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RTDs

SL NO.	ITEM	RANGE	TAG	QTY.	REMARKS	BHEL DWG.	DETAILS	SPEC
01	PRT-100 ohm	0-300°C	TR 21-10	1	TE-76		PRT-04 WORKING LEN 200	ST44010
02	PRT-100 ohm	0-300°C	TR 21-11	1	TE-77		PRT-04 WORKING LEN 200	ST44010
03	PRT-100 ohm	0-150°C	TR 21-12	1	TI-3		PRT-04 WORKING LEN 200	ST44010
04	PRT-100 ohm	0-150°C	TR 26-3	1			PRT-04 WORKING LEN 200	ST44010
05	PRT-100 ohm	0-150°C	TR 26-4	1	TE-58		PRT-04 WORKING LEN 200	ST44010
06	PRT-100 ohm	0-150°C	TR 26-5	1	TE-59		PRT-04 WORKING LEN 200	ST44010
07	PRT-100 ohm	0-150°C	TR 26-6	1	TE-62		PRT-04 WORKING LEN 200	ST44010
08	PRT-100 ohm	0-150°C	TR 26-7	1	TE-63		PRT-04 WORKING LEN 200	ST44010
09	PRT-100 ohm	0-100°C	TR -57	1	---		PRT-04 WORKING LEN 120	ST44010
10	PRT-100 ohm	0-100°C	TR -57	1	---		PRT-04 WORKING LEN 120	ST44010
11	PRT-100 ohm	0-150°C	TR 21-6	1	---		PRT-04 WORKING LEN 200	ST44010
12	PRT-100 ohm	0-150°C		1	TE-55		PRT-04 WORKING LEN 200	ST44010
13	PRT-100 ohm	0-150°C		1	TE-56		PRT-04 WORKING LEN 200	ST44010
14	PRT-100 ohm	0-150°C		1	TE-76		PRT-04 SCREWED M33x2 EXT LEN 160 INST LEN 200	ST44010
15	PRT-100 ohm	0-150°C		1	TE-77		PRT-04 SCREWED M33x2 EXT LEN 160 INST LEN 200	ST44010
16	PRT-100 ohm	0-150°C		1	TE-61		PRT-04 WORKING LEN 200	ST44010
17	PRT-100 ohm	0-150°C		1	TE-60		PRT-04 WORKING LEN 200	ST44010
18	TEMP SWITCH	0-150°C		12	BFP A.B.C	Dial Guage type-0-150 Degree C ,Dial Guage size 150 mm with single contact Mercury in steel thermometer with capillary length 3 mtr , outer dia 6mm with compression fitting being fitted with thermowell.	FOR FURTHER DETAILS VENDOR IS REQUESTED TO VISIT THE SITE AND CHECK THE INSTRUMENTS AND IT'S MOUNTING DETAILS.	

PROJECT: DBRA R&M 200 MW (10-13) CUST: UPRVUNL

PRODUCT : RTDs DRG.:

BHARAT HEAVY ELECTRICALS LTD. HARDWAR	PRPD.	NAME NITIN	SIGN -sd-	DATE 03.10.13	NO. OF VAR
	CHKD.	S. K. DAS	-sd-	03.10.13	
	APPD.	K B BATRA	-sd-	03.10.13	

DEPT. CIE CODE 4180	GRADE OF UNTOL. DIM G/M/F		SCALE NTS	WEIGHT (KG)	REF. TO ASSY DRG	ITEM NO.	NO. OF ITEMS
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TITLE: TURBINE RTDs FOR R&M CARD CODE: DRAWING NO. 41814800005 REV: 00

SHEET NO. 01 NO. OF SHEETS 01



PRODUCT STANDARD
STEAM TURBINE ENGINEERING

ST 44010

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from possible mechanical damage.

3.0 TECHNICAL REQUIREMENT :

3.1 General :

The temperature detector shall be suitable for operation intratropical & humid atmosphere.

3.2 Resistance Element :

3.2.1 The resistance element shall be of platinum conforming to IS: 2848-1965⁸⁶ Gr.B. Element to BS: 1904-1964⁸⁴ Gr.2 and DIN 43760 -1968⁸⁷ are also acceptable.

