(केवल कार्यालय प्रयोग हेतु)
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भारत सरकार रेल मंत्रालय

GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS

डीजल एवं इलेक्ट्रिक लोकोमोटिव के ब्रेक सिस्टम में प्रयोग हेतु डी–1 इमरजेन्सी ब्रेक वाल्व की विशिष्टि और तकनीकी आवश्यकताओ की अनुसूची

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

विशिष्टि संख्या एम.पी.0.01.00.13 (संशो.–02)
जून – 2024

SPECIFICATION NO. MP.0.01.00.13 (REV- 02)
June –2024

अनुसंधान अभिकल्प एवं मानक संगठन
लखनऊ –226 011
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, 5.6, 5.7,6.1,7.5	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.
			5.6	'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, 3.4.1, 4.1, 4.3,4.6,5.7,7.3 (now 7.2), 7.7 (now 7.6), 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.

CONTENTS

PART- A- Specification for D-1 Emergency brake valve for its use in brake system fitted on diesel and electric locomotives

PART -B - Schedule of Technical Requirements for D-1 Emergency brake valve for its use in brake system fitted on diesel and electric locomotives

PART -A

Specification for D-1 Emergency brake 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 D-1 emergency brake 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

2.1 Tenderer -means firm/company from whom the offer for the supply of this air brake equipment is invited.

2.2 Contractor- means the present firm/company on whom the order for the supply of this air brake equipment is placed.

2.3 Purchaser- means the Indian Railways on behalf of the President of the Republic of India who are purchasing this air brake equipment.

2.4 Inspecting Authority- means the organisation or its representative nominated by the purchaser to inspect this air brake equipment.

2.5 The Research Designs and Standards Organization, Manak Nagar, Lucknow- 226011 is hereafter referred to as RDSO.

2.6 Indian Railways is hereafter referred to as I R.

2.7 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 ºC to 55 ºC. The air temperature inside the equipment compartment may reach up to 70 ºC.
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

3.4.1 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 D-1 emergency brake 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 D-1 emergency brake 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 D-1 emergency brake 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 D-1 emergency brake 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 D-1 Emergency brake valve shall be suitable for the brake system provided on diesel and electric locomotives on Indian Railways.

5.2 D-1 Emergency brake valve should be able to apply brakes on train and locomotive in case of failure of automatic brake valve or in case of any emergency.

5.3 It should be lever operated and during operation it should be able to open the vacuum train pipe and the air brake pipe simultaneously to atmosphere. Both the vacuum and air brake pipe pressure should be in separate ports as indicated in RDSO drg No SKDP-2954.

5.4 It should have following port:

i) Port to connect it to brake pipe.
ii) Port to connect it to Vacuum Train Pipe.

The location and size of port are shown in RDSO drg. No.SK.DP-3573. The port numbers should be cast on the pipe bracket/valve body and should be clearly legible.

5.5 Proper heat treatment should be given to achieve required hardness on wearing components.

5.6 The general shape, envelop size and mounting dimension of D-1 Emergency brake valve shall be as per RDSO drawing No.SD.DP-3573. The brake valve should be fully interchangeable with respect to overall mounting dimensions & threads, with brake valves of existing approved design already fitted on locomotives.

5.7 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 brake valves should have minimum life of one and half year.

6. PERFORMANCE TEST:

6.1 D-1 emergency brake valve shall be tested on AB test rack or alternative arrangement conforming to AB test rack. However, the diagrammatic arrangement of AB test rack is shown in RDSO drawing. No. SK.DP- 2664. For testing of vacuum portion of the valve, additional attachment with the AB test rack or alternative arrangement would be required as shown in figure 1.

