INDIAN RAILWAYS

MAINTENANCE INSTRUCTION
FOR FITMENT OF AUXILIARY RESERVOIR IN FREIGHT STOCK

S.No.	Month/Year of issue	Revision/Amendment	Page No.	Reason for Amendement
01	Feb 2017	Nil		First Issue
02	April 2017	01		Revision

Issued By :
Wagon Directorate
Research Designs and Standards Organization
Manak Nagar, Lucknow-226011.

Contents

1. BACKGROUND:

1.1. This instruction pertains to fitment of auxiliary reservoir with auxiliary reservoir support bracket, Suspension strap and M-16 stud with nut and washer.

1.2. There have been several reported instances of auxiliary reservoir falling from wagons. These incidents have mostly been reported during running condition of wagons resulting in even derailments in some cases. In a safety drive carried out by zonal railways in between Jan 2017 and Feb 2017 on instructions Railway Board it has been found out that approximately 1620 wagons out of 3.08 lacks wagons i.e. 0.5 % wagons were having problems with securing arrangement of auxiliary reservoir. This maintenance instruction covers understanding of fitment of auxiliary reservoir in wagons, key areas of inspection in POH/ROH and check sheet to ensure correct fitment of reservoir.

2. FITMENT OF AUXILIARY RESERVOIR

2.1. Main components of Auxiliary reservoir support:

2.1.1. Auxiliary reservoir support bracket

2.1.2. suspension strap

2.1.3. M-16 stud with nut and washer

2.2. The reservoir support bracket is generally fitted on underframe longitudinal members with welding. The Auxiliary reservoir is secured by a suspension strap, the suspension strap is wrapped around the Auxiliary reservoir and fastened with Auxiliary bracket by M-16 stud with nut and washer. Nut is tack welded over the M-16 stud. In BOXNHL and BOXNS there are three support brackets and suspension strap per auxiliary reservoir but in rest of wagons these are two per reservoir.

2.3. Sketch of fitment of Auxiliary reservoir with support bracket, suspension strap and M-16 stud with nut and washer is shown in Annexure-1.

3. CRITICAL AREAS IDENTIFIED IN SAFETY DRIVE:

Defects were observed in following areas in safety drive:

3.1. Stud/nut missing/loose or welding open

3.2. Suspension strap loose/welding open

3.3. Suspension bracket welding open

4. REASONS FOR OBSERVED DEFECTS:

No attention is prescribed for auxiliary reservoir in ROH. In POH auxiliary reservoir is to be completely dismantled and overhauled as per procedure given in Chapter 7, Para 710 of wagon maintenance manual. After overhauling, auxiliary reservoir is to be re-fitted as per relevant drawing of that particular wagon and also indicated in sketch at Annexure-1. Main reason of occurrence of above mentioned defects is improper work during re-fitment of auxiliary reservoir in POH shops. There is no design lacuna in fitment arrangement of auxiliary reservoir. A detailed Inspection plan has been formulated which is given below.

This inspection regime to be strictly followed in ROH and POH (after fitment of overhauled reservoir) by depot/shop inspection wing for prevention of these defects.

5. INSPECTION PLAN TO CHECK CORRECT FITMENT OF AUXILIARY RESERVOIR:

For purpose of inspection the indicative sketch shown in annexure 1 is to be referred. Complete details are in relevant RDSO drawings. Check sheet for inspection of fitment of auxiliary reservoir is as follows:

S.No	Description	Observation noted	Action to be taken
1.	Tack welding of M-16 nut with stud at top	found loose	Tighten the nut and then tack weld
2.	All round proper 50 mm overlap welding of suspension strap with M-16 Stud	Improper/ In sufficient welding	Weld the suspension strap with M-16 Stud, minimum 50 mm overlap
3.	Proper seating of M-16 nut on the stud	Projection of stud is visible or not	If, stud is not visible above nut, then replace the stud.
4.	Proper fitment of Suspension strap with reservoir	Suspension strap is found loose or cracked	If suspension strap is found loose, tighten the nut and then tack weld the nut. If suspension strap is found crack or damaged the same shall be replaced.
5.	Proper welding of Auxiliary reservoir supporting bracket with under frame member	Welding opened	If welding found deficient, follow para 6.3
6.	Condition of underframe longitudinal member (where AR support bracket is mounted)	Underframe member bend/broke	Repair work should be taken during POH with provision of addition third bracket as per para 7 of the WMI

6. REPAIR PROCEDURE DURING ROH:

The following repairs to be undertaken for defects mentioned above:

6.1. Stud/Nut Missing/Loose Or Welding Open:

In case where the stud /nut is found to be missing/ loose or its tack welding is opened then in that case new stud/nut is to be provided and all round proper welding of suspension strap with M-16 Stud to be done ensuring 50 mm overlap as shown at 'X' in Annexure-1. Nut to be tightened over stud and tack welded as shown at 'Z' in Annexure-1.

