

owner and maintainer of the nsw rail network

# **RAIL**INFRASTRUCTURE CORPORATION

Discipline  
**Rolling Stock Engineering Standard**

Category  
**Maintenance**

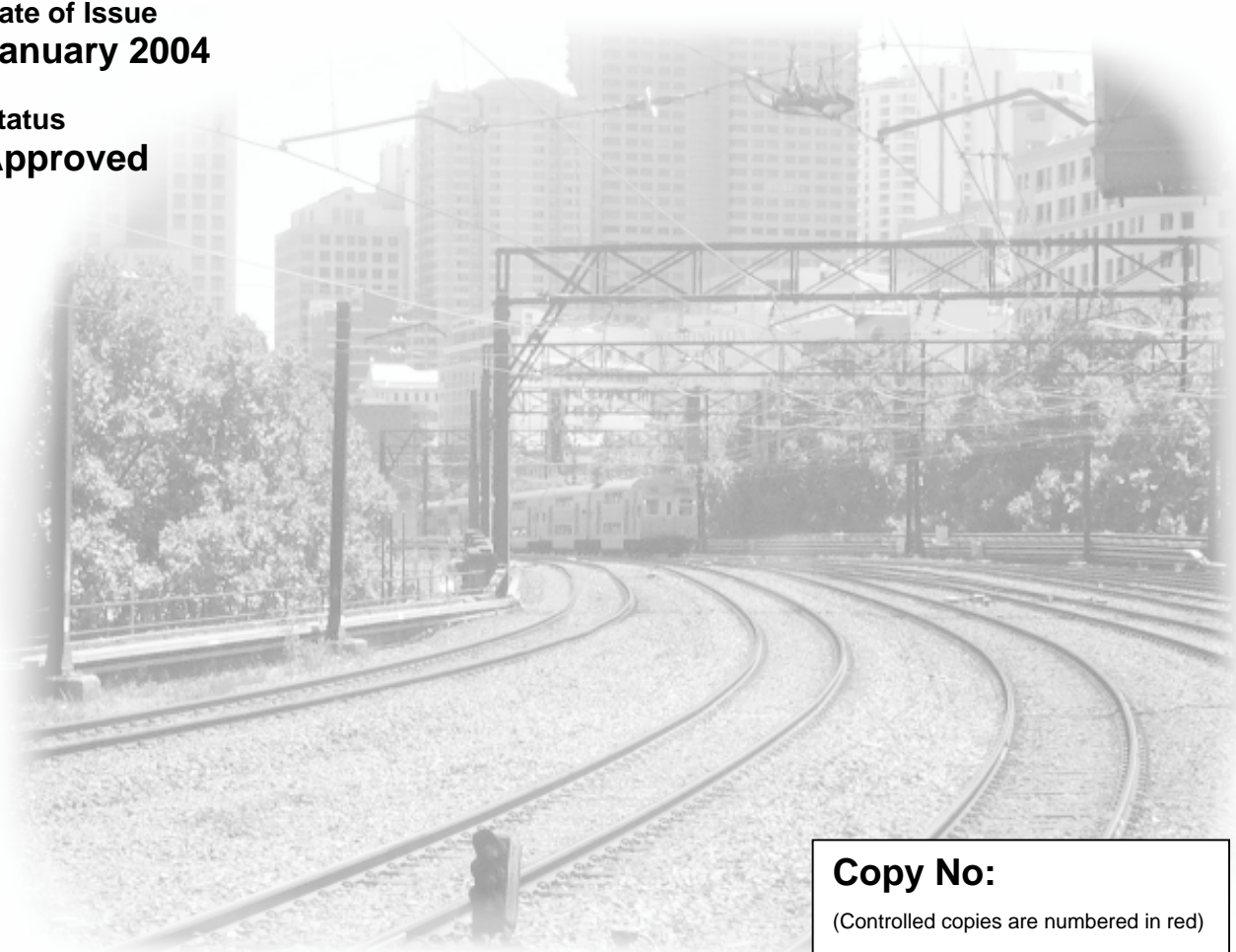
Title  
**NDFP TYPE BALLAST WAGONS  
DOOR MAINTENANCE & TEST PROCEDURE**

