सत्यमेव जयते

GOVERNMENT OF INDIA
Ministry of Railways



IOH-MAINTENANCE GUIDELINES FOR VVN COACHES
IRCAMTECH/GWL/MECH/P/JULY 2021

अअमा संRDS
रेल अग्रदूत Transforming Railways

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EXCELLENCE IN MAINTENANCE

Indian Railways
Centre for Advanced Maintenance Technology

Maharajpur, Gwalior – 474005 (INDIA)
Ph: 0751 -2470803 & Fax: 0751 -2470841

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FOREWORD

These guidelines have been prepared for the guidance of staff dealing with repair and maintenance of Rail Milk Tank (RMT van) for transportation of Liquid Milk. The purpose of this document is to lay down guidelines for easy maintainability and effective use of the fleet of RMT Vans with minimum or zero breakdown en-route, thus increasing the efficiency of Bulk movement of Milk through RMT Vans.

Taking into account the large territory covered by the Indian Railways and geographic, climatic and other variations, some local variation in practices and procedures are inescapable. To this extent these guidelines should be supplemented by detailed maintenance instructions issued by individual zonal railways in the form of workshop orders & carriage circulars, technical standing orders etc. it is also to be noted that this basically adds to all existing instructions issued by Railway Board, CAMTECH, RDSO and IRCA in regard to repairs and maintenance of coaching stock taking into account special requirements of RMT Vans. Such instruction must be referred to when required.

Statutory provisions and instructions in the general rules and various codes are to be followed and remain unaffected by the issue of these guidelines.

RDSO, Lucknow **Jitendra Singh**
Date: **Principal Executive Director**

PREFACE

The purpose to issue IOH guideline is to enhance knowledge and competence of C&W staff in dealing with.

This Booklet is aimed at assisting concerned staff and does not supersede any existing instructions from Railway Board, RDSO, IRCA or OEMs etc. Most of data and information mentioned herein are available in some form the other in various books and OEMs manuals.

Technological up gradation and learning is a continuous process. Hence feel free to write us any addition / modification in this handbook or in case you have any suggestion to improve the handbook. Your contribution in this direction will be appreciated.

We welcome any suggestion for addition and improvements from our readers.

CAMTECH, Gwalior **Manoj Kumar**
Date: **Director /Mechanical**

QUALITY POLICY

"To develop safe, modern and cost effective Railway Technology complying with Statutory and Regulatory requirements, through excellence in Research, Designs and Standards and Continual improvements in Quality Management System to cater to growing demand of passenger and freight traffic on the railways".

OUR OBJECTIVE

To upgrade maintenance technologies and methodologies and achieve improvement in productivity and performance of all Railway assets and manpower which inter-alia would cover reliability, availability, utilization and efficiency.

CAMTECH is continuing its efforts in the documentation and upgradation of information on maintenance practices of railway assets. Over the years a large number of publications on railway assets have been prepared in the form of handbooks, pocket books, pamphlets & video films etc. These publications have been uploaded on the internet as well as on rail net.

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Director/ Mechanical

Landline: 0751-2470890

CUG: 9752447040

E Mail: dirmech@gmail.com

Fax: 0751-2470841

Write us at:

Director (Mechanical)

Indian Railways Centre for Advanced Maintenance Technology

In front of Hotel Adityaz, Airport

Maharajpur, Gwalior (M.P.), Pin code- 474005

AMENDMENT AND REVISIONS

Version No.	Date	Corrections	Remarks
1.0		First release	------

ABBREVIATIONS

VVN	Milk Van Air Braked
IOH	Intermediate Over Hauling
BSS	Bogie Secondary Suspension
EOT CRANES	Electric Overhead Traveling Crane
RMT VANS	Rail Milk Tank Vans
SAB	Slack Adjuster Barrel
CBC	Centre Buffer Coupler
NRV	Non Return Valve
AR	Auxiliary Reservoir
DV	Distributor Valve
QRV	Quick Release Valve
CR	Control Reservoir
LSD	Load Sensing Device
VTR VALVE	Veteran Tire and Rubber Valve
BC	Brake Cylinder
SWTR	Single Wagon Test Rig
BMBS	Bogie Mounted Brake System

1. INTRODUCTION

Guidelines contained as per Railway Board Letter No. 2007/M(C)/141/1 dated 28.06.2011 stipulate that OCVs forming a part of standard composition of Mail/Express trains shall be undertaken for IOH/POH at an interval of 9/18 months. Rail Milk Tankers fall under this category and are to be dealt with for IOH/POH accordingly.

2. DESCRIPTION

- A routine IOH should be given to all RMT vans an interval of 9 months in line with other ICF coaching stocks at nominated depot as per details given below:
- Milk Van are required to be detached from the rake and taken to the sick line for examination and repairs.
- Maintenance of RMT shall be carried out strictly as per Maintenance Manual of BG ICF coaching stock issued by CAMTECH and as per particular specifications of RMT van No. RSD-Milk-6410-2013 Version 2 or latest.
- Unit exchanged of overhauled bogie supplied by the workshops must be ensured. In case a logistical issued involved in transporting assembled bogie because of the workshop being far away from the base depot, the bogie may be attended for IOH in the depots with mandatory replacement of overhauled wheel sets supplied by workshop.
- Each Vans requires undergoing IOH individually. The important points generally to look into and other details of IOH procedure as in maintenance manual of ICF coach design issued by CAMTECH.

3. DETACHMENT PROCEDURE OF SINGLE VVN:

The activities performed to detach a milk van with air brake system are as under-

S.No.	Activities	Trip	Monthly	Quarterly	IOH
1.	Safety precautions shall be taken to prevent injury while detaching/ attaching a milk van.	✓	✓	✓	✓
2.	Remove the clamps on the cut off angle cocks. Close the Cut Off angle cock of both feed pipe and brake pipe on both sides of the milk van feed and brake that has to be detached.	✓	✓	✓	✓
3.	Close the cut off angle cocks of the feed and brake pipe of adjacent milk vans. This is to ensure that the air pressure locked up in the air hose coupling gets vented to atmosphere through the vent hole of the cut off angle cock.	✓	✓	✓	✓
4.	Observe above mentioned safety measures to close all the four cut off angle cocks on either side of the milk van to be detached so that while opening air hose coupling, it may not cause injury due to air pressure inside.	✓	✓	✓	✓
5.	Release the brake of the milk van to be detached by pulling the manual release lever of the distributor valve.	✓	✓	✓	✓
6.	Open the feed pipe and Brake pipe hose coupling from both side of the milk van.	✓	✓	✓	✓
7.	If the air pressure of the brake cylinder does not vent by pulling the manual release valve of distributor valve, Open the brake	✓	✓	✓	✓

	cylinder vent plug to drain the air pressure				
8.	Uncouple screw coupling and detach the milk van.				✓
9.	Observe all other safety measures as prescribed.	✓	✓	✓	✓
The following items of work should be attended during IOH.					
4. MAINTENANCE OF AIR BRAKE SYSTEM:					
1.	Check brake cylinder for loose rocker arm plate and change on Bogie Mounted system.	✓	✓	✓	✓
2.	Brake cylinder should be checked for smooth functioning and prescribed stroke. Defective brake cylinders shall be sent for repairs.	✓	✓	✓	✓
3.	Test BP & FP air pressure measuring gauges with master gauge and replace if found defective. A set of two master gauges should be kept for this purpose at every Primary Maintenance Depot and each master gauge should be sent one after the other to the base workshops for testing, repairs and calibration.	✓	✓	✓	✓
4.	Thoroughly clean Dirt collector filter in Kerosene or replace on condition basis.			✓	✓
5. MAINTENANCE OF OTHER ASSEMBLIES:					
1.	All items of schedule 'B'			✓	✓

2.	Thorough repair of running gear including running out of bogies where considered necessary. Bogie which are working on train earning more than nine months must be run out and unit exchanged with overhauled bogie received from workshop.				✓
3.	Touching up damaged paint of Milk Van on outside as well as Bottom side.	✓	✓	✓	✓
4.	Thorough cleaning and removal of dust, dirt, rust, etc., accumulated at the pillars through the turn under holes, with coir brush and compressed air.			✓	✓
5.	Thorough checking and full repairs of Milk Van's body made with SS metal and the arrangement by which temperature to be maintained under 4°C to preserve the Milk.				✓
6.	Drain holes provided in the floors should be kept clean and unclogged. If during the cleaning of these drains holes any accumulation of water is observed, the affected area should be very carefully inspected for possible corrosion.	✓	✓	✓	✓
7.	The date of intermediate lifting should then be stencilled at the appropriate place in schedule chart on the end panel.	✓	✓	✓	✓

6. ACTIVITIES OF IOH SCHEDULE:

Bogie which are working on train rake earning more than nine months must be run out and unit exchanged with overhauled bogie received from workshop. In this case bogie must be changed in milk van and following activities should be carried out-

- Measurement of all dimensions to be kept for history card.
- Precautions of lifting the body and run out the bogie.
- Thoroughly examined to bogie which has been received from workshop.
- Thoroughly examination of safety items and changes if required.
- Fitment of Bogie.
- Slack adjuster
- Shock Absorbers
- Suspension helical Springs
- Draft gears
- buffing gears
- Testing Method of Brake cylinder.
- Maintenance of Air Brake Equipments.
- Load sensing device.
- Testing of VVN in empty condition.
- Testing of VVN in Loaded condition.
- Single VVN testing

6.1 Measurement of all dimensions to be kept for history card.

1.	Buffer Height	✓	✓	✓	✓
2.	A-Clearance	✓	✓	✓	✓
3.	B-Clearance	✓	✓	✓	✓
4.	C-Clearance	✓	✓	✓	✓
5.	Wheel dia & wheel distance measurement			✓	✓
6.	Dashpot safety loop clearance.	✓	✓	✓	✓
7.	Buffer projection			✓	✓
8.	'A' dimension-27.5mm	✓	✓	✓	✓
9.	Spring free height (Loaded/unloaded)			✓	✓

10.	Side bearer machined steel wearing plate (12.5mm thickness & condemning size to wear more than 1.5mm) & Bronze wearing piece with a spherical to surface (36mm thickness)				✓
11.	(As per Drg. No. RDSO ©, sketch 65244 alt-2)				✓
12.	Wearing plate-12.5x220x100mm				✓
13.	Housing size-70x270x200mm				✓
14.	Distance between side bearers-1200±1				✓
6.2 Measurement of Inclined BSS hanger and BSS stone.					
1.	For hanger block-ICF Drg. no. EMU/M-0-5-006, alt-2, item1.				✓
2.	For hanger- Drg. No.-EMU/M-0-5-041, alt-3, item-1 confirming RDSO- spec.no. CK-105 amendment no-2				✓
3.	For Pin Drg. No. EMU/M-0-5-007, alt-3, itme-3				✓
4.	Centre Pivot measurement.				✓
5.	For hanger block-ICF Drg. no. EMU/M-0-5-006, alt-2, item1.				✓
6.3 Precautions of lifting the body and run out the bogie.					
1.	Make sure to putting the wooden wedges under the wheel of milk van.				✓
2.	All pneumatic pipe line connection should be disconnected including brake cylinder.				✓
3.	Remove Cotter of Centre Pivot gently.				✓
4.	EOT crane to be operated by skilled operator.				✓
5.	Match the shackles at stencilled mark.				✓

6.	Lift the body of Milk Van and run out the bogie (received from Work shop)				✓
6.4 Thoroughly examined to bogie which has been received from workshop.					
1.	Bogie received from work shop to be examined thoroughly. All safety items must be checked and ensure to functional condition.				✓
2.	Thoroughly check of Bogie frame, Transom, Longitudinal and Cross bar, Anchor link, Equalizing stay rod, Centre pivot housing, side bearer housing, Dashpot assembly, safety wire rope, Primary suspension helical spring, Secondary suspension helical spring, Primary safety loop and Secondary safety loop, Lower plank and upper plank of bolster, Axle and wheel assembly, Axle box front cover, axle box wing and wheel profile etc.			✓	✓
6.5 Thoroughly examination of safety items and change if required.					
Check the function of Brake cylinder, anchor link, equalising stay rod, condition of safety wire rope, Brake beam hanger, Brake shoe, Brake block, various type of nut-bolt, cotters, split pins, other pins, Bushes, hytral packing, inspection of welding joints, greasing of centre pivot, Brake cylinder barrel and piston and other rotating and moveable parts where required.					
6.6 Fitment of Bogie.					
1.	Removing run out the old bogie and replaced new bogie received from workshop.				✓
2.	Match the centre pivot and feed fresh yantrol-100 oil in side bearer.				✓

