

BAB 6

KESIMPULAN DAN SARAN

6.1. Kesimpulan

Dari analisis data dan pembahasan pada Bab 5, dapat disimpulkan bahwa didapatkan hasil perencanaan proyek *LPG Storage Tank* Kapasitas 50 Ton dengan spesifikasi sebagai berikut:

1. Waktu normal

a. Durasi = 46,23 hari

b. Biaya total = Rp787.167.947,00

1) Biaya tenaga kerja = Rp43.158.010,42

2) Biaya material = Rp722.398.356,43

3) Biaya telepon = Rp465.760,00

4) Biaya listrik = Rp21.145.820,14

c. Jumlah tenaga kerja total = 45 orang

2. Waktu dipercepat dengan penambahan jam lembur (*overtime*)

a. Durasi = 39,85 hari

b. Biaya total = Rp787.424.035,00

1) Biaya tenaga kerja = Rp43.414.260,42

2) Biaya material = Rp722.398.356,43

3) Biaya telepon = Rp465.760,00

4) Biaya listrik = Rp21.145.820,14

c. Jumlah tenaga kerja total = 45 orang

Perencanaan proyek dengan waktu dipercepat ini membawa konsekuensi pertambahan biaya tenaga kerja sebesar Rp256.250,00 dan dapat mengurangi durasi proyek sebanyak 6,38 hari. Pertambahan biaya ini sangat kecil dan tidak sebanding dengan penalti

keterlambatan yang sebesar 1% dari harga penawaran atau sebesar Rp10.510.000,00 per harinya.

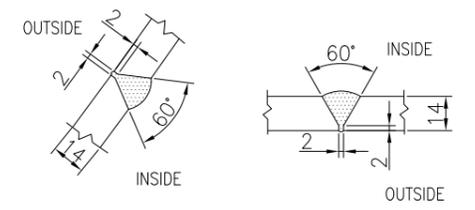
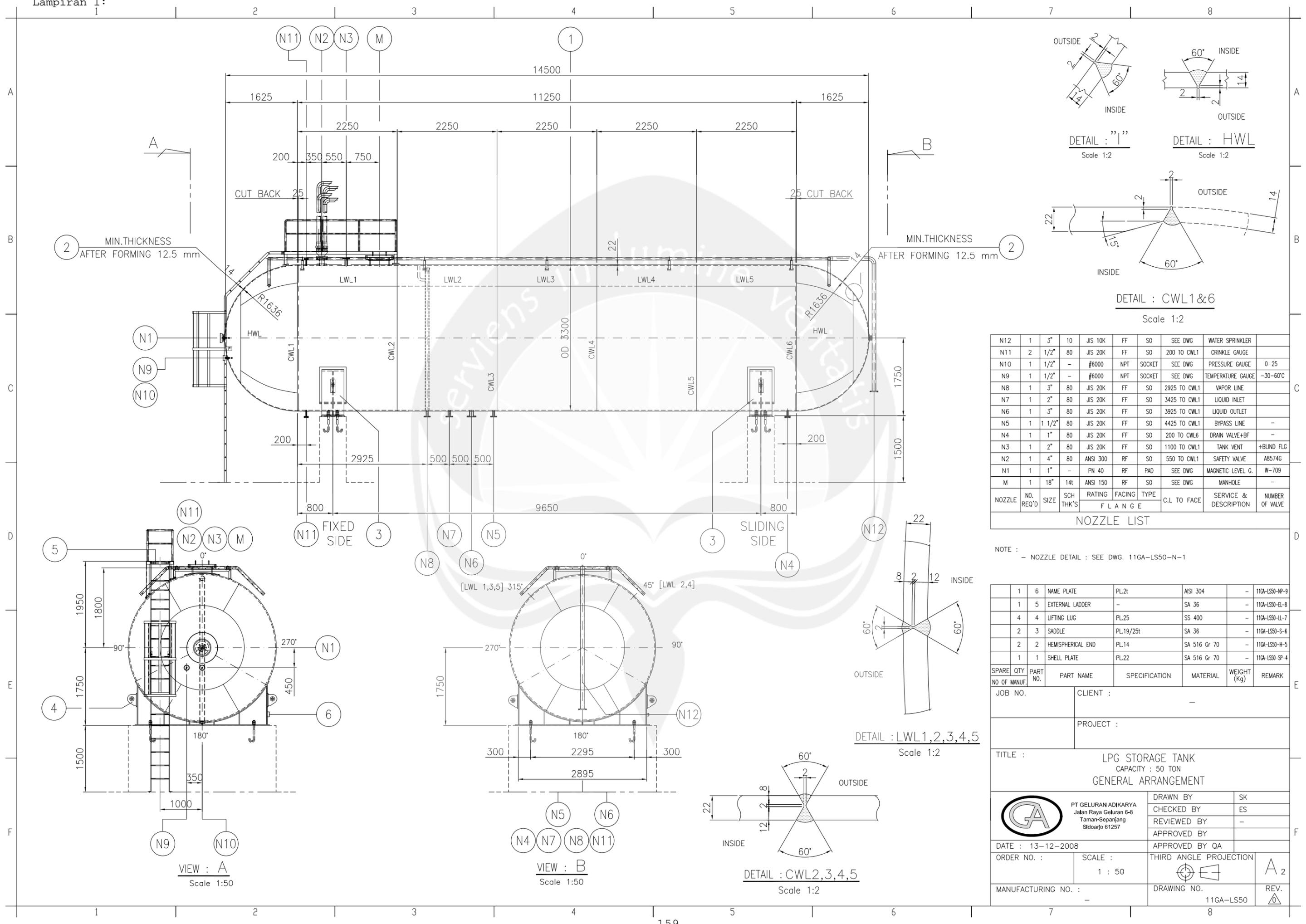
6.2. Saran

Setelah dilakukan analisis data dan pembahasan, berikut ini beberapa saran yang dapat menjadi pertimbangan dan masukan bagi penelitian selanjutnya, antara lain yaitu:

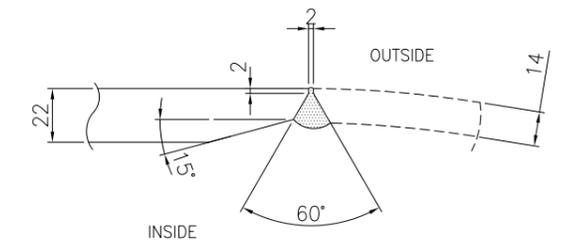
1. Dalam penelitian ini *project crashing* dilakukan dengan cara penambahan jam lembur (*overtime*) karena penggunaan tenaga kerja baru terbatas. Untuk itu, diharapkan untuk penelitian selanjutnya dapat dilakukan untuk kasus yang mana penggunaan tenaga kerja baru masih dapat didapatkan dengan mudah.
2. Penelitian berikutnya dapat memanfaatkan *baseline plan* dari *file* perencanaan proyek yang telah dibuat ini untuk mendapatkan hasil evaluasi pelaksanaannya.

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DETAIL : "1" Scale 1:2
DETAIL : HWL Scale 1:2



DETAIL : CWL1&6 Scale 1:2

NO.	QTY	SIZE	SCH THK'S	RATING	FACING	TYPE	SEE DWG	DESCRIPTION	REMARK
N12	1	3"	10	JIS 10K	FF	SO	SEE DWG	WATER SPRINKLER	
N11	2	1/2"	80	JIS 20K	FF	SO	200 TO CWL1	CRINKLE GAUGE	
N10	1	1/2"	-	#6000	NPT	SOCKET	SEE DWG	PRESSURE GAUGE	0-25
N9	1	1/2"	-	#6000	NPT	SOCKET	SEE DWG	TEMPERATURE GAUGE	-30-60°C
N8	1	3"	80	JIS 20K	FF	SO	2925 TO CWL1	VAPOR LINE	
N7	1	2"	80	JIS 20K	FF	SO	3425 TO CWL1	LIQUID INLET	
N6	1	3"	80	JIS 20K	FF	SO	3925 TO CWL1	LIQUID OUTLET	
N5	1	1 1/2"	80	JIS 20K	FF	SO	4425 TO CWL1	BYPASS LINE	-
N4	1	1"	80	JIS 20K	FF	SO	200 TO CWL6	DRAIN VALVE+BF	-
N3	1	2"	80	JIS 20K	FF	SO	1100 TO CWL1	TANK VENT	+BLIND FLG
N2	1	4"	80	ANSI 300	RF	SO	550 TO CWL1	SAFETY VALVE	A8574G
N1	1	1"	-	PN 40	RF	PAD	SEE DWG	MAGNETIC LEVEL G.	W-709
M	1	18"	14t	ANSI 150	RF	SO	SEE DWG	MANHOLE	-

NOZZLE LIST

NOTE :
- NOZZLE DETAIL : SEE DWG. 11GA-LS50-N-1

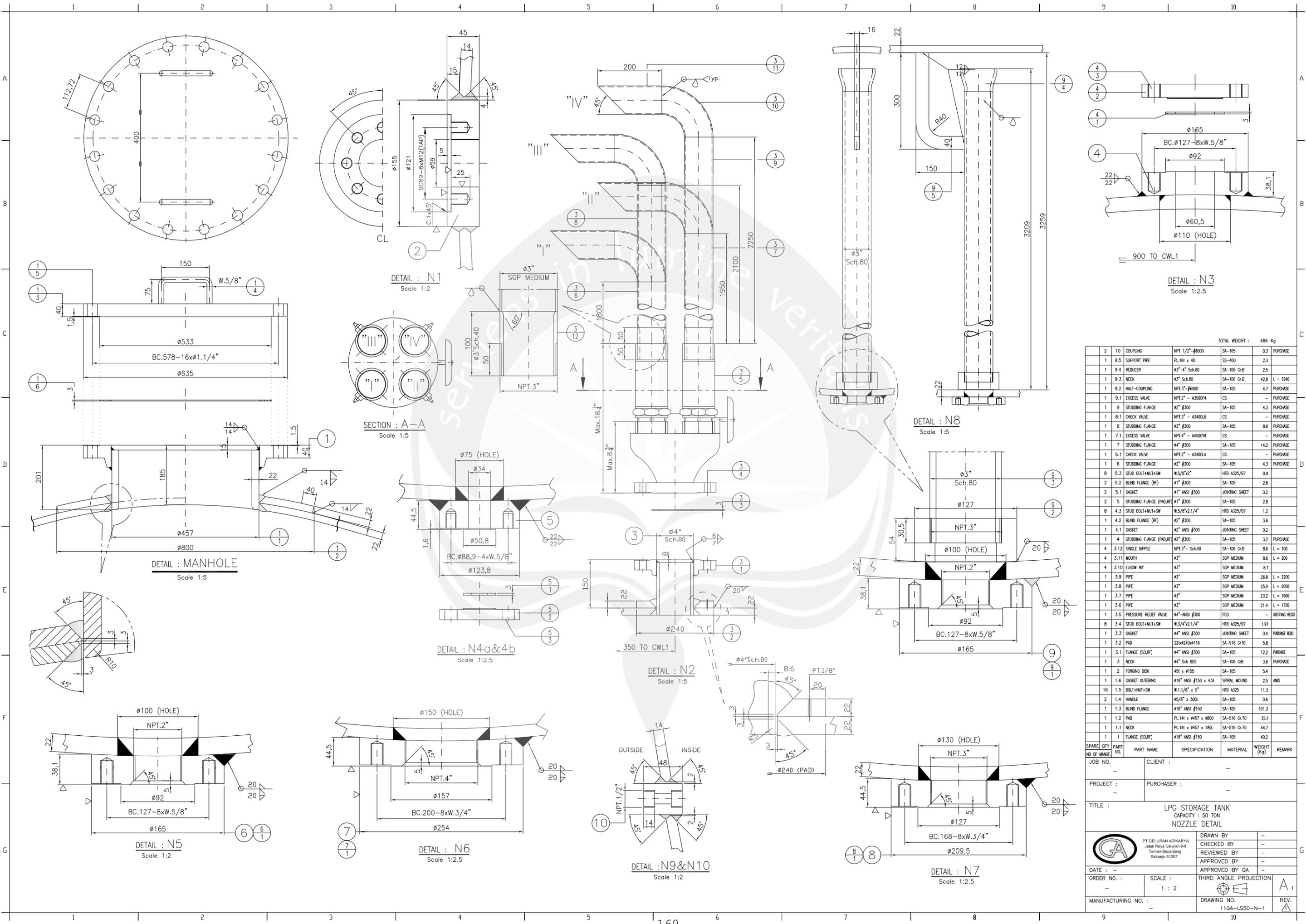
NO.	QTY	NAME	SPECIFICATION	MATERIAL	WEIGHT (kg)	REMARK
1	6	NAME PLATE	PL.2t	AISI 304	-	11GA-LS50-NP-9
1	5	EXTERNAL LADDER	-	SA 36	-	11GA-LS50-EL-8
4	4	LIFTING LUG	PL.25	SS 400	-	11GA-LS50-LL-7
2	3	SADDLE	PL.19/25t	SA 36	-	11GA-LS50-S-6
2	2	HEMISPHERICAL END	PL.14	SA 516 Gr 70	-	11GA-LS50-H-5
1	1	SHELL PLATE	PL.22	SA 516 Gr 70	-	11GA-LS50-SP-4

JOB NO. : CLIENT :
PROJECT :
TITLE : LPG STORAGE TANK
CAPACITY : 50 TON
GENERAL ARRANGEMENT

PT GELURAN ADIKARYA
Jalan Raya Geluran 6-8
Taman-Sepanjang
Sidoarjo 61257

DATE : 13-12-2008
ORDER NO. : SCALE : 1 : 50
MANUFACTURING NO. : -

DRAWN BY : SK
CHECKED BY : ES
REVIEWED BY : -
APPROVED BY :
APPROVED BY QA :
THIRD ANGLE PROJECTION
DRAWING NO. : 11GA-LS50
REV. : A2



TOTAL WEIGHT : 486 Kg

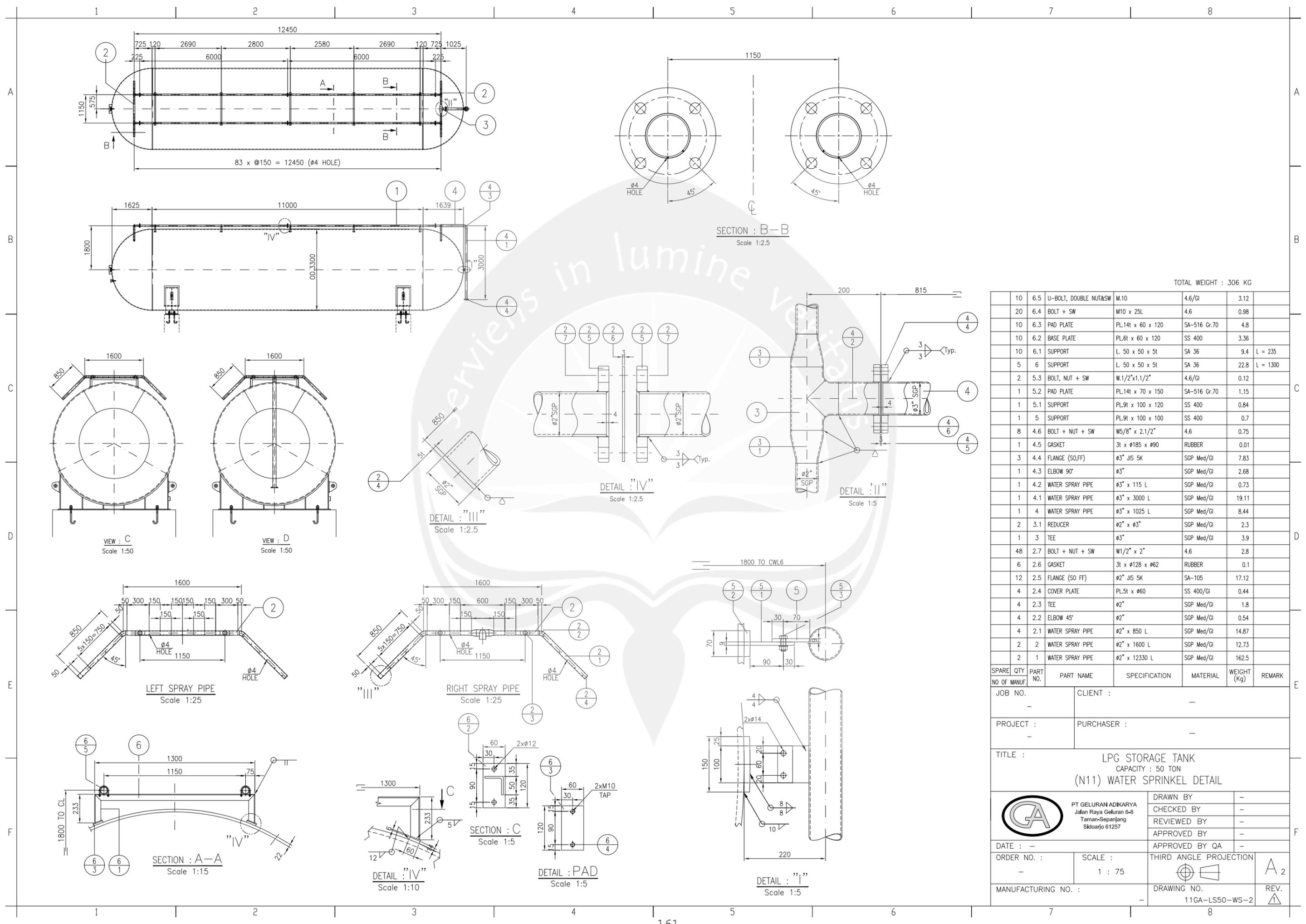
NO	QTY	PART NO.	PART NAME	SPECIFICATION	MATERIAL	WEIGHT (Kg)	REMARK
2	10		COUPLING	NPT 1/2" - #6000	SA-105	0.3	PURCHASE
1	9.5		SUPPORT PIPE	PL 161 x 40	SS-400	2.3	
1	9.4		REDUCER	43"-4" Sch.80	SA-106 Gr.B	2.5	
1	9.3		NECK	43" Sch.80	SA-106 Gr.B	42.8	L = 3240
1	9.2		HALF-COUPLING	NPT.3" - #6000	SA-105	4.7	PURCHASE
1	9.1		EXCESS VALVE	NPT.2" - A3500P4	CS	-	PURCHASE
1	9		STUDING FLANGE	42" #300	SA-105	4.3	PURCHASE
1	8.1		CHECK VALVE	NPT.3" - A3400L6	CS	-	PURCHASE
1	8		STUDING FLANGE	43" #300	SA-105	8.8	PURCHASE
1	7.1		EXCESS VALVE	NPT.4" - A4500Y8	CS	-	PURCHASE
1	7		STUDING FLANGE	44" #300	SA-105	14.2	PURCHASE
1	6.1		CHECK VALVE	NPT.2" - A3400L4	CS	-	PURCHASE
1	6		STUDING FLANGE	42" #300	SA-105	4.3	PURCHASE
8	5.3		STUD BOLT+NUT+SW	W.5/8"x2"	HB A325/B7	0.9	
2	5.2		BLIND FLANGE (RF)	41" #300	SA-105	2.8	
2	5.1		GASKET	41" ANSI #300	JOINTING SHEET	0.2	
2	5		STUDING FLANGE (PAD,RF)	41" #300	SA-105	2.8	
8	4.3		STUD BOLT+NUT+SW	W.5/8"x1/4"	HB A325/B7	1.2	
1	4.2		BLIND FLANGE (RF)	42" #300	SA-105	3.6	
1	4.1		GASKET	42" ANSI #300	JOINTING SHEET	0.2	
1	4		STUDING FLANGE (PAD,RF)	42" #300	SA-105	3.2	PURCHASE
4	3.12		SINGLE NIPPLE	NPT.3" - Sch.40	SA-106 Gr.B	8.6	L = 100
4	3.11		MOUTH	43"	SGP MEDIUM	8.6	L = 200
4	3.10		ELBOW 90°	43"	SGP MEDIUM	8.1	
1	3.9		PIPE	43"	SGP MEDIUM	26.8	L = 2200
1	3.8		PIPE	43"	SGP MEDIUM	25.0	L = 2050
1	3.7		PIPE	43"	SGP MEDIUM	23.2	L = 1900
1	3.6		PIPE	43"	SGP MEDIUM	21.4	L = 1750
1	3.5		PRESSURE RELIEF VALVE	44" - ANSI #300	FCD	-	ABSTAG RECO
8	3.4		STUD BOLT+NUT+SW	W.3/4"x2 1/4"	HB A325/B7	1.91	
1	3.3		GASKET	44" ANSI #300	JOINTING SHEET	0.4	PURCHASE RECO
1	3.2		PAD	22x240x116	SA-516 Gr.70	5.8	
1	3.1		FLANGE (SO,RF)	44" ANSI #300	SA-105	12.2	PURCHASE
1	3		NECK	44" Sch 80S	SA-106 Gr.B	3.6	PURCHASE
1	2		FORGING DISK	45L x #155	SA-105	5.4	
1	1.6		GASKET OUTERING	#18" ANSI #150 x 4.5L	SPRAL WOUND	2.5	ANS
16	1.5		BOLT+NUT+SW	W.1 1/8" x 5"	HB A325	11.3	
2	1.4		HANDLE	45/8" x 300L	SA-105	0.6	
1	1.3		BLIND FLANGE	#18" ANSI #150	SA-105	101.3	
1	1.2		PAD	PL.141 x 4457 x #800	SA-516 Gr.70	35.1	
1	1.1		NECK	PL.141 x 4457 x 180L	SA-516 Gr.70	44.7	
1	1		FLANGE (SO,RF)	#18" ANSI #150	SA-105	40.2	

JOB NO. : _____ CLIENT : _____

PROJECT : _____ PURCHASER : _____

TITLE : **LPG STORAGE TANK
CAPACITY : 50 TON
NOZZLE DETAIL**

DATE : -	SCALE : 1 : 2	THIRD ANGLE PROJECTION	APPROVED BY QA
ORDER NO. : -	MANUFACTURING NO. : -	DRAWING NO. : 11GA-LS50-N-1	REV. : A1



TOTAL WEIGHT : 306 KG

QTY	PART NO.	PART NAME	SPECIFICATION	MATERIAL	WEIGHT (kg)	REMARK
10	6.5	U-BOLT, DOUBLE NUT&SW	M.10	4.6/GI	3.12	
20	6.4	BOLT + SW	M10 x 25L	4.6	0.98	
10	6.3	PAD PLATE	PL.14t x 60 x 120	SA-516 Gr.70	4.8	
10	6.2	BASE PLATE	PL.6t x 60 x 120	SS 400	3.36	
10	6.1	SUPPORT	L. 50 x 50 x 5t	SA 36	9.4	L = 235
5	6	SUPPORT	L. 50 x 50 x 5t	SA 36	22.8	L = 1300
2	5.3	BOLT, NUT + SW	W.1/2"x1.1/2"	4.6/GI	0.12	
1	5.2	PAD PLATE	PL.14t x 70 x 150	SA-516 Gr.70	1.15	
1	5.1	SUPPORT	PL.9t x 100 x 120	SS 400	0.84	
1	5	SUPPORT	PL.9t x 100 x 100	SS 400	0.7	
8	4.6	BOLT + NUT + SW	W5/8" x 2.1/2"	4.6	0.75	
1	4.5	GASKET	3t x Ø185 x Ø90	RUBBER	0.01	
3	4.4	FLANGE (SO,FF)	Ø3" JIS 5K	SGP Med/GI	7.83	
1	4.3	ELBOW 90°	Ø3"	SGP Med/GI	2.68	
1	4.2	WATER SPRAY PIPE	Ø3" x 115 L	SGP Med/GI	0.73	
1	4.1	WATER SPRAY PIPE	Ø3" x 3000 L	SGP Med/GI	19.11	
1	4	WATER SPRAY PIPE	Ø3" x 1025 L	SGP Med/GI	8.44	
2	3.1	REDUCER	Ø2" x Ø3"	SGP Med/GI	2.3	
1	3	TEE	Ø3"	SGP Med/GI	3.9	
48	2.7	BOLT + NUT + SW	W1/2" x 2"	4.6	2.8	
6	2.6	GASKET	3t x Ø128 x Ø62	RUBBER	0.1	
12	2.5	FLANGE (SO FF)	Ø2" JIS 5K	SA-105	17.12	
4	2.4	COVER PLATE	PL.5t x Ø60	SS 400/GI	0.44	
4	2.3	TEE	Ø2"	SGP Med/GI	1.8	
4	2.2	ELBOW 45°	Ø2"	SGP Med/GI	0.54	
4	2.1	WATER SPRAY PIPE	Ø2" x 850 L	SGP Med/GI	14.87	
2	2	WATER SPRAY PIPE	Ø2" x 1600 L	SGP Med/GI	12.73	
2	1	WATER SPRAY PIPE	Ø2" x 12330 L	SGP Med/GI	162.5	

SPARE NO OF MANUF.	QTY	PART NO.	PART NAME	SPECIFICATION	MATERIAL	WEIGHT (kg)	REMARK
JOB NO. :			CLIENT :				
PROJECT :			PURCHASER :				
TITLE :			LPG STORAGE TANK CAPACITY : 50 TON (N11) WATER SPRINKEL DETAIL				
DATE : -			DRAWN BY : -				
ORDER NO. :			CHECKED BY : -				
SCALE : 1 : 75			REVIEWED BY : -				
MANUFACTURING NO. :			APPROVED BY : -				
			APPROVED BY QA : -				
			THIRD ANGLE PROJECTION				
			DRAWING NO. 11GA-LS50-WS-2				
			REV. A2				

1

2

3

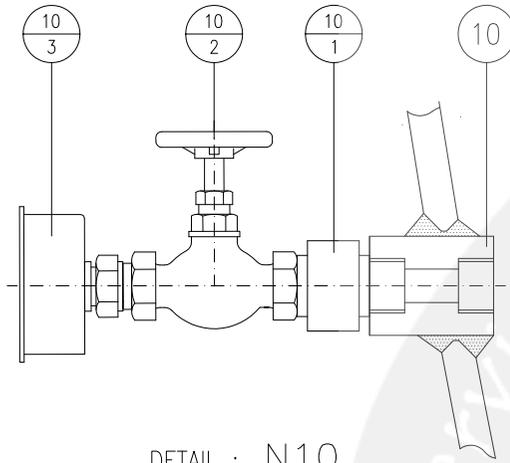
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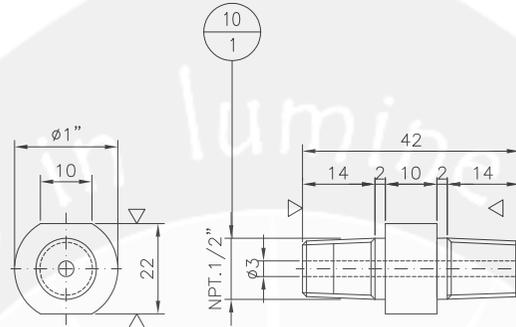
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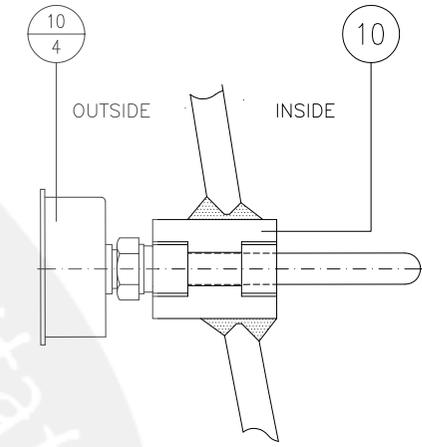
A



DETAIL : N10
Scale 1:2



DETAIL : N9
Scale 1:2



B

B

C

C

TOTAL WEIGHT : 0.7 Kg

SPARE	QTY	PART	PART NAME	SPECIFICATION	MATERIAL	WEIGHT	REMARK
NO OF MANUF.		NO.				(Kg)	
1	1.4		THERMOWELL	NPT.1/2" (-30' - 50')	AIISI 304	0.1	PURCHASE
1	1.3		PRESSURE GAUGE	NPT.1/2" (0' - 25') Ø4"	-	0.1	PURCHASE
1	1.2		GLOBE VALVE (SCREW)	NPT.1/2"	IRON	0.1	KITZ 20SY
1	1.1		DOUBLE NIPPLE	NPT.1/2"	ST-60	0.1	SEE DETAIL
1	1		COUPLING	NPT.1/2" #6000	SA-105	0.3	01-0001-A

JOB NO. CLIENT :

PROJECT : PURCHASER :

TITLE : LPG STORAGE TANK
CAPACITY : 50 TON
EQUIPMENT OF NOZZLE N9 & N10 FOR PG & TI



PT GELURAN ADIKARYA
Jalan Raya Geluran 6-8
Taman-Sepanjang
Sidoarjo 61257

DRAWN BY	-
CHECKED BY	-
REVIEWED BY	-
APPROVED BY	
APPROVED BY QA	

DATE : -

ORDER NO. :	SCALE :	THIRD ANGLE PROJECTION	A 3
	1 : 2		

MANUFACTURING NO. :	DRAWING NO.	REV.
-	11GA-LS50-EN-3	

D

D

1

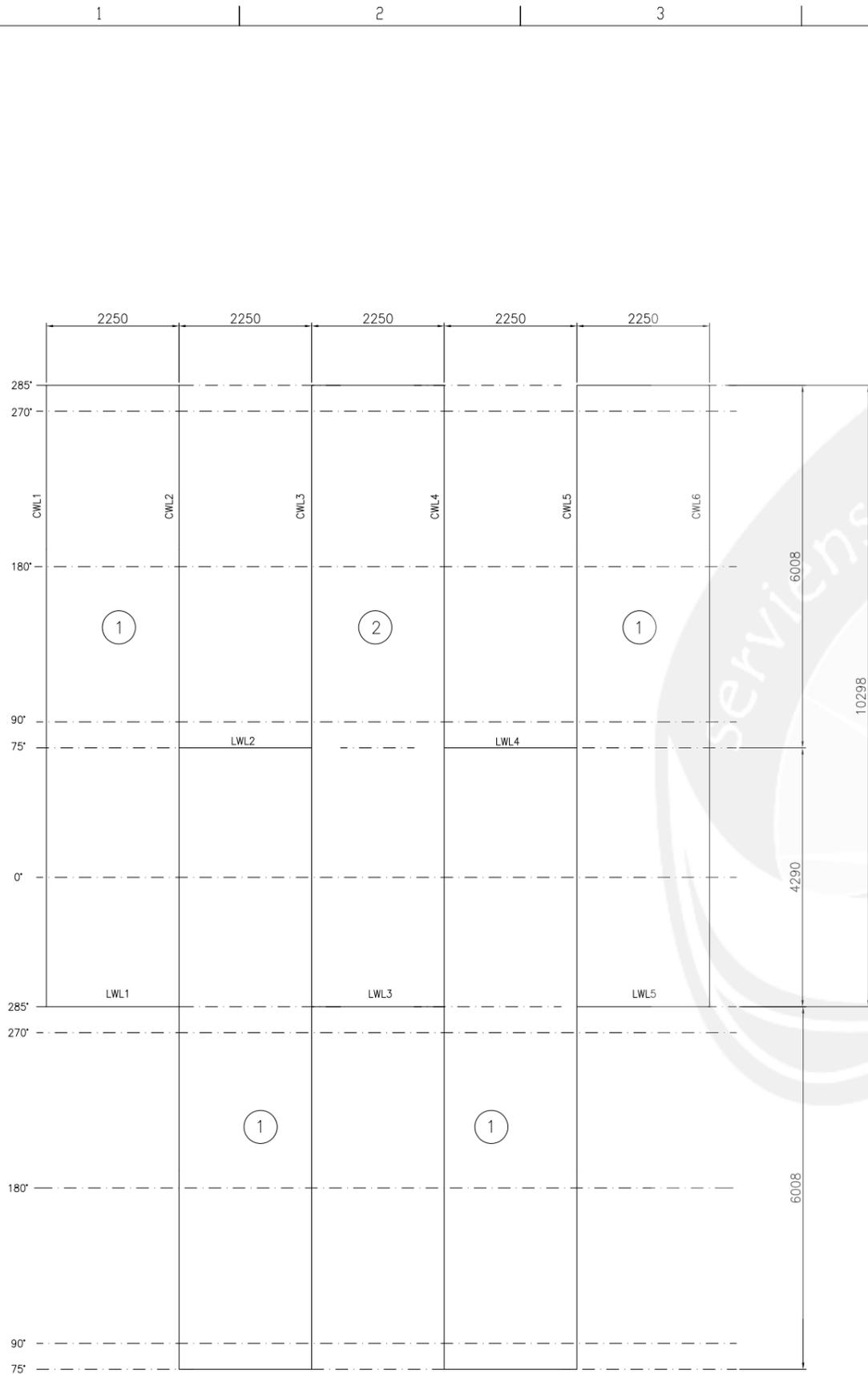
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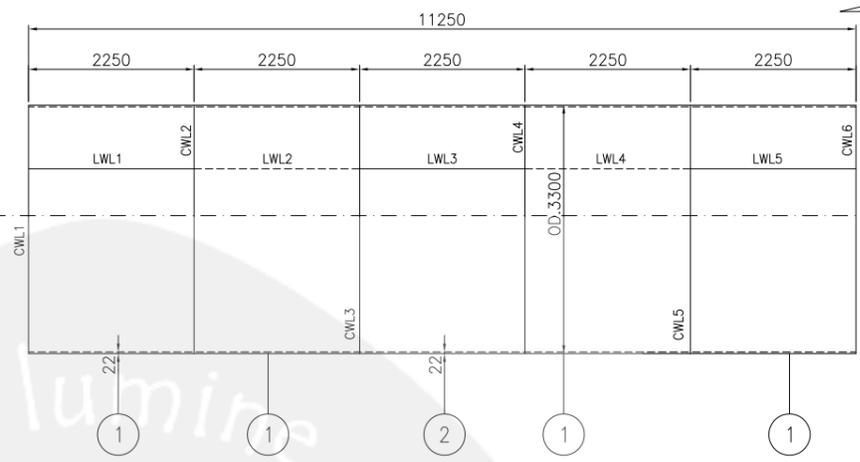
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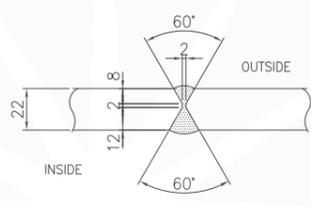
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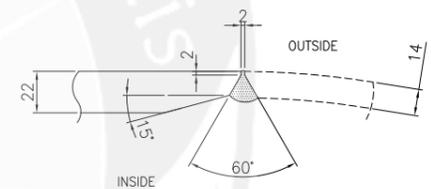
DEVELOPMENT OF SHELL PLATE
Scale 1:50
VIEW FROM OUTSIDE



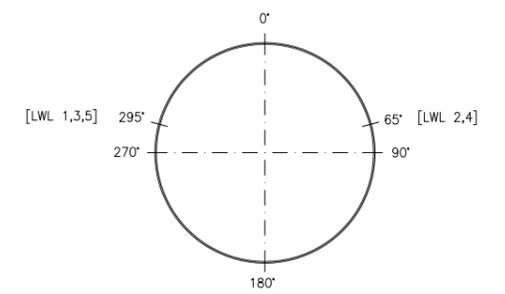
SIDE VIEW
Scale 1:50



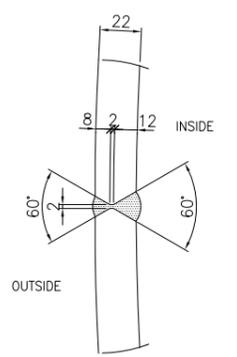
DETAIL : CWL2,3,4,5
Scale 1:2



DETAIL : CWL1&6
Scale 1:2



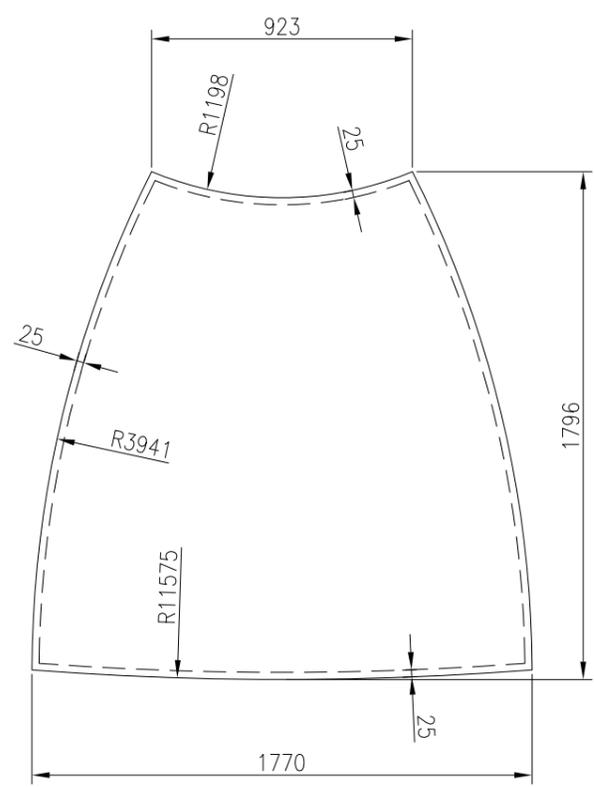
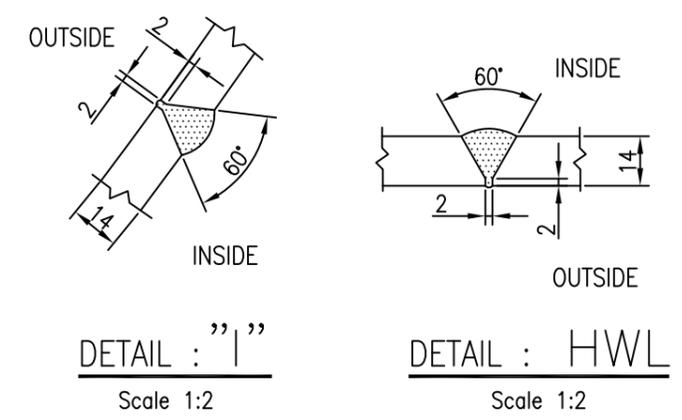
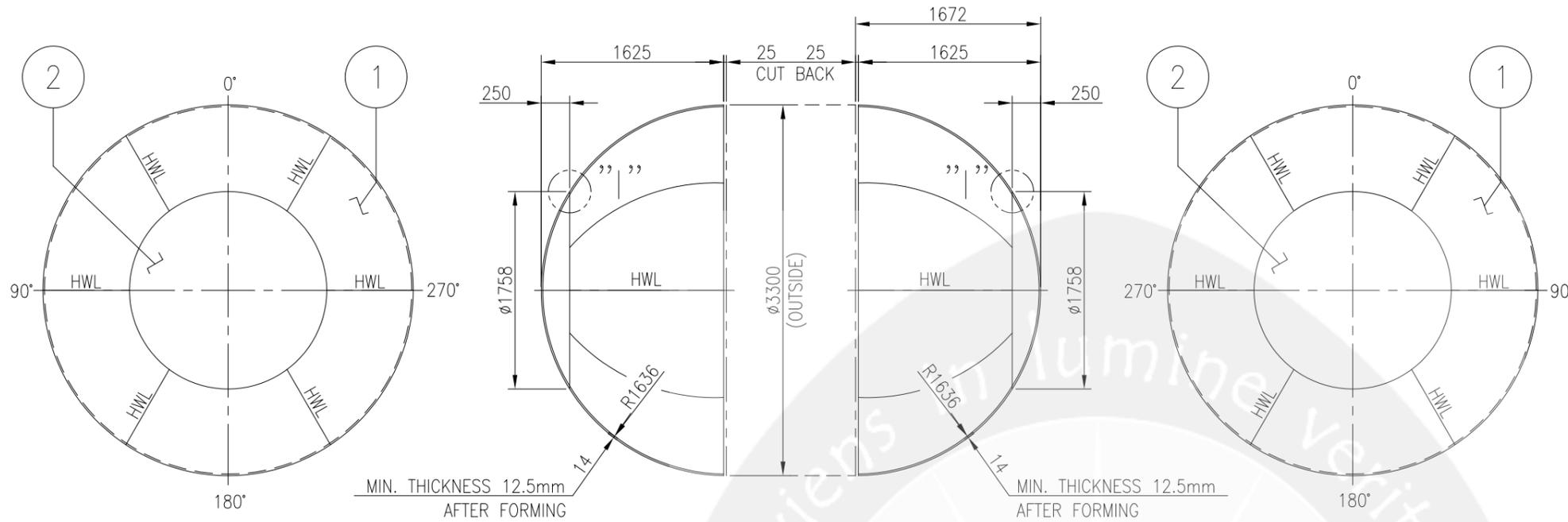
VIEW A
Scale 1:50



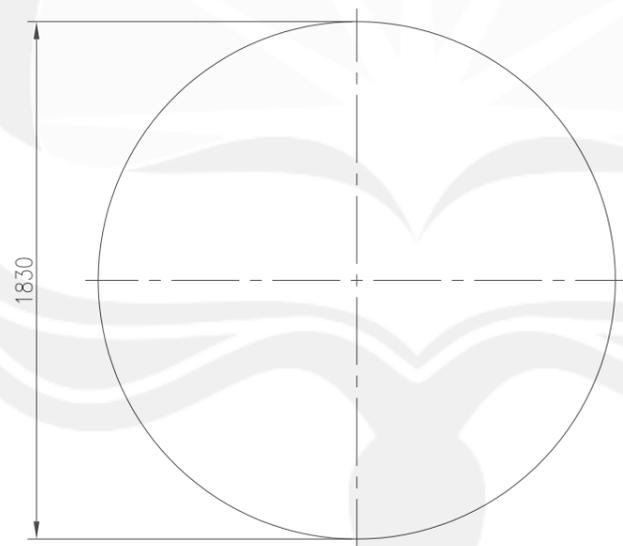
DETAIL : LWL1,2,3,4,5
Scale 1:2

TOTAL WEIGHT : 21009.8 Kg

SPARE NO	QTY	PART NO.	PART NAME	SPECIFICATION	MATERIAL	WEIGHT (kg)	REMARK
	5	1	SHELL PLATE	22t x 2250 x 10298	A 516 Gr 70	21009.8	
JOB NO.			CLIENT :				
PROJECT :			PURCHASER :				
TITLE :			LPG STORAGE TANK CAPACITY : 50 TON SHELL PLATE DETAIL				
 PT GELURAN ADIKARYA Jalan Raya Geluran 6-8 Taman-Sepanjang Sidoarjo 61257			DRAWN BY		-		
			CHECKED BY		-		
			REVIEWED BY		-		
			APPROVED BY		-		
DATE : -			APPROVED BY QA				
ORDER NO. :		SCALE :		THIRD ANGLE PROJECTION		 A2	
		1 : 2					
MANUFACTURING NO. :			DRAWING NO.		REV.		
			11GA-LS50-SP-4				



DEVELOPMENT OF ITEM 1
Scale 1:25

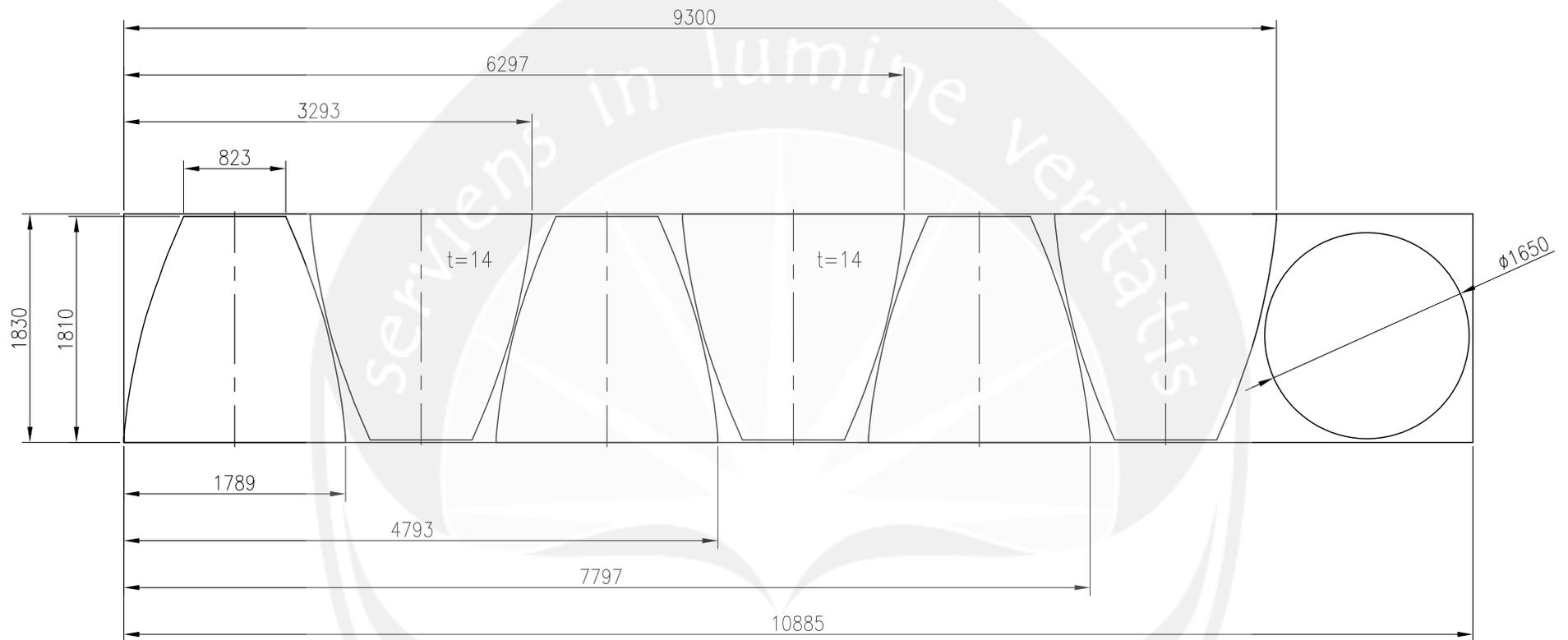


DEVELOPMENT OF ITEM 2
Scale 1:25

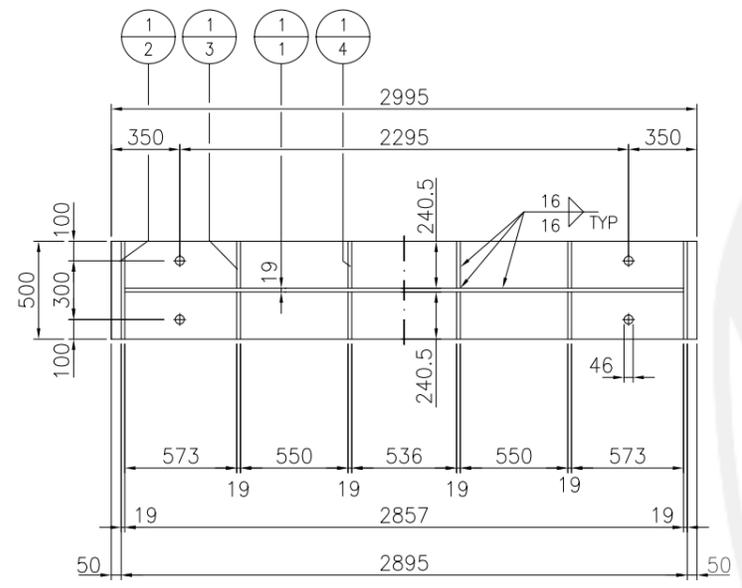
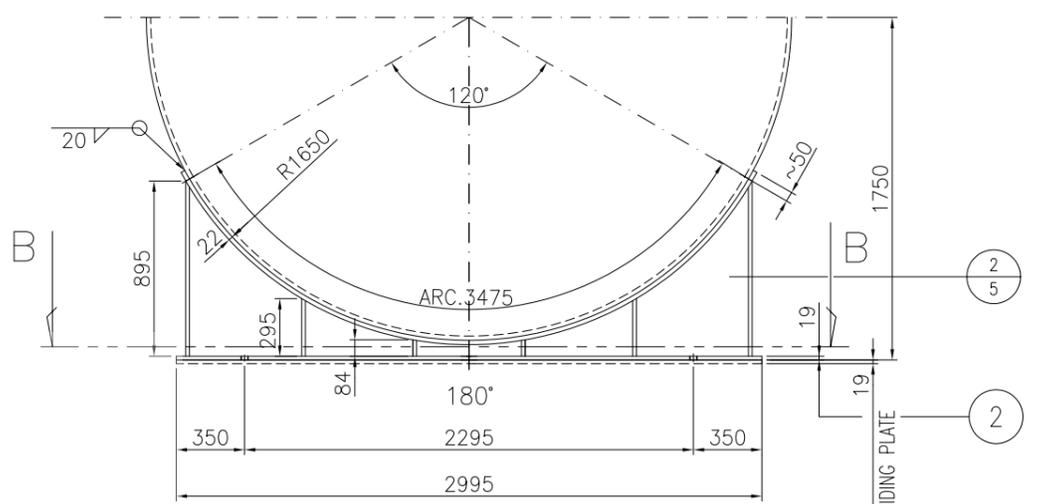
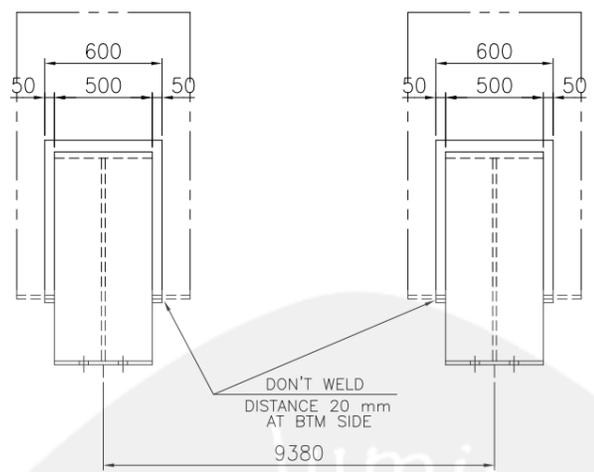
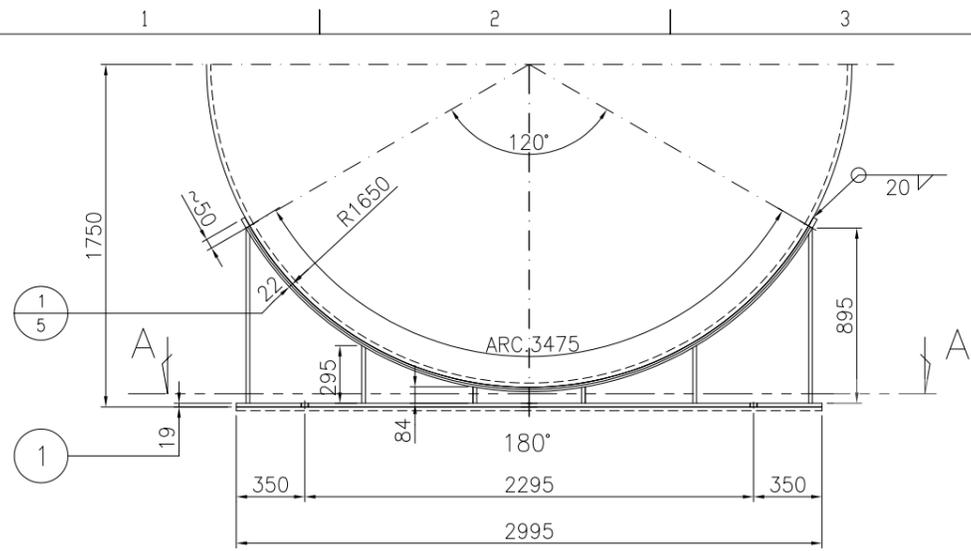
TOTAL WEIGHT : 4770.48 Kg

SPARE NO	QTY	PART NO.	PART NAME	SPECIFICATION	MATERIAL	WEIGHT (Kg)	REMARK
	2	2	HEMISPHERICAL PLATE	14t x Ø1830	SA-516 Gr.70	578.12	
	12	1	HEMISPHERICAL PLATE	14t x 1770 x 1796	SA-516 Gr.70	4192.36	

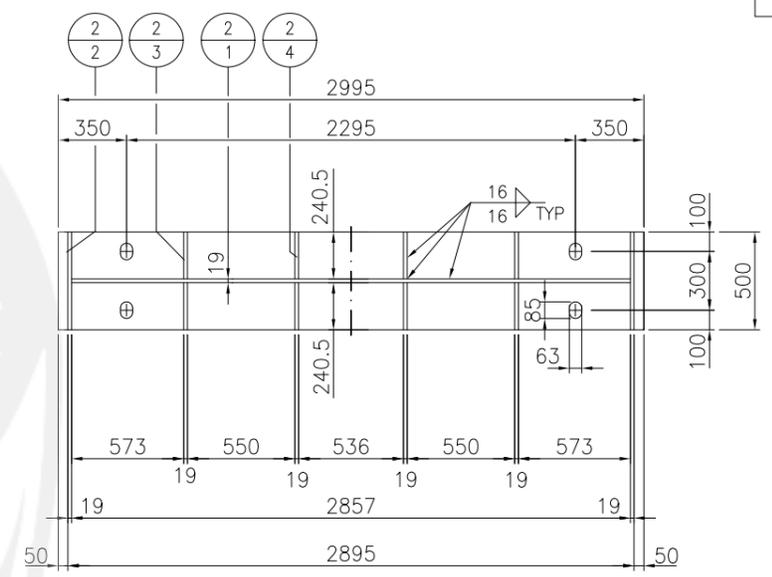
JOB NO.	CLIENT :		
PROJECT :	PURCHASER :		
TITLE : LPG STORAGE TANK CAPACITY : 50 TON HEMISPHERICAL (L&R) DETAIL			
<p>PT GELURAN ADIKARYA Jalan Raya Geluran 6-8 Taman-Sepanjang Sidoarjo 61257</p>	DRAWN BY	-	
	CHECKED BY	-	
	REVIEWED BY	-	
	APPROVED BY	-	
DATE : -	APPROVED BY QA		
ORDER NO. :	SCALE : 1 : 50	THIRD ANGLE PROJECTION	
MANUFACTURING NO. :	DRAWING NO. 11GA-LS50-H-5	REV.	



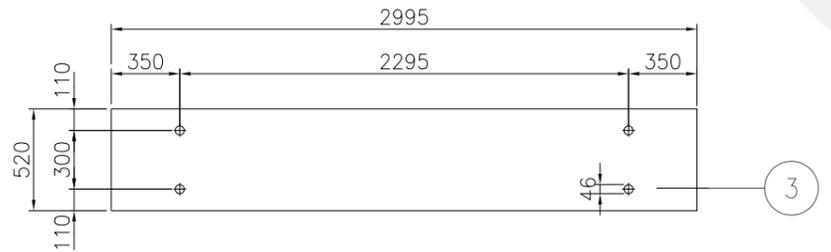
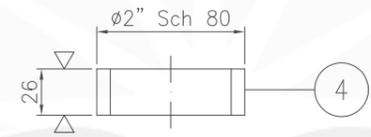
LPG STORAGE TANK 50 TON
 MAL SEGMENT HEMISPHERE OD 3300
 Scale 1 : 50



SECTION : A-A
FOR FIXED SIDE
Scale 1:25



SECTION : B-B
FOR SLIDING SIDE
Scale 1:25



DETAIL : SLIDING PLATE
Scale 1:25

TOTAL WEIGHT : 2580.2 Kg

QTY	PART NO.	PART NAME	SPECIFICATION	MATERIAL	WEIGHT (kg)	REMARK
4	4	SPACER	ø2" Sch 80	SA 53	0.78	L = 26
1	3	SLIDING PLATE	19t x 520 x 2995	SS 400	237	
1	2.5	PAD PLATE (SLIDING SIDE)	22t x 600 x 3575	SA 516 Gr.70	377.5	
4	2.4	SUPPORT PLATE (SLIDING SIDE)	19t x 240.5 x 84	SS 400	12	
4	2.3	SUPPORT PLATE (SLIDING SIDE)	19t x 240.5 x 295	SS 400	42.1	
2	2.2	SIDE PLATE (SLIDING SIDE)	19t x 500 x 895	SS 400	132.6	
1	2.1	SADDLE PLATE (SLIDING SIDE)	19t x 895 x 2857	SS 400	379	
1	2	BASE PLATE (SLIDING SIDE)	19t x 500 x 2995	SS 400	228	

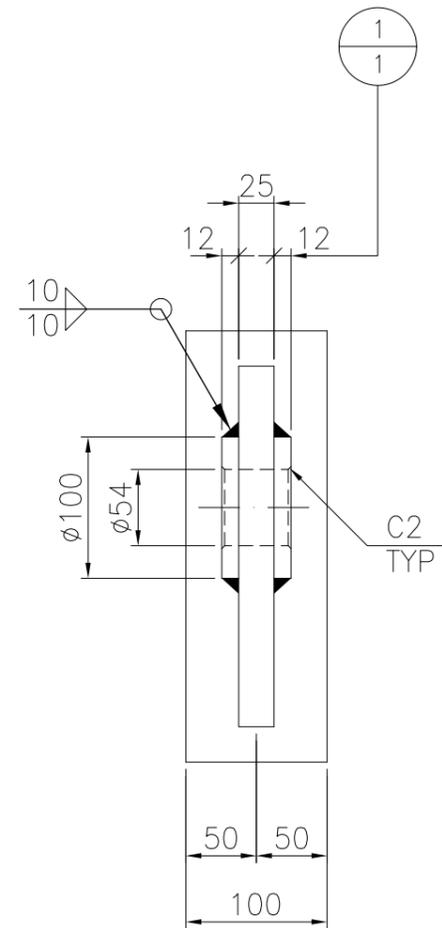
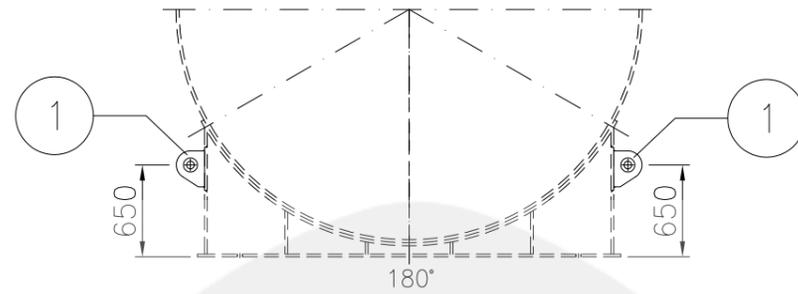
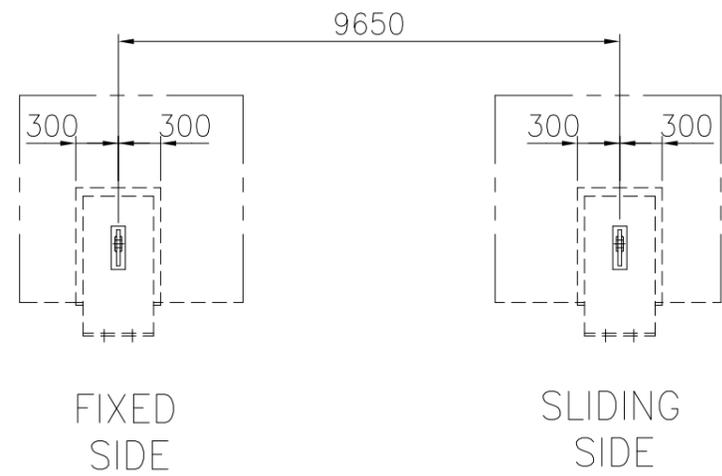
QTY	PART NO.	PART NAME	SPECIFICATION	MATERIAL	WEIGHT (kg)	REMARK
1	1.5	PAD PLATE (FIXED SIDE)	22t x 600 x 3575	SA 516 Gr.70	377.5	
4	1.4	SUPPORT PLATE (FIXED SIDE)	19t x 240.5 x 84	SS 400	12	
4	1.3	SUPPORT PLATE (FIXED SIDE)	19t x 240.5 x 295	SS 400	42.1	
2	1.2	SIDE PLATE (FIXED SIDE)	19t x 500 x 895	SS 400	132.6	
1	1.1	SADDLE PLATE (FIXED SIDE)	19t x 895 x 2857	SS 400	379	
1	1	BASE PLATE (FIXED SIDE)	19t x 500 x 2995	SS 400	228	

JOB NO. : _____ CLIENT : _____

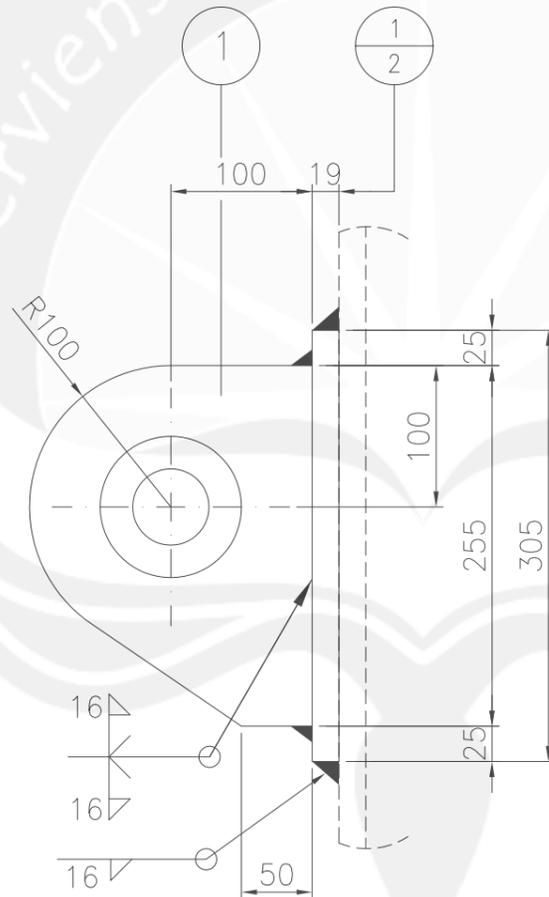
PROJECT : _____ PURCHASER : _____

TITLE : LPG STORAGE TANK
CAPACITY : 50 TON
SADDLE DETAIL

	DRAWN BY	-
	CHECKED BY	-
	REVIEWED BY	-
	APPROVED BY	-
DATE : -	APPROVED BY QA	-
ORDER NO. : _____	SCALE : 1 : 25	THIRD ANGLE PROJECTION
MANUFACTURING NO. : _____	DRAWING NO. 11GA-LS50-S-6	REV. A2



Scale 1:5



TOTAL WEIGHT : 53.4 Kg

SPARE NO	QTY	PART NO.	PART NAME	SPECIFICATION	MATERIAL	WEIGHT (Kg)	REMARK
4	1.2	PAD	19t x 100 x 305	SS 400	18.6		
8	1.1	RING PLATE	12t x ϕ 54 x ϕ 100	SS 400	4.3		
4	1	LIFTING LUGS	25t x 200 x 255	SS 400	30.5		

JOB NO. : _____ CLIENT : _____

PROJECT : _____ PURCHASER : _____

TITLE : LPG STORAGE TANK
CAPACITY : 50 TON
LIFTING LUG DETAIL


PT GELURAN ADIKARYA
 Jalan Raya Geluran 6-8
 Taman-Sepanjang
 Sidoarjo 61257

DRAWN BY : -
 CHECKED BY : -
 REVIEWED BY : -
 APPROVED BY : _____

DATE : -

ORDER NO. : _____ SCALE : 1 : 50

THIRD ANGLE PROJECTION

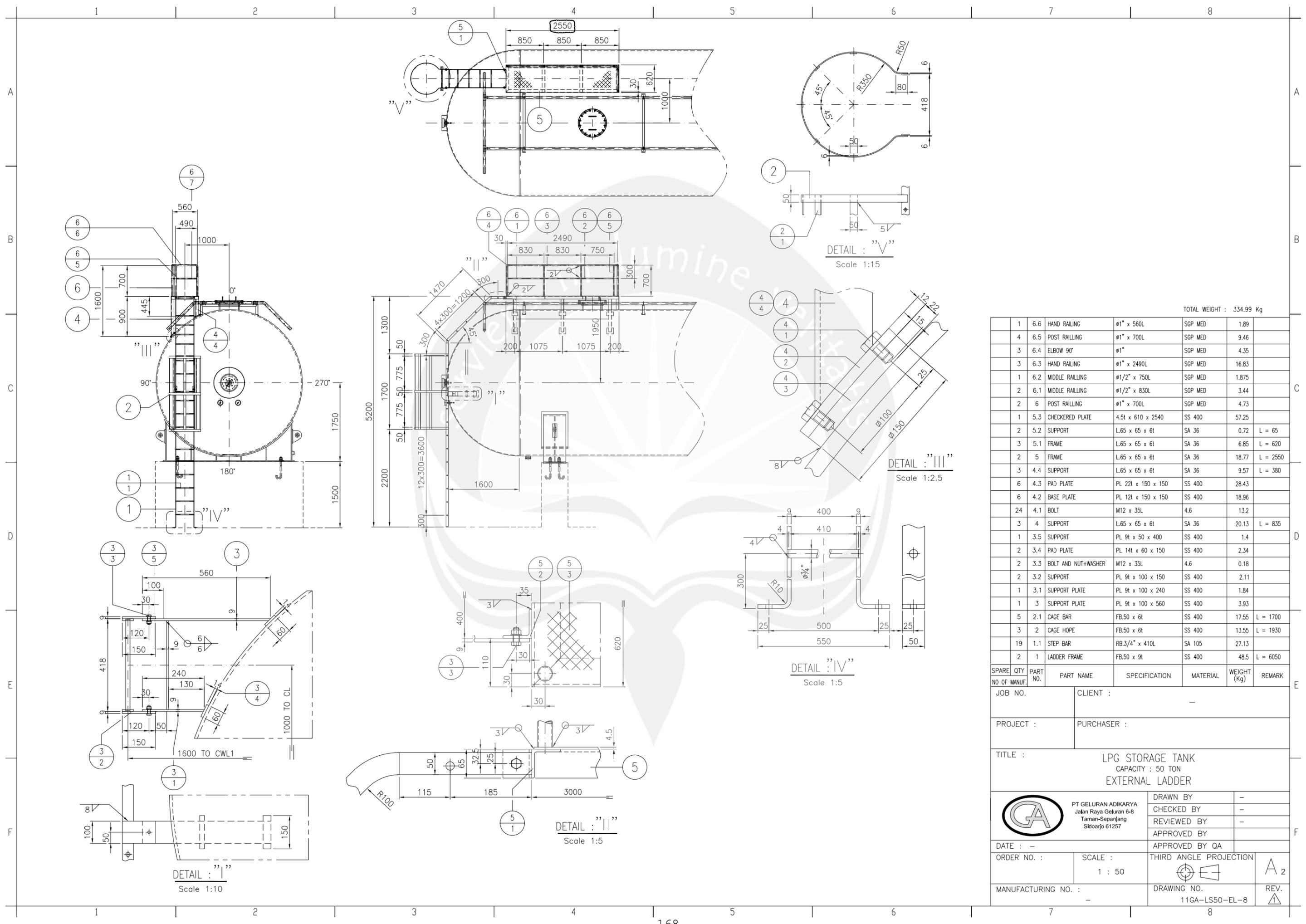


A₃

MANUFACTURING NO. : -

DRAWING NO. : 11GA-LS50-LL-7

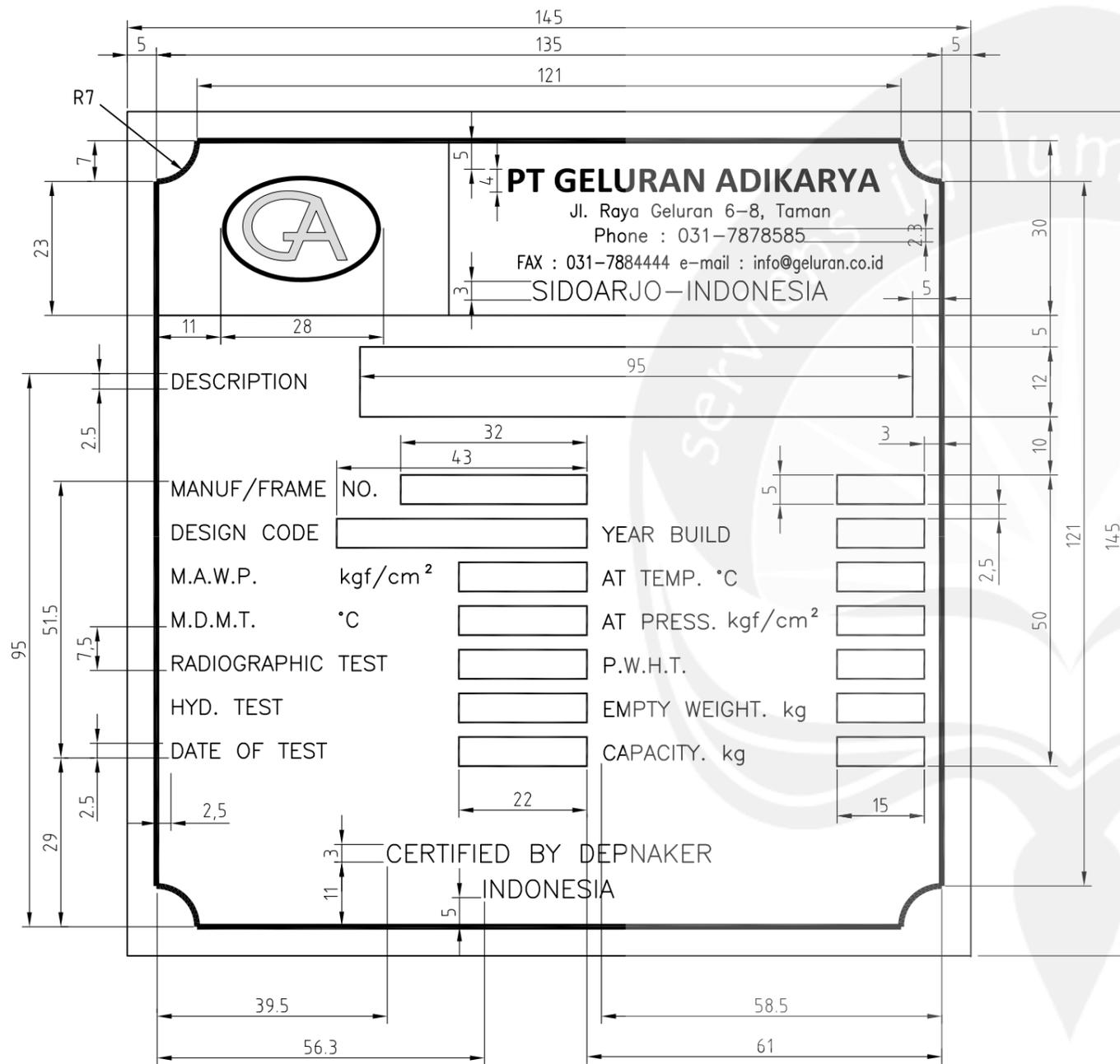
REV. : 



TOTAL WEIGHT : 334.99 Kg

QTY	PART NO.	PART NAME	SPECIFICATION	MATERIAL	WEIGHT (kg)	REMARK
1	6.6	HAND RAILING	Ø1" x 560L	SGP MED	1.89	
4	6.5	POST RAILING	Ø1" x 700L	SGP MED	9.46	
3	6.4	ELBOW 90°	Ø1"	SGP MED	4.35	
3	6.3	HAND RAILING	Ø1" x 2490L	SGP MED	16.83	
1	6.2	MIDDLE RAILING	Ø1/2" x 750L	SGP MED	1.875	
2	6.1	MIDDLE RAILING	Ø1/2" x 830L	SGP MED	3.44	
2	6	POST RAILING	Ø1" x 700L	SGP MED	4.73	
1	5.3	CHECKERED PLATE	4.5t x 610 x 2540	SS 400	57.25	
2	5.2	SUPPORT	L.65 x 65 x 6t	SA 36	0.72	L = 65
3	5.1	FRAME	L.65 x 65 x 6t	SA 36	6.85	L = 620
2	5	FRAME	L.65 x 65 x 6t	SA 36	18.77	L = 2550
3	4.4	SUPPORT	L.65 x 65 x 6t	SA 36	9.57	L = 380
6	4.3	PAD PLATE	PL 22t x 150 x 150	SS 400	28.43	
6	4.2	BASE PLATE	PL 12t x 150 x 150	SS 400	18.96	
24	4.1	BOLT	M12 x 35L	4.6	13.2	
3	4	SUPPORT	L.65 x 65 x 6t	SA 36	20.13	L = 835
1	3.5	SUPPORT	PL 9t x 50 x 400	SS 400	1.4	
2	3.4	PAD PLATE	PL 14t x 60 x 150	SS 400	2.34	
2	3.3	BOLT AND NUT+WASHER	M12 x 35L	4.6	0.18	
2	3.2	SUPPORT	PL 9t x 100 x 150	SS 400	2.11	
1	3.1	SUPPORT PLATE	PL 9t x 100 x 240	SS 400	1.84	
1	3	SUPPORT PLATE	PL 9t x 100 x 560	SS 400	3.93	
5	2.1	CAGE BAR	FB.50 x 6t	SS 400	17.55	L = 1700
3	2	CAGE HOPE	FB.50 x 6t	SS 400	13.55	L = 1930
19	1.1	STEP BAR	RB.3/4" x 410L	SA 105	27.13	
2	1	LADDER FRAME	FB.50 x 9t	SS 400	48.5	L = 6050

SPARE NO OF MANUF.	QTY	PART NO.	PART NAME	SPECIFICATION	MATERIAL	WEIGHT (kg)	REMARK
JOB NO.			CLIENT :				
PROJECT :			PURCHASER :				
TITLE :			LPG STORAGE TANK CAPACITY : 50 TON EXTERNAL LADDER				
DATE : -			DRAWN BY : -				
ORDER NO. :			CHECKED BY : -				
MANUFACTURING NO. :			REVIEWED BY : -				
			APPROVED BY :				
			APPROVED BY QA :				
SCALE : 1 : 50			THIRD ANGLE PROJECTION		A2		
			DRAWING NO. 11GA-LS50-EL-8		REV. A		



WARNA DASAR PUTIH



PT GELURAN ADIKARYA

Jl. Raya Geluran 6-8, Taman
 Phone : 031-7878585
 FAX : 031-7884444 e-mail : info@geluran.co.id
 SIDOARJO-INDONESIA

DESCRIPTION

LPG STORAGE TANK 50 TON
 OD 3300 mm x 11250 mm

MANUF/FRAME NO.	-	MODEL	-
DESIGN CODE	-	YEAR BUILD	2009
M.A.W.P.	kgf/cm ² 17.6	AT TEMP. °C	55
M.D.M.T.	°C -9	AT PRESS. kgf/cm ²	17.6
RADIOGRAPHIC TEST	FULL	P.W.H.T.	NONE
HYD. TEST	23	EMPTY WEIGHT. kg	-
DATE OF TEST		CAPACITY. kg	50.000

CERTIFIED BY DEPNAKER
 INDONESIA

SPARE	QTY	PART NO.	PART NAME	SPECIFICATION	MATERIAL	WEIGHT (Kg)	REMARK
	1	1	NAME PLATE	PL 2tx145x145	AISI 304	0.2	



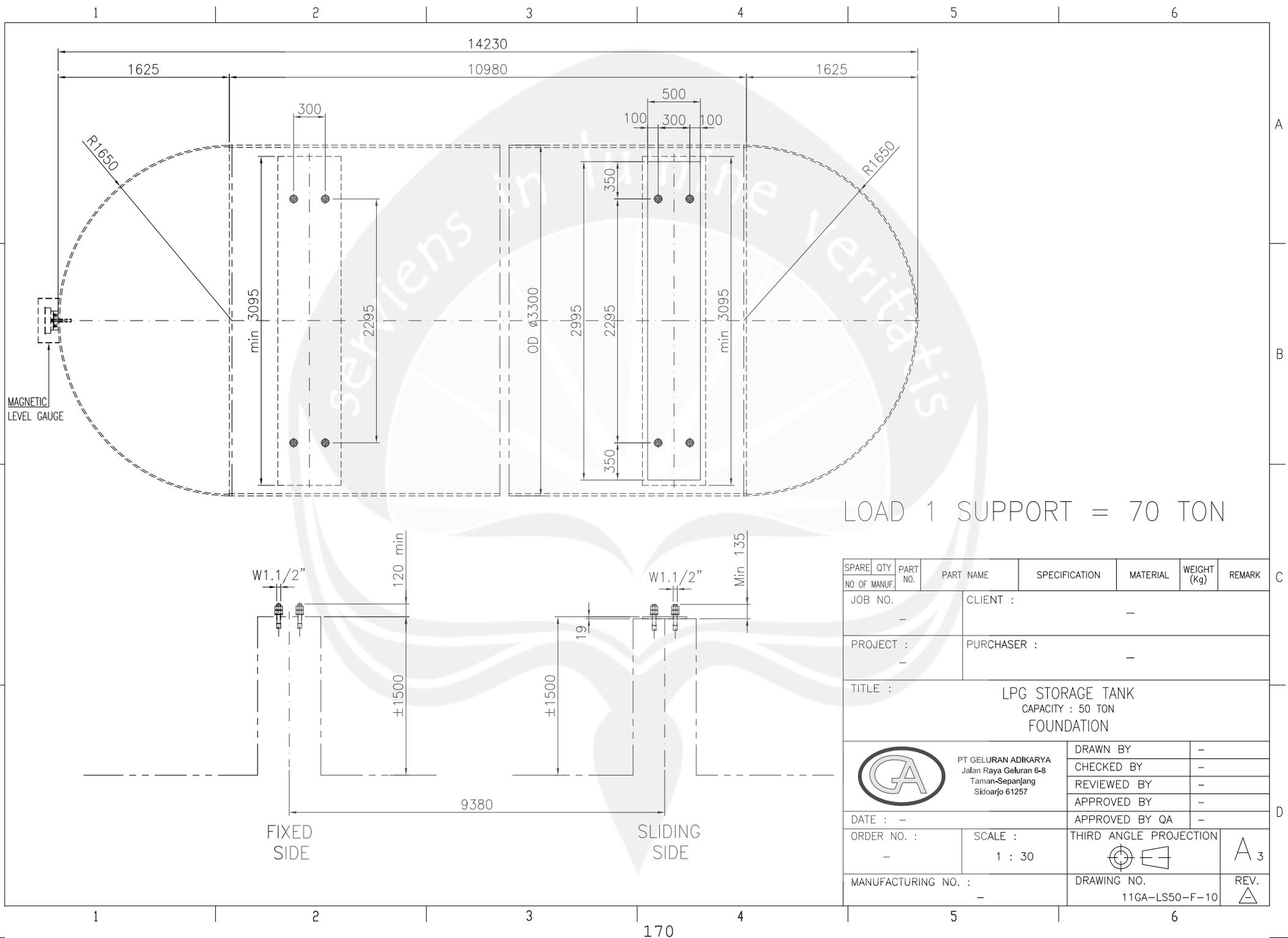
PT GELURAN ADIKARYA
 Jalan Raya Geluran 6-8
 Taman-Sepanjang
 Sidoarjo 61257

CLIENT :

TITLE :

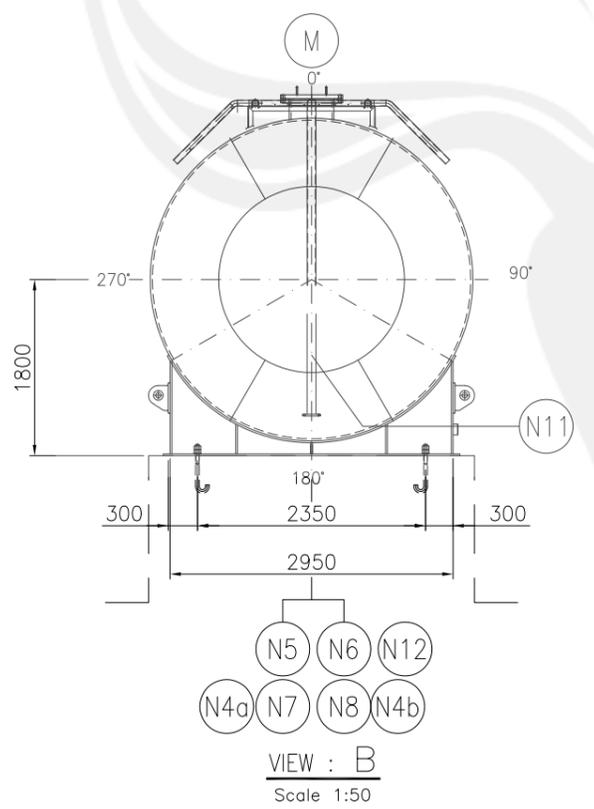
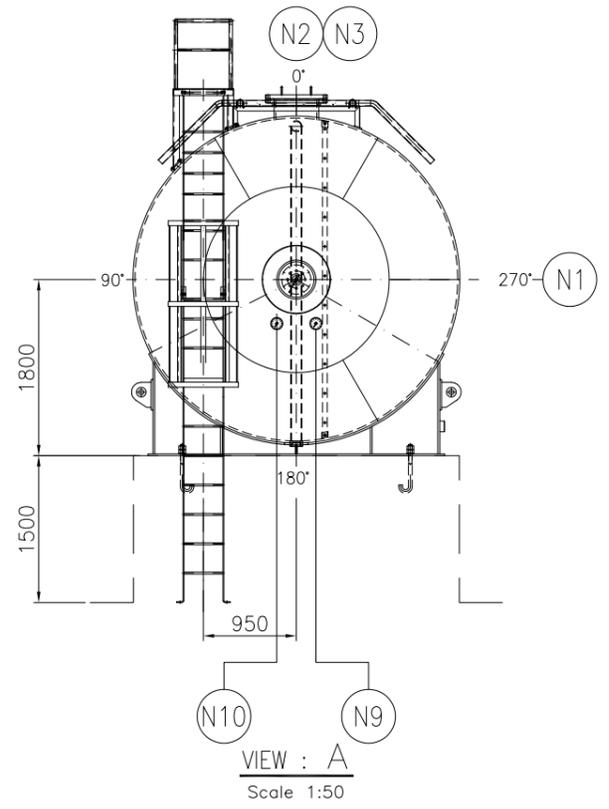
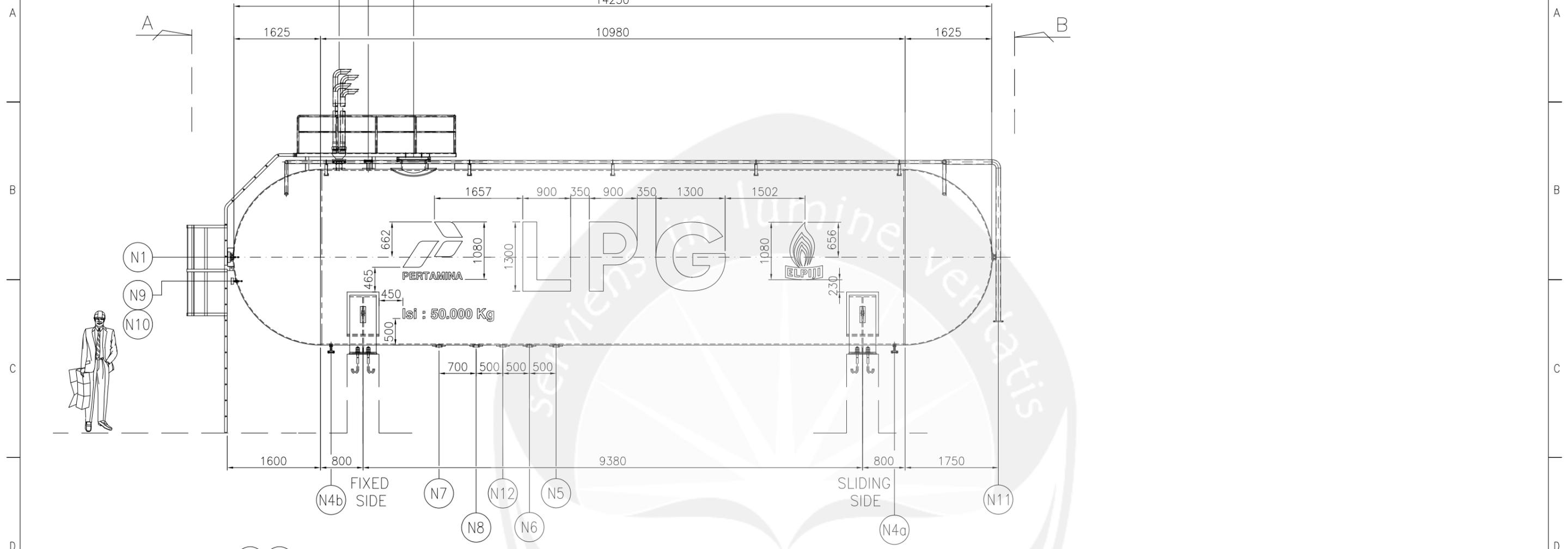
LPG STORAGE TANK
 CAPACITY : 50 Tons
 NAME PLATE DETAIL

DATE : -	SKALA : -	A ₃
DRAWN BY	ORDER NO. :	
CHECKED BY		
REVIEWED BY		
APPROVED BY	DRAWING NO. 11GA-LS50-NP-9	REV. △



LOAD 1 SUPPORT = 70 TON

SPARE	QTY	PART NO.	PART NAME	SPECIFICATION	MATERIAL	WEIGHT (Kg)	REMARK
			CLIENT :				
			PURCHASER :				
TITLE :			LPG STORAGE TANK CAPACITY : 50 TON FOUNDATION				
 PT GELURAN ADIKARYA Jalan Raya Geluran 6-8 Taman-Sepanjang Sidoarjo 61257			DRAWN BY		-		
			CHECKED BY		-		
			REVIEWED BY		-		
			APPROVED BY		-		
DATE : -			APPROVED BY QA		-		
ORDER NO. :		SCALE :		THIRD ANGLE PROJECTION		A 3	
-		1 : 30					
MANUFACTURING NO. :				DRAWING NO.		REV.	
-				11GA-LS50-F-10			



SPARE NO	QTY	PART NO.	PART NAME	SPECIFICATION	MATERIAL	WEIGHT (kg)	REMARK
JOB NO.			CLIENT :				
PROJECT :			PURCHASER :				
TITLE :				LPG STORAGE TANK CAPACITY : 50 TON GENERAL ARRANGEMENT U/ HURUF			
 PT GELURAN ADIKARYA Jalan Raya Geluran 6-8 Taman-Sepanjang Sidoarjo 61257			DRAWN BY		-		
			CHECKED BY		-		
DATE : -			REVIEWED BY		-		
ORDER NO. :			APPROVED BY		-		
MANUFACTURING NO. :			APPROVED BY QA		-		
SCALE :			THIRD ANGLE PROJECTION		A ₂		
1 : 50							
-			DRAWING NO.		REV.		
-			11GA-LS50-S-11				

Lampiran 2:

ESTIMASI ANGGARAN DAN BIAYA

Nama Proyek : LPG Storage Tank 50 Tons (OD 3300x11250)
 Q'ty : 1 unit

(Sumber: data perusahaan dan *supplier* per Juni 2011)

No.	Item	Mat'l/Unit	Q'ty	Dimensi (mm)				Massa Jenis (kg/mm ³)	Berat (kg)	Total (kg)	Price (Rp/kg)	Unit Price (Rp/unit)	Total (Rp)
				π	P	L	t						
I	MATERIAL												
	Dwg 11GA-LS50-N-1 (Nozzle Detail)												
1	SO RF flange Ø18" ANSI 150	A 105	1									1.250.000	1.250.000
1.1	Neck 22txØ457x210	A 516 Gr 70	1	3,1416	457	210	22	0,00000786	52,14	52,14	15.000	782.027	782.027
1.2	Pad 22txØ460xØ	A 516 Gr 70	1	3,1416	410	410	22	0,00000786	91,32	91,32	14.600	1.333.263	1.333.263
1.3	Blind flange Ø18" ANSI 150	A 105	1									1.876.250	1.876.250
1.4	Handle round bar Ø16x12 m	A 105	1									85.200	85.200
1.5	Hex. bolt+nut W1½"x5"	HTB A325	16									57.390	918.240
	Spring washer W1½"	HTB A325	16									1.376	22.016
1.6	Gasket outering Ø18" ANSI 150	spiral wound	1									340.000	340.000
2	Forging disk 45txØ155												
4	Studding pad flange Ø2" ANSI 300 (1x)												
5	Studding pad flange Ø1" ANSI 300 (2x)												
6	Studding pad flange Ø2" ANSI 300 (1x)												
7	Studding pad flange Ø4" ANSI 300 (1x)												
8	Studding pad flange Ø3" ANSI 300 (1x)												
9	Studding pad flange Ø2" ANSI 300 (1x)												
3	Neck Ø4" Sch 80	A 106 Gr B	1									180.000	180.000
3.1	SO RF flange Ø4" ANSI 300	A 105	1									209.000	209.000
3.2	Pad 22txØ116xØ240	A 106 Gr 70	1	3,1416	125	125	22	0,00000786	8,49	8,49	8.500	72.149,62	72.150
3.3	Gasket Ø4" ANSI 300	jointing sheet	1									50.000	50.000
3.4	Hex. bolt+nut W¾"x2"	HTB A325	8									4.050	32.400
	Spring washer W¾"	HTB A325	8									282	2.256
3.6	Pipe Ø3" L=1750												
3.7	Pipe Ø3" L=1900												
3.8	Pipe Ø3" L=2050												
3.9	Pipe Ø3" L=2200												
3.11	Mouth Ø3"												
3.10	Elbow 90° Ø3"	SGP Medium	4									25.000	100.000
3.12	Single Nipple NPT 3" Sch 40	A 106 Gr B	4									30.000	120.000
4.1	Gasket Ø2" ANSI 300	jointing sheet	1									50.000	50.000
4.2	Blind flange Ø2" ANSI 300	SS 400	1									74.700	74.700
4.3	Hex. Bolt+nut W5/8"x2½"	HTB A325	8									3.380	27.040
5.1	Gasket Ø1" ANSI 300	jointing sheet	2									40.000	80.000
5.2	Blind flange Ø1" ANSI 300	SS 400	2									48.600	97.200

ESTIMASI ANGGARAN DAN BIAYA

Nama Proyek : LPG Storage Tank 50 Tons (OD 3300x11250)
 Q'ty : 1 unit

(Sumber: data perusahaan dan *supplier* per Juni 2011)

No.	Item	Mat'l/Unit	Q'ty	Dimensi (mm)				Massa Jenis (kg/mm ³)	Berat (kg)	Total (kg)	Price (Rp/kg)	Unit Price (Rp/unit)	Total (Rp)
				π	P	L	t						
5.3	Hex. bolt+nut W5/8"x2"	HTB A325	8								3.350	26.800	
9.2	Half-coupling NPT 3"-#6000	A 105	1								323.750	323.750	
9.3	Neck Ø3" Sch 80	A 106 Gr B	1								900.000	900.000	
9.4	Reducer Ø3"xØ4" Sch 80	A 106 Gr B	1								25.000	25.000	
9.5	Support pipe 16tx40	SS 400	1	1	300	150	16	0,00000786	5,66	5,66	8.500	48.103	
10	Coupling NPT ½"-#6000	A 105	2								30.000	60.000	
	Blind flange N1 20txØ155	SS 400	1	3,1416	82,5	82,5	20	0,00000786	3,36	3,36	8.500	28.571	
	Blind flange Ø2" ANSI 300	A 105	2								74.700	149.400	
	Blind flange Ø3" ANSI 300	A 105	1								198.000	198.000	
	Blind flange Ø4" ANSI 300	A 105	2								324.000	648.000	
	Plug NPT ½"-#3000	A 105	2								16.000	32.000	
												22.261.036	
	Nozzle Accessories												
3.5	Multiport PRV A8574G REGO	FCD	1								47.541.000	47.541.000	
6.1	Check valve 2" A3400L4 REGO	CS	1								2.433.566	2.433.566	
7.1	Excess flow valve 4" A4500Y8 REGO	CS	1								8.754.596	8.754.596	
8.1	Check valve 3" A3400L6 REGO	CS	1								4.050.460	4.050.460	
9.1	Excess flow valve 2" A3500P4	CS	1								2.517.602	2.517.602	
	Internal valve A3219F6000 flange REGO		1								22.257.602	22.257.602	
	Magnetic level Rochester		1								19.500.000	19.500.000	
	TSS 3169 ¼"		2								135.000	270.000	
												107.324.826	
	Dwg 11GA-LS50-WS-2 (Water Sprinkle Detail)												
1	Water spray pipe Ø2" L=12330 (2x)	SGP Medium @6 m	7									220.800	1.545.600
2	Water spray pipe Ø2" L=1600 (2x)												
2.1	Water spray pipe Ø2" L=850 (4x)												
2.2	Elbow 45° Ø2"	SGP Medium	4								17.000	68.000	
2.3	Tee Ø2"	SGP Medium	4								78.000	312.000	
2.4	Cover plate 5txØ60	SS 400	4	3,1416	35	35	5	0,00000786	0,15	0,60	9.000	5.445	
2.5	SO FF flange Ø2" JIS 5K	A 105	12								42.300	507.600	
2.6	Gasket Ø2" JIS 5K	rubber	6								20.000	120.000	
2.7	Hex. bolt+nut M12x35	GI 4.6	48								650	31.200	
	Spring washer M12	GI 4.6	48								64	3.072	
3	Tee Ø3"	SGP Medium	1								39.000	39.000	
3.1	Reducer Ø2"xØ3"	SGP Medium	2								16.000	32.000	
4	Water spray pipe Ø3" L=1025												

ESTIMASI ANGGARAN DAN BIAYA

Nama Proyek : LPG Storage Tank 50 Tons (OD 3300x11250)
 Q'ty : 1 unit

(Sumber: data perusahaan dan *supplier* per Juni 2011)

No.	Item	Mat'l/Unit	Q'ty	Dimensi (mm)				Massa Jenis (kg/mm ³)	Berat (kg)	Total (kg)	Price (Rp/kg)	Unit Price (Rp/unit)	Total (Rp)
				π	P	L	t						
4.1	Water spray pipe Ø3" L=3000	SGP Medium @6 m	1								390.000	390.000	
4.2	Water spray pipe Ø3" L=115												
4.3	Elbow 90° Ø3"	SGP Medium	1								25.000	25.000	
4.4	SO FF flange Ø3" JIS 5K	A 105	3								46.000	138.000	
4.5	Gasket Ø3" JIS 5K	rubber	1								25.000	25.000	
4.6	Hex. bolt+nut M12x75	GI 4.6	8								1.490	11.920	
5	Support 9tx100x100	SS 400	1	1	100	100	9	0,00000786	0,71	0,71	8.500	6.013	6.013
5.1	Support 9tx100x120	SS 400	1	1	100	120	9	0,00000786	0,85	0,85	8.500	7.215	7.215
5.2	Pad plate 14tx70x150	SS 400	1	1	70	150	14	0,00000786	1,16	1,16	8.500	9.821	9.821
5.3	Hex. bolt+nut M12x35	GI 4.6	2								650	1.300	
	Spring washer M12	GI 4.6	2								64	128	
6	Support L=1300 (5x)		2								141.800	283.600	
6.1	Support L=235 (10x)	L50x50x5 A 36 (@6m)											
6.2	Base plate 6tx60x120	SS 400	10	1	60	120	6	0,00000786	0,34	3,40	8.500	2.886	28.862
6.3	Pad plate 14tx60x120	SS 400	10	1	60	120	14	0,00000786	0,79	7,92	8.500	6.734	67.344
6.4	Hex. bolt+nut M10x25	GI 4.6	20								582	11.640	
	Spring washer M10	GI 4.6	20								37	740	
6.5	U-bolt M10	GI 4.6	10								1.650	16.500	
	Spring washer M10	GI 4.6	10								37	370	
												3.687.371	
	Dwg 11GA-LS50-EN-3 (Equipment of Nozzle N9 & N10 for PG & TI)												
1.1	Double Nipple NPT ½"	St. 60	1								30.000	30.000	
1.2	Globe valve NPT ½"	iron	1								22.000	22.000	
1.3	Pressure gauge (liquid) 0-25 bar dial 6" BSP ½" JAKO		1								350.000	350.000	
1.4	Termometer 0-100°C dial 6" BSP ½" JAKO	AISI 304	1								520.000	520.000	
												922.000	
	Dwg 11GA-LS50-SP-4 (Shell Plate Detail)												
1	Shell plate 22tx2250x10800	A 516 Gr 70	5	1	10800	2250	22	0,00000786	4201,96	21.009,78	19.000	79.837.164	399.185.820
	Dwg 11GA-LS50-H-5 (Hemispherical End Detail)												
1	Hemispherical plate	A 516 Gr 70											
2	Hemispherical plate	14tx1830x10885	2	1	10885	1830	14	0,00000786	2191,95	4.383,89	19.000	41.646.998	83.293.997
	Dwg 11GA-LS50-S-6 (Saddle Detail)												
1	Base plate (fixed side) 19tx500x2995 (1x)												

ESTIMASI ANGGARAN DAN BIAYA

Nama Proyek : LPG Storage Tank 50 Tons (OD 3300x11250)
 Q'ty : 1 unit

(Sumber: data perusahaan dan *supplier* per Juni 2011)

No.	Item	Mat'l/Unit	Q'ty	Dimensi (mm)				Massa Jenis (kg/mm ³)	Berat (kg)	Total (kg)	Price (Rp/kg)	Unit Price (Rp/unit)	Total (Rp)	
				π	P	L	t							
1.1	Saddle plate (fixed side) 19tx895x2857 (1x)	SS 400 19tx6'x20'	1	1	6096	1830	19	0,00000786	1665,99	1665,99	8.500	14.160.909	14.160.909	
1.2	Side plate (fixed side) 19tx500x895 (2x)													
1.3	Support plate (fixed side) 19tx240,5x295 (4x)													
1.4	Support plate (fixed side) 19tx240,5x84 (4x)													
2	Base plate (sliding side) 19tx500x2995 (1x)													
2.1	Saddle plate (sliding side) 19tx895x2857 (1x)													
2.2	Side plate (sliding side) 19tx500x895 (2x)													
2.3	Support plate (sliding side) 19tx240,5x295 (4x)													
2.4	Support plate (sliding side) 19tx240,5x84 (4x)													
3	Sliding plate 19tx520x2995													
1.5	Pad plate (fixed side) 22tx600x3575 (1x)	SS 400	1	1	600	3575	22	0,00000786	370,91	370,91	8.500	3.152.764	3.152.764	
2.5	Pad plate (sliding side) 22tx600x3575 (1x)	SS 400	1	1	600	3575	22	0,00000786	370,91	370,91	8.500	3.152.764	3.152.764	
4	Spacer Ø2" Sch 80 L=26 (4x)	A 53 @6 m	0,5									430.000	215.000	
													20.681.436	
	Dwg 11GA-LS50-LL-7 (Lifting Lug Detail)													
1	Lifting lugs 25tx200x255	SS 400	4	1	255	200	25	0,00000786	10,02	40,09	8.500	85.183	340.731	
1.1	Ring plate 12txØ54xØ100	SS 400	8	3,1416	100	100	12	0,00000786	2,96	23,71	8.500	25.187	201.494	
1.2	Pad 19tx100x305	SS 400	4	dari sisa plat 19tx6'x20' yang digunakan untuk Saddle (11GA-LS50-S-6)										
													542.225	
	Dwg 11GA-LS50-EL-8 (External Ladder Detail)													
1	Ladder frame FB 50x9t L=6000	SS 400	2									170.000	340.000	
1.1	Step bar RB Ø¾"x410L (19x)	A 105 @6 m	2									107.000	214.000	
2	Cage hope FB 50x6t L=1930 (3x)	SS 400 @6 m	3									118.000	354.000	
2.1	Cage bar FB 50x6t L=1700 (5x)													
3	Support plate 9tx100x560 (1x)	SS 400 @6 m	1									360.000	360.000	
3.1	Support plate 9tx100x240 (1x)													
3.2	Support 9tx100x150 (2x)													
3.3	Hex. bolt+nut M12x35	GI 4.6	2									650	1.300	
3.4	Pad plate 14tx60x150	SS 400	2	1	150	60	14	0,00000786	0,99	1,98	8.500	8.418	16.836	
3.5	Support 9tx50x400	SS 400	1	1	400	50	9	0,00000786	1,41	1,41	8.500	12.026	12.026	
4	Support L65x65x6 L=835 (3x)													

ESTIMASI ANGGARAN DAN BIAYA

Nama Proyek : LPG Storage Tank 50 Tons (OD 3300x11250)
 Q'ty : 1 unit

(Sumber: data perusahaan dan *supplier* per Juni 2011)

No.	Item	Mat'l/Unit	Q'ty	Dimensi (mm)				Massa Jenis (kg/mm ³)	Berat (kg)	Total (kg)	Price (Rp/kg)	Unit Price (Rp/unit)	Total (Rp)
				π	P	L	t						
4.4	Support L65x65x6 L=380 (4x)	A 36	2									245.000	490.000
5	Frame L65x65x6 L=2550 (2x)												
5.1	Frame L65x65x6 L=620 (3x)												
5.2	Support L65x65x6 L=65 (2x)												
4.1	Hex. bolt M12x35	GI 4.6	24								375	9.000	
4.2	Base plate 12tx150x150	SS 400	6	1	150	150	12	0,00000786	2,12	12,73	8.500	18.039	108.232
4.3	Pad plate 22tx150x150	SS 400	6	1	150	150	22	0,00000786	3,89	23,34	8.500	33.071	198.426
5.3	Checkered plate 4,5tx610x2540	SS 400 4,5tx4'x8'	1									880.000	880.000
6	Post railing Ø1" L=700 (2x)	SGP Medium @6 m	2									82.000	164.000
6.3	Hand railing Ø1" L=2490 (1x)												
6.5	Post railing Ø1" L=700 (4x)												
6.6	Hand railing Ø1" L=560 (1x)												
6.4	Elbow 90° Ø1"	SGP Medium	3								3.300	9.900	
6.1	Middle railing Ø½" L=830 (2x)	SGP Medium @6 m	1									59.000	59.000
6.2	Middle railing Ø½" L=750 (1x)												
												3.216.720	
Dwg 11GA-LS50-NP-9 (Name Plate Detail)													
1	Name plate 2tx145x145	AISI 304	1	1	145	145	2	0,000007916	0,33	0,33	40.000	13.315	13.315
	Name plate support 3tx170x270	SS 400	1	1	170	270	3	0,00000786	1,08	1,08	8.500	9.200	9.200
												22.514	
Anchor Bolt													
	Round bar Ø1½" L=6 m	St. 60	1									645.000	645.000
	Hex. nut W1½"	HTB A325	16									15.300	244.800
												889.800	
SUBTOTAL MATERIAL											642.027.745		
II	ALAT BANTU & PERLENGKAPAN												
1	Topeng las	plastik	4									15.000	60.000
2	Sarung tangan las	kulit	13									7.917	102.921
3	Sarung tangan kombinasi	kulit	20									5.833	116.660
4	Sarung tangan kaus	benang	18									833	14.994
5	Oto + lengan las		4									45.000	180.000
6	Masker kain	kain	46									333	15.318
7	Kacamata gerinda		15									3.000	45.000
8	Electrode holder 600A		4									25.000	100.000
9	Terpal 3x4 m	A3-Standar	4									42.000	168.000

ESTIMASI ANGGARAN DAN BIAYA

Nama Proyek : LPG Storage Tank 50 Tons (OD 3300x11250)
 Q'ty : 1 unit

(Sumber: data perusahaan dan *supplier* per Juni 2011)