Reference Number  
**RSS 0071**

Version  
**1.0**

Date of Issue  
**January 2004**

Status  
**Approved**



**Copy No:**

(Controlled copies are numbered in red)

## **DISCLAIMER**

Rail Infrastructure Corporation has used its best endeavors to ensure that the content, layout and text of this document is accurate, complete and suitable for its stated purpose. It makes no warranties, express or implied, that compliance with the contents of this document shall be sufficient to ensure safe systems of work or operation. Rail Infrastructure Corporation will not be liable to pay compensation in respect of the content or subsequent use of this document for any other purpose than its stated purpose or for any purpose other than that for which it was prepared except where it can be shown to have acted in bad faith or there has been willful default.

## **DOCUMENT APPROVAL**

The technical content of this document has been approved by the relevant RIC engineering authority.

## **DOCUMENT SUPPLY and CONTROL**

The Primary Version of this document is the electronic version that is available and accessible on the Rail Infrastructure Corporation Internet and Intranet website.

It is the document user's sole responsibility to ensure that copies are checked for currency against the Primary Version prior to its use.

Controlled hardcopy versions of this document will be issued by the Principal Engineer Rolling Stock & Mechanical Assurance.

Controlled hardcopy versions of this document may be made and issued to sub-contractors if they are registered using a local document management and distribution system.

When controlled hardcopy versions are issued using a local document management system each copy is to be uniquely identified in the Control Box provided on the front of the document. The identifier used must identify the local distribution centre and the copy number. The identifier is to be marked using a colour other than black or grey.

## **COPYRIGHT**

The information in this document is Copyright protected. Apart from the reproduction without alteration of this document for personal use, non-profit purposes or for any fair dealing as permitted under the Copyright Act 1968, no part of this document may be reproduced, altered, stored or transmitted by any person without the prior written consent of RIC.

## **About This Standard**

The standard is based on Goulburn Rail Workshop Procedure NDFF-009 NDFF Type Ballast Wagons Door Maintenance & Test Procedure

## **Version History**

**Version 1.0**

**2003**

This page has been intentionally left blank

# Table of Contents

About This Standard	3
Version History	3
<b>1 Purpose</b>	<b>7</b>
<b>2 Procedure</b>	<b>7</b>
2.1 Service Frequency	7
2.2 Filters	7
2.3 Door Isolating Cock (DIC)	7
2.4 Lock Up Valve (LUV)	8
2.4.1 To test the operation of the Lock-Up Valve	8
2.5 Fail- Safe Feature	9
2.5.1 To test the operation of the fail-safe feature	9
2.6 Main Control Valves	9
2.6.1 To service the main control valves	9
2.7 Door Operation	10
2.7.1 To test the operation of the doors	10
2.8 Trouble shooting	11
<b>3 Reporting</b>	<b>11</b>
<b>4 References</b>	<b>12</b>
4.1 RIC Drawings	12
<b>5 Referenced Documents</b>	<b>12</b>

This page has been intentionally left blank

## 1 Purpose

These procedures cover the maintenance, testing and troubleshooting the pneumatic discharge door system on NDFF class ballast wagons.

## 2 Procedure

The door system has been designed for easy maintenance. "Push on" fittings are used extensively to facilitate change out of whole assemblies. Note: Series 1 wagons (NDFF 2975 to 2989) use imperial fittings and Series 2, 3 & 4 use metric fittings. The air supply for the doors is provided via the Main Reservoir line and requires an operating pressure of between 500 and 800 kPa.

- Keep hands and feet away from the moving parts of the door
- Always completely discharge the door system before starting working on the door mechanisms.
- Always use a suitable sealant when reassembling threaded joints. Refer to RSS 0064.
- Always use thread locking compound or nylon locking nuts on fasteners.

