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EUROPEAN STANDARD

EN 16019

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English Version

Railway applications - Automatic coupler - Performance requirements, specific interface geometry and test method

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

Bahnanwendungen - Automatische Kupplung - Leistungsanforderungen, spezifische Schnittstellengeometrie und Prüfverfahren

This European Standard was approved by CEN on 17 November 2013.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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EN 16019:2014 (E)**Foreword**

This document (EN 16019:2014) 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of an identical text or by endorsement, at the latest by September 2014, and conflicting national standards shall be withdrawn at the latest by September 2014.

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

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

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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1 Scope

This European Standard specifies the requirements for Type 10 automatic couplers for railway applications.

It defines the minimum interface requirements in order to allow automatic coupling (mechanical and pneumatic) of two Type 10 automatic couplers.

The interfaces of the end coupler specified in this European Standard:

- enable the rescue of a train set in an event of a breakdown by another trainset of different type, without the need to use an intermediate coupler adapter, accessories or component;
- are the reference interfaces to which the rescue coupler defined by EN 15020 will comply.

It does not define:

- interface requirements concerning electrical connections;
- clearance requirements around the coupler head;
- the height above top of rail for the coupler;
- the position of the pivot point of the coupler.

2 Normative references

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

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EN 15020, *Railway applications - Rescue coupler - Performance requirements, specific interface geometry and test methods*

EN ISO 6892-1, *Metallic materials - Tensile testing - Part 1: Method of test at room temperature (ISO 6892-1)*

ISO 2768 (all parts), *General tolerances*

3 Terms and definitions

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

3.1

Type 10 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 coupler¹⁾

3.2

coupler head

part of couplers, consisting of coupler head housing with gathering elements, coupler lock, uncoupling device, air pipe connections and an appropriate interface towards the rear part of the coupler

¹⁾ 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 16019:2014 (E)**3.3****main reservoir pipe**

pipe containing air pressure at a value which is sufficient to supply subsystems, including the brake system

[SOURCE: EN 14478:2005, 4.9.6.10]

3.4**brake pipe**

pipe containing and conveying air, enabling train brake control

[SOURCE: EN 14478:2005, 4.9.6.7, modified]

3.5**uncoupling pipe**

pipe containing and conveying air, enabling uncoupling of the coupler locks

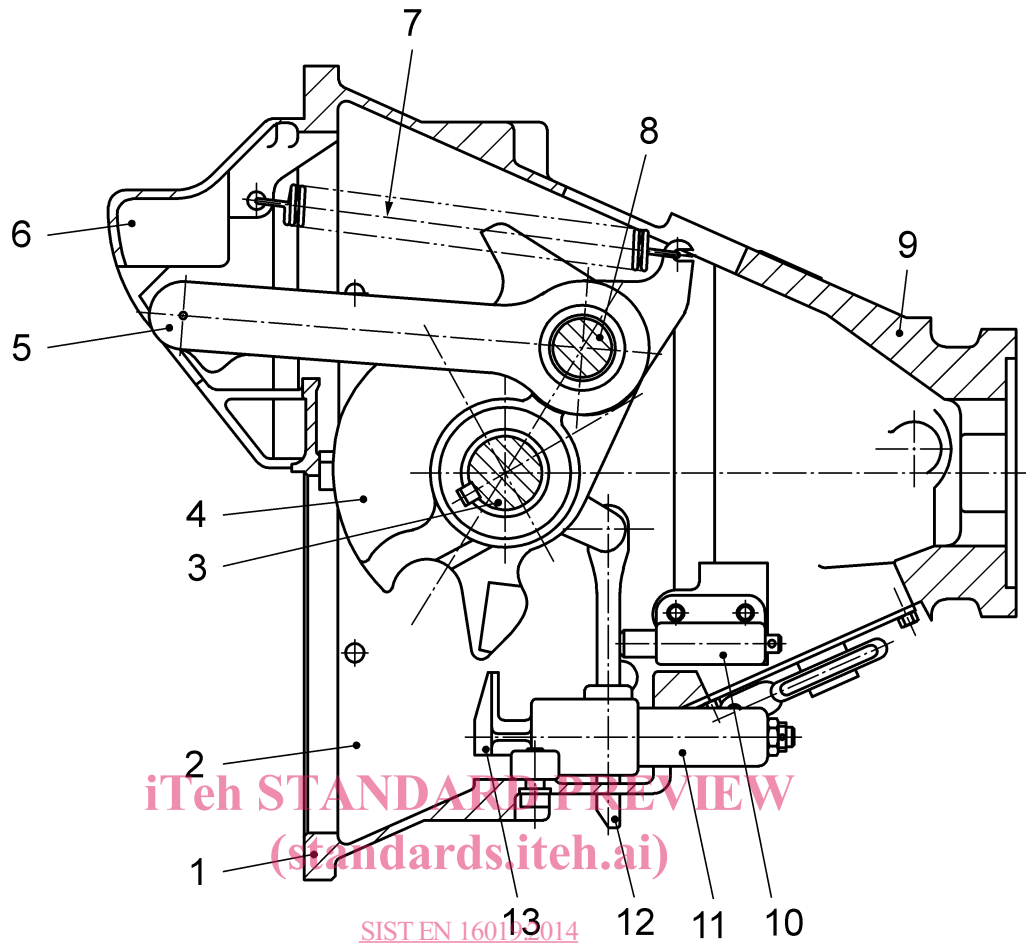
4 Product requirements**4.1 Automatic coupler head characteristics**