No.	Item	Mat'l/Unit	Q'ty	Dimensi (mm)				Massa Jenis (kg/mm ³)	Berat (kg)	Total (kg)	Price (Rp/kg)	Unit Price (Rp/unit)	Total (Rp)
				π	P	L	t						
10	Palet	kayu	2								187.750	375.500	
11	Flat bar untuk packing 1tx20 (rol)	SS 400	1								600.000	600.000	
												1.778.393	
III	CONSUMEABLE												
1	Batu gerinda cutting 4" I-Prix		50								4.180	209.000	
2	Batu gerinda kasar 4" I-Prix		90								3.410	306.900	
3	Batu gerinda fleksibel 4" WA60/AC60 I-Prix		222								6.325	1.404.150	
4	Batu gerinda cutting 7" I-Prix		62								12.100	750.200	
5	Batu gerinda kasar 7" I-Prix		220								9.350	2.057.000	
6	Cylindrical mounted point C13x25 Kinik		6								11.000	66.000	
7	Cup wire brush CC-31 Kinik		3								13.200	39.600	
8	Gas LPG 50 kg	tabung	2								360.000	720.000	
9	Gas O ₂ 6 m ³	tabung	12								40.000	480.000	
10	Gas CO ₂ 6 m ³	tabung	16								60.500	968.000	
11	Gas N ₂ 6 m ³	tabung	27								70.000	1.890.000	
12	Welding Electrode FCAW ESAB E71T-1 Æ1,2	kg	227,7								20.000	4.554.000	
13	Welding Electrode OK 46.00/AWS E6013 Æ3,2	kg	5,8								12.100	70.476	
14	Welding Electrode OK 48.04/AWS E7018 Æ3,2	kg	60,9								14.600	889.140	
15	Welding Electrode OK 48.04/AWS E7018 Æ2,5	kg	0,5								16.400	8.439	
16	Kaca las hitam		16								1.650	26.400	
17	Kaca las bening		46								275	12.650	
18	Kapur besi	pak	7								500	3.500	
19	White marker <i>Snowman</i>		2								10.000	20.000	
20	Solid marker yellow		2								20.000	40.000	
21	Kain majun	kg	5								3.000	15.000	
22	Mega Check Cleaner 450 ml NABAKEM	kaleng	8								45.833	366.664	
23	Mega Check Developer 450 ml NABAKEM	kaleng	8								45.833	366.664	
24	Mega Check Penetrant 450 ml NABAKEM	kaleng	2								45.833	91.666	
25	Sikat baja		1								3.000	3.000	
26	Kuas 3" ETERNA		1								4.500	4.500	
27	Kuas rol 10 cm		1								3.500	3.500	
28	Contact tip Æ1,2		4								7.500	30.000	

ESTIMASI ANGGARAN DAN BIAYA

Nama Proyek : LPG Storage Tank 50 Tons (OD 3300x11250)
 Q'ty : 1 unit

(Sumber: data perusahaan dan *supplier* per Juni 2011)

No.	Item	Mat'l/Unit	Q'ty	Dimensi (mm)				Massa Jenis (kg/mm ³)	Berat (kg)	Total (kg)	Price (Rp/kg)	Unit Price (Rp/unit)	Total (Rp)
				π	P	L	t						
29	Carbon brush angle grinder 4" BOSCH		3								10.000	30.000	
30	Carbon brush angle grinder 7" BOSCH		3								20.000	60.000	
31	Air PDAM untuk <i>hydrotest</i>	m ³	112								15.000	1.680.000	
32	Air PDAM untuk <i>pressure purging</i>	m ³	112								13.000	1.456.000	
33	Air PDAM untuk pencucian tangki	m ³	1								9.500	9.500	
34	Material cat internal tangki	m ²	149,5								50.342	7.526.129	
35	Material cat eksternal tangki	m ²	193,9								50.342	9.761.314	
												35.919.392	
IV	ONGKOS KERJA												
1	Pengerolan <i>shell</i>	kg	21.009,8								950	19.959.291	
2	Pres <i>hemispherical ends</i>	kg	4.770,5								1.900	9.063.912	
3	Bevel & potong	kg	21.009,8								300	6.302.934	
4	Assembly & welding	kg	29.541,8								1.850	54.652.238	
5	Bubut <i>con e safety valve 10"x16"</i>		1								300.000	300.000	
6	Machining Nozzle Part 2 (bubut, bor, tap)		1								200.000	200.000	
7	Machining Nozzle Part 4 (bubut, bor, tap)		1								220.000	220.000	
8	Machining Nozzle Part 5 (bubut, bor, tap)		2								180.000	360.000	
9	Machining Nozzle Part 6 (bubut, bor, tap)		1								220.000	220.000	
10	Machining Nozzle Part 7 (bubut, bor, tap)		1								260.000	260.000	
11	Machining Nozzle Part 8 (bubut, bor, tap)		1								240.000	240.000	
12	Machining Nozzle Part 9 (bubut, bor, tap)		1								220.000	220.000	
13	Radiography test & magnetic test												
	- <i>equipment</i> , personel, transportasi (PT Radiant Utama Interisco)	hari	5								935.000	4.675.000	
	- X-ray film 4"x15"	set	402								30.250	12.160.500	
14	Material & jasa pendempulan	lot	1								6.000.000	6.000.000	
15	Material & jasa <i>sand blasting</i>	m ²	343,2								15.300	5.251.374	
16	Jasa <i>painting</i>	m ²	343,2								10.000	3.432.271	
17	Stiker logo LPG & Pertamina + jasa	lot	1								800.000	800.000	
18	Kirim plat 45tx4'x8'	rit	1								175.000	175.000	
19	Sewa forklift kapasitas 5 ton	jam	3								75.000	225.000	
20	Sewa crane kapasitas 45 ton untuk pemindahan tangki	lot	1								3.500.000	3.500.000	
21	Sewa crane kapasitas 45 ton untuk menaikkan tangki ke <i>low bed</i>	lot	1								3.500.000	3.500.000	
22	Jasa sopir <i>crane</i>	orang	1								50.000	50.000	
23	Jasa sopir <i>trailer</i>	orang	1								50.000	50.000	

ESTIMASI ANGGARAN DAN BIAYA

Nama Proyek : LPG Storage Tank 50 Tons (OD 3300x11250)
 Q'ty : 1 unit

(Sumber: data perusahaan dan *supplier* per Juni 2011)

No.	Item	Mat'l/Unit	Q'ty	Dimensi (mm)				Massa Jenis (kg/mm ³)	Berat (kg)	Total (kg)	Price (Rp/kg)	Unit Price (Rp/unit)	Total (Rp)
				π	P	L	t						
24	Jasa keamanan pemberangkatan	orang	1								50.000	50.000	
25	Konsumsi makanan pemindahan tangki	bungkus	12								7.000	84.000	
26	Konsumsi minuman pemindahan tangki	bungkus	15								2.000	30.000	
27	Konsumsi pemberangkatan tangki	bungkus	10								10.000	100.000	
28	Bonus sopir pengirim tangki	orang	1								200.000	200.000	
29	Perizinan Depnaker & pengesahan	lot	1								750.000	750.000	
30	Perizinan Depnaker (SKPP)	lot	1								1.500.000	1.500.000	
31	Jasa pembuatan <i>name plate</i>	lot	1								150.000	150.000	
												134.681.520	
GRAND TOTAL (I+II+III+IV)												814.407.050	
OVERHEAD											2%	16.288.141	
PROFIT												15%	124.604.279
PPN												10%	95.529.947
HARGA PENAWARAN (Rp)													1.050.829.417
													1.051.000.000

Lampiran 3:

RASIC Matrix
Proyek LPG Storage Tank Kapasitas 50 Ton

No.	WBS	Responsible (R) Approval (A) Supports (S) Informed (I) Consulted (C)	Project Manager	Engineering Manager	QA Manager	Purchasing Manager	Marketing Manager	Production Supervisor	Drafter	QC	Warehouse	Assistant Warehouse	Tukang Potong	Tukang Rol	Tukang Pres	Operator Mesin Perkakas	Fitter	Helper	Welder	Testing & Examination (outsourcing)	Spesialis Name Plate (outsourcing)	Spesialis Stiker (outsourcing)	Sand Blasting & Painting (outsourcing)
1	1	Pemrosesan PO																					
2	1.1	Menerima & memproses purchase order dari klien	I	I	I	I	R																
3	1.2	Initial meeting	R/A	S/C	S/C	S/C	S/C																
4	2	Engineering																					
5	2.1	Mengonfirmasikan desain & gambar kepada klien untuk memperoleh approval	I	R					I														
6	2.2	Pembuatan gambar pabrikasi	I	A/C					R														
7	2.3	Penyusunan Welding Procedure Specification (WPS) & Procedure Qualification Report (PQR)	I	R/A	C																		
8	2.4	Penyusunan hydrostatic test procedure	I	S	A/C					R													
9	2.5	Penyusunan material cutting plan	I	C					R														
10	3	Procurement																					
11	3.1	Pengisian material requisition sheet	R																				
12	3.2	Pengecekan stok material, komponen & consumable yang ada di warehouse									R	S											
13	3.3	Penyusunan flow process sheet untuk produksi	R																				
14	3.4	Mengontak vendor atau supplier				R																	
15	3.5	Penetapan pilihan supplier dengan penawaran terbaik	C			R																	
16	3.6	Pembuatan & rilis purchase order (PO)				R																	
17	3.7	Follow up PO untuk menelusuri perkembangan posisi order				R																	
18	3.8	Penerimaan material, komponen & consumable dari supplier								R	S												
19	3.9	Inspeksi material & komponen yang datang		I	A				I	R													
20	3.10	Penyiapan peralatan kerja dan alat bantu proyek	C					R		S	S												
21	3.11	Pengambilan material	C					A		S	S							R					
22	3.12	Marking layout pemotongan pada material	C					A/S				R											
23	4	Shell Plate																					
24	4.1	Pemotongan material plat shell	C					A/C				R											
25	4.2	Edge preparation plat shell																R					
26	4.3	Pengerolan plat shell						A/C					R										
27	4.4	Pembentukan welding groove pada shell	I/C					A/C										R					
28	4.5	Assembly (tack weld & weld) shell plate	A/C														R	S	S				
29	4.6	Pelubangan pada shell plate untuk posisi manhole															R	S					
30	5	Hemispherical Ends																					
31	5.1	Pemotongan material plat hemispherical ends	C					A/C				R											
32	5.2	Edge preparation plat hemispherical ends																R					
33	5.3	Pengepresan plat segmen hemispherical ends	C					A/C							R								
34	5.4	Pembentukan welding groove pada segmen hemispherical ends	I/C															R					
35	5.5	Assembly (tack weld & weld) hemispherical ends	A/C														R	S	S				
36	6	Nozzles Attachment																					
37	6.1	Pemotongan material studding pad flange & reinforcement pad	I									R											
38	6.2	Edge preparation material studding pad flange & reinforcement pad																R					
39	6.3	Pengerolan neck manhole diameter 18" Sch 80												R									
40	6.4	Assembly manhole	I														R	S	S				
41	6.5	Machining studding pad flange N1, N3, N4, N5, N6, N7, N8	I													R							
42	6.6	Machining reinforcement pad nozzle N2 & manhole	I													R							
43	6.7	Machining blind flange N1	I													R							
44	6.8	Pembuatan pipa penyalur vapor line	I														R		S				

RASIC Matrix
Proyek LPG Storage Tank Kapasitas 50 Ton

No.	WBS	Responsible (R) Approval (A) Supports (S) Informed (I) Consulted (C)	Project Manager	Engineering Manager	QA Manager	Purchasing Manager	Marketing Manager	Production Supervisor	Drafter	QC	Warehouse	Assistant Warehouse	Tukang Potong	Tukang Rol	Tukang Pres	Operator Mesin perkakas	Fitter	Helper	Welder	Testing & Examination (outsourcing)	Specialis Name Plate (outsourcing)	Specialis Stiker (outsourcing)	Sand Blasting & Painting (outsourcing)
45	6.9	Assembly komponen nozzle N2	I														R		S				
46	7	Water Sprinkler																					
47	7.1	Assembly pipa water sprinkler	I														R	S	S				
48	7.2	Pelubangan pipa water sprinkler	I													R	S						
49	8	Saddle																					
50	8.1	Pemotongan material saddle	I										R										
51	8.2	Edge preparation material saddle																R					
52	8.3	Pengerolan pad plate (fixed & sliding side)	I											R									
53	8.4	Pengeboran base plate (fixed & sliding side)	I										S			R		S					
54	8.5	Assembly (tack weld & weld) saddle	I														R	S	S				
55	9	Lifting Lug																					
56	9.1	Pemotongan material lifting lug	C										R										
57	9.2	Edge preparation lifting lug																R					
58	9.3	Machining lifting lug	I													R							
59	9.4	Assembly (tack weld & weld) lifting lug															R		S				
60	10	External Ladder																					
61	10.1	Assembly (tack weld & weld) external ladder with cage	I														R	S	S				
62	10.2	Assembly (tack weld & weld) platform & handrail	I														R	S	S				
63	11	Name Plate & Stiker																					
64	11.1	Pembuatan name plate	I																	R			
65	11.2	Pembuatan name plate support	I												R		S						
66	11.3	Pembuatan stiker logo & keterangan tangki	I	I					C													R	
67	12	Anchor Bolt																					
68	12.1	Machining ulir anchor bolt	I													R							
69	12.2	Assembly & pengelasan anchor bolt	I														R		S				
70	13	Assembly																					
71	13.1	Joint (pengelasan) hemispherical end dengan shell	I/C					A									R	S	S				
72	13.2	Joint nozzle attachment & manhole pada shell & head	I/C					A									R	S	S				
73	13.3	Assembly external parts (water sprinkle, saddle, external ladder, lifting lug, name plate support) pada tangki	I/C														R	S	S				
74	14	Inspection																					
75	14.1	Inspeksi dimensi plat shell yang telah dirol & segmen hemispherical ends	I		I					R													
76	14.2	Kontrol pengelasan shell & hemispherical ends	I		I					R													
77	14.3	Magnetic test (MT) pada bagian-bagian yang selesai dilas	A		I					I										R			
78	14.4	Non-destructive examination (NDE) berupa radiographic (X-ray) test	A		I					I										R			
79	14.5	Repair cacat pengelasan	A		I			C		I								S	R				
80	14.6	NDE ulang pada bagian yang telah diperbaiki	I		A					C										R			
81	14.7	Pengecekan visual dan dimensional	I		A			C		R													
82	14.8	Hydrostatic test	I		A					R					S								
83	14.9	Proses pressure purging	I		A					R					S								
84	14.10	Inspeksi ketebalan cat pada shell & head	I		A					R													
85	15	Quality Records																					
86	15.1	Penyusunan inspection report & quality record	I		A/C					R													
87	15.2	Penyusunan Manufacturing Data Report (MDR)	I/C		A/C				S	R													
88	16	Finishing																					
89	16.1	Surface preparation dengan sand blasting	I					I/C															R
90	16.2	Pendempulan						I/C															R
91	16.3	Pengecatan bagian internal tangki	A					I/C															R
92	16.4	Pengecatan bagian eksternal tangki	A					I/C															R

RASIC Matrix
Proyek LPG Storage Tank Kapasitas 50 Ton

No.	WBS	Responsible (R) Approval (A) Supports (S) Informed (I) Consulted (C)	Project Manager	Engineering Manager	QA Manager	Purchasing Manager	Marketing Manager	Production Supervisor	Drafter	QC	Warehouse	Assistant Warehouse	Tukang Potong	Tukang Rol	Tukang Pres	Operator Mesin perkakas	Fitter	Helper	Welder	Testing & Examination (outsourcing)	Specialis Name Plate (outsourcing)	Specialis Stiker (outsourcing)	Sand Blasting & Painting (outsourcing)
93	16.5	Pengecatan <i>external parts</i> (water sprinkle, external ladder, platform & handrail)	I					A/C															R
94	16.6	Pembersihan/pencucian permukaan tangki	I												R								
95	16.7	Pemasangan stiker logo LPG & Pertamina	A					I/C														R	
96	16.8	Pemasangan name plate	I														R						
97	16.9	Penutupan lubang pada tangki termasuk nozzle	I														R	S					
98	16.10	Packaging & packing	I				I				S	R						S					
99	16.11	Pemindahan tangki ke posisi pemberangkatan	A					I/C							S			R					
100	16.12	Pemberangkatan tangki ke alat transportasi	A				I/C	I/C										R					



Lampiran 4:

Matriks Perencanaan Alokasi Tenaga Kerja
Proyek LPG Storage Tank Kapasitas 50 Ton

No.	WBS	Responsible (R) Approval (A) Support (S) Inform (I) Consult (C)	Project Manager	Engineering Manager	QA Manager	Purchasing Manager	Marketing Manager	Production Supervisor	Drafter	QC	Warehouse	Assistant Warehouse	Tukang Potong	Tukang Rol	Tukang Pres	Operator Mesin Perkakas	Fitter	Helper	Welder	
1	1	Pemrosesan PO																		
2	1.1	Menerima & memproses <i>purchase order</i> dari klien					1													
3	1.2	<i>Initial meeting</i>	1	1	1	1	1													
4	2	Engineering																		
5	2.1	Mengonfirmasi desain & gambar kepada <i>klien</i> untuk memperoleh <i>approval</i>		1																
6	2.2	Pembuatan gambar pabrikan							1											
7	2.3	Penyusunan <i>Welding Procedure Specification (WPS)</i> & <i>Procedure Qualification Report (PQR)</i>		1																
8	2.4	Penyusunan <i>hydrostatic test procedure</i>			1					1										
9	2.5	Penyusunan <i>material cutting plan</i>							1											
10	3	Procurement																		
11	3.1	Pengisian <i>material requisition sheet</i>	1																	

Matriks Perencanaan Alokasi Tenaga Kerja
Proyek LPG Storage Tank Kapasitas 50 Ton

No.	WBS	Responsible (R) Approval (A) Support (S) Inform (I) Consult (C)	Project Manager	Engineering Manager	QA Manager	Purchasing Manager	Marketing Manager	Production Supervisor	Drafter	QC	Warehouse	Assistant Warehouse	Tukang Potong	Tukang Rol	Tukang Pres	Operator Mesin Perkakas	Fitter	Helper	Welder
12	3.2	Pengecekan stok material, komponen & consumable yang ada di warehouse									1	1							
13	3.3	Penyusunan flow process sheet untuk produksi	1																
14	3.4	Mengontak vendor atau supplier				1													
15	3.5	Penetapan pilihan supplier dengan penawaran terbaik				1													
16	3.6	Pembuatan & rilis purchase order (PO)				1													
17	3.7	Follow up PO untuk menelusuri perkembangan posisi order				1													
18	3.8	Penerimaan material, komponen & consumable dari supplier									1	1							
19	3.9	Inspeksi material & komponen yang datang			1					2									
20	3.10	Penyiapan peralatan kerja dan alat bantu proyek						1			1	1							
21	3.11	Pengambilan material						1			1	1						1	
22	3.12	Marking layout pemotongan pada material						1					1						
23	4	Shell Plate																	

Matriks Perencanaan Alokasi Tenaga Kerja
Proyek LPG Storage Tank Kapasitas 50 Ton

No.	WBS	Responsible (R) Approval (A) Support (S) Inform (I) Consult (C)	Project Manager	Engineering Manager	QA Manager	Purchasing Manager	Marketing Manager	Production Supervisor	Drafter	QC	Warehouse	Assistant Warehouse	Tukang Potong	Tukang Rol	Tukang Pres	Operator Mesin Perkakas	Fitter	Helper	Welder	
24	4.1	Pemotongan material plat <i>shell</i>						1					1							
25	4.2	Edge preparation plat <i>shell</i>																1		
26	4.3	Pengerolan plat <i>shell</i>						1						3						
27	4.4	Pembentukan <i>welding groove</i> pada <i>shell</i>						1										3		
28	4.5	Assembly (<i>tack weld & weld</i>) <i>shell plate</i>															3	3	3	
29	4.6	Pelubangan pada <i>shell plate</i> untuk posisi <i>manhole</i>															1	1		
30	5	Hemispherical Ends																		
31	5.1	Pemotongan material plat <i>hemispherical ends</i>						1					2							
32	5.2	Edge preparation plat <i>hemispherical ends</i>																4		
33	5.3	Pengepresan plat segmen <i>hemispherical ends</i>						1							5					
34	5.4	Pembentukan <i>welding groove</i> pada segmen <i>hemispherical ends</i>																4		
35	5.5	Assembly (<i>tack weld & weld</i>) <i>hemispherical ends</i>															2	2	1	

Matriks Perencanaan Alokasi Tenaga Kerja
Proyek LPG Storage Tank Kapasitas 50 Ton

No.	WBS	Responsible (R) Approval (A) Support (S) Inform (I) Consult (C)	Project Manager	Engineering Manager	QA Manager	Purchasing Manager	Marketing Manager	Production Supervisor	Drafter	QC	Warehouse	Assistant Warehouse	Tukang Potong	Tukang Rol	Tukang Pres	Operator Mesin Perkakas	Fitter	Helper	Welder
36	6	Nozzles Attachment																	
37	6.1	Pemotongan material <i>studding pad flange & reinforcement pad</i>											1						
38	6.2	Edge preparation material <i>studding pad flange & reinforcement pad</i>																1	
39	6.3	Pengerolan neck manhole diameter 18" Sch 80												1					
40	6.4	Assembly manhole															1	1	1
41	6.5	Machining <i>studding pad flange N1, N3, N4, N5, N6, N7, N8</i>														5			
42	6.6	Machining reinforcement pad nozzle N2 & manhole														1			
43	6.7	Machining blind flange N1														2			
44	6.8	Pembuatan pipa penyalur vapor line															1		1
45	6.9	Assembly komponen nozzle N2															1		1
46	7	Water Sprinkler																	
47	7.1	Assembly pipa water sprinkler															1	1	1

Matriks Perencanaan Alokasi Tenaga Kerja
Proyek LPG Storage Tank Kapasitas 50 Ton

No.	WBS	Responsible (R) Approval (A) Support (S) Inform (I) Consult (C)	Project Manager	Engineering Manager	QA Manager	Purchasing Manager	Marketing Manager	Production Supervisor	Drafter	QC	Warehouse	Assistant Warehouse	Tukang Potong	Tukang Rol	Tukang Pres	Operator Mesin Perkakas	Fitter	Helper	Welder
48	7.2	Pelubangan pipa water sprinkler														2	1		
49	8	Saddle																	
50	8.1	Pemotongan material saddle											2						
51	8.2	Edge preparation material saddle																2	
52	8.3	Pengerolan pad plate (fixed & sliding side)												2					
53	8.4	Pengeboran base plate (fixed & sliding side)											1			2		1	
54	8.5	Assembly (tack weld & weld) saddle															2	2	1
55	9	Lifting Lug																	
56	9.1	Pemotongan material lifting lug											1						
57	9.2	Edge preparation lifting lug																1	
58	9.3	Machining lifting lug														1			
59	9.4	Assembly (tack weld & weld) lifting lug															1		1
60	10	External Ladder																	

Matriks Perencanaan Alokasi Tenaga Kerja
Proyek LPG Storage Tank Kapasitas 50 Ton

No.	WBS	Responsible (R) Approval (A) Support (S) Inform (I) Consult (C)	Project Manager	Engineering Manager	QA Manager	Purchasing Manager	Marketing Manager	Production Supervisor	Drafter	QC	Warehouse	Assistant Warehouse	Tukang Potong	Tukang Rol	Tukang Pres	Operator Mesin Perkakas	Fitter	Helper	Welder
61	10.1	Assembly (tack weld & weld) external ladder with cage															1	1	1
62	10.2	Assembly (tack weld & weld) platform & handrail															1	1	1
63	11	Name Plate & Stiker																	
64	11.1	Pembuatan name plate																	
65	11.2	Pembuatan name plate support													1		1		
66	11.3	Pembuatan stiker logo & keterangan tangki																	
67	12	Anchor Bolt																	
68	12.1	Machining ulir anchor bolt														2			
69	12.2	Assembly & pengelasan anchor bolt															1		1
70	13	Assembly																	
71	13.1	Joint (pengelasan) hemispherical end dengan shell						1									2	4	2
72	13.2	Joint nozzle attachment & manhole pada shell & head						1									1	2	1

Matriks Perencanaan Alokasi Tenaga Kerja
Proyek LPG Storage Tank Kapasitas 50 Ton

No.	WBS	Responsible (R) Approval (A) Support (S) Inform (I) Consult (C)	Project Manager	Engineering Manager	QA Manager	Purchasing Manager	Marketing Manager	Production Supervisor	Drafter	QC	Warehouse	Assistant Warehouse	Tukang Potong	Tukang Rol	Tukang Pres	Operator Mesin Perkakas	Fitter	Helper	Welder
73	13.3	Assembly external parts (water sprinkle, saddle, external ladder, lifting lug, name plate support) pada tangki															2	2	2
74	14	Inspection																	
75	14.1	Inspeksi dimensi plat <i>shell</i> yang telah dirol & segmen <i>hemispherical ends</i>								1									
76	14.2	Kontrol pengelasan <i>shell</i> & <i>hemispherical ends</i>								1									
77	14.3	<i>Magnetic test</i> (MT) pada bagian-bagian yang selesai dilas																	
78	14.4	<i>Non-destructive examination</i> (NDE) berupa <i>radiographic</i> (X-ray) <i>test</i>																	
79	14.5	Repair cacat pengelasan																1	1
80	14.6	NDE ulang pada bagian yang telah diperbaiki																	
81	14.7	Pengecekan visual dan dimensional								2									

Matriks Perencanaan Alokasi Tenaga Kerja
Proyek LPG Storage Tank Kapasitas 50 Ton

No.	WBS	Responsible (R) Approval (A) Support (S) Inform (I) Consult (C)	Project Manager	Engineering Manager	QA Manager	Purchasing Manager	Marketing Manager	Production Supervisor	Drafter	QC	Warehouse	Assistant Warehouse	Tukang Potong	Tukang Rol	Tukang Pres	Operator Mesin Perkakas	Fitter	Helper	Welder
82	14.8	Hydrostatic test								1					5				
83	14.9	Proses pressure purging								1					5				
84	14.10	Inspeksi ketebalan cat pada shell & head								1									
85	15	Quality Records																	
86	15.1	Penyusunan inspection report & quality record			1					1									
87	15.2	Penyusunan Manufacturing Data Report (MDR)			1				1	1									
88	16	Finishing																	
89	16.1	Surface preparation dengan sand blasting						1											
90	16.2	Pendempulan						1											
91	16.3	Pengecatan bagian internal tangki						1											
92	16.4	Pengecatan bagian eksternal tangki						1											
93	16.5	Pengecatan external parts (water sprinkle, external ladder, platform & handrail)						1											
94	16.6	Pembersihan/pencucian permukaan tangki													5				

Matriks Perencanaan Alokasi Tenaga Kerja
Proyek LPG Storage Tank Kapasitas 50 Ton

No.	WBS	Responsible (R) Approval (A) Support (S) Inform (I) Consult (C)	Project Manager	Engineering Manager	QA Manager	Purchasing Manager	Marketing Manager	Production Supervisor	Drafter	QC	Warehouse	Assistant Warehouse	Tukang Potong	Tukang Rol	Tukang Pres	Operator Mesin Perkakas	Fitter	Helper	Welder
95	16.7	Pemasangan stiker logo LPG & Pertamina						1											
96	16.8	Pemasangan <i>name plate</i>															1		
97	16.9	Penutupan lubang pada tangki termasuk <i>nozzle</i>															1	2	
98	16.10	<i>Packaging & packing</i>									1	1						1	
99	16.11	Pemindahan tangki ke posisi pemberangkatan						1							3			2	
100	16.12	Pemberangkatan tangki ke alat transportasi						1										3	

Lampiran 5:

Rencana Kebutuhan Material
Proyek LPG Storage Tank Kapasitas 50 Ton

No.	Nama Pekerjaan	Jumlah	Satuan	Harga Satuan (Rp)	Total (Rp)
10	Procurement				
18	Penerimaan material, komponen & consumable dari supplier				
	Kirim plat 45tx4'x8'	1	rit	175.000	175.000
	Jasa sopir trailer	1	orang	50.000	50.000
20	Penyiapan peralatan kerja dan alat bantu proyek				
	Electrode holder 600A	4	unit	25.000	100.000
	Terpal 3x4 m	4	sheet	42.000	168.000
21	Pengambilan material				
	Sarung tangan kaus	8	pasang	833	6.664
	Sewa forklift kapasitas 5 ton	3	jam	75.000	225.000
22	Marking layout pemotongan pada				
	Kapur besi	7	pak	500	3.500
	White marker Snowman	2	piece	10.000	20.000
	Solid marker yellow	2	piece	20.000	40.000
23	Shell Plate				
24	Pemotongan material plat shell				
	Pl. A 516 Gr 70 22tx2250x10800	5	sheet	79.837.164	399.185.820
	Sarung tangan kombinasi	5	pasang	5.833	29.165
	Batu gerinda cutting 7" I-Prix	1	piece	12.100	12.100
	Gas LPG 50 kg	0,5	tabung	360.000	180.000
	Gas O ₂ 6 m3	2	tabung	40.000	80.000
25	Edge preparation plat shell				
	Masker kain	4	piece	333	1.332
	Kacamata gerinda	2	unit	3.000	6.000
	Batu gerinda kasar 4" I-Prix	3	piece	3.410	10.230
	Batu gerinda fleksibel 4" WA60/AC60 I-Prix	14	piece	6.325	88.550
	Batu gerinda kasar 7" I-Prix	17	piece	9.350	158.950
	Carbon brush angle grinder 4" BOSCH	2	set	10.000	20.000
26	Pengerolan plat shell				
	Sarung tangan kombinasi	5	pasang	5.833	29.165
27	Pembentukan welding groove pada shell				
	Masker kain	12	piece	333	3.996
	Kacamata gerinda	3	unit	3.000	9.000
	Batu gerinda kasar 4" I-Prix	25	piece	3.410	85.250
	Batu gerinda fleksibel 4" WA60/AC60 I-Prix	40	piece	6.325	253.000
	Batu gerinda cutting 7" I-Prix	17	piece	12.100	205.700
	Batu gerinda kasar 7" I-Prix	62	piece	9.350	579.700
	Carbon brush angle grinder 7" BOSCH	2	set	20.000	40.000
28	Assembly (tack weld & weld) shell plate				
	Topeng las	3	unit	15.000	45.000
	Sarung tangan las	9	pasang	7.917	71.253
	Oto + lengan las	3	set	45.000	135.000

Rencana Kebutuhan Material
Proyek LPG Storage Tank Kapasitas 50 Ton

No.	Nama Pekerjaan	Jumlah	Satuan	Harga Satuan (Rp)	Total (Rp)
	Gas CO ₂ 6 m3	6	tabung	60.500	363.000
	Welding Electrode FCAW ESAB 71T dia 1,2	82,1	kg	20.000	1.642.000
	Kaca las hitam	6	piece	1.650	9.900
	Kaca las bening	14	piece	275	3.850
	Sikat baja	1	piece	3.000	3.000
	Contact tip dia 1,2	1	piece	7.500	7.500
29	Pelubangan pada <i>shell plate</i> untuk posisi <i>manhole</i>				
	Batu gerinda kasar 4" <i>I-Prix</i>	5	piece	3.410	17.050
	Batu gerinda fleksibel 4" WA60/AC60 <i>I-Prix</i>	15	piece	6.325	94.875
	Batu gerinda kasar 7" <i>I-Prix</i>	2	piece	9.350	18.700
	<i>Cylindrical mounted point C13x25 Kinik</i>	1	piece	11.000	11.000
30	Hemispherical Ends				
31	Pemotongan material plat <i>hemispherical ends</i>				
	Pl. A 516 Gr 70 14tx1830x10885	2	sheet	41.646.998	83.293.996
	Sarung tangan kombinasi	10	pasang	5.833	58.330
	Batu gerinda <i>cutting 7" I-Prix</i>	2	piece	12.100	24.200
	Gas LPG 50 kg	0,8	tabung	360.000	288.000
	Gas O ₂ 6 m3	4	tabung	40.000	160.000
32	Edge preparation plat segmen <i>hemispherical ends</i>				
	Masker kain	12	piece	333	3.996
	Kacamata gerinda	4	unit	3.000	12.000
	Batu gerinda kasar 4" <i>I-Prix</i>	2	piece	3.410	6.820
	Batu gerinda fleksibel 4" WA60/AC60 <i>I-Prix</i>	36	piece	6.325	227.700
	Batu gerinda kasar 7" <i>I-Prix</i>	44	piece	9.350	411.400
	<i>Carbon brush angle grinder 4" BOSCH</i>	1	set	10.000	10.000
33	Pengepresan plat segmen <i>hemispherical ends</i>				
	Sarung tangan kaus	10	pasang	833	8.330
	Batu gerinda fleksibel 4" WA60/AC60 <i>I-Prix</i>	10	piece	6.325	63.250
	Batu gerinda kasar 7" <i>I-Prix</i>	7	piece	9.350	65.450
34	Pembentukan <i>welding groove</i> pada segmen <i>hemispherical ends</i>				
	Masker kain	18	piece	333	5.994
	Kacamata gerinda	5	unit	3.000	15.000
	Batu gerinda kasar 4" <i>I-Prix</i>	25	piece	3.410	85.250
	Batu gerinda fleksibel 4" WA60/AC60 <i>I-Prix</i>	35	piece	6.325	221.375
	Batu gerinda kasar 7" <i>I-Prix</i>	55	piece	9.350	514.250
	<i>Carbon brush angle grinder 7" BOSCH</i>	1	set	20.000	20.000
35	<i>Assembly (tack weld & weld) hemispherical ends</i>				
	Topeng las	1		15.000	15.000
	Sarung tangan las	4		7.917	31.668

Rencana Kebutuhan Material
Proyek LPG Storage Tank Kapasitas 50 Ton

No.	Nama Pekerjaan	Jumlah	Satuan	Harga Satuan (Rp)	Total (Rp)
	Oto + lengan las	1		45.000	45.000
	Batu gerinda cutting 7" I-Prix	10		12.100	121.000
	Gas CO ₂ 6 m3	3,5		60.500	211.750
	Welding Electrode FCAW ESAB 71T dia 1,2	44,1		20.000	882.000
	Kaca las hitam	3		1.650	4.950
	Kaca las bening	12		275	3.300
	Contact tip dia 1,2	1		7.500	7.500
36	Nozzles Attachment				
37	Pemotongan material <i>studding pad</i>				
	Plate SS 400 45tx4'x8'	1		11.339.670	11.339.670
	Gas LPG 50 kg	0,2		360.000	72.000
	Gas O ₂ 6 m3	2		40.000	80.000
38	Edge preparation material <i>studding pad flange & reinforcement pad</i>				
	Batu gerinda kasar 4" I-Prix	1	piece	3.410	3.410
	Batu gerinda fleksibel 4" WA60/AC60 I-Prix	2	piece	6.325	12.650
	Batu gerinda kasar 7" I-Prix	5	piece	9.350	46.750
39	Pengerolan neck manhole diameter 18" Sch 80				
	Neck 22txdia457x210	1	piece	782.027	782.027
40	Assembly manhole				
	SO RF flange dia 18" ANSI 150	1	piece	1.250.000	1.250.000
	Blind flange dia 18" ANSI 150	1	piece	1.876.250	1.876.250
	Handle round bar dia 16x12 m	1	piece	85.200	85.200
	Batu gerinda fleksibel 4" WA60/AC60 I-Prix	3	piece	6.325	18.975
	Batu gerinda cutting 7" I-Prix	1	piece	12.100	12.100
	Welding Electrode FCAW ESAB 71T dia 1,2	2,4	kg	20.000	48.000
41	Machining <i>studding pad flange</i> N1, N3, N4, N5, N6, N7, N8				
	Batu gerinda fleksibel 4" WA60/AC60 I-Prix	1	piece	6.325	6.325
42	Machining reinforcement pad nozzle N2				
	Pad 22txdia460xdia820	1	piece	1.333.263	1.333.263
	Pad 22txdia116xdia240	1	piece	72.150	72.150
43	Machining blind flange N1				-
	Blind flange N1 20txdia155	1	piece	28.571	28.571
44	Pembuatan pipa penyalur vapor line				-
	Half-coupling NPT 3"-#6000	1	piece	323.750	323.750
	Neck dia 3" Sch 80	1	piece	900.000	900.000
	Reducer dia 3"xdia 4" Sch 80	1	piece	25.000	25.000
	Support pipe 16tx40	1	piece	48.103	48.103
	Batu gerinda cutting 4" I-Prix	1	piece	4.180	4.180
	Batu gerinda kasar 4" I-Prix	1	piece	3.410	3.410
	Batu gerinda fleksibel 4" WA60/AC60 I-Prix	1	piece	6.325	6.325
	Batu gerinda cutting 7" I-Prix	1	piece	12.100	12.100
45	Assembly komponen nozzle N2				
	Neck dia 4" Sch 80	1	piece	180.000	180.000

Rencana Kebutuhan Material
Proyek LPG Storage Tank Kapasitas 50 Ton

No.	Nama Pekerjaan	Jumlah	Satuan	Harga Satuan (Rp)	Total (Rp)
	SO RF flange dia 4" ANSI 300	1	piece	209.000	209.000
	Pipe dia 3" SGP Medium L=6 m	2	piece	390.000	780.000
	Elbow 90° dia 3"	4	piece	25.000	100.000
	Single Nipple NPT 3" Sch 40	4	piece	30.000	120.000
	Batu gerinda cutting 4" I-Prix	1	piece	4.180	4.180
	Batu gerinda kasar 4" I-Prix	1	piece	3.410	3.410
	Batu gerinda fleksibel 4" WA60/AC60 I-Prix	1	piece	6.325	6.325
	Batu gerinda cutting 7" I-Prix	1	piece	12.100	12.100
	Welding Electrode FCAW ESAB 71T dia 1,2	0,17	kg	20.000	3.400
46	Water Sprinkler				
47	Assembly pipa water sprinkler				
	Pipe dia 3" SGP Medium L=6 m	1	batang	390.000	390.000
	Elbow 90° dia 3"	1	piece	25.000	25.000
	Pipe dia 2" SGP Medium L=6 m	7	batang	220.800	1.545.600
	Elbow 45° dia 2"	4	piece	17.000	68.000
	Tee dia 2"	4	piece	78.000	312.000
	Cover plate 5txdia 60	4	piece	1.361	5.444
	SO FF flange dia 2" JIS 5K	12	piece	42.300	507.600
	Gasket dia 2" JIS 5K	6	piece	20.000	120.000
	Tee dia 3"	1	piece	39.000	39.000
	Reducer dia2"xdia3"	2	piece	16.000	32.000
	SO FF flange dia 3" JIS 5K	3	piece	46.000	138.000
	Gasket dia 3" JIS 5K	1	piece	25.000	25.000
	Support 9tx100x100	1	piece	6.013	6.013
	Support 9tx100x120	1	piece	7.215	7.215
	Pad plate 14tx70x150	1	piece	9.821	9.821
	L50x50x5 A 36 L=6 m	2	batang	141.800	283.600
	Base plate 6tx60x120	10	piece	2.886	28.860
	Pad plate 14tx60x120	10	piece	6.734	67.340
	Batu gerinda cutting 4" I-Prix	2	piece	4.180	8.360
	Batu gerinda kasar 4" I-Prix	2	piece	3.410	6.820
	Batu gerinda fleksibel 4" WA60/AC60 I-Prix	4	piece	6.325	25.300
	Batu gerinda cutting 7" I-Prix	5	piece	12.100	60.500
	Welding Electrode AWS E6013 dia 3,2	2,57	kg	12.100	31.097
	Welding Electrode AWS E7018 dia 2,5	0,5	kg	16.400	8.200
49	Saddle				
50	Pemotongan material saddle				
	Pl. SS 400 19tx6'x20'	1	sheet	14.160.909	14.160.909
	Pad plate (fixed side) 22tx600x3575 (1x)	1	piece	3.152.764	3.152.764
	Pad plate (sliding side) 22tx600x3575 (1x)	1	piece	3.152.764	3.152.764
	Spacer dia 2" Sch 80 L=6 m	0,5	piece	430.000	215.000
	Batu gerinda cutting 7" I-Prix	2	piece	12.100	24.200
	Gas LPG 50 kg	0,4	tabung	360.000	144.000
	Gas O ₂ 6 m ³	3	tabung	40.000	120.000
51	Edge preparation material saddle				

Rencana Kebutuhan Material
Proyek LPG Storage Tank Kapasitas 50 Ton

No.	Nama Pekerjaan	Jumlah	Satuan	Harga Satuan (Rp)	Total (Rp)
	Kacamata gerinda	1	unit	3.000	3.000
	Batu gerinda kasar 4" I-Prix	1	piece	3.410	3.410
	Batu gerinda fleksibel 4" WA60/AC60 I-Prix	13	piece	6.325	82.225
	Batu gerinda kasar 7" I-Prix	11	piece	9.350	102.850
53	Pengeboran base plate (fixed & sliding side)				
	Cylindrical mounted point C13x25 Kinik	5	piece	11.000	55.000
54	Assembly (tack weld & weld) saddle				
	Batu gerinda fleksibel 4" WA60/AC60 I-Prix	15	piece	6.325	94.875
	Batu gerinda cutting 7" I-Prix	5	piece	12.100	60.500
	Batu gerinda kasar 7" I-Prix	8	piece	9.350	74.800
	Welding Electrode AWS E7018 dia 3,2	57,6	kg	14.600	840.960
	Kaca las hitam	3	piece	1.650	4.950
	Kaca las bening	6	piece	275	1.650
55	Lifting Lug				
56	Pemotongan material plat lifting lug				
	Lifting lugs 25tx200x255	4	piece	85.183	340.732
	Ring plate 12txdia54xdia100	8	piece	25.187	201.496
	Gas LPG 50 kg	0,1	tabung	360.000	36.000
	Gas O ₂ 6 m3	1	tabung	40.000	40.000
57	Edge preparation plat lifting lug				
	Batu gerinda kasar 4" I-Prix	3	piece	3.410	10.230
	Batu gerinda fleksibel 4" WA60/AC60 I-Prix	5	piece	6.325	31.625
	Batu gerinda kasar 7" I-Prix	1	piece	9.350	9.350
59	Assembly (tack weld & weld) lifting lug				
	Batu gerinda fleksibel 4" WA60/AC60 I-Prix	6	piece	6.325	37.950
	Batu gerinda cutting 7" I-Prix	1	piece	12.100	12.100
	Batu gerinda kasar 7" I-Prix	2	piece	9.350	18.700
	Welding Electrode AWS E7018 dia 3,2	3,3	kg	14.600	48.180
60	External Ladder				
61	Assembly (tack weld & weld) external ladder with cage				
	Flat bar 50x9t L=6 m	2	batang	170.000	340.000
	Round bar dia 3/4" L=6 m	2	batang	107.000	214.000
	Flat bar 50x6t L=6 m	3	batang	118.000	354.000
	Flat bar 100x9t L=6 m	1	batang	360.000	360.000
	Pad plate 14tx60x150	2	piece	8.418	16.836
	Support 9tx50x400	1	piece	12.026	12.026
	Batu gerinda cutting 4" I-Prix	30	piece	4.180	125.400
	Batu gerinda kasar 4" I-Prix	6	piece	3.410	20.460
	Batu gerinda fleksibel 4" WA60/AC60 I-Prix	5	piece	6.325	31.625
	Welding Electrode AWS E6013 dia 3,2	0,6	kg	12.100	7.260

Rencana Kebutuhan Material
Proyek LPG Storage Tank Kapasitas 50 Ton

No.	Nama Pekerjaan	Jumlah	Satuan	Harga Satuan (Rp)	Total (Rp)
62	<i>Assembly (tack weld & weld) platform & handrail</i>				
	L65x65x6 L=6 m	2	batang	245.000	490.000
	Base plate 12tx150x150	6	piece	18.039	108.234
	Pad plate 22tx150x150	6	piece	33.071	198.426
	Checked plate 4,5tx4'x8'	1	sheet	880.000	880.000
	Pipe dia 1" SGP Medium L=6 m	2	batang	82.000	164.000
	Elbow 90° dia 1"	3	piece	3.300	9.900
	Pipe dia ½" SGP Medium L=6 m	1	batang	59.000	59.000
	Batu gerinda cutting 4" I-Prix	5	piece	4.180	20.900
	Batu gerinda kasar 4" I-Prix	5	piece	3.410	17.050
	Batu gerinda fleksibel 4" WA60/AC60 I-Prix	5	piece	6.325	31.625
	Welding Electrode AWS E6013 dia 3,2	0,9	kg	12.100	10.890
63	Name Plate & Stiker				
64	<i>Pembuatan name plate</i>				
	Name plate 2tx145x145	1	piece	13.315	13.315
	Jasa pembuatan name plate	1	lot	150.000	150.000
65	<i>Pembuatan name plate support</i>				-
	Name plate support 3tx170x270	1	piece	9.200	9.200
	Batu gerinda cutting 4" I-Prix	1	piece	4.180	4.180
	Batu gerinda fleksibel 4" WA60/AC60 I-Prix	1	piece	6.325	6.325
66	<i>Pembuatan stiker logo & keterangan tangki</i>				
	Stiker logo LPG & Pertamina + jasa	0,5	lot	800.000	400.000
67	Anchor Bolt				
68	<i>Machining ulir anchor bolt</i>				
	Round bar dia 1½" L=6 m	1	batang	645.000	645.000
69	<i>Assembly anchor bolt</i>				-
	Hex. nut W1½"	16	piece	15.300	244.800
	Batu gerinda fleksibel 4" WA60/AC60 I-Prix	5	piece	6.325	31.625
	Batu gerinda cutting 7" I-Prix	1	piece	12.100	12.100
	Welding Electrode AWS E6013 dia 3,2	0,2	kg	12.100	2.420
70	Assembly				
71	<i>Joint (pengelasan) hemispherical end dengan shell</i>				
	Batu gerinda cutting 7" I-Prix	5	piece	12.100	60.500
	Batu gerinda kasar 7" I-Prix	4	piece	9.350	37.400
	Gas CO ₂ 6 m3	2	tabung	60.500	121.000
	Welding Electrode FCAW ESAB 71T dia 1,2	21,3	kg	20.000	426.000
	Kaca las hitam	2	piece	1.650	3.300
	Kaca las bening	8	piece	275	2.200
	Contact tip dia 1,2	1	piece	7.500	7.500
72	<i>Joint nozzle attachment & manhole pada shell & head</i>				
	Coupling NPT ½"-#6000	2	piece	30.000	60.000

Rencana Kebutuhan Material
Proyek LPG Storage Tank Kapasitas 50 Ton

No.	Nama Pekerjaan	Jumlah	Satuan	Harga Satuan (Rp)	Total (Rp)
	Batu gerinda kasar 4" I-Prix	10	piece	3.410	34.100
	Batu gerinda fleksibel 4" WA60/AC60 I-Prix	5	piece	6.325	31.625
	Batu gerinda kasar 7" I-Prix	2	piece	9.350	18.700
	Gas CO ₂ 6 m ³	2,5	tabung	60.500	151.250
	Welding Electrode FCAW ESAB 71T dia 1,2	29,1	kg	20.000	582.000
	Contact tip dia 1,2	1	piece	7.500	7.500
73	Assembly external parts (water sprinkle, saddle, external ladder, lifting lug, name plate support) pada tangki				
	Gas CO ₂ 6 m ³	2	tabung	60.500	121.000
	Welding Electrode FCAW ESAB 71T dia 1,2	26,3	kg	20.000	526.000
	Welding Electrode AWS E6013 dia 3,2	1,56	kg	12.100	18.876
	Kaca las hitam	2	piece	1.650	3.300
	Kaca las bening	6	piece	275	1.650
74	Inspection				
76	Kontrol pengelasan shell & hemispherical ends				
	Mega Check Cleaner 450 ml NABAKEM	8	botol	45.833	366.664
	Mega Check Developer 450 ml NABAKEM	8	botol	45.833	366.664
	Mega Check Penetrant 450 ml NABAKEM	2	botol	45.833	91.666
77	Magnetic test (MT) pada bagian-bagian Testing & Examination	1	hari	935.000	935.000
78	Non-destructive examination (NDE) berupa radiographic (X-ray) test				
	Testing & Examination	3	hari	935.000	2.805.000
	X-ray film 4"x15"	398	set	30.250	12.039.500
79	Repair cacat pengelasan				
	Batu gerinda cutting 4" I-Prix	10	piece	4.180	41.800
	Batu gerinda cutting 7" I-Prix	10	piece	12.100	121.000
	Welding Electrode FCAW ESAB 71T dia 1,2	22,2	kg	20.000	444.000
80	NDE ulang pada bagian yang telah di-repair				
	Testing & Examination	1	hari	935.000	935.000
	X-ray film 4"x15"	4	set	30.250	121.000
82	Hydrostatic test				
	Air PDAM untuk hydrotest	112	m ³	15.000	1.680.000
83	Proses pressure purging				
	Air PDAM untuk pressure purging	112	m ³	13.000	1.456.000
	Gas N ₂ 6 m ³	27	tabung	70.000	1.890.000
85	Quality Records				
87	Penyusunan Manufacturing Data Report				
	Perizinan Depnaker & pengesahan	1	lot	750.000	750.000
	Perizinan Depnaker (SKP)	1	lot	1.500.000	1.500.000
88	Finishing				

Rencana Kebutuhan Material
Proyek LPG Storage Tank Kapasitas 50 Ton

No.	Nama Pekerjaan	Jumlah	Satuan	Harga Satuan (Rp)	Total (Rp)
89	Surface preparation dengan sand blasting				
	Cup wire brush CC-31 Kinik	3	piece	13.200	39.600
	Jasa & material sand blasting	343,2	m ²	15.300	5.250.960
90	Pendempulan				
	Material & jasa pendempulan	1	lot	6.000.000	6.000.000
91	Pengecatan bagian internal tangki				
	Material cat internal tangki	149,42	m ²	50.342	7.522.102
	Jasa painting	149,42	m ²	10.000	1.494.200
92	Pengecatan bagian eksternal tangki				
	Material cat eksternal tangki	175,46	m ²	50.342	8.833.007
	Jasa painting	175,46	m ²	10.000	1.754.600
93	Pengecatan external parts (water				
	Kuas 3" ETERNA	1	piece	4.500	4.500
	Kuas rol 10 cm	1	piece	3.500	3.500
	Material cat eksternal tangki	18,34	m ²	50.342	923.272
	Jasa painting	18,34	m ²	10.000	183.400
94	Pembersihan/pencucian permukaan tangki				
	Kain majun	5	kg	3.000	15.000
	Air PDAM	1	m ³	9.500	9.500
95	Pemasangan stiker logo LPG & Pertamina				
	Stiker logo LPG & Pertamina + jasa	0,5	lot	800.000	400.000
97	Penutupan lubang pada tangki termasuk nozzle				
	Hex. bolt+nut W1½"x5"	16	set	57.390	918.240
	Spring washer W1½"	16	piece	1.376	22.016
	Gasket outerring dia 18" ANSI 150	1	piece	340.000	340.000
	Gasket dia 4" ANSI 300	1	piece	50.000	50.000
	Hex. bolt+nut W¾"x2"	8	set	4.050	32.400
	Spring washer W¾"	8	piece	282	2.256
	Gasket dia 2" ANSI 300	1	piece	50.000	50.000
	Blind flange dia 2" ANSI 300	3	piece	74.700	224.100
	Hex. bolt+nut W5/8"x2¼"	8	set	3.380	27.040
	Gasket dia 1" ANSI 300	2	piece	40.000	80.000
	Blind flange dia 1" ANSI 300	2	piece	48.600	97.200
	Hex. bolt+nut W5/8"x2"	8	set	3.350	26.800
	Blind flange dia 3" ANSI 300	1	piece	198.000	198.000
	Blind flange dia 4" ANSI 300	2	piece	324.000	648.000
	Plug NPT ½"-#3000	2	piece	16.000	32.000
98	Packaging & packing				
	Multiport PRV A8574G REGO	1	set	47.541.000	47.541.000
	Check valve 2" A3400L4 REGO	1	unit	2.433.566	2.433.566
	Excess flow valve 4" A4500Y8 REGO	1	unit	8.754.596	8.754.596
	Check valve 3" A3400L6 REGO	1	unit	4.050.460	4.050.460
	Excess flow valve 2" A3500P4	1	unit	2.517.602	2.517.602
	Internal valve A3219F6000 flange REGO	1	unit	22.257.602	22.257.602