6.2. Suspension Strap Loose/Welding Open:

This can be attended in situ without wagon detachment**.** Whenever suspension strap is found loose or welding is observed to be open, then first try to remove the tack weld of nut and tighten the nut till suspension strap is properly gripped over the reservoir. After wards tack weld the nut.

In case nut/stud gets damaged in removing the tack weld then stud/nut to be replaced with new ones and all-round proper welding of suspension strap with M-16 stud to be done ensuring 50 mm overlap as shown at 'X' in Annexure-1. Nut to be tightened over the stud and tack weld the nut as shown at 'Z' in Annexure-1. In case of missing suspension strap fit the new suspension strap as per relevant drawing.

6.3. Suspension Bracket Welding Open:

This can be done in-situ without wagon detachment. Whenever suspension bracket welding with underframe is found be deficient, it is to be welded again to the under frame member properly after cleaning that area with wire brush as shown at 'Y' in Annexure-1.

7. REPAIR PROCEDURE DURING POH:

During POH auxiliary reservoir is to be removed from underframe and overhauled as per procedure given in Chapter 7, Para 710 of wagon maintenance manual (Annxeure-4). After overhauling, the auxiliary reservoir is to be re-fitted as per relevant drawing of that particular wagon.

An additional auxiliary reservoir support bracket is to be provided between the existing two brackets as shown in the sketch at Annexure-2.

The following procedure to be adopted for fitment of auxiliary reservoir:

Check the condition of underframe members (condition of longitudinal member, auxiliary reservoir support bracket, welding of longitudinal member with cross bar, etc.,).

7.1. Underframe Members Found In Sound Condition:

1) Provide an additional bracket between the existing brackets as shown in the sketch at Annexure-2.
2) Proper size Holes of this additional bracket should be made by drilling only, Holes should not be oval/oversize and should not be made by gas cutting. At locations 'A' welding should be done in the flat position and at location 'B' welding may be done in overhead position as shown in Annexure-2 for fitment of bracket to underframe members.
3) This additional bracket should be properly aligned with the other two existing brackets to ensure proper grip over the reservoir
4) Clamp the reservoir with proper size of suspension strap as prescribed in relevant drawings of the wagon.
5) Ensure that the suspension strap is properly welded (minimum 50 mm overlap) with the stud
6) Stud should be in exactly vertical portion to ensure proper seating of nut and its washer. Tighten the nut to ensure proper clamping of suspension strap with auxiliary reservoir
7) Ensure that sufficient projection (minimum 8-10 mm) of stud is visible from outside
8) Tack weld the nut with stud