3.2.2 The element shall be simplex or Duplex with 2 wire connection as specified elsewhere.

3.2.3 The resistance values at different temperatures and corresponding tolerances shall be as per DIN 43760-1968 reproduced in Table-A.

3.2.4 The element shall be fused in ceramic and silver leads shall be brought out through ceramic former. The element and the ceramic former shall be enclosed in a stainless steel sheath/well as shown in the figure 1

3.2.5 The element construction shall be such that it has no strain during fabrication or use and no thermoelectric voltage is generated within them.

3.3 INSULATION :

3.3.1 The insulation provided for the element must withstand 500 Volts A.C. (sinusoidal) at 50 Hz at a temperature of $20 \pm 5^\circ\text{C}$ & relative



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STEAM TURBINE ENGINEERING

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INVENTORY No.

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full details of the temperature detector shall be furnished with the offer. The final operating/trouble shooting and maintenance manuals shall be supplied within 4 weeks after placement of order.

9.0 PACKING :

Each temperature detector shall be wrapped individually in a bubbled polythene sheet and packed in a carton or a case with adequate cushioning materials to withstand normal transit risks. An additional copy of each of the test and Guarantee Certificate shall be enclosed to the packing list alongwith the consignment.

10.0 MARKING :

10.1 Each detector shall be marked permanently with the following details.

- a) Supplier's name or trade mark.
- b) S.No. of RTD for identification/correlation with test certificates.
- c) Temperature range of the RTD.
- d) Type of RTD and number of this specification.

10.2 Following details shall be marked on the packing case :

- a) Supplier's name or Trade mark
- b) BHEL's Order No.
- c) Net and Gross weight.
- d) Indication of top of the box.
- e) Caution sign against over turning.

SIGN & DATE	SIGN & DATE	INVENTORY No. P 5649	SIGN & DATE RM	<p style="text-align: center;">BHEL</p> <p style="text-align: center;">PRODUCT STANDARD</p> <p style="text-align: center;">STEAM TURBINE ENGINEERING</p>	ST 44010
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SUPERSEDES INVENTORY No.					
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				<p>f) Size and No. of items.</p> <p>g) Sign indicating precision instrument on the top of the box.</p> <p>10.3 Enclosed in each box there shall be a packing list specifying.</p> <p>a) Manufacture's Name or Trade Mark.</p> <p>b) Designation of RTD's and their number against each type.</p> <p>c) Year and month of manufacturing of RTD's.</p> <p>d) Net and gross weight.</p> <p>e) BHEL's Purchase Order number.</p> <p>f) Number of this specification.</p> <p>10.4 A tag bearing the designation like PRT-04 with BHEL's material code number as mentioned in purchase order shall be attached to each RTD.</p> <p>11.0 <u>REJECTION</u> :</p> <p>BHEL reserves the right to reject the thermometers not conforming to the requirements of this purchase specification.</p>	



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STEAM TURBINE ENGINEERING

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TABLE - A

Temp. °C	Resistance	Tolerance Resistance ± ohms ± °C		Temp.	Resistance	Tolerance ± ohms ± °C	
0	100.00			310	215.58		
10	103.90			320	219.13		
20	107.79			330	222.66		
30	111.79			340	226.18		
40	115.54			350	229.69		
50	119.40			360	233.19		
60	123.24			370	236.67		
70	127.07			380	240.15		
80	130.59			390	243.61		
90	134.70			400	247.06	0.85	2.4
100	138.50	0.25	0.6	410	250.50		
110	142.28			420	253.93		
120	146.06			430	257.34		
130	149.82			440	260.75		
140	153.57			450	264.14		
150	157.32			460	267.52		
160	161.04			470	270.89		
170	164.76			480	274.25		
180	168.47			490	277.60		
190	172.16			500	280.93	1.00	3.0
200	175.84	0.45	1.2	510	284.26		
210	178.51			520	287.57		
220	183.17			530	290.87		
230	186.82			540	294.16		
240	190.46			550	297.43		
250	194.08			560	300.70		
260	197.70			570	303.95		
270	201.30			580	307.20		
280	204.88			590	310.43		
290	208.46			600	313.65	1.20	3.6
300	212.03	0.65	1.8				

Note : Tolerance at intermediate temperature shall be determined by interpolation.

