

ISO9001: 2008	Document No. SIQ-0701	Version No. 3	Date Effective: 30.11.2016
Document Title: STR for Railway Signalling Cable			



Government of India

Ministry of Railways

Signal Directorate

**Schedule of Technical Requirement (STR)
For vendor approval for manufacture and
supply of**

Railway Signalling Cable

SI Q - 0701 (Ver.3)

**Research Designs and Standards
Organisation**

**Manak Nagar,
Lucknow – 226011**

30.11.2016

SSE/Signal	ADE/Signal - 6	Director /Signal - 2	Page 1 of 14
Prepared By	Checked By	Issued By	

ISO9001: 2008	Document No. SIQ-0701	Version No. 3	Date Effective: 30.11.2016
Document Title: STR for Railway Signalling Cable			

1.0 Scope:

The schedule of technical requirements covers the norms for manufacture of different types of signalling cables for Railway applications, as follows:-

S.No.	Item Description	Specification
1.	PVC insulated armoured, unscreened, underground Railway Signalling cable	IRS-S:63/2014(Rev.4)
2.	PVC Insulated armoured, unscreened underground power cable	IRS-S:63/2014(Rev.4) & IS:1554(Part-1)
3.	PVC Insulated Railway Signalling Indoor Single Core Cable	IRS-S:76/89(Amd.3)
4.	PVC Insulated Railway Signalling Indoor Multi Core Cable	IRS-S:76/89(Amd.3)
5.	PVC insulated DST armoured, aluminium screened, underground cable	IRS-S:35/93

2.0 REQUIREMENTS:

Vendors seeking approval for manufacture and supply of above cables shall download the specification for the concerned item from the RDSO website and go through the detailed technical stipulations. They shall comply the requirements given below:-

2.1 GENERAL INFRASTRUCTURE FACILITY:

The factory/manufacturing unit shall be located in an approved industrial area and shall have proper access road. The infrastructure should be adequate for manufacture of the cable (applied for) as per concerned 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, factory area with minimum areabreak up for manufacturing, testing, storage etc. given below.

Covered area break up - minimum requirement

- I. Manufacturing floor area: 8000 sq.ft
 - (a)II. Laboratory area:
 - a) Air conditioned Lab area for carrying out physical tests : 500sq.ft.
 - b) Cage for high voltage test with Interlocking facility : 900sq.ft.
 - c) Electrical Laboratory adjacent to high voltage cage : 400sq.ft.
- III. Godown area for keeping the finished product : 5000sq.ft.
- IV. Separate godown with interlocking and sealing facility for the offered lot. Minimum 1000 sq.ft. subject to condition that maximum lot offered to be not more than 1/16th of the area available in separate godown (in sq.ft)
- V. Stores for keeping raw material : 1200sq.ft.

SSE/Signal	ADE/Signal - 6	Director /Signal - 2	Page 2 of 14
Prepared By	Checked By	Issued By	

ISO9001: 2008	Document No. SIQ-0701	Version No. 3	Date Effective: 30.11.2016
Document Title: STR for Railway Signalling Cable			

VI. Office area inside the factory premises : 500 sq.ft.

VII Proper approach road for reaching the transport in the factory at loading site.

VIII. **Road Map for existing and new vendors for complying to new STR clauses shall be 6 months from the date of issue of this STR. (Only for information of compliance.)**

As far as possible the space for conducting physical tests and electrical tests should be adjacent to each other. It can be combined also. The laboratories should be arranged in such a fashion that the equipments requiring air conditioning like tensile testing machine, computerized test setup/ electrical test equipments etc. are kept in air conditioned area while equipments generating excessive heat like water baths are kept outside the air conditioned area. There should be a clear view of the cable drums kept in the cage for electrical testing from the electrical lab.

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

2.3 The plant & machinery shall be suitably laid out process wise and each line duly labelled. 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.

2.4 Sanctioned Power Load should be adequate for meeting the load requirements for the plant. Diesel generator set back up with adequate facility for storage of diesel oil shall also be available. It is preferable to run the sheathing line on diesel generating set so that there are no interruptions and continuity in the finished cable is maintained.

2.5 Essential Plant & Machinery:

The minimum essential plant and machinery shall be available for the concerned type of cable as stipulated in clause 5.0 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 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. Only required plant and machinery should be in manufacturing of Signalling and Telecom cables. Each plant and machinery should be labelled with "MAKE", "RATING" & "YEAR" of manufacture.

2.6 Test and measuring facilities :

The testing and measuring equipments shall be available as stipulated in clause 6.0 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). For details regarding the test requirement/set up, the concerned cable IRS specification shall be referred. 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.

2.7 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.

3.0 QUALITY CONTROL REQUIREMENTS:

SSE/Signal	ADE/Signal - 6	Director /Signal - 2	Page 3 of 14
Prepared By	Checked By	Issued By	

ISO9001: 2008	Document No. SIQ-0701	Version No. 3	Date Effective: 30.11.2016
Document Title: STR for Railway Signalling Cable			

- 3.1** The Quality Assurance Plan for the product should detail various parameters and to ensure control over them.

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. This shall positively implement the process flow chart given at Annexure-I. Guideline for preparing of QAP is given at Annexure-II.

- 3.2** 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.
- 3.3** Ensure that the system of First in -First out is followed for raw material and the intermediate stage product.

3.3.1. Inward Raw material sources should be approved and their testing facility should be verified at the time of approvals and renewals. In case inward raw material sources proposed by firm not approved for any firm earlier, the approval should be done at the time of renewal.

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

3.3.3. In process testing should be verified by various high level /competent Officials of firm.

- 3.4** Adequate qualified and trained technical manpower shall be available.

- 3.5** The responsibilities for quality control person shall be separately laid out. He should be actively responsible for day to day inspection, quality inspection, compliance of QAP etc. Quality In charge shall be free from day to day production, and should be responsible for testing and quality control of the product right from raw material stage till the finished goods stage. He shall be technically qualified and have adequate experience and shall be actively involved with day to day inspection, quality inspection and compliance of QAP.

- 3.6** The firm should have acquired ISO – 9001/2008 series certification and the product for which the approval is sought, should be broadly covered in the scope of the certification for manufacture & supply.

- 3.7** The Quality manual of the firm for ISO- 9001/2008 should clearly indicate at any stage the control over manufacturing and testing of the said railway product.

- 3.8** It should be ensured that proper analysis is being done on monthly basis to study the rejection at various internal stages and it is documented.

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

4.0 CHECK LIST

SSE/Signal	ADE/Signal - 6	Director /Signal - 2	Page 4 of 14
Prepared By	Checked By	Issued By	

ISO9001: 2008	Document No. SIQ-0701	Version No. 3	Date Effective: 30.11.2016
Document Title: STR for Railway Signalling Cable			

Local, State & Central authorities & other commercial documents/certificates required to be ensured and are to be submitted with the application along with the summary/checklist.

5.0 ESSENTIAL PLANT AND MACHINERY REQUIRED FOR PRODUCTION

All manufacturing process stages should be automatic to the maximum extent with in process feedback arrangement for dia. Correction, minimal human intervention and synchronization between pay off and take-up. Vendors should specify make, model and details of machines used and get it approved from R.D.S.O.

5.1 POWER:

- i. DG: Single unit, DG Set 100 KVA (minimum) in covered room/enclosure to minimize noise pollution
- ii. On line UPS: 100KVA with back up of 15 minutes

5.2 DRAWING/ANNEALING

The process involves drawing of copper /aluminium rods , then doing annealing using following machines/set up which should be automated.

Outsourcing of some minor activities by any vendor will require approval of the directorate head.

- 5.2.1 Drawing and annealing of Copper/Aluminium (of high conductivity Electric grade as per IS:8130) with following machine
 - a) RBD [Rod break down machine] machine
 - b) Wire drawing (Medium/Fine)
 - c) Annealing (on line//Tandem line/Tube)
 - d) Copper purity test set up by electrolysis supported by resistivity test having supplier's certificate
 - e) Tinning Machine(Electro/Hot Dip). In case this activity is performed in house [for Indoor signaling cable]. This can be in-housed/outsourced. However permission of RDSO shall be required.

5.3 INSULATION EXTRUSION LINE

Insulation extrusion line for PVC to insulate conductor, producing high quality signalling wire shall be equipped with :-

- 5.3.1 Pay off shall be driven in tension control mode with pneumatic/Electrical/Mechanical arrangement.
- 5.3.2 Wire straightened with wiper.
- 5.3.3 Conductor preheated with Current control.
- 5.3.4 Upto 45mm or 65 mm or 80 mm capacity (maximum) extruder with proper (24:1) L/D ratio of screw and barrel with automatic feeding of PVC, master batch & preheating facility(with on

SSE/Signal	ADE/Signal - 6	Director /Signal - 2	Page 5 of 14
Prepared By	Checked By	Issued By	

ISO9001: 2008	Document No. SIQ-0701	Version No. 3	Date Effective: 30.11.2016
Document Title: STR for Railway Signalling Cable			

line dia controller & PID control for temperature). The head has to be self centring. The blowers to be used for temperature control for PVC cores.

5.3.5 PVC conveying / drying unit with air circulation.

5.3.6 Self centering head.

5.3.7 P.I.D. (Proportional Integral Differential) type pyrometer controlled heating system with display for each zone of barrel and cross head of extruder

5.3.8. (i) In case up to 45mm capacity extruder is provided gradient water cooling arrangement followed by stainless steel cooling trough of length 30 ft. (10 meters).

(ii) In case upto 65mm or 80mm capacity extruder gradient water cooling arrangement followed by stainless steel cooling trough of effective length 60 ft. (20 meters) shall be provided.

5.3.9 On line automatic dia controller (Dual axis) one each for 65 mm /80 mm extruder.

5.3.10 On line AC spark tester 0-10 KV with numeric fault counter meter and with audio visual alarm.

5.3.11 Counter meter.

5.3.12 Dancer with speed control for proper spread out winding of cable on drum.

5.3.13 Suitable capstan Synchronized with AC(VFD)/DC control drive.

5.3.14 (i)Dancer with speed control for proper spread of winding of cable on drum.

(ii)AC(VFD)/DC control drive

(iii)Proper tension control

(iv)traverse arrangement

(v)Slip clutch

(vi)Synchronized with the line.

(vii) DC drive dual take up with proper tension control and traverse arrangement.

5.3.15 Dot marking machine/inkjet printing machine/ laser printing machine for indoor signalling cable.

5.4 LAYING UP with minimum 36 bobbins and extendable arrangement with anti- torsion device and variable lay arrangement.

This process involves laying up of insulated conductor wires to obtain desired cable core sequence using the following :

5.4.1 Laying up with minimum 36 bobbins and extendable arrangement with alternate direction & variable lay up arrangement

5.4.2 Taping head for polyster tape.

5.4.3 Pay off shall be with proper tension control with Electrical/Pneumatic/Mechanical arrangement. For other operation pay off may have either DC motor drive or AC motor and drive in tension control mode alternatively it may have clutch or a brake to ensure appropriate tension between laying machine and pay off.

5.4.4 Take up shall be with proper tension arrangement duly synchronised and having Electrical/Pneumatic/Mechanical arrangement. For other operation take up may have either DC motor drive or AC motor and drive in tension control mode alternatively it may have clutch or a brake with mechanically coupled drive between take up and capstan/caterpillar.

5.4.5 Capstan/caterpillar synchronized with laying machine. It can have DC/AC drive or Mechanical coupling with laying machine.

5.5 INNER SHEATHING LINE

This process involves sheathing of the laid up core conductors using automated inner sheathing line for PVC, producing high quality sheathing of the signaling cable, equipped with

SSE/Signal	ADE/Signal - 6	Director /Signal - 2	Page 6 of 14
Prepared By	Checked By	Issued By	

ISO9001: 2008	Document No. SIQ-0701	Version No. 3	Date Effective: 30.11.2016
Document Title: STR for Railway Signalling Cable			

- 5.5.1 Pay off should be drive in tension control mode with Electrical/Pneumatic/Mechanical arrangement.
- 5.5.2 Extruder of 65 mm or higher size with proper (24:1) L/D ratio of screw and barrel with automatic feeding of PVC, Master Batch mixing & preheating facility (with online dia controller & PID control for temperature).
- 5.5.3 P.I.D.(Proportional Integral Differential) controlled heating system with display for each zone of barrel/cross head of extruder.
- (i) In case up to 100mm capacity extruder is provided gradient water cooling arrangement followed by stainless steel cooling trough of length 30 ft. (10 meters).
- (ii) In case above 100mm capacity extruder gradient water cooling arrangement followed by stainless steel cooling trough of effective length 60 ft. (20 meters) shall be provided.
- 5.5.4 Single/Double wheel capstan/belt caterpillar with AC(VFD)/DC drive and synchronized with the line.
- 5.5.5 (i)AC(VFD)/DC control drive
(ii)Proper tension control
(iii) Traverse arrangement
(iv)Slip clutch
(v) Synchronized for the line .
- 5.5.6 Take up (dancer/tension controlled)
- 5.5.7 AC (VFD)/DC controlled synchronized with the line.
- 5.5.8 On line spark tester(0 - 10 KV AC rms with counter and alarm) .
- 5.5.9 PVC conveying / drying unit.
- 5.5.10 Counter meter for length
- 5.6 **STRANDING CUM ARMOURING MACHINE** for steel wire /strip of 30 (minimum) bobbins
This process involves armouring/stranding of the inner sheathed cable using automated stranding cum armouring machines and line for producing high quality of the stranding/armouring of the signaling cable, equipped with
- 5.6.1 Pay off suitable for 2.2 Mtr. Steel drum. Essentially motorized operation for lowering and lifting of cable drums. Pay off should be driven in tension control mode with Electrical/Pneumatic/Mechanical arrangement. For other operation pay off may have suitable drive in tension control mode. It should have clutch or a brake to ensure appropriate tension between stranding/Armouring machine and pay off with tension control for 2.2 M dia reel.
- 5.6.2 Lay changing arrangement.
- 5.6.3 Fine arrangement for adjustment of gap and overlap.
- 5.6.4 Take up suitable for 2.2 M steel drum. Essentially motorized operation for lowering and lifting of cable drums. Take up should be synchronised with proper tension arrangement (electrical/pneumatic/mechanical). For other operation take up may have either DC motor drive or AC motor and drive in tension control mode.
- 5.6.5 Machine should be equipped for compacting and shaping of rounded conductor
- 5.6.6 Butt/Spot/brazing welding machine.
- 5.6.7 Single/Double wheel Capstan/Belt caterpillar with AC(VFD)/DC drive and synchronized with the line.
- 5.6.8 Counter meter for length.

SSE/Signal	ADE/Signal - 6	Director /Signal - 2	Page 7 of 14
Prepared By	Checked By	Issued By	

ISO9001: 2008	Document No. SIQ-0701	Version No. 3	Date Effective: 30.11.2016
Document Title: STR for Railway Signalling Cable			

5.7 **STEEL TAPE ARMOURING MACHINE** with :-

This process involves steel tape armouring of the signaling/power cable using automated steel tape armouring machines and line for producing high quality of the armoured signaling/power cable, equipped with.

- 5.7.1 Pay off suitable for 2.2 Mtr. Steel drum. Essentially motorized operation for lowering and lifting of cable drums. Pay off should be driven in tension control mode with Electrical/Pneumatic/Mechanical arrangement. For other operation pay off may have suitable drive in tension control mode. It should have appropriate tension between steel tape armouring machine and pay off with tension control for 2.2 M dia reel.
- 5.7.2 Fine arrangement for adjustment of gap & overlap.
- 5.7.3 Take up suitable for 2.2 M steel drum. Essentially motorized operation for lowering and lifting of cable drums. Take up should be synchronized with proper tension arrangement (electrical/pneumatic/mechanical). For other operation take up may have either DC motor drive or AC motor and drive in tension control mode.
- 5.7.4 Butt/Spot/brazing welding machine.
- 5.7.5 Single/Double wheel Capstan/Belt caterpillar with AC(VFD)/DC drive and synchronized with the line
- 5.7.6 Double Tapping head for bedding tape(for screened cable).
- 5.7.7 Double Tapping head for steel tape.
- 5.7.8 Hoist.

5.8 **PVC OUTER SHEATHING**

This process involves final outer sheathing of the laid armoured signaling/power cable using automated outer sheathing line for PVC signaling/power cable, equipped with

On line 100 mm minimum extruder (with on line Dia. controller) with following arrangements:

- 5.8.1 Pay off suitable for 2.2 Mtr. Steel drum. Essentially motorized operation for lowering and lifting of cable drums. Pay off should be driven in tension control mode with Electrical/Pneumatic/Mechanical arrangement. For other operation pay off may have suitable drive in tension control mode. It should have appropriate tension between sheathing machine and pay off with tension control for 2.2 M dia reel.
- 5.8.2 PVC conveying / drying unit.
- 5.8.3 P.I.D.(Proportional Integral Differential) controlled heating system with display for each zone of barrel/cross head of extruder.
- 5.8.4 Marking and drum no. embossing wheel/Hot stamp.
- 5.8.5 (i) In case up to 100mm capacity extruder is provided gradient water cooling arrangement followed by stainless steel cooling trough of length 30 ft. (10 meters).
(ii) In case above 100mm capacity extruder gradient water cooling arrangement followed by stainless steel cooling trough of effective length 60 ft. (20 meters) shall be provided.
- 5.8.6 Counter meter for length.
- 5.8.7 Sequential length marking machine of ± 0.2 % accuracy with auto tape feeding and hot stamping.
- 5.8.8 Single/Double wheel Capstan/Belt caterpillar with AC(VFD)/DC drive and synchronized with the line
- 5.8.9 Take up suitable for 2.2 M steel drum. Essentially motorized operation for lowering and lifting of cable drums. Take up should be synchronized with proper tension arrangement

SSE/Signal	ADE/Signal - 6	Director /Signal - 2	Page 8 of 14
Prepared By	Checked By	Issued By	

ISO9001: 2008	Document No. SIQ-0701	Version No. 3	Date Effective: 30.11.2016
Document Title: STR for Railway Signalling Cable			

(electrical/pneumatic/mechanical). For other operation take up may have either DC motor drive or AC motor and drive in tension control mode.

5.9 REWINDING Machine suitable for 2.2 M steel reel with :-

- 5.9.1 Pay off suitable for 2.2 Mtr. Steel drum. Essentially motorized operation for lowering and lifting of cable drums. Pay off should be driven in tension control mode with Electrical/Pneumatic/Mechanical arrangement. For other operation pay off may have suitable drives in tension control mode. It should have appropriate tension between rewinding machine and pay off with tension control for 2.2 M dia reel.
- 5.9.2 Roller guide.
- 5.9.3 Counter meter for length measurement.
- 5.9.4 Take up suitable for 2.2 M steel drum. Essentially motorized operation for lowering and lifting of cable drums. Take up should be synchronized with proper tension arrangement (electrical/pneumatic/mechanical). For other operation take up may have either DC motor drive or AC motor and drive in tension control mode.
- 5.9.5 Sufficient space to inspect the cable.
- 5.9.6 One meter long steel scale.

5.10 Bunching Machine [Indoor cable]

- 5.10.1 High speed double twist bunching machine with 630 mm spool size and 30 wire pay off. Coiling machine[minimum two nos].(For Indoor signaling cable)
- 5.11 Spooling machine (min. 2 nos.)for indoor signaling cable.
- 5.12 Small workshop with minimum one number of lathe, drilling machine, grinding machine and welding machine.
- 5.13 Laying machine for power cable.
- 5.14 EOT crane or fork lift or hoist for handling of cable drums (minimum 5 ton capacity).
- 5.15 Core printing machine.
- 5.16 Up to 45 mm or 65 mm or 80 mm capacity (maximum) extruder with proper (24:1) L/D ratio of screw and barrel with automatic feeding of PVC , master batch & preheating facility (with on line dia. Controller & PID control for temperature). The head has to be self centering. The blowers to be used for temperature control for power cable.

6.0 ESSENTIAL TESTING EQUIPMENTS REQUIRED FOR QUALITY ASSURANCE

- 6.1 Digital micro ohm meter based on Senior Kelvin bridge principle for measurement of specific resistance.
- 6.2 Million Meg ohmmeter. (min. two numbers) for measurement of insulation resistance.
- 6.3 Digital resistance meter (ohmmeter), min two numbers for conductor resistance measurement.
- 6.4.1 H.V Tester 0-10 KV, 30 Amps primary current , 10 KVA capacity with arrangement for measurement of both primary and secondary side voltage and currents.
- 6.4.2 H.V Tester 0-10 kV, 100 Amps primary current,22 KVA capacity with arrangement for measurement of both primary and secondary side voltage and currents.
- 6.5 Water bath for 50°C± 1°C (with sealing arrangement) of size 120cm X 75cm X 60cm fitted with digital temp. indicator temperature recorder and hour meter.
- 6.6 Water bath for 60°C±1°C (with sealing arrangement) of size 120cm X 90cm X 60cm with digital temp. Indicator temperature recorder and hour meter.
- 6.7 D. C. H. V. Tester 0-2 kV, 5 amp primary current capacity.
- 6.8 Digital multi meter with suitable high voltage probes for measuring 0-10 kV AC

SSE/Signal	ADE/Signal - 6	Director /Signal - 2	Page 9 of 14
Prepared By	Checked By	Issued By	

ISO9001: 2008	Document No. SIQ-0701	Version No. 3	Date Effective: 30.11.2016
Document Title: STR for Railway Signalling Cable			

6.9 **Measurement of conductor Resistance:** One of the following setup shall be provided for measurement of the conductor resistance.

- (1) Automatic cable tester set for measurement of conductor resistance. Provision of auto report generation should be available with strict control on software changes.
- (2) Digital resistance meter (ohmmeter), min two numbers for conductor resistance measurement.
- 6.10.1 Calibration box for C.R. duly calibrated by a Govt. test house or other agencies having traceability to National Standards.
- 6.10.2 Calibration box for I.R. duly calibrated by a Govt. test house or other agencies having traceability to National Standards.
- 6.11 Automatic computerized Tensile testing machine with load cell with auto report generation/ microprocessor based Mechanical Tensile machine with following ranges
 - (a) Tensile testing machine 0-50 kgf
 - (b) Tensile testing machine 0-250 kgf
 - (c) Tensile testing machine 0-1500 kgf. (for screened cables)
 - (d) Tensile testing machine 0-2500 kgf. (for DST)
- 6.12 MFI set up for PE cables
- 6.13 Stamping die (for cutting dumbell).
- 6.14 Hot rolling milling machine with hydraulic press for testing of PVC compound before extrusion
- 6.15 Conditioning chamber 27°C.
- 6.16 Digital vernier.(min. Two numbers)with least count 0.01 mm
- 6.17 Digital micrometer.(min. Two numbers)with least counter 0.001 mm
- 6.18 Digital/Analog stop watch.(min. Two numbers)
- 6.19 Digital / Analog Thermometer (0-100°C, 0-200°C, 0-300°C) minimum two each.
- 6.20 Travelling microscope/profile projector for thickness measurement.
- 6.21 Electronic Digital balance [0.1 mg – 200 grams] with accuracy of ± 0.1 mg.
- 6.22 Apparatus for testing colour fastness to water.
- 6.23 Torsion testing machine for steel wires (Motor drive with counter arrangement).
- 6.24 Spark tester 0-15 kV separately for off line testing of cores.
- 6.25 Multicell aging oven 0-150°C with temperature accuracy of $\pm 1^\circ\text{C}$ fitted with digital temp. indicator, temp. recorder, hour meter and air flow meter (Rotameter) as per IS specification.
- 6.26 Heating oven 0-300°C fitted with digital temp indicator, hour meter temp. recorder, and air flow meter (Rotameter) as per IS specification.
- 6.27 Small water bath. (for indoor signalling cables).
- 6.28 Thermal stability test apparatus at 200°C, temp. accuracy $\pm 1^\circ\text{C}$.
- 6.29 Flammability/Fire resistance test apparatus.
- 6.30 Reduction factor measurement set up (for screened cables).
- 6.31 Hot deformation test apparatus.
- 6.32 Apparatus for bleeding and blooming test.
- 6.33 Apparatus for cold bend test.(at -20°C).
- 6.34 Apparatus for cold impact test.(at -20°C).
- 6.35 Apparatus for heat shock test.
- 6.36 Apparatus for winding testing of Armour strips and Tapes.
- 6.37 5/6 Channel Data logger for Temperature recording.
- 6.38 Apparatus for specific gravity test.
- 6.39 Apparatus for colour fastness to daylight exposure.

SSE/Signal	ADE/Signal - 6	Director /Signal - 2	Page 10 of 14
Prepared By	Checked By	Issued By	

ISO9001: 2008	Document No. SIQ-0701	Version No. 3	Date Effective: 30.11.2016
Document Title: STR for Railway Signalling Cable			

- Note:**
1. All the above specified requirements of machinery are the minimum requirements. Vendors can utilize better/higher standards of machines also. Simultaneously, vendor can also utilize other alternative equipments with the better/higher standards machines to achieve the desired results. However these needs to be done at approval stage are fresh approval to be taken.
 2. For indoor signalling cable, S. No. 6.4.2, 6.11(b), 6.11(c), 6.23, 6.30, 6.36 are not required.
In addition S. No. 6.13 is not required for single core Indoor signalling cable.
 3. Implementation of new STR within 06 months from the date of issue.

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SSE/Signal	ADE/Signal - 6	Director /Signal - 2	Page 11 of 14
Prepared By	Checked By	Issued By	

ISO9001: 2008	Document No. SIQ-0701	Version No. 3	Date Effective: 30.11.2016
Document Title: STR for Railway Signalling Cable			

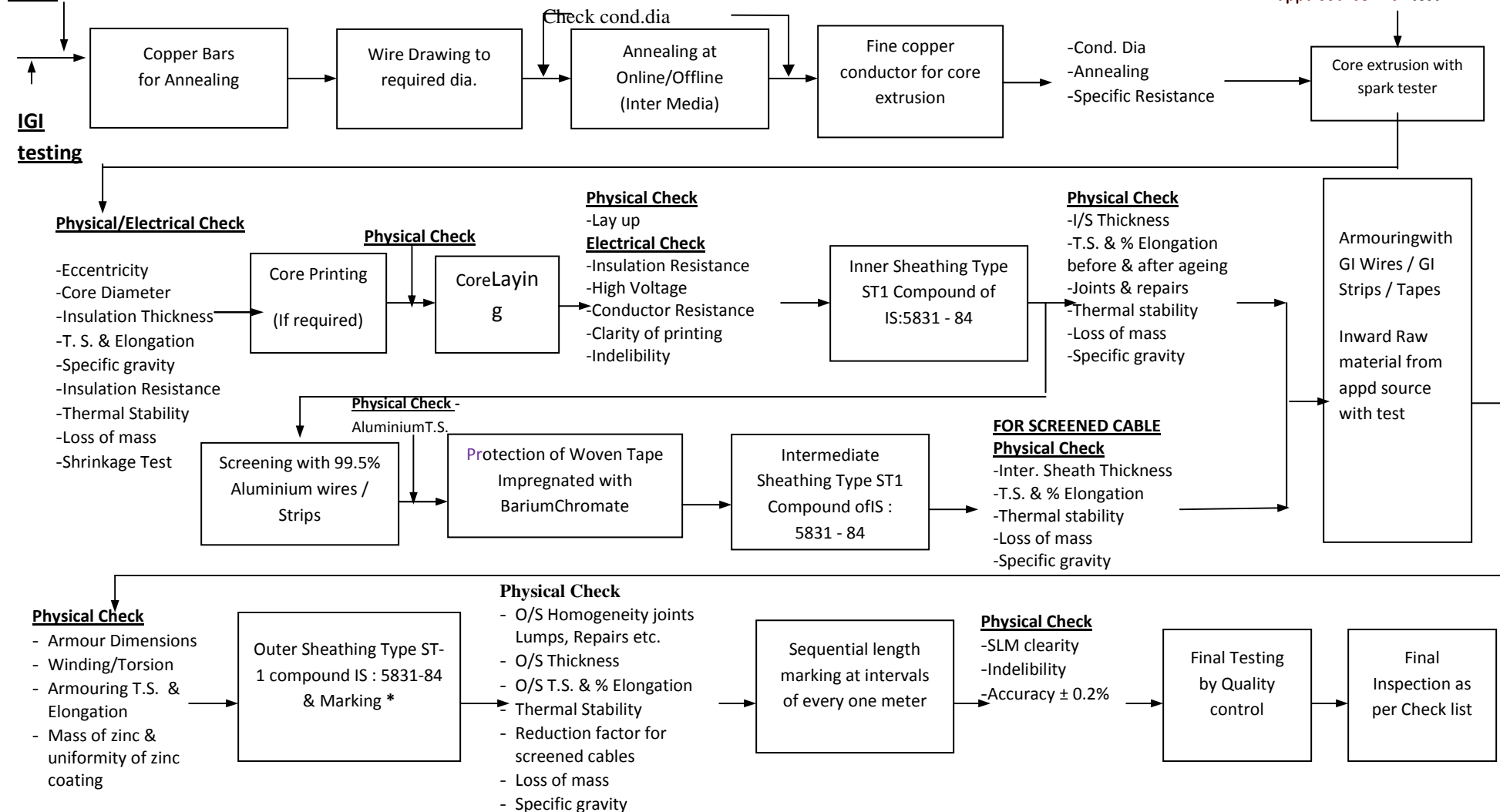
QUALITY ASSURANCE FLOW CHART FOR RAILWAY SIGNALLING CABLE

**Inward Raw material from
appd source with test
reports**

**IGI
testing**

PVC Type 'A' Compound to IS
: 5831-84

Inward Raw material from
appd source with test



*** Embossing of trade mark/Firm's name, Specn. No., Month, year, drum no. at Interval of every one meter**

SSE/Signal	ADE/Signal - 6	Director /Signal - 2	Page 12 of 14
Prepared By	Checked By	Issued By	

ISO9001: 2008	Document No. SIQ-0701	Version No. 3	Date Effective: 30.11.2016
Document Title: STR for Railway Signalling Cable			

Annexure -II

Guidelines for Preparing QAP during fresh registration

The QAP to be submitted by the vendor in triplicate (along with the application form for registration) shall cover the following aspects –

- Organisation Chart emphasising Quality Control Set-up.
- Qualification of key personnel and the officials deployed in Quality Control Cell.
- Process Flow Chart indicating process of manufacture for an individual product or for a family of products if the process is same.
- Details of vendors -
The name of components for which it is approved
Vendor Approving Agency.
.Inspection criteria at vendors' premises.
In case large no. of bought out items are required, the information shall be given in the format as below :

Sl. No.	Name of Component	Drawing No. / Specn. No.	Name of the vendors	Vendors approving agency RDSO/Self/Open market	Inspection criteria (Write details or check sheet* No.)

The check sheet should be a controlled document of ISO : 9000 quality control systems.

- Quality Assurance System – Inspection & Testing Plan. This shall cover the following:
Incoming material

Process control

Product control

. System control
. Gauging scheme – In the format for each operation gauges should be mentioned, if used.
- Stage inspection detailing inspection procedure, inspection parameters, method of testing/test procedure including sample sizes for destructive and non-destructive testing etc.

SSE/Signal	ADE/Signal - 6	Director /Signal - 2	Page 13 of 14
Prepared By	Checked By	Issued By	

ISO9001: 2008	Document No. SIQ-0701	Version No. 3	Date Effective: 30.11.2016
Document Title: STR for Railway Signalling Cable			

The generalised format covering the information under e, f, should be as below:

Subject/ Product/ Process g	Sample Size & its Frequency in inspection	Parameters for inspection	Mode of inspection / equip. used	Acceptance limits/Criteria/ Specified Value	Rejection details Reprocessed /Scraped

Q

- g. QAP covering all the information as asked above under 'a' to 'f' must be given in the form of single document indicating name of the firm and page no. 'x' of 'y' on each page. Each page should be signed by QC in-charge. The approved QAP must be a controlled document and a quality record of ISO : 9000 quality control system of the vendor. A certificate to this effect shall be provided along with the QAP by the vendor

h. Any other thing decided by R.D.S.O.

I The QAP shall be approved by R.D.S.O. and this will be subjected to review/upgradation by R.D.S.O. in light of fresh data and experience/ renewals.

SSE/Signal	ADE/Signal - 6	Director /Signal - 2	Page 14 of 14
Prepared By	Checked By	Issued By	