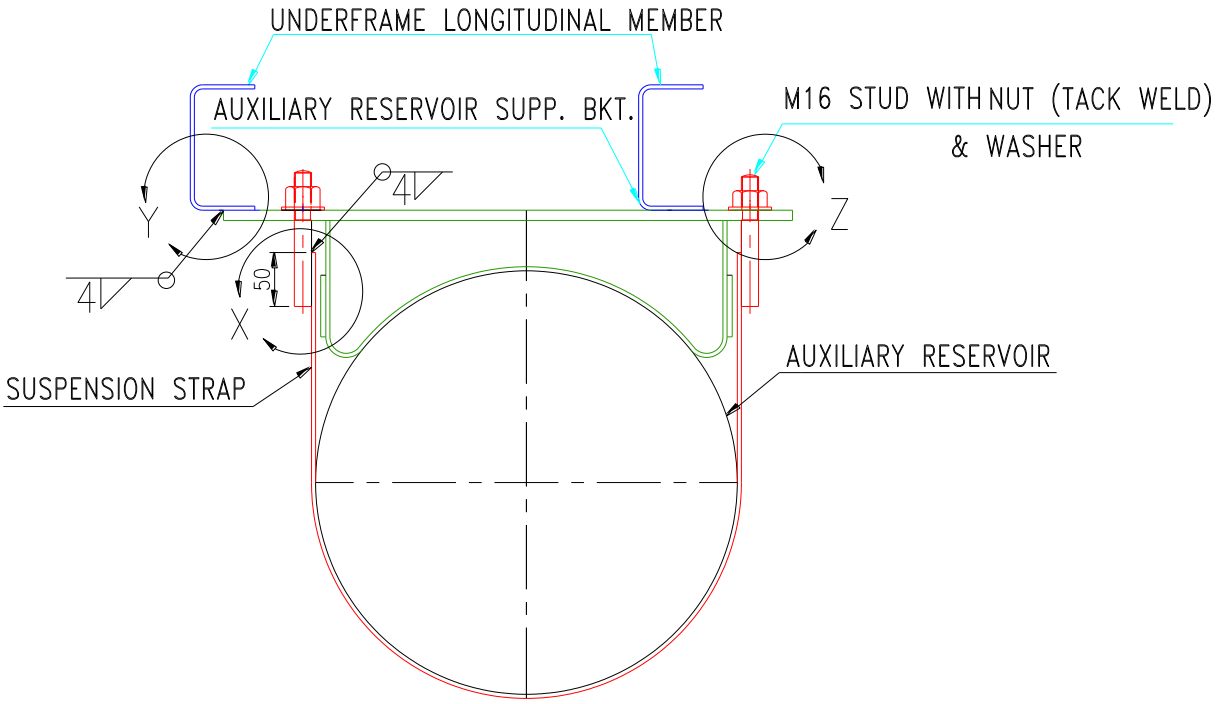
7.2. Under Members Not Found In Sound Condition:

1) If the underframe members are found broken, bend or their welding with other underframe members opened, then the longitudinal members to be replaced with new members
2) Remove the floorplate, between the adjacent cross bars as shown in sketch at Annexure-3.
3) Damaged/ broken longitudinal members to be removed from underframe.
4) Fit three AR support brackets on the new Longitudinal members by down hand welding as per the sketch at annexure-2 at shop floor

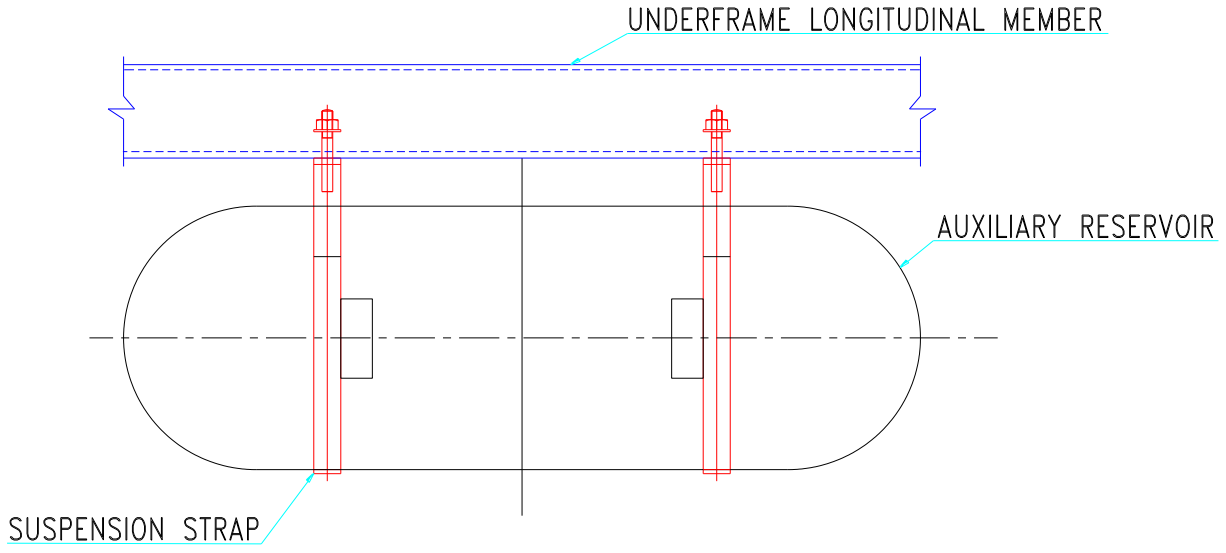
5) Ensure that all three Auxiliary reservoir suspension brackets are aligned properly to ensure proper grip over the reservoir
6) Now, fit the reservoir in AR support brackets with proper size suspension strap as per relevant drawing of the wagon
7) Ensure that the suspension strap is properly welded (minimum 50 mm overlap) with the stud
8) Stud should be in exactly vertical portion to ensure proper seating of nut and its washer. Tighten the nut to ensure the proper clamping of suspension strap with Auxiliary reservoir
9) Ensure that specified projection (minimum 8-10 mm) of the stud is visible from outside
10) Tack weld the nut with stud
11) Now, weld the complete assembly of longitudinal members with three AR support brackets fitted with the reservoir with underframe cross members.
12) Ensure down hand all round welding while welding the longitudinal members with cross bars.
13) Provide the floor plate from top of under fame between the crossbars as shown in Annexure-3

