



SLOVENSKI STANDARD
SIST EN 15020:2007+A1:2010
01-december-2010

Železniške naprave - Vlečna spenjača - Zahteve za izdelavo, geometrija vmesnika in preskusne metode

Railway applications - Rescue coupler - Performance requirements, specific interface geometry and test methods

Bahnanwendungen - Abschleppkupplung - Leistungsanforderungen, spezifische Schnittstellengeometrie und Prüfverfahren

Applications ferroviaires - Attelage de secours - Exigences concernant la performance, la géométrie des interfaces et les méthodes d'essai

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EUROPEAN STANDARD
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Railway applications - Rescue coupler - Performance requirements, specific interface geometry and test methods

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This European Standard was approved by CEN on 2 October 2006 and includes Amendment 1 approved by CEN on 28 September 2010.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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Contents

	Page
Foreword.....	3
1 Scope	4
2 Normative references	4
3 Terms and definitions	4
4 Product requirements	5
5 Test requirements.....	8
Annex A (informative) Automatic coupler.....	10
Annex B (normative) Rescue coupler.....	14
Annex C (informative) Characteristics of the rescue vehicle	18
Annex D (informative) Air pipe coupling heads	21
Annex ZA (informative)  Relationship between this European Standard and the Essential Requirements of EU Directive 2008/57/EC of the European Parliament and of the Council of 17 June 2008 on the interoperability of the rail system within the Community (Recast) 	24
Bibliography	26
Figure 1 — Pneumatic connection between the rescue vehicle and the rescue coupler	7
Figure A.1 — Automatic coupler (front view)	10
Figure A.2 — Automatic coupler (top view)	11
Figure A.3 — Automatic coupler (lateral view)	12
Figure A.4 — Automatic coupler (isometric view).....	13
Figure B.1 — Rescue coupler (lateral view).....	14
Figure B.2 — Rescue coupler (top view).....	15
Figure B.3 — Rescue coupler (front view)	16
Figure B.4 — Rescue coupler (isometric view)	17
Figure C.1 — Draw hook	18
Figure C.2 — Available space for locomotives with foot-step.....	19
Figure C.3 — Connection for air pipes (see UIC 648:2001, Annex A)	20
Figure D.1 — Coupling head for brake pipe.....	21
Figure D.2 — Washer.....	22
Figure D.3 — Washer with bevelled edge.....	22
Figure D.4 — Coupling head for main reservoir pipe	23

Foreword

This document (EN 15020:2006+A1:2010) 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 May 2011, and conflicting national standards shall be withdrawn at the latest by May 2011.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document includes Amendment 1, approved by CEN on 2010-09-28.

This document supersedes EN 15020:2006.

The start and finish of text introduced or altered by amendment is indicated in the text by tags A1 and A1.

A1 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. A1

The requirements on coupling interfaces of end couplers will be dealt with in a new work item.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

EN 15020:2006+A1:2010 (E)**1 Scope**

This European Standard specifies the requirements for the rescue coupler for train sets compliant with the Technical Specification for Interoperability High Speed Rolling Stock. It defines the interfaces to which it has to match during rescue operations. It is suitable for locomotives fitted with UIC 520 pattern draw gear and buffers, i.e. moveable draw hook and draw gear capable of compressive loading.¹⁾

Provisions going beyond the scope of this European Standard need to be agreed upon by the contracting parties involved.

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.

prEN 15085, *Railway applications — Welding of railway vehicles and components*

EN ISO 5817, *Welding — Fusion-welded joints in steel, nickel, titanium and their alloys (beam welding excluded) — Quality levels for imperfections (ISO 5817:2003)*

3 Terms and definitions

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For the purposes of this document, the following terms and definitions apply.

3.1
rescue coupler
special coupling that enables the hauling and propelling of a failed train unit or train set by another vehicle that is equipped with different coupling design

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3.2
rescue vehicle
type of vehicle used to rescue a failed train unit or train set

3.3
automatic coupler
latch-type automatic coupler allowing the mechanical, pneumatic and in some cases electrical connection between two train units or train sets without manual assistance, also known as "Scharfenberg system type 10" automatic coupler

3.4
draw hook
part of a conventional and mechanical manual coupling, also known as UIC draw hook

3.5
main reservoir pipe
pipe containing air pressure at a value which is sufficient to supply subsystems including the brake system
[EN 14478:2005]

¹⁾ UIC 520 will be replaced by a European Standard on draw gear and buffers which is in preparation (prEN 15551 for buffers and prEN 15566 for draw gears).

