BS EN 16241:2014

BSI Standards Publication

Railway applications — Slack adjuster

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National foreword

This British Standard is the UK implementation of EN 16241:2014.

The UK participation in its preparation was entrusted to Technical Committee RAE/4/-/1, Railway applications - Braking.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

ISBN 978 0 580 57775 8

ICS 45.040

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 28 February 2014.

Amendments issued since publication

Date	Text affected

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 16241

February 2014

ICS 45.040

English Version

Railway applications - Slack adjuster

Applications ferroviaires - Régleur de timonerie

Bahnanwendungen - Gestängesteller

This European Standard was approved by CEN on 16 November 2013.

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

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Foreword

This document (EN 16241:2014) 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of an identical text or by endorsement, at the latest by August 2014, and conflicting national standards shall be withdrawn at the latest by August 2014.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 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.

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.

1 Scope

This European Standard establishes general principles for designing, manufacturing and type testing slack adjusters.

NOTE 1 These requirements cannot be written in sufficient detail to ensure good workmanship or proper construction. Each manufacturer is therefore responsible for taking every necessary step to make sure that the quality of workmanship and construction is such as to ensure accordance with good engineering practice.

It is applicable to double acting slack adjusters designed to control the block (shoe) to tread (wheel) clearance of tread braked vehicles with conventional brake cylinders and rigging, without taking the track-gauge into consideration.

NOTE 2 The term used for this device by UIC is “Brake rigging adjuster”.

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.

EN 60721-3-5:1997, *Classification of environmental conditions — Part 3: Classification of groups of environmental parameters and their severities — Section 5: Ground vehicle installations*

EN 61373, *Railway applications — Rolling stock equipment — Shock and vibration tests (IEC 61373)*

3 Terms and definitions

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

3.1
tread
surface of a monobloc wheel or of a separate tread on which the brake block rubs

3.2
slack adjuster
device to compensate for wear of brake shoes, wheel treads, and brake rigging pivots to maintain a nominal block to tread clearance

Note 1 to entry: These slack adjusters are fitted separately in the brake rigging as independent devices. These slack adjusters are sometimes referred to as regulators.

3.3
double acting
works in two directions to take up excessive clearance between the brake block and tread or pay out to allow the nominal clearance to be restored between the brake block and tread where this is reduced

3.4
take up
reduction in the length of the brake rigging caused by the operation of the slack adjuster

3.5
pay out
increase in length of the brake rigging caused by the operation of the slack adjuster

4 Design and manufacture

4.1 Requirements

4.1.1 General

Slack adjusters shall be able to operate in the brake rigging of railway rolling stock. Slack adjusters shall be able to be mounted in both exposed and protected locations and function correctly in normal conditions of operation. The impact of direct pollution and shocks linked to loading and unloading of vehicles are excluded from this European Standard.

4.1.2 Maintenance of block to tread clearance

Slack adjusters shall operate to maintain a set block to tread clearance within a tolerance of ± 2 mm. The block to tread clearance is a function of the setting of the slack adjuster control dimension “A” which is chosen to provide the required block to wheel clearance when fitted to a vehicle. Examples of installations are shown in Figure 1. This is tested in accordance with 6.3.3.1.

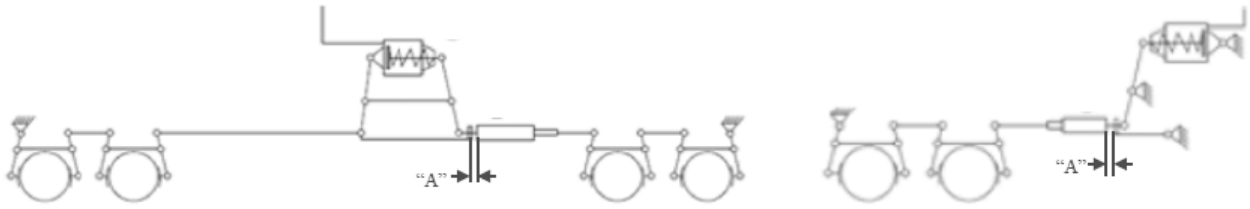


Figure 1

4.1.3 Take up

Slack adjusters shall take up excessive block to tread clearance in a minimum number of cycles of the brake (application and release), but this shall not be more than 3 cycles. This requirement is tested in accordance with 6.3.3.2.

