

REV. NO.	AUTHY	DESCRIPTION	DATE INITIAL
1	DY.CEE/D	PLATE 127mm x 127mm x 3.2mm THK WITH 4 HOLES Ø 5.5mm ADDED.	CAJONK/SHILU

- NOTE :**
1. THE DIAL SHOULD BE BACK LIT TYPE.
  2. THE DIGITAL AND SCALE GRADATION SHOULD BE TRANSLUCENT WHITE WITH CLEAN AND SHARP OUT LINE. THE REST OF THE DIAL FACE SHOULD BE MATT BLACK.
  3. THE DIAL FACE SHOULD BE MADE OF POLYCARBONATE TRANSPARENT OR WHITE SHEETING OF SUITABLE THICKNESS.
  4. POINTER WHITE PLASTIC BODY WITH CENTRAL BLACK CAP.
  5. THE LED'S SHOULD BE PLACED ON A MOUNTING PLATE BEHIND DIAL FACE IN SUCH A MANNER THAT THE LIGHT WILL PASS THROUGH THE TRANSLUCENT MATERIAL.
  6. THE TRANSPARENT COVER MADE OUT OF GLASS SHOULD HAVE 1.5 TO 3 MM UNIFORM THICKNESS.
  7. LED'S - 16 NOS. FOR GAUGE (WHITE) ON MOUNTING PLATE BEHIND DIAL FACE SPACE EVENLY, 02 NOS. (WHITE) AT THE LOWER PERIPHERY OF THE GAUGE.
  - a) THE TERMINAL FOR POWER INPUT OF 24 V.D.C. TO 110 V.D.C. ±10% TO LED'S SHOULD BE AT THE BACK OF THE GAUGE REVERES POLARITY PROTECTION SHOULD BE ENSURED.
  - b) CIRCUIT TO ENSURE INDEPENDENT WORKING AND SHOULD NOT BE AFFECTED BY THE FAILURE OF ONE ANOTHER.
  8. THE MATERIAL OF THE BOURDON TUBE SHALL BE PHO SPHOR BRONZE TO DIN SPEC. 17821/155 OR AS PER D.L.A OF APENDIX ONE OF IS 3624-1987.
  9. THREADS SHALL BE SUITABLE PROTECTED BY PLASTIC/RUBBER CAPS.
  10. CABLE SOCKET BE CRIMPED ON EACH CONNECTION WIRE.
  11. CONNECTION WIRE SHALL BE 1.5mm Sq. P.V.C. INSULATED FLEXIBLE CORD SUITABLE FOR 250V CONFORMING TO IS:604 P.T.I.-1984.
  12. GAUGE SHALL HAVE REMOVABLE BACK PLATE FOR ADJUSTMENT.
  13. THE CASE AND BEZEL OF GAUGE SHALL BE MANUFACTURED FROM ALUMINIUM AND GAUGE COMPONENT SHALL BE DESIGNED AND MANUFACTURED IN SUCH A MANNER SO AS TO WITHSTAND A HIGH DEGREE OF VIBRATION DUST AND HUMIDITY COUPLED WITH HIGH AMBIENT TEMPERATURES.
  14. MANUFACTURER SHOULD INDICATE THEIR IDENTIFICATION & MANUFACTURING MONTH & YEAR BY PAINT AT SUITABLE LOCATION.
  15. COMPLETE OUTER PROTION OF THE GAUGE SHOULD BE PAINTED IN MATT BLACK COLOUR.
  16. GAUGE SHALL BE TESTED AS PER RDSO INSPECTION PLAN MP, TP-14 AND ACCURACY SHALL BE AS INDICATED IN THE INSPECTION PLAN.

7							
6							
5							
4							
3							
2							
1							
REV. NO.	REV. DATE	REV. BY	REV. DESCRIPTION	REV. BY	REV. DATE	REV. BY	REV. DATE
REF. ASSY. DRG. NO. CLW DRG. 1209-18-306-183				CRITTARANJAN LOCOMOTIVE WORKS			
DIFFERENTIAL GAUGE SELF ILLUMINATED LED (BACK LIT TYPE) (FLUSH MOUNTED)				WAP-7, WAP-4, WAP-5 USED FOR LOCOMOTIVES WAG-7, WAP-4, WAG-5			
APPROVAL REF.				DRAWING NO. 1209-18-306-226			

Alt. No.	①	②	③	④	⑤				
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ENCLOSURES :

1. ANNEXURE - 1 + 1
2. DRAWINGS - 04 NOS (FOUR)

TENDER SPECIFICATION

FOR BRAKE CONTROL

ITEMS ( PNEUMATIC GAUGES ) FOR

CREW FRIENDLY LOCO ( WAP - 4 ) & WAG - 7

THIS SPECIFICATION SUPERSEDES SPECN. NO. CLW/Ts/99/CF/1

ISSUED BY  
 BY C.E.E./D-1  
 C.L.W. / CHITTARANJAN

PREPARED BY	CHECKED BY	APPROVED BY	ISSUED BY	DATE
<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>	DY.C.E.E.(D-1)	20.09.06.

## TENDER SPECIFICATION NO CLW /TS/99/CF/3

Specification for Purchase /Supply of different types of gauges ( Pneumatic ) used in WAP -4 Electric Locomotive .

1. **Detail of supply** :- The required outline specification / drawing and sizes has been shown in enclosed sheet at Annexure .
2. **Standard used in this specification** :- Drawing and specification mentioned in Annexure .
3. **Routine Test and Inspection**
  - a) Routine Inspection test such as dimentsional checking , tesing of Air pressure etc. are strictly as per drawing and Specifications.
  - b) All the equipments must be tested individually by the manufacturer before supply to purchaser .
  - c) Prototype testing shal be carried out in the manufacturer's premises in p:esence of purhaser's authorised resp. esentative.
4. **General Requirements**
  - a) Manufacturer must supply the following details of each of the items mentioned in the specification .
  - b) Detail drawings with all dimensions , sectionel views with proper dimensions , part list including part drawings material specifications etc.
  - c) General descriptions of individual equipment along with operating features .
  - d) Test specifications of ~~Testing of~~ individual equipment .
  - e) Testing procedure of individual equipment . Detail of testing equipment /Test Racks are also to be mentioned .
  - f) Maintenance instructions including over hauling procedure of Individual equipment.
  - g) Detail Catalogue and information regarding assly./Installation details / spares .
  - h) Any special tool or other material required for maintenance of equipments. All documents are to be provided .