3.6**brake pipe**

pipe containing and conveying fluid, usually air, enabling train brake control

[EN 14478:2005]

3.7**air pipe coupling head**

special connection situated at the free end of the hoses used for conventional pneumatic links between vehicles (see Annex D)

4 Product requirements**4.1 Rescue coupler characteristics**

The rescue coupler shall be compatible with:

- the Scharfenberg® system type 10 automatic coupler²⁾ having the dimensions specified in Annex A and
- the draw hook having the dimensions shown in Figure C.1.

The main dimensions and characteristics of the rescue coupler shall be as given in Annex B.

The mass of the complete rescue coupler in its operational condition shall not exceed 50 kg.

The rescue coupler shall be able to withstand the following loads without permanent deformation:

- maximum tensile load = 300 kN;
- maximum compressive load = 250 kN.

NOTE There are no fatigue requirements for the rescue coupler.

The rescue coupler shall be equipped with handles or components which serve as such for transport and lifting.

Material certificates and weld-classes used shall meet current requirements. Welded parts shall be in accordance with prEN 15085 and EN ISO 5817.

4.2 Rescue vehicle characteristics

The rescue vehicle characteristics to be taken into account are defined as follows:

- connections for electric cables and air pipes on head stocks of locomotives (see Figure C.3);
- draw hook (see Figure C.1). Due to different markings located on both sides of the hook it is compulsory to consider a 59_0^{+2} mm hook width;
- pneumatic coupling for brake pipe and main air reservoir pipe (see Annex D). The rescue coupler pneumatic pipes and their connections shall be provided for a 10 bar pressure.

2) Scharfenberg® is a registered trademark of Voith Turbo Scharfenberg, Salzgitter, Germany. This information is given for the convenience of users of this European Standard and does not constitute an endorsement by CEN of the product bearing this trademark. Equivalent products may be used if they can be shown to lead to the same results.

EN 15020:2006+A1:2010 (E)**4.3 Fitting procedure**

The rescue coupler shall be placed close to the front of the rescue vehicle.

The rescue coupler shall be mounted on the draw hook.

It shall be possible for the coupler to be lifted and mounted onto the draw hook of the rescue vehicle by no more than two persons. The available space around the draw hook of the rescue vehicle shall be taken into account.

Mounting of the rescue coupler on the draw hook shall not require any special tools.

The coupler shall be secured to the draw hook with a fixing device in such a way that it cannot freely move or come off the draw hook during the rescue operation.

Once the rescue coupler is mounted on the draw hook of the rescue vehicle:

- the installed rescue coupler shall have at least $\pm 6^\circ$ vertical movement from the horizontal during operation;
- it shall be possible for the coupler to be adjusted vertically on the draw hook without the need for special tools;
- coupling and uncoupling operation shall not require any human presence between the rescue vehicle and the failed train unit or train set whilst either is being moved;
- the rescue coupler and the pneumatic hoses shall not limit the maximum lateral movement of the draw hook.

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4.4 Coupling conditions

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4.4.1 Mechanical coupling

The mechanical coupling between the automatic coupler on the failed train set and the rescue coupler on the rescue vehicle shall be automatic.

It shall be possible to couple a train set to a rescue vehicle in a 150 m radius curve. For vehicles fitted with automatic couplers, the car builder shall demonstrate:

- automatic coupling with a rescue coupler
- uncoupling performance in 150 m radius curve conditions.

The rescue coupler shall be designed to ensure that coupling is possible when the height mismatch between the centre lines of the automatic coupler and the draw hook is up to 75 mm. Use of guide horn is not compulsory if this requirement is fulfilled by the vertical adjustability of the rescue coupler.

Coupling operation should be done as follows:

- at a speed not exceeding 2 km/h;
- the rescue coupler shall be aligned in order to be coupled with the mating automatic coupler of the failed train unit or train set to be rescued.

4.4.2 Pneumatic coupling

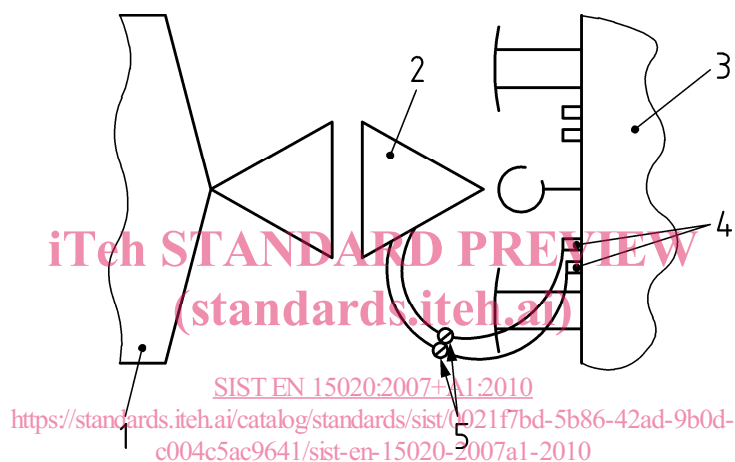
Connection of the air pipes (brake pipe and main reservoir pipe) shall be made semi-automatically through the rescue coupler. Therefore, the rescue coupler air pipe ends shall be equipped with air pipe coupling heads which allow manual connection of the rescue vehicle air pipes (see Figure 1).

