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भारत सरकार . रेल मंत्रालय

**GOVERNMENT OF INDIA  
MINISTRY OF RAILWAYS**

डीजल एवं इलेक्ट्रिक लोकोमोटिव के ब्रेक सिस्टम में प्रयोग  
हेतु जे-1 सेफटी वाल्व की विशिष्टि और तकनीकी आवश्यकताओं  
की अनुसूची

**SPECIFICATION & SCHEDULE OF TECHNICAL  
REQUIREMENTS FOR J-1 SAFETY VALVE FOR ITS USE  
IN BRAKE SYSTEM FITTED ON DIESEL AND ELECTRIC  
LOCOMOTIVES**

विशिष्टि संख्या एम.पी.0.0100.14 (संशो.-02)  
जून - 2024

**SPECIFICATION NO. MP.0.01.00.14 (REV- 02)  
June -2024**

अनुसंधान अभिकल्प एवं मानक संगठन  
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**RESEARCH DESIGNS & STANDARDS ORGANISATION  
LUCKNOW - 226 011**

LIST OF AMENDMENTS

| S. No       | Amendment Date  | Rev. | Revised Para                    | Details  |
|-------------|---|------|---------------------------------|--|
| 1           | March' 2021   | 1    | 1, 4.2, 4.4, 4.5, 5.8, 5.9, 7.5 | Para has been revised to address restrictive/narrow eligibility criteria.  |
|             |   |      | 3.1.3                           | The standard for Vibration & shock test has been referred. Accordingly, para has been revised.   |
|             |   |      | 3.2                             | Clause 4.3.1 of RDSO ISO Apex document no. QO-D-8.1-5, Ver. 2.1- Application for registration of vendor, covers the requirement of ISO certification. Accordingly, para has been deleted.                                      |
|             |   |      | 3.5                             | RDSO ISO Apex document no. QO-D-8.1-13, Ver. 1.2- Quality Audit of Approved Vendor, covers the requirement of quality audit. Accordingly, para has been deleted.   |
|             |   |      | 4.2                             | "components" word deleted in the sentence to address restrictive/narrow eligibility criteria.  |
|             |   |      | 4.5                             | "conforming to WABCO requirements" has been removed from para to address restrictive/narrow eligibility criteria   |
|             |   |      | 4.6                             | RDSO ISO document no-QM-RF-8.1.3 (Ver-1.0) - Guidelines for preparing QAP during registration, is referred in the para. Accordingly, para has been revised   |
|             |   |      | 4.7                             | Clause 4.13 of RDSO ISO Apex document no QO-D-8.1-6, Ver.3.0 - Vendor application processing, covers the requirement for review/upgradation of QAP. Accordingly, para has been deleted.  |
|             |   |      | 5.8                             | 'Interchangeability of individual components, rubber kit and springs' has been removed from para to address restrictive/narrow eligibility criteria.   |
|             |   |      | 7                               | Heading has been changed from 'Developmental inspection' to 'Type and Routine Test'.   |
|             |   |      | 7.1                             | As stage inspection not required, Para has been revised for better clarity.  |
|             |   |      | 7.3                             | Para has been revised to define type test and for better clarity. No. of samples also include for type test.   |
|             |   |      | 7.4                             | Addition of new Para added to define routine test.   |
|             |   |      | 7.8                             | Field trial quantity and field trial period are defined as per RDSO document no- MP-M-8.1-1 (latest version) and Field trial performance feedback format & acceptance criteria are added.                                      |
|             |   |      | 9.1                             | "5 copies" word deleted in the sentence.   |
|             |   |      | 10.                             | Clause 4.11.2 of RDSO ISO Apex document no. QO-D-8.1-6, Ver.3.0- Vendor application processing, covers the requirement of 'Procurement of Raw Material/sub-assembly from Approved Source'. Accordingly, para has been deleted. |
|             |   |      | 11 (Now 10)                     | Addition of new Para (Preference to Make In India) in compliance of directives issued by GOI for promotion of Make in India policy.  |
| 12 (Now 11) | Addition of new Para (Vendor Changes in Approved Status) in compliance to Vigilance cell note no. 13/Vig/Policy dated 08.09.2016. |      |                                 |  |

