

API 650 | DISEÑO DE TANQUES DE ALMACENAMIENTO

Curso Online: **Lección 3**

Diseño de la Pared del Tanque

Casos de Estudio Resueltos



Instructor: Javier Tirenti

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Tank Shell Design

API 650 12th Edition

Eqpt: TK-01

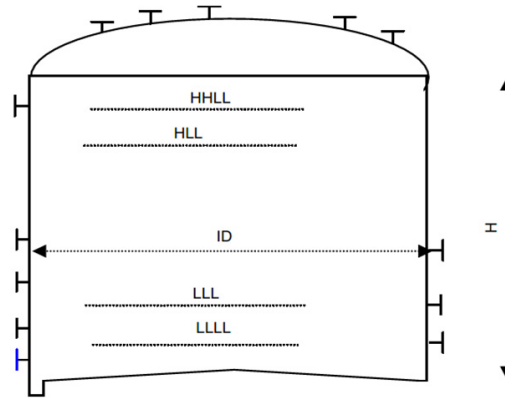
One Foot Method

Design Conditions

2	85	T [°C] - Design Temperature
3	0,000	Pi [kPa] - Internal pressure
3	0,25	Pe [kPa] - External pressure
4	0,805	G [-] - Specific gravity
5	18,600	HLL [m] - Maximum Liquid level
6	1,5	CA [mm] - Corrosion Allowance

Dimensions:

8	42,670	D [m] - inside diameter
9	42,708	Do [m] - outside diameter
10	19,510	H [m] - total tank height
11	2,500	Sh [m] - shell course height
12	8	n [dless] - number of shell courses



Material and Conditions:

14	A131 Gr.EH 36	Material
15	360	Sy [MPa] - yield strength
16	196	Sd [MPa] - allowable stress x design
17	210	St [MPa] - allowable stress x test

$$t_d = \frac{4.9D(H-0.3)G}{S_d} + CA$$

$$t_t = \frac{4.9D(H-0.3)}{S_t}$$

Required Thickness: section 5.6.3.2

19	td1 [mm] = [4,9*D*(HLL-0,3)*G / Sd] + CA	shell thk x design	= 17,21
20	tt1 [mm] = [4,9*D*(HLL-0,3) / St]	shell thk x test	= 18,22
21	mt [mm] = Minimum thickness	section 5.6.1.1	= 8
22	ut [mm] = Mill under tolerance	section 2.2.1.2.3	= 0,25
23	Tmax1 [mm] = Max(td1,tt1,mt)	required minimum thickness	Max(17,21;18,22;8) = 18,22

Shell Course	Sh [m]	HLL [m]	td [mm]	tt [mm]	mt [mm]	Tmax [mm]	nom thk [mm]	ut [mm]	Check
1	2,50	18,60	17,21	18,22	8,00	18,22	19	0,25	Ok
2	2,50	16,10	15,07	15,73	8,00	15,73	16	0,25	Ok
3	2,50	13,60	12,92	13,24	8,00	13,24	14	0,25	Ok
4	2,50	11,10	10,77	10,75	8,00	10,77	12	0,25	Ok
5	2,50	8,60	8,63	8,26	8,00	8,63	9	0,25	Ok
6	2,50	6,10	6,48	5,77	8,00	8,00	8	0,25	Ok
7	2,50	3,60	4,33	3,29	8,00	8,00	8	0,25	Ok
8	2,01	1,10	2,19	0,80	8,00	8,00	8	0,25	Ok
9	0,00	0,00	0,00	0,00	0,00	0,00	0	0,00	Ok
10	0,00	0,00	0,00	0,00	0,00	0,00	0	0,00	Ok
11	0,00	0,00	0,00	0,00	0,00	0,00	0	0,00	Ok
12	0,00	0,00	0,00	0,00	0,00	0,00	0	0,00	Ok

Tmax provides a worst case required thickness for shell analysis
 This sheet will not calculate thick walled tanks
 This sheet cannot be used to check for allowable exterior pressure loads.
 This sheet is for educational use only - use at your own risk.