Following testing on location at the manufacturer's establishment the air pipes connected to the rescue coupler shall be free to rotate about their axes .

In the case of pneumatic hoses that can be removed from the coupler body, it shall not be possible to refit the hoses incorrectly.

The pipe length (brake pipe and main reservoir pipe) shall be sufficient in order to ensure safe connection between the pipes of the rescue coupler and the rescue vehicle.

After completion of the mechanical coupling operation and the connection of the air pipes, the end-cocks on the rescue vehicle shall be open.



Key

- | | | | |
|---|-----------------|---|----------------|
| 1 | train set | 2 | rescue coupler |
| 3 | locomotive | 4 | air pipes |
| 5 | ⊕ coupling head | | |

Figure 1 — Pneumatic connection between the rescue vehicle and the rescue coupler

4.5 Operating conditions

The brake pipe of the rescued train set shall be connected to the brake pipe of the rescue vehicle. The rescue vehicle shall be able to control the braking system of the rescued train set in accordance with the operator's rules.

The rescue coupler when coupled with the automatic coupler of the failed train shall be capable of negotiating a 150 m radius S-curve with an intermediate straight of 7 m without interference to other vehicle elements. The car builder shall demonstrate that the length of the rescue coupler is sufficient.

The minimum speed for hauling and propelling should be 30 km/h because of higher in-train forces resulting from the pneumatic braking system propagation and build-up times. Higher speeds are permissible.

EN 15020:2006+A1:2010 (E)**4.6 Uncoupling conditions**

Before uncoupling, the end cocks of the main reservoir pipe (air pipe) and automatic air brake pipe (brake pipe) of the rescue vehicle shall be closed.

Uncoupling may be done manually or automatically by releasing the coupler lock of the mating automatic coupler on the rescued train set.

5 Test requirements**5.1 Routine tests**

The supplier of the rescue coupler shall perform routine tests during manufacturing and after final assembly.

The following tests are recommended to be part of the routine test program for all rescue couplers that are manufactured in serial production:

- visual checks based on assembly drawings;
- dimensional checks (main and interface dimensions) with the aim of ensuring the compatibility of the rescue coupler with the draw hook and the automatic coupler. The dimensional checks shall include all main dimensions as stated in Annex B;
- weight check;
- check of fit of the rescue coupler on the draw hook according to Figure C.1;
- automatic mechanical and pneumatic coupling of the rescue coupler with an automatic coupler. The rescue coupler and the automatic coupler should be horizontally and vertically aligned;
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- uncoupling performance of the rescue coupler coupled to an automatic coupler by releasing the coupler lock of the adjacent automatic coupler. Uncoupling shall be possible with a minimum air pressure of 6,5 bar and maximum air pressure of 10 bar;
- leakage test.

5.2 Type tests**5.2.1 General**

Type tests shall be performed on a rescue coupler representative of serial production.

5.2.2 Strength

It shall be demonstrated by static tests that the rescue coupler withstands the loads stated in 4.1.

Static testing under maximum tensile and compressive loads shall be performed with a rescue coupler mounted on a draw hook. The rescue coupler shall be coupled to an automatic coupler.

The loads shall be applied gradually up to the maximum value and held for 3 min.

The maximum tensile and compressive loads shall not give repeatable permanent deformation of the rescue coupler.

The maximum tensile and compressive loads shall not produce undue uncoupling of the rescue coupler.

5.2.3 Coupling

Type tests shall be performed with the rescue coupler mounted on a draw hook and with an automatic coupler in order to demonstrate the gathering range and the vertical adjustability and the automatic coupling performance under the conditions stated in 4.4 and under the following conditions:

- an automatic coupler and a rescue coupler mounted on a moveable draw hook are horizontally aligned whilst the following vertical mismatch exists:
 - 1) the longitudinal axis of the draw hook is 75 mm lower than that of the automatic coupler;
 - 2) the longitudinal axis of the draw hook is 75 mm higher than that of the automatic coupler.

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