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INVENTORY No.

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STEAM TURBINE ENGINEERING

FORM

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INVENTORY No.

P 5649
RC

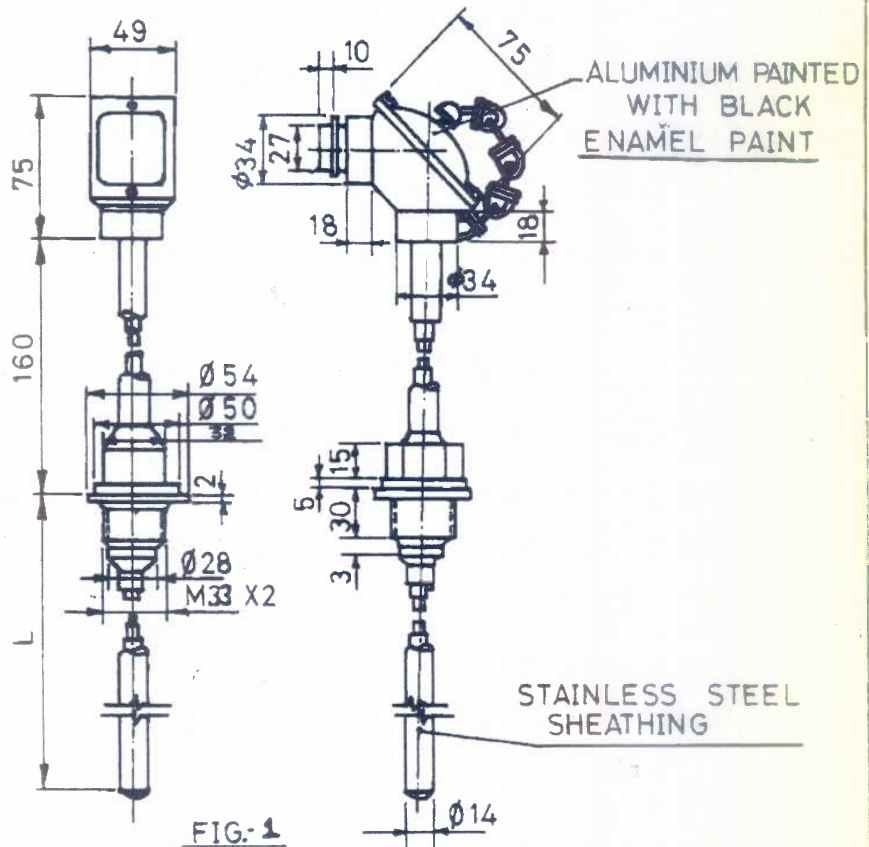


FIG. 1
PRT.-04

TYPE OF THERMOMETER WORKING LENGTH L IN mm			
PRT - 04	160	200	120

DRAWN:- J.S. BHANDARI

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FORM



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STEAM TURBINE ENGINEERING

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INVENTORY No.

P 5849

TYPE	L in mm	Material Code number
PRT-04	120	W9737266707
Duplex	160	W9737266708
	200	W9737266709
PRT-04	120	W9737266710
Simplex	160	W9737266711
	200	W9737266712

NOTE : All these code numbers are for PRTs with 2 wire connections.



