# STEEL CONSTRUCTION CE Marking







Tata Steel and the British Constructional Steelwork Association (BCSA) have worked closely together for many years to promote the effective use of structural steelwork. This collaborative effort ensures that advances in the knowledge of the constructional use of steel are shared with construction professionals.

Steel is the most popular framing material for multi-storey buildings in the UK and has a long track record of delivering high quality and cost-effective structures with proven sustainability benefits. Steel can be naturally recycled and re-used continuously, and offers a wide range of additional advantages such as health and safety benefits, speed of construction, quality, efficiency, innovation, offsite manufacture and service and support.



The steel sector is renowned for keeping specifiers abreast of the latest advances in areas such as Building Information Modelling (BIM), fire protection of structural steelwork and achieving buildings with the highest sustainability ratings. Recent publications have provided detailed guidance on Fire Protection, Cost, Thermal Mass and Embodied Carbon and what each means for the construction sector. Guidance is provided on all relevant technical developments as quickly as is possible.

The sector's go to resource website – www.steelconstruction.info – is a free online encyclopedia for UK construction that shares a wealth of up-to-date, reliable information with the construction industry in one easily accessible place.

#### **Tata Steel Europe**

The European operations of Tata Steel comprise Europe's second largest steel producer. With the main steelmaking operations in the UK and Netherlands, they supply steel and related services to the construction, automotive, packaging, lifting and excavating, energy and power, aerospace and other demanding markets worldwide. The combined Tata Steel group is one of the world's largest steel producers, with an aggregate crude steel capacity of more than 28 million tonnes and approximately 80,000 employees across four continents.

#### **British Constructional Steelwork Association**

BCSA is the national organisation for the steel construction industry: its Member companies undertake the design, fabrication and erection of steelwork for all forms of construction in building and civil engineering. Industry Members are those principal companies involved in the direct supply to all or some Members of components, materials or products. Corporate Members are clients, professional offices, educational establishments etc which support the development of national specifications, quality, fabrication and erection techniques, overall industry efficiency and good practice.



# **Contents**

- 5 Introduction
- **CE Marking of products** 6
- **CE Marking of fabricated structural steelwork** 7
- 9 Engineer's responsibility
  - 1. Determine the Consequences Class
  - 2. Selection of Execution Class
- Client and/or main contractor's responsibility 13
- 14 How to check compliance with the CPR and **CE Marking**

What to check - Factory Production Control and Welding Certificates

What to check - Declaration of Performance

16 Summary

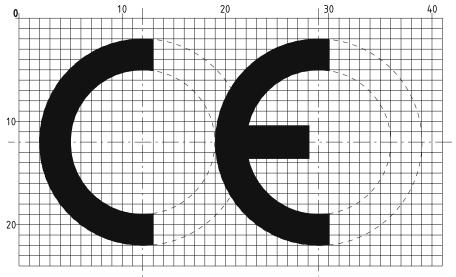


This guide has been updated to reflect the changes in determining Execution Class to the procedure outlined in earlier versions





# Introduction



CE Marking (formerly Conformité Européenne) demonstrates compliance with the appropriate manufacturing standard for a product. As a symbol, it will be familiar as it has been a requirement for many years on products sold in the European Union such as toys and electrical goods.

Under the Construction Products Regulation (CPR), new legal obligations have been placed on manufacturers, distributors and importers of construction products used within the EU to CE Mark their products where they are covered by either a harmonised standard or European Technical Assessment (ETA). This applies not only to constituent products (such as steel beams, bolts etc) but also to fabricated elements and systems made from both CE Marked and non-CE Marked products.

In the UK, Trading Standards is the enforcement agency for non-compliance. Penalties for non-compliance include suspension notices, prohibition notices, notices to warn and application for forfeiture. For certain offences the penalties may include a fine, imprisonment or both.

The CPR required the CE Marking of all construction products from 1 July 2013 and the CE Marking of fabricated structural steelwork from 1 July 2014.

The CPR describes the legal obligations it places on the construction supply chain in terms of 'manufacturers', 'distributors' and 'importers'. However, the construction supply chain in the UK would normally be described in terms of clients, designers, specifiers, contractors and specialist subcontractors. The purpose of this document is to provide some guidance to the UK supply chain on the implications of the CPR on steel construction.

The requirements of the CPR and CE Marking apply to construction products used on a project irrespective of whether that project has been designed to National Standards (i.e. BS 5950) or to the Eurocodes.

# **CE Marking of products**

Under the CPR, all products used in construction must now have CE Marking to demonstrate compliance where either a harmonised standard or ETA is in force. All mainstream construction products are covered by harmonised standards and must therefore be CE Marked.

Specifications
must ensure that
only CE Marked
products are used
on projects

For fabricated structural steelwork, engineers, contractors and steelwork contractors should have amended their specifications accordingly to ensure only CE Marked products are used on their projects.

Manufacturers must publish declarations of performance for their products. Tata Steel has published declarations of performance for its Advance section range and Celsius® 355 and Hybox® 355 structural hollow sections at www.tatasteeleurope.com/dop.