4.1.4 Pay out

Slack adjusters shall pay out, if the block to tread clearance is insufficient, to restore the correct block to tread clearance. This situation may come about due to a change in the vehicles laden state. This pay out shall not increase the distance between brake block and wheel when releasing after the first brake application when the insufficient block to tread clearance is detected, but only after the release following the second brake application if the distance remains insufficient. This is to prevent the clearance being increased due to the presence of ice, snow or other foreign bodies. This requirement is tested in accordance with 6.3.3.3.

4.1.5 Shock and Vibration

4.1.5.1 Shock

Slack adjusters shall not take up or pay out when subjected to longitudinal shocks in accordance with EN 61373 for body mounted equipment with one level of suspension, category 2. This requirement is tested in accordance with 6.3.3.4.1.

4.1.5.2 Vibration

Slack adjusters shall not take up or pay out when subjected to vibrations in accordance with EN 61373 category 2, for body mounted equipment with one level of suspension. This requirement is tested in accordance with 6.3.3.4.2.

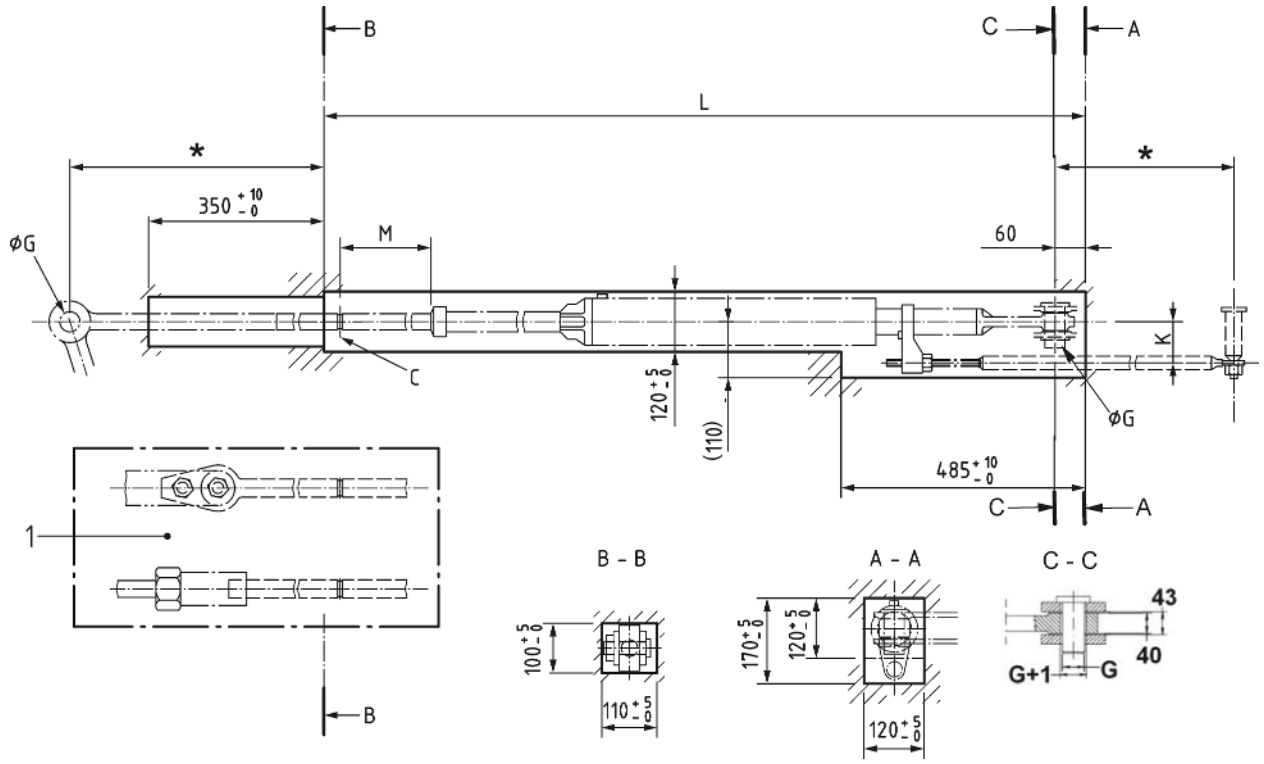
4.1.5.3 Compliance of existing designs

Should existing designs of slack adjuster be subject to the requirements of this standard, compliance with the shock and vibration requirements of this clause can be demonstrated by the documentary evidence of 10 years satisfactory service experience with a minimum of 3 operators, each with a minimum of 500 slack adjusters in service.

