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Document Title: Schedule of Technical Requirement for Vendor Approval for Manufacture and Supply of Double Walled Corrugated HDPE Ducts for Railway Signalling			



**Government of India - Ministry of Railways
RESEARCH DESIGNS & STANDARDS ORGANISATION
Manak Nagar, Lucknow-226011**

**SCHEDULE OF TECHNICAL REQUIREMENT
(STR)
FOR VENDOR APPROVAL FOR MANUFACTURE
AND SUPPLY OF
DOUBLE WALLED CORRUGATED HDPE DUCTS
FOR
RAILWAY SIGNALLING**

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DOCUMENT DATA SHEET

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Title of Document	SCHEDULE OF TECHNICAL REQUIREMENT (STR) FOR VENDOR APPROVAL FOR MANUFACTURE AND SUPPLY OF DOUBLE WALLED CORRUGATED HDPE DUCTS FOR RAILWAY SIGNALLING (SPECIFICATION NO. RDSO/SPN/204/2011 Version: 1.1)
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Document Control Sheet

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SCHEDULE OF TECHNICAL REQUIREMENT FOR DOUBLE WALLED CORRUGATED (DWC) HDPE DUCTS

(SPECIFICATION NO. RDSO/SPN/204/2011 Version: 1.1)

1 SCOPE:

The Schedule of Technical Requirement covers the norms, machinery & plants, testing equipment and quality assurance plan required for manufacturing of Double Walled Corrugated HDPE (High Density Polyethylene) Ducts, as per RDSO Specification.

2 REQUIREMENTS:

Vendors seeking approval for manufacture and supply of Double Walled Corrugated HDPE Ducts shall procure the specification and go through the detailed technical stipulations. They shall comply the requirements given below:-

2.1 GENERAL INFRASTRUCTUR:

2.1.1 The infrastructure should be adequate for manufacture of the Double Walled Corrugated HDPE Ducts (applied for) as per specification and to ensure adherence to quality assurance plan. The manufacturing, testing, storage facilities etc. shall be close by and adjacent to each other. It should have a proper shed/ manufacturing hall.

2.1.2 All the statutory approvals by local, state & Central Government authorities for running the factory at the given premises, manufacture & sale of the product by the firm shall be available & submitted.

2.1.3 The plant & machinery shall be suitably laid out process wise and each line duly labeled. It shall be so arranged as to facilitate smooth flow of product from one stage to the next stage & avoid unnecessary blockages or to & fro movement.

2.1.4 Sanctioned Power Load should be adequate for meeting the load requirements for the plant. Diesel generator set back up facility shall also be available.

2.1.5 There should be proper approach road to the factory.

2.1.6 Essential Plant & Machinery: The minimum essential plant and machinery shall be available for the Double Walled Corrugated HDPE Ducts as stipulated in **clause 4.0** of this document. The plant and machinery should be in good working condition. The complete details of each plant and machinery like make, rating, date of installation, serial number etc. shall be duly maintained and submitted. Suitable arrangements for

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maintenance and upkeep of the plant and machinery by way of AMC or in-house maintenance shall be ensured. For equipments requiring calibration, valid calibration shall be ensured.

2.1.7 Test and measuring facilities: The testing and measuring equipments shall be available as stipulated in **clause 5.0** of this document. All the equipments shall be calibrated at regular interval specified by calibrating agency (Govt. test house or other agency having trace-ability to National standards). The complete detail of each testing and measuring equipment like Sl. No. , make, rating, date of installation etc. shall be duly maintained and submitted along with the application for registration.

2.1.8 The firm shall not withdraw any machinery and plants or testing equipments, which have been indicated at the time of capacity-cum-capability assessment except for repairs/renewals.

2.2 QUALITY CONTROL:

2.2.1 The Quality Assurance Plan for the product should detail various parameters and to ensure control over them. Quality Assurance Process Flow Chart for broad guideline is given at Annexure-I to this document. The quality assurance plan & flow chart shall cover the complete process from the testing of raw material, stage by stage in process testing to final product testing i.e. complete process.

2.2.2 There should be a system to ensure the traceability of the product from raw material stage to finished product stage. This system should also facilitate to identify the raw material composition from the finished product stage.

2.2.3 Inward goods Inspection report should be maintained by firm and verified by Inspecting Official (I/O).

2.2.4 In process testing should be verified by various high level/competent officials of firm.

2.2.5 Adequate qualified and trained technical manpower shall be available.

2.2.6 Quality In-charge shall be responsible for day to day inspection, testing and quality control and compliance of QAP etc. of the product right from raw material stage till the finished goods stage. He shall be technically qualified and have adequate experience.

