E+05	70.62	3.24E+04
1.88E+04	3.94E+05	67.86	3.17E+04
1.83E+04	3.86E+05	85.09	3.64E+04
1.84E+04	3.87E+05	83.72	3.60E+04
1.84E+04	3.87E+05	82.25	3.56E+04
1.84E+04	3.88E+05	80.59	3.51E+04
1.85E+04	3.89E+05	78.75	3.46E+04
1.86E+04	3.90E+05	76.71	3.41E+04
1.86E+04	3.91E+05	74.47	3.35E+04
1.87E+04	3.92E+05	72.02	3.28E+04
1.88E+04	3.93E+05	69.36	3.21E+04
1.89E+04	3.94E+05	66.49	3.13E+04
1.83E+04	3.86E+05	84.53	3.62E+04
1.84E+04	3.87E+05	83.08	3.58E+04
1.84E+04	3.88E+05	81.52	3.54E+04
1.85E+04	3.88E+05	79.78	3.49E+04
1.85E+04	3.89E+05	77.84	3.44E+04
1.86E+04	3.90E+05	75.71	3.38E+04
1.87E+04	3.91E+05	73.36	3.32E+04
1.87E+04	3.92E+05	70.8	3.25E+04
1.88E+04	3.94E+05	68.04	3.17E+04
1.89E+04	3.95E+05	65.07	3.09E+04

26 - Molar Flow	26 - Higher Heating Value	T-101 C2 Recovery	17 - Actual Volume Flow
lbmole/hr	Btu/lbmole	%	USGPH
1.84E+04	3.87E+05	83.94	3.61E+04
1.84E+04	3.87E+05	82.39	3.56E+04
1.84E+04	3.88E+05	80.75	3.52E+04
1.85E+04	3.89E+05	78.92	3.47E+04
1.86E+04	3.90E+05	76.89	3.41E+04
1.86E+04	3.91E+05	74.65	3.35E+04
1.87E+04	3.92E+05	72.2	3.29E+04
1.88E+04	3.93E+05	69.54	3.21E+04
1.88E+04	3.94E+05	66.67	3.13E+04
1.89E+04	3.96E+05	63.6	3.05E+04
1.84E+04	3.87E+05	83.31	3.59E+04
1.84E+04	3.88E+05	81.67	3.54E+04
1.85E+04	3.88E+05	79.94	3.50E+04
1.85E+04	3.89E+05	78.01	3.44E+04
1.86E+04	3.90E+05	75.88	3.39E+04
1.86E+04	3.91E+05	73.54	3.32E+04
1.87E+04	3.92E+05	70.98	3.25E+04
1.88E+04	3.93E+05	68.22	3.18E+04
1.89E+04	3.95E+05	65.24	3.09E+04
1.90E+04	3.96E+05	62.07	3.00E+04
1.84E+04	3.87E+05	82.64	3.57E+04
1.84E+04	3.88E+05	80.9	3.52E+04
1.85E+04	3.89E+05	79.08	3.47E+04
1.85E+04	3.90E+05	77.06	3.42E+04
1.86E+04	3.91E+05	74.82	3.36E+04
1.87E+04	3.92E+05	72.38	3.29E+04
1.88E+04	3.93E+05	69.71	3.22E+04
1.88E+04	3.94E+05	66.84	3.14E+04
1.89E+04	3.95E+05	63.75	3.05E+04
1.90E+04	3.97E+05	60.48	2.96E+04
1.84E+04	3.87E+05	81.93	3.55E+04
1.85E+04	3.88E+05	80.09	3.50E+04
1.85E+04	3.89E+05	78.17	3.45E+04
1.86E+04	3.90E+05	76.05	3.39E+04
1.86E+04	3.91E+05	73.71	3.33E+04
1.87E+04	3.92E+05	71.15	3.26E+04
1.88E+04	3.93E+05	68.39	3.18E+04
1.89E+04	3.95E+05	65.4	3.10E+04
1.90E+04	3.96E+05	62.21	3.01E+04
1.91E+04	3.98E+05	58.84	2.91E+04
1.84E+04	3.88E+05	81.18	3.53E+04
1.85E+04	3.89E+05	79.23	3.48E+04
1.85E+04	3.90E+05	77.22	3.42E+04
1.86E+04	3.90E+05	74.99	3.36E+04
1.87E+04	3.92E+05	72.54	3.30E+04
1.88E+04	3.93E+05	69.88	3.22E+04
1.88E+04	3.94E+05	67	3.14E+04
1.89E+04	3.95E+05	63.9	3.05E+04
1.90E+04	3.97E+05	60.61	2.96E+04
1.91E+04	3.99E+05	57.14	2.86E+04

Stream 17 Molar Component Fractions

17 - C2	17 - C3	17 - i-C4	17 - n-C4	17 - i-C5	17 - n-C5	17 -n-C6
0.6036	0.2068	0.053	0.0681	0.0237	0.0156	0.0222
0.601	0.2081	0.0534	0.0686	0.0239	0.0157	0.0224
0.5978	0.2097	0.0539	0.0692	0.0241	0.0159	0.0225
0.5943	0.2115	0.0544	0.0699	0.0244	0.016	0.0228
0.5902	0.2135	0.055	0.0707	0.0246	0.0162	0.023
0.5855	0.2158	0.0557	0.0716	0.0249	0.0164	0.0233
0.5803	0.2183	0.0565	0.0726	0.0253	0.0166	0.0237
0.5743	0.2212	0.0574	0.0738	0.0257	0.0169	0.0241
0.5676	0.2244	0.0584	0.0751	0.0262	0.0172	0.0245
0.5601	0.2279	0.0596	0.0767	0.0267	0.0176	0.025
0.6026	0.2073	0.0532	0.0683	0.0238	0.0157	0.0223
0.5996	0.2088	0.0536	0.0689	0.024	0.0158	0.0224
0.5963	0.2104	0.0541	0.0695	0.0242	0.0159	0.0226
0.5925	0.2123	0.0547	0.0703	0.0245	0.0161	0.0229
0.5882	0.2145	0.0553	0.0711	0.0248	0.0163	0.0232
0.5832	0.2169	0.056	0.072	0.0251	0.0165	0.0235
0.5777	0.2196	0.0569	0.0731	0.0255	0.0168	0.0238
0.5714	0.2226	0.0578	0.0744	0.0259	0.0171	0.0243
0.5643	0.226	0.0589	0.0758	0.0264	0.0174	0.0247
0.5564	0.2296	0.0601	0.0774	0.027	0.0178	0.0253
0.6014	0.2079	0.0534	0.0686	0.0239	0.0157	0.0223
0.5982	0.2095	0.0538	0.0692	0.0241	0.0158	0.0225
0.5946	0.2113	0.0544	0.0698	0.0243	0.016	0.0227
0.5906	0.2133	0.055	0.0706	0.0246	0.0162	0.023
0.586	0.2155	0.0556	0.0715	0.0249	0.0164	0.0233
0.5808	0.2181	0.0564	0.0725	0.0253	0.0166	0.0236
0.5749	0.2209	0.0573	0.0737	0.0257	0.0169	0.024
0.5682	0.2241	0.0583	0.075	0.0262	0.0172	0.0245
0.5607	0.2276	0.0595	0.0765	0.0267	0.0176	0.025
0.5524	0.2314	0.0608	0.0783	0.0273	0.018	0.0255
0.6001	0.2086	0.0536	0.0688	0.024	0.0158	0.0224
0.5966	0.2103	0.0541	0.0695	0.0242	0.0159	0.0226
0.5929	0.2121	0.0546	0.0702	0.0244	0.0161	0.0229
0.5886	0.2143	0.0552	0.071	0.0247	0.0163	0.0231
0.5837	0.2167	0.056	0.072	0.0251	0.0165	0.0234
0.5782	0.2194	0.0568	0.073	0.0255	0.0167	0.0238
0.5719	0.2224	0.0578	0.0743	0.0259	0.017	0.0242
0.5649	0.2257	0.0588	0.0757	0.0264	0.0174	0.0247
0.557	0.2293	0.0601	0.0773	0.027	0.0177	0.0252
0.5481	0.2333	0.0614	0.0791	0.0276	0.0182	0.0258
0.5987	0.2093	0.0538	0.0691	0.0241	0.0158	0.0225
0.595	0.2111	0.0543	0.0698	0.0243	0.016	0.0227
0.591	0.2131	0.0549	0.0705	0.0246	0.0162	0.023
0.5864	0.2153	0.0556	0.0714	0.0249	0.0164	0.0233
0.5813	0.2179	0.0563	0.0724	0.0252	0.0166	0.0236
0.5754	0.2207	0.0572	0.0736	0.0256	0.0169	0.024
0.5688	0.2238	0.0582	0.0749	0.0261	0.0172	0.0244
0.5613	0.2273	0.0594	0.0764	0.0266	0.0175	0.0249
0.553	0.2312	0.0607	0.0781	0.0273	0.0179	0.0255
0.5437	0.2353	0.0621	0.0801	0.0279	0.0184	0.0261
0.5972	0.21	0.054	0.0694	0.0242	0.0159	0.0226
0.5933	0.212	0.0546	0.0701	0.0244	0.0161	0.0228
0.589	0.2141	0.0552	0.0709	0.0247	0.0163	0.0231
0.5842	0.2164	0.0559	0.0719	0.025	0.0165	0.0234
0.5787	0.2191	0.0567	0.0729	0.0254	0.0167	0.0238
0.5724	0.2221	0.0577	0.0742	0.0259	0.017	0.0242
0.5654	0.2254	0.0587	0.0756	0.0264	0.0173	0.0246
0.5575	0.2291	0.06	0.0772	0.0269	0.0177	0.0252
0.5487	0.2331	0.0613	0.079	0.0276	0.0181	0.0258
0.5389	0.2374	0.0629	0.0811	0.0283	0.0186	0.0265

Stream 17 Molar Component Fractions

17 - C2	17 - C3	17 - i-C4	17 - n-C4	17 - i-C5	17 - n-C5	17 -n-C6
0.5956	0.2108	0.0542	0.0697	0.0243	0.016	0.0227
0.5914	0.2129	0.0548	0.0705	0.0245	0.0161	0.023
0.5869	0.2151	0.0555	0.0713	0.0249	0.0163	0.0232
0.5817	0.2176	0.0563	0.0723	0.0252	0.0166	0.0236
0.5759	0.2204	0.0572	0.0735	0.0256	0.0168	0.024
0.5693	0.2236	0.0582	0.0748	0.0261	0.0172	0.0244
0.5619	0.2271	0.0593	0.0763	0.0266	0.0175	0.0249
0.5536	0.2309	0.0606	0.078	0.0272	0.0179	0.0255
0.5442	0.2351	0.062	0.0799	0.0279	0.0184	0.0261
0.5339	0.2396	0.0637	0.0821	0.0287	0.0189	0.0268
0.5939	0.2117	0.0545	0.07	0.0244	0.016	0.0228
0.5894	0.2139	0.0551	0.0708	0.0247	0.0162	0.0231
0.5846	0.2162	0.0558	0.0718	0.025	0.0165	0.0234
0.5792	0.2189	0.0567	0.0728	0.0254	0.0167	0.0237
0.573	0.2219	0.0576	0.0741	0.0258	0.017	0.0241
0.566	0.2252	0.0587	0.0755	0.0263	0.0173	0.0246
0.5581	0.2288	0.0599	0.0771	0.0269	0.0177	0.0251
0.5493	0.2328	0.0612	0.0789	0.0275	0.0181	0.0258
0.5395	0.2372	0.0628	0.081	0.0283	0.0186	0.0264
0.5286	0.2419	0.0645	0.0833	0.0291	0.0192	0.0272
0.5921	0.2125	0.0547	0.0703	0.0245	0.0161	0.0229
0.5873	0.2149	0.0554	0.0713	0.0248	0.0163	0.0232
0.5822	0.2174	0.0562	0.0722	0.0252	0.0166	0.0235
0.5764	0.2202	0.0571	0.0734	0.0256	0.0168	0.0239
0.5698	0.2233	0.0581	0.0747	0.026	0.0171	0.0244
0.5624	0.2268	0.0592	0.0762	0.0266	0.0175	0.0248
0.5541	0.2307	0.0605	0.0779	0.0272	0.0179	0.0254
0.5448	0.2348	0.062	0.0798	0.0279	0.0183	0.0261
0.5345	0.2394	0.0636	0.082	0.0287	0.0189	0.0268
0.523	0.2442	0.0654	0.0845	0.0295	0.0194	0.0277
0.5902	0.2135	0.055	0.0707	0.0246	0.0162	0.023
0.585	0.216	0.0558	0.0717	0.025	0.0164	0.0234
0.5796	0.2187	0.0566	0.0728	0.0254	0.0167	0.0237
0.5735	0.2216	0.0575	0.074	0.0258	0.017	0.0241
0.5665	0.2249	0.0586	0.0754	0.0263	0.0173	0.0246
0.5586	0.2286	0.0598	0.077	0.0268	0.0177	0.0251
0.5498	0.2326	0.0612	0.0788	0.0275	0.0181	0.0257
0.54	0.2369	0.0627	0.0808	0.0282	0.0186	0.0264
0.5291	0.2417	0.0644	0.0832	0.0291	0.0191	0.0272
0.5171	0.2467	0.0664	0.0858	0.03	0.0198	0.0281
0.5881	0.2145	0.0553	0.0711	0.0248	0.0163	0.0232
0.5826	0.2172	0.0561	0.0722	0.0251	0.0165	0.0235
0.5769	0.22	0.057	0.0733	0.0255	0.0168	0.0239
0.5703	0.2231	0.058	0.0746	0.026	0.0171	0.0243
0.5629	0.2266	0.0591	0.0761	0.0265	0.0175	0.0248
0.5546	0.2304	0.0604	0.0778	0.0271	0.0179	0.0254
0.5453	0.2346	0.0619	0.0797	0.0278	0.0183	0.026
0.535	0.2392	0.0635	0.0819	0.0286	0.0188	0.0268
0.5235	0.244	0.0654	0.0844	0.0295	0.0194	0.0276
0.5108	0.2492	0.0674	0.0872	0.0305	0.0201	0.0286

State	Case Study Variables 19 - Temperature F	27 - Molar Flow lbmole/hr	Total Heat Ex. Cost
Case 1	-40	1.30E+04	$140,051.53
Case 2	-40	1.27E+04	$91,145.07
Case 3	-40	1.23E+04	$81,008.54
Case 4	-40	1.20E+04	$73,822.12
Case 5	-40	1.17E+04	$70,179.27
Case 6	-40	1.13E+04	$65,807.70
Case 7	-40	1.10E+04	$63,081.39
Case 8	-40	1.07E+04	$59,923.23
Case 9	-40	1.03E+04	$57,358.78
Case 10	-40	1.00E+04	$52,584.12
Case 11	-43	1.30E+04	$131,823.36
Case 12	-43	1.27E+04	$90,443.22
Case 13	-43	1.23E+04	$80,477.17
Case 14	-43	1.20E+04	$73,518.67
Case 15	-43	1.17E+04	$70,137.12
Case 16	-43	1.13E+04	$65,626.81
Case 17	-43	1.10E+04	$62,056.21
Case 18	-43	1.07E+04	$58,762.97
Case 19	-43	1.03E+04	$55,981.72
Case 20	-43	1.00E+04	$53,677.47
Case 21	-46	1.30E+04	$127,229.58
Case 22	-46	1.27E+04	$89,962.20
Case 23	-46	1.23E+04	$79,190.96
Case 24	-46	1.20E+04	$74,201.63
Case 25	-46	1.17E+04	$68,758.17
Case 26	-46	1.13E+04	$65,799.48
Case 27	-46	1.10E+04	$62,433.00
Case 28	-46	1.07E+04	$59,599.89
Case 29	-46	1.03E+04	$52,243.41
Case 30	-46	1.00E+04	$58,922.28
Case 31	-49	1.30E+04	$123,375.71
Case 32	-49	1.27E+04	$89,117.83
Case 33	-49	1.23E+04	$78,816.29
Case 34	-49	1.20E+04	$72,914.13
Case 35	-49	1.17E+04	$68,818.48
Case 36	-49	1.13E+04	$64,633.66
Case 37	-49	1.10E+04	$60,745.75
Case 38	-49	1.07E+04	$57,539.68
Case 39	-49	1.03E+04	$54,950.98
Case 40	-49	1.00E+04	$55,388.84
Case 41	-52	1.30E+04	$119,969.67
Case 42	-52	1.27E+04	$87,756.57
Case 43	-52	1.23E+04	$79,476.57
Case 44	-52	1.20E+04	$72,700.09
Case 45	-52	1.17E+04	$67,473.09
Case 46	-52	1.13E+04	$65,230.15
Case 47	-52	1.10E+04	$62,614.15
Case 48	-52	1.07E+04	$84,242.33
Case 49	-52	1.03E+04	$56,288.65
Case 50	-52	1.00E+04	$54,444.01
Case 51	-55	1.30E+04	$117,243.18
Case 52	-55	1.27E+04	$87,068.86
Case 53	-55	1.23E+04	$78,151.94
Case 54	-55	1.20E+04	$71,133.74
Case 55	-55	1.17E+04	$67,658.54
Case 56	-55	1.13E+04	$63,359.04
Case 57	-55	1.10E+04	$37,340.95
Case 58	-55	1.07E+04	$61,286.92
Case 59	-55	1.03E+04	$58,004.42
Case 60	-55	1.00E+04	$53,767.00

State	Case Study Variables 19 - Temperature F	27 - Molar Flow lbmole/hr	Total Heat Ex. Cost
Case 61	-58	1.30E+04	$114,507.45
Case 62	-58	1.27E+04	$86,699.26
Case 63	-58	1.23E+04	$77,990.62
Case 64	-58	1.20E+04	$71,000.43
Case 65	-58	1.17E+04	$65,003.26
Case 66	-58	1.13E+04	$39,724.69
Case 67	-58	1.10E+04	$62,103.83
Case 68	-58	1.07E+04	$57,360.72
Case 69	-58	1.03E+04	$56,839.67
Case 70	-58	1.00E+04	$54,115.41
Case 71	-61	1.30E+04	$111,120.85
Case 72	-61	1.27E+04	$86,410.36
Case 73	-61	1.23E+04	$75,857.85
Case 74	-61	1.20E+04	$71,991.85
Case 75	-61	1.17E+04	$67,505.59
Case 76	-61	1.13E+04	$62,320.73
Case 77	-61	1.10E+04	$61,346.99
Case 78	-61	1.07E+04	$58,651.33
Case 79	-61	1.03E+04	$55,919.59
Case 80	-61	1.00E+04	$53,265.46
Case 81	-64	1.30E+04	$108,895.30
Case 82	-64	1.27E+04	$86,169.97
Case 83	-64	1.23E+04	$76,128.95
Case 84	-64	1.20E+04	$64,530.38
Case 85	-64	1.17E+04	$68,618.51
Case 86	-64	1.13E+04	$63,098.66
Case 87	-64	1.10E+04	$60,428.32
Case 88	-64	1.07E+04	$57,743.10
Case 89	-64	1.03E+04	$55,010.42
Case 90	-64	1.00E+04	$53,062.56
Case 91	-67	1.30E+04	$104,895.12
Case 92	-67	1.27E+04	$83,428.03
Case 93	-67	1.23E+04	$66,138.51
Case 94	-67	1.20E+04	$76,207.85
Case 95	-67	1.17E+04	$64,855.95
Case 96	-67	1.13E+04	$64,442.06
Case 97	-67	1.10E+04	$59,848.56
Case 98	-67	1.07E+04	$57,014.38
Case 99	-67	1.03E+04	$54,973.13
Case 100	-67	1.00E+04	$52,781.33
Case 101	-70	1.30E+04	$106,139.14
Case 102	-70	1.27E+04	$71,949.73
Case 103	-70	1.23E+04	$77,027.88
Case 104	-70	1.20E+04	$73,201.53
Case 105	-70	1.17E+04	$67,001.11
Case 106	-70	1.13E+04	$62,307.31
Case 107	-70	1.10E+04	$60,143.16
Case 108	-70	1.07E+04	$57,058.77
Case 109	-70	1.03E+04	$54,145.73
Case 110	-70	1.00E+04	$51,898.86

E-101 - LMTD	E-101 - UA	E-101 - Cold Duty	AREA	
F	Btu/F-hr	Btu/hr	ft2	$
14.24	1.82E+05	2.59E+06	726.4	$7,990.45
14.2	1.78E+05	2.53E+06	713.2	$7,845.63
14.15	1.75E+05	2.47E+06	698.8	$7,686.78
14.09	1.71E+05	2.41E+06	682.8	$7,510.29
14.03	1.66E+05	2.33E+06	664.3	$7,307.20
13.95	1.61E+05	2.25E+06	644	$7,084.16
13.85	1.55E+05	2.15E+06	621.8	$6,839.86
13.74	1.49E+05	2.05E+06	596.8	$6,564.77
13.61	1.42E+05	1.94E+06	569.3	$6,262.16
13.44	1.35E+05	1.82E+06	540.2	$5,941.96
14.22	1.80E+05	2.56E+06	720.7	$7,927.43
14.18	1.77E+05	2.51E+06	706.9	$7,776.02
14.13	1.73E+05	2.44E+06	691.6	$7,607.36
14.07	1.69E+05	2.37E+06	674.3	$7,417.77
13.99	1.64E+05	2.29E+06	655.6	$7,211.72
13.91	1.59E+05	2.21E+06	634.1	$6,974.84
13.8	1.53E+05	2.11E+06	610.7	$6,717.97
13.68	1.46E+05	2.00E+06	584.8	$6,432.75
13.53	1.39E+05	1.88E+06	556.4	$6,120.33
13.36	1.31E+05	1.75E+06	525.1	$5,776.65
14.2	1.79E+05	2.54E+06	714.9	$7,864.23
14.16	1.75E+05	2.48E+06	700	$7,700.00
14.1	1.71E+05	2.41E+06	684.3	$7,526.81
14.03	1.67E+05	2.34E+06	666.3	$7,329.15
13.96	1.62E+05	2.25E+06	645.8	$7,104.30
13.86	1.56E+05	2.16E+06	623.7	$6,860.32
13.75	1.50E+05	2.06E+06	599	$6,588.80
13.62	1.43E+05	1.95E+06	571.8	$6,289.87
13.46	1.36E+05	1.82E+06	542.1	$5,962.56
13.27	1.28E+05	1.69E+06	510	$5,610.25
14.18	1.77E+05	2.51E+06	708.9	$7,797.74
14.13	1.73E+05	2.45E+06	693.3	$7,626.04
14.07	1.69E+05	2.38E+06	676.3	$7,439.66
14	1.64E+05	2.30E+06	657.4	$7,231.71
13.92	1.59E+05	2.21E+06	635.9	$6,995.11
13.81	1.53E+05	2.12E+06	612.9	$6,741.78
13.69	1.47E+05	2.01E+06	587	$6,456.98
13.55	1.40E+05	1.89E+06	558.5	$6,143.76
13.37	1.32E+05	1.76E+06	527.7	$5,805.24
13.17	1.24E+05	1.63E+06	493.8	$5,432.35
14.16	1.76E+05	2.49E+06	702.3	$7,724.86
14.11	1.72E+05	2.42E+06	685.8	$7,543.30
14.04	1.67E+05	2.35E+06	668.1	$7,349.00
13.96	1.62E+05	2.26E+06	648.1	$7,129.51
13.87	1.56E+05	2.17E+06	625.8	$6,883.92
13.76	1.50E+05	2.07E+06	601.2	$6,612.79
13.63	1.44E+05	1.96E+06	574	$6,314.31
13.47	1.36E+05	1.83E+06	544.6	$5,990.79
13.28	1.28E+05	1.70E+06	512.3	$5,635.84
13.06	1.19E+05	1.56E+06	477.2	$5,249.00
14.14	1.74E+05	2.46E+06	695.3	$7,648.66
14.08	1.70E+05	2.39E+06	677.8	$7,456.25
14.01	1.65E+05	2.31E+06	659	$7,248.54
13.92	1.60E+05	2.22E+06	638.2	$7,020.40
13.82	1.54E+05	2.13E+06	615.1	$6,765.56
13.7	1.47E+05	2.02E+06	589.2	$6,481.17
13.56	1.40E+05	1.90E+06	560.8	$6,168.44
13.39	1.33E+05	1.77E+06	529.6	$5,826.14
13.18	1.24E+05	1.64E+06	496.2	$5,458.27
12.94	1.15E+05	1.49E+06	459.7	$5,056.26

E-101 - LMTD	E-101 - UA	E-101 - Cold Duty	AREA	
F	Btu/F-hr	Btu/hr	ft2	$
14.11	1.72E+05	2.43E+06	688.3	$7,571.37
14.05	1.67E+05	2.35E+06	669.6	$7,365.69
13.97	1.63E+05	2.27E+06	650	$7,149.61
13.88	1.57E+05	2.18E+06	627.7	$6,904.32
13.77	1.51E+05	2.08E+06	603.3	$6,636.75
13.64	1.44E+05	1.97E+06	576.2	$6,338.71
13.48	1.37E+05	1.84E+06	546.9	$6,015.73
13.3	1.29E+05	1.71E+06	514.3	$5,657.14
13.07	1.20E+05	1.57E+06	479.6	$5,275.29
12.81	1.10E+05	1.41E+06	441.2	$4,853.40
14.09	1.70E+05	2.40E+06	680.5	$7,485.31
14.02	1.65E+05	2.32E+06	660.8	$7,268.47
13.93	1.60E+05	2.23E+06	640.1	$7,040.63
13.83	1.54E+05	2.13E+06	616.9	$6,786.12
13.71	1.48E+05	2.03E+06	591.4	$6,505.32
13.57	1.41E+05	1.91E+06	563	$6,193.07
13.4	1.33E+05	1.78E+06	531.9	$5,851.34
13.2	1.25E+05	1.64E+06	498.2	$5,480.00
12.95	1.16E+05	1.50E+06	462.1	$5,082.93
12.66	1.06E+05	1.34E+06	422.4	$4,646.76
14.06	1.68E+05	2.36E+06	672.3	$7,394.88
13.98	1.63E+05	2.28E+06	651.5	$7,166.52
13.89	1.57E+05	2.19E+06	629.5	$6,924.69
13.78	1.51E+05	2.09E+06	605.2	$6,657.47
13.65	1.45E+05	1.97E+06	578.5	$6,363.08
13.49	1.37E+05	1.85E+06	549.1	$6,040.62
13.31	1.29E+05	1.72E+06	516.6	$5,682.64
13.09	1.20E+05	1.58E+06	481.3	$5,294.12
12.82	1.11E+05	1.42E+06	443.4	$4,877.07
12.5	1.01E+05	1.26E+06	402.6	$4,428.16
14.02	1.66E+05	2.33E+06	664.2	$7,306.13
13.94	1.61E+05	2.24E+06	641.9	$7,060.83
13.84	1.55E+05	2.14E+06	618.8	$6,806.65
13.72	1.48E+05	2.04E+06	593.3	$6,526.24
13.58	1.41E+05	1.92E+06	564.9	$6,214.43
13.41	1.34E+05	1.79E+06	534.2	$5,876.51
13.21	1.25E+05	1.65E+06	500.5	$5,505.83
12.97	1.16E+05	1.50E+06	463.5	$5,098.84
12.67	1.06E+05	1.34E+06	424.3	$4,667.40
12.33	9.54E+04	1.18E+06	381.2	$4,193.03
13.99	1.64E+05	2.29E+06	654.8	$7,202.29
13.9	1.58E+05	2.19E+06	631.4	$6,945.04
13.79	1.52E+05	2.09E+06	607.1	$6,678.17
13.66	1.45E+05	1.98E+06	580.4	$6,384.19
13.51	1.38E+05	1.86E+06	550.7	$6,057.74
13.32	1.30E+05	1.73E+06	518.6	$5,704.80
13.1	1.21E+05	1.58E+06	483.4	$5,316.95
12.83	1.11E+05	1.43E+06	445.5	$4,900.70
12.51	1.01E+05	1.26E+06	404.2	$4,445.72
12.13	8.99E+04	1.09E+06	359.4	$3,953.83

E-102 - LMTD	E-102 - UA	E-102 -Cold Duty	AREA	
F	Btu/F-hr	Btu/hr	ft2	$
11.58	3.75E+06	4.34E+07	18,731	$93,652.85
23.4	1.81E+06	4.23E+07	9,032	$45,160.26
28.47	1.45E+06	4.12E+07	7,227	$36,134.53
32.48	1.23E+06	4.00E+07	6,164	$30,818.97
35.98	1.08E+06	3.89E+07	5,410	$27,049.75
39.18	9.65E+05	3.78E+07	4,826	$24,132.21
42.18	8.70E+05	3.67E+07	4,352	$21,757.94
45.04	7.90E+05	3.56E+07	3,952	$19,760.21
47.81	7.21E+05	3.45E+07	3,607	$18,034.93
50.5	6.61E+05	3.34E+07	3,305	$16,524.75
12.64	3.43E+06	4.34E+07	17,160	$85,799.05
23.54	1.80E+06	4.23E+07	8,978	$44,891.67
28.6	1.44E+06	4.12E+07	7,194	$35,970.28
32.6	1.23E+06	4.00E+07	6,141	$30,705.52
36.1	1.08E+06	3.89E+07	5,392	$26,959.83
39.31	9.62E+05	3.78E+07	4,810	$24,052.40
42.32	8.68E+05	3.67E+07	4,337	$21,685.96
45.19	7.88E+05	3.56E+07	3,939	$19,694.62
47.97	7.19E+05	3.45E+07	3,595	$17,974.78
50.67	6.59E+05	3.34E+07	3,294	$16,469.31
13.39	3.24E+06	4.34E+07	16,199	$80,993.28
23.7	1.78E+06	4.23E+07	8,918	$44,588.61
28.72	1.43E+06	4.12E+07	7,164	$35,819.99
32.72	1.22E+06	4.00E+07	6,119	$30,592.91
36.23	1.08E+06	3.89E+07	5,373	$26,863.10
39.44	9.59E+05	3.78E+07	4,795	$23,973.12
42.46	8.65E+05	3.67E+07	4,323	$21,614.46
45.34	7.85E+05	3.56E+07	3,926	$19,629.47
48.13	7.17E+05	3.45E+07	3,583	$17,915.02
50.85	6.56E+05	3.34E+07	3,282	$16,411.01
14.02	3.09E+06	4.34E+07	15,471	$77,353.78
23.85	1.77E+06	4.23E+07	8,862	$44,308.18
28.86	1.43E+06	4.12E+07	7,129	$35,646.22
32.86	1.22E+06	4.00E+07	6,093	$30,462.57
36.37	1.07E+06	3.89E+07	5,352	$26,759.69
39.58	9.55E+05	3.78E+07	4,778	$23,888.33
42.61	8.62E+05	3.67E+07	4,308	$21,538.37
45.51	7.82E+05	3.56E+07	3,911	$19,556.14
48.31	7.14E+05	3.45E+07	3,570	$17,848.27
51.03	6.54E+05	3.34E+07	3,271	$16,353.13
14.58	2.98E+06	4.34E+07	14,877	$74,382.72
24.02	1.76E+06	4.23E+07	8,799	$43,994.59
29	1.42E+06	4.12E+07	7,095	$35,474.14
33	1.21E+06	4.00E+07	6,067	$30,333.33
36.51	1.07E+06	3.89E+07	5,331	$26,657.08
39.73	9.52E+05	3.78E+07	4,760	$23,798.14
42.77	8.58E+05	3.67E+07	4,292	$21,457.80
45.68	7.79E+05	3.56E+07	3,897	$19,483.36
48.49	7.11E+05	3.45E+07	3,556	$17,782.02
51.23	6.52E+05	3.34E+07	3,258	$16,289.28
15.1	2.87E+06	4.34E+07	14,364	$71,821.19
24.19	1.75E+06	4.23E+07	8,737	$43,685.41
29.15	1.41E+06	4.12E+07	7,058	$35,291.60
33.14	1.21E+06	4.00E+07	6,041	$30,205.19
36.66	1.06E+06	3.89E+07	5,310	$26,548.01
39.89	9.48E+05	3.78E+07	4,741	$23,702.68
42.94	8.55E+05	3.67E+07	4,275	$21,372.85
45.86	7.76E+05	3.56E+07	3,881	$19,406.89
48.68	7.09E+05	3.45E+07	3,543	$17,712.61
51.43	6.49E+05	3.34E+07	3,245	$16,225.94

E-102 - LMTD	E-102 - UA	E-102 -Cold Duty	AREA	
F	Btu/F-hr	Btu/hr	ft2	$
15.59	2.78E+06	4.34E+07	13,913	$69,563.82
24.37	1.73E+06	4.23E+07	8,673	$43,362.74
29.31	1.40E+06	4.12E+07	7,020	$35,098.94
33.3	1.20E+06	4.00E+07	6,012	$30,060.06
36.82	1.06E+06	3.89E+07	5,287	$26,432.65
40.06	9.44E+05	3.78E+07	4,720	$23,602.10
43.11	8.52E+05	3.67E+07	4,258	$21,288.56
46.04	7.73E+05	3.56E+07	3,866	$19,331.02
48.87	7.06E+05	3.45E+07	3,529	$17,643.75
51.64	6.46E+05	3.34E+07	3,232	$16,159.95
16.05	2.70E+06	4.34E+07	13,514	$67,570.09
24.56	1.72E+06	4.23E+07	8,605	$43,027.28
29.47	1.40E+06	4.12E+07	6,982	$34,908.38
33.46	1.20E+06	4.00E+07	5,983	$29,916.32
36.98	1.05E+06	3.89E+07	5,264	$26,318.28
40.23	9.40E+05	3.78E+07	4,700	$23,502.36
43.3	8.48E+05	3.67E+07	4,239	$21,195.15
46.23	7.70E+05	3.56E+07	3,850	$19,251.57
49.08	7.03E+05	3.45E+07	3,514	$17,568.26
51.86	6.44E+05	3.34E+07	3,218	$16,091.40
16.51	2.63E+06	4.34E+07	13,137	$65,687.46
24.76	1.71E+06	4.23E+07	8,536	$42,679.73
29.65	1.39E+06	4.12E+07	6,939	$34,696.46
33.63	1.19E+06	4.00E+07	5,953	$29,765.09
37.16	1.05E+06	3.89E+07	5,238	$26,190.80
40.41	9.36E+05	3.78E+07	4,680	$23,397.67
43.49	8.44E+05	3.67E+07	4,221	$21,102.55
46.44	7.67E+05	3.56E+07	3,833	$19,164.51
49.29	7.00E+05	3.45E+07	3,499	$17,493.41
52.08	6.41E+05	3.34E+07	3,205	$16,023.43
16.95	2.56E+06	4.34E+07	12,796	$63,982.30
24.97	1.69E+06	4.23E+07	8,464	$42,320.78
29.83	1.38E+06	4.12E+07	6,897	$34,487.09
33.8	1.19E+06	4.00E+07	5,923	$29,615.38
37.34	1.04E+06	3.89E+07	5,213	$26,064.54
40.6	9.32E+05	3.78E+07	4,658	$23,288.18
43.69	8.40E+05	3.67E+07	4,201	$21,005.95
46.65	7.63E+05	3.56E+07	3,816	$19,078.24
49.52	6.97E+05	3.45E+07	3,482	$17,412.16
52.32	6.38E+05	3.34E+07	3,190	$15,949.92
17.38	2.50E+06	4.34E+07	12,480	$62,399.31
25.19	1.68E+06	4.23E+07	8,390	$41,951.17
30.02	1.37E+06	4.12E+07	6,854	$34,268.82
33.99	1.18E+06	4.00E+07	5,890	$29,449.84
37.53	1.04E+06	3.89E+07	5,187	$25,932.59
40.8	9.27E+05	3.78E+07	4,635	$23,174.02
43.89	8.36E+05	3.67E+07	4,182	$20,910.23
46.87	7.60E+05	3.56E+07	3,798	$18,988.69
49.75	6.93E+05	3.45E+07	3,466	$17,331.66
52.56	6.35E+05	3.34E+07	3,175	$15,877.09

E-103 - UA	E-103 - HTC	AREA	
Btu/F-hr	Btu/hr-ft2-F	ft2	$
1.81E+06	1,684.00	2,601	$28,613.59
7.08E+05	657.4	2,555	$28,106.19
5.42E+05	503.5	2,473	$27,203.99
4.38E+05	406.9	2,339	$25,727.33
3.59E+05	333.3	2,358	$25,935.82
2.92E+05	271.4	2,250	$24,753.99
2.33E+05	216.2	2,245	$24,693.86
1.78E+05	165	2,170	$23,868.38
1.25E+05	116	2,113	$23,245.45
7.31E+04	67.87	1,838	$20,222.95
6.19E+05	574.8	2,555	$28,101.30
4.96E+05	460.7	2,530	$27,833.21
4.09E+05	380.3	2,455	$27,001.62
3.40E+05	315.6	2,322	$25,542.68
2.80E+05	259.7	2,362	$25,985.91
2.25E+05	209	2,258	$24,837.87
1.74E+05	161.3	2,163	$23,795.58
1.24E+05	115.2	2,077	$22,842.06
7.51E+04	69.79	2,001	$22,012.63
2.61E+04	24.22	1,965	$21,616.88
4.58E+05	425.1	2,587	$28,453.81
3.84E+05	356.3	2,510	$27,608.55
3.22E+05	299.1	2,366	$26,020.47
2.67E+05	248.4	2,394	$26,336.41
2.17E+05	201.6	2,279	$25,066.70
1.69E+05	157.2	2,286	$25,140.84
1.23E+05	114	2,209	$24,303.51
7.66E+04	71.15	2,166	$23,820.64
3.01E+04	27.98	1,689	$18,581.46
-7.479	-0.01	2,470	$27,168.65
3.61E+05	335.2	2,562	$28,178.96
3.05E+05	283.5	2,493	$27,421.67
2.56E+05	237.4	2,347	$25,819.10
2.09E+05	194.3	2,305	$25,357.71
1.65E+05	152.9	2,297	$25,265.28
1.21E+05	112.4	2,191	$24,097.15
7.75E+04	72	2,096	$23,060.07
3.35E+04	31.1	2,006	$22,065.33
-5.19E+00	0	1,951	$21,460.41
-2.62E+01	-0.02	2,166	$23,821.04
2.90E+05	269.7	2,537	$27,911.62
2.44E+05	226.8	2,394	$26,336.05
2.01E+05	187	2,439	$26,833.24
1.60E+05	148.5	2,315	$25,460.65
1.19E+05	110.4	2,187	$24,057.18
7.79E+04	72.35	2,274	$25,011.41
3.62E+04	33.67	2,282	$25,097.91
-3.021	0	4,450	$48,946.41
-23.61	-0.02	2,101	$23,106.90
-45.18	-0.04	2,098	$23,080.82
2.34E+05	217.6	2,519	$27,706.09
1.93E+05	179.7	2,377	$26,144.71
1.55E+05	143.8	2,336	$25,696.11
1.16E+05	108.1	2,187	$24,059.97
7.78E+04	72.25	2,232	$24,546.85
3.84E+04	35.67	2,131	$23,441.42
-1.03E+00	0	-	$-
-2.13E+01	-0.02	2,380	$26,181.44
-4.24E+01	-0.04	2,275	$25,021.45
-6.46E+01	-0.06	2,056	$22,616.14

E-103 - UA	E-103 - HTC	AREA	
Btu/F-hr	Btu/hr-ft2-F	ft2	$
1.87E+05	173.7	2,508	$27,587.01
1.50E+05	139	2,371	$26,079.52
1.14E+05	105.5	2,356	$25,915.57
7.72E+04	71.73	2,207	$24,272.44
4.00E+04	37.17	2,007	$22,082.07
1585	1.47	-	$-
-19.05	-0.02	2,267	$24,941.32
-39.82	-0.04	2,053	$22,578.06
-61.59	-0.06	2,188	$24,070.07
-84.35	-0.08	2,108	$23,187.27
1.46E+05	135.4	2,380	$26,185.28
1.11E+05	102.7	2,377	$26,146.38
7.62E+04	70.82	2,198	$24,176.84
4.11E+04	38.17	2,315	$25,460.79
4.70E+03	4.37	2,266	$24,921.25
-1.70E+01	-0.02	2,072	$22,788.05
-3.74E+01	-0.03	2,218	$24,396.14
-5.88E+01	-0.05	2,189	$24,080.04
-8.11E+01	-0.08	2,124	$23,366.33
-1.05E+02	-0.1	2,052	$22,576.34
1.09E+05	101.2	2,365	$26,018.04
7.49E+04	69.57	2,420	$26,618.62
4.17E+04	38.73	2,245	$24,698.74
7247	6.73	1,656	$18,213.00
-15.21	-0.01	2,386	$26,241.96
-35.19	-0.03	2,161	$23,767.93
-56.16	-0.05	2,177	$23,952.32
-78.09	-0.07	2,139	$23,523.57
-101.1	-0.09	2,075	$22,826.77
-125.2	-0.12	2,067	$22,735.95
7.52E+04	69.87	2,155	$23,707.90
4.19E+04	38.88	2,206	$24,267.45
9.25E+03	8.59	1,361	$14,973.23
-1.36E+01	-0.01	2,752	$30,266.89
-3.32E+01	-0.03	2,077	$22,845.48
-5.37E+01	-0.05	2,316	$25,476.33
-7.52E+01	-0.07	2,145	$23,599.71
-9.78E+01	-0.09	2,094	$23,037.99
-1.22E+02	-0.11	2,095	$23,045.36
-1.46E+02	-0.14	2,066	$22,731.38
4.38E+04	40.7	2,416	$26,571.00
1.08E+04	9.99	1,200	$13,201.61
-12.16	-0.01	2,377	$26,145.52
-31.32	-0.03	2,514	$27,653.36
-51.45	-0.05	2,293	$25,225.53
-72.59	-0.07	2,144	$23,579.24
-94.72	-0.09	2,194	$24,133.88
-118	-0.11	2,121	$23,329.06
-142.3	-0.13	2,044	$22,483.42
-167.8	-0.16	2,012	$22,127.11

E-104 - UA	E-104 - HTC	AREA	
Btu/F-hr	Btu/hr-ft2-F	ft2	$
2.05E+05	190.7	890.4	$9,794.64
2.30E+05	214.1	912.1	$10,032.99
2.58E+05	239.8	907.6	$9,983.24
2.90E+05	269.6	887.8	$9,765.53
3.28E+05	304.6	898.8	$9,886.51
3.73E+05	346.5	894.3	$9,837.34
4.28E+05	397.4	890	$9,789.73
4.96E+05	460.8	884.5	$9,729.86
5.83E+05	541.8	892.4	$9,816.24
6.99E+05	649.2	899.5	$9,894.46
2.16E+05	200.6	908.7	$9,995.59
2.42E+05	225.1	903.9	$9,942.31
2.72E+05	252.6	899.8	$9,897.91
3.06E+05	284.6	895.7	$9,852.69
3.47E+05	322.6	907.2	$9,979.65
3.97E+05	368.3	887.4	$9,761.70
4.57E+05	424.5	896.1	$9,856.70
5.33E+05	495.3	890.3	$9,793.54
6.32E+05	587.2	897.6	$9,873.99
7.67E+05	712.1	892.2	$9,814.64
2.27E+05	210.7	901.7	$9,918.27
2.55E+05	237	915	$10,065.04
2.87E+05	266.4	893.1	$9,823.69
3.24E+05	300.9	903.9	$9,943.15
3.68E+05	342.2	884	$9,724.07
4.22E+05	392.4	893.2	$9,825.20
4.90E+05	454.7	902.4	$9,926.23
5.75E+05	534.4	896.4	$9,859.91
6.89E+05	639.8	889.5	$9,784.37
8.47E+05	787	884.8	$9,732.36
2.38E+05	221.5	913.2	$10,045.22
2.69E+05	249.6	887.5	$9,761.94
3.03E+05	281.3	901	$9,911.31
3.43E+05	318.7	896.6	$9,862.15
3.92E+05	363.8	890.8	$9,798.39
4.51E+05	419.1	900.6	$9,906.39
5.26E+05	488.7	880.9	$9,690.33
6.23E+05	579.1	888.6	$9,774.45
7.55E+05	701.6	894.3	$9,837.06
9.46E+05	879	889.3	$9,782.33
2.51E+05	233	904.6	$9,950.48
2.83E+05	263.3	898.4	$9,882.63
3.20E+05	297.4	892.7	$9,820.19
3.64E+05	338.1	888.8	$9,776.59
4.17E+05	387.5	897.7	$9,874.91
4.83E+05	448.9	891.6	$9,807.81
5.68E+05	527.3	885.8	$9,744.14
6.79E+05	630.9	892.9	$9,821.76
8.34E+05	775.1	887.6	$9,763.89
1.07E+06	994.7	893.2	$9,824.90
2.64E+05	245.3	915.2	$10,067.25
2.99E+05	278	889.3	$9,782.49
3.39E+05	314.9	901.4	$9,915.71
3.87E+05	359.4	895.3	$9,848.17
4.46E+05	413.9	890.7	$9,798.13
5.19E+05	482.5	884.9	$9,733.77
6.15E+05	571.3	890.9	$9,799.67
7.45E+05	691.6	897.5	$9,872.45
9.31E+05	865.1	892	$9,812.09
1.24E+06	1147	897.2	$9,868.66

E-104 - UA	E-104 - HTC	AREA	
Btu/F-hr	Btu/hr-ft2-F	ft2	$
2.78E+05	258.5	889.6	$9,785.26
3.16E+05	294	899.2	$9,891.31
3.60E+05	334.1	893.3	$9,826.50
4.12E+05	382.9	887.6	$9,763.60
4.77E+05	443.4	895.6	$9,851.80
5.60E+05	520.5	889.4	$9,783.88
6.70E+05	622.3	896.2	$9,858.22
8.22E+05	763.8	890.4	$9,794.49
1.05E+06	978.3	895.5	$9,850.56
1.47E+06	1,362.00	901.3	$9,914.79
2.94E+05	272.7	898.2	$9,880.17
3.35E+05	311.3	906.2	$9,968.22
3.82E+05	355.2	884.7	$9,732.00
4.40E+05	408.9	893.5	$9,828.62
5.13E+05	476.5	887.3	$9,760.73
6.07E+05	564	894.3	$9,837.24
7.34E+05	682.2	900.4	$9,904.35
9.17E+05	852.2	894.5	$9,839.72
1.21E+06	1127	900.2	$9,902.07
1.84E+06	1705	904.6	$9,950.96
3.10E+05	288.1	890.5	$9,794.92
3.56E+05	330.3	882.3	$9,705.10
4.07E+05	378.4	891.7	$9,809.06
4.72E+05	438	899.5	$9,894.82
5.53E+05	514	893	$9,822.68
6.61E+05	614.2	899.3	$9,892.44
8.11E+05	753.5	881	$9,690.80
1.04E+06	963.1	887.4	$9,760.90
1.44E+06	1,335.00	892.1	$9,813.18
2.65E+06	2,466.00	897.7	$9,875.02
3.28E+05	304.8	899.9	$9,898.78
3.78E+05	351.1	889	$9,778.96
4.35E+05	404.2	897.4	$9,871.55
5.07E+05	470.8	890.9	$9,799.34
6.00E+05	557	884.7	$9,731.49
7.25E+05	673.3	891	$9,801.04
9.04E+05	840.1	885.2	$9,737.07
1.19E+06	1108	890.9	$9,799.31
1.79E+06	1664	895.3	$9,848.21
3.32E+09	3080000	900.6	$9,907.00
3.48E+05	323.2	906.1	$9,966.54
4.03E+05	374.1	895.6	$9,851.92
4.66E+05	433	903.2	$9,935.37
5.47E+05	507.9	883.1	$9,714.14
6.53E+05	606.7	889.6	$9,785.26
8.00E+05	743.6	895.4	$9,849.24
1.02E+06	949.1	889.3	$9,782.11
1.41E+06	1,311.00	894.6	$9,840.32
2.54E+06	2,363.00	898.6	$9,884.92
1.05E+10	9,750,000.00	903.7	$9,940.82

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INPUT SUMMARY

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FLUID PACKAGE: Basis-1(Peng-Robinson)

Property Package Type: PengRob
Component List - 1: Methane /Propane /n-Butane /n-Pentane /Ethane /i-Butane /n-Hexane//iPPentane//Nitrogen//CO2//H2O//

FLUID PACKAGE: Basis-2(Peng-Robinson)

Property Package Type: PengRob
Component List - 2: Methane /Propane /n-Butane /n-Pentane /Ethane /i-Butane /n-Hexane//iPPentane//Nitrogen//CO2//

FLOWSHEET: Main

Fluid Package: Basis-1

UNIT OPERATION: V-101 (Separator)
  Feed Stream = 5.2
  Vapour Product = 6
  Liquid Product = 7
  Diameter = 8.5 ft
  Height = 46.75 ft

STREAM: 7 (Material Stream)

UNIT OPERATION: T-101 (Reboiled Absorber)
  TwoLiquidCheck = 2 Liquid Check
  TargetType = 0
  Phase = Liquid
  TargetType = 0
  Phase = Liquid
  TargetType = 0
  Phase = Liquid
  ShowEffDiagFlag = True
Specification Name = Boilup RatioSpecConvergedStatus = InactiveSpecification Value = 4Specification Name = eth recoverySpecConvergedStatus = InactiveSpecification Value = 0.05Specification Name = MethNGLSpecConvergedStatus = YesSpecification Value =

0.005Specification Name = MethTopSpecConvergedStatus = InactiveSpecification Value = 0.997

STREAM: Q_T-101 (Energy Stream)

STREAM: 14 (Material Stream)

STREAM: 6 (Material Stream)

STREAM: 12 (Material Stream)

UNIT OPERATION: VLV-100 (Valve)
Feed Stream = 7
Product Stream = 10
Pressure Drop = 600 psi
ValveManufacturer = FISHER
ValveManufacturerType = 0
C1 = 33.4664011
RigorousSizingMethod = True
UseXtTable = False
RigorousFlowCalc = True
ActuatorDampFactor = 0.95

STREAM: 10 (Material Stream)

UNIT OPERATION: C-101 (Expander)
Feed Stream = 9
Product Stream = 12
Energy Stream = W_C-101
AdiabaticEfficiency = 75
CurveCollectionName = CC-0
SelectedCurveCollection = True
NumberOfCurves = 0
NumberOfCurves = 0
NumberOfCurves = 0
EffCurveType = 0
NumberOfCurves = 0
Delta P = 600 psi

STREAM: 13 (Material Stream)

UNIT OPERATION: TEE-100 (Tee)
Feed Stream = 6
Product Stream = 9Product Stream = 8

STREAM: 9 (Material Stream)

STREAM: 8 (Material Stream)

STREAM: 11 (Material Stream)
Temperature = -112 F

STREAM: 18 (Material Stream)

STREAM: 1 (Material Stream)
Temperature = 80 F
Pressure = 914.696 psia
Molar Flow = 21960.9387 lbmole/hr
Composition Basis (In Mole Fractions):Methane = 0.81522/ Propane = 0.0355/ n-Butane==00.01014/ nnPPentane==00.00202/ EEthane==00.1217/ iiBButane==00.00761/ nn Hexane==00.00253/ iiPPentane==00.00304/ NNitrogen==00.00124/ CCO2==00.001/ HH2O==00/

UNIT OPERATION: E-102 (LNG)
Pressure-Drop = 1 psi /
Sides: Feed-Stream = 2 / Product-Stream = 3 / Selection = HotSide
Sides: Feed-Stream = 32 / Product-Stream = 27 / Selection = ColdSide
MaximumIteration = 100
Exchange Details: HCurveName = 2-3 /
Exchange Details: HCurveName = 32-27 /

STREAM: 16 (Material Stream)
Temperature = 72 F

STREAM: 27 (Material Stream)
Vapour Fraction = 1
Pressure = 15.9 psia
Molar Flow = 13000 lbmole/hr
Composition Basis (In Mole Fractions):Methane = 0/ Propane = 1/ n-Butane = 0/ n-Pentane = 0/ Ethane = 0/ i-Butane = 0/ n-Hexane = 0/ i-Pentane = 0/ Nitrogen = 0/ CO2 = 0/ H2O = 0/

UNIT OPERATION: C-102 (Compressor)
Feed Stream = 20
Product Stream = 22
Energy Stream = W_C-101
CurveCollectionName = CC-0
SelectedCurveCollection = True
NumberOfCurves = 0
NumberOfCurves = 0
NumberOfCurves = 0
EffCurveType = 0

NumberOfCurves = 0

STREAM: 22 (Material Stream)

UNIT OPERATION: C-103 (Compressor)
Feed Stream = 23
Product Stream = 25
Energy Stream = W_C-103
CurveCollectionName = CC-0
SelectedCurveCollection = True
NumberOfCurves = 0
NumberOfCurves = 0
NumberOfCurves = 0
EffCurveType = 0
NumberOfCurves = 0

STREAM: W_C-103 (Energy Stream)

STREAM: 25 (Material Stream)
Pressure = 964.7 psia

STREAM: W_C-101 (Energy Stream)

UNIT OPERATION: C-201 (Compressor)
Feed Stream = 28
Product Stream = 30.2
Energy Stream = W_C-201
AdiabaticEfficiency = 75
PressureRatio = 2.75
CurveCollectionName = CC-0
SelectedCurveCollection = True
NumberOfCurves = 0
NumberOfCurves = 0
NumberOfCurves = 0
EffCurveType = 0
NumberOfCurves = 0

STREAM: W_C-201 (Energy Stream)

UNIT OPERATION: P-102 A/B (Pump)
Feed Stream = 16
Product Stream = 17
Energy Stream = W_P-102
AdiabaticEfficiency = 75 %

STREAM: 17 (Material Stream)
Pressure = 1314.69594 psia

STREAM: W_P-102 (Energy Stream)

STREAM: 20 (Material Stream)

STREAM: 23 (Material Stream)

UNIT OPERATION: E-104 (Plate Exchanger)
Hot_Side_PressureDrop = 1 psi
Cold_Side_PressureDrop = 1 psi
HCurveName = 8-11
PassInterval = 1
HCurveName = 13-18
PassInterval = 1
ModelType = 0

UNIT OPERATION: P-101A/B (Pump)
Feed Stream = 14
Product Stream = 15
Energy Stream = W_P-101A/B
Delta P = 100 psi
AdiabaticEfficiency = 75 %

STREAM: 15 (Material Stream)

STREAM: W_P-101A/B (Energy Stream)

STREAM: 30.2 (Material Stream)

UNIT OPERATION: E-101 (LNG)
Pressure-Drop = 2 psi /
Pressure-Drop = 2 psi /
Sides: Feed-Stream = 1 / Product-Stream = 2 / Selection = HotSide
Sides: Feed-Stream = 15 / Product-Stream = 16 / Selection = ColdSide
Exchange Details: HCurveName = 1-2 /
Exchange Details: HCurveName = 15-16 /

STREAM: 2 (Material Stream)

STREAM: 3 (Material Stream)

UNIT OPERATION: V-201 (Separator)
Feed Stream = 27
Vapour Product = 28
Liquid Product = 29

STREAM: 28 (Material Stream)
Pressure = 14.7 psia

STREAM: 29 (Material Stream)

UNIT OPERATION: C-202 (Compressor)
Feed Stream = 31.2
Product Stream = 33
Energy Stream = W_C-202
PressureRatio = 2.75
CurveCollectionName = CC-0
SelectedCurveCollection = True
NumberOfCurves = 0
NumberOfCurves = 0
NumberOfCurves = 0
EffCurveType = 0
NumberOfCurves = 0
FlowUnits = ACFM
FlowUnits = ACFM

STREAM: 33 (Material Stream)

STREAM: W_C-202 (Energy Stream)

UNIT OPERATION: V-202 (Separator)
Feed Stream = 30.2
Vapour Product = 31.2
Liquid Product = 32.2
VapourDeltaP = 2 psi

STREAM: 31.2 (Material Stream)

STREAM: 32.2 (Material Stream)

UNIT OPERATION: V-203 (Separator)
Feed Stream = 33
Vapour Product = 34
Liquid Product = 35
VapourDeltaP = 2 psi

UNIT OPERATION: C-203 (Compressor)
Feed Stream = 34
Product Stream = 36
Energy Stream = W_C-203
CurveCollectionName = CC-0
SelectedCurveCollection = True
NumberOfCurves = 0
NumberOfCurves = 0
NumberOfCurves = 0
EffCurveType = 0
NumberOfCurves = 0
FlowUnits = ACFM
FlowUnits = ACFM

STREAM: 34 (Material Stream)

STREAM: 35 (Material Stream)

STREAM: 36 (Material Stream)
Pressure = 249.7275 psia

STREAM: W_C-203 (Energy Stream)

UNIT OPERATION: E-202 (Air cooler)
Feed Stream = 30
Product Stream = 31
Pressure Drop = 3 psi
AirInletTemperature = 100 F
NumberOfFans = 4
Fan_Name = Fan 0
FanDemandedSpeed = 180 rpm
Fan_Name = Fan 1
FanDemandedSpeed = 180 rpm
Fan_Name = Fan 2
FanDemandedSpeed = 180 rpm
Fan_Name = Fan 3
FanDemandedSpeed = 180 rpm

UNIT OPERATION: VLV-101 (Valve)
Feed Stream = 31
Product Stream = 32
Pressure Drop = 245 psi
ValveManufacturer = FISHER
ValveManufacturerType = 0
ValveOpening = 100 %
C1 = 33.4664011

RigorousSizingMethod = True
UseXtTable = False
RigorousFlowCalc = True
ActuatorCurrent = 100 %
ValveCurrent = 100 %
ActuatorDesired = 100 %

STREAM: 31 (Material Stream)
Vapour Fraction = 0

UNIT OPERATION: RCY-1 (Recycle)
Inlet Stream = 5
Output Stream = 5.2

UNIT OPERATION: V-102 (Separator)
Feed Stream = 19
Vapour Product = 20
Liquid Product = 21

UNIT OPERATION: V-103 (Separator)
Feed Stream = 22
Vapour Product = 23
Liquid Product = 24

STREAM: 5.2 (Material Stream)
Temperature = -56.1442901 F
Pressure = 809.696 psia
Molar Flow = 21960.9387 lbmole/hr
Composition Basis (In Mole Fractions):Methane = 0.81522/ Propane = 0.0355/ n-Butane==00.01014/ nnPPentane==00.00202/ EEthane==00.1217/ iiBButane==00.00761/ nn Hexane==00.00253/ iiPPentane==00.00304/ NNitrogen==00.00124/ CCO2==00.001/ HH2O==00/

UNIT OPERATION: VLV-102 (Valve)
Feed Stream = 3
Product Stream = 4
Pressure Drop = 100 psi
ValveManufacturer = FISHER
ValveManufacturerType = 0
C1 = 33.4664011
RigorousSizingMethod = True
UseXtTable = False
RigorousFlowCalc = True

STREAM: 4 (Material Stream)

UNIT OPERATION: E-103 (Plate Exchanger)

Hot_Side_PressureDrop = 2 psi
Cold_Side_PressureDrop = 2 psi
HCurveName = 4-5
PassInterval = 1
HCurveName = 18-19
PassInterval = 1
ModelType = 0

STREAM: 19 (Material Stream)
Temperature = -41 F

STREAM: 5 (Material Stream)

STREAM: 21 (Material Stream)

STREAM: 24 (Material Stream)

UNIT OPERATION: E-105 (Air cooler)
Feed Stream = 25
Product Stream = 26
Pressure Drop = 3 psi
AirInletTemperature = 100 F
NumberOfFans = 1
Fan_Name = Fan 0

STREAM: 26 (Material Stream)
Temperature = 120 F

STREAM: 32 (Material Stream)

UNIT OPERATION: C-204 (Compressor)
Feed Stream = 38
Product Stream = 30
Energy Stream = W_C-204
CurveCollectionName = CC-0
SelectedCurveCollection = True
NumberOfCurves = 0
NumberOfCurves = 0
NumberOfCurves = 0
EffCurveType = 0
NumberOfCurves = 0
FlowUnits = ACFM
FlowUnits = ACFM

UNIT OPERATION: V-204 (Separator)

Feed Stream = 36
Vapour Product = 38
Liquid Product = 39
VapourDeltaP = 2 psi

STREAM: 38 (Material Stream)

STREAM: 39 (Material Stream)

STREAM: W_C-204 (Energy Stream)

STREAM: 30 (Material Stream)
Pressure = 267 psia

FLOWSHEET: COL1 (OWNER: T-101)

Fluid Package: Basis-1

UNIT OPERATION: Main Tower (Tower)
StageNumber = 1 (Feed)/ StageNumber = 6 (Feed)/ NumberOfColumnStages = 10
WHtSpeced = 1
RateHoldup = 0.0883572188
StgNumber = 0
StgNumber = 1
StgNumber = 2
StgNumber = 3
StgNumber = 4
StgNumber = 5
StgNumber = 6
StgNumber = 7
StgNumber = 8
StgNumber = 9
HasTPSAROption = True

UNIT OPERATION: Reboiler (Reboiler)
Feed Stream = To Reboiler @COL1
Vapour Product = Boilup @COL1
Liquid Product = DeMeth @COL1
Energy Stream = Qr @COL1
Volume = 70.62934 ft3
HeatExchanger = Duty
ViewVapourPhase = False
ViewLightLiqPhase = False
ViewHeavyLiqPhase = False

STREAM: To Reboiler (Material Stream)

STREAM: Boilup (Material Stream)

STREAM: DeMeth (Material Stream)

STREAM: Qr (Energy Stream)

STREAM: TE out (Material Stream)

STREAM: CS liq 2 (Material Stream)

STREAM: TopMeth (Material Stream)

STREAM: CS vap to DeMeth (Material Stream)

##

OUTPUT SUMMARY

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OKLAHOMA STATE UNIVERSIT Case Name: Design HEX25.hsc
Bedford, MA
USA Unit Set: NewUser1

Date/Time: Wed Nov 28 20:35:37 2018

Basis-1 (Fluid Package): Component List

Fluid Package: Basis-1

COMPONENT LIST

Component List - 1 [HYSYS Databanks]

COMPONENT	TYPE	MOLECULAR WEIGHT	BOILING PT (F)	IDEAL LIQ DENSITY (lb/ft3)	CRITICAL TEMP (F)
Methane	Pure	16.04	-258.7	18.69	-116.4
Propane	Pure	44.10	-43.78	31.63	206.1
n-Butane	Pure	58.12	31.10	36.41	305.7

n-Pentane	Pure	72.15	96.91	39.31	385.6
Ethane	Pure	30.07	-127.5	22.20	90.10
i-Butane	Pure	58.12	10.89	35.08	274.9
n-Hexane	Pure	86.18	155.7	41.37	454.5
i-Pentane	Pure	72.15	82.18	38.92	369.0
Nitrogen	Pure	28.01	-320.4	50.34	-232.5
CO2	Pure	44.01	-109.4	51.52	87.71
H2O	Pure	18.02	212.0	62.30	705.5

(Continued..) Component List - 1 [HYSYS Databanks]

COMPONENT	CRITICAL PRES (psia)	CRITICAL VOL (ft3/lbmole)	ACENTRICITY	HEAT OF FORM (Btu/lbmole)
Methane	673.1	1.586	1.150e-002	-3.220e+004
Propane	617.4	3.204	0.1524	-4.466e+004
n-Butane	550.7	4.085	0.2010	-5.425e+004
n-Pentane	489.5	4.982	0.2539	-6.298e+004
Ethane	708.3	2.371	9.860e-002	-3.643e+004
i-Butane	529.0	4.213	0.1848	-5.786e+004
n-Hexane	439.7	5.895	0.3007	-7.192e+004
i-Pentane	483.5	4.934	0.2222	-6.646e+004
Nitrogen	492.3	1.442	4.000e-002	0.0000
CO2	1069	1.504	0.2389	-1.693e+005
H2O	3208	0.9147	0.3440	-1.040e+005

Basis-2 (Fluid Package): Component List

Fluid Package: Basis-2

COMPONENT LIST

Component List - 2 [HYSYS Databanks]

COMPONENT	TYPE	MOLECULAR WEIGHT	BOILING PT (F)	IDEAL LIQ DENSITY (lb/ft3)	CRITICAL TEMP (F)
Methane	Pure	16.04	-258.7	18.69	-116.4
Propane	Pure	44.10	-43.78	31.63	206.1
n-Butane	Pure	58.12	31.10	36.41	305.7
n-Pentane	Pure	72.15	96.91	39.31	385.6
Ethane	Pure	30.07	-127.5	22.20	90.10
i-Butane	Pure	58.12	10.89	35.08	274.9
n-Hexane	Pure	86.18	155.7	41.37	454.5
i-Pentane	Pure	72.15	82.18	38.92	369.0
Nitrogen	Pure	28.01	-320.4	50.34	-232.5
CO2	Pure	44.01	-109.4	51.52	87.71

(Continued..) Component List - 2 [HYSYS Databanks]

COMPONENT	CRITICAL PRES (psia)	CRITICAL VOL (ft3/lbmole)	ACENTRICITY	HEAT OF FORM (Btu/lbmole)
Methane	673.1	1.586	1.150e-002	-3.220e+004
Propane	617.4	3.204	0.1524	-4.466e+004
n-Butane	550.7	4.085	0.2010	-5.425e+004

n-Pentane	489.5	4.982	0.2539	-6.298e+004
Ethane	708.3	2.371	9.860e-002	-3.643e+004
i-Butane	529.0	4.213	0.1848	-5.786e+004
n-Hexane	439.7	5.895	0.3007	-7.192e+004
i-Pentane	483.5	4.934	0.2222	-6.646e+004
Nitrogen	492.3	1.442	4.000e-002	0.0000
CO2	1069	1.504	0.2389	-1.693e+005

Case (Simulation Case): Mass and Energy Balance, Utility Balance, Process CO2 Emissions

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Simulation Case: Case

OVERALL MASS BALANCE

In Stream	Count	Mass Flow (lb/hr)	Out Stream	Count	Mass Flow (lb/hr)
1	Yes	4.392e+005	17	Yes	1.404e+005
			29	Yes	0.0000
			32.2	Yes	0.0000
			35	Yes	0.0000
			21	Yes	0.0000
			24	Yes	0.0000
			26	Yes	2.988e+005
			39	Yes	0.0000

Total In MassFlow (lb/hr) 4.392e+005 Total Out MassFlow (lb/hr) 4.392e+005
Mass Imbalance (lb/hr) 1.692e-010 Rel Mass Imbalance Pct (%) 0.00

OVERALL ENERGY BALANCE

InStream	Count	Energy Flow (Btu/hr)	OutStream	Count	Energy Flow (Btu/hr)
Q_T-101	Yes	2.097e+07	17	Yes	-1.755e+08
W_C-103	Yes	2.411e+07	29	Yes	0.000e-01
W_C-201	Yes	1.488e+07	32.2	Yes	0.000e-01
W_P-102	Yes	1.166e+06	35	Yes	0.000e-01
W_P-101A/B	Yes	1.172e+05	21	Yes	0.000e-01
1	Yes	-7.615e+08	24	Yes	0.000e-01
W_C-202	Yes	1.690e+07	26	Yes	-5.918e+08
W_C-203	Yes	1.587e+07	39	Yes	0.000e-01
W_C-204	Yes	1.401e+06			

Total In EnergyFlow (Btu/hr) -6.661e+008 Total Out EnergyFlow (Btu/hr) -7.673e+008
Energy Imbalance (Btu/hr) -1.012e+008 Rel Energy Imbalance Pct (%) 15.20

OVERALL UTILITY BALANCE

Utility Name	Usage Info	Energy Flow	Mass Flow	Cost

Hot Utility Summary Cold Utility Summary

Utility Flow --- Utility Flow ---
Utility Cost --- Utility Cost ---
Carbon Emiss. --- Carbon Emiss. ---
Carbon Fees --- Carbon Fees ---

PROCESS CO2 EMISSIONS

Inlet Stream	Count	IFPP (1995) (lb/hr)	IFPP (2007) (lb/hr)	EPA (2009) (lb/hr)
1	Yes	6.033e+06	7.181e+06	6.033e+06
Total from Inlets		6.033e+06	7.181e+06	6.033e+06
Total Carbon Fees from Inlets (Cost/hr)		0.000e-01	0.000e-01	0.000e-01
Outlet Stream	Count	IFPP (1995) (lb/hr)	IFPP (2007) (lb/hr)	EPA (2009) (lb/hr)
17	Yes	1.077e+04	1.272e+04	1.077e+04
29	Yes	0.000e-01	0.000e-01	0.000e-01
32.2	Yes	0.000e-01	0.000e-01	0.000e-01
35	Yes	0.000e-01	0.000e-01	0.000e-01
21	Yes	0.000e-01	0.000e-01	0.000e-01
24	Yes	0.000e-01	0.000e-01	0.000e-01
26	Yes	6.022e+06	7.169e+06	6.022e+06
39	Yes	0.000e-01	0.000e-01	0.000e-01
Total from Outlets		6.033e+06	7.181e+06	6.033e+06
Total Carbon Fees from Outlets (Cost/hr)		0.000e-01	0.000e-01	0.000e-01

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7 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments

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Material Stream: 7 Fluid Package: Basis-1

Property Package: Peng-Robinson

CONDITIONS

	OVERALL	VAPOUR PH.	LIQUID PH.
Vapour / Phase Fraction	0.0000	0.0000	1.0000
Temperature: (F)	-56.14	-56.14	-56.14
Pressure: (psia)	809.7	809.7	809.7
Molar Flow (lbmole/hr)	6902	0.0000	6902
Mass Flow (lb/hr)	1.749e+005	0.0000	1.749e+005
Std Ideal Liq VolFlow (barrel/day)	3.192e+004	0.0000	3.192e+004
Molar Enthalpy (Btu/lbmole)	-4.208e+04	-3.500e+04	-4.208e+04
Molar Entropy (Btu/lbmole-F)	2.665e+01	3.234e+01	2.665e+01
Heat Flow (Btu/hr)	-2.904e+08	0.000e-01	-2.904e+08
Liq VolFlow @Std Cond (barrel/day)	1.111e+007	0.0000	1.111e+007

COMPOSITION

Overall Phase Vapour Fraction 0.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	4208	0.6096	6.751e+004	0.3859	1.544e+004	0.4837
Propane	624.5	0.0905	2.754e+004	0.1574	3721	0.1166
n-Butane	205.0	0.0297	1.192e+004	0.0681	1399	0.0438
n-Pentane	43.01	0.0062	3103	0.0177	337.5	0.0106
Ethane	1541	0.2233	4.635e+004	0.2649	8923	0.2796
i-Butane	149.6	0.0217	8694	0.0497	1059	0.0332

n-Hexane	54.90	0.0080	4731	0.0270	488.9	0.0153
i-Pentane	64.11	0.0093	4626	0.0264	508.1	0.0159
Nitrogen	2.931	0.0004	82.11	0.0005	6.972	0.0002
CO2	9.001	0.0013	396.1	0.0023	32.86	0.0010
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	6902	1.0000	1.749e+005	1.0000	3.192e+004	1.0000

Vapour Phase Phase Fraction 0.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.9095	0.0000	0.8316	0.0000	0.8647
Propane	0.0000	0.0103	0.0000	0.0259	0.0000	0.0159
n-Butane	0.0000	0.0012	0.0000	0.0039	0.0000	0.0021
n-Pentane	0.0000	0.0001	0.0000	0.0004	0.0000	0.0002
Ethane	0.0000	0.0751	0.0000	0.1287	0.0000	0.1127
i-Butane	0.0000	0.0012	0.0000	0.0039	0.0000	0.0021
n-Hexane	0.0000	0.0000	0.0000	0.0002	0.0000	0.0001
i-Pentane	0.0000	0.0002	0.0000	0.0007	0.0000	0.0004
Nitrogen	0.0000	0.0016	0.0000	0.0026	0.0000	0.0010
CO2	0.0000	0.0009	0.0000	0.0022	0.0000	0.0008
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000

Liquid Phase Phase Fraction 1.000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	4208	0.6096	6.751e+004	0.3859	1.544e+004	0.4837
Propane	624.5	0.0905	2.754e+004	0.1574	3721	0.1166
n-Butane	205.0	0.0297	1.192e+004	0.0681	1399	0.0438
n-Pentane	43.01	0.0062	3103	0.0177	337.5	0.0106
Ethane	1541	0.2233	4.635e+004	0.2649	8923	0.2796
i-Butane	149.6	0.0217	8694	0.0497	1059	0.0332
n-Hexane	54.90	0.0080	4731	0.0270	488.9	0.0153
i-Pentane	64.11	0.0093	4626	0.0264	508.1	0.0159
Nitrogen	2.931	0.0004	82.11	0.0005	6.972	0.0002
CO2	9.001	0.0013	396.1	0.0023	32.86	0.0010
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	6902	1.0000	1.749e+005	1.0000	3.192e+004	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	1.492	1.492	---
Propane	0.1139	0.1139	---
n-Butane	3.942e-002	3.942e-002	---
n-Pentane	1.436e-002	1.436e-002	---
Ethane	0.3364	0.3364	---
i-Butane	5.375e-002	5.375e-002	---
n-Hexane	5.488e-003	5.488e-003	---
i-Pentane	1.894e-002	1.894e-002	---
Nitrogen	3.800	3.800	---
CO2	0.6600	0.6600	---
H2O	---	---	---

UNIT OPERATIONS

FEED TO PRODUCT FROM LOGICAL CONNECTION
Valve: VLV-100 Separator: V-101
UTILITIES

(No utilities reference this stream)
PROCESS UTILITY

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14 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments
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Material Stream: 14 Fluid Package: Basis-1

Property Package: Peng-Robinson
CONDITIONS

	OVERALL	VAPOUR PH.	LIQUID PH.
Vapour / Phase Fraction	0.0000	0.0000	1.0000
Temperature: (F)	45.67	45.67	45.67
Pressure: (psia)	280.0	280.0	280.0
Molar Flow (lbmole/hr)	3694	6.001e-003	3694
Mass Flow (lb/hr)	1.404e+005	0.1880	1.404e+005
Std Ideal Liq VolFlow (barrel/day)	2.228e+004	3.421e-002	2.228e+004
Molar Enthalpy (Btu/lbmole)	-4.856e+04	-3.970e+04	-4.856e+04
Molar Entropy (Btu/lbmole-F)	2.781e+01	3.930e+01	2.781e+01
Heat Flow (Btu/hr)	-1.794e+08	-2.382e+02	-1.794e+08
Liq VolFlow @Std Cond (barrel/day)	2.090e+004	3.428e-002	2.090e+004

COMPOSITION

Overall Phase Vapour Fraction 0.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	30.42	0.0082	488.0	0.0035	111.6	0.0050
Propane	773.5	0.2094	3.411e+004	0.2430	4610	0.2069
n-Butane	222.6	0.0603	1.294e+004	0.0922	1519	0.0682
n-Pentane	44.36	0.0120	3201	0.0228	348.0	0.0156
Ethane	2322	0.6286	6.983e+004	0.4973	1.344e+004	0.6033
i-Butane	167.0	0.0452	9705	0.0691	1183	0.0531
n-Hexane	55.56	0.0150	4788	0.0341	494.8	0.0222
i-Pentane	66.76	0.0181	4817	0.0343	529.0	0.0237
Nitrogen	6.261e-006	0.0000	1.754e-004	0.0000	1.489e-005	0.0000
CO2	11.87	0.0032	522.4	0.0037	43.34	0.0019
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	3694	1.0000	1.404e+005	1.0000	2.228e+004	1.0000

Vapour Phase Phase Fraction 1.624e-006

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	3.009e-004	0.0501	4.827e-003	0.0257	1.104e-003	0.0323
Propane	5.371e-004	0.0895	2.369e-002	0.1260	3.201e-003	0.0936
n-Butane	5.090e-005	0.0085	2.959e-003	0.0157	3.473e-004	0.0102

n-Pentane 3.531e-006 0.0006 2.547e-004 0.0014 2.770e-005 0.0008
Ethane 4.990e-003 0.8316 0.1501 0.7984 2.889e-002 0.8443
i-Butane 5.182e-005 0.0086 3.012e-003 0.0160 3.670e-004 0.0107
n-Hexane 1.607e-006 0.0003 1.385e-004 0.0007 1.431e-005 0.0004
i-Pentane 6.865e-006 0.0011 4.953e-004 0.0026 5.440e-005 0.0016
Nitrogen 1.673e-010 0.0000 4.686e-009 0.0000 3.979e-010 0.0000
CO2 5.749e-005 0.0096 2.530e-003 0.0135 2.099e-004 0.0061
H2O 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
Total 6.001e-003 1.0000 0.1880 1.0000 3.421e-002 1.0000
Liquid Phase Phase Fraction 1.000

COMPONENTS MOLE FLOW MOLE FRAC MASS FLOW MASS FRAC LIQVOL FLOW LIQVOL FRAC
(lbmole/hr) (lb/hr) (barrel/day)
Methane 30.42 0.0082 488.0 0.0035 111.6 0.0050
Propane 773.5 0.2094 3.411e+004 0.2430 4610 0.2069
n-Butane 222.6 0.0603 1.294e+004 0.0922 1519 0.0682
n-Pentane 44.36 0.0120 3201 0.0228 348.0 0.0156
Ethane 2322 0.6286 6.983e+004 0.4973 1.344e+004 0.6033
i-Butane 167.0 0.0452 9705 0.0691 1183 0.0531
n-Hexane 55.56 0.0150 4788 0.0341 494.8 0.0222
i-Pentane 66.76 0.0181 4817 0.0343 529.0 0.0237
Nitrogen 6.261e-006 0.0000 1.754e-004 0.0000 1.489e-005 0.0000
CO2 11.87 0.0032 522.4 0.0037 43.34 0.0019
H2O 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
Total 3694 1.0000 1.404e+005 1.0000 2.228e+004 1.0000
K VALUE

COMPONENTS MIXED LIGHT HEAVY
Methane 6.089 6.089 ---
Propane 0.4275 0.4275 ---
n-Butane 0.1408 0.1408 ---
n-Pentane 4.900e-002 4.900e-002 ---
Ethane 1.323 1.323 ---
i-Butane 0.1911 0.1911 ---
n-Hexane 1.780e-002 1.780e-002 ---
i-Pentane 6.331e-002 6.331e-002 ---
Nitrogen 16.45 16.45 ---
CO2 2.982 2.982 ---
H2O --- --- ---
UNIT OPERATIONS

FEED TO PRODUCT FROM LOGICAL CONNECTION
Pump: P-101A/B Reboiled Absorber: T-101
UTILITIES

(No utilities reference this stream)
PROCESS UTILITY

Material Stream: 6 Fluid Package: Basis-1

Property Package: Peng-Robinson

CONDITIONS

	OVERALL	VAPOUR PH.	LIQUID PH.
Vapour / Phase Fraction	1.0000	1.0000	0.0000
Temperature: (F)	-56.14	-56.14	-56.14
Pressure: (psia)	809.7	809.7	809.7
Molar Flow (lbmole/hr)	1.506e+004	1.506e+004	0.0000
Mass Flow (lb/hr)	2.642e+005	2.642e+005	0.0000
Std Ideal Liq VolFlow (barrel/day)	5.811e+004	5.811e+004	0.0000
Molar Enthalpy (Btu/lbmole)	-3.500e+04	-3.500e+04	-4.208e+04
Molar Entropy (Btu/lbmole-F)	3.234e+01	3.234e+01	2.665e+01
Heat Flow (Btu/hr)	-5.271e+08	-5.271e+08	0.000e-01
Liq VolFlow @Std Cond (barrel/day)	2.431e+007	2.431e+007	0.0000

COMPOSITION

Overall Phase Vapour Fraction 1.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	1.370e+004	0.9095	2.197e+005	0.8316	5.025e+004	0.8647
Propane	155.1	0.0103	6841	0.0259	924.5	0.0159
n-Butane	17.63	0.0012	1025	0.0039	120.3	0.0021
n-Pentane	1.348	0.0001	97.23	0.0004	10.57	0.0002
Ethane	1131	0.0751	3.402e+004	0.1287	6548	0.1127
i-Butane	17.54	0.0012	1019	0.0039	124.2	0.0021
n-Hexane	0.6574	0.0000	56.65	0.0002	5.854	0.0001
i-Pentane	2.649	0.0002	191.1	0.0007	20.99	0.0004
Nitrogen	24.30	0.0016	680.7	0.0026	57.80	0.0010
CO2	12.96	0.0009	570.4	0.0022	47.32	0.0008
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.506e+004	1.0000	2.642e+005	1.0000	5.811e+004	1.0000

Vapour Phase Phase Fraction 1.000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	1.370e+004	0.9095	2.197e+005	0.8316	5.025e+004	0.8647
Propane	155.1	0.0103	6841	0.0259	924.5	0.0159
n-Butane	17.63	0.0012	1025	0.0039	120.3	0.0021
n-Pentane	1.348	0.0001	97.23	0.0004	10.57	0.0002
Ethane	1131	0.0751	3.402e+004	0.1287	6548	0.1127
i-Butane	17.54	0.0012	1019	0.0039	124.2	0.0021
n-Hexane	0.6574	0.0000	56.65	0.0002	5.854	0.0001
i-Pentane	2.649	0.0002	191.1	0.0007	20.99	0.0004
Nitrogen	24.30	0.0016	680.7	0.0026	57.80	0.0010
CO2	12.96	0.0009	570.4	0.0022	47.32	0.0008
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.506e+004	1.0000	2.642e+005	1.0000	5.811e+004	1.0000

Liquid Phase Phase Fraction 0.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC

Methane	0.0000	0.6096	0.0000	0.3859	0.0000	0.4837
Propane	0.0000	0.0905	0.0000	0.1574	0.0000	0.1166
n-Butane	0.0000	0.0297	0.0000	0.0681	0.0000	0.0438
n-Pentane	0.0000	0.0062	0.0000	0.0177	0.0000	0.0106
Ethane	0.0000	0.2233	0.0000	0.2649	0.0000	0.2796
i-Butane	0.0000	0.0217	0.0000	0.0497	0.0000	0.0332
n-Hexane	0.0000	0.0080	0.0000	0.0270	0.0000	0.0153
i-Pentane	0.0000	0.0093	0.0000	0.0264	0.0000	0.0159
Nitrogen	0.0000	0.0004	0.0000	0.0005	0.0000	0.0002
CO2	0.0000	0.0013	0.0000	0.0023	0.0000	0.0010
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	1.492	1.492	---
Propane	0.1139	0.1139	---
n-Butane	3.942e-002	3.942e-002	---
n-Pentane	1.436e-002	1.436e-002	---
Ethane	0.3364	0.3364	---
i-Butane	5.375e-002	5.375e-002	---
n-Hexane	5.488e-003	5.488e-003	---
i-Pentane	1.894e-002	1.894e-002	---
Nitrogen	3.800	3.800	---
CO2	0.6600	0.6600	---
H2O	---	---	---

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
Tee: TEE-100	Separator: V-101	

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

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12 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments

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Material Stream: 12 Fluid Package: Basis-1

Property Package: Peng-Robinson

CONDITIONS

	OVERALL	VAPOUR PH.	LIQUID PH.
Vapour / Phase Fraction	0.8837	0.8837	0.1163
Temperature: (F)	-140.8	-140.8	-140.8
Pressure: (psia)	209.7	209.7	209.7
Molar Flow (lbmole/hr)	1.129e+004	9980	1314
Mass Flow (lb/hr)	1.982e+005	1.651e+005	3.307e+004
Std Ideal Liq VolFlow (barrel/day)	4.358e+004	3.727e+004	6308
Molar Enthalpy (Btu/lbmole)	-3.547e+04	-3.446e+04	-4.308e+04

Molar Entropy (Btu/lbmole-F) 3.283e+01 3.407e+01 2.335e+01
Heat Flow (Btu/hr) -4.006e+08 -3.440e+08 -5.658e+07
Liq VolFlow @Std Cond (barrel/day) 1.823e+007 1.612e+007 2.113e+006
COMPOSITION

Overall Phase Vapour Fraction 0.8837

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	1.027e+004	0.9095	1.648e+005	0.8316	3.769e+004	0.8647
Propane	116.4	0.0103	5131	0.0259	693.4	0.0159
n-Butane	13.23	0.0012	768.8	0.0039	90.26	0.0021
n-Pentane	1.011	0.0001	72.92	0.0004	7.929	0.0002
Ethane	848.4	0.0751	2.551e+004	0.1287	4911	0.1127
i-Butane	13.15	0.0012	764.6	0.0039	93.16	0.0021
n-Hexane	0.4930	0.0000	42.49	0.0002	4.390	0.0001
i-Pentane	1.987	0.0002	143.3	0.0007	15.74	0.0004
Nitrogen	18.23	0.0016	510.5	0.0026	43.35	0.0010
CO2	9.720	0.0009	427.8	0.0022	35.49	0.0008
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.129e+004	1.0000	1.982e+005	1.0000	4.358e+004	1.0000

Vapour Phase Phase Fraction 0.8837

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	9636	0.9655	1.546e+005	0.9364	3.536e+004	0.9486
Propane	6.015	0.0006	265.3	0.0016	35.85	0.0010
n-Butane	7.050e-002	0.0000	4.097	0.0000	0.4811	0.0000
n-Pentane	5.838e-004	0.0000	4.212e-002	0.0000	4.580e-003	0.0000
Ethane	313.0	0.0314	9412	0.0570	1812	0.0486
i-Butane	0.1376	0.0000	8.001	0.0000	0.9748	0.0000
n-Hexane	3.425e-005	0.0000	2.951e-003	0.0000	3.050e-004	0.0000
i-Pentane	2.177e-003	0.0000	0.1571	0.0000	1.725e-002	0.0000
Nitrogen	18.05	0.0018	505.6	0.0031	42.93	0.0012
CO2	6.758	0.0007	297.4	0.0018	24.68	0.0007
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	9980	1.0000	1.651e+005	1.0000	3.727e+004	1.0000

Liquid Phase Phase Fraction 0.1163

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	635.0	0.4834	1.019e+004	0.3081	2330	0.3693
Propane	110.3	0.0840	4866	0.1471	657.6	0.1042
n-Butane	13.16	0.0100	764.7	0.0231	89.77	0.0142
n-Pentane	1.010	0.0008	72.88	0.0022	7.924	0.0013
Ethane	535.4	0.4076	1.610e+004	0.4869	3099	0.4914
i-Butane	13.02	0.0099	756.6	0.0229	92.19	0.0146
n-Hexane	0.4930	0.0004	42.49	0.0013	4.390	0.0007
i-Pentane	1.984	0.0015	143.2	0.0043	15.73	0.0025
Nitrogen	0.1764	0.0001	4.940	0.0001	0.4195	0.0001
CO2	2.962	0.0023	130.3	0.0039	10.81	0.0017
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1314	1.0000	3.307e+004	1.0000	6308	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	1.997	1.997	---
Propane	7.175e-003	7.175e-003	---
n-Butane	7.052e-004	7.052e-004	---
n-Pentane	7.607e-005	7.607e-005	---
Ethane	7.694e-002	7.694e-002	---
i-Butane	1.392e-003	1.392e-003	---
n-Hexane	9.143e-006	9.143e-006	---
i-Pentane	1.444e-004	1.444e-004	---
Nitrogen	13.47	13.47	---
CO2	0.3003	0.3003	---
H2O	---	---	---

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
Reboiled Absorber: T-101	Expander: C-101	

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

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10 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments

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Material Stream: 10 Fluid Package: Basis-1

Property Package: Peng-Robinson

CONDITIONS

	OVERALL	VAPOUR PH.	LIQUID PH.
Vapour / Phase Fraction	0.4537	0.4537	0.5463
Temperature: (F)	-119.5	-119.5	-119.5
Pressure: (psia)	209.7	209.7	209.7
Molar Flow (lbmole/hr)	6902	3132	3771
Mass Flow (lb/hr)	1.749e+005	5.267e+004	1.223e+005
Std Ideal Liq VolFlow (barrel/day)	3.192e+004	1.182e+004	2.009e+004
Molar Enthalpy (Btu/lbmole)	-4.208e+04	-3.443e+04	-4.843e+04
Molar Entropy (Btu/lbmole-F)	2.747e+01	3.481e+01	2.137e+01
Heat Flow (Btu/hr)	-2.904e+08	-1.078e+08	-1.826e+08
Liq VolFlow @Std Cond (barrel/day)	1.111e+007	5.057e+006	5.532e+005

COMPOSITION

Overall Phase Vapour Fraction 0.4537

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	4208	0.6096	6.751e+004	0.3859	1.544e+004	0.4837
Propane	624.5	0.0905	2.754e+004	0.1574	3721	0.1166
n-Butane	205.0	0.0297	1.192e+004	0.0681	1399	0.0438
n-Pentane	43.01	0.0062	3103	0.0177	337.5	0.0106

Ethane	1541	0.2233	4.635e+004	0.2649	8923	0.2796
i-Butane	149.6	0.0217	8694	0.0497	1059	0.0332
n-Hexane	54.90	0.0080	4731	0.0270	488.9	0.0153
i-Pentane	64.11	0.0093	4626	0.0264	508.1	0.0159
Nitrogen	2.931	0.0004	82.11	0.0005	6.972	0.0002
CO2	9.001	0.0013	396.1	0.0023	32.86	0.0010
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	6902	1.0000	1.749e+005	1.0000	3.192e+004	1.0000

Vapour Phase Phase Fraction 0.4537

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	2969	0.9481	4.764e+004	0.9045	1.089e+004	0.9215
Propane	6.966	0.0022	307.2	0.0058	41.51	0.0035
n-Butane	0.2538	0.0001	14.75	0.0003	1.732	0.0001
n-Pentane	6.435e-003	0.0000	0.4643	0.0000	5.049e-002	0.0000
Ethane	149.5	0.0477	4496	0.0854	865.6	0.0732
i-Butane	0.3559	0.0001	20.69	0.0004	2.521	0.0002
n-Hexane	1.099e-003	0.0000	9.473e-002	0.0000	9.789e-003	0.0000
i-Pentane	1.767e-002	0.0000	1.275	0.0000	0.1401	0.0000
Nitrogen	2.760	0.0009	77.32	0.0015	6.566	0.0006
CO2	2.589	0.0008	114.0	0.0022	9.454	0.0008
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	3132	1.0000	5.267e+004	1.0000	1.182e+004	1.0000

Liquid Phase Phase Fraction 0.5463

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	1239	0.3285	1.987e+004	0.1625	4544	0.2262
Propane	617.5	0.1638	2.723e+004	0.2227	3680	0.1831
n-Butane	204.8	0.0543	1.190e+004	0.0973	1398	0.0695
n-Pentane	43.01	0.0114	3103	0.0254	337.4	0.0168
Ethane	1392	0.3691	4.185e+004	0.3423	8057	0.4010
i-Butane	149.2	0.0396	8674	0.0709	1057	0.0526
n-Hexane	54.90	0.0146	4731	0.0387	488.9	0.0243
i-Pentane	64.09	0.0170	4624	0.0378	507.9	0.0253
Nitrogen	0.1709	0.0000	4.787	0.0000	0.4065	0.0000
CO2	6.411	0.0017	282.2	0.0023	23.41	0.0012
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	3771	1.0000	1.223e+005	1.0000	2.009e+004	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	2.886	2.886	---
Propane	1.358e-002	1.358e-002	---
n-Butane	1.492e-003	1.492e-003	---
n-Pentane	1.802e-004	1.802e-004	---
Ethane	0.1293	0.1293	---
i-Butane	2.871e-003	2.871e-003	---
n-Hexane	2.411e-005	2.411e-005	---
i-Pentane	3.320e-004	3.320e-004	---
Nitrogen	19.44	19.44	---
CO2	0.4862	0.4862	---
H2O	---	---	---

UNIT OPERATIONS

FEED TO PRODUCT FROM LOGICAL CONNECTION
Reboiled Absorber: T-101 Valve: VLV-100
UTILITIES

(No utilities reference this stream)
PROCESS UTILITY

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13 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments
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Material Stream: 13 Fluid Package: Basis-1

Property Package: Peng-Robinson
CONDITIONS

	OVERALL	VAPOUR PH.
Vapour / Phase Fraction	1.0000	1.0000
Temperature: (F)	-145.0	-145.0
Pressure: (psia)	260.0	260.0
Molar Flow (lbmole/hr)	1.827e+004	1.827e+004
Mass Flow (lb/hr)	2.988e+005	2.988e+005
Std Ideal Liq VolFlow (barrel/day)	6.774e+004	6.774e+004
Molar Enthalpy (Btu/lbmole)	-3.451e+04	-3.451e+04
Molar Entropy (Btu/lbmole-F)	3.323e+01	3.323e+01
Heat Flow (Btu/hr)	-6.305e+08	-6.305e+08
Liq VolFlow @Std Cond (barrel/day)	2.950e+007	2.950e+007

COMPOSITION

Overall Phase Vapour Fraction 1.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	1.787e+004	0.9784	2.867e+005	0.9597	6.558e+004	0.9680
Propane	6.097	0.0003	268.8	0.0009	36.33	0.0005
n-Butane	7.820e-002	0.0000	4.545	0.0000	0.5336	0.0000
n-Pentane	7.170e-004	0.0000	5.173e-002	0.0000	5.625e-003	0.0000
Ethane	350.5	0.0192	1.054e+004	0.0353	2029	0.0300
i-Butane	0.1455	0.0000	8.458	0.0000	1.031	0.0000
n-Hexane	4.621e-005	0.0000	3.982e-003	0.0000	4.115e-004	0.0000
i-Pentane	2.555e-003	0.0000	0.1843	0.0000	2.025e-002	0.0000
Nitrogen	27.23	0.0015	762.8	0.0026	64.78	0.0010
CO2	10.09	0.0006	444.1	0.0015	36.85	0.0005
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.827e+004	1.0000	2.988e+005	1.0000	6.774e+004	1.0000

Vapour Phase Phase Fraction 1.000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	1.787e+004	0.9784	2.867e+005	0.9597	6.558e+004	0.9680

Propane	6.097	0.0003	268.8	0.0009	36.33	0.0005
n-Butane	7.820e-002	0.0000	4.545	0.0000	0.5336	0.0000
n-Pentane	7.170e-004	0.0000	5.173e-002	0.0000	5.625e-003	0.0000
Ethane	350.5	0.0192	1.054e+004	0.0353	2029	0.0300
i-Butane	0.1455	0.0000	8.458	0.0000	1.031	0.0000
n-Hexane	4.621e-005	0.0000	3.982e-003	0.0000	4.115e-004	0.0000
i-Pentane	2.555e-003	0.0000	0.1843	0.0000	2.025e-002	0.0000
Nitrogen	27.23	0.0015	762.8	0.0026	64.78	0.0010
CO2	10.09	0.0006	444.1	0.0015	36.85	0.0005
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.827e+004	1.0000	2.988e+005	1.0000	6.774e+004	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	---	---	---
Propane	---	---	---
n-Butane	---	---	---
n-Pentane	---	---	---
Ethane	---	---	---
i-Butane	---	---	---
n-Hexane	---	---	---
i-Pentane	---	---	---
Nitrogen	---	---	---
CO2	---	---	---
H2O	---	---	---

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
Plate Exchanger: E-104	Reboiled Absorber: T-101	

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

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9 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments

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Material Stream: 9 Fluid Package: Basis-1

Property Package: Peng-Robinson

CONDITIONS

	OVERALL	VAPOUR PH.	LIQUID PH.
Vapour / Phase Fraction	1.0000	1.0000	0.0000
Temperature: (F)	-56.14	-56.14	-56.14
Pressure: (psia)	809.7	809.7	809.7
Molar Flow (lbmole/hr)	1.129e+004	1.129e+004	0.0000
Mass Flow (lb/hr)	1.982e+005	1.982e+005	0.0000
Std Ideal Liq VolFlow (barrel/day)	4.358e+004	4.358e+004	0.0000
Molar Enthalpy (Btu/lbmole)	-3.500e+04	-3.500e+04	-4.208e+04
Molar Entropy (Btu/lbmole-F)	3.234e+01	3.234e+01	2.665e+01

Heat Flow (Btu/hr) -3.953e+08 -3.953e+08 0.000e-01
Liq VolFlow @Std Cond (barrel/day) 1.823e+007 1.823e+007 0.0000
COMPOSITION

Overall Phase Vapour Fraction 1.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	1.027e+004	0.9095	1.648e+005	0.8316	3.769e+004	0.8647
Propane	116.4	0.0103	5131	0.0259	693.4	0.0159
n-Butane	13.23	0.0012	768.8	0.0039	90.26	0.0021
n-Pentane	1.011	0.0001	72.92	0.0004	7.929	0.0002
Ethane	848.4	0.0751	2.551e+004	0.1287	4911	0.1127
i-Butane	13.15	0.0012	764.6	0.0039	93.16	0.0021
n-Hexane	0.4930	0.0000	42.49	0.0002	4.390	0.0001
i-Pentane	1.987	0.0002	143.3	0.0007	15.74	0.0004
Nitrogen	18.23	0.0016	510.5	0.0026	43.35	0.0010
CO2	9.720	0.0009	427.8	0.0022	35.49	0.0008
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.129e+004	1.0000	1.982e+005	1.0000	4.358e+004	1.0000

Vapour Phase Phase Fraction 1.000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	1.027e+004	0.9095	1.648e+005	0.8316	3.769e+004	0.8647
Propane	116.4	0.0103	5131	0.0259	693.4	0.0159
n-Butane	13.23	0.0012	768.8	0.0039	90.26	0.0021
n-Pentane	1.011	0.0001	72.92	0.0004	7.929	0.0002
Ethane	848.4	0.0751	2.551e+004	0.1287	4911	0.1127
i-Butane	13.15	0.0012	764.6	0.0039	93.16	0.0021
n-Hexane	0.4930	0.0000	42.49	0.0002	4.390	0.0001
i-Pentane	1.987	0.0002	143.3	0.0007	15.74	0.0004
Nitrogen	18.23	0.0016	510.5	0.0026	43.35	0.0010
CO2	9.720	0.0009	427.8	0.0022	35.49	0.0008
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.129e+004	1.0000	1.982e+005	1.0000	4.358e+004	1.0000

Liquid Phase Phase Fraction 0.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.6096	0.0000	0.3859	0.0000	0.4837
Propane	0.0000	0.0905	0.0000	0.1574	0.0000	0.1166
n-Butane	0.0000	0.0297	0.0000	0.0681	0.0000	0.0438
n-Pentane	0.0000	0.0062	0.0000	0.0177	0.0000	0.0106
Ethane	0.0000	0.2233	0.0000	0.2649	0.0000	0.2796
i-Butane	0.0000	0.0217	0.0000	0.0497	0.0000	0.0332
n-Hexane	0.0000	0.0080	0.0000	0.0270	0.0000	0.0153
i-Pentane	0.0000	0.0093	0.0000	0.0264	0.0000	0.0159
Nitrogen	0.0000	0.0004	0.0000	0.0005	0.0000	0.0002
CO2	0.0000	0.0013	0.0000	0.0023	0.0000	0.0010
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	1.492	1.492	---
Propane	0.1139	0.1139	---
n-Butane	3.942e-002	3.942e-002	---
n-Pentane	1.436e-002	1.436e-002	---
Ethane	0.3364	0.3364	---
i-Butane	5.375e-002	5.375e-002	---
n-Hexane	5.488e-003	5.488e-003	---
i-Pentane	1.894e-002	1.894e-002	---
Nitrogen	3.800	3.800	---
CO2	0.6600	0.6600	---
H2O	---	---	---

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
Expander: C-101	Tee: TEE-100	

UTILITIES

(No utilities reference this stream)
PROCESS UTILITY

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8 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments

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Material Stream: 8 Fluid Package: Basis-1

Property Package: Peng-Robinson

CONDITIONS

	OVERALL	VAPOUR PH.	LIQUID PH.
Vapour / Phase Fraction	1.0000	1.0000	0.0000
Temperature: (F)	-56.14	-56.14	-56.14
Pressure: (psia)	809.7	809.7	809.7
Molar Flow (lbmole/hr)	3765	3765	0.0000
Mass Flow (lb/hr)	6.605e+004	6.605e+004	0.0000
Std Ideal Liq VolFlow (barrel/day)	1.453e+004	1.453e+004	0.0000
Molar Enthalpy (Btu/lbmole)	-3.500e+04	-3.500e+04	-4.208e+04
Molar Entropy (Btu/lbmole-F)	3.234e+01	3.234e+01	2.665e+01
Heat Flow (Btu/hr)	-1.318e+08	-1.318e+08	0.000e-01
Liq VolFlow @Std Cond (barrel/day)	6.077e+006	6.077e+006	0.0000

COMPOSITION

Overall Phase Vapour Fraction 1.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	3424	0.9095	5.493e+004	0.8316	1.256e+004	0.8647
Propane	38.79	0.0103	1710	0.0259	231.1	0.0159
n-Butane	4.409	0.0012	256.3	0.0039	30.09	0.0021
n-Pentane	0.3369	0.0001	24.31	0.0004	2.643	0.0002
Ethane	282.8	0.0751	8504	0.1287	1637	0.1127

i-Butane	4.385	0.0012	254.9	0.0039	31.05	0.0021
n-Hexane	0.1643	0.0000	14.16	0.0002	1.463	0.0001
i-Pentane	0.6622	0.0002	47.78	0.0007	5.248	0.0004
Nitrogen	6.075	0.0016	170.2	0.0026	14.45	0.0010
CO2	3.240	0.0009	142.6	0.0022	11.83	0.0008
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	3765	1.0000	6.605e+004	1.0000	1.453e+004	1.0000

Vapour Phase Phase Fraction 1.000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	3424	0.9095	5.493e+004	0.8316	1.256e+004	0.8647
Propane	38.79	0.0103	1710	0.0259	231.1	0.0159
n-Butane	4.409	0.0012	256.3	0.0039	30.09	0.0021
n-Pentane	0.3369	0.0001	24.31	0.0004	2.643	0.0002
Ethane	282.8	0.0751	8504	0.1287	1637	0.1127
i-Butane	4.385	0.0012	254.9	0.0039	31.05	0.0021
n-Hexane	0.1643	0.0000	14.16	0.0002	1.463	0.0001
i-Pentane	0.6622	0.0002	47.78	0.0007	5.248	0.0004
Nitrogen	6.075	0.0016	170.2	0.0026	14.45	0.0010
CO2	3.240	0.0009	142.6	0.0022	11.83	0.0008
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	3765	1.0000	6.605e+004	1.0000	1.453e+004	1.0000

