



Bharat Heavy Electricals Limited

(A Government of India Undertaking)

BOILER AUXILIARIES PL

INDIRA GANDHI INDUSTRIAL COMPLEX, RANIPET – 632 406, TAMIL NADU, INDIA

Annexure-A

A. BoM/Scope: Supply of Dial Thermometers as mentioned below							
Item No	Material code	Description	Specification	Unit	Qty	Delivery Schedule	
01	962561690000)	Gas Filled Dial Thermometer VAR 01	TECI:TG FANS:008:REV 00 dt 16.06.2023 & QA:CI:STD:QP:02	No	05	BHEL prefers shortest possible delivery	
02	962561720000	Gas Filled Dial Thermometer L150 VAR 03		No	10	BHEL prefers shortest possible delivery	
SL N	Terms	Description			Remarks		
A.	Delivery	FOR destination at BHEL Site/ Stores Ranipet / Others					
B.	Payment terms	i) For Non-MSE: 100% payment shall be released within 90 days from the date of acknowledged receipt & acceptance of material at BHEL Stores and submission of billing documents. ii) For MSE: 100% payment shall be released within 45 days from the date of acknowledged receipt & acceptance of material at BHEL Stores and submission of billing documents.					
C.	BHEL contact for query/ Integrity pact etc	Any pre-bid query, kindly contact: Tel: 04172-284240/4811, email: m.nayak@bhel.in / idm@bhel.in and get your queries cleared before submitting the offer.					
D.	Packing	As applicable					
E.	Marking	As applicable					
F.	Post PO Documents	Data sheet, QAP to be submitted within 15 days from PO for approval. Revised Drawing, Data sheet, QAP if any to be re-submitted within 7 days. Delay, if any, shall be attributed to bidder.					
G.	Inspection call	Mail/ Online (https://cqir.bhel.in/) / Not applicable					
H.	Purchase preference	MSE purchase preference for 100 % of quantity MII purchase preference-NA					

Following documents are to be submitted along with the offer for evaluation.

- Covering Letter
- Technical Bid (mentioning item descriptions, make, model, offered qty etc.)
- Technical Specification attached in the tender with signed & sealed as an acceptance.
- Quality documents with signed & sealed as an acceptance.
- Commercial Terms & Condition form with filled & signed.
- Other documents attached in the tender with sign & seal.

PRODUCT STANDARD
EDC/ELECTRICAL, C&I
RANIPET – 632406

TECI: TG FANS:008:REV 00
Page 1 of 3
Effective Date: 16.06.2023

TITLE : TECHNICAL SPECIFICATION FOR BOUGHT OUT ITEMS FOR ECI
ITEM : TEMPERATURE GAUGE(TG) FOR FANS
PROJECT : BHEL STANDARD

NAME		DESIGNATION	SIGNATURE	DATE
PREPARED	A.P.CHANDRASEKAR	Manager/ECI		16-06-2023
CHECKED	Gouri Shankar Naik	DGM/ECI		16-06-2023
APPROVED	M.JEYAMURUGANAND	AGM/ECI		16-06-2023

ISSUED BY
EDC-ECI

RECORDS OF REVISION:

REVISION NUMBER 00 INITIAL RELEASE 16-06-2023

PRODUCT STANDARD
EDC/ELECTRICAL, C&I
RANIPET – 632406

TECI: TG FANS:008:REV 00
Page 2 of 3
Effective Date: 16.06.2023

1. 0 Site conditions:

1. Design Amb. Temp condition	: 50° C
2. Relative humidity	: 100%
3. Atmosphere	: Heavily polluted, Dusty, Salty and Corrosive As prevalent in a coal fired Thermal Power Station
4. Application	: For local measurement of bearing temperature.

2.0 Technical Data:

1. System	: Liquid / Inert gas Filled (Other than mercury).
2. Type of construction	: Bottom entry suitable for local/ surface Mounting with armored capillary
3. Bezel construction	: Cast aluminum with Screwed Ring type OR SS304 with Snap action bayonet type.

