



BAB III NERACA MASSA

Kapasitas Produksi	=	50.000	ton/tahun
	=	6313,1313	kg/jam
Waktu Operasi	=	1 Hari	= 24 Jam
	=	1 Tahun	= 330 Hari
Sistem Operasi	=	Continue	
Satuan Neraca Massa	=	kg/jam	

1. Tangki Pencampuran Asam (M-130)

Neraca Massa Tangki Pencampuran Asam (M-130) (Sebelum Recycle) :

Aliran Masuk		Aliran Keluar	
Komponen	M (kg/jam)	Komponen	M (kg/jam)
H ₂ SO ₄ dari tangki (M2)		Campuran asam ke Reaktor (M)	
H ₂ SO ₄	42077,1148	H ₂ SO ₄	42077,1148
H ₂ O	858,7166	HNO ₃	14034,4166
HNO ₃ dari tangki (M1)		H ₂ O	10663,0204
HNO ₃	14034,4166		
H ₂ O	6604,4313		
Air proses (M3)			
H ₂ O	3199,87		
Total	66774,5518	Total	66774,5518

Neraca Massa Tangki Pencampuran Asam (M-130) (Setelah Recycle) :

Aliran Masuk		Aliran Keluar	
Komponen	M (kg/jam)	Komponen	M (kg/jam)
H ₂ SO ₄ dari tangki (M2)		Asam campuran (M4)	
H ₂ SO ₄	841,5423	HNO ₃	14034,4166
H ₂ O	858,7166	H ₂ SO ₄	42077,1148
HNO ₃ dari tangki (M1)		H ₂ O	10663,0204
HNO ₃	14034,4166		
H ₂ O	6604,4313		
Air proses (M3)			
H ₂ O	2358,33		
Recycle (M)			
H ₂ SO ₄	41235,5725		
H ₂ O	841,5423		
Total	66774,5518	Total	66774,5518



2. Reaktor (R-210)

Neraca Massa Reaktor (R-210) :

Aliran Masuk		Aliran Keluar	
Komponen	M (kg/jam)	Komponen	M (kg/jam)
Feed C ₆ H ₁₀ O ₅ (M5)		Nitroselulosa (M6)	
C ₆ H ₁₀ O ₅	4034,3794	C ₆ H ₇ O ₂ (ONO ₂)	6286,9079
SiO ₂	12,8688	C ₆ H ₁₀ O ₅	605,1569
H ₂ O	242,3630	SiO ₂	12,8688
Total	4289,6113	HNO ₃	10033,6570
Asam campuran (M4)		H ₂ SO ₄	42077,1148
HNO ₃	14034,4166	H ₂ O	12048,4576
H ₂ SO ₄	42077,1148		
H ₂ O	10663,0204		
Total	66774,5518		
Total	71064,1631	Total	71064,1631

3. Centrifuge (H-310)

Neraca Massa Centrifuge (H-310) :

Aliran Masuk		Aliran Keluar	
Komponen	M (kg/jam)	Komponen	M (kg/jam)
Slurry Nitroselulosa (M6)		Liquid (M7)	
C ₆ H ₇ O ₂ (ONO ₂)	6286,9079	HNO ₃	9832,9838
C ₆ H ₁₀ O ₅	605,1569	H ₂ SO ₄	41235,5725
SiO ₂	12,8688	H ₂ O	11807,4885
HNO ₃	10033,6570	Total	62876,0448
H ₂ SO ₄	42077,1148	Nitroselulosa (M8)	
H ₂ O	12048,4576	C ₆ H ₁₀ O ₇	605,1569
		SiO ₂	12,8688
		HNO ₃	200,6731
		H ₂ SO ₄	841,5423
		H ₂ O	240,9692
		C ₆ H ₇ O ₂ (ONO ₂)	6286,9079
		Total	8188,1183
Total	71064,1631	Total	71064,1631



4. Evaporator (V-320)

Neraca Massa Evaporator (V-320) :

Aliran Masuk		Aliran Keluar	
Komponen	M (kg/jam)	Komponen	M (kg/jam)
Dari Centrifuge (M7)		Asam Sulfat recycle (M9)	
HNO ₃	9832,9838	H ₂ SO ₄	41235,5725
H ₂ SO ₄	41235,5725	H ₂ O	841,5423
H ₂ O	11807,4885	Total	42077,1148
		Vapor Asam Nitrat (M10)	
		HNO ₃	9832,9838
		H ₂ O	10965,9462
		Total	20798,9300
Total	62876,0448	Total	62876,0448

5. Rotary Drum Vacuum Filter (H-330)

Neraca Massa Rotary Drum Vacuum Filter (H-330) :

