

Tabel E.2 Harga Peralatan Proses

Kode Alat	Alat Proses	Spek untuk pembelian			Harga Satuan, \$				F <sub>BM</sub>	C <sub>BM</sub>	Jumlah	Harga Total, \$
					Ulrich, 1982	Timmerhaus, 1990	matche.com 2007	2012				
TP-101	Tangki Penyimpanan Formaldehid	V	347.372,1	gallon			78.130	82.502,352			4	247.507,05724
VP-101	Vaporizer 01	A	11,67188	m2	2.300			3.292,257	3,5	11.522,898	1	11.522,898
SD-101	Separator Drum 01	D H	0,76200 2,71237	m m	2.500			3.578,540	4	14.314,159	1	14.314,159
HT-101	Heater 01	A	94,54222	m2	4.500			6.441,37143	3,5	22.544,80000	1	22.544,80000
R-201	Reaktor 01	V	670,1779	m2			446.690	471.687,90220				
PC-301	Partial Condensor	A	153,4852	m2	10.000		10.000	14.314,15873				
SD-302	Separator Drum 02	D H	0,85109 2,95493	m m								
K-101	Kompresor 01	power	88	hp			214.000	225.975,981	3,5	50.099,55556	1	50.099,55556
DC-301	Kolom Distilasi 01	N D H	15 1,23750 8,00000	Tray m m	900			1.288,27429	1,2	23.188,93714	1	23.188,93714
CD-301	Condensor 01	A	56,02502	m2	9.500			13.598,451	3,5	47.594,578	1	47.594,578
ACC-301	Accumulator 01	V D L	0,37570 0,42780 1,71120	m m m	2.500			3.578,53968	3,5	12.524,88889	1	12.524,88889
DC-302	Kolom Distilasi 02	N D H	23 1,22 11	m m m	300			429,42476		11.852,12343	1	11.852,12343

Kode Alat	Alat Proses	Spek untuk pembelian			Harga Satuan, \$				F <sub>BM</sub>	C <sub>BM</sub>	Jumlah	Harga Total, \$
					Ulrich, 1982	Timmerhaus, 1990	matche.com 2007	2012				
CD-302	Condensor 02	A	31,51407	m2	15.000			21.471,23810	3,5	75.149,33333	1	75.149,33333
ACC-302	Accumulator 02	V D L	0,37570 0,42780 1,71120	m3 m m	600			858,84952	3,5	3.005,97333	1	3.005,97333
RB-302	Reboiler 02	A	11,82782	m	600			858,84952	1,2	3.005,97333	1	3.005,97333
CO-303	Cooler 03	A	2,77378	m2	1.000			1.431,41587	3,5	5.009,95556	1	5.009,95556
CO-304	Cooler 04	A	10,22330	m2	1.000			1.431,41587	3,5	5.009,95556	1	5.009,95556
TP-401	Tangki penyimpanan butynediol	V	320,01860	m3	18.000			25.765,48571	1,9	48.954,42286	1	146.863,26857
P-101	Pompa 01	power	0,373	kW	2.500			3.578,540	4,5	16.103,429	1	16.103,429
P-301	Pompa 02	power	0,373	kW	2.500			3.578,540	3,8	13.598,451	1	13.598,451
P-302	Pompa 03	power	0,373	kW	2.500			3.578,540	3,8	13.598,451	1	13.598,451
P-303	Pompa 04	power	0,373	kW	2.500			3.578,540	3,8	13.598,451	1	13.598,451
P-304	Pompa 05	power	0,373	kW	2.500			3.578,540	3,8	13.598,451	1	13.598,451
P-305	Pompa 06	power	0,373	kW	2.500			3.578,540	3,8	13.598,451	1	13.598,451
<b>Total Harga Alat proses</b>											<b>17.281.501,827,3488</b>	

Total Harga Peralatan Proses = Rp. 17.281.501.827,3488

LAMPIRAN E

Prarancangan Pabrik Butynediol Dari Acetylene dan Formaldehyde Kapasitas 40.000 Ton/Tahun

Tabel E.3 Harga Peralatan Utilitas

Kode Alat	Alat Utilitas	Spek untuk pembelian			Harga Satuan, \$				F <sub>BM</sub>	C <sub>BM</sub>	Jmh	Harga Total, \$
					Ulrich, 1982	Timmerhaus, 1990	matche.com 2007	2012				
BS-401	Bak Sedimentasi	Q	0,024	m3/s	4.800			6.870,796			1	6.870,796
BP-401	Bak Penggumpal	Q	0,024	m3/s	4.800			6.870,796			1	6.870,796
TU-401	Tangki larutan NaOH	V	207,375	gallon		5.000		6.332,809			1	6.332,809
TU-402	Tangki larutan Kaporit 01	V	7.085,357	gallon		25.000		31.664,045			1	31.664,045
TU-403	Tangki larutan Alum	V	354,255	gallon		6.500		8.232,652			1	8.232,652
CL-401	Clarifier	D	8,572	m	55.000			78.727,873	3,0	236.183,619	1	236.183,619
SF-401	Sand Filter	Q	0,024	m3/5	4.800			6.870,796			2	13.741,592
TP-401	Tangki Penyimpanan Air Filter	V	686,068	m3	21.000			30.059,733	1,9	57.113,493	1	57.113,493
TP-402	Tangki Air domestik	V	46,532	m3	5.000			7.157,079	1,9	13.598,451	1	13.598,451
HB-401	Hot Basin	V	1.008,486	yd3		14.142		17.911,717			1	17.911,717
CT-401	Cooling Tower	Q	0,216	m3/s	300.000			429.424,762			1	429.424,762
TU-404	Tangki Kaporit	V	42.560,751	gallon		50.000		63.328,090			1	63.328,090
TU-405	Tangki Asam Sulfat	V	73.436,910	gallon		69.361		87.849,533			1	87.849,533
TU-406	Tangki larutan Natrium Phosphat	V	3.166,894	gallon		10.518		13.322,046			1	13.322,046

**LAMPIRAN E**

Prarancangan Pabrik Butynediol Dari Acetylene dan Formaldehide Kapasitas 40.000 Ton/Tahun

Kode Alat	Alat Utilitas	Spek untuk pembelian			Harga Satuan, \$				F <sub>BM</sub>	C <sub>BM</sub>	Jmh	Harga Total, \$
					Ulrich, 1982	Timmerhaus, 1990	mathe.com 2007	2012				
TU-407	Tangki Dispersant	V	8.056,982	gallon		18.419		23.328,899			1	23.328,899
CB-401	Cold Basin	V	1.138,468	yd3		15.209		19.263,180			1	19.263,180
CE-401	Cation Exchanger	Q	0,001	m3/s	75.000			107.356,190			2	214.712,381
TU-408	Tangki Asam Sulfat	V	264,700	gallon		2.373		3.004,993			1	3.004,993
AE-401	Anion Exchanger	Q	0,001	m3/s	75.000			107.356,190			2	214.712,381
DA-401	Deaerator	D L	3,048 1,829	m m	22.000			31.491,149	4,5	141.710,171	1	141.710,171
TU-409	Tangki hidrazin	V	204,997	gallon		2.035		2.577,745			1	2.577,745
TP-403	Tangki Air Demin	V	35,282	m3	3.539			5.066,368	1,9	38.322,518	1	9.626,099
Boiler (SG-401)	Boiler	Q	11,058	kg/ja m	300.000			429.424,762	1,8	772.964,571	1	772.964,571
COS-401	Steam compressor	Power	431,000	hp			143.500	151.530,623			1	151.530,623
CN-401	Cyclone	Q	0,056	m3/s	3.500			5.009,956	3,0	15.029,867	2	30.059,733
AD-401	Air Dryer	D H	1,752 5,257	m m	15.000			21.471,238	4,5	96.620,571	1	96.620,571
BL-401	Blower 01	power	3,354	kW	4.000			5.725,663	2,5	14.314,159	1	14.314,159
BL-402	Blower 02	power	3,354	kW	4.000			5.725,663	2,5	14.314,159	1	14.314,159
PU-401	Pompa 01	power	1,491	kW	3.500			5.009,956	3,8	19.037,831	2	38.075,662
PU-402	Pompa 02	power	1,118	kW	3.000			4.294,248	3,8	16.318,141	2	32.636,282
PU-403	Pompa 03	power	0,373	kW	2.500			3.578,540	3,8	13.598,451	2	27.196,902
PU-404	Pompa 04	power	0,373	kW	2.500			3.578,540	3,8	13.598,451	2	27.196,902
PU-405	Pompa 05	power	0,373	kW	2.500			3.578,540	3,8	13.598,451	2	27.196,902

