PROCESS SIMULATION LAB

Day 1
Group 2

Student's Name	Roll no
Prince Yadav	002010301008
Shreya Ghosh	002010301009
Soumodip Paul	002010301010
Shayantan Sahoo	002010301011

Submission Date

09/08/2023

Question 1

Create one materials stream that contains only water with following conditions:

Fluid Package: Peng-Robinson

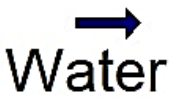
Flowrate: 100 $kgmol/h$

Pressure: 1 atm

Vapor/Phase Fraction: 1.00

What is the temperature of this stream? _____

Answer:



Water		
Temperature	99.96	C
Pressure	101.3	kPa
Molar Flow	100.0	kgmole/h

Temperature of the stream is 99.96℃.

Material Stream: Water

Fluid Package: Basis-1
Property Package: Peng-Robinson

CONDITIONS

	Overall	Vapour Phase	Aqueous Phase		
Vapour / Phase Fraction	1.0000 *	1.0000	0.0000		
Temperature: (C)	99.96	99.96	99.96		
Pressure: (kPa)	101.3 *	101.3	101.3		
Molar Flow (kgmole/h)	100.0 *	100.0	0.0000		
Mass Flow (kg/h)	1802	1802	0.0000		
Std Ideal Liq Vol Flow (m3/h)	1.805	1.805	0.0000		
Molar Enthalpy (kJ/kgmole)	-2.393e+005	-2.393e+005	-2.804e+005		
Molar Entropy (kJ/kgmole-C)	181.1	181.1	71.23		
Heat Flow (kJ/h)	-2.393e+007	-2.393e+007	0.0000		
Liq Vol Flow @Std Cond (m3/h)	1.775 *	1.775	0.0000		

PROPERTIES

	Overall	Vapour Phase	Aqueous Phase		
Molecular Weight	18.02	18.02	18.02		
Molar Density (kgmole/m3)	3.295e-002	3.295e-002	52.62		
Mass Density (kg/m3)	0.5935	0.5935	947.9		
Act. Volume Flow (m3/h)	3035	3035	0.0000		
Mass Enthalpy (kJ/kg)	-1.329e+004	-1.329e+004	-1.556e+004		
Mass Entropy (kJ/kg-C)	10.06	10.06	3.954		
Heat Capacity (kJ/kgmole-C)	34.36	34.36	79.22		
Mass Heat Capacity (kJ/kg-C)	1.907	1.907	4.398		
LHV Molar Basis (Std) (kJ/kgmole)	0.0000	0.0000	0.0000		
HHV Molar Basis (Std) (kJ/kgmole)	4.101e+004	4.101e+004	4.101e+004		
HHV Mass Basis (Std) (kJ/kg)	2276	2276	2276		
CO2 Loading	---	---	---		
CO2 Apparent Mole Conc. (kgmole/m3)	---	---	---		
CO2 Apparent Wt. Conc. (kgmol/kg)	---	---	---		
LHV Mass Basis (Std) (kJ/kg)	0.0000	0.0000	0.0000		
Phase Fraction [Vol. Basis]	1.000	1.000	---		
Phase Fraction [Mass Basis]	1.000	1.000	0.0000		
Phase Fraction [Act. Vol. Basis]	1.000	1.000	0.0000		
Mass Exergy (kJ/kg)	492.6	---	---		
Partial Pressure of CO2 (kPa)	0.0000	---	---		
Cost Based on Flow (Cost/s)	0.0000	0.0000	0.0000		
Act. Gas Flow (ACT_m3/h)	3035	3035	---		
Avg. Liq. Density (kgmole/m3)	55.40	55.40	55.40		
Specific Heat (kJ/kgmole-C)	34.36	34.36	79.22		
Std. Gas Flow (STD_m3/h)	2364	2364	0.0000		
Std. Ideal Liq. Mass Density (kg/m3)	998.0	998.0	998.0		
Act. Liq. Flow (m3/s)	0.0000	---	0.0000		
Z Factor	---	0.9914	6.208e-004		
Watson K	---	---	---		
User Property	---	---	---		
Partial Pressure of H2S (kPa)	0.0000	---	---		
Cp/(Cp - R)	1.319	1.319	1.117		
Cp/Cv	1.331	1.331	1.176		
Ideal Gas Cp/Cv	1.323	1.323	1.323		
Ideal Gas Cp (kJ/kgmole-C)	34.09	34.09	34.09		
Mass Ideal Gas Cp (kJ/kg-C)	1.892	1.892	1.892		
Heat of Vap. (kJ/kgmole)	4.101e+004	---	---		
Kinematic Viscosity (cSt)	20.40	20.40	0.2944		
Liq. Mass Density (Std. Cond) (kg/m3)	1015	1015	1015		
Liq. Vol. Flow (Std. Cond) (m3/h)	1.775	1.775	0.0000		
Liquid Fraction	0.0000	0.0000	1.000		
Molar Volume (m3/kgmole)	30.35	30.35	1.900e-002		
Mass Heat of Vap. (kJ/kg)	2276	---	---		
Phase Fraction [Molar Basis]	1.0000	1.0000	0.0000		

* Specified by user.

Material Stream: Water (continued)

Fluid Package: Basis-1
Property Package: Peng-Robinson

PROPERTIES

		Overall	Vapour Phase	Aqueous Phase		
Surface Tension	(dyne/cm)	---	---	58.61		
Thermal Conductivity	(W/m-K)	2.446e-002	2.446e-002	0.6807		
Bubble Point Pressure	(kPa)	101.3	---	---		
Viscosity	(cP)	1.211e-002	1.211e-002	0.2791		
Cv (Semi-Ideal)	(kJ/kgmole-C)	26.04	26.04	70.91		
Mass Cv (Semi-Ideal)	(kJ/kg-C)	1.446	1.446	3.936		
Cv	(kJ/kgmole-C)	25.81	25.81	67.38		
Mass Cv	(kJ/kg-C)	1.432	1.432	3.740		
Cv (Ent. Method)	(kJ/kgmole-C)	---	---	---		
Mass Cv (Ent. Method)	(kJ/kg-C)	---	---	---		
Cp/Cv (Ent. Method)		---	---	---		
Reid VP at 37.8 C	(kPa)	---	---	---		
True VP at 37.8 C	(kPa)	---	---	---		
Liq. Vol. Flow - Sum(Std. Cond)	(m3/h)	1.775	1.775	0.0000		
Viscosity Index		-23.99	---	---		

COMPOSITION

Overall Phase

Vapour Fraction 1.0000 *

COMPONENTS	MOLAR FLOW (kgmole/h)	MOLE FRACTION	MASS FLOW (kg/h)	MASS FRACTION	LIQUID VOLUME FLOW (m3/h)	LIQUID VOLUME FRACTION
H2O	100.0000 *	1.0000 *	1801.5100 *	1.0000 *	1.8051 *	1.0000 *
Total	100.0000	1.0000	1801.5100	1.0000	1.8051	1.0000

Vapour Phase

Phase Fraction 1.000

COMPONENTS	MOLAR FLOW (kgmole/h)	MOLE FRACTION	MASS FLOW (kg/h)	MASS FRACTION	LIQUID VOLUME FLOW (m3/h)	LIQUID VOLUME FRACTION
H2O	100.0000	1.0000	1801.5100	1.0000	1.8051	1.0000
Total	100.0000	1.0000	1801.5100	1.0000	1.8051	1.0000

Aqueous Phase

Phase Fraction 0.0000

COMPONENTS	MOLAR FLOW (kgmole/h)	MOLE FRACTION	MASS FLOW (kg/h)	MASS FRACTION	LIQUID VOLUME FLOW (m3/h)	LIQUID VOLUME FRACTION
H2O	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000
Total	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
H2O	1.000	---	1.000

UNIT OPERATIONS

FEED TO	PRODUCT FROM	LOGICAL CONNECTION

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

DYNAMICS

Pressure Specification (Active): 101.3 kPa *

Flow Specification (Active) Molar: 100.0 kgmole/h * Mass: 1802 kg/h Std Ideal Liq Volume: 1.805 m3/h

* Specified by user.

Question 2

Calculate the discharge pressure and required duty of the pump of mixtures half pentene and half hexane.

Given, property method: Peng Robinson

Total mass flow: 30000 kg/h

Feed temperature: 30°C

Feed pressure - 1 bar.

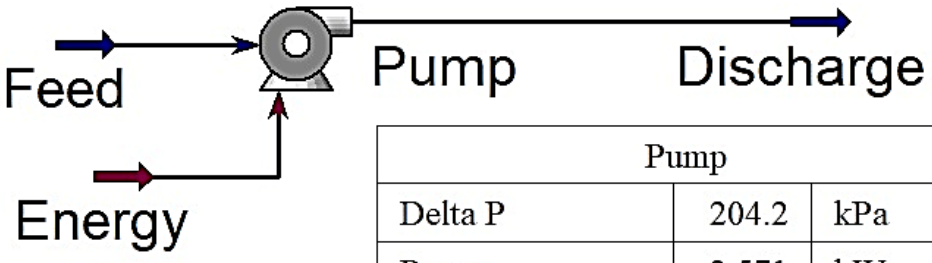
Pressure changer-Pump

Pump efficiency: 75%

Pump curve data

GPM	25	50	100	150	200	250	300	325	350	375	400	425	450
$Head(ft)$	115.3	114.9	113.8	111	108.2	103	97	94	90.3	86.3	82.4	78.5	74.4

Answer:



Pump		
Delta P	204.2	kPa
Power	3.571	kW
Feed Pressure	100.0	kPa
Product Pressure	304.2	kPa
Molar Flow	379.0	kgmole/h

Discharge Pressure: 304.2 kPa

Required Duty: 3.571 kW

Workbook: Case (Main)

Material Streams

Fluid Pkg: All

Name		Feed	Discharge			
Vapour Fraction		0.0000	0.0000			
Temperature	(C)	30.00 *	30.11			
Pressure	(kPa)	100.0 *	304.2			
Molar Flow	(kgmole/h)	379.0	379.0			
Mass Flow	(kg/h)	3.000e+004 *	3.000e+004			
Liquid Volume Flow	(m3/h)	46.35	46.35			
Heat Flow	(kJ/h)	-7.012e+007	-7.010e+007			

Compositions

Fluid Pkg: All

Name	Feed	Discharge			
Comp Mole Frac (n-Pentane)	0.5000 *	0.5000			
Comp Mole Frac (n-Hexane)	0.5000 *	0.5000			

Energy Streams

Fluid Pkg: All

Name	Energy				
Heat Flow (kJ/h)	1.285e+004				

Unit Ops

Operation Name	Operation Type	Feeds	Products	Ignored	Calc Level
Pump	Pump	Feed Energy	Discharge	No	500.0 *

Pump: Pump

CONNECTIONS

Inlet Stream

Stream Name	From Unit Operation
Feed	

Outlet Stream

Stream Name	To Unit Operation
Discharge	

Energy Stream

Stream Name	From Unit Operation
Energy	

PARAMETERS

Adiabatic Efficiency (%):	75.00	Delta P:	204.2 kPa	Pressure Ratio:	3.042	Duty:	3.571 kW
Multiphase Pump							Not Active

CURVES

Delta P:	204.2 kPa	Duty:	3.571 kW		
Coefficient A:	0.0000 *	Coefficient B:	0.0000 *	Coefficient C:	0.0000 *

Parameter Preferences	Units for Head:	m	Flow Basis	ActVolFlow	Units for Flow:	m3/h

User Variables

RATING

* Specified by user.

Pump: Pump (continued)

Head Offset:	0.0000 m	Efficiency Offset:	0.0000

Characteristic Curves

PumpCurve-1 for Pump — Speed: ---

Flow (m3/h)	Head (m)	Efficiency (%)
5.678 *	35.14 *	75.00 *
11.36 *	35.02 *	75.00 *
22.71 *	34.69 *	75.00 *
34.07 *	33.83 *	75.00 *
45.43 *	32.98 *	75.00 *
56.78 *	31.39 *	75.00 *
68.14 *	29.57 *	75.00 *
73.82 *	28.65 *	75.00 *
79.49 *	27.52 *	75.00 *
85.17 *	26.30 *	75.00 *
90.85 *	25.12 *	75.00 *
96.53 *	23.93 *	75.00 *
102.2 *	22.68 *	75.00 *

NPSH

NPSH Required	---	NPSH Available	9.807 m	Enable NPSH Curves:	No

NPSH Curves

Nozzle Paramaters

Base Elevation Relative to Ground Level: 0.0000 m *

		Feed	Discharge	
Diameter	(m)	5.000e-002	5.000e-002	
Elevation (Base)	(m)	0.0000	0.0000	
Elevation (Ground)	(m)	0.0000	0.0000	

Inertia

Rotational inertia (kg-m2)	0.5000	Radius of gyration (m)	0.1000	Mass (kg)	50.00	Friction loss factor (kg-m2/s)	5.000e-002

