

## DAFTAR ISI

LEMBAR PENGESAHAN .....	i
PERNYATAAN PENYUSUN .....	ii
PRAKATA .....	iii
DAFTAR <i>CODE AND STANDARD</i> YANG DIGUNAKAN PADA DESAIN ALAT .....	iv
INTISARI.....	xiv
<i>ABSTRACT</i> .....	xvi
BAB I. PENGANTAR .....	18
1.1 Latar Belakang .....	18
1.2 Pemilihan Proses .....	19
1.3 Analisa Pasar.....	23
1.4 Pemilihan Lokasi Pabrik .....	26
BAB II. URAIAN PROSES.....	30
BAB III. SPESIFIKASI BAHAN DAN PRODUK .....	33
3.1 Bahan Baku .....	33
3.2 Bahan Pembantu.....	34
3.3 Produk .....	34
BAB IV. DIAGRAM BLOK DAN PEFD .....	35
BAB V. NERACA MASSA .....	38
5.1 Neraca Massa <i>Overall</i> .....	38
5.2 Neraca Massa Tiap Alat.....	38
BAB VI. NERACA PANAS.....	44

6.1	Neraca Panas Tiap Alat.....	44
BAB VII. SPESIFIKASI ALAT .....		48
7.1	Tangki Penyimpan Asam Nitrat (T-101) .....	48
7.2	Tangki Penyimpan Amonia (T-102) .....	49
7.3	<i>Heat Exchanger</i> (HE-101) .....	50
7.4	<i>Vaporizer</i> (VAP-101).....	51
7.5	<i>Separator Drum</i> (SD-101) .....	52
7.6	<i>Heat Exchanger</i> (HE-102) .....	53
7.7	Reaktor (R-101) .....	54
7.8	<i>Mixing Tank</i> (MT-101) .....	54
7.9	<i>Evaporator</i> (EV-101).....	56
7.10	<i>Prilling Tower</i> (PT-101) .....	56
7.11	<i>Screen</i> (SC-101).....	57
7.12	<i>Crusher</i> (CR-101) .....	57
7.13	<i>Mixing Tank</i> (MT-102) .....	58
7.14	<i>Mixing Tank</i> (MT-103) .....	59
7.15	<i>Coating Drum</i> (CD-101).....	60
7.16	<i>Rotary Dryer</i> (RD-101).....	61
7.17	<i>Rotary Cooler</i> (RC-101) .....	61
7.18	<i>Rotary Cooler</i> (RC-102) .....	62
7.19	<i>Blower</i> (BL-101).....	62
7.20	<i>Blower</i> (BL-102) .....	63
7.21	<i>Cyclone</i> (CY-101).....	64

7.22	<i>Cyclone</i> (CY-102) .....	65
7.23	<i>Screen</i> (SC-102) .....	66
7.24	<i>Coating Drum</i> (CD-102) .....	66
7.25	Tangki Penyimpan Kaolin (T-103) .....	67
7.26	Silo Amonium Nitrat (SL-101) .....	67
7.27	<i>Expansion Valve</i> (EX-101) .....	68
7.28	Pompa (P-101) .....	69
7.29	Pompa (P-102) .....	70
7.30	Pompa (P-103) .....	71
7.31	Pompa (P-104) .....	72
7.32	Pompa (P-105) .....	73
7.33	Pompa (P-106) .....	74
7.34	Pompa (P-107) .....	75
7.35	Pompa (P-108) .....	76
7.36	Pompa (P-109) .....	77
7.37	<i>Bucket Elevator</i> (EL-101) .....	78
7.38	<i>Bucket Elevator</i> (EL-102) .....	78
7.39	<i>Belt Conveyor</i> (BC-101) .....	79
7.40	<i>Belt Conveyor</i> (BC-102) .....	80
7.41	<i>Belt Conveyor</i> (BC-103) .....	80
7.42	<i>Belt Conveyor</i> (BC-104) .....	81
7.43	<i>Belt Conveyor</i> (BC-105) .....	82
7.44	<i>Belt Conveyor</i> (BC-106) .....	82