3.0 Material:

Case Material	: Die-cast aluminium
1. Dial Material	: Aluminium
2. Pointer Assy	: Aluminium, Black
3. Material of sensing element	: SS 316
4. Material of movement	: SS 304
5. Capillary	: SS 304 with SS 304 Armour
6. Window	: Shatter proof glass / Acrylic.

4.0 Finish:

1. External painting	: Black stove enameled and anti corrosive black paint or Epoxy powder coated.
2. Dial finish	: Anti corrosive bright finish

5.0 Dimensions:

1. Dial size	: 150mm
2. Stem Size (As per enquiry/indent)	VAR 01 - 11.8 to 12.0mm (KKK Fans). Immersion length of stem: 120 mm (Matl code 962561690000)
General sizes for variants	VAR 02 - 7.8 to 8.0mm (TLT Fans). Immersion length of stem: 120 mm (Matl code 962561700000)

VAR 03 - 7.8 to 8.0mm (TLT Fans).
Immersion length of stem: 150 mm
(Matl code 962561720000)

VAR 04 - 7.8 to 8.0mm (TLT Fans).

PRODUCT STANDARD
EDC/ELECTRICAL, C&I
RANIPET – 632406

TECI: TG FANS:008:REV 00
Page 3 of 3
Effective Date: 16.06.2023
Immersion length of stem: 180 mm
(Matl code **962561730000**)

3. Immersion length of stem	: As per sl. no. 2 above
4. Capillary Size	: 1.5 mm dia
5. Capillary Sheath	: 4.5mm OD
6. Capillary length	: 5 meters
7. Adjustable Union	: Required with $\frac{3}{4}$ " BSP (M) Thread
8. Thread length on adjustable Union	: 20mm

TG shall be supplied with adjustable adapter with thread $\frac{3}{4}$ " BSP (M), L20

Adapter ferrule in TG shall be adjustable over entire stem length

6.0 Other Details:

1. Scale	: Graduated in degree C as per IS 3602 (Latest) White background, black letters
2. Deflection	: 270° linear
3. Range	: 0 to 150° C
4. Zero adjustment	: Micrometer type (adjustable from the front after opening the Bezel)
5. Type of mounting / enclosure per IS13947	: Outdoor, weather and dust proof IP 55 as (LATEST)
6. Accuracy	: $\pm 1\%$ of span
7. Over range protection	: 125 % of FSD

7.0 General Requirement:

Temperature compensation for ambient Temperature change: Required

8.0 Packing:

Each gauge shall be wrapped individually in a bubbled polythene sheet and such gauges shall be in a placed in a carton or case and packed with adequate cushioning material to withstand normal transit risks.

9.0 Testing & Inspection:

As per relevant QP.

Vendor shall submit a Xerox copy of this specification with their confirmations with the offer.



CONTROLS AND INSTRUMENTATION/QA/FB

STANDARD QUALITY PLAN FOR TEMPERATURE GAUGE

" Bidder to clearly mention the deviation taken against SQP in deviation format provided in the tender. In the event no deviation is taken it will be presumed that all the quality points in SQP and specification are complied by the bidder without any deviation . NO deviation will be accepted once PO is placed. "

REV	DATE	PREPARED	REVIEWED	APPROVED	REVISION HISTORY
00	--	Sd/-	Sd/-	Sd/-	Initial release.
01	--	Sd/-	Sd/-	Sd/-	General Revision
02	03/06/1993	Sd/-	Sd/-	Sd/-	Format revised to 9 column QP
03	16/06/1997	Sd/-	Sd/-	Sd/-	Format revised
04	21/03/2002	Sd/-	Sd/-	Sd/-	Dept. name changed CTQ requirements added & General revision.
05	08/01/2004	Sd/-	Sd/-	Sd/-	Revised to include the comments / Feedback of internal discussion / Vendors meet.
06	01/12/2009	SD/-	Sd/-	N.SRIDHAR	Quantum of check included. Format changed. Test stages modified.
07	23/12/2016	AVINASH V 	RM VAIRAVAN 	T KANAGARAJ 	S DAKSHINAMOORTHY



