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* XPSIM, Vers. 1.06 *
* Cust/User " " *
* Proj/Problem " " *
* Date AUG 18, 2008 *
* Job " " *
* Page 0001 *
*... extended Process SIMulation ...*
- INPUT -
--- Simulation Input File ---
*-STMT-*
*XPSIM> ...generated by XpsimWin v.1.06 ...
*EXE-0PT> PAGELEN=66
*
100 RUN ID=COLUMN01 CUSTOMER=STAFF PROJECT='COLUMN SAMPLE 01'
200 DESC CALCULATION TEST
300 DIMENSION INPUT ENG
*
*
400 System Data
*
*
500 CHEMCOMP IBUTANE / BUTANE / IPENTANE / PENTANE / HEXANE / HEPTANE / +
OCTANE / NONANE
600 THERMSET UID=M1
700 METHODS K=SRK HV=LK HL=LK DV=LK DL=LK
*
*
800 Flowsheet Data
*
*
*
900 STREAM=F100 TEMP=163 PRES=37.
1000 COMP .004 / 1.296 / 51.454 / 65.364 / 10.621 / 1.302 / .112 / .003
*
1100 COLUMN IN F100 OUT E110 E120 UID=C01
1200 PARA TRAY=8 CON REB NITER=10
1300 FEED STR=F100 TRAY=5
1400 DRAWOFF STR=E110 TRAY=0 PHASE=LIQ
1500 DRAWOFF STR=E120 TRAY=9 PHASE=LIQ RATE(VAR)=15.
1600 HEAT TRAY=0 VAR
1700 HEAT TRAY=9 VAR
1800 PSPEC PTOP=30.5 TRAY=0 DP=5. / TRAY=1 DP=.1
1900 PROFILE TRAY=0 LIQ=350. TEMP=130. / TRAY=8 LIQ=200. / TRAY=9 LIQ=15. +
TEMP=200.
2000 PRINT TRACE=PART LKEY=IPENTANE,PENTANE HKEY=HEXANE FORMAT=2 TRAY=2 +
PROP=2 MFRAC WFRAC WRATE
2100 PLOT PROFILE
2200 SPEC FRAC(M)=.005 STR=E110 COMP=HEXANE
2300 SPEC FRAC(M)=.657 STR=E120 COMP=HEXANE
2400 TSIZE VALVE RATE
*
*
2500 END
--- End of Simulation Input File ---
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I) * PROBLEM GENERAL DATA *

- 1) * PROBLEM/PROJECT *
- ' CALCULATION TEST'
- 2) * UNITS OF MEASURE *
- Input system BRITISH - Output system BRITISH

- INPUT AND OUTPUT UNITS -			
Time	- HR	Weight	- LB
Temperature	- FAR	Pressure	- PSIA
Energy/Duty	- M-BTU	Work	- HP
Liq volums	- CUFT	Vap Volume	- CUFT
Viscosity	- CP	Thermal cond	- BTU/HFTF
Surface tens	- DYCM	Std Vap Vol	- S-CUFT

Standard Vapor Volume is 379.48318 FT3/LBM
Reference Status - Temperature 60°F - Pressure 1 atm

Enthalpy is 0.0 for ideal gas at 298.15 K
Std entropy is for ideal gas at 298.15 K and 1 Atm

II) * DEFINED COMPONENTS *

* No of Chemical Components 8
No of Hypothetical/Petroleum Components 0

No	1	2	3	4	5
CAS Registry no.	75-28-5	106-97-8	78-78-4	109-66-0	110-54-3
Name	ISOBUTANE	BUTANE	ISOPENTANE	PENTANE	HEXANE
Component Key	IBUTANE	BUTANE	IPENTANE	PENTANE	HEXANE
Type	LIBRARY	LIBRARY	LIBRARY	LIBRARY	LIBRARY
Class	SHYD	SHYD	SHYD	SHYD	SHYD
Formula	C4H10	C4H10	C5H12	C5H12	C6H14
Molecular weight	58.120	58.120	72.150	72.150	86.180
Boiling point,FAR	10.89	31.10	82.18	96.91	155.71
Std spec. gravity	0.55891	0.58434	0.62469	0.63094	0.65877
Critical temp,FAR	274.98	305.65	369.10	385.86	454.55
Critical pres,PSIA	529.099	550.854	490.664	488.778	439.755
Critical vol,CUFT	4.212638	4.083302	4.897169	4.876506	5.924768
Critical Z	0.282728	0.273882	0.270180	0.262694	0.265578
Acentric factor	0.183000	0.200000	0.227000	0.251000	0.294000
Lat. heat, BTU/LBM	9083.074	9448.820	10451.086	11028.154	12376.581
H form, BTU/LBM	-57869.895	-54071.870	-66411.231	-62968.146	-71766.975
G form, BTU/LBM	-95734.534	-93782.315	-110454.190	-107754.554	-121603.711
Std entr, BT/LBM-F	70.55479	73.99416	82.06712	83.45242	92.86291

No	6	7	8
CAS Registry no.	142-82-5	111-65-9	111-84-2
Name	HEPTANE	OCTANE	NONANE
Component Key	HEPTANE	OCTANE	NONANE
Type	LIBRARY	LIBRARY	LIBRARY
Class	SHYD	SHYD	SHYD
Formula	C7H16	C8H18	C9H20
Molecular weight	100.210	114.230	128.260
Boiling point,FAR	209.17	258.21	303.48
Std spec. gravity	0.68637	0.70390	0.72446
Critical temp,FAR	512.51	564.19	610.56
Critical pres,PSIA	396.824	360.855	332.137
Critical vol,CUFT	6.919009	7.887020	8.780034
Critical Z	0.263181	0.259039	0.253920
Acentric factor	0.349000	0.397000	0.445000
Lat. heat, BTU/LBM	13618.673	14591.632	15731.095
H form, BTU/LBM	-80693.280	-89772.831	-98372.706
G form, BTU/LBM	-135541.890	-149658.950	-163283.516
Std entr, BT/LBM-F	102.20175	111.58835	120.95107

III) * PVT/THERMO/TRANSPORT PROPERTIES CALCULATION METHODS *

* CALCULATION SET 1 - M1 *

VLE K-values	SRK	- REDLICH-KWONG-SOAVE
ENTHALPY - Vapor	LK	- LEE-KESLER
ENTHALPY - Liquid	LK	- LEE-KESLER
DENSITY - Vapor	LK	- LEE-KESLER
DENSITY - Liquid	LK	- LEE-KESLER

- LIMITS AND OPTIONS -
Temperature - Min -359.67 FAR - Max 2240.33 FAR
Pressure - Min 0.100000E-04 PSIA - Max 15000.0 PSIA

Lowest significant composition 0.10000000E-19

Water K-values are calculated based on
'Vapor Pressure curve'
Water thermo-props are calculated based on
'Saturated conditions'
Water solubility in hydr phases calculated based on
'API solubility in HC mixtures'

*** STREAM 'F100' ***									
- Temperature		163.000 FAR		- Pressure		37.0000 PSIA			
----- GLOBAL STREAM -----									
* No	* Component	*	- Mols	- Mol fr-	- Weight	- Wt fr-			
1	ISOBUTANE		0.004	0.000031	0.232	0.000024			
2	BUTANE		1.296	0.009957	75.324	0.007877			
3	ISOPENTANE		51.454	0.395326	3712.406	0.388207			
4	PENTANE		65.364	0.502197	4716.012	0.493155			
5	HEXANE		10.621	0.081602	915.318	0.095715			
6	HEPTANE		1.302	0.010003	130.473	0.013644			
7	OCTANE		0.112	0.000861	12.794	0.001338			
8	NONANE		0.003	0.000023	0.385	0.000040			