STANDARD QUALITY PLAN

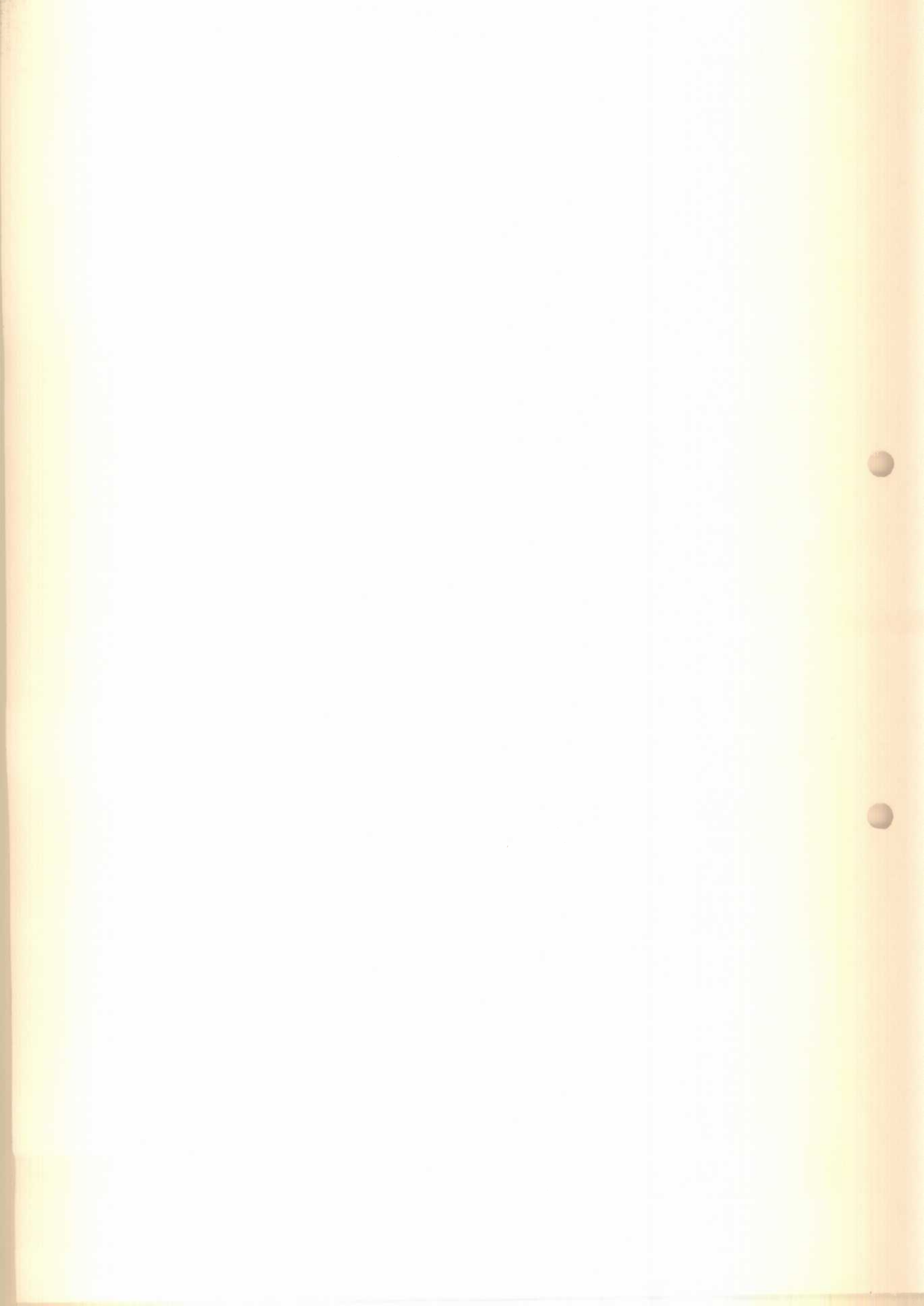
QPNO : QA/BE/IQP/908 **REV.NO. :** 06 **DESCRIPTION:** (MATERIAL, CLASS, GRADE, RATING, SIZE ETC); PLATINUM RESISTANCE TEMPERATURE DETECTORS & ASSEMBLIES WITH THERMOWELL
SPECNO: As Per PO **REV.NO. :** --
DRG : As Per PO **REV.NO. :** --

LEGENDS:
 P-PERFORMED BY 1-BHEL REP.
 W-WITNESS BY 2-VENDOR
 V-VERIFIED BY 3-SUB-VENDOR

SL. NO.	COMPONENT/OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY P W V	REMARKS
1	2	3	4	5	6	7	8	9	10 11 12	13