Liquid Phase Phase Fraction 0.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.6096	0.0000	0.3859	0.0000	0.4837
Propane	0.0000	0.0905	0.0000	0.1574	0.0000	0.1166
n-Butane	0.0000	0.0297	0.0000	0.0681	0.0000	0.0438
n-Pentane	0.0000	0.0062	0.0000	0.0177	0.0000	0.0106
Ethane	0.0000	0.2233	0.0000	0.2649	0.0000	0.2796
i-Butane	0.0000	0.0217	0.0000	0.0497	0.0000	0.0332
n-Hexane	0.0000	0.0080	0.0000	0.0270	0.0000	0.0153
i-Pentane	0.0000	0.0093	0.0000	0.0264	0.0000	0.0159
Nitrogen	0.0000	0.0004	0.0000	0.0005	0.0000	0.0002
CO2	0.0000	0.0013	0.0000	0.0023	0.0000	0.0010
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	1.492	1.492	---
Propane	0.1139	0.1139	---
n-Butane	3.942e-002	3.942e-002	---
n-Pentane	1.436e-002	1.436e-002	---
Ethane	0.3364	0.3364	---
i-Butane	5.375e-002	5.375e-002	---
n-Hexane	5.488e-003	5.488e-003	---
i-Pentane	1.894e-002	1.894e-002	---
Nitrogen	3.800	3.800	---
CO2	0.6600	0.6600	---
H2O	---	---	---

UNIT OPERATIONS

FEED TO PRODUCT FROM LOGICAL CONNECTION
Plate Exchanger: E-104 Tee: TEE-100
UTILITIES

(No utilities reference this stream)
PROCESS UTILITY

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11 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments
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Material Stream: 11 Fluid Package: Basis-1

Property Package: Peng-Robinson
CONDITIONS

	OVERALL	LIQUID PH.
Vapour / Phase Fraction	0.0000	1.0000
Temperature: (F)	-112.0	-112.0
Pressure: (psia)	808.7	808.7
Molar Flow (lbmole/hr)	3765	3765
Mass Flow (lb/hr)	6.605e+004	6.605e+004
Std Ideal Liq VolFlow (barrel/day)	1.453e+004	1.453e+004
Molar Enthalpy (Btu/lbmole)	-3.714e+04	-3.714e+04
Molar Entropy (Btu/lbmole-F)	2.662e+01	2.662e+01
Heat Flow (Btu/hr)	-1.398e+08	-1.398e+08
Liq VolFlow @Std Cond (barrel/day)	6.077e+006	6.077e+006

COMPOSITION

Overall Phase Vapour Fraction 0.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	3424	0.9095	5.493e+004	0.8316	1.256e+004	0.8647
Propane	38.79	0.0103	1710	0.0259	231.1	0.0159
n-Butane	4.409	0.0012	256.3	0.0039	30.09	0.0021
n-Pentane	0.3369	0.0001	24.31	0.0004	2.643	0.0002
Ethane	282.8	0.0751	8504	0.1287	1637	0.1127
i-Butane	4.385	0.0012	254.9	0.0039	31.05	0.0021
n-Hexane	0.1643	0.0000	14.16	0.0002	1.463	0.0001
i-Pentane	0.6622	0.0002	47.78	0.0007	5.248	0.0004
Nitrogen	6.075	0.0016	170.2	0.0026	14.45	0.0010
CO2	3.240	0.0009	142.6	0.0022	11.83	0.0008
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	3765	1.0000	6.605e+004	1.0000	1.453e+004	1.0000

Liquid Phase Phase Fraction 1.000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	3424	0.9095	5.493e+004	0.8316	1.256e+004	0.8647
Propane	38.79	0.0103	1710	0.0259	231.1	0.0159

n-Butane	4.409	0.0012	256.3	0.0039	30.09	0.0021
n-Pentane	0.3369	0.0001	24.31	0.0004	2.643	0.0002
Ethane	282.8	0.0751	8504	0.1287	1637	0.1127
i-Butane	4.385	0.0012	254.9	0.0039	31.05	0.0021
n-Hexane	0.1643	0.0000	14.16	0.0002	1.463	0.0001
i-Pentane	0.6622	0.0002	47.78	0.0007	5.248	0.0004
Nitrogen	6.075	0.0016	170.2	0.0026	14.45	0.0010
CO2	3.240	0.0009	142.6	0.0022	11.83	0.0008
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	3765	1.0000	6.605e+004	1.0000	1.453e+004	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	0.0000	0.0000	---
Propane	0.0000	0.0000	---
n-Butane	0.0000	0.0000	---
n-Pentane	0.0000	0.0000	---
Ethane	0.0000	0.0000	---
i-Butane	0.0000	0.0000	---
n-Hexane	0.0000	0.0000	---
i-Pentane	0.0000	0.0000	---
Nitrogen	0.0000	0.0000	---
CO2	0.0000	0.0000	---
H2O	---	---	---

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
Reboiled Absorber: T-101	Plate Exchanger: E-104	

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

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18 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments

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Material Stream: 18 Fluid Package: Basis-1

Property Package: Peng-Robinson

CONDITIONS

	OVERALL	VAPOUR PH.
Vapour / Phase Fraction	1.0000	1.0000
Temperature: (F)	-100.6	-100.6
Pressure: (psia)	259.0	259.0
Molar Flow (lbmole/hr)	1.827e+004	1.827e+004
Mass Flow (lb/hr)	2.988e+005	2.988e+005
Std Ideal Liq VolFlow (barrel/day)	6.774e+004	6.774e+004
Molar Enthalpy (Btu/lbmole)	-3.407e+04	-3.407e+04
Molar Entropy (Btu/lbmole-F)	3.455e+01	3.455e+01
Heat Flow (Btu/hr)	-6.224e+08	-6.224e+08

Liq VolFlow @Std Cond (barrel/day) 2.950e+007 2.950e+007
COMPOSITION

Overall Phase Vapour Fraction 1.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	1.787e+004	0.9784	2.867e+005	0.9597	6.558e+004	0.9680
Propane	6.097	0.0003	268.8	0.0009	36.33	0.0005
n-Butane	7.820e-002	0.0000	4.545	0.0000	0.5336	0.0000
n-Pentane	7.170e-004	0.0000	5.173e-002	0.0000	5.625e-003	0.0000
Ethane	350.5	0.0192	1.054e+004	0.0353	2029	0.0300
i-Butane	0.1455	0.0000	8.458	0.0000	1.031	0.0000
n-Hexane	4.621e-005	0.0000	3.982e-003	0.0000	4.115e-004	0.0000
i-Pentane	2.555e-003	0.0000	0.1843	0.0000	2.025e-002	0.0000
Nitrogen	27.23	0.0015	762.8	0.0026	64.78	0.0010
CO2	10.09	0.0006	444.1	0.0015	36.85	0.0005
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.827e+004	1.0000	2.988e+005	1.0000	6.774e+004	1.0000

Vapour Phase Phase Fraction 1.000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	1.787e+004	0.9784	2.867e+005	0.9597	6.558e+004	0.9680
Propane	6.097	0.0003	268.8	0.0009	36.33	0.0005
n-Butane	7.820e-002	0.0000	4.545	0.0000	0.5336	0.0000
n-Pentane	7.170e-004	0.0000	5.173e-002	0.0000	5.625e-003	0.0000
Ethane	350.5	0.0192	1.054e+004	0.0353	2029	0.0300
i-Butane	0.1455	0.0000	8.458	0.0000	1.031	0.0000
n-Hexane	4.621e-005	0.0000	3.982e-003	0.0000	4.115e-004	0.0000
i-Pentane	2.555e-003	0.0000	0.1843	0.0000	2.025e-002	0.0000
Nitrogen	27.23	0.0015	762.8	0.0026	64.78	0.0010
CO2	10.09	0.0006	444.1	0.0015	36.85	0.0005
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.827e+004	1.0000	2.988e+005	1.0000	6.774e+004	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	---	---	---
Propane	---	---	---
n-Butane	---	---	---
n-Pentane	---	---	---
Ethane	---	---	---
i-Butane	---	---	---
n-Hexane	---	---	---
i-Pentane	---	---	---
Nitrogen	---	---	---
CO2	---	---	---
H2O	---	---	---

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
Plate Exchanger: E-103	Plate Exchanger: E-104	

UTILITIES

(No utilities reference this stream)
PROCESS UTILITY

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1 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments
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Material Stream: 1 Fluid Package: Basis-1

Property Package: Peng-Robinson
CONDITIONS

	OVERALL	VAPOUR PH.
Vapour / Phase Fraction	1.0000	1.0000
Temperature: (F)	80.00	80.00
Pressure: (psia)	914.7	914.7
Molar Flow (lbmole/hr)	2.196e+004	2.196e+004
Mass Flow (lb/hr)	4.392e+005	4.392e+005
Std Ideal Liq VolFlow (barrel/day)	9.002e+004	9.002e+004
Molar Enthalpy (Btu/lbmole)	-3.467e+04	-3.467e+04
Molar Entropy (Btu/lbmole-F)	3.595e+01	3.595e+01
Heat Flow (Btu/hr)	-7.615e+08	-7.615e+08
Liq VolFlow @Std Cond (barrel/day)	3.542e+007	3.542e+007

COMPOSITION

Overall Phase Vapour Fraction 1.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	1.790e+004	0.8152	2.872e+005	0.6540	6.569e+004	0.7297
Propane	779.6	0.0355	3.438e+004	0.0783	4646	0.0516
n-Butane	222.7	0.0101	1.294e+004	0.0295	1520	0.0169
n-Pentane	44.36	0.0020	3201	0.0073	348.0	0.0039
Ethane	2673	0.1217	8.037e+004	0.1830	1.547e+004	0.1719
i-Butane	167.1	0.0076	9714	0.0221	1184	0.0131
n-Hexane	55.56	0.0025	4788	0.0109	494.8	0.0055
i-Pentane	66.76	0.0030	4817	0.0110	529.0	0.0059
Nitrogen	27.23	0.0012	762.8	0.0017	64.78	0.0007
CO2	21.96	0.0010	966.5	0.0022	80.18	0.0009
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	2.196e+004	1.0000	4.392e+005	1.0000	9.002e+004	1.0000

Vapour Phase Phase Fraction 1.000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	1.790e+004	0.8152	2.872e+005	0.6540	6.569e+004	0.7297
Propane	779.6	0.0355	3.438e+004	0.0783	4646	0.0516
n-Butane	222.7	0.0101	1.294e+004	0.0295	1520	0.0169
n-Pentane	44.36	0.0020	3201	0.0073	348.0	0.0039
Ethane	2673	0.1217	8.037e+004	0.1830	1.547e+004	0.1719
i-Butane	167.1	0.0076	9714	0.0221	1184	0.0131

n-Hexane	55.56	0.0025	4788	0.0109	494.8	0.0055
i-Pentane	66.76	0.0030	4817	0.0110	529.0	0.0059
Nitrogen	27.23	0.0012	762.8	0.0017	64.78	0.0007
CO2	21.96	0.0010	966.5	0.0022	80.18	0.0009
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	2.196e+004	1.0000	4.392e+005	1.0000	9.002e+004	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	---	---	---
Propane	---	---	---
n-Butane	---	---	---
n-Pentane	---	---	---
Ethane	---	---	---
i-Butane	---	---	---
n-Hexane	---	---	---
i-Pentane	---	---	---
Nitrogen	---	---	---
CO2	---	---	---
H2O	---	---	---

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
LNG: E-101		

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

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16 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments

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Material Stream: 16 Fluid Package: Basis-1

Property Package: Peng-Robinson

CONDITIONS

	OVERALL	LIQUID PH.
Vapour / Phase Fraction	0.0000	1.0000
Temperature: (F)	72.00	72.00
Pressure: (psia)	378.0	378.0
Molar Flow (lbmole/hr)	3694	3694
Mass Flow (lb/hr)	1.404e+005	1.404e+005
Std Ideal Liq VolFlow (barrel/day)	2.228e+004	2.228e+004
Molar Enthalpy (Btu/lbmole)	-4.783e+04	-4.783e+04
Molar Entropy (Btu/lbmole-F)	2.917e+01	2.917e+01
Heat Flow (Btu/hr)	-1.767e+08	-1.767e+08
Liq VolFlow @Std Cond (barrel/day)	2.090e+004	2.090e+004

COMPOSITION

Overall Phase Vapour Fraction 0.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	30.42	0.0082	488.0	0.0035	111.6	0.0050
Propane	773.5	0.2094	3.411e+004	0.2430	4610	0.2069
n-Butane	222.6	0.0603	1.294e+004	0.0922	1519	0.0682
n-Pentane	44.36	0.0120	3201	0.0228	348.0	0.0156
Ethane	2322	0.6286	6.983e+004	0.4973	1.344e+004	0.6033
i-Butane	167.0	0.0452	9705	0.0691	1183	0.0531
n-Hexane	55.56	0.0150	4788	0.0341	494.8	0.0222
i-Pentane	66.76	0.0181	4817	0.0343	529.0	0.0237
Nitrogen	6.261e-006	0.0000	1.754e-004	0.0000	1.489e-005	0.0000
CO2	11.87	0.0032	522.4	0.0037	43.34	0.0019
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	3694	1.0000	1.404e+005	1.0000	2.228e+004	1.0000

Liquid Phase Phase Fraction 1.000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	30.42	0.0082	488.0	0.0035	111.6	0.0050
Propane	773.5	0.2094	3.411e+004	0.2430	4610	0.2069
n-Butane	222.6	0.0603	1.294e+004	0.0922	1519	0.0682
n-Pentane	44.36	0.0120	3201	0.0228	348.0	0.0156
Ethane	2322	0.6286	6.983e+004	0.4973	1.344e+004	0.6033
i-Butane	167.0	0.0452	9705	0.0691	1183	0.0531
n-Hexane	55.56	0.0150	4788	0.0341	494.8	0.0222
i-Pentane	66.76	0.0181	4817	0.0343	529.0	0.0237
Nitrogen	6.261e-006	0.0000	1.754e-004	0.0000	1.489e-005	0.0000
CO2	11.87	0.0032	522.4	0.0037	43.34	0.0019
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	3694	1.0000	1.404e+005	1.0000	2.228e+004	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	0.0000	0.0000	---
Propane	0.0000	0.0000	---
n-Butane	0.0000	0.0000	---
n-Pentane	0.0000	0.0000	---
Ethane	0.0000	0.0000	---
i-Butane	0.0000	0.0000	---
n-Hexane	0.0000	0.0000	---
i-Pentane	0.0000	0.0000	---
Nitrogen	0.0000	0.0000	---
CO2	0.0000	0.0000	---
H2O	---	---	---

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
Pump: P-102 A/B	LNG: E-101	

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

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27 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments
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Material Stream: 27 Fluid Package: Basis-1

Property Package: Peng-Robinson

CONDITIONS

	OVERALL	VAPOUR PH.	LIQUID PH.
Vapour / Phase Fraction	1.0000	1.0000	0.0000
Temperature: (F)	-40.67	-40.67	-40.67
Pressure: (psia)	15.90	15.90	15.90
Molar Flow (lbmole/hr)	1.300e+004	1.300e+004	0.0000
Mass Flow (lb/hr)	5.733e+005	5.733e+005	0.0000
Std Ideal Liq VolFlow (barrel/day)	7.747e+004	7.747e+004	0.0000
Molar Enthalpy (Btu/lbmole)	-4.667e+04	-4.667e+04	-5.468e+04
Molar Entropy (Btu/lbmole-F)	3.436e+01	3.436e+01	1.524e+01
Heat Flow (Btu/hr)	-6.067e+08	-6.067e+08	0.000e-01
Liq VolFlow @Std Cond (barrel/day)	7.732e+004	7.732e+004	0.0000

COMPOSITION

Overall Phase Vapour Fraction 1.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	1.300e+004	1.0000	5.733e+005	1.0000	7.747e+004	1.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.300e+004	1.0000	5.733e+005	1.0000	7.747e+004	1.0000

Vapour Phase Phase Fraction 1.000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	1.300e+004	1.0000	5.733e+005	1.0000	7.747e+004	1.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.300e+004	1.0000	5.733e+005	1.0000	7.747e+004	1.0000

Liquid Phase Phase Fraction 0.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	---	---	---
Propane	1.000	1.000	---
n-Butane	---	---	---
n-Pentane	---	---	---
Ethane	---	---	---
i-Butane	---	---	---
n-Hexane	---	---	---
i-Pentane	---	---	---
Nitrogen	---	---	---
CO2	---	---	---
H2O	---	---	---

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
Separator: V-201	LNG: E-102	

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

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22 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments

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Material Stream: 22 Fluid Package: Basis-1

Property Package: Peng-Robinson

CONDITIONS

	OVERALL	VAPOUR PH.
Vapour / Phase Fraction	1.0000	1.0000

Temperature: (F) -2.285 -2.285
Pressure: (psia) 338.3 338.3
Molar Flow (lbmole/hr) 1.827e+004 1.827e+004
Mass Flow (lb/hr) 2.988e+005 2.988e+005
Std Ideal Liq VolFlow (barrel/day) 6.774e+004 6.774e+004
Molar Enthalpy (Btu/lbmole) -3.323e+04 -3.323e+04
Molar Entropy (Btu/lbmole-F) 3.615e+01 3.615e+01
Heat Flow (Btu/hr) -6.071e+08 -6.071e+08
Liq VolFlow @Std Cond (barrel/day) 2.950e+007 2.950e+007
COMPOSITION

Overall Phase Vapour Fraction 1.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	1.787e+004	0.9784	2.867e+005	0.9597	6.558e+004	0.9680
Propane	6.097	0.0003	268.8	0.0009	36.33	0.0005
n-Butane	7.820e-002	0.0000	4.545	0.0000	0.5336	0.0000
n-Pentane	7.170e-004	0.0000	5.173e-002	0.0000	5.625e-003	0.0000
Ethane	350.5	0.0192	1.054e+004	0.0353	2029	0.0300
i-Butane	0.1455	0.0000	8.458	0.0000	1.031	0.0000
n-Hexane	4.621e-005	0.0000	3.982e-003	0.0000	4.115e-004	0.0000
i-Pentane	2.555e-003	0.0000	0.1843	0.0000	2.025e-002	0.0000
Nitrogen	27.23	0.0015	762.8	0.0026	64.78	0.0010
CO2	10.09	0.0006	444.1	0.0015	36.85	0.0005
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.827e+004	1.0000	2.988e+005	1.0000	6.774e+004	1.0000

Vapour Phase Phase Fraction 1.000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	1.787e+004	0.9784	2.867e+005	0.9597	6.558e+004	0.9680
Propane	6.097	0.0003	268.8	0.0009	36.33	0.0005
n-Butane	7.820e-002	0.0000	4.545	0.0000	0.5336	0.0000
n-Pentane	7.170e-004	0.0000	5.173e-002	0.0000	5.625e-003	0.0000
Ethane	350.5	0.0192	1.054e+004	0.0353	2029	0.0300
i-Butane	0.1455	0.0000	8.458	0.0000	1.031	0.0000
n-Hexane	4.621e-005	0.0000	3.982e-003	0.0000	4.115e-004	0.0000
i-Pentane	2.555e-003	0.0000	0.1843	0.0000	2.025e-002	0.0000
Nitrogen	27.23	0.0015	762.8	0.0026	64.78	0.0010
CO2	10.09	0.0006	444.1	0.0015	36.85	0.0005
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.827e+004	1.0000	2.988e+005	1.0000	6.774e+004	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	---	---	---
Propane	---	---	---
n-Butane	---	---	---
n-Pentane	---	---	---
Ethane	---	---	---
i-Butane	---	---	---
n-Hexane	---	---	---
i-Pentane	---	---	---

Nitrogen --- --- ---
CO2 --- --- ---
H2O --- --- ---
UNIT OPERATIONS

FEED TO PRODUCT FROM LOGICAL CONNECTION
Separator: V-103 Compressor: C-102
UTILITIES

(No utilities reference this stream)
PROCESS UTILITY

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25 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments
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Material Stream: 25 Fluid Package: Basis-1

Property Package: Peng-Robinson
CONDITIONS

OVERALL VAPOUR PH.
Vapour / Phase Fraction 1.0000 1.0000
Temperature: (F) 166.4 166.4
Pressure: (psia) 964.7 964.7
Molar Flow (lbmole/hr) 1.827e+004 1.827e+004
Mass Flow (lb/hr) 2.988e+005 2.988e+005
Std Ideal Liq VolFlow (barrel/day) 6.774e+004 6.774e+004
Molar Enthalpy (Btu/lbmole) -3.191e+04 -3.191e+04
Molar Entropy (Btu/lbmole-F) 3.669e+01 3.669e+01
Heat Flow (Btu/hr) -5.830e+08 -5.830e+08
Liq VolFlow @Std Cond (barrel/day) 2.950e+007 2.950e+007
COMPOSITION

Overall Phase Vapour Fraction 1.0000

COMPONENTS MOLE FLOW MOLE FRAC MASS FLOW MASS FRAC LIQVOL FLOW LIQVOL FRAC
(lbmole/hr) (lb/hr) (barrel/day)
Methane 1.787e+004 0.9784 2.867e+005 0.9597 6.558e+004 0.9680
Propane 6.097 0.0003 268.8 0.0009 36.33 0.0005
n-Butane 7.820e-002 0.0000 4.545 0.0000 0.5336 0.0000
n-Pentane 7.170e-004 0.0000 5.173e-002 0.0000 5.625e-003 0.0000
Ethane 350.5 0.0192 1.054e+004 0.0353 2029 0.0300
i-Butane 0.1455 0.0000 8.458 0.0000 1.031 0.0000
n-Hexane 4.621e-005 0.0000 3.982e-003 0.0000 4.115e-004 0.0000
i-Pentane 2.555e-003 0.0000 0.1843 0.0000 2.025e-002 0.0000
Nitrogen 27.23 0.0015 762.8 0.0026 64.78 0.0010
CO2 10.09 0.0006 444.1 0.0015 36.85 0.0005
H2O 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
Total 1.827e+004 1.0000 2.988e+005 1.0000 6.774e+004 1.0000
Vapour Phase Phase Fraction 1.000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	1.787e+004	0.9784	2.867e+005	0.9597	6.558e+004	0.9680
Propane	6.097	0.0003	268.8	0.0009	36.33	0.0005
n-Butane	7.820e-002	0.0000	4.545	0.0000	0.5336	0.0000
n-Pentane	7.170e-004	0.0000	5.173e-002	0.0000	5.625e-003	0.0000
Ethane	350.5	0.0192	1.054e+004	0.0353	2029	0.0300
i-Butane	0.1455	0.0000	8.458	0.0000	1.031	0.0000
n-Hexane	4.621e-005	0.0000	3.982e-003	0.0000	4.115e-004	0.0000
i-Pentane	2.555e-003	0.0000	0.1843	0.0000	2.025e-002	0.0000
Nitrogen	27.23	0.0015	762.8	0.0026	64.78	0.0010
CO2	10.09	0.0006	444.1	0.0015	36.85	0.0005
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.827e+004	1.0000	2.988e+005	1.0000	6.774e+004	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	---	---	---
Propane	---	---	---
n-Butane	---	---	---
n-Pentane	---	---	---
Ethane	---	---	---
i-Butane	---	---	---
n-Hexane	---	---	---
i-Pentane	---	---	---
Nitrogen	---	---	---
CO2	---	---	---
H2O	---	---	---

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
Air cooler: E-105	Compressor: C-103	

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

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17 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments

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Material Stream: 17 Fluid Package: Basis-1

Property Package: Peng-Robinson

CONDITIONS

	OVERALL	LIQUID PH.
Vapour / Phase Fraction	0.0000	1.0000
Temperature: (F)	88.27	88.27
Pressure: (psia)	1315	1315
Molar Flow (lbmole/hr)	3694	3694
Mass Flow (lb/hr)	1.404e+005	1.404e+005

Std Ideal Liq VolFlow (barrel/day) 2.228e+004 2.228e+004
Molar Enthalpy (Btu/lbmole) -4.752e+04 -4.752e+04
Molar Entropy (Btu/lbmole-F) 2.933e+01 2.933e+01
Heat Flow (Btu/hr) -1.755e+08 -1.755e+08
Liq VolFlow @Std Cond (barrel/day) 2.090e+004 2.090e+004
COMPOSITION

Overall Phase Vapour Fraction 0.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	30.42	0.0082	488.0	0.0035	111.6	0.0050
Propane	773.5	0.2094	3.411e+004	0.2430	4610	0.2069
n-Butane	222.6	0.0603	1.294e+004	0.0922	1519	0.0682
n-Pentane	44.36	0.0120	3201	0.0228	348.0	0.0156
Ethane	2322	0.6286	6.983e+004	0.4973	1.344e+004	0.6033
i-Butane	167.0	0.0452	9705	0.0691	1183	0.0531
n-Hexane	55.56	0.0150	4788	0.0341	494.8	0.0222
i-Pentane	66.76	0.0181	4817	0.0343	529.0	0.0237
Nitrogen	6.261e-006	0.0000	1.754e-004	0.0000	1.489e-005	0.0000
CO2	11.87	0.0032	522.4	0.0037	43.34	0.0019
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	3694	1.0000	1.404e+005	1.0000	2.228e+004	1.0000

Liquid Phase Phase Fraction 1.000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	30.42	0.0082	488.0	0.0035	111.6	0.0050
Propane	773.5	0.2094	3.411e+004	0.2430	4610	0.2069
n-Butane	222.6	0.0603	1.294e+004	0.0922	1519	0.0682
n-Pentane	44.36	0.0120	3201	0.0228	348.0	0.0156
Ethane	2322	0.6286	6.983e+004	0.4973	1.344e+004	0.6033
i-Butane	167.0	0.0452	9705	0.0691	1183	0.0531
n-Hexane	55.56	0.0150	4788	0.0341	494.8	0.0222
i-Pentane	66.76	0.0181	4817	0.0343	529.0	0.0237
Nitrogen	6.261e-006	0.0000	1.754e-004	0.0000	1.489e-005	0.0000
CO2	11.87	0.0032	522.4	0.0037	43.34	0.0019
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	3694	1.0000	1.404e+005	1.0000	2.228e+004	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	0.0000	0.0000	---
Propane	0.0000	0.0000	---
n-Butane	0.0000	0.0000	---
n-Pentane	0.0000	0.0000	---
Ethane	0.0000	0.0000	---
i-Butane	0.0000	0.0000	---
n-Hexane	0.0000	0.0000	---
i-Pentane	0.0000	0.0000	---
Nitrogen	0.0000	0.0000	---
CO2	0.0000	0.0000	---
H2O	---	---	---

UNIT OPERATIONS

FEED TO PRODUCT FROM LOGICAL CONNECTION
Pump: P-102 A/B
UTILITIES

(No utilities reference this stream)
PROCESS UTILITY

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20 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments
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Material Stream: 20 Fluid Package: Basis-1

Property Package: Peng-Robinson
CONDITIONS

	OVERALL	VAPOUR PH.	LIQUID PH.
Vapour / Phase Fraction	1.0000	1.0000	0.0000
Temperature: (F)	-41.00	-41.00	-41.00
Pressure: (psia)	257.0	257.0	257.0
Molar Flow (lbmole/hr)	1.827e+004	1.827e+004	0.0000
Mass Flow (lb/hr)	2.988e+005	2.988e+005	0.0000
Std Ideal Liq VolFlow (barrel/day)	6.774e+004	6.774e+004	0.0000
Molar Enthalpy (Btu/lbmole)	-3.352e+04	-3.352e+04	-3.352e+04
Molar Entropy (Btu/lbmole-F)	3.599e+01	3.599e+01	3.599e+01
Heat Flow (Btu/hr)	-6.123e+08	-6.123e+08	0.000e-01
Liq VolFlow @Std Cond (barrel/day)	2.950e+007	2.950e+007	0.0000

COMPOSITION

Overall Phase Vapour Fraction 1.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	1.787e+004	0.9784	2.867e+005	0.9597	6.558e+004	0.9680
Propane	6.097	0.0003	268.8	0.0009	36.33	0.0005
n-Butane	7.820e-002	0.0000	4.545	0.0000	0.5336	0.0000
n-Pentane	7.170e-004	0.0000	5.173e-002	0.0000	5.625e-003	0.0000
Ethane	350.5	0.0192	1.054e+004	0.0353	2029	0.0300
i-Butane	0.1455	0.0000	8.458	0.0000	1.031	0.0000
n-Hexane	4.621e-005	0.0000	3.982e-003	0.0000	4.115e-004	0.0000
i-Pentane	2.555e-003	0.0000	0.1843	0.0000	2.025e-002	0.0000
Nitrogen	27.23	0.0015	762.8	0.0026	64.78	0.0010
CO2	10.09	0.0006	444.1	0.0015	36.85	0.0005
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.827e+004	1.0000	2.988e+005	1.0000	6.774e+004	1.0000

Vapour Phase Phase Fraction 1.000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	1.787e+004	0.9784	2.867e+005	0.9597	6.558e+004	0.9680
Propane	6.097	0.0003	268.8	0.0009	36.33	0.0005

n-Butane	7.820e-002	0.0000	4.545	0.0000	0.5336	0.0000
n-Pentane	7.170e-004	0.0000	5.173e-002	0.0000	5.625e-003	0.0000
Ethane	350.5	0.0192	1.054e+004	0.0353	2029	0.0300
i-Butane	0.1455	0.0000	8.458	0.0000	1.031	0.0000
n-Hexane	4.621e-005	0.0000	3.982e-003	0.0000	4.115e-004	0.0000
i-Pentane	2.555e-003	0.0000	0.1843	0.0000	2.025e-002	0.0000
Nitrogen	27.23	0.0015	762.8	0.0026	64.78	0.0010
CO2	10.09	0.0006	444.1	0.0015	36.85	0.0005
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.827e+004	1.0000	2.988e+005	1.0000	6.774e+004	1.0000

Liquid Phase Phase Fraction 0.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.9784	0.0000	0.9597	0.0000	0.9680
Propane	0.0000	0.0003	0.0000	0.0009	0.0000	0.0005
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0192	0.0000	0.0353	0.0000	0.0300
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0015	0.0000	0.0026	0.0000	0.0010
CO2	0.0000	0.0006	0.0000	0.0015	0.0000	0.0005
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	1.000	1.000	---
Propane	0.9997	0.9997	---
n-Butane	0.9996	0.9996	---
n-Pentane	0.9995	0.9995	---
Ethane	0.9999	0.9999	---
i-Butane	0.9996	0.9996	---
n-Hexane	0.9994	0.9994	---
i-Pentane	0.9995	0.9995	---
Nitrogen	1.000	1.000	---
CO2	1.000	1.000	---
H2O	---	---	---

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
Compressor: C-102	Separator: V-102	

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

Material Stream: 23 Fluid Package: Basis-1

Property Package: Peng-Robinson

CONDITIONS

	OVERALL	VAPOUR PH.	LIQUID PH.
Vapour / Phase Fraction	1.0000	1.0000	0.0000
Temperature: (F)	-2.285	-2.285	-2.285
Pressure: (psia)	338.3	338.3	338.3
Molar Flow (lbmole/hr)	1.827e+004	1.827e+004	0.0000
Mass Flow (lb/hr)	2.988e+005	2.988e+005	0.0000
Std Ideal Liq VolFlow (barrel/day)	6.774e+004	6.774e+004	0.0000
Molar Enthalpy (Btu/lbmole)	-3.323e+04	-3.323e+04	-3.323e+04
Molar Entropy (Btu/lbmole-F)	3.615e+01	3.615e+01	3.615e+01
Heat Flow (Btu/hr)	-6.071e+08	-6.071e+08	0.000e-01
Liq VolFlow @Std Cond (barrel/day)	2.950e+007	2.950e+007	0.0000

COMPOSITION

Overall Phase Vapour Fraction 1.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	1.787e+004	0.9784	2.867e+005	0.9597	6.558e+004	0.9680
Propane	6.097	0.0003	268.8	0.0009	36.33	0.0005
n-Butane	7.820e-002	0.0000	4.545	0.0000	0.5336	0.0000
n-Pentane	7.170e-004	0.0000	5.173e-002	0.0000	5.625e-003	0.0000
Ethane	350.5	0.0192	1.054e+004	0.0353	2029	0.0300
i-Butane	0.1455	0.0000	8.458	0.0000	1.031	0.0000
n-Hexane	4.621e-005	0.0000	3.982e-003	0.0000	4.115e-004	0.0000
i-Pentane	2.555e-003	0.0000	0.1843	0.0000	2.025e-002	0.0000
Nitrogen	27.23	0.0015	762.8	0.0026	64.78	0.0010
CO2	10.09	0.0006	444.1	0.0015	36.85	0.0005
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.827e+004	1.0000	2.988e+005	1.0000	6.774e+004	1.0000

Vapour Phase Phase Fraction 1.000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	1.787e+004	0.9784	2.867e+005	0.9597	6.558e+004	0.9680
Propane	6.097	0.0003	268.8	0.0009	36.33	0.0005
n-Butane	7.820e-002	0.0000	4.545	0.0000	0.5336	0.0000
n-Pentane	7.170e-004	0.0000	5.173e-002	0.0000	5.625e-003	0.0000
Ethane	350.5	0.0192	1.054e+004	0.0353	2029	0.0300
i-Butane	0.1455	0.0000	8.458	0.0000	1.031	0.0000
n-Hexane	4.621e-005	0.0000	3.982e-003	0.0000	4.115e-004	0.0000
i-Pentane	2.555e-003	0.0000	0.1843	0.0000	2.025e-002	0.0000
Nitrogen	27.23	0.0015	762.8	0.0026	64.78	0.0010
CO2	10.09	0.0006	444.1	0.0015	36.85	0.0005
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.827e+004	1.0000	2.988e+005	1.0000	6.774e+004	1.0000

Liquid Phase Phase Fraction 0.0000

COMPONENTS MOLE FLOW MOLE FRAC MASS FLOW MASS FRAC LIQVOL FLOW LIQVOL FRAC

	(lbmole/hr)		(lb/hr)		(barrel/day)	
Methane	0.0000	0.9784	0.0000	0.9597	0.0000	0.9680
Propane	0.0000	0.0003	0.0000	0.0009	0.0000	0.0005
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0192	0.0000	0.0353	0.0000	0.0300
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0015	0.0000	0.0026	0.0000	0.0010
CO2	0.0000	0.0006	0.0000	0.0015	0.0000	0.0005
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	1.000	1.000	---
Propane	0.9998	0.9998	---
n-Butane	0.9997	0.9997	---
n-Pentane	0.9996	0.9996	---
Ethane	0.9999	0.9999	---
i-Butane	0.9997	0.9997	---
n-Hexane	0.9995	0.9995	---
i-Pentane	0.9996	0.9996	---
Nitrogen	1.000	1.000	---
CO2	1.000	1.000	---
H2O	---	---	---

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
Compressor: C-103	Separator: V-103	

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

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15 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments

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Material Stream: 15 Fluid Package: Basis-1

Property Package: Peng-Robinson

CONDITIONS

	OVERALL	LIQUID PH.
Vapour / Phase Fraction	0.0000	1.0000
Temperature: (F)	47.19	47.19
Pressure: (psia)	380.0	380.0
Molar Flow (lbmole/hr)	3694	3694
Mass Flow (lb/hr)	1.404e+005	1.404e+005
Std Ideal Liq VolFlow (barrel/day)	2.228e+004	2.228e+004

Molar Enthalpy (Btu/lbmole) -4.853e+04 -4.853e+04
Molar Entropy (Btu/lbmole-F) 2.783e+01 2.783e+01
Heat Flow (Btu/hr) -1.793e+08 -1.793e+08
Liq VolFlow @Std Cond (barrel/day) 2.090e+004 2.090e+004
COMPOSITION

Overall Phase Vapour Fraction 0.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	30.42	0.0082	488.0	0.0035	111.6	0.0050
Propane	773.5	0.2094	3.411e+004	0.2430	4610	0.2069
n-Butane	222.6	0.0603	1.294e+004	0.0922	1519	0.0682
n-Pentane	44.36	0.0120	3201	0.0228	348.0	0.0156
Ethane	2322	0.6286	6.983e+004	0.4973	1.344e+004	0.6033
i-Butane	167.0	0.0452	9705	0.0691	1183	0.0531
n-Hexane	55.56	0.0150	4788	0.0341	494.8	0.0222
i-Pentane	66.76	0.0181	4817	0.0343	529.0	0.0237
Nitrogen	6.261e-006	0.0000	1.754e-004	0.0000	1.489e-005	0.0000
CO2	11.87	0.0032	522.4	0.0037	43.34	0.0019
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	3694	1.0000	1.404e+005	1.0000	2.228e+004	1.0000

Liquid Phase Phase Fraction 1.000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	30.42	0.0082	488.0	0.0035	111.6	0.0050
Propane	773.5	0.2094	3.411e+004	0.2430	4610	0.2069
n-Butane	222.6	0.0603	1.294e+004	0.0922	1519	0.0682
n-Pentane	44.36	0.0120	3201	0.0228	348.0	0.0156
Ethane	2322	0.6286	6.983e+004	0.4973	1.344e+004	0.6033
i-Butane	167.0	0.0452	9705	0.0691	1183	0.0531
n-Hexane	55.56	0.0150	4788	0.0341	494.8	0.0222
i-Pentane	66.76	0.0181	4817	0.0343	529.0	0.0237
Nitrogen	6.261e-006	0.0000	1.754e-004	0.0000	1.489e-005	0.0000
CO2	11.87	0.0032	522.4	0.0037	43.34	0.0019
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	3694	1.0000	1.404e+005	1.0000	2.228e+004	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	0.0000	0.0000	---
Propane	0.0000	0.0000	---
n-Butane	0.0000	0.0000	---
n-Pentane	0.0000	0.0000	---
Ethane	0.0000	0.0000	---
i-Butane	0.0000	0.0000	---
n-Hexane	0.0000	0.0000	---
i-Pentane	0.0000	0.0000	---
Nitrogen	0.0000	0.0000	---
CO2	0.0000	0.0000	---
H2O	---	---	---

UNIT OPERATIONS

FEED TO PRODUCT FROM LOGICAL CONNECTION
LNG: E-101 Pump: P-101A/B
UTILITIES

(No utilities reference this stream)
PROCESS UTILITY

30.2 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments
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Material Stream: 30.2 Fluid Package: Basis-1

Property Package: Peng-Robinson
CONDITIONS

	OVERALL	VAPOUR PH.
Vapour / Phase Fraction	1.0000	1.0000
Temperature: (F)	36.51	36.51
Pressure: (psia)	40.42	40.42
Molar Flow (lbmole/hr)	1.300e+004	1.300e+004
Mass Flow (lb/hr)	5.733e+005	5.733e+005
Std Ideal Liq VolFlow (barrel/day)	7.747e+004	7.747e+004
Molar Enthalpy (Btu/lbmole)	-4.552e+04	-4.552e+04
Molar Entropy (Btu/lbmole-F)	3.510e+01	3.510e+01
Heat Flow (Btu/hr)	-5.918e+08	-5.918e+08
Liq VolFlow @Std Cond (barrel/day)	7.732e+004	7.732e+004

COMPOSITION

Overall Phase Vapour Fraction 1.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	1.300e+004	1.0000	5.733e+005	1.0000	7.747e+004	1.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.300e+004	1.0000	5.733e+005	1.0000	7.747e+004	1.0000

Vapour Phase Phase Fraction 1.000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	1.300e+004	1.0000	5.733e+005	1.0000	7.747e+004	1.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.300e+004	1.0000	5.733e+005	1.0000	7.747e+004	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	---	---	---
Propane	---	---	---
n-Butane	---	---	---
n-Pentane	---	---	---
Ethane	---	---	---
i-Butane	---	---	---
n-Hexane	---	---	---
i-Pentane	---	---	---
Nitrogen	---	---	---
CO2	---	---	---
H2O	---	---	---

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
Separator: V-202	Compressor: C-201	

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

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2 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments

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Material Stream: 2 Fluid Package: Basis-1

Property Package: Peng-Robinson

CONDITIONS

	OVERALL	VAPOUR PH.
Vapour / Phase Fraction	1.0000	1.0000
Temperature: (F)	70.92	70.92
Pressure: (psia)	912.7	912.7
Molar Flow (lbmole/hr)	2.196e+004	2.196e+004
Mass Flow (lb/hr)	4.392e+005	4.392e+005
Std Ideal Liq VolFlow (barrel/day)	9.002e+004	9.002e+004
Molar Enthalpy (Btu/lbmole)	-3.479e+04	-3.479e+04
Molar Entropy (Btu/lbmole-F)	3.573e+01	3.573e+01
Heat Flow (Btu/hr)	-7.641e+08	-7.641e+08
Liq VolFlow @Std Cond (barrel/day)	3.542e+007	3.542e+007

COMPOSITION

Overall Phase Vapour Fraction 1.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	1.790e+004	0.8152	2.872e+005	0.6540	6.569e+004	0.7297
Propane	779.6	0.0355	3.438e+004	0.0783	4646	0.0516
n-Butane	222.7	0.0101	1.294e+004	0.0295	1520	0.0169
n-Pentane	44.36	0.0020	3201	0.0073	348.0	0.0039
Ethane	2673	0.1217	8.037e+004	0.1830	1.547e+004	0.1719
i-Butane	167.1	0.0076	9714	0.0221	1184	0.0131
n-Hexane	55.56	0.0025	4788	0.0109	494.8	0.0055
i-Pentane	66.76	0.0030	4817	0.0110	529.0	0.0059
Nitrogen	27.23	0.0012	762.8	0.0017	64.78	0.0007
CO2	21.96	0.0010	966.5	0.0022	80.18	0.0009
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	2.196e+004	1.0000	4.392e+005	1.0000	9.002e+004	1.0000

Vapour Phase Phase Fraction 1.000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	1.790e+004	0.8152	2.872e+005	0.6540	6.569e+004	0.7297
Propane	779.6	0.0355	3.438e+004	0.0783	4646	0.0516
n-Butane	222.7	0.0101	1.294e+004	0.0295	1520	0.0169
n-Pentane	44.36	0.0020	3201	0.0073	348.0	0.0039
Ethane	2673	0.1217	8.037e+004	0.1830	1.547e+004	0.1719
i-Butane	167.1	0.0076	9714	0.0221	1184	0.0131
n-Hexane	55.56	0.0025	4788	0.0109	494.8	0.0055
i-Pentane	66.76	0.0030	4817	0.0110	529.0	0.0059
Nitrogen	27.23	0.0012	762.8	0.0017	64.78	0.0007
CO2	21.96	0.0010	966.5	0.0022	80.18	0.0009
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	2.196e+004	1.0000	4.392e+005	1.0000	9.002e+004	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	---	---	---
Propane	---	---	---
n-Butane	---	---	---
n-Pentane	---	---	---
Ethane	---	---	---
i-Butane	---	---	---
n-Hexane	---	---	---
i-Pentane	---	---	---
Nitrogen	---	---	---
CO2	---	---	---
H2O	---	---	---

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
LNG: E-102	LNG: E-101	

UTILITIES

(No utilities reference this stream)
PROCESS UTILITY

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3 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments
---
Material Stream: 3 Fluid Package: Basis-1

Property Package: Peng-Robinson

CONDITIONS

	OVERALL	VAPOUR PH.	LIQUID PH.
Vapour / Phase Fraction	0.8013	0.8013	0.1987
Temperature: (F)	-33.04	-33.04	-33.04
Pressure: (psia)	911.7	911.7	911.7
Molar Flow (lbmole/hr)	2.196e+004	1.760e+004	4364
Mass Flow (lb/hr)	4.392e+005	3.194e+005	1.198e+005
Std Ideal Liq VolFlow (barrel/day)	9.002e+004	6.911e+004	2.092e+004
Molar Enthalpy (Btu/lbmole)	-3.677e+04	-3.516e+04	-4.324e+04
Molar Entropy (Btu/lbmole-F)	3.154e+01	3.269e+01	2.691e+01
Heat Flow (Btu/hr)	-8.074e+08	-6.187e+08	-1.887e+08
Liq VolFlow @Std Cond (barrel/day)	3.542e+007	2.840e+007	7.014e+006

COMPOSITION

Overall Phase Vapour Fraction 0.8013

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	1.790e+004	0.8152	2.872e+005	0.6540	6.569e+004	0.7297
Propane	779.6	0.0355	3.438e+004	0.0783	4646	0.0516
n-Butane	222.7	0.0101	1.294e+004	0.0295	1520	0.0169
n-Pentane	44.36	0.0020	3201	0.0073	348.0	0.0039
Ethane	2673	0.1217	8.037e+004	0.1830	1.547e+004	0.1719
i-Butane	167.1	0.0076	9714	0.0221	1184	0.0131
n-Hexane	55.56	0.0025	4788	0.0109	494.8	0.0055
i-Pentane	66.76	0.0030	4817	0.0110	529.0	0.0059
Nitrogen	27.23	0.0012	762.8	0.0017	64.78	0.0007
CO2	21.96	0.0010	966.5	0.0022	80.18	0.0009
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	2.196e+004	1.0000	4.392e+005	1.0000	9.002e+004	1.0000

Vapour Phase Phase Fraction 0.8013

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	1.548e+004	0.8798	2.484e+005	0.7777	5.680e+004	0.8220
Propane	302.1	0.0172	1.332e+004	0.0417	1800	0.0260
n-Butane	43.65	0.0025	2537	0.0079	297.9	0.0043
n-Pentane	3.985	0.0002	287.5	0.0009	31.26	0.0005
Ethane	1673	0.0951	5.030e+004	0.1575	9683	0.1401
i-Butane	40.78	0.0023	2370	0.0074	288.8	0.0042
n-Hexane	2.224	0.0001	191.7	0.0006	19.81	0.0003

i-Pentane	7.486	0.0004	540.1	0.0017	59.32	0.0009
Nitrogen	25.55	0.0015	715.7	0.0022	60.77	0.0009
CO2	16.62	0.0009	731.5	0.0023	60.69	0.0009
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.760e+004	1.0000	3.194e+005	1.0000	6.911e+004	1.0000

Liquid Phase Phase Fraction 0.1987

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	2421	0.5548	3.884e+004	0.3242	8883	0.4246
Propane	477.6	0.1094	2.106e+004	0.1758	2846	0.1360
n-Butane	179.0	0.0410	1.041e+004	0.0869	1222	0.0584
n-Pentane	40.38	0.0093	2913	0.0243	316.8	0.0151
Ethane	1000	0.2292	3.007e+004	0.2510	5789	0.2767
i-Butane	126.3	0.0290	7344	0.0613	894.8	0.0428
n-Hexane	53.34	0.0122	4596	0.0384	474.9	0.0227
i-Pentane	59.28	0.0136	4277	0.0357	469.7	0.0225
Nitrogen	1.683	0.0004	47.15	0.0004	4.004	0.0002
CO2	5.339	0.0012	235.0	0.0020	19.49	0.0009
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	4364	1.0000	1.198e+005	1.0000	2.092e+004	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	1.586	1.586	---
Propane	0.1569	0.1569	---
n-Butane	6.047e-002	6.047e-002	---
n-Pentane	2.447e-002	2.447e-002	---
Ethane	0.4148	0.4148	---
i-Butane	8.005e-002	8.005e-002	---
n-Hexane	1.034e-002	1.034e-002	---
i-Pentane	3.132e-002	3.132e-002	---
Nitrogen	3.764	3.764	---
CO2	0.7720	0.7720	---
H2O	---	---	---

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
Valve: VLV-102	LNG: E-102	

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

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28 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments

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Material Stream: 28 Fluid Package: Basis-1

Property Package: Peng-Robinson

CONDITIONS

	OVERALL	VAPOUR PH.
Vapour / Phase Fraction	1.0000	1.0000
Temperature: (F)	-41.06	-41.06
Pressure: (psia)	14.70	14.70
Molar Flow (lbmole/hr)	1.300e+004	1.300e+004
Mass Flow (lb/hr)	5.733e+005	5.733e+005
Std Ideal Liq VolFlow (barrel/day)	7.747e+004	7.747e+004
Molar Enthalpy (Btu/lbmole)	-4.667e+04	-4.667e+04
Molar Entropy (Btu/lbmole-F)	3.451e+01	3.451e+01
Heat Flow (Btu/hr)	-6.067e+08	-6.067e+08
Liq VolFlow @Std Cond (barrel/day)	7.732e+004	7.732e+004

COMPOSITION

Overall Phase Vapour Fraction 1.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	1.300e+004	1.0000	5.733e+005	1.0000	7.747e+004	1.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.300e+004	1.0000	5.733e+005	1.0000	7.747e+004	1.0000

Vapour Phase Phase Fraction 1.000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	1.300e+004	1.0000	5.733e+005	1.0000	7.747e+004	1.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.300e+004	1.0000	5.733e+005	1.0000	7.747e+004	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	---	---	---
Propane	---	---	---
n-Butane	---	---	---
n-Pentane	---	---	---
Ethane	---	---	---

i-Butane --- --- ---
n-Hexane --- --- ---
i-Pentane --- --- ---
Nitrogen --- --- ---
CO2 --- --- ---
H2O --- --- ---
UNIT OPERATIONS

FEED TO PRODUCT FROM LOGICAL CONNECTION
Compressor: C-201 Separator: V-201
UTILITIES

(No utilities reference this stream)
PROCESS UTILITY

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29 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments
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Material Stream: 29 Fluid Package: Basis-1

Property Package: Peng-Robinson
CONDITIONS

	OVERALL	VAPOUR PH.	LIQUID PH.
Vapour / Phase Fraction	0.0000	0.0000	1.0000
Temperature: (F)	-40.67	-40.67	-40.67
Pressure: (psia)	15.90	15.90	15.90
Molar Flow (lbmole/hr)	0.0000	0.0000	0.0000
Mass Flow (lb/hr)	0.0000	0.0000	0.0000
Std Ideal Liq VolFlow (barrel/day)	0.0000	0.0000	0.0000
Molar Enthalpy (Btu/lbmole)	-5.468e+04	-4.667e+04	-5.468e+04
Molar Entropy (Btu/lbmole-F)	1.524e+01	3.436e+01	1.524e+01
Heat Flow (Btu/hr)	0.000e-01	0.000e-01	0.000e-01
Liq VolFlow @Std Cond (barrel/day)	0.0000	0.0000	0.0000

COMPOSITION

Overall Phase Vapour Fraction 0.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Total	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000

Vapour Phase Phase Fraction 0.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000

Liquid Phase Phase Fraction 1.000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	---	---	---
Propane	1.000	1.000	---
n-Butane	---	---	---
n-Pentane	---	---	---
Ethane	---	---	---
i-Butane	---	---	---
n-Hexane	---	---	---
i-Pentane	---	---	---
Nitrogen	---	---	---
CO2	---	---	---
H2O	---	---	---

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
	Separator: V-201	

UTILITIES

(No utilities reference this stream)

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33 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments
---
Material Stream: 33 Fluid Package: Basis-1

