Company Name Not Available Bedford, MA USA	Case Name: GamVet From LEVULINIC ACID and ISOPROPANOL -Double Series Re Unit Set: SI Date/Time: Sat Jul 22 12:30:17 2023

HI Design Datasheet

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Scenario 1

SimulationBaseCase

Performance

Summary

NETWORK COST INDEXES

	Cost Index	% of Target
Heating (Cost/s)	6.049e-002 *	101.0 *
Cooling (Cost/s)	-4.766e-004 *	-6696 *
Operating Cost (Cost/s)	6.001e-002 *	100.2 *
Capital Cost (Cost)	2.345e+006 *	112.0 *
Total Cost (Cost/s)	7.963e-002 *	102.9 *

NETWORK PERFORMANCE

	HEN	% of Target
Heating (kJ/h)	2.627e+007 *	103.5 *
Cooling (kJ/h)	2.580e+007 *	103.6 *
Number of Units	13.00 *	76.47 *
Number of Shells	22.00 *	104.8 *
Total Area (m2)	3582 *	100.8 *

Heat Exchangers

Heat Exchanger	Cost Index (Cost)	Area (m2)	Shells	Load (kJ/h)
HE-102	1.062e+004 *	0.7219	1 *	3.420e+005
Condenser@DC-103	5.837e+004 *	168.6	1 *	1.566e+006
STHE-101	1.096e+004 *	0.8863	4 *	5.084e+004
Reboiler@DC-101	1.212e+006 *	34.89	1 *	2.313e+007
R-102_heat_Exchanger	1.099e+004 *	1.309	1 *	5.403e+004
HE-101	1.055e+004 *	0.6196	1 *	1.807e+005
STHE-102	1.058e+004 *	0.6662	1 *	3.245e+005
Reboiler@DC-102	1.691e+005 *	1.085	1 *	7.178e+005
R-101_heat_Exchanger	1.242e+004 *	3.982	1 *	1.644e+005
Condenser@DC-101	7.789e+005 *	3290	7 *	2.344e+007
Reboiler@DC-103	2.646e+004 *	43.81	1 *	1.687e+006
Condenser@DC-102	2.373e+004 *	34.93	1 *	7.950e+005
R-103_heat_Exchanger	1.028e+004 *	0.2689	1 *	1277
Total	**2.345e+006** *	**3582** *	**22** *	**5.245e+007** *

Utilities

Utility	Type	Cost Index (Cost/s)	Load (kJ/h)	% of Target
Air	COLD	6.945e-006 *	2.500e+007 *	100.4 *
MP Steam Generation	COLD	-4.836e-004 *	7.950e+005 *	*** *
Cooling Water	COLD	7.538e-008 *	1277 *	37.83 *
HP Steam	HOT	5.146e-004 *	7.410e+005 *	*** *
Very High Temperature	HOT	5.894e-002 *	2.384e+007 *	100.0 *
MP Steam	HOT	1.031e-003 *	1.687e+006 *	109.7 *
Total		**6.001e-002** *	**---**	**---**

WorkSheet

Heat Exchanger	Cold Stream	Cold T in (C)	Tied	Cold T out (C)	Tied	Hot Stream	Hot T in (C)	Tied	Hot T out (C)	Tied	Load (kJ/h)	Area (m2)	Status	dT Min Hot	dT Min Cold
HE-102	S7_To_S9	122.1	T	190.0	T	HP Steam	250.0		249.0		3.420e+005	0.7	OK	60.00	126.9
Condenser@DC-103	Air	30.00		35.00		ondenser@DC-103_TO_S20	56.25	T	55.75	T	1.566e+006	168.6	OK	21.25	25.75

