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Steels for the reinforcement of concrete — Reinforcement couplers for mechanical splices of bars —

Part 3: Conformity assessment scheme

Aciers pour l'armature du béton — Couplers d'armature destines aux raboutages mécanique de barre —
Partie 3: Système particulier d'évaluation de la conformité

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 17, *Steel*, Subcommittee SC 16, *Steels for the reinforcement and prestressing of concrete*.

A list of all the parts in the ISO 15835 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Steels for the reinforcement of concrete — Reinforcement couplers for mechanical splices of bars —

Part 3: Conformity assessment scheme

1 Scope

This document specifies rules for the certification and for the self-evaluation of couplers to be used for the mechanical splicing of steel reinforcing bars.

It includes requirements for the control of the manufacturing process of the couplers and for the verification of their conformity in the form of mechanical splices.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

ISO 2859-1:1999, *Sampling procedures for inspection by attributes — Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*

ISO 15835-1:—[1)], *Steels for the reinforcement of concrete — Reinforcement couplers for mechanical splices of bars — Part 1: Requirements*

ISO 16020, *Steel for the reinforcement and prestressing of concrete — Vocabulary*

ISO/IEC 17000, *Conformity assessment — Vocabulary and general principles*

ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

ISO/IEC 17050, *Conformity assessment — Supplier's declaration of conformity*

ISO/IEC 17065, *Conformity assessment — Requirements for bodies certifying products, processes and services*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 15835-1, ISO 16020, ISO/IEC 17000 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

1) Under preparation.

3.1
splice system
mechanical splice using a specific technology and made by the same manufacturer

Note 1 to entry: A splice system may include several *splice types* (3.2).

3.2
splice type
mechanical splices from the same *splice system* (3.1), of the same generic design, designed for the same purpose and existing in different sizes suitable for specific bar diameters

4 Evaluation of conformity

Evaluation of the compliance of the products to the requirements of ISO 15835-1 may be done by one of the following methods.

— Product certification, described in Clause 5, is made by a certification body who inspects the manufacturing facility and collects test samples at regular periods.

— Verification of lots, described in Clause 6, is made by agreement between the supplier and the purchaser, and involves only testing of the exact lot that is going to be delivered to the purchaser.

5 System for certification

5.1 General

The purpose of this clause is to provide rules for the product certification of couplers in accordance with ISO/IEC 17065.

The certification is based on qualification testing and surveillance by the certification body, and on factory production control by the manufacturer. Qualification and surveillance audits shall be performed by the certification body at each manufacturing location listed in the certificate.

The manufacturer of the couplers shall implement a quality management system certified by a certification body; for example, ISO 9001.

Qualification testing shall be conducted whenever there is a change in material properties, geometry or manufacturing technology.

5.2 Documentation and user information

For each type of coupler, the manufacturer shall maintain a file of data sheets with which the coupler shall comply. If various types are very similar and use identical components, the certification body may decide not to test all of them.

The supplier shall present detailed information to the purchaser on how to prepare the ends of the reinforcing bars to be spliced, the tools and equipment to be used, and the instructions to be followed.

Written instructions for the final installation of the mechanical splice at the construction site shall be made available to the purchaser and to the testing laboratory.

5.3 Qualification testing

To assess that the couplers conform to the requirements of ISO 15835-1:—, Clause 5, qualification testing shall be performed on samples which reflect the scope of the products to be certified.

For each splice system, samples shall be randomly taken from the production line or from the manufacturer's inventory in accordance with Table 1.

Tests shall be performed for all characteristics of the products, mandatory or optional as defined in ISO 15835-1, for which the manufacturer applies for certification.

Tests are the responsibility of the certification body, and shall be performed by an independent, accredited laboratory with the appropriate scope, operating in accordance with ISO/IEC 17025.

Samples shall be assembled in accordance with the manufacturer's written instructions and under the same conditions as they would have been when delivered to a construction site, either at the laboratory by the laboratory operator, or at the manufacturer's facility under witness of the certification body.

Table 1 — Sampling plan

Stage	Size and type	Scope of testing			
		Strength and ductility	Slip	High-cycle fatigue for category F	Low-cycle loading for category S
Qualification testing[a]	For each splice type, largest, median and smallest size of the size range[b]	Five samples per size	Five samples per size	Three samples of the largest size	Three samples per size
Continuous third party surveillance[c]	One size of one splice type	Three samples[d]	Five samples[e]	Three samples	Three samples[f]
Factory production control		One sample for each batch of 2 500[g]	No	No	No

[a] If one of the samples fails, the whole test series shall be repeated with couplers from the same batch, except for high-cycle fatigue testing, see ISO 15835-1:—,5.5.2.

[b] Except for the fatigue test, for which only the largest size is to be tested.

[c] If one of the samples fails, the test series shall be repeated with five additional samples made with couplers from the same batch, and no failure shall occur. If two or more samples fail, then a cause shall be found by the manufacturer and appropriate corrective actions taken, after which five samples shall be tested without failure.

[d] If the same specimen is used for the slip test and the tensile test, all the specimens tested in slip shall be tensile-tested.