The coupler head of the automatic coupler shall be equipped with a pivoting coupler lock, enabling the mechanical connection of two vehicles. The coupler lock consists of the following parts: hook plate, coupling link, central pin, tension springs, release bar holder, and release bar with trigger device. In order to ensure a maximum gathering range, both vertically and horizontally, the coupler head shall be provided with male cone, female cone and gathering horn, such that the couplers can be aligned and centred also in curves and in case of vertical mismatch. The coupler head dimensions shall be according to Annex A.

Tolerances for dimensions shall be according to ISO 2768, tolerance class mK, unless otherwise specified in this standard.

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The principle arrangement of a coupler head is shown in Figure 1. Alternatives to this principle arrangement are allowed as long as functional and interface compatibility are maintained and the clauses of this standard remain applicable.



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Key

1	coupler face	6	male cone	11	trigger device
2	female cone	7	tension spring	12	release bar
3	main pin	8	coupling link pin	13	trigger
4	hook plate	9	coupler head housing		
5	coupling link	10	release bar holder		

Figure 1 — Principle arrangement of coupler head

When coupled, the coupler lock elements are subjected to tensile load and form a parallelogram ensuring equilibrium of forces and an equal load distribution onto both coupling links. The equilibrium of forces prevents involuntary unlocking of the coupler locks and reduces wear.

Compressive loads are transmitted through the flat coupler faces of the coupler heads.

The automatic coupler head shall be designed to withstand the following forces without permanent deformation:

- tensile load = 1 000 kN;
- compressive load = 1 500 kN.

These values are for normal operating conditions. If the coupler is used only for rescue conditions, lower values are allowed; these loads are defined in EN 15020.

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When coupled, the coupler locks ensure a nearly slack-free connection between the automatic couplers. Coupler lock play is evidenced by a distance between the coupler faces of two coupled coupler heads. An example of how to measure coupler lock play of a single coupler is shown in Annex C. Coupler lock play of a single coupler shall not exceed 0,8 mm in the new condition.

4.2 Coupling system positions

4.2.1 General

The state of coupling shall be made visible e.g. by contrasting coloured release bar or any other solution.

4.2.2 Ready-to-couple position

In the ready-to-couple position, the coupling link shall be retracted and lie close to the edge of the male cone and the release bar shall hold the hook plate. In this position, where the tension springs are loaded, the release bar shall project over the side of the coupler head housing and shall be engaged with the catch of the trigger device. See Figure 2.