### 2.1 Service Frequency

Preventative maintenance and testing of the door systems shall be carried out at each R Inspection. Refer to RSS 0010.

### 2.2 Filters

There are two types of filters fitted to the wagons. These filter elements are to be replaced as part of the preventative maintenance service.

- **In Line Filter/Strainer** - Located up stream of the Door Isolating Cock.
- **Mist Separator** – Series 1 & 2 wagons have one Mist Separator fitted adjacent to the Door Isolating Cock. Series 3 wagons have an additional separator located on the underside of the wagons adjacent to the main control valves.

### 2.3 Door Isolating Cock (DIC)

There are two door-isolating cocks, one on each side of the wagon. Opening either one of the valves will allow the doors to operate. The Door Isolating Cock is a two-position lockable globe valve. To operate the doors turn the handle to

the vertical position, this will isolate the exhaust port and allow air from the MR line to charge the door reservoir. When the handle is in the horizontal position the MR line supply is isolated and the door reservoir allowed to vent through the exhaust port at the back of the valve body. The door reservoir takes about 5 minutes to fully discharge. When replacing this valve take care to ensure that the orientation of the ball is correct.

## 2.4 Lock Up Valve (LUV)

The purpose of the lock up valve is to ensure that the doors will only operate when the supply pressure is greater than 500kPa. The lock up valve operates by sensing the pressure on either side of the Door Isolating Cock valve. Whilst ever the pressure in these lines is less than 500kPa, the valve sends a "close door" signal to each of the control valves. This signal will over ride all other signals and prevent the doors from operating. When the pressure rises above 500kPa the Lock up valve will cut out and cancel the 'close door" signal and thus allow the doors to operate. As the valve cuts out a brief discharge of air can be heard from the vent hole in the body of the valve. A regulated air supply is required to test the operation of the lock up valve.

### 2.4.1 To test the operation of the Lock-Up Valve

- Connect air to wagon with key locking valve in closed position. (horizontal), no air should leak from either exhaust. If air does leak, key lock handle should be unscrewed (remove 2 screws) Using handle rotate shaft of keylock 180°, replace handle. Air may still leak for 4-5 seconds and then cease.
- Attach supply to Main Reservoir line and set air supply pressure to just below 500kPa. Check that doors are not operational.
- Slowly increase the pressure until a discharge of air is heard from the valve. The supply pressure should be 500kPa-510kPa. The doors should now operate.
- To adjust the setting of the lock up valve, set the supply pressure to 500kPa. Back off the lock nut and using a screwdriver adjust the needle at the end of the valve. Screw in to increase the pressure and out to decrease. Listen for the discharge of air when the correct pressure setting is reached. Repeat the test and secure the lock nut.



## 2.5 Fail- Safe Feature

In the event of a loss of air supply to the system the doors will close automatically once the pressure in the system falls below 425kPa. The Lock Up Valve automatically sends a “close door” signal to the control valves and closes all doors before all pressure is lost.

### 2.5.1 To test the operation of the fail-safe feature

- Open the locking globe valve to apply air to the door system.
- Open all doors and isolate the air supply by closing the cock on the wagon.
- Vent the air from the main reservoir line to simulate a loss of air supply by opening any one of the free main reservoir line cocks.

**Warning, when opening the cock hold the end of the hose securely to ensure that it cannot fly up and strike you.**

When the cock is open and sufficient air is lost from the system all of the doors should close automatically. If the doors do not close the lock up valve may be defective or requires adjustment.

## 2.6 Main Control Valves

Each set of doors is driven by a separate cylinder and each cylinder is actuated by its own main control valve. The main control valve is a three position, self-centring valve. The main control valve is to be removed, cleaned and lubricated as part of each preventative maintenance service.