Property Package: Peng-Robinson

CONDITIONS

	OVERALL	VAPOUR PH.
Vapour / Phase Fraction	1.0000	1.0000
Temperature: (F)	119.3	119.3
Pressure: (psia)	105.7	105.7
Molar Flow (lbmole/hr)	1.300e+004	1.300e+004
Mass Flow (lb/hr)	5.733e+005	5.733e+005
Std Ideal Liq VolFlow (barrel/day)	7.747e+004	7.747e+004
Molar Enthalpy (Btu/lbmole)	-4.422e+04	-4.422e+04
Molar Entropy (Btu/lbmole-F)	3.576e+01	3.576e+01
Heat Flow (Btu/hr)	-5.749e+08	-5.749e+08
Liq VolFlow @Std Cond (barrel/day)	7.732e+004	7.732e+004

COMPOSITION

Overall Phase Vapour Fraction 1.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	1.300e+004	1.0000	5.733e+005	1.0000	7.747e+004	1.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.300e+004	1.0000	5.733e+005	1.0000	7.747e+004	1.0000

Vapour Phase Phase Fraction 1.000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	1.300e+004	1.0000	5.733e+005	1.0000	7.747e+004	1.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Nitrogen 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
CO2 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
H2O 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
Total 1.300e+004 1.0000 5.733e+005 1.0000 7.747e+004 1.0000
K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	---	---	---
Propane	---	---	---
n-Butane	---	---	---
n-Pentane	---	---	---
Ethane	---	---	---
i-Butane	---	---	---
n-Hexane	---	---	---
i-Pentane	---	---	---
Nitrogen	---	---	---
CO2	---	---	---
H2O	---	---	---

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
Separator: V-203	Compressor: C-202	

UTILITIES

(No utilities reference this stream)
PROCESS UTILITY

31.2 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments
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Material Stream: 31.2 Fluid Package: Basis-1

Property Package: Peng-Robinson
CONDITIONS

	OVERALL	VAPOUR PH.	LIQUID PH.
Vapour / Phase Fraction	1.0000	1.0000	0.0000
Temperature: (F)	36.05	36.05	36.05
Pressure: (psia)	38.42	38.42	38.42
Molar Flow (lbmole/hr)	1.300e+004	1.300e+004	0.0000
Mass Flow (lb/hr)	5.733e+005	5.733e+005	0.0000
Std Ideal Liq VolFlow (barrel/day)	7.747e+004	7.747e+004	0.0000
Molar Enthalpy (Btu/lbmole)	-4.552e+04	-4.552e+04	-5.277e+04
Molar Entropy (Btu/lbmole-F)	3.519e+01	3.519e+01	1.941e+01
Heat Flow (Btu/hr)	-5.918e+08	-5.918e+08	0.000e-01
Liq VolFlow @Std Cond (barrel/day)	7.732e+004	7.732e+004	0.0000

COMPOSITION

Overall Phase Vapour Fraction 1.0000

COMPONENTS MOLE FLOW MOLE FRAC MASS FLOW MASS FRAC LIQVOL FLOW LIQVOL FRAC

	(lbmole/hr)		(lb/hr)		(barrel/day)	
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	1.300e+004	1.0000	5.733e+005	1.0000	7.747e+004	1.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.300e+004	1.0000	5.733e+005	1.0000	7.747e+004	1.0000

Vapour Phase Phase Fraction 1.000

COMPONENTS MOLE FLOW MOLE FRAC MASS FLOW MASS FRAC LIQVOL FLOW LIQVOL FRAC

	(lbmole/hr)		(lb/hr)		(barrel/day)	
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	1.300e+004	1.0000	5.733e+005	1.0000	7.747e+004	1.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.300e+004	1.0000	5.733e+005	1.0000	7.747e+004	1.0000

Liquid Phase Phase Fraction 0.0000

COMPONENTS MOLE FLOW MOLE FRAC MASS FLOW MASS FRAC LIQVOL FLOW LIQVOL FRAC

	(lbmole/hr)		(lb/hr)		(barrel/day)	
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	---	---	---
Propane	1.000	1.000	---
n-Butane	---	---	---
n-Pentane	---	---	---
Ethane	---	---	---
i-Butane	---	---	---

n-Hexane	---	---	---
i-Pentane	---	---	---
Nitrogen	---	---	---
CO2	---	---	---
H2O	---	---	---

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
Compressor: C-202	Separator: V-202	

UTILITIES

(No utilities reference this stream)
PROCESS UTILITY

32.2 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments

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Material Stream: 32.2 Fluid Package: Basis-1

Property Package: Peng-Robinson

CONDITIONS

	OVERALL	VAPOUR PH.	LIQUID PH.
Vapour / Phase Fraction	0.0000	0.0000	1.0000
Temperature: (F)	36.51	36.51	36.51
Pressure: (psia)	40.42	40.42	40.42
Molar Flow (lbmole/hr)	0.0000	0.0000	0.0000
Mass Flow (lb/hr)	0.0000	0.0000	0.0000
Std Ideal Liq VolFlow (barrel/day)	0.0000	0.0000	0.0000
Molar Enthalpy (Btu/lbmole)	-5.275e+04	-4.552e+04	-5.275e+04
Molar Entropy (Btu/lbmole-F)	1.944e+01	3.510e+01	1.944e+01
Heat Flow (Btu/hr)	0.000e-01	0.000e-01	0.000e-01
Liq VolFlow @Std Cond (barrel/day)	0.0000	0.0000	0.0000

COMPOSITION

Overall Phase Vapour Fraction 0.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000

Vapour Phase Phase Fraction 0.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000

Liquid Phase Phase Fraction 1.000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	---	---	---
Propane	1.000	1.000	---
n-Butane	---	---	---
n-Pentane	---	---	---
Ethane	---	---	---
i-Butane	---	---	---
n-Hexane	---	---	---
i-Pentane	---	---	---
Nitrogen	---	---	---
CO2	---	---	---
H2O	---	---	---

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
	Separator: V-202	

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

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34 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments
---
Material Stream: 34 Fluid Package: Basis-1

Property Package: Peng-Robinson

CONDITIONS

	OVERALL	VAPOUR PH.	LIQUID PH.
Vapour / Phase Fraction	1.0000	1.0000	0.0000
Temperature: (F)	118.9	118.9	118.9
Pressure: (psia)	103.7	103.7	103.7
Molar Flow (lbmole/hr)	1.300e+004	1.300e+004	0.0000
Mass Flow (lb/hr)	5.733e+005	5.733e+005	0.0000
Std Ideal Liq VolFlow (barrel/day)	7.747e+004	7.747e+004	0.0000
Molar Enthalpy (Btu/lbmole)	-4.422e+04	-4.422e+04	-5.022e+04
Molar Entropy (Btu/lbmole-F)	3.580e+01	3.580e+01	2.411e+01
Heat Flow (Btu/hr)	-5.749e+08	-5.749e+08	0.000e-01
Liq VolFlow @Std Cond (barrel/day)	7.732e+004	7.732e+004	0.0000

COMPOSITION

Overall Phase Vapour Fraction 1.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	1.300e+004	1.0000	5.733e+005	1.0000	7.747e+004	1.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.300e+004	1.0000	5.733e+005	1.0000	7.747e+004	1.0000

Vapour Phase Phase Fraction 1.000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	1.300e+004	1.0000	5.733e+005	1.0000	7.747e+004	1.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.300e+004	1.0000	5.733e+005	1.0000	7.747e+004	1.0000

Liquid Phase Phase Fraction 0.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	---	---	---
Propane	1.000	1.000	---
n-Butane	---	---	---
n-Pentane	---	---	---
Ethane	---	---	---
i-Butane	---	---	---
n-Hexane	---	---	---
i-Pentane	---	---	---
Nitrogen	---	---	---
CO2	---	---	---
H2O	---	---	---

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
Compressor: C-203	Separator: V-203	

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

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35 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments

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Material Stream: 35 Fluid Package: Basis-1

Property Package: Peng-Robinson

CONDITIONS

	OVERALL	VAPOUR PH.	LIQUID PH.

Vapour / Phase Fraction	0.0000	0.0000	1.0000
Temperature: (F)	119.3	119.3	119.3
Pressure: (psia)	105.7	105.7	105.7
Molar Flow (lbmole/hr)	0.0000	0.0000	0.0000
Mass Flow (lb/hr)	0.0000	0.0000	0.0000
Std Ideal Liq VolFlow (barrel/day)	0.0000	0.0000	0.0000
Molar Enthalpy (Btu/lbmole)	-5.021e+04	-4.422e+04	-5.021e+04
Molar Entropy (Btu/lbmole-F)	2.413e+01	3.576e+01	2.413e+01
Heat Flow (Btu/hr)	0.000e-01	0.000e-01	0.000e-01
Liq VolFlow @Std Cond (barrel/day)	0.0000	0.0000	0.0000

COMPOSITION

Overall Phase Vapour Fraction 0.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000

Vapour Phase Phase Fraction 0.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000

Liquid Phase Phase Fraction 1.000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	---	---	---
Propane	1.000	1.000	---
n-Butane	---	---	---
n-Pentane	---	---	---
Ethane	---	---	---
i-Butane	---	---	---
n-Hexane	---	---	---
i-Pentane	---	---	---
Nitrogen	---	---	---
CO2	---	---	---
H2O	---	---	---

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
	Separator: V-203	

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

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36 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments

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Material Stream: 36 Fluid Package: Basis-1

Property Package: Peng-Robinson

CONDITIONS

	OVERALL	VAPOUR PH.
Vapour / Phase Fraction	1.0000	1.0000
Temperature: (F)	198.4	198.4
Pressure: (psia)	249.7	249.7
Molar Flow (lbmole/hr)	1.300e+004	1.300e+004
Mass Flow (lb/hr)	5.733e+005	5.733e+005
Std Ideal Liq VolFlow (barrel/day)	7.747e+004	7.747e+004
Molar Enthalpy (Btu/lbmole)	-4.300e+04	-4.300e+04
Molar Entropy (Btu/lbmole-F)	3.627e+01	3.627e+01
Heat Flow (Btu/hr)	-5.590e+08	-5.590e+08
Liq VolFlow @Std Cond (barrel/day)	7.732e+004	7.732e+004

COMPOSITION

Overall Phase Vapour Fraction 1.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	1.300e+004	1.0000	5.733e+005	1.0000	7.747e+004	1.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.300e+004	1.0000	5.733e+005	1.0000	7.747e+004	1.0000

Vapour Phase Phase Fraction 1.000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	1.300e+004	1.0000	5.733e+005	1.0000	7.747e+004	1.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.300e+004	1.0000	5.733e+005	1.0000	7.747e+004	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	---	---	---
Propane	---	---	---
n-Butane	---	---	---
n-Pentane	---	---	---
Ethane	---	---	---
i-Butane	---	---	---
n-Hexane	---	---	---
i-Pentane	---	---	---
Nitrogen	---	---	---
CO2	---	---	---
H2O	---	---	---

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
Separator: V-204	Compressor: C-203	

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

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31 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments
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Material Stream: 31 Fluid Package: Basis-1

Property Package: Peng-Robinson

CONDITIONS

	OVERALL	LIQUID PH.	VAPOUR PH.
Vapour / Phase Fraction	0.0000	1.0000	0.0000
Temperature: (F)	126.7	126.7	126.7
Pressure: (psia)	264.0	264.0	264.0
Molar Flow (lbmole/hr)	1.300e+004	1.300e+004	0.0000
Mass Flow (lb/hr)	5.733e+005	5.733e+005	0.0000
Std Ideal Liq VolFlow (barrel/day)	7.747e+004	7.747e+004	0.0000
Molar Enthalpy (Btu/lbmole)	-5.000e+04	-5.000e+04	-4.474e+04
Molar Entropy (Btu/lbmole-F)	2.440e+01	2.440e+01	3.339e+01
Heat Flow (Btu/hr)	-6.501e+08	-6.501e+08	0.000e-01
Liq VolFlow @Std Cond (barrel/day)	7.732e+004	7.732e+004	0.0000

COMPOSITION

Overall Phase Vapour Fraction 0.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	1.300e+004	1.0000	5.733e+005	1.0000	7.747e+004	1.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.300e+004	1.0000	5.733e+005	1.0000	7.747e+004	1.0000

Liquid Phase Phase Fraction 1.000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	1.300e+004	1.0000	5.733e+005	1.0000	7.747e+004	1.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.300e+004	1.0000	5.733e+005	1.0000	7.747e+004	1.0000

Vapour Phase Phase Fraction 0.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	---	---	---
Propane	1.000	1.000	---
n-Butane	---	---	---
n-Pentane	---	---	---
Ethane	---	---	---
i-Butane	---	---	---
n-Hexane	---	---	---
i-Pentane	---	---	---
Nitrogen	---	---	---
CO2	---	---	---
H2O	---	---	---

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
Valve: VLV-101	Air cooler: E-202	

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

5.2 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments

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Material Stream: 5.2 Fluid Package: Basis-1

Property Package: Peng-Robinson

CONDITIONS

	OVERALL	VAPOUR PH.	LIQUID PH.
Vapour / Phase Fraction	0.6857	0.6857	0.3143

Temperature: (F) -56.14 -56.14 -56.14
Pressure: (psia) 809.7 809.7 809.7
Molar Flow (lbmole/hr) 2.196e+004 1.506e+004 6902
Mass Flow (lb/hr) 4.392e+005 2.642e+005 1.749e+005
Std Ideal Liq VolFlow (barrel/day) 9.002e+004 5.811e+004 3.192e+004
Molar Enthalpy (Btu/lbmole) -3.723e+04 -3.500e+04 -4.208e+04
Molar Entropy (Btu/lbmole-F) 3.055e+01 3.234e+01 2.665e+01
Heat Flow (Btu/hr) -8.175e+08 -5.271e+08 -2.904e+08
Liq VolFlow @Std Cond (barrel/day) 3.542e+007 2.431e+007 1.111e+007
COMPOSITION

Overall Phase Vapour Fraction 0.6857

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	1.790e+004	0.8152	2.872e+005	0.6540	6.569e+004	0.7297
Propane	779.6	0.0355	3.438e+004	0.0783	4646	0.0516
n-Butane	222.7	0.0101	1.294e+004	0.0295	1520	0.0169
n-Pentane	44.36	0.0020	3201	0.0073	348.0	0.0039
Ethane	2673	0.1217	8.037e+004	0.1830	1.547e+004	0.1719
i-Butane	167.1	0.0076	9714	0.0221	1184	0.0131
n-Hexane	55.56	0.0025	4788	0.0109	494.8	0.0055
i-Pentane	66.76	0.0030	4817	0.0110	529.0	0.0059
Nitrogen	27.23	0.0012	762.8	0.0017	64.78	0.0007
CO2	21.96	0.0010	966.5	0.0022	80.18	0.0009
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	2.196e+004	1.0000	4.392e+005	1.0000	9.002e+004	1.0000

Vapour Phase Phase Fraction 0.6857

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	1.370e+004	0.9095	2.197e+005	0.8316	5.025e+004	0.8647
Propane	155.1	0.0103	6841	0.0259	924.5	0.0159
n-Butane	17.63	0.0012	1025	0.0039	120.3	0.0021
n-Pentane	1.348	0.0001	97.23	0.0004	10.57	0.0002
Ethane	1131	0.0751	3.402e+004	0.1287	6548	0.1127
i-Butane	17.54	0.0012	1019	0.0039	124.2	0.0021
n-Hexane	0.6574	0.0000	56.65	0.0002	5.854	0.0001
i-Pentane	2.649	0.0002	191.1	0.0007	20.99	0.0004
Nitrogen	24.30	0.0016	680.7	0.0026	57.80	0.0010
CO2	12.96	0.0009	570.4	0.0022	47.32	0.0008
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.506e+004	1.0000	2.642e+005	1.0000	5.811e+004	1.0000

Liquid Phase Phase Fraction 0.3143

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	4208	0.6096	6.751e+004	0.3859	1.544e+004	0.4837
Propane	624.5	0.0905	2.754e+004	0.1574	3721	0.1166
n-Butane	205.0	0.0297	1.192e+004	0.0681	1399	0.0438
n-Pentane	43.01	0.0062	3103	0.0177	337.5	0.0106
Ethane	1541	0.2233	4.635e+004	0.2649	8923	0.2796
i-Butane	149.6	0.0217	8694	0.0497	1059	0.0332
n-Hexane	54.90	0.0080	4731	0.0270	488.9	0.0153

i-Pentane	64.11	0.0093	4626	0.0264	508.1	0.0159
Nitrogen	2.931	0.0004	82.11	0.0005	6.972	0.0002
CO2	9.001	0.0013	396.1	0.0023	32.86	0.0010
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	6902	1.0000	1.749e+005	1.0000	3.192e+004	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	1.492	1.492	---
Propane	0.1139	0.1139	---
n-Butane	3.942e-002	3.942e-002	---
n-Pentane	1.436e-002	1.436e-002	---
Ethane	0.3364	0.3364	---
i-Butane	5.375e-002	5.375e-002	---
n-Hexane	5.488e-003	5.488e-003	---
i-Pentane	1.894e-002	1.894e-002	---
Nitrogen	3.800	3.800	---
CO2	0.6600	0.6600	---
H2O	---	---	---

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
Separator: V-101	Recycle: RCY-1	

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

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4 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments

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Material Stream: 4 Fluid Package: Basis-1

Property Package: Peng-Robinson

CONDITIONS

	OVERALL	VAPOUR PH.	LIQUID PH.
Vapour / Phase Fraction	0.7992	0.7992	0.2008
Temperature: (F)	-39.98	-39.98	-39.98
Pressure: (psia)	811.7	811.7	811.7
Molar Flow (lbmole/hr)	2.196e+004	1.755e+004	4409
Mass Flow (lb/hr)	4.392e+005	3.149e+005	1.242e+005
Std Ideal Liq VolFlow (barrel/day)	9.002e+004	6.856e+004	2.146e+004
Molar Enthalpy (Btu/lbmole)	-3.677e+04	-3.497e+04	-4.390e+04
Molar Entropy (Btu/lbmole-F)	3.166e+01	3.299e+01	2.639e+01
Heat Flow (Btu/hr)	-8.074e+08	-6.139e+08	-1.936e+08
Liq VolFlow @Std Cond (barrel/day)	3.542e+007	2.833e+007	7.085e+006

COMPOSITION

Overall Phase Vapour Fraction 0.7992

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	1.790e+004	0.8152	2.872e+005	0.6540	6.569e+004	0.7297
Propane	779.6	0.0355	3.438e+004	0.0783	4646	0.0516
n-Butane	222.7	0.0101	1.294e+004	0.0295	1520	0.0169
n-Pentane	44.36	0.0020	3201	0.0073	348.0	0.0039
Ethane	2673	0.1217	8.037e+004	0.1830	1.547e+004	0.1719
i-Butane	167.1	0.0076	9714	0.0221	1184	0.0131
n-Hexane	55.56	0.0025	4788	0.0109	494.8	0.0055
i-Pentane	66.76	0.0030	4817	0.0110	529.0	0.0059
Nitrogen	27.23	0.0012	762.8	0.0017	64.78	0.0007
CO2	21.96	0.0010	966.5	0.0022	80.18	0.0009
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	2.196e+004	1.0000	4.392e+005	1.0000	9.002e+004	1.0000
Vapour Phase			Phase Fraction 0.7992			

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	1.559e+004	0.8884	2.502e+005	0.7944	5.721e+004	0.8345
Propane	254.9	0.0145	1.124e+004	0.0357	1519	0.0222
n-Butane	31.39	0.0018	1825	0.0058	214.2	0.0031
n-Pentane	2.453	0.0001	177.0	0.0006	19.24	0.0003
Ethane	1591	0.0906	4.783e+004	0.1519	9207	0.1343
i-Butane	30.77	0.0018	1788	0.0057	217.9	0.0032
n-Hexane	1.192	0.0001	102.7	0.0003	10.61	0.0002
i-Pentane	4.805	0.0003	346.7	0.0011	38.07	0.0006
Nitrogen	25.79	0.0015	722.5	0.0023	61.35	0.0009
CO2	16.43	0.0009	723.2	0.0023	60.00	0.0009
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.755e+004	1.0000	3.149e+005	1.0000	6.856e+004	1.0000
Liquid Phase			Phase Fraction 0.2008			

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	2310	0.5238	3.705e+004	0.2982	8474	0.3948
Propane	524.7	0.1190	2.314e+004	0.1862	3127	0.1457
n-Butane	191.3	0.0434	1.112e+004	0.0895	1305	0.0608
n-Pentane	41.91	0.0095	3024	0.0243	328.8	0.0153
Ethane	1082	0.2454	3.254e+004	0.2619	6264	0.2918
i-Butane	136.4	0.0309	7926	0.0638	965.7	0.0450
n-Hexane	54.37	0.0123	4685	0.0377	484.1	0.0226
i-Pentane	61.96	0.0141	4470	0.0360	491.0	0.0229
Nitrogen	1.439	0.0003	40.30	0.0003	3.422	0.0002
CO2	5.529	0.0013	243.3	0.0020	20.19	0.0009
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	4409	1.0000	1.242e+005	1.0000	2.146e+004	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	1.696	1.696	---
Propane	0.1220	0.1220	---
n-Butane	4.123e-002	4.123e-002	---
n-Pentane	1.470e-002	1.470e-002	---
Ethane	0.3692	0.3692	---

i-Butane	5.668e-002	5.668e-002	---
n-Hexane	5.506e-003	5.506e-003	---
i-Pentane	1.948e-002	1.948e-002	---
Nitrogen	4.504	4.504	---
CO2	0.7467	0.7467	---
H2O	---	---	---

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
Plate Exchanger: E-103	Valve: VLV-102	

UTILITIES

(No utilities reference this stream)
PROCESS UTILITY

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19 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments

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Material Stream: 19 Fluid Package: Basis-1

Property Package: Peng-Robinson

CONDITIONS

	OVERALL	VAPOUR PH.
Vapour / Phase Fraction	1.0000	1.0000
Temperature: (F)	-41.00	-41.00
Pressure: (psia)	257.0	257.0
Molar Flow (lbmole/hr)	1.827e+004	1.827e+004
Mass Flow (lb/hr)	2.988e+005	2.988e+005
Std Ideal Liq VolFlow (barrel/day)	6.774e+004	6.774e+004
Molar Enthalpy (Btu/lbmole)	-3.352e+04	-3.352e+04
Molar Entropy (Btu/lbmole-F)	3.599e+01	3.599e+01
Heat Flow (Btu/hr)	-6.123e+08	-6.123e+08
Liq VolFlow @Std Cond (barrel/day)	2.950e+007	2.950e+007

COMPOSITION

Overall Phase Vapour Fraction 1.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	1.787e+004	0.9784	2.867e+005	0.9597	6.558e+004	0.9680
Propane	6.097	0.0003	268.8	0.0009	36.33	0.0005
n-Butane	7.820e-002	0.0000	4.545	0.0000	0.5336	0.0000
n-Pentane	7.170e-004	0.0000	5.173e-002	0.0000	5.625e-003	0.0000
Ethane	350.5	0.0192	1.054e+004	0.0353	2029	0.0300
i-Butane	0.1455	0.0000	8.458	0.0000	1.031	0.0000
n-Hexane	4.621e-005	0.0000	3.982e-003	0.0000	4.115e-004	0.0000
i-Pentane	2.555e-003	0.0000	0.1843	0.0000	2.025e-002	0.0000
Nitrogen	27.23	0.0015	762.8	0.0026	64.78	0.0010
CO2	10.09	0.0006	444.1	0.0015	36.85	0.0005
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Total 1.827e+004 1.0000 2.988e+005 1.0000 6.774e+004 1.0000
Vapour Phase Phase Fraction 1.000

COMPONENTS MOLE FLOW MOLE FRAC MASS FLOW MASS FRAC LIQVOL FLOW LIQVOL FRAC
(lbmole/hr) (lb/hr) (barrel/day)
Methane 1.787e+004 0.9784 2.867e+005 0.9597 6.558e+004 0.9680
Propane 6.097 0.0003 268.8 0.0009 36.33 0.0005
n-Butane 7.820e-002 0.0000 4.545 0.0000 0.5336 0.0000
n-Pentane 7.170e-004 0.0000 5.173e-002 0.0000 5.625e-003 0.0000
Ethane 350.5 0.0192 1.054e+004 0.0353 2029 0.0300
i-Butane 0.1455 0.0000 8.458 0.0000 1.031 0.0000
n-Hexane 4.621e-005 0.0000 3.982e-003 0.0000 4.115e-004 0.0000
i-Pentane 2.555e-003 0.0000 0.1843 0.0000 2.025e-002 0.0000
Nitrogen 27.23 0.0015 762.8 0.0026 64.78 0.0010
CO2 10.09 0.0006 444.1 0.0015 36.85 0.0005
H2O 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
Total 1.827e+004 1.0000 2.988e+005 1.0000 6.774e+004 1.0000
K VALUE

COMPONENTS MIXED LIGHT HEAVY
Methane --- --- ---
Propane --- --- ---
n-Butane --- --- ---
n-Pentane --- --- ---
Ethane --- --- ---
i-Butane --- --- ---
n-Hexane --- --- ---
i-Pentane --- --- ---
Nitrogen --- --- ---
CO2 --- --- ---
H2O --- --- ---
UNIT OPERATIONS

FEED TO PRODUCT FROM LOGICAL CONNECTION
Separator: V-102 Plate Exchanger: E-103
UTILITIES

(No utilities reference this stream)
PROCESS UTILITY

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5 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments
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Material Stream: 5 Fluid Package: Basis-1

Property Package: Peng-Robinson
CONDITIONS

OVERALL VAPOUR PH. LIQUID PH.
Vapour / Phase Fraction 0.6858 0.6858 0.3142
Temperature: (F) -56.13 -56.13 -56.13

Pressure: (psia) 809.7 809.7 809.7
Molar Flow (lbmole/hr) 2.196e+004 1.506e+004 6900
Mass Flow (lb/hr) 4.392e+005 2.643e+005 1.749e+005
Std Ideal Liq VolFlow (barrel/day) 9.002e+004 5.812e+004 3.191e+004
Molar Enthalpy (Btu/lbmole) -3.723e+04 -3.500e+04 -4.208e+04
Molar Entropy (Btu/lbmole-F) 3.055e+01 3.234e+01 2.665e+01
Heat Flow (Btu/hr) -8.175e+08 -5.272e+08 -2.903e+08
Liq VolFlow @Std Cond (barrel/day) 3.542e+007 2.431e+007 1.110e+007
COMPOSITION

Overall Phase Vapour Fraction 0.6858

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	1.790e+004	0.8152	2.872e+005	0.6540	6.569e+004	0.7297
Propane	779.6	0.0355	3.438e+004	0.0783	4646	0.0516
n-Butane	222.7	0.0101	1.294e+004	0.0295	1520	0.0169
n-Pentane	44.36	0.0020	3201	0.0073	348.0	0.0039
Ethane	2673	0.1217	8.037e+004	0.1830	1.547e+004	0.1719
i-Butane	167.1	0.0076	9714	0.0221	1184	0.0131
n-Hexane	55.56	0.0025	4788	0.0109	494.8	0.0055
i-Pentane	66.76	0.0030	4817	0.0110	529.0	0.0059
Nitrogen	27.23	0.0012	762.8	0.0017	64.78	0.0007
CO2	21.96	0.0010	966.5	0.0022	80.18	0.0009
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	2.196e+004	1.0000	4.392e+005	1.0000	9.002e+004	1.0000

Vapour Phase Phase Fraction 0.6858

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	1.370e+004	0.9094	2.197e+005	0.8315	5.026e+004	0.8647
Propane	155.2	0.0103	6844	0.0259	925.0	0.0159
n-Butane	17.64	0.0012	1026	0.0039	120.4	0.0021
n-Pentane	1.348	0.0001	97.27	0.0004	10.58	0.0002
Ethane	1132	0.0751	3.403e+004	0.1288	6551	0.1127
i-Butane	17.55	0.0012	1020	0.0039	124.3	0.0021
n-Hexane	0.6577	0.0000	56.68	0.0002	5.856	0.0001
i-Pentane	2.650	0.0002	191.2	0.0007	21.00	0.0004
Nitrogen	24.30	0.0016	680.8	0.0026	57.81	0.0010
CO2	12.96	0.0009	570.5	0.0022	47.33	0.0008
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.506e+004	1.0000	2.643e+005	1.0000	5.812e+004	1.0000

Liquid Phase Phase Fraction 0.3142

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	4206	0.6096	6.747e+004	0.3858	1.543e+004	0.4837
Propane	624.4	0.0905	2.753e+004	0.1574	3721	0.1166
n-Butane	205.0	0.0297	1.192e+004	0.0681	1399	0.0439
n-Pentane	43.01	0.0062	3103	0.0177	337.4	0.0106
Ethane	1541	0.2233	4.634e+004	0.2649	8921	0.2796
i-Butane	149.6	0.0217	8694	0.0497	1059	0.0332
n-Hexane	54.90	0.0080	4731	0.0271	488.9	0.0153
i-Pentane	64.11	0.0093	4626	0.0264	508.0	0.0159

Nitrogen	2.929	0.0004	82.05	0.0005	6.968	0.0002
CO2	8.997	0.0013	396.0	0.0023	32.85	0.0010
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	6900	1.0000	1.749e+005	1.0000	3.191e+004	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	1.492	1.492	---
Propane	0.1139	0.1139	---
n-Butane	3.942e-002	3.942e-002	---
n-Pentane	1.436e-002	1.436e-002	---
Ethane	0.3364	0.3364	---
i-Butane	5.375e-002	5.375e-002	---
n-Hexane	5.488e-003	5.488e-003	---
i-Pentane	1.894e-002	1.894e-002	---
Nitrogen	3.801	3.801	---
CO2	0.6601	0.6601	---
H2O	---	---	---

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
Recycle: RCY-1	Plate Exchanger: E-103	

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

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21 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments

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Material Stream: 21 Fluid Package: Basis-1

Property Package: Peng-Robinson

CONDITIONS

	OVERALL	VAPOUR PH.	LIQUID PH.
Vapour / Phase Fraction	0.0000	0.0000	1.0000
Temperature: (F)	-41.00	-41.00	-41.00
Pressure: (psia)	257.0	257.0	257.0
Molar Flow (lbmole/hr)	0.0000	0.0000	0.0000
Mass Flow (lb/hr)	0.0000	0.0000	0.0000
Std Ideal Liq VolFlow (barrel/day)	0.0000	0.0000	0.0000
Molar Enthalpy (Btu/lbmole)	-3.352e+04	-3.352e+04	-3.352e+04
Molar Entropy (Btu/lbmole-F)	3.599e+01	3.599e+01	3.599e+01
Heat Flow (Btu/hr)	0.000e-01	0.000e-01	0.000e-01
Liq VolFlow @Std Cond (barrel/day)	0.0000	0.0000	0.0000

COMPOSITION

Overall Phase Vapour Fraction 0.0000

COMPONENTS MOLE FLOW MOLE FRAC MASS FLOW MASS FRAC LIQVOL FLOW LIQVOL FRAC

	(lbmole/hr)		(lb/hr)		(barrel/day)	
Methane	0.0000	0.9784	0.0000	0.9597	0.0000	0.9680
Propane	0.0000	0.0003	0.0000	0.0009	0.0000	0.0005
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0192	0.0000	0.0353	0.0000	0.0300
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0015	0.0000	0.0026	0.0000	0.0010
CO2	0.0000	0.0006	0.0000	0.0015	0.0000	0.0005
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000

Vapour Phase Phase Fraction 0.0000

COMPONENTS MOLE FLOW MOLE FRAC MASS FLOW MASS FRAC LIQVOL FLOW LIQVOL FRAC

	(lbmole/hr)		(lb/hr)		(barrel/day)	
Methane	0.0000	0.9784	0.0000	0.9597	0.0000	0.9680
Propane	0.0000	0.0003	0.0000	0.0009	0.0000	0.0005
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0192	0.0000	0.0353	0.0000	0.0300
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0015	0.0000	0.0026	0.0000	0.0010
CO2	0.0000	0.0006	0.0000	0.0015	0.0000	0.0005
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000

Liquid Phase Phase Fraction 1.000

COMPONENTS MOLE FLOW MOLE FRAC MASS FLOW MASS FRAC LIQVOL FLOW LIQVOL FRAC

	(lbmole/hr)		(lb/hr)		(barrel/day)	
Methane	0.0000	0.9784	0.0000	0.9597	0.0000	0.9680
Propane	0.0000	0.0003	0.0000	0.0009	0.0000	0.0005
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0192	0.0000	0.0353	0.0000	0.0300
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0015	0.0000	0.0026	0.0000	0.0010
CO2	0.0000	0.0006	0.0000	0.0015	0.0000	0.0005
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	1.000	1.000	---
Propane	0.9997	0.9997	---
n-Butane	0.9996	0.9996	---
n-Pentane	0.9995	0.9995	---
Ethane	0.9999	0.9999	---
i-Butane	0.9996	0.9996	---

n-Hexane	0.9994	0.9994	---
i-Pentane	0.9995	0.9995	---
Nitrogen	1.000	1.000	---
CO2	1.000	1.000	---
H2O	---	---	---

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
	Separator: V-102	

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

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24 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments

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Material Stream: 24 Fluid Package: Basis-1

Property Package: Peng-Robinson

CONDITIONS

	OVERALL	VAPOUR PH.	LIQUID PH.
Vapour / Phase Fraction	0.0000	0.0000	1.0000
Temperature: (F)	-2.285	-2.285	-2.285
Pressure: (psia)	338.3	338.3	338.3
Molar Flow (lbmole/hr)	0.0000	0.0000	0.0000
Mass Flow (lb/hr)	0.0000	0.0000	0.0000
Std Ideal Liq VolFlow (barrel/day)	0.0000	0.0000	0.0000
Molar Enthalpy (Btu/lbmole)	-3.323e+04	-3.323e+04	-3.323e+04
Molar Entropy (Btu/lbmole-F)	3.615e+01	3.615e+01	3.615e+01
Heat Flow (Btu/hr)	0.000e-01	0.000e-01	0.000e-01
Liq VolFlow @Std Cond (barrel/day)	0.0000	0.0000	0.0000

COMPOSITION

Overall Phase Vapour Fraction 0.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.9784	0.0000	0.9597	0.0000	0.9680
Propane	0.0000	0.0003	0.0000	0.0009	0.0000	0.0005
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0192	0.0000	0.0353	0.0000	0.0300
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0015	0.0000	0.0026	0.0000	0.0010
CO2	0.0000	0.0006	0.0000	0.0015	0.0000	0.0005
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000

Vapour Phase Phase Fraction 0.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.9784	0.0000	0.9597	0.0000	0.9680
Propane	0.0000	0.0003	0.0000	0.0009	0.0000	0.0005
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0192	0.0000	0.0353	0.0000	0.0300
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0015	0.0000	0.0026	0.0000	0.0010
CO2	0.0000	0.0006	0.0000	0.0015	0.0000	0.0005
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000

Liquid Phase Phase Fraction 1.000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.9784	0.0000	0.9597	0.0000	0.9680
Propane	0.0000	0.0003	0.0000	0.0009	0.0000	0.0005
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0192	0.0000	0.0353	0.0000	0.0300
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0015	0.0000	0.0026	0.0000	0.0010
CO2	0.0000	0.0006	0.0000	0.0015	0.0000	0.0005
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	1.000	1.000	---
Propane	0.9998	0.9998	---
n-Butane	0.9997	0.9997	---
n-Pentane	0.9996	0.9996	---
Ethane	0.9999	0.9999	---
i-Butane	0.9997	0.9997	---
n-Hexane	0.9995	0.9995	---
i-Pentane	0.9996	0.9996	---
Nitrogen	1.000	1.000	---
CO2	1.000	1.000	---
H2O	---	---	---

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
	Separator: V-103	

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

---
26 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments
---
Material Stream: 26 Fluid Package: Basis-1

Property Package: Peng-Robinson

CONDITIONS

	OVERALL	VAPOUR PH.
Vapour / Phase Fraction	1.0000	1.0000
Temperature: (F)	120.0	120.0
Pressure: (psia)	961.7	961.7
Molar Flow (lbmole/hr)	1.827e+004	1.827e+004
Mass Flow (lb/hr)	2.988e+005	2.988e+005
Std Ideal Liq VolFlow (barrel/day)	6.774e+004	6.774e+004
Molar Enthalpy (Btu/lbmole)	-3.240e+04	-3.240e+04
Molar Entropy (Btu/lbmole-F)	3.589e+01	3.589e+01
Heat Flow (Btu/hr)	-5.918e+08	-5.918e+08
Liq VolFlow @Std Cond (barrel/day)	2.950e+007	2.950e+007

COMPOSITION

Overall Phase Vapour Fraction 1.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	1.787e+004	0.9784	2.867e+005	0.9597	6.558e+004	0.9680
Propane	6.097	0.0003	268.8	0.0009	36.33	0.0005
n-Butane	7.820e-002	0.0000	4.545	0.0000	0.5336	0.0000
n-Pentane	7.170e-004	0.0000	5.173e-002	0.0000	5.625e-003	0.0000
Ethane	350.5	0.0192	1.054e+004	0.0353	2029	0.0300
i-Butane	0.1455	0.0000	8.458	0.0000	1.031	0.0000
n-Hexane	4.621e-005	0.0000	3.982e-003	0.0000	4.115e-004	0.0000
i-Pentane	2.555e-003	0.0000	0.1843	0.0000	2.025e-002	0.0000
Nitrogen	27.23	0.0015	762.8	0.0026	64.78	0.0010
CO2	10.09	0.0006	444.1	0.0015	36.85	0.0005
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.827e+004	1.0000	2.988e+005	1.0000	6.774e+004	1.0000

Vapour Phase Phase Fraction 1.000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	1.787e+004	0.9784	2.867e+005	0.9597	6.558e+004	0.9680
Propane	6.097	0.0003	268.8	0.0009	36.33	0.0005
n-Butane	7.820e-002	0.0000	4.545	0.0000	0.5336	0.0000
n-Pentane	7.170e-004	0.0000	5.173e-002	0.0000	5.625e-003	0.0000
Ethane	350.5	0.0192	1.054e+004	0.0353	2029	0.0300
i-Butane	0.1455	0.0000	8.458	0.0000	1.031	0.0000
n-Hexane	4.621e-005	0.0000	3.982e-003	0.0000	4.115e-004	0.0000
i-Pentane	2.555e-003	0.0000	0.1843	0.0000	2.025e-002	0.0000
Nitrogen	27.23	0.0015	762.8	0.0026	64.78	0.0010

CO2 10.09 0.0006 444.1 0.0015 36.85 0.0005
H2O 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
Total 1.827e+004 1.0000 2.988e+005 1.0000 6.774e+004 1.0000
K VALUE

COMPONENTS MIXED LIGHT HEAVY
Methane --- --- ---
Propane --- --- ---
n-Butane --- --- ---
n-Pentane --- --- ---
Ethane --- --- ---
i-Butane --- --- ---
n-Hexane --- --- ---
i-Pentane --- --- ---
Nitrogen --- --- ---
CO2 --- --- ---
H2O --- --- ---
UNIT OPERATIONS

FEED TO PRODUCT FROM LOGICAL CONNECTION
Air cooler: E-105
UTILITIES

(No utilities reference this stream)
PROCESS UTILITY

---
32 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments
---
Material Stream: 32 Fluid Package: Basis-1

Property Package: Peng-Robinson
CONDITIONS

OVERALL VAPOUR PH. LIQUID PH.
Vapour / Phase Fraction 0.5668 0.5668 0.4332
Temperature: (F) -33.08 -33.08 -33.08
Pressure: (psia) 19.00 19.00 19.00
Molar Flow (lbmole/hr) 1.300e+004 7368 5632
Mass Flow (lb/hr) 5.733e+005 3.249e+005 2.484e+005
Std Ideal Liq VolFlow (barrel/day) 7.747e+004 4.391e+004 3.356e+004
Molar Enthalpy (Btu/lbmole) -5.000e+04 -4.657e+04 -5.450e+04
Molar Entropy (Btu/lbmole-F) 2.620e+01 3.426e+01 1.566e+01
Heat Flow (Btu/hr) -6.501e+08 -3.431e+08 -3.070e+08
Liq VolFlow @Std Cond (barrel/day) 7.732e+004 4.382e+004 3.350e+004
COMPOSITION

Overall Phase Vapour Fraction 0.5668

COMPONENTS MOLE FLOW MOLE FRAC MASS FLOW MASS FRAC LIQVOL FLOW LIQVOL FRAC
(lbmole/hr) (lb/hr) (barrel/day)

Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	1.300e+004	1.0000	5.733e+005	1.0000	7.747e+004	1.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.300e+004	1.0000	5.733e+005	1.0000	7.747e+004	1.0000

Vapour Phase Phase Fraction 0.5668

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	7368	1.0000	3.249e+005	1.0000	4.391e+004	1.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	7368	1.0000	3.249e+005	1.0000	4.391e+004	1.0000

Liquid Phase Phase Fraction 0.4332

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	5632	1.0000	2.484e+005	1.0000	3.356e+004	1.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	5632	1.0000	2.484e+005	1.0000	3.356e+004	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	---	---	---
Propane	1.000	1.000	---
n-Butane	---	---	---
n-Pentane	---	---	---
Ethane	---	---	---
i-Butane	---	---	---
n-Hexane	---	---	---

i-Pentane --- --- ---
Nitrogen --- --- ---
CO2 --- --- ---
H2O --- --- ---
UNIT OPERATIONS

FEED TO PRODUCT FROM LOGICAL CONNECTION
LNG: E-102 Valve: VLV-101
UTILITIES

(No utilities reference this stream)
PROCESS UTILITY

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38 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments
---
Material Stream: 38 Fluid Package: Basis-1

Property Package: Peng-Robinson
CONDITIONS

	OVERALL	VAPOUR PH.	LIQUID PH.
Vapour / Phase Fraction	1.0000	1.0000	0.0000
Temperature: (F)	198.2	198.2	198.2
Pressure: (psia)	247.7	247.7	247.7
Molar Flow (lbmole/hr)	1.300e+004	1.300e+004	0.0000
Mass Flow (lb/hr)	5.733e+005	5.733e+005	0.0000
Std Ideal Liq VolFlow (barrel/day)	7.747e+004	7.747e+004	0.0000
Molar Enthalpy (Btu/lbmole)	-4.300e+04	-4.300e+04	-4.300e+04
Molar Entropy (Btu/lbmole-F)	3.628e+01	3.628e+01	3.628e+01
Heat Flow (Btu/hr)	-5.590e+08	-5.590e+08	0.000e-01
Liq VolFlow @Std Cond (barrel/day)	7.732e+004	7.732e+004	0.0000

COMPOSITION

Overall Phase Vapour Fraction 1.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	1.300e+004	1.0000	5.733e+005	1.0000	7.747e+004	1.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.300e+004	1.0000	5.733e+005	1.0000	7.747e+004	1.0000

Vapour Phase Phase Fraction 1.000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	1.300e+004	1.0000	5.733e+005	1.0000	7.747e+004	1.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.300e+004	1.0000	5.733e+005	1.0000	7.747e+004	1.0000

Liquid Phase Phase Fraction 0.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	---	---	---
Propane	1.000	1.000	---
n-Butane	---	---	---
n-Pentane	---	---	---
Ethane	---	---	---
i-Butane	---	---	---
n-Hexane	---	---	---
i-Pentane	---	---	---
Nitrogen	---	---	---
CO2	---	---	---
H2O	---	---	---

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
Compressor: C-204	Separator: V-204	

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

---
39 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments
---
Material Stream: 39 Fluid Package: Basis-1

Property Package: Peng-Robinson

CONDITIONS

	OVERALL	VAPOUR PH.	LIQUID PH.
Vapour / Phase Fraction	0.0000	0.0000	1.0000
Temperature: (F)	198.4	198.4	198.4
Pressure: (psia)	249.7	249.7	249.7
Molar Flow (lbmole/hr)	0.0000	0.0000	0.0000
Mass Flow (lb/hr)	0.0000	0.0000	0.0000
Std Ideal Liq VolFlow (barrel/day)	0.0000	0.0000	0.0000
Molar Enthalpy (Btu/lbmole)	-4.300e+04	-4.300e+04	-4.300e+04
Molar Entropy (Btu/lbmole-F)	3.627e+01	3.627e+01	3.627e+01
Heat Flow (Btu/hr)	0.000e-01	0.000e-01	0.000e-01
Liq VolFlow @Std Cond (barrel/day)	0.0000	0.0000	0.0000

COMPOSITION

Overall Phase Vapour Fraction 0.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000

Vapour Phase Phase Fraction 0.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000

Liquid Phase Phase Fraction 1.000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	---	---	---
Propane	1.000	1.000	---
n-Butane	---	---	---
n-Pentane	---	---	---
Ethane	---	---	---
i-Butane	---	---	---
n-Hexane	---	---	---
i-Pentane	---	---	---
Nitrogen	---	---	---
CO2	---	---	---
H2O	---	---	---

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
	Separator: V-204	

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

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30 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments

---

Material Stream: 30 Fluid Package: Basis-1

Property Package: Peng-Robinson

CONDITIONS

	OVERALL	VAPOUR PH.
Vapour / Phase Fraction	1.0000	1.0000

Temperature: (F) 205.5 205.5
Pressure: (psia) 267.0 267.0
Molar Flow (lbmole/hr) 1.300e+004 1.300e+004
Mass Flow (lb/hr) 5.733e+005 5.733e+005
Std Ideal Liq VolFlow (barrel/day) 7.747e+004 7.747e+004
Molar Enthalpy (Btu/lbmole) -4.289e+04 -4.289e+04
Molar Entropy (Btu/lbmole-F) 3.632e+01 3.632e+01
Heat Flow (Btu/hr) -5.576e+08 -5.576e+08
Liq VolFlow @Std Cond (barrel/day) 7.732e+004 7.732e+004
COMPOSITION

Overall Phase Vapour Fraction 1.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	1.300e+004	1.0000	5.733e+005	1.0000	7.747e+004	1.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.300e+004	1.0000	5.733e+005	1.0000	7.747e+004	1.0000

Vapour Phase Phase Fraction 1.000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	1.300e+004	1.0000	5.733e+005	1.0000	7.747e+004	1.0000
n-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ethane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Butane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
n-Hexane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
i-Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.300e+004	1.0000	5.733e+005	1.0000	7.747e+004	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	---	---	---
Propane	---	---	---
n-Butane	---	---	---
n-Pentane	---	---	---
Ethane	---	---	---
i-Butane	---	---	---
n-Hexane	---	---	---
i-Pentane	---	---	---

Nitrogen --- --- ---
CO2 --- --- ---
H2O --- --- ---
UNIT OPERATIONS

FEED TO PRODUCT FROM LOGICAL CONNECTION
Air cooler: E-202 Compressor: C-204
UTILITIES

(No utilities reference this stream)
PROCESS UTILITY

V-101 (Separator): Design, Reactions, Rating, Carry Over

Separator: V-101

CONNECTIONS

Inlet Stream

Stream Name From Unit Operation
5.2 Recycle: RCY-1
Outlet Stream

Stream Name To Unit Operation
6 Tee: TEE-100
7 Valve: VLV-100
Energy Stream

Stream Name From Unit Operation

PARAMETERS

Vessel Volume: 2653 ft3 Level SP: 50.00 % Liquid Volume: 1326 ft3
Vessel Pressure: 809.7 psia Pressure Drop: 0.0000 psi Duty: 0.0000 Btu/hr Heat Transfer Mode: Heating
User Variables

RATING

Sizing

Cylinder Vertical Separator has a Boot: No
Volume: 2653 ft3 Diameter: 8.500 ft Height: 46.75 ft
Nozzles

Base Elevation Relative to Ground Level 0.0000 ft Diameter 8.500 ft Height 46.75

	5.2	6	7
Diameter (ft)	2.337	2.337	2.337
Elevation (Base) (ft)	23.37	46.75	0.0000

Elevation (Ground) (ft) 23.37 46.75 0.0000
Elevation (% of Height) (%) 50.00 100.00 0.00
Level Taps: Level Tap Specification

Level Tap PV High PV Low OP High OP Low
Level Taps: Calculated Level Tap Values

Level Tap Liquid Level Aqueous Level
Options

PV Work Term Contribution (%) 100.00

V-201 (Separator): Design, Reactions, Rating, Carry Over

Separator: V-201

CONNECTIONS

Inlet Stream

Stream Name From Unit Operation
27 LNG: E-102
Outlet Stream

Stream Name To Unit Operation
28 Compressor: C-201
29
Energy Stream

Stream Name From Unit Operation

PARAMETERS

Vessel Volume: --- Level SP: 50.00 % Liquid Volume: ---
Vessel Pressure: 15.90 psia Pressure Drop: 0.0000 psi Duty: 0.0000 Btu/hr Heat Transfer Mode: Heating
User Variables

RATING

Sizing

Cylinder Vertical Separator has a Boot: No
Volume: --- Diameter: --- Height: ---
Nozzles

Base Elevation Relative to Ground Level 0.0000 ft Diameter --- Height ---

	27	28	29
Diameter (ft)	0.1640	0.1640	0.1640
Elevation (Base) (ft)	0.0000	0.0000	0.0000
Elevation (Ground) (ft)	0.0000	0.0000	0.0000
Elevation (% of Height) (%)	---	---	---

Level Taps: Level Tap Specification

Level Tap PV High PV Low OP High OP Low
Level Taps: Calculated Level Tap Values

Level Tap Liquid Level Aqueous Level
Options

PV Work Term Contribution (%) 100.00

V-202 (Separator): Design, Reactions, Rating, Carry Over

Separator: V-202

CONNECTIONS

Inlet Stream

Stream Name From Unit Operation
30.2 Compressor: C-201
Outlet Stream

Stream Name To Unit Operation
31.2 Compressor: C-202
32.2
Energy Stream

Stream Name From Unit Operation

PARAMETERS

Vessel Volume: --- Level SP: 50.00 % Liquid Volume: ---
Vessel Pressure: 40.42 psia Pressure Drop: 0.0000 psi Duty: 0.0000 Btu/hr Heat Transfer Mode: Heating
User Variables

RATING

Sizing

Cylinder Vertical Separator has a Boot: No
Volume: --- Diameter: --- Height: ---
Nozzles

Base Elevation Relative to Ground Level 0.0000 ft Diameter --- Height ---

	30.2	31.2	32.2
Diameter (ft)	0.1640	0.1640	0.1640
Elevation (Base) (ft)	0.0000	0.0000	0.0000
Elevation (Ground) (ft)	0.0000	0.0000	0.0000
Elevation (% of Height) (%)	---	---	---

Level Taps: Level Tap Specification

Level Tap PV High PV Low OP High OP Low
Level Taps: Calculated Level Tap Values

Level Tap Liquid Level Aqueous Level
Options

PV Work Term Contribution (%) 100.00

V-203 (Separator): Design, Reactions, Rating, Carry Over

Separator: V-203

CONNECTIONS

Inlet Stream

Stream Name From Unit Operation
33 Compressor: C-202
Outlet Stream

Stream Name To Unit Operation
34 Compressor: C-203
35
Energy Stream

Stream Name From Unit Operation

PARAMETERS

Vessel Volume: --- Level SP: 50.00 % Liquid Volume: ---
Vessel Pressure: 105.7 psia Pressure Drop: 0.0000 psi Duty: 0.0000 Btu/hr Heat Transfer Mode: Heating
User Variables

