

## BAB IV NERACA PANAS

Kapasitas Produksi <i>Precipitated Silica</i>	= 50.000 ton/tahun
	= 6313.1313 kg/jam
1 tahun	= 330 hari
1 hari	= 24 jam
Kondisi Referensi	= 25°C, 1 atm

### 4.1. *Mixer (M-130)*

**Tabel 4.1** Neraca Panas *Mixer*

Komponen	Q Masuk (kJ/jam)		Q Keluar (kJ/jam)
	Arus 1	Arus 2	Arus 3
H <sub>2</sub> SO <sub>4</sub>	24467.9036	-	74726.8812
H <sub>2</sub> O	1462.4839	1360110.0609	4130794.8033
<b>Subtotal</b>	<b>25930.3875</b>	<b>1360110.0609</b>	<b>4205521.6846</b>
Panas Pelarutan	2819481.2361		-
<b>Total</b>	<b>4205521.6846</b>		<b>4205521.6846</b>

### 4.2. *Heater 01 (E-131)*

**Tabel 4.2** Neraca Panas *Heater 01*

Komponen	Q Masuk (kJ/jam)	Q Keluar (kJ/jam)
	Arus 3	Arus 4
H <sub>2</sub> SO <sub>4</sub>	74726.8812	3771675.6711
H <sub>2</sub> O	4130794.8033	107333.4744
<b>Subtotal</b>	<b>4205521.6846</b>	<b>21.336.644,06</b>

Beban Panas	13754616.4092	-
<b>Total</b>	<b>17960138.09</b>	<b>17960138.09</b>

#### 4.3. Heater 02 (E-122)

**Tabel 4.3** Neraca Panas Heater 02

Komponen	Masuk (kJ/jam)	Keluar (kJ/jam)
	Arus 5	Arus 6
Na <sub>2</sub> O.3,3SiO <sub>2</sub>	3771675.6711	65971506.6187
H <sub>2</sub> O	107333.4744	1390014.4090
<b>Subtotal</b>	<b>3879009.1455</b>	<b>67361521.0277</b>
Beban Panas	63482511.8821	-
<b>Total</b>	<b>67361521.0277</b>	<b>67361521.0277</b>

#### 4.4. Reaktor (R-210)

**Tabel 4.4** Neraca Panas Reaktor

Komponen	Q Masuk (kJ/jam)		Q Keluar (kJ/jam)
	Arus 4	Arus 6	Arus 7
Na <sub>2</sub> O.3,3SiO <sub>2</sub>	-	65971506.6187	395829.0397
H <sub>2</sub> SO <sub>4</sub>	327191.1825	-	31529.3321
SiO <sub>2</sub>	-	-	1761903.1581
Na <sub>2</sub> SO <sub>4</sub>	-	-	465314.3238
H <sub>2</sub> O	17632946.91	1390014.4090	19177038.8573
<b>Subtotal</b>	<b>17960138.0938</b>	<b>67361521.0277</b>	<b>21831614.7111</b>
Panas Reaksi	-		98542884.2822
Beban Pendingin	<b>5806342.7308</b>		
<b>Total</b>	<b>91128001.8523</b>		<b>91128001.8523</b>

#### 4.5. Cooler (E-212)

**Tabel 4.5** Neraca Panas Cooler

Komponen	Q Masuk (kJ/jam)		Q Keluar (kJ/jam)	
	Arus 7		Arus 8	
Na <sub>2</sub> O.3,3SiO <sub>2</sub>	395829.0397		125093.2862	
H <sub>2</sub> SO <sub>4</sub>	31529.3321		11910.2880	
SiO <sub>2</sub>	1761903.1581		689264.4326	
Na <sub>2</sub> SO <sub>4</sub>	465314.3238		179395.1844	
H <sub>2</sub> O	19177038.8573		7386628.3181	
Pendingin	-		13439323.2017	
<b>Subtotal</b>	<b>21831614.7111</b>		<b>21831614.7111</b>	
<b>Total</b>	<b>21831614.7111</b>		<b>21831614.7111</b>	

#### 4.6. Rotary Drum Vacuum Filter (H-320)

**Tabel 4.6** Neraca Panas Rotary Drum Vacuum Filter

Komponen	Q Masuk (kJ/jam)		Q Keluar (kJ/jam)	
	Arus 8	Arus 9	Arus 10	Arus 11
Na <sub>2</sub> O.3,3SiO <sub>2</sub>	15526.0590	-	-	13241.0882
H <sub>2</sub> SO <sub>4</sub>	1478.2555	-	-	1279.6808
SiO <sub>2</sub>	689264.4326	-	598498.4427	-
Na <sub>2</sub> SO <sub>4</sub>	22265.7849	-	141.6077	19168.5378
H <sub>2</sub> O	916797.6170	65472.4877	56254.6203	1022220.6590
<b>Subtotal</b>	<b>1645332.1490</b>	<b>65472.4877</b>	<b>654894.6707</b>	<b>1055909.9658</b>
<b>Total</b>	<b>1710804.6367</b>		<b>1710804.6367</b>	

#### 4.7. Rotary Dryer (B-330)

Tabel 4.7 Neraca Panas Rotary Dryer

Komponen	Q Masuk (kJ/jam)		Q Keluar (kJ/jam)	
	Arus 10	Arus 14	Arus 13	Arus 12
SiO <sub>2</sub>	598,498.4427	-	1,497,927.2279	6,198,776.1587
Na <sub>2</sub> SO <sub>4</sub>	141.6077	-	359.5845	3,486.8410
H <sub>2</sub> O	56,254.6203	-	13,600.8669	16,716.4895
Uap Air	-	-	-	290,898.4358
<b>Subtotal</b>	<b>654,894.6707</b>	<b>-</b>	<b>1,511,887.6793</b>	<b>6,509,877.9249</b>
<b>Udara Panas</b>	<b>-</b>	<b>2,797,709.5105</b>	<b>-</b>	<b>1,235,942.3952</b>
<i>Heat Loss</i>	-	-	-5,805,103.8182	
<b>Total</b>	<b>3,452,604.1813</b>		<b>3,452,604.1813</b>	

#### 4.8. Cooling Conveyor (E-335)

Tabel 4.8 Neraca Panas Cooling Conveyor

Komponen	Q Masuk (kJ/jam)		Q Keluar (kJ/jam)
	Arus 12	Arus 13	Arus 15
SiO <sub>2</sub>	1498035.038	1,046,081.3992	11,706,833.7123
Na <sub>2</sub> SO <sub>4</sub>	359.611	221.9380	2,463.8660
H <sub>2</sub> O	13601.873	9,063.6099	101,157.0407
<b>Subtotal</b>	<b>1,511,996.5217</b>	<b>1,055,366.9471</b>	<b>1.181.0454,62</b>
Panas Diserap	-	-	-8,760,426.8179
<b>Total</b>	<b>2,567,363.4688</b>		<b>2,567,363.4688</b>

#### 4.9. Air Heater (E-331)

Tabel 4.9 Neraca Panas Air Heater

<b>Energi Masuk</b>	<b>Jumlah (kJ/jam)</b>	<b>Energi Keluar</b>	<b>Jumlah (kJ/jam)</b>
Q udara masuk	1,235,942.3952	Q udara keluar	2,797,709.5105
Q steam	1,643,965.3845	Q loss	82198.26923
<b>Total</b>	<b>2,879,907.7798</b>	<b>Total</b>	<b>2,879,907.7798</b>