BS 6744:2016

BSI Standards Publication

Stainless steel bars – Reinforcement of concrete – Requirements and test methods

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Contents

Summary of pages

This document comprises a front cover, an inside front cover, pages i to vi, pages 1 to 36, an inside back cover and a back cover.

Introduction by Lee Brankley, CEO, CARES

BS 6744 is widely specified, both in the UK and internationally. I believe that British Standards remain the choice of informed construction procurement teams because they are performance-based and are developed in partnership with industry.

CARES welcomes the publication by the British Standards Institution of BS 6744:2016, *Stainless steel bars – Reinforcement of concrete – Requirements and test methods*, which was developed by Technical Committee ISE/104 with contributions and support from CARES. Its content forms an essential part of the technical framework used to improve the durability of reinforced concrete structures in chloride containing environments.

I am pleased to introduce BS 6744:2016 and commend its performance-based approach which will make a valuable contribution to the appropriate use of stainless steel reinforcing bar in the UK and internationally.

Developments in the field of the measurement of corrosion resistance and durability guidance have been taken into account during the development of BS 6744:2016. The test method for determining the corrosion resistance of stainless reinforcing steel in chloride contaminated concrete and the guidance on the durability aspects of the corrosion resistance of the reinforcement will be useful tools for engineers.

The 2016 update will help to maintain BS 6744's pre-eminent position in the UK and, more importantly, internationally, as the preferred choice of standard when stainless steel reinforcing is required.

Foreword

Publishing information

This British Standard is published by BSI Standards Limited, under licence from The British Standards Institution, and came into effect on 31 May 2016. It was prepared by Technical Committee ISE/104, *Concrete Reinforcing and Pre-Stressing Steels*. A list of organizations represented on this committee can be obtained on request to its secretary.

Supersession

This British Standard supersedes BS 6744:2001+A2:2009, which is withdrawn.

Information about this document

Attention is drawn to the fact that compliance with this document might involve the use of patents applied to steel designation 1.4162 (see 5.1.2.4). The patent holder agrees to make the material available for production of stainless reinforcing steel bars on reasonable and accessible and non-discriminatory terms. Information on designation 1.4162 may be obtained from: Outokumpu Stainless Ltd, Europa Link, Sheffield, South Yorkshire S9 1TZ.

This standard has been revised so that it can be used in conjunction with BS 8666, *Scheduling, dimensioning, bending and cutting of steel reinforcement for concrete – Specification*, but also to take into account the requirements of Eurocode (EC) 2 (specifically BS EN 1992-1-1 and BS EN 1992-1-2) and the Construction Products Regulations (CPR) [1] with respect to constitutive relationship and durability. It has also been revised to act as the national application standard for BS EN 10088-1, *Steel for the reinforcement of concrete – Stainless steels* (in preparation).

The decision was taken to remove other uses of steel in concrete, which means that plain bars and grades 200 MPa and ribbed bars above grade 500 MPa are no longer covered by this standard. These products are covered by other standards. This is with the exception of 500 MPa bar and 650 MPa ribbed bar which are now in an informative Annex (Annex I). The standard is open to other strength grades of ribbed bar on the basis that the designers know that these are outside normal UK practice and, once over 600 MPa, outside EC2.

Informative annexes have been prepared to give guidance on durability, magnetic properties, coefficients of thermal expansion, constitutive relationship, welding, performance at elevated temperatures and quality assurance. As far as is possible, the revision has been written to reflect the requirements of BS 4449.

The test method in Annex A is based on the method in BS EN 480-14 adapted by Schoening, Randström and Adair for determining a critical chloride threshold level for stainless steel rebar [2] and that in *Testing for chloride threshold levels of stainless reinforcing bar* [3].

Product certification/inspection/testing. Users of this British Standard are advised to consider the desirability of third-party certification/inspection/testing of product conformity to this British Standard. Appropriate conformity attestation arrangements are described in BS EN ISO/IEC 17065. Users seeking assistance in identifying appropriate conformity assessment bodies or schemes may ask BSI to forward their enquiries to the relevant association.

Use of this document

It has been assumed in the preparation of this British Standard that the execution of its provisions will be entrusted to appropriately qualified and experienced people, for whose use it has been produced.

Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is "shall".

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Contractual and legal considerations

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

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

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1 Scope

This British Standard specifies requirements and test methods for solid stainless steel bars used for the reinforcement of concrete. It is applicable to ribbed stainless reinforcing steel bars in grade 500.

It is applicable to bars in which the ribs have been formed by the cold working or hot rolling processes.

NOTE Annex A specifies a test method for determining the corrosion resistance of stainless reinforcing steel in chloride contaminated concrete. Informative annexes give guidance on durability (Annex B), magnetic properties (Annex C), coefficients of thermal expansion (Annex D), constitutive relationship (Annex E), welding (Annex F), performance at elevated temperatures (Annex G) and quality assurance (Annex H).

This British Standard is not applicable to stainless reinforcing steel bars produced from material whose metallurgical history is not known and fully documented.

It is not applicable to other uses of steel in concrete, such as plain bars and grades 200 MPa and ribbed bars above grade 500 MPa, which are covered by other standards. This is with the exception of 500 MPa bar and 650 MPa ribbed bar which are now in an informative annex (Annex I). The standard is open to other strength grades of ribbed bar on the basis that the designers know that these are outside normal UK practice and, once over 600 MPa, outside BS EN 1992 (EC2).

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.

BS 8666, *Scheduling, dimensioning, bending and cutting of steel reinforcement for concrete – Specification*

BS EN 196-1, *Methods of testing cement – Part 1: Determination of strength*

BS EN 1993-1-2:2005, *Eurocode 3 – Design of steel structures – Part 1-2: General rules – Structural fire design*

BS EN 10088 (all parts), *Stainless steels*

BS EN ISO 148-1, *Metallic materials – Charpy pendulum impact test – Part 1: Test method*

BS EN ISO 3651-2, *Determination of resistance to intergranular corrosion of stainless steels – Part 2: Ferritic, austenitic and ferritic-austenitic (duplex) stainless steels – Corrosion test in media containing sulfuric acid*

BS EN ISO 6892-2, *Metallic materials – Tensile testing – Part 2: Method of test at elevated temperature*

BS EN ISO 15630-1:2010, *Steel for the reinforcement and prestressing of concrete – Test methods – Part 1: Reinforcing bars, wire rod and wire*