|   |            |   |  |  |
|---|------------|---|--|--|
| 2 | June' 2024 | 2 | 2.7, 3.4.,4.1,<br>4.3, 4.6, 5.9<br>7.3(now 7.2),<br>7.7(now7.6),<br>11 | Para has been revised to keeping in view of probable change in vendor approving agency.  |
|   |            |   | 7.1, 7.2   | In view of M. P. Dte's note dt.19.03.2024, regarding "Vendor Approval Process ensuring transparency and competition' & Para 4.3.5.1.1 of ISO document QO-D-8.1-10 ver. 2.4, the para 7.1 has been revised & para 7.2 has been deleted. Accordingly para 7.3 to 7.8 have been shifted to one place above & re-numbered 7.2 to 7.7 |
|   |            |   | 7.8 (Now 7.7)  | The document referred for Quantity of the valve for field trial and field trial period has been obsolete. The qualifying quantity and period is mentioned in UVAM. Accordingly, the para has been revised.   |
|   |            |   | Part B   | Addition of new Paras to include STR requirements.   |

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**PART- A-**

**Specification for J-1 Safety valve for its use in brake system fitted on diesel and electric locomotives**

**1. SCOPE:**

This specification covers the purchase, acceptance and technical requirements related to the performance, inspection and tests of J-1 Safety valve conforming to existing approved design. This valve is used in the twin pipe graduated release type brake system fitted on diesel and electric locomotives of Indian Railways.

**2. DEFINITIONS**

- 21 Tenderer -means firm/company from whom the offer for the supply of this air brake equipment is invited.
- 22 Contractor- means the present firm/company on whom the order for the supply of this air brake equipment is placed.
- 23 Purchaser- means the Indian Railways on behalf of the President of the Republic of India who are purchasing this air brake equipment.
- 24 Inspecting Authority- means the organisation or its representative nominated by the purchaser to inspect this air brake equipment.
- 25 The Research Designs and Standards Organization, Manak Nagar, Lucknow- 226011 is hereafter referred to as RDSO.
- 26 Indian Railways is hereafter referred to as I R.
- 27 In case, tenderer needs any clarification with respect to any clause of this specification or drawings, the tenderer may contact Motive Power Directorate, RDSO/Vendor Approving Agency.

**3. GENERAL CONDITIONS:**

**3.1 Service Conditions**

3.1.1 The valve/equipment shall be capable of operating efficiently inspite of dust, dirt, mist, torrential rains, sand storm and presence of oil vapours to which the locomotive is normally exposed in service.

3.1.2 The valve/equipment shall be capable of working satisfactorily under the site conditions indicated below:

|                     |   |
|---------------------|---|
| Altitude            | : Mean sea levels to an altitude of 1000m.  |
| Ambient temperature | : -5 °C to 55 °C. The air temperature inside the equipment compartment may reach up to 70 °C. |
| Relative Humidity   | : Up to 100%.   |

3.1.3 The valve/equipment with mounting arrangement shall be able to withstand the vibrations and shocks normally encountered during service. Vibration testing shall be done in accordance with IEC-61373 (Category 1, Class A) or equivalent Indian Standards.

**3.2 Warranty**

3.2.1 The contractor shall warrant the valve/equipment furnished hereunder, shall be free from all defects and faults in material, workmanship and manufacture and shall be of the highest grade.

3.2.2 The Warranty/Guarantee period will be 36 months from the date of delivery or 24 months from the date of commissioning whichever is earlier.

- 3.2.3 The contractor shall, if required, replace or repair the goods or such portion thereof as is rejected by the purchaser free of cost at the ultimate destination or at the option of the purchaser the contractor shall pay to the purchaser value thereof at the contract price.
- 3.2.4 All replacements and repairs that the purchaser shall call upon the contractor to deliver or perform under this warranty shall be delivered and performed by the contractor within six months (promptly and satisfactorily). If the Contractor so desires, the replaced parts can be taken over by him or his representative for disposal as he deems fit within a period of three months from the date of replacement of goods/parts. At the expiry of this period, no claim whatsoever shall lie on the Purchaser.
- 3.2.5 The decision of the purchaser in regard to contractor's liability and the amount, if any, payable under this warranty shall be final and conclusive.

