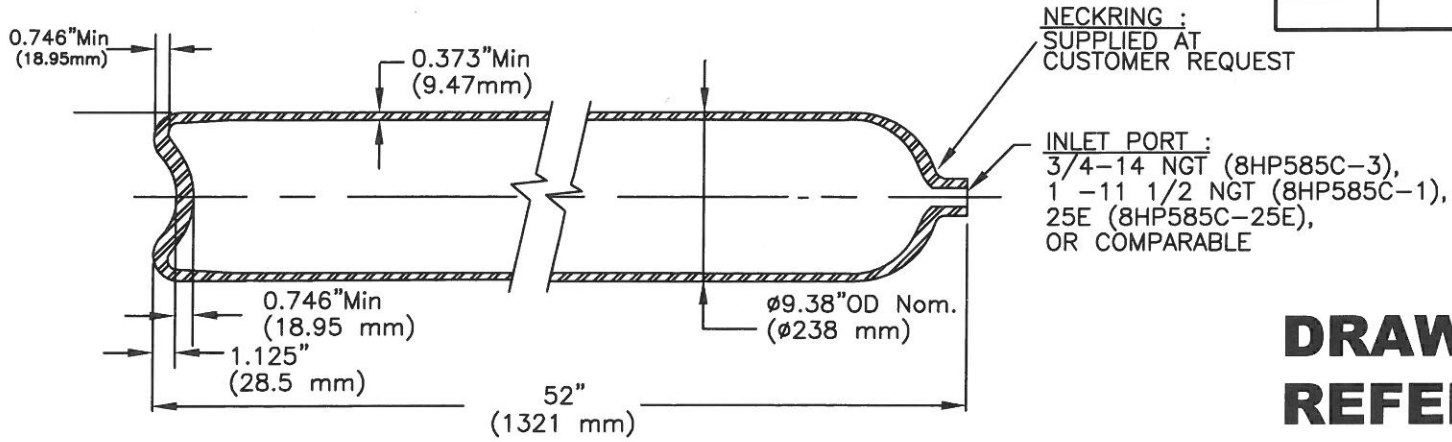


REV.	ECN - DESCIP.	DATE	DRWN.	CHKD.	APP.
01	ISO WALL CALCS./REE	3/18/11	JJM		



DRAWING FOR REFERENCE ONLY

SPECIFICATION: DOT-SP 10869-6000 / TC SU4369-413	
MODEL: 8HP585C	
1. Principal Elements: - Min water volume: 2640 in ³ (43.3 liter) - Approx. cylinder wt. 194.5 lbs. (88.2 kg) w/o fittings - DOT Service pressure: 6000 psi (413 bar) - TC Service pressure: 413 bar - Test pressure: 9000 psi (621 bar)	4. Manufacture: Hot billet pierced followed by hot drawing.
2. Material: Alloy steel, A.I.S.I. 4130 Modified. Per Norris' 4133M4 specification EO-A6	5. Mechanical Properties: - Tensile: 155,000/175,000 psi (1069/1206 MPa) - Elong.: > 12% (on 2" gauge) - Flattening: to 10xt without cracks - Charpy: (at -60°F, 1/2 size tran. specimen) - avg. 3 spec.: 13 ft-lb (45 J/cm ²) - individual: 10 ft-lb (35 J/cm ²) - Hardness test (each cyld.): ≤ Rc 40 - UT flaw detection (each cyld.): Reject flaws ≥ 5% of tmin.
3. Heat Treatment: Quenched and Tempered	

NOTES (other requirements):
 - Rejection Elastic Expansion: 314 cc
 Determined in accordance with CGA pamphlet C-5.

Formula for wall stress calculations:

$$S = \frac{P(1.3D^2 + 0.4d^2)}{(D^2 - d^2)}$$

S = Wall stress, psi
 P = Minimum test pressure, psi
 D = Outside diameter, inch
 d = Inside diameter, inch


$$S = \frac{9000(1.3(9.38)^2 + 0.4(8.634)^2)}{(9.38)^2 - (8.634)^2} = 96,572 \text{ psi (665.8 MPa)}$$

ISO 9809-2 Thickness Calculations included for Harmonization:

Ph = Test Pressure (bar) = 621 bar (9,000 psi)
 D = External diameter of container = 241.4mm Max
 F = Lesser of 0.65/(Re/Rg) or 0.77; Re/Rg ≤ 0.9
 = Lesser of 0.65/0.85 or 0.77 = 0.765 (for Re/Rg = 0.85)

$$a = 0.5 \times D \left(1 - \sqrt{\frac{(10FRe - \sqrt{3} Ph)}{(10FRe)}} \right) = 9.45 \text{ mm (0.372")}$$

NOTE: a', the guaranteed min thickness = 9.47 mm (0.373") exceeds calculated min thickness, a.

 NORRIS CYLINDER COMPANY 4818 WEST LOOP 281 LONGVIEW, TEXAS 75603 USA			
SEAMLESS STEEL CYLINDER, FOR NON-EMBRITTLING PERMANENT GASES, MODEL 8HP585C			
SCALE	NOT TO SCALE	DRAWING NO.	REV.
DWN. BY	JJM	2/5/10	901A-A-9839 01
CHK'D BY			
APP'D BY		SHEET NO. 1	OF 1 SHEETS