ISO Standards Summary as compared to US DOT 49 CFR

Recommendations for UN Model Regulation

ISO Standard 7866

Refillable Transportable Seamless Aluminum Alloy Cylinders - Design, Manufacture and Acceptance

	ISO 7866	49 CFR 178.46(DOT 3AL)
Safety Margin (Burst/Test)	1.6 min	1.5 min
Material	6351A, 6082A, 6061A, 5283A, 7060	6351 or 6061 alloys (proposed to eliminate 6351)
Wall thickness (min.)	1.5 mm	Wall stress at test press. must be less than 80% of yield and less than 67% of UTS. Min wall 0.125 inch (3.175 mm) for cylinders with outside diameter greater than 5 inches. Base thickness 2x wall thickness.
Manufacturing method		
	Cold or hot extrusion from cast or extruded billet; cold or hot extrusion, followed by cold drawing from cast; cupping and cold drawing sheet or plate; or open necking at both ends on an extruded or cold-drawn tube.	Backward extrusion
Design qualification tests	Mechanical testing, burst testing and Cycling: 12,000 cycles to test pressure	Cycling: 100,000 cycles to service pressure or 10,000 cycles to test pressure; burst testing to 2.5 times service pressure- failure must initiate in sidewall
Physical tests	(One per batch= 200 cylinders) taken in longitudinal direction	(2 per lot= 200 cylinders) specimens 4D bar or gauge length 2 inches with width not over 1 ½ inch taken in direction of extrusion approximately 180 degrees from each other. 24 x 6t when wall less than 3/16 inch thick.
Tensile (min)	6351-T6: 42,000psi 6061-T6: 38,000psi	None
Yield (min)	6351-T6: 37,000psi 6061-T6: 35,000psi	None
Elongation	12% min, for gauge length see ISO 6892	10% for 24t x 6t; 14% for 4D or 2inch size specimen
Hardness test	per ISO 6506 or 6508	None
Flattening	(1 per batch) Flattening to 10, 12, or 15t depending on tensile strength or (2 per batch)an alternative bend test	(1 per lot) Flattening to 9 times wall thickness (2 per lot) an alternative bend test per ASTM E 290
Burst test	(1 per batch) 1.6 times test pressure extensive failure mode requirements.	No lot test requirement

Hydrostatic test	(each cyl.) Volumetric expansion with permanent expansion less than 10% of total expansion or proof pressure test	(each cyl.) Volumetric expansion test to 5/3 times service pressure. Permanent expansion must be less than 10% of total expansion.
Other criteria	1. Examination for surface imperfections and neck folds e.g. entroscope, tactile, ultrasonic, etc. & machining as necessary. 2. Annex A(normative): evaluation os sensitivity to intercrystalline corrosion. 3. Annex D(normative): Test method to determine sustained-load cracking resistance of aluminum alloy cylinders.	1. Ultrasonic inspection of starting stock.
Recommendations (i.e. accept as is, accept conditionally, reject)	Accept conditionally: Remove 6351 alloy from 5.1.1 Table 1.	