

(For official use only)



भारत सरकार रेल मंत्रालय

GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS

डीजल एवं इलेक्ट्रिक लोकोमोटिव के ब्रेक सिस्टम में प्रयोग
हेतु वीए.1 रिलीज वाल्व की विशिष्टि

**SPECIFICATION FOR VA-1 RELEASE VALVE FOR ITS USE IN
BRAKE SYSTEM FITTED ON DIESEL AND ELECTRIC
LOCOMOTIVES**

विशिष्टि संख्या एम.पी.0.01.00.16(संशो.-0.00)
अप्रैल-2004

SPECIFICATION NO. MP.0.01.00.16(REV- 0.00)
APRIL -2004

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

CONTENTS

Sl. No.	Description	Page No.
1.	Scope	1
2.	Definitions	1
3.	General Conditions	1-4
4.	General Requirements	4-5
5.	Technical Requirements	6
6.	Performance Test	6-8
7.	Developmental Inspection	9
8.	Installation	9
9.	Technical Documents/Drawings	10
10.	Approval of Sub-contractors	9

Specification for VA-1 Release 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 VA-1 Release valve conforming to WABCO design (PC no.563510 & test specification no. T-2968-0). 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.

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:

- .1 Altitude : Mean sea levels to an altitude of 1000m.
- .2 Ambient temperature : -5 deg. C to 55 deg. C. The air temperature in-side the equipment compartment may reach up to 70 deg. C.
- .3 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 . The conditions are indicated below:

- .1 Maximum vertical acceleration 1.0g.
- .2 Maximum longitudinal acceleration 3.0g.
- .3 Maximum transverse acceleration 0.5g.
('g' being acceleration due to gravity)

3.2 The supplier shall have ISO-9000 series certification.

3.3 Warranty

3.3.1 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.

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

3.3.3 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.

3.3.4 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.

3.3.5 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.

3.4 After sales

3.4.1 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

3.4.2 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.

3.4.3 The contractor will impart training of working, operation and maintenance of the system to selected concerned personnels of Indian Railway.

3.5 Quality Audit

Periodical Quality audit will be carried out by RDSO to ascertain that procedure of manufacturing, inspection and testing of the equipment is being followed by the firm as per the approved QAP. Frequency of quality audit will be once in six months by concerned design Directorate of RDSO during developmental stage and thereafter normal procedure for quality audit shall be followed as mentioned in vendor approval/vendor registration guidelines and application form no. MP/01-2003 of RDSO.

3.6 Training

Sufficient number of technicians/engineers/officers shall be trained in consultation with the purchaser/RDSO 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.

3.7 Deviations

- 3.7.1 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.
- 3.7.2 The final decision regarding the acceptance of the deviations submitted by the contractor shall be at the discretion of the purchaser.
- 3.7.3 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 VA-1 Release valve for the use in brake system of diesel and electric locomotives shall register themselves with RDSO.
- 4.2 Manufacturer shall provide sufficient evidence of their capability in support of the technology of manufacturing VA-1 Release valve conforming to Wabco design in view of the interchangeability of the components/assembly.
- 4.3 The manufacturer shall submit three complete sets of manufacturing drawings of VA-1 Release valve to RDSO. 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 WABCO design.
- 4.5 The manufacturer shall have adequate facilities for the manufacturing, assembly and testing of VA-1 Release valve conforming to WABCO design. The manufacturers shall also have facilities for inspection and testing of individual components and sub-assembly conforming to WABCO requirements.
- 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 which shall consist of the following:
 - .1 Organisation chart emphasising quality control set-up.
 - .2 Qualification of key personals and the officials deployed in quality control cell.
 - .3 Process flow chart indicating process of manufacture for an individual product or for a family of products if the process is same.
 - .4 Stage inspection detailing inspection procedure, inspection parameters, method of testing/test procedure including sample sizes for destructive and non-destructive testing etc.
 - .5 Details of sublet vendors-

- The name of components for which it is approved.
- Sublet vendor approving agency.
- Inspection criteria at sublet vendor's premises.