RATING

Sizing

Cylinder Vertical Separator has a Boot: No
Volume: --- Diameter: --- Height: ---
Nozzles

Base Elevation Relative to Ground Level 0.0000 ft Diameter --- Height ---

	33	34	35
Diameter (ft)	0.1640	0.1640	0.1640
Elevation (Base) (ft)	0.0000	0.0000	0.0000
Elevation (Ground) (ft)	0.0000	0.0000	0.0000
Elevation (% of Height) (%)	---	---	---

Level Taps: Level Tap Specification

Level Tap PV High PV Low OP High OP Low
Level Taps: Calculated Level Tap Values

Level Tap Liquid Level Aqueous Level
Options

PV Work Term Contribution (%) 100.00

V-102 (Separator): Design, Reactions, Rating, Carry Over

Separator: V-102

CONNECTIONS

Inlet Stream

Stream Name From Unit Operation
19 Plate Exchanger: E-103
Outlet Stream

Stream Name To Unit Operation
20 Compressor: C-102
21
Energy Stream

Stream Name From Unit Operation

PARAMETERS

Vessel Volume: --- Level SP: 50.00 % Liquid Volume: ---
Vessel Pressure: 257.0 psia Pressure Drop: 0.0000 psi Duty: 0.0000 Btu/hr Heat Transfer Mode: Heating
User Variables

RATING

Sizing

Cylinder Vertical Separator has a Boot: No
Volume: --- Diameter: --- Height: ---
Nozzles

Base Elevation Relative to Ground Level 0.0000 ft Diameter --- Height ---

	19	20	21
Diameter (ft)	0.1640	0.1640	0.1640
Elevation (Base) (ft)	0.0000	0.0000	0.0000
Elevation (Ground) (ft)	0.0000	0.0000	0.0000
Elevation (% of Height) (%)	---	---	---

Level Taps: Level Tap Specification

Level Tap PV High PV Low OP High OP Low
Level Taps: Calculated Level Tap Values

Level Tap Liquid Level Aqueous Level

Options

PV Work Term Contribution (%) 100.00

V-103 (Separator): Design, Reactions, Rating, Carry Over

Separator: V-103

CONNECTIONS

Inlet Stream

Stream Name	From Unit Operation
22	Compressor: C-102

Outlet Stream

Stream Name	To Unit Operation
23	Compressor: C-103
24	

Energy Stream

Stream Name	From Unit Operation

PARAMETERS

Vessel Volume: --- Level SP: 50.00 % Liquid Volume: ---
Vessel Pressure: 338.3 psia Pressure Drop: 0.0000 psi Duty: 0.0000 Btu/hr Heat Transfer Mode: Heating
User Variables

RATING

Sizing

Cylinder Vertical Separator has a Boot: No
Volume: --- Diameter: --- Height: ---
Nozzles

Base Elevation Relative to Ground Level 0.0000 ft Diameter --- Height ---

	22	23	24
Diameter (ft)	0.1640	0.1640	0.1640
Elevation (Base) (ft)	0.0000	0.0000	0.0000
Elevation (Ground) (ft)	0.0000	0.0000	0.0000
Elevation (% of Height) (%)	---	---	---

Level Taps: Level Tap Specification

Level Tap	PV High	PV Low	OP High	OP Low

Level Taps: Calculated Level Tap Values

Level Tap	Liquid Level	Aqueous Level

Options

PV Work Term Contribution (%) 100.00

V-204 (Separator): Design, Reactions, Rating, Carry Over

Separator: V-204

CONNECTIONS

Inlet Stream

Stream Name	From Unit Operation
36	Compressor: C-203

Outlet Stream

Stream Name	To Unit Operation
38	Compressor: C-204
39	

Energy Stream

Stream Name	From Unit Operation

PARAMETERS

Vessel Volume: --- Level SP: 50.00 % Liquid Volume: ---
Vessel Pressure: 249.7 psia Pressure Drop: 0.0000 psi Duty: 0.0000 Btu/hr Heat Transfer Mode: Heating
User Variables

RATING

Sizing

Cylinder Vertical Separator has a Boot: No
Volume: --- Diameter: --- Height: ---
Nozzles

Base Elevation Relative to Ground Level 0.0000 ft Diameter --- Height ---

	36	38	39
Diameter (ft)	0.1640	0.1640	0.1640
Elevation (Base) (ft)	0.0000	0.0000	0.0000
Elevation (Ground) (ft)	0.0000	0.0000	0.0000
Elevation (% of Height) (%)	---	---	---

Level Taps: Level Tap Specification

Level Tap	PV High	PV Low	OP High	OP Low

Level Taps: Calculated Level Tap Values

Level Tap	Liquid Level	Aqueous Level

Options

PV Work Term Contribution (%) 100.00

T-101 (Reboiled Absorber): Design, Parameters, Side Ops, Internals, Rating, Performance, Flowsheet, Tray Tables
---
Reboiled Absorber: T-101

CONNECTIONS

Inlet Stream
STREAM NAME Stage FROM UNIT OPERATION
Qr Reboiler
TE out 1__Main Tower C-101 Expander
CS liq 2 6__Main Tower VLV-100 Valve
CS vap to DeMeth 1__Main Tower E-104 Plate Exchanger
Outlet Stream
STREAM NAME Stage TO UNIT OPERATION
DeMeth Reboiler P-101A/B Pump
TopMeth 1__Main Tower E-104 Plate Exchanger
MONITOR

Specifications Summary
Specified Value Current Value Wt. Error
Btms Prod Rate --- 3694 lbmole/hr ---
Boilup Ratio 4.000 1.053 2.947
eth recovery 0.0500 0.8688 0.4382
MethNGL 5.000e-003 5.009e-003 6.946e-004
TopMeth Rate --- 1.827e+004 lbmole/hr ---
MethTop 0.9970 0.9983 6.510e-004
Wt. Tol. Abs. Tol. Active Estimate Used
Btms Prod Rate 1.000e-002 2.205 lbmole/hr Off On Off
Boilup Ratio 1.000e-002 1.000e-002 Off On Off
eth recovery 1.000e-002 1.000e-003 Off On Off
MethNGL 1.000e-002 1.000e-003 On On On
TopMeth Rate 1.000e-002 2.205 lbmole/hr Off On Off
MethTop 1.000e-002 1.000e-003 Off On Off
SPECS

Column Specification Parameters
Btms Prod Rate

Fix/Rang: Fixed Prim/Alter: Primary Lower Bnd: --- Upper Bnd: ---
Stream: DeMeth @COL1 Flow Basis: Molar
Boilup Ratio

Fix/Rang: Fixed Prim/Alter: Primary Lower Bnd: --- Upper Bnd: ---
Stage: Reboiler Basis: Molar
eth recovery

Fix/Rang: Fixed Prim/Alter: Primary Lower Bnd: --- Upper Bnd: ---
Draw: DeMeth @COL1 Flow Basis: Molar
Components: Ethane
MethNGL

Fix/Rang: Fixed Prim/Alter: Primary Lower Bnd: --- Upper Bnd: ---
Stage: Flow Basis: Volume Fraction Phase: Liquid
Components: Methane
TopMeth Rate

Fix/Rang: Fixed Prim/Alter: Primary Lower Bnd: --- Upper Bnd: ---
Stream: TopMeth @COL1 Flow Basis: Molar
MethTop

Fix/Rang: Fixed Prim/Alter: Primary Lower Bnd: --- Upper Bnd: ---
Draw: TopMeth @COL1 Flow Basis: Molar
Components: Methane
SUBCOOLING

Degrees of Subcooling
Subcool to
User Variables

PROFILES

General Parameters
Sub-Flow Sheet: T-101 (COL1) Number of Stages: 10
Profile Estimates

	Temperature (F)	Net Liquid (lbmole/hr)	Net Vapour (lbmole/hr)
1__Main Tower	-145.0	3285	1.827e+004
2__Main Tower	-143.5	3230	6494
3__Main Tower	-140.8	3113	6438
4__Main Tower	-135.7	2923	6321
5__Main Tower	-127.5	2640	6132
6__Main Tower	-112.8	6505	5848
7__Main Tower	-95.90	6341	2811
8__Main Tower	-55.55	6514	2646
9__Main Tower	-8.711	7172	2820
10__Main Tower	20.67	7585	3477
Reboiler	45.67	3694	3891

EFFICIENCIES

Stage Efficiencies

Stages	Overall	Methane	Propane	n-Butane	n-Pentane
1__Main Tower	1.000	1.000	1.000	1.000	1.000
2__Main Tower	1.000	1.000	1.000	1.000	1.000
3__Main Tower	1.000	1.000	1.000	1.000	1.000
4__Main Tower	1.000	1.000	1.000	1.000	1.000
5__Main Tower	1.000	1.000	1.000	1.000	1.000
6__Main Tower	1.000	1.000	1.000	1.000	1.000
7__Main Tower	1.000	1.000	1.000	1.000	1.000
8__Main Tower	1.000	1.000	1.000	1.000	1.000
9__Main Tower	1.000	1.000	1.000	1.000	1.000
10__Main Tower	1.000	1.000	1.000	1.000	1.000
Reboiler	1.000	1.000	1.000	1.000	1.000

Stages	Overall	Ethane	i-Butane	n-Hexane	i-Pentane
1__Main Tower	1.000	1.000	1.000	1.000	1.000

2__Main Tower 1.000 1.000 1.000 1.000 1.000
3__Main Tower 1.000 1.000 1.000 1.000 1.000
4__Main Tower 1.000 1.000 1.000 1.000 1.000
5__Main Tower 1.000 1.000 1.000 1.000 1.000
6__Main Tower 1.000 1.000 1.000 1.000 1.000
7__Main Tower 1.000 1.000 1.000 1.000 1.000
8__Main Tower 1.000 1.000 1.000 1.000 1.000
9__Main Tower 1.000 1.000 1.000 1.000 1.000
10__Main Tower 1.000 1.000 1.000 1.000 1.000
Reboiler 1.000 1.000 1.000 1.000 1.000
Stages Overall Nitrogen CO2 H2O
1__Main Tower 1.000 1.000 1.000 1.000
2__Main Tower 1.000 1.000 1.000 1.000
3__Main Tower 1.000 1.000 1.000 1.000
4__Main Tower 1.000 1.000 1.000 1.000
5__Main Tower 1.000 1.000 1.000 1.000
6__Main Tower 1.000 1.000 1.000 1.000
7__Main Tower 1.000 1.000 1.000 1.000
8__Main Tower 1.000 1.000 1.000 1.000
9__Main Tower 1.000 1.000 1.000 1.000
10__Main Tower 1.000 1.000 1.000 1.000
Reboiler 1.000 1.000 1.000 1.000
SOLVER

Column Solving Algorithm: HYSIM Inside-Out
Solving Options Acceleration Parameters
Maximum Iterations: 10000 Accelerate K Value & H Model Parameters: Off
Equilibrium Error Tolerance: 1.000e-05
Heat/Spec Error Tolerance: 5.000e-004
Save Solutions as Initial Estimate: On
Super Critical Handling Model: Simple K
Trace Level: Low
Init from Ideal K's: Off Damping Parameters
Initial Estimate Generator Parameters Azeotrope Check: Off
Iterative IEG (Good for Chemicals): Off Fixed Damping Factor: 1

SIDE STRIPPERS

SIDE RECTIFIERS

PUMP AROUNDS

VAP BYPASSES

ACTIVE INTERNAL OPTION: Internals-1@Main Tower@COL1

Name	Start Stage	End Stage	Mode	Internals Type	Tray / Packing Number of Passes	Packing Vendor	Packing Material	Packing Dimension	Tray Spacing / Section Packed Height (ft)	Diameter (ft)
CS-1	1__Main Tower	4__Main Tower	Interactive Sizing	Trayed	Bubble Cap 1	---	---	---	2.000	8.000
CS-2	5__Main Tower	10__Main Tower	Interactive Sizing	Trayed	Bubble Cap 2	---	---	---	2.200	6.322

SETUP

Section Name	CS-1	CS-2
Section Start	1__Main Tower	5__Main Tower
Section End	4__Main Tower	10__Main Tower
Internals	Trayed	Trayed
Internals Type	Bubble Cap	Bubble Cap
Diameter (ft)	8.000	6.322
Tray Spacing / Section Packed Height (ft)	2.000	2.200
Number Of Passes	1	2
Maximum Acceptable Pressure Drop (psi)	0.3626	0.3626
Maximum Percent Downcomer Backup	100.00 %	100.00 %
Maximum Percent Jet Flood	100.00 %	100.00 %
Percent Jet Flood For Design	80.00 %	80.00 %
Maximum Percent Liquid Entrainment	10.00 %	10.00 %
Minimum Weir Loading (USGPM/ft)	6.000	6.000
Maximum Weir Loading (USGPM/ft)	157.5	180.0
Minimum Downcomer Area / Total Tray Area	0.1000	0.1000
Override Downcomer Froth Density	No	No
Froth Density	---	---
Weep Method	Hsieh	Hsieh
Default Jet Flood Calculation Method	GLITSCH6	GLITSCH6
Maximum Downcomer Loading Method	Glitsch	Glitsch
% Approach to Maximum Capacity	---	---
Design Capacity Factor	---	---
Capacity Factor at Flooding	---	---
System Foaming Factor	1.000	1.000
Aeration Factor Multipler	1.000	1.000
Minimum Liquid Flow Rate	---	---
Pressure Drop at Flood per Unit Packed Height	---	---
Allowable Pressure Drop per Unit Packed Height	---	---
Minimum Pressure Drop per Unit Packed Height	---	---
Number of Curves	---	---
Warning Status (% to Limit)	10.00 %	10.00 %
Pressure Drop Calculation Method	---	---
Mode	Interactive Sizing	Interactive Sizing
Status	Needs Calculating	Needs Calculating

GEOMETRY DETAILS

Common Geometry	CS-1	CS-2
Section Start	1__Main Tower	5__Main Tower
Section End	4__Main Tower	10__Main Tower
Internals	Bubble Cap	Bubble Cap
Section Diameter (ft)	8.000	6.322
Foaming Factor	1.000	1.000
Over-Design Factor	1.000	1.000
Common Tray Geometry	CS-1	CS-2
Number of Passes	1	2
Tray Spacing (ft)	2.000	2.200
Picket Fence Weirs	No	No
Swept Back Weirs	No	No
Active Area Under Downcomer	No	No
Deck Thickness	10 Gauge	10 Gauge
Deck Thickness Value (in)	0.1340	0.1340
Balance Downcomers Based On	Maximum Downcomer Loading	Maximum Downcomer Loading
Weir Modifications	None	None

Net Area (ft2) 45.24 24.36
Cross-Sectional Area (ft2) 50.27 31.39
Active Area (ft2) 40.21 17.33
Downcomer Geometry CS-1 CS-2
Side Weir Height (in) 2.000 2.200
Weir Length (ft) --- ---
Downcomer Clearance (in) 1.500 1.700
Downcomer Width - Top (in) 15.02 12.84
Downcomer Width - Bottom (in) 15.02 12.84
Downcomer Loading Top (USGPM/ft2) 65.64 39.51
Weir Loading (USGPM/ft) 56.76 118.7
Downcomer Area - Top (ft2) 5.027 3.515
Downcomer Area - Bottom (ft2) 5.027 3.515
Picketing Fraction --- ---
Center Weir Height (in) --- 2.200
Weir Length (ft) --- 6.222
Downcomer Clearance (in) --- 1.700
Downcomer Width - Top (in) --- 13.41
Downcomer Width - Bottom (in) --- 13.41
Downcomer Loading Top (USGPM/ft2) --- 39.51
Weir Loading (USGPM/ft) --- 90.42
Downcomer Area - Top (ft2) --- 7.031
Downcomer Area - Bottom (ft2) --- 7.031
Picketing Fraction --- ---
Off Center Weir Height (in) --- ---
Inside Weir Length (ft) --- ---
Outside Weir Length (ft) --- ---
Downcomer Clearance (in) --- ---
Downcomer Width - Top (in) --- ---
Downcomer Width - Bottom (in) --- ---
Downcomer Loading Top (USGPM/ft2) --- ---
Maximum Outside Weir Loading (USGPM/ft) --- ---
Maximum Inside Weir Loading (USGPM/ft) --- ---
Downcomer Area - Top (ft2) --- ---
Downcomer Area - Bottom (ft2) --- ---
Inside Picketing Fraction --- ---
Outside Picketing Fraction --- ---
Off-Center Downcomer Location (ft) --- ---
Swept Back Weir Geometry CS-1 CS-2
Compatibility KG Tower KG Tower
A --- ---
B/Parallel Chord Segment --- ---
S/Swept-Back Weir --- ---
Swept-Back Weir Chord --- ---
Angled Chord Segment --- ---
Tray With Maximum Weir Loading 1 10
Maximum Weir Loading (USGPM/ft) 56.76 118.7
Maximum Allowable Weir Loading in Section (USGPM/ft) 157.5 180.0
Actual Side Weir Length (ft) 5.813 4.741
Effective Side Weir Length (ft) 5.813 4.741
Lost Area (%) 0.00 0.00
Sieve Geometry CS-1 CS-2
Hole Diameter (in) --- ---
Number of Holes --- ---

Hole Area to Active Area --- ---
Bubble Cap Geometry CS-1 CS-2
Cap Diameter 3 in (76.2 mm) 3 in (76.2 mm)
Skirt Height 1.0 in (25.4 mm) 1.0 in (25.4 mm)
Number of Caps 187 81
Number of Caps Per Active Area 4.645 4.645
Valve Geometry CS-1 CS-2
Tray Type --- ---
Valve Type --- ---
Valve Material --- ---
Leg Length --- ---
Valve Thickness --- ---
Number of Valves --- ---
Number of Valves per Active Area --- ---
Packing Geometry CS-1 CS-2
HETP (ft) --- ---
Section Packed Height (ft) --- ---
Packing Type --- ---
Packing Vendor --- ---
Packing Material --- ---
Packing Dimension --- ---
Packing Factor (ft2/ft3) --- ---
Packing Surface Area (ft2/ft3) --- ---
1st Stichlmair Constant --- ---
2nd Stichlmair Constant --- ---
3rd Stichlmair Constant --- ---
Void Fraction --- ---
RESULTS SUMMARY

Section Name CS-1 CS-2
Section Start 1__Main Tower 5__Main Tower
Section End 4__Main Tower 10__Main Tower
Internals Trayed Trayed
Diameter (ft) 8.000 6.322
Number of Passes 1 2
Tray Spacing / Section Packed Height (ft) 2.000 2.200
Total Height (ft) 8.000 13.20
Total Pressure Drop (psi) 11.98 21.79
Total Pressure Drop (Head Loss) (ft) 27.24 44.72
Trays With Weeping None None
Maximum Percent Jet Flood (%) 77.85 80.00
Tray With Maximum Jet Flood 1__Main Tower 10__Main Tower
Maximum Percent Downcomer Backup (%) 98.01 83.31
Tray With Maximum Downcomer Backup 1__Main Tower 10__Main Tower
Maximum Downcomer Loading (USGPM/ft2) 65.64 160.0
Tray With Maximum Downcomer Loading 1__Main Tower 10__Main Tower
Maximum Downcomer Loading Location Side Side
Maximum Weir Loading (USGPM/ft) 56.76 118.7
Tray With Maximum Weir Loading 1__Main Tower 10__Main Tower
Maximum Weir Loading Location Side Side
Maximum Aerated Height Over Weir (in) 3.304 4.419
Tray With Maximum Aerated Height Over Weir 1__Main Tower 10__Main Tower
Maximum % Approach To System Limit (%) 58.15 45.98
Tray With Maximum % Approach To System Limit 1__Main Tower 10__Main Tower

Maximum Cs Based On Bubbling Area (%) 0.2971 0.2591
Tray With Maximum Cs Based On Bubbling Area 1__Main Tower 10__Main Tower
Maximum % Capacity (Constant L/V) 77.85 80.00
Maximum Capacity Factor --- ---
Section Pressure Drop (psi) 11.98 21.79
Average Pressure Drop Per Height (inH2O/ft) --- ---
Average Pressure Drop Per Height (Frictional) (inH2O/ft) --- ---
Maximum Stage Liquid Holdup (ft3) --- ---
Maximum Liquid Superficial Velocity (ft/s) --- ---
Surface Area (ft2/ft3) --- ---
Void Fraction --- ---
1st Stichlmair Constant --- ---
2nd Stichlmair Constant --- ---
3rd Stichlmair Constant --- ---
STAGE BY STAGE RESULTS: CS-1

State Conditions

Stages	Liquid Temperature (F)	Vapor Temperature (F)	Liquid Mass Flow (lb/hr)	Vapor Mass Flow (lb/hr)	Liquid Volume Flow (USGPM)	Vapor Volume Flow (USGPM)
1__Main Tower	-145.0	-137.1	7.173e+004	2.714e+005	329.9	2.171e+004
2__Main Tower	-143.5	-140.8	7.114e+004	1.057e+005	325.6	8133
3__Main Tower	-140.8	-135.7	6.985e+004	1.044e+005	316.0	8109
4__Main Tower	-135.7	-127.5	6.783e+004	1.024e+005	300.7	8102

Physical Conditions

Stages	Liquid Molecular Weight	Vapor Molecular Weight	Liquid Mass Density (lb/ft3)	Vapor Mass Density (lb/ft3)	Liquid Viscosity (cP)	Vapor Viscosity (cP)	Surface Tension (dyne/cm)
1__Main Tower	21.83	16.47	27.11	1.558	8.466e-002	7.640e-003	7.488
2__Main Tower	22.02	16.42	27.24	1.620	8.553e-002	7.592e-003	7.570
3__Main Tower	22.44	16.52	27.56	1.605	8.779e-002	7.685e-003	7.789
4__Main Tower	23.20	16.70	28.12	1.575	9.195e-002	7.830e-003	8.193

Hydraulic Results

Stages	Percent Jet Flood (%)	Dry Pressure Drop (inH2O(60F))	Total Pressure Drop (inH2O(60F))	Dry Pressure Drop (Head Loss) (in)	Total Pressure Drop (Head Loss) (in)
1__Main Tower	77.85	3.126	4.655	7.193	10.71
2__Main Tower	35.56	0.8139	2.466	1.863	5.645
3__Main Tower	34.89	0.8112	2.445	1.836	5.533
4__Main Tower	33.88	0.8094	2.414	1.795	5.353

Stages	Downcomer Backup (Aerated) (ft)	Downcomer Backup (Unaerated) (ft)	Percent Downcomer Backup (Aerated) (%)	Percent Downcomer Backup (Unaerated) (%)
1__Main Tower	2.124	1.088	98.01	50.23
2__Main Tower	1.352	0.6943	62.40	32.04
3__Main Tower	1.314	0.6802	60.64	31.39
4__Main Tower	1.254	0.6581	57.86	30.37

Stages	Mass Rate / Column Area (lb/s-ft2)	Volume Rate / Column Area (USGPM/ft2)	Fs (Net Area) (ft/(s/sqrt(lb/ft3)))	Fs (Bubble Area) (ft/(s/sqrt(lb/ft3)))	Cs (Net Area) (ft/s)
1__Main Tower	0.3964	6.564	1.335	1.502	0.2641
2__Main Tower	0.3931	6.477	0.5098	0.5736	0.1007
3__Main Tower	0.3860	6.286	0.5060	0.5692	9.931e-002
4__Main Tower	0.3749	5.983	0.5009	0.5635	9.721e-002

Stages Cs (Bubble Area) Approach to System Limit Height Over Weir (Aerated) Height Over Weir (Unaerated)

	(ft/s)	(%)	(ft)	(ft)	
1__Main Tower	0.2971	58.15	0.2754	8.063e-002	
2__Main Tower	0.1133	22.19	0.1729	9.590e-002	
3__Main Tower	0.1117	21.76	0.1689	9.402e-002	
4__Main Tower	0.1094	21.08	0.1626	9.096e-002	

Side Downcomer Results

Stages	Volume (ft3)	Residence Time (seconds)	Velocity From Top (ft/s)	Velocity from Bottom (ft/s)	Exit Velocity (ft/s)
1__Main Tower	5.471	7.442	0.1462	0.1462	1.012
2__Main Tower	3.490	4.811	0.1443	0.1443	0.9983
3__Main Tower	3.419	4.857	0.1400	0.1400	0.9688
4__Main Tower	3.308	4.937	0.1333	0.1333	0.9222

STAGE BY STAGE RESULTS: CS-2

State Conditions

Stages	Liquid Temperature (F)	Vapor Temperature (F)	Liquid Mass Flow (lb/hr)	Vapor Mass Flow (lb/hr)	Liquid Volume Flow (USGPM)	Vapor Volume Flow (USGPM)
5__Main Tower	-127.5	-112.8	6.431e+004	9.886e+004	277.8	8201
6__Main Tower	-112.8	-103.7	1.896e+005	1.019e+005	743.2	8654
7__Main Tower	-95.90	-55.55	1.932e+005	5.279e+004	751.3	4360
8__Main Tower	-55.55	-8.711	2.106e+005	7.018e+004	832.4	4969
9__Main Tower	-8.711	20.67	2.408e+005	1.004e+005	999.0	6187
10__Main Tower	20.67	45.67	2.623e+005	1.219e+005	1125	7207

Physical Conditions

Stages	Liquid Molecular Weight	Vapor Molecular Weight	Liquid Mass Density (lb/ft3)	Vapor Mass Density (lb/ft3)	Liquid Viscosity (cP)	Vapor Viscosity (cP)	Surface Tension (dyne/cm)
5__Main Tower	24.36	16.91	28.86	1.503	9.782e-002	8.088e-003	8.728
6__Main Tower	29.15	17.15	31.81	1.468	0.1318	8.243e-003	10.53
7__Main Tower	30.47	19.95	32.06	1.510	0.1302	8.995e-003	10.82
8__Main Tower	32.32	24.88	31.54	1.761	0.1158	9.472e-003	9.867
9__Main Tower	33.57	28.86	30.05	2.022	9.640e-002	9.603e-003	7.473
10__Main Tower	34.58	31.32	29.06	2.108	8.710e-002	9.778e-003	5.859

Hydraulic Results

Stages	Percent Jet Flood (%)	Dry Pressure Drop (inH2O(60F))	Total Pressure Drop (inH2O(60F))	Dry Pressure Drop (Head Loss) (in)	Total Pressure Drop (Head Loss) (in)
5__Main Tower	60.22	2.462	3.541	5.319	7.651
6__Main Tower	68.08	2.684	4.138	5.263	8.112
7__Main Tower	41.51	1.067	2.651	2.076	5.158
8__Main Tower	50.28	1.372	3.076	2.714	6.083
9__Main Tower	67.09	2.028	3.863	4.209	8.019
10__Main Tower	80.00	2.629	4.519	5.642	9.699

Stages	Downcomer Backup (Aerated) (ft)	Downcomer Backup (Unaerated) (ft)	Percent Downcomer Backup (Aerated) (%)	Percent Downcomer Backup (Unaerated) (%)
5__Main Tower	1.319	0.7051	55.35	29.59
6__Main Tower	1.528	0.8613	64.12	36.14
7__Main Tower	1.139	0.6437	47.78	27.01
8__Main Tower	1.280	0.7155	53.72	30.02
9__Main Tower	1.642	0.8896	68.89	37.33
10__Main Tower	1.986	1.052	83.31	44.14

Stages	Mass Rate / Column Area	Volume Rate / Column Area	Fs (Net Area)	Fs (Bubble Area)	Cs (Net Area)

	(lb/s-ft2)	(USGPM/ft2)	(ft/(s/sqrt(lb/ft3)))	(ft/(s/sqrt(lb/ft3)))	(ft/s)
5__Main Tower	0.5691	8.850	0.9195	1.293	0.1758
6__Main Tower	1.678	23.68	0.9590	1.348	0.1741
7__Main Tower	1.710	23.93	0.4899	0.6887	8.864e-002
8__Main Tower	1.863	26.52	0.6030	0.8477	0.1105
9__Main Tower	2.130	31.83	0.8047	1.131	0.1520
10__Main Tower	2.321	35.84	0.9570	1.345	0.1843

Stages	Cs (Bubble Area) (ft/s)	Approach to System Limit (%)	Height Over Weir (Aerated) (ft)	Height Over Weir (Unaerated) (ft)
5__Main Tower	0.2471	37.71	0.1391	4.603e-002
6__Main Tower	0.2447	36.69	0.2774	8.873e-002
7__Main Tower	0.1246	18.61	0.2046	0.1035
8__Main Tower	0.1553	23.97	0.2383	0.1067
9__Main Tower	0.2137	35.58	0.3092	0.1134
10__Main Tower	0.2591	45.98	0.3683	0.1180

Side Downcomer Results

Stages	Volume (ft3)	Residence Time (seconds)	Velocity From Top (ft/s)	Velocity from Bottom (ft/s)	Exit Velocity (ft/s)
5__Main Tower	2.479	8.009	8.804e-002	8.804e-002	0.4608
6__Main Tower	3.028	3.657	0.2355	0.2355	1.233
7__Main Tower	2.263	2.703	0.2381	0.2381	1.246
8__Main Tower	2.515	2.712	0.2638	0.2638	1.381
9__Main Tower	3.127	2.810	0.3166	0.3166	1.657
10__Main Tower	3.698	2.950	0.3566	0.3566	1.866

Center Downcomer Result

Stages	Volume (ft3)	Residence Time (seconds)	Velocity From Top (ft/s)	Velocity from Bottom (ft/s)	Exit Velocity (ft/s)
5__Main Tower	4.957	8.009	8.804e-002	8.804e-002	0.3511
6__Main Tower	6.055	3.657	0.2355	0.2355	0.9393
7__Main Tower	4.525	2.703	0.2381	0.2381	0.9494
8__Main Tower	5.031	2.712	0.2638	0.2638	1.052
9__Main Tower	6.254	2.810	0.3166	0.3166	1.263
10__Main Tower	7.396	2.950	0.3566	0.3566	1.422

RATING

Tray Sections

Tray Section	Main Tower @COL1
Tray Diameter (ft)	4.921
Weir Height (ft)	0.1640
Weir Length (ft)	3.937
Tray Space (ft)	1.640
Tray Volume (ft3)	31.20
Disable Heat Loss Calculations	No
Heat Model	None
Rating Calculations	No
Tray Hold Up (ft3)	3.120

Vessels

Vessel	Reboiler @COL1
Diameter (ft)	3.914
Length (ft)	5.871
Volume (ft3)	70.63
Orientation	Horizontal

Vessel has a Boot No
Boot Diameter (ft) ---
Boot Length (ft) ---
Hold Up (ft3) 35.31
Other Equipment In Column Flowsheet

Pressure Profile

	Pressure (psia)	Pressure Drop (psi)
1__Main Tower	260.0 psia	2.222 psi
2__Main Tower	262.2 psia	2.222 psi
3__Main Tower	264.4 psia	2.222 psi
4__Main Tower	266.7 psia	2.222 psi
5__Main Tower	268.9 psia	2.222 psi
6__Main Tower	271.1 psia	2.222 psi
7__Main Tower	273.3 psia	2.222 psi
8__Main Tower	275.6 psia	2.222 psi
9__Main Tower	277.8 psia	2.222 psi
10__Main Tower	280.0 psia	---
Reboiler	280.0 psia	0.0000 psi

Pressure Solving Options

Pressure Tolerance 1.000e-004 Pressure Drop Tolerance 1.000e-004
Damping Factor 1.000 Max Press Iterations 100
SUMMARY

Flow Basis: Molar The composition option is selected
Feed Composition

	TE out	CS vap to DeMeth	CS liq 2
Flow Rate (lbmole/hr)	1.129389e+04	3.764631e+03	6.902413e+03
---	---	---	---
Methane	0.9095	0.9095	0.6096
Propane	0.0103	0.0103	0.0905
n-Butane	0.0012	0.0012	0.0297
n-Pentane	0.0001	0.0001	0.0062
Ethane	0.0751	0.0751	0.2233
i-Butane	0.0012	0.0012	0.0217
n-Hexane	0.0000	0.0000	0.0080
i-Pentane	0.0002	0.0002	0.0093
Nitrogen	0.0016	0.0016	0.0004
CO2	0.0009	0.0009	0.0013
H2O	0.0000	0.0000	0.0000

Flow Basis: Molar The composition option is selected
Feed Flows

	TE out	CS vap to DeMeth	CS liq 2
Flow Rate (lbmole/hr)	1.129389e+04	3.764631e+03	6.902413e+03
---	---	---	---
Methane (lbmole/hr)	1.027130e+04	3.423765e+03	4.207935e+03
Propane (lbmole/hr)	116.3566	38.7855	624.4712
n-Butane (lbmole/hr)	13.2261	4.4087	205.0491
n-Pentane (lbmole/hr)	1.0107	0.3369	43.0135
Ethane (lbmole/hr)	848.4248	282.8083	1.541413e+03
i-Butane (lbmole/hr)	13.1549	4.3850	149.5829

n-Hexane (lbmole/hr)	0.4930	0.1643	54.9038
i-Pentane (lbmole/hr)	1.9866	0.6622	64.1124
Nitrogen (lbmole/hr)	18.2254	6.0751	2.9310
CO2 (lbmole/hr)	9.7202	3.2401	9.0007
H2O (lbmole/hr)	0.0000	0.0000	0.0000

Products

Flow Basis: Molar The composition option is selected

Product Compositions

	TopMeth	DeMeth
Flow Rate (lbmole/hr)	1.826677e+04	3.694172e+03
---	---	---
Methane	0.9784	0.0082
Propane	0.0003	0.2094
n-Butane	0.0000	0.0603
n-Pentane	0.0000	0.0120
Ethane	0.0192	0.6286
i-Butane	0.0000	0.0452
n-Hexane	0.0000	0.0150
i-Pentane	0.0000	0.0181
Nitrogen	0.0015	0.0000
CO2	0.0006	0.0032
H2O	0.0000	0.0000

Flow Basis: Molar The composition option is selected

Product Flows

	TopMeth	DeMeth
Flow Rate (lbmole/hr)	1.826677e+04	3.694172e+03
---	---	---
Methane (lbmole/hr)	1.787258e+04	30.4179
Propane (lbmole/hr)	6.0965	773.5168
n-Butane (lbmole/hr)	0.0782	222.6057
n-Pentane (lbmole/hr)	0.0007	44.3604
Ethane (lbmole/hr)	350.5409	2.322105e+03
i-Butane (lbmole/hr)	0.1455	166.9772
n-Hexane (lbmole/hr)	0.0000	55.5611
i-Pentane (lbmole/hr)	0.0026	66.7587
Nitrogen (lbmole/hr)	27.2316	0.0000
CO2 (lbmole/hr)	10.0918	11.8691
H2O (lbmole/hr)	0.0000	0.0000

Flow Basis: Molar The composition option is selected

Product Recoveries

	TopMeth	DeMeth
Flow Rate (lbmole/hr)	1.826677e+04	3.694172e+03
---	---	---
Methane (%)	99.8301	0.1699
Propane (%)	0.7820	99.2180
n-Butane (%)	0.0351	99.9649
n-Pentane (%)	0.0016	99.9984
Ethane (%)	13.1159	86.8841
i-Butane (%)	0.0871	99.9129
n-Hexane (%)	0.0001	99.9999
i-Pentane (%)	0.0038	99.9962
Nitrogen (%)	100.0000	0.0000
CO2 (%)	45.9536	54.0464
H2O (%)	0.0000	0.0000

COLUMN PROFILES

Reflux Ratio: 0.1799 Reboil Ratio: 1.053 The Flows Option is Selected Flow Basis: Molar
Column Profiles Flows

	Temp (F)	Pres (psia)	Net Liq (lbmole/hr)	Net Vap (lbmole/hr)	Net Feed (lbmole/hr)	Net Draws (lbmole/hr)	Duty (Btu/hr)
1__Main Tower	-145.0	260.0	3285	---	1.506e+004	1.827e+004	---
2__Main Tower	-143.5	262.2	3230	6494	---	---	---
3__Main Tower	-140.8	264.4	3113	6438	---	---	---
4__Main Tower	-135.7	266.7	2923	6321	---	---	---
5__Main Tower	-127.5	268.9	2640	6132	---	---	---
6__Main Tower	-112.8	271.1	6505	5848	6902	---	---
7__Main Tower	-95.9	273.3	6341	2811	---	---	---
8__Main Tower	-55.5	275.6	6514	2646	---	---	---
9__Main Tower	-8.7	277.8	7172	2820	---	---	---
10__Main Tower	20.7	280.0	7585	3477	---	---	---
Reboiler	45.7	280.0	---	3891	---	3694	2.10e+007

Column Profiles Energy

	Temperature (F)	Liq Enthalpy (Btu/lbmole)	Vap Enthalpy (Btu/lbmole)	Heat Loss (Btu/hr)
1__Main Tower	-145.0	-4.089e+004	-3.451e+004	---
2__Main Tower	-143.5	-4.106e+004	-3.456e+004	---
3__Main Tower	-140.8	-4.138e+004	-3.459e+004	---
4__Main Tower	-135.7	-4.190e+004	-3.463e+004	---
5__Main Tower	-127.5	-4.255e+004	-3.467e+004	---
6__Main Tower	-112.8	-4.593e+004	-3.461e+004	---
7__Main Tower	-95.90	-4.684e+004	-3.502e+004	---
8__Main Tower	-55.55	-4.756e+004	-3.651e+004	---
9__Main Tower	-8.711	-4.718e+004	-3.880e+004	---
10__Main Tower	20.67	-4.678e+004	-3.969e+004	---
Reboiler	45.67	-4.856e+004	-3.970e+004	---

FEEDS / PRODUCTS

Flow Basis: Molar

	Stream	Type	Duty (Btu/hr)	State	Flows (lbmole/hr)	Enthalpy (Btu/lbmole)	Temp (F)
1__Main Tower	TE out	Feed	---	Mixed	1.13e+004	-3.5e+004	-140.84
	CS vap to DeMeth	Feed	---	Liquid	3.76e+003	-3.7e+004	-112.00
	TopMeth	Draw	---	Vapour	1.83e+004	-3.5e+004	-145.02
2__Main Tower							
3__Main Tower							
4__Main Tower							
5__Main Tower							
6__Main Tower	CS liq 2	Feed	---	Mixed	6.90e+003	-4.2e+004	-119.52
7__Main Tower							
8__Main Tower							
9__Main Tower							
10__Main Tower							
Reboiler	Qr	Energy	2.1e+007	---	---	---	
	DeMeth	Draw	---	Liquid	3.69e+003	-4.9e+004	45.67

PERFORMANCE SUMMARY FOR INTERNAL OPTION: Internals-1@Main Tower@COL1

Number Of Stages	10
Total Height (ft)	21.20

Total Head Loss (in) 71.96
Total Pressure Drop (inH2O(60F)) 33.77
Number Of Sections 2
Number Of Diameters 2
Pressure Drop Across Sump (psi) ---

Section	Start	End	Height (ft)	Diameter (ft)	Internals Type	Tray or Packing Type	Section Pressure Drop (inH2O(60F))	Approach To Flood (%)	Limiting Stage
CS-1	1__Main Tower	4__Main Tower	2.000	8.000	Trayed	Bubble Cap	11.98	77.85	
CS-2	5__Main Tower	10__Main Tower	2.200	6.322	Trayed	Bubble Cap	21.79	80.00	

SETUP

Sub-Flowsheet

Internal Feed Stream	External Feed Stream	Transfer Basis
Qr	Q_T-101	None Req'd
TE out	12	P-H Flash
CS liq 2	10	P-H Flash
CS vap to DeMeth	11	P-H Flash

Internal Prod Stream	External Prod Stream	Transfer Basis
DeMeth	14	P-H Flash
TopMeth	13	P-H Flash

VARIABLES

Column Flowsheet Vars Available as Parameters

Data Source	Variable	Component	Description

COMPONENT MAPS

Feed Streams

Feed Name	In to SubFlowSheet	Out of SubFlowSheet
Qr		
TE out		
CS liq 2		

Product Stream

Product Name	In to SubFlowSheet	Out of SubFlowSheet
DeMeth		

TRAY by TRAY PROPERTIES TABLES

Column Temperature / Pressure Profile

Column Stage	Temperature (F)	Pressure (psia)
1__Main Tower	-145.0	260.0
2__Main Tower	-143.5	262.2
3__Main Tower	-140.8	264.4
4__Main Tower	-135.7	266.7
5__Main Tower	-127.5	268.9
6__Main Tower	-112.8	271.1
7__Main Tower	-95.90	273.3
8__Main Tower	-55.55	275.6
9__Main Tower	-8.711	277.8
10__Main Tower	20.67	280.0

Reboiler 45.67 280.0
Column Flow Profile

Options Selected
Molar flow is selected Net is selected as flow basis

Tray Number	Vapour (lbmole/hr)	Bulk Liquid (lbmole/hr)
1__Main Tower	1.827e+004	3285
2__Main Tower	6494	3230
3__Main Tower	6438	3113
4__Main Tower	6321	2923
5__Main Tower	6132	2640
6__Main Tower	5848	6505
7__Main Tower	2811	6341
8__Main Tower	2646	6514
9__Main Tower	2820	7172
10__Main Tower	3477	7585
Reboiler	3891	3694

Column Properties Profile

Options Selected
Mass basis is selected

Stage	Surf Tens L-Liq (dyne/cm)	Mol Wt L-Liq	Dens L-Liq (lb/ft3)	Visc L-Liq (cP)	Therm Con L-Liq (Btu/hr-ft-F)	Heat Cap L-Liq (Btu/lb-F)
1__Main Tower	7.49	21.8	27.1	8.47e-002	6.86e-002	0.748
2__Main Tower	7.57	22.0	27.2	8.55e-002	6.83e-002	0.742
3__Main Tower	7.79	22.4	27.6	8.78e-002	6.80e-002	0.731
4__Main Tower	8.19	23.2	28.1	9.20e-002	6.75e-002	0.711
5__Main Tower	8.73	24.4	28.9	9.78e-002	6.66e-002	0.686
6__Main Tower	10.5	29.2	31.8	0.132	6.56e-002	0.602
7__Main Tower	10.8	30.5	32.1	0.130	6.73e-002	0.598
8__Main Tower	9.87	32.3	31.5	0.116	6.66e-002	0.619
9__Main Tower	7.47	33.6	30.0	9.64e-002	6.07e-002	0.675
10__Main Tower	5.86	34.6	29.1	8.71e-002	5.55e-002	0.722
Reboiler	5.51	38.0	29.6	9.06e-002	5.14e-002	0.709

Column Composition Profile

Options Selected
Fraction is selected as the composition basis Net is selected as flow basis
Molar basis is selected

Stage	Methane L-Liq	Propane L-Liq	n-Butane L-Liq	n-Pentane L-Liq
1__Main Tower	0.6612	0.0461	0.0054	0.0004
2__Main Tower	0.6495	0.0469	0.0054	0.0004
3__Main Tower	0.6237	0.0489	0.0057	0.0004
4__Main Tower	0.5756	0.0525	0.0060	0.0005
5__Main Tower	0.5054	0.0609	0.0068	0.0005
6__Main Tower	0.3950	0.1204	0.0343	0.0068
7__Main Tower	0.3158	0.1260	0.0353	0.0070
8__Main Tower	0.1868	0.1295	0.0349	0.0068
9__Main Tower	0.0832	0.1300	0.0326	0.0063

10__Main Tower 0.0297 0.1479 0.0337 0.0062
Reboiler 0.0082 0.2094 0.0603 0.0120
Heavy/Light Key Component Ratios

Options Selected
Molar basis is selected
Key Components

Light Key	Chosen	Heavy Key	Chosen
Methane	On	Methane	Off
Propane	On	Propane	Off
n-Butane	On	n-Butane	Off
n-Pentane	On	n-Pentane	Off
Ethane	Off	Ethane	On
i-Butane	Off	i-Butane	On
n-Hexane	Off	n-Hexane	Off
i-Pentane	Off	i-Pentane	Off
Nitrogen	Off	Nitrogen	Off
CO2	Off	CO2	Off
H2O	Off	H2O	Off

Stage	Light Liq
1__Main Tower	2.515
2__Main Tower	2.390
3__Main Tower	2.143
4__Main Tower	1.764
5__Main Tower	1.365
6__Main Tower	1.322
7__Main Tower	0.9880
8__Main Tower	0.5837
9__Main Tower	0.3496
10__Main Tower	0.2865
Reboiler	0.4302

Column K-Values Profile

Tray Number	Methane	Propane	n-Butane	n-Pentane
1__Main Tower	1.480	7.244e-003	7.997e-004	9.573e-005
2__Main Tower	1.506	7.574e-003	8.461e-004	1.025e-004
3__Main Tower	1.563	8.146e-003	9.247e-004	1.139e-004
4__Main Tower	1.682	9.323e-003	1.088e-003	1.381e-004
5__Main Tower	1.891	1.169e-002	1.431e-003	1.908e-004
6__Main Tower	2.386	1.657e-002	2.135e-003	3.001e-004
7__Main Tower	2.861	2.674e-002	3.887e-003	6.154e-004
8__Main Tower	3.988	7.344e-002	1.405e-002	2.903e-003
9__Main Tower	5.054	0.1906	4.874e-002	1.331e-002
10__Main Tower	5.481	0.3089	9.305e-002	2.972e-002
Reboiler	6.089	0.4275	0.1408	4.900e-002

VLV-100 (Valve): Design, Rating

Valve: VLV-100

CONNECTIONS

Inlet Stream

STREAM NAME FROM UNIT OPERATION
7 V-101 Separator
Outlet Stream

STREAM NAME TO UNIT OPERATION
10 T-101 Reboiled Absorber
PARAMETERS

Physical Properties

Pressure Drop: 600.0 psi
User Variables

RATING

Sizing

Sizing Conditions
Inlet Pressure 809.7 psia Molecular Weight 25.35 Current
Valve Opening 50.00 % Delta P 600.0 psi Flow Rate 1.749e+005 lb/hr
Valve Sizing Method and Type
Sizing Method: ANSI/ISA
Valve Operating Characteristic and Sizing Information
Linear Sized Coefficient: Cv (standard) cal/min.sqrt(psi)
Fl 0.9000 Cv 45.68 USGPM(60F,1psi) Cg 1529 Fp 1.000 Xt 0.7000 Rigorous Cp/Cv Method
Nozzle Parameters

Base Elevation Relative to Ground Level 0.0000 ft

	7	10
Diameter (ft)	0.1640	0.1640
Elevation (Base) (ft)	0.0000	0.0000
Elevation (Ground) (ft)	0.0000	0.0000
Elevation (% of Height) (%)		

VLV-101 (Valve): Design, Rating

Valve: VLV-101

CONNECTIONS

Inlet Stream

STREAM NAME FROM UNIT OPERATION
31 E-202 Air cooler
Outlet Stream

STREAM NAME TO UNIT OPERATION

32 E-102 LNG
PARAMETERS

Physical Properties

Pressure Drop: 245.0 psi
User Variables

RATING

Sizing

Sizing Conditions
Inlet Pressure 264.0 psia Molecular Weight 44.10 Current
Valve Opening 100.00 % Delta P 245.0 psi Flow Rate 5.733e+005 lb/hr
Valve Sizing Method and Type
Sizing Method: ANSI/ISA
Valve Operating Characteristic and Sizing Information
Linear Sized Coefficient: Cv (standard) cal/min.sqrt(psi)
Fl 0.9000 Cv 109.8 USGPM(60F,1psi) Cg 3676 Fp 1.000 Xt 0.7000 Rigorous Cp/Cv Method
Nozzle Parameters

Base Elevation Relative to Ground Level 0.0000 ft

	31	32
Diameter (ft)	0.1640	0.1640
Elevation (Base) (ft)	0.0000	0.0000
Elevation (Ground) (ft)	0.0000	0.0000
Elevation (% of Height) (%)		

VLV-102 (Valve): Design, Rating

Valve: VLV-102

CONNECTIONS

Inlet Stream

STREAM NAME FROM UNIT OPERATION
3 E-102 LNG
Outlet Stream

STREAM NAME TO UNIT OPERATION
4 E-103 Plate Exchanger
PARAMETERS

Physical Properties

Pressure Drop: 100.0 psi
User Variables

RATING

Sizing

Sizing Conditions
Inlet Pressure 911.7 psia Molecular Weight 20.00 Current
Valve Opening 50.00 % Delta P 100.0 psi Flow Rate 4.392e+005 lb/hr
Valve Sizing Method and Type
Sizing Method: ANSI/ISA
Valve Operating Characteristic and Sizing Information
Linear Sized Coefficient: Cv (standard) cal/min.sqrt(psi)
Fl 0.9000 Cv 991.5 USGPM(60F,1psi) Cg 3.318e+004 Fp 1.000 Xt 0.7000 Rigorous Cp/Cv Method
Nozzle Parameters

Base Elevation Relative to Ground Level 0.0000 ft

	3	4
Diameter (ft)	0.1640	0.1640
Elevation (Base) (ft)	0.0000	0.0000
Elevation (Ground) (ft)	0.0000	0.0000

Elevation (% of Height) (%)

C-101 (Expander): Design, Rating

Expander: C-101

CONNECTIONS

Inlet Stream

STREAM NAME	FROM UNIT OPERATION
9	TEE-100 Tee

Outlet Stream

STREAM NAME	TO UNIT OPERATION
12	T-101 Reboiled Absorber

Energy Stream

STREAM NAME	TO UNIT OPERATION
W_C-101	C-102 Compressor

PARAMETERS

Duty: 2.0637e+03 hp Speed: ---
Adiabatic Eff.: 75.00 PolyTropic Eff.: 72.88
Adiabatic Head: 2.749e+004 ft Polytropic Head: 2.829e+004 ft
Adiabatic Fluid Head: 2.749e+004 lbf-ft/lbm Polytropic Fluid Head: 2.829e+004 lbf-ft/lbm
Polytropic Exp. 1.007 Isentropic Exp. 1.052 Poly Head Factor 1.002
User Variables

RATING

Curves

Expander Speed: --- Efficiency: Adiabatic Curves Enabled: Yes
Curve Name Activate

Speed:
Flow Head Efficiency (%)
Flow Limits

Surge Curve: Inactive
Speed Flow

Stone Wall Curve: Inactive
Speed Flow

Surge Flow Rate --- Field Flow Rate 595.1 ACFM Stone Wall Flow --- Expander Volume 0.0000 ft3
Nozzle Paramaters

Base Elevation Relative to Ground Level 0.0000 ft

	9	12
Diameter (ft)	0.1640	0.1640
Elevation (Base) (ft)	0.0000	0.0000
Elevation (Ground) (ft)	0.0000	0.0000

Inertia

Rotational inertia (lb-ft2) 142.4 Radius of gyration (ft) 0.6562 Mass (lb) 330.7 Friction loss factor (lb-ft2/s) 0.1424

TEE-100 (Tee): Design, Rating

Tee: TEE-100

CONNECTIONS

Inlet Stream

STREAM NAME	FROM UNIT OPERATION
6	V-101 Separator

Outlet Stream

STREAM NAME	TO UNIT OPERATION
9	C-101 Expander
8	E-104 Plate Exchanger

PARAMETERS

	Flow Ratios	Dynamic Valve Openings
9	0.7500	75.00
8	0.2500	25.00

Valve Control: Multiple Stream
User Variables

RATING

Nozzle Parameters

Base Elevation Relative to Ground Level 0.0000 ft

	6	9	8
Diameter (ft)	0.1640	0.1640	0.1640
Elevation (Base) (ft)	0.0000	0.0000	0.0000
Elevation (Ground) (ft)	0.0000	0.0000	0.0000

E-102 (LNG): Design, Rating, Details, HTFS - Results, EDR CoilWound - Results

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LNG: E-102

CONNECTIONS

Inlet Stream

STREAM NAME	FROM UNIT OPERATION
2	E-101 LNG
32	VLV-101 Valve

Outlet Stream

STREAM NAME	TO UNIT OPERATION
3	VLV-102 Valve
27	V-201 Separator

PARAMETERS

Exchanger Parameters

Rating Method: Simple Weighted Shell Passes: ---

Exchange Details

Pass Name	Intervals	Dew/Bubble Pt.	Equilibrate	Step Type	Pressure Profile
2-3	10	On	Off	Equal Enthalpy Const dPdH	
32-27	10	On	Off	Equal Enthalpy Const dPdH	

Specifications Summary

Name	Type	Value	Curr Value	Rel Error	Active	Estimate
Heat Balance	Duty	0.0000 Btu/hr	6.324e-005 Btu/hr	1.458e-012	On	Off

Side Results

Pass Name	Inlet Temp (F)	Outlet Temp (F)	Delta P (psi)
2-3	70.92	-33.04	1.000
32-27	-33.08	-40.67	3.100

Molar Flow (lbmole/hr)	Duty (Btu/hr)	Ua (Btu/F-hr)	Hot/Cold
2.196e+004	-4.338e+007	3.618e+006	Hot
1.300e+004	4.338e+007	3.618e+006	Cold

Overall/Detailed Performance

Duty: 4.338e+07 Btu/hr UA Curv. Error: 1.685e+05 Btu/F-hr

Heat Leak: 0.000e-01 Btu/hr Hot Pinch Temp: -33.04 F
Heat Loss: 0.000e-01 Btu/hr Cold Pinch Temp: -33.08 F
UA: 3.618e+06 Btu/F-hr Cold Inlet Eqm Temp: -33.08 F
Min. Approach: 4.784e-002 F Hot Inlet Eqm Temp: 70.92 F
Lmtd: 11.99 F
SPECIFICATIONS

Heat Balance

Type: Duty Pass: Error Spec Value: 0.0000 Btu/hr
RATING

Sizing

Zone Geometry

Zone Number	Width	Length
Zone 0	3.281 ft	3.281 ft

Zone Metal Properties

Zone Number	Thermal Cond	Cp	Density
Zone 0	92.45 Btu/hr-ft-F	0.2102 Btu/lb-F	168.6 lb/ft3

Zone Layers

Zone Number	Number of Layers in Set	Repeated Sets
Zone 0	2	1

Layers

Zone 0

Layer	Perforation (%)	Height (ft)	Pitch (fins/m)	Fin Thick (ft)	Plate Thick (ft)
L 0	0.00	2.208e-002	530.0	1.375e-003	4.000e-003
L 1	0.00	2.208e-002	530.0	1.375e-003	4.000e-003

Heat Transfer

Zone 0
Initial Metal Temp
77.00 F
Internal Heat Transfer

Layer	U Calculator	U (Btu/hr-ft2-F)	Ref Flow (lb/hr)	Min Scale	Override UA	Convective UA (Btu/F-hr)
L 0	U specified	0.0000	---	0.0000	No	0.0000
L 1	U specified	0.0000	---	0.0000	No	0.0000

External Heat Transfer

Layer	External T (F)	UA (Btu/F-hr)	Q1 (Btu/hr)	Q fixed (Btu/hr)
L 0	77.00	0.0000	0.0000	0.0000
L 1	77.00	0.0000	0.0000	0.0000

PERFORMANCE TABLES

Cold Composite

Overall Phase Cold Composite

Temperature (F)	Pressure (psia)	Heat Flow (Btu/hr)	Enthalpy (Btu/lbmole)
-33.08	---	0.00	---
-33.70	---	3746465.62	---
-33.80	---	4337647.39	---
-34.40	---	7977341.16	---

-34.52	---	8675294.79	---
-35.13	---	12320215.09	---
-35.25	---	13012942.18	---
-35.89	---	16739858.27	---
-35.99	---	17350589.57	---
-36.67	---	21226161.29	---
-36.75	---	21688236.97	---
-37.47	---	25775401.33	---
-37.51	---	26025884.36	---
-38.28	---	30363531.76	---
-39.07	---	34701179.15	---
-39.48	---	36915456.78	---
-39.86	---	39038826.54	---
-40.67	---	43376473.94	---

UA (Btu/F-hr)	Molar Vap Frac	Mass Vap Frac	Heat of Vap. (Btu/lbmole)	Delta Temp (F)
---	---	0.0000	---	0.0478
---	---	0.0000	---	7.2937
---	---	0.0000	---	8.5024
---	---	0.0000	---	15.9492
---	---	0.0000	---	17.4569
---	---	0.0000	---	25.3373
---	---	0.0000	---	26.9144
---	---	0.0000	---	35.4108
---	---	0.0000	---	36.8753
---	---	0.0000	---	46.1800
---	---	0.0000	---	47.3478
---	---	0.0000	---	57.6831
---	---	0.0000	---	58.3513
---	---	0.0000	---	69.9346
---	---	0.0000	---	82.1543
---	---	0.0000	---	88.6214
---	---	0.0000	---	96.0440
---	---	0.0000	---	111.5925

Vapour Phase Cold Composite

Mass Flow (lb/hr)	Molecular Wt	Density (lb/ft3)	Mass Sp Heat (Btu/lb-F)	Viscosity (cP)	Thermal Cond (Btu/hr-ft-F)
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Std Gas Flow (MMSCFD)	Z Factor	Pseudo Pc (psia)	Pseudo Tc (F)	Pseudo Zc	Pseudo Omega
---	---	-33.70	---	---	
---	---	-33.70	---	---	
---	---	-33.70	---	---	
---	---	-33.70	---	---	
---	---	-33.70	---	---	
---	---	-33.70	---	---	
---	---	-33.70	---	---	
---	---	-33.70	---	---	
---	---	-33.70	---	---	
---	---	-33.70	---	---	
---	---	-33.70	---	---	
---	---	-33.70	---	---	
---	---	-33.70	---	---	
---	---	-33.70	---	---	
---	---	-33.70	---	---	
---	---	-33.70	---	---	
---	---	-33.70	---	---	
---	---	-33.70	---	---	

Light Liquid Phase Cold Composite

Mass Flow (lb/hr)	Density (lb/ft3)	Mass Sp Heat (Btu/lb-F)	Viscosity (cP)	Thermal Cond (Btu/hr-ft-F)	Surface Tens (dyne/cm)
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Molecular Wt	Sp Gravity	Pseudo Pc (psia)	Pseudo Tc (F)	Pseudo Zc	Pseudo Omega
---	---	-33.80	---	---	
---	---	-33.80	---	---	
---	---	-33.80	---	---	
---	---	-33.80	---	---	
---	---	-33.80	---	---	
---	---	-33.80	---	---	
---	---	-33.80	---	---	
---	---	-33.80	---	---	

---	---	---	-33.80	---	---
---	---	---	-33.80	---	---
---	---	---	-33.80	---	---
---	---	---	-33.80	---	---
---	---	---	-33.80	---	---
---	---	---	-33.80	---	---
---	---	---	-33.80	---	---
---	---	---	-33.80	---	---
---	---	---	-33.80	---	---
---	---	---	-33.80	---	---

Heavy Liquid Phase Cold Composite

Mass Flow (lb/hr)	Density (lb/ft3)	Mass Sp Heat (Btu/lb-F)	Viscosity (cP)	Thermal Cond (Btu/hr-ft-F)	Surface Tens (dyne/cm)
---	---	---	---	---	---
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Molecular Wt	Sp Gravity	Pseudo Pc (psia)	Pseudo Tc (F)	Pseudo Zc	Pseudo Omega
---	---	---	-34.40	---	---
---	---	---	-34.40	---	---
---	---	---	-34.40	---	---
---	---	---	-34.40	---	---
---	---	---	-34.40	---	---
---	---	---	-34.40	---	---
---	---	---	-34.40	---	---
---	---	---	-34.40	---	---
---	---	---	-34.40	---	---
---	---	---	-34.40	---	---
---	---	---	-34.40	---	---
---	---	---	-34.40	---	---
---	---	---	-34.40	---	---
---	---	---	-34.40	---	---
---	---	---	-34.40	---	---
---	---	---	-34.40	---	---
---	---	---	-34.40	---	---
---	---	---	-34.40	---	---

Mixed Liquid Cold Composite

Mass Flow (lb/hr)	Density (lb/ft3)	Mass Sp Heat (Btu/lb-F)	Viscosity (cP)	Thermal Cond (Btu/hr-ft-F)	Surface Tens (dyne/cm)
---	---	---	---	---	---
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Molecular Wt	Sp Gravity	Pseudo Pc (psia)	Pseudo Tc (F)	Pseudo Zc	Pseudo Omega
---	---	---	-34.52	---	---
---	---	---	-34.52	---	---
---	---	---	-34.52	---	---
---	---	---	-34.52	---	---
---	---	---	-34.52	---	---
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---	---	---	-34.52	---	---
---	---	---	-34.52	---	---
---	---	---	-34.52	---	---

Hot Composite

Overall Phase Hot Composite

Temperature (F)	Pressure (psia)	Heat Flow (Btu/hr)	Enthalpy (Btu/lbmole)
-33.04	---	0.00	---
-26.41	---	3746465.62	---
-25.30	---	4337647.39	---
-18.45	---	7977341.16	---
-17.06	---	8675294.79	---
-9.80	---	12320215.09	---
-8.34	---	13012942.18	---
-0.48	---	16739858.27	---

0.88	---	17350589.57	---
9.51	---	21226161.29	---
10.60	---	21688236.97	---
20.22	---	25775401.33	---
20.84	---	26025884.36	---
31.65	---	30363531.76	---
43.08	---	34701179.15	---
49.15	---	36915456.78	---
56.18	---	39038826.54	---
70.92	---	43376473.94	---

UA	Molar Vap Frac	Mass Vap Frac	Heat of Vap.	Delta Temp
(Btu/F-hr)			(Btu/lbmole)	(F)
---	---	0.0000	---	0.0478
---	---	0.0000	---	7.2937
---	---	0.0000	---	8.5024
---	---	0.0000	---	15.9492
---	---	0.0000	---	17.4569
---	---	0.0000	---	25.3373
---	---	0.0000	---	26.9144
---	---	0.0000	---	35.4108
---	---	0.0000	---	36.8753
---	---	0.0000	---	46.1800
---	---	0.0000	---	47.3478
---	---	0.0000	---	57.6831
---	---	0.0000	---	58.3513
---	---	0.0000	---	69.9346
---	---	0.0000	---	82.1543
---	---	0.0000	---	88.6214
---	---	0.0000	---	96.0440
---	---	0.0000	---	111.5925

Vapour Phase Hot Composite

Mass Flow	Molecular Wt	Density	Mass Sp Heat	Viscosity	Thermal Cond
(lb/hr)		(lb/ft3)	(Btu/lb-F)	(cP)	(Btu/hr-ft-F)
---	---	---	---	---	---
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Std Gas Flow	Z Factor	Pseudo Pc	Pseudo Tc	Pseudo Zc	Pseudo Omega
(MMSCFD)		(psia)	(F)		

---	---	---	-26.41	---	---
---	---	---	-26.41	---	---
---	---	---	-26.41	---	---
---	---	---	-26.41	---	---
---	---	---	-26.41	---	---
---	---	---	-26.41	---	---
---	---	---	-26.41	---	---
---	---	---	-26.41	---	---
---	---	---	-26.41	---	---
---	---	---	-26.41	---	---
---	---	---	-26.41	---	---
---	---	---	-26.41	---	---
---	---	---	-26.41	---	---
---	---	---	-26.41	---	---
---	---	---	-26.41	---	---
---	---	---	-26.41	---	---
---	---	---	-26.41	---	---
---	---	---	-26.41	---	---
---	---	---	-26.41	---	---

Light Liquid Phase Hot Composite

Mass Flow (lb/hr)	Density (lb/ft3)	Mass Sp Heat (Btu/lb-F)	Viscosity (cP)	Thermal Cond (Btu/hr-ft-F)	Surface Tens (dyne/cm)
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Molecular Wt	Sp Gravity	Pseudo Pc (psia)	Pseudo Tc (F)	Pseudo Zc	Pseudo Omega
---	---	-25.30	---	---	
---	---	-25.30	---	---	
---	---	-25.30	---	---	
---	---	-25.30	---	---	
---	---	-25.30	---	---	
---	---	-25.30	---	---	
---	---	-25.30	---	---	
---	---	-25.30	---	---	
---	---	-25.30	---	---	
---	---	-25.30	---	---	
---	---	-25.30	---	---	
---	---	-25.30	---	---	

---	---	---	-25.30	---	---
---	---	---	-25.30	---	---
---	---	---	-25.30	---	---
---	---	---	-25.30	---	---
---	---	---	-25.30	---	---
---	---	---	-25.30	---	---

Heavy Liquid Phase Hot Composite

Mass Flow (lb/hr)	Density (lb/ft3)	Mass Sp Heat (Btu/lb-F)	Viscosity (cP)	Thermal Cond (Btu/hr-ft-F)	Surface Tens (dyne/cm)
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Molecular Wt	Sp Gravity	Pseudo Pc (psia)	Pseudo Tc (F)	Pseudo Zc	Pseudo Omega
---	---	---	-18.45	---	---
---	---	---	-18.45	---	---
---	---	---	-18.45	---	---
---	---	---	-18.45	---	---
---	---	---	-18.45	---	---
---	---	---	-18.45	---	---
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Mixed Liquid Hot Composite

Mass Flow (lb/hr)	Density (lb/ft3)	Mass Sp Heat (Btu/lb-F)	Viscosity (cP)	Thermal Cond (Btu/hr-ft-F)	Surface Tens (dyne/cm)
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Molecular Wt	Sp Gravity	Pseudo Pc (psia)	Pseudo Tc (F)	Pseudo Zc	Pseudo Omega
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2-3

Overall Phase 2-3

Temperature (F)	Pressure (psia)	Heat Flow (Btu/hr)	Enthalpy (Btu/lbmole)
-33.04	911.70	0.00	-36766.56
-26.41	911.78	3746465.62	-36595.96
-18.45	911.88	7977341.16	-36403.31
-9.80	911.98	12320215.09	-36205.56
-0.48	912.08	16739858.27	-36004.31
9.51	912.19	21226161.29	-35800.03
20.22	912.29	25775401.33	-35592.88
31.65	912.40	30363531.76	-35383.96
43.08	912.50	34701179.15	-35186.44
49.15	912.55	36915456.78	-35085.61
56.18	912.60	39038826.54	-34988.93
70.92	912.70	43376473.94	-34791.41

UA (Btu/F-hr)	Molar Vap Frac	Mass Vap Frac	Heat of Vap. (Btu/lbmole)	Delta Temp (F)
0.00	0.8013	0.7272	---	0.0478
2455890.78	0.8363	0.7658	---	0.0478
2838341.39	0.8704	0.8056	---	0.0478
3052467.38	0.9004	0.8431	---	0.0478
3199335.45	0.9266	0.8781	---	0.0478
3309953.75	0.9491	0.9107	---	0.0478
3397915.78	0.9681	0.9407	---	0.0478
3470042.62	0.9836	0.9676	---	0.0478
3527206.79	0.9951	0.9898	---	0.0478
3553151.20	1.0000	1.0000	---	0.0478
3576160.55	1.0000	1.0000	---	0.0478
3618020.07	1.0000	1.0000	---	0.0478

Vapour Phase 2-3

Mass Flow (lb/hr)	Molecular Wt	Density (lb/ft3)	Mass Sp Heat (Btu/lb-F)	Viscosity (cP)	Thermal Cond (Btu/hr-ft-F)
319366.97	18.15	6.02	1.04	0.01	0.02
336311.04	18.31	5.82	0.98	0.01	0.02
353795.86	18.51	5.61	0.92	0.01	0.02
370242.73	18.72	5.41	0.87	0.01	0.02
385631.03	18.95	5.22	0.83	0.01	0.02
399955.94	19.19	5.04	0.79	0.01	0.02
413131.76	19.43	4.86	0.76	0.01	0.02
424938.07	19.67	4.69	0.73	0.01	0.02
434671.59	19.89	4.53	0.70	0.01	0.02
439152.99	20.00	4.45	0.69	0.01	0.02
439152.99	20.00	4.32	0.68	0.01	0.02
439152.99	20.00	4.07	0.66	0.01	0.02

Std Gas Flow (MMSCFD)	Z Factor	Pseudo Pc (psia)	Pseudo Tc (F)	Pseudo Zc	Pseudo Omega
159.96	0.60	674.79	-88.87	0.29	0.02
166.95	0.62	674.74	-86.86	0.29	0.02
173.76	0.64	674.61	-84.47	0.29	0.03
179.75	0.65	674.39	-81.95	0.29	0.03
184.97	0.67	674.08	-79.35	0.29	0.03
189.46	0.69	673.67	-76.73	0.29	0.03
193.26	0.71	673.16	-74.15	0.29	0.03
196.35	0.73	672.58	-71.70	0.29	0.03
198.66	0.74	671.99	-69.58	0.29	0.03
199.63	0.75	671.69	-68.58	0.29	0.03
199.63	0.76	671.69	-68.58	0.29	0.03
199.63	0.79	671.69	-68.58	0.29	0.03

Light Liquid Phase 2-3

Mass Flow (lb/hr)	Density (lb/ft3)	Mass Sp Heat (Btu/lb-F)	Viscosity (cP)	Thermal Cond (Btu/hr-ft-F)	Surface Tens (dyne/cm)
119786.02	24.79	0.78	0.07	0.05	5.52
102841.94	25.48	0.75	0.07	0.05	5.79
85357.13	26.23	0.73	0.08	0.05	6.07
68910.26	26.96	0.71	0.08	0.05	6.34
53521.96	27.68	0.69	0.09	0.05	6.58
39197.05	28.40	0.67	0.09	0.05	6.82

26021.22	29.15	0.65	0.10	0.05	7.05
14214.92	29.91	0.64	0.10	0.05	7.30
4481.40	30.65	0.63	0.11	0.05	7.54
0.00	31.01	0.62	0.11	0.05	7.66
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Molecular Wt	Sp Gravity	Pseudo Pc (psia)	Pseudo Tc (F)	Pseudo Zc	Pseudo Omega
27.45	0.40	659.16	13.28	0.29	0.07
28.61	0.41	656.08	24.82	0.29	0.07
29.99	0.42	652.03	38.21	0.28	0.08
31.52	0.43	647.18	52.40	0.28	0.09
33.20	0.44	641.46	67.40	0.28	0.09
35.06	0.46	634.76	83.37	0.28	0.10
37.15	0.47	626.95	100.54	0.28	0.11
39.51	0.48	617.90	119.10	0.28	0.12
41.99	0.49	608.30	137.81	0.28	0.13
43.33	0.50	603.09	147.65	0.28	0.13
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Heavy Liquid Phase 2-3

Mass Flow (lb/hr)	Density (lb/ft3)	Mass Sp Heat (Btu/lb-F)	Viscosity (cP)	Thermal Cond (Btu/hr-ft-F)	Surface Tens (dyne/cm)
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Molecular Wt	Sp Gravity	Pseudo Pc (psia)	Pseudo Tc (F)	Pseudo Zc	Pseudo Omega
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Mixed Liquid 2-3

Mass Flow (lb/hr)	Density (lb/ft3)	Mass Sp Heat (Btu/lb-F)	Viscosity (cP)	Thermal Cond (Btu/hr-ft-F)	Surface Tens (dyne/cm)

119786.02 24.79 0.78 0.07 0.05 ---
102841.94 25.48 0.75 0.07 0.05 ---
85357.13 26.23 0.73 0.08 0.05 ---
68910.26 26.96 0.71 0.08 0.05 ---
53521.96 27.68 0.69 0.09 0.05 ---
39197.05 28.40 0.67 0.09 0.05 ---
26021.22 29.15 0.65 0.10 0.05 ---
14214.92 29.91 0.64 0.10 0.05 ---
4481.40 30.65 0.63 0.11 0.05 ---
0.00 31.01 0.62 0.11 0.05 ---
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Molecular Wt	Sp Gravity	Pseudo Pc (psia)	Pseudo Tc (F)	Pseudo Zc	Pseudo Omega
27.45	0.40	659.16	13.28	0.29	0.07
28.61	0.41	656.08	24.82	0.29	0.07
29.99	0.42	652.03	38.21	0.28	0.08
31.52	0.43	647.18	52.40	0.28	0.09
33.20	0.44	641.46	67.40	0.28	0.09
35.06	0.46	634.76	83.37	0.28	0.10
37.15	0.47	626.95	100.54	0.28	0.11
39.51	0.48	617.90	119.10	0.28	0.12
41.99	0.49	608.30	137.81	0.28	0.13
43.33	0.50	603.09	147.65	0.28	0.13
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32-27

Overall Phase 32-27

Temperature (F)	Pressure (psia)	Heat Flow (Btu/hr)	Enthalpy (Btu/lbmole)
-33.08	19.00	0.00	-50004.48
-33.80	18.69	4337647.39	-49670.82
-34.52	18.38	8675294.79	-49337.16
-35.25	18.07	13012942.18	-49003.49
-35.99	17.76	17350589.57	-48669.83
-36.75	17.45	21688236.97	-48336.17
-37.51	17.14	26025884.36	-48002.51
-38.28	16.83	30363531.76	-47668.85
-39.07	16.52	34701179.15	-47335.18
-39.86	16.21	39038826.54	-47001.52
-40.67	15.90	43376473.94	-46667.86

UA (Btu/F-hr)	Molar Vap Frac	Mass Vap Frac	Heat of Vap. (Btu/lbmole)	Delta Temp (F)
0.00	0.5668	0.5668	---	0.0478
2530889.30	0.6104	0.6104	---	0.0478
2880155.74	0.6539	0.6539	---	0.0478
3078990.48	0.6974	0.6974	---	0.0478
3216235.36	0.7408	0.7408	---	0.0478
3319835.29	0.7842	0.7842	---	0.0478
3402233.22	0.8275	0.8275	---	0.0478
3470042.62	0.8707	0.8707	---	0.0478
3527206.79	0.9139	0.9139	---	0.0478

3576160.55 0.9570 0.9570 --- 0.0478
3618020.07 1.0000 1.0000 --- 0.0478
Vapour Phase 32-27

Mass Flow (lb/hr)	Molecular Wt (lb/ft3)	Density (Btu/lb-F)	Mass Sp Heat (cP)	Viscosity (Btu/hr-ft-F)	Thermal Cond
324910.26	44.10	0.19	0.35	0.01	0.01
349908.18	44.10	0.19	0.35	0.01	0.01
374867.33	44.10	0.18	0.35	0.01	0.01
399789.32	44.10	0.18	0.35	0.01	0.01
424680.43	44.10	0.18	0.35	0.01	0.01
449538.35	44.10	0.18	0.35	0.01	0.01
474354.86	44.10	0.17	0.35	0.01	0.01
499137.10	44.10	0.17	0.34	0.01	0.01
523883.77	44.10	0.17	0.34	0.01	0.01
548587.11	44.10	0.16	0.34	0.01	0.01
573261.00	44.10	0.16	0.34	0.01	0.01

Std Gas Flow (MMSCFD)	Z Factor	Pseudo Pc (psia)	Pseudo Tc (F)	Pseudo Zc	Pseudo Omega
66.98	0.96	617.38	206.15	0.28	0.15
72.13	0.96	617.38	206.15	0.28	0.15
77.27	0.96	617.38	206.15	0.28	0.15
82.41	0.96	617.38	206.15	0.28	0.15
87.54	0.96	617.38	206.15	0.28	0.15
92.67	0.96	617.38	206.15	0.28	0.15
97.78	0.96	617.38	206.15	0.28	0.15
102.89	0.96	617.38	206.15	0.28	0.15
107.99	0.96	617.38	206.15	0.28	0.15
113.08	0.96	617.38	206.15	0.28	0.15
118.17	0.96	617.38	206.15	0.28	0.15

Light Liquid Phase 32-27

Mass Flow (lb/hr)	Density (lb/ft3)	Mass Sp Heat (Btu/lb-F)	Viscosity (cP)	Thermal Cond (Btu/hr-ft-F)	Surface Tens (dyne/cm)
248350.74	35.86	0.53	0.18	0.08	14.66
223352.82	35.89	0.53	0.19	0.08	14.71
198393.67	35.92	0.53	0.19	0.08	14.77
173471.68	35.95	0.53	0.19	0.08	14.82
148580.58	35.98	0.53	0.19	0.08	14.88
123722.65	36.01	0.53	0.19	0.08	14.93
98906.14	36.04	0.53	0.19	0.08	14.99
74123.90	36.07	0.53	0.19	0.08	15.05
49377.23	36.11	0.53	0.19	0.08	15.11
24673.90	36.14	0.52	0.19	0.08	15.17
0.00	36.17	0.52	0.19	0.08	15.23

Molecular Wt	Sp Gravity	Pseudo Pc (psia)	Pseudo Tc (F)	Pseudo Zc	Pseudo Omega
44.10	0.57	617.38	206.15	0.28	0.15
44.10	0.57	617.38	206.15	0.28	0.15
44.10	0.58	617.38	206.15	0.28	0.15
44.10	0.58	617.38	206.15	0.28	0.15
44.10	0.58	617.38	206.15	0.28	0.15
44.10	0.58	617.38	206.15	0.28	0.15
44.10	0.58	617.38	206.15	0.28	0.15

44.10	0.58	617.38	206.15	0.28	0.15
44.10	0.58	617.38	206.15	0.28	0.15
44.10	0.58	617.38	206.15	0.28	0.15
44.10	0.58	617.38	206.15	0.28	0.15

Heavy Liquid Phase 32-27

Mass Flow (lb/hr)	Density (lb/ft3)	Mass Sp Heat (Btu/lb-F)	Viscosity (cP)	Thermal Cond (Btu/hr-ft-F)	Surface Tens (dyne/cm)
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Molecular Wt	Sp Gravity	Pseudo Pc (psia)	Pseudo Tc (F)	Pseudo Zc	Pseudo Omega
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Mixed Liquid 32-27

Mass Flow (lb/hr)	Density (lb/ft3)	Mass Sp Heat (Btu/lb-F)	Viscosity (cP)	Thermal Cond (Btu/hr-ft-F)	Surface Tens (dyne/cm)
248350.74	35.86	0.53	0.18	0.08	---
223352.82	35.89	0.53	0.19	0.08	---
198393.67	35.92	0.53	0.19	0.08	---
173471.68	35.95	0.53	0.19	0.08	---
148580.58	35.98	0.53	0.19	0.08	---
123722.65	36.01	0.53	0.19	0.08	---
98906.14	36.04	0.53	0.19	0.08	---
74123.90	36.07	0.53	0.19	0.08	---
49377.23	36.11	0.53	0.19	0.08	---
24673.90	36.14	0.52	0.19	0.08	---
0.00	36.17	0.52	0.19	0.08	---

Molecular Wt	Sp Gravity	Pseudo Pc (psia)	Pseudo Tc (F)	Pseudo Zc	Pseudo Omega
44.10	0.57	617.38	206.15	0.28	0.15
44.10	0.57	617.38	206.15	0.28	0.15
44.10	0.58	617.38	206.15	0.28	0.15
44.10	0.58	617.38	206.15	0.28	0.15
44.10	0.58	617.38	206.15	0.28	0.15

44.10 0.58 617.38 206.15 0.28 0.15
44.10 0.58 617.38 206.15 0.28 0.15
44.10 0.58 617.38 206.15 0.28 0.15
44.10 0.58 617.38 206.15 0.28 0.15
44.10 0.58 617.38 206.15 0.28 0.15
44.10 0.58 617.38 206.15 0.28 0.15
HTFS

EDR Coil Wound Bundle Geometry

Bundle Number Bundle Height Bundle Diameter Tubes Layers Longitudinal Pitch
Bundle Number Transverse Pitch Surface Area Shell Side Flow Area Tube OD Tube Wall Thickness
Bundle Number Tube Material Helix Angle Mandrel OD Shell Diameter ---

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E-101 (LNG): Design, Rating, Details, HTFS - Results, EDR CoilWound - Results
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LNG: E-101

CONNECTIONS

Inlet Stream

STREAM NAME FROM UNIT OPERATION
1
15 P-101A/B Pump
Outlet Stream

STREAM NAME TO UNIT OPERATION
2 E-102 LNG
16 P-102 A/B Pump
PARAMETERS

Exchanger Parameters

Rating Method: Simple Weighted Shell Passes: ---
Exchange Details

Pass Name Intervals Dew/Bubble Pt. Equilibrate Step Type Pressure Profile
1-2 10 On Off Equal Enthalpy Const dPdH
15-16 10 On Off Equal Enthalpy Const dPdH
Specifications Summary

Name Type Value Curr Value Rel Error Active Estimate
Heat Balance Duty 0.0000 Btu/hr 6.919e-005 Btu/hr 2.684e-011 On Off
Side Results

Pass Name Inlet Temp Outlet Temp Delta P
(F) (F) (psi)
1-2 80.00 70.92 2.000
15-16 47.19 72.00 2.000

Molar Flow (lbmole/hr)	Duty (Btu/hr)	Ua (Btu/F-hr)	Hot/Cold
2.196e+004	-2.577e+006	1.811e+005	Hot
3694	2.577e+006	1.811e+005	Cold

Overall/Detailed Performance

Duty: 2.577e+06 Btu/hr
Heat Leak: 0.000e-01 Btu/hr
Heat Loss: 0.000e-01 Btu/hr
UA: 1.811e+05 Btu/F-hr
Min. Approach: 8.000 F
Lmtd: 14.23 F
UA Curv. Error: 3.273e+01 Btu/F-hr
Hot Pinch Temp: 80.00 F
Cold Pinch Temp: 72.00 F
Cold Inlet Eqm Temp: 47.19 F
Hot Inlet Eqm Temp: 80.00 F

SPECIFICATIONS

Heat Balance

Type: Duty Pass: Error Spec Value: 0.0000 Btu/hr

RATING

Sizing

Zone Geometry

Zone Number	Width	Length
Zone 0	3.281 ft	3.281 ft

Zone Metal Properties

Zone Number	Thermal Cond	Cp	Density
Zone 0	92.45 Btu/hr-ft-F	0.2102 Btu/lb-F	168.6 lb/ft3

Zone Layers

Zone Number	Number of Layers in Set	Repeated Sets
Zone 0	2	1

Layers

Zone 0

Layer	Perforation (%)	Height (ft)	Pitch (fins/m)	Fin Thick (ft)	Plate Thick (ft)
L 0	0.00	2.208e-002	530.0	1.375e-003	4.000e-003
L 1	0.00	2.208e-002	530.0	1.375e-003	4.000e-003

Heat Transfer

Zone 0

Initial Metal Temp
77.00 F

Internal Heat Transfer

Layer	U Calculator	U (Btu/hr-ft2-F)	Ref Flow (lb/hr)	Min Scale	Override UA	Convective UA (Btu/F-hr)
L 0	U specified	0.0000	4.400e+005	0.0000	No	0.0000
L 1	U specified	0.0000	1.400e+005	0.0000	No	0.0000

External Heat Transfer

Layer	External T (F)	UA (Btu/F-hr)	Q1 (Btu/hr)	Q fixed (Btu/hr)
L 0	77.00	0.0000	0.0000	0.0000
L 1	77.00	0.0000	0.0000	0.0000

PERFORMANCE TABLES

Cold Composite

Overall Phase Cold Composite

Temperature (F)	Pressure (psia)	Heat Flow (Btu/hr)	Enthalpy (Btu/lbmole)
47.19	---	0.00	---
49.78	---	256820.91	---
49.79	---	257736.30	---
52.36	---	514307.73	---
52.39	---	518037.55	---
54.90	---	771989.05	---
54.97	---	778092.35	---
57.43	---	1029779.44	---
57.51	---	1037833.67	---
59.93	---	1287648.57	---
60.02	---	1297190.90	---
62.40	---	1545578.30	---
62.50	---	1556063.22	---
64.84	---	1803556.58	---
64.94	---	1814296.63	---
67.26	---	2061574.44	---
67.35	---	2071630.71	---
69.64	---	2319626.71	---
69.72	---	2327539.75	---
72.00	---	2577363.01	---

UA (Btu/F-hr)	Molar Vap Frac	Mass Vap Frac	Heat of Vap. (Btu/lbmole)	Delta Temp (F)
---	---	0.0000	---	23.7261
---	---	0.0000	---	22.0340
---	---	0.0000	---	22.0279
---	---	0.0000	---	20.3644
---	---	0.0000	---	20.3403
---	---	0.0000	---	18.7206
---	---	0.0000	---	18.6818
---	---	0.0000	---	17.1037
---	---	0.0000	---	17.0532
---	---	0.0000	---	15.5142
---	---	0.0000	---	15.4554
---	---	0.0000	---	13.9527
---	---	0.0000	---	13.8893
---	---	0.0000	---	12.4198
---	---	0.0000	---	12.3561
---	---	0.0000	---	10.9161
---	---	0.0000	---	10.8575
---	---	0.0000	---	9.4420
---	---	0.0000	---	9.3969
---	---	0.0000	---	8.0000

Vapour Phase Cold Composite

Mass Flow (lb/hr)	Molecular Wt	Density (lb/ft3)	Mass Sp Heat (Btu/lb-F)	Viscosity (cP)	Thermal Cond (Btu/hr-ft-F)
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Std Gas Flow (MMSCFD)	Z Factor	Pseudo Pc (psia)	Pseudo Tc (F)	Pseudo Zc	Pseudo Omega
---	---	49.78	---	---	
---	---	49.78	---	---	
---	---	49.78	---	---	
---	---	49.78	---	---	
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---	---	49.78	---	---	
---	---	49.78	---	---	
---	---	49.78	---	---	
---	---	49.78	---	---	
---	---	49.78	---	---	

Light Liquid Phase Cold Composite

Mass Flow (lb/hr)	Density (lb/ft3)	Mass Sp Heat (Btu/lb-F)	Viscosity (cP)	Thermal Cond (Btu/hr-ft-F)	Surface Tens (dyne/cm)
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Molecular Wt	Sp Gravity	Pseudo Pc (psia)	Pseudo Tc (F)	Pseudo Zc	Pseudo Omega
---	---	---	49.79	---	---
---	---	---	49.79	---	---
---	---	---	49.79	---	---
---	---	---	49.79	---	---
---	---	---	49.79	---	---
---	---	---	49.79	---	---
---	---	---	49.79	---	---
---	---	---	49.79	---	---
---	---	---	49.79	---	---
---	---	---	49.79	---	---
---	---	---	49.79	---	---
---	---	---	49.79	---	---
---	---	---	49.79	---	---
---	---	---	49.79	---	---
---	---	---	49.79	---	---
---	---	---	49.79	---	---
---	---	---	49.79	---	---
---	---	---	49.79	---	---
---	---	---	49.79	---	---
---	---	---	49.79	---	---
---	---	---	49.79	---	---

Heavy Liquid Phase Cold Composite

Mass Flow (lb/hr)	Density (lb/ft3)	Mass Sp Heat (Btu/lb-F)	Viscosity (cP)	Thermal Cond (Btu/hr-ft-F)	Surface Tens (dyne/cm)
---	---	---	---	---	---
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Molecular Wt	Sp Gravity	Pseudo Pc	Pseudo Tc	Pseudo Zc	Pseudo Omega

		(psia)	(F)		
---	---	---	52.36	---	---
---	---	---	52.36	---	---
---	---	---	52.36	---	---
---	---	---	52.36	---	---
---	---	---	52.36	---	---
---	---	---	52.36	---	---
---	---	---	52.36	---	---
---	---	---	52.36	---	---
---	---	---	52.36	---	---
---	---	---	52.36	---	---
---	---	---	52.36	---	---
---	---	---	52.36	---	---
---	---	---	52.36	---	---
---	---	---	52.36	---	---
---	---	---	52.36	---	---
---	---	---	52.36	---	---
---	---	---	52.36	---	---
---	---	---	52.36	---	---
---	---	---	52.36	---	---
---	---	---	52.36	---	---
---	---	---	52.36	---	---

Mixed Liquid Cold Composite

Mass Flow (lb/hr)	Density (lb/ft3)	Mass Sp Heat (Btu/lb-F)	Viscosity (cP)	Thermal Cond (Btu/hr-ft-F)	Surface Tens (dyne/cm)
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Molecular Wt	Sp Gravity	Pseudo Pc (psia)	Pseudo Tc (F)	Pseudo Zc	Pseudo Omega
---	---	---	52.39	---	---
---	---	---	52.39	---	---
---	---	---	52.39	---	---
---	---	---	52.39	---	---
---	---	---	52.39	---	---
---	---	---	52.39	---	---
---	---	---	52.39	---	---

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---	---	---	52.39	---	---
---	---	---	52.39	---	---
---	---	---	52.39	---	---
---	---	---	52.39	---	---
---	---	---	52.39	---	---
---	---	---	52.39	---	---
---	---	---	52.39	---	---
---	---	---	52.39	---	---
---	---	---	52.39	---	---
---	---	---	52.39	---	---

Hot Composite

Overall Phase Hot Composite

Temperature (F)	Pressure (psia)	Heat Flow (Btu/hr)	Enthalpy (Btu/lbmole)
70.92	---	0.00	---
71.82	---	256820.91	---
71.82	---	257736.30	---
72.72	---	514307.73	---
72.73	---	518037.55	---
73.63	---	771989.05	---
73.65	---	778092.35	---
74.53	---	1029779.44	---
74.56	---	1037833.67	---
75.44	---	1287648.57	---
75.47	---	1297190.90	---
76.35	---	1545578.30	---
76.39	---	1556063.22	---
77.26	---	1803556.58	---
77.30	---	1814296.63	---
78.17	---	2061574.44	---
78.21	---	2071630.71	---
79.09	---	2319626.71	---
79.11	---	2327539.75	---
80.00	---	2577363.01	---

UA (Btu/F-hr)	Molar Vap Frac	Mass Vap Frac	Heat of Vap. (Btu/lbmole)	Delta Temp (F)
---	---	0.0000	---	23.7261
---	---	0.0000	---	22.0340
---	---	0.0000	---	22.0279
---	---	0.0000	---	20.3644
---	---	0.0000	---	20.3403
---	---	0.0000	---	18.7206
---	---	0.0000	---	18.6818
---	---	0.0000	---	17.1037
---	---	0.0000	---	17.0532
---	---	0.0000	---	15.5142
---	---	0.0000	---	15.4554
---	---	0.0000	---	13.9527
---	---	0.0000	---	13.8893

---	---	0.0000	---	12.4198
---	---	0.0000	---	12.3561
---	---	0.0000	---	10.9161
---	---	0.0000	---	10.8575
---	---	0.0000	---	9.4420
---	---	0.0000	---	9.3969
---	---	0.0000	---	8.0000

Vapour Phase Hot Composite

Mass Flow (lb/hr)		Molecular Wt	Density (lb/ft3)	Mass Sp Heat (Btu/lb-F)	Viscosity (cP)	Thermal Cond (Btu/hr-ft-F)
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Std Gas Flow (MMSCFD)		Z Factor	Pseudo Pc (psia)	Pseudo Tc (F)	Pseudo Zc	Pseudo Omega
---	---	---	71.82	---	---	
---	---	---	71.82	---	---	
---	---	---	71.82	---	---	
---	---	---	71.82	---	---	
---	---	---	71.82	---	---	
---	---	---	71.82	---	---	
---	---	---	71.82	---	---	
---	---	---	71.82	---	---	
---	---	---	71.82	---	---	
---	---	---	71.82	---	---	
---	---	---	71.82	---	---	
---	---	---	71.82	---	---	
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---	---	---	71.82	---	---	
---	---	---	71.82	---	---	
---	---	---	71.82	---	---	
---	---	---	71.82	---	---	

Light Liquid Phase Hot Composite

Mass Flow (lb/hr)	Density (lb/ft3)	Mass Sp Heat (Btu/lb-F)	Viscosity (cP)	Thermal Cond (Btu/hr-ft-F)	Surface Tens (dyne/cm)
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Molecular Wt	Sp Gravity	Pseudo Pc (psia)	Pseudo Tc (F)	Pseudo Zc	Pseudo Omega
---	---	---	71.82	---	---
---	---	---	71.82	---	---
---	---	---	71.82	---	---
---	---	---	71.82	---	---
---	---	---	71.82	---	---
---	---	---	71.82	---	---
---	---	---	71.82	---	---
---	---	---	71.82	---	---
---	---	---	71.82	---	---
---	---	---	71.82	---	---
---	---	---	71.82	---	---
---	---	---	71.82	---	---
---	---	---	71.82	---	---
---	---	---	71.82	---	---
---	---	---	71.82	---	---
---	---	---	71.82	---	---
---	---	---	71.82	---	---
---	---	---	71.82	---	---
---	---	---	71.82	---	---
---	---	---	71.82	---	---
---	---	---	71.82	---	---

Heavy Liquid Phase Hot Composite

Mass Flow (lb/hr)	Density (lb/ft3)	Mass Sp Heat (Btu/lb-F)	Viscosity (cP)	Thermal Cond (Btu/hr-ft-F)	Surface Tens (dyne/cm)
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Molecular Wt	Sp Gravity	Pseudo Pc (psia)	Pseudo Tc (F)	Pseudo Zc	Pseudo Omega
---	---	---	72.72	---	---
---	---	---	72.72	---	---
---	---	---	72.72	---	---
---	---	---	72.72	---	---
---	---	---	72.72	---	---
---	---	---	72.72	---	---
---	---	---	72.72	---	---
---	---	---	72.72	---	---
---	---	---	72.72	---	---
---	---	---	72.72	---	---
---	---	---	72.72	---	---
---	---	---	72.72	---	---
---	---	---	72.72	---	---
---	---	---	72.72	---	---
---	---	---	72.72	---	---
---	---	---	72.72	---	---
---	---	---	72.72	---	---
---	---	---	72.72	---	---
---	---	---	72.72	---	---
---	---	---	72.72	---	---
---	---	---	72.72	---	---
---	---	---	72.72	---	---
---	---	---	72.72	---	---

Mixed Liquid Hot Composite

Mass Flow (lb/hr)	Density (lb/ft3)	Mass Sp Heat (Btu/lb-F)	Viscosity (cP)	Thermal Cond (Btu/hr-ft-F)	Surface Tens (dyne/cm)
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Molecular Wt	Sp Gravity	Pseudo Pc (psia)	Pseudo Tc (F)	Pseudo Zc	Pseudo Omega
---	---	---	72.73	---	---
---	---	---	72.73	---	---
---	---	---	72.73	---	---
---	---	---	72.73	---	---
---	---	---	72.73	---	---
---	---	---	72.73	---	---
---	---	---	72.73	---	---
---	---	---	72.73	---	---
---	---	---	72.73	---	---
---	---	---	72.73	---	---
---	---	---	72.73	---	---
---	---	---	72.73	---	---
---	---	---	72.73	---	---
---	---	---	72.73	---	---
---	---	---	72.73	---	---
---	---	---	72.73	---	---
---	---	---	72.73	---	---
---	---	---	72.73	---	---
---	---	---	72.73	---	---
---	---	---	72.73	---	---
---	---	---	72.73	---	---

1-2

Overall Phase 1-2

Temperature (F)	Pressure (psia)	Heat Flow (Btu/hr)	Enthalpy (Btu/lbmole)
70.92	912.70	0.00	-34791.41
71.82	912.89	256820.91	-34779.72
72.72	913.10	514307.73	-34767.99
73.63	913.30	771989.05	-34756.26
74.53	913.50	1029779.44	-34744.52
75.44	913.70	1287648.57	-34732.78
76.35	913.90	1545578.30	-34721.03
77.26	914.10	1803556.58	-34709.29
78.17	914.30	2061574.44	-34697.54
79.09	914.50	2319626.71	-34685.79
80.00	914.70	2577363.01	-34674.05

UA (Btu/F-hr)	Molar Vap Frac	Mass Vap Frac	Heat of Vap. (Btu/lbmole)	Delta Temp (F)
0.00	1.0000	1.0000	---	8.0000
11229.79	1.0000	1.0000	---	8.0000
23382.16	1.0000	1.0000	---	8.0000
36575.73	1.0000	1.0000	---	8.0000
50977.67	1.0000	1.0000	---	8.0000
66802.12	1.0000	1.0000	---	8.0000

84325.54	1.0000	1.0000	---	8.0000
103912.60	1.0000	1.0000	---	8.0000
126057.76	1.0000	1.0000	---	8.0000
151454.82	1.0000	1.0000	---	8.0000
181077.30	1.0000	1.0000	---	8.0000

Vapour Phase 1-2

Mass Flow (lb/hr)	Molecular Wt	Density (lb/ft3)	Mass Sp Heat (Btu/lb-F)	Viscosity (cP)	Thermal Cond (Btu/hr-ft-F)
439152.99	20.00	4.07	0.66	0.01	0.02
439152.99	20.00	4.06	0.66	0.01	0.02
439152.99	20.00	4.04	0.66	0.01	0.02
439152.99	20.00	4.03	0.66	0.01	0.02
439152.99	20.00	4.02	0.66	0.01	0.02
439152.99	20.00	4.01	0.66	0.01	0.02
439152.99	20.00	3.99	0.66	0.01	0.02
439152.99	20.00	3.98	0.65	0.01	0.02
439152.99	20.00	3.97	0.65	0.01	0.02
439152.99	20.00	3.96	0.65	0.01	0.02
439152.99	20.00	3.95	0.65	0.01	0.02

Std Gas Flow (MMSCFD)	Z Factor	Pseudo Pc (psia)	Pseudo Tc (F)	Pseudo Zc	Pseudo Omega
199.63	0.79	671.69	-68.58	0.29	0.03
199.63	0.79	671.69	-68.58	0.29	0.03
199.63	0.79	671.69	-68.58	0.29	0.03
199.63	0.79	671.69	-68.58	0.29	0.03
199.63	0.79	671.69	-68.58	0.29	0.03
199.63	0.79	671.69	-68.58	0.29	0.03
199.63	0.80	671.69	-68.58	0.29	0.03
199.63	0.80	671.69	-68.58	0.29	0.03
199.63	0.80	671.69	-68.58	0.29	0.03
199.63	0.80	671.69	-68.58	0.29	0.03
199.63	0.80	671.69	-68.58	0.29	0.03

Light Liquid Phase 1-2

Mass Flow (lb/hr)	Density (lb/ft3)	Mass Sp Heat (Btu/lb-F)	Viscosity (cP)	Thermal Cond (Btu/hr-ft-F)	Surface Tens (dyne/cm)
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Molecular Wt	Sp Gravity	Pseudo Pc (psia)	Pseudo Tc (F)	Pseudo Zc	Pseudo Omega
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Heavy Liquid Phase 1-2

Mass Flow (lb/hr)	Density (lb/ft3)	Mass Sp Heat (Btu/lb-F)	Viscosity (cP)	Thermal Cond (Btu/hr-ft-F)	Surface Tens (dyne/cm)
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Molecular Wt	Sp Gravity	Pseudo Pc (psia)	Pseudo Tc (F)	Pseudo Zc	Pseudo Omega
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Mixed Liquid 1-2

Mass Flow (lb/hr)	Density (lb/ft3)	Mass Sp Heat (Btu/lb-F)	Viscosity (cP)	Thermal Cond (Btu/hr-ft-F)	Surface Tens (dyne/cm)
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Molecular Wt	Sp Gravity	Pseudo Pc (psia)	Pseudo Tc (F)	Pseudo Zc	Pseudo Omega
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15-16

Overall Phase 15-16

Temperature (F)	Pressure (psia)	Heat Flow (Btu/hr)	Enthalpy (Btu/lbmole)
47.19	380.00	0.00	-48529.12
49.79	379.80	257736.30	-48459.35
52.39	379.60	518037.55	-48388.89
54.97	379.40	778092.35	-48318.49
57.51	379.19	1037833.67	-48248.18
60.02	378.99	1297190.90	-48177.97
62.50	378.79	1556063.22	-48107.90
64.94	378.59	1814296.63	-48038.00
67.35	378.39	2071630.71	-47968.34
69.72	378.19	2327539.75	-47899.07
72.00	378.00	2577363.01	-47831.44

UA (Btu/F-hr)	Molar Vap Frac	Mass Vap Frac	Heat of Vap. (Btu/lbmole)	Delta Temp (F)
0.00	0.0000	0.0000	---	8.0000
11271.34	0.0000	0.0000	---	8.0000
23565.42	0.0000	0.0000	---	8.0000
36902.09	0.0000	0.0000	---	8.0000
51449.27	0.0000	0.0000	---	8.0000
67418.36	0.0000	0.0000	---	8.0000
85078.71	0.0000	0.0000	---	8.0000
104779.58	0.0000	0.0000	---	8.0000
126981.47	0.0000	0.0000	---	8.0000
152294.90	0.0000	0.0000	---	8.0000
181077.30	0.0000	0.0000	---	8.0000

Vapour Phase 15-16

Mass Flow (lb/hr)	Molecular Wt	Density (lb/ft3)	Mass Sp Heat (Btu/lb-F)	Viscosity (cP)	Thermal Cond (Btu/hr-ft-F)

Std Gas Flow (MMSCFD)	Z Factor	Pseudo Pc (psia)	Pseudo Tc (F)	Pseudo Zc	Pseudo Omega
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Light Liquid Phase 15-16

Mass Flow (lb/hr)	Density (lb/ft3)	Mass Sp Heat (Btu/lb-F)	Viscosity (cP)	Thermal Cond (Btu/hr-ft-F)	Surface Tens (dyne/cm)
140395.21	29.56	0.70	0.09	0.05	5.41
140395.21	29.39	0.71	0.09	0.05	5.25
140395.21	29.21	0.72	0.09	0.05	5.09
140395.21	29.03	0.72	0.09	0.05	4.93
140395.21	28.85	0.73	0.08	0.05	4.77
140395.21	28.67	0.74	0.08	0.05	4.62
140395.21	28.49	0.75	0.08	0.05	4.47
140395.21	28.32	0.76	0.08	0.05	4.33
140395.21	28.16	0.77	0.08	0.05	4.19
140395.21	28.00	0.77	0.08	0.05	4.05
140395.21	27.84	0.78	0.08	0.05	3.92

Molecular Wt	Sp Gravity	Pseudo Pc (psia)	Pseudo Tc (F)	Pseudo Zc	Pseudo Omega
38.00	0.47	661.83	148.11	0.28	0.13
38.00	0.47	661.83	148.11	0.28	0.13
38.00	0.47	661.83	148.11	0.28	0.13
38.00	0.47	661.83	148.11	0.28	0.13
38.00	0.46	661.83	148.11	0.28	0.13
38.00	0.46	661.83	148.11	0.28	0.13
38.00	0.46	661.83	148.11	0.28	0.13
38.00	0.45	661.83	148.11	0.28	0.13
38.00	0.45	661.83	148.11	0.28	0.13
38.00	0.45	661.83	148.11	0.28	0.13
38.00	0.45	661.83	148.11	0.28	0.13

