



**GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS**

TELECOM DIRECTORATE

SCHEDULE OF TECHNICAL REQUIREMENT (STR)

FOR

1.4 mm DIA. COPPER CONDUCTOR 4/6 QUAD CABLE

RESEARCH DESIGNS AND STANDARDS ORGANISATION

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**1.4 mm DIA. COPPER CONDUCTOR 4/6 QUAD CABLE
SPECIFICATION NO. RDSO/SPN/TC/72/2007 (REV.-0)**

I. SCOPE:

The Schedule of Technical Requirement covers machinery & plants, testing equipments and quality assurance plan required for manufacturing of 1.4mm Conductor dia. 4 Quad Underground Armoured Jelly filled Cable as per RDSO specification No. RDSO/SPN/72/2007 Revision-0 or latest.

Vendor shall also comply norms issued by RDSO time to time in this connection and other relevant laws of the country.

II. ESSENTIAL MACHINERY & PLANT REQUIRED FOR PRODUCTION:

SN.	Description	Qty. Req.	Qty. Available	Make	Sr. No.	Remarks
1	<u>INSULATION :</u> Insulation/extrusion line for production of high quality telecommunication core with solid polythene insulation provided with:	1 No.				
1.1	Pay off with proper tension arrangement	1 No.				
1.2	Wire cleaner	1 No.				
1.3	Conductor pre heater	1 No.				
1.4	Polythene Drying Unit with digital temperature display and controller.	1 No.				
1.5	On line automatic dia Controller preferably XY Axis.	1 No.				
1.6	On line spark Tester (0-15 KV AC) with numeric fault counter meter with audio & visual alarm.	1 No.				
1.7	Extruder with Temp. Controller PID (Proportional Integral Differential) type & Digital Display for Controlling each zone, die, Barrel & Head etc.	1 No.				
1.8	Self Centering Head made of stainless steel with inner surface coated with diamond or equivalently hardened	1 No.				
1.9	Gradient water cooling arrangement made of Stainless Steel/non rusting material Cooling trough with minimum length 25 feet with air spurger at the end	1 No.				
1.10	Capstan with automatic speed control synchronised with Dia. Controller and preferably multipass.	1 No.				
1.11	A.C./D.C. variable Drive take up preferably with dual spool, proper tension control & traverse arrangements.	1 No.				

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SN.	Description	Qty. Req.	Qty. Available	Make	Sr. No.	Remarks
2	<u>QUAD FORMATION :</u> Quadding machine to make star quad equipped with PIV control mechanism, variable lay arrangement and anti twist arrangements.	1 No.				
2.1	Concentric applicator for quad whipping	1 No.				
2.2	Built in fast action auto break stop system	1 No.				
2.3	Capstan with proper tension control mechanism	1 No.				
2.4	Pay off and take up with proper tension control.	1 No.				
3	<u>QUAD LAYING, TAPING HEAD AND JELLY FILLING MACHINE :</u> Floating Carriage - Quad laying machine of minimum 6 Bobbins equipped with:	1 No.				
3.1	Taping head for application of polyester tape.	1 No.				
3.2	Lay changing arrangement.	1 No.				
3.3	Heavy duty Jelly Filling Machine with provision of Automatic temperature & pressure controller with digital display.	1 No.				
3.4	AC/DC variable Drive take up with proper tension control arrangement with suitable diameter drum.	1 No.				
4	<u>INNER POLYTHENE SHEATHING LINE WITH POLY-AL TAPE, GLUE APPLICATOR AND JELLY FLOODING ARRANGEMENT :</u> Inner Polyethylene sheathing Line of size 65 mm with following arrangement:	1 No.				
4.1	Mechanical tension control at pay off.	1 No.				
4.2	Extruder with Temp. Controller PID (Proportional Integral Differential) type & Digital Display for Controlling each zone , die, Barrel & Head etc.	1 No.				
4.3	Pay Off for Poly-Al tape	1 No.				
4.4	Poly-Al Application system with tension control.	1 No.				

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SN.	Description	Qty. Req.	Qty. Available	Make	Sr. No.	Remarks
4.5	Jelly flooding unit with PID Control heating arrangement of Jelly having digital display of Jelly Temperature.	1 No.				
4.6	Poly-AI Tape folding unit having smooth running rollers with die holders for tape folding	1 No.				
4.7	Poly al patch unit (Glue –Applicator) with in built heating system with digital temperature controller to control and monitor the temperature of melted glue and device for horizontal & vertical movement of its nozzle in order to ensure pressurized flow (maintained by adequate capacity compressor) of Glue for pressurized and accurate sealing of Poly-AI tape.	1 No.				
4.8	Gradient water cooling arrangement made up of Stainless Steel/non rusting material Cooling trough with minimum length of 25 feet with air spurger at the end .	1 No.				
4.9	On line spark tester (0-15 KV AC) with numeric fault counter with audio visual alarm.	1 No.				
4.10	Air Spurger.	1 No.				
4.11	Controlled speed cater- pillar arrangement.	1 No.				
4.12	Take up with suitable diameter Steel drum with proper tension control and having AC/DC variable drive.	1 No.				
5	<u>SCREENING :</u> Aluminium Wire /tape screening machine comprising of:	1 No.				
5.1	Proper tension control at pay off	1 No.				
5.2	Variable lay arrangements	1 No.				
5.3	Taping head for application of Barrium Chromate tape.	1 No.				
5.4	Capstan with speed control	1 No.				
5.5	Take up with DC/AC variable drive with Proper tension control arrangement.	1 No.				
5.6	Wire Welding Unit	1 No.				