3.	Place the body on bogie and make sure match should be perfect of centre pivot and its housing.				✓
4.	Place the centre pivot cotter accordingly.				✓
5.	Connect the pneumatic system and hoses at their place.				✓
6.	Take it away the shackles of EOT crane.				✓
7.	Release the wooden wedges.				✓
6.7 Slack adjuster:					
1.	Make sure the hand brake and air brake are fully released and the whole rigging is in proper order.	✓	✓	✓	✓
2.	Make 3 or 4 brake applications at correct air pressure to ease the rigging.	✓	✓	✓	✓
3.	Once again make sure that the whole rigging is in the fully released position. The installation cannot be correctly adjusted or checked if the brake rigging is only partially released.	✓	✓	✓	✓
4.	Now the set dimension 'A' between the control rod head and barrel, this is 27.5mm for the milk tank Van.	✓	✓	✓	✓
5.	To check proper function of SAB, the control rods of both the slack adjusters are connected by means of a common pin. Remove this pin in order to detach the control rods and rotate to suit. Refit the control rods and pin when dimension 'A' is 27.5mm for both the slack adjusters.	✓	✓	✓	✓
6.	Make a few more brake applications at the correct air, this time for checking piston strokes which should	✓	✓	✓	✓

	be within the limits specified. Also re-check dimension 'A' again with brake fully released and correct if necessary.				
7.	A long piston stroke may be caused by free lift or defective cylinder or damaged brake rigging.	✓	✓	✓	✓
8.	A short stroke may be caused by low air pressure or defective air brake cylinder or by defects/damage in rigging	✓	✓	✓	✓

6.8 Shock Absorbers:

Check the fitment and torque of double acting hydraulic shock absorbers with capacity of ±900 kg at a speed of 10cm/s are fitted to work in parallel with the bolster springs to provide damping for vertical oscillations.

6.9 Suspension helical spring:

In the VVN bogie, helical spring are used for suspension and maintain its centre less ground to tolerance as per Drg. No. RDSO Sketch 76159. Although spring being provided by the workshop with ready IOH bogie and group wise record (A-yellow, B- oxford blue, C- green) already being kept by workshop bogie section.

6.10 Draft gears:

1.	Check the draw hook for scale, rust, work hardened.	✓	✓	✓	✓
2.	Check draw bar for dimensional distortion and damaged threads.	✓	✓	✓	✓
3.	Check draft key for bending and wear.	✓	✓	✓	✓
4.	Rubber draft pads should check at each IOH.				✓
5.	Draft yoke is carried out detailed inspection after removal and cleaning for				✓

	welding cracks, distortion and wear.				
6.	Draw gear pin replace if found damaged.				✓
7.	Maintain length of draw hook 682mm			✓	✓
8.	If RMT equipped with High tensile tight lock transition coupler with draft gear to RDSO specification No. RDSO/2009/CG-22 and coupler mounting arrangement shall be done on under frame and shall confirm RDSO drawing NO. CG-K4012, shall maintenance as per CBC chapter 5 of CAMTECH manual for AC LHB coaches.				✓
6.11 Buffing gears:					
1.	Take out split pin and unscrew nuts holding buffer casing with underframe, headstock and remove buffer assembly from the VVN.				✓
2.	Remove split cotter and nut from buffer spindle and separate buffer plunger from casing and take out all components for inspection.				✓
3.	Clean the components by any suitable method thoroughly before inspection and check for cracks, distortion, wear, corrosion and pitting.				✓
4.	Maintain the length of buffer plunger 452mm				✓
6.12 Testing Method of Brake cylinder:					
1.	To set brake cylinder stroke at 90+10mm		✓	✓	✓
2.	To stable brake cylinder pressure at 0.8±0.1 kg/cm2 and to check pressure drop with the help of pressure gauge which is not more		✓	✓	✓