6.2 Test set up

6.2.1 Mount the valve on the test rack as shown in figure 1.

6.2.2 Maintain supply pressure to 90 Psi minimum.

6.2.3 The feed valve of the test rack should be set at 70 psi.

6.2.4 Exhauster unit should maintain at least 25” vacuum in the vacuum supply reservoir.

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

TABLE-1

Sl. No.	Test description	Standard values
1.	**LEAKAGE TEST** • Keep valve ‘A’ in position no. 8 and all cock in closed position. • Open cock 1. Move valve A handle to position no. 1 and charge brake pipe volume to 70 psi and do the following tests: **(i) Leakage in exhaust valve and “O” ring** • Allow 20 sec for temperature effect , then close cock 1 and note *B.P. line gauge*	*No psi drop in 15 sec.*
	• After above check move valve “A” handle to position no. 8 and check **(ii) Leakage in flapper valve and “O” ring** • Open cocks “X” and “Y”. • When 25” of vacuum is obtained on the vacuum line gauge • Close cock “Y” and note *Vacuum line gauge*	*No vacuum drop in 10 sec*
2.	**CAPACITY AND FUNCTION TEST** • Start the test with cocks “X” and 1 open and valve ‘A’ handle in position no. 8 • Close cock “X” and open cock “Y” • Move valve ‘A’ handle in position no. 1 • When BP volume charged to 70 psi , move valve A handle to position no. 3 • Pull flapper valve lever to open (application) position and note. *BP volume gauge pressure must drop to zero in*	*3 sec.max.*
	Vacuum line gauge vacuum must drop to zero in	*1 sec. Max.*
	• At completion of test move valve ‘A’ handle to position no. 8. • After all indications reduces to zero close all cocks and remove valve from the test rack	

7. Type and Routine Test

7.1 The brake valves shall be offered for type test. Any change in design found necessary during type test shall be carried out by the contractor free of cost to ensure satisfactory performance of the brake valve.

7.2 Type test shall be carried out on two samples of D-1 emergency brake valve. If RDSO/ Vendor Approving Agency feels necessary to conduct type test on some more units, the samples will be picked up at random for further validations of design and drawings. Following shall comprise type tests:

S.N	Test	Details
1.	Dimensional check	As per para 5.6
2.	Performance Test	As per para 6
3.	Vibrations and shocks	As per para 3.1.3
4.	Any other test specified in the approved QAP as well as desired by purchaser	As per QAP or as specified by the purchaser

7.3 Routine test (for regular Inspection) shall consist of visual check and performance test of D-1 emergency brake valve and these tests shall be done on all or sample of lot. Sampling shall be done as per IS 2500 (part 1). Details of routine test are as under;

S.N	Test	Details
1.	Dimensional check	As per para 5.6
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 brake valve fulfils the technical requirements conforming to existing approved design for D-1 emergency brake 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.

9.2 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.

PART – B

Schedule of Technical requirements for D-1 emergency brake 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.

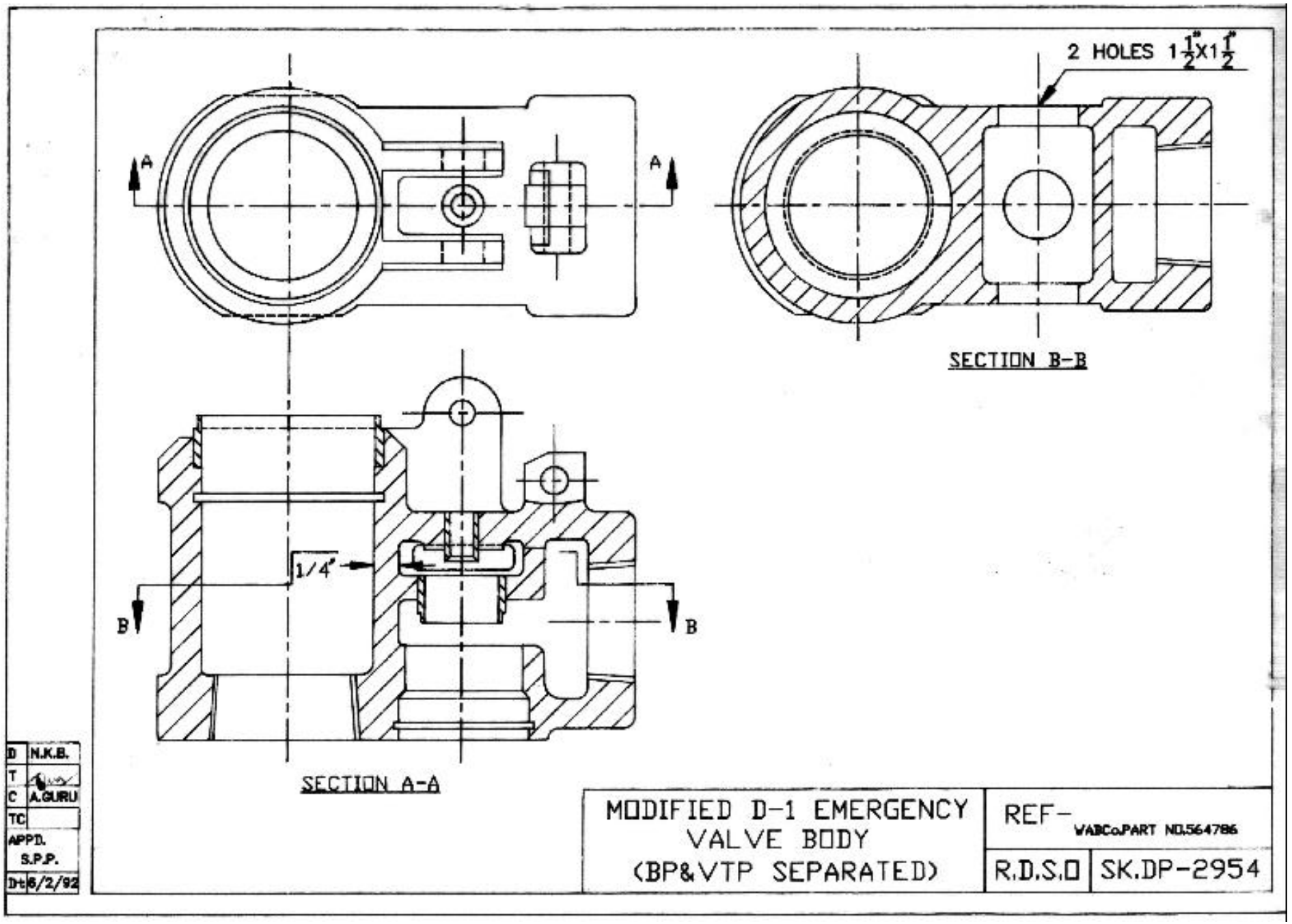
c) The calibration of the Testing/Measuring Equipment's/Weighing machines should be done at least once in a year unless stated otherwise.