4.1.6 Space envelope

Slack adjusters which act to reduce or extend the length of an active member (rod that takes the braking loads) in the brake rigging shall fit within the space envelope of Figure 2 where their load (force) capability is up to 75 kN and Figure 3 where it is greater than 75 kN and up to 130 kN.

Dimensions in millimetres

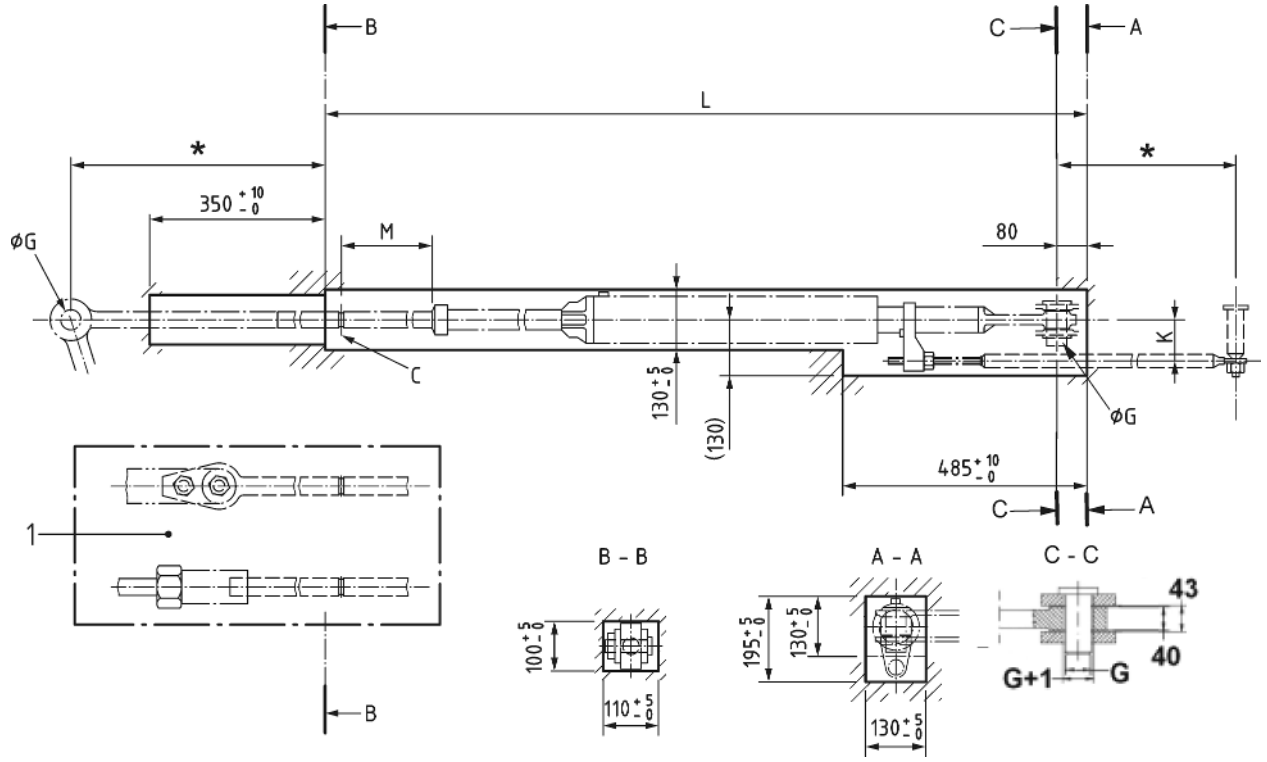


Key

*	Length adjusted to the vehicle		
C	Measurement mark		
G	36 mm pin diameter Pins shall be a case hardened steel where Rm is greater or equal to 370 N/mm^2 NOTE Rm is the tensile strength of the steel.		
K	83 mm		
Slack Adjuster type		1	2
L	Length	2 325 mm	1 875 mm
M	Take up	580 mm	440 mm
1	Alternative attachment arrangements for the brake rigging		
(XX)	Figures in brackets ( ) are nominal values.		

