



SPECIFICATION
of
Pyrometer for Measuring Temperature of Molten steel

No: CFF/SFQC-19
Rev No.: 00
Date: 31/08/2016
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1.0 DESCRIPTION:

This specification governs the requirement of Portable pyrometer for measuring temperature of molten steel.

2.0 OBJECTIVE:

The portable pyrometer should be able to accurately measure the temperature of running stream of molten steel, as it pours down from the ladle into the mould for manufacture of steel castings/forgings. The pyrometer should also be able to measure the temperature of solid steel at high temperature in the range of 300 to 1400 °C

3.0 SCOPE:

Scope of supply includes design, manufacture, supply and commissioning of the equipment alongwith necessary software at CFFP. The technical and general requirements of the pyrometer are given below.

The supplier shall give guarantee for trouble free operation of the equipment for a period of 12 months from the date of commissioning of the equipment.

4.0 TECHNICAL REQUIREMENTS:

- 4.1 The equipment should be capable of measuring temperature of liquid steel in range of 1500-1800 °C in ladle and in pouring stream of nozzle diameter 40 to 100 mm.
- 4.2 The equipment should also be capable of measuring temperature of solid steel objects in the temperature range of 300 to 1500 °C
- 4.3 The equipment should be portable, handy and easy to use.
- 4.4 The equipment should have a robust housing fit for industrial use under harsh environments.
- 4.5 The equipment should not have any manual operation except focusing at the point of interest for measuring temperature.
- 4.6 The equipment should be capable to capture Infrared radiation emitted from molten steel through non-contact method.
- 4.7 The equipment should be capable to measure accurate temperature in dirty or smoky atmosphere usually associated with a large foundry/Steel Melting Shop.
- 4.8 The equipment should be capable to target molten/solid steel through a lens for accurate measurement from a distance of 1 meter to 50 metres.

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- 4.9 The equipment should display measured reading in digital format in four digits less than a second after focusing and should have provision to store them for 1000 previous readings. It should also have provision to transfer recorded data in PC through USB port.
- 4.10 The equipment should work on rechargeable battery and have a provision to connect 220 V single phase AC for continuous monitoring.
- 4.11 The equipment should be calibrated with immersion type probe method within the range of ± 5 C.
- 4.12 Necessary spares required for smooth functioning of equipment for five years are to be listed and quoted separately.
- 4.13 The uncertainty of the test results should also be specified. Calibration certificate is to be supplied with the equipment.

5.0 GENERAL REQUIREMENTS:

- 5.1 The supplier shall provide free maintenance of equipment and Upgradation of software for five years.
- 5.2 Supplier should provide three sets of operation and maintenance manual alongwith equipment.
- 5.3 Training to be provided to BHEL personnel for operating & maintaining the equipment.
- 5.4 Vendor should provide relevant technical literature of the equipment which explains the principal of operation at the time of submission of technical offer.

6.0 TESTING AND COMMISSIONING:

- 6.1 The equipment shall be tested and commissioned by vendor at CFFP/BHEL. For this purpose, readings shall be taken as the molten steel is tapped from Arc Furnace into the ladle and the same shall be compared with reading obtained from immersion type thermocouple. The difference of reading should not be more than 10°C . Subsequent to this, readings shall be taken during pouring of liquid steel from ladle into the mould at equal intervals and the same needs to be shown to be transferred into PC using USB port.
- 6.2 Temperature of casting/forging under heat treatment shall also be taken at equal intervals of time and data shall be transferred onto PC using USB port.

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7.0 INSPECTION, DEVIATION AND REPLACEMENT

- 7.1 The equipment shall be inspected at CFFP, BHEL which will be binding on supplier. If the equipment received at CFFP is not found in accordance with the requirements, it shall be rejected.
- 7.2 BHEL reserves the right to inspect equipment at site before despatch. The supplier shall give prior intimation in such case. The supplier shall submit a copy of test certificate in advance of the equipment offered for inspection. However inspection at BHEL, CFFP shall be final. The supplier shall offer BHEL representative all reasonable test facilities without charge to satisfy the latter that the equipment is being furnished in accordance with this specification.
- 7.3 For any deviation from the specification demanded by the supplier, prior approval of BHEL must be obtained in writing.

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