### 3.3 After sales

- 3.3.1 Contractor shall supply one set of maintenance manual with every 5 sets of the equipment. Manual shall contain the details of the following information. Updated position of modifications, if any, shall also be incorporated.
- i) Mounting arrangement
  - ii) Sub-assemblies
  - iii) Principle of operation
  - iv) Maintenance schedules during Trip/Monthly/Half Yearly/3 Yearly and POH
  - v) Trouble shooting
  - vi) Part catalogue
  - vii) Testing procedure
  - viii) Test equipment and tools
- 3.3.2 At least one set of wall charts showing pictorial view of components along with part nos. will be given with every 5 sets. The copies of Maintenance Manual and wall charts are meant for wider circulation in Railways and fresh copies shall be furnished as stipulated even if there are no changes in the manual and wall charts furnished against earlier contract.
- 3.3.3 The contractor will impart training of working, operation and maintenance of the system to selected concerned personnel of Indian Railway.

### 3.4 Training

Sufficient number of technicians/engineers/officers shall be trained in consultation with the purchaser/RDSO/Vendor Approving Agency so that adequate trained personnel are available in the field for maintenance. This training shall be at the contractor's works for a suitable period and shall cover maintenance, testing, design and quality control.

The contractor shall undertake training of Indian Railway personnel free of cost.

### 3.5 Deviations

- 3.5.1 In case the offer does not correspond to this specification in any respect a "Deviation Statement" shall be submitted by the Tenderer. This statement shall clearly indicate the deviation CLAUSE-WISE with technical reasons.
- 3.5.2 The final decision regarding the acceptance of the deviations submitted by the contractor shall be at the discretion of the purchaser.
- 3.5.3 Clauses not covered in the Deviation Statement shall be deemed to be acceptable to the Tenderer in all respects. In case of Deviation Statement is not submitted it would be taken, as the complete specification is acceptable to the Tenderer.

## 4. GENERAL REQUIREMENTS:

- 4.1 Manufacturer willing to supply J-1 Safety valve for the use in brake system of diesel and

electric locomotives shall register themselves with RDSO/Vendor Approving Agency.

- 4.2 Manufacturer shall provide sufficient evidence of their capability in support of the technology of manufacturing J-1 Safety valve conforming to existing approved design in view of the interchangeability of the assembly.
- 4.3 The manufacturer shall submit three complete sets of manufacturing drawings of J-1 Safety valve to RDSO/Vendor Approving Agency. One set of drawings duly authenticated shall be returned to the manufacturer for record and to produce the same at the time of inspection.
- 4.4 The manufacturers shall have all drawings, process sheets, test specification and test rig arrangement for manufacturing and testing of the valve/equipment conforming to existing approved design.
- 4.5 The manufacturer shall have adequate facilities for the manufacturing, assembly and testing of J-1 Safety valve conforming to existing approved design. The manufacturers shall also have facilities for inspection and testing of individual components and sub-assembly.
- 4.6 Manufacturer shall have an “internal quality assurance system” with proper documentation to sustain quality of products being manufactured. Firm will also prepare quality assurance plan: as per ISO document of RDSO/Vendor Approving Agency.

## **5. TECHNICAL REQUIREMENTS:**

- 5.1 The J-1 Safety valve shall be suitable for the brake system provided on diesel and electric locomotives on Indian Railways.
- 5.2 J-1 Safety valve, installed vertically in the main reservoir system, should be able to vent main reservoir air pressure at a predetermined setting to atmosphere in order to prevent excessive main reservoir pressure build-up.
- 5.3 J-1 Safety valve should be able to operate up-to a pressure level of 11.5 kg/sq.cm (164 psi) and close within a range of pressure differential of 0.7- 1.0 kg/sq.cm. (10-15 psi).
- 5.4 To adjust the upper setting of safety valve, clockwise movement of adjusting screw should raise the setting whereas anti clockwise movement should reduce the setting.
- 5.5 To adjust the pressure differential range of safety valve, clockwise movement of range ring should reduce the range whereas anti clockwise movement should increase the range.
- 5.6 It should have port to connect it to main reservoir pipe. The location and size of port is shown in RDSO drawing. no. SK.DP-3580.
- 5.7 Proper heat treatment shall be given to attain required hardness on wearing components.
- 5.8 The general shape, envelop size and mounting dimension of J-1 Safety valve shall be as per RDSO drawing no. SK.DP-3580. The safety valve should be fully interchangeable with respect to overall mounting dimensions & threads with safety valves of original manufacturer i.e. existing approved design.
- 5.9 Rubber components shall be procured from approved sources as given in UVAM portal and shall also conform to IRS.R-48-24 (latest) or equivalent rubber specification. All rubber components used in the safety valves shall have minimum life of one and half year.

