

# THE BAR GUIDE TO STEEL REINFORCEMENT STANDARDS AND CODES

There is a wide range of standards, codes and regulations that effect the specification and use of reinforcement steel. Below is an informative guide from the British Association of Reinforcement [BAR] that aims to assist both designer and specifier.

## The impact of Brexit

The short-term impact of the result of the recent Brexit referendum to leave the European Union will have limited impact on the UK reinforcement sector. The UK is a full member of the European Committee for Standardisation [CEN] and, as such, adopts European Standards [ENs] just as non-EU members of CEN do.

The British Standards Institution [BSi] will continue to be a voting member of CEN as are non-EU European Free Trade Association [EFTA] members. In addition, CEN has 17 affiliate members in eastern Europe, north Africa and the Middle East, and three partner organisations, including Standards Australia. Standards approved by CEN, by a qualified majority, must be adopted at national standards by all 33 members who must withdraw any conflicting national standards.

The long-term effect of Brexit may be a little difficult to predict. The UK may or may not be in the European Economic Area [EEA] or the European Free Trade Association [EFTA] and so may or may not get a vote on future European standards. On the other side we may not have to adopt aspects of the standards that we do not to subscribe to.

## CE marking

With regards to CE marking there are currently two routes to achieve CE marking via compliance with a harmonised standard or the preparation of the European Technical Approval [ETA] where no harmonised standard exists. However, where a harmonised standard is under preparation [for steel reinforcement this is the draft EN 10080] it is not possible to prepare an ETA.

As there is currently no harmonised European Standard [hEN] steel reinforcement does not require a CE mark. It is expected that steel reinforcement will eventually be covered by a harmonised European standard. This standard, EN 10080, is currently at draft stage and is not predicted to facilitate CE marking before 2018 at the earliest. Until then as there is no hEN there is no CE marking necessary for reinforcing steel, reinforcing fabric or lattice girders. Furthermore, there are no plans for cut and bent reinforcement to be subject to a hEN as it is not included in the European Commission's mandate. It should be noted, however, that some reinforcement accessories are subject to CE marking and designers and specifiers are advised to check accordingly.

## Codes and standards

### **BS EN 1992-1-1: 2004+1: 2014. Eurocode 2: Design of concrete structures. General rules and rules for buildings.**

BS EN 1992-1-1 provides general rules for the design of structures in plain, reinforced and prestressed concrete with specific rules for buildings. The National Annex to BS EN 1992-1-1 provides UK decisions where national choice is allowed and it is to be read in conjunction with BS EN 1992-1-1.

### **BS EN 1992-2: 2005. Eurocode 2. Design of concrete structures. Concrete bridges. Design and detailing rules.**

BS EN 1992-2 gives principles and application rules for the design of concrete bridges in addition to those stated in BS EN 1992-1-1

### **BS EN 1992-3: 2006. Eurocode 2. Design of concrete structures. Liquid retaining and containing structures.**

BS EN 1992-3:2006 covers additional rules to those in Part 1 for the design of structures constructed from plain or lightly reinforced concrete, reinforced concrete or prestressed concrete for the containment of liquids or granular solids.

### **BS 4449: 2005 + A3: 2016. Steel for the reinforcement of concrete. Weldable reinforcing steel. Bar, coil and decoiled product specification.**

Provides designations based on the grade of steel, the product form and dimensions. The standard is used to specify all normal technical requirements for reinforcing steels, including chemical analysis, mechanical properties, rib geometry and tolerances on dimensions.

### **BS 4482: 2005. Steel wire for the reinforcement of concrete products. Specification**

BS 4482:2005 specifies requirements for plain, indented and ribbed steel wire used for the reinforcement of concrete products. The standard contains provisions for two grades, based on mechanical properties. Grade 500 is specified for plain, indented and ribbed wires. Grade 250 is specified as an option for plain wires only.

### **BS 4483: 2005. Steel fabric for the reinforcement of concrete. Specification**

Lists the range of standard reinforcement fabrics for use in different design situations. It is a requirement of this standard that all fabric should be electrical resistance welded.

### **BS 8548 Guidance on the Welding of Steel Reinforcement** – under development

### **BS 8597: 2015. Steels for the reinforcement of concrete. Reinforcement couplers. Requirements and test methods.**

Specifies requirements and test methods for steel reinforcement couplers to be used for the mechanical splicing of steel reinforcing bars. It specifies requirements for couplers to be used for mechanical splices in reinforced concrete structures under predominantly static loads and additional requirements for couplers to be used in elements of structures subject to high cycle elastic fatigue loading. It also specifies requirements for the evaluation of conformity of couplers.

### **BS 6744: 2016. Stainless steel bars. Reinforcement of concrete. Requirements and test methods.**

This British Standard specifies requirements

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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.

## **BS 8666: 2005. Scheduling, dimensioning, bending and cutting of steel reinforcement for concrete. Specification.**

The standard includes requirements for the cutting and bending of reinforcing bars and coils. It also specifies the requirements for scheduling fabricated reinforcing steels, including a standard notation for different reinforcing steel types, standard bent shapes, and standard designations of welded fabric.

## **BS EN 10080: 2005. Steel for the reinforcement of concrete. Weldable reinforcing steel. General**

BS EN 10080 specifies general requirements and definitions for the performance characteristics of weldable reinforcing steel used for the reinforcement of concrete structures, delivered as finished products in the form of bars, coils (rod, wire) and decoiled products, sheets of factory-made machine-welded fabric or lattice girders. BS EN 10080 is a harmonized European Standard, and contains within it the requirements for CE marking of reinforcing steels according to the Construction Products Directive.

## **BS EN 17660-1: 2006. Welding. Welding of reinforcing steel. Load-bearing welded joints**

Reinforcing steel bars are produced by a number of process routes and usually have a ribbed profile. Taking these issues into account, it is apparent that both the welder and the welding coordinator require a

specific level of skill and job knowledge and that special procedures for quality assurance need to be adopted.

BS EN ISO 17660-1 is applicable to the welding of weldable reinforcing steel and stainless reinforcing steel of load-bearing joints, in workshops or on site. It specifies requirements for materials, design and execution of welded joints, welding personnel, quality requirements, examination and testing. It also covers welded joints between reinforcing steel bars and other steel components, such as connection devices and insert anchors, including prefabricated assemblies.

## **BS EN 17660-2: 2006 Welding. Welding of reinforcing steel. Non load-bearing welded joints.**

Applies to the welding of weldable reinforcing steel and stainless reinforcing steel of non load-bearing welded joints, in workshops or on site. Gives requirements for materials, design and execution of welded joints, welding personnel, quality requirements, examination and testing.

## **RAISING THE BAR**

The British Association of Reinforcement (BAR) provides an industry focus and marketing champion for the UK's reinforcement industry. BAR membership includes UK major reinforcement fabricators and manufacturing mills. It has representation on British Standards and its members are CARES approved.



**GIVE YOUR PROJECT A REINFORCED ADVANTAGE**  
**RAISE THE BAR**

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BRITISH ASSOCIATION OF REINFORCEMENT FOR:**

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- COMMITMENT TO HEALTH AND SAFETY
- COMMITMENT TO SUSTAINABILITY
- TECHNICAL EXPERTISE
- ADDED VALUE
- PRODUCT INNOVATION AND DEVELOPMENT
- QUALITY PRODUCTS AND SERVICE



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