2.2.7 The firm should have experience of manufacturing of Double walled Corrugated HDPE duct.

2.2.8 All the relevant specification, IS standards should be available and properly documented with the firm.

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3 CHECK LIST

Local, state & central authorities & other commercial documents/certificates required to be ensured & submitted with the application along with the summary/checklist.

4 ESSENTIAL MACHINERY & PLANT REQUIRED FOR PRODUCTION:

4.1 All manufacturing process stages should be automatic to the maximum extent. Correction, minimal human intervention and synchronization between processes shall be ensured. Vendors should specify make, model and details of machines used and get it approved from RDSO.

4.2 Required essential machinery & plant shall be as follows:-

S. No. DESCRIPTION OF EQUIPMENT

1. HDPE Extruder with Digital PID Controller, automatic Hopper, Loaders, Dryers and all other complete attachments for outer wall.
2. HDPE Extruder with Digital PID Controller, automatic Hopper, Loaders, Dryers and all other complete attachments for inner wall.
3. Dies for DWC HDPE Duct.
4. Corrugator for DWC HDPE Duct.
5. Mould set for DWC HDPE Duct.
6. Spray Bath for DWC HDPE Duct.
7. Printing Machine/Hot Embossing Machine with printing stereotypes (On line marking machine).
8. Pipe Cutter for DWC HDPE Duct.
9. Tilting Unit for DWC HDPE Duct.
10. Automatic Coiler for DWC HDPE Duct.
11. Chilling Plant for DWC HDPE Duct.
12. Weighing Balance
13. Air Compressor.

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14. Generator.
15. Grinder with Motor
16. Crane

5.0 ESSENTIAL TESTING EQUIPMENTS REQUIRED FOR QUALITY ASSURANCE

5.1 The firm shall have full furnished laboratory for conducting testing as per specification. All testing equipment shall have calibration certificate with NABL traceability with valid calibration certificate.

5.2 Required essential testing equipments shall be as follows:-

S. No. DESCRIPTION OF EQUIPMENT

1. Density Tester (Range:. 0 - 200 gm L.C. = 0.005 gm)
2. Melt Flow Index Tester (Range: 0 - 300°C L.C. = 1°C)
3. Tensile & Elongation Testing Machine (Range: 0 -100 kgf L.C. = 1 kgf)
4. Shore D Hardness Tester (Range: 0 -100 Shore D L.C.= 1 Shore D)
5. ESCR Tester (Range: 0 - 200°C L.C. = 1°C)
6. Compression moulding machine. (Hot Plate for sheet preparation)
(Range: 0 - 200°C L.C. = 1°C)
7. Dumbbells cutting machine.
8. Digital Vernier calipers (02 Nos.). (Range: 0-300 mm) & (0-450 mm) (L.C. = 0.01mm)
9. Digital Micrometer (Range: 0 - 25mm L.C. = 0.001mm)
10. Calibrated length measurement tape. (Range: 0 -10 mtr L.C. = 1 mm)
11. Steel Scale (Range: 0 -1000 mm L.C. = 1 mm)
12. Compression testing machine (Range: 0 -2000 N L.C. = 1 N)

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13. Impact tester.
14. Cold chamber (Range: -10°C to 50°C, L.C. = 1°C)
15. Bending test fixtures.
16. OIT tester-Automatic Differential Scanning Calorimeter (DSC) type
(Range: 0 - 450°C L.C. = 0.1°C)
17. Resistance to flame propagation test enclosure.
18. Glow Wire Test apparatus. (as per IS: 11000 Part 2/Sec 1)
(Range: 0 - 900°C L.C. = 1°C)
19. Digital Weighing balance (Range: 0 - 210 gm L.C. = 0.001 gm)
20. Hot air oven (Range: 0 - 200°C L.C. = 1°C)
21. Water tank for IP7 testing.
22. Dust chamber for IP 6 testing.

Note:

1. Plant, machinery and testing equipments given above are only indicative. All necessary plant & machinery and testing equipments of adequate capacity and least count as necessary to manufacture the product as per RDSO specification and to ensure quality shall be provided.
2. Checks and tests shown in the Quality Assurance Flow Charts are only indicative. All necessary checks and tests as necessary to ensure quality shall be carried out at every stage of manufacturing and proper record of all checks and tests shall be maintained.
3. Sealing facilities should be provided in Hour Meter of ESCR Tester, Hot Air Oven and Cold chamber.
4. Testing Lab shall be air conditioned.
5. This STR shall be applicable to all new vendors applying for registration.

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ANNEXURE-I

QUALITY ASSURANCE FLOW CHART FOR DWC HDPE DUCT:

