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GOVERNMENT OF INDIA
(Ministry of Railways)

Schedule of Technical Requirement (STR)
for
LED Signal Lighting Units

Signal Directorate

Research Designs & Standards Organisation
Manak Nagar Lucknow –226011

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Scope

The Schedule of Technical Requirement No. SIQ 0204 covers machinery & plants, testing equipments and quality assurance plan required for manufacturing of LED Signal Lighting Units for Railway Signalling as per RDSO specification no. RDSO/SPN/153/2004 Revision: 3 (DRAFT).

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

Note:

- i) This STR shall be applicable to all new vendors applying for registration.
- ii) All existing approved vendors shall be advised for implementation of this STR.
A reasonable period for compliance shall be given.

Copy Holders:

- i) ED / QA-III
- ii) DSIG-II
- iii) JDSIG-VII
- iv) ADE/ES-II

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Essential Machinery & Plants and Testing Equipments

1.	3 Aspect CLS unit for Main Signal
2.	CLS unit for Direction type Route Indicator
3.	CLS unit for Position Light Shunt Signal
4.	CLS unit for calling ON Signal
5.	DC variable power supply (0-200 V)
6.	Variable AC Supply (0-350 V)
7.	Spectrometer
8.	Illumination test fixture
9.	Dispersion angle test fixture
10.	Digital Multi meter
11.	Insulation tester (500 Volts)
12.	High voltage Break down tester (0 – 3 KV)
13.	Oscilloscope two channel
14.	LCR meter
15.	Variable wire wound resistor for resistive load
16.	Digital Vernier callipers
17.	Screw gauge
18.	Steel Scale
19.	Bench vice
20.	Drill Machine
21.	Temperature controlled soldering / de soldering station
22.	Cold Test chamber
23.	Dry Heat chamber
24.	Electro-static discharge protected work benches
25.	Burn-in test benches
26.	Dark Room for measurement of illumination, chromaticity & dispersion angle
27.	Dust free environment for manufacturing/assembly

Note:

1. Plant, machinery and testing equipments shall be of adequate capacity to manufacture the product as per RDSO specification and drawings.
2. Recommended technical requirements of spectrometer suitable for measurement of LED signal for railway signalling are enclosed at page 4 & 5.
3. Colour Light Signal (CLS) units shall be complete with post, ladder etc.

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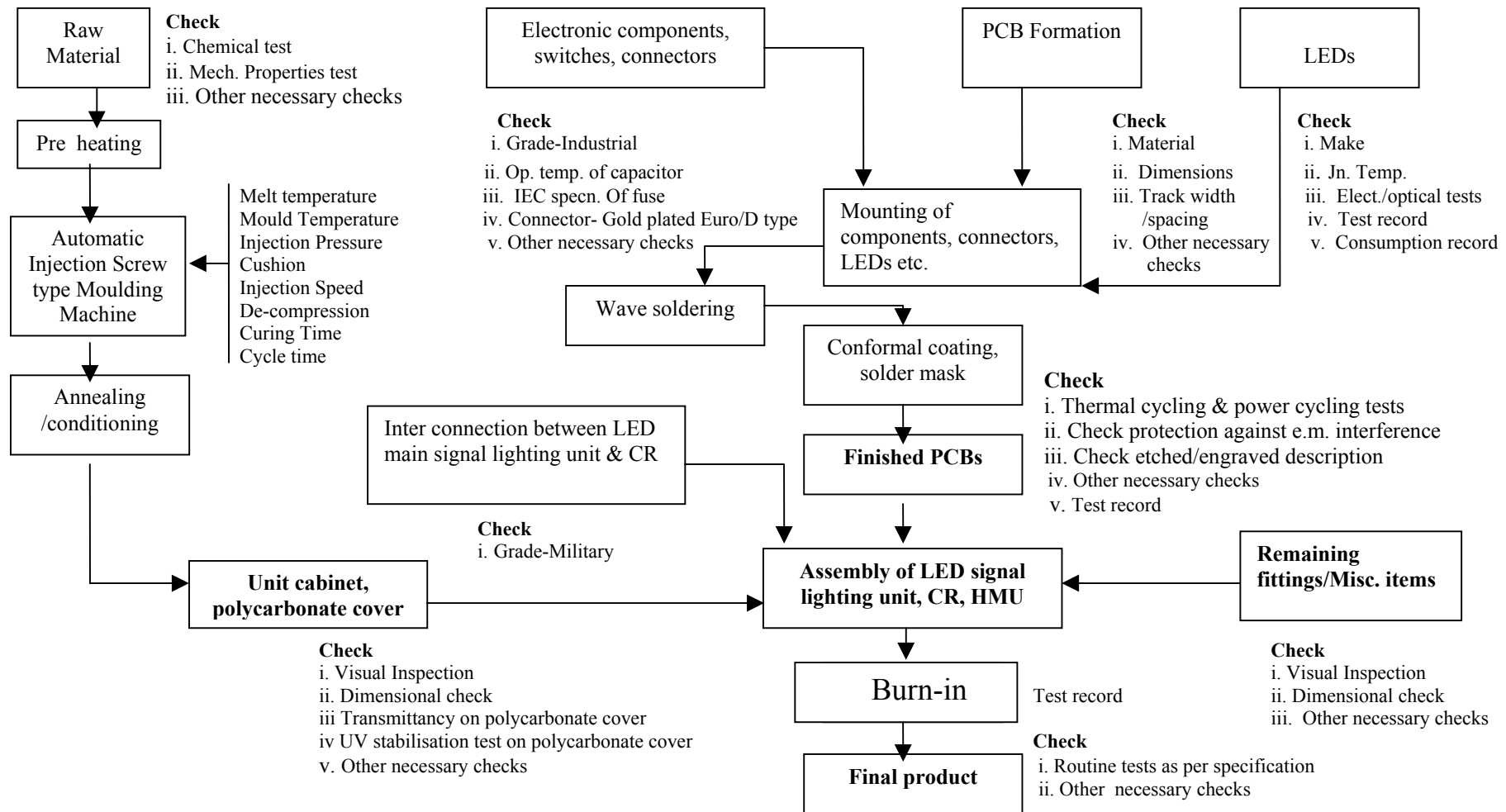
Recommended technical requirements of Spectrometer suitable for measurement of LED signal for railway signalling

- (1) Spectrometer should be capable of following measurements for individual LED and cluster of LEDs (LED signal unit upto 125 mm diameter)-
 - (i) For LED
 - (a) Luminous intensity
 - (b) Spectrum with Dominant & Peak wave length and spectral width
 - (c) Colour co-ordinates, colour temperature and colour differences
 - (ii) For cluster of LEDs upto 125 mm diameter
 - (a) Illuminance
 - (b) Spectrum with Dominant & Peak wave length and spectral width
 - (c) Colour co-ordinates, colour temperature and colour differences
- (2) Spectrometer should be able to measure all colour parameters as per CIE (International Commission on Illumination) - 1931 chromaticity diagram as mentioned in BS 1376 : 1974.
- (3) Minimum measurement ranges and measurement accuracy will be as given below:
 - (i) Luminous intensity: 0 to 50 cd
 - (ii) Illuminance: 0 to 1000 LUX.
 - (iii) Wave length: 380 nm to 780 nm.
 - (iv) Spectrometer resolution: 3 nm or better
 - (v) Measurement accuracy for wave length: ± 0.5 nm or better
 - (vi) Measurement accuracy for chromaticity (x,y,z): ± 0.002 or better
 - (vii) Measurement accuracy for rest measurements: ± 5 % or better
- (4) It should be feasible to enhance measurement ranges for luminous intensity and illuminance, if required in future.
- (5) It should be possible to take print out of all measurements directly on printer or transfer the measurement data in personal computer. PC interface should be RS-232.
- (6) Display: LCD with backlight illumination / monitor of PC
- (7) Power source: It should be possible to operate on 220V AC (through AC adapter) / batteries.
- (8) All accessories and necessary software for measurements as per Para-1, 2, 3 & 4 shall be provided as an integral part of the instrument. Printer and PC as per paras-4&5 alongwith connecting cables etc. complete shall be part of the supply.
(Printer / PC may be procured from other sources provided these are compatible with the spectrometer)

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- (9) Measurement probes/adapters shall be CIE-compliant. Measurements shall be in conformance with CIE recommendations/specifications, as applicable. Copies of relevant CIE recommendations/specifications shall also be supplied for reference.
- (10) Equipment and accessories should be duly calibrated and calibration certificate with proper traceability to a national calibration laboratory like PTB (German Calibration Service) or NIST (US National Institute of Standards & Technology) shall be submitted alongwith the equipment.
- (11) Detailed literature on construction, functioning and maintenance shall be supplied.
- (12) Warranty of minimum two years should be given. Procedure of warranty and outside warranty services should be clearly detailed.

Quality Assurance Flow Chart LED signal lighting units, Current regulator (CR), Health Monitoring Unit (HMU)



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- Note: 1. Outsourcing, if any, of any sub-modules or PCB shall be indicated in the ‘Quality Assurance Plan’ and approval of RDSO, Lucknow shall be obtained. Any outsourcing of safety related sub-module or PCB shall be from ISO-9001 or ISO-9002 certified manufacturers only. Necessary tests and checks shall be done by the manufacturer of LED signal to ensure quality, reliability and compliance of the specification.
2. Checks and tests shown in the Quality Assurance Flow Chart 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. Abbreviations used in the Quality Assurance Flow Chart are given below-
- i. Jn. : Junction
 - ii. Temp. : Temperature
 - iii. Op. : Operating
 - iv. Elect. : Electrical
 - v. IEC : International Electrotechnical Commission
 - vi. Specn. : Specification
 - vii. Mech. : Mechanical

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