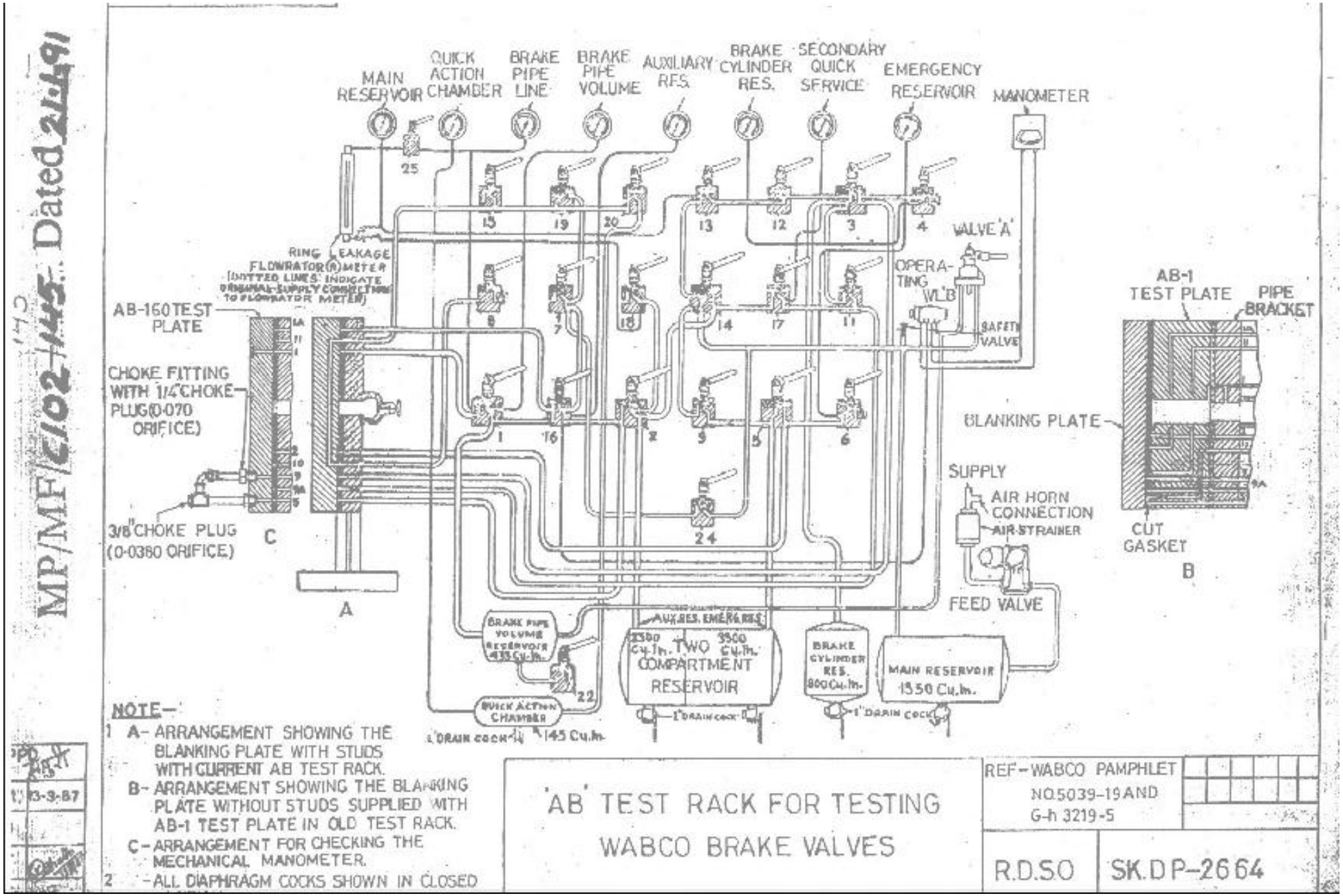
d) The manufacturer shall have a system of review of rejections detailing rejection rate, cause of rejection, corrective action taken etc. on regular basis and records thereof should be maintained.