Rencana Kebutuhan Material
Proyek LPG Storage Tank Kapasitas 50 Ton

No.	Nama Pekerjaan	Jumlah	Satuan	Harga Satuan (Rp)	Total (Rp)
	<i>Magnetic level Rochester</i>	1	set	19.500.000	19.500.000
	TSS 3169 ¼"	2	unit	135.000	270.000
	<i>Hex. bolt+nut M12x35</i>	52	set	650	33.800
	<i>Spring washer M12</i>	50	piece	64	3.200
	<i>Hex. bolt+nut M12x75</i>	8	set	1.490	11.920
	<i>Hex. bolt+nut M10x25</i>	20	set	582	11.640
	<i>Spring washer M10</i>	30	piece	37	1.110
	U-bolt M10	10	set	1.650	16.500
	<i>Double nipple NPT ½"</i>	1	piece	30.000	30.000
	<i>Globe valve NPT ½"</i>	1	unit	22.000	22.000
	<i>Pressure gauge (liquid) 0-25 bar dial 6" BSP ½" JAKO</i>	1	unit	350.000	350.000
	<i>Termometer 0-100°C dial 6" BSP ½" JAKO</i>	1	unit	520.000	520.000
	<i>Hex. bolt M12x35</i>	24	piece	375	9.000
	Palet	2	unit	187.750	375.500
	<i>Flat bar untuk packing 1tx20 (rol)</i>	1	rol	600.000	600.000
99	Pemindahan tangki ke posisi pemberangkatan				
	Sewa crane kapasitas 45 ton	1	lot	3.500.000	3.500.000
	Konsumsi makanan pemindahan tangki	12	bungkus	7.000	84.000
	Konsumsi minuman pemindahan tangki	15	bungkus	2.000	30.000
100	Pemberangkatan tangki ke alat transportasi				
	Sewa crane kapasitas 45 ton	1	lot	3.500.000	3.500.000
	Jasa sopir crane	1	orang	50.000	50.000
	Jasa keamanan pemberangkatan	1	orang	50.000	50.000
	Konsumsi pemberangkatan tangki	10	bungkus	10.000	100.000
	Bonus sopir pengirim tangki	1	orang	200.000	200.000
TOTAL					722.398.354
Ikhtisar Batu Gerinda & Welding Electrode					
	<i>Batu gerinda cutting 4" I-Prix</i>	50	piece	4.180	209.000
	<i>Batu gerinda kasar 4" I-Prix</i>	90	piece	3.410	306.900
	<i>Batu gerinda fleksibel 4" WA60/AC60 I-Prix</i>	222	piece	6.325	1.404.150
	<i>Batu gerinda cutting 7" I-Prix</i>	62	piece	12.100	750.200
	<i>Batu gerinda kasar 7" I-Prix</i>	220	piece	9.350	2.057.000
	<i>Cylindrical mounted point C13x25 Kinik</i>	6	piece	11.000	66.000
	<i>Cup wire brush CC-31 Kinik</i>	3	piece	13.200	39.600
	<i>Welding Electrode FCAW ESAB 71T dia 1,2</i>	227,67	kg	20.000	4.553.400
	<i>Welding Electrode AWS E7018 dia 3,2</i>	60,9	kg	14.600	889.140
	<i>Welding Electrode AWS E7018 dia 2,5</i>	0,5	kg	16.400	8.200
	<i>Welding Electrode AWS E6013 dia 3,2</i>	5,83	kg	12.100	70.543

Lampiran 6:

Rencana Biaya Listrik
Proyek LPG Storage Tank Kapasitas 50 Ton

Biaya pemakaian (Rp/kWh) = 1.156

No.	Nama Pekerjaan	Mesin/Perlengkapan Listrik	Daya (watt)	Unit Digunakan	Durasi (jam)	Daya Jam =Daya x Durasi (kWh)	Biaya/Jam =Daya x Biaya Pemakaian (Rp/jam)	Total Durasi =Unit Digunakan x Durasi (jam)	Biaya =Biaya/Jam x Total Durasi (Rp)
1	Pemrosesan PO				1.618				
2	Menerima & memproses <i>purchase order</i> dari klien (<i>customer</i>)	Komputer	350	1	4	1,4	405	4	1.618
4	Engineering							19.421	
6	Pembuatan gambar fabrikasi	Komputer	350	2	16	11,2	405	32	12.947
7	Penyusunan <i>Welding Procedure Specification (WPS) & Procedure Qualification Report (PQR)</i>	Komputer	350	1	4	1,4	405	4	1.618
8	Penyusunan <i>hydrostatic test procedure</i>	Komputer	350	2	4	2,8	405	8	3.237
9	Penyusunan <i>material cutting plan</i>	Komputer	350	1	4	1,4	405	4	1.618
10	Procurement							36.009	
12	Pengecekan stok material, komponen & <i>consumable</i> yang ada di <i>warehouse</i>	Komputer	350	1	12	4,2	405	12	4.855
13	Penyusunan <i>flow process sheet</i> untuk produksi	Komputer	350	1	16	5,6	405	16	6.474
14	Mengontak vendor atau <i>supplier</i>	Komputer	350	1	8	2,8	405	8	3.237
15	Penetapan pilihan <i>supplier</i> dengan penawaran terbaik	Komputer	350	1	16	5,6	405	16	6.474
16	Pembuatan & rilis <i>purchase order (PO)</i>	Komputer	350	1	8	2,8	405	8	3.237
18	Penerimaan material, komponen & <i>consumable</i> dari <i>supplier</i>	Komputer	350	1	24	8,4	405	24	9.710

Rencana Biaya Listrik
Proyek LPG Storage Tank Kapasitas 50 Ton

Biaya pemakaian (Rp/kWh) = 1.156

No.	Nama Pekerjaan	Mesin/Perlengkapan Listrik	Daya (watt)	Unit Digunakan	Durasi (jam)	Daya Jam =Daya x Durasi (kWh)	Biaya/Jam =Daya x Biaya Pemakaian (Rp/jam)	Total Durasi =Unit Digunakan x Durasi (jam)	Biaya =Biaya/Jam x Total Durasi (Rp)
21	Pengambilan material	Komputer	350	1	5	1,75	405	5	2.023
23	Shell Plate							1.550.233	
24	Pemotongan material plat shell	Angle grinder BOSCH GWS 20-180	2.000	1	1	2	2.312	1	2.312
25	Edge preparation plat shell	Angle grinder BOSCH GWS 8-100 C	850	2	0,5	0,85	983	1	983
		Angle grinder BOSCH GWS 20-180	2.000	2	0,5	2	2.312	1	2.312
26	Pengerolan plat shell	Mesin rol plat Herkules Wetzlar	30.000	1	24	720	34.680	24	832.320
27	Pembentukan welding groove pada shell	Angle grinder BOSCH GWS 8-100 C	850	3	6	15,3	983	18	17.687
		Angle grinder BOSCH GWS 20-180	2.000	3	6	36	2.312	18	41.616
28	Assembly (tack weld & weld) shell plate	MIG welding power source CEMONT BLUMIG 403 S	11.709	3	16	562,032	13.536	48	649.709
29	Pelubangan pada shell plate untuk posisi manhole	Angle grinder BOSCH GWS 8-100 C	850	1	1	0,85	983	1	983
		Angle grinder BOSCH GWS 20-180	2.000	1	1	2	2.312	1	2.312
30	Hemispherical Ends							579.423	
31	Pemotongan material plat hemispherical ends	Angle grinder BOSCH GWS 20-180	2.000	1	1,5	3	2.312	1,5	3.468
32	Edge preparation plat segmen hemispherical ends	Angle grinder BOSCH GWS 8-100 C	850	4	1	3,4	983	4	3.930
		Angle grinder BOSCH GWS 20-180	2.000	4	1	8	2.312	4	9.248

Rencana Biaya Listrik
Proyek LPG Storage Tank Kapasitas 50 Ton

Biaya pemakaian (Rp/kWh) = 1.156

No.	Nama Pekerjaan	Mesin/Perlengkapan Listrik	Daya (watt)	Unit Digunakan	Durasi (jam)	Daya Jam =Daya x Durasi (kWh)	Biaya/Jam =Daya x Biaya Pemakaian (Rp/jam)	Total Durasi =Unit Digunakan x Durasi (jam)	Biaya =Biaya/Jam x Total Durasi (Rp)
33	Pengepresan plat segmen hemispherical ends	Mesin pres hidrolik	11.000	1	30	330	12.716	30	381.480
		Angle grinder BOSCH GWS 8-100 C	850	1	1	0,85	983	1	983
		Angle grinder BOSCH GWS 20-180	2.000	1	1	2	2.312	1	2.312
34	Pembentukan welding groove pada segmen hemispherical ends	Angle grinder BOSCH GWS 8-100 C	850	4	6	20,4	983	24	23.582
		Angle grinder BOSCH GWS 20-180	2.000	4	6	48	2.312	24	55.488
35	Assembly (tack weld & weld) hemispherical ends	MIG welding power source CEMONT BLUMIG 403 S	11.709	1	7,167	83,9145	13.536	7,1667	97.005
		Angle grinder BOSCH GWS 20-180	2.000	1	0,833	1,667	2.312	0,8333	1.927
36	Nozzles Attachment							1.241.312	
38	Edge preparation material studding pad flange & reinforcement pad	Angle grinder BOSCH GWS 8-100 C	850	1	0,125	0,10625	983	0,125	123
		Angle grinder BOSCH GWS 20-180	2.000	1	0,125	0,25	2.312	0,125	289
39	Pengerolan neck manhole diameter 18" Sch 80	Mesin rol plat	6.000	1	1	6	6.936	1	6.936
40	Assembly manhole	Angle grinder BOSCH GWS 8-100 C	850	1	0,25	0,2125	983	0,25	246
		Angle grinder BOSCH GWS 20-180	2.000	1	0,0833	0,1667	2.312	0,0833	193

Rencana Biaya Listrik
Proyek LPG Storage Tank Kapasitas 50 Ton

Biaya pemakaian (Rp/kWh) = 1.156

No.	Nama Pekerjaan	Mesin/Perlengkapan Listrik	Daya (watt)	Unit Digunakan	Durasi (jam)	Daya Jam =Daya x Durasi (kWh)	Biaya/Jam =Daya x Biaya Pemakaian (Rp/jam)	Total Durasi =Unit Digunakan x Durasi (jam)	Biaya =Biaya/Jam x Total Durasi (Rp)
		MIG welding power source CEMONT BLUMIG 403 S	11.709	1	1,667	19,515	13.536	1,6667	22.559
41	Machining studding pad flange N1, N3, N4, N5, N6, N7, N8	Angle grinder BOSCH GWS 8-100 C	850	1	1	0,85	983	1	983
		Mesin bubut Tuda	5.000	5	39	975	5.780	195	1.127.100
42	Machining reinforcement pad nozzle N2 & manhole	Mesin bubut Tuda	5.000	1	3	15	5.780	3	17.340
43	Machining blind flange N1	Mesin bubut Tuda	5.000	1	5	25	5.780	5	28.900
44	Pembuatan pipa penyalur vapor line	Angle grinder BOSCH GWS 8-100 C	850	1	0,0833	0,070833	983	0,0833	82
		Angle grinder BOSCH GWS 20-180	2.000	1	0,0833	0,1667	2.312	0,0833	193
		MIG welding power source CEMONT BLUMIG 403 S	11.709	1	1,333	15,612	13.536	1,3333	18.047
45	Assembly komponen nozzle N2	Angle grinder BOSCH GWS 8-100 C	850	1	0,0833	0,070833	983	0,0833	82
		Angle grinder BOSCH GWS 20-180	2.000	1	0,0833	0,1667	2.312	0,0833	193
		MIG welding power source CEMONT BLUMIG 403 S	11.709	1	1,3333	15,612	13.536	1,3333	18.047
46	Water Sprinkler							42.784	
47	Assembly pipa water sprinkler	Angle grinder BOSCH GWS 8-100 C	850	1	1,5	1,275	983	1,5	1.474
		Angle grinder BOSCH GWS 20-180	2.000	1	0,5	1	2.312	0,5	1.156

Rencana Biaya Listrik
Proyek LPG Storage Tank Kapasitas 50 Ton

Biaya pemakaian (Rp/kWh) = 1.156

No.	Nama Pekerjaan	Mesin/Perlengkapan Listrik	Daya (watt)	Unit Digunakan	Durasi (jam)	Daya Jam =Daya x Durasi (kWh)	Biaya/Jam =Daya x Biaya Pemakaian (Rp/jam)	Total Durasi =Unit Digunakan x Durasi (jam)	Biaya =Biaya/Jam x Total Durasi (Rp)
		MMA welding equipment CEMONT YARD SV 403	11.974	1	2,5	29,935	13.842	2,5	34.605
48	Pelubangan pipa water sprinkler	Impact drill BOSCH GSB 13 RE	600	1	8	4,8	694	8	5.549
49	Saddle							104.924	
50	Pemotongan material saddle	Angle grinder BOSCH GWS 20-180	2.000	1	0,25	0,5	2.312	0,25	578
51	Edge preparation material saddle	Angle grinder BOSCH GWS 8-100 C	850	1	0,25	0,2125	983	0,25	246
		Angle grinder BOSCH GWS 20-180	2.000	1	0,25	0,5	2.312	0,25	578
52	Pengerolan pad plate (fixed & sliding side)	Mesin rol plat Herkules Wetzlar	30.000	1	1	30	34.680	1	34.680
53	Pengeboran base plate (fixed & sliding side)	Portable magnetic drill Unibor EQ100	1.850	1	2,667	4,9333	2.139	2,667	5.703
		Straight grinder BOSCH GGS 27 L	500	1	0,333	0,1667	578	0,333	193
54	Assembly (tack weld & weld) saddle	Angle grinder BOSCH GWS 8-100 C	850	2	0,333	0,5667	983	0,667	655
		Angle grinder BOSCH GWS 20-180	2.000	2	0,25	1	2.312	0,5	1.156
		MMA welding equipment CEMONT YARD SV 403	11.974	1	4,417	52,885167	13.842	4,41667	61.135
55	Lifting Lug							24.109	

Rencana Biaya Listrik
Proyek LPG Storage Tank Kapasitas 50 Ton

Biaya pemakaian (Rp/kWh) = 1.156

No.	Nama Pekerjaan	Mesin/Perlengkapan Listrik	Daya (watt)	Unit Digunakan	Durasi (jam)	Daya Jam =Daya x Durasi (kWh)	Biaya/Jam =Daya x Biaya Pemakaian (Rp/jam)	Total Durasi =Unit Digunakan x Durasi (jam)	Biaya =Biaya/Jam x Total Durasi (Rp)
57	Edge preparation plat lifting lug	Angle grinder BOSCH GWS 8-100 C	850	1	0,0833	0,070833	983	0,0833	82
		Angle grinder BOSCH GWS 20-180	2.000	1	0,0833	0,1667	2.312	0,0833	193
58	Machining lifting lug	Mesin bubut Tuda	5.000	1	2	10	5.780	2	11.560
59	Assembly (tack weld & weld) lifting lug	Angle grinder BOSCH GWS 8-100 C	850	1	0,75	0,6375	983	0,75	737
		Angle grinder BOSCH GWS 20-180	2.000	1	0,5	1	2.312	0,5	1.156
		MMA welding equipment CEMONT YARD SV 403	11.974	1	0,75	8,9805	13.842	0,75	10.381
60	External Ladder						94.886		
61	Assembly (tack weld & weld) external ladder with cage	Angle grinder BOSCH GWS 8-100 C	850	1	3	2,55	983	3	2.948
		MMA welding equipment CEMONT YARD SV 403	11.974	1	4	47,896	13.842	4	55.368
62	Assembly (tack weld & weld) platform & handrail	Angle grinder BOSCH GWS 8-100 C	850	1	2	1,7	983	2	1.965
		MMA welding equipment CEMONT YARD SV 403	11.974	1	2,5	29,935	13.842	2,5	34.605
67	Anchor Bolt						61.397		
68	Machining ulir anchor bolt	Mesin bubut Tuda	5.000	1	8	40	5.780	8	46.240
69	Assembly anchor bolt	Angle grinder BOSCH GWS 8-100 C	850	1	0,75	0,6375	983	0,75	737

Rencana Biaya Listrik
Proyek LPG Storage Tank Kapasitas 50 Ton

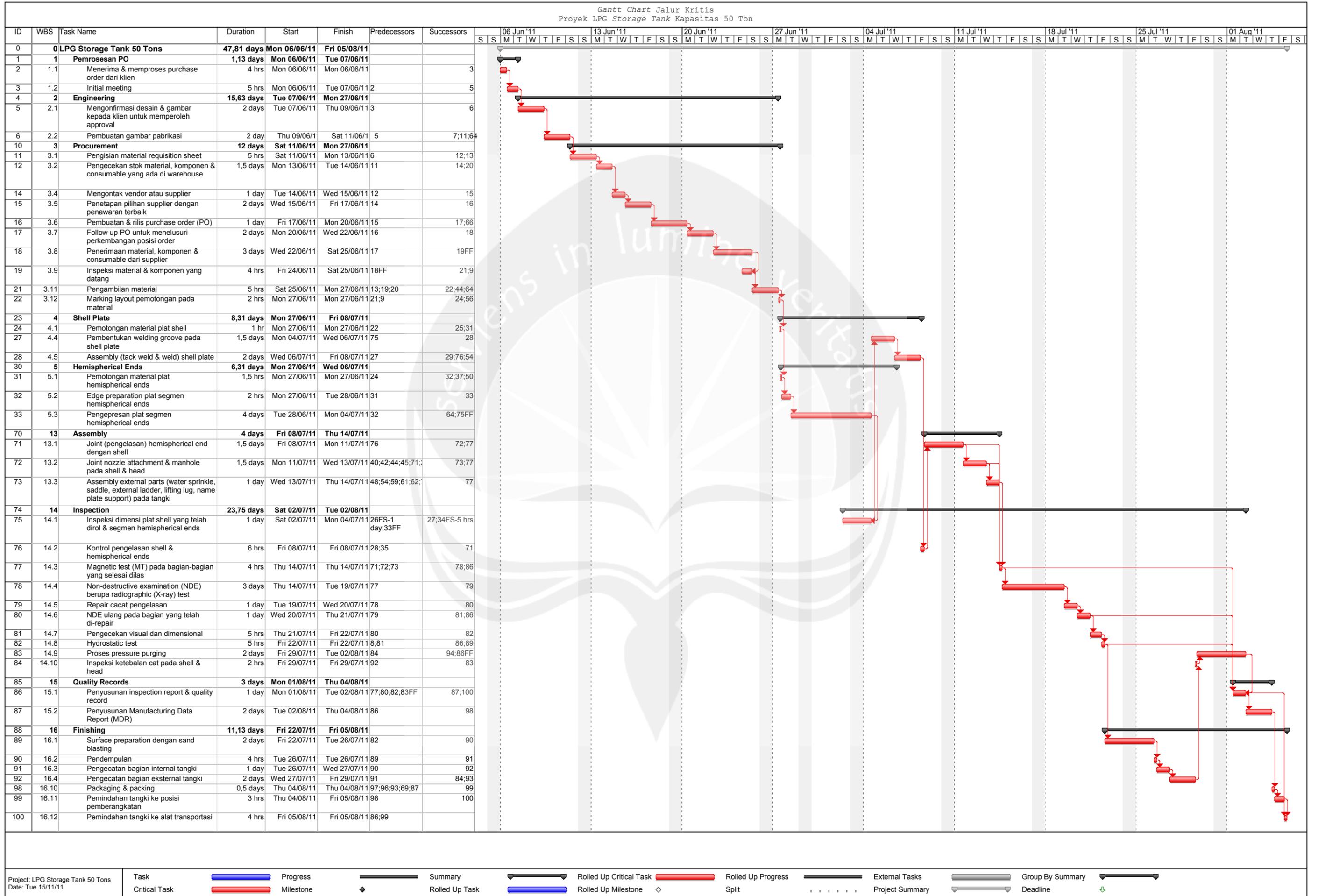
Biaya pemakaian (Rp/kWh) = 1.156

No.	Nama Pekerjaan	Mesin/Perlengkapan Listrik	Daya (watt)	Unit Digunakan	Durasi (jam)	Daya Jam =Daya x Durasi (kWh)	Biaya/Jam =Daya x Biaya Pemakaian (Rp/jam)	Total Durasi =Unit Digunakan x Durasi (jam)	Biaya =Biaya/Jam x Total Durasi (Rp)
		Angle grinder BOSCH GWS 20-180	2.000	1	0,25	0,5	2.312	0,25	578
		MMA welding equipment CEMONT YARD SV 403	11.974	1	1	11,974	13.842	1	13.842
70	Assembly							655.908	
71	Joint (pengelasan) hemispherical end dengan shell	Angle grinder BOSCH GWS 20-180	2.000	2	0,25	1	2.312	0,5	1.156
		MIG welding power source CEMONT BLUMIG 403 S	11.709	2	11,50	269,307	13.536	23	311.319
72	Joint nozzle attachment & manhole pada shell & head	Angle grinder BOSCH GWS 8-100 C	850	2	1,5	2,55	983	3	2.948
		Angle grinder BOSCH GWS 20-180	2.000	1	0,25	0,5	2.312	0,25	578
		MIG welding power source CEMONT BLUMIG 403 S	11.709	1	8,75	102,45375	13.536	8,75	118.437
73	Assembly external parts (water sprinkle, saddle, external ladder, lifting lug, name plate support) pada tangki	MMA welding equipment CEMONT YARD SV 403	11.974	2	8	191,584	13.842	16	221.471
74	Inspection							112.752	
79	Repair cacat pengelasan	Angle grinder BOSCH GWS 8-100 C	850	1	2	1,7	983	2	1.965
		Angle grinder BOSCH GWS 20-180	2.000	1	2	4	2.312	2	4.624

Rencana Biaya Listrik
Proyek LPG Storage Tank Kapasitas 50 Ton

Biaya pemakaian (Rp/kWh) = 1.156

No.	Nama Pekerjaan	Mesin/Perlengkapan Listrik	Daya (watt)	Unit Digunakan	Durasi (jam)	Daya Jam =Daya x Durasi (kWh)	Biaya/Jam =Daya x Biaya Pemakaian (Rp/jam)	Total Durasi =Unit Digunakan x Durasi (jam)	Biaya =Biaya/Jam x Total Durasi (Rp)
		MIG welding power source CEMONT BLUMIG 403 S	11.709	1	4	46,836	13.536	4	54.142
82	Hydrostatic test	Hydrostatic test pump PressureJet TW-130	9.000	1	5	45	10.404	5	52.020
85	Quality Records							9.710	
86	Penyusunan inspection report & quality record	Komputer	350	1	8	2,8	405	8	3.237
87	Penyusunan Manufacturing Data Report (MDR)	Komputer	350	1	16	5,6	405	16	6.474
88	Finishing							291.312	
89	Surface preparation dengan sand blasting	Air compressor Puma TE75250	5.600	1	16	89,6	6.474	16	103.578
91	Pengecatan bagian internal tangki	Air compressor Puma TE75250	5.600	1	8	44,8	6.474	8	51.789
92	Pengecatan bagian eksternal tangki	Air compressor Puma TE75250	5.600	1	16	89,6	6.474	16	103.578
93	Pengecatan external parts (water sprinkle, external ladder, platform)	Air compressor Puma TE75250	5.600	1	5	28	6.474	5	32.368
TOTAL						4.174,566			4.825.798



Project: LPG Storage Tank 50 Tons
Date: Tue 15/11/11

Task		Progress		Summary		Rolled Up Critical Task		Rolled Up Progress		External Tasks		Group By Summary		Deadline	
Critical Task		Milestone		Rolled Up Task		Rolled Up Milestone		Split		Project Summary		Deadline			

Lampiran 8:

Tabel Pemakaian Biaya Proyek Waktu Normal

Tanggal	Total Cost (Rp)	Cumulative Cost (Rp)	% Cumulative Cost
06/06/2011	9.667.618,40	9.667.618,40	1,23%
07/06/2011	1.592.661,86	11.260.280,26	1,43%
08/06/2011	448.756,41	11.709.036,67	1,49%
09/06/2011	515.647,71	12.224.684,38	1,55%
10/06/2011	841.771,74	13.066.456,12	1,66%
11/06/2011	443.998,34	13.510.454,46	1,72%
12/06/2011	-	13.510.454,46	1,72%
13/06/2011	956.628,35	14.467.082,81	1,84%
14/06/2011	1.159.180,75	15.626.263,55	1,99%
15/06/2011	927.876,55	16.554.140,09	2,10%
16/06/2011	853.179,88	17.407.319,97	2,21%
17/06/2011	875.237,68	18.282.557,65	2,32%
18/06/2011	465.215,54	18.747.773,18	2,38%
19/06/2011	-	18.747.773,18	2,38%
20/06/2011	930.431,08	19.678.204,26	2,50%
21/06/2011	1.816.758,68	21.494.962,94	2,73%
22/06/2011	2.112.201,21	23.607.164,15	3,00%
23/06/2011	2.136.201,21	25.743.365,36	3,27%
24/06/2011	2.587.243,32	28.330.608,68	3,60%
25/06/2011	506.952.695,62	535.283.304,30	68,00%
26/06/2011	-	535.283.304,30	68,00%
27/06/2011	21.314.513,15	556.597.817,46	70,71%
28/06/2011	4.569.299,19	561.167.116,65	71,29%
29/06/2011	-	561.167.116,65	71,29%
30/06/2011	6.056.100,65	567.223.217,30	72,06%
01/07/2011	7.382.292,58	574.605.509,88	73,00%
02/07/2011	2.321.467,31	576.926.977,19	73,29%
03/07/2011	-	576.926.977,19	73,29%
04/07/2011	6.398.838,76	583.325.815,96	74,10%
05/07/2011	5.626.249,76	588.952.065,72	74,82%
06/07/2011	4.593.028,91	593.545.094,64	75,40%
07/07/2011	3.779.771,80	597.324.866,43	75,88%
08/07/2011	1.438.566,70	598.763.433,13	76,07%
09/07/2011	614.740,73	599.378.173,86	76,14%
10/07/2011	-	599.378.173,86	76,14%
11/07/2011	1.041.424,87	600.419.598,73	76,28%
12/07/2011	1.984.555,01	602.404.153,74	76,53%
13/07/2011	3.859.710,97	606.263.864,71	77,02%
14/07/2011	4.948.166,67	611.212.031,38	77,65%