* TOTAL *			130.156	1.000000	9562.944	1.000000			
			LBM		LB				

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* XPSIM, Vers. 1.06 *
* Cust/User "STAFF" *
* Proj/Problem "COLUMN SAMPLE 01" *
* Date AUG 18, 2008 *

*... extended Process SIMulation ...*
* Job "COLUMN01" *

*** UNIT 1 - 'C01' - 'DISTILLATION COLUMN' ***
--- Feed Streams ---
'F100'
- Product Streams -
'E110'
'E120'

1) * PARAMETERS *

No of theoretical trays 8
- condenser
- reboiler

No of Feeds 1
Products 2
Heater-Coolers 2
Pump-Arounds 0
Specifications 2

Calculation method 'SURE'
Maximum no of iterations 10
Max no of iterations with no error improvements 3

2) * CALCULATION TOLERANCES *
Bubble point 0.001000 Enthalpy balances 0.001000
Component balances 0.001000 Composition sums 0.001000

3) * COLUMN FEEDS *

1 - Stream F100 ON tray 5 - Flowrate FIXED - Temperature FIXED

4) * PRODUCT STREAMS *

1 - Stream E110 extracted as LIQUID from condenser - Flowrate NOT GIVEN
Material balance closed on this stream

2 - Stream E120 extracted as LIQUID from reboiler - Flowrate VARIABLE
Initial flowrate 15.000 LBM /HR

5) * HEATER / COOLERS *

1 - CONDENSER - User Id 0
Duty is VARIABLE - Initial value 0.000 M-BTU /HR

2 - REBOILER - User Id 9
Duty is VARIABLE - Initial value 0.000 M-BTU /HR

6) * CONDENSER/REBOILER SPECS *
Reboiler is a KETTLE type
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7) * INITIAL TEMPERATURE/FLOW-RATE ESTIMATES *

*** TRAY ***	OUTLET		* TEMPERATURE * FAR	* PRESSURE * PSIA
	* LIQUID RATE *	LBM /HR		
CON	350.000		130.000	30.5000
1	NOT GIVEN		NOT GIVEN	35.5000
8	200.000		NOT GIVEN	NOT GIVEN
REB	15.000		200.000	36.3000

8) * PERFORMANCE SPECIFICATIONS *

Spec 1
* Hold sum of MOLAR fractions of component(s)
5) HEXANE
contained in stream
'E110 '- LIQUID DRAW-OFF FROM CONDENSER
at EQUAL TO 0.500000E-02
Tolerance (RELATIVE) 0.010000

Spec 2
* Hold sum of MOLAR fractions of component(s)
5) HEXANE
contained in stream
'E120 '- LIQUID DRAW-OFF FROM REBOILER
at EQUAL TO 0.657000
Tolerance (RELATIVE) 0.010000

9) * TRAY SIZING & RATING *

CASE NO. 1
Sizing for section from tray 1 to tray 0
Tray type VALVE No of passes 1
Flooding 80.0000 System factor 1.0000
Trays are RE-RATED on the basis of largest tray

V) **** STREAM / UNITS DICTIONARY ****

1) STREAMS-UNITS CROSS-REFERENCE TABLE

No	Stream Id	Description/Service	Product of Unit	Feed of Unit(s)
1	F100			1 C01
2	E110		1 C01	
3	E120		1 C01	

2) UNITS-STREAMS CROSS-REFERENCE TABLE

No	Unit	Unit Description	Feed Streams	Product Streams
1	C01		1 F100	2 E110 3 E120

VI) **** RUN STATISTICS ****

* No of streams	3
process operations	1
topping structures	0
control operations	0
set operations	0

The calculation is NOT a RECYCLE PROBLEM
Calculation sequence defined by input sequence

*** SIMULATION TRACE FOLLOWS ***

... New/output binary file 'COLUMN01' initialized ...

. Stream 'F100' flashed .
. Feed/Recycle streams processed .

Intermediate column calculation printout
... Feed F100 on tray 5 flashed at 35.9000 PSIA ...
- Temp 162.69 FAR , Rate, Liquid 0.000 LBM , Vapor 130.156 LBM

- at iter 0, err sum 3.04501 , max err sum 0.774140 - adj. factor 0.000000
DK/K - max .43016E-03 - min .39190E-06 - avg 0.000084
Error sums, total 3.04501 , BP 0.709534 , H 0.709532 , Comp 1.62595
- Maximum Relative Errors -
* BP 0.137643 at tray 5 * H 0.329418 at tray 1
Tray Glob Mat Bal -0.307079 at tray 7 * Tray Part Mat Bal 0.116720 for comp 8 at tray 4
Coln Part Mat Bal 0.229972 for comp 8

*** TRAY ***	INITIAL TEMP	COLUMN -TOTAL LIQ &	STATUS VAP	OUTLET-	* - LIQ. & VAP.	DRAW-OFF -	* BP.ERROR	* ENT.BAL.ERR.*
0	130.000	350.000	0.000	0.000	115.156	0.000	-0.011751	0.000000
1	137.778	331.250	350.000	0.000	0.000	0.000	-0.065280	0.329418
2	145.556	312.500	446.406	0.000	0.000	0.000	0.011898	-0.046047
3	153.333	293.750	427.656	0.000	0.000	0.000	0.081354	-0.045152
4	161.111	275.000	408.906	0.000	0.000	0.000	0.132966	-0.051788
5	168.889	256.250	260.000	0.000	0.000	0.000	0.137643	-0.055865
6	176.667	237.500	241.250	0.000	0.000	0.000	0.088374	-0.053110
7	184.444	218.750	222.500	0.000	0.000	0.000	0.007003	-0.057741
8	192.222	200.000	203.750	0.000	0.000	0.000	-0.063993	-0.070412
9	200.000	15.000	185.000	15.000	0.000	0.000	-0.109272	0.000000

* HEATERS / COOLERS *
TRAY 0 - DUTY -3670.856 M-BTU
TRAY 9 - DUTY 2159.765 M-BTU

* SPECIFICATIONS *
NO TYPE GIVEN VALUE CALC VALUE ERROR CONV
1 COMPOS 0.005000 0.007831 0.224309 N
2 COMPOS 0.657000 0.795159 0.095429 N

- at iter 1, err sum 2.02565 , max err sum 0.506948 - adj. factor 0.236524
DK/K - max .61266E-05 - min .21779E-08 - avg 0.000001
DT max - abs 10.5486 - rel 0.016856 DR max - abs 132.5000 - rel 0.666667
Error sums, total 2.02565 , BP 0.439741 , H 0.471173 , Comp 1.11474
- Maximum Relative Errors -
* BP 0.086450 at tray 4 * H 0.217057 at tray 1
Tray Glob Mat Bal -0.203441 at tray 7 * Tray Part Mat Bal 0.072704 for comp 8 at tray 4
Coln Part Mat Bal 0.171194 for comp 8

- at iter 2, err sum 0.261319 , max err sum 0.831258E-01 - adj. factor 0.803407
DK/K - max .47358E-05 - min .22749E-08 - avg 0.000001
DT max - abs 10.7722 - rel 0.017515 DR max - abs 26.8728 - rel 0.166667
Error sums, total 0.261319 , BP 0.563600E-01, H 0.123134 , Comp 0.818248E-01
- Maximum Relative Errors -
* BP -0.012385 at tray 1 * H 0.056713 at tray 1
Tray Glob Mat Bal -0.014028 at tray 5 * Tray Part Mat Bal 0.008294 for comp 8 at tray 4
Coln Part Mat Bal 0.010158 for comp 8

