

COLOUR LIGHT SIGNAL, MULTI-UNIT TYPE



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**INDIAN RAILWAY STANDARD SPECIFICATION
FOR
COLOUR LIGHT SIGNAL, MULTI-UNIT TYPE
(TENTATIVE)**

SPECIFICATION NO. IRS: S 26 – ~~64~~ 2020

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COLOUR LIGHT SIGNAL, MULTI-UNIT TYPE

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This document specifies Technical specification for Colour Light Signal, Multi-Unit Type.			

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AMENDMENTS

Version	Chapter/ Annexure	Amendment	Effective date
IRS: S 26/1964	-	FIRST ISSUE	1964
IRS: S 26/2020	-	1 st Amendment (To withdraw provisions related to use it with signal bulbs)	2020

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(Note: SN:7 deleted as not needed for LED signal unit)

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**Government of India
MINISTRY OF RAILWAYS
(RAILWAY BOARD)**



IR;eso t;rs

**INDIAN RAILWAY STANDARD SPECIFICATION
for
COLOUR LIGHT SIGNAL, MULTI-UNIT TYPE
(Tentative)**

SPECIFICATION NO. IRS: S 26-~~64~~ 2020

0. FOREWORD.

- 0.1 These specifications are issued under the fixed Serial No. S 26, followed by the year of original adoption as standard, or in the event of revision, the year of last revision.

ADOPTED, 1964.

- 0.2 This specification requires reference to the following Indian Railway Standard (IRS), Indian Standard (IS) and British Standard (BS) Specifications, which shall also be complied with to the extent applicable:-

~~IRS: S 7 — Roundels, Glasses and Lenses.~~

IRS: S 23 Electrical Signalling and Interlocking Equipment.

~~IS: 591 — Low Power, Low Voltage Mains Transformers for Radio Receivers, Amplifiers, Small Transmitters and similar other purposes.~~

BS: 376: Part 2 Railway Signalling Symbols, Wiring Symbols and Written Circuits.

~~BS: 469 — Electric Lamps for Railway Signalling.~~ Draft IS

HEX. HEAD BOLTS, SCREWS & NUTS
Specification (M 1.6 to M 5).

(Note: IRS:S 7, IS: 591 & BS: 469 deleted as not needed for LED signal)

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DOC : EDC 27 (694)

Oct., 1962.

- 0.3 Wherever, in this specification, any of the above mentioned specification is referred to by number only without mentioning the year of issue, the latest issue of that specification is implied; otherwise, the particular issue referred to is meant.
- 0.4 This specification is intended chiefly to cover the technical provisions and the provisions relating to supply of the equipment and so does not include all the necessary provisions of a contract.

1. SCOPE

- 1.1 This specification applies to Multi-Unit Colour Light Signals ~~of Doublet Lens Type, Long range and Short range~~ used in railway signalling. ~~This Colour lighting housing is to be used with LED Signal lighting unit as per RDSO/SPN/199/2010 Rev. 1.1 or latest only.~~
- 1.2 This specification gives details of rated voltage, general requirements, operating characteristics and tests.
- 1.3 This specification does not cover the wiring and protective devices used in conjunction with Colour Light Signals in their installation.

2 TERMINOLOGY

- 2.1 The terminology referred to in this specification is covered by IRS Specification Nos. ~~S-7 and~~ S 23.
- 2.2 The terms referred to in this specification but not covered in IRS Specification Nos. ~~S-7 and~~ S 23 are defined below:-

2.1.1 Colour Light Signal- A fixed signal, the aspects of which are given by the colour of a light.

~~**2.1.2 Doublet Combination Lens-** A matched combination of an inside step outer lens and an outside step inner lens for the efficient utilisation of light flux in a Colour Light Signal.~~

~~**2.1.3 Range-** Longitudinal distance at which, under bright sun light conditions with the sun at or near the Zenith, the indication of signal will be clear and distinct to a person with normal vision.~~

~~**2.1.4 Close up Indication-** An indication provided for drivers when at close range near the signal. This is obtained by providing a deflecting prism or a moulded deflecting sector in the outer lens so as to deflect a portion of the light beam in the intended direction from the axis of the main beam.~~

(Note: Strike through of clause no. 1.1, 2.1, 2.2, 2.1.2 & 2.1.4 deleted as not needed for LED signal whereas clause no. 1.1 modified as needed for LED signal)

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~~2.1.5 Light Unit~~ - An assembly of lenses, lamp holder unit, electric lamp and frame.

2.1.6 Angle of spread- Angle included by that portion of the beam within which the intensity of the beam is not less than 50 per cent of the candle power of the axial beam.

2.1.7 Top of Post Mounting- Colour light signal for mounting at the top of signal post.

2.1.8 Base Mounting- Colour light signal for mounting on a flat surface.

2.1.9 Sighting Device- A device used with Colour light signal for the purpose of checking the alignment of the signal in respect to the track it controls.

2.1.10 Side Light- An attachment used in connection with Colour light signals for the purpose of giving a close range view of the signal aspect displayed.

3 RATED VOLTAGE

3.1. The rated voltage of the Signal shall be 110 V, AC (RMS) \pm 20% ~~one of the following:-~~

<u>Type</u>	<u>Rated voltage</u>
High Voltage	110 volts, 50 cps. A.C.
Low Voltage	12 volts D.C.

4 GENERAL REQUIREMENTS

4.1 Means shall be provided for independent vertical and horizontal adjustment of the signal for accurate alignment of the projected light beams in respect to the track which it controls.

4.2 A Suitable type of sighting device accurately aligned parallel to the projected light beam shall be provided on the signal case.

4.3 Sighting device on the signal shall be drilled and/or finally adjusted on the Test Bench after the requirements ~~specified in Clauses 6.12 and~~ 13.2.2 have been complied with.

4.4 Assembly and seating of light unit to signal case shall be so designed that the projected light beams from all units of a signal are parallel to each other.

4.5 Doors ~~and lenses~~ shall be provided with durable water proof gaskets fastened securely in place to prevent the entrance of dust and moisture.

4.6 A screened breather shall be provided to ensure ventilation in all units of signal case.

(Note: Strike through of clause no. 2.1.5, 3.1, 4.3 & 4.5 deleted as not needed for LED signal whereas clause no. 3.1 modified as needed for LED signal)

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- 4.7 Mounting socket shall be suitable for either top of post mounting on 90, 100, 125 and 140 mm outside dia. posts or base mounting as specified by the purchaser.
- 4.8 The number and colour of aspects of the signal and the order in which they have to be provided shall be specified by the purchaser, giving the bottom colour first and thence upwards.
- 4.9 A side light of approved type shall be provided for each signal aspect if so specified by the purchaser. The colour of the side light shall correspond with the colour of the respective signal aspect displayed.
- ~~4.10 Lamp for side light shall be single filament, 2-pin to SL5 or SL8 of BS 469 unless otherwise specified by the purchaser.~~
- ~~4.11 Light Unit of high voltage signal shall be fed through a step down transformer 110V/12V A.C.~~
- ~~4.12 Light unit and the associated transformer shall be independent for each aspect and housed in the respective unit compartments.~~
- 4.13 Suitable weather proof entrance for cable and means for clamping the cable shall be provided.
- 4.14 Terminal for external connections shall preferably be housed in a separate terminal box attached to the bottom of the signal case.
- 4.15 A hood shall be provided for each unit projecting substantially at right angles to the body of the case and extending one half way ~~around the lens on the~~ opening side and shall be not less than 300 mm long for long range signals and 150 mm long for short range signals.
- 4.16 Hood shall be designed to prevent possibility of Phantom-indication due to sun at low altitudes as also to minimise the likelihood of snow or ice accumulating on the ~~lens polycarbonate cover of LED signal lighting unit.~~
- 4.17 Background of suitable size shall be provided, the overall width of the signal with background being not more than 445 mm.

5 SIGNAL CASE

- 5.1 Signal Case shall be of metal, strong, weather-proof and of ample size to properly house, without crowding, the apparatus and wiring contained therein, suitably arranged for convenient and ready access.
- 5.2 Arrangements shall be provided for rigidly securing and pad-locking the doors of terminal box and each unit of signal case.

(Note: Strike through of clause no. 4.10, 4.11, 4.12, 4.15 & 4.16 deleted as not needed for LED signal whereas clause no. 4.15 & 4.16 modified as needed for LED signal)

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- 5.3 Signal case shall be provided with an eye bolt of suitable size fixed on top of the signal case for convenience in handling.
- 5.4 The doors when open shall permit easy access to all parts.
- 5.5 Side light openings shall be provided as shown on the drawings or specified by the purchaser and shall be blanked off if side lights are not required to be provided.
- 5.6 Signal case shall be so designed that ~~the lenses and associated parts~~ can be cleaned without disturbing the adjustment of the optical system.

