भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS

पश्चिम क्षेत्रीय कार्यालय : 'मानकालय', ई-9, एम. आय. डी. सी., रोड नं. 8, अंधेरी (पूर्व), मुंबई – 400093.
Western Regional Office : 'Manakalaya', E-9, M. I. D. C., Road No. 8, Andheri (East), Mumbai 400093.

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Our Fax No. 022 2826 2057

Our Ref : WROL/ 3 : 40

Mumbai
2006 11 29

To,

The Manufacturers & Suppliers of **"Glow-wire Test Apparatus" used for testing of Fire Resistance Property of Moulding Material used in manufacture of Electrical Wiring Accessories**

Subject: Sealed Quotation for Supply of "Glow-wire Test Apparatus" used for testing of Fire Resistance Property of Moulding Material used in manufacture of Electrical Wiring Accessories, Quantity : 1 No.

Dear Sirs,

1. Bureau of Indian Standards invites sealed quotations in duplicate for the supply of **"Glow-wire Test Apparatus" for testing of Fire Resistance property of Moulding Material used in manufacture of Electrical Wiring Accessories, Quantity : 1 No"** with **Technical Specification** mentioned in the **Schedule** attached hereto and as per terms and conditions given hereunder:

2. Quotation in a sealed cover superscripted "**Supply of Glow-wire Test Apparatus" Quantity : 1 No.** should reach the undersigned latest **by 1500 h on 22 December 2006** and the same shall be opened at 1600 h on the same day in the presence of such bidders or their duly authorized representative who may like to attend.

3. Unless stated otherwise, quotations shall be deemed to be for delivery at **" Bureau of Indian Standards, Western Regional Office Laboratory, Manakalaya, E-9, MIDC, Andheri (E) , Mumbai 400 093 .**

4. The Bureau gives first preference in its purchases to goods bearing BIS Standard Mark and second preference to those which conform to the relevant Indian Standard specification.

5. Supply should be arranged within 30 days of receipt of order. If, however, it is not possible for you to effect delivery during working hours by that date, you should specify the date by which you can guarantee delivery. Quotations qualified by such vague and indefinite expressions as 'subject to immediate acceptance', 'subject to prior sale', etc and incomplete quotations are liable to be summarily rejected.

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6. All quotations shall remain open for acceptance for a period of 6 months from the date of opening of quotations specified in Para 1 above.

7. The rate quoted shall include all charges such as packing and forwarding, freight, insurance etc. If the rates quotated do not include Excise duty, Sales Tax, Octroi or any other taxes or charges, the same should be specifically stated. In the absence of any such stipulations, it will be presumed that the prices include all such charges and taxes and no claim for the same shall be entertained later.

8. All goods received shall be subject to approval on inspection. The decision of Bureau shall be final and binding. Rejected items/goods/stores shall be removed by the supplier at his own cost and risk, within 30 days of receipt of notice for the removal of such goods, and no liability whatsoever on the Bureau shall be attached for rejected/disapproved goods/items/stores.

9. In case of outstation supplies, goods shall be despatched duly insured against all risks.

10. All questions, disputes or differences arising under/out of or in connection with this order shall be subject to the exclusive jurisdiction of Mumbai courts.

11. Warranty : The equipment shall be under the warranty for a minimum period of 1 year from the date of satisfactory commissioning.

12. Performance security : In compliance of General Finance Rule 158 as applicable to present purchase, you will be required to provide a Performance Security equivalent to 10 percent of the cost of equipment, to be furnished in the form of an Account Payee Demand Draft or a fixed deposit receipt from a commercial bank or a Bank Guarantee from a Commercial Bank in an acceptable form to Bureau of Indian Standards, Mumbai.

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Performance Security should remain valid for a period of 14 months from the date of commissioning of the equipment to cover warranty obligations.

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13. **Payment Terms**. – Payment will be made only after approval of the material. Full payment within 60 days from the date of commissioning of equipment in the event of your providing Performance Security as stated in Clause 12 above or alternatively 90% after satisfactory commissioning and training for operation of "**Glow-wire Test Apparatus used for testing of Fire Resistance Property Moulding Material used in manufacture of Electrical Wiring Accessories, Quantity: 1 No.**" and balance 10% after expiry of warranty period.

14. In case of non-compliance with the contract, the Bureau reserves its right to Cancel/rescind/revoke the order.

15. The Bureau reserves the right to accept or reject summarily any or all bids in whole or in part without assigning any reason whatsoever, or increase or decrease of quantities of any item of the work and the successful bidder shall perform the same at the rate quoted.

16. The Bureau shall not be responsible for delay, loss or non-receipt of a quotation after despatch.

17. The bidder shall be an agency/organization having appropriate infrastructure for the job description and will operate from its office premises. Agency shall provide contact details and shall be available during normal working days(Monday to Friday) and working hours (10.00 am to 5.30 pm).

18. Individuals are not eligible to apply.

19. The bidder who is engaged in similar activities may be preferred.

20. The bidder shall have sound financial status.

21. The bidder would visit BIS as and when deemed necessary by BIS.

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22. The Bureau shall recover TDS and any other taxes, as applicable from time to time, from the bills submitted by the successful bidder.

23. Price quoted by the bidder shall be firm and all-inclusive flat rate (not in terms of percentage of the total cost of work) and shall be inclusive of all taxes and levies applicable.

24. No escalation of prices would be permitted on any grounds.

Yours faithfully,

(A.S.Jamkhindikar)
Sc 'F' & Head WRO Lab

Encl : Schedule

For display on BIS Web Site

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BUREAU OF INDIAN STANDARDS
मानक : पथप्रदर्शक

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SCHEDULE

Our Ref : WROL/ 3 :40
Subject : Inviting Sealed Quotation for supply of "Glow-wire Test Apparatus"

Mumbai,
2006 11 29

Technical Specification of Glow-wire Test Apparatus used for testing of Fire Resistance Property of Moulding Material used in manufacture of Electrical Wiring Accessories
Ref : IS 3854 : 1997/IS 1293:1988/IS 371:1999 & IS 11000 Pt 2 Sec 1 : 1984

→ Temp Requirement : The temp of the tip of the glow-wire shall be as follows

a) 550° C ± 10° C
b) 650° C ± 10° C
c) 750° C ± 10° C
d) 850° C ± 15° C
e) 960° C ± 15° C

→ Specified loop of glow-wire shall be Nickel/Chromium (80/20) wire 4 mm in diameter. When forming loop, care must be taken to avoid fine cracking at the tip.

→ The glow-wire is electrically heated; the current necessary for heating the tip to a temp of 960° C ± 15° C is between 120 A and 150 A. (This means a current source to give current upto 150 A at a low voltage, preferably less than 10 V is required to be provided in the equipment.)

→ A sheathed fine-wire thermocouple, having an overall diameter of 0.5 mm and wires of Ni Cr and Ni Al with the welded point located inside the sheath, is used for measuring the temp of glow-wire.

→ The sheath consists of a metal resistant to a temperature of at least 960° C ± 15° C. The thermocouple is arranged in a pocket hole, 0.6 mm in diameter, drilled in the tip of the glow-wire as shown in detail Z of Fig 1. The cold connection shall be kept in melting ice unless a reliable reference temp. is obtained by other means e.g. by a compensation box.

→ Timer to measure time having Least Count 0.1 sec / 1 sec.

→ Accuracy of thermo voltage and current measuring instruments : The instrument for measuring the thermo voltage and current should be accurate to 1 %, i.e. Class 0.5

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Ref : IS 3854 : 1997/IS 1293:1988/IS 371:1999 & IS 11000 Pt 2 Sec 1 : 1984

→ The test apparatus shall be so designed that the glow-wire is kept in a horizontal plane and that it applies a force of 0.8 N to 1.2 N to the test specimen; the force being maintained at this value when the glow-wire or the test specimen is moved horizontally and towards the other over a distance of at least 7 mm

→ The loop of resistance wire which is electrically heated to the temperature as mentioned above does not cause ignition of parts.

→ If a sub-assembly or a part of the equipment is tested separately, a piece of white pine wood board, approx 10 mm thick and covered with a single layer of tissue paper, is positioned at a distance of 200 ± 5 mm below the place where the glow-wire is applied to the test specimen, unless otherwise specified.

→ Calibration of thermocouple shall be carried out at the temp 960° C using as standard method a foil of Silver, 99.8% pure, 2mm square and 0.06 mm thick, placed on the upper face of the tip of the glow-wire. The glow-wire s heated and a temp of 960° C is reached when the silver foil melts. Care shall be taken to ensure that the thermocouple can follow the movement of the tip of the glow-wire caused by thermal elongation.

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Technical Specification of Glow-wire Test Apparatus
used for testing of Fire Resistance Property of Moulding Material used in manufacture of Electrical Wiring Accessories
Ref : IS 3854 : 1997/IS 1293:1988/IS 371:1999 & IS 11000 Pt 2 Sec 1 : 1984

→ Heat losses due to the supporting or fixing means are insignificant when the specimen is fixed. Arrangement shall be so made that

a) the surface of test specimen in contact with the tip of glow-wire is vertical.
b) the tip of the glow-wire I applied to the part of the surface of the specimen which is likely to be subjected to thermal stresses in normal use. In cases where the areas subjected to thermal stress during normal use of the equipment are not specified in detail, the tip of glow-wire is applied at a place where the section is thinnest, but preferably not less than 15 mm from the upper edge of the specimen. If possible the tip of glow-wire is applied to flat surfaces and not to grooves, knock-outs, narrow recesses or sharp edges.

→ Temp of glow-wire is measured by means of the calibrated thermocouple. Care must be taken to ensure that, before starting the test, this temp and heating current are constant for a period of at least 60 sec and that heat radiation dos not influence the specimen during this period or during calibration e.g. by providing an adequate distance or by using an appropriate screen.

→ The tip of the glow-wire is then brought into contact with the specimen for 30 ± 1 sec. The heating current is maintained during this period. After this period, the glow wire & specimen are slowly separated, avoiding any further heating of the specimen and any movement of air which might affect the result of the test. The movement of the tip of glow-wire into the specimen when pressed to it shall be mechanically limited to 7 mm.

→ Fig 1 & Fig 2 as well as copy of relevant portion of ISS is attached.

----------xxxxxx----------

— that a specified loop of resistance wire, which is electrically heated to the temperature specified for the relevant equipment, does not under defined conditions cause ignition of parts, or

— that a part, which might be ignited by the electrically heated test wire under defined conditions, has a limited duration of burning, without spreading fire by flames or burning or glowing particles falling from the specimen.

The test may not be appropriate for small components, for which reference may need to be made to the needle-flame test. If the specimen is ignited by this method the fire hazard created may necessitate further tests using other sources of ignition such as the needle-flame or a heater element simulating a bad connection.

4. Description of test apparatus

The glow-wire consists of a specified loop of a nickel/chromium (80/20) wire 4 mm in diameter; when forming the loop, care must be taken to avoid fine cracking at the tip.

A sheathed fine-wire thermocouple, having an overall diameter of 0.5 mm and wires of NiCr and NiAl with the welded point located inside the sheath, is used for measuring the temperature of the glow-wire.

The glow-wire, with the thermocouple, is shown in Figure 1, page 16.

The sheath consists of a metal resistant to a temperature of at least 960°C. The thermocouple is arranged in a pocket hole, 0.6 mm in diameter, drilled in the tip of the glow-wire, as shown in detail Z of Figure 1. The thermovoltages shall comply with IEC Publication 584-1: Thermocouples, Part 1: Reference Tables; the characteristics given in this publication are practically linear. The cold connection shall be kept in melting ice unless a reliable reference temperature is obtained by other means, for example by a compensation box.

The instrument for measuring the thermovoltage should be accurate to 1% (i.e. Class 0.5 according to IEC Publication 51: Recommendations for Direct Acting Indicating Electrical Measuring Instruments and Their Accessories).

The glow-wire is electrically heated; the current necessary for heating the tip to a temperature of 960°C is between 120 A and 150 A.

The test apparatus shall be so designed that the glow-wire is kept in a horizontal plane and that it applies a force of 0.8 N to 1.2 N to the specimen, the force being maintained at this value when the glow-wire or the specimen is moved horizontally one towards the other over a distance of at least 7 mm.

An example of the test apparatus is shown in Figure 2, page 17.

To evaluate the possibility of spread of fire, for example by burning or glowing particles falling from the specimen, a layer of the material or components normally surrounding or situated underneath the specimen is placed underneath the specimen at a distance equal to the distance between the specimen and the surrounding material or components when the specimen is mounted as in normal use.

If a sub-assembly or a part of the equipment is tested separately, a piece of white pinewood board, approximately 10 mm thick and covered with a single layer of tissue paper, is positioned at a distance of 200 ± 5 mm below the place where the glow-wire is applied to the specimen, unless otherwise specified in the relevant specification.

Note. — Wrapping tissue as specified in Clause 6.86 of ISO Standard 4046 - 1978: Paper board, pulp and related terms - Vocabulary: A soft and strong, lightweight wrapping paper of grammage generally between 12 g/m² and 30 g/m², primarily intended for protective packaging of delicate articles and for gift wrapping.

5. Severities

The temperature of the tip of the glow-wire and the duration of its application to the specimen shall be specified (see also Guidance in Appendix A).

Preferred test temperatures (°C)	Tolerances (°C)
550	± 10
650	± 10
750	± 10
850	± 15
960	± 15

Preferred duration of application:

$$t_a = 30 \pm 1 \text{ s}$$

If required by the relevant specification, other severities may be used.

6. Calibration of the thermocouple

The calibration of the thermocouple shall be carried out at the temperature 960 °C using as standard method a foil of silver, 99.8% pure, 2 mm square and 0.06 mm thick, placed on the upper face of the tip of the glow-wire. The glow-wire is heated and a temperature of 960 °C is reached when the silver foil melts.

Note. — Calibration must be repeated to compensate for alterations in the thermocouple and in the connections.

Care should be taken to ensure that the thermocouple can follow the movement of the tip of the glow-wire caused by thermal elongation.

7. Preconditioning

If not otherwise specified in the relevant specification, the specimen is stored for 24 h in an atmosphere having a temperature between 15 °C and 35 °C and a relative humidity between 45% and 75%.

8. **Initial measurements**

The specimen shall be examined visually and, when specified in the relevant specification, the physical/electrical parameters measured.

9. **Test procedure**

Warning note

Precautions must be taken to safeguard the health of personnel conducting tests against:

— the risks of explosion or fire;
— the inhalation of smoke and/or toxic products;
— the toxic residues.

9.1 For the test the specimen is fixed so that heat losses due to the supporting or fixing means are insignificant. The specimen is arranged so that:

— the surface in contact with the tip of the glow-wire is vertical;

— the tip of the glow-wire is applied to the part of the surface of the specimen which is likely to be subjected to thermal stresses in normal use. In cases where the areas subjected to thermal stress during normal use of the equipment are not specified in detail, the tip of the glow-wire is applied at a place where the section is thinnest, but preferably not less than 15 mm from the upper edge of the specimen. If possible the tip of the glow-wire is applied to flat surfaces and not to grooves, knock-outs, narrow recesses or sharp edges.

9.2 The glow-wire is electrically heated to the temperature specified (see Clause 5), which is measured by means of the calibrated thermocouple. Care must be taken to ensure that, before starting the test, this temperature and the heating current are constant for a period of at least 60 s and that heat radiation does not influence the specimen during this period or during the calibration, for example by providing an adequate distance or by using an appropriate screen.

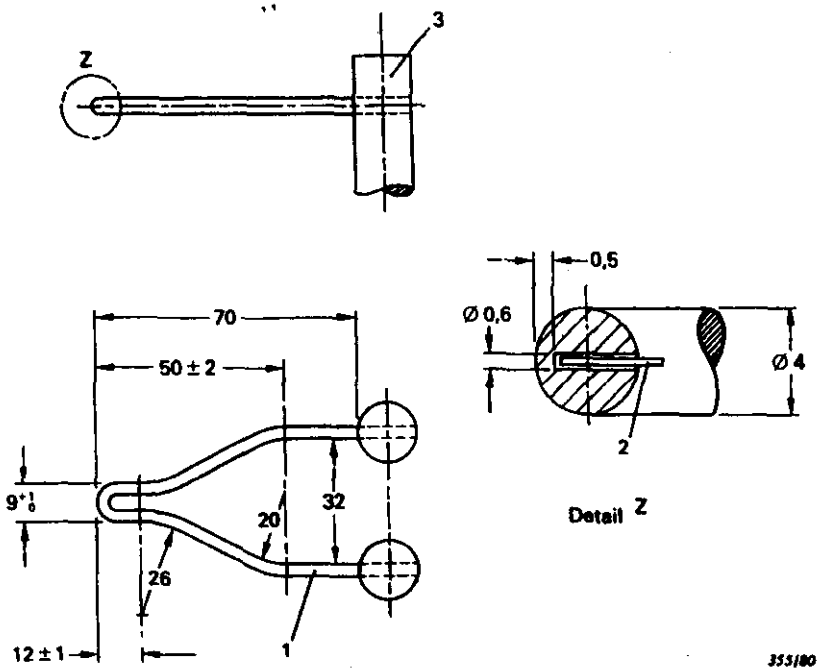
9.3 The tip of the glow-wire is then brought into contact with the specimen for 30 ± 1 s (see Clause 5). The heating current is maintained during this period. After this period, the glow-wire and specimen are slowly separated, avoiding any further heating of the specimen and any movement of air which might affect the result of the test.

The movement of the tip of the glow-wire into the specimen when pressed to it shall be mechanically limited to 7 mm.

9.4 If not otherwise specified by the relevant specification, the test is made on one specimen. In the case of doubt with regard to the results of the test, the test is repeated on two further specimens.

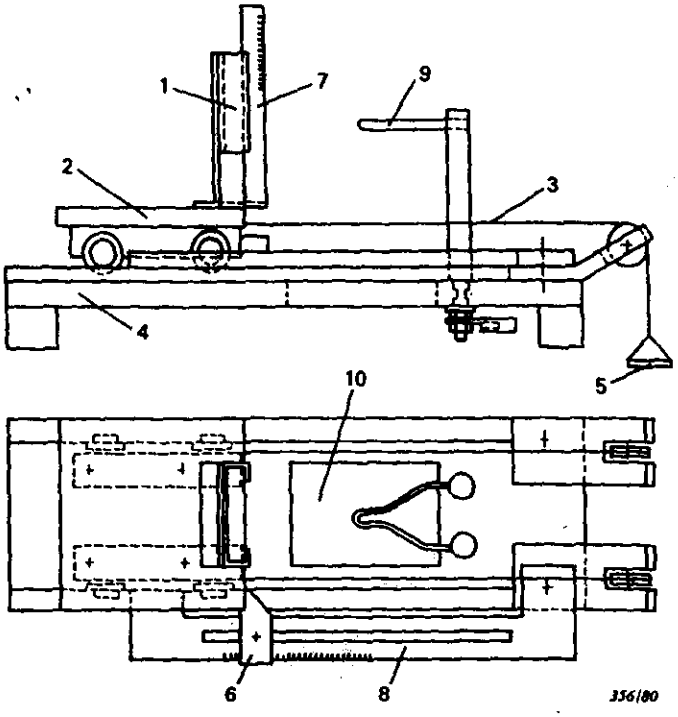
Before each test, it is necessary to clean the tip of the glow-wire of any residue of previously tested material, for example by means of a brush.

Dimensions in millimetres



1 glow-wire hard soldered at 3
2 thermocouple
3 stud

FIG. 1. — Glow-wire and position of the thermocouple.



1 positioning clamp

2 carriage

3 tensioning cord

4 base plate

5 weight

6 stop

7 scale for measure of flame

8 scale for penetration

9 glow-wire (Fig. 1).

10 break-through in base plate for particles falling from the specimen

FIG. 2. — Test apparatus (example).