	than 0.1 kg/cm2 in 10 minutes.				
3.	Now this time, to set a pressure at 3.6+0.1 kg/cm2 in gauge and to check pressure drop is not more than 0.1 kg/cm2 in 10 minutes.		✓	✓	✓
4.	If leakage rate is more than dismantle the brake cylinder and check piston packing, wear ring and plug.		✓	✓	✓
5.	To assemble all component once again and test.		✓	✓	✓
6.	The exterior of the brake cylinder shall be painted with black paint.		✓	✓	✓

6.13 Maintenance of Air Brake equipments:

6.13.1 BP & FP cut off angle cock and hoses:

1.	Clean to BP and FP cut off angle cut off angle cock.			✓	✓
2.	Operate it close wise and anti-clock wise 4-5 times and grease it for smooth operation.	✓	✓	✓	✓
3.	Make sure pressure should vent to atmosphere when position of handle on parallel to elbow of angle cock. And pressure should not vent out at 90° handle position of cut off angle cock.	✓	✓	✓	✓
4.	Check the condition of rubber hoses of BP & FP. Both should be in good condition.	✓	✓	✓	✓
5.	Check the leakage of BP & FP cut off angle cock and its hoses, if found then rectify the same.	✓	✓	✓	✓

6.13.2	**Isolating cock:**				
1.	Clean to isolating cock.			✓	✓
2.	Operate it close wise and anti-clock wise 4-5 times and grease it for smooth operation.	✓	✓	✓	✓
3.	Make sure pressure should flow other side when position of handle on parallel of isolating cock. And pressure should not flow other side at 90° handle position of isolating cock.	✓	✓	✓	✓
6.13.3	**Dirt collector:**				
1.	Clean to dirt collector.			✓	✓
2.	Open the dirt collector from bottom side and remove a strainer from inside and clean it with kerosene oil & refit.			✓	✓
6.13.4	**Non Return valve:**				
1.	Clean to Non return valve.			✓	✓
2.	Check to NRV for its proper functioning. Pressure should go forward to AR and should not come back from AR through passing it		✓	✓	✓
6.13.5	**Auxiliary tank:**				
1.	Clean to AR and check the corrosion on AR surface with the use of pity hammer.		✓	✓	✓
2.	Drain the moisture from it with operate the drain cock.	✓	✓	✓	✓
6.13.6	**Distributor Valve:**				
1.	Clean to Distributor valve.			✓	✓

2.	Check the proper functioning of DV by its various position:	✓	✓	✓	✓
3.	Application, release, manual release, Quick release valve and CR.	✓	✓	✓	✓

6.13.7 Load sensing device:

Compressed air from auxiliary reservoir charges into another branch pipe and reaches the inlet ports of both the VTA valves. However, on one side, the compressed air passes get regulated to 4 bar before reaching the inlet port of the VTA connected to the branch of pipe.

7. TESTING OF VVN IN EMPTY CONDITION:

1.	Since the VTA valves is not actuated in this condition, the compressed air at the inlet port of the VTA valves is not connected to the delivery ports of these valves. On the contrary, the delivery ports are connected to the atmosphere at the exhaust ports of the VTA valve.	✓	✓	✓	✓
2.	In the absence at the signal pressure from any of these 'VTA' valves, the empty load port at the c2w2 distributor valve is connected to atmosphere and hence any brake application during this stage will be maintained in empty condition by the distributor valve. However, irrespective at the empty or loaded brake cylinder pressure, the distributor valve maintains the specified application and release timings as per the specifications.	✓	✓	✓	✓

8. TESTING OF SINGLE VVN:

Single VVN test is performed by using a portable device called single VVN test rig. This test rig provides all facilities like that of a driver's brake valve.