Figure 2 — Space envelope – loads (forces) up to 75 kN

Dimensions in millimetres



Key

*	Length adjusted to the vehicle			
C	Measurement mark			
G	40 mm pin diameter Pins shall be a case hardened steel where Rm is greater or equal to 370 N/mm^2 NOTE Rm is the tensile strength of the steel.			
K	83 mm			
Slack Adjuster type		1	2	3
L	Length	2 390 mm	1 940 mm	1 640 mm
M	Take up	580 mm	440 mm	280 mm
1	Alternative attachment arrangements for the brake rigging			
(XX)	Figures in brackets ( ) are nominal values.			

Figure 3 — Space envelope – loads (forces) from 75 kN to 130 kN

4.1.7 Maximum load absorption

The slack adjuster shall not absorb more than 2 kN of the brake application force. This requirement is tested in accordance with 6.3.5.

4.2 Service life

A life test shall be carried out on the slack adjuster to demonstrate it is fit for service on railway vehicles and to verify the maintenance requirements for the operational design life so these can be taken into account for the actual service life. This life test shall be carried out at loads between 35 kN and the maximum rated load, spanning the full range of adjustment. This requirement is tested in accordance with 6.3.6.

4.3 Ambient temperature

Slack adjusters shall be able to operate within the temperature range from –40 °C to +70 °C external air temperature. This requirement is tested in accordance with 6.3.4.

4.4 Other environmental conditions

4.4.1 General

The following environmental conditions shall be considered in the design of the slack adjuster.

It shall be demonstrated that these environmental conditions have been taken into account in the design of the slack adjuster. It is sufficient for the supplier to make a declaration of conformity stating how the environmental conditions in the following clauses have been taken into account.

If not specifically required to be tested as part of the type testing requirements in Clause 6 of this document, suitable tests and/or design assessments considering the effect of the following environmental conditions on the slack adjuster, shall be used in the development/design proving of the device, prior to type testing.

4.4.2 Humidity

The following external humidity levels shall be considered:

— yearly average: ≤ 75 % relative humidity;

— on 30 d in the year continuously: between 75 % and 95 % relative humidity;

— on the other days occasionally: between 95 % and 100 % relative humidity;

— maximum absolute humidity: 30 g/m^3 occurring in tunnels.

An operationally caused infrequent and slight moisture condensation shall not lead to any malfunction or failure.

At cooled surfaces, 100 % relative humidity can occur causing condensation on parts of equipment; this shall not lead to any malfunction or failure.

Sudden changes of the air temperature local to the vehicle, with a rate of 3 K/s and maximum variation of 40 K, can cause condensation of water on parts of equipment; these conditions, particularly occurring when entering or leaving a tunnel, shall not lead to any malfunction or failure of the equipment.

NOTE Reference to EN 50125-1.

4.4.3 Rain

Rain rate of 6 mm/min shall be taken into account. The effect of rain shall be considered depending on the possible equipment installation together with wind and vehicle movement.

NOTE Reference to EN 50125-1.

4.4.4 Snow, ice and hail

Consideration shall be given to the effect of all kinds of snow, ice and hail. The maximum diameter of hailstones shall be taken as 15 mm, larger diameter can occur exceptionally. The effect of snow, ice and hail shall be considered depending on the equipment installation together with wind and vehicle movement.

NOTE Reference to EN 50125-1.

4.4.5 Solar radiation

Equipment design shall allow for direct exposure to solar radiation at the rate of 1 120 W/m^2 for a maximum duration of 8 h.

NOTE Reference to EN 50125-1.

4.4.6 Resistance to pollution

The effects of pollution shall be considered in the design of equipment and components. Means may be provided to reduce pollution by the effective use of protection of the device. The severity of pollution can depend upon the location of the equipment therefore the effects of the kinds of pollution indicated in Table 1 shall be considered as a minimum.

Table 1 — Pollution

Pollution	Class to be considered
Chemically active substances	Class 5C2 of EN 60721-3-5:1997
Contaminating fluids	Class 5F2 (electrical engine) of EN 60721-3-5:1997 Class 5F3 (thermal engine) of EN 60721-3-5:1997
Biologically active substances	Class 5B2 of EN 60721-3-5:1997
Dust	Class 5S2 of EN 60721-3-5:1997
Stones and other objects	Ballast and other objects of maximum 15 mm diameter
Slack adjusters shall be designed so as to prevent intrusion of grasses and leaves, pollen, flying insects, fibres, etc.	For the design of ventilation ducts
Sand	Class 5S2 of EN 60721-3-5:1997
Sea spray	Class 5C2 of EN 60721-3-5:1997

4.5 External appearance

The external surfaces of the slack adjuster shall be free of sharp edges that could be a danger to those persons handling the slack adjuster or to other equipment in the proximity of the slack adjuster. This requirement shall be checked while testing the other constructional features in accordance with 6.3.2.