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WorkSheet

Heat Exchanger	Cold Stream	Cold T in (C)	Tied	Cold T out (C)	Tied	Hot Stream	Hot T in (C)	Tied	Hot T out (C)	Tied	Load (kJ/h)	Area (m2)	Status	dT Min Hot	dT Min Cold
STHE-101	S2_To_S4	28.13	T	63.68	T	S33_To_S34	210.9	T	30.00	T	5.084e+004	0.9	OK	147.3	1.867
Reboiler@DC-101	Reboiler@DC-101_TO_S24	419.8	T	420.3	T	Very High Temperature	3000		2999		2.313e+007	34.9	OK	2580	2579
-102_heat_Exchanger	R-102_heat	190.0	T	190.5	T	HP Steam	250.0		249.0		5.403e+004	1.3	OK	59.50	59.00
HE-101	S2_To_S4	63.68	T	190.0	T	HP Steam	250.0		249.0		1.807e+005	0.6	OK	60.00	185.3
STHE-102	S7_To_S9	28.60	T	122.1	T	S28_To_S29	425.7	T	190.0	T	3.245e+005	0.7	OK	303.6	161.4
Reboiler@DC-102	Reboiler@DC-102_TO_S26	425.1	T	425.6	T	Very High Temperature	3000		2999		7.178e+005	1.1	OK	2574	2574
-101_heat_Exchanger	R-101_heat	190.0	T	190.5	T	HP Steam	250.0		249.0		1.644e+005	4.0	OK	59.50	59.00
Condenser@DC-101	Air	30.00		35.00		ondenser@DC-101_TO_S17	60.55	T	60.05	T	2.344e+007	3289.9	OK	25.55	30.05
Reboiler@DC-103	Reboiler@DC-103_TO_S22	119.0	T	119.5	T	MP Steam	175.0		174.0		1.687e+006	43.8	OK	55.52	55.02
Condenser@DC-102	MP Steam Generation	174.0		175.0		ondenser@DC-102_TO_S31	207.4	T	206.9	T	7.950e+005	34.9	OK	32.42	32.92
-103_heat_Exchanger	Cooling Water	20.00		25.00		R-103_heat	30.00	T	29.50	T	1277	0.3	OK	5.000	9.500

Heat Exchangers

Summary

ALL HEAT EXCHANGERS

Heat Exchanger	Load (kJ/h)	Cost	Area (m2)	Shells	LMTD (C)	HTC (kJ/h-m2-C)	F Factor	Fouling
HE-102	3.420e+005	1.062e+004 *	0.7219	1 *	89.30	5419	0.9985	0.0000 *
Condenser@DC-103	1.566e+006	5.837e+004 *	168.6	1 *	23.43	396.8	0.9992	0.0000 *
STHE-101	5.084e+004	1.096e+004 *	0.8863	4 *	33.29	1805	0.8914	0.0000 *
Reboiler@DC-101	2.313e+007	1.212e+006 *	34.89	1 *	2579	257.0	1.000	0.0000 *
R-102_heat_Exchanger	5.403e+004	1.099e+004 *	1.309	1 *	59.25	696.8	1.000	0.0000 *
HE-101	1.807e+005	1.055e+004 *	0.6196	1 *	111.1	2629	0.9982	0.0000 *
STHE-102	3.245e+005	1.058e+004 *	0.6662	1 *	225.1	2261	0.9209	0.0000 *
Reboiler@DC-102	7.178e+005	1.691e+005 *	1.085	1 *	2574	257.0	1.000	0.0000 *
R-101_heat_Exchanger	1.644e+005	1.242e+004 *	3.982	1 *	59.25	696.8	1.000	0.0000 *
Condenser@DC-101	2.344e+007	7.789e+005 *	3290	7 *	27.74	257.0	0.9995	0.0000 *
Reboiler@DC-103	1.687e+006	2.646e+004 *	43.81	1 *	55.27	696.8	1.000	0.0000 *
Condenser@DC-102	7.950e+005	2.373e+004 *	34.93	1 *	32.67	696.8	0.9999	0.0000 *
R-103_heat_Exchanger	1277	1.028e+004 *	0.2689	1 *	7.011	683.5	0.9913	0.0000 *

All Heat Exchangers (Continued)

Heat Exchanger	Hot Stream	Hot T in (C)	Hot T out (C)	Cold Stream	Cold T in (C)	Cold T out (C)	dT Min Hot (C)	dT Min Cold (C)
HE-102	HP Steam	250.0	249.0	S7_To_S9	122.1	190.0	60.00	126.9
Condenser@DC-103	To Condenser@DC-103_TO_S20	56.25	55.75	Air	30.00	35.00	21.25	25.75
STHE-101	S33_To_S34	210.9	30.00	S2_To_S4	28.13	63.68	147.3	1.867
Reboiler@DC-101	Very High Temperature	3000	2999	To Reboiler@DC-101_TO_S24	419.8	420.3	2580	2579
R-102_heat_Exchanger	HP Steam	250.0	249.0	R-102_heat	190.0	190.5	59.50	59.00
HE-101	HP Steam	250.0	249.0	S2_To_S4	63.68	190.0	60.00	185.3
STHE-102	S28_To_S29	425.7	190.0	S7_To_S9	28.60	122.1	303.6	161.4
Reboiler@DC-102	Very High Temperature	3000	2999	To Reboiler@DC-102_TO_S26	425.1	425.6	2574	2574
R-101_heat_Exchanger	HP Steam	250.0	249.0	R-101_heat	190.0	190.5	59.50	59.00
Condenser@DC-101	To Condenser@DC-101_TO_S17	60.55	60.05	Air	30.00	35.00	25.55	30.05
Reboiler@DC-103	MP Steam	175.0	174.0	To Reboiler@DC-103_TO_S22	119.0	119.5	55.52	55.02
Condenser@DC-102	To Condenser@DC-102_TO_S31	207.4	206.9	MP Steam Generation	174.0	175.0	32.42	32.92
R-103_heat_Exchanger	R-103_heat	30.00	29.50	Cooling Water	20.00	25.00	5.000	9.500

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Scenario 1

SimulationBaseCase

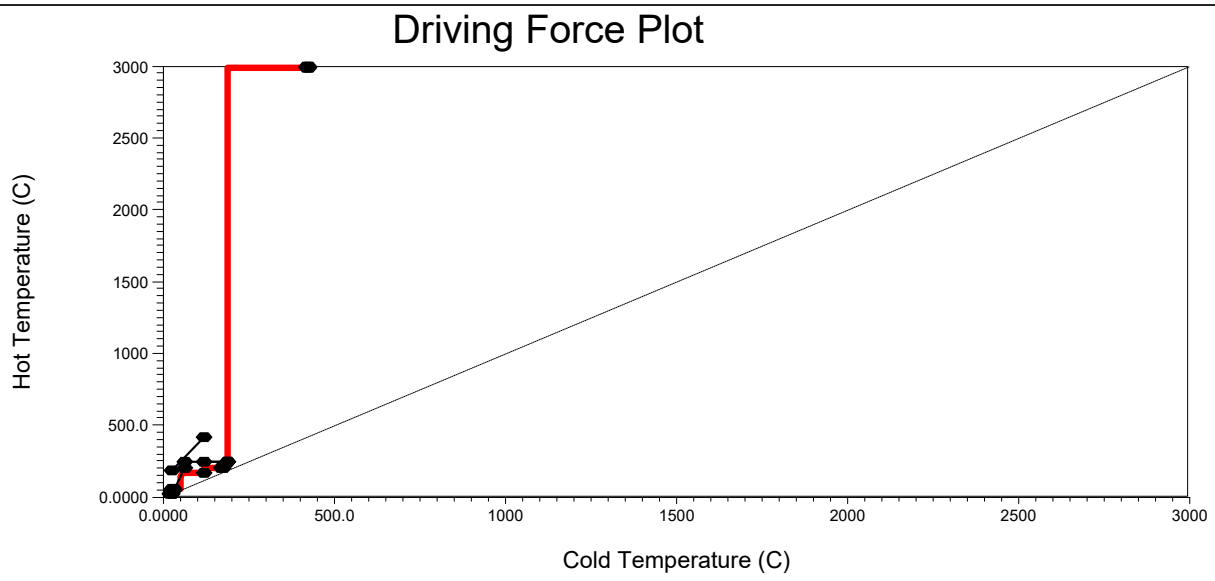
Heat Exchangers

Summary

HEAT EXCHANGERS FOR STREAM: R-102_heat

Heat Exchanger	Load (kJ/h)	Cost Index (Cost)	Area (m2)	Shells	LMTD (C)	HTC (kJ/h-m2-C)	T in (C)	T out (C)	Matched With
R-102_heat_Exchanger	5.403e+004 *	1.099e+004 *	1.309 *	1 *	59.25 *	696.8 *	190.0 *	190.5 *	HP Steam

DRIVING FORCE PLOT



Targets

Heating	2.538e+007 kJ/h *	Operating Cost Index	5.989e-002 Cost/s *
Cooling	2.491e+007 kJ/h *	Capital Cost Index	2.093e+006 Cost *
Number of Units	16 *	Total Cost Index	7.740e-002 Cost/s *
Total Area	3553 m2 *		

