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Brakes - Regulations concerning the design of brake components

Frein - Prescriptions concernant la construction des différents organes de frein
Bremse - Vorschriften für den Bau der verschiedenen Bremsteile



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The person responsible for this leaflet is indicated in the UIC Code

Contents

Summary	1
1 - Air brake components	2
1.1 - Pipes and connections.....	2
1.2 - End cocks	2
1.3 - Isolation cocks	3
1.4 - Quick-release valves	3
1.5 - Components for operation of the changeover apparatus	4
2 - Alarm signals and release mechanisms for emergency braking	6
2.1 - Alarm signals	6
2.2 - Release mechanisms for emergency braking.....	6
3 - Brake block and rigging	7
3.1 - Brake blocks and brake block holders.....	7
3.2 - Brake rigging.....	7
4 - Couplings	9
5 - Brake pipe emptying accelerators	10
Appendix A - Arrangement of air brake pipe connections	11
A.1 - Arrangement permissible only for vehicles fitted at 1.1.1969 with a continuous brake or only one train pipe.....	11
A.2 - Obligatory arrangement as of 1.1.1969 for new vehicles or vehicles equipped with a continuous brake and, where relevant, a main feed pipe	13
Appendix B - Arrangement of air brake pipe connections	16
Appendix C - Coupling for automatic air brakes	18
Appendix D - Brake hose coupling for main reservoir pipe	19
Appendix E - Handles of the brake changeover apparatus	20
Appendix F - Standard contact surface and cotter shape for brake block in two parts.....	21

Appendix G - Standard contact surface and cotter shape for double brake block in two parts	22
Appendix H - Control handle for quick-release valves.....	23
Appendix I - Quick-release valves accepted in international services	24
Appendix J - Brake pipe emptying accelerators accepted in international service ...	25
Appendix K - Brake block holder for organic bond composite brake blocks, type K.	26
Bibliography	27

Summary

This leaflet outlines the key characteristics with which brake system components must comply in so far as these are not covered in other separate leaflets in the 541-X series.

The brake must comply with all UIC regulations governing the design of the different equipment components and their fitting to the vehicles (for example, layout of the couplings, shape and position of the changeover devices, etc.).

1 - Air brake components

○ 1.1 - Pipes and connections

1.1.1 - Pipes and connections are governed by the requirements of *EN 15179* and *EN 15807* (see [Bibliography - page 27](#)). The requirements of *EN 15179* are also applicable for wagons except the internal diameter of the brake pipe which shall be 32 mm.

1.1.2 - The arrangement of air brake pipe connections of vehicles must comply with the provisions of Appendices [A.1 - page 11](#), [A.2 - page 13](#) or [B - page 16](#).

NB: It is recommended that the coupling arrangements laid down in Appendices [A.1](#) and [B](#) of this leaflet should be made the same as those in [Appendix A.2](#), in the event of any considerable modification to vehicles built prior to 1.1.1969.

1.1.3 - If the vehicle is fitted with a main feed pipe, the coupling connections of this pipe must be placed at a greater distance from the centre-line of the vehicle than those of the automatic brake train pipe.

1.1.4 - The shape of the ends of the pipes and their threading must comply with the indications of Appendices [C - page 18](#) and [D - page 19](#).

1.2 - End cocks

○ **1.2.1** - End cocks are governed by *EN 14601* (see [Bibliography](#)).

○ **1.2.2** - Brake cock design:

1.2.2.1 - A rotation angle of 125° is permissible for cocks which are not intended to be used on vehicles fitted with automatic couplers. The square of the cock plug shall have a notch indicating the respective position of the cock (the notch placed lengthwise indicates that the cock is in the "open" position).

1.2.2.2 - If a control shaft is used, it must be possible for the cock plug to be fitted with a forked lever in such a way that the rotation angle, between the extreme positions of the cock be symmetrical in relation to the perpendicular line to the longitudinal centre-line of the cock.

1.2.2.3 - The cock handle situated in front of the vehicle headstock may be to the right or left of the pipe except when the cut-off cock is situated near the draw hook ([point A.1](#), [Fig. 1](#), [2](#) and [3](#) and [Appendix B](#), [Fig. 12](#) and [13](#)), in which case the handle must exclusively be mounted on the side opposite the draw gear. The layout of the handles of cocks mounted on vehicles fitted with automatic couplers is governed by *UIC Leaflet 535-2* (see [Bibliography](#)).

1.2.2.4 - The torque values prescribed by *EN 14601* for actuation of the cock must not damage the interlocking device when interlocked in any way.

R 1.2.3 - It is recommended that all new vehicles be equipped with end cocks fitted with a spring locking device in the extreme positions.

- **1.2.4** - End cocks must include a holding device for the handle in both "open" and "closed" positions:
 - as from 1 January 1980 on new coaches and wagons,
 - as from 1 January 1990 on existing coaches,
 - as from 1 January 2000 on freight wagons and all coaches in international service.

This device may consist of:

- either an interlocking,
 - or a spring lock.
- **1.2.5** - Vehicles fitted with the automatic coupler are to be fitted with end cocks with a spring locking device in the extreme positions.
 - **1.2.6** - As from 1 January 2000, all vehicles running in international traffic must be fitted with a device complying with *EN 14601, point 4.3.4*.

1.3 - Isolation cocks

- **1.3.1** - Isolating cocks are governed by *EN 15355* (see Bibliography - page 27).
- R **1.3.2** - It is recommended:
 - that the isolating cock of the brake be fitted on the distributor or in the proximity thereof and that the handle of the cock be clearly visible in its "open" or "closed" positions and can be easily operated from one side of the vehicle.
 - that the movement of the handle of the isolating cock be made parallel to the side of the solebar.

1.4 - Quick-release valves

The release valve must be designed and assembled so that:

- before splitting of the train in marshalling yards takes place, with the through pipe empty, it ensures complete release of the brake after operating the chain for a short time, the air capacities being, furthermore, retained to the greatest possible degree (complete emptying of the control reservoir is permissible);

NB: [R]: It is however permissible for the auxiliary reservoir to be emptied by the quick-release valve in the case of triple valves or old-type distributors.

- in the event of a capacity overload, it ensures that the control reservoir is emptied (also the auxiliary reservoir, if necessary) thereby bringing the capacity to the working pressure;
- when a vehicle brake is taken out of service (following an incident, for example) or is in the workshop, it ensures complete release of the distributor by operating the chain, before any repair work on the brake components takes place.

- It is recommended that the release valve should also be able to empty the air in the equipment, in this case, followed, if necessary, by the closing of the isolating cock (involving isolation of the brake);
- only one chain is necessary, situated on or near the distributor (which can be operated from both sides of the vehicle). In order to be able to distinguish easily the quick-release valve from the conventional release valve, the control handle should comply with [Appendix H - page 23](#) to this leaflet;
- it resumes the loaded position as soon as the pressure in the train pipe reaches 3 kg/cm²;
- it must not alter the characteristics of the brakes to which it is fitted;
- it cannot operate inadvertently as a result of impacts in marshalling yards or circumstances likely to arise during running.

Any Railway wishing to introduce a new quick-release valve for use on international services has to request for UIC certification of the device and applying the procedure as per *UIC Leaflet 541-00*.

Quick-release valves which are found to comply with the above conditions will be shown in [Appendix I - page 24](#) to this leaflet.

○ 1.5 - Components for operation of the changeover apparatus

1.5.1 - The components for operation of the changeover apparatus must be very clearly visible and capable of being worked easily from each side of the vehicle.

1.5.2 - They must, furthermore, comply with the following regulations:

1.5.2.1 - "Passenger only" changeover:

- When a vehicle is fitted with several "passenger" brake systems, changeover from one to another of these systems must be made by means of a lever moving perpendicularly to the axles and the working handle of which has the shape of a loop, in conformity with the indications of [Appendix E, Fig. 20 - page 20](#).
- The position of this lever, which gives a braking system complying with the conditions for passenger trains as laid down in *UIC Leaflet 540*, must be indicated by a special embossed sign, as shown in [Appendix E, Fig. 24 - page 20](#).
- If the application of the "passenger" brake system, which complies with the conditions laid down, requires one or several other levers to be placed in a given position, this position must, for each of them, be indicated by the special embossed sign in conformity with [Appendix E, Fig. 24](#).

1.5.2.2 - "Goods-Passenger" changeover:

- When a vehicle is fitted with one or several "passenger" brake systems and one "goods" brake system, changeover from one to another of these systems must be made by means of a lever moving perpendicularly to the axles and fitted, at its end, with a ball in conformity with the indications of [Appendix E, Fig. 21 - page 20](#).
- For the "goods" brake system, the lever must be inclined towards the top on the left and occupy its extreme position on the left.

- If there is only one "passenger" brake system, the lever for this system must be in an inclined position towards the top on the right, making with the "goods" position an angle of approximately 90°. If there are several "passenger" brake systems, the position of the lever which gives the "passenger" system complying with the conditions laid down in *UIC Leaflet 540* must be indicated by the special embossed sign in conformity with [Appendix E, Fig. 24 - page 20](#).

1.5.2.3 - "Empty-loaded" changeover:

"Empty-loaded changeover" devices are governed by *EN 15624*.

1.5.2.4 - Release changeover (graduated release and direct release positions):

- When a vehicle is fitted with an apparatus allowing the application or the cutting out of the graduated release, this apparatus must work by means of a changeover lever moving perpendicularly to the axles in conformity with the indications of [Appendix E, Fig. 22 - page 20](#).
- In the "graduated release" position, the handle must be directed vertically towards the bottom. In the "direct release" position, the handle must be horizontal and directed either towards the right or the left.

1.5.2.5 - Plain-Mountain" changeover:

- When a vehicle is fitted with a "plain-mountain" changeover, changeover from one system to another must be made by pulling (mountain) and pushing (plain), in a direction parallel to the axles, a ring-shaped handle in conformity with the indications of [Appendix E, Fig. 23 - page 20](#).
- In the "mountain" position, a red sign must be shown, and a yellow one in the "plain" position.

2 - Alarm signals and release mechanisms for emergency braking

2.1 - Alarm signals

Alarm signal devices are governed by *EN 16334* (see Bibliography - page 27).

2.2 - Release mechanisms for emergency braking

The smallest cross section through which air can escape in the event of emergency braking triggered from the train must be at least equal to a 19 mm diameter cross section for new vehicles or vehicles equipped with brake pipe emptying accelerators.

[R]: It is recommended that the same cross section be used for existing vehicles.

[R]: It is recommended that the release valve for emergency braking be connected directly to the train pipe and that the handle of this mechanism be fitted with an extension piece which will be in a vertical position when the valve is closed. If this position is adopted, the valve must be opened from the vehicle by pulling.

- **2.3** - The emergency brake (alarm signal) handle, stipulated in *UIC Leaflet 543, point 1.2.4*, must be easily accessible and able to be sealed.

- R **2.4** - It is recommended that the release valve for emergency braking be connected directly to the train pipe and that the handle of this mechanism be fitted with an extension piece which will be in a vertical position when the valve is closed.

If this position is adopted, the valve must be opened from the vehicle by pulling.

- **2.5** - In all coaches built as from 1.1.1969, the alarm signal resetting device must be placed inside the vehicle and easy to operate from there. It must be designed in such a way that passengers are not able to activate it.

- **2.6** - The release of air to atmosphere from the train pipe, when the emergency alarm is operated, must be carried out in complete safety. The release pipe must not, therefore be fitted with either isolating cocks or dust filters.

- **2.7** - On those vehicles fitted with emergency brake override (SAFI / EBO), the release valve must be designed in such a way that, when the alarm signal is triggered, the pressure in the train pipe falls rapidly to 2 bars (+0/-0,5 bar) and remains at that level thereafter.

- R **2.8** - Release valves designed in accordance with the provisions of **point 2.7** are also accepted for vehicles not equipped with SAFI.