ANNEXURE-1

SKETCH OF FITMENT OF AUXILIARY RESERVOIR WITH SUSPENSION STRAP AND SUPPORT BRACKET:



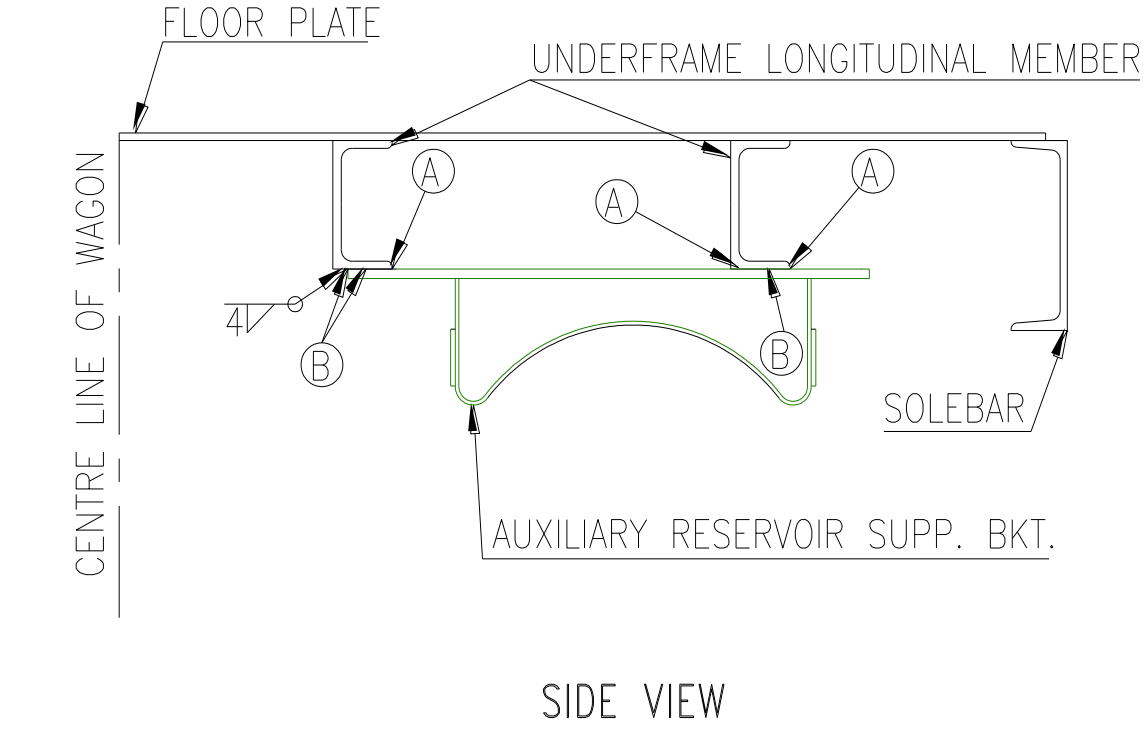
SIDE VIEW



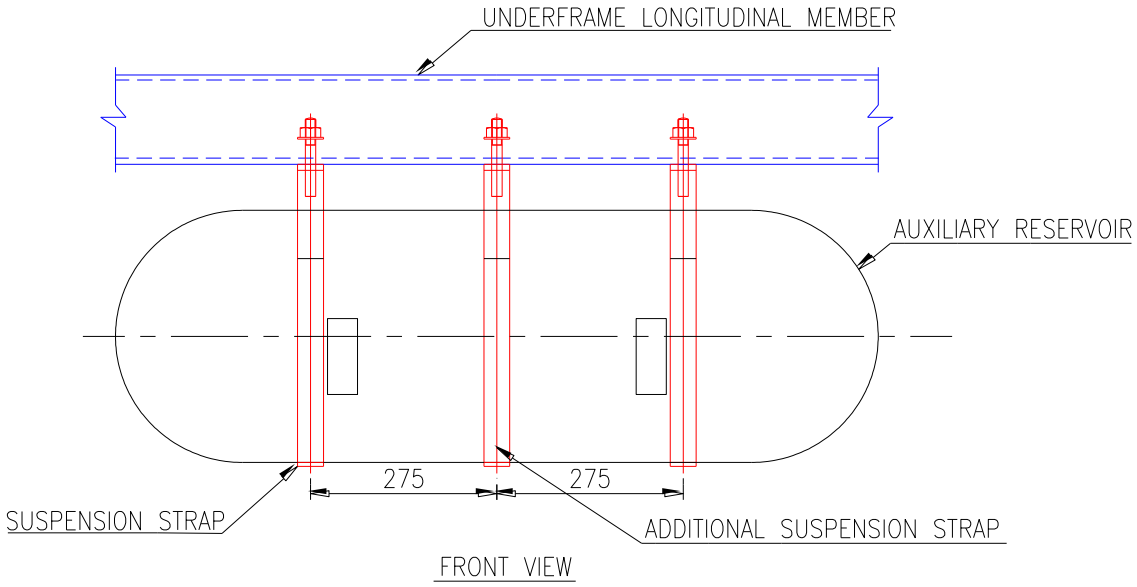
FRONT VIEW

ANNEXURE-2

Sketch of fitment of one additional AR bracket at the center of two outer AR brackets