## **6. PERFORMANCE TEST:**

- 6.1 J-1 Safety valve shall be tested on the test rack as shown in figure 1.
- 6.2 Test set up
  - 6.2.1 Close cock 1, the 2” gate valve and the supply cock.
  - 6.2.2 Mount the safety valve on the test rack as shown in figure 1.
  - 6.2.3 Maintain supply pressure between 10 and 15 Psi higher than the desired pressure setting (149 psi) of the safety valve under test.

6.2.4 Conduct the test as per the test procedure given in table no. 1.

TABLE-1

| Sl. No. | Test description  | Standard values  |
|---------|---|--|
| 1.      | <p><b>VALVE FUNCTIONS</b></p> <ul style="list-style-type: none"> <li>• Start the test with all cocks and the 2” gate valve closed.</li> <li>• Adjust supply feed valve to maintain a pressure between 10 and 15 psi higher than the desired setting of the safety valve under test.</li> <li>• Remove the hexagon head cap screw, which holds the plain cap over the upper housing.</li> <li>• Remove the plain cap from the upper housing.</li> <li>• Remove the range ring lock, range ring lock spring and range ring locking pin from the body.</li> <li>• Loosen the adjusting nut by turning it anti-clockwise holding the adjusting screw steady.</li> </ul> <p><b>(i) Valve setting</b></p> <ul style="list-style-type: none"> <li>• Open the supply cock and the 2” gate valve.</li> <li>• Turn the adjusting screw (clockwise to raise and anti-clockwise to lower the pressure) to achieve</li> </ul> <p style="text-align: center;"><i>Desired setting as indicated on the 300 psi gauge</i></p> <ul style="list-style-type: none"> <li>• After the proper setting, hold the adjusting screw firmly in position and turn the adjusting nut clockwise and tighten it with 35 to 50 ft-lb of torque.</li> </ul> <p><b>(ii) Range</b></p> <ul style="list-style-type: none"> <li>• Insert a small pointed rod in the range ring locking hole and turn the range ring (clockwise to reduce the range and anti-clockwise to increase the range) to adjust the safety valve</li> </ul> <p style="text-align: center;"><i>With in the range limits.</i></p> <ul style="list-style-type: none"> <li>• Operate safety valve several times and note that it functions properly without any fluttering.</li> <li>• After the proper range setting is obtained, insert the following in to the tapped hole in the side of the body. <ul style="list-style-type: none"> <li>· Range ring locking pin</li> <li>· Range ring lock spring</li> <li>· Range ring lock</li> </ul> </li> <li>• Tighten the range ring lock to maintain the safety valve range setting.</li> <li>• Check the safety valve setting and re-adjust, if necessary.</li> </ul> | <p style="text-align: center;"><i>149 psi (Desired setting)</i></p> <p style="text-align: center;"><i>10-15 psi (Range limits)</i></p> |



(part 1). Details of routine test are as under:

| S.N | Test   | Details                                     |
|-----|--|---|
| 1.  | Dimensional check  | As per para 5.8                             |
| 2.  | Performance Test   | As per para 6                               |
| 3.  | Any other test specified in the approved QAP as well as desired by purchaser | As per QAP or as specified by the purchaser |

- 7.4 The contractor shall provide without extra charge, all material equipment tools, labour for tests of every kind, which the purchaser or his nominee shall require to be made on the contractor's premises. The contractor shall also provide any other assistance, which the inspecting authority may consider necessary for any test, examination and dimensional checking.
- 7.5 At the time of inspection the supplier shall submit the internal test results necessary to prove that the safety valve fulfils the technical requirements conforming to existing approved design for J-1 Safety valve.
- 7.6 If endurance test for components and sub-assemblies is required by RDSO/Vendor Approving Agency the contractor will create facilities in his works for the same.
- 7.7 After inspection of the valve it will be subjected for field trials to monitor its performance on locomotive. Quantity of the valve for field trial and field trial period shall be as mentioned in the UVAM portal.