5 Materials

The materials used for manufacturing the slack adjuster shall be appropriate to meet all the specifications of the present standard.

6 Type test methods

6.1 Sampling for type test

A sample of ten (10) slack adjusters is taken randomly from the production line.

6.2 Test requirements

All the type tests shall be performed at (20 ± 5) °C. The tests marked with a « * » shall be performed additionally at the temperature limits of –40 °C and +70 °C as specified in 4.3.

Tests without specific requirements shall be performed with the slack adjuster set so the take up is 10 mm less than its maximum.

6.3 Test procedure

6.3.1 Principle

The tests on the sample of ten (10) slack adjusters shall be carried out in the order shown in Table 2.

Table 2 — Operations to carry out for qualification

Tests	Corresponding standard clause	Tested slack adjuster number									
		1	2	3	4	5	6	7	8	9	10
Physical and geometrical characteristics	6.3.2	X	X	X	X	X	X	X	X	X	X
Operation	6.3.3	X	X	X	X	X	X	X	X	X	X
Extreme temperatures *	6.3.4			X*				X*			
Load absorption	6.3.5	X	X	X	X	X	X	X	X	X	X
Life test	6.3.6					X					
NOTE For tests marked with a « * » see 6.2.											

All the test requirements shall be achieved to obtain type test compliance.

6.3.2 Check of physical and geometrical characteristics

The requirement of 4.1.6 and 4.5 shall be checked using appropriate measuring instruments, in accordance with this European Standard and the manufacturer's drawings. Any threaded connections shall be checked by GO/NO-GO gauges.

Pass/fail criteria: The result is satisfactory if all the specified characteristics are met.

6.3.3 Operation

6.3.3.1 Maintenance of block to tread clearance

Slack adjusters shall be placed in a suitable test rig that will enable an excessive amount of block to tread clearance to be simulated that is at least equal to M in Figures 2 and 3.

The rig is operated with a simulated new brake block configuration and the “block to tread clearance” checked. The “block to tread clearance” is the preset dimension as defined in 4.1.2. Wear is simulated in small increments and the rig operated and the “block to tread clearance” checked. This is repeated until the slack adjuster has taken up its full stroke, so that full brake block wear has been simulated.

Pass/fail criteria: The “block to tread clearance” ± 2 mm shall be maintained.

6.3.3.2 Take up

With the slack adjuster in the rig, the rig is operated with a simulated new brake block configuration and the “block to tread clearance” checked. The full brake block wear is simulated and the rig operated repeatedly until the “block to tread clearance” reaches the set value ± 2 mm.

Pass/fail criteria: Excessive “block to tread clearance” shall be reduced to the set block to tread clearance with a tolerance of ± 2 mm in 3 operations of the rig (cycles), or less.

6.3.3.3 Pay out

With the slack adjuster in the rig, the rig is operated with a simulated fully worn brake block configuration and the “block to tread clearance” checked. The block to tread clearance is reduced to a minimum, tending to zero, the rig operated and the block to tread clearance checked. This reduction of clearance is repeated until the new brake block condition of the slack adjuster has been reached (so full take up is available).

Pass/fail criteria: The block to tread clearance shall be restored to the set block to tread clearance with a tolerance of ± 2 mm, but this shall be 3 operations of the rig (cycles) or less. The set block to tread clearance with a tolerance of ± 2 mm shall be maintained following each subsequent operation of the slack adjuster.

6.3.3.4 Shock and vibration

6.3.3.4.1 Shock

The slack adjuster is set up in a rig capable of imposing a shock load in accordance with EN 61373 category 2, for body mounted equipment with one level of suspension, in both the direction to attempt to cause take up and the direction to attempt to cause it to pay out. There shall be 6 shocks (three positive and three negative) applied to the slack adjuster on test.

The slack adjuster shall have either a 10 m steel rod to represent the rigging, or a mass to simulate this, attached to the output link.