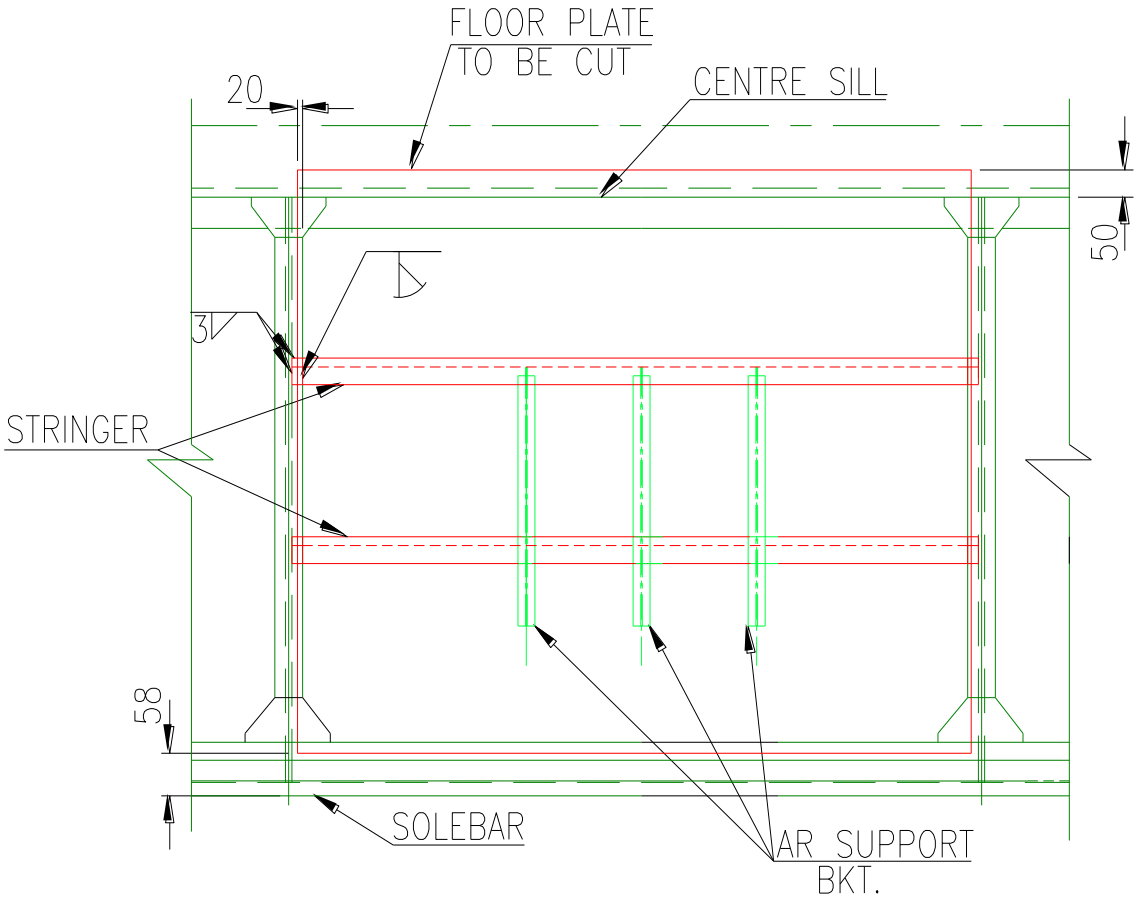
SIDE VIEW



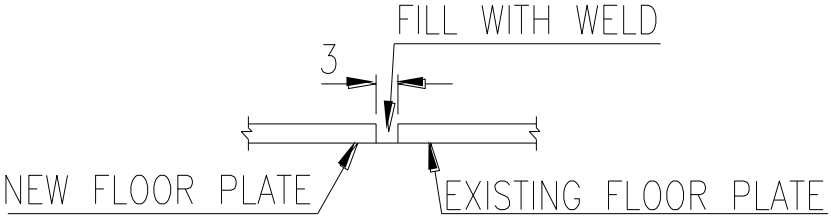
FRONT VIEW

ANNEXURE-3

Sketch for fitment of longitudinal member with underframe



CUT OF FLOOR PLATE AND FITMENT OF LONGITUDINAL MEMBERS



JOINING OF NEW AND EXISTING FLOOR PLATES

ANNEXURE-4

CHAPTER 7-AIR BRAKE SYSTEM

710. AUXILIARY RESERVOIR

A. FUNCTION

Auxiliary reservoir is actually a pressure vessel and its function is to feed dry compressed air to the brake cylinder for application of brakes.

B. SALIENT FEATURES

The auxiliary reservoir is a cylindrical vessel made of sheet metal. On both the ends of the reservoir, flanges are provided for pipe connection. One end of the auxiliary reservoir is connected to the brake pipe through the distributor valve. Auxiliary reservoir is charged through the brake pipe. The auxiliary reservoir is charged to 5kg/cm^2 pressure, charging from the brake pipe through Distributor valve.

At the bottom of the auxiliary reservoir, drain plug (or drain cock) is provided for draining out the condensate/moisture.

Note: The dimension & tolerances of the auxiliary reservoir shall be as indicated in latest revision of RDSO drawing WD-92051-S-01 for 100 lit. Capacity and RDSO drawing number WD-92051-S-02 for 75 lit. capacity.

The auxiliary reservoir is to be completely dismantled and overhauled during POH or if there is some specific trouble.

C. TOOLS AND EQUIPMENT

a) Spanner A/F 19x22.

b) Light hammer

D. PROCEDURE FOR MAINTENANCE

DISMANTLING

- Unscrew the drain plug or drain cock.
- Drain the water accumulated in the tank.

CLEANING OF PARTS

- Examine the outer surface for any pitting scales or rusting.