PREPARED BY	CHECKED BY	APPROVED BY	ISSUED BY	DATE
<i>L. M. S.</i>	<i>WS</i>	<i>DL</i>	DY.C.E.E(O-1)	20.09.06

The manufacturer is required to guarantee that the <sup>see</sup> item ( Pressure Gages ) satisfactorily for a period of 5 ( five ) years after commissioning . Any equipment /part which falls during the guarantee period shall be replaced free of cost by the manufacturer . The replaced componerts shall further under warranty for (5) five years from date of thir fitment.

6. Maintenance Spare :-

The manufacturer shall submit the list of spares required for 5 ( five ) years and must clearly indicate the cost of component.

7. Literature and Documentation :-

The manufacturer shall supply alongwith the offer 2 copies each of the detail drawing descriptive literature operation / maintenance trouble shooting and testing / instructions.

8. Surface treatment , packing and delivery

- All the equipments / assemblies shall be given proper anticorrosive treatment .
- Proper packing should be done to ensure prevention from possible damage. Deterioration during transit and stroage prior to fiment .
- The item shall be offered in a complete set of locomotives .
- The identical items of the set shall be packed separately .
- Packed material shall be marked with identification marks with size/ total quantity / manufacture's batch and Code No ./strage temperature required and set per loco.

9. Rate :-

Tender shall quote the rate of complete set only . Individual rate shall not be acceptable .

PREPARED BY	CHECKED BY	APPROVED BY	ISSUED BY	DATE
<u>L. Prasad</u>	<u>VB</u>	<u>dlc</u>	DY.C.E.E(0-1)	20.09.06

Page 4 of 4.5  
CLW/TS/99/CF/3

## Annexure - 1

Tender specification for PNEUMATIC GAUGE USED FOR WAP-4 LOCO  
(CREW FRIENDLY)

Sl. No.	Description	Drg./Specn. No. (D&M Part No.)	Qty./Loco
③ ②	1. Gauge for air flow indicator	<del>FF-4154T-1</del> (1209-18.306-183)	02 nos.
④	2. Gauge for BP (4")	<del>FF-5302T-4C</del> (1209-18.306-184) ALT-① 225	02 nos.
	3. Gauge for BC-1 & BC-2	<del>FF-2481T-1</del> (1209-18.306-182) 227	02 nos.
	4. Gauge for MR-FP	<del>F-2481T-7</del> (1209-18.306-184) 225	02 nos.
5	DIFFERENTIAL GAUGE SELF ILLUMINATED LED (BACKLIT TYPE) (FLUSH MOUNTED)	1209-18.306-226	02 NOS.

PREPARED BY	CHECKED BY	APPROVED BY	ISSUED BY	DATE
<u>Lozank</u>	<u>WS</u>	<u>AL</u>	DY.CEE (D-1)	20.09.06.

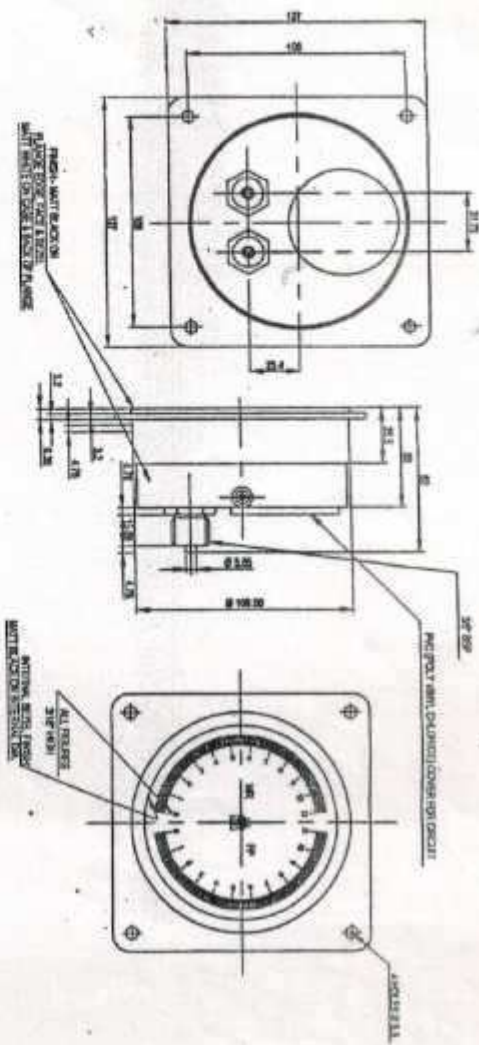
ALTERATION SHEET

SPECIFICATION No. CLW/TS/99/CF/3

FOR WAP-4 & WAG-7 (CF) LOCO

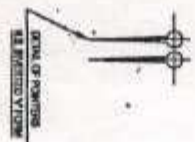
ALT. No.	DATE	DESCRIPTION	SIGNATURE OF DY. CEE/D-II	REMARKS
①	15.03.07	THIS SPECIFICATION IS ALSO REQD FOR WAG-7 (CF) LOCO AS PER LETT. NO. 8LDD/3256/CRH. DTD. 9.3.07	<i>[Signature]</i>	
②	4.12.08	AIR FLOW GAUGES ITEM SL NO 1 EXCLUDED AND NEW CAT NO GIVEN SEPARATELY FOR AIR FLOW	<i>[Signature]</i> 04/12/08	
③	04.04.11	New Dwg. no. incorporated against item no. 2, 3 & 4.	<i>[Signature]</i> 4/4/11	
④	11/1/17	ALT-1 ADDED TO DRAWING NO 1209-18-306-225 AT SL NO-2 OF ANNEXURE-J	<i>[Signature]</i> 11/1/17	DRG. NO. UPDATED
⑤	26.06.21	DRG NO. 1209-18-306-226 ADDED AT SL NO. 5 OF ANNEXURE-1	<i>[Signature]</i> 26/6/21	VIDE APPROVAL OF CEE/D2 DON THIS OFFICE NOTE NO. ELDD/300/pt dfor-621