The different tests performed during single VVN test of VVN

	TEST-1: Leakage test TEST-2: Brake application and release test TEST-3: Graduated application and release test TEST-4: Sensitivity and insensitivity test TEST-5: Emergency brake application test TEST-6: check and adjust slack adjuster Performa: Single VVN testing				
8.1	**TEST-1: Leakage test:**				
1.	Close charging cock of SWTR and record the drop in BP pressure for 3 minutes. The drop should not exceed 0.1 kg/cm2 in 01 minute.				✓
2.	Close FP cock and record the drop it should not exceed 0.1 kg/cm2 in 1 minute.				✓
3.	Joints/ connections to sub-assemblies. It should be tested with soap foam for ascertaining leakage. Any leakage found should be rectified.				✓
8.2	**TEST-2: Brake application and release test:**				
1.	Open cocks at test rig and charge the system 05 minutes.				✓
2.	Keep brake application to full service position by driver's brake valve on the test rig.				✓

3.	Record the BC filling time for BC pressure rising from 0 to 3.6 kg/cm2. The filling time should be between 3 to 5 sec.				✓
4.	Record the maximum brake cylinder pressure when it gets stabilized, which should be 3.8±0.1 kg/cm2.				✓
5.	Record the BC piston stroke and check that brake blocks are binding on wheels. Piston stroke should be between 90+10mm				✓
6.	Release the brake through driver brake valve by charging the BP to 5 kg/cm2, after conduct the test.				✓
7.	Record the draining time of both the cylinder for BP pressure dropping from 3.6 to 0.4 kg/cm2. This should be between 15-20 sec. the piston should reach initial position and brakes blocks should gets released fully.				✓
8.3	**TEST-3: Graduated application and release test:**				
1.	Charge the brake pipe and feed pipe at 5kg/cm2 and 6 kg/cm2 respectively.				✓
2.	Apply brake in steps by driver's brake valve handle and record the brake pipe pressure and the BC pressure.				✓
3.	BC pressure should rise in steps and BP pressure should decrease in steps.				✓
4.	Release the brakes in steps by driver brake valve handle and record the BP and BC pressure.				✓
5.	BC pressure should decrease in steps and BC pressure should rise in steps. When the BP pressure rise to 4.8				✓

	kg/cm2, the BC will get fully released.				
8.4	**TEST-4: Sensitivity and insensitivity test:**				
1.	Open cock(charging) of the test rig, to fully charge the system including the reservoir.				✓
2.	Close charging cock of SWTR and open sensitivity cock of SWTR to reduce to air pressure in BP and check at the rate of 0.6 kg/cm2 in 63 sec.				✓
3.	Check sensitivity by recording the tie at which brakes get applied.				✓
4.	Close sensitivity cock after test.				✓
5.	Now once again charging cock and charge the air brake system till brakes are released.				✓
6.	Close charging cock and open insensitivity cock to reduce the air pressure in the BP chock at the rate of 0.3 kg/cm2.				✓
7.	Check the insensitivity by recording the time within which brakes do not apply				✓
8.	Close cock of the test rig, after the test.				✓
8.5	**TEST-5: Emergency brake application test:**				
1.	Charge fully the air brake system of the VVN by opening charging cock of SWTR.				✓
2.	Open emergency cock for emergency applied.				✓
3.	Record the BC pressure and check for any leakage in BC for 5 minute.				✓
4.	Pull the manual release handle for short time (about 10 second)				✓

5.	Check BC pressure drops to zero.				✓

8.6 TEST-6: Check and adjustment of slack adjuster:

Control dimension 'A' for slack adjuster. Slack adjuster is a device for automatic and adjustment of the clearance between the wheel and the brake blocks. It quickly adjusts to too large or too small clearances to the pre-determined value- dimension 'A' during application and release and brake.