- Clean the exterior of the auxiliary reservoir with a wire brush.
- Pour kerosene oil in to the auxiliary reservoir and roll few times and drain the oil.
- Dry the interior of the reservoir with a jet of air.
- Rinse the reservoir with RUSTO-LINE and then with ESSO-RUST 392 or equivalent.
- Clean the drain plug with a wire brush.
- Auxiliary reservoir shall be painted on the exterior with two coats of zinc

chromium primer and two coats of black enamel.

CHAPTER 7-AIR BRAKE SYSTEM

REPLACEMENT OF PARTS

- Replace the plug washer.
- Replace the plug if threads are rusted or damaged.
- Replace the reservoir having deep cuts on surface.

ASSEMBLY

Assemble the drain plug with washer by screwing it back into its position.

E. TESTING OF AUXILIARY RESERVOIR

Air Pressure Test

- Block one side passage of the auxiliary reservoir with dummy flange.
- Admit air pressure from the other side passage at 10 Kg/cm^2.
- Check the leakage at the weld seams, with soap water solution.
- No leakage is permitted.

Hydraulic Test

- With a hydraulic pump, apply a pressure of 16 Kg./cm^2 from one flange end after blocking the opposite end.
- Hold the pressure for 5 minutes.
- Check for the leakage on the external surface of the reservoir by gently tapping on the weld seams with a light hammer.
- No leakage is permitted.
- Drain out the water completely and allow the reservoir to dry, by directing a jet of air.

F. SAFETY PRECAUTIONS

- Specified tools and fixtures should be used for assembly and dismantling operations.
- Rubber / leather components should be stored in a safe place away from heat, alcohol & acids. All metal parts like washers should be kept in a safe place.