Tank Shell Design

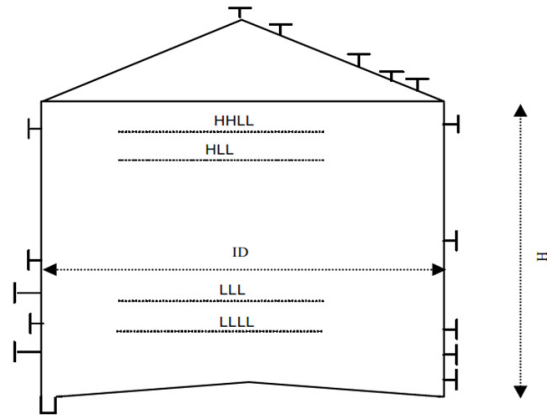
API 650 12th Edition

Eqpt: TK-02

One Foot Method

Design Conditions

2	105	T [°C] - Design Temperature	Annex M
3	0,000	Pi [kPa] - Internal pressure	
3	0,25	Pe [kPa] - External pressure	
4	0,936	G [dless] - Specific gravity	
5	16,160	HLL [m] - Maximum Liquid level	
6	3,0	CA [mm] - Corrosion Allowance	



Dimensions:

8	57,950	D [m] - inside diameter
9	58,002	Do [m] - outside diameter
10	17,070	H [m] - total tank height
11	2,000	Sh [m] - shell course height
12	9	n [dless] - number of shell courses

Material and Conditions:

14	S355	Material	
15	345	Sy [MPa] - yield strength	
16	186,3	Sd [MPa] - allowable stress x design	Annex M
17	201	St [MPa] - allowable stress x test	

$$t_d = \frac{4.9D(H-0.3)G}{S_d} + CA$$

$$t_t = \frac{4.9D(H-0.3)}{S_t}$$

Required Thickness: section 5.6.3.2

19	td1 [mm] = [4,9*D*(HLL-0,3)*G / Sd] + CA	shell thk x design	= 25,63
20	tt1 [mm] = [4,9*D*(HLL-0,3) / St]	shell thk x test	= 22,41
21	mt [mm] = Minimum thickness	section 5.6.1.1	= 8
22	ut [mm] = Mill under tolerance	section 2.2.1.2.3	= 0,25
23	Tmax1 [mm] = Max(td1,tt1,mt)	required minimum thickness	Max(25,63;22,41;8) = 25,63

Shell Course	Sh [m]	HLL [m]	td [mm]	tt [mm]	mt [mm]	Tmax [mm]	nom thk [mm]	ut [mm]	Check
1	2,00	16,16	25,63	22,41	8,00	25,63	26	0,25	Ok
2	2,00	14,16	22,77	19,58	8,00	22,77	24	0,25	Ok
3	2,00	12,16	19,92	16,75	8,00	19,92	21	0,25	Ok
4	2,00	10,16	17,07	13,93	8,00	17,07	18	0,25	Ok
5	2,00	8,16	14,21	11,10	8,00	14,21	15	0,25	Ok
6	2,00	6,16	11,36	8,28	8,00	11,36	12	0,25	Ok
7	2,00	4,16	8,51	5,45	8,00	8,51	9	0,25	Ok
8	2,00	2,16	5,65	2,63	8,00	8,00	8	0,25	Ok
9	1,07	0,16	2,80	-0,20	8,00	8,00	8	0,25	Ok
10	0,00	0,00	0,00	0,00	0,00	0,00	0	0,00	Ok
11	0,00	0,00	0,00	0,00	0,00	0,00	0	0,00	Ok
12	0,00	0,00	0,00	0,00	0,00	0,00	0	0,00	Ok

Tmax provides a worst case required thickness for shell analysis
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