SL. NO.	CKD BY	REVIEWED BY	APPROVED BY	REMARKS
1.	<i>[Signature]</i>	<i>[Signature]</i> 15/1/17	<i>[Signature]</i> 15/3/17	



**NOTE :-**

1. THE GAUGE RECEIVED IN THIS DRAWING IS FOR INFORMATION PURPOSES ONLY AND SHOULD NOT BE USED FOR ANY OTHER PURPOSE.
2. THE GAUGE RECEIVED IN THIS DRAWING IS FOR INFORMATION PURPOSES ONLY AND SHOULD NOT BE USED FOR ANY OTHER PURPOSE.
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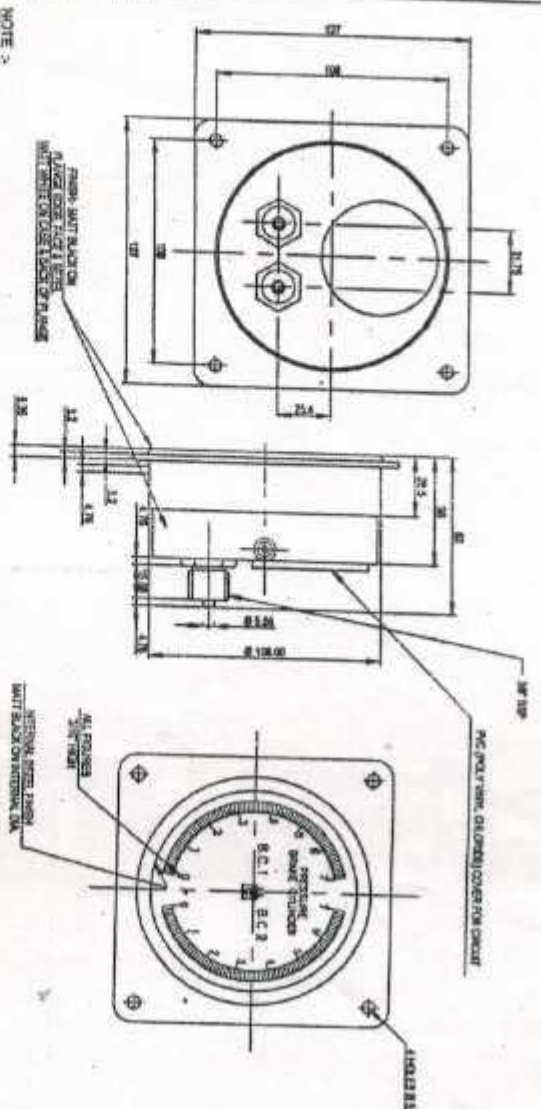
SL. NO.	DATE	DESCRIPTION	BY

FOR INFORMATION ONLY

Tender Purpose

Sl. No.	Particulars	Quantity	Unit	Remarks
1	Pressure Gauge	1	Each	For Tender Purpose
2				
3				
4				
5				
6				
7				

Q.M. - 100 - 18-306 - 104  
 SELF ILLUMINATED  
 BLOCK TYPE  
 FLASH MOUNTED M.R. 173  
 1809-18306-223



**NOTE -**

1. THE GAUGE SHOULD BE SUBJECT TO THE FOLLOWING TESTS:
2. PRESSURE TEST: THE GAUGE SHOULD BE TESTED AT 1.5 TIMES THE FULL SCALE RANGE FOR A PERIOD OF 15 MINUTES.
3. SEALING TEST: THE GAUGE SHOULD BE TESTED AT 1.5 TIMES THE FULL SCALE RANGE FOR A PERIOD OF 15 MINUTES.
4. THE GAUGE SHOULD BE TESTED AT 1.5 TIMES THE FULL SCALE RANGE FOR A PERIOD OF 15 MINUTES.
5. THE GAUGE SHOULD BE TESTED AT 1.5 TIMES THE FULL SCALE RANGE FOR A PERIOD OF 15 MINUTES.
6. THE GAUGE SHOULD BE TESTED AT 1.5 TIMES THE FULL SCALE RANGE FOR A PERIOD OF 15 MINUTES.
7. THE GAUGE SHOULD BE TESTED AT 1.5 TIMES THE FULL SCALE RANGE FOR A PERIOD OF 15 MINUTES.
8. THE GAUGE SHOULD BE TESTED AT 1.5 TIMES THE FULL SCALE RANGE FOR A PERIOD OF 15 MINUTES.
9. THE GAUGE SHOULD BE TESTED AT 1.5 TIMES THE FULL SCALE RANGE FOR A PERIOD OF 15 MINUTES.
10. THE GAUGE SHOULD BE TESTED AT 1.5 TIMES THE FULL SCALE RANGE FOR A PERIOD OF 15 MINUTES.
11. THE GAUGE SHOULD BE TESTED AT 1.5 TIMES THE FULL SCALE RANGE FOR A PERIOD OF 15 MINUTES.
12. THE GAUGE SHOULD BE TESTED AT 1.5 TIMES THE FULL SCALE RANGE FOR A PERIOD OF 15 MINUTES.
13. THE GAUGE SHOULD BE TESTED AT 1.5 TIMES THE FULL SCALE RANGE FOR A PERIOD OF 15 MINUTES.
14. THE GAUGE SHOULD BE TESTED AT 1.5 TIMES THE FULL SCALE RANGE FOR A PERIOD OF 15 MINUTES.
15. THE GAUGE SHOULD BE TESTED AT 1.5 TIMES THE FULL SCALE RANGE FOR A PERIOD OF 15 MINUTES.
16. THE GAUGE SHOULD BE TESTED AT 1.5 TIMES THE FULL SCALE RANGE FOR A PERIOD OF 15 MINUTES.
17. THE GAUGE SHOULD BE TESTED AT 1.5 TIMES THE FULL SCALE RANGE FOR A PERIOD OF 15 MINUTES.
18. THE GAUGE SHOULD BE TESTED AT 1.5 TIMES THE FULL SCALE RANGE FOR A PERIOD OF 15 MINUTES.
19. THE GAUGE SHOULD BE TESTED AT 1.5 TIMES THE FULL SCALE RANGE FOR A PERIOD OF 15 MINUTES.
20. THE GAUGE SHOULD BE TESTED AT 1.5 TIMES THE FULL SCALE RANGE FOR A PERIOD OF 15 MINUTES.