### 2.6.1 To service the main control valves

- Discharge the door system
- Take note of the position of the hoses and remove the main control valve from the wagon.
- Wipe down the exterior of the valve body, taking care not to allow any dirt to enter the valve.
- Remove the plastic backing plate from the end of the valve and carefully remove the spool.
- Wipe out the inside of the valve body with a lint free cloth. Do not insert any hard objects into the bore of the valve body. If the bore is damaged the valve will have to be replaced.
- Wipe down the spool with a lint free cloth and inspect sealing surfaces for damage.

- Relubricate the spool and bore using “Maglube” and reassemble and replace the valve.

## 2.7 Door Operation

There are four sets of control handles on the wagon. The function of each set is identical. Each set of controls consist of three handles, each handle corresponds to a set of doors.

### 2.7.1 To test the operation of the doors

- Open the locking globe valve to apply air to the door system.
- Check for leaks in the valve body. If leaks are detected replace hand valve. Hand valves can be serviced in the same manner as the main control valve.
- Fully open and close each door. The doors should be fully open in approximately 3 to 4 seconds. The speed at which the doors open and close can be set by adjusting the exhaust needle on the main control valve.
- Check for binding in the door mechanism or blockages. Note, do not use wet lubricants on bushes in the door linkages.
- Repeat the process for each set of controls.
- With the system charged close all of the doors and allow the wagon to stand for 10 minutes.
- After ten minutes check the position of the doors to see if any of the doors have crept open. If any of the doors have opened then the main control valve is faulty and must be replaced.
- Retest the door operation if a valve is replaced.
- Return the Door Isolating Cock to the close position and lock with the key.
- Complete the NDFF Dor Test Report Sheet

## 2.8 Trouble shooting

<b>Problem</b>	<b>Possible Fault</b>	<b>Action required</b>
All of the doors not operating	1. Lock up valve not operating correctly Air supply not attached	<ul style="list-style-type: none"> <li>• Adjust or replace LUV</li> </ul>
Some doors not operating	1. Faulty main control valve 2. Faulty shuttle valve 3. Door linkages jammed or damaged	<ul style="list-style-type: none"> <li>• Replace valve assembly</li> <li>• Check and replace shuttle valves</li> <li>• Check and repair linkages</li> </ul>
Doors only operate from some hand control sets	1. Faulty hand control valve 2. Faulty shuttle valve	<ul style="list-style-type: none"> <li>• Replace valve assembly</li> <li>• Check and replace as required</li> </ul>
Failsafe not operating	Faulty Lock up valve	<ul style="list-style-type: none"> <li>• Adjust or replace valve LUV</li> </ul>
Doors close by themselves	Faulty Lock up valve	<ul style="list-style-type: none"> <li>• Adjust or replace valve</li> </ul>
Doors operate too slow or fast	Main control valve not operating correctly	<ul style="list-style-type: none"> <li>• Adjust exhaust port needle setting on Main control valve</li> </ul>
Doors open by themselves	Faulty Main control valve	<ul style="list-style-type: none"> <li>• Replace Main control valve assembly</li> </ul>
Doors reservoir not discharging	DIC globe not installed correctly	<ul style="list-style-type: none"> <li>• Disassemble DIC and rotate globe 180<sup>0</sup> and reassemble</li> </ul>
Continuous discharge of air from DIC exhaust	DIC globe not installed correctly	<ul style="list-style-type: none"> <li>• Disassemble DIC and rotate globe 180<sup>0</sup> and reassemble</li> </ul>

## 3 Reporting

Complete the NDFF Door Test Report Sheet and fax to Train Operations Unit.

## 4 References

### 4.1 RIC Drawings

004-700	Wagon General Arrangements Schematic
004-714	Door Air Equipment and Piping Arrangement
004-715	Door Air Equipment and Piping Arrangement
004-717	Door Air Equipment and Piping Schematic

### 4.0 Definitions

- kPa. Kilopascals – area pressure

## 5 Referenced Documents

RSS 0010	Ballast Wagon Maintenance Policy
RSS 0064	Brake Pipe sealant Compounds