



SLOVENSKI STANDARD
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Železniške naprave - Pnevmatске polspojke

Railway applications - Pneumatic half couplings

Bahnanwendungen - Bremskupplungen

Applications ferroviaires - Demi-accouplements

Ta slovenski standard je istoveten z: EN 15807:2011

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45.040 Materiali in deli za železniško Materials and components
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Applications ferroviaires - Demi-accouplements

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Management Centre: Avenue Marnix 17, B-1000 Brussels

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EN 15807:2011 (E)

Foreword

This document (EN 15807:2011) has been prepared by Technical Committee CEN/TC 256 "Railway applications", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by July 2011 and conflicting national standards shall be withdrawn at the latest by July 2011.

This document has been prepared under a mandate given to CEN/CENELEC/ETSI by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive 2008/57/EC.

For relationship with EU Directive 2008/57/EC, see informative Annex ZA, which is an integral part of this document.

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1 Scope

This European Standard applies to pneumatic half couplings designed to couple either the brake pipes or main reservoir pipes of railway vehicles, without taking the type of vehicles and track-gauge into consideration.

This European Standard gives the requirements for the design, dimensions, testing and quality assurance of pneumatic half couplings.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 14478:2005, *Railway applications — Braking — Generic vocabulary*

EN 50125-1:1999, *Railway applications — Environmental conditions for equipment — Part 1: Equipment on board rolling stock*

EN ISO 8033:2006, *Rubber and plastics hoses — Determination of adhesion between components (ISO 8033:2006)*

EN ISO 9227, *Corrosion tests in artificial atmospheres — Salt spray tests (ISO 9227:2006)*

ISO 37:2005, *Rubber, vulcanized or thermoplastic — Determination of tensile stress-strain properties*

ISO 48:2007, *Rubber, vulcanized or thermoplastic — Determination of hardness (hardness between 10 IRHD and 100 IRHD)*

ISO 188, *Rubber, vulcanized or thermoplastic — Accelerated ageing and heat resistance tests*

ISO 815, *Rubber, vulcanized or thermoplastic — Determination of compression set at ambient, elevated or low temperatures*

ISO 1431-1, *Rubber, vulcanized or thermoplastic — Resistance to ozone cracking — Part 1: Static and dynamic strain testing*

ISO 1431-3, *Rubber, vulcanized or thermoplastic — Resistance to ozone cracking — Part 3: Reference and alternative methods for determining the ozone concentration in laboratory test chambers*

ISO 2285, *Rubber, vulcanized or thermoplastic — Determination of tension set under constant elongation, and of tension set, elongation and creep under constant tensile load*

ISO 8573-1:2010, *Compressed air — Part 1: Contaminants and purity classes*

ISO 23529:2004, *Rubber — General procedures for preparing and conditioning test pieces for physical test methods*

3 Terms, definitions, symbols and abbreviations

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 14478:2005 and the following apply.

EN 15807:2011 (E)**3.1.1****pneumatic half coupling**

assembly of components to connect the BP or MRP of a rail vehicle to the BP or MRP, respectively, of another rail vehicle

3.1.2**components****3.1.2.1****brake coupling head**

components that when mechanically coupled together allow a flow of pressurised air between them

3.1.2.2**nipple**

component at one end of the pneumatic half coupling that connects it to the end cock, or pipe, located on the vehicle

3.1.2.3**hose clip**

component that mechanically fixes the hose to the coupling head or the nipple in order to assembly the pneumatic half coupling

3.1.2.4**sealing washer**

component that is installed in the coupling head to prevent unacceptable loss of air when two coupling heads are connected to one another

3.1.2.5**flexible hose and constituents**

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3.1.2.5.1**flexible hose**

component that is connected between the brake coupling head and the nipple to convey the pressurised air and give the required flexibility between vehicles, and that is generally made up of a elastomeric tube, textile reinforcement and a elastomeric covering bonded together

3.1.2.5.2**tube**

interior layer of the flexible hose

3.1.2.5.3**reinforcement**

intermediate layer that provides the strength to maintain the general shape of the hose whilst giving the flexibility

3.1.2.5.4**covering**

external layer of the flexible hose which protects the interior constituents from mechanical and environmental damage

3.1.3**bar**

1 bar = $10^5 \text{ N/m}^2 = 10^5 \text{ Pa} = 10^{-1} \text{ MPa}$

3.2 Abbreviations

BP	Brake Pipe
MRP	Main Reservoir Pipe

"	inch
LO	a length of 20 mm marked on the calibrated part of the test piece
IRHD	International Rubber Hardness Degree

4 Design and manufacture

4.1 Requirements

4.1.1 Brake pipe

The pneumatic half couplings for the automatic air brake pipe shall conform to Figures 1 and 2 and either 3 or 4. The length of the assembled pneumatic half coupling, dimension X-X in Figure 1, is specified to suit the application, but the recommended length is 730 mm. The nipple to connect to the end cock shall be as shown in Figure 1 and have a truncated internal ISO 228 - G 1 1/4" pipe thread.

4.1.2 Main reservoir pipe

The pneumatic half couplings for the main reservoir pipe shall conform to Figures 5, 6 and either Figures 3 or 4 for interoperable traffic and either Figures 5 and 6 or Figures 7 and 8 plus either Figures 3 or 4 for internal traffic within a Member State. The length of the assembled pneumatic half coupling, dimension X-X in Figure 5 or 7, is specified to suit the application, but the recommended length is 730 mm. The nipple to connect to the end cock shall be as shown in Figure 1 (and is the same as for the air brake pipe) and have a truncated internal ISO 228 - G 1 1/4" pipe thread.

4.1.3 Flexible hose

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4.1.3.1 General <https://standards.iteh.ai/catalog/standards/sist/4e955518-f415-4847-b465-d0911b13a464/sist-en-15807-2011>

The internal diameter of the coupling hoses for both pipes shall be between 25 mm and 30 mm. The recommended diameter is 28 mm. The length of the flexible hose is varied to suit the application, but should be the standard 620 mm to give the recommended length of 730 mm for dimension X-X as shown in Figures 1, 5 and 7. The recommended length of these hoses when used with a swing head autocoupler should be increased to give an assembled length of the pneumatic half coupling of 1 080 mm for the automatic air brake pipe and 930 mm for the main reservoir pipe. Elastomeric composite hoses having a textile reinforcing inlay sealed (vulcanised) at each end shall generally be used for these couplings, Figure 9, but hoses of other materials, e.g. metallic, may be used if they are flexible enough. The flexible hose shall conform to the dimensions defined in Figure 9. The choice of elastomers for elastomeric composite hoses is the choice of a manufacturer to meet the requirements of this specification. The elastomer used during a serial production shall conform with regard to the formulation of materials and characteristics to those products tested in the qualification procedure.

The tolerances for the overall length of the pneumatic half couplings shall be:

< 1 000 mm	± 5 mm
1 000 mm to 2 499 mm	± 10 mm
2 500 mm to 6 000 mm	± 30 mm
> 6 000 mm	± 0,8 %

The requirements 4.1.3.2 to 4.1.3.14 concern the elastomeric composite hoses.

NOTE In the case of use of another material, the tests to be conducted shall be defined in agreement between the customer and the supplier.

EN 15807:2011 (E)**4.1.3.2 Bending**

It shall be possible to bend the hose to form approximately a torus of internal diameter equivalent to about 4 times the external nominal diameter of the hose, without using a force greater than 130 N for this operation, without folds appearing on the peripheral surface and without the maximum flattening recorded amounting to more than 16 % of the nominal external diameter of the hose.

This requirement shall be tested in accordance with 5.3.3.

4.1.3.3 Pressure test

After being subjected to an internal pressure of 13 bar for a period of 5 min, there shall be no apparent leak, swelling, or tear on the hose. The dimensional variations admitted under pressure conditions shall be as follows:

- variation in external diameter $\pm 10 \%$;
- variation in length $\leq 3,5 \%$;
- twist $\leq 20 \text{ }^\circ/\text{m}$.

In addition, after discontinuation of the test pressure, no permanent deformation of the hose shall be apparent, after a waiting period of 3 min.

This requirement shall be tested in accordance with 5.3.4.

4.1.3.4 Bursting pressure

The bursting pressure, measured on the hose in delivery condition, shall not be less than 70 bar.

This requirement shall be tested in accordance with 5.3.5.

4.1.3.5 Adhesion of the reinforcement

The mean value of the force needed to separate the reinforcement and each of the layers shall not be less than:

- 70 N for hoses tested in accordance with EN ISO 8033:2006, type 1 in delivery condition, and
- 87 N for hoses tested in accordance with EN ISO 8033:2006, type 2 in delivery condition;
- 55 N for hoses tested in accordance with EN ISO 8033:2006, type 1 after ageing for 7 days at 70 °C, and
- 75 N for hoses tested in accordance with EN ISO 8033:2006, type 2 after ageing for 7 days at 70 °C.

This requirement shall be tested in accordance with 5.3.6.

NOTE if the methods from EN ISO 8033:2006, types 1 or 2 are not appropriate to a specific design of half coupling another method from EN ISO 8033 can be used. The criteria of acceptance shall be defined before the test on a case-by-case basis.

4.1.3.6 Resistance of the internal and external layers of the hose to repeated tensile loads

The internal and external layers of the hose, when subjected to successive repeated tensile loads, shall withstand, in accordance with the conditions defined in 5.3.7:

- 400 tensile loadings for hoses tested in delivery condition;
- 350 tensile loadings for hoses tested after ageing for 7 days at 70 °C.

This requirement shall be tested in accordance with 5.3.7.

4.1.3.7 Residual deformation through static tensile loading of the internal layer of the hose

After tensile loading, the test piece taken from the internal layer of the hose and tested after ageing for 7 days at 70 °C, shall not be more than $L_0 + 12\%$ in length.

This requirement shall be tested in accordance with 5.3.8.

4.1.3.8 Impact test

After being subjected to the impact of a weight of 10 kg dropped from a height of 1 m, the bursting pressure of the hose shall not be less than 70 bar.

This requirement shall be tested in accordance with 5.3.9.

4.1.3.9 Resistance to ozone cracking of the external layer of the hose under static conditions

The external layer of the hose, after exposure to an ozone enriched atmosphere, shall not show signs of cracking visible with a magnifying glass with a magnifying power of 7 X.

This requirement shall be tested in accordance with 5.3.10.

4.1.3.10 Deflection at low temperature

The deflection of the hose as measured at the end of a length of 250 mm, 3 s after application of a load of 20 N at -30 °C , shall not be less than 20 mm.

This requirement shall be tested in accordance with 5.3.11.

4.1.3.11 Ease of assembly of connections on the hoses

It shall be possible for the connections to be easily mounted on the hoses under the conditions stipulated in 5.3.11, so that the end of the hose makes clean contact with the shoulder of the connection. The centre lines of the hose and connection shall be in alignment after assembly.

This requirement shall be tested in accordance with 5.3.12.

4.1.3.12 Resistance to uncoupling of connections on the hoses

Uncoupling of the connection of the hose to the end fittings shall not occur when the pressure is less than 20 bar when the hose has been inserted as prescribed in 4.1.3.11 and the hose clamp has been tightened using the minimum force prescribed in the assembly instructions for the pneumatic half coupling.

This requirement shall be tested in accordance with 5.3.13.

4.1.3.13 Flare test

After the test provided for in 5.3.14, the linings and layers shall neither tear nor become detached. The inspection shall cover the visible outer surfaces and it shall be performed with the naked eye.

Moreover, the residual widening shall not exceed 2 % after a period of rest.

This requirement shall be tested in accordance with 5.3.14.

EN 15807:2011 (E)**4.1.3.14 Hardness**

Requirements for hardness are the following:

- hardness as ready for submission (at $23\text{ °C} \pm 2\text{ °C}$): Manufacturers stated nominal IRDH with a tolerance of -2 +8 % IRHD.
- hardness after ageing for 7 days at 70 °C : Hardness recorded after ageing shall not deviate by more than -2 +8 % IRHD from the value recorded before ageing.

This requirement shall be tested in accordance with 5.3.15.

4.1.4 Ring-shaped elastomer joints**4.1.4.1 Dimensions**

The dimensional specifications of the joints shall be in conformity with the requirements of Figures 3 or 4.

4.1.4.2 Hardness

Requirements for hardness are the following:

- hardness as ready for submission (at $23\text{ °C} \pm 2\text{ °C}$): 65 IRDH with a tolerance of ± 5 IRHD.
- hardness after ageing for 7 days at 70 °C : Hardness recorded after ageing shall not deviate by more than 5 IRHD from the value recorded before ageing.

This requirement shall be tested in accordance with 5.4.3.

4.1.4.3 Tensile characteristics

a) As ready for submission:

- 1) ultimate tensile strength $\geq 10\text{ MPa}$;
- 2) elongation at break $\geq 300\text{ %}$.

b) After ageing for 7 days at 70 °C :

Characteristics recorded after ageing shall not deviate from those recorded prior to ageing by more than:

- 1) 20 % for ultimate tensile strength;
- 2) 30 % for elongation at break.

This requirement shall be tested in accordance with 5.4.4.

4.1.4.4 Deformation tests

Deformation tests shall be carried out at high and low temperature. The test set out in Table 2 under point “deformation under tensile test” or those specified under point “deformation under compression test” shall be performed.

a) Deformation under tensile test:

- 1) tension set under 50 % elongation for 24 h at 70 °C : $\leq 10\text{ %}$;

- 2) flexibility test at $-25\text{ }^{\circ}\text{C}$ and under 50 % compression, carried out on a joint as ready for submission: $\leq 8\text{ }%$.

b) Deformation under compression test:

- 1) compression set following compression for 22 h at $70\text{ }^{\circ}\text{C}$: $\leq 25\text{ }%$;
- 2) compression set following compression for 22 h at $-30\text{ }^{\circ}\text{C}$: $\leq 60\text{ }%$.

This requirement shall be tested in accordance with 5.4.5.

4.1.4.5 Water tightness

Two coupling heads, fitted with sealing washers and joined together to simulate service conditions and immersed in water, shall be watertight round the sealing washers and allow no visible leakage (no air bubbles) under the effect of 0,5 bar air pressure.

This requirement shall be tested in accordance with 5.4.6.

4.1.5 Coupling heads

The coupling heads for the BP shall conform to Figure 2. The coupling head for the MRP shall conform to Figure 6 for interoperable traffic and either Figure 6 or Figure 8 for internal traffic within a Member State. Both figures show the mandatory dimensions to ensure coupling, but the shape and the other dimensions are able to be varied provided the heads are designed to offer the least possible resistance to airflow. The coupling heads can be made as a single piece or two pieces, the second piece is shown by the ++ in Figures 2 and 6. If the coupling head is made in a single piece the sealing washer shown in Figure 3 shall be used, otherwise the sealing washer shown in Figure 4 shall be used.

Annex B shows a special form of coupling head for the MRP when used for rescue purposes for internal traffic within a Member State. <https://standards.iteh.ai/catalog/standards/sist/4e955518-f415-4847-b465-d0911b13a464/sist-en-15807-2011>

Dimensions in millimetres

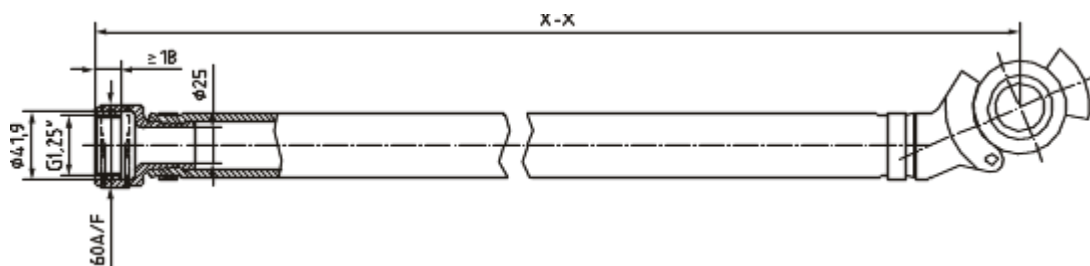
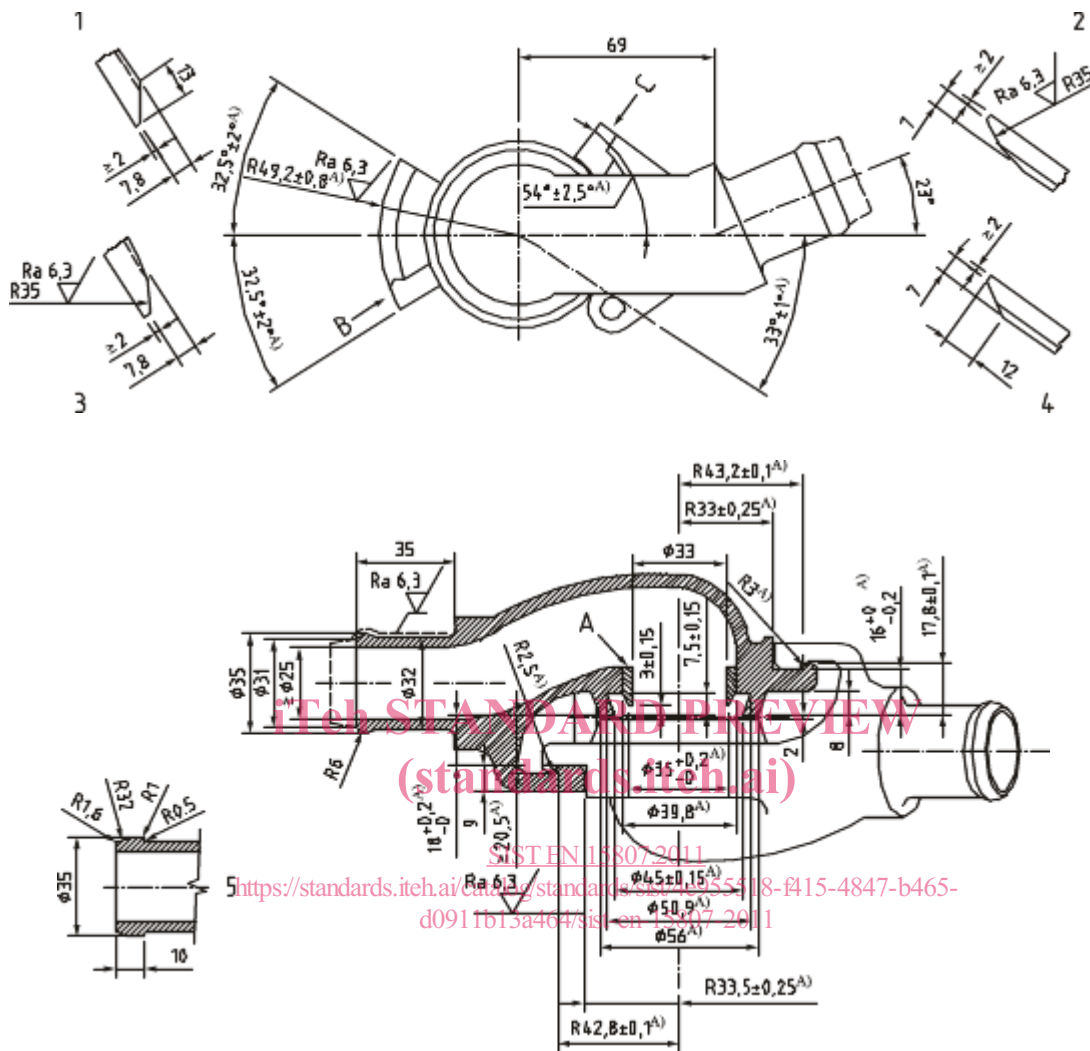


Figure 1 — Brake pipe pneumatic half coupling

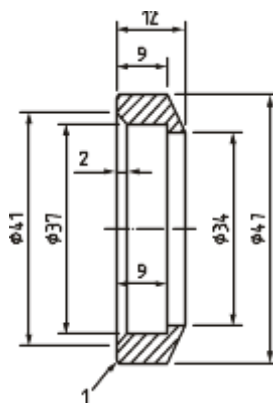
Dimensions in millimetres

**Key**

- 1 alternative view in direction of arrow B
 - 2 part view in direction of arrow C
 - 3 part view in direction of arrow B
 - 4 alternative view in direction of arrow C
 - 5 alternative form for end nipple of coupling head
- A) mandatory dimension

Figure 2 — Brake pipe coupling head

Dimensions in millimetres

**Key**

1 bevelled edge

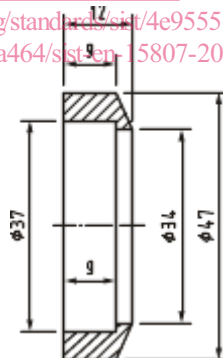
NOTE All dimensions are mandatory.

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Figure 3 — Sealing washer
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Dimensions in millimetres

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NOTE All dimensions are mandatory.

Figure 4 — Sealing washer