- at iter 3, err sum 0.212303E-01, max err sum 0.708806E-02 - adj. factor 1.000000
DK/K - max .12595E-03 - min .31507E-07 - avg 0.000033
DT max - abs 1.0297 - rel 0.001694 DR max - abs 23.9314 - rel 0.121572
Error sums, total 0.212303E-01, BP 0.348012E-02, H 0.938611E-02, Comp 0.836409E-02
- Maximum Relative Errors -
* BP 0.000872 at tray 9 * H 0.004413 at tray 1
Tray Glob Mat Bal 0.001803 at tray 7 * Tray Part Mat Bal 0.000654 for comp 8 at tray 4
Coln Part Mat Bal 0.000699 for comp 8

* XPSIM, Vers. 1.06 * *... extended Process SIMulation ...* * Page 0011 *
* Cust/User "STAFF " * - CALCULATION - * Job "COLUMN01 " *
* Proj/Problem "COLUMN SAMPLE 01 " * * Date AUG 18, 2008 *

- at iter 4, err sum 0.159852E-02, max err sum 0.581295E-03 - adj. factor 1.000000
DK/K - max .13641E-02 - min .81230E-05 - avg 0.000413
DT max - abs 0.0581 - rel 0.000093 DR max - abs 2.0898 - rel 0.009774
Error sums, total 0.159852E-02, BP 0.196855E-03, H 0.971102E-03, Comp 0.430564E-03
- Maximum Relative Errors -
* BP 0.000056 at tray 9 * H 0.000429 at tray 1
Tray Glob Mat Bal 0.000097 at tray 7 * Tray Part Mat Bal 0.000037 for comp 8 at tray 4
Coln Part Mat Bal 0.000027 for comp 8
*** COLUMN CALCULATION RESOLVED ***

*** FINAL COLUMN STATUS ***
* TRAY * TEMP ** -TOTAL LIQ & VAP OUTLET- * - LIQ. & VAP. DRAW-OFF - * BP.ERROR * ENT.BAL.ERR.*
0 130.528 324.220 0.000 114.864 0.000 -0.000004 0.000000
1 141.929 216.562 324.220 0.000 0.000 -0.000006 0.000429
2 143.571 214.879 331.426 0.000 0.000 -0.000014 -0.000039
3 145.463 212.136 329.743 0.000 0.000 -0.000024 -0.000022
4 148.257 204.422 326.999 0.000 0.000 -0.000020 0.000013
5 150.983 202.012 189.130 0.000 0.000 -0.000017 -0.000025
6 155.757 197.642 186.720 0.000 0.000 -0.000019 -0.000069
7 164.270 191.497 182.350 0.000 0.000 -0.000013 -0.000179
8 177.405 185.363 176.205 0.000 0.000 0.000025 -0.000196
9 193.756 15.292 170.071 15.292 0.000 0.000056 0.000000
* HEATERS / COOLERS *
TRAY 0 - DUTY -3433.894 M-BTU
TRAY 9 - DUTY 1984.448 M-BTU
* SPECIFICATIONS *
NO TYPE GIVEN VALUE CALC VALUE ERROR CONV
1 COMPOS 0.005000 0.005003 0.000290 Y
2 COMPOS 0.657000 0.656936 -0.000048 Y
Unit op 1 - 'C01 ' calculated

*** SOLUTION OBTAINED ***

... Base case results loaded on binary file 'COLUMN01' ...

*** UNIT 1 - 'C01' - 'DISTILLATION COLUMN' ***

--- Feed Streams ---

'F100'

- Product Streams -

'E110'

'E120'

1) * OPERATING CONDITIONS *

* Tray *	* Temperature °F	* Pressure psia	*** OUTLET LIQUID ***			*** OUTLET VAPOR ***		
			* -Molar Rate- lbm/h	* -Weight Rate- lb/h		* -Molar Rate- lbm/h	* -Weight Rate- lb/h	
CON	130.53	30.5	324.22	23363.9		0.0000	0.00000	
1	141.93	35.5	216.56	15654.5		324.22	23363.9	
2	143.57	35.6	214.88	15589.1		331.43	23931.8	
3	145.46	35.7	212.14	15481.6		329.74	23866.4	
4	148.26	35.8	204.42	15079.7		327.00	23758.9	
5	150.98	35.9	202.01	15008.9		189.13	13794.0	
6	155.76	36.0	197.64	14905.5		186.72	13723.3	
7	164.27	36.1	191.50	14837.3		182.35	13619.9	
8	177.40	36.2	185.36	14921.2		176.20	13551.6	
REB	193.76	36.3	15.292	1285.67		170.07	13635.6	

- HEATER/COOLERS -

1 - Condenser -3433.894 kBtu/h

2 - Reboiler 1984.448 kBtu/h

- PRODUCT STREAMS -

Stream 'E110', LIQUID draw-off from condenser

Flow rate, molar 114.864 lbm/h - weight 8277.273 lb/h

Stream 'E120', LIQUID draw-off from reboiler

Flow rate, molar 15.292 lbm/h - weight 1285.666 lb/h

- FEED STREAMS -

Stream 'F100', Feed on tray 5

Flow rate, molar 130.156 lbm/h - weight 9562.944 lb/h

- REFLUX DATA -

Molar rate 209.357 lbm/h Weight rate 15086.606 lb/h

Ratios with respect to OVERHEAD product(s)

Molar 1.8227 Weight 1.8227

Ratios with respect to TOTAL FEED

Molar 1.6085 Weight 1.5776

2) * PRODUCT STREAMS *

* Stream 'E110', LIQUID draw-off from condenser									
- Temperature		130.528 °F	- Pressure		30.5000 psia				
* No	* Component	*	-Molar	Rate-	-Mol Fr-	- Weight	Rate-	-Wt	Fr-
1	ISOBUTANE		0.004	0.000035		0.232	0.000028		
2	BUTANE		1.296	0.011282		75.316	0.009099		
3	ISOPENTANE		50.842	0.442629		3668.248	0.443171		
4	PENTANE		62.146	0.541041		4483.832	0.541704		
5	HEXANE		0.575	0.005003		49.524	0.005983		
6	HEPTANE		0.001	0.000010		0.120	0.000015		
7	OCTANE		0.000	0.000000		0.000	0.000000		
8	NONANE		0.000	0.000000		0.000	0.000000		

* TOTAL *			114.864	1.000000		8277.273	1.000000		
			lbm/h			lb/h			
* Stream 'E120', LIQUID draw-off from reboiler									
- Temperature		193.756 °F	- Pressure		36.3000 psia				
* No	* Component	*	-Molar	Rate-	-Mol Fr-	- Weight	Rate-	-Wt	Fr-
1	ISOBUTANE		0.000	0.000000		0.000	0.000000		
2	BUTANE		0.000	0.000009		0.008	0.000006		
3	ISOPENTANE		0.612	0.040033		44.170	0.034356		
4	PENTANE		3.218	0.210442		232.190	0.180599		
5	HEXANE		10.046	0.656936		865.771	0.673403		
6	HEPTANE		1.301	0.085060		130.350	0.101387		
7	OCTANE		0.112	0.007324		12.793	0.009951		
8	NONANE		0.003	0.000196		0.385	0.000299		

* TOTAL *			15.292	1.000000		1285.666	1.000000		
			lbm/h			lb/h			

3) * TRAY OUTLET Molar flow rates - lbm/h *

	-----* TRAY 0 *-----	-----* TRAY 1 *-----	-----* TRAY 2 *-----
Temperature	130.528 °F	141.929 °F	143.571 °F
Pressure	30.5000 psia	35.5000 psia	35.6000 psia
Phase	VAPOR LIQUID	VAPOR LIQUID	VAPOR LIQUID
1 ISOBUTANE	0.000000 0.011290	0.011290 0.002329	0.006329 0.001248
2 BUTANE	0.000000 3.657806	3.657806 0.997480	2.293351 0.596812
3 ISOPENTANE	0.000000 143.509297	143.509297 84.105380	134.947326 75.221868
4 PENTANE	0.000000 175.416615	175.416615 128.370023	190.516027 132.449575
5 HEXANE	0.000000 1.622044	1.622044 3.070193	3.644849 6.525855
6 HEPTANE	0.000000 0.003388	0.003388 0.016701	0.017901 0.083097
7 OCTANE	0.000000 0.000007	0.000007 0.000084	0.000086 0.001022
8 NONANE	0.000000 0.000000	0.000000 0.000000	0.000000 0.000004
Total	0.000000 324.220447	324.220447 216.562190	331.425870 214.879480

	-----* TRAY 3 *-----	-----* TRAY 4 *-----	-----* TRAY 5 *-----
Temperature	145.463 °F	148.257 °F	150.983 °F
Pressure	35.7000 psia	35.8000 psia	35.9000 psia
Phase	VAPOR LIQUID	VAPOR LIQUID	VAPOR LIQUID
1 ISOBUTANE	0.005248 0.001008	0.005008 0.000908	0.000908 0.000274
2 BUTANE	1.892675 0.479132	1.774982 0.423630	0.423499 0.167757
3 ISOPENTANE	126.063715 68.097982	118.939628 60.240391	59.628141 49.856048
4 PENTANE	194.595656 130.927848	193.074032 121.558299	118.340062 122.763015
5 HEXANE	7.100540 12.243257	12.818050 20.534571	10.488611 27.494044
6 HEPTANE	0.084297 0.374882	0.376086 1.542154	0.241406 1.607828
7 OCTANE	0.001025 0.011551	0.011554 0.119222	0.007228 0.120287
8 NONANE	0.000004 0.000119	0.000119 0.003074	0.000075 0.003085
Total	329.743160 212.135779	326.999458 204.422250	189.129930 202.012338

	-----* TRAY 6 *-----	-----* TRAY 7 *-----	-----* TRAY 8 *-----
Temperature	155.757 °F	164.270 °F	177.405 °F
Pressure	36.0000 psia	36.1000 psia	36.2000 psia
Phase	VAPOR LIQUID	VAPOR LIQUID	VAPOR LIQUID
1 ISOBUTANE	0.000274 0.000078	0.000078 0.000020	0.000020 0.000005
2 BUTANE	0.167627 0.062476	0.062346 0.021035	0.020905 0.006169
3 ISOPENTANE	49.243745 38.383381	37.771051 26.224561	25.612254 15.181723
4 PENTANE	119.544655 115.225336	112.006858 95.604017	92.385528 66.731872
5 HEXANE	17.448233 41.990362	31.944668 66.666833	56.621109 96.909121
6 HEPTANE	0.307103 1.854099	0.553400 2.833798	1.533115 6.228783
7 OCTANE	0.008296 0.123599	0.011611 0.143601	0.031614 0.300432
8 NONANE	0.000085 0.003109	0.000109 0.003237	0.000238 0.005254
Total	186.720018 197.642440	182.350120 191.497103	176.204782 185.363359

3) * TRAY OUTLET MOLAR FLOW RATES - lbm/h *- CONTINUATION

	-----*	TRAY	9	*-----
Temperature		193.756	°F	
Pressure		36.3000	psia	
Phase	VAPOR		LIQUID	
1 ISOBUTANE	0.000005		0.000000	
2 BUTANE	0.006039		0.000130	
3 ISOPENTANE	14.569493		0.612195	
4 PENTANE	63.513591		3.218153	
5 HEXANE	86.863153		10.046083	
6 HEPTANE	4.928062		1.300765	
7 OCTANE	0.188442		0.111995	
8 NONANE	0.002254		0.003000	
Total	170.071039		15.292320	

* XPSIM, Vers. 1.06 *			*... extended Process SIMulation ...*			* Page 0016 *		
* Cust/User "STAFF " *			- SOLUTION -			* Job "COLUMN01 " *		
* Proj/Problem "COLUMN SAMPLE 01 " *			- UNIT 1 - C01 -			* Date AUG 18, 2008 *		
4) * TRAY OUTLET WEIGHT FLOW RATES - lb/h *								
-----* TRAY 0 *-----			-----* TRAY 1 *-----			-----* TRAY 2 *-----		
Temperature	130.528 °F		141.929 °F			143.571 °F		
Pressure	30.5000 psia		35.5000 psia			35.6000 psia		
Phase	VAPOR	LIQUID	VAPOR	LIQUID		VAPOR	LIQUID	
1 ISOBUTANE	0.000000	0.656200	0.656200	0.135378		0.367853	0.072511	
2 BUTANE	0.000000	212.591653	212.591653	57.973511		133.289569	34.686711	
3 ISOPENTANE	0.000000	10354.194943	10354.194943	6068.202645		9736.448750	5427.257335	
4 PENTANE	0.000000	12656.307745	12656.307745	9261.896400		13745.730184	9556.236012	
5 HEXANE	0.000000	139.787758	139.787758	264.589201		314.113052	562.398122	
6 HEPTANE	0.000000	0.339482	0.339482	1.673607		1.793880	8.327103	
7 OCTANE	0.000000	0.000761	0.000761	0.009602		0.009872	0.116764	
8 NONANE	0.000000	0.000001	0.000001	0.000018		0.000018	0.000536	
Total	0.000000	23363.878542	23363.878542	15654.480361		23931.753179	15589.095094	
-----* TRAY 3 *-----			-----* TRAY 4 *-----			-----* TRAY 5 *-----		
Temperature	145.463 °F		148.257 °F			150.983 °F		
Pressure	35.7000 psia		35.8000 psia			35.9000 psia		
Phase	VAPOR	LIQUID	VAPOR	LIQUID		VAPOR	LIQUID	
1 ISOBUTANE	0.304985	0.058565	0.291037	0.052800		0.052795	0.015929	
2 BUTANE	110.002281	27.847139	103.161966	24.621354		24.613770	9.750054	
3 ISOPENTANE	9095.496277	4913.269019	8581.493427	4346.343874		4302.169997	3597.113534	
4 PENTANE	14040.075396	9446.443433	13930.290258	8770.430560		8538.234750	8857.350827	
5 HEXANE	611.924527	1055.123828	1104.659438	1769.669173		903.908383	2369.436488	
6 HEPTANE	8.447423	37.566885	37.687624	154.539295		24.191307	161.120492	
7 OCTANE	0.117034	1.319479	1.319765	13.618690		0.825710	13.740367	
8 NONANE	0.000537	0.015260	0.015261	0.394328		0.009564	0.395656	
Total	23866.368459	15481.643609	23758.918776	15079.670073		13794.006276	15008.923348	
-----* TRAY 6 *-----			-----* TRAY 7 *-----			-----* TRAY 8 *-----		
Temperature	155.757 °F		164.270 °F			177.405 °F		
Pressure	36.0000 psia		36.1000 psia			36.2000 psia		
Phase	VAPOR	LIQUID	VAPOR	LIQUID		VAPOR	LIQUID	
1 ISOBUTANE	0.015925	0.004537	0.004533	0.001177		0.001172	0.000269	
2 BUTANE	9.742472	3.631105	3.623533	1.222568		1.215004	0.358542	
3 ISOPENTANE	3552.935898	2769.360703	2725.181137	1892.101908		1847.923946	1095.361237	
4 PENTANE	8625.146127	8313.507332	8081.294106	6897.829226		6665.615295	4814.704160	
5 HEXANE	1503.688619	3618.729075	2752.991244	5745.347203		4879.606795	8351.627332	
6 HEPTANE	30.774836	185.799269	55.456207	283.974948		153.633436	624.186452	
7 OCTANE	0.947619	14.118771	1.326290	16.403546		3.611268	34.318338	
8 NONANE	0.010899	0.398721	0.013972	0.415222		0.030479	0.673876	
Total	13723.262396	14905.549514	13619.891022	14837.295797		13551.637395	14921.230206	

4) * TRAY OUTLET WEIGHT FLOW RATES - lb/h *- CONTINUATION

	-----*	TRAY	9	*-----
Temperature		193.756	°F	
Pressure		36.3000	psia	
Phase		VAPOR	LIQUID	
1 ISOBUTANE	0.000264		0.000004	
2 BUTANE	0.350984		0.007557	
3 ISOPENTANE	1051.188816		44.169835	
4 PENTANE	4582.505210		232.189711	
5 HEXANE	7485.865887		865.771341	
6 HEPTANE	493.841170		130.349696	
7 OCTANE	21.525745		12.793150	
8 NONANE	0.289125		0.384770	
Total	13635.567203		1285.666064	

5) * TRAY OUTLET MOLAR COMPOSITIONS *

	-----* TRAY 0 *-----	-----* TRAY 1 *-----	-----* TRAY 2 *-----
Temperature	130.528 °F	141.929 °F	143.571 °F
Pressure	30.5000 psia	35.5000 psia	35.6000 psia
Phase	VAPOR LIQUID	VAPOR LIQUID	VAPOR LIQUID
1 ISOBUTANE	0.000115 0.000035	0.000035 0.000011	0.000019 0.000006
2 BUTANE	0.027759 0.011282	0.011282 0.004606	0.006920 0.002777
3 ISOPENTANE	0.492904 0.442629	0.442629 0.388366	0.407172 0.350065
4 PENTANE	0.477574 0.541041	0.541041 0.592763	0.574838 0.616390
5 HEXANE	0.001647 0.005003	0.005003 0.014177	0.010997 0.030370
6 HEPTANE	0.000001 0.000010	0.000010 0.000077	0.000054 0.000387
7 OCTANE	0.000000 0.000000	0.000000 0.000000	0.000000 0.000005
8 NONANE	0.000000 0.000000	0.000000 0.000000	0.000000 0.000000
Total	1.000000 1.000000	1.000000 1.000000	1.000000 1.000000

	-----* TRAY 3 *-----	-----* TRAY 4 *-----	-----* TRAY 5 *-----
Temperature	145.463 °F	148.257 °F	150.983 °F
Pressure	35.7000 psia	35.8000 psia	35.9000 psia
Phase	VAPOR LIQUID	VAPOR LIQUID	VAPOR LIQUID
1 ISOBUTANE	0.000016 0.000005	0.000015 0.000004	0.000005 0.000001
2 BUTANE	0.005740 0.002259	0.005428 0.002072	0.002239 0.000830
3 ISOPENTANE	0.382309 0.321011	0.363730 0.294686	0.315276 0.246797
4 PENTANE	0.590143 0.617189	0.590441 0.594643	0.625708 0.607701
5 HEXANE	0.021534 0.057714	0.039199 0.100452	0.055457 0.136101
6 HEPTANE	0.000256 0.001767	0.001150 0.007544	0.001276 0.007959
7 OCTANE	0.000003 0.000054	0.000035 0.000583	0.000038 0.000595
8 NONANE	0.000000 0.000001	0.000000 0.000015	0.000000 0.000015
Total	1.000000 1.000000	1.000000 1.000000	1.000000 1.000000

	-----* TRAY 6 *-----	-----* TRAY 7 *-----	-----* TRAY 8 *-----
Temperature	155.757 °F	164.270 °F	177.405 °F
Pressure	36.0000 psia	36.1000 psia	36.2000 psia
Phase	VAPOR LIQUID	VAPOR LIQUID	VAPOR LIQUID
1 ISOBUTANE	0.000001 0.000000	0.000000 0.000000	0.000000 0.000000
2 BUTANE	0.000898 0.000316	0.000342 0.000110	0.000119 0.000033
3 ISOPENTANE	0.263730 0.194206	0.207135 0.136945	0.145355 0.081903
4 PENTANE	0.640235 0.582999	0.614241 0.499245	0.524308 0.360006
5 HEXANE	0.093446 0.212456	0.175183 0.348135	0.321337 0.522806
6 HEPTANE	0.001645 0.009381	0.003035 0.014798	0.008701 0.033603
7 OCTANE	0.000044 0.000625	0.000064 0.000750	0.000179 0.001621
8 NONANE	0.000000 0.000016	0.000001 0.000017	0.000001 0.000028
Total	1.000000 1.000000	1.000000 1.000000	1.000000 1.000000

5) * TRAY OUTLET MOLAR COMPOSITIONS *- CONTINUATION

	-----*	TRAY	9	*-----
Temperature		193.756	°F	
Pressure		36.3000	psia	
Phase	VAPOR		LIQUID	
1 ISOBUTANE	0.000000		0.000000	
2 BUTANE	0.000036		0.000009	
3 ISOPENTANE	0.085667		0.040033	
4 PENTANE	0.373453		0.210442	
5 HEXANE	0.510746		0.656936	
6 HEPTANE	0.028976		0.085060	
7 OCTANE	0.001108		0.007324	
8 NONANE	0.000013		0.000196	
Total	1.000000		1.000000	

6) * TRAY OUTLET WEIGHT COMPOSITIONS *

	-----* TRAY 0 *-----	-----* TRAY 1 *-----	-----* TRAY 2 *-----
Temperature	130.528 °F	141.929 °F	143.571 °F
Pressure	30.5000 psia	35.5000 psia	35.6000 psia
Phase	VAPOR LIQUID	VAPOR LIQUID	VAPOR LIQUID
1 ISOBUTANE	0.000093 0.000028	0.000028 0.000009	0.000015 0.000005
2 BUTANE	0.022475 0.009099	0.009099 0.003703	0.005570 0.002225
3 ISOPENTANE	0.495430 0.443171	0.443171 0.387634	0.406842 0.348144
4 PENTANE	0.480022 0.541704	0.541704 0.591645	0.574372 0.613008
5 HEXANE	0.001977 0.005983	0.005983 0.016902	0.013125 0.036076
6 HEPTANE	0.000002 0.000015	0.000015 0.000107	0.000075 0.000534
7 OCTANE	0.000000 0.000000	0.000000 0.000001	0.000000 0.000007
8 NONANE	0.000000 0.000000	0.000000 0.000000	0.000000 0.000000
Total	1.000000 1.000000	1.000000 1.000000	1.000000 1.000000

	-----* TRAY 3 *-----	-----* TRAY 4 *-----	-----* TRAY 5 *-----
Temperature	145.463 °F	148.257 °F	150.983 °F
Pressure	35.7000 psia	35.8000 psia	35.9000 psia
Phase	VAPOR LIQUID	VAPOR LIQUID	VAPOR LIQUID
1 ISOBUTANE	0.000013 0.000004	0.000012 0.000004	0.000004 0.000001
2 BUTANE	0.004609 0.001799	0.004342 0.001633	0.001784 0.000650
3 ISOPENTANE	0.381101 0.317361	0.361190 0.288225	0.311887 0.239665
4 PENTANE	0.588279 0.610171	0.586318 0.581606	0.618982 0.590139
5 HEXANE	0.025640 0.068153	0.046495 0.117355	0.065529 0.157869
6 HEPTANE	0.000354 0.002427	0.001586 0.010248	0.001754 0.010735
7 OCTANE	0.000005 0.000085	0.000056 0.000903	0.000060 0.000915
8 NONANE	0.000000 0.000001	0.000001 0.000026	0.000001 0.000026
Total	1.000000 1.000000	1.000000 1.000000	1.000000 1.000000

	-----* TRAY 6 *-----	-----* TRAY 7 *-----	-----* TRAY 8 *-----
Temperature	155.757 °F	164.270 °F	177.405 °F
Pressure	36.0000 psia	36.1000 psia	36.2000 psia
Phase	VAPOR LIQUID	VAPOR LIQUID	VAPOR LIQUID
1 ISOBUTANE	0.000001 0.000000	0.000000 0.000000	0.000000 0.000000
2 BUTANE	0.000710 0.000244	0.000266 0.000082	0.000090 0.000024
3 ISOPENTANE	0.258899 0.185794	0.200088 0.127523	0.136362 0.073410
4 PENTANE	0.628506 0.557746	0.593345 0.464898	0.491868 0.322675
5 HEXANE	0.109572 0.242777	0.202130 0.387223	0.360075 0.559714
6 HEPTANE	0.002243 0.012465	0.004072 0.019139	0.011337 0.041832
7 OCTANE	0.000069 0.000947	0.000097 0.001106	0.000266 0.002300
8 NONANE	0.000001 0.000027	0.000001 0.000028	0.000002 0.000045
Total	1.000000 1.000000	1.000000 1.000000	1.000000 1.000000

6) * TRAY OUTLET WEIGHT COMPOSITIONS *- CONTINUATION

	-----*	TRAY	9	*-----
Temperature		193.756	°F	
Pressure		36.3000	psia	
Phase	VAPOR		LIQUID	
1 ISOBUTANE	0.000000		0.000000	
2 BUTANE	0.000026		0.000006	
3 ISOPENTANE	0.077092		0.034356	
4 PENTANE	0.336070		0.180599	
5 HEXANE	0.548996		0.673403	
6 HEPTANE	0.036217		0.101387	
7 OCTANE	0.001579		0.009951	
8 NONANE	0.000021		0.000299	
Total	1.000000		1.000000	

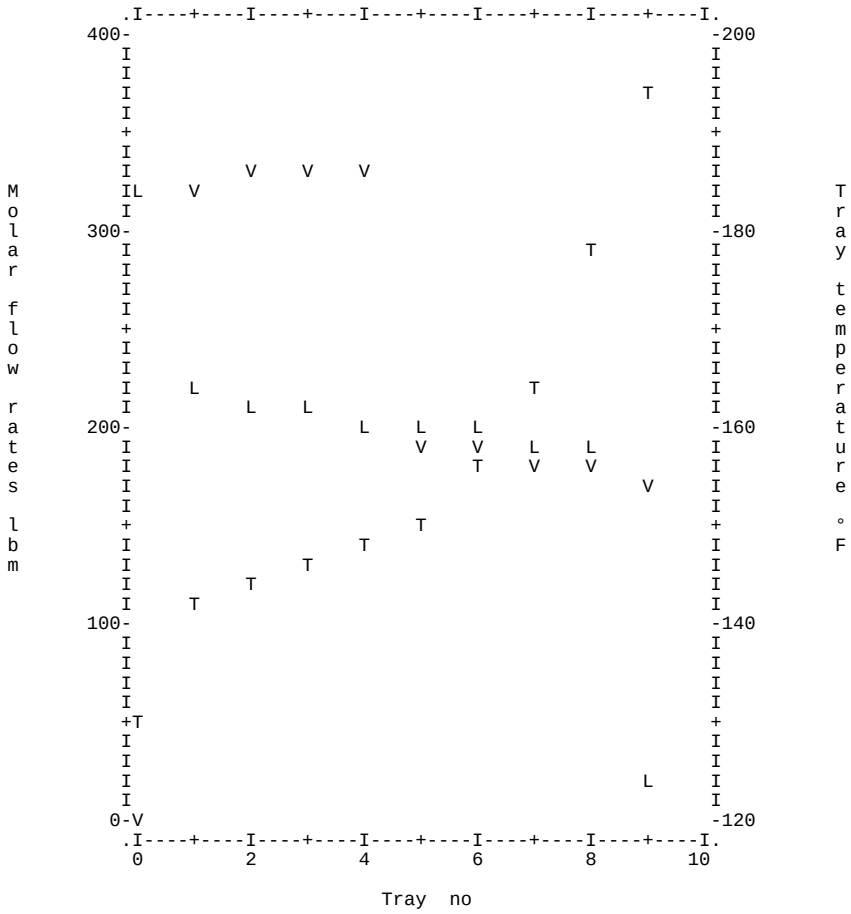
7) * TRAY PROPERTIES - Time basis 'h' *

	- Tray 0 -	- Tray 1 -	- Tray 2 -	- Tray 3 -	- Tray 4 -
Temperature, °F	130.528	141.929	143.571	145.463	148.257
Pressure, psia	30.500	35.500	35.600	35.700	35.800
*** VAPOR ***					
Flow rate	lbm	324.220	331.426	329.743	326.999
	lb	23363.879	23931.753	23866.368	23758.919
Mol. weight		72.0617	72.2085	72.3787	72.6574
Std. Volume rate	SCF	123036.206427	125770.542995	125131.982912	124090.794350
Act. volume rate	ft3	54105.4888	55299.0414	55038.9969	54692.6223
Heat content	kBtu	522.625476	552.253561	570.393376	596.998193
Enthalpy	Btu/lbm	1611.945	1666.296	1729.811	1825.686
	Btu/lb	22.369	23.076	23.899	25.127
Compressibility		0.917480	0.917414	0.917460	0.917673
Density	lb/ft3	0.4318	0.4328	0.4336	0.4344
*** LIQUID ***					
Flow rate	lbm	324.220	216.562	212.136	204.422
	lb	23363.879	15654.480	15481.644	15079.670
Mol. weight		72.0617	72.2863	72.9799	73.7673
Std. Volume rate	ft3	596.058586	398.797322	396.593775	393.129730
Act. volume rate	ft3	636.8639	431.0661	429.2323	426.1896
Heat content	kBtu	-2911.268115	-1851.276532	-1833.042768	-1806.385555
Enthalpy	Btu/lbm	-8979.286	-8548.475	-8530.562	-8515.233
	Btu/lb	-124.606	-118.259	-117.585	-116.679
Density	lb/ft3	36.6858	36.3157	36.3186	36.3257
Sp. Grav. 60/60		0.6279	0.6288	0.6296	0.6308

* TRAY PROPERTIES - Time basis 'h' ' - Continuation

	- Tray 5 -	- Tray 6 -	- Tray 7 -	- Tray 8 -	- Tray 9 -
Temperature, °F	150.983	155.757	164.270	177.405	193.756
Pressure, psia	35.900	36.000	36.100	36.200	36.300
*** VAPOR ***					
Flow rate					
lbm	189.130	186.720	182.350	176.205	170.071
lb	13794.006	13723.262	13619.891	13551.637	13635.567
Mol. weight	72.9340	73.4965	74.6909	76.9085	80.1757
Std. Volume rate	71771.627198	70857.106165	69198.803443	66866.751181	64539.098539
Act. volume rate	31686.7334	31445.5981	31053.1027	30536.5118	30088.9363
Heat content	363.062413	390.147422	438.822892	516.527754	620.995735
Enthalpy					
Btu/lbm	1919.645	2089.478	2406.485	2931.406	3651.390
Btu/lb	26.320	28.430	32.219	38.116	45.542
Compressibility	0.917682	0.917846	0.917991	0.917476	0.915717
Density	lb/ft3	0.4353	0.4364	0.4438	0.4532
*** LIQUID ***					
Flow rate					
lbm	202.012	197.642	191.497	185.363	15.292
lb	15008.923	14905.550	14837.296	14921.230	1285.666
Mol. weight	74.2971	75.4167	77.4805	80.4972	84.0727
Std. Volume rate	379.060509	374.821831	370.373034	368.758923	31.420082
Act. volume rate	412.9667	410.1844	408.7371	412.3705	35.7113
Heat content	-1710.079647	-1661.259987	-1583.180007	-1478.300688	-114.848273
Enthalpy					
Btu/lbm	-8465.224	-8405.381	-8267.384	-7975.151	-7510.193
Btu/lb	-113.938	-111.452	-106.703	-99.074	-89.330
Density	36.3441	36.3387	36.3003	36.1840	36.0017
Sp. Grav. 60/60	0.6342	0.6370	0.6417	0.6481	0.6554

*** COLUMN FLOW-RATES AND TEMPERATURES PROFILES ***



* XPSIM, Vers. 1.06 *		*... extended		Process SIMulation ...*		* Page 0025 *	
* Cust/User "STAFF " *		- SOLUTION -		* Job "COLUMN01 " *			
* Proj/Problem "COLUMN SAMPLE 01 " *		- UNIT 1 - C01 -		* Date AUG 18, 2008 *			
*** TRAY COMPOSITION OF LIGHT/HEAVY KEYS ***							
TRAY NO.	0		1		2		
PHASE	LIQUID	VAPOR	LIQUID	VAPOR	LIQUID	VAPOR	
* LIGHT KEYS *							
3 ISOPENTANE	0.44262877	0.49290407	0.38836595	0.44262877	0.35006539	0.40717197	
4 PENTANE	0.54104119	0.47757440	0.59276286	0.54104119	0.61639006	0.57483753	
* HEAVY KEYS *							
5 HEXANE	0.00500291	0.00164695	0.01417696	0.00500291	0.03036984	0.01099748	
RELATIVE VOLATILITY	2.99694048		2.84108430		2.80597109		
SEPARATION FACTOR	5.28127162		4.23708584		3.46018528		
TRAY NO.	3		4		5		
PHASE	LIQUID	VAPOR	LIQUID	VAPOR	LIQUID	VAPOR	
* LIGHT KEYS *							
3 ISOPENTANE	0.44262877	0.49290407	0.38836595	0.44262877	0.35006539	0.40717197	
4 PENTANE	0.54104119	0.47757440	0.59276286	0.54104119	0.61639006	0.57483753	
* HEAVY KEYS *							
5 HEXANE	0.00500291	0.00164695	0.01417696	0.00500291	0.03036984	0.01099748	
RELATIVE VOLATILITY	2.77805003		2.74945449		2.70255361		
SEPARATION FACTOR	2.78845926		2.18079013		1.83711783		
TRAY NO.	6		7		8		
PHASE	LIQUID	VAPOR	LIQUID	VAPOR	LIQUID	VAPOR	
* LIGHT KEYS *							
3 ISOPENTANE	0.44262877	0.49290407	0.38836595	0.44262877	0.35006539	0.40717197	
4 PENTANE	0.54104119	0.47757440	0.59276286	0.54104119	0.61639006	0.57483753	
* HEAVY KEYS *							
5 HEXANE	0.00500291	0.00164695	0.01417696	0.00500291	0.03036984	0.01099748	
RELATIVE VOLATILITY	2.64438625		2.56572461		2.46549505		
SEPARATION FACTOR	1.29696846		0.60290738		-0.16810866		
TRAY NO.	9						
PHASE	LIQUID	VAPOR					
* LIGHT KEYS *							
3 ISOPENTANE	0.44262877	0.49290407					
4 PENTANE	0.54104119	0.47757440					
* HEAVY KEYS *							
5 HEXANE	0.00500291	0.00164695					
RELATIVE VOLATILITY	2.35765334						
SEPARATION FACTOR	-0.96422726						

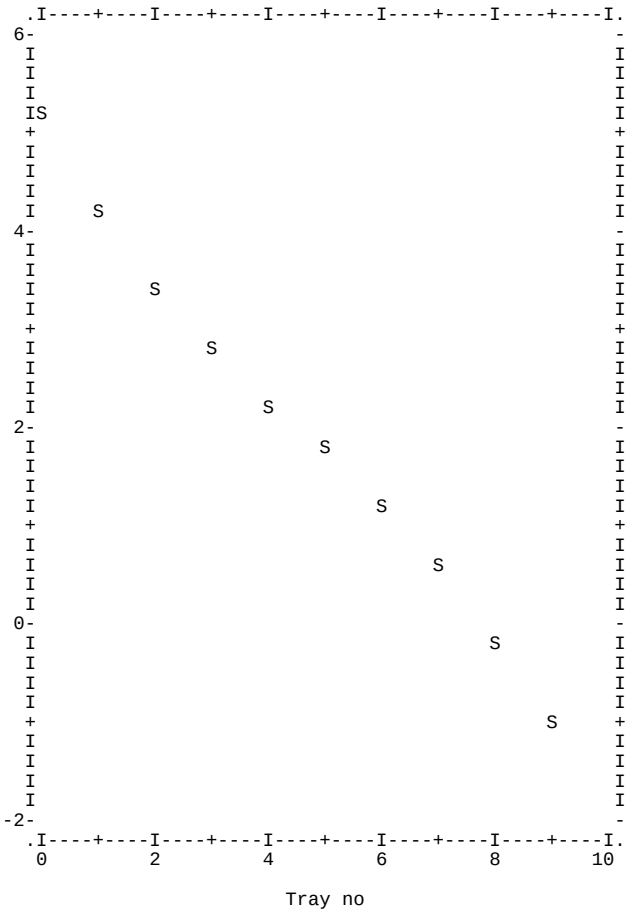
*** LIGHT-KEY/HEAVY-KEY SEPARATION FACTOR ***

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**** TRAY LOADING PRINTOUT ***

		***** TOTAL INLET VAPOR *****					***** TOTAL OUTLET LIQUID *****								
Tray	Pressure*	- Temp	-Weight	Rate-	Mol wei-	Z value-	- Temp	-Weight	Rate-	Mol wei-	Sp. Grav-	Density	-Visc	-Surf	Tens-
	PSIA	FAR	LB	/HR			FAR	LB	/HR			LB/CUF	CP		DYCM
1	35.600	143.57	23931.75	72.208	0.91759		141.93	15654.48	72.286	0.62877		36.316	0.000		0.000
2	35.700	145.46	23866.37	72.379	0.91764		143.57	15589.10	72.548	0.62962		36.319	0.000		0.000
3	35.800	148.26	23758.92	72.657	0.91785		145.46	15481.64	72.980	0.63079		36.326	0.000		0.000
4	35.900	155.79	23356.95	73.154	0.91976		148.26	15079.67	73.767	0.63276		36.345	0.000		0.000
5	36.000	155.76	13723.26	73.496	0.91803		150.98	15008.92	74.297	0.63423		36.344	0.000		0.000
6	36.100	164.27	13619.89	74.691	0.91817		155.76	14905.55	75.417	0.63699		36.339	0.000		0.000
7	36.200	177.40	13551.64	76.908	0.91766		164.27	14837.30	77.481	0.64169		36.300	0.000		0.000
8	36.300	193.76	13635.57	80.176	0.91590		177.40	14921.23	80.497	0.64814		36.184	0.000		0.000

*** TRAY SIZING FOR COLUMN SECTION FROM TRAY NO. 1 TO TRAY NO. 8

Tray type VALVE
Design Flooding 80.00 % System Factor 1.0000
Tray spacing, INCH 24.000 No. of passes 1

Tray	VAPOR CFS	LIQUID GPM	Vload CFS	--- DESIGN ---		--- NEXT ---		SMALLER		--- NEXT ---		LARGER	
				Diamt INCH	F.F.	Diamt INCH	F.F.	Pres	Drop MMHG	Diamt INCH	F.F.	Pres	Drop MMHG
1	15.361	53.743	1.687	32.154	80.04	30.000	95.30	7.595		36.000	64.28	5.811	
2	15.289	53.514	1.681	32.059	80.04	30.000	94.95	7.549		36.000	64.04	5.778	
3	15.192	53.135	1.671	31.918	80.06	30.000	94.42	7.483		36.000	63.68	5.730	
4	15.007	51.728	1.647	31.505	80.16	30.000	92.96	7.302		36.000	62.68	5.599	
5	8.735	51.486	0.963	25.500	80.64	24.000	92.64	8.480		30.000	59.14	4.335	
6	8.626	51.140	0.953	25.500	79.87	24.000	91.75	8.342		30.000	58.57	4.278	
7	8.482	50.959	0.944	25.222	80.15	24.000	90.87	8.196		30.000	58.01	4.218	
8	8.358	51.412	0.941	25.100	80.51	24.000	90.73	8.141		30.000	57.93	4.195	

Tray	Next Larger		Downcomer widths INCH		
	Diameter INCH		Side	Center	Off ctr
1	36.000		4.00	0.00	0.00
2	36.000		4.00	0.00	0.00
3	36.000		4.00	0.00	0.00
4	36.000		4.00	0.00	0.00
5	30.000		4.75	0.00	0.00
6	30.000		4.75	0.00	0.00
7	30.000		4.75	0.00	0.00
8	30.000		4.75	0.00	0.00

* TRAY RE-RATING WITH TRAYS DIAMETERS EQUAL TO 36.000 INCH

Design VALVE diameter 1.528 INCH VALVE Total area 126.573 SQIN

Design tray Number	Diameter INCH	Number of Units	Downcomer widths INCH		
1	36.0	69	Side 4.00	Center 0.00	Off ctr 0.00

Tray	VAPOR CFS	LIQUID GPM	Vload CFS	Diamt INCH	F.F.	Pres Drop MMHG	Gpm/Lwi GPM/INCH	Dc backup INCH
1	15.361	53.743	1.687	36.00	59.07	28.59	3.53	81.89
2	15.289	53.514	1.681	36.00	58.85	28.56	3.52	81.86
3	15.192	53.135	1.671	36.00	58.52	28.52	3.49	81.81
4	15.007	51.728	1.647	36.00	57.60	28.40	3.40	81.66
5	8.735	51.486	0.963	36.00	35.42	25.92	3.38	79.36
6	8.626	51.140	0.953	36.00	35.08	25.91	3.36	79.35
7	8.482	50.959	0.944	36.00	34.76	25.87	3.35	79.35
8	8.358	51.412	0.941	36.00	34.73	25.80	3.38	79.37

*** STREAM DATA CALCULATION AND STORING ***

Stream 'F100 ' pvt/thermo/trans props calculated
Stream 'E110 ' pvt/thermo/trans props calculated
Stream 'E120 ' pvt/thermo/trans props calculated

* XPSIM, Vers. 1.06 *

* Cust/User "STAFF" *

* Proj/Problem "COLUMN SAMPLE 01" *

... extended Process SIMulation ...

- SOLUTION -

- STREAM F100 -

* Job "COLUMN01" *

* Date AUG 18, 2008 *

* STREAM 'F100', feed of unit(s) 1 'C01'

- Temperature 163.00 °F - Pressure 37.0000 psia

Phase VAPOR

Molar Flow Rate lbm/h 130.156

Weight Flow Rate lb/h 9562.944

Molar Fraction 1.000000

Weight Fraction 1.000000

Molecular Weight 73.4729

Std Vap Vol Rate S-ft3/h 49392.0073

Act Volume Rate ft3/h 21623.4956

Enthalpy kBtu/h 303.1328

Spec. Enthalpy Btu/lb 31.699

Btu/lbm 2328.996

Compressibility 0.919772

Density lb/ft3 0.4422

Reference Gas Status - Temperature 60°F - Pressure 1 atm

No	Components	Mol. Rate	TOTAL Mol. Fr	PHASE Wt. Rate	Wt. Fr.
		lbm /h		lb /h	
1	ISOBUTANE	0.004	0.000031	0.232	0.000024
2	BUTANE	1.296	0.009957	75.324	0.007877
3	ISOPENTANE	51.454	0.395326	3712.406	0.388207
4	PENTANE	65.364	0.502197	4716.012	0.493155
5	HEXANE	10.621	0.081602	915.318	0.095715
6	HEPTANE	1.302	0.010003	130.473	0.013644
7	OCTANE	0.112	0.000861	12.794	0.001338
8	NONANE	0.003	0.000023	0.385	0.000040
***	TOTAL	130.156	1.000000	9562.944	1.000000

* XPSIM, Vers. 1.06 *
* Cust/User "STAFF " *
* Proj/Problem "COLUMN SAMPLE 01 " *
extended Process SIMulation ...*
- SOLUTION -
- STREAM E110 -
* Date AUG 18, 2008 *
* STREAM 'E110 ', product of unit 1 'C01 '
- Temperature 130.53 °F - Pressure 30.5000 psia
Phase LIQUID
Molar Flow Rate lbm/h 114.864
Weight Flow Rate lb/h 8277.273
Molar Fraction 1.000000
Weight Fraction 1.000000
Molecular Weight 72.0617
Std Liq Vol Rate ft3/h 211.1695
Act Volume Rate ft3/h 225.6259
Enthalpy kBtu/h -1031.3938
Spec. Enthalpy Btu/lb -124.606
Btu/lbm -8979.286
Density lb/ft3 36.6858
Gravity at 60/60 0.627860
Reference Gas Status - Temperature 60°F - Pressure 1 atm
No Components
Mol. Rate Mol. Fr Wt. Rate Wt. Fr.
lbm /h lb /h
1 ISOBUTANE 0.004 0.000035 0.232 0.000028
2 BUTANE 1.296 0.011282 75.316 0.009099
3 ISOPENTANE 50.842 0.442629 3668.248 0.443171
4 PENTANE 62.146 0.541041 4483.832 0.541704
5 HEXANE 0.575 0.005003 49.524 0.005983
6 HEPTANE 0.001 0.000010 0.120 0.000015
7 OCTANE 0.000 0.000000 0.000 0.000000
8 NONANE 0.000 0.000000 0.000 0.000000
*** TOTAL *** 114.864 1.000000 8277.273 1.000000

* XPSIM, Vers. 1.06 *

* Cust/User "STAFF" *

* Proj/Problem "COLUMN SAMPLE 01" *

... extended Process SIMulation ...

- SOLUTION -

- STREAM E120 -

* Job "COLUMN01" *

* Date AUG 18, 2008 *

* STREAM 'E120', product of unit 1 'C01'

- Temperature 193.76 °F - Pressure 36.3000 psia

Phase LIQUID

Molar Flow Rate lbm/h 15.292

Weight Flow Rate lb/h 1285.666

Molar Fraction 1.000000

Weight Fraction 1.000000

Molecular Weight 84.0727

Std Liq Vol Rate ft3/h 31.4201

Act Volume Rate ft3/h 35.7113

Enthalpy kBtu/h -114.8483

Spec. Enthalpy Btu/lb -89.330

Btu/lbm -7510.193

Density lb/ft3 36.0017

Gravity at 60/60 0.655432

Reference Gas Status - Temperature 60°F - Pressure 1 atm

No Components

Mol. Rate

TOTAL

Mol. Fr

PHASE

Wt. Rate

Wt. Fr.

1 ISOBUTANE

0.000 0.000000

0.000 0.000000

0.000 0.000000

2 BUTANE

0.000 0.000009

0.008 0.000006

3 ISOPENTANE

0.612 0.040033

44.170 0.034356

4 PENTANE

3.218 0.210442

232.190 0.180599

5 HEXANE

10.046 0.656936

865.771 0.673403

6 HEPTANE

1.301 0.085060

130.350 0.101387

7 OCTANE

0.112 0.007324

12.793 0.009951

8 NONANE

0.003 0.000196

0.385 0.000299

*** TOTAL ***

15.292 1.000000

1285.666 1.000000

*** STREAM INDEX ***

- ALPHABETIC Stream	ORDER Page	- INPUT Stream	ORDER Page
E110	31	F100	30
E120	32	E110	31
F100	30	E120	32

- Calculation time 0.66 sec

- Simulation no. 55 - Ended at 14.53.40 on AUG 18, 2008 -