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Topology Data

Sub-Networks

Number of Sub-Networks	11 *	

Network Number	Streams in Network
1 *	S7_To_S9 S28_To_S29
2 *	S2_To_S4 S33_To_S34
3 *	To Condenser@DC-101_TO_S17
4 *	To Condenser@DC-102_TO_S31
5 *	To Condenser@DC-103_TO_S20
6 *	R-102_heat
7 *	R-103_heat
8 *	R-101_heat
9 *	To Reboiler@DC-102_TO_S26
10 *	To Reboiler@DC-103_TO_S22
11 *	To Reboiler@DC-101_TO_S24

Loops

Independant Loops:	0 *	Dependant Loops:	0 *

Loop Number	Exchangers in Loop

Paths

Path Number	Hot Utility	Heat Exchangers in Path	Cold Utility

Utilities

Utilities in Design	Utility Included in Searches for Sub-Nets, Loops and Paths
Air	Not Included
MP Steam Generation	Not Included
Cooling Water	Not Included
HP Steam	Not Included
Very High Temperature	Not Included
MP Steam	Not Included

Notes

Design Notes

Modification Log

Heat exchanger STHE-101 is added by data extraction module;Heat exchanger STHE-102 is added by data extraction module;Cooler Condenser@DC-103 is added by data extraction module;Cooler Condenser@DC-101 is added by data extraction module;Cooler Condenser@DC-

Grid Design

Infeasible HX: 0, HX Not Calculated: 0Unsatisfied Streams: 0

Cross Pinch

Pinch		429.80 C / 419.80 C	425.73 C / 415.73 C	60.55 C / 50.55 C	38.13 C / 28.13 C	
Network Cross Pinch Load	(kJ/h)	0.0000 *	0.0000 *	8.898e+005 *	7.929e+005 *	

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Scenario 1

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Grid Design

Cross Pinch

HE-102	(kJ/h)	0.0000 *	0.0000 *	0.0000 *	0.0000 *	
Condenser@DC-103	(kJ/h)	0.0000 *	0.0000 *	0.0000 *	0.0000 *	
STHE-101	(kJ/h)	0.0000 *	0.0000 *	2.417e+004 *	-2100 *	
Reboiler@DC-101	(kJ/h)	0.0000 *	0.0000 *	0.0000 *	0.0000 *	
R-102_heat_Exchanger	(kJ/h)	0.0000 *	0.0000 *	0.0000 *	0.0000 *	
HE-101	(kJ/h)	0.0000 *	0.0000 *	0.0000 *	0.0000 *	
STHE-102	(kJ/h)	0.0000 *	0.0000 *	7.061e+004 *	0.0000 *	
Reboiler@DC-102	(kJ/h)	0.0000 *	0.0000 *	0.0000 *	0.0000 *	
R-101_heat_Exchanger	(kJ/h)	0.0000 *	0.0000 *	0.0000 *	0.0000 *	
Condenser@DC-101	(kJ/h)	0.0000 *	0.0000 *	0.0000 *	0.0000 *	
Reboiler@DC-103	(kJ/h)	0.0000 *	0.0000 *	0.0000 *	0.0000 *	
Condenser@DC-102	(kJ/h)	0.0000 *	0.0000 *	7.950e+005 *	7.950e+005 *	
R-103_heat_Exchanger	(kJ/h)	0.0000 *	0.0000 *	0.0000 *	0.0000 *	

Heat Exchanger Status

Degrees of Freedom: 0

Heat Exchangers	Status

Stream Load Status

Streams	Type	Unsatisfied	% of Total	Total

Network Heating

Utility	Type	Cost Index (Cost/s)	Load (kJ/h)	% of Target
HP Steam	HOT	5.146e-004 *	7.410e+005 *	*** *
MP Steam	HOT	1.031e-003 *	1.687e+006 *	109.7 *
Very High Temperature	HOT	5.894e-002 *	2.384e+007 *	100.0 *
	Total	**6.049e-002** *	**2.627e+007** *	**103.5** *

Network Cooling

Utility	Type	Cost Index (Cost/s)	Load (kJ/h)	% of Target
MP Steam Generation	COLD	-4.836e-004 *	7.950e+005 *	*** *
Cooling Water	COLD	7.538e-008 *	1277 *	37.83 *
Air	COLD	6.945e-006 *	2.500e+007 *	100.4 *
	Total	**-4.766e-004** *	**2.580e+007** *	**103.6** *

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