8.4.1 Procedure for adjustment of Slack adjuster:

1.	Ensure the air brake is in fully released condition and the brake rigging is in proper condition.	✓	✓	✓	✓
2.	Apply brake three to four time to ease the rigging, by dropping the air pressure in the brake pipe.	✓	✓	✓	✓
3.	Ensure once again the brake rigging in full release condition.	✓	✓	✓	✓
4.	Set the dimension 'A' between the control rod head and the barrel head to 27.5mm.	✓	✓	✓	✓
5.	Remove pin securing the control rod in the 'V' bracket.	✓	✓	✓	✓
6.	Detach control rod and rotate to enable re-fitting control rod and pin when the dimension 'A' is correct	✓	✓	✓	✓
7.	Apply brake few times at correct brake pipe pressure.	✓	✓	✓	✓
8.	Check the limits specified.	✓	✓	✓	✓
9.	Re-check dimension 'A' with brake fully released and correct, it necessary.	✓	✓	✓	✓
10.	Lock the control rod head firmly with nut and tooth lock washer, secure pin with split pin.	✓	✓	✓	✓
11.	Observe the necessary safety precautions	✓	✓	✓	✓

8.4.2 Dimension 'E' of SAB:					
1.	The dimension 'E' which is 450mm represents the capacity available for adjustment and will decrease as wear take place at the brake shoe, wheels and pin joints. The maximum value of dimension 'E' should be within the permissible limit for each value when: -	✓	✓	✓	✓
2.	All brake shoe are new.	✓	✓	✓	✓
3.	All pin joints have new pins and bushes	✓	✓	✓	✓
4.	All wheels are new.	✓	✓	✓	✓
5.	Adjust the length of one of the pull rod and piston stroke is checked again. If dimension 'E' is not within permissible limit.	✓	✓	✓	✓

9. SINGLE VVN TEST PERFORMA OF MILK VAN(VVN)

Sr. No.	Description	specified
1.0	Pressure in BP	5+0.1 kg/cm2
2.0	Pressure in FP	6+0.1 kg/cm2
3.0	Leakage	0.1 kg/cm2 in 5 mint
4.0	**Test full service application**	
4.1	Reduction in BP pressure required for full service application	1.3 to 1.6 kg/cm2
4.2	BC filling time Empty Loaded	 3-5 sec 3-5 sec
4.3	BC pressure Empty Loaded	 2.2+0.1 kg/cm2 3.6+0.1 kg/cm2
4.4	Release after full service Empty loaded	 15-20 sec 15-20 sec
5.0	**Sensitivity test**	
5.1	Reduce BP pressure at the rate of 0.6 kg/cm2 in 6 sec	Brake should start applying
6.0	**Insensitivity test**	
6.1	Reduce BP pressure at the rate of 0.3 kg/cm2 in 60 sec	Brake should not apply
7.0	**Emergency application**	
7.1	BC filling time (pressure rise from 0 to 3.6 kg/cm2) Empty Loaded	 3-5 sec 3-5 sec
7.2	BC pressure Empty Loaded	 2.2+0.1 kg/cm2 3.6+0.1 kg/cm2
7.3	Piston stroke Empty Loaded	 90+10mm 90+10mm
7.4	Leakage from BC after emergency application	0.1 kg/cm2 in 10 mint.
8.0	**Automatic exhaust of BC and CR**	BC and CR should exhaust
9.0	**Over-charge protection**	

10. LIST OF REFERENCES:

- Guidelines for Maintenance of MILK TANK VAN (VVNH1) fitted with Bogie Mounted Brake System. FOR TRANSPORTATION OF LIQUID MILK issued by RITES Limited-Gurgaon OCTOBER-2017 (REV-01 of JAN-2018)
- IRCA Conference Rules Part IV (2014)- Rules for Maintenance Examination and Interchange of Coaching Stock (BG system) of Indian Railways.
- Indian Railways Code for Mechanical Department (Workshops)
- General and Subsidiary rules
- Accident Manual
- Maintenance Guide issued by Western Railways for the maintenance of BG Bogie Air Brake MILK Tank Vans (RMTs).
- Manufactures Manual for major Sub-assemblies i.e. Distributor Valve, CBC and for the maintenance of air brake system shall be as per coaching maintenance manual for BG ICF coaches.
- Maintenance manual of CAMTECH for BG coaches of ICF design shall be followed.
- For CBC chapter 5 of CAMTECH manual for AC LHB coaches.