7.45	<i>Belt Conveyor</i> (BC-107) .....	83
7.46	<i>Belt Conveyor</i> (BC-108) .....	84
7.47	<i>Belt Conveyor</i> (BC-109) .....	84
7.48	<i>Belt Conveyor</i> (BC-110) .....	85
7.49	<i>Belt Conveyor</i> (BC-111) .....	86
BAB VIII. UTILITAS.....		87
8.1	Unit Penyediaan dan Pengolahan Air .....	87
8.2	Unit Penyedia Udara Instrumen.....	106
8.3	Unit Pembangkit <i>Steam</i> .....	110
8.4	Unit Penyedia Listrik .....	131
8.5	Unit Refrigerasi.....	137
8.6	Unit Pengolahan Limbah.....	153
8.7	Unit Cooling Tower .....	159
BAB IX. TATA LETAK PABRIK.....		170
9.1	<i>Layout</i> Pabrik Keseluruhan.....	170
9.2	<i>Layout</i> Alat Proses .....	171
BAB X. ASPEK KESELAMATAN, KESEHATAN KERJA DAN LINGKUNGAN .....		174
10.1	<i>Process Safety Management</i> (PSM).....	179
10.2	<i>Environmental Management System</i> .....	184
10.3	Struktur Organisasi Manajemen SHE .....	188
10.4	Identifikasi <i>Hazard</i> Bahan Kimia .....	191
10.5	Identifikasi <i>Hazard</i> Limbah .....	206

10.6	Identifikasi <i>Hazard</i> Proses .....	212
10.7	<i>Hazard and Operability Study</i> (HAZOP).....	254
BAB XI. ORGANISASI PERUSAHAAN .....		271
11.1	Bentuk Perusahaan .....	271
11.2	Struktur Organisasi.....	272
11.3	Tugas dan Wewenang .....	273
11.4	Pembagian Jam Kerja Karyawan .....	285
11.5	Perhitungan Kebutuhan Jumlah Operator .....	287
11.6	Penggolongan Gaji Karyawan.....	289
11.7	Kesejahteraan Sosial Karyawan.....	290
11.8	Manajemen Produksi.....	292
BAB XII. ANALISIS EKONOMI .....		295
12.1	Modal Tetap .....	298
12.2	Biaya Produksi ( <i>Manufacturing Cost</i> ) .....	315
12.3	Modal Kerja .....	317
12.4	Pengeluaran Umum ( <i>General Expenses</i> ) .....	318
12.5	Analisis Keuntungan .....	319
12.6	Analisis Kelayakan.....	319
BAB XIII. KESIMPULAN .....		332
DAFTAR PUSTAKA .....		333
ALAT YANG DIRANCANG OLEH STEFANUS LINTANG AGUNG MUSTIKAJATI .....		339
REAKTOR GELEMBUNG (R-101) .....		340

<i>HEAT EXCHANGER (HE-101)</i> .....	397
ALAT YANG DIRANCANG OLEH MUHAMMAD RAYHAN ARIANDRA .....	408
PRILLING TOWER (PT-101) .....	409
POMPA (P-101A) .....	433
LAMPIRAN PERHITUNGAN ALAT PROSES .....	443
TANGKI PENYIMPAN ASAM NITRAT (T-101A) .....	444
TANGKI PENYIMPAN ASAM NITRAT (T-101B) .....	452
TANGKI PENYIMPAN ASAM NITRAT (T-101C) .....	453
TANGKI PENYIMPAN AMONIA (T-102) .....	454
TANGKI PENYIMPAN KAOLIN (T-103) .....	468
SILO AMONIUM NITRAT (SL-102) .....	469
<i>BUCKET ELEVATOR (EL-101)</i> .....	474
<i>BUCKET ELEVATOR (EL-102)</i> .....	477
<i>BELT CONVEYOR (BC-101)</i> .....	478
<i>BELT CONVEYOR (BC-102)</i> .....	483
<i>BELT CONVEYOR (BC-103)</i> .....	484
<i>BELT CONVEYOR (BC-104)</i> .....	485
<i>BELT CONVEYOR (BC-105)</i> .....	486
<i>BELT CONVEYOR (BC-106)</i> .....	487
<i>BELT CONVEYOR (BC-107)</i> .....	488
<i>BELT CONVEYOR (BC-108)</i> .....	489
<i>BELT CONVEYOR (BC-109)</i> .....	490
<i>BELT CONVEYOR (BC-110)</i> .....	491

