
2. Service conditions:
   - DOT rated service pressure: 150 bar (2175 psi)
   - Hydraulic test pressure: 250 bar (3625 psi)

3. Material:
   Mn-Steel, Fully killed and made to fine grain practice by basic oxygen or electric furnace process Chemical Composition (%)

<table>
<thead>
<tr>
<th>37Mn</th>
<th>C</th>
<th>Si</th>
<th>Mn</th>
<th>P</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min.</td>
<td>0.34</td>
<td>0.10</td>
<td>1.35</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Max.</td>
<td>0.40</td>
<td>0.15</td>
<td>1.65</td>
<td>0.020</td>
<td>0.020</td>
</tr>
</tbody>
</table>

4. Manufacture:
   Spun-tube cylinder

5. Cylinder leakage test:
   The cylinder needs to be done air-tightness test, Test pressure is 150 bar, holding 60s, not leak is qualified.

6. Heat Treatment: Quenching and Tempering

<table>
<thead>
<tr>
<th>Quench</th>
<th>Quench contents</th>
<th>Temper</th>
<th>Temperature</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water+</td>
<td>Additive</td>
<td>645±20°C</td>
<td>60min</td>
<td></td>
</tr>
</tbody>
</table>

7. Mechanical Properties: (at room temperature)
   - Tensile (Rg): ≥ 720MPa (104400psi)
   - Yield (Re): ≥ 540MPa (78300psi)
   - Elong (A): ≥ 20% on 2" G.L. for DOT
   - Flattening test: Flatten to 6 × t without cracks

8. MT flaw detection: Each cyl. per DOT-3AA

9. Cylinder hydraulic test
   - Carry out hydraulic test with test pressure of 250 bar and cylinder should be found no distortion or leakage, the ratio of permanent volumetric expansion ≤ 10%

8. D.O.T. Wall Stress Calculations:
   \[ S = \frac{P(1.3D^2 + 0.4d^2)}{(D^2 - d^2)} \]
   \[ S = \text{Maximum wall stress, psi} \]
   \[ P = \text{Test pressure, psi} \]
   \[ D = \text{Outside diameter, inch} \]
   \[ d = \text{Inside diameter, inch} \]
   \[ Rg = \text{The minimum tensile strength, psi} \]
   \[ S = 3625 \times (1.3 \times 9.134)^2 + 0.4 \times (8.724)^2 \]
   \[ (9.134)^2 - (8.724)^2 \]
   \[ S = 68770psi < 70000psi \]
   
   Thus the minimum wall thickness will be:
   \[ t = \frac{1.25(9.134 - 8.724)}{9.134^2 - 8.724^2} \]
   \[ = 0.205 \text{ inch} \]
   \[ 0.67Rg = 104400psi \times 0.67 = 69948psi \]
   \[ S = 68770psi < 69948psi < 70000psi \]

---

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Min WATER CAPACITY</th>
<th>LENGTH &quot;L&quot;</th>
<th>APPROX WEIGHT ±5%</th>
</tr>
</thead>
<tbody>
<tr>
<td>LITERS</td>
<td>IN³</td>
<td>MM</td>
<td>IN</td>
</tr>
<tr>
<td>46L</td>
<td>46.0</td>
<td>2805</td>
<td>1340</td>
</tr>
<tr>
<td>Vmin</td>
<td>30.0</td>
<td>1830</td>
<td>920</td>
</tr>
<tr>
<td>Vmax</td>
<td>56.0</td>
<td>3415</td>
<td>1600</td>
</tr>
</tbody>
</table>

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**DRAWN**

**DESCRIPTION**

**DOT 3AA 2175**

**SCALE**

**CHECKED**

**PART NO.**

**DATE**

**APPROVED**

**DWG NO.**

**ISSUE**