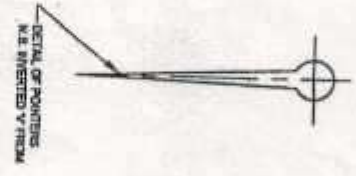
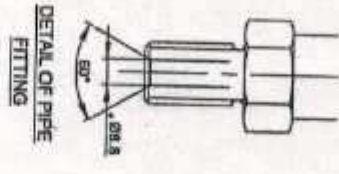
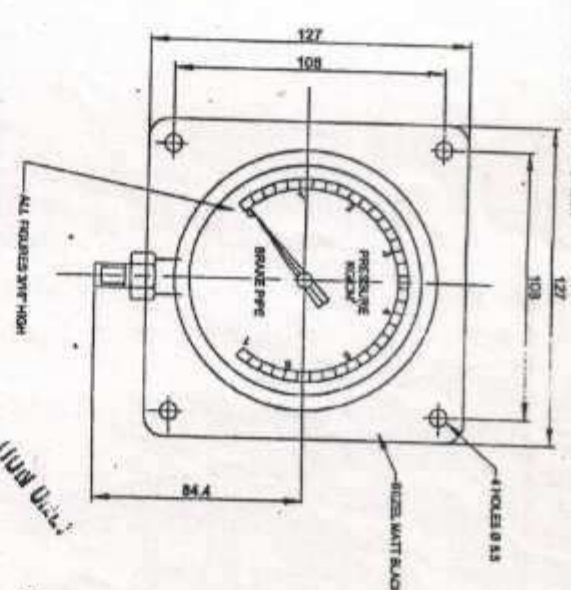
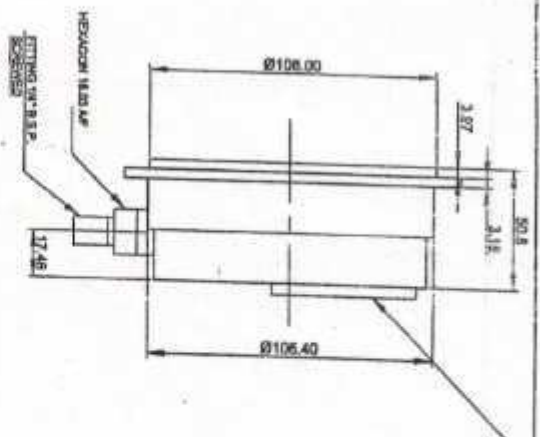
FOR INFORMATION USE

Tender Purpose

Sl. No.	Part Name	Quantity	Unit	Material	Remarks	Spec. Ref.	Drawn By	Checked By	Date
1	Pressure Gauge	1	Each	Stainless Steel	For use in loco	IS 103-18:2012			
2	Pressure Gauge	1	Each	Stainless Steel	For use in loco	IS 103-18:2012			
3	Pressure Gauge	1	Each	Stainless Steel	For use in loco	IS 103-18:2012			
4	Pressure Gauge	1	Each	Stainless Steel	For use in loco	IS 103-18:2012			
5	Pressure Gauge	1	Each	Stainless Steel	For use in loco	IS 103-18:2012			
6	Pressure Gauge	1	Each	Stainless Steel	For use in loco	IS 103-18:2012			
7	Pressure Gauge	1	Each	Stainless Steel	For use in loco	IS 103-18:2012			

Sl. No.	Part Name	Quantity	Unit	Material	Remarks	Spec. Ref.	Drawn By	Checked By	Date
1	Pressure Gauge	1	Each	Stainless Steel	For use in loco	IS 103-18:2012			
2	Pressure Gauge	1	Each	Stainless Steel	For use in loco	IS 103-18:2012			
3	Pressure Gauge	1	Each	Stainless Steel	For use in loco	IS 103-18:2012			
4	Pressure Gauge	1	Each	Stainless Steel	For use in loco	IS 103-18:2012			
5	Pressure Gauge	1	Each	Stainless Steel	For use in loco	IS 103-18:2012			
6	Pressure Gauge	1	Each	Stainless Steel	For use in loco	IS 103-18:2012			
7	Pressure Gauge	1	Each	Stainless Steel	For use in loco	IS 103-18:2012			

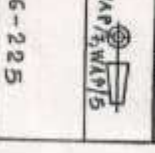
103-18:2012



Tender Purpose

- NOTE :-**
1. THE DIAL SHOULD BE RADIALLY TYPE.
  2. THE POINTING AND SCREW CONNECTION SHOULD BE TRAVEL LIGHT WHITE WITH CLEAN AND SHARP OUTLINE. THE REST OF THE DIAL FACE SHOULD BE MATT BLACK.
  3. THE DIAL FACE SHOULD BE MADE OF POLYCARBONATE TRANSPARENT OR WHITE SUBSTRATE OF SUITABLE THICKNESS.
  4. POINTING WHITE PLASTIC FOOT WITH CENTRAL BLACK CAP.
  5. THE LENS SHOULD BE PLACED ON A MOUNTING PLATE BEHIND DIAL FACE IN SUCH A MANNER THAT THE LIGHT WILL PASS THROUGH THE TRANSPARENT MATERIAL.
  6. LENS OF 1008 FOR GAUGE MOUNTING ON MOUNTING PLATE SHOULD HAVE 1.2 TO 2.0 MILLIMETER THICKNESS.
  7. THE TERMINAL FOR POWER SUPPLY OF 24 VOLTS TO 110 VOLTS AC. FROM TO LENS SHOULD BE AT THE BACK OF THE GAUGE. THE LOWER PROTECTIVE PROTECTION SHOULD BE ENSURED.
  8. THE MOUNTING OF THE GAUGE THESE SHALL BE AND WHICH SHOULD TO DIN SPEC. TRYING FOR AN AREA 1.1 OF APPROX. DIA. OF 250MM.
  9. POINTING SHALL BE SUPPLIED PROTECTED BY PLASTIC COVER LENSES COVER.
  10. CONNECTION THESE SHOULD BE 1.5MM OR 2.0MM DIA. INSTEAD OF 1.0MM DIA. SUITABLE FOR NEW CONNECTION TO BE PER P.T.A. 1981.
  11. CONNECTION THESE SHOULD BE 1.5MM OR 2.0MM DIA. INSTEAD OF 1.0MM DIA. SUITABLE FOR NEW CONNECTION TO BE PER P.T.A. 1981.
  12. THE GAUGE AND POINTING SHOULD BE PROTECTED FROM ALL VIBRATION AND SHOCK BY USING SUITABLE MOUNTING AND SUPPORTING MATERIALS.
  13. THE GAUGE AND POINTING SHOULD BE PROTECTED FROM ALL VIBRATION AND SHOCK BY USING SUITABLE MOUNTING AND SUPPORTING MATERIALS.
  14. MANUFACTURER SHOULD INDICATE THEIR IDENTIFICATION & MANUFACTURING MONTH YEAR BY PEN AT SUITABLE LOCATION.
  15. COVER THE OUTER PORTION OF THE GAUGE SHOULD BE PAINTED IN MATT BLACK COLOR.
  16. GAUGE SHALL BE TESTED AS PER ISO 9000 INSPECTION PLAN UP TO 14 AND ACCEPTANCE SHALL BE AS INDICATED IN THE INSPECTION PLAN.

Sl. No.	Part Name	Qty	Spec. No.	Part No.	Remarks
1	Pressure Gauge	1	CLW - 1209 - 18 - 306 - 181		4" SINGLE AIR PRESSURE GAUGE SELF ILLUMINATED WITH LED (BACK LT TYPE) FLUSH MOUNTED (BRAKE PIPE)
2	Pointing	1			
3	Mounting Plate	1			
4	Bracket	1			
5	Cover	1			
6	Pointing	1			
7	Mounting Plate	1			
8	Bracket	1			
9	Cover	1			
10	Pointing	1			
11	Mounting Plate	1			
12	Bracket	1			
13	Cover	1			
14	Pointing	1			
15	Mounting Plate	1			
16	Bracket	1			
17	Cover	1			
18	Pointing	1			
19	Mounting Plate	1			
20	Bracket	1			
21	Cover	1			
22	Pointing	1			
23	Mounting Plate	1			
24	Bracket	1			
25	Cover	1			
26	Pointing	1			
27	Mounting Plate	1			
28	Bracket	1			
29	Cover	1			
30	Pointing	1			
31	Mounting Plate	1			
32	Bracket	1			
33	Cover	1			
34	Pointing	1			
35	Mounting Plate	1			
36	Bracket	1			
37	Cover	1			
38	Pointing	1			
39	Mounting Plate	1			
40	Bracket	1			
41	Cover	1			
42	Pointing	1			
43	Mounting Plate	1			
44	Bracket	1			
45	Cover	1			
46	Pointing	1			
47	Mounting Plate	1			
48	Bracket	1			
49	Cover	1			
50	Pointing	1			
51	Mounting Plate	1			
52	Bracket	1			
53	Cover	1			
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55	Mounting Plate	1			
56	Bracket	1			
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59	Mounting Plate	1			
60	Bracket	1			
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87	Mounting Plate	1			
88	Bracket	1			
89	Cover	1			
90	Pointing	1			
91	Mounting Plate	1			
92	Bracket	1			
93	Cover	1			
94	Pointing	1			
95	Mounting Plate	1			
96	Bracket	1			
97	Cover	1			
98	Pointing	1			
99	Mounting Plate	1			
100	Bracket	1			

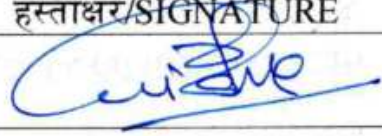



1209-18-306-225




पृष्ठ संख्या/Page of 19	प्रकाशित/ issued on (April - 2022)	एस.टी.आर.सं./STR No.CLW/2020/ELDO/M/STR/0085	पुनरावृत्ति/Rev 0
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**SCHEDULE OF TECHNICAL REQUIREMENTS FOR MANUFACTURING AND SUPPLY OF  
"All types and sizes of Pressure gauges for Crew Friendly Locomotives (Other than Airflow indicator)"**

जारी कर्ता  
ISSUED BY  
विद्युत इंजन अभिकल्प कार्यालय  
चिरेका/चित्तरंजन  
ELECTRIC LOCO DESIGN OFFICE  
CHITTARANJAN LOCOMOTIVE WORKS  
CHITTARANJAN-713331  
WEST BENGAL

अनुमोदन कर्ता/APPROVED BY	हस्ताक्षर/SIGNATURE
प्र.मु.वि.अभि./PCEE	

शिफारिश कर्ता/RECOMMENDED BY	हस्ताक्षर/SIGNATURE
मु. वि. अभि. / डि.एंड. डि. / CEE/D&D	

बनाया गया (के द्वारा) Prepared By	जांचा गया (के द्वारा) Checked By	जारी किया गया (के द्वारा) Reviewed by
SSE/DRG. 	SEE/D-II 	DY.CEE/D/Conv. 

Signature Not Verified

Digitally signed by GAURAV KUMAR  
Date: 2022.04.29  
17:34:12 +05:30  
Reason: IRLPS-CRIS  
Location: New Delhi

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**1.0 NAME OF THE ITEM:**

All types and sizes of Pressure gauges for Crew Friendly Locomotives (Other than Airflow indicator).

**2.0 APPLICATION:**

This STR prescribes the requirements for All types and sizes of Pressure gauges for C/F Loco (Other than Airflow indicator) for compressed air transmission for braking purpose in conventional electric locomotives (WAG-7 & WAP-4). Operating air pressure may be as high as 15 Kg/cm<sup>2</sup>. Normal air pressure is 10 Kg/cm<sup>2</sup>.

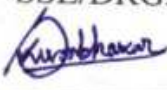


**3.0 SCOPE:**

The Schedule of Technical Requirements (STR) is issued to serve as a guide to manufactures (called the "firm" hereafter) and should be read in conjunction with the relevant drawings and specifications with latest Revisions / Alterations. The technical requirements are meant to serve as guidelines only and are not exhaustive. The firm should satisfy themselves having complied with the requirements of drawings and STR.

Wherever lacking, existing CLW approved sources must also upgrade their facilities to fulfill the requirements of this STR within a period of One year from date of issue of this STR.

**4.0 GENERAL REQUIREMENTS**

- 4.1 The firm should have currently valid ISO-9000 certification issued by an approved agency of the International Accreditation Forum (IAF) with the activity desired clearly mentioned in the scope of certification.
- 4.2 A system of regular submission of rejection details of material giving rejection rate, cause of rejection, corrective action taken etc. on quarterly basis should be followed by firm.
- 4.3 The firm must have system of documentation in respect of rejection at customer end, warranty replacement and failure of item supplied by them during service.
- 4.4 The firm shall have all latest relevant Standards like IS, DIN, BS etc. pertaining to product specification.
- 4.5 The firm shall have system of recording the plant, machinery and control equipments remaining out of service, nature of repairs done etc.
- 4.6 The testing & measuring equipments shall be duly calibrated and the validity of calibration should be current and verified by physically checking the calibration certificate issued by Calibration Agency from whom it was calibrated. Calibration shall be done by NABL accredited labs whose accreditation is valid on the date of calibration.
- 4.7 Firm should have adequate trained personnel for after sales network.
- 4.8 Whenever there is any change with respect to approved QAP, the same shall be promptly submitted to CLW/BLW for approval.




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### 5.0 QUALITY ASSURANCE PLAN (QAP)

The firm shall prepare a Quality Assurance Plan (QAP) before approval is sought and submit the same as part of compliance of this STR. The QAP shall be a comprehensive document covering the following aspects.

- i) Details of Quality Control Organization of the firm along with key personnel engaged in the QC function.
- ii) Qualification log sheet of the personnel manning the quality control set up.
- iii) Process flow chart indicating process of manufacture of an individual product or for a family of products for which the process is same.
- iv) Details of Sub-Vendors:
  - The name of item for which sub-vendor is approved.
  - The name of approving agency
  - Quality manual submitted by sub-vendor to primary vendor
  - The sub-vendor to have all the requisite infrastructure of manufacturing and testing facilities, preferably under one roof. The sub-vendor to broadly meet with all the technical requirements laid down in this STR.
  - The primary vendor is following periodical inspection schedule for sub-vendor strictly.
  - ISO Certification details of sub-vendor also.
  - The sub-vendor is also liable for assessment by CLW.
- v) Inspection and testing plan of
  - a) Incoming Material as per format in Annexure – IV, Clause – 7.3(a)
  - b) Process (stage inspection) as per format in Annexure – IV, Clause – 7.3(b)
  - c) Product (Final inspection) as per format in Annexure – IV, Clause – 7.3(c)
- vi) All the formats used for recording inspection results.
- vii) System of traceability, traceability diagram linking traceability from raw material stage to internal check and finally lot offered for inspection.
- viii) All internal checks to be carried out during manufacturing shall be summarized and furnished .List of documents to be maintained for these internal checks; that need to

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be signed by inspecting official before issue of Inspection Certificate shall also be furnished.

ix) **QAP Format:**

QAP must be submitted in the form of single document indicating name of the firm and page no. 'X' of 'y' on each page. Each page should be signed by Quality Control in-charge. The approved QAP must be a controlled document and a quality record of ISO 9001:2015 quality control system of the firm. A certificate to this effect shall be provided along with the QAP by the firm. The QAP shall be submitted in duplicate.

Details of the above aspect are described in the following paragraphs. The QAP shall be approved by CLW/BLW and shall form basis of approval process.

**5.1 QUALITY CONTROL ORGANISATION**

5.1.1 The complete organizational setup of the Quality Control Key personnel and official along with their qualification and experience should be furnished.

5.1.2 The Quality Control Organization should be headed by a senior level official having degree in engineering who shall directly report to plant in charge.




**5.2 INCOMING MATERIAL**

5.2.1 A complete bill of material indicating all input material items required for manufacturing of the products, governing specification and their sources of supplies as approved by the firm should be furnished.

5.2.2 Raw material shall be procured from CLW/BLW/RDSO approved sources wherever applicable or from reputed suppliers if no CLW/BLW/RDSO source is specified. Documentary proof of purchase and test certificate of each component shall be maintained and produced.

5.2.3 Record of each sub-supplier clearly showing the quantity purchased and rejected as well as cases of late delivery, if any shall be kept.

5.2.4 Incoming raw material shall be 100% inspected by Quality Control Department of the firm for any defect and deviation. The test results of incoming raw material with references to test certificate issued by the supplier and the results of internal tests carried out by the firm for verification may be submitted as part of QAP.

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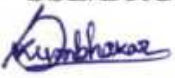


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### 5.3 PROCESS OF MANUFACTURING

- 5.3.1 Complete process flow chart covering all steps of process of manufacture for an individual product (or for a family of product if the process is same), including the process flow of outsourced activities along with its integration with main process, shall be clearly enlisted as part of QAP.
- 5.3.2 The following details of machine used for all the steps of machining operations should be included.
- Make, model and commissioning date of the machine.
  - Accuracy.
  - Details of machining operations.
- 5.3.3 Machining process should be such that all critical dimensions are final. Vague language like available or will install is not acceptable.
- 5.3.4 Details of jigs and fixtures used during manufacture should be furnished along with the manufacturing process wherever used.
- 5.3.5 List of typical Machinery & Plant, testing and measuring instruments required for manufacture is mentioned in Annexure – II & III. The list is for general guidance only and manufacturing operation shall be submitted and got approved by the firm as a part of QAP.

### 5.4 INSPECTION AND TESTING PLAN

- 5.4.1 Testing setup should be available in the firm's own premises capable of testing the equipments as specified in the relevant technical specification.
- 5.4.2 Complete Inspection and Testing Chart covering all steps of process of manufacture for an individual product including final inspection should be clearly enlisted as part of QAP.
- 5.4.3 The following details of Testing / measuring instruments / equipments / tools / jigs / fixtures used for all the steps of measurement and testing operations should be included:
- Make and Model of the equipment
  - Name of the manufacturer
  - Accuracy
  - Capacity or Range
  - Date of Calibration

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- Due date of calibration
- Agency of Calibration

Vague language like available or will install is not acceptable.