Heavy Liquid Phase 15-16

Mass Flow (lb/hr)	Density (lb/ft3)	Mass Sp Heat (Btu/lb-F)	Viscosity (cP)	Thermal Cond (Btu/hr-ft-F)	Surface Tens (dyne/cm)
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Molecular Wt Sp Gravity Pseudo Pc Pseudo Tc Pseudo Zc Pseudo Omega
(psia) (F)
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--- --- --- --- --- ---
Mixed Liquid 15-16

Mass Flow Density Mass Sp Heat Viscosity Thermal Cond Surface Tens
(lb/hr) (lb/ft3) (Btu/lb-F) (cP) (Btu/hr-ft-F) (dyne/cm)
140395.21 29.56 0.70 0.09 0.05 ---
140395.21 29.39 0.71 0.09 0.05 ---
140395.21 29.21 0.72 0.09 0.05 ---
140395.21 29.03 0.72 0.09 0.05 ---
140395.21 28.85 0.73 0.08 0.05 ---
140395.21 28.67 0.74 0.08 0.05 ---
140395.21 28.49 0.75 0.08 0.05 ---
140395.21 28.32 0.76 0.08 0.05 ---
140395.21 28.16 0.77 0.08 0.05 ---
140395.21 28.00 0.77 0.08 0.05 ---
140395.21 27.84 0.78 0.08 0.05 ---
Molecular Wt Sp Gravity Pseudo Pc Pseudo Tc Pseudo Zc Pseudo Omega
(psia) (F)
38.00 0.47 661.83 148.11 0.28 0.13
38.00 0.47 661.83 148.11 0.28 0.13
38.00 0.47 661.83 148.11 0.28 0.13
38.00 0.47 661.83 148.11 0.28 0.13
38.00 0.46 661.83 148.11 0.28 0.13
38.00 0.46 661.83 148.11 0.28 0.13
38.00 0.46 661.83 148.11 0.28 0.13
38.00 0.45 661.83 148.11 0.28 0.13
38.00 0.45 661.83 148.11 0.28 0.13
38.00 0.45 661.83 148.11 0.28 0.13
38.00 0.45 661.83 148.11 0.28 0.13
HTFS

EDR Coil Wound Bundle Geometry

Bundle Number Bundle Height Bundle Diameter Tubes Layers Longitudinal Pitch
Bundle Number Transverse Pitch Surface Area Shell Side Flow Area Tube OD Tube Wall Thickness
Bundle Number Tube Material Helix Angle Mandrel OD Shell Diameter ---

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C-102 (Compressor): Design, Rating, Performance

Compressor: C-102

DESIGN

Connections

Inlet Stream

STREAM NAME FROM UNIT OPERATION
20 V-102 Separator
Outlet Stream

STREAM NAME TO UNIT OPERATION
22 V-103 Separator
Energy Stream

STREAM NAME FROM UNIT OPERATION
W_C-101 C-101 Expander
Parameters

Speed: --- Duty: 2.0637e+03 hp
Adiabatic Eff.: 75.00 PolyTropic Eff.: 75.86
Adiabatic Head: 1.026e+004 ft Polytropic Head: 1.038e+004 ft
Adiabatic Fluid Head: 1.026e+004 lbf-ft/lbm Polytropic Fluid Head: 1.038e+004 lbf-ft/lbm
Polytropic Exp. 1.477 Isentropic Exp. 1.318 Poly Head Factor 1.000
User Variables

RATING

Curves

Compressor Speed: --- Efficiency: Adiabatic Curves Enabled: Yes
Head Offset: 0.0000 ft Efficiency Offset: 0.00 %
Speed:
Flow Head Efficiency (%)
Flow Limits

Surge Curve: Inactive
Speed Flow
Stone Wall Curve: Inactive
Speed Flow
Surge Flow Rate --- Field Flow Rate 4855 ACFM Stone Wall Flow --- Compressor Volume 0.0000 ft3
Nozzle Paramaters

Base Elevation Relative to Ground Level 0.0000 ft

	20	22
Diameter (ft)	0.1640	0.1640
Elevation (Base) (ft)	0.0000	0.0000
Elevation (Ground) (ft)	0.0000	0.0000

Inertia

Rotational inertia (lb-ft2) 142.4 Radius of gyration (ft) 0.6562
Mass (lb) 330.7 Friction loss factor (rad/min) (lb-ft2/s) 0.1424
PERFORMANCE

Results

Adiabatic Head (ft) 1.026e+004 Power Consumed (hp) 2064
Polytropic Head (ft) 1.038e+004 Polytropic Head Factor 1.000
Adiabatic Fluid Head (lbf-ft/lbm) 1.026e+004 Polytropic Exponent 1.477
Polytropic Fluid Head (lbf-ft/lbm) 1.038e+004 Isentropic Exponent 1.318
Adiabatic Efficiency 75 Speed (rpm) ---
Polytropic Efficiency 76 ---
Power/Torque

Total Rotor Power (hp) 2064 Total Rotor Torque (lbf-ft) ---
Transient Rotor Power (hp) 0.0000 Transient Rotor Torque (lbf-ft) ---
Friction Power Loss (hp) 0.0000 Friction Torque Loss (lbf-ft) ---
Fluid Power (hp) 2064 Fluid Torque (lbf-ft) ---

C-103 (Compressor): Design, Rating, Performance

Compressor: C-103

DESIGN

Connections

Inlet Stream

STREAM NAME FROM UNIT OPERATION
23 V-103 Separator
Outlet Stream

STREAM NAME TO UNIT OPERATION
25 E-105 Air cooler
Energy Stream

STREAM NAME FROM UNIT OPERATION
W_C-103
Parameters

Speed: --- Duty: 9.4770e+03 hp
Adiabatic Eff.: 75.00 PolyTropic Eff.: 77.83
Adiabatic Head: 4.711e+004 ft Polytropic Head: 4.888e+004 ft
Adiabatic Fluid Head: 4.711e+004 lbf-ft/lbm Polytropic Fluid Head: 4.888e+004 lbf-ft/lbm
Polytropic Exp. 1.460 Isentropic Exp. 1.329 Poly Head Factor 0.9985
User Variables

RATING

Curves

Compressor Speed: --- Efficiency: Adiabatic Curves Enabled: Yes
Head Offset: 0.0000 ft Efficiency Offset: 0.00 %
Speed:
Flow Head Efficiency (%)
Flow Limits

Surge Curve: Inactive
Speed Flow
Stone Wall Curve: Inactive
Speed Flow
Surge Flow Rate --- Field Flow Rate 4030 ACFM Stone Wall Flow --- Compressor Volume 0.0000 ft3
Nozzle Paramaters

Base Elevation Relative to Ground Level 0.0000 ft

	23	25
Diameter (ft)	0.1640	0.1640
Elevation (Base) (ft)	0.0000	0.0000
Elevation (Ground) (ft)	0.0000	0.0000

Inertia

Rotational inertia (lb-ft2) 142.4 Radius of gyration (ft) 0.6562
Mass (lb) 330.7 Friction loss factor (rad/min) (lb-ft2/s) 0.1424
PERFORMANCE

Results

Adiabatic Head (ft) 4.711e+004 Power Consumed (hp) 9477
Polytropic Head (ft) 4.888e+004 Polytropic Head Factor 0.9985
Adiabatic Fluid Head (lbf-ft/lbm) 4.711e+004 Polytropic Exponent 1.460
Polytropic Fluid Head (lbf-ft/lbm) 4.888e+004 Isentropic Exponent 1.329
Adiabatic Efficiency 75 Speed (rpm) ---
Polytropic Efficiency 78 ---
Power/Torque

Total Rotor Power (hp) 9477 Total Rotor Torque (lbf-ft) ---
Transient Rotor Power (hp) 0.0000 Transient Rotor Torque (lbf-ft) ---
Friction Power Loss (hp) 0.0000 Friction Torque Loss (lbf-ft) ---
Fluid Power (hp) 9477 Fluid Torque (lbf-ft) ---

C-201 (Compressor): Design, Rating, Performance

Compressor: C-201

DESIGN

Connections

Inlet Stream

STREAM NAME FROM UNIT OPERATION

28 V-201 Separator
Outlet Stream

STREAM NAME TO UNIT OPERATION
30.2 V-202 Separator
Energy Stream

STREAM NAME FROM UNIT OPERATION
W_C-201
Parameters

Speed: --- Duty: 5.8498e+03 hp
Adiabatic Eff.: 75.00 PolyTropic Eff.: 76.57
Adiabatic Head: 1.515e+004 ft Polytropic Head: 1.547e+004 ft
Adiabatic Fluid Head: 1.515e+004 lbf-ft/lbm Polytropic Fluid Head: 1.547e+004 lbf-ft/lbm
Polytropic Exp. 1.164 Isentropic Exp. 1.112 Poly Head Factor 1.003
User Variables

RATING

Curves

Compressor Speed: --- Efficiency: Adiabatic Curves Enabled: Yes
Head Offset: 0.0000 ft Efficiency Offset: 0.00 %
Speed:
Flow Head Efficiency (%)
Flow Limits

Surge Curve: Inactive
Speed Flow
Stone Wall Curve: Inactive
Speed Flow
Surge Flow Rate --- Field Flow Rate 6.404e+004 ACFM Stone Wall Flow --- Compressor Volume 0.0000 ft3
Nozzle Paramaters

Base Elevation Relative to Ground Level 0.0000 ft

	28	30.2
Diameter (ft)	0.1640	0.1640
Elevation (Base) (ft)	0.0000	0.0000
Elevation (Ground) (ft)	0.0000	0.0000

Inertia

Rotational inertia (lb-ft2) 142.4 Radius of gyration (ft) 0.6562
Mass (lb) 330.7 Friction loss factor (rad/min) (lb-ft2/s) 0.1424
PERFORMANCE

Results

Adiabatic Head (ft) 1.515e+004 Power Consumed (hp) 5850
Polytropic Head (ft) 1.547e+004 Polytropic Head Factor 1.003
Adiabatic Fluid Head (lbf-ft/lbm) 1.515e+004 Polytropic Exponent 1.164
Polytropic Fluid Head (lbf-ft/lbm) 1.547e+004 Isentropic Exponent 1.112
Adiabatic Efficiency 75 Speed (rpm) ---
Polytropic Efficiency 77 ---

Power/Torque

Total Rotor Power (hp) 5850 Total Rotor Torque (lbf-ft) ---
Transient Rotor Power (hp) 0.0000 Transient Rotor Torque (lbf-ft) ---
Friction Power Loss (hp) 0.0000 Friction Torque Loss (lbf-ft) ---
Fluid Power (hp) 5850 Fluid Torque (lbf-ft) ---

C-202 (Compressor): Design, Rating, Performance

Compressor: C-202

DESIGN

Connections

Inlet Stream

STREAM NAME FROM UNIT OPERATION
31.2 V-202 Separator
Outlet Stream

STREAM NAME TO UNIT OPERATION
33 V-203 Separator
Energy Stream

STREAM NAME FROM UNIT OPERATION
W_C-202
Parameters

Speed: --- Duty: 6.6412e+03 hp
Adiabatic Eff.: 75.00 PolyTropic Eff.: 76.52
Adiabatic Head: 1.720e+004 ft Polytropic Head: 1.755e+004 ft
Adiabatic Fluid Head: 1.720e+004 lbf-ft/lbm Polytropic Fluid Head: 1.755e+004 lbf-ft/lbm
Polytropic Exp. 1.114 Isentropic Exp. 1.067 Poly Head Factor 1.004
User Variables

RATING

Curves

Compressor Speed: --- Efficiency: Adiabatic Curves Enabled: Yes
Head Offset: 0.0000 ft Efficiency Offset: 0.00 %
Speed:
Flow Head Efficiency (%)
Flow Limits

Surge Curve: Inactive
Speed Flow
Stone Wall Curve: Inactive
Speed Flow
Surge Flow Rate --- Field Flow Rate 2.832e+004 ACFM Stone Wall Flow --- Compressor Volume 0.0000 ft3

Nozzle Paramaters

Base Elevation Relative to Ground Level 0.0000 ft

	31.2	33
Diameter (ft)	0.1640	0.1640
Elevation (Base) (ft)	0.0000	0.0000
Elevation (Ground) (ft)	0.0000	0.0000

Inertia

Rotational inertia (lb-ft2) 142.4 Radius of gyration (ft) 0.6562
Mass (lb) 330.7 Friction loss factor (rad/min) (lb-ft2/s) 0.1424
PERFORMANCE

Results

Adiabatic Head (ft) 1.720e+004 Power Consumed (hp) 6641
Polytropic Head (ft) 1.755e+004 Polytropic Head Factor 1.004
Adiabatic Fluid Head (lbf-ft/lbm) 1.720e+004 Polytropic Exponent 1.114
Polytropic Fluid Head (lbf-ft/lbm) 1.755e+004 Isentropic Exponent 1.067
Adiabatic Efficiency 75 Speed (rpm) ---
Polytropic Efficiency 77 ---
Power/Torque

Total Rotor Power (hp) 6641 Total Rotor Torque (lbf-ft) ---
Transient Rotor Power (hp) 0.0000 Transient Rotor Torque (lbf-ft) ---
Friction Power Loss (hp) 0.0000 Friction Torque Loss (lbf-ft) ---
Fluid Power (hp) 6641 Fluid Torque (lbf-ft) ---

C-203 (Compressor): Design, Rating, Performance

Compressor: C-203

DESIGN

Connections

Inlet Stream

STREAM NAME	FROM UNIT OPERATION
34	V-203 Separator

Outlet Stream

STREAM NAME	TO UNIT OPERATION
36	V-204 Separator

Energy Stream

STREAM NAME	FROM UNIT OPERATION
W_C-203	

Parameters

Speed: --- Duty: 6.2388e+03 hp

Adiabatic Eff.: 75.00 PolyTropic Eff.: 76.38
Adiabatic Head: 1.616e+004 ft Polytropic Head: 1.646e+004 ft
Adiabatic Fluid Head: 1.616e+004 lbf-ft/lbm Polytropic Fluid Head: 1.646e+004 lbf-ft/lbm
Polytropic Exp. 1.053 Isentropic Exp. 1.009 Poly Head Factor 1.005
User Variables

RATING

Curves

Compressor Speed: --- Efficiency: Adiabatic Curves Enabled: Yes
Head Offset: 0.0000 ft Efficiency Offset: 0.00 %
Speed:
Flow Head Efficiency (%)
Flow Limits

Surge Curve: Inactive
Speed Flow
Stone Wall Curve: Inactive
Speed Flow
Surge Flow Rate --- Field Flow Rate 1.166e+004 ACFM Stone Wall Flow --- Compressor Volume 0.0000 ft3
Nozzle Paramaters

Base Elevation Relative to Ground Level 0.0000 ft

	34	36
Diameter (ft)	0.1640	0.1640
Elevation (Base) (ft)	0.0000	0.0000
Elevation (Ground) (ft)	0.0000	0.0000

Inertia

Rotational inertia (lb-ft2) 142.4 Radius of gyration (ft) 0.6562
Mass (lb) 330.7 Friction loss factor (rad/min) (lb-ft2/s) 0.1424
PERFORMANCE

Results

Adiabatic Head (ft) 1.616e+004 Power Consumed (hp) 6239
Polytropic Head (ft) 1.646e+004 Polytropic Head Factor 1.005
Adiabatic Fluid Head (lbf-ft/lbm) 1.616e+004 Polytropic Exponent 1.053
Polytropic Fluid Head (lbf-ft/lbm) 1.646e+004 Isentropic Exponent 1.009
Adiabatic Efficiency 75 Speed (rpm) ---
Polytropic Efficiency 76 ---
Power/Torque

Total Rotor Power (hp) 6239 Total Rotor Torque (lbf-ft) ---
Transient Rotor Power (hp) 0.0000 Transient Rotor Torque (lbf-ft) ---
Friction Power Loss (hp) 0.0000 Friction Torque Loss (lbf-ft) ---
Fluid Power (hp) 6239 Fluid Torque (lbf-ft) ---

C-204 (Compressor): Design, Rating, Performance

Compressor: C-204

DESIGN

Connections

Inlet Stream

STREAM NAME FROM UNIT OPERATION
38 V-204 Separator
Outlet Stream

STREAM NAME TO UNIT OPERATION
30 E-202 Air cooler
Energy Stream

STREAM NAME FROM UNIT OPERATION
W_C-204
Parameters

Speed: --- Duty: 5.5076e+02 hp
Adiabatic Eff.: 75.00 PolyTropic Eff.: 75.12
Adiabatic Head: 1427 ft Polytropic Head: 1429 ft
Adiabatic Fluid Head: 1427 lbf-ft/lbm Polytropic Fluid Head: 1429 lbf-ft/lbm
Polytropic Exp. 1.019 Isentropic Exp. 0.9777 Poly Head Factor 1.000
User Variables

RATING

Curves

Compressor Speed: --- Efficiency: Adiabatic Curves Enabled: Yes
Head Offset: 0.0000 ft Efficiency Offset: 0.00 %
Speed:
Flow Head Efficiency (%)
Flow Limits

Surge Curve: Inactive
Speed Flow
Stone Wall Curve: Inactive
Speed Flow
Surge Flow Rate --- Field Flow Rate 5104 ACFM Stone Wall Flow --- Compressor Volume 0.0000 ft3
Nozzle Paramaters

Base Elevation Relative to Ground Level 0.0000 ft

	38	30
Diameter (ft)	0.1640	0.1640
Elevation (Base) (ft)	0.0000	0.0000
Elevation (Ground) (ft)	0.0000	0.0000

Inertia

Rotational inertia (lb-ft2) 142.4 Radius of gyration (ft) 0.6562
Mass (lb) 330.7 Friction loss factor (rad/min) (lb-ft2/s) 0.1424
PERFORMANCE

Results

Adiabatic Head (ft)	1427	Power Consumed (hp)	550.8
Polytropic Head (ft)	1429	Polytropic Head Factor	1.000
Adiabatic Fluid Head (lbf-ft/lbm)	1427	Polytropic Exponent	1.019
Polytropic Fluid Head (lbf-ft/lbm)	1429	Isentropic Exponent	0.9777
Adiabatic Efficiency	75	Speed (rpm)	---
Polytropic Efficiency	75		---

Power/Torque

Total Rotor Power (hp)	550.8	Total Rotor Torque (lbf-ft)	---
Transient Rotor Power (hp)	0.0000	Transient Rotor Torque (lbf-ft)	---
Friction Power Loss (hp)	0.0000	Friction Torque Loss (lbf-ft)	---
Fluid Power (hp)	550.8	Fluid Torque (lbf-ft)	---

E-202 (Air cooler): Design, Rating, Performance, HTFS - ACOL

Air cooler: E-202

CONNECTIONS

Inlet Stream

STREAM NAME	FROM UNIT OPERATION
30	C-204 Compressor

Outlet Stream

STREAM NAME	TO UNIT OPERATION
31	VLV-101 Valve

DESIGN PARAMETERS

Pressure Drop: 3.000 psi	UA: 2.555e+006 Btu/F-hr
Inlet Air Temp: 100.0 F	Outlet Air Temp: 136.6 F

Configuration: one tube row, one pass

User Variables

SIZING

Number of Fans 4

Fan	Fan 0	Fan 1	Fan 2
Speed (rpm)	180.0	180.0	180.0
Speed (rpm)	180.0	180.0	180.0
Max Acceleration (rpm)	---	---	---
Design Speed (rpm)	60.00	60.00	60.00
Design airflow (ACFM)	2.119e+005	2.119e+005	2.119e+005
Current airflow (ACFM)	6.357e+005	6.357e+005	6.357e+005

Fan	Fan 3
Speed (rpm)	180.0
Speed (rpm)	180.0
Max Acceleration (rpm)	---

Design Speed (rpm) 60.00
Design airflow (ACFM) 2.119e+005
Current airflow (ACFM) 6.357e+005
NOZZLE PARAMETERS

Base Elevation Relative to Ground Level 0.0000 ft

	30	31
Diameter (ft)	0.1640	0.1640
Elevation (Base) (ft)	0.0000	0.0000
Elevation (Ground) (ft)	0.0000	0.0000

PERFORMANCE RESULTS

Working Fluid Duty: -9.243e+007 Btu/hr Correction Factor: 0.8135
UA: 2.555e+006 Btu/F-hr LMTD: 44.48 F
Feed Temp: 205.5 F Prod Temp: 126.7 F
Air Feed Temp: 100.0 F Air Prod Temp: 136.6 F
Volumetric Air Flow: 2.543e+006 ACFM Mass Air Flow: 1.043e+007 lb/hr
PERFORMANCE TABLE

Overall Phase

Temperature (F)	Pressure (psia)	Heat Flow (Btu/hr)	Enthalpy (Btu/lbmole)
205.46	267.00	0.00	-42894.21
175.07	266.70	-9243445.59	-43605.24
144.76	266.40	-18486891.18	-44316.26
127.33	266.10	-27730336.77	-45027.29
127.24	265.80	-36973782.36	-45738.32
127.14	265.50	-46217227.95	-46449.34
127.05	265.20	-55460673.54	-47160.37
126.95	264.90	-64704119.13	-47871.40
126.86	264.60	-73947564.72	-48582.43
126.76	264.30	-83191010.32	-49293.45
126.67	264.00	-92434455.91	-50004.48

Vapour Fraction	Vap Phase Mass Frac	Heat of Vap (Btu/lbmole)
1.0000	1.0000	---
1.0000	1.0000	---
1.0000	1.0000	---
0.9438	0.9438	---
0.8086	0.8086	---
0.6735	0.6735	---
0.5385	0.5385	---
0.4037	0.4037	---
0.2689	0.2689	---
0.1344	0.1344	---
0.0000	0.0000	---

Vapour Phase

Mass Flow (lb/hr)	Molecular Wt	Density (lb/ft3)	Mass Sp Heat (Btu/lb-F)	Viscosity (cP)	Thermal Cond (Btu/hr-ft-F)
573261.00	44.10	2.01	0.53	0.01	0.02
573261.00	44.10	2.20	0.53	0.01	0.01
573261.00	44.10	2.44	0.54	0.01	0.01

541063.87	44.10	2.63	0.55	0.01	0.01
463520.00	44.10	2.63	0.55	0.01	0.01
386077.86	44.10	2.62	0.55	0.01	0.01
308705.38	44.10	2.62	0.55	0.01	0.01
231412.41	44.10	2.62	0.55	0.01	0.01
154178.25	44.10	2.61	0.55	0.01	0.01
77059.38	44.10	2.61	0.55	0.01	0.01
---	---	---	---	---	---

Std Gas Flow (MMSCFD)	Z Factor	Pseudo Pc (psia)	Pseudo Tc (F)	Pseudo Zc	Pseudo Omega
118.17	0.82	617.38	206.15	0.28	0.15
118.17	0.79	617.38	206.15	0.28	0.15
118.17	0.74	617.38	206.15	0.28	0.15
111.53	0.71	617.38	206.15	0.28	0.15
95.55	0.71	617.38	206.15	0.28	0.15
79.58	0.71	617.38	206.15	0.28	0.15
63.64	0.71	617.38	206.15	0.28	0.15
47.70	0.71	617.38	206.15	0.28	0.15
31.78	0.71	617.38	206.15	0.28	0.15
15.88	0.71	617.38	206.15	0.28	0.15
---	---	---	---	---	---

Light Liquid Phase

Mass Flow (lb/hr)	Density (lb/ft3)	Mass Sp Heat (Btu/lb-F)	Viscosity (cP)	Thermal Cond (Btu/hr-ft-F)	Surface Tens (dyne/cm)
---	---	---	---	---	---
---	---	---	---	---	---
---	---	---	---	---	---
32197.13	27.67	0.83	0.08	0.05	3.77
109741.01	27.68	0.83	0.08	0.05	3.78
187183.14	27.68	0.83	0.08	0.05	3.78
264555.62	27.69	0.83	0.08	0.05	3.79
341848.59	27.70	0.83	0.08	0.05	3.80
419082.75	27.70	0.83	0.08	0.05	3.80
496201.63	27.71	0.83	0.08	0.05	3.81
573261.00	27.72	0.83	0.08	0.05	3.81

Molecular Wt	Sp Gravity	Pseudo Pc (psia)	Pseudo Tc (F)	Pseudo Zc	Pseudo Omega
---	---	---	---	---	---
---	---	---	---	---	---
---	---	---	---	---	---
44.10	0.44	617.38	206.15	0.28	0.15
44.10	0.44	617.38	206.15	0.28	0.15
44.10	0.44	617.38	206.15	0.28	0.15
44.10	0.44	617.38	206.15	0.28	0.15
44.10	0.44	617.38	206.15	0.28	0.15
44.10	0.44	617.38	206.15	0.28	0.15
44.10	0.44	617.38	206.15	0.28	0.15
44.10	0.44	617.38	206.15	0.28	0.15

Heavy Liquid Phase

Mass Flow (lb/hr)	Density (lb/ft3)	Mass Sp Heat (Btu/lb-F)	Viscosity (cP)	Thermal Cond (Btu/hr-ft-F)	Surface Tens (dyne/cm)
---	---	---	---	---	---

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---	---	---	---	---	---
---	---	---	---	---	---
---	---	---	---	---	---
---	---	---	---	---	---

Molecular Wt	Sp Gravity	Pseudo Pc (psia)	Pseudo Tc (F)	Pseudo Zc	Pseudo Omega
---	---	---	---	---	---
---	---	---	---	---	---
---	---	---	---	---	---
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---	---	---	---	---	---
---	---	---	---	---	---

Mixed Liquid Phase

Mass Flow (lb/hr)	Density (lb/ft3)	Mass Sp Heat (Btu/lb-F)	Viscosity (cP)	Thermal Cond (Btu/hr-ft-F)	Surface Tens (dyne/cm)
---	---	---	---	---	---
---	---	---	---	---	---
---	---	---	---	---	---
32197.13	27.67	0.83	0.08	0.05	3.77
109741.01	27.68	0.83	0.08	0.05	3.78
187183.14	27.68	0.83	0.08	0.05	3.78
264555.62	27.69	0.83	0.08	0.05	3.79
341848.59	27.70	0.83	0.08	0.05	3.80
419082.75	27.70	0.83	0.08	0.05	3.80
496201.63	27.71	0.83	0.08	0.05	3.81
573261.00	27.72	0.83	0.08	0.05	3.81

Molecular Wt	Sp Gravity	Pseudo Pc (psia)	Pseudo Tc (F)	Pseudo Zc	Pseudo Omega
---	---	---	---	---	---
---	---	---	---	---	---
---	---	---	---	---	---
44.10	0.44	617.38	206.15	0.28	0.15
44.10	0.44	617.38	206.15	0.28	0.15
44.10	0.44	617.38	206.15	0.28	0.15
44.10	0.44	617.38	206.15	0.28	0.15
44.10	0.44	617.38	206.15	0.28	0.15
44.10	0.44	617.38	206.15	0.28	0.15
44.10	0.44	617.38	206.15	0.28	0.15
44.10	0.44	617.38	206.15	0.28	0.15

E-105 (Air cooler): Design, Rating, Performance, HTFS - ACOL

Air cooler: E-105

CONNECTIONS

Inlet Stream

STREAM NAME	FROM UNIT OPERATION
25	C-103 Compressor

Outlet Stream

STREAM NAME	TO UNIT OPERATION
26	

DESIGN PARAMETERS

Pressure Drop: 3.000 psi UA: 1.201e+006 Btu/F-hr
Inlet Air Temp: 100.0 F Outlet Air Temp: 142.0 F
Configuration: one tube row, one pass
User Variables

SIZING

Number of Fans 1

Fan	Fan 0
Speed (rpm)	60.00
Speed (rpm)	60.00
Max Acceleration (rpm)	---
Design Speed (rpm)	60.00
Design airflow (ACFM)	2.119e+005
Current airflow (ACFM)	2.119e+005

NOZZLE PARAMETERS

Base Elevation Relative to Ground Level 0.0000 ft

	25	26
Diameter (ft)	0.1640	0.1640
Elevation (Base) (ft)	0.0000	0.0000
Elevation (Ground) (ft)	0.0000	0.0000

PERFORMANCE RESULTS

Working Fluid Duty: -8.796e+006 Btu/hr Correction Factor: 0.3309
UA: 1.201e+006 Btu/F-hr LMTD: 22.13 F
Feed Temp: 166.4 F Prod Temp: 120.0 F
Air Feed Temp: 100.0 F Air Prod Temp: 142.0 F
Volumetric Air Flow: 2.119e+005 ACFM Mass Air Flow: 8.650e+005 lb/hr
PERFORMANCE TABLE

Overall Phase

Temperature (F)	Pressure (psia)	Heat Flow (Btu/hr)	Enthalpy (Btu/lbmole)
166.40	964.70	0.00	-31914.17
161.76	964.40	-879224.08	-31962.31

157.12	964.10	-1758237.10	-32010.43
152.48	963.80	-2637143.25	-32058.54
147.84	963.50	-3516051.74	-32106.65
143.20	963.20	-4395077.15	-32154.78
138.56	962.90	-5274339.85	-32202.91
133.92	962.60	-6153966.39	-32251.06
129.28	962.30	-7034090.03	-32299.25
124.64	962.00	-7914851.25	-32347.46
120.00	961.70	-8796398.30	-32395.72

Vapour Fraction	Vap Phase Mass Frac	Heat of Vap (Btu/lbmole)
1.0000	1.0000	---
1.0000	1.0000	---
1.0000	1.0000	---
1.0000	1.0000	---
1.0000	1.0000	---
1.0000	1.0000	---
1.0000	1.0000	---
1.0000	1.0000	---
1.0000	1.0000	---
1.0000	1.0000	---
1.0000	1.0000	---

Vapour Phase

Mass Flow (lb/hr)	Molecular Wt	Density (lb/ft3)	Mass Sp Heat (Btu/lb-F)	Viscosity (cP)	Thermal Cond (Btu/hr-ft-F)
298757.78	16.36	2.53	0.64	0.01	0.03
298757.78	16.36	2.56	0.64	0.01	0.03
298757.78	16.36	2.58	0.64	0.01	0.03
298757.78	16.36	2.61	0.64	0.01	0.03
298757.78	16.36	2.63	0.64	0.01	0.03
298757.78	16.36	2.66	0.64	0.01	0.03
298757.78	16.36	2.69	0.64	0.01	0.03
298757.78	16.36	2.72	0.64	0.01	0.03
298757.78	16.36	2.74	0.64	0.01	0.03
298757.78	16.36	2.77	0.64	0.01	0.02
298757.78	16.36	2.81	0.64	0.01	0.02

Std Gas Flow (MMSCFD)	Z Factor	Pseudo Pc (psia)	Pseudo Tc (F)	Pseudo Zc	Pseudo Omega
166.05	0.93	673.68	-112.40	0.29	0.01
166.05	0.93	673.68	-112.40	0.29	0.01
166.05	0.92	673.68	-112.40	0.29	0.01
166.05	0.92	673.68	-112.40	0.29	0.01
166.05	0.92	673.68	-112.40	0.29	0.01
166.05	0.92	673.68	-112.40	0.29	0.01
166.05	0.91	673.68	-112.40	0.29	0.01
166.05	0.91	673.68	-112.40	0.29	0.01
166.05	0.91	673.68	-112.40	0.29	0.01
166.05	0.90	673.68	-112.40	0.29	0.01
166.05	0.90	673.68	-112.40	0.29	0.01

Light Liquid Phase

Mass Flow (lb/hr)	Density (lb/ft3)	Mass Sp Heat (Btu/lb-F)	Viscosity (cP)	Thermal Cond (Btu/hr-ft-F)	Surface Tens (dyne/cm)

Molecular Wt	Sp Gravity	Pseudo Pc (psia)	Pseudo Tc (F)	Pseudo Zc	Pseudo Omega

Heavy Liquid Phase

Mass Flow (lb/hr)	Density (lb/ft3)	Mass Sp Heat (Btu/lb-F)	Viscosity (cP)	Thermal Cond (Btu/hr-ft-F)	Surface Tens (dyne/cm)

Molecular Wt	Sp Gravity	Pseudo Pc (psia)	Pseudo Tc (F)	Pseudo Zc	Pseudo Omega

Mixed Liquid Phase

Mass Flow (lb/hr)	Density (lb/ft3)	Mass Sp Heat (Btu/lb-F)	Viscosity (cP)	Thermal Cond (Btu/hr-ft-F)	Surface Tens (dyne/cm)

Molecular Wt	Sp Gravity	Pseudo Pc (psia)	Pseudo Tc (F)	Pseudo Zc	Pseudo Omega

---

P-102 A/B (Pump): Design, Rating, Performance

Pump: P-102 A/B

CONNECTIONS

Inlet Stream

Stream Name From Unit Operation
16 E-101 LNG
Outlet Stream

Stream Name To Unit Operation
17
Energy Stream

Stream Name From Unit Operation
W_P-102
PARAMETERS

Adiabatic Efficiency (%): 75.00 Delta P: 936.7 psi Duty: 458.1 hp
CURVES

Delta P: 936.7 psi Duty: 458.1 hp

Coefficient A: 0.0000 Coefficient B: 0.0000 Coefficient C: 0.0000
Parameter Preferences Units for Delta P: m Flow Basis ActVolFlow Units for Flow: m3/h
User Variables

RATING

Head Offset: --- Efficiency Offset: ---
Characteristic Curves

Speed:
Flow Head Efficiency (%)
NPSH

NPSH Required --- NPSH Available 86.54 ft Enable NPSH Curves: No
NPSH Curves

Nozzle Paramaters

Base Elevation Relative to Ground Level 0.0000 ft

	16	17
Diameter (ft)	0.1640	0.1640
Elevation (Base) (ft)	0.0000	0.0000
Elevation (Ground) (ft)	0.0000	0.0000

Inertia

Rotational inertia (lb-ft2) 11.87 Radius of gyration (ft) 0.3281 Mass (lb) 110.2 Friction loss factor (lb-ft2/s) 1.187
Start Up

Design Flow Typical Operating Capacity 2642 USGPH
PERFORMANCE

Results

Total Head --- Velocity Head -3.171 ft
Total Fluid Head ---
Pressure Head 4845 ft Delta P excluding Static Head Results ---

---
P-101A/B (Pump): Design, Rating, Performance

Pump: P-101A/B

CONNECTIONS

Inlet Stream

Stream Name	From Unit Operation
14	T-101 Reboiled Absorber

Outlet Stream

Stream Name	To Unit Operation
15	E-101 LNG

Energy Stream

Stream Name From Unit Operation
W_P-101A/B
PARAMETERS

Adiabatic Efficiency (%): 75.00 Delta P: 100.0 psi Duty: 46.06 hp
CURVES

Delta P: 100.0 psi Duty: 46.06 hp
Coefficient A: 0.0000 Coefficient B: 0.0000 Coefficient C: 0.0000
Parameter Preferences Units for Delta P: m Flow Basis ActVolFlow Units for Flow: m3/h
User Variables

RATING

Head Offset: --- Efficiency Offset: ---
Characteristic Curves

Speed:
Flow Head Efficiency (%)
NPSH

NPSH Required --- NPSH Available 60.55 ft Enable NPSH Curves: No
NPSH Curves

Nozzle Paramaters

Base Elevation Relative to Ground Level 0.0000 ft

	14	15
Diameter (ft)	0.1640	0.1640
Elevation (Base) (ft)	0.0000	0.0000
Elevation (Ground) (ft)	0.0000	0.0000

Inertia

Rotational inertia (lb-ft2) 11.87 Radius of gyration (ft) 0.3281 Mass (lb) 110.2 Friction loss factor (lb-ft2/s) 1.187
Start Up

Design Flow Typical Operating Capacity 2642 USGPH
PERFORMANCE

Results

Total Head --- Velocity Head -1.807e-002 ft
Total Fluid Head ---
Pressure Head 487.2 ft Delta P excluding Static Head Results ---

---
E-104 (Plate Exchanger): Design, Rigorous Plate

Plate Exchanger: E-104

CONNECTIONS

Hot Side Cold Side

Inlet Outlet Inlet Outlet
Name 8 Name 11 Name 13 Name 18
From Op. TEE-100 To Op. T-101 From Op. T-101 To Op. E-103
Op. Type Tee Op. Type Reboiled Absorber Op. Type Reboiled Absorber Op. Type Plate Exchanger
Temp -56.14 F Temp -112.00 F Temp -145.02 F Temp -100.63 F
PARAMETERS

Heat Exchanger Model: Simple End Point

HotSide DeltaP: 1.000 psi ColdSide DeltaP: 1.000 psi
UA: 2.095e+005 Btu/F-hr Heat Transfer Coefficient: 1.9464e+02 Btu/hr-ft2-F Area: 1.0764e+03 ft2
User Variables

EDR Plate

Duty: --- Area: --- MTD: --- HTCClean: --- HTCDirty: ---
Hot Side Cold Side

Stream Name 8 Stream Name 13
Allowable Pressure Drop --- Allowable Pressure Drop ---
Calculated Pressure Drop --- Calculated Pressure Drop ---
Port Velocity --- Port Velocity ---
Plate Velocity --- Plate Velocity ---

E-103 (Plate Exchanger): Design, Rigorous Plate

Plate Exchanger: E-103

CONNECTIONS

Hot Side Cold Side

Inlet Outlet Inlet Outlet
Name 4 Name 5 Name 18 Name 19
From Op. VLV-102 To Op. RCY-1 From Op. E-104 To Op. V-102
Op. Type Valve Op. Type Recycle Op. Type Plate Exchanger Op. Type Separator
Temp -39.98 F Temp -56.13 F Temp -100.63 F Temp -41.00 F
PARAMETERS

Heat Exchanger Model: Simple End Point

HotSide DeltaP: 2.000 psi ColdSide DeltaP: 2.000 psi
UA: 8.649e+005 Btu/F-hr Heat Transfer Coefficient: 8.0351e+02 Btu/hr-ft2-F Area: 1.0764e+03 ft2
User Variables

EDR Plate

Duty: --- Area: --- MTD: --- HTCClean: --- HTCDirty: ---
Hot Side Cold Side

Stream Name 4 Stream Name 18
Allowable Pressure Drop --- Allowable Pressure Drop ---
Calculated Pressure Drop --- Calculated Pressure Drop ---
Port Velocity --- Port Velocity ---
Plate Velocity --- Plate Velocity ---

RCY-1 (Recycle): Design

Recycle: RCY-1

CONNECTIONS

Inlet Stream

Stream Name From Unit Operation
5 E-103 Plate Exchanger
Outlet Stream

Stream Name To Unit Operation
5.2 V-101 Separator
TOLERANCE

Vapour Fraction: 10.00 Temperature: 10.00 Pressure: 10.00
Flow: 10.00 Enthalpy: 10.00 Composition: 10.00
NUMERICAL

Acceleration Type: Wegstein Iteration Type: Nested
Maximum Iterations: 10 Iteration Count: 0
Wegstein Count: 3 Q Minimum: -20.00 Q Maximum: 0.0000
Iteration History

Iteration Variable Outlet Value Inlet Value
0 Converged --- ---
User Variables

To Reboiler @COL1 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments
---
Material Stream: To Reboiler @COL1 Fluid Package: Basis-1

Property Package: Peng-Robinson
CONDITIONS

OVERALL VAPOUR PH. LIQUID PH.
Vapour / Phase Fraction 0.0000 0.0000 1.0000
Temperature: (F) 20.67 20.67 20.67

Pressure: (psia) 280.0 280.0 280.0
Molar Flow (lbmole/hr) 7585 0.0000 7585
Mass Flow (lb/hr) 2.623e+005 0.0000 2.623e+005
Std Ideal Liq VolFlow (barrel/day) 4.446e+004 0.0000 4.446e+004
Molar Enthalpy (Btu/lbmole) -4.678e+04 -3.969e+04 -4.678e+04
Molar Entropy (Btu/lbmole-F) 2.810e+01 3.912e+01 2.810e+01
Heat Flow (Btu/hr) -3.548e+08 0.000e-01 -3.548e+08
Liq VolFlow @Std Cond (barrel/day) 4.249e+004 0.0000 4.249e+004
COMPOSITION

Overall Phase Vapour Fraction 0.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	225.5	0.0297	3617	0.0138	827.3	0.0186
Propane	1122	0.1479	4.947e+004	0.1886	6685	0.1504
n-Butane	255.6	0.0337	1.486e+004	0.0566	1744	0.0392
n-Pentane	46.65	0.0062	3366	0.0128	366.0	0.0082
Ethane	5558	0.7327	1.671e+005	0.6372	3.217e+004	0.7236
i-Butane	200.6	0.0264	1.166e+004	0.0445	1421	0.0319
n-Hexane	56.60	0.0075	4878	0.0186	504.0	0.0113
i-Pentane	71.21	0.0094	5138	0.0196	564.3	0.0127
Nitrogen	1.147e-004	0.0000	3.214e-003	0.0000	2.729e-004	0.0000
CO2	49.14	0.0065	2163	0.0082	179.4	0.0040
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	7585	1.0000	2.623e+005	1.0000	4.446e+004	1.0000

Vapour Phase Phase Fraction 0.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.1629	0.0000	0.0906	0.0000	0.1102
Propane	0.0000	0.0457	0.0000	0.0698	0.0000	0.0502
n-Butane	0.0000	0.0031	0.0000	0.0063	0.0000	0.0039
n-Pentane	0.0000	0.0002	0.0000	0.0005	0.0000	0.0003
Ethane	0.0000	0.7681	0.0000	0.8002	0.0000	0.8194
i-Butane	0.0000	0.0034	0.0000	0.0069	0.0000	0.0045
n-Hexane	0.0000	0.0001	0.0000	0.0002	0.0000	0.0001
i-Pentane	0.0000	0.0004	0.0000	0.0009	0.0000	0.0005
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0161	0.0000	0.0246	0.0000	0.0108
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000

Liquid Phase Phase Fraction 1.000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	225.5	0.0297	3617	0.0138	827.3	0.0186
Propane	1122	0.1479	4.947e+004	0.1886	6685	0.1504
n-Butane	255.6	0.0337	1.486e+004	0.0566	1744	0.0392
n-Pentane	46.65	0.0062	3366	0.0128	366.0	0.0082
Ethane	5558	0.7327	1.671e+005	0.6372	3.217e+004	0.7236
i-Butane	200.6	0.0264	1.166e+004	0.0445	1421	0.0319
n-Hexane	56.60	0.0075	4878	0.0186	504.0	0.0113
i-Pentane	71.21	0.0094	5138	0.0196	564.3	0.0127

Nitrogen 1.147e-004 0.0000 3.214e-003 0.0000 2.729e-004 0.0000
CO2 49.14 0.0065 2163 0.0082 179.4 0.0040
H2O 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
Total 7585 1.0000 2.623e+005 1.0000 4.446e+004 1.0000
K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	0.0000	0.0000	---
Propane	0.0000	0.0000	---
n-Butane	0.0000	0.0000	---
n-Pentane	0.0000	0.0000	---
Ethane	0.0000	0.0000	---
i-Butane	0.0000	0.0000	---
n-Hexane	0.0000	0.0000	---
i-Pentane	0.0000	0.0000	---
Nitrogen	0.0000	0.0000	---
CO2	0.0000	0.0000	---
H2O	---	---	---

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
Reboiler: Reboiler @COL1	Tower: Main Tower @COL1	

UTILITIES

(No utilities reference this stream)
PROCESS UTILITY

Boilup @COL1 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments

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Material Stream: Boilup @COL1 Fluid Package: Basis-1

Property Package: Peng-Robinson
CONDITIONS

	OVERALL	VAPOUR PH.
Vapour / Phase Fraction	1.0000	1.0000
Temperature: (F)	45.67	45.67
Pressure: (psia)	280.0	280.0
Molar Flow (lbmole/hr)	3891	3891
Mass Flow (lb/hr)	1.219e+005	1.219e+005
Std Ideal Liq VolFlow (barrel/day)	2.218e+004	2.218e+004
Molar Enthalpy (Btu/lbmole)	-3.970e+04	-3.970e+04
Molar Entropy (Btu/lbmole-F)	3.930e+01	3.930e+01
Heat Flow (Btu/hr)	-1.545e+08	-1.545e+08
Liq VolFlow @Std Cond (barrel/day)	2.223e+004	2.223e+004

COMPOSITION

Overall Phase Vapour Fraction 1.0000

COMPONENTS	MOLE FLOW	MOLE FRAC	MASS FLOW	MASS FRAC	LIQVOL FLOW	LIQVOL FRAC

	(lbmole/hr)		(lb/hr)		(barrel/day)	
Methane	195.1	0.0501	3129	0.0257	715.7	0.0323
Propane	348.3	0.0895	1.536e+004	0.1260	2076	0.0936
n-Butane	33.01	0.0085	1918	0.0157	225.2	0.0102
n-Pentane	2.289	0.0006	165.2	0.0014	17.96	0.0008
Ethane	3236	0.8316	9.730e+004	0.7983	1.873e+004	0.8443
i-Butane	33.60	0.0086	1953	0.0160	238.0	0.0107
n-Hexane	1.042	0.0003	89.79	0.0007	9.278	0.0004
i-Pentane	4.452	0.0011	321.2	0.0026	35.28	0.0016
Nitrogen	1.085e-004	0.0000	3.038e-003	0.0000	2.580e-004	0.0000
CO2	37.27	0.0096	1640	0.0135	136.1	0.0061
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	3891	1.0000	1.219e+005	1.0000	2.218e+004	1.0000

Vapour Phase Phase Fraction 1.000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	195.1	0.0501	3129	0.0257	715.7	0.0323
Propane	348.3	0.0895	1.536e+004	0.1260	2076	0.0936
n-Butane	33.01	0.0085	1918	0.0157	225.2	0.0102
n-Pentane	2.289	0.0006	165.2	0.0014	17.96	0.0008
Ethane	3236	0.8316	9.730e+004	0.7983	1.873e+004	0.8443
i-Butane	33.60	0.0086	1953	0.0160	238.0	0.0107
n-Hexane	1.042	0.0003	89.79	0.0007	9.278	0.0004
i-Pentane	4.452	0.0011	321.2	0.0026	35.28	0.0016
Nitrogen	1.085e-004	0.0000	3.038e-003	0.0000	2.580e-004	0.0000
CO2	37.27	0.0096	1640	0.0135	136.1	0.0061
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	3891	1.0000	1.219e+005	1.0000	2.218e+004	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	---	---	---
Propane	---	---	---
n-Butane	---	---	---
n-Pentane	---	---	---
Ethane	---	---	---
i-Butane	---	---	---
n-Hexane	---	---	---
i-Pentane	---	---	---
Nitrogen	---	---	---
CO2	---	---	---
H2O	---	---	---

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
Tower: Main Tower @COL1	Reboiler: Reboiler @COL1	

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

DeMeth @COL1 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments
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Material Stream: DeMeth @COL1 Fluid Package: Basis-1

Property Package: Peng-Robinson

CONDITIONS

	OVERALL	VAPOUR PH.	LIQUID PH.
Vapour / Phase Fraction	0.0000	0.0000	1.0000
Temperature: (F)	45.67	45.67	45.67
Pressure: (psia)	280.0	280.0	280.0
Molar Flow (lbmole/hr)	3694	0.0000	3694
Mass Flow (lb/hr)	1.404e+005	0.0000	1.404e+005
Std Ideal Liq VolFlow (barrel/day)	2.228e+004	0.0000	2.228e+004
Molar Enthalpy (Btu/lbmole)	-4.856e+04	-3.970e+04	-4.856e+04
Molar Entropy (Btu/lbmole-F)	2.781e+01	3.930e+01	2.781e+01
Heat Flow (Btu/hr)	-1.794e+08	0.000e-01	-1.794e+08
Liq VolFlow @Std Cond (barrel/day)	2.090e+004	0.0000	2.090e+004

COMPOSITION

Overall Phase Vapour Fraction 0.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	30.42	0.0082	488.0	0.0035	111.6	0.0050
Propane	773.5	0.2094	3.411e+004	0.2430	4610	0.2069
n-Butane	222.6	0.0603	1.294e+004	0.0922	1519	0.0682
n-Pentane	44.36	0.0120	3201	0.0228	348.0	0.0156
Ethane	2322	0.6286	6.983e+004	0.4973	1.344e+004	0.6033
i-Butane	167.0	0.0452	9705	0.0691	1183	0.0531
n-Hexane	55.56	0.0150	4788	0.0341	494.8	0.0222
i-Pentane	66.76	0.0181	4817	0.0343	529.0	0.0237
Nitrogen	6.261e-006	0.0000	1.754e-004	0.0000	1.489e-005	0.0000
CO2	11.87	0.0032	522.4	0.0037	43.34	0.0019
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	3694	1.0000	1.404e+005	1.0000	2.228e+004	1.0000

Vapour Phase Phase Fraction 0.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	0.0000	0.0501	0.0000	0.0257	0.0000	0.0323
Propane	0.0000	0.0895	0.0000	0.1260	0.0000	0.0936
n-Butane	0.0000	0.0085	0.0000	0.0157	0.0000	0.0102
n-Pentane	0.0000	0.0006	0.0000	0.0014	0.0000	0.0008
Ethane	0.0000	0.8316	0.0000	0.7983	0.0000	0.8443
i-Butane	0.0000	0.0086	0.0000	0.0160	0.0000	0.0107
n-Hexane	0.0000	0.0003	0.0000	0.0007	0.0000	0.0004
i-Pentane	0.0000	0.0011	0.0000	0.0026	0.0000	0.0016
Nitrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	0.0000	0.0096	0.0000	0.0135	0.0000	0.0061
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000

Liquid Phase Phase Fraction 1.000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	30.42	0.0082	488.0	0.0035	111.6	0.0050
Propane	773.5	0.2094	3.411e+004	0.2430	4610	0.2069
n-Butane	222.6	0.0603	1.294e+004	0.0922	1519	0.0682
n-Pentane	44.36	0.0120	3201	0.0228	348.0	0.0156
Ethane	2322	0.6286	6.983e+004	0.4973	1.344e+004	0.6033
i-Butane	167.0	0.0452	9705	0.0691	1183	0.0531
n-Hexane	55.56	0.0150	4788	0.0341	494.8	0.0222
i-Pentane	66.76	0.0181	4817	0.0343	529.0	0.0237
Nitrogen	6.261e-006	0.0000	1.754e-004	0.0000	1.489e-005	0.0000
CO2	11.87	0.0032	522.4	0.0037	43.34	0.0019
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	3694	1.0000	1.404e+005	1.0000	2.228e+004	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	0.0000	0.0000	---
Propane	0.0000	0.0000	---
n-Butane	0.0000	0.0000	---
n-Pentane	0.0000	0.0000	---
Ethane	0.0000	0.0000	---
i-Butane	0.0000	0.0000	---
n-Hexane	0.0000	0.0000	---
i-Pentane	0.0000	0.0000	---
Nitrogen	0.0000	0.0000	---
CO2	0.0000	0.0000	---
H2O	---	---	---

