

BAB III

METODOLOGI PERANCANGAN

3.1. Data Perancangan

Data yang digunakan dalam perancangan bejana tekan ini mengikuti data yang sudah ada yaitu bejana tekan vertikal *2nd Stage Compressor Suction KOD* yang terdapat di Qatar Petroleum, Bul Hanine Arab “C” Gas Cap Recyling. Standar perancangan menggunakan standar ASME *section VIII division 1* untuk seluruh komponen bejana tekan.

3.1.1. Data General

Tabel 3.1. Data Desain Bejana Tekan *2nd Stage Compressor Suction KOD*

No	Parameter	Satuan	Nilai
1	<i>Orientation</i>		<i>Vertical</i>
2	<i>Contents</i>		HC,H ₂ S,Water,CO ₂
3	<i>Criticality Rating</i>		3
4	<i>Service</i>		<i>Lethal,Sour</i>
5	<i>Design Code</i>		ASME Sec.VIII DIV.1
6	<i>Code Stamp</i>		<i>Yes</i>
7	<i>Temperature</i>		
	<i>- Design – Upper/Lower</i>	°C	150/-15
	<i>-Operating – Max/Normal/Min</i>	°C	43/35/35
8	<i>Pressure</i>		
	<i>-Design Internal</i>	barg	62
	<i>-Design External – Upper/Lower</i>		Full Vacuum
	<i>-Operating – Max/Normal/Min</i>	bar	-/34/-
9	<i>Corrosion Allowance</i>	mm	3
10	<i>Specific Gravity Liquid (HC/W)</i>		<i>Refer Sheet 2</i>

No	Parameter	Satuan	Nilai
11	<i>Gross Capacity</i>	m ³	10,4
12	<i>Vessel Diameter (ID)</i>	mm	1550
13	<i>Vessel Length (T/L TO T/L)</i>	mm	5000
14	<i>Shop Hydrotest Pressure (N&C)</i>		<i>Per code</i>
15	<i>Wind</i>		BS CP3, Chapter V, <i>Part 2</i>
16	<i>Design Wind Speed</i>	m/s	45
17	<i>Seismic (refer Enviromental data)</i>		1535-0-56-0001
18	<i>Shell Thickness (NOM)</i>	mm	42 VTC
19	<i>Min. Head Thickness (Top/Bot)</i>	mm	42 VTC
20	<i>Skirt Thickness</i>	mm	8/1500
21	<i>Weld Joint Efficiencies</i>		
	<i>- Shell</i>		1
	<i>- Head</i>		1
22	<i>Inspection and Testing</i>		
23	<i>Third Party Inspection</i>		<i>Yes</i>
24	<i>Non Destructive Testing</i>		
	<i>-Radiography</i>		100%
	<i>-Ultrasonic</i>		<i>Yes, Per code/spec</i>
	<i>-Magnetic Particle</i>		100%
	<i>-Dye Penetrant</i>		<i>Per code/spec</i>
25	<i>Post Weld Heat Treatment</i>		<i>Yes</i>
26	<i>Material Impact Test Required</i>		<i>Per code/spec</i>
27	<i>Certified Elevated Temp. Test Required</i>		<i>No</i>
28	<i>Insulation (By others)</i>	mm	<i>No</i>
29	<i>Fireproofing (By others)</i>	mm	<i>No</i>
30	<i>Painting (External)</i>		ES-Q-12
31	<i>Painting (Internal)</i>		<i>No</i>

3.1.2. Data Konstruksi

Tabel 3.2. Data Konstruksi Bejana Tekan *2nd Stage Compressor Suction KOD*

No	Part	Type
1	<i>Head</i>	<i>2:1 Elipsoidal</i>
2	<i>Support</i>	<i>Skirt</i>
3	<i>Platform/Ladder/Pipe Clip</i>	<i>Required</i>
4	<i>Insulation Supports</i>	<i>Not Required</i>
5	<i>Manway Davit</i>	<i>Required</i>
6	<i>Earthing Boss</i>	<i>Required</i>
7	<i>Lifting Lugs/Eyes/Trunions</i>	<i>Required</i>
8	<i>Name plate</i>	<i>Required, SS316</i>