Pass/fail criteria: The slack adjuster shall not take up or pay out when subjected to the shock loading. The slack adjuster shall operate in accordance with 6.3.3.1 to 6.3.3.3 following the shock test.

6.3.3.4.2 Vibration

The slack adjuster is supported in the same manner as it is on a vehicle and subjected to the vibration tests, “functional random test levels” and “simulated long life test levels”, in accordance with EN 61373 category 2, for body mounted equipment with one level of suspension. Different slack adjusters are used for the functional random and simulated long life tests.

Pass/fail criteria: The slack adjuster shall operate in accordance with 6.3.3.1 to 6.3.3.3 following each vibration test.

6.3.4 Operation at extreme temperatures

6.3.4.1 General

The test is on a slack adjuster at temperatures of –40 °C and +70 °C.

The slack adjuster is set up in a test rig located within a thermostatic enclosure.

6.3.4.2 Operation at –40 °C

The slack adjuster is soaked at the extreme temperature of –40 °C for a minimum period of 12 h. When the system temperature has stabilized carry out tests 6.3.3.1 to 6.3.3.3 and 6.3.5.

Pass/fail criteria: The result is satisfactory if the slack adjuster passes tests 6.3.3.1 to 6.3.3.3, with 50 % enlarged tolerance increased to ± 3 mm, and 6.3.5 at this extreme temperature value.

6.3.4.3 Operation at +70 °C

The slack adjuster is soaked at the extreme temperature of +70 °C. When the system has stabilized carry out tests 6.3.3.1 to 6.3.3.3 and 6.3.5.

Pass/fail criteria: The result is satisfactory if the slack adjuster passes tests 6.3.3.1 to 6.3.3.3, with the tolerance increased to ± 3 mm, and 6.3.5 at this extreme temperature value.

6.3.5 Maximum load absorption

The slack adjuster is placed in a rig simulating the installation in a vehicle rigging, that can apply a measured load on the slack adjuster and the resulting output load measured after the slack adjuster mechanism has absorbed some of the applied load during its operation.

Pass/fail criteria: The result is satisfactory if the difference between the applied measured load and the resulting load is 2 kN or less.

6.3.6 Life test

The slack adjuster is placed in a rig simulating the installation in a vehicle rigging that can apply the maximum design load on the slack adjuster and that is capable of being steadily varied to simulate brake block wear. The slack adjuster is subjected to 1 000 000 application and release cycles to simulate a realistic period of operation before attention is required. The wear adjustment can be done manually or automatically, but the rate of wear shall be approximately 1 mm per 20 cycles such that the slack adjuster utilizes its full take up capability. The slack adjuster is reset when the full take up has been achieved and the test continued in this manner until the full 1 000 000 cycles are complete. The load/application range shall be as follows:

Table 3 — Load/application range

Load kN	Number of applications	Remarks
Maximum design load	30 000	
130	60 000	For slack adjusters having a maximum design load above 75 and below 130 kN, use the maximum design load
75	310 000	For slack adjusters having a maximum design load below 75 kN, use the maximum design load
35	600 000	

Pass/fail criteria: The result is satisfactory if the slack adjuster passes its routine test specification at the end of the 1 000 000 cycles and performs satisfactorily.

The slack adjuster shall be stripped after passing the test to establish the wear rates and to verify the maintenance regime.

6.4 Approval validity

Qualification using this European Standard is valid for:

— a manufacturer (or suppliers) defined by name; and

— a given manufacturing quality and materials specifications.

6.5 Test Report

The qualification test report shall contain at least the following data:

a) identification in reference to accurate design drawings;

b) manufacturing date;

c) reference to this standard;

d) accurate figures found through the tests;

e) manufacturing quality and material specifications.

7 Routine test

Every slack adjuster in serial production shall be subject to the tests specified in 6.3.3.1 to 6.3.3.3 at temperature of (20 ± 5) °C at the manufacturer's works.

8 In-Service assessment

For a slack adjuster to be used on interoperable vehicles, an in-service trial may be required dependant on the verification requirements. Annex A contains typical requirements of an in-service trial that may be used to assess a slack adjuster.

For a slack adjuster to be used on interoperable vehicles, testing of the slack adjuster as part of the complete brake system when static, when fitted to a vehicle, should be conducted in accordance with the requirements of the vehicle brake system type tests as defined in the relevant system test clause of the applicable European Standard.