S. No	Component & Operation	Characteristics	Class	Type of Check	Quantum of check		Ref Doc. & Acceptance STD	Format of record	AGENCY			REMARKS
					M	B/C			M	B	C	
A	FINISHED PRODUCT INSPECTION											
01	Routine test	a. Physical, Dimensional check, scale marking, tag number, process connection	Major	PHYS VISU	100%	20%	Datasheet	TR	P	W	-	
		b. Range, type, Dial size	Major	PHYS	100%	20%	Datasheet	TR		W		
		c. Mounting, entry and process connection for gauge and thermowell	Major	PHYS VISU	100%	20%	Datasheet	TR		W		
		c. Calibration test (accuracy) at 5 points over the range before and after over pressure test	Critical	MEAS	100%	20%	EN 13190	TR	P	W	-	
		d. Hydraulic test for thermowell	Major	MECH	100%	Sample	Mfr std	TR	P	W	-	1.5 Times for Max Process Pressure shall be applied
		e. Hysteresis, Repeatability	Major	PHYS MECH	Sample	Sample	EN 13190	TR	P	W		
		f. Response Time Test	Critical	MEAS	Sample	Sample	Note: DI	TR	P	W	-	
		g. Material for Sensing element, thermowell, movement assembly, socket	Major	CHEM	100%	20%	Purchase Spec.	TC	P	V	-	
		h. Concentricity for thermowell	Critical	MEAS	100%	20%	Mfr. S.d., Drg.	TR	P	W	-	
02	Type Test	a. Enclosure protection for housing.	Critical	ENVI	One of Design	One of Design	Purchase spec.	TC	V	V	-	From Govt. approved Lab
		b. Over temperature stability test	Critical	THER	-Do-	-Do-	ASME B40 200.2008	TC	V	V	-	
		c. Vibration test	Critical	MECH	-Do-	-Do-	ASME B40 200.2008	TC	V	V	-	
	ASMEB40 200.2008	d. Ambient temperature compensation test.	Critical	THER	-Do-	-Do-	Note: D2	TC	V	V	-	



B.NOTES:

1.LEGENDS:

ENVI	: Environmental	MEAS	: Measurement
THER	: Thermal	VISU	: Visual
CHEM	: Chemical	TC	: Test certificate
MECH	: Mechanical	TR	: Test Report

2. The vendor at their works shall arrange all testing facilities. Tests for which facilities are not available are to be carried out at recognized National Test Houses like ETDC/CIL/NPL/ERTL etc., at vendor cost.
3. Through Log Book / any other documents available at the vendor's works, it shall be possible to correlate the finished product with inspection carried out.
4. All Measuring and Testing Instruments shall be periodically calibrated from recognized test houses & certificates made available during inspection for verification.
5. Test certificates for routine type tests are to be furnished by the vendor.
6. Type test certificate shall not be earlier than 5 years from the date of Purchase enquiry.
7. Vendor to give tentative inspection program in advance and confirm exact date two weeks in advance for arranging BHEL's inspection.
8. Packing shall be as per "PACKING PROCEDURE" indicated in the specification.

C. REFERENCE STANDARDS: (For Indicated Standards Refer the Latest Version)

EN 13190	: Dial thermometers
ASME B40.200	: Thermometers, Direct reading and Remote reading

D1.Response time test:

Time taken to reach 63% of the temperature difference between bath temperature and room temperature, shall not exceed 30 seconds, when the bulb is directly immersed in a well stirred liquid bath.

D2.Ambient temperature compensation test:

The thermometer case (along with capillary in the case of capillary thermometers) shall be kept in an environment chamber. The temperature will be varied from 0 to 60°C keeping the thermometer bulb in a constant temperature bath. The resultant difference in gauge reading due to temperature variation in the chamber shall not exceed the specified accuracy limits.