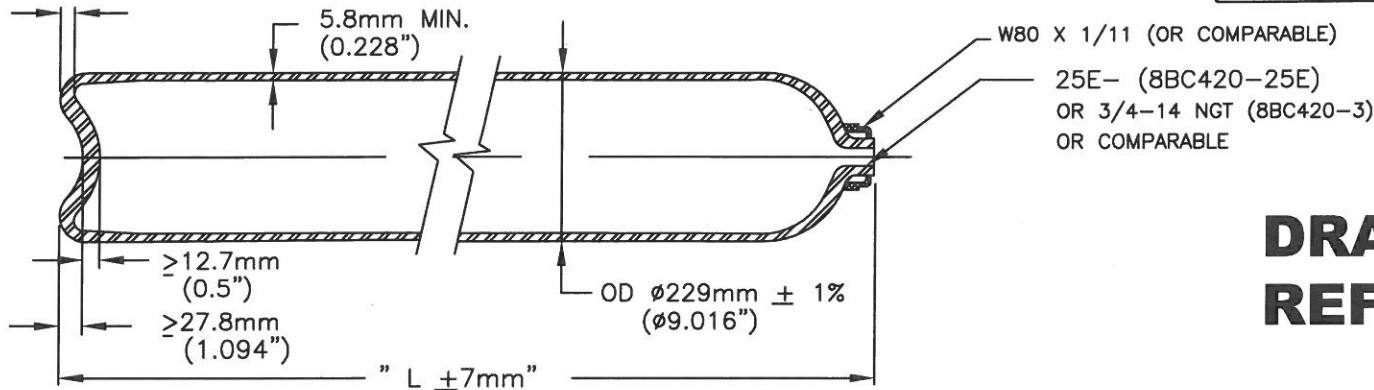


≥12.7mm
(0.5")



REV.	ECN - DESCRIP.	DATE	DRWN.	CHKD.	APP.
01	2868	06/05/09	JJM		
02	2890	07/31/09	JJM		

DRAWING FOR REFERENCE ONLY

SPECIFICATION: ISO 9809/1: 1999

1. Service Conditions:

- Working pressure: 230 bar (3335 psi)
- Hydraulic test pressure: 345 bar (5004 psi)
(14.5 PSI = 1 bar)

2. Material:

Cr-Mo-steel (4137) complying with the requirements of clause 6.2 of ISO 9809-1
See Norris' 4137 SPEC.

3. Manufacture:

Hot billet extrusion followed by hot drawing

4. Heat Treatment: Quenched and Tempered

- Austenitize: ~899°C (1650°F)
- Quenchant: Water based polymer
(temperature ≤ 60°C(140°F))
- Temper: ~615°C (1140°F) (Min. 30 minutes at temp.)

5. Mechanical Properties: (at room temperature)

- Tensile (Rg): 945 - 1075 MPa (137 - 156 ksi)
- Yield (Re): ≥ 803 MPa (116.5 ksi)
- Elong (A): ≥ 14% (ON 5.65 √S₀)
- Out-of-roundness per ISO 9809-1 8.5 - <2%
- Straightness per ISO 9809-1 8.7 - 3 mm per m
- Verticality per ISO 9809-1 8.8 - 10 mm per m
- Hardness test: Each end of every cylinder
- Flattening test: Flatten to 8 x t_m without cracks
- Charpy test (-50°C, Trans): ≥ 35 J/cm² (avg.)
- UT flaw detection: Each cyld. per ISO 9809-1
- Batch burst test: P_b ≥ 552 bar (8007psi)

6(a). Thickness Calculations: (ISO 9809/1: 1999)

$$a = 0.5xD \left(1 - \sqrt{\frac{(10FRe - \sqrt{3} Ph)}{(10FRe)}} \right)$$

Where:

- Ph = Test Pressure (bar) = 345 bar (5004psi)
- D = External diameter of container = ø231.3mm Max
- F = Lesser of 0.65/(Re/Rg) or 0.85; Re/Rg ≤ 0.9
= Lesser of 0.65/0.85 or 0.85 = 0.765 (for Re/Rg = 0.85)

$$a = 0.5 \times 231.3 \left(1 - \sqrt{\frac{(10 \times 0.765 \times 803 - \sqrt{3} \times 345)}{(10 \times 0.765 \times 803)}} \right) = 5.77 \text{ mm (0.227")}$$

NOTE: a', the guaranteed min thickness = 5.8mm (0.228") equals or exceeds the calculated min thickness, a.

MODEL	LENGTH 'L'		Min WATER CAPACITY		APPROX. WGT. W/O FITTINGS	
	MM	IN	LITERS	IN ³	KG	LBS
8BC420	1499	59.0	50.0	3051	64.4	142
8BC335	1229	48.375	40.0	2441	54.0	119
8BC253	960	37.8	30.0	1831	43.5	96
*Vmin	699	27.5	20.5	1251	33.6	74
*Vmax	2235	88	77.3	4717	93.4	206

*Note: Model 8BC420 is the design qualification test cylinder. Vmin and Vmax represent the range covered by the same design family. 14.5 PSI = 1 bar.



NORRIS CYLINDER COMPANY

4818 WEST LOOP 281 LONGVIEW, TEXAS 75603

REFILLABLE SEAMLESS STEEL CYLINDER FOR COMPRESSED GASES EXCEPT HYDROGEN AND METHANE PER ISO 11114-1

SCALE	NOT TO SCALE		DRAWING NO.		REV.
DWN. BY	R.S.	11/1/06	901A-A-9695		02
CHK'D BY	JJM	02/25/09			
APP'D BY			SHEET NO. 1	OF 1	SHEETS