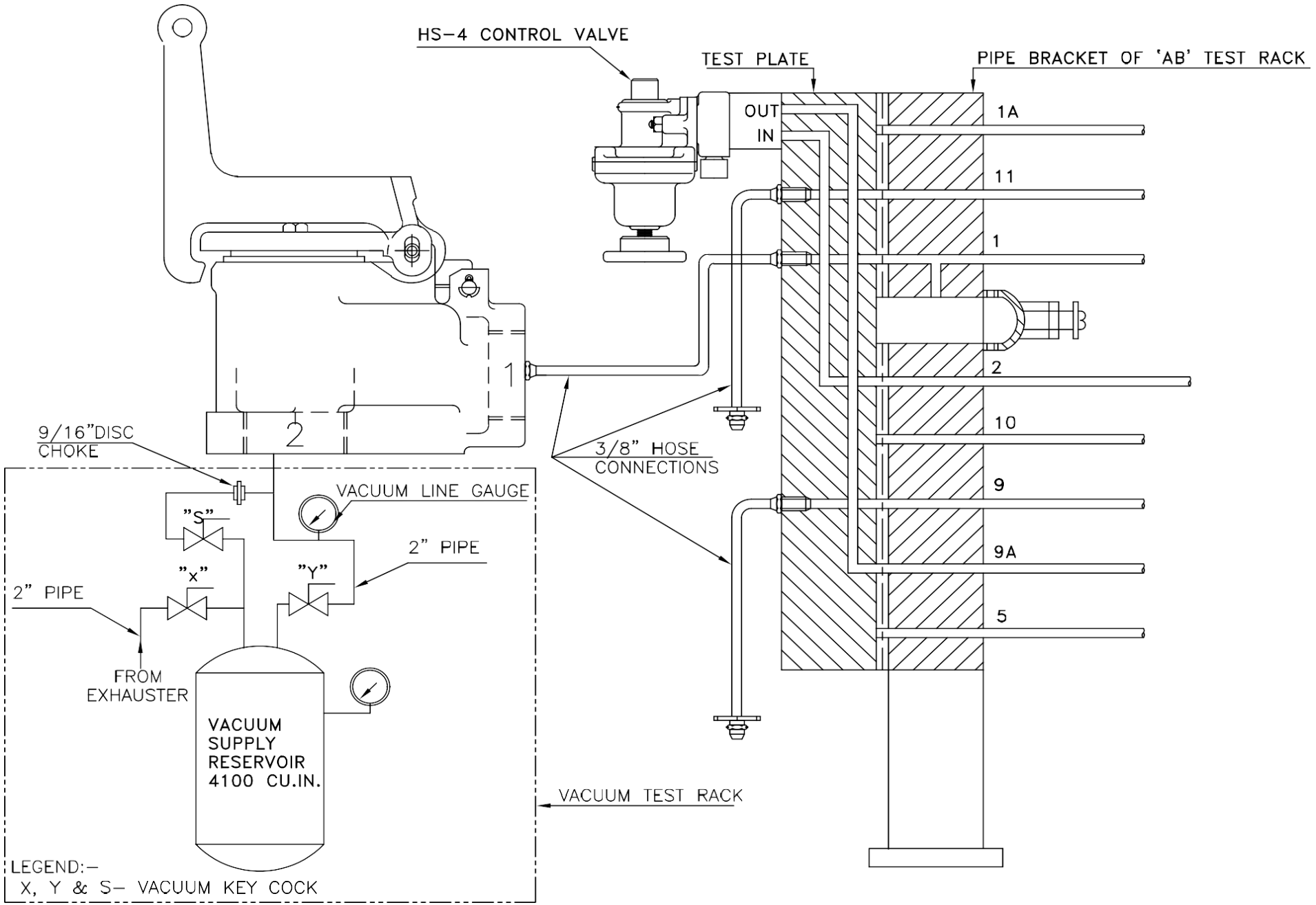
e) The manufacturer shall have a system of documentation in respect of rejection at customer end, warranty replacement and failure of brake valve in service.

