

BAB IV

NERACA MASSA

Kapasitas Produksi	: 100.000 Ton/Tahun
Operasi Pabrik	: 300 Hari/Tahun
Basis	: 1 jam operasi
Bahan Baku	: Metanol dan Karbon monoksida
Produk	: Asam asetat

4.1. *Mixing point 01 (MP-01)*

Komponen	Input (kg/jam)		Output (kg/jam)
	Aliran 63	Aliran 2	Aliran 3
CH ₃ OH	1599,6571	10051,2444	11650,9015
CH ₃ COOH	0,0416	0,0000	0,0416
CH ₃ I	6207,9591	0,0000	6207,9591
H ₂ O	38,2057	79,4802	117,6859
CH ₃ COI	6371,6025	0,0000	6371,6025
Total	14217,46595	10130,72455	24348,1905
	24348,1905		

4.2. *Mixing point 02 (MP-02)*

Komponen	Input (kg/jam)		Output (kg/jam)
	Aliran 27	Aliran 2	Aliran 5
HI	0,0000	46512,4084	46512,4084
Rh(CO) ₂ I ₂	11656,1992	0,0000	11656,1992
Total	58168,6076		58168,6076

4.3. Reaktor 01 (R-01)

Komponen	Input (kg/jam)			Output (kg/jam)	
	Aliran 3	Aliran 10	Aliran 13	Aliran 67	Aliran 14
CH ₃ OH	11.650,9015	-	-	-	1.631,1262
CO	-	8.759,1453	-	-	1.226,2803
CH ₃ COOH	-	-	-	-	13.888,8896
HI	-	-	-	46.512,4084	36.096,2336
CH ₃ I	-	-	-	-	6.214,1732
H ₂ O	117,6859	-	-	-	1.584,6479
CH ₃ COI	-	-	-	-	6.398,7901
Rh(CO) ₂ I ₂	-	-	11,6562	-	11,6562
Total	11.768,5873	8.759,1453	11,6562	46.512,4084	67.051,7973

4.4. Decanter 01 (DE-01)

Komponen	Input (kg/jam)	Output (kg/jam)	
	Aliran 16	Aliran 17	Aliran 20
CH ₃ OH	1631,1262	1631,1262	0
CO	1226,2803	1226,2803	0
CH ₃ COOH	13888,8896	13888,8896	0
HI	36096,2336	36096,2336	0
CH ₃ I	6214,1732	6214,1732	0
H ₂ O	1584,6479	1584,6479	0
CH ₃ COI	6398,7901	6398,7901	0
Rh(CO) ₂ I ₂	11656,1992	0,0000	11656
Total	78696,3402	78696,3402	

4.5. Flash Drum 01 (FD-01)

Komponen	Input (kg/jam)	Output (kg/jam)	
	Aliran 19	Aliran 23	Aliran 24
CH ₃ OH	1631,1262	0	1631,1262
CO	1226,2803	1226	0,0000
CH ₃ COOH	13888,8896	0	13888,8896
HI	36096,2336	36096	0,0000

CH ₃ I	6214,1732	0	6214,1732
H ₂ O	1584,6479	0	1584,6479
CH ₃ COI	6398,7901	0	6398,7901
Total	67040,1411	37322,5140	29717,6271
			67040,1411

4.6. Kolom Destilasi 01 (KD-01)

Komponen	Input (kg/jam)	Output (kg/jam)	
	Aliran 26	Aliran 27	Aliran 31
CH ₃ OH	1.631,1262	1.593,7418	37,3844
CH ₃ COOH	13.888,8896	13,8889	13.875,0008
CH ₃ I	6.214,1732	6.207,9591	6,2142
H ₂ O	1.584,6479	33,9157	1.550,7322
CH ₃ COI	6.398,7901	6.371,5604	27,2296
Total	29.717,6271	14.221,0660	15.496,5611
		29.717,6271	

4.7. Kolom Destilasi 02 (KD-02)

Komponen	Input (kg/jam)	Output (kg/jam)	
	Aliran 34	Aliran 35	Aliran 40
CH ₃ OH	37,3844	37,3158	0,0686
CH ₃ COOH	13.875,0008	13,8750	13.861,1258
CH ₃ I	6,2142	6,2130	0,0012
H ₂ O	1.550,7322	111,5260	1.439,2062
CH ₃ COI	27,2296	27,2024	0,0272
Total	15.496,5611	196,1322	15.300,4289
		15.496,5611	

4.8. Kolom Destilasi 03 (KD-03)

Komponen	Input (kg/jam)	Output (kg/jam)	
	Aliran 43	Aliran 44	Aliran 48
CH ₃ OH	0,0689	0,0689	0,0000

CH ₃ COOH	13.925,3219	13,9253	13.911,3965
CH ₃ I	0,0012	0,0012	0,0000
H ₂ O	1.445,8717	1.444,4258	1,4459
CH ₃ COI	0,0274	0,0274	0,0000
Total	15.371,2910	1.458,4486	13.912,8424
		15.371,2910	

4.9. Kolom Destilasi 04 (KD-04)

Komponen	Input (kg/jam)	Output (kg/jam)	
	Aliran 57	Aliran 58	Aliran 62
CH ₃ OH	1.631,1262	1.599,6571	31,4691
CH ₃ COOH	41,6250	0,0416	41,5834
CH ₃ I	6.214,1732	6.207,9591	6,2142
H ₂ O	1.583,2087	38,2057	1.545,0030
CH ₃ COI	6.398,7901	6.371,6025	27,1876
Total	15.868,9232	14.217,4660	1.651,4573
		15.868,9232	

4.10. Total Kondensor 01 (TC-01)

Komponen	Input (kg/jam)	Output (kg/jam)	
	Aliran 27	Aliran 28	Aliran 29
CH ₃ OH	3.434,0533	1.593,7418	1.840,3115
CH ₃ COOH	127,2972	13,8889	113,4083
CH ₃ I	9.440,7580	6.207,9591	3.232,7989
H ₂ O	202,2635	33,9157	168,3478
CH ₃ COI	10.825,2588	6.371,5604	4.453,6984
Total	24.029,6309	14.221,0660	9.808,5649
		24.029,6309	

4.11. Total Kondensor 02 (TC-02)

Komponen	Input (kg/jam)	Output (kg/jam)	
	Aliran 35	Aliran 36	Aliran 37
CH ₃ OH	202,4453	37,3158	165,1295
CH ₃ COOH	398,2437	13,8750	384,3687
CH ₃ I	24,2732	6,2130	18,0602
H ₂ O	1.859,7817	111,5260	1.748,2557
CH ₃ COI	127,3935	27,2024	100,1911
Total	2.612,1374	196,1322	2.416,0052
		2.612,1374	

4.12. Total Kondensor 03 (TC-03)

Komponen	Input (kg/jam)	Output (kg/jam)	
	Aliran 44	Aliran 45	Aliran 46
CH ₃ OH	0,0686	0,0686	0,0000
CH ₃ COOH	13,8984	13,8611	0,0373
CH ₃ I	0,0012	0,0012	0,0000
H ₂ O	1.439,9439	1.437,7670	2,1769
CH ₃ COI	0,0272	0,0272	0,0000
Total	1.453,9393	1.451,7251	2,2142
		1.453,9393	

4.13. Total Kondensor 04 (TC-04)

Komponen	Input (kg/jam)	Output (kg/jam)	
	Aliran 58	Aliran 59	Aliran 60
CH ₃ OH	1.600,3573	1.599,6571	0,7002
CH ₃ COOH	0,0417	0,0416	0,0001
CH ₃ I	6.209,4816	6.207,9591	1,5226
H ₂ O	38,2699	38,2057	0,0642
CH ₃ COI	6.373,6269	6.371,6025	2,0245
Total	14.221,7775	14.217,4660	4,3115
		14.221,7775	

4.14. Reboiler 01 (RB-01)

Komponen	Input (kg/jam)	Output (kg/jam)	
	Aliran 31	Aliran 32	Aliran 33
CH ₃ OH	181,4525	144,0681	37,3844
CH ₃ COOH	22.690,1684	8.815,1676	13.875,0008
CH ₃ I	38,7015	32,4873	6,2142
H ₂ O	3.334,9501	1.784,2179	1.550,7322
CH ₃ COI	141,1737	113,9440	27,2296
Total	26386,44604	10889,88493	15496,56111
		26386,44604	