Tabel Pemakaian Biaya Proyek Waktu Normal

Tanggal	Total Cost (Rp)	Cumulative Cost (Rp)	% Cumulative Cost
15/07/2011	4.948.166,67	616.160.198,05	78,28%
16/07/2011	1.871.699,05	618.031.897,10	78,51%
17/07/2011	-	618.031.897,10	78,51%
18/07/2011	852.397,20	618.884.294,30	78,62%
19/07/2011	916.521,04	619.800.815,34	78,74%
20/07/2011	1.632.554,17	621.433.369,51	78,95%
21/07/2011	2.805.921,32	624.239.290,83	79,30%
22/07/2011	2.777.983,80	627.017.274,63	79,65%
23/07/2011	6.321.039,98	633.338.314,61	80,46%
24/07/2011	-	633.338.314,61	80,46%
25/07/2011	8.203.497,69	641.541.812,29	81,50%
26/07/2011	5.813.352,67	647.355.164,96	82,24%
27/07/2011	5.425.592,46	652.780.757,42	82,93%
28/07/2011	3.031.391,79	655.812.149,21	83,31%
29/07/2011	3.185.255,99	658.997.405,20	83,72%
30/07/2011	3.948.287,32	662.945.692,52	84,22%
31/07/2011	-	662.945.692,52	84,22%
01/08/2011	4.052.997,19	666.998.689,71	84,73%
02/08/2011	34.887.034,27	701.885.723,98	89,17%
03/08/2011	85.035.868,83	786.921.592,82	99,97%
04/08/2011	246.354,17	787.167.946,98	100,00%

Lampiran 9:

Tabel Pemakaian Biaya Proyek Waktu Dipercepat

Tanggal	Total Cost (Rp)	Cumulative Cost (Rp)	% Cumulative Cost
06/06/2011	9.667.618,40	9.667.618,40	1,23%
07/06/2011	1.633.687,50	11.301.305,90	1,44%
08/06/2011	495.642,86	11.796.948,76	1,50%
09/06/2011	801.033,17	12.597.981,92	1,60%
10/06/2011	1.074.648,95	13.672.630,86	1,74%
11/06/2011	626.753,17	14.299.384,03	1,82%
12/06/2011	-	14.299.384,03	1,82%
13/06/2011	1.172.417,08	15.471.801,11	1,96%
14/06/2011	942.942,88	16.414.743,99	2,08%
15/06/2011	946.602,88	17.361.346,86	2,20%
16/06/2011	1.003.016,28	18.364.363,14	2,33%
17/06/2011	1.021.414,08	19.385.777,21	2,46%
18/06/2011	806.149,57	20.191.926,78	2,56%
19/06/2011	-	20.191.926,78	2,56%
20/06/2011	2.203.184,21	22.395.110,99	2,84%
21/06/2011	2.203.184,21	24.598.295,20	3,12%
22/06/2011	2.152.286,68	26.750.581,88	3,40%
23/06/2011	523.974.993,00	550.725.574,87	69,94%
24/06/2011	6.995.685,05	557.721.259,93	70,83%
25/06/2011	2.462.318,50	560.183.578,43	71,14%
26/06/2011	-	560.183.578,43	71,14%
27/06/2011	5.174.631,48	565.358.209,92	71,80%
28/06/2011	9.651.053,55	575.009.263,47	73,02%
29/06/2011	-	575.009.263,47	73,02%
30/06/2011	5.281.812,03	580.291.075,50	73,69%
01/07/2011	8.584.309,77	588.875.385,28	74,79%
02/07/2011	3.240.337,49	592.115.722,77	75,20%
03/07/2011	-	592.115.722,77	75,20%
04/07/2011	6.077.918,83	598.193.641,60	75,97%
05/07/2011	2.019.168,12	600.212.809,72	76,22%
06/07/2011	2.652.572,72	602.865.382,44	76,56%
07/07/2011	4.245.152,34	607.110.534,78	77,10%
08/07/2011	4.948.166,67	612.058.701,45	77,73%
09/07/2011	2.474.083,33	614.532.784,78	78,04%
10/07/2011	-	614.532.784,78	78,04%
11/07/2011	4.056.539,85	618.589.324,64	78,56%
12/07/2011	1.194.878,67	619.784.203,30	78,71%
13/07/2011	2.272.596,69	622.056.800,00	79,00%
14/07/2011	2.777.983,80	624.834.783,80	79,35%

Tabel Pemakaian Biaya Proyek Waktu Dipercepat

Tanggal	Total Cost (Rp)	Cumulative Cost (Rp)	% Cumulative Cost
15/07/2011	8.720.651,64	633.555.435,44	80,46%
16/07/2011	232.696,92	633.788.132,36	80,49%
17/07/2011	-	633.788.132,36	80,49%
18/07/2011	9.068.987,36	642.857.119,72	81,64%
19/07/2011	5.425.592,46	648.282.712,18	82,33%
20/07/2011	5.352.017,99	653.634.730,17	83,01%
21/07/2011	2.668.643,87	656.303.374,04	83,35%
22/07/2011	3.713.726,38	660.017.100,43	83,82%
23/07/2011	3.944.242,36	663.961.342,78	84,32%
24/07/2011	-	663.961.342,78	84,32%
25/07/2011	5.143.648,61	669.104.991,39	84,97%
26/07/2011	117.938.761,84	787.043.753,23	99,95%
27/07/2011	380.281,25	787.424.034,48	100,00%

Lampiran 10:

Tabel pemakaian biaya proyek waktu normal untuk sumber daya bertipe work dan cost

Tanggal	Total Cost (Rp)	Cumulative Cost (Rp)	% Cumulative Cost
06/06/2011	9.600.000,00	9.600.000,00	16,11%
07/06/2011	1.558.974,36	11.158.974,36	18,73%
08/06/2011	410.256,41	11.569.230,77	19,41%
09/06/2011	499.506,41	12.068.737,18	20,25%
10/06/2011	831.239,74	12.899.976,92	21,65%
11/06/2011	440.761,54	13.340.738,46	22,39%
12/06/2011	-	13.340.738,46	22,39%
13/06/2011	901.523,08	14.242.261,54	23,90%
14/06/2011	961.523,08	15.203.784,62	25,51%
15/06/2011	867.773,08	16.071.557,69	26,97%
16/06/2011	836.523,08	16.908.080,77	28,37%
17/06/2011	836.523,08	17.744.603,85	29,78%
18/06/2011	418.261,54	18.162.865,38	30,48%
19/06/2011	-	18.162.865,38	30,48%
20/06/2011	836.523,08	18.999.388,46	31,88%
21/06/2011	1.670.273,08	20.669.661,54	34,68%
22/06/2011	1.948.189,75	22.617.851,28	37,95%
23/06/2011	1.972.189,75	24.590.041,03	41,26%
24/06/2011	1.383.875,65	25.973.916,67	43,59%
25/06/2011	1.039.583,70	27.013.500,37	45,33%
26/06/2011	-	27.013.500,37	45,33%
27/06/2011	2.929.804,45	29.943.304,83	50,25%
28/06/2011	2.898.189,87	32.841.494,70	55,11%
29/06/2011	-	32.841.494,70	55,11%
30/06/2011	2.881.939,87	35.723.434,57	59,95%
01/07/2011	2.843.356,54	38.566.791,11	64,72%
02/07/2011	1.393.053,27	39.959.844,38	67,05%
03/07/2011	-	39.959.844,38	67,05%
04/07/2011	2.857.564,87	42.817.409,26	71,85%
05/07/2011	2.911.419,04	45.728.828,30	76,73%
06/07/2011	2.713.814,87	48.442.643,17	81,29%
07/07/2011	1.291.463,08	49.734.106,25	83,46%
08/07/2011	787.604,17	50.521.710,42	84,78%
09/07/2011	287.708,33	50.809.418,75	85,26%
10/07/2011	-	50.809.418,75	85,26%
11/07/2011	370.000,00	51.179.418,75	85,88%
12/07/2011	581.041,67	51.760.460,42	86,86%
13/07/2011	-	51.760.460,42	86,86%

Tabel pemakaian biaya proyek waktu normal untuk sumber daya bertipe work dan cost

Tanggal	Total Cost (Rp)	Cumulative Cost (Rp)	% Cumulative Cost
14/07/2011	-	51.760.460,42	86,86%
15/07/2011	-	51.760.460,42	86,86%
16/07/2011	21.875,00	51.782.335,42	86,89%
17/07/2011	-	51.782.335,42	86,89%
18/07/2011	128.125,00	51.910.460,42	87,11%
19/07/2011	14.000,00	51.924.460,42	87,13%
20/07/2011	188.187,50	52.112.647,92	87,45%
21/07/2011	100.104,17	52.212.752,08	87,62%
22/07/2011	80.000,00	52.292.752,08	87,75%
23/07/2011	40.000,00	52.332.752,08	87,82%
24/07/2011	-	52.332.752,08	87,82%
25/07/2011	80.000,00	52.412.752,08	87,95%
26/07/2011	80.000,00	52.492.752,08	88,09%
27/07/2011	80.000,00	52.572.752,08	88,22%
28/07/2011	246.645,83	52.819.397,92	88,63%
29/07/2011	1.509.555,56	54.328.953,47	91,17%
30/07/2011	1.094.270,83	55.423.224,31	93,00%
31/07/2011	-	55.423.224,31	93,00%
01/08/2011	2.122.125,00	57.545.349,31	96,56%
02/08/2011	1.742.027,77	59.287.377,08	99,49%
03/08/2011	242.812,50	59.530.189,58	99,89%
04/08/2011	63.020,83	59.593.210,42	100,00%

Lampiran 11:

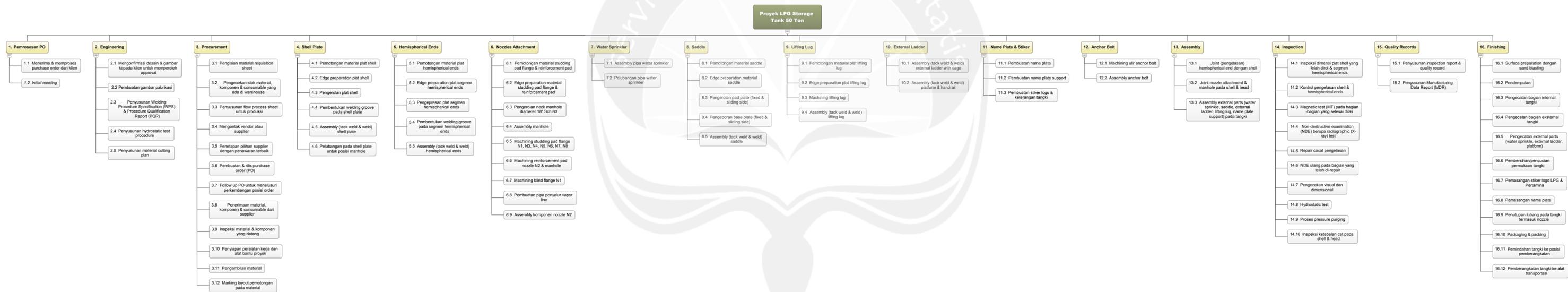
Tabel pemakaian biaya proyek waktu dipercepat untuk sumber daya bertipe work dan cost

Tanggal	Total Cost (Rp)	Cumulative Cost (Rp)	% Cumulative Cost
06/06/2011	9.600.000,00	9.600.000,00	16,04%
07/06/2011	1.600.000,00	11.200.000,00	18,71%
08/06/2011	457.142,86	11.657.142,86	19,48%
09/06/2011	775.779,07	12.432.921,92	20,77%
10/06/2011	1.016.506,08	13.449.428,00	22,47%
11/06/2011	526.253,04	13.975.681,03	23,35%
12/06/2011	-	13.975.681,03	23,35%
13/06/2011	1.021.256,08	14.996.937,11	25,06%
14/06/2011	927.506,08	15.924.443,19	26,61%
15/06/2011	927.506,08	16.851.949,26	28,16%
16/06/2011	927.506,08	17.779.455,34	29,71%
17/06/2011	927.506,08	18.706.961,41	31,26%
18/06/2011	741.669,71	19.448.631,12	32,50%
19/06/2011	-	19.448.631,12	32,50%
20/06/2011	2.039.172,75	21.487.803,86	35,90%
21/06/2011	2.039.172,75	23.526.976,60	39,31%
22/06/2011	1.934.506,08	25.461.482,68	42,54%
23/06/2011	2.210.130,10	27.671.612,78	46,24%
24/06/2011	3.253.388,06	30.925.000,84	51,67%
25/06/2011	1.626.694,03	32.551.694,87	54,39%
26/06/2011	-	32.551.694,87	54,39%
27/06/2011	3.253.388,06	35.805.082,93	59,83%
28/06/2011	3.315.929,73	39.121.012,66	65,37%
29/06/2011	-	39.121.012,66	65,37%
30/06/2011	3.263.346,39	42.384.359,05	70,82%
01/07/2011	3.766.908,89	46.151.267,94	77,11%
02/07/2011	1.742.027,36	47.893.295,30	80,02%
03/07/2011	-	47.893.295,30	80,02%
04/07/2011	2.352.019,28	50.245.314,58	83,95%
05/07/2011	971.604,17	51.216.918,75	85,58%
06/07/2011	769.791,67	51.986.710,42	86,86%
07/07/2011	-	51.986.710,42	86,86%
08/07/2011	-	51.986.710,42	86,86%
09/07/2011	-	51.986.710,42	86,86%
10/07/2011	-	51.986.710,42	86,86%
11/07/2011	88.291,67	52.075.002,08	87,01%
12/07/2011	74.708,33	52.149.710,42	87,13%
13/07/2011	240.291,67	52.390.002,08	87,54%

Tabel pemakaian biaya proyek waktu dipercepat
untuk sumber daya bertipe work dan cost

Tanggal	Total Cost (Rp)	Cumulative Cost (Rp)	% Cumulative Cost
14/07/2011	80.000,00	52.470.002,08	87,67%
15/07/2011	80.000,00	52.550.002,08	87,80%
16/07/2011	40.000,00	52.590.002,08	87,87%
17/07/2011	-	52.590.002,08	87,87%
18/07/2011	80.000,00	52.670.002,08	88,00%
19/07/2011	80.000,00	52.750.002,08	88,14%
20/07/2011	81.000,00	52.831.002,08	88,27%
21/07/2011	269.770,83	53.100.772,92	88,72%
22/07/2011	2.036.666,67	55.137.439,58	92,13%
23/07/2011	1.291.423,61	56.428.863,19	94,28%
24/07/2011	-	56.428.863,19	94,28%
25/07/2011	2.530.291,67	58.959.154,86	98,51%
26/07/2011	792.909,72	59.752.064,58	99,84%
27/07/2011	97.395,83	59.849.460,42	100,00%

Work Breakdown Structure (WBS) Proyek LPG Storage Tank Kapasitas 50 Ton



ID	Task Name	Duration	Start	Finish	Predecessors	Successors
0	LPG Storage Tank 50 Tons	46.23 days	Mon 06/06/11	Tue 04/08/11		
1	Pemrosesan PO	1.13 days	Mon 06/06/11	Tue 07/06/11		
2	Menerima & memproses purchase order dari klien	4 hrs	Mon 06/06/11	Tue 07/06/11		Marketing Manager;Telepon SLJ[60 menit];Listrik komputer[4 jam]
3	Initial meeting	5 hrs	Mon 06/06/11	Tue 07/06/11		Engineering Manager;Project Manager;Purchasing Manager;Marketing Manager;QA Manager
4	Engineering	14.63 days	Tue 07/06/11	Fri 24/06/11		Engineering Manager;Telepon SLJ[70 menit]
5	Mengonfirmasi desain & gambar kepada klien untuk memperoleh approval	2 days	Tue 07/06/11	Thu 09/06/11		
6	Pembuatan gambar fabrikasi	1 day	Thu 09/06/11	Fri 10/06/11		7.11.64
7	Penyusunan Welding Procedure Specification (WPS) & Procedure	4 hrs	Fri 10/06/11	Fri 10/06/11		8SS
8	Penyusunan hydrostatic test procedure	4 hrs	Fri 10/06/11	Fri 10/06/11		82
9	Penyusunan material cutting plan	4 hrs	Fri 24/06/11	Fri 24/06/11		22
10	Procurement	12 days	Fri 10/06/11	Sat 25/06/11		
11	Pengisian material requisition sheet	5 hrs	Fri 10/06/11	Fri 10/06/11		12.13
12	Pengecekan stok material, komponen & consumable yang ada di warehouse	1.5 days	Fri 10/06/11	Mon 13/06/11		14.20
13	Penyusunan flow process sheet untuk produk	2 days	Fri 10/06/11	Tue 14/06/11		21
14	Mengontak vendor atau supplier	1 day	Mon 13/06/11	Tue 14/06/11		15
15	Penetapan pilihan supplier dengan penawaran terbaik	2 days	Tue 14/06/11	Thu 16/06/11		16
16	Pembuatan & file purchase order (PO)	1 day	Thu 16/06/11	Fri 17/06/11		17.66
17	Follow up PO untuk menelusuri perkembangan posisi order	2 days	Fri 17/06/11	Tue 21/06/11		18
18	Penerimaan material, komponen & consumable dari supplier	3 days	Tue 21/06/11	Fri 24/06/11		19FF
19	Inspeksi material & komponen yang datang	4 hrs	Thu 23/06/11	Fri 24/06/11		21.9
20	Penyapan peralatan kerja dan alat bantu proyek	1.5 days	Mon 13/06/11	Wed 15/06/11		21
21	Pengambilan material	5 hrs	Fri 24/06/11	Fri 24/06/11		22.44.6
22	Marking layout pemotongan pada material	2 hrs	Fri 24/06/11	Sat 25/06/11		24.56
23	Shell Plate	8.23 days	Sat 25/06/11	Thu 07/07/11		
24	Pemotongan material plat shell	1 hr	Sat 25/06/11	Sat 25/06/11		25.31
25	Edge preparation plat shell	1 hr	Sat 25/06/11	Sat 25/06/11		26
26	Pengelasan plat shell	3 days	Sat 25/06/11	Thu 30/06/11		39.75FS-1 day
27	Pembentukan welding groove pada shell plate	1.5 days	Sat 02/07/11	Tue 05/07/11		28
28	Assembly (tack weld & weld) shell plate	2 days	Tue 05/07/11	Thu 07/07/11		29.76.54
29	Pembentukan pada shell plate untuk posisi manhole	2 hrs	Thu 07/07/11	Thu 07/07/11		72
30	Hemispherical Ends	6.23 days	Sat 25/06/11	Tue 05/07/11		
31	Pemotongan material plat hemispherical ends	1.5 hrs	Sat 25/06/11	Sat 25/06/11		32.37.50
32	Edge preparation plat segmen hemispherical ends	1.33 hrs	Sat 25/06/11	Mon 27/06/11		33
33	Pengepresan plat segmen hemispherical ends	4 days	Mon 27/06/11	Sat 02/07/11		64.75FF
34	Pembentukan welding groove pada segmen hemispherical ends	1.5 days	Fri 01/07/11	Mon 04/07/11		35
35	Assembly (tack weld & weld) plat segmen hemispherical ends	1 day	Mon 04/07/11	Tue 05/07/11		76
36	Nozzles Attachment	6.28 days	Fri 24/06/11	Tue 05/07/11		
37	Pemotongan material studding pad flange & reinforcement pad	0.5 hrs	Sat 25/06/11	Sat 25/06/11		38
38	Edge preparation material studding pad flange & reinforcement pad	15 mins	Mon 27/06/11	Mon 27/06/11		41.42
39	Pengelasan neck manhole diameter 18" Sch 80	1 hr	Thu 30/06/11	Thu 30/06/11		40.52
40	Assembly manhole	2 hrs	Fri 01/07/11	Fri 01/07/11		72
41	Machining studding pad flange N1, N3, N4, N5, N6, N7, N8	5 days	Mon 27/06/11	Mon 04/07/11		42.43.53.72
42	Machining reinforcement pad nozzle N2 & manhole	3 hrs	Mon 04/07/11	Mon 04/07/11		72
43	Machining blind flange N1	5 hrs	Mon 04/07/11	Tue 05/07/11		58.68
44	Pembuatan pipa penyalur vapor line	1.5 hrs	Fri 24/06/11	Sat 25/06/11		45.72
45	Assembly komponen nozzle N2	1.5 hrs	Sat 25/06/11	Sat 25/06/11		47.72
46	Water Sprinkler	9.48 days	Sat 25/06/11	Fri 08/07/11		
47	Pembangunan pipa water sprinkler	1 day	Sat 25/06/11	Mon 27/06/11		48.61
48	Pelubangan pipa water sprinkler	1 day	Thu 07/07/11	Fri 08/07/11		73
49	Saddle	8.29 days	Sat 25/06/11	Thu 07/07/11		
50	Pemotongan material saddle	1.5 hrs	Sat 25/06/11	Mon 27/06/11		51
51	Edge preparation material saddle	0.5 hrs	Mon 27/06/11	Mon 27/06/11		52.53
52	Pengelasan pad plate (fixed & sliding side)	1 hr	Fri 01/07/11	Fri 01/07/11		54
53	Pengelasan base plate (fixed & sliding side)	3 hrs	Mon 04/07/11	Mon 04/07/11		54
54	Assembly (tack weld & weld) saddle	5 hrs	Thu 07/07/11	Thu 07/07/11		59.73.48
55	Lifting Lug	8.85 days	Sat 25/06/11	Thu 07/07/11		
56	Pemotongan material plat lifting lug	0.5 hrs	Sat 25/06/11	Sat 25/06/11		57
57	Edge preparation plat lifting lug	10 mins	Sat 25/06/11	Sat 25/06/11		58
58	Pengelasan lifting lug	2 hrs	Tue 05/07/11	Tue 05/07/11		59
59	Assembly (tack weld & weld) lifting lug	2 hrs	Thu 07/07/11	Thu 07/07/11		73
60	External Ladder	2.5 days	Mon 27/06/11	Fri 01/07/11		
61	Assembly (tack weld & weld) external ladder with cage	1.5 days	Mon 27/06/11	Thu 30/06/11		62.73
62	Assembly (tack weld & weld) platform & handrail	1 day	Thu 30/06/11	Fri 01/07/11		73
63	Name Plate & Stiker	12.42 days	Fri 17/06/11	Tue 05/07/11		
64	Pembuatan name plate	2 days	Sat 02/07/11	Tue 05/07/11		65
65	Pembuatan name plate support	0.5 hrs	Tue 05/07/11	Tue 05/07/11		73
66	Pembuatan stiker logo & keterangan tangki	5 days	Fri 17/06/11	Fri 24/06/11		95
67	Anchor Bolt	1.25 days	Tue 05/07/11	Wed 06/07/11		
68	Machining ulir anchor bolt	1 day	Tue 05/07/11	Wed 06/07/11		69
69	Assembly anchor bolt	2 hrs	Wed 06/07/11	Wed 06/07/11		98
70	Assembly	3.5 days	Thu 07/07/11	Tue 12/07/11		
71	Joint (pengelasan) hemispherical end dengan shell	1.5 days	Thu 07/07/11	Sat 09/07/11		72.77
72	Joint nozzle attachment & manhole pada shell & head	1.5 days	Sat 09/07/11	Tue 12/07/11		73.77
73	Assembly external parts (water sprinker, saddle, external ladder, lifting lug, name plate support) pada tangki	0.5 days	Tue 12/07/11	Tue 12/07/11		74.54.59.61.62
74	Inspection	23.25 days	Fri 01/07/11	Sat 30/07/11		
75	Inspeksi dimensi plat shell yang telah dirol & segmen hemispherical ends	1 day	Fri 01/07/11	Sat 02/07/11		27.34FS-5 hrs
76	Kontrol pengelasan shell & hemispherical ends	6 hrs	Thu 07/07/11	Thu 07/07/11		71
77	Magnetic test (MT) pada bagian-bagian yang selesai dirol	4 hrs	Tue 12/07/11	Wed 13/07/11		78.86
78	Non-destructive examination (NDE) berupa radiographic (X-ray) test	3 days	Wed 13/07/11	Sat 16/07/11		77
79	NDE utang pada bagian yang telah di-repair	1 day	Sat 16/07/11	Mon 18/07/11		81.86
80	Pengecekan visual dan dimensional	5 hrs	Tue 19/07/11	Wed 20/07/11		82
81	Hydrostatic test	2 days	Thu 21/07/11	Thu 21/07/11		86.89
82	Proses pressure purging	2 days	Thu 28/07/11	Sat 30/07/11		94.86FF
83	Inspeksi ketebalan cat pada shell & head	2 hrs	Thu 28/07/11	Thu 28/07/11		83
84	Quality Records	3 days	Fri 28/07/11	Tue 02/08/11		
85	Penyusunan inspection report & quality record	1 day	Fri 29/07/11	Sat 30/07/11		87.100
86	Penyusunan Manufacturing Data Report (MDR)	2 days	Sat 30/07/11	Tue 02/08/11		98
87	Finishing	11.13 days	Thu 21/07/11	Thu 04/08/11		
88	Surface preparation dengan sand blasting	2 days	Thu 21/07/11	Sat 23/07/11		90
89	Pendempulan	4 hrs	Sat 23/07/11	Mon 25/07/11		92
90	Pengelasan bagian internal tangki	1 day	Mon 25/07/11	Tue 26/07/11		92
91	Pengelasan bagian eksternal tangki	2 days	Tue 26/07/11	Thu 28/07/11		84.93
92	Pengelasan external parts (water sprinker, external ladder, platform)	5 hrs	Thu 28/07/11	Thu 28/07/11		98
93	Pembersihan/pencucian permukaan tangki	3 hrs	Sat 30/07/11	Mon 01/08/11		95
94	Pemasangan stiker logo LPG & Pertamina	4 hrs	Mon 01/08/11	Mon 01/08/11		96SS.97
95	Pemasangan name plate	1 hr	Mon 01/08/11	Mon 01/08/11		98
96	Penutupan lubang pada tangki termasuk nozzle	4 hrs	Mon 01/08/11	Tue 02/08/11		98
97	Packing & packing	0.5 days	Tue 02/08/11	Wed 03/08/11		99
98	Permindahan tangki ke posisi pemberangkatan	3 hrs	Wed 03/08/11	Wed 03/08/11		100
99	Permindahan tangki ke alat transportasi	4 hrs	Wed 03/08/11	Thu 04/08/11		