9 Designation

Slack adjusters complying with this document shall be designated as follows:

a) the number of the standard;

b) the generic type designation and the part number.

10 Identification and marking

Each slack adjuster shall be indelibly marked to identify:

a) the manufacturer;

b) the date of manufacturing (the month and year (four digits));

c) type, part number and standard number;

d) serial number;

e) month and year of overhauling (four digits) and the name (can be coded) of the overhauling company.

Annex A
(informative)

In-service trial

A.1 General

An in-service trial may be conducted on slack adjusters which are defined as a new product or a modified version of an existing product which has changed the design sufficiently such that it requires a new type designation.

A.2 Test set-up and sampling

The in-service trials should be conducted using a number of slack adjusters of the same type, with a minimum number of 5, fitted to vehicles running in agreed train formations running in defined service duties.

The slack adjusters should be taken from a representative production process and subject to the type testing requirements of this document prior to the in-service trial.

A.3 Procedure

The in-service trial should be conducted for a minimum period of 12 months. During this time the functional performance of the slack adjuster should be monitored at agreed times on not less than three occasions. This monitoring should be carried out by performing static functional testing on all the vehicles fitted with trial slack adjusters, and by physical examination of the slack adjusters.

A.4 Pass/fail criteria

All functional requirements should be met and no physical deterioration should occur at the end of the 12 month trial.

Annex ZA
(informative)

Relationship between this European Standard and the Essential Requirements of EU Directive 2008/57/EC

This European Standard has been prepared under a mandate given to CEN/CENELEC/ETSI by the European Commission and the European Free Trade Association to provide a means of conforming to Essential Requirements of the Directive 2008/57/EC[1)].

Once this standard is cited in the Official Journal of the European Union under that Directive and has been implemented as a national standard in at least one Member State, compliance with the clauses of this standard given in Table ZA.1 for HS Rolling Stock, Tables ZA.2 and ZA.4 for CR Freight Wagons, Table ZA.3 for CR Locomotives and Passenger Rolling Stock and Table ZA.5 for Locomotives and Passenger Rolling Stock confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding Essential Requirements of that Directive and associated EFTA regulations.

Table ZA.1 — Correspondence between this European Standard, the HS TSI RST published in the OJEU dated 26 March 2008 and Directive 2008/57/EC

Clause/ subclauses of this European Standard	Chapter/§/annexes of the TSI	Corresponding text, articles/§/annexes of the Directive 2008/57/EC	Comments
The whole standard applies	4. Characterisation of the subsystem 4.2 Functional and technical specification of the subsystem 4.2.4 Braking	Annex III, Essential requirements 1 General requirements 1.1 Safety Clauses 1.1.1, 1.1.3, 1.1.5 1.2. Reliability and availability 2 Requirements specific to each subsystem 2.4 Rolling stock 2.4.2 Reliability and availability 2.4.3 Technical compatibility §3	The full compliance with the TSI requirements depends on the way the product is integrated into the rolling stock. After the publication of the TSI Locomotives and Passenger RST, Table ZA.5 shall be used instead of this one.

1) This Directive 2008/57/EC adopted on 17th June 2008 is a recast of the previous Directives 96/48/EC 'Interoperability of the trans-European high-speed rail system' and 2001/16/EC 'Interoperability of the trans-European conventional rail system' and revisions thereof by 2004/50/EC 'Corrigendum to Directive 2004/50/EC of the European Parliament and of the Council of 29 April 2004 amending Council Directive 96/48/EC on the interoperability of the trans-European high-speed rail system and Directive 2001/16/EC of the European Parliament and of the Council on the interoperability of the trans-European conventional rail system'.

Table ZA.2 — Correspondence between this European Standard, the CR TSI RST Freight Wagons dated July 2006, published in the OJEU on 8 December 2006 and its intermediate revision published in the OJEU on 14 February 2009 and Directive 2008/57/EC