- 5.4.4 The accuracy and capacity of the testing and measuring equipments shall be adequate to meet the requirements of the specification and drawing.
- 5.4.5 Stage inspection detailing inspection procedure, inspection parameters and method of testing / test procedure including sample sizes for destructive and non-destructive testing. Record of test results of stage inspection should be available and furnished.
- 5.4.6 List of typical Testing and measuring instruments required for manufacture is mentioned in Annexure – II. The list is for general guidance only. However, the specific Testing & measuring instruments, gauges used by the firm will also form part of QAP and shall be submitted.

#### 5.5 FORMAT TO BE SUBMITTED WITH QAP

Format to be submitted with QAP is enclosed as Annexure – IV. Firms shall fill these formats keeping in view Para 5.0.

#### STORAGE FACILITY

- Adequate Dust free, clean and non - humid environment for storage of raw material and finished product separately
- Adequate Dust free, clean and non-humid environment for product assembly area
- Adequate Stacking / Handling tables and racks in above storage area.

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## ANNEXURE - I

**LIST OF DRAWINGS, SPECIFICATION AND STANDARDS****1. CLW specification/Drawings:**

CLW/TS/99/CF/3 Alt. 5 or latest for WAG-7/ WAP-4 locomotives.

1209-18.306-225 Alt-1 or latest

1209-18.306-224 Alt-Nil or latest

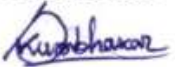
1209-18.306-223 Alt-Nil or latest

1209-18.306-226 Alt-1 or latest

**2. Relevant Standard**

IS: 3624-1987 or DIN-17662/1755

IS: 694

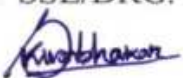


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## ANNEXURE – II

**LIST OF MACHINERY AND PLANT:**

Sl. No.	Name of Machinery & Plant	Capacity / Rating	Essential / Optional
1.	Lathe Machine	Standard	Essential
2.	Drill Machine	Standard	Essential
3.	Grinding Machine	Standard	Essential
4.	Thread cutting machine	Standard	Essential
5.	Dial making machine graduation	Standard	Essential
6.	Gas welding Set	Standard	Essential
7.	Dead weight tester	Standard	Essential
8.	Comparison Pressure Tester	Standard	Essential
9.	Shock testing machine complete with electric motor and counter	Standard	Essential
10.	Endurance testing machine	Standard	Essential
11.	Tapping Machine	Standard	Essential
12.	Bourdon bending machine	Standard	Essential
13.	Pressing machine	Standard	Essential
14.	Power Hacksaw Machine	Standard	Essential
15.	Soldering Machine	Standard	Essential
16.	Air compressor	Standard	Essential

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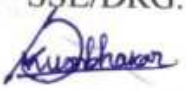


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## ANNEXURE – III

**LIST OF MEASURING & TESTING EQUIPMENTS:**

Sl.No.	Name of Measuring & Testing Equipments	Capacity / Rating	Essential/ Optional
1.	Inside/Outside venire Caliper	Standard	Essential
2.	Micrometer	Standard	Essential
3.	Scale	Standard	Essential
4.	Master Pressure gauge	Standard	Essential
5.	1000 $\Omega$ Megger	Standard	Essential
6.	Auto Transformer 0 to 200 volt (Variac)	Standard	Essential
7.	Volt meter	Standard	Essential
8.	Air pressure Test Set up	As per RDSO inspection plan MP, TP-14	Essential
9.	Shock Test Set up	As per RDSO inspection plan MP, TP-14	Essential
10.	Endurance Test Set up	As per RDSO inspection plan MP, TP	Essential
11.	Led Glow Test Set up	As per RDSO inspection plan MP, TP	Essential

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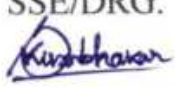


## ANNEXURE – IV

QAP FORMAT

Item	Enter Item Name here	Date:	Enterdate
Specification:	Enter Specification No. here		

## FIRM DETAILS:

Firm Name	
Address	
Contact Person	
Email	
Phone	
Mobile No.	

Firm Name & Logo		
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Item	Enter Item Name here	Date:	Enter date
Specification:	Enter Specification No. here		




### Amendment History:

Sl.No.	Amendment Date	Version	Reason for Amendment

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Firm Name & Logo	Signature of Quality Head	Page 2 of 10
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### 1. Purpose:

Purpose of QAP.....

### 2. Scope of Application:

Applicable for .....

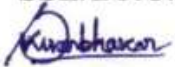


### 3. Item Details:

Item Name	
Specification no.	
Drawing no.	
STR No.	

### 4. Reference Documents:

If Any.....

Firm Name & Logo		
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Item	Enter Item Name here	Date:	Enterdate
Specification:	Enter Specification No. here		

## 5. Organization Setup

### 5.1. Organization Chart

Complete Organization setup to be given including:

- Production setup
- Quality Control setup
- After Sales & Service setup
- R&D/Design setup

### 5.2. Qualification of Personals

#### a) Production

Sl.No.	Name	Dsgn.	Qualification	Experience	Remarks

#### b) Quality Control

Sl.No.	Name	Dsgn.	Qualification	Experience	Remarks

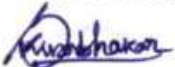


#### c) After Sales & Service

Sl.No.	Name	Dsgn.	Qualification	Experience	Remarks

#### d) R&D/Design

Sl.No.	Name	Dsgn.	Qualification	Experience	Remarks

Firm Name & Logo		
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Item	Enter Item Name here	Date:	Enter date
Specification:	Enter Specification No. here		

## 6. Manufacturing Process

### 6.1. Process Flow Chart

- Stage wise manufacturing process flow chart to be given
- Clearly state work instruction/checklist to be followed

