

BAB VI PERANCANGAN ALAT UTAMA

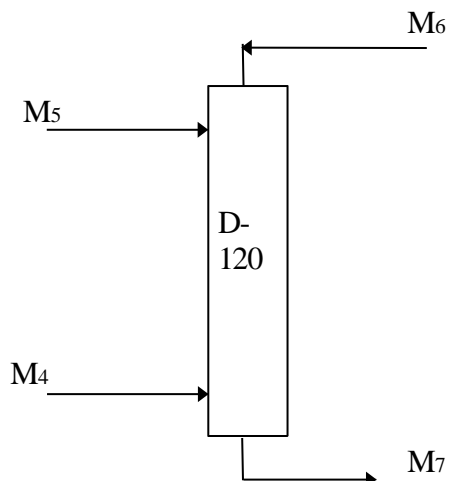
Nama Alat : Absorber
Kode : D-120
Fungsi : Untuk menghilangkan gas CO, CO₂ yang terbentuk serta gas O₂ dan N₂ yang tidak ikut bereaksi
Jumlah : satu unit
Type : Packed Columnn

Kondisi Operasi :

- Tekanan operasi : 1 atm = 14,696 psia = 0 psig
- Temperatur : 30 °C = 303,15 K = 545,67 R
- Rate feed masuk : 304,7705 kg/jam
: 671,8970 lb/jam
: 0,1866 lb/detik
- waktu tinggal : 4 menit = 0,0667 jam = 240 detik
- Fase : gas - liquid

Direncanakan :

- Bahan konstruksi : HAS SA-240 Grade M type 316
f = 17100 (Pada suhu 599,67 F
Brownell,1959
App D-4, hal 342)
- Jenis pengelasan : Double welded butt joint
E = 0,8 (Brownell,1959. tabel 13-2)
- Faktor korosi : 1/16 = 0,0625 in
- Bahan masuk : 304,7705 kg/jam
: 672,018953 lb/jam



Dimensi Peralatan :

1. Dimensi Absorber

do	=	54	in =	4,5	ft
di	=	53,625	in =	4,46875	ft
Ls	=	815701,982	in =	67975,2	ft
d1	=	2	in =	0,16667	ft
L1	=	4	in =	0,33333	ft
tha/thb	=	3/16	in =	3535,83	ft
ha/hb	=	9,062625	in =	0,75522	ft
ts	=	3/16	in =	3535,83	ft
H	=	815720,107	in =	67976,7	ft

2. Dimensi Nozzle

1. Nozzle liquid masuk

Spesifikasi nozzle standar (Brownell and Young, 1959, App. F item 1 dan 2 hal. 349)

Size	=	1 1/2	in
OD of pipe	=	1,9	in
Flange Nozzle thickness (n)	=	0,2	in
Diameter of hole in reinforcing plate (DR)	=	2	in
Length of side of reinforcing plate, L	=	-	in
Width of reinforcing plate, W	=	-	in
Distance, shell to flange face, outside, J	=	6	in
Distance, shell to flange face, inside, K	=	6	in
Distance from bottom of tank to center of nozzle - Regular, Type H	=	6	in

- Low, Type C = 3 in

2. Nozzle gas masuk

Spesifikasi nozzle standar (Brownell and Young, 1959, App. F item 1 dan 2 hal. 349)

Size = 18 in

OD of pipe = 18 in

Flange Nozzle thickness (n) = 1/2 in

Diameter of hole in reinforcing plate (DR) = 18 1/8 in

Length of side of reinforcing plate, L = 39 in

Width of reinforcing plate, W = 47 5/8 in

Distance, shell to flange face, outside, J = 10 in

Distance, shell to flange face, inside, K = 8 in

Distance from bottom of tank to center of nozzle

- Regular, Type H = 22 in

- Low, Type C = 19 1/2 in

3. Nozzle gas keluar top kolom

Spesifikasi nozzle standar (Brownell and Young, 1959, App. F item 1 dan 2 hal. 349)

Size = 14 in

OD of pipe = 14 in

Flange Nozzle thickness (n) = 1/2 in

Diameter of hole in reinforcing plate (DR) = 14 1/8 in

Length of side of reinforcing plate, L = 31 in

Width of reinforcing plate, W = 38 in

Distance, shell to flange face, outside, J = 10 in

Distance, shell to flange face, inside, K = 8 in

Distance from bottom of tank to center of nozzle

- Regular, Type H = 18 in

- Low, Type C = 15 1/2 in

4. Nozzle liquid keluar bottom kolom

Spesifikasi nozzle standar (Brownell and Young, 1959, App. F item 1 dan 2 hal. 349)

Size = 1 1/2 in

OD of pipe = 1,9 in

Flange Nozzle thickness (n) = 0,2 in

Diameter of hole in reinforcing plate (DR) = 2 in

Length of side of reinforcing plate, L = - in

Width of reinforcing plate, W = - in

Distance, shell to flange face, outside, J = 6 in

Distance, shell to flange face, inside, K = 6 in

Distance from bottom of tank to center of nozzle

- Regular, Type H = 6 in
- Low, Type C = 3 in

Dari Brownell & Ypung tabel 12.2 halaman 221 diperoleh dimensi flange untuk semua nozzle, dipilih flange standart type welding neck dengan dimensi nozzle:

- Nozzle 1 = Nozzle liquid masuk
- Nozzle 2 = Nozzle gas masuk
- Nozzle 3 = Nozzle gas keluar top kolom
- Nozzle 4 = Nozzle liquid keluar bottom kolom
- NPS = ukuran pipa nominal, in
- A = Diameter luar flange, in
- T = Ketebalan minimum flange, in
- R = Diameter luar bagian yang menonjol, in
- E = Diameter hubungan atas, in
- K = Diameter hubungan pada titik pengelasan, in
- L = Panjang julukan, in
- B = Diameter dalam flange, in

Fig. 12.2, hal 221, Brownell & Young:

Nozzle	NPS	A	T	R	E	K	L	B
1	2	6	3/4	3 5/8	31/16	2	2 1/2	2
2	16	23 1/2	1 7/16	18 1/2	18	16	5	17,25
3	2	6	1 1/16	16 1/4	15 3/4	14	5	13,25
4	1 1/2	5	11/16	2 7/8	2 9/16	2	2 7/16	2
5	20	27 1/2	1 11/16	23	22	20	5 11/16	6

3. Dimensi Flange, Bolting dan Gasket

a. Bagian flange

- Bahan konstruksi = High alloy steel SA-336, Grade F8, Type 30
- Tensile stress minimum = 75000
- Allowable stress (f) = 17910
- ID = 54 in
- Tebal = 1,5 in
- OD = 60,66 in
- Type flange = Loose ring flange type

b. Bagian bolting

- Bahan konstruksi = High alloy steel SA-193, Grade B8T, Type
- Ukuran = 1 3/8 in
- Jumlah = 8 buah
- Bolt circle diameter (C) = 57,905963 in

Jarak dari tepi	=	1,375	in
Jarak radial minimum	=	1,875	in
c. Bagian gasket			
Bahan konstruksi	=	Solid flat metal (stainlees steel)	
Gasket faktor (m)	=	6,5	in
design seating stress	=	26000,0	psia
Tebal gasket	=	0,1226	in

4. Sistem Penyangga

- Kolom penyangga = 4 buah
- Jenis kolom = I-beam
- b = 2,796 in
- h = 4 in
- Ay = 2,76 in²
- r = 1,56 in

5. Base Plate

Dari tabel 10.4 hal. 188 Brownell & Young, didapatkan baut dengan ukuran 0,5 in adalah :

Ukuran	=	0,5	in
Root area	=	0,126	in
Bolt spacing	=	1 1/4	in
Minimum radial distance	=	1 3/16	in
Edge distance	=	5/8	in
Nut dimension	=	7/8	in
Maximum fillet radius	=	1/4	in

6. Dimensi lug dan gusset

- lug
 - lebar = 9,5000 in
 - tebal = 30,9227 in
 - tinggi = 71,8454 in
- gusset
 - lebar = 5,5000 in
 - tebal = 11,5960 in
 - tinggi = 10,0000 in

7. Dimensi Pondasi

- luas atas = 75 x 75 in
- luas bawah = 100 x 100 in
- tinggi = 150 in

- Bahan = semen, sand dan gravel
- Luas permukaan tanah rata = 10000 in²