

SOUTH CENTRAL RAILWAY

Safety.387/Fly Leaf/01/2025

Fly Leaf No. 01 / 2025

Attention..... All Concerned

(As per 6th Correction slip of Maintenance Manual version 1.1 July 2022 Volume-II & IR CAMTECH.M.GWL.IRCA-IV (LHB) August'2024, Annexure-II.)

Air Brake Rake Testing Procedure (RTR). (LHB Coaching Stock)

I. General Instructions to be followed before embarking on RTR.

a) Air Compressor and Connections.

- a. Ensure that the Proper working of Air Compressor.
- b. Ensure UT and HT Testing details of Air Reservoir.
- c. Ensure Air Drier and Drain Valve connections are in working and operational condition.
- d. Ensure that the all connecting line / pipe line joints are free from leakages from Air Compressor Out let to RTR inlet.

b) Rake Test Rig (RTR).

- a. Ensure RTR Connections, Valves, Driver's Brake Valve (DBV) and connections are free from leakages.
- b. Ensure Pressure Gauges provided are Calibrated and error free.
- c. Working Procedure / Working Instructions to be displayed / painted at convenient / readable location.

c) Necessary Tools & Plants.

- a. Required nos of Pressure Gauges with End Test Points and with connecting hose to be provided.
- b. Necessary Hand tools as per IRCAMTECH manual / firm manual to be procured and used.

d) Awareness Programmes.

- a. Necessary awareness programmes / classes / meetings to be conducted to update on latest modifications / guide lines / working procedures.

II. Air Brake Rake Testing Procedure with Rake Test Rig (RTR).

(As per LHB Maintenance Manual, Volume II – System Documentation, IRCAMTECH/GWL/MECH/2022-23/LHB/Manual/1.1)

1. Draining of Auxiliary Reservoirs / Strainers

On arrival of the rake on pit line, completely drain the AR tank (125 litres & 75 litres) (LHB Coach with Air Spring connected Reservoir 150 litres) of all the coaches by opening the drain cock, to remove the water / moisture in air.

2. NRV Check

Initially, couple the BP Air Hose of the test rig with the BP Air Hose of the rake & then charge the BP pressure to 5.0 kg/cm². Keep the FP angle cock of

both end power cars in close position. Check the FP gauge fitted in the power car, if the gauge does not show any pressure, the NRV of all the coaches are ok. If, FP gauge shows any pressure, the NRV of any coach in the rake is defective. In this condition, check the rake for defective NRV by taking the coaches in parts. NRV found defective in particular coach should be replaced.

3. Self-Release Check.

Step-1. Open all the four cocks of rake, couple BP & FP air hoses of test rig with the BP & FP air hoses of the rake. Charge the BP & FP to 5.0 kg/cm^2 & 6.0 kg/cm^2 respectively.

Step-2. After building of pressure in BP & FP, disconnect the test rig BP & FP air hose by closing COAC on the first coach from RTR.

Step-3. Open both the angle cocks, due to which air pressure will be exhausted into atmosphere & brake will be applied. Wait for 20 to 25 minutes.

- After 20 to 25 minutes, check the complete rake from one end. Note down the coach nos. found with released brake cylinder.
- Check whether, AR tank of the coach is charged or empty. If AR tanks found empty, write down Empty AR on the respective coach.
- If found charge, pull manual release of DV to check whether CR tank is charged / empty. If CR found empty, write down Empty CR on respective coach. With this, all the defects in the rake can be checked and rectified.

4. Accuracy of BP / FP Gauge of Front Power Car / LSLRD

Again, charge BP to 5.0 kg/cm^2 & FP to 6.0 kg/cm^2 . Connect BP & FP gauges with dummy on free end of other power car / LSLRD. Check the BP & FP pressure gauges in front power car / LSLRD, BP pressure should show 5.0 kg/cm^2 & FP pressure should show 6.0 kg/cm^2 . If there is any difference in any pressure, check by fitting master gauge if still the pressure is not showing 5.0 kg/cm^2 in BP & 6.0 kg/cm^2 in FP, check for leakage & attend.

5. Leakage Check (Before maintenance)

Close the BP & FP angle cock of test rig for 03 minutes. Monitor the leakage in both BP & FP. The leakage should not be more than 0.6 kg/cm^2 in 03 minutes.

6. Attention to Self-released Coaches

Attend the coaches in which AR empty & CR empty are found.

- Check the AR tank & pipe line from the back of the brake panel for leakage.
- Similarly, check CR tank & pipe line & dummy plug on the brake panel.
- If defect is still persisted after attending the leakage, then mark the coach sick for detailed investigation & single car testing in sick line.

7. Leakage Test by Dropping 1.6 Kg/cm^2 pressure in BP.

Start the pressure & charge the BP to 5.0 kg/cm^2 & FP to 6.0 kg/cm^2 . Drop the BP pressure by 1.6 kg/cm^2 , brake should apply in all coaches.

- Start the leakage checking with the help of soap solution from one end. During soap solution testing, check all the BP & FP hose pipe, all hose pipe connectors, Main pressure pipe line, Angle cocks, Brake cylinder pipe line, CDTS pipe line.

- Similarly, check & attend leakage in components on Brake panel like DV, FP & BP filter, NRV, all isolating cock, brake indicator, brake accelerator & brake cylinder with soap solution.

8. Bogie Isolation Test (All Coaches)

Isolate the isolating cock provided on Brake panel; check all brake calipers & brake pad of all cylinders.

- In isolated condition, all brake pads should be released simultaneously. Similarly, on opening of isolating cock all Brake cylinder should operate & brakes should apply.

9. Brake Indicator Test (All Coaches)

Check the brake indicator when brakes are applied, indicator should display red colour. However, when the brakes are released from isolating cock the brake indicator should display green colour. If on brake release condition, brake indicator is not showing green or on brake applied condition brake indicator is not showing red, then the brake indicator is defective.

Repair / replace the brake indicator.

10. Check for any cross connection in BP & FP pressure

The BP & FP pressure gauges in the other end power car should show pressure 3.4 kg/cm^2 & $5.8 - 6.0 \text{ kg/cm}^2$ respectively. If any difference in above pressure is noticed that means there is any cross connection in BP & FP connection. Attend the same & ensure BP pressure 3.4 kg/cm^2 & FP pressure $5.8 - 6.0 \text{ kg/cm}^2$.

11. Check for CR overcharging

Charge the BP & FP pressure to 5.0 kg/cm^2 & 6.0 kg/cm^2 respectively. Check the brake indicator of complete rake, all coaches should be in released condition. If any coach is not released, it means that the CR of that particular coach may be overcharged & there is an internal defect in DV. Mark the coach sick for detailed investigation.

12. Check PEASD (Any 03 Coaches)

Check PEASD of at least 03 coaches. During PEASD checking, brakes should apply in all coaches & the brake accelerator should operate. Coach numbers should be noted in maintenance dairy.

13. Continuity Test

Now close the pressure supply from the test rig.

- Operate the emergency guard van valve of front power car guard van. BP pressure should become 0.0 kg/cm^2 in approx. 25 to 30 sec in front power car / LSLRD & approx. 40 to 50 sec in rear power car / LSLRD.

Open the pressure supply

- Charge BP & FP to 5.0 kg/cm^2 & 6.0 kg/cm^2 respectively. Now again close the pressure supply from the test rig. Operate the emergency guard van valve of rear power car / LSLRD guard van. BP pressure should become 0.0 kg/cm^2 in approx. 25 to 30 sec in rear power car / LSLRD & approx. 40 to 50 sec in front power car / LSLRD.

Check for any significant difference in time for droppage of BP pressure to 0.0 kg/cm² between front & rear power cars / LSLRD. If any, there may be blockage in BP line of any coach. If found, attend the same.

14. Hand Brake Check of both Power Car/LSLRD

In the power car / LSLRD, check the condition & mounting of hand brake cables fitted on both the brake cylinders.

- Rotate the hand wheel fitted in guard van clockwise to apply the brakes, after full rotation brake should apply in both the brake cylinders & hand brake indicator should show red.
- Rotate the hand wheel anti clockwise, now brakes of both the cylinders should get released & hand brake indicator should show green.

15. Monitor for Leakage (After work)

Charge the BP & FP to 5.0 kg/cm² & 6.0 kg/cm² respectively. Close the BP & FP angle cock of test rig for 03 minute. Monitor the leakage in both BP & FP. The leakage should not be more than 0.6 kg/cm² in 03 minutes.

16. Manual release of Rake

Isolate the isolating cock of BP & FP of the test rig & angle cock of BP & FP.

- Uncouple both air hoses & open both the angle cocks of coach. After draining of pressure from both the BP & FP air hose, release the complete rake by pulling the manual release handle of the DV of each coach & ensure the brake indicator of all coaches displays green colour.
- Ensure that all BP, FP & BC gauges fitted in power car / LSLRD are calibrated & showing correct reading.