Clauses/subclauses of this European Standard	Chapter/§/annexes of the TSI	Corresponding text, articles/§/annexes of the Directive 2008/57/EC	Comments
The whole standard is applicable	4.Characterisation of the subsystem 4.2. Functional and technical specifications of the subsystem 4.2.4 Braking §4.2.4.1.2.3 Braking performance, Functional and technical specification, Mechanical components 5. Interoperability constituents 5.3 List of constituents §5.3.3.4 Braking, slack adjuster 5.4 Constituents performances and specifications §5.4.3.5 Braking, slack adjuster 6. Assessment of conformity and/or suitability for the use of the constituents and verification of the subsystem 6.2 Subsystem conventional rail rolling stock freight wagons §6.2.3.3.2 Specification for assessment of the subsystem, Braking, Minimum brake system testing Annex I Interfaces of braking interoperability constituents §I.4 Slack adjuster	Annex III, Essential requirements 1 General requirements 1.1 Safety Clauses 1.1.1, 1.1.3, 1.1.5 1.2. Reliability and availability 2 Requirements specific to each subsystem 2.4 Rolling stock 2.4.1 Safety §3 2.4.3 Technical compatibility §3	The slack adjuster is cited as an Interoperability Constituent in the TSI. From 1 January 2014 this table is withdrawn and Table ZA.4 applies.

Clauses/subclauses of this European Standard	Chapter/§/annexes of the TSI	Corresponding text, articles/§/annexes of the Directive 2008/57/EC	Comments
	Annex P Braking performance, assessment of interoperability constituents §P1.4 Design assessment, Slack adjuster §P2.4 Product assessment, Slack adjuster Annex Q Assessment procedures, Interoperability constituents		

Table ZA.3 — Correspondence between this European Standard, the CR LOC and PAS RST TSI published in the OJEU dated 26 May 2011 and Directive 2008/57/EC

Clauses/subclauses of this European Standard	Chapter/§/annexes of the TSI	Corresponding text, articles/§/annexes of the Directive 2008/57/EC	Comments
The whole standard is applicable	4.Characterisation of the Rolling stock subsystem 4.2 Functional and technical specifications of the subsystem. 4.2.4 Braking	Annex III, Essential requirements 1 General requirements 1.1 Safety Clauses 1.1.1, 1.1.3, 1.1.5 1.2. Reliability and availability 2 Requirements specific to each subsystem 2.4 Rolling stock 2.4.2 Reliability and availability 2.4.3 Technical compatibility §3	The full compliance with the TSI requirements depends on the way the product is integrated into the rolling stock. After the publication of the TSI Locomotives and Passenger RST, Table ZA.5 shall be used instead of this one.

Table ZA.4 — Correspondence between this European Standard, the Draft Commission Regulation concerning the technical specification for interoperability relating to the 'rolling stock – freight wagons' subsystem of the rail system in the European Union and repealing Commission Decision 2006/861/EC, approved by the RISC on 06.06.2012 and Directive 2008/57/EC

Clauses/subclauses of this European Standard	Chapter/§/annexes of the TSI	Corresponding text, articles/§/annexes of the Directive 2008/57/EC	Comments
The whole standard is applicable	4.Characterisation of the subsystem 4.2 Functional and technical specifications of the subsystem 4.2.4 Brake Appendix C: Additional optional requirements 9 UIC brake (m) ERA technical document ERA/TD/2012–05/INT version 1.0 of 04.06.2012	Annex III, Essential requirements 1 General requirements 1.1 Safety Clauses 1.1.1, 1.1.3, 1.1.5 1.2. Reliability and availability 2 Requirements specific to each subsystem 2.4 Rolling stock 2.4.2 Reliability and availability 2.4.3 Technical compatibility §3	The full compliance with the TSI requirements depends on the way the product is integrated into the rolling stock. This table comes into effect on 1 January 2014.

Table ZA.5 — Correspondence between this European Standard, the TSI Locomotive and Passenger Rolling Stock (ERA final version approved by RISC on June 2013), and Directive 2008/57/EC

Clauses/subclauses of this European Standard	Chapter/§/annexes of the TSI	Corresponding text, articles/§/annexes of the Directive 2008/57/EC	Comments
The whole standard is applicable	4.2 Functional and technical specification 4.2 Functional and technical specifications of the subsystem 4.2.4 Braking	Annex III, Essential requirements 1 General requirements 1.1 Safety Clauses 1.1.1, 1.1.3, 1.1.5 1.2. Reliability and availability 2 Requirements specific to each subsystem 2.4 Rolling stock 2.4.2 Reliability and availability 2.4.3 Technical compatibility §3	The full compliance with the TSI requirements depends on the way the product is integrated into the rolling stock.

WARNING — Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.

Bibliography

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

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