Field performance feedback format is as under:

| S. No. | Shed/Rly. | Loco No. | Date of fitment | Date of failure, if any | Reason of failure | Remarks |
|--------|-----------|----------|-----------------|-------------------------|-------------------|---------|
|        |           |          |                 |                         |                   |         |
|        |           |          |                 |                         |                   |         |

The acceptance criteria of field trial shall be the satisfactory field performance of equipment.

## 8. Installation:

- 8.1 Installation and commissioning of the valve/ equipment of the first prototype shall be the responsibility of the supplier. Other equipment shall, however, be installed by purchaser. Assistance with regard to labour and other facilities which are available in the workshop would, however, be provided by the purchaser to the supplier. Additional equipment/fittings, not covered in the specification, if required, for installation of valve/equipment, shall be supplied by the supplier.

The supplier shall submit tentative installation drawings along with the offer based on the availability of space in the locomotive. These drawings would, however, be finalised after fitment of the first prototype.

## 9. Technical Documents/Drawings

- 9.1 Following documents shall be submitted along with the offer:-
- .1 List of equipment with part catalogue numbers and drawing numbers.
  - .2 Technical literature covering design and principle of operation, to have a general idea of the valve/equipment offered.
  - .3 Detailed dimensional drawings indicating mounting arrangements, layout of valves, sub-assemblies etc.

- .4 Clause wise comments on specification.
- .5 Test program and details of testing facilities at manufacturer's works.
- .6 List of recommended spares for maintenance of valve/equipment for two years.
- .7 List of special tools required for maintenance of valve/equipment.
- .8 Latest Copy of bill of material of all brake items with Drg. No. of individual components.

92 One copy per five set of the following documents shall be supplied by the supplier as part of contract:-

- .1 Type and routine test specification and test reports.

**10. Preference to Make In India**

The Government of India policy on 'Make in India' shall apply.

**11. Vendor Changes in Approved Status**

All the provisions contained RDSO's ISO procedures laid down in Document No. QO-D-8.1-11,(latest version), (Titled "Vendor-changes in approved status") and subsequent version/amendment thereof/respective ISO procedure of Vendor Approving Agency, shall be binding and applicable on the successful vendor/vendors in the contract floated by Railways to maintain of products supplied to Railways.

**12. Date of Enforcement**

The date of enforcement of the specification is with immediate effect i.e. date of issue of specification.

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**PART – B**

**Schedule of Technical requirements for J-1 Safety valve for its use in brake system fitted on diesel and electric locomotives**

- 1. Minimum Requirements of Infrastructure, Manufacturing, Testing & Quality Control for Approval of Manufacturer**
- 1.1 The manufacturer shall have at least the following infrastructure and manufacturing facilities:
  - 1.1.1 The Manufacturer shall have adequate space and covered area with proper floor to accommodate the following:
    - Dust & Damp-free space for storage of raw materials.
    - Manufacturing Activities.
    - Finishing, Assembly
    - Inspection and Testing.
    - Storing and dispatch of finished products.
  - 1.1.2 **M & P requirement:**

The following is the indicative list of Machineries and Plant to be available with the firm or its sub-vendor, as the case may be. The capacity of the machines shall be suitable for manufacturing the required job:

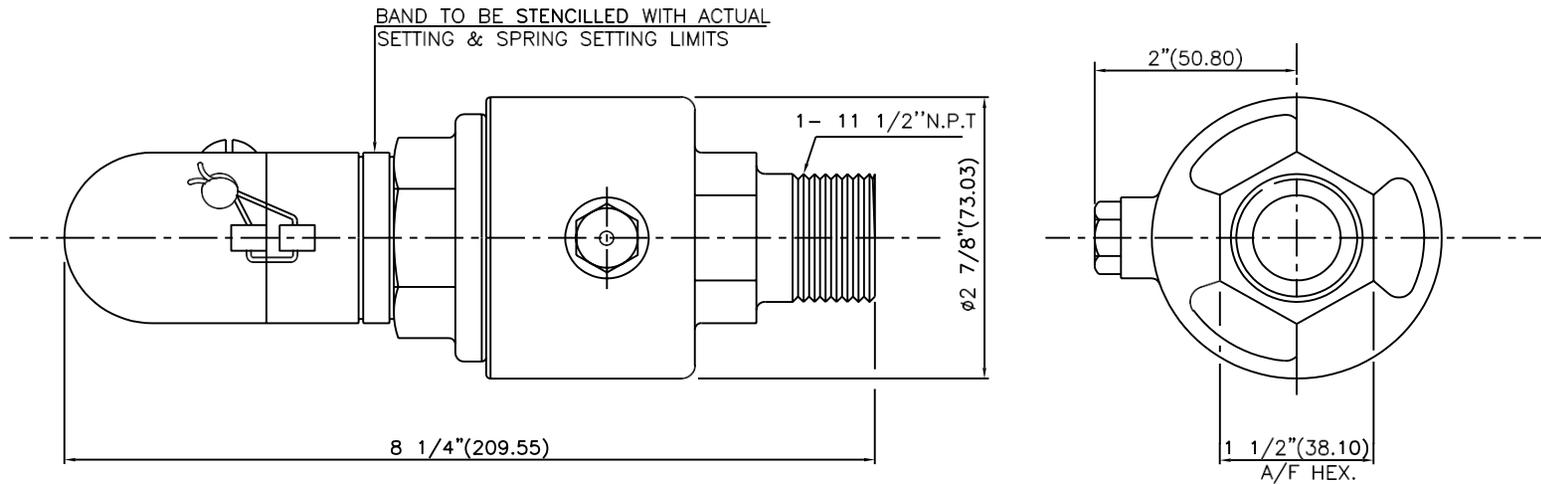
    - a) Machine(s) having facilities of Bending, Cutting, Machining, Punching, Lapping and shearing facility
    - b) Grinding Machine
    - c) Drilling Machine
    - d) Air compressor
    - e) Humidifier or other facility (For storage of Rubber items)
    - f) Painting Equipment
  - 1.1.3 **List of Measuring and Testing Equipment**

The firm shall have facilities and major equipment's needed for conducting test as follows:

    - a) Test Bench for Functional Testing of Brake Valves
    - b) Surface Table
    - c) Digital Vernier Caliper
    - d) Dial Gauge
    - e) Micrometer
    - f) Measuring tapes
    - g) Thread Plug Gauges
    - h) Ring Gauges
    - i) Steel Scale
    - j) Digital Weigh scale
    - k) Stop watch
    - l) Torque Wrench
    - m) Height Gauge
    - n) Depth Micrometer

## 1.2 **Quality Control Requirements**

- a) The manufacturer shall have a system of easy traceability of the product from raw material stage to finished product stage.
- b) The manufacturer shall have a system to ensure that Equipment's are checked dimensionally and functionally prior to release for production and records of these checks are maintained.
- c) The calibration of the Testing/Measuring Equipment's/Weighing machines should be done at least once in a year unless stated otherwise.
- d) The manufacturer shall have a system of review of rejections detailing rejection rate, cause of rejection, corrective action taken etc. on regular basis and records thereof should be maintained.
- e) The manufacturer shall have a system of documentation in respect of rejection at customer end, warranty replacement and failure of brake valve in service.
- f) The manufacturer should have a system of recording plant, machinery & control equipment remaining out of service, nature of repairs done etc.
- g) Latest versions of relevant specifications and drawings shall be available with the manufacturer.