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SN.	Description	Qty. Req.	Qty. Available	Make	Sr. No.	Remarks
6	<u>INTERMEDIATE / OUTER POLYTHENE SHEATHING :</u> Intermediate/Outer Polythene Sheathing Line of size 100 mm with following arrangements:	1 No.				
6.1	Mechanical breaking at pay off for proper tension.	1 No.				
6.2	Extruder with Temp. Controller PID (Proportional Integral Differential) type, Digital Display for Controlling each zone, die, Barrel & Head etc.	1 No.				
6.3	Gradient water cooling arrangement made of Stainless Steel/non rusting material Cooling Trough with minimum length 25 feet with air spurger at the end	1 No.				
6.4	Counter meter for length measurement.	1 No.				
6.5	On line spark tester (0-15 KV AC) with numeric fault counter with audio visual alarm.	1 No.				
6.6	Air spurger	1 No.				
6.7	Controlled speed cater- pillar arrangement	1 No.				
6.8	Take up suitable for 2.5 mtr. Steel drum with proper tension control and having AC/DC variable drive.	1 No.				
7	<u>STEEL TAPE ARMOURING :</u> Steel tape armouring machine with two tapes holding arrangement:	1 No.				
7.1	Pay off with proper tension arrangement.	1 No.				
7.2	Mechanism for fine adjustment of gap /overlap of Steel tape	1 No.				
7.3	Butt/Spot Welding machine for steel tape jointing	1 No.				
7.4	Controlled speed cater pillar arrangement	1 No.				
7.5	Take up suitable for 2.5 mtr. Steel drum with proper tension control and having AC/DC variable drive.	1 No.				

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SN.	Description	Qty. Req.	Qty. Available	Make	Sr. No.	Remarks
8	<u>MARKING:</u> Following Marking arrangements on line or off line on outer sheathing :	1 No.				
8.1	Embossing or indenting/ engraving cum printing					
8.2	Manufacturer name/Brand name					
8.3	Year & month of manufacturer					
8.4	Drum number					
8.5	Specification Number					
8.6	Sequential length marking machine of 0.02% accuracy with auto tape feeding and hot stamping.					
9	<u>Rewinding:</u> Rewinding machine suitable for 2.5 mtr. Drum size with following arrangement :-	1 No.				
9.1	Pay Off with proper tension arrangement	1 No.				
9.2	Meter counter	1 No.				
9.3	Speed Control Facility	1 No.				
9.4	Spark Tester (0 to 15 KV)	1 No.				
9.5	Take up stand for suitable drum /reels size having AC/DC variable drive.	1 No.				
10	D.G. set (heavy duty) of 100 KVA minimum capacity.	1 No.				

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SN.	Description	Qty. Req.	Qty. Available	Make	Sr. No.	Calibration Status						Remarks
						Cal. Certificate no. (enclose cert.)	Cal. Certificate valid upto	Cal. Agency (Internal/ external)	Master equipment traceable to	Master equipmnt calibration valid upto	Cal. Procedure doc. No. (enclose procedure)	
21.6	ELFEXT and NEXT Measurement at 0.8 kHz, 5 kHz, 21 kHz & 150 kHz..											
21.7	Characteristic impedance test at 0.8 KHz, 5 kHz, 21 kHz & 150 kHz.											
22	AC High voltage tester 0-10 KV (30 Amps. capacity).	1 No.										
23	Digital million meg ohm meter range 1 Megohm to 10 ⁹ Megohm in six ranges, DC test voltage, 100 Volt to 500 Volt ± 2% with one minute timer..	1 No.										
24	Set up for reduction factor test as per VDE spec..	1 No.										
25	Automatic/semi automatic Carbon black content test set up for checking carbon black content for inner, intermediate and outer Sheathing/Jacketing Compound.	1 No.										
26	Carbon black dispersion test set up for checking uniformity of carbon in inner, intermediate and outer Sheathing/ Jacketing Compound.	1 No.										

Note:- If few measurements are not available on the Automatic Computer Controlled Testing equipments, the same can be done through separate measuring instruments manually.