B. WSP Testing

1. Initially with no pressure, the WSP processor in all the coaches should be OFF. If any processor is in ON condition, there is problem in any of pressure switch, wiring or K-05 relay. Attend the same.
2. Start the BP & FP pressure. The processor should automatically ON when FP pressure reaches 1.3 to 1.8 kg/cm² in WSP system.
3. Check & attend for loose / proper fitment of WSP components like speed sensor, junction box, dump valve, dump valve connector & pressure switch.
4. Drop the BP pressure by 1.6 kg/cm², brake should apply in all the coaches. Now check the WSP processor for correct reading '99' on the electrical panel inside the coach. If the reading shows '99', it means that the WSP system is OK. Operate the test button on the processor to check the proper working of dump valves. The dump valve should operate in a sequence & pressure should be exhausted from brake cylinder. If the dump valve is not operated in proper sequence attend the same. Similarly, check & attend the WSP system of all the coach. All the WSP system should be in operating condition in the rake.

The above instructions should be strictly followed in letter and spirit.

Encl : **Annexure – A**

A. Air Brake Testing Rig (RTR)
(Addition to Annexure–A of Chapter 3)

Format for Air Brake Testing on RTR (LHB) (RDSO letter no. MC / LHB / Brake dated 10.08.2024.)			
Train No.:		Load:	Date:
Name of Staff :			
S. No.	Description	Observation	Remarks
a		Rake Test	
1	Draining of Auxiliary Reservoirs / Strainers	125 L	
		75 L	
		150 L	
		BP Strainer	
		FP Strainer	
		Ensure all WSPs of the rake in "OFF" condition after 10 minutes of draining BP & FP.	
2	NRV check (On charging BP line, FP gauge should show Nil pressure)	Pressure in FP:	
		Front Power Car:	
		Rear Power Car:	
	Self Release Check		
3	Step-1 : BP & FP to be charged 5.0 & 6.0 Kg/Cm ² respectively.	Coaches in which Brakes found released-	
	Step-2 : RTR BP/FP palms to be disconnected.		
	Step-3 : Open the Angle Cocks to exhaust BP and FP pressure and wait for 20-25 minutes.		
4	Accuracy of BP / FP Gauge of Front Power Car / LSLRD	Connect BP & FP Master Gauges with dummy on free end of last vehicle and charge again BP and FP pressure.	
5	Leakage Check (Before maintenance) BP & FP to be charged to 5.0 & 6.0 kg/cm ² . Close BP & FP Angle Cock for 03 minutes.	Attend leakage if any	
		Leakage ≤ 0.6 Kg/cm ² in 3 minutes	
6	Attention to Self-released Coaches	(i) If AR tank found empty check for the leakage on back of the Brake Panel.	
		(ii) If CR tank found empty check for the leakage on CR tank, pipes & test points of the Brake Panel.	
		(iii) If defect persist, sick for SCTR Test	
7	Leakage Test by Dropping 1.6 kg/cm ² in BP.	Leakage location to be pin-pointed using soap solution.	

8	Bogie Isolation Test (All Coaches)	Functional test of brake release through bogie isolation cocks on Brake Panel.	
9	Brake Indicator Test (All Coaches)	On Brake application Indicator display RED. On Brake release Indicator display GREEN.	
10	Check for any cross connection in BP & FP pressure	In Rear End Power Car- (i) BP = 3.4 Kg/cm ² (ii) FP = 5.8 to 6.0 Kg/cm ²	
11	Check for CR overcharging	If CR over charged, mark Sick	
12	Check PEASD (Any 3 Coaches)	Coach No: 1. 2. 3.	
13	Continuity Test	On operating Guard emergency valve from Front Power Car, BP = 0 Kg/cm ² in 25 to 30 seconds in Front Power Car and 40 to 50 seconds in Rear Power Car. On operating Guard emergency valve from Rear Power Car, BP = 0 Kg/cm ² in 25 to 30 seconds in Rear Power Car and 40 to 50 seconds in Front Power Car.	
14	Check Hand Brake of both Power Car / LSLRD	(i) Condition & mounting of Hand Brake Cables. (ii) Application and Release.	
15	Monitor for Leakage (After Work) (After BP - 5.0 kg/cm ² & FP - 6.0 kg/cm ² for 3 minutes)	Leakage ≤ 0.6 Kg/cm ² in 3 minutes	
16	Manual Release of Rake	Ensure manual release of all DVs	
b	WSP Testing		
1	Check for any loose WSP Components		
2	Check for WSP Display 99		
3	Perform Dump Valve test for operating in sequence.		
c	Check for the free movement of Caliper Arms by physical shaking the Brake Caliper units.		

SAFETY ORGANISATION

SOUTH CENTRAL RAILWAY