



Rules for the Installation, Inspection and Testing of Air Reservoirs (Other than on Locomotives)

December 5, 1994



Railway Association
of Canada

Rules for the Installation, Inspection and Testing of Air Reservoirs (Other than on Locomotives)

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PART I - GENERAL

1. Short Title

1. For ease of reference, this rule may be referred to as the "Air Reservoir Rule".

2. Scope

- 2.1 These rules prescribe the standards for installation, inspection, testing and reporting of air reservoirs used by railway companies subject to the jurisdiction of Transport Canada. These rules apply to stationary and portable reservoirs except those on locomotives.

3. Definitions

In these rules:.

- 3.1 "**air reservoir**" means a tank of air larger than 5 cubic feet and under pressure greater than 15 pounds per square inch;
- 3.2 "**automatic drain valve**" means a device which automatically drains condensate from the air reservoir supply system;
- 3.3 "**department**" means the Department of Transport, Surface Group;
- 3.4 "**design pressure**" means the maximum permissible internal operating pressure for a vessel in its normal operating position at the operating temperature specified for that pressure, and includes a factor of safety of 4*;
- 3.5.1 "**factor of safety**" means a margin of safety and is used to determine maximum allowable stress value used for the design of the reservoir;
- 3.6 "**authorized working pressure**" means the pressure at which a vessel is authorized to operate; it must always be less than the design pressure;
- 3.7 "**hydrostatic testing**" means a test capable of pressurizing the reservoir to a minimum test pressure of 1 1/4 times the maximum authorized working pressure (as prescribed on the badge plate);
- 3.8 "**railway company**" means a railway or railway company subject to the Railway Safety Act; * factor corrected to read 4 instead of 5 as per approval letter dated March 11, 1998
- 3.9 "**railway safety inspector**" means a Department of Transport inspector appointed pursuant to section 27 of the Railway Safety Act;
- 3.10 "**telltale drilled**" means a reservoir drilled to a pre-determined depth over its entire surface, both shell and heads, using a standard 3/16" drill.

4. General

- 4.1 A railway company is responsible to ensure that all air reservoirs, associated piping, pressure gauges and safety valves attached thereto, are safely maintained.
- 4.2 A railway company shall prepare and distribute suitable air reservoir maintenance guidelines to railway staff which upon request shall be made available to a railway safety inspector. These guidelines will include authorized working pressure.
- 4.3 Any reservoir developing leakage through a telltale hole or corrosion of the reservoir steel plate shall be permanently removed from service.
- 4.4 Any newly installed reservoir shall be telltale drilled using the procedures in section 8.2.

5. Reservoir Installation Requirements

5.1 Identification

A serial number and the authorized working pressure shall be plainly stamped in figures not less than 1/4 inch high on a metal plate, and the metal plate fastened to the reservoir in a conspicuous location.

5.2 Pressure Gauges

Each stationary air reservoir system shall be equipped with a pressure gauge graduated to a least fifty per cent above the safety valve setting.

5.3 Safety Valves

- a) Capacity: All air pressure systems shall carry a safety valve or valves of approved design in an approved location and of the capacity specified to suit conditions of the individual service. In this section, 'approved' refers to the current version of Section 1, ASME Boiler and Pressure Vessel Codes.
- b) Adjustment: Safety valves shall be set at a pressure not to exceed 6 pounds above the authorized working pressure, and never above the design pressure.

5.4 Drain Valve

Every air reservoir shall be provided with an automatic or manual drain valve connected to the lowest part of the reservoir.

5.5 Setting

Reservoirs shall be set up on supports, so that the bottom of the reservoir is clear of the ground and ample space for a drain valve is provided.

6. Inspection and Hydrostatic Testing

6.1 Reservoirs will be inspected to verify condition of reservoir system, air gauges and safety valves. Air gauges and safety valves shall be inspected annually. Defective components will be replaced.

6.2 Inspections and hydrostatic testing will be performed:

- a) following telltale drilling;
- b) following a modification to the reservoir;
- c) and according to the following schedule:

	TYPE OF RESERVOIR	INSPECTION FREQUENCY		HYDROSTATIC TESTING
		STATIONARY	PORTABLE	
i)	Corrosion resistant steel	Once every 10 years	To be included with routine inspection of main equipment	Not required
ii)	Telltale drilled, welded	Once every 5 years	To be included with routine inspection of main equipment	Not required
iii)	Undrilled, welded	Once every 3 years	To be included with routine inspection of main equipment	Once every 3 years
iv)	Riveted	Annually	Annually	Annually

7. Hydrostatic Testing Procedures

7.1 Reservoirs requiring hydrostatic testing shall be tested to a pressure at least 25 per cent greater than the working pressure authorized under 5.1. The date of the hydrostatic test shall be stenciled in not less than one inch figures at a prominent location on each reservoir.

7.2 The entire surface of an undrilled reservoir shall be hammer-tested before each hydrostatic test with reservoir under atmospheric pressure.

7.3 All undrilled air reservoirs shall be thoroughly cleaned by washing out at each hydrostatic test, so as to remove all foreign matter, and then closely examined for corrosion and pitting.

8. Telltale Drilling

8.1 General

Existing welded reservoirs may be telltale drilled using the procedures in section 8.2. Newly installed reservoirs, except those constructed of corrosion resistant steel, must be telltale drilled.

8.2 Procedures

- a) Each air reservoir, originally constructed and maintained to withstand at least four* times the authorized working pressure, may be drilled over its entire surface both shell and heads with telltale holes, made by a standard 3/16" drill which shall be spaced not more than 12 inches apart, measured both longitudinally and circumferentially, and drilled from the outer surface to a minimum depth determined by the formula:

$$D = \frac{0.6 PR}{S - 0.6 P}$$

where:

D = minimum depth of telltale holes in inches but in no case less than 1/16 inch;

P = design pressure in pounds per square inch;

S = 1/5 of the minimum specified tensile strength of the material in pounds per square inch; and

- factor corrected to read four instead of five as per approval letter dated March 11, 1998
 - R = inside radius of the reservoir in inches;
- b) the design pressure P is obtained from:

$$P = \frac{SEt}{R + 0.6t}$$

where:

S = 1/5 of the Minimum tensile strength in pounds per square inch;

E = joint efficiency as specified per UW-12 ASME Code Section VIII Div 1;

t = minimum thickness of shell plate in inches; and

R = inside radius of shell in inches;

- c) on horizontal reservoirs, one row of holes shall be drilled lengthwise in a line at the bottom of the reservoir;
- d) on vertical reservoirs one row of holes shall be drilled on a line passing through the lowest point of the reservoir;
- e) the holes drilled in each head shall be radially in line with the longitudinal rows of the holes in the shell; and
- f) flange connections, longitudinal seams or other permanent connections to the air reservoir that interfere with telltale hole lines or circles must be cleared by a least one inch.

PART II - FILING REQUIREMENTS

9. FILING REQUIREMENTS WITH THE DEPARTMENT

9.1 Stationary Air Reservoirs

- a) each railway company shall file with the Department a list of all air reservoirs in service;
- b) any new air reservoirs placed in service or air reservoirs removed from service shall be filed with the Department annually; and
- c) a copy of "Specification and Inspection Report for Air Reservoirs and Associated Components" form (Appendix I) will be displayed under transparent cover at or near the location of the air reservoir.

9.2 Portable Air Reservoirs

- a) each railway company shall file with the Department a list of the air reservoirs in service;
- b) any new air reservoirs placed in service or air reservoirs removed from service shall be filed with the Department annually; and
- c) the inspection date will be stamped or stenciled on the reservoir.

APPENDIX I

SPECIFICATION AND INSPECTION REPORT FOR AIR RESERVOIRS AND ASSOCIATED COMPONENTS

.....
(Name of railway company)

Located at or on _____ Railway Serial No. _____
Manufactured by _____ Service _____
Manufacturer's No. _____
Design pressure _____ Constructed at _____ Date _____
Authorized working pressure lb. per sq. inch _____ Factor of safety _____

Diameter of reservoir _____
Material of shell plates _____ Radius of heads _____ Top _____ Bottom _____
Material of heads _____ Minimum tensile _____ lb/sq. in. _____
Thickness of shell plates _____ Minimum tensile _____ lb/sq. in. _____
Thickness of heads _____
Number and size of manholes _____

Position of reservoir - vertical or horizontal _____
Number, size, make and model of safety valves _____
Location of safety valves (on reservoir, in supply line, etc.) _____
Safety valve or valves set at _____
Telltale drill depth _____
The data upon which calculations were made was _____
obtained from drawing Nos. _____
Date of: the inspection: _____
telltale drilling: _____
hydrostatic testing: _____
the annual inspection of
air gauges and safety valves: _____



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