4.15. Reboiler 02 (RB-02)

Komponen	Input (kg/jam)	Output (kg/jam)	
	Aliran 40	Aliran 42	Aliran 41
CH ₃ OH	103,7611	67,2912	36,4700
CH ₃ COOH	17.653,0107	4.117,3788	13.535,6319
CH ₃ I	21,2363	15,1741	6,0622
H ₂ O	2.346,1733	833,3705	1.512,8028
CH ₃ COI	79,7845	53,2209	26,5636
Total	20203,96603	5086,435482	15117,53055
		20203,96603	

4.16. Reboiler 03 (RB-03)

Komponen	Input (kg/jam)	Output (kg/jam)	
	Aliran 48	Aliran 49	Aliran 50
CH ₃ OH	73,1362	46,0613	27,0749
CH ₃ COOH	12.867,0776	2.818,3773	10.048,7003
CH ₃ I	14,8873	10,3868	4,5005
H ₂ O	1.693,5362	570,4485	1.123,0877
CH ₃ COI	56,1506	36,4301	19,7205
Total	14704,78792	3481,703995	11223,08392
		14704,78792	

4.17. Reboiler 04 (RB-04)

Komponen	Input (kg/jam)	Output (kg/jam)	
	Aliran 62	Aliran 63	Aliran 64
CH ₃ OH	86,8927	76,6058	10,2869
CH ₃ COOH	8.505,2350	4.687,3163	3.817,9187
CH ₃ I	18,9845	17,2746	1,7099
H ₂ O	1.375,4354	948,7277	426,7077
CH ₃ COI	68,0805	60,5878	7,4927
Total	10054,628	5790,512156	4264,115849
		10054,628	

4.18. Accumulator (ACC-01)

Komponen	Input (kg/jam)	Output (kg/jam)	
	Aliran 28	Aliran 29	Aliran 30
CH ₃ OH	3.434,0533	1.593,7418	1.840,3115
CH ₃ COOH	127,2972	13,8889	113,4083
CH ₃ I	9.440,7580	6.207,9591	3.232,7989
H ₂ O	202,2635	33,9157	168,3478
CH ₃ COI	10.825,2588	6.371,5604	4.453,6984
Total	24.029,6309	14.221,0660	9.808,5649
		24.029,6309	

4.19. Accumulator (ACC-02)

Komponen	Input (kg/jam)	Output (kg/jam)	
	Aliran 36	Aliran 37	Aliran 38
CH ₃ OH	26,8855	37,3158	-10,4303
CH ₃ COOH	-10,4034	13,8750	-24,2784
CH ₃ I	5,0722	6,2130	-1,1408
H ₂ O	1,0985	111,5260	-110,4275
CH ₃ COI	20,8739	27,2024	-6,3285
Total	43,5267	196,1322	-152,6055
		43,5267	

4.20. Accumulator (ACC-03)

Komponen	Input (kg/jam)	Output (kg/jam)	
	Aliran 45	Aliran 46	Aliran 47
CH ₃ OH	0,0686	0,0686	0,0000
CH ₃ COOH	13,8984	13,8611	0,0373
CH ₃ I	0,0012	0,0012	0,0000
H ₂ O	1.439,9439	1.437,7670	2,1769
CH ₃ COI	0,0272	0,0272	0,0000
Total	1.453,9393	1.451,7251	2,2142
		1.453,9393	

4.21. Accumulator (ACC-04)

Komponen	Input (kg/jam)	Output (kg/jam)	
	Aliran 45	Aliran 46	Aliran 47
CH ₃ OH	1.600,3573	1.599,6571	0,7002
CH ₃ COOH	0,0417	0,0416	0,0001
CH ₃ I	6.209,4816	6.207,9591	1,5226
H ₂ O	38,2699	38,2057	0,0642
CH ₃ COI	6.373,6269	6.371,6025	2,0245
Total	14.221,7775	14.217,4660	4,3115
		14.221,7775	