
**Steel for the reinforcement of concrete —
Headed bars —**

**Part 1:
Requirements**

*Aciers pour l'armature du béton — Barres avec platine d'ancrage —
Partie 1: Exigences*





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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 15698-1 was prepared by Technical Committee ISO/TC 17, *Steel*, Subcommittee SC 16, *Steels for the reinforcement and prestressing of concrete*.

ISO 15698 consists of the following parts, under the general title *Steels for the reinforcement of concrete* — *Headed bars*:

- *Part 1: Requirements*
- *Part 2: Test methods*

Introduction

Reinforcing bars with end anchorages have been used for many years, in particular in civil engineering structures, such as marine structures (e.g. offshore platforms), bridges, structures for nuclear power plants, etc. The properties and the requirements for the anchorage products have normally been specified for each separate project. The properties have often been tested individually, due to the lack of standards for the products. Some countries have, however, developed national standards or recommendations for requirements and test methods for such products, e.g. USA.

As a result of the discussions carried out in ISO/TC 17/SC 16, it has been agreed to name these anchorage products “headed bars” as a general term for various types of heads at the bar end.

The advantage of headed bars, as compared to ordinary bond anchored bars, is that the bar can be loaded up to the ultimate capacity of the bar at its end in a very stiff fixing without slip at the end of the bar. In some cases, the head at the bar end is designed such that the end anchorage is combined with a bond anchorage to achieve the ultimate capacity of the bar. The bond length will then be substantially reduced as compared to the bond length without an end anchorage.

The goal of this part of ISO 15698 is to specify requirements to the product in a neutral way, i.e. not to refer to specific types and geometries of heads, and to specify test methods such that the variety of headed bars currently on the market are covered, as well as new types that might be developed in the future.

Steel for the reinforcement of concrete — Headed bars —

Part 1: Requirements

1 Scope

This part of ISO 15698 specifies requirements for headed steel bars to be used as reinforcement of concrete structures.

This part of ISO 15698 is a product standard and not an application standard. It is intended to cover a large variety of products and also to support the development of new products.

This part of ISO 15698 specifies requirements for headed reinforcing bars with heads made of steel. Heads or head-bar connections made using other materials, including metal-filled sleeves, are not covered by this part of ISO 15698.

End anchorages consisting of a steel bar or other steel component positioned orthogonally at the end(s) of a bar and welded on-site to the bar are outside the scope of this part of ISO 15698.

This part of ISO 15698 is intended to cover products which are manufactured in a continuous production that allows the products to be tested in accordance with a defined testing regime.

Requirements and testing for headed bars under impact loading are outside the scope of this part of ISO 15698.

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.

ISO 630-2, *Structural steels — Part 2: Technical delivery conditions for structural steels for general purposes*

ISO 4950-2, *High yield strength flat steel products — Part 2: Products supplied in the normalized or controlled rolled condition*

ISO 4950-3, *High yield strength flat steel products — Part 3: Products supplied in the heat-treated (quenched + tempered) condition*

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

ISO 6935-1, *Steel for the reinforcement of concrete — Part 1: Plain bars*

ISO 6935-2, *Steel for the reinforcement of concrete — Part 2: Ribbed bars*

ISO 15698-2, *Steel for the reinforcement of concrete — Headed bars — Part 2: Test methods*

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

ISO 17660-1, *Welding of reinforcing steel — Part 1: Load-bearing welded joints*

ISO 22965-2, *Concrete — Part 2: Specification of constituent materials, production of concrete and compliance of concrete*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 16020 and the following apply.

3.1

head

separate piece of steel of any shape firmly attached to the end of a bar or a protuberance of the bar itself at the end, used to anchor a steel reinforcing bar in concrete

3.2

headed bar

steel reinforcing bar that has steel head(s) on one or both ends with the purpose of anchoring the bar in concrete

3.2.1

welded headed bar

headed bar that has the head(s) welded onto the bar

3.2.2

forged headed bar

headed bar that has the head(s) integrally forged from the bar

3.2.3

threaded headed bar

headed bar that has the head(s) attached utilising tapered or straight threads internal to the head or by a separate internally threaded nut or sleeve fixing the head to the threaded bar end(s)

3.2.4

swaged or extruded headed bar

headed bar with the head(s) attached to the bar by swaging or extruding the head directly onto the bar or by using a sleeve

3.2.5

Shear-bolted sleeve-headed bar

headed bar with sleeve(s) attached to the bar by a series of shear bolts which indent into the surface of the reinforcing bar and push the bar against the opposite internal surface of the sleeve

3.3

loose head

head which is not permanently attached to the bar by the head manufacturer, but is attached on-site or in a reinforcement workshop

3.4

head bearing area

area of the head projected onto a plane orthogonal to the longitudinal axis of the bar minus the bar cross-sectional area and minus any area of the head that extends more than one bar diameter from its main face, representing the contact surface between head and concrete where the bar tensile force is transferred to the concrete by compression stress

3.5

head anchorage capacity

maximum force that can be transferred from the head of the bar to the surrounding concrete

3.6

headed bar series

headed bars of identical shape and with the ratio between the head bearing area and the bar cross-sectional area within specified maximum and minimum values, produced from identical materials, by the same production method, but with different nominal bar diameters

3.7

qualification test

test designed to verify the anchorage capacity (category) of a headed bar series