.6 Quality assurance system- Inspection & Testing Plan. This shall cover the following:

- Incoming material.
- Process control
- Product control
- System control

The general format for this should be as below:

Subject/product/ process	Sample size & its frequency of inspection	Parameters for inspection	Mode of insp./equip. used.	Acceptance limits/Criteria/ specified value	Rejection details Reprocessed/ scrapped

.7 QAP covering all the information as asked above must be given in the form of single document indicating name of the firm and page number on each page. Each page should be signed by QC in-charge.

.8 Firm will submit a copy of QAP to RDSO for its approval.

.9 Seven copies of the approved QAP will be given to RDSO.

4.7 Under any of the following conditions, the QAP is required to be revised.

- Change in Quality Control Organisation Set-up.
- Change of official working in Quality Control Organisation.
- Change in machines, which may affect the process/method/mode of production.
- Change of conventional machines by CNC machines.
- Change in control over incoming material such as,
Sublet vendor
Inspection Criteria
- Change in control over process.
- Change in control over product.
- Change in control over system.
- Addition of any corrective action taken to improve the system by the vendor.
- Alterations suggested by RDSO in the intervening period since last approval.

5. TECHNICAL REQUIREMENTS:

- 5.1 The VA-1 Release valve shall be suitable for brake system provided on diesel and electric locomotives on Indian Railways.
- 5.2 The VA-1 Release valve shall be able to connect the vacuum train pipe and VA1B Control valve in “lead” position of MU-2B valve.
- 5.3 In “trail” position of MU-2B valve the VA-1 Release valve shall remain closed at all times and shall open only during release of brakes by drivers automatic brake valve.
- 5.6 The VA-1 Release shall have following ports:
- i) Port No. 1- Leads to the VA-1B Control valve.
 - ii) Port No. 2- Leads to the vacuum train pipe.
 - iii) Port No. 3- Leads to an auxillary device that supplies air to unseat the valve stem

The location and size of port are shown in RDSO drawing. no. SK.DP-3583 . The marking of ports “1, 2 & 3” shall be cast on the valve body and should be clearly visible.

- 5.7 Proper heat treatment shall be given to attain required hardness on wearing components.
- 5.8 The general shape, envelope size and mounting dimension of the VA-1 Release valve shall be as per RDSO drawing no. SK.DP-3583. The VA-1 Release valve should be fully interchangeable with respect to overall mounting dimensions, threads, individual components, including rubber kits and springs with valves of original manufacturer i.e. WABCO design.
- 5.9 Rubber components shall be procured from RDSO approved sources and shall also conform to IRS.R-48-88 or to WABCO rubber specification. All rubber components used in the safety valves shall have minimum life of one and half year.

6. PERFORMANCE TEST:

- 6.1 The VA-1 Release valve shall be tested on WABCO AB test rack or alternative arrangement conforming to AB test rack. However, the diagrammatic arrangement of WABCO AB test rack is shown in RDSO drawing. No. SK.DP-2664.