### 6.2. Machinery and Plant (M&P)

Sl.No.	IS/STR/Specification on Para no	Requirement of M&P as per IS/STR/Specification		Details of the M&P available with the firm					
		M&P name	Range / Capacity of M&P	Name of M&P	Model	Make	Machine no.	Year of Built	Range/ Capacity

### 6.3. Testing & Plant

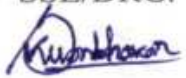


Sl.No.	IS/STR/Specification on Para no	Requirement of T&P as per IS/STR/Specification		Details of the T&P available with the firm					
		T&P name	Range / Capacity of T&P	Name of T&P	Model	Make	Machine no.	Year of Built	Range/ Capacity

### 6.4. Details of Sub-assemblies/Components Manufactured

#### a) Part I: Details of in-house manufactured (Components/sub-assemblies)

Sl.No.	Item Name	Drawing No

Firm Name & Logo		
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Item	Enter Item Name here	Date:	Enter date
Specification:	Enter Specification No. here		

**b) Part II: Details of components/Sub-assemblies purchased from CLW/RDSO approved vendors**

Sl.No.	Item Name	Drawing No	Approved source of RDSO/CLW	Name/Address of the source

**c) Part III: Details of items outsourced from other than CLW/RDSO approved items**

Sl.No.	Item Name	Drawing No	Name/Address of the source

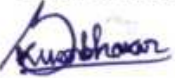


**6.5. Details of Sub-vendors**

Sl.No.	Vendor Name	Item Name	ISO Certified (Yes/No)	QAP Approved (Yes/No)	Frequency of review of the performance of sublet source

Note: Following points to be taken in due consideration in providing information about manufacturing process:

- Details of Work Instruction for each stage as mentioned in process flow chart.
- Inspection in Plant (Stage & Final)
- Bill of Material
- Stages of manufacturing should be clearly indicating that M&P and T&P required for each stage.
- Pre manufacturing stage and after manufacturing stage inspection & testing should be clearly mentioned along with checklist.
- Checklist should be attached with the QAP.
- Please attach ISO certificates of sub-vendors.

Firm Name & Logo		
	Signature of Quality Head	Page 6 of 10

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SSE/DRG. 	SEE/D-II 	DY.CEE/D/Conv. 

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Item	Enter Item Name here	Date:	Enter date
Specification:	Enter Specification No. here		

## 7. Quality Control

### 7.1. Quality Certification

- ISO
- Any other Document/certification

### 7.2. Calibration Plan for Testing & Measuring Equipment

- Part I :In-house Testing facilities available for calibration with the firm

Sl.No.	Name of Master	Make	Range	Frequency of calibration	Traceability to national standard

- Part II : Personnel trained for in-house calibration

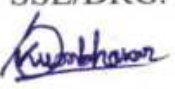


Sl.No.	Name	Qualification	Experience

Part III : Calibration plan for the items identified for specified calibration in STR/Specification

Sl.No.	Measuring Equipment	Ref. Para of STR/Spec.	Range/ Accuracy	Frequency Specified in STR/Spec	In-house/ Outsourced	Name of agency if outsourced

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Specification: Enter Specification No. here

c) Part IV : Calibration plan for other measuring equipment

Sl.No.	Measuring Equipment	Range/ Accuracy	Frequency	In-house/ Outsourced	Name of calibration agency

7.3. Incoming Raw Material & In-process/Final Inspection

Stage inspection detailing inspection procedure, inspection parameters, method of testing/test procedure including sample sizes for destructive and non-destructive testing etc.

a) Part I: Incoming raw materials/parts/sub-assemblies

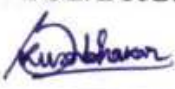
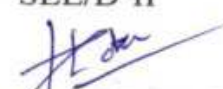

Sl.No.	Incoming Product/ assembly	Sample Size & its Frequency of inspection	In-house / outsourc ed	Checklist no.	Mode of inspection / equipment used	Rejection & Disposal	Traceability register no
						Reprocessed / Scrapped	

b) Part II: In process inspection (of the product)

Sl.No	Name of the process	Sample Size & its Frequency of inspection	Checklist no.	Mode of inspection / equipment used	Rejection / Disposal	Corrective& preventive action	Traceabilit y register no

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Specification:	Enter Specification No. here
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**Part III: Final internal inspection of the product by the firm**

Sl.No.	Name of the test/ process	Sample Size & its Frequency of inspection	Checklist no.	Mode of inspection / equipment used	Rejection & Disposal	Traceability register no
					Reprocessed / Scrapped	

**7.4. Handling of Rejected Material**

- Please provide details

**7.5. System for Customer Complaints/Warranty Failures****Warranty failures/In-service failures reported from customers**

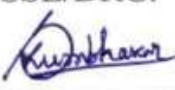


Sl.No.	Date of report of complaint	Letter no	Complaint received from	Brief details of complaint	Classification of failure	Whether any person deputed for collecting field sample	Date of joint inspection	Failure analysis & cause of failure	Date of compliance in case of warranty	C & P action taken
					Warranty failure/ In service failure/ Call for joint inspection / Consignee end rejection / General					

\* The firm shall maintain a complaint register in the above format and the summary required to be given during renewal.

**7.6. Details of after Sales & Service**

Name of Service Engineer	Location/Place	Contact Detail

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बनाया गया (के द्वारा) Prepared By	जांचा गया (के द्वारा) Checked By	जारी किया गया (के द्वारा) Reviewed by	
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Specification:

**8. Additional Information**

- The firm can furnish any other information which they wish to submit on items other than furnished above.

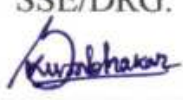

**Annexure:**

1. Work Instruction for each stage
2. Inspection check sheet for:
  - a. Incoming material
  - b. In-process/stage inspection
  - c. Final material
3. ISO Certificate
4. Any other quality/design certification

**Note:**

1. QAP covering all the information as asked above under section '0' to 'I' must be given in the form of single document indicating name and works address of the firm and page no. 'x' of 'y' on each page. Each page should be signed by Quality Control in-charge. The approved QAP must be a controlled document and a quality record of ISO Quality Control System of the vendor. A certificate to this effect shall be provided along with the QAP by the vendor.
2. One copy of the QAP, after final approval will be given back to the vendor for implementation.

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