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**LAMPIRAN E**

Prarancangan Pabrik Butynediol Dari Acetylene dan Formaldehide Kapasitas 40.000 Ton/Tahun

Kode Alat	Alat utilitas	Spek untuk pembelian			Harga Satuan, \$				F <sub>BM</sub>	C <sub>BM</sub>	Jmh	Harga Total, \$
					Ulrich, 1982	Timmerhaus, 1990	mathe.com 2007	2012				
PU-406	Pompa 06	power	1,118	kW	3.000			4.294,248	3,8	16.318,141	2	32.636,282
PU-407	Pompa 07	power	1,118	kW	3.000			4.294,248	3,8	16.318,141	2	32.636,282
PU-408	Pompa 08	power	1,491	kW	3.500			5.009,956	3,8	19.037,831	2	38.075,662
PU-409	Pompa 09	power	1,491	kW	3.500			5.009,956	3,8	19.037,831	2	38.075,662
PU-410	Pompa 10	power	14,908	kW	8.000			11.451,327	3,8	43.515,043	2	87.030,085
PU-411	Pompa 11	power	11,926	kW	7.000			10.019,911	3,8	38.075,662	2	76.151,324
PU-412	Pompa 12	power	0,373	kW	2.500			3.578,540	3,8	13.598,451	2	27.196,902
PU-413	Pompa 13	power	0,373	kW	2.500			3.578,540	3,8	13.598,451	2	27.196,902
PU-414	Pompa 14	power	0,373	kW	2.500			3.578,540	3,8	13.598,451	2	27.196,902
PU-415	Pompa 15	power	0,373	kW	2.500			3.578,540	3,8	13.598,451	2	27.196,902
PU-416	Pompa 16	power	12,672	kW	7.200			10.306,194	3,8	39.163,538	2	78.327,077
PU-417	Pompa 17	power	0,373	kW	2.500			3.578,540	3,8	13.598,451	2	27.196,902
PU-418	Pompa 18	power	0,373	kW	2.500			3.578,540	3,8	13.598,451	2	27.196,902
PU-419	Pompa 19	power	0,373	kW	2.500			3.578,540	3,8	13.598,451	2	27.196,902
PU-420	Pompa 20	power	0,373	kW	2.500			3.578,540	3,8	13.598,451	2	27.196,902
PU-421	Pompa 21	power	0,373	kW	2.500			3.578,540	3,8	13.598,451	2	27.196,902
GE-101	Generator	power	1.923,017	kW	80.000			114.513,270	2,8	320.637,156	2	641.274,311
TU-410	Tangki Bahan bakar	V	46.239,874	gallon		52.550		66.558,083			3	199.674,250
	Waste water treatmen plant	Q	0,002	m <sup>3</sup> /s	250.000			357.853,968			1	357.853,968
<b>3.770.152,905</b>												

Total Harga Pembelian Alat Utilitas = Rp. 33.837.122.323,4528

#### LAMPIRAN E

Prarancangan Pabrik Butynediol Dari Acetylene dan Formaldehyde Kapasitas 40.000 Ton/Tahun