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
Material Stream: 14	Reboiler: Reboiler @COL1	

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

TE out @COL1 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments

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Material Stream: TE out @COL1 Fluid Package: Basis-1

Property Package: Peng-Robinson

CONDITIONS

	OVERALL	VAPOUR PH.	LIQUID PH.
Vapour / Phase Fraction	0.8837	0.8837	0.1163
Temperature: (F)	-140.8	-140.8	-140.8
Pressure: (psia)	209.7	209.7	209.7

Molar Flow (lbmole/hr) 1.129e+004 9980 1314
Mass Flow (lb/hr) 1.982e+005 1.651e+005 3.307e+004
Std Ideal Liq VolFlow (barrel/day) 4.358e+004 3.727e+004 6308
Molar Enthalpy (Btu/lbmole) -3.547e+04 -3.446e+04 -4.308e+04
Molar Entropy (Btu/lbmole-F) 3.283e+01 3.407e+01 2.335e+01
Heat Flow (Btu/hr) -4.006e+08 -3.440e+08 -5.658e+07
Liq VolFlow @Std Cond (barrel/day) 1.823e+007 1.612e+007 2.113e+006
COMPOSITION

Overall Phase Vapour Fraction 0.8837

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	1.027e+004	0.9095	1.648e+005	0.8316	3.769e+004	0.8647
Propane	116.4	0.0103	5131	0.0259	693.4	0.0159
n-Butane	13.23	0.0012	768.8	0.0039	90.26	0.0021
n-Pentane	1.011	0.0001	72.92	0.0004	7.929	0.0002
Ethane	848.4	0.0751	2.551e+004	0.1287	4911	0.1127
i-Butane	13.15	0.0012	764.6	0.0039	93.16	0.0021
n-Hexane	0.4930	0.0000	42.49	0.0002	4.390	0.0001
i-Pentane	1.987	0.0002	143.3	0.0007	15.74	0.0004
Nitrogen	18.23	0.0016	510.5	0.0026	43.35	0.0010
CO2	9.720	0.0009	427.8	0.0022	35.49	0.0008
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.129e+004	1.0000	1.982e+005	1.0000	4.358e+004	1.0000

Vapour Phase Phase Fraction 0.8837

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	9636	0.9655	1.546e+005	0.9364	3.536e+004	0.9486
Propane	6.015	0.0006	265.3	0.0016	35.85	0.0010
n-Butane	7.050e-002	0.0000	4.097	0.0000	0.4811	0.0000
n-Pentane	5.838e-004	0.0000	4.212e-002	0.0000	4.580e-003	0.0000
Ethane	313.0	0.0314	9412	0.0570	1812	0.0486
i-Butane	0.1376	0.0000	8.001	0.0000	0.9748	0.0000
n-Hexane	3.425e-005	0.0000	2.951e-003	0.0000	3.050e-004	0.0000
i-Pentane	2.177e-003	0.0000	0.1571	0.0000	1.725e-002	0.0000
Nitrogen	18.05	0.0018	505.6	0.0031	42.93	0.0012
CO2	6.758	0.0007	297.4	0.0018	24.68	0.0007
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	9980	1.0000	1.651e+005	1.0000	3.727e+004	1.0000

Liquid Phase Phase Fraction 0.1163

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	635.0	0.4834	1.019e+004	0.3081	2330	0.3693
Propane	110.3	0.0840	4866	0.1471	657.6	0.1042
n-Butane	13.16	0.0100	764.7	0.0231	89.77	0.0142
n-Pentane	1.010	0.0008	72.88	0.0022	7.924	0.0013
Ethane	535.4	0.4076	1.610e+004	0.4869	3099	0.4914
i-Butane	13.02	0.0099	756.6	0.0229	92.19	0.0146
n-Hexane	0.4930	0.0004	42.49	0.0013	4.390	0.0007
i-Pentane	1.984	0.0015	143.2	0.0043	15.73	0.0025
Nitrogen	0.1764	0.0001	4.940	0.0001	0.4195	0.0001

CO2	2.962	0.0023	130.3	0.0039	10.81	0.0017
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1314	1.0000	3.307e+004	1.0000	6308	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	1.997	1.997	---
Propane	7.175e-003	7.175e-003	---
n-Butane	7.052e-004	7.052e-004	---
n-Pentane	7.607e-005	7.607e-005	---
Ethane	7.694e-002	7.694e-002	---
i-Butane	1.392e-003	1.392e-003	---
n-Hexane	9.143e-006	9.143e-006	---
i-Pentane	1.444e-004	1.444e-004	---
Nitrogen	13.47	13.47	---
CO2	0.3003	0.3003	---
H2O	---	---	---

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
Tower: Main Tower @COL1	Material Stream: 12	

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

CS liq 2 @COL1 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments

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Material Stream: CS liq 2 @COL1 Fluid Package: Basis-1

Property Package: Peng-Robinson

CONDITIONS

	OVERALL	VAPOUR PH.	LIQUID PH.
Vapour / Phase Fraction	0.4537	0.4537	0.5463
Temperature: (F)	-119.5	-119.5	-119.5
Pressure: (psia)	209.7	209.7	209.7
Molar Flow (lbmole/hr)	6902	3132	3771
Mass Flow (lb/hr)	1.749e+005	5.267e+004	1.223e+005
Std Ideal Liq VolFlow (barrel/day)	3.192e+004	1.182e+004	2.009e+004
Molar Enthalpy (Btu/lbmole)	-4.208e+04	-3.443e+04	-4.843e+04
Molar Entropy (Btu/lbmole-F)	2.747e+01	3.481e+01	2.137e+01
Heat Flow (Btu/hr)	-2.904e+08	-1.078e+08	-1.826e+08
Liq VolFlow @Std Cond (barrel/day)	1.111e+007	5.057e+006	5.532e+005

COMPOSITION

Overall Phase Vapour Fraction 0.4537

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC

Methane	4208	0.6096	6.751e+004	0.3859	1.544e+004	0.4837
Propane	624.5	0.0905	2.754e+004	0.1574	3721	0.1166
n-Butane	205.0	0.0297	1.192e+004	0.0681	1399	0.0438
n-Pentane	43.01	0.0062	3103	0.0177	337.5	0.0106
Ethane	1541	0.2233	4.635e+004	0.2649	8923	0.2796
i-Butane	149.6	0.0217	8694	0.0497	1059	0.0332
n-Hexane	54.90	0.0080	4731	0.0270	488.9	0.0153
i-Pentane	64.11	0.0093	4626	0.0264	508.1	0.0159
Nitrogen	2.931	0.0004	82.11	0.0005	6.972	0.0002
CO2	9.001	0.0013	396.1	0.0023	32.86	0.0010
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	6902	1.0000	1.749e+005	1.0000	3.192e+004	1.0000

Vapour Phase Phase Fraction 0.4537

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	2969	0.9481	4.764e+004	0.9045	1.089e+004	0.9215
Propane	6.966	0.0022	307.2	0.0058	41.51	0.0035
n-Butane	0.2538	0.0001	14.75	0.0003	1.732	0.0001
n-Pentane	6.435e-003	0.0000	0.4643	0.0000	5.049e-002	0.0000
Ethane	149.5	0.0477	4496	0.0854	865.6	0.0732
i-Butane	0.3559	0.0001	20.69	0.0004	2.521	0.0002
n-Hexane	1.099e-003	0.0000	9.473e-002	0.0000	9.789e-003	0.0000
i-Pentane	1.767e-002	0.0000	1.275	0.0000	0.1401	0.0000
Nitrogen	2.760	0.0009	77.32	0.0015	6.566	0.0006
CO2	2.589	0.0008	114.0	0.0022	9.454	0.0008
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	3132	1.0000	5.267e+004	1.0000	1.182e+004	1.0000

Liquid Phase Phase Fraction 0.5463

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	1239	0.3285	1.987e+004	0.1625	4544	0.2262
Propane	617.5	0.1638	2.723e+004	0.2227	3680	0.1831
n-Butane	204.8	0.0543	1.190e+004	0.0973	1398	0.0695
n-Pentane	43.01	0.0114	3103	0.0254	337.4	0.0168
Ethane	1392	0.3691	4.185e+004	0.3423	8057	0.4010
i-Butane	149.2	0.0396	8674	0.0709	1057	0.0526
n-Hexane	54.90	0.0146	4731	0.0387	488.9	0.0243
i-Pentane	64.09	0.0170	4624	0.0378	507.9	0.0253
Nitrogen	0.1709	0.0000	4.787	0.0000	0.4065	0.0000
CO2	6.411	0.0017	282.2	0.0023	23.41	0.0012
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	3771	1.0000	1.223e+005	1.0000	2.009e+004	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	2.886	2.886	---
Propane	1.358e-002	1.358e-002	---
n-Butane	1.492e-003	1.492e-003	---
n-Pentane	1.802e-004	1.802e-004	---
Ethane	0.1293	0.1293	---
i-Butane	2.871e-003	2.871e-003	---
n-Hexane	2.411e-005	2.411e-005	---

i-Pentane 3.320e-004 3.320e-004 ---
Nitrogen 19.44 19.44 ---
CO2 0.4862 0.4862 ---
H2O --- --- ---
UNIT OPERATIONS

FEED TO PRODUCT FROM LOGICAL CONNECTION
Tower: Main Tower @COL1 Material Stream: 10
UTILITIES

(No utilities reference this stream)
PROCESS UTILITY

TopMeth @COL1 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments
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Material Stream: TopMeth @COL1 Fluid Package: Basis-1

Property Package: Peng-Robinson
CONDITIONS

OVERALL VAPOUR PH.
Vapour / Phase Fraction 1.0000 1.0000
Temperature: (F) -145.0 -145.0
Pressure: (psia) 260.0 260.0
Molar Flow (lbmole/hr) 1.827e+004 1.827e+004
Mass Flow (lb/hr) 2.988e+005 2.988e+005
Std Ideal Liq VolFlow (barrel/day) 6.774e+004 6.774e+004
Molar Enthalpy (Btu/lbmole) -3.451e+04 -3.451e+04
Molar Entropy (Btu/lbmole-F) 3.323e+01 3.323e+01
Heat Flow (Btu/hr) -6.305e+08 -6.305e+08
Liq VolFlow @Std Cond (barrel/day) 2.950e+007 2.950e+007
COMPOSITION

Overall Phase Vapour Fraction 1.0000

COMPONENTS MOLE FLOW MOLE FRAC MASS FLOW MASS FRAC LIQVOL FLOW LIQVOL FRAC
(lbmole/hr) (lb/hr) (barrel/day)
Methane 1.787e+004 0.9784 2.867e+005 0.9597 6.558e+004 0.9680
Propane 6.097 0.0003 268.8 0.0009 36.33 0.0005
n-Butane 7.820e-002 0.0000 4.545 0.0000 0.5336 0.0000
n-Pentane 7.170e-004 0.0000 5.173e-002 0.0000 5.625e-003 0.0000
Ethane 350.5 0.0192 1.054e+004 0.0353 2029 0.0300
i-Butane 0.1455 0.0000 8.458 0.0000 1.031 0.0000
n-Hexane 4.621e-005 0.0000 3.982e-003 0.0000 4.115e-004 0.0000
i-Pentane 2.555e-003 0.0000 0.1843 0.0000 2.025e-002 0.0000
Nitrogen 27.23 0.0015 762.8 0.0026 64.78 0.0010
CO2 10.09 0.0006 444.1 0.0015 36.85 0.0005
H2O 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
Total 1.827e+004 1.0000 2.988e+005 1.0000 6.774e+004 1.0000
Vapour Phase Phase Fraction 1.000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	1.787e+004	0.9784	2.867e+005	0.9597	6.558e+004	0.9680
Propane	6.097	0.0003	268.8	0.0009	36.33	0.0005
n-Butane	7.820e-002	0.0000	4.545	0.0000	0.5336	0.0000
n-Pentane	7.170e-004	0.0000	5.173e-002	0.0000	5.625e-003	0.0000
Ethane	350.5	0.0192	1.054e+004	0.0353	2029	0.0300
i-Butane	0.1455	0.0000	8.458	0.0000	1.031	0.0000
n-Hexane	4.621e-005	0.0000	3.982e-003	0.0000	4.115e-004	0.0000
i-Pentane	2.555e-003	0.0000	0.1843	0.0000	2.025e-002	0.0000
Nitrogen	27.23	0.0015	762.8	0.0026	64.78	0.0010
CO2	10.09	0.0006	444.1	0.0015	36.85	0.0005
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.827e+004	1.0000	2.988e+005	1.0000	6.774e+004	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	---	---	---
Propane	---	---	---
n-Butane	---	---	---
n-Pentane	---	---	---
Ethane	---	---	---
i-Butane	---	---	---
n-Hexane	---	---	---
i-Pentane	---	---	---
Nitrogen	---	---	---
CO2	---	---	---
H2O	---	---	---

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION
Material Stream: 13	Tower: Main Tower @COL1	

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

CS vap to DeMeth @COL1 (Material Stream): Conditions, Composition, K Value, Package Properties, Attachments

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Material Stream: CS vap to DeMeth @COL1 Fluid Package: Basis-1

Property Package: Peng-Robinson

CONDITIONS

	OVERALL	LIQUID PH.
Vapour / Phase Fraction	0.0000	1.0000
Temperature: (F)	-112.0	-112.0
Pressure: (psia)	808.7	808.7
Molar Flow (lbmole/hr)	3765	3765

Mass Flow (lb/hr) 6.605e+004 6.605e+004
Std Ideal Liq VolFlow (barrel/day) 1.453e+004 1.453e+004
Molar Enthalpy (Btu/lbmole) -3.714e+04 -3.714e+04
Molar Entropy (Btu/lbmole-F) 2.662e+01 2.662e+01
Heat Flow (Btu/hr) -1.398e+08 -1.398e+08
Liq VolFlow @Std Cond (barrel/day) 6.077e+006 6.077e+006
COMPOSITION

Overall Phase Vapour Fraction 0.0000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	3424	0.9095	5.493e+004	0.8316	1.256e+004	0.8647
Propane	38.79	0.0103	1710	0.0259	231.1	0.0159
n-Butane	4.409	0.0012	256.3	0.0039	30.09	0.0021
n-Pentane	0.3369	0.0001	24.31	0.0004	2.643	0.0002
Ethane	282.8	0.0751	8504	0.1287	1637	0.1127
i-Butane	4.385	0.0012	254.9	0.0039	31.05	0.0021
n-Hexane	0.1643	0.0000	14.16	0.0002	1.463	0.0001
i-Pentane	0.6622	0.0002	47.78	0.0007	5.248	0.0004
Nitrogen	6.075	0.0016	170.2	0.0026	14.45	0.0010
CO2	3.240	0.0009	142.6	0.0022	11.83	0.0008
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	3765	1.0000	6.605e+004	1.0000	1.453e+004	1.0000

Liquid Phase Phase Fraction 1.000

COMPONENTS	MOLE FLOW (lbmole/hr)	MOLE FRAC	MASS FLOW (lb/hr)	MASS FRAC	LIQVOL FLOW (barrel/day)	LIQVOL FRAC
Methane	3424	0.9095	5.493e+004	0.8316	1.256e+004	0.8647
Propane	38.79	0.0103	1710	0.0259	231.1	0.0159
n-Butane	4.409	0.0012	256.3	0.0039	30.09	0.0021
n-Pentane	0.3369	0.0001	24.31	0.0004	2.643	0.0002
Ethane	282.8	0.0751	8504	0.1287	1637	0.1127
i-Butane	4.385	0.0012	254.9	0.0039	31.05	0.0021
n-Hexane	0.1643	0.0000	14.16	0.0002	1.463	0.0001
i-Pentane	0.6622	0.0002	47.78	0.0007	5.248	0.0004
Nitrogen	6.075	0.0016	170.2	0.0026	14.45	0.0010
CO2	3.240	0.0009	142.6	0.0022	11.83	0.0008
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	3765	1.0000	6.605e+004	1.0000	1.453e+004	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
Methane	0.0000	0.0000	---
Propane	0.0000	0.0000	---
n-Butane	0.0000	0.0000	---
n-Pentane	0.0000	0.0000	---
Ethane	0.0000	0.0000	---
i-Butane	0.0000	0.0000	---
n-Hexane	0.0000	0.0000	---
i-Pentane	0.0000	0.0000	---
Nitrogen	0.0000	0.0000	---
CO2	0.0000	0.0000	---
H2O	---	---	---

UNIT OPERATIONS

FEED TO PRODUCT FROM LOGICAL CONNECTION
Tower: Main Tower @COL1 Material Stream: 11
UTILITIES

(No utilities reference this stream)
PROCESS UTILITY

Main Tower @COL1 (Tower): Design, Rating, Performance

Tower: Main Tower @COL1

Vapour Draws Summary

Name: Name: Name:
Tray Number
Temperature (F)
Pressure (psia)
Mass Flow (lb/hr)
Molar Flow (lbmole/hr)
Ideal Liquid Volume Flow (barrel/day)
Molar Enthalpy (Btu/lbmole)
Mass Enthalpy (Btu/lb)
Heat Flow (Btu/hr)
Molecular Weight
Molar Entropy (Btu/lbmole-F)
Mass Entropy (Btu/lb-F)
Molar Density (lbmole/ft3)
Mass Density (lb/ft3)
Std Liq Mass Den (lb/ft3)
Molar Heat Cap (Btu/lbmole-F)
Mass Heat Cap (Btu/lb-F)
Thermal Cond (Btu/hr-ft-F)
Viscosity (cP)
Surface Tension (dyne/cm) --- --- ---
Z Factor
Liquid Draws Summary

Name: Name: Name:
Tray Number
Temperature (F)
Pressure (psia)
Mass Flow (lb/hr)
Molar Flow (lbmole/hr)
Ideal Liquid Volume Flow (barrel/day)
Molar Enthalpy (Btu/lbmole)
Mass Enthalpy (Btu/lb)
Heat Flow (Btu/hr)

Molecular Weight
Molar Entropy (Btu/lbmole-F)
Mass Entropy (Btu/lb-F)
Molar Density (lbmole/ft3)
Mass Density (lb/ft3)
Std Liq Mass Den (lb/ft3)
Molar Heat Cap (Btu/lbmole-F)
Mass Heat Cap (Btu/lb-F)
Thermal Cond (Btu/hr-ft-F)
Viscosity (cP)
Surface Tension (dyne/cm)
Z Factor
Water Draws Summary

	Name:	Name:	Name:
Tray Number			
Temperature (F)			
Pressure (psia)			
Mass Flow (lb/hr)			
Molar Flow (lbmole/hr)			
Water Volume Flow (barrel/day)			
Molar Enthalpy (Btu/lbmole)			
Mass Enthalpy (Btu/lb)			
Heat Flow (Btu/hr)			
Molecular Weight			
Molar Entropy (Btu/lbmole-F)			
Mass Entropy (Btu/lb-F)			
Molar Density (lbmole/ft3)			
Mass Density (lb/ft3)			
Std Liq Mass Den (lb/ft3)			
Molar Heat Cap (Btu/lbmole-F)			
Mass Heat Cap (Btu/lb-F)			
Thermal Cond (Btu/hr-ft-F)			
Viscosity (cP)			
Surface Tension (dyne/cm)			
Z Factor			
User Variables			

RATING

Sizing

Weir Height (ft)	0.1640
Weir Length (ft)	3.937
Tray Space (ft)	1.640
Tray Volume (ft3)	31.20
DC Volume (ft3)	3.120
Diameter (ft)	4.921
Active Area (ft2)	13.60
Flow Paths	1

Internal Type: Sieve
Nozzles

Tray Section Elevation Relative to Ground Level 0.0000 ft

	HoldupRG	VtoAbove (ft)	Diameter (ft)	L toBelow (ft)	Diameter (ft)
1__Main Tower	14.76 ft	---	---	0.0000 ft	9.843e-003 ft
2__Main Tower	13.12 ft	1.640 ft	9.843e-003 ft	0.0000 ft	9.843e-003 ft
3__Main Tower	11.48 ft	1.640 ft	9.843e-003 ft	0.0000 ft	9.843e-003 ft
4__Main Tower	9.843 ft	1.640 ft	9.843e-003 ft	0.0000 ft	9.843e-003 ft
5__Main Tower	8.202 ft	1.640 ft	9.843e-003 ft	0.0000 ft	9.843e-003 ft
6__Main Tower	6.562 ft	1.640 ft	9.843e-003 ft	0.0000 ft	9.843e-003 ft
7__Main Tower	4.921 ft	1.640 ft	9.843e-003 ft	0.0000 ft	9.843e-003 ft
8__Main Tower	3.281 ft	1.640 ft	9.843e-003 ft	0.0000 ft	9.843e-003 ft
9__Main Tower	1.640 ft	1.640 ft	9.843e-003 ft	0.0000 ft	9.843e-003 ft
10__Main Tower	0.0000 ft	1.640 ft	9.843e-003 ft	---	---

	Feed Tray	Elevation RH (ft)	Diameter (ft)
TE out	1__Main Tower	1.230 ft	0.1640 ft
CS vap to DeMeth	1__Main Tower	1.230 ft	0.1640 ft
CS liq 2	6__Main Tower	1.230 ft	0.1640 ft
Boilup	10__Main Tower	0.0000 ft	0.1640 ft

	Prod Tray	Elevation RH (ft)	Diameter (ft)
TopMeth	1__Main Tower	1.640 ft	0.1640 ft
To Reboiler	10__Main Tower	0.0000 ft	9.843e-003 ft

Heat Loss

Efficiency

Overall Efficiency

Tray	Overall
1__Main Tower	1.000
2__Main Tower	1.000
3__Main Tower	1.000
4__Main Tower	1.000
5__Main Tower	1.000
6__Main Tower	1.000
7__Main Tower	1.000
8__Main Tower	1.000
9__Main Tower	1.000
10__Main Tower	1.000

Component Efficiency

Tray	Methane	Propane	n-Butane	n-Pentane
1__Main Tower	1.000	1.000	1.000	1.000
2__Main Tower	1.000	1.000	1.000	1.000
3__Main Tower	1.000	1.000	1.000	1.000
4__Main Tower	1.000	1.000	1.000	1.000
5__Main Tower	1.000	1.000	1.000	1.000
6__Main Tower	1.000	1.000	1.000	1.000
7__Main Tower	1.000	1.000	1.000	1.000
8__Main Tower	1.000	1.000	1.000	1.000
9__Main Tower	1.000	1.000	1.000	1.000
10__Main Tower	1.000	1.000	1.000	1.000

Tray	Ethane	i-Butane	n-Hexane	i-Pentane
1__Main Tower	1.000	1.000	1.000	1.000
2__Main Tower	1.000	1.000	1.000	1.000
3__Main Tower	1.000	1.000	1.000	1.000
4__Main Tower	1.000	1.000	1.000	1.000
5__Main Tower	1.000	1.000	1.000	1.000
6__Main Tower	1.000	1.000	1.000	1.000

7__Main Tower	1.000	1.000	1.000	1.000
8__Main Tower	1.000	1.000	1.000	1.000
9__Main Tower	1.000	1.000	1.000	1.000
10__Main Tower	1.000	1.000	1.000	1.000

Tray	Nitrogen	CO2	H2O
1__Main Tower	1.000	1.000	1.000
2__Main Tower	1.000	1.000	1.000
3__Main Tower	1.000	1.000	1.000
4__Main Tower	1.000	1.000	1.000
5__Main Tower	1.000	1.000	1.000
6__Main Tower	1.000	1.000	1.000
7__Main Tower	1.000	1.000	1.000
8__Main Tower	1.000	1.000	1.000
9__Main Tower	1.000	1.000	1.000
10__Main Tower	1.000	1.000	1.000

Pressure Drop

	Pressure (psia)	Pressure Drop (psi)
1__Main Tower	260.0 psia	2.222 psi
2__Main Tower	262.2 psia	2.222 psi
3__Main Tower	264.4 psia	2.222 psi
4__Main Tower	266.7 psia	2.222 psi
5__Main Tower	268.9 psia	2.222 psi
6__Main Tower	271.1 psia	2.222 psi
7__Main Tower	273.3 psia	2.222 psi
8__Main Tower	275.6 psia	2.222 psi
9__Main Tower	277.8 psia	2.222 psi
10__Main Tower	280.0 psia	---

Rating Enabled: No Top Tray Fixed For Update Tray Section Pressure Drop 20.00 psi

Vapour Mole Fractions

Tray Number	Methane	Propane	n-Butane	n-Pentane	Ethane
1__Main Tower	0.9784	0.0003	0.0000	0.0000	0.0192
2__Main Tower	0.9778	0.0004	0.0000	0.0000	0.0205
3__Main Tower	0.9747	0.0004	0.0000	0.0000	0.0234
4__Main Tower	0.9680	0.0005	0.0000	0.0000	0.0296
5__Main Tower	0.9557	0.0007	0.0000	0.0000	0.0414
6__Main Tower	0.9425	0.0020	0.0001	0.0000	0.0531
7__Main Tower	0.9033	0.0034	0.0001	0.0000	0.0886
8__Main Tower	0.7450	0.0095	0.0005	0.0000	0.2327
9__Main Tower	0.4207	0.0248	0.0016	0.0001	0.5322
10__Main Tower	0.1629	0.0457	0.0031	0.0002	0.7681

Tray Number	i-Butane	n-Hexane	i-Pentane	Nitrogen	CO2
1__Main Tower	0.0000	0.0000	0.0000	0.0015	0.0006
2__Main Tower	0.0000	0.0000	0.0000	0.0005	0.0007
3__Main Tower	0.0000	0.0000	0.0000	0.0005	0.0010
4__Main Tower	0.0000	0.0000	0.0000	0.0005	0.0013
5__Main Tower	0.0000	0.0000	0.0000	0.0005	0.0017
6__Main Tower	0.0001	0.0000	0.0000	0.0005	0.0017
7__Main Tower	0.0002	0.0000	0.0000	0.0001	0.0043
8__Main Tower	0.0006	0.0000	0.0000	0.0000	0.0116
9__Main Tower	0.0018	0.0000	0.0002	0.0000	0.0187
10__Main Tower	0.0034	0.0001	0.0004	0.0000	0.0161

Tray Number	H2O

1__Main Tower 0.0000
2__Main Tower 0.0000
3__Main Tower 0.0000
4__Main Tower 0.0000
5__Main Tower 0.0000
6__Main Tower 0.0000
7__Main Tower 0.0000
8__Main Tower 0.0000
9__Main Tower 0.0000
10__Main Tower 0.0000
Liquid Mole Fractions

Tray Number	Methane	Propane	n-Butane	n-Pentane	Ethane
1__Main Tower	0.6612	0.0461	0.0054	0.0004	0.2782
2__Main Tower	0.6495	0.0469	0.0054	0.0004	0.2884
3__Main Tower	0.6237	0.0489	0.0057	0.0004	0.3110
4__Main Tower	0.5756	0.0525	0.0060	0.0005	0.3538
5__Main Tower	0.5054	0.0609	0.0068	0.0005	0.4134
6__Main Tower	0.3950	0.1204	0.0343	0.0068	0.3953
7__Main Tower	0.3158	0.1260	0.0353	0.0070	0.4633
8__Main Tower	0.1868	0.1295	0.0349	0.0068	0.5868
9__Main Tower	0.0832	0.1300	0.0326	0.0063	0.6962
10__Main Tower	0.0297	0.1479	0.0337	0.0062	0.7327

Tray Number	i-Butane	n-Hexane	i-Pentane	Nitrogen	CO2
1__Main Tower	0.0053	0.0002	0.0008	0.0002	0.0023
2__Main Tower	0.0054	0.0002	0.0008	0.0001	0.0028
3__Main Tower	0.0056	0.0002	0.0009	0.0001	0.0036
4__Main Tower	0.0060	0.0002	0.0009	0.0001	0.0045
5__Main Tower	0.0068	0.0002	0.0010	0.0000	0.0049
6__Main Tower	0.0257	0.0085	0.0103	0.0000	0.0037
7__Main Tower	0.0266	0.0088	0.0105	0.0000	0.0067
8__Main Tower	0.0264	0.0085	0.0103	0.0000	0.0099
9__Main Tower	0.0249	0.0078	0.0095	0.0000	0.0095
10__Main Tower	0.0264	0.0075	0.0094	0.0000	0.0065

Tray Number	H2O
1__Main Tower	0.0000
2__Main Tower	0.0000
3__Main Tower	0.0000
4__Main Tower	0.0000
5__Main Tower	0.0000
6__Main Tower	0.0000
7__Main Tower	0.0000
8__Main Tower	0.0000
9__Main Tower	0.0000
10__Main Tower	0.0000

Vapour Mass Fractions

Tray Number	Methane	Propane	n-Butane	n-Pentane	Ethane
1__Main Tower	0.9597	0.0009	0.0000	0.0000	0.0353
2__Main Tower	0.9584	0.0010	0.0000	0.0000	0.0377
3__Main Tower	0.9525	0.0011	0.0000	0.0000	0.0429
4__Main Tower	0.9403	0.0013	0.0000	0.0000	0.0540
5__Main Tower	0.9183	0.0019	0.0000	0.0000	0.0745
6__Main Tower	0.8944	0.0052	0.0003	0.0000	0.0944

7__Main Tower 0.8274 0.0085 0.0005 0.0000 0.1522
8__Main Tower 0.5991 0.0210 0.0014 0.0001 0.3507
9__Main Tower 0.2712 0.0439 0.0037 0.0002 0.6431
10__Main Tower 0.0906 0.0698 0.0063 0.0005 0.8002

Tray Number	i-Butane	n-Hexane	i-Pentane	Nitrogen	CO2
1__Main Tower	0.0000	0.0000	0.0000	0.0026	0.0015
2__Main Tower	0.0000	0.0000	0.0000	0.0009	0.0019
3__Main Tower	0.0000	0.0000	0.0000	0.0008	0.0026
4__Main Tower	0.0000	0.0000	0.0000	0.0008	0.0035
5__Main Tower	0.0001	0.0000	0.0000	0.0008	0.0045
6__Main Tower	0.0003	0.0000	0.0000	0.0009	0.0044
7__Main Tower	0.0006	0.0000	0.0000	0.0001	0.0107
8__Main Tower	0.0017	0.0000	0.0002	0.0000	0.0257
9__Main Tower	0.0042	0.0001	0.0005	0.0000	0.0331
10__Main Tower	0.0069	0.0002	0.0009	0.0000	0.0246

Tray Number	H2O
1__Main Tower	0.0000
2__Main Tower	0.0000
3__Main Tower	0.0000
4__Main Tower	0.0000
5__Main Tower	0.0000
6__Main Tower	0.0000
7__Main Tower	0.0000
8__Main Tower	0.0000
9__Main Tower	0.0000
10__Main Tower	0.0000

Liquid Mass Fractions

Tray Number	Methane	Propane	n-Butane	n-Pentane	Ethane
1__Main Tower	0.4858	0.0930	0.0142	0.0014	0.3832
2__Main Tower	0.4731	0.0940	0.0144	0.0014	0.3938
3__Main Tower	0.4459	0.0960	0.0146	0.0014	0.4168
4__Main Tower	0.3980	0.0997	0.0151	0.0014	0.4585
5__Main Tower	0.3328	0.1102	0.0163	0.0015	0.5102
6__Main Tower	0.2174	0.1821	0.0683	0.0169	0.4077
7__Main Tower	0.1663	0.1823	0.0674	0.0166	0.4573
8__Main Tower	0.0927	0.1766	0.0627	0.0153	0.5459
9__Main Tower	0.0398	0.1708	0.0564	0.0135	0.6236
10__Main Tower	0.0138	0.1886	0.0566	0.0128	0.6372

Tray Number	i-Butane	n-Hexane	i-Pentane	Nitrogen	CO2
1__Main Tower	0.0141	0.0008	0.0027	0.0002	0.0046
2__Main Tower	0.0143	0.0008	0.0027	0.0001	0.0056
3__Main Tower	0.0145	0.0008	0.0027	0.0001	0.0071
4__Main Tower	0.0150	0.0008	0.0028	0.0001	0.0086
5__Main Tower	0.0163	0.0009	0.0030	0.0001	0.0088
6__Main Tower	0.0513	0.0253	0.0254	0.0000	0.0055
7__Main Tower	0.0507	0.0248	0.0250	0.0000	0.0097
8__Main Tower	0.0475	0.0228	0.0230	0.0000	0.0135
9__Main Tower	0.0432	0.0200	0.0204	0.0000	0.0124
10__Main Tower	0.0445	0.0186	0.0196	0.0000	0.0082

Tray Number	H2O
1__Main Tower	0.0000
2__Main Tower	0.0000
3__Main Tower	0.0000

4__Main Tower 0.0000
5__Main Tower 0.0000
6__Main Tower 0.0000
7__Main Tower 0.0000
8__Main Tower 0.0000
9__Main Tower 0.0000
10__Main Tower 0.0000
Vapour LiqVolume Fractions

Tray Number	Methane	Propane	n-Butane	n-Pentane	Ethane
1__Main Tower	0.9680	0.0005	0.0000	0.0000	0.0300
2__Main Tower	0.9663	0.0006	0.0000	0.0000	0.0320
3__Main Tower	0.9616	0.0006	0.0000	0.0000	0.0365
4__Main Tower	0.9516	0.0008	0.0000	0.0000	0.0460
5__Main Tower	0.9332	0.0011	0.0000	0.0000	0.0637
6__Main Tower	0.9134	0.0031	0.0001	0.0000	0.0812
7__Main Tower	0.8574	0.0052	0.0002	0.0000	0.1327
8__Main Tower	0.6527	0.0135	0.0008	0.0000	0.3216
9__Main Tower	0.3172	0.0303	0.0022	0.0001	0.6331
10__Main Tower	0.1102	0.0502	0.0039	0.0003	0.8194

Tray Number	i-Butane	n-Hexane	i-Pentane	Nitrogen	CO2
1__Main Tower	0.0000	0.0000	0.0000	0.0010	0.0005
2__Main Tower	0.0000	0.0000	0.0000	0.0003	0.0007
3__Main Tower	0.0000	0.0000	0.0000	0.0003	0.0009
4__Main Tower	0.0000	0.0000	0.0000	0.0003	0.0013
5__Main Tower	0.0000	0.0000	0.0000	0.0003	0.0016
6__Main Tower	0.0002	0.0000	0.0000	0.0003	0.0016
7__Main Tower	0.0003	0.0000	0.0000	0.0001	0.0040
8__Main Tower	0.0010	0.0000	0.0001	0.0000	0.0101
9__Main Tower	0.0026	0.0001	0.0003	0.0000	0.0140
10__Main Tower	0.0045	0.0001	0.0005	0.0000	0.0108

Tray Number	H2O
1__Main Tower	0.0000
2__Main Tower	0.0000
3__Main Tower	0.0000
4__Main Tower	0.0000
5__Main Tower	0.0000
6__Main Tower	0.0000
7__Main Tower	0.0000
8__Main Tower	0.0000
9__Main Tower	0.0000
10__Main Tower	0.0000

Liquid LiqVolume Fractions

Tray Number	Methane	Propane	n-Butane	n-Pentane	Ethane
1__Main Tower	0.5507	0.0623	0.0083	0.0007	0.3656
2__Main Tower	0.5379	0.0631	0.0084	0.0007	0.3769
3__Main Tower	0.5104	0.0650	0.0086	0.0008	0.4015
4__Main Tower	0.4605	0.0682	0.0090	0.0008	0.4466
5__Main Tower	0.3915	0.0766	0.0098	0.0009	0.5051
6__Main Tower	0.2844	0.1408	0.0459	0.0105	0.4491
7__Main Tower	0.2202	0.1427	0.0458	0.0104	0.5098
8__Main Tower	0.1240	0.1396	0.0430	0.0097	0.6147
9__Main Tower	0.0532	0.1350	0.0387	0.0086	0.7024

10__Main Tower	0.0186	0.1504	0.0392	0.0082	0.7236

Tray Number	i-Butane	n-Hexane	i-Pentane	Nitrogen	CO2
1__Main Tower	0.0085	0.0004	0.0014	0.0001	0.0019
2__Main Tower	0.0086	0.0004	0.0015	0.0000	0.0023
3__Main Tower	0.0089	0.0004	0.0015	0.0000	0.0029
4__Main Tower	0.0092	0.0004	0.0016	0.0000	0.0036
5__Main Tower	0.0102	0.0005	0.0017	0.0000	0.0037
6__Main Tower	0.0358	0.0149	0.0160	0.0000	0.0026
7__Main Tower	0.0358	0.0148	0.0159	0.0000	0.0047
8__Main Tower	0.0338	0.0138	0.0148	0.0000	0.0066
9__Main Tower	0.0308	0.0121	0.0131	0.0000	0.0060
10__Main Tower	0.0319	0.0113	0.0127	0.0000	0.0040

Tray Number	H2O
1__Main Tower	0.0000
2__Main Tower	0.0000
3__Main Tower	0.0000
4__Main Tower	0.0000
5__Main Tower	0.0000
6__Main Tower	0.0000
7__Main Tower	0.0000
8__Main Tower	0.0000
9__Main Tower	0.0000
10__Main Tower	0.0000

Reboiler @COL1 (Reboiler): Design, Rating, Performance

Reboiler: Reboiler @COL1

CONNECTIONS

Inlet	Name	From Oper
	To Reboiler @COL1	Tower: Main Tower @COL1

Outlet	Name	To Oper
	Boilup @COL1	Tower: Main Tower @COL1
	DeMeth @COL1	Material Stream: 14

Energy	Name	To Oper
	Qr @COL1	Reboiler: Reboiler @COL1

PARAMETERS

Vessel Volume: 70.63 ft3 Pressure Drop: 0.0000 psi Duty: 2.0967e+07 Btu/hr
Level SP: 50.00 % Liquid Volume: 35.31 ft3

RATING

Sizing

Cylinder Horizontal This reboiler has a Boot: No
Volume 70.63 ft3 Diameter 3.914 ft Length 5.871
Nozzles

Base Elevation Relative to Ground Level 0.0000 ft Diameter 3.914 ft Length 5.871

	To Reboiler @COL1	Boilup @COL1	DeMeth @COL1
Diameter (ft)	0.1957	0.1957	0.1957
Elevation (Base) (ft)	3.914	3.914	0.0000
Elevation (Ground) (ft)	3.914	3.914	0.0000
Elevation (% of Height) (%)	100.00	100.00	0.00

Options

PV Work Term Contribution (%) 100.00

PERFORMANCE TABLE

Overall Phase

Temperature (F)	Pressure (psia)	Heat Flow (Btu/hr)	Enthalpy (Btu/lbmole)
20.67	280.00	0.00	-46778.54
45.67	280.00	20967614.88	-44014.19

Vapour Fraction	Vap Phase Mass Frac	Heat of Vap (Btu/lbmole)
0.0000	0.0000	---
0.5130	0.4647	---

Vapour Phase

Mass Flow (lb/hr)	Molecular Wt	Density (lb/ft3)	Mass Sp Heat (Btu/lb-F)	Viscosity (cP)	Thermal Cond (Btu/hr-ft-F)
0.00	28.86	2.02	0.50	0.01	0.01
121877.84	31.32	2.11	0.50	0.01	0.01

Std Gas Flow (MMSCFD)	Z Factor	Pseudo Pc (psia)	Pseudo Tc (F)	Pseudo Zc	Pseudo Omega
0.00	0.78	703.00	63.21	0.28	0.09
35.37	0.77	698.54	94.13	0.28	0.10

Light Liquid Phase

Mass Flow (lb/hr)	Density (lb/ft3)	Mass Sp Heat (Btu/lb-F)	Viscosity (cP)	Thermal Cond (Btu/hr-ft-F)	Surface Tens (dyne/cm)
262269.92	29.06	0.72	0.09	0.06	5.86
140392.07	29.56	0.71	0.09	0.05	5.51

Molecular Wt	Sp Gravity	Pseudo Pc (psia)	Pseudo Tc (F)	Pseudo Zc	Pseudo Omega
34.58	0.47	680.66	120.42	0.28	0.11
38.00	0.47	661.82	148.11	0.28	0.13

Heavy Liquid Phase

Mass Flow (lb/hr)	Density (lb/ft3)	Mass Sp Heat (Btu/lb-F)	Viscosity (cP)	Thermal Cond (Btu/hr-ft-F)	Surface Tens (dyne/cm)
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---	---	---	---	---	---

Molecular Wt	Sp Gravity	Pseudo Pc (psia)	Pseudo Tc (F)	Pseudo Zc	Pseudo Omega
---	---	---	---	---	---
---	---	---	---	---	---

Mixed Liquid Phase

Mass Flow (lb/hr)	Density (lb/ft3)	Mass Sp Heat (Btu/lb-F)	Viscosity (cP)	Thermal Cond (Btu/hr-ft-F)	Surface Tens (dyne/cm)

262269.92	29.06	0.72	0.09	0.06	5.86
140392.07	29.56	0.71	0.09	0.05	5.51

Molecular Wt	Sp Gravity	Pseudo Pc (psia)	Pseudo Tc (F)	Pseudo Zc	Pseudo Omega
34.58	0.47	680.66	120.42	0.28	0.11
38.00	0.47	661.82	148.11	0.28	0.13

Feed Stream		
Name	1	
Pressure [psia]		**914.70**
Temperature [F]		**80.00**
Mass Flow [lb/hr]		439,152.99
Std Ideal Liq Vol Flow [barrel/day]		90,024.93
Vapor / Phase Fraction		1.00
Molar Enthalpy [Btu/lbmole]		(34,674.05)
Stream Price Basis		**Molar Flow**

	LNG	
Name	E-102	E-101
Number of Sides	2	2
LMTD [F]	11.99	14.23
UA [Btu/F-hr]	3,618,020.07	181,077.30
Hot Pinch Temperature [F]	(33.04)	80.00
Cold Pinch Temperature [F]	(33.08)	72.00
Number of Hot Sides	1	1
Number of Cold Sides	1	1
Hot Inlet Eqm. Temp. [F]	70.92	80.00
Cold Inlet Eqm. Temp. [F]	(33.08)	47.19
Exchanger Cold Duty [Btu/hr]	43,376,473.94	2,577,363.01

Air cooler		
Name	E-202	E-105
Pressure Drop [psi]	**3.00**	**3.00**
Duty [Btu/hr]	(92,434,455.91)	(8,796,398.30)
UA [Btu/F-hr]	2,554,780.22	1,200,849.51
LMTD-SS [F]	44.48	22.13
Air inlet T [F]	**100.00**	**100.00**
Air outlet T [F]	136.60	141.99
Air inlet P [psia]	**14.70**	**14.70**
Air mass flow [lb/hr]	10,428,771.95	865,033.05
Air volume flow [USGPH]	1,141,223,040.00	95,101,920.00
Fan speed [rpm]	180.00	60.00
Fan demanded speed [rpm]	**180.00**	**60.00**
Fan maximum acceleration [rpm]		
Fan design speed [rpm]	**60.00**	**60.00**
Fan design volume flow [USGPH]	**95,101,920.00**	**95,101,920.00**
Fan actual volume flow [USGPH]	285,305,760.00	95,101,920.00

	Separator						
Name	V-101	V-201	V-202	V-203	V-102	V-103	V-204
Vessel Temperature [F]	(56.14)	(40.67)	36.51	119.29	(41.00)	(2.28)	198.45
Vessel Pressure [psia]	**809.70**	**15.90**	**40.43**	**105.67**	**257.00**	**338.34**	**249.73**
Vessel Pressure Drop [psi]	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Vapour Outlet Pressure Drop [psi]	**-**	1.20	**2.00**	**2.00**	**-**	**-**	**2.00**
Tank Volume [ft3]	2,652.83						
Liquid Volume [ft3]	1,326.41						
Liquid Volume Percent [%]	**50.00**	**50.00**	**50.00**	**50.00**	**50.00**	**50.00**	**50.00**
Duty [Btu/hr]	-	-	-	-	-	-	-
Vessel Diameter [ft]	**8.50**						
Vessel Length or Height [ft]	**46.75**						

Pump		
Name	P-102 A/B	P-101A/B
Speed [rpm]		
Power [hp]	458.10	46.06
Delta P [psi]	936.70	**100.00**
Adiabatic Efficiency [%]	**75.00**	**75.00**
Duty [hp]	458.10	46.06
NPSH required [ft]		
NPSH available [ft]	86.54	60.55
Total Head [ft]		
Capacity [USGPH]	37,727.71	35,531.48
Linker power loss [Btu/hr]		
Delta T [F]	16.27	1.53
Pressure Head [ft]	4,845.44	487.18
Velocity Head [ft]	(3.17)	(0.02)
Delta P excluding Static Head [psi]		
Total Fluid Head [lbf-ft/lbm]		
Pump Curve Coefficient		
Transient Rotational Power [hp]	-	-
Friction Loss Power [hp]	-	-
Total Rotor Power [hp]	458.10	46.06
Total Rotor Torque [lbf-ft]		
Transient Rotational Torque [lbf-ft]		
Friction Loss Torque [lbf-ft]		
Fluid Torque [lbf-ft]		

	Compressor					
Name	C-102	C-103	C-201	C-202	C-203	C-204
Compressor Speed [rpm]						
Power [hp]	2,063.71	9,477.03	5,849.80	6,641.20	6,238.76	550.76
Capacity (act feed vol flow) [ACFM]	4,854.88	4,030.43	64,043.32	28,318.22	11,658.20	5,104.50
Adiabatic Efficiency	**75.00**	**75.00**	**75.00**	**75.00**	**75.00**	**75.00**
Polytropic Efficiency	75.86	77.83	76.57	76.52	76.38	75.12
Compressor Volume [ft3]	-	-	-	-	-	-
Delta T [F]	38.72	168.69	77.58	83.24	79.51	7.29
Delta P [psi]	81.34	626.36	25.73	67.24	146.06	19.27
Polytropic Head [ft]	10,375.73	48,880.68	15,470.33	17,552.08	16,457.86	1,428.91
Adiabatic Head [ft]	10,257.74	47,105.87	15,153.42	17,203.48	16,160.98	1,426.69
Dynamic Head [ft]	10,375.73	48,880.68	15,470.33	17,552.08	16,457.86	1,428.91
Polytropic Fluid Head [lbf-ft/lbm]	10,375.81	48,881.04	15,470.44	17,552.21	16,457.98	1,428.92
Adiabatic Fluid Head [lbf-ft/lbm]	10,257.81	47,106.21	15,153.53	17,203.60	16,161.10	1,426.70
Dynamic Fluid Head [lbf-ft/lbm]	10,375.81	48,881.04	15,470.44	17,552.21	16,457.98	1,428.92
Polytropic Head Factor	1.00	1.00	1.00	1.00	1.01	1.00
Polytropic Exponent	1.48	1.46	1.16	1.11	1.05	1.02
Isentropic Exponent	1.32	1.33	1.11	1.07	1.01	0.98
Dynamic Delta P						
RC-Typical Design Speed						
RC-Volumetric Efficiency						
PD Number of Cylinders	-	-	-	-	-	-
PD Bore [ft]						
PD Stroke [ft]						
PD Piston Rod Diameter [ft]						
PD Const Volmetric Efficiency Loss						
Transient Rotational Power [hp]	-	-	-	-	-	-
Friction Loss Power [hp]	-	-	-	-	-	-
Fluid Power [hp]	2,063.71	9,477.03	5,849.80	6,641.20	6,238.76	550.76
Total Rotor Torque [lbf-ft]						
Transient Rotational Torque [lbf-ft]						
Friction Loss Torque [lbf-ft]						
Fluid Torque [lbf-ft]						
Duty [Btu/hr]	5,250,973.64	24,113,666.14	14,884,423.31	16,898,089.63	15,874,101.48	1,401,367.55

Expander	
Name	C-101
Expander Speed [rpm]	
Power [hp]	2,063.71
Adiabatic Efficiency	
Polytropic Efficiency	72.88
Delta T [F]	(84.70)
Delta P [psi]	**600.00**
Polytropic Head [ft]	28,293.77
Adiabatic Head [ft]	27,494.36
Dynamic Head [ft]	28,293.77
Polytropic Fluid Head [lbf-ft/lbm]	28,293.98
Adiabatic Fluid Head [lbf-ft/lbm]	27,494.56
Dynamic Fluid Head [lbf-ft/lbm]	28,293.98
Polytropic Head Factor	1.00
Polytropic Exponent	1.01
Isentropic Exponent	1.05
Dynamic Delta P	
Linker Power Loss [Btu/hr]	

	Valve		
Name	VLV-100	VLV-101	VLV-102
Pressure Drop [psi]	**600.00**	**245.00**	**100.00**
Percentage open [%]	**50.00**	**100.00**	**50.00**
Friction pressure Drop [psi]	600.00	245.00	100.00
Holdup Temperature [F]			
Pipe k [lb/hr/sqrt(psia-lb/ft3)]	-	-	-
Resistance (Cv or K) [USGPM(60F,1psi)]	**45.68**	**109.84**	**991.48**
Cg	1,528.72	3,675.90	33,181.30
C1	**33.47**	**33.47**	**33.47**
Km	**0.90**	**0.90**	**0.90**
Critical Pressure Ratio			
Pipe roughness [ft]	0.00	0.00	0.00
Pipe length [ft]	**-**	**-**	**-**
Pipe friction factor (Darcy)			
Pipe Velocity [ft/s]	**94.33**	**271.85**	**760.55**
Reynolds Number	**8,736,945.59**	**24,196,888.34**	**93,984,733.87**
Pipe Feed Diameter [ft]	**0.16**	**0.16**	**0.16**

Column Sub-Flowsheet		
Name	T-101	
Number of Stage	**10**	
Top Stage Temperature [F]		**(145.02)**
Bottom Stage Temperature [F]		**45.67**
Top Stage Pressure [psia]		**260.00**
Bottom Stage Pressure [psia]		**280.00**
Reboil Ratio		
Reflux Flow/Total Liq Flow		0.18
Condenser Duty		
Reboiler Duty [Btu/hr]		20,967,179.16

Plate Exchanger		
Name	E-104	E-103
Hot Side Delta P [psi]	**1.00**	**2.00**
Cold Side Delta P [psi]	**1.00**	**2.00**
UA [Btu/F-hr]	209,506.41	864,891.00
Area [ft2]	**1,076.39**	**1,076.39**
Heat Transfer Coefficient [Btu/hr-ft2-F]	194.64	803.51

COL1 - Material Stream							
Name	To Reboiler	Boilup	DeMeth	TE out	CS liq 2	TopMeth	CS vap to DeMeth
Pressure [psia]	280.00	280.00	280.00	209.70	209.70	260.00	808.70
Temperature [F]	20.67	45.67	45.67	(140.84)	(119.52)	(145.02)	(112.00)
Mass Flow [lb/hr]	262,269.92	121,874.71	140,395.21	198,154.84	174,946.53	298,757.78	66,051.61
Std Ideal Liq Vol Flow [barrel/day]	44,464.24	22,184.11	22,280.13	43,581.36	31,916.46	67,744.80	14,527.12
Vapor / Phase Fraction	-	1.00	-	0.88	0.45	1.00	-
Molar Enthalpy [Btu/lbmole]	(46,778.54)	(39,697.37)	(48,560.84)	(35,466.42)	(42,077.41)	(34,514.14)	(37,142.17)