Elliptical Head(2:1)-Internal Pressure

Date: 25-May-10

ASME Code VIII Div I

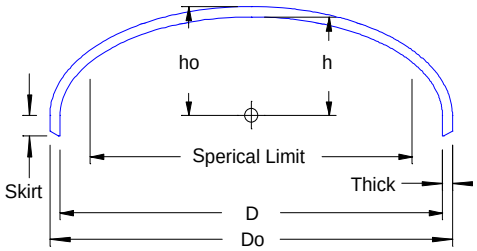
Petrogas Energy Services Ltd.	<- Client	CRN:	H5920.2
V-303 Ethane Storage	<- Vessel	Mfg. S/N:	3142
VIII div. 1	<- Section	Dwg. No:	3142
Sweet	<- Service	Jurisdiction No:	A2501321
Full	<- RT Examination	Year of Mfg:	1989
Terry Williams P. Eng.	<- Designed/Verified By	Job No:	10-1093
	<- Reviewed by	ASME Code:	UW 12 (a) 1989

Comment: No comments

Recommendation: No concerns

Dimensions:

		Metric
147.900	<- Do, Outside diameter, in	3756.66 mm
1.950	<- tb, Nominal wall thickness before forming, in	49.53 mm
1.950	<- tf, Nominal wall thickness after forming, in	49.53 mm
0.063	<- C.A, Corrosion allowance, in	1.59 mm



Material and Conditions:

SA 516 70N	<- Material	SA 516 70N
17500.000	<- S, Allowable stress level, psi	120.66 MPa
38000.000	<- Sy, Allowable stress level, psi	262.01 MPa
451.000	<- P, Design pressure, psig	3.11 MPa
-20.000	<- MDMT, ^{0}F	-28.89 °C
200.000	<-T, Maximum design temperature, ^{0}F	93.33 °C
1.000	<- E, Efficiency	1.00

Variables:

t =	tf-C.A = Actual available thickness	= 1.95-0.0625	t =	1.888 in	47.94 mm
D =	Do-2*t = Inside diameter	= 147.9-2*1.888	D =	144.125 in	3660.78 mm
ho =	h+t = Outside height	= 36.031+1.888	ho =	37.919 in	963.14 mm
D/2h =	D/(2*h)	= 144.125/(2*36.031)	D/2h =	2.000	2.00
Do/2ho =	Do/(2*ho)	= 147.9/(2*37.919)	Do/2ho =	1.950	1.95
h =	D/4 = Inside height		h =	36.031 in	915.19 mm
Kone =	Interpolated value from table UG-37		Kone =	0.900	0.90
L =	Kone*D	= 0.9*144.125	L =	129.713 in	3294.70 mm
			t/L =	0.015	0.01
K =	Interpolated value from table 1-4.1		K =	1.000	1.00

Interior Pressure App 1-4(b),(c), UG-32(d)

Here, t/L >0.002 ? **Yes**

tmin = (P*D*K)/(2*S*E-0.2*P) <= t

= (451*144.125*1)/(2*17500*1-0.2*451) <= 1.888

tmin = ***1.862*** in 47.29 mm

Okay

PMax = (2*S*E*t)/(K*D+0.2*t) >= P

= (2*17500*1*1.888)/(1*144.125+0.2*1.888) >= 451

Pmax = ***457*** psig 3.15 MPa

Okay

Condition can be checked for validation.

tmin/L = 0.0144 >0.002 **Valid**

Phydro = 1.5*275 = 275 * 1.5 Phydro = **677** psig **4.66** MPa

Pmax > Phydro

Maximum Stress for test pressure =

Smax = P*(K*D+0.2*t)/(2*E*t) Smax = 17263.74 psi 119.03 MPa

Design Criteria, Phydro<Smax ? **Okay**

Yield Criteria, Smax<=0.9*Sy ? **Okay** % Yield = **45%**