

ASME VIII | DISEÑO DE RECIPIENTES A PRESIÓN

Curso Online: **Lección 7**

Diseño por Presión Exterior

Casos de Estudio Resueltos



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Cylindrical Shell Design

BPVC ASME VIII DIV.1

Eqpt: PV-01

External Pressure Calculation

Design Conditions

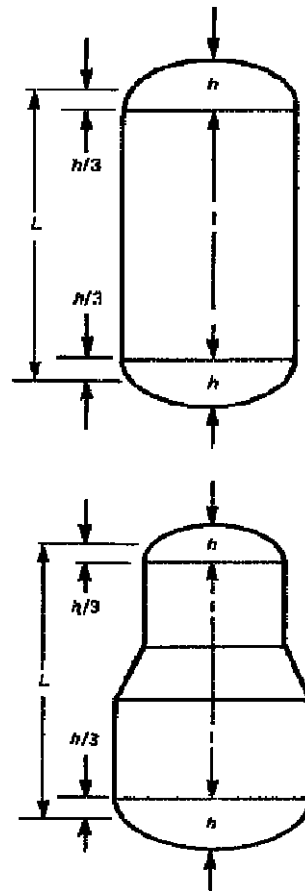
2	97	T [°C] - External Design Temperature
3	0.1013	Pe [MPa] - External pressure
4	3.0	CA [mm] - internal corrosion allowance
5	0.0	eCA [mm] - external corrosion allowance

Dimensions:

7	2800	Di [mm] - inside diameter
8	2840	Do [mm] - outside diameter
9	17	t [mm] - nominal wall thickness w/o CA
10	710	ho [mm] - height of heads
11	11000	TL [mm] - TL to TL length
12	11473	L [mm] - Distance between lines of support

Material and Conditions:

14	Plate	Wall Product form
15	SA-285 Gr.C	Material
16	CS-1	External Pressure Chart
17	198,000	E [MPa] - moduli of Elasticity @design T° (II-D TM-1)
18	189	Ys [MPa] - yield strength @design T° (II-D Y-1)
19	108	S [MPa] - allowable stress
20	0.30	UT [mm] - under tolerances (SA-20)



Parameters & Factors: UG-28 (c)

22	Dot [mm] = Do/t	external diameter - nominal thickness ratio	$2840 / 17 = 170.1$
23	LDo [mm] = L/Do	distance between supports - external diameter ratio	$11473.3 / 2840 = 4.04$
24	A [dless] = Factor determined from figure G (II-D, part 3)		= 0.00014
25	A [dless] = $1,1/(Do/t)^2$	factor for Do/t < 4	= NA
26	B [dless] = Factor determined from figure CS-1 (II-D, part 3)		= 14.0

External Pressure Verification: UG-28 (c)

28	Pa [MPa] = If Do/t ≥ 10		
29	$4*B / 3*(Do/t)$	allowable external pressure when B is known for Do/t ≥ 10	= 0.1098
30	$2*A*E / 3*(Do/t)$	allowable external pressure when B is unknown for Do/t ≥ 10	= 0.1087
31	Pa [MPa] = If Do/t < 10		
32	Pa1 [MPa] = $((2,167/(Do/t))-0,0833)*B$	allowable external pressure for Do/t < 10	= NA
33	Pa2 [MPa] = $((2*S/(Do/t))*(1-(Do/t)))$	allowable external pressure for Do/t < 10	= NA
34	Pa [MPa] = Allowable external pressure for Do/t ≥ 10		= 0.1087
35	Check Pa = Pa ≥ Pe		$0.1087 > 0.1013 = \text{Acceptable}$

This sheet provides maximum allowable external pressure only, no other external loads considered
 The UG-16(b) minimum thickness requirement has not been taken into consideration here.
 This sheet cannot be used to check for allowable interior pressure loads.
 This sheet is for educational use only - use at your own risk.