<i>BELT CONVEYOR (BC-111)</i> .....	492
<i>MIXING TANK (MT-101)</i> .....	493
<i>MIXING TANK (MT-102)</i> .....	501
<i>MIXING TANK (MT-103)</i> .....	503
<i>SEPARATOR DRUM (SD-101)</i> .....	505
<i>HEAT EXCHANGER (HE-102)</i> .....	511
<i>VAPORIZER (VAP-101)</i> .....	525
<i>EVAPORATOR (EV-101)</i> .....	539
<i>SCREEN (SC-101)</i> .....	554
<i>SCREEN (SC-102)</i> .....	556
<i>COATING DRUM (CD-101)</i> .....	557
<i>COATING DRUM (CD-102)</i> .....	561
<i>EXPANSION VALVE (EX-101)</i> .....	562
<i>POMPA (P-101B)</i> .....	565
<i>POMPA (P-101C)</i> .....	575
<i>POMPA (P-102)</i> .....	577
<i>POMPA (P-103)</i> .....	579
<i>POMPA (P-104)</i> .....	581
<i>POMPA (P-105)</i> .....	583
<i>POMPA (P-106A)</i> .....	585
<i>POMPA (P-106B)</i> .....	587
<i>POMPA (P-106C)</i> .....	589
<i>POMPA (P-107)</i> .....	591

POMPA (P-108).....	593
POMPA (P-109).....	595
<i>CRUSHER</i> (CR-101).....	597
<i>CYCLONE</i> (CY-101) .....	600
<i>CYCLONE</i> (CY-102) .....	605
<i>BLOWER</i> (BL-101).....	606
<i>BLOWER</i> (BL-102).....	610
<i>ROTARY DRYER</i> (RD-101) .....	611
<i>ROTARY COOLER</i> (RC-101) .....	620
<i>ROTARY COOLER</i> (RC-102) .....	628
LAMPIRAN PERHITUNGAN ALAT UTILITAS.....	629
<i>SCREEN</i> (S-01).....	630
BAK EKUALISASI (KE-01) .....	631
BAK SEDIMENTASI (BS-01).....	632
TANGKI PENYIMPAN ALUMUNIUM SULFAT (TP-01) .....	635
TANGKI PENYIMPAN SODA ABU (TP-02) .....	638
TANGKI PENCAMPUR (TP-03) .....	641
<i>CLARIFIER</i> (CLA-01).....	646
<i>SAND FILTER</i> (SF-01) .....	649
<i>ACTIVATED CARBON FILTER</i> (CF-01) .....	651
BAK PENAMPUNG AIR (TP-04).....	653
TANGKI PENYIMPAN KAPORIT (TP-05) .....	654
TANGKI KLOORINASI (CLO-01).....	656



BAK PENAMPUNG AIR II (TP-06) .....	658
TANGKI PENYIMPAN AIR DINGIN (TP-07) .....	659
TANGKI PENYIMPAN AIR PANAS (TP-08) .....	660
<i>CATION EXCHANGER</i> (CE-01) .....	661
<i>ANION EXCHANGER</i> (AE-01) .....	665
TANGKI PENYIMPAN AIR DEMIN (TP-09) .....	669
TANGKI PENYIMPAN <i>HYDRAZINE</i> (TP-10) .....	670
DEAERATOR (DU-01) .....	671
<i>BOILER</i> (BU-01) .....	675
TANGKI PENYIMPAN KONDENSAT (TP-11) .....	681
<i>HEAT EXCHANGER</i> (HE-01) .....	682
POMPA UTILITAS .....	692