

Document Number

WIK-IAS-S-400-41-2

**AIR RECEIVER**

Rev. : 0

Document Number

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ID = 2830 mm  
 T/T = 7100 mm  
 material = SA 516 Gr.70  
 joint efficiency = 1  
 CA = 3 mm  
 maximum allowable stress = 138 Mpa (see table 1A ASME Sec. II D)  
 type head = elipsoidal (2:1)  
 operating pressure = 9 bar = 0,900 Mpa  
 =  
 design pressure = 10,5 bar = 1,05 Mpa (maximum working pressure PSV)  
 design temperature = 65°C

**shell**

(internal pressure) ASME Sec. VIII UG-27  
 thickness (t<sub>r</sub>) =  $\frac{P D}{2 S E - 2 0,6 P}$   
 (t<sub>r</sub>) =  $\frac{1,05 \cdot 2830}{2 \cdot 138 \cdot 1 - 2 \cdot 0,6 \cdot 1,05}$   
 = 10,81568 mm  
 nominal thickness = (t<sub>r</sub>) + CA  
 = 10,81568 + 3,0  
 = 13,81568 mm

actual thickness (t) = 14 mm

**head**

(internal pressure)  
 thickness (t<sub>r</sub>) =  $\frac{P D}{2 S E - 0,2 P}$   
 (t<sub>r</sub>) =  $\frac{1,05 \cdot 2830}{2 \cdot 138 \cdot 1 - 0,2 \cdot 1,05}$   
 = 10,7745 mm

nominal thickness = (t<sub>r</sub>) + CA  
 = 10,77450 + 3,0  
 = 13,77450 mm

thickness tolerance for metal forming  
 10% = 15,15195 mm

actual thickness  
 (t) = 16 mm

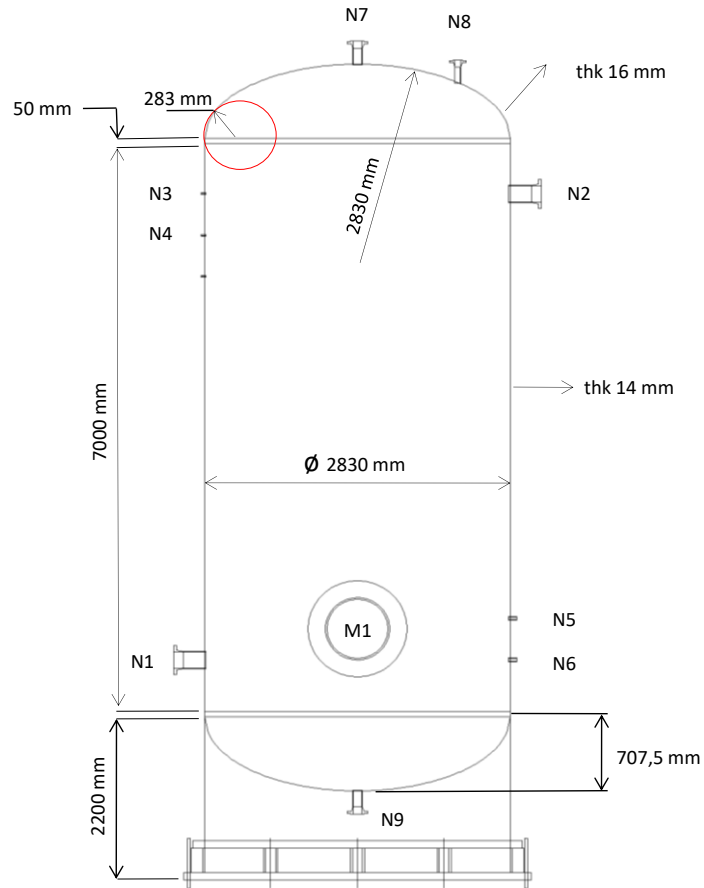
dimension head (eliptical 2:1)  
 D/2h h = 707,5  
 crown radius (L) = 2830 mm  
 knuckle radius = L x 10%  
 = 2830 x 10%  
 = 283 mm  
 stright line = 50 mm

Maximum Allowable Working Pressure (MAWP)

MAWP (shell) =  $\frac{t \cdot 2 S E}{D + 1,2 t}$   
 = 1,3573 Mpa

MAWP (head) =  $\frac{t \cdot 2 S E}{D + 0,2 t}$   
 = 1,5587 MPa

For Hydrotest pressure, used MAWP + static head + safety factor pressure for hydrotest  
 static head pressure =  $\rho$  (water) x g x h (horizontal position)  
 = 27762,3 Pa  
 = 0,0278 Mpa  
 P (hydrotest) = MAWP + static head + safety factor pressure (hydrotest)  
 P (hydrotest) = 1,680 Mpa



nozzle	size (inch)	nozzle thickness (mm)	Flange rating	projection (mm)	weight nozzle neck (kg)	weight flange (kg)	weight nozzle (kg)	
N1- Nozzle inlet	6	7,11	150	200	5,258	14	19,258	
N2- Nozzle outlet	6	7,11	150	200	5,258	14	19,258	
N3- temperature indicator	3/4	4,9	-	36,5	0,083	0	0,083	
N4- Pressure indicator transmitter	3/4	4,9	-	36,5	0,083	0	0,083	
N5- Level switch	1 1/2	6,35	-	44,5	0,261	0	0,261	
N6- Level glass/level transmitter, Pressure indicator	1 1/2	6,35	-	44,5	0,261	0	0,261	
N7- Vent	3	5,49	150	150	1,522	5,75	7,272	
N8- Pressure safety valve	2	3,91	150	150	0,723	3,31	4,033	
N9- Drain	3	5,49	150	150	1,522	5,75	7,272	
M1-Manhole	24	14	150	300	62,115	171,61	233,725	
total weight								291,506



DESIGN STRENGTH  
CALCULATION



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support dimension

diameter = 2830 mm

length = 2200 mm

thickness = 16 mm

material = ASME SA 283 Gr. C

weight = 2455 kg

weight of anchor,  
bolt, and accessories = 2640,006 kg

elips length = 3357,25 mm

stright line = 50 mm

Weight of vessel =  $((\pi \times D \times h_{shell} \times thickness) + (2 \times (elips\ length + stright\ line + length\ tolerance\ for\ metal\ forming)^2 \times thickness))) \times density\ of\ carbon\ steel$

Weight of vessel = 10453,090 kg

total weight = 13384,603 kg

= 11,335 Ton