6. LIGHT UNIT

- 6.1 Light unit shall be designed to prevent possibility of phantom- indications due to external light.
- ~~6.2—A doublet combination lens shall be employed for each aspect, consisting of a coloured outside step inner lens 140 mm diameter, the clear inside step outer lens being 213 mm diameter for long range signals and 160 mm diameter for short range signals.~~
- ~~6.3—Doublet combination lens shall be designed to project a highly concentrated parallel beam of light from a lamp of approved type, placed with the centre of the filament at the focal distance of the combination.~~
- ~~6.4—The colour of inner lens of the doublet combination lens shall be Red, Yellow or Green.~~
- 6.5 Suitable means for close up indication shall be provided unless specified otherwise.
- ~~6.6—The angle of spread for the light unit with 213 mm outer lens and lamp as specified by the purchaser shall not be less than 2 degrees.~~
- ~~6.7—A spread light lens for horizontal spread of beam to 8 or 30 degrees, as specified, shall be provided to cover extra wide range on curves, if required by the purchaser.~~
- ~~6.8—The lenses shall be conform to IRS Specification No. S 7.~~
- 6.9 Ranges of visibility of a long range signal shall not be less than 1000 metres and of a short range signal not less than 350 metres with the lamp, as specified by the purchaser, burning at 90 per cent of the rated voltage.

(Note: Strike through of clause no. 5.6, 6.2 to 6.4, 6.6 to 6.8 deleted as not needed for LED signal)

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~~6.10—Lamp for light unit shall be double filament, 3 pin to SL 17 or SL 21 of BS 469 unless otherwise specified by the purchaser.~~

~~6.11—Lamp holder unit shall be designed to suit the type of lamp specified by the purchaser and shall provide for adjustment of its position.~~

~~6.12—Lamp holder unit shall be so adjusted that the position of the filament of the specified lamp is at the focal point of the lens combination and shall be sealed in position at the factory.~~

~~6.13—Lamp holder unit shall be insulated from the case and lens support.~~

~~7~~ **TRANSFORMER.**

~~7.1—Transformer shall comply with all relevant provisions for Grade 'A' Transformer of the open type specified in IS 591. The severities of climatic and Applied High Voltage Tests will, however, be as laid down in IRS: S 23.~~

~~7.2—Transformer shall be air cooled, for indoor service for low voltage lighting, and comply with the follow rated values:-~~

~~Capacity—————50 volt ampere, continuous.~~

~~Frequency—————50 cycles per second.~~

~~Type—————Single phase.~~

~~Tappings:-~~

~~Primary—————110, 105, 5, 0 volts.~~

~~Secondary—————12, 11, 2, 0 volts.~~

~~Maximum no loader~~

~~Current (Primary)—————45 milliamp, at 110 volts.~~

~~7.3—Terminals shall be marked for the appropriate voltages.~~

~~7.4—Transformer shall be so designed that when the rated voltage of 110 volts, 50 cps. is applied across the appropriate terminals of the Primary, the voltage across a (12 volts, 33 watts signal lamp) resistive load of 4.37 ohms, connected across the 12 volts terminals of the Secondary, is 12 volts.~~

8 TERMINALS

8.1 Terminals shall comply with IRS Specification No. S 23 except that they shall be of size M 5 to Draft IS Specification No. DOC : EDC-27 (694) October, 1962.

8.2 Terminals shall be marked in accordance with the wiring diagram.

(Note: Strike through of clause no. 6.10 to 6.13, 7 to 7.4 deleted as not needed for LED signal)

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9 WIRING

- 9.1 Internal wiring shall be neatly arranged and shall conform to IRS Specification No. S 23.
- 9.2 The conductors for the internal wiring shall be insulated and shall be of tinned copper, stranded, having a cross-sectional area of not less than 2 Sq. mm and not less than three strands. Both ends of a conductor shall be provided with an eyelet of suitable type and labelled.
- 9.3 Common connections shall be capable of being disconnected readily for test purposes.
- 9.4 Wiring diagram with symbols to BS 376, Part 2 and explanation, if in English shall be securely attached to the inner face of the cover of the and protected from fading and effects of moisture.