Aliran Masuk		Aliran Keluar	
Komponen	M (kg/jam)	Komponen	M (kg/jam)
Dari Centrifuge (M9)		Ke Boiling Tub (M12)	
C ₆ H ₁₀ O ₇	605,1569	C ₆ H ₁₀ O ₇	605,1569
SiO ₂	12,8688	SiO ₂	12,8688
HNO ₃	200,6731	HNO ₃	8,9066
H ₂ SO ₄	841,5423	H ₂ O	10,6951
H ₂ O	240,9692	C ₆ H ₇ O ₂ (ONO ₂)	6286,9079
C ₆ H ₇ O ₂ (ONO ₂)	6286,9079	Total	6924,5353
Total	8188,1183	Ke WWTP (M13)	
Air Proses (M11)		HNO ₃	191,7666
H ₂ O	1380,9867	H ₂ SO ₄	841,5423
Total	1380,9867	H ₂ O	1611,2608
		Total	2644,5697
Total	9569,1050	Total	9569,1050



6. Boiling Tub (M-340)

Neraca Massa Boiling Tub (M-340) :

Aliran Masuk		Aliran Keluar	
Komponen	M (kg/jam)	Komponen	M (kg/jam)
Dari RDVF (M12)		Ke Centrifuge (M15)	
C ₆ H ₁₀ O ₇	605,1569	C ₆ H ₁₀ O ₇	605,1569
SiO ₂	12,8688	SiO ₂	12,8688
HNO ₃	8,9066	HNO ₃	8,9066
H ₂ O	10,6951	H ₂ O	12584,5109
C ₆ H ₇ O ₂ (ONO ₂)	6286,9079	C ₆ H ₇ O ₂ (ONO ₂)	6286,9079
Total	6924,5353		
Air Proses (M14)			
H ₂ O	12573,8158		
Total	12573,8158		
Total	19498,3511	Total	19498,3511

7. Centrifuge (H-350)

Neraca Massa Centrifuge (H-350) :

Aliran Masuk		Aliran Keluar	
Komponen	M (kg/jam)	Komponen	M (kg/jam)
Nitroselulosa (M15)		Filtrat (M17)	
C ₆ H ₁₀ O ₇	605,1569	C ₆ H ₁₀ O ₇	593,0538
SiO ₂	12,8688	SiO ₂	12,6115
HNO ₃	8,9066	HNO ₃	8,7284
H ₂ O	12584,5109	H ₂ O	12332,8207
C ₆ H ₇ O ₂ (ONO ₂)	6286,9079	Total	12947,2144
		Slurry Nitroselulosa (M16)	
		C ₆ H ₁₀ O ₇	12,1031
		SiO ₂	0,2574
		HNO ₃	0,1781
		H ₂ O	251,6902
		C ₆ H ₇ O ₂ (ONO ₂)	6286,9079
Total	6551,1368		
Total	19498,3511	Total	19498,3511



8. Tangki Stabilisasi (M-360)

Neraca Massa Tangki Stabilisasi (M-360) :

Aliran Masuk		Aliran Keluar	
Komponen	M (kg/jam)	Komponen	M (kg/jam)
Dari Centrifuge (M16)		Ke RDVF (M19)	
C ₆ H ₁₀ O ₇	12,1031	C ₆ H ₁₀ O ₇	12,1031
SiO ₂	0,2574	SiO ₂	0,2574
HNO ₃	0,1781	HNO ₃	0,1781
H ₂ O	251,6902	H ₂ O	386,4097
C ₆ H ₇ O ₂ (ONO ₂)	6286,9079	C ₆ H ₇ O ₂ (ONO ₂)	6286,9079
Total	6551,1368	C ₂ H ₅ OH	2559,6697
Ethanol (M18)			
C ₂ H ₅ OH	2559,6697		
H ₂ O	134,7195		
Total	2694,3891		
Total	9245,5259	Total	9245,5259

9. Rotary Drum Vacuum Filter (H-370)

Neraca massa Rotary Drum Vacuum Filter (H-370) :

Aliran Masuk		Aliran Keluar	
Komponen	M (kg/jam)	Komponen	M (kg/jam)
Nitroselulosa (M19)		Sisa Filtrat (M21)	
C ₆ H ₁₀ O ₇	12,1031	HNO ₃	0,1717
SiO ₂	0,2574	H ₂ O	372,5532
HNO ₃	0,1781	C ₂ H ₅ OH	2559,6697
H ₂ O	386,4097	Total	2932,3946
C ₆ H ₇ O ₂ (ONO ₂)	6286,9079	Cake Nitroselulosa (M20)	
C ₂ H ₅ OH	2559,6697	C ₆ H ₁₀ O ₇	12,1031
		SiO ₂	0,2574
		C ₆ H ₇ O ₂ (ONO ₂)	6286,9079
		HNO ₃	0,0064
		H ₂ O	13,8565
		Total	6313,1313
Total	9245,5259	Total	9245,5259

**10. Ball Mill (C-380)**

Neraca Massa Ball Mill (C-380) :

Aliran Masuk		Aliran Keluar	
Komponen	M (kg/jam)	Komponen	M (kg/jam)
Dari RDVF (M18)		Ke Silo (M20)	
$C_6H_{10}O_7$	12,1031	$C_6H_{10}O_7$	12,1031
SiO_2	0,2574	SiO_2	0,2574
$C_6H_7O_2(ONO_2)$	6286,9079	$C_6H_7O_2(ONO_2)$	6286,9079
HNO_3	0,0064	HNO_3	0,0064
H_2O	13,8565	H_2O	13,8565
Total	6313,1313	Total	6313,1313