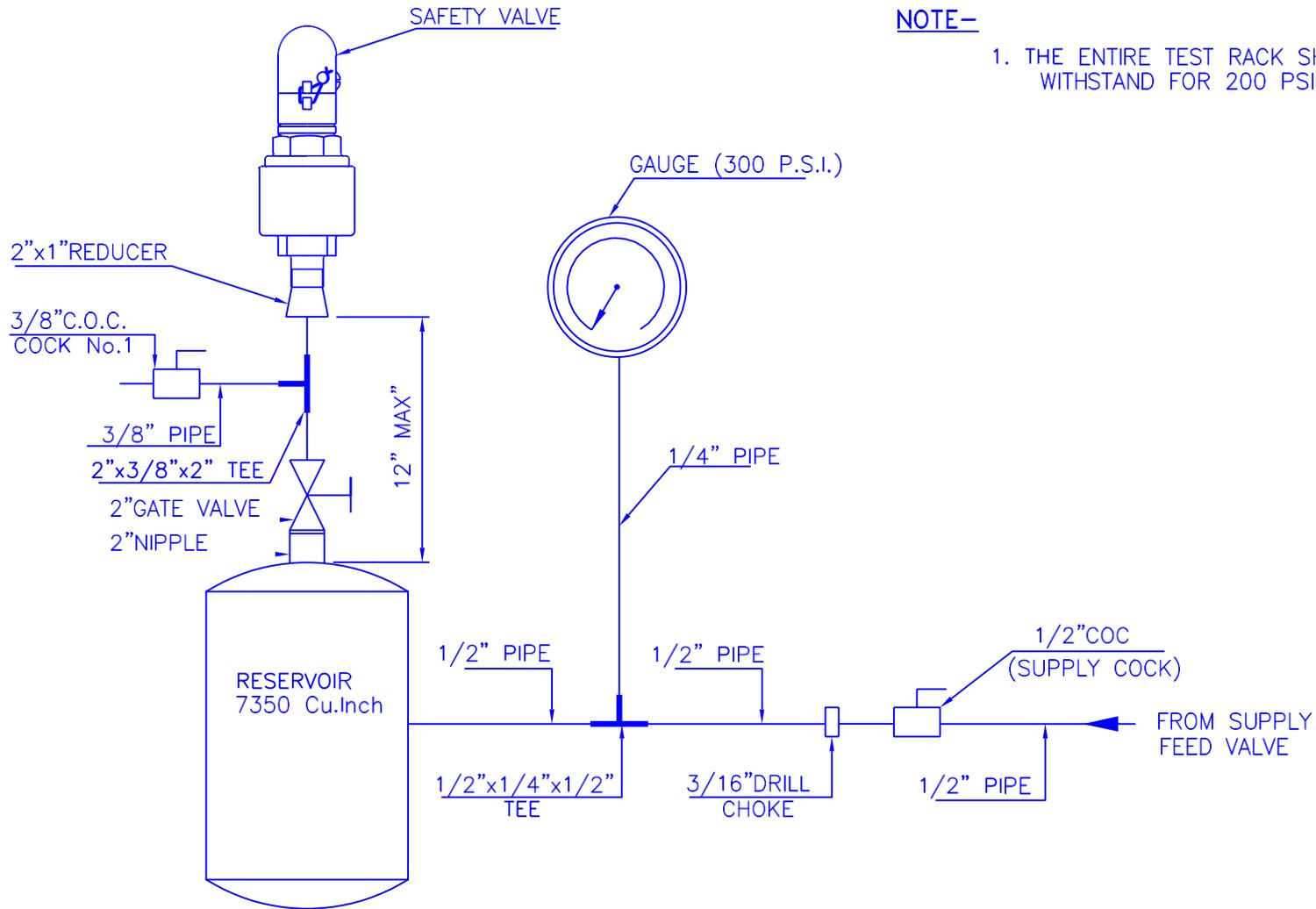
NOTES-

1. PIPE CONNECTION OPENINGS TO BE PLUGGED WITH PROTECTION CAP.
2. DIMENSIONS GIVEN IN BRACKET ARE IN mm.

D RAVI KANT  
C S.P.GOVIL  
APPD.  
DIR/BK  
Dt 02.2004

|     |               |          |             |          |      |                |                         |                   |
|-----|---------------|----------|-------------|----------|------|----------------|-------------------------|-------------------|
|     |               |          |             |          |      | APPLICABLE FOR | <b>J-1 SAFETY VALVE</b> |                   |
|     |               |          |             |          |      | DSL/ELEC.LOCO. | <b>(OUT LINE)</b>       |                   |
|     |               |          |             |          |      | SCALE          | REF:                    | FIRST ISSUED      |
|     |               |          |             |          |      | N.T.S.         |                         |                   |
|     |               |          |             |          |      | INDIAN RLYS    | DRG. NO.                | <b>SK.DP-3580</b> |
|     |               |          |             |          |      | RDSO (MP)      |                         |                   |
| ALT | NO. OF PLACES | REF. NO. | DESCRIPTION | ALT. NO. | SIGN | DATE           | SUPERSEDES              | SUPERSEDED BY     |
|     |               |          |             |          |      |                |                         |                   |

Specification for J-1 Safety valve for its use in brake system fitted on diesel and electric locomotives



NOTE-

1. THE ENTIRE TEST RACK SHALL BE SUITABLE TO WITHSTAND FOR 200 PSI WORKING PRESSURE.

TESTING RACK ARRANGEMENT FOR TESTING J-1 SAFETY VALVE

FIG. 1