3.1.3. Data Material Konstruksi

Tabel 3.3. Data Material Konstruksi Bejana Tekan *2nd Stage Compressor Suction KOD*

No	Part	Material
1	<i>Shell</i>	SA537 Cl.1
2	<i>Cladding/Lining of shell</i>	-
3	<i>Heads</i>	SA537 Cl.1
4	<i>Claddisng/Linning of heads</i>	-
5	<i>Support Skirt (Top/Bottom Section)</i>	SA537 Cl.1/SA283Gr.C
6	<i>Self Reinforced Nozzle/Forged Flg. On CS</i>	SA 105
7	<i>Self Reinforced Noz. above 3"on weld deposite</i>	SA 105
8	<i>Nozzle neck on weld deposite</i>	SB444Gr.1 UNS N06625
9	<i>Forged Flange above 3"NB on weld deposite</i>	SA 105
10	<i>Forged Flange 3"NB and below on weld deposite</i>	SB564Gr.1 UNS N06625
11	<i>Welding Elbow</i>	SB 366 UNS N06625
12	<i>Demister</i>	<i>Solution Treated SS316L</i>

No	Part	Material
13	<i>Self Reinforcing Nozzles 3"NB and below on weld deposite</i>	SB564Gr.1 UNS N06625
14	<i>Skirt Base ring/stiffeners</i>	SA 283 GR C
15	<i>Nozzle neck on CS</i>	SA 106 Gr.B
16	<i>Vortex Breakers</i>	SB443 UNS N06625
17	<i>Internal attachments on CS</i>	SA 537 Cl.1
18	<i>Internal attachments on weld deposite</i>	<i>Inconel 625</i>
19	<i>External attachment</i>	SA 193 GR C
20	<i>External Bolts</i>	SA 193 GR B7
21	<i>Nuts</i>	SA 194 GR 2H
22	<i>Gaskets External</i>	<i>Spiral Wound</i>
23	<i>Gaskets Internal</i>	-
24	<i>Internal Bolt</i>	SS 316
25	<i>Nuts</i>	SS 316

3.1.4. Estimated Weights

Tabel 3.4. *Estimated Weight Bejana Tekan 2nd Stage Compressor Suction KOD*

No	Estimated	Satuan	Weight
1	<i>Empty</i>	Kg	14,500 VTC
2	<i>Shipping</i>	Kg	VTA
3	<i>Operation</i>	Kg	20,400 VTC
4	<i>Field Test</i>	Kg	25,000 VTC