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 at least 140 psi.
- 6.2.3 The feed valve of the test rack should be set at 120 psi.
- 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>LEAKAGE TEST</p> <ul style="list-style-type: none"> Start the test with all cocks in closed position and valve “A” handle in position no. 8. <p>(i) Leakage in Gasket & Casting</p> <ul style="list-style-type: none"> Open cock 1 & 5. Move valve “A” handle to position No. 1. Partially open cock 9 and charge emergency reservoir to 40psi & then close cock 9 and Note <i>Leakage in entire valve portion by applying soap solution</i> <p>(ii) Leakage through ‘O’ ring</p> <ul style="list-style-type: none"> Close cock 5. Open cock 6 and Note <i>Leakage through Cock 6 with leak test fitting</i> Move valve “A” handle to position No. 8. Open Cock 3. <p>(iii) Leakage in Check valve Seal</p> <ul style="list-style-type: none"> Partly open cock 13, and charge Brake cylinder reservoir line to 7psi, then close cock 13 and Note <i>Leakage through Cock 6 with leak test fitting</i> Open cock 9. Close cock 3 and 6. Remove hose connection from port 1 of the Release valve 	<p><i>No Leakage</i></p> <p><i>No float rise in Flowrator meter</i></p> <p><i>No float rise in Flowrator meter</i></p>
2.	<p>Check Valve Spring Test</p> <ul style="list-style-type: none"> Start the test with cocks 1 and 9 open Move valve “A” handle in position no. 8 & do the following test <p>a) Opening of Valve</p> <ul style="list-style-type: none"> Move valve “A” handle in position No. 2 and observe through Port No. 1 that <i>Piston starts moving when Brake Pipe Reservoir Gauge shows</i> <i>And continues to move its full travel when Brake Pipe Reservoir Gauge shows</i> <p>b) Closing of valve</p> <ul style="list-style-type: none"> Allow Brake pipe reservoir to charge to 65 psi Move valve “A” handle in position No.5, and observe through Port No. 1 that <i>Check valve seats when Brake Pipe Res. Gauge shows</i> <p>Completion of test</p> <ul style="list-style-type: none"> Move valve “A” handle to position no. 8. After all the test rack gauge indications have decreased to zero psi close all test rack cocks. Remove the valve from the test rack. 	<p><i>47psi to 56psi</i></p> <p><i>57psi to 66psi</i></p> <p><i>41psi to 48psi</i></p>

7. Developmental inspection

- 7.1 The valve/equipment shall be offered for stages & final inspection for approval. Any change in design found necessary during inspection shall be carried out by the contractor free of cost to ensure satisfactory performance of the reducing valve.
- 7.2 The inspection of the valve/equipment shall be carried out by Motive Power Directorate of RDSO during developmental stage, at the contractor's premises during the manufacture and before despatch. Timely intimation (at least 2 weeks notice) should be given to the inspecting authorities.
- 7.3 The reducing valve will be checked as per para 6 of specification for performance test. For this purpose the contractor will provide the inspecting authority copies of test specification, inspection schedule and drawings free of cost.
- 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 reducing valve fulfils the technical requirements conforming to WABCO design for VA-1 Release valve.
- 7.6 If endurance test for components and sub-assemblies is required by RDSO, Lucknow, 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. Performance during field trials will be monitored at least for one year before giving final approval.

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 (5 copies) shall be submitted along with the offer:-

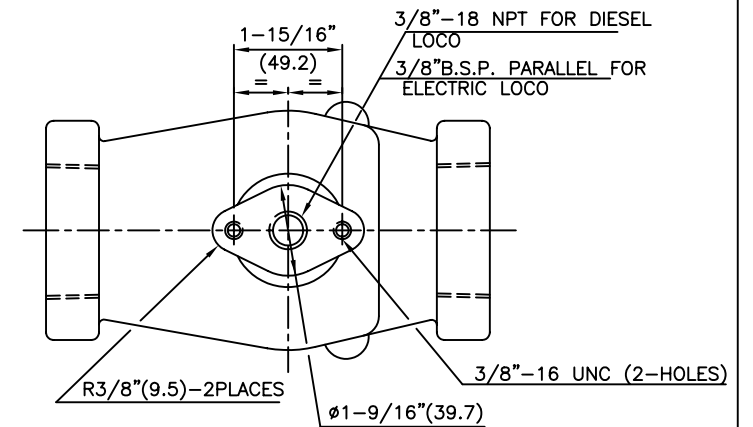
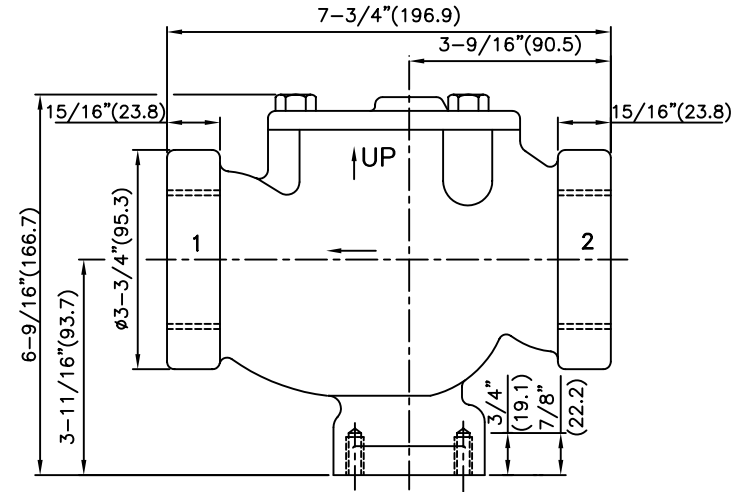
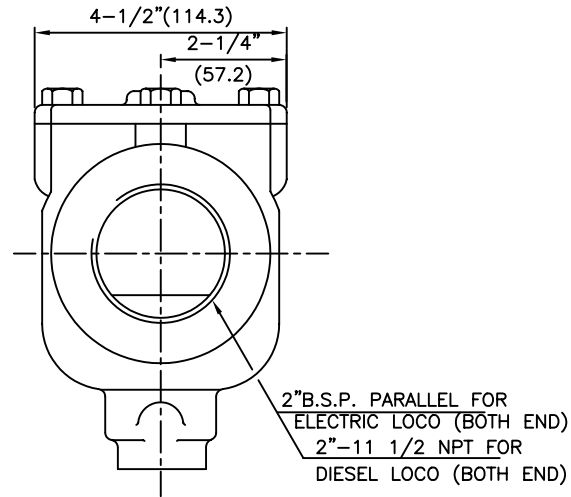
- .1 List of equipment with part catalogue numbers and drawing numbers.
- .2 Technical literature covering design and principle of operation, to have a general idea of the valve/equipment offered.
- .3 Detailed dimensional drawings indicating mounting arrangements, layout of valves, sub-assemblies etc.
- .4 Clausewise 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 & routine test specification and test reports.

10. Approval of Sub-Contractors

The firm shall obtain components, sub-assemblies and assemblies from sources approved by RDSO.