# Product standards for CE Marking

open sections - BS EN 10025-1

#### hollow sections

- hot finished BS EN 10210-1
- cold formed welded –
   BS EN 10219-1

plates - BS EN 10025-1

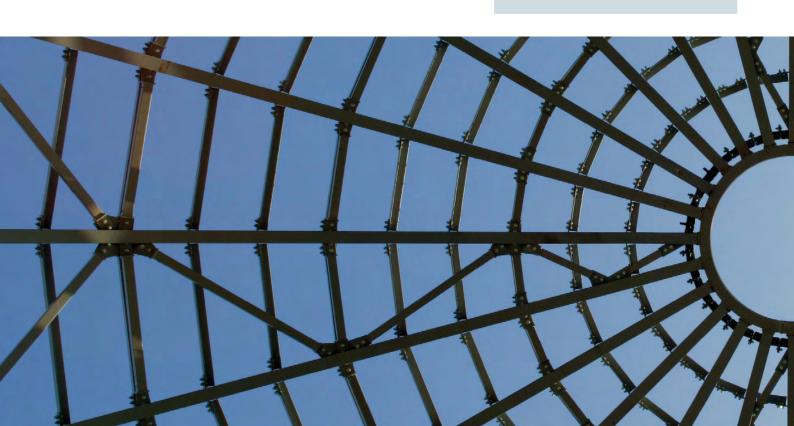
fabricated structural steelwork – BS EN 1090-1

#### structural bolts

- non-preloaded structural bolting assemblies – BS EN 15048-1
- high strength structural bolting assemblies for preloading – BS EN 14399-1

#### Note:

A full list of harmonised standards can be found on the EU's Nando website here



# **CE Marking of fabricated structural steelwork**

The harmonised standard covering fabricated structural steelwork is BS EN 1090: Execution of steel structures and aluminium structures.

Part 1 of the standard is the Requirements for Conformity Assessment of Structural Components. It describes how manufacturers can demonstrate that the **components** they produce meet the declared performance characteristics (the structural characteristics which make them fit for their particular use and function).

# **Specifications**

Contracts for fabricated structural steelwork should include the following specification, which incorporates the obligations of BS EN 1090-1 and BS EN 1090-2 on the steelwork contractor:

#### **Buildings**

 National Structural Steelwork Specification (NSSS) for Building Construction 5th Edition CE Marking Version Part 2 is the Technical Requirements for Steel Structures. It specifies the requirements for the execution of steel **structures** to ensure adequate levels of mechanical resistance and stability, serviceability and durability. It determines the performance characteristics for components that the manufacturer must achieve and declare through the requirements of Part 1.

BS EN 1090-1 became mandatory on 1 July 2014. It is therefore now a legal requirement for all fabricated structural steelwork delivered to site to be CE Marked.

The BCSA has made CE Marking compliance a condition of membership of the Association, so selection of any BCSA Member company

guarantees that the steelwork contractor has the necessary certification to comply with the CPR requirements. Clients and main contractors can therefore have confidence in the complete supply chain for steel construction from manufacture of the steel sections through distribution to fabrication and erection on site.





# **Engineer's responsibility**

For any project, the required quality of fabrication or Execution Class (EXC) must be specified. The procedure to determine the Execution Class has recently been changed. It must now be determined according to the requirements of Annex C of BS EN 1993-1-1 and its associated National Annex. The Execution Class must be specified for:

- the works as a whole
- an individual component
- a detail of a component

EXC2 will be
the appropriate
requirement for the
majority of buildings
constructed
in the UK

The engineer is responsible for specifying the Execution Class for the structure (the works as a whole) and for components and details where it is appropriate to specify an Execution Class different to that specified for the structure. Where different, the Execution Class for a component or detail should not be lower than that specified for the works as a whole. The Execution Class for a component or detail should be clearly identified in the execution specification if it is different to the Execution Class for the structure.

The procedure for determining the Execution Class **for buildings** is a straightforward two step process:

- 1. Determine the Consequences Class
- 2. Select the Execution Class

Whilst each building needs to be considered on its own merits, Execution Class 2 (EXC2) will be appropriate for the majority of buildings constructed in the UK. If the Consequences Class is not specified, clause NA.2.27.2 of the National Annex to BS EN 1993-1-1:2005+A1:2014 states that it should be assumed that the design rules in BS EN 1993 are safe for classes up to and including Consequences Class 2.

It should also be noted that the NSSS for Building Construction 5th Edition CE Marking Version has been written for the steelwork contractor to deliver the requirements of EXC2.

## Consequences Class

Table 11
Approved
Document A

# Execution Class

Table NA.4
National Annex to
BS EN 1993-1-1:
2005+A1:2014

# 1. Determine the Consequences Class

The purpose of categorising the Consequences Class (CC) is to ensure that buildings are constructed with the appropriate level of quality control within the fabrication process. The Consequences Class for a building is derived on the basis of building type, building height (number of storeys), floor plan area per storey (for retail) and occupancy. A structure, or a part of it, could also contain components with different Consequences Classes.

Table 11 of Approved Document A may be used to determine the Consequences Class for a range of building types and occupancy. In Table 11, CC2a and CC2b are subdivisions of CC2 when determining the Execution Class required for a structure.

Table 11	Building Consequence Classes			
Consequence Class	Building type and occupancy			
1	Houses not exceeding 4 storeys. Agricultural buildings. Buildings into which people rarely go, provided no part of the building is closer to another building, or area where people do go, than a distance 1½ times the building height.			
2a Lower Risk Group	5 storey single occupancy houses. Hotels not exceeding 4 storeys. Flats, apartments and other residential buildings not exceeding 4 storeