SUPPORTING INFORMATION (SI)

Improving Purity of Maleic Anhydride Production by Multi-stage Distillation

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Table S1. Heat and material balance of modified process using Aspen HYSYS

Stream No.		benzene	air	1	2	3	4	5	6
Material Streams									
Vapour Fraction		0	1	0	1	1	1	1	0,07888
Temperature	*C*	30	30	30,1411	120,276	139,951	138,798	378,919	1335
Pressure	*bar*	1,014	6,99129	3,014	3,014	17,2645	3,014	3,014	1,014
Molar Flow	*kgmole/h*	54,79	3324	54,79	54,79	3324	3378,79	3378,79	3351,4
Mass Flow	*kg/h*	4279,65	95898,3	4279,65	4279,65	95898,3	100178	100178	100178
Liquid Volume Flow	*m3/h*	4,85116	110,859	4,85116	4,85116	110,859	115,71	115,71	115,806
Heat Flow	*kcal/h*	659937	115831	660173	1207034	2694609	3901643	1E+07	1,5E+07
Master Comp Mass Flow (Air)	*kg/h*	0	0	0	0	0	0	0	0
Master Comp Mass Flow (Benzene)	*kg/h*	4279,65	0	4279,65	4279,65	0	4279,65	4279,65	2,62E-35
ster Comp Mass Flow (MaleicAnhy	*kg/h*	0	0	0	0	0	0	0	5372,78
Master Comp Mass Flow (CO2)	*kg/h*	0	0	0	0	0	0	0	4822,76
Master Comp Mass Flow (Oxygen)	*kg/h*	0	22337,3	0	0	22337,3	22337,3	22337,3	14447,2
Composition									
Comp Mole Frac (Benzene)		1	0	1	1	0	0,01622	0,01622	1,00E-40
Comp Mole Frac (Oxygen)		0	0,21	0	0	0,21	0,20659	0,20659	0,13471
Comp Mole Frac (MaleicAnhydr)		0	0	0	0	0	0	0	0,01635
Comp Mole Frac (CO2)		0	0	0	0	0	0	0	0,0327
Comp Mole Frac (H2O)		0	0	0	0	0	0	0	0,0327
Comp Mole Frac (Nitrogen)		0	0,79	0	0	0,79	0,77719	0,77719	0,78354
Comp Mole Frac (Quinone)		0	0	0	0	0	0	0	0
Comp Mole Frac (DinC4Phthate)		0	0	0	0	0	0	0	0
Comp Mole Frac (Air)		0	0	0	0	0	0	0	0
Comp Mole Frac (CO)		0	0	0	0	0	0	0	0
Comp Mole Frac (Ethane)		0	0	0	0	0	0	0	0
Comp Mole Frac (Propane)		0	0	0	0	0	0	0	0
Energy Streams									
		P1	**E1**	**lps**	**Energy**	**duty**	**Qreb1**	**Qcond1**	**Qcond2**
Heat Flow	*kcal/h*	236,012	2578777	546861	-5E+06	487582	2033375	1802622	403267

7	8	9	10	11	12	13	ng	air2	poc	CW	HW	H2O	MAN
0,976	1	1	0	1,86E-05	1	0	1	1	0,96302	0	0	0	0
39,2639	450,188	89,0788	38,2133	-92,792	450,178	323,828	30	30	488,145	30	83,0876	-38,517	182,257
1,0061	0,82	0,82	0,82	0,82	0,82	0,82	27,0379	1370,15	27,0379	1,014	1,01088	0,82	0,82
3351,4	16,28	3264,25	103,431	87,2466	16,1846	16,1846	50	487	598,966	38639,8	38639,8	32	55,2466
100178	4502,21	94258,3	10421,9	5946,16	4475,78	4475,78	1524,54	14050,1	15574,6	696100	696100	629,491	5316,67
115,806	4,28669	111,192	8,90081	4,63929	4,26152	4,26152	4,2308	16,2419	19,2721	697,505	697,505	0,61485	4,02444
-2E+07	-2E+06	-1E+07	-1E+07	-9E+06	-2E+06	-3E+06	-1E+06	16970,5	-7E+06	-3E+09	-3E+09	-2E+06	-6E+06
0	1,1E-307	1,1E-307	0	0	0	0	0	0	0	0	0	0	0
2,62E-35	1,27E-37	2,55E-35	8,08E-37	6,81E-37	1,26E-37	1,26E-37	0	0	0	0	0	2,50E-37	4,32E-37
5372,78	15,9362	14,0367	5374,68	5358,81	15,8704	15,8704	0	0	0	0	0	64,8034	5294,01
4822,76	7,11E-28	4822,6	0,15603	0,15602	7,12E-28	7,12E-28	0	0	0	0	0	0,15602	7,16E-48
14447,2	5,23E-28	14447,2	0,01493	0,01455	5,18E-28	5,18E-28	0	3272,64	0	0	0	0,01455	1,0E-164
1,00E-40	1,00E-40	1,00E-40	1,00E-40	1,00E-40	1,00E-40	1,00E-40	0	0	0	0	0	1,00E-40	1,00E-40
0,13471	1,00E-30	0,13831	4,51E-06	5,21E-06	1,00E-30	1,00E-30	0	0,21	0	0	0	1,42E-05	5,9E-168
0,01635	0,00998	4,39E-05	0,52993	0,62638	0,01	0,01	0	0	0	0	0	0,02065	0,97723
0,0327	9,93E-31	0,03357	3,43E-05	4,06E-05	1,00E-30	1,00E-30	0	0	0	0	0	0,00011	2,95E-51
0,0327	5,03E-22	0,02359	0,31511	0,37356	4,78E-22	4,78E-22	0	0	0,20439	1	1	0,97919	0,02277
0,78354	1,01E-30	0,80446	1,16E-05	1,34E-05	1,00E-30	1,00E-30	0	0,79	0,64233	0	0	3,64E-05	1,0E-184
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0,99002	2,90E-05	0,15491	3,92E-12	0,99	0,99	0	0	0	0	0	2,77E-16	6,19E-12
0	2,3e-310	1,1e-312	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0,1371	0	0	0	0
0	0	0	0	0	0	0	0,97	0	0,01618	0	0	0	0
0	0	0	0	0	0	0	0,03	0	0	0	0	0	0

Qreb2
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