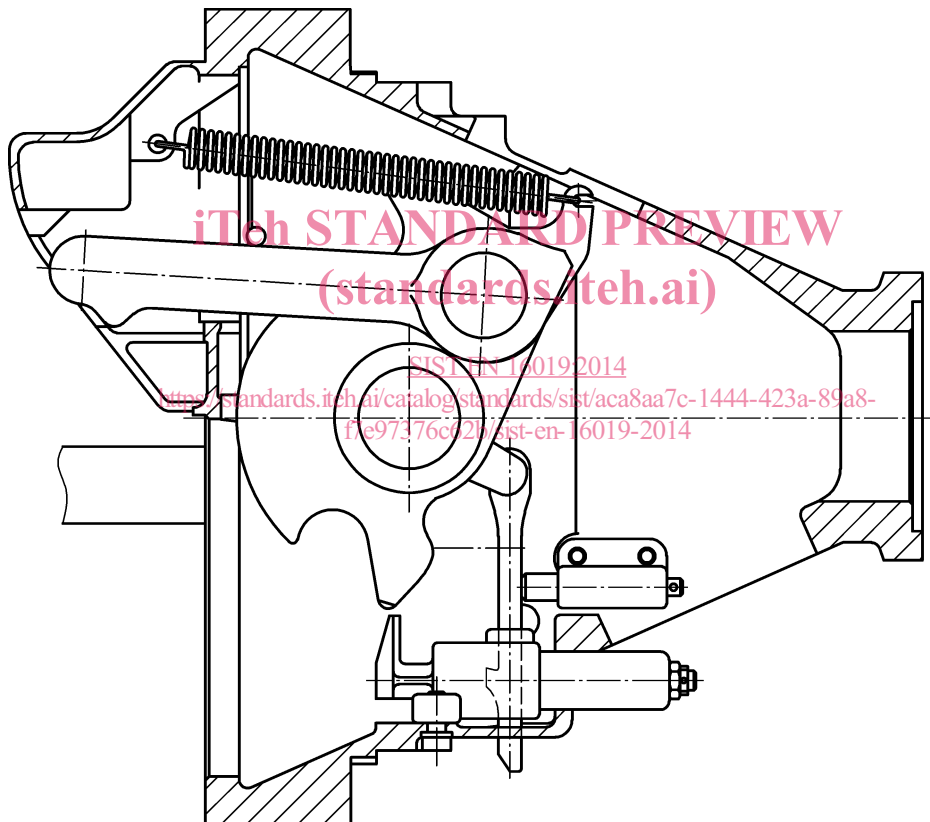


Figure 2 — Ready-to-couple position

4.2.3 Coupled position

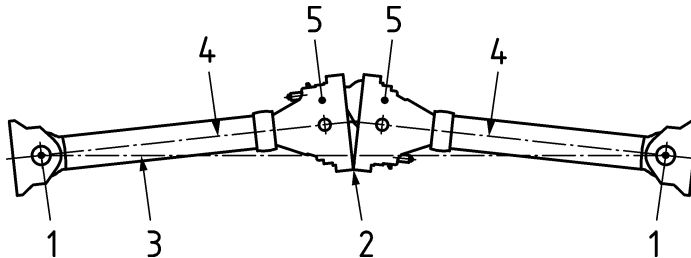
As the coupler faces mate, the male cones entering the female cones shall press the triggers backwards, in order for the release bars to be released. The release bar shall be retracted in the coupler head housings when they engage with the trigger devices. After the release bars have been released, the tension springs shall turn the hook plates counter clockwise until they reach the stops in the coupler head housings. In the coupled position, the coupler locks are engaged. See Figure 3.

The release bar shall be retracted into the coupler head housings when they engage with the trigger devices.

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If the coupler faces are in an angular position relative to each other, the projection of the opposite coupler "M" point should hit inside the hatched surface of Figure B.1 and Figure B.2. Additionally, the first contact point shall be external to the triangular area formed by the lines 3 and 4 in Figure 5. This ensures a successful coupling.

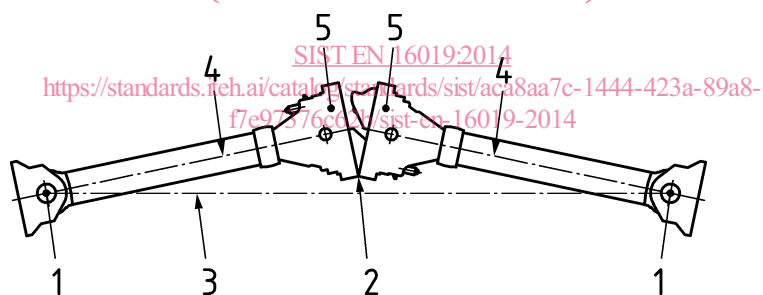
Figure 6 shows an unsuccessful coupling position since the first contact point is within the triangular area formed by the lines 3 and 4.

**Key**

- 1 pivot point
- 2 first contact point of coupler faces
- 3 line between pivot points
- 4 centre line of coupler
- 5 coupler head

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Figure 5 — Successful coupling in curves

**Key**

- 1 pivot point
- 2 first contact point of coupler faces
- 3 line between pivot points
- 4 centre line of coupler
- 5 coupler head

Figure 6 — Unsuccessful coupling in curves

4.3.2 Pneumatic coupling

The air pipes (brake pipe, main reservoir pipe and uncouple pipe) shall be connected automatically by means of the air pipe connections in the course of the mechanical coupling operation (see Figure A.1).

The air pipe connection of the brake pipe is located in the coupler face (see Annex A) and shall ensure the sealing of the brake pipe in coupled condition. A valve controlled by the main pin shall open the brake pipe