Start Up

Design Flow Typical Operating Capacity: 10.00 m3/h

CONDITIONS

Name		Feed	Discharge	Energy	
Vapour		0.0000	0.0000	---	
Temperature	(C)	30.0000 *	30.1119	---	
Pressure	(kPa)	100.0000 *	304.2385	---	
Molar Flow	(kgmole/h)	378.9580	378.9580	---	
Mass Flow	(kg/h)	30000.0000 *	30000.0000	---	
Std Ideal Liq Vol Flow	(m3/h)	46.3508	46.3508	---	
Molar Enthalpy	(kJ/kgmole)	-1.850e+005	-1.850e+005	---	
Molar Entropy	(kJ/kgmole-C)	82.57	82.60	---	
Heat Flow	(kJ/h)	-7.0115e+07	-7.0102e+07	1.2854e+04	

PROPERTIES

Name		Feed	Discharge			
Molecular Weight		79.16	79.16			
Molar Density	(kgmole/m3)	8.028	8.030			
Mass Density	(kg/m3)	635.6	635.7			

Pump: Pump (continued)

PROPERTIES

Name	Feed	Discharge			
Act. Volume Flow (m3/h)	47.20	47.19			
Mass Enthalpy (kJ/kg)	-2337	-2337			
Mass Entropy (kJ/kg-C)	1.043	1.043			
Heat Capacity (kJ/kgmole-C)	177.6	177.6			
Mass Heat Capacity (kJ/kg-C)	2.243	2.243			
LHV Molar Basis (Std) (kJ/kgmole)	3.581e+006	3.581e+006			
HHV Molar Basis (Std) (kJ/kgmole)	3.848e+006	3.848e+006			
HHV Mass Basis (Std) (kJ/kg)	4.860e+004	4.860e+004			
CO2 Loading	---	---			
CO2 Apparent Mole Conc. (kgmole/m3)	---	---			
CO2 Apparent Wt. Conc. (kgmol/kg)	---	---			
LHV Mass Basis (Std) (kJ/kg)	4.523e+004	4.523e+004			
Phase Fraction [Vol. Basis]	0.0000	0.0000			
Phase Fraction [Mass Basis]	0.0000	0.0000			
Phase Fraction [Act. Vol. Basis]	0.0000	0.0000			
Mass Exergy (kJ/kg)	9.059e-002	0.4072			
Partial Pressure of CO2 (kPa)	0.0000	0.0000			
Cost Based on Flow (Cost/s)	0.0000	0.0000			
Act. Gas Flow (ACT_m3/h)	---	---			
Avg. Liq. Density (kgmole/m3)	8.176	8.176			
Specific Heat (kJ/kgmole-C)	177.6	177.6			
Std. Gas Flow (STD_m3/h)	8960	8960			
Std. Ideal Liq. Mass Density (kg/m3)	647.2	647.2			
Act. Liq. Flow (m3/s)	1.311e-002	1.311e-002			
Z Factor	4.942e-003	1.503e-002			
Watson K	12.91	12.91			
User Property	---	---			
Partial Pressure of H2S (kPa)	0.0000	0.0000			
Cp/(Cp - R)	1.049	1.049			
Cp/Cv	1.332	1.331			
Ideal Gas Cp/Cv	1.066	1.066			
Ideal Gas Cp (kJ/kgmole-C)	133.4	133.5			
Mass Ideal Gas Cp (kJ/kg-C)	1.685	1.686			
Heat of Vap. (kJ/kgmole)	2.882e+004	2.640e+004			
Kinematic Viscosity (cSt)	0.3890	0.3886			
Liq. Mass Density (Std. Cond) (kg/m3)	650.0	650.0			
Liq. Vol. Flow (Std. Cond) (m3/h)	46.15	46.15			
Liquid Fraction	1.000	1.000			
Molar Volume (m3/kgmole)	0.1246	0.1245			
Mass Heat of Vap. (kJ/kg)	364.0	333.4			
Phase Fraction [Molar Basis]	0.0000	0.0000			
Surface Tension (dyne/cm)	16.09	16.08			
Thermal Conductivity (W/m-K)	0.1084	0.1084			
Bubble Point Pressure (kPa)	53.04	53.26			
Viscosity (cP)	0.2472	0.2470			
Cv (Semi-Ideal) (kJ/kgmole-C)	169.3	169.2			
Mass Cv (Semi-Ideal) (kJ/kg-C)	2.138	2.138			
Cv (kJ/kgmole-C)	133.4	133.4			
Mass Cv (kJ/kg-C)	1.685	1.685			
Cv (Ent. Method) (kJ/kgmole-C)	137.1	137.1			
Mass Cv (Ent. Method) (kJ/kg-C)	1.731	1.732			

* Specified by user.

Pump: Pump (continued)

PROPERTIES

Name	Feed	Discharge			
Cp/Cv (Ent. Method)	1.296	1.295			
Reid VP at 37.8 C (kPa)	69.82	69.82			
True VP at 37.8 C (kPa)	70.07	70.07			
Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	46.15	46.15			
Viscosity Index	-14.52	-14.55			

PERFORMANCE

Results

Total Head	---	Velocity Head	-1.097e-003 m
Total Fluid Head	---	Delta P excluding Static Head Results	---
Pressure Head	32.77 m		

DYNAMICS

Dynamic Specifications

Head (m)	---	Not Active	Power (kJ/h)	1.285e+004	Not Active
Fluid Head (kJ/kg)	---	Not Active	Capacity (m3/h)	46.35	
Speed (rpm)	---	Not Active	Use Characteristic Curves		Not Active
Efficiency (%)	75.00	Active	Pump is Acting as a Turbine		Not Active
Pressure Increase (kPa)	204.2	Active			

Malfunction Details

Total Pump Failure	Not Active	Pump Overheating	Not Active	Pump Performance Deterioration	Not Active
Delay Time	---	Delay Time	---	Delay Time	---
Ramp Time	---	Ramp Time	---	Ramp Time	---
		Additional Heat	---	Decrease in Head	---
				Decrease in Efficiency	---

Holdup Details

Phase	Accumulation (kgmole/h)	Moles (kgmole)	Volume (m3)
Vapour	0.0000	0.0000	0.0000
Liquid	0.0000	0.0000	0.0000
Aqueous	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**

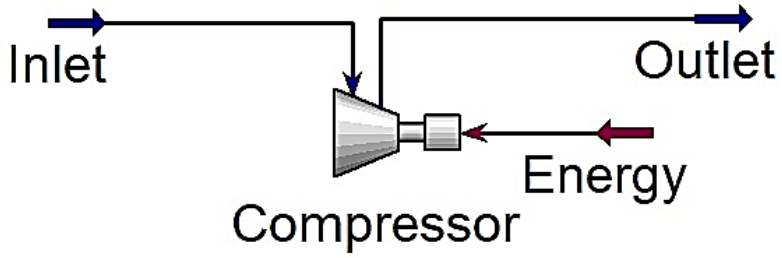
NOTES

* Specified by user.

Question 3

Air is compressed by a reversible compressor from an inlet state of 100 kpa and 300 K to an exit pressure of 900 kpa. Using the Peng-Robinson equation of state, determine the compressor work per unit mass (kJ/kg). Assume 100% adiabatic efficiency of the compressor.

Answer :



Compressor		
Feed Pressure	100.0	kPa
Product Pressure	900.0	kPa
Molar Flow	3.454e-002	kgmole/h
Energy	351.4	kJ/h

Feed Basis, $F = 1\ kg/hr$

Compressor Duty, $W = 351.4\ kJ/hr$

Compressor work per unit mass is :

$$\frac{W}{F} = \frac{351.4}{1}\frac{kJ/hr}{kg/hr} = 351.4\ kJ/kg$$

Workbook: Case (Main)

Material Streams

Fluid Pkg: All

Name		Inlet	Outlet			
Vapour Fraction		1.0000	1.0000			
Temperature	(C)	26.85 *	369.5			
Pressure	(kPa)	100.0 *	900.0 *			
Molar Flow	(kgmole/h)	3.454e-002	3.454e-002			
Mass Flow	(kg/h)	1.000 *	1.000			
Liquid Volume Flow	(m3/h)	1.137e-003	1.137e-003			
Heat Flow	(kJ/h)	1.559	353.0			

Compositions

Fluid Pkg: All

Name	Inlet	Outlet			
Comp Mole Frac (Air)	1.0000 *	1.0000			

Energy Streams

Fluid Pkg: All

Name		Energy				
Heat Flow	(kJ/h)	351.4				

Unit Ops

Operation Name	Operation Type	Feeds	Products	Ignored	Calc Level
Compressor	Compressor	Inlet	Outlet	No	500.0 *
		Energy			

Compressor: Compressor

DESIGN

Connections

Inlet Stream

STREAM NAME	FROM UNIT OPERATION
Inlet	

Outlet Stream

STREAM NAME	TO UNIT OPERATION
Outlet	

Energy Stream

STREAM NAME	FROM UNIT OPERATION
Energy	

Parameters

Speed:	---		Duty:	9.7619e-02 kW	
Adiabatic Eff.:	75.00		PolyTropic Eff.:	81.04	
Adiabatic Head:	2.688e+004 m		Polytropic Head:	2.904e+004 m	
Adiabatic Fluid Head:	263.6 kJ/kg		Polytropic Fluid Head:	284.8 kJ/kg	
Polytropic Exp.	1.534	Isentropic Exp.	1.399	Poly Head Factor	1.002

User Variables

RATING

Curves

* Specified by user.

Compressor: Compressor (continued)

Curves

Compressor Speed:	---	Efficiency:	Adiabatic	Curves Enabled:	No
Head Offset:	0.0000 m	Efficiency Offset:			0.00 %

Speed:

Flow	Head	Efficiency (%)

Flow Limits

Surge Curve: Inactive

Speed	Flow	Speed	Flow	Speed	Flow

Stone Wall Curve: Inactive

Speed	Flow	Speed	Flow	Speed	Flow

Surge Flow Rate	---	Field Flow Rate	0.8611 ACT_m3/h	Stone Wall Flow	---	Compressor Volume	0.0000 m3

Nozzle Paramaters

Base Elevation Relative to Ground Level: 0.0000 m *

		Inlet	Outlet	
Diameter	(m)	5.000e-002	5.000e-002	
Elevation (Base)	(m)	0.0000	0.0000	
Elevation (Ground)	(m)	0.0000	0.0000	

Inertia

Rotational inertia (kg-m2)	6.000	Radius of gyration (m)	0.2000
Mass (kg)	150.0	Friction loss factor (rad/min) (kg-m2/s)	6.000e-003

WORKSHEET

Conditions

Name		Inlet	Outlet	Energy	
Vapour		1.0000	1.0000	---	
Temperature	(C)	26.8500 *	369.4582	---	
Pressure	(kPa)	100.0000 *	900.0000 *	---	
Molar Flow	(kgmole/h)	0.0345	0.0345	---	
Mass Flow	(kg/h)	1.0000 *	1.0000	---	
Std Ideal Liq Vol Flow	(m3/h)	0.0011	0.0011	---	
Molar Enthalpy	(kJ/kgmole)	45.13	1.022e+004	---	
Molar Entropy	(kJ/kgmole-C)	118.5	122.7	---	
Heat Flow	(kJ/h)	1.5588e+00	3.5299e+02	3.5143e+02	

Properties

Name		Inlet	Outlet			
Molecular Weight		28.95	28.95			
Molar Density	(kgmole/m3)	4.011e-002	0.1680			
Mass Density	(kg/m3)	1.161	4.863			
Act. Volume Flow	(m3/h)	0.8611	0.2056			
Mass Enthalpy	(kJ/kg)	1.559	353.0			
Mass Entropy	(kJ/kg-C)	4.092	4.238			
Heat Capacity	(kJ/kgmole-C)	28.74	30.79			
Mass Heat Capacity	(kJ/kg-C)	0.9927	1.064			
LHV Molar Basis (Std)	(kJ/kgmole)	0.0000	0.0000			
HHV Molar Basis (Std)	(kJ/kgmole)	0.0000	0.0000			
HHV Mass Basis (Std)	(kJ/kg)	0.0000	0.0000			
CO2 Loading		---	---			
CO2 Apparent Mole Conc.	(kgmole/m3)	---	---			
CO2 Apparent Wt. Conc.	(kgmol/kg)	---	---			

* Specified by user.