LEGEND

PORT NO. 1	LEAD TO VA-1B CONTROL VALVE
PORT NO. 2	LEAD TO VACUUM TRAIN PIPE
PORT NO. 3	LEAD TO TO CONTROL PIPE

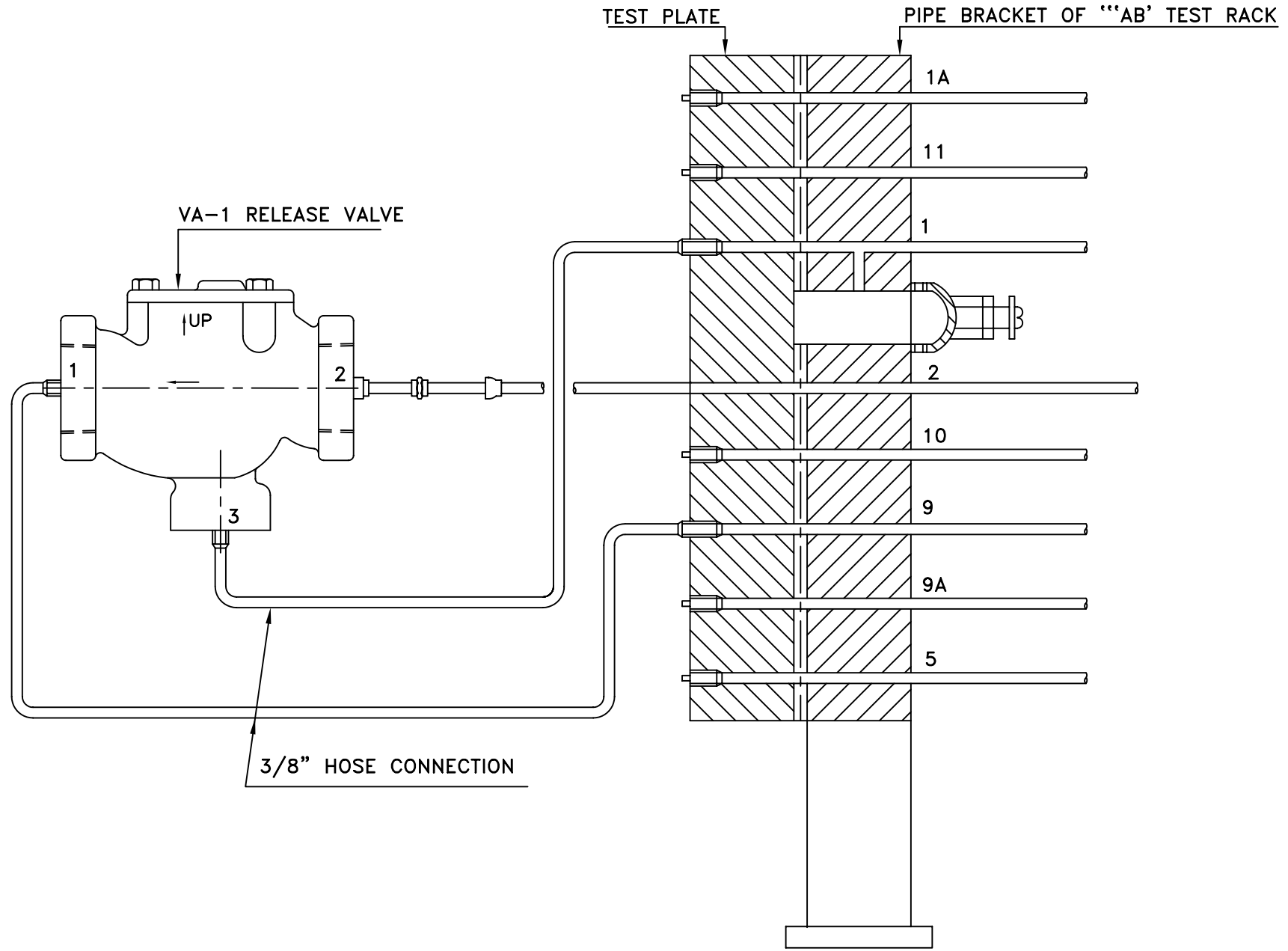
NOTES-

1. PIPE CONNECTION OPENINGS TO BE PLUGGED WITH PROTECTION CAP.
2. DIMENSIONS GIVEN IN BRACKET ARE IN mm.
3. APPROXIMATE WEIGHT = 7.750 Kg

D	RAVI KANT
C	S.P.GOVIL
APPD	
DIR/MP	
Dt	04.2004

DATE	ALT	DESCRIPTION	ALT. NOTE NO.	SIGN
------	-----	-------------	---------------	------

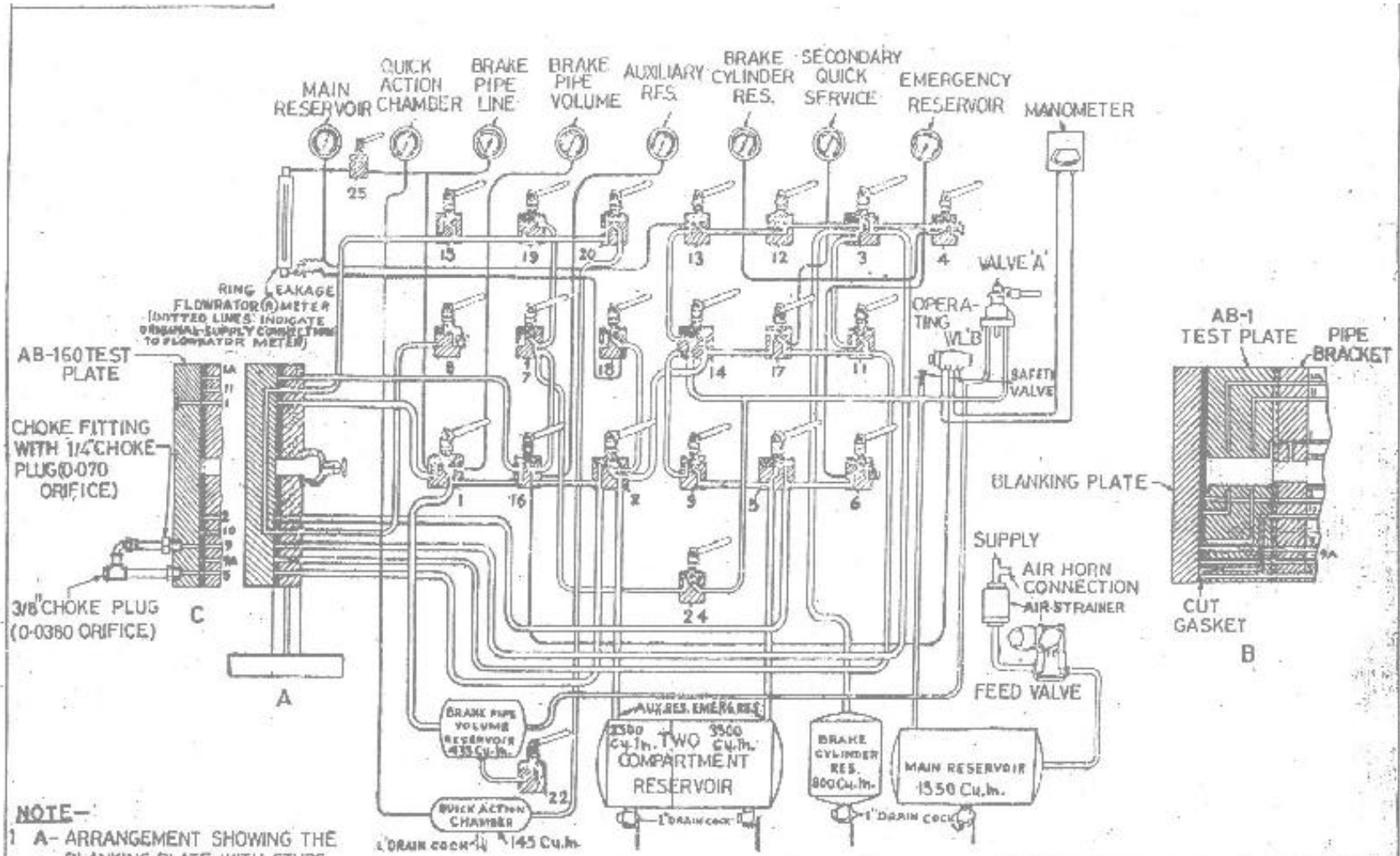
APPLICABLE FOR DSL/ELEC. LOCOMOTIVE	VA-1 RELEASE VALVE (OUT LINE)	FIRST ISSUED
SCALE N.T.S.	REF:	SUPERSEDES
INDIAN RLYS RDSO (MP)	DRG. NO. SK.DP-3583	SUPERSEDED BY



MOUNTING ARRANGEMENT OF THE VALVE ON TEST RACK

Fig.-1

14C
 MP/MF/C102-145 Dated 2-1-69



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.50	SK.DP-2664

3-9-87
 14C