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.

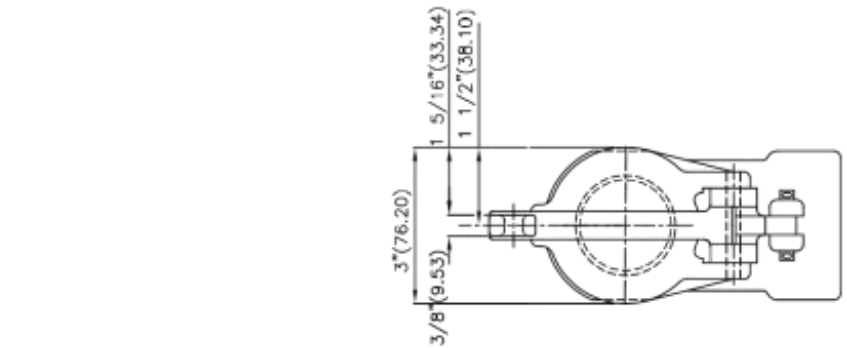

2 HOLES 1 1/2" X 1 1/2"
A
A
SECTION B-B
1/4"
B
B
SECTION A-A
D N.K.B.
T
C A.GURU
TC
APPD. S.P.P.
Dt 6/2/92
MODIFIED D-1 EMERGENCY VALVE BODY (BP&VTP SEPARATED)
REF- WABCo PART NO. 564786
R.D.S.O
SK.DP-2954


MP/MF/C102+145 Dated 21.4.91
MAIN RESERVOIR
QUICK ACTION CHAMBER
BRAKE PIPE LINE
BRAKE PIPE VOLUME
AUXILIARY RES.
BRAKE CYLINDER RES.
SECONDARY QUICK SERVICE
EMERGENCY RESERVOIR
MANOMETER
RING LEAKAGE FLOWRATOR(R) METER
(DOTTED LINES INDICATE ORIGINAL SUPPLY CONNECTION TO FLOWRATOR METER)
AB-160 TEST PLATE
CHOKE FITTING WITH 1/4" CHOKE PLUG (0-070 ORIFICE)
3/8" CHOKE PLUG (0-0380 ORIFICE)
C
A
VALVE 'A'
OPERATING VLB
SAFETY VALVE
BLANKING PLATE
AB-1 TEST PLATE
PIPE BRACKET
CUT GASKET
B
SUPPLY
AIR HORN CONNECTION
AIR STRAINER
FEED VALVE
BRAKE PIPE VOLUME RESERVOIR 435 Cu.In.
QUICK ACTION CHAMBER
1" DRAIN COCK
145 Cu.In.
AUX. RES. EMERG. RES.
3500 Cu.In. TWO 3500 Cu.In. COMPARTMENT RESERVOIR
1" DRAIN COCK
BRAKE CYLINDER RES. 900 Cu.In.
1" DRAIN COCK
MAIN RESERVOIR 1550 Cu.In.
NOTE:-
1 A- ARRANGEMENT SHOWING THE BLANKING PLATE WITH STUDS WITH CURRENT AB TEST RACK.
B- ARRANGEMENT SHOWING THE BLANKING PLATE WITHOUT STUDS SUPPLIED WITH AB-1 TEST PLATE IN OLD TEST RACK.
C- ARRANGEMENT FOR CHECKING THE MECHANICAL MANOMETER.
2 -ALL DIAPHRAGM COCKS SHOWN IN CLOSED
'AB' TEST RACK FOR TESTING WABCO BRAKE VALVES
REF-WABCO PAMPHLET NO.5039-19 AND G-h 3219-5
R.D.S.O
SK.D P-2664



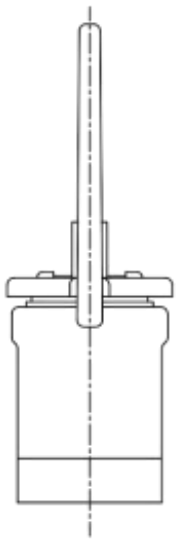
MOUNTING ARRANGEMENT OF THE VALVE ON TEST RACK

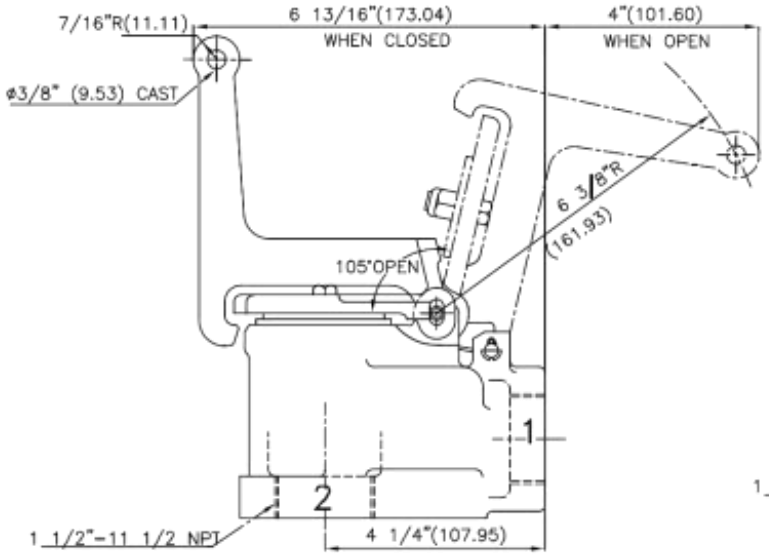
FIGURE–1

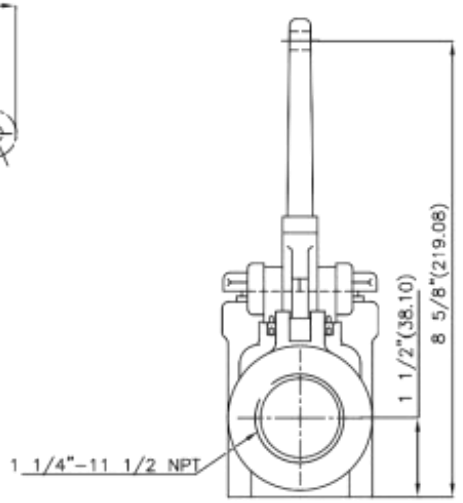


LEGEND:–

PORT NO.1. – BRAKE PIPE
PORT NO.2. – VACUUM BRAKE PIPE







NOTES:–

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

REF NO	I R PART NO	DESCRIPTION	NO OFF	WT(kg) EACH	MATL	SPEC

APPLICABLE FOR	DIESEL/ELECTRIC LOCOMOTIVE
SCALE N.T.S.	REF:
INDIAN RLYS	DRG. NO. SKDP 3573
RDSO (MP)	

D RAVI KANT
C SANJAI
APPD
DIR/BK
Dt 01.2004

SYMBOL	Ra um (MAX)	
	50	
▽	25	
▽▽	6.3	
▽▽▽	0.8	*SURFACE ROUGHNESS TO IS:3073
▽▽▽▽	0.1	WELDING SYMBOLS TO IS:813
		TOLERANCES ON UNTOLERANCED DIMENSIONS TO IS- 2101 ( )

ALT	NO. OF PLACES	REF. NO.	DESCRIPTION	ALT.NOTE NO.	SIGN	DATE

FIRST ISSUED
SUPERSEDES
SUPERSEDEDBY