3.1.5. Nozzle Schedule

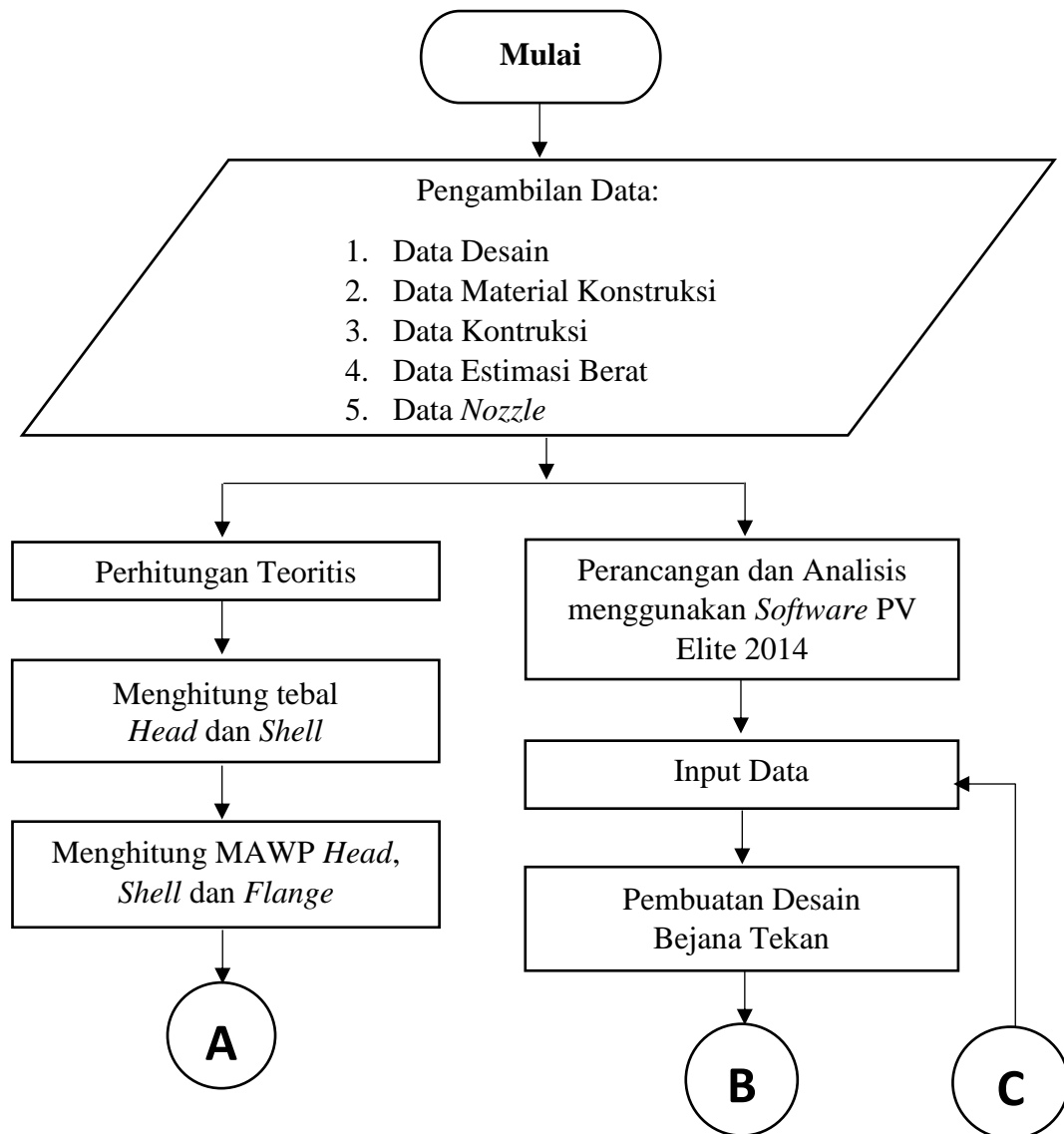
Tabel 3.5. Data Nozzle Bejana Tekan 2nd Stage Compressor Suction KOD

No	Mark No	Size NPS	Flange		Service
			Rating	Type/Face	
	N1	16"	600#	SR/RF	Fluid Inlet
	N2	10"	600#	SR/RF	Vapour Outlet
	N3	2"	600#	WN/RF	Water outlet
	N4	6"	600#	SR/RF	Hydrocarbon Outlet
	N5	2"	600#	WN/RF	Vent
	N6	4"	600#	SR/RF	PSV
	N7	2"	600#	SR/RF	Drain
	N8	2"	600#	WN/RF	Utility Connection
	K1A/B	4"	600#	SR/RF	Condensate Level Bridle
	K2A/B	4"	600#	SR/RF	Condensate Level Bridle
	K3	2"	600#	WN/RF	Pressure Transmitter
	K4A/B	4"	600#	SR/RF	Water Level Bridle
	K5A/B	4"	600#	SR/RF	Water Level Bridle
	M1	20"	600#	SR/RF	Manway
	S _A	ID.610	-	-	Skirt Access
	S _V	2"	-	-	Skirt Vent
	S _S	6"	-	-	Skirt Sleeve

