

### **TECHNICAL DELIVERY CONDITIONS**

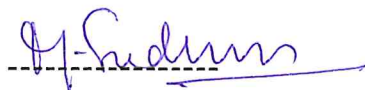
**Project** : Mumbai Metro cars - L2 & L7  
**Item** : Seamless Tubes to Standard IS:3074

SI No.	Part No.	Item Description
1	R109135001	Ø93mm x 7.5mm Wall Thickness Seamless steel Tube to Spec: IS:3074 of L=7060mm(+10,-0)mm length tolerance maintaining perpendicular with tube axis on both ends.

1. All seamless tubes shall be supplied conforming to **IS 3074:2005 CDS3 as drawn and tempered**. The firm shall carry out the following test & submit all test certificates along with each supplies.
2. The tubes shall be manufactured by the seamless process only(welding not permitted) conforming to IS:3074 CDS3.

SI. No.	Tests	Reference Test Standard
1	Raw Material Analysis a) Chemical Composition	IS:3074 CDS3(Clause-7)
2	Heat Treatment Details	IS:3074 CDS3
3	Heat & Product Analysis a) Chemical Composition	IS:3074 CDS3(Clause-7.1.1) & IS:228
4	Mechanical Tests	IS:3074 CDS3(Clause-8)
a	Tensile Strength & Elongation	IS:3074 CDS3(Clause-8.1) & IS:1608
b	Flattening Test	IS:3074 CDS3(Clause-8.2) & IS:2328
c	Impact Test (1 set /heat /Size)	Charpy V notch, test Temp: 18°C. required impact energy 40 joules for full size specimen
d	Crushing Test	IS:3074 CDS3(Clause-8.3)
e	Drift Test	IS:3074 CDS3(Clause-8.4) & IS:2335
5	Non destructive test (NDT) 100% (Ultrasonic Test or Eddy current Test or Magnetic Transducer Test)	EN 10305-1/ASTM E213 or ASTM E570

3. The firm shall be a original manufacturer of Seamless tubes.
4. Dimensions & permissible variations shall conform to IS:5429 (Clause-2&3)
5. Micro structure: Grain size shall be fine (ASTM Number-5 or more).
6. Workmanship, finish, appearance shall conform to ASTM A618 (Clause-9)
7. Atmospheric corrosion resistance Index shall be calculated as per guide ASTM G101 shall be 6 or higher.
8. All tubing shall be subject to an inspection at the place of manufacture & assure conformance with the requirements of IS:3074 CDS3.
9. Packing, marking & loading: Each length of structural tubing shall be legibly marked by rolling, die stamping, ink printing, or paint stenciling to show the following information: manufacturer's name, brand, or trademark: size and wall thickness; steel grade; and the specification number.
10. The finished seamless tubes shall be cleaned, deburred at the ends and shall be coated completely with rust preventive oil or black lacquer and supplied without any dents and wrinkles with plastic caps covering the open ends of the tubes.
11. Firm will be evaluated technically / assessed by BEML or customer before technical bid clearance. This evaluation includes raw material manufacturing or sourcing facility, heat treatment facility, all lab test facilities, seamless tube manufacturing facility, NDT facility & other quality inspection facilities.
12. The supplier shall submit confirmation for the above points along with their technical offer.



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