10 MANUFACTURE

- 10.1 The manufacturer shall ensure that in addition to all the provisions of this specification, the requirements of IRS Specification No. S 23 and any other specifications and drawings referred to by the purchaser are fully complied with.
- 10.2 Following shall be in accordance with IRS Specification No. S 23 wherever applicable:-
- 10.2.1 Material.
 - 10.2.2 Workmanship.
 - 10.2.3 Limits and Fits.
 - 10.2.4 Interchangeability.
 - 10.2.5 Other general requirements of S 23 not covered by this specification.
 - 10.2.6 Packing.
 - 10.2.7 Warranty.

11. MARKING AND IDENTIFICATION

- 11.1 Marking and identification shall be to IRS Specification No. S 23.

~~11.2 Each transformer shall be indelibly marked and indicate:-~~

- ~~1. Manufacturer's name.~~
- ~~2. IRS No., if any.~~
- ~~3. Serial No.~~
- ~~4. Year of manufacture.~~
- ~~5. Input voltages.~~

(Note: Strike through of clause no. 11.2 (SN 1 to 5) deleted as not needed for LED signal)

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- ~~6. Output voltages.~~
~~7. Capacity in volt-amperes.~~
~~8. Secondary current at full load at unity PF.~~

12 FINISH

- 12.1 Finish of various parts shall be to IRS Specification No. S 23.
- 12.2 Non- reflecting dead black paint to IS 154 shall be used all over the signal after a priming coat of red lead to IS 102.

13 INSPECTION AND TESTING

- 13.1 Inspection and tests shall be carried out to ensure that all requirements of this specification, IRS Specifications ~~S-7~~ and S 23, IS 591 and any other specifications referred to are complied with.

13.2 Routine Tests:

- ~~13.2.1 In addition to the tests on assembled equipment specified in IRS Specification No. S 23, each transformer shall also be tested to ensure compliance of the requirements laid down in clauses 7.2 and 7.4.~~

- 13.2.2 The following test shall be conducted to ensure the adjustment of the signal for straight and parallel beams of light. A screen shall be marked with spots, one for each aspect of the signal, on a vertical line, their spacing being exactly the same as that of the light units of the signal.

Signal under test shall be mounted on an adjustable base approximately 6 metre away from and facing the screen. After ensuring that the signal is vertical, top face horizontal, front face on which the light units seat parallel with the screen and the height so adjusted that the centre of the light beam (the black spot in the area of light falling on the screen) of the bottom light unit of the signal coincides with the respective spot on the screen, it shall be checked that the centres of the light beam of other light units of the signal shall also coincide with the respective spots on the screen.

13.3 Type Tests:

- 13.3.1 Tests shall be carried out to verify the operating characteristics **laid down in clauses 6.6, 6.7 and 6.9.** and compliance as per drawings referred by the purchaser.

13.4 Acceptance Investigation Tests:

- 13.4.1 All the environmental tests specified in IRS Specification No. S 23 shall be carried out.

(Note: Strike through of clause no. 11.2 (SN: 6 to 8), 13.1, 13.2.1 & 13.3.1 deleted as not needed for LED signal whereas clause no. 13.3.1 modified as needed for LED signal. Strike through and addition in clause no. 13.4 is for better understanding)

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14 REJECTION

14.1. The colour light signal or any part thereof that does not comply with any of the requirements of this specification and/or any other specification and/or of drawings as approved by the purchaser will be rejected.

APPENDIX 'A'**INFORMATION TO BE SUPPLIED BY THE PURCHASER**

1. **Range:** long range or short range (Clauses 1.1, ~~6.2~~ & 6.9).
2. **Type:** high voltage or low voltage (Clause 3.1).
3. Number, colour and order of aspects; giving the bottom colour first and thence upwards (Clauses 4.8 ~~& 6.4~~).
4. With or without side light and their position (Clauses 4.9 ~~and 5.5~~).
5. The angle of horizontal spread if the signal is to be used on curves (~~Clause 6.7~~).
- ~~6. Type of lamp for side lights and signal aspects (Clauses 4.10 & 6.10).~~
7. **Mounting arrangement:** type and size (Clause 4.7).

(Note: Strike through of SN: 1,3,4,5 and 6 deleted as not needed for LED signal)