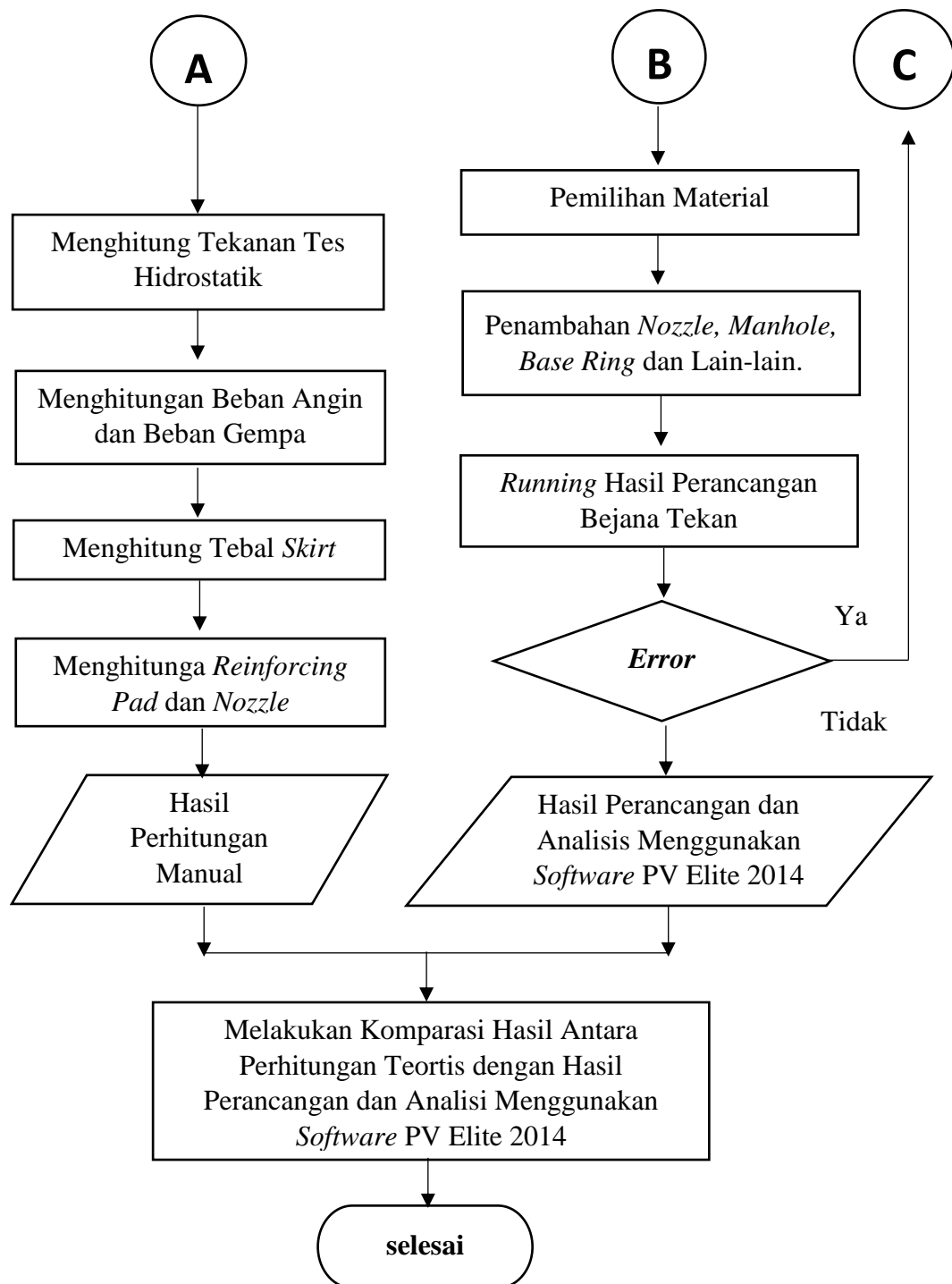
Data lengkap terdapat pada lampiran 1.

3.2. Diagram Alir

Diagram alir perancangan ulang bejana tekan vertikal *2nd stage compressor suction KOD* kapasitas $10,4 \text{ m}^3$, tekanan internal 62 barg, tekanan eksternal *full vacuum* dan temperatur 150°C , dengan menggunakan bantuan *software PV Elite 2014* ditunjukkan oleh gambar 3.1 berikut:



Gambar 3.1. Diagram Alir Perancangan Bejana Tekan



Gambar 3.1 Lanjutan Diagram Alir Perancangan Bejana Tekan