1.00	Raw Material									
1.01	Resistance Element	Material Grade, Type & Resistance Characteristics.	Major	Visual / Electrical	1 Sample / Lot	Ordering Specn / BHEL Appd Drawing.	Ordering Specn / BHEL Appd Drawing.	Test Report* / Internal Records*	2 - - 1	If Applicable
1.02	Cable for RTD	Continuity	Major	Electrical	1 Sample / Lot	Mfg. Specn	Mfg. Specn	Internal Record	2 - - 1	
1.03	Protecting Sheath, Terminal Head & Spring	Material Type / Grade	Major	Chemical / Physical	1 Sample / Lot	Ordering Specn / BHEL Appd Drawing.	Ordering Specn / BHEL Appd Drawing.	Test Report* / Internal Records*	2 - - 1	
1.04	Extension Pipe & Thermowell	Chemical Analysis & Physical Properties	Major	Chemical / Physical	1 Sample / Lot	Ordering Specn / BHEL Appd Drawing.	Ordering Specn / BHEL Appd Drawing.	Test Report* / Internal Records*	2 - - 1	
2.00	Fitting & Assembly	Soundness of Embedment / Fitting / Connections & Terminal Marking	Major	Physical	100%	Ordering Specn / BHEL Appd Drawing.	Ordering Specn / BHEL Appd Drawing.	Internal Records	2 - - -	
3.00	Type Tests									Note: 3
4.00	Routine Tests									Note: 5
4.01		Visual and Dimensions	Major	Visual / Measurement	100%	Ordering Specn / BHEL Appd Drawing.	Ordering Specn / BHEL Appd Drawing.	Inspection Report*	2 1 - -	
4.02		Resistance Accuracy	Major	Electrical	100%	Ordering Specn / BHEL Appd Drawing.	Ordering Specn / BHEL Appd Drawing.	Test Report*	2 1 - -	
4.03		Pull out	Major	Physical	100%	Ordering Specn / BHEL Appd Drawing.	Ordering Specn / BHEL Appd Drawing.	Test Report*	2 1 - -	Note: 2
4.04		Continuity	Major	Electrical	100%	Ordering Specn / BHEL Appd Drawing.	Ordering Specn / BHEL Appd Drawing.	Test Report*	2 1 - -	
4.05		Insulation Resistance	Major	Electrical	100%	Ordering Specn / BHEL Appd Drawing.	Ordering Specn / BHEL Appd Drawing.	Test Report*	2 1 - -	

21/02/14
 Nishant
 Fi-OAX





STANDARD QUALITY PLAN

LEGENDS:
 P-PERFORMED BY 1-BHEL REP.
 W-WITNESS BY 2-VENDOR
 V-VERIFIED BY 3-SUB-VENDOR

OPNO : QA/BE/QP/908
SPECNO: As Per PO
DRG : As Per PO

REV.NO. : 06
DESCRIPTION: (MATERIAL, CLASS, GRADE, RATING, SIZE ETC); PLATINUM RESISTANCE TEMPERATURE DETECTORS & ASSEMBLIES WITH THERMOWELL

SL. NO.	COMPONENT/ OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY	REMARKS
1	2	3	4	5	6	7	8	9	10 11 12	13

NOTE:-

1. Records as marked * shall essentially be submitted by vendor as QA documentation package.
2. If applicable as per ordering specification, BHEL approved Drawing / BHEL Appd Data Sheet.
3. Type tests clearance from BHEL Engineering to be verified by inspection engineer during inspection at vendor's works.
4. Manufacturer to maintain calibrated instruments having better accuracy than the item under the test. Inspection engineer shall check the same.
5. Witness by inspection agency to be 10% of each type from each lot or minimum 10 pieces whichever is higher. For quantity up to 10 nos, 100% test to be witnessed by inspection engineer. However vendor to carry out 100% tests internally and tests report shall be reviewed by inspection engineer during inspection at Vendor's works.

21/02/14
 BHEL