Compressor: Compressor (continued)

Properties

Name	Inlet	Outlet			
LHV Mass Basis (Std) (kJ/kg)	0.0000	0.0000			
Phase Fraction [Vol. Basis]	1.000	1.000			
Phase Fraction [Mass Basis]	1.000	1.000			
Phase Fraction [Act. Vol. Basis]	1.000	1.000			
Mass Exergy (kJ/kg)	-1.121	306.7			
Partial Pressure of CO2 (kPa)	0.0000	0.0000			
Cost Based on Flow (Cost/s)	0.0000	0.0000			
Act. Gas Flow (ACT_m3/h)	0.8611	0.2056			
Avg. Liq. Density (kgmole/m3)	30.38	30.38			
Specific Heat (kJ/kgmole-C)	28.74	30.79			
Std. Gas Flow (STD_m3/h)	0.8167	0.8167			
Std. Ideal Liq. Mass Density (kg/m3)	879.6	879.6			
Act. Liq. Flow (m3/s)	---	---			
Z Factor	0.9995	1.003			
Watson K	5.914	5.914			
User Property	---	---			
Partial Pressure of H2S (kPa)	0.0000	0.0000			
Cp/(Cp - R)	1.407	1.370			
Cp/Cv	1.410	1.373			
Ideal Gas Cp/Cv	1.408	1.371			
Ideal Gas Cp (kJ/kgmole-C)	28.69	30.71			
Mass Ideal Gas Cp (kJ/kg-C)	0.9909	1.061			
Heat of Vap. (kJ/kgmole)	5826	4677			
Kinematic Viscosity (cSt)	16.51	6.894			
Liq. Mass Density (Std. Cond) (kg/m3)	1.225	1.225			
Liq. Vol. Flow (Std. Cond) (m3/h)	0.8162	0.8162			
Liquid Fraction	0.0000	0.0000			
Molar Volume (m3/kgmole)	24.93	5.953			
Mass Heat of Vap. (kJ/kg)	201.3	161.6			
Phase Fraction [Molar Basis]	1.0000	1.0000			
Surface Tension (dyne/cm)	---	---			
Thermal Conductivity (W/m-K)	2.463e-002	4.515e-002			
Bubble Point Pressure (kPa)	---	---			
Viscosity (cP)	1.917e-002	3.353e-002			
Cv (Semi-Ideal) (kJ/kgmole-C)	20.43	22.48			
Mass Cv (Semi-Ideal) (kJ/kg-C)	0.7055	0.7764			
Cv (kJ/kgmole-C)	20.38	22.42			
Mass Cv (kJ/kg-C)	0.7040	0.7746			
Cv (Ent. Method) (kJ/kgmole-C)	---	---			
Mass Cv (Ent. Method) (kJ/kg-C)	---	---			
Cp/Cv (Ent. Method)	---	---			
Reid VP at 37.8 C (kPa)	---	---			
True VP at 37.8 C (kPa)	---	---			
Liq. Vol. Flow - Sum(Std. Cond) (m3/h)	0.8162	0.8162			
Viscosity Index	-5.179	-7.622			

PERFORMANCE

Results

Adiabatic Head	(m)	2.688e+004	Power Consumed	(kW)	9.762e-002
Polytropic Head	(m)	2.904e+004	Polytropic Head Factor		1.002

Compressor: Compressor (continued)

Results

Adiabatic Fluid Head	(kJ/kg)	263.6	Polytropic Exponent		1.534
Polytropic Fluid Head	(kJ/kg)	284.8	Isentropic Exponent		1.399
Adiabatic Efficiency		75	Speed	(rpm)	---
Polytropic Efficiency		81			---

Power/Torque

Total Rotor Power	(kW)	9.762e-002	Total Rotor Torque	(N-m)	---
Transient Rotor Power	(kW)	0.0000	Transient Rotor Torque	(N-m)	---
Friction Power Loss	(kW)	0.0000	Friction Torque Loss	(N-m)	---
Fluid Power	(kW)	9.762e-002	Fluid Torque	(N-m)	---

DYNAMICS

Dynamic Specifications

Duty	(kJ/h)	351.4	Active	Head	(m)	2.904e+004	Not Active
Adiabatic Efficiency		75	Not Active	Fluid Head	(kJ/kg)	284.8	Not Active
Polytropic Efficiency		81	Active	Capacity	(ACT_m3/h)	0.8611	Not Active
Pressure Increase	(kPa)	800.0	Not Active	Speed	(rpm)	---	Not Active
		---		Use Characteristic Curves			No

Holdup Details

Phase	Accumulation (kgmole/h)	Moles (kgmole)	Volume (m3)
Vapour	0.0000	0.0000	0.0000
Liquid	0.0000	0.0000	0.0000
Aqueous	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**

NOTES

* Specified by user.