[e] Three samples are sufficient if all individual test results meet the slip requirement specified for the median value in accordance with ISO 15835-1:—, 5.4.2.

[f] Until all sizes and types in the scope have been tested.

[g] After successful results of continuous testing during the first year of production, the test frequency may be reduced to one in every 5 000. If all test results are successful during the next two years of production, the test frequency may then be further reduced to one in every 10 000. As soon as a test failure is observed, the sampling rate shall revert to the original one in every 2 500.

5.4 Factory production control

In accordance with ISO 15835-1:—, 5.7, the manufacturer shall establish and maintain records for demonstration of traceability, and mark the couplers with durable identification marks.

As part of the factory production control system, the manufacturer shall implement a sampling plan as defined in Table 1, and maintain the records of test results to demonstrate that the products perform satisfactorily. The manufacturer may choose to test the couplers either assembled to reinforcing bars, or assembled to high-tensile strength bars in order to measure the strength of the coupler itself.

5.5 Surveillance audits

Third-party surveillance shall be conducted to demonstrate that the manufacturer's factory production control system continues to ensure that the couplers conform to the requirements of ISO 15835-1. The certification body should accept quality management system certificates from other bodies which verify compliance with this subclause.

Surveillance audits shall be performed at least annually.

During these audits, samples shall be taken for testing in accordance with Table 1. The sampling shall be such that, within a period of five years, all types and sizes are tested, except those that are not manufactured during these five years.

Tests are the responsibility of the product certification body, and shall be performed by an accredited laboratory with an appropriate scope operating in accordance with ISO/IEC 17025. If the tests are conducted at the manufacturer's laboratory, they shall be done under the constant witnessing of the certification body.

The certification body shall also verify that the declarations of conformity, issued by the manufacturer under the self-declaration of conformity path in conformance with Clause 6, comply with the requirements of 6.1.

5.6 Certificate of product conformity

If the manufacturer's quality management system and the product qualification tests meet the requirements of this document, the certification body shall issue, either in written or electronic format, a certificate to the manufacturer covering the products under the certification scheme. In addition to the requirements in ISO/IEC 17065, the certificate shall contain the following information:

— certificate number;

— name of manufacturer;

— manufacturing locations covered by the certificate;

— name of products covered by the certificate;

— types and sizes approved, including the dimensions of the coupler (length and width);

— grades of reinforcing bars for which the certificate is valid, by reference to a standard or specification;

— tools/equipment to be used;

— written installation instructions;

— marking/identification to be found on the couplers;

— statement of conformity with ISO 15835-1 (including category of the coupler).

6 System for self-declaration of conformity

6.1 General

The purpose of this clause is to provide rules for the self-declaration of product conformity through the testing of delivery lots as per ISO/IEC 17050.

The manufacturer shall hold a valid certificate as per Clause 5 for the main range of the same type of couplers. The manufacturer can then use this method to certify some lots of couplers that are not entirely covered by the scope of the certificate. This method should not be used, however, for the majority of the production of the manufacturer. It is intended for minor deviations from the scope of the certification, for example

— mechanical splices made with bars from a different grade than those already certified,

— mechanical splices of bars of a nominal size which is not commonly used, and

— variants of couplers which are close in design to those already certified.

The manufacturer shall document each of the self-declared lots, including, but not limited to, comparisons with certified products and in-house test reports, and shall show them to the certification body at the subsequent audit.

6.2 Extent of sampling and testing

For the purpose of testing, the delivery shall be subdivided into test units. For testing strength, ductility and slip under static loading, each test unit shall consist of couplers of the same splice type and size, and shall represent a maximum number of 10 000 couplers. The extent of testing for each test unit shall be level S-3 in accordance with ISO 2859-1:1999, Table 3-A. The acceptance quality limit (AQL) shall be 2,5. For the fatigue and cyclic testing, see Table 2.

Table 2 — Sampling rate for high-cycle fatigue and low-cycle loading

Properties to be tested	Number of samples
Properties under high-cycle fatigue for couplers of category F.	A minimum of three samples of the largest size of each splice type. (Or for the largest size of each group of diameters, if the manufacturer selects this option in accordance with ISO 15835-1:—, 5.4.1.)
Properties under low-cycle loading for couplers of category S.	For a size range of the same splice type, at least three samples of the largest size, three samples of a medium size and three samples of the smallest size.

6.3 Declaration of product conformity

If all the test results meet the requirements of this document, the manufacturer may issue, either in written or electronic format, a declaration of conformity, in accordance with ISO/IEC 17050, covering the batch of products delivered. This declaration shall contain at least the following information:

- name of the manufacturer (including the address of the manufacturing location);
- certificate number;
- types, sizes and dimensions of the coupler (length and width);
- types of reinforcing bars for which the certificate is valid by reference to a standard or specification;
- tools/equipment to be used;
- written installation instructions;
- marking/identification to be found on the couplers;
- statement of conformity with ISO 15835-1 (including category of the coupler);
- limitation on the validity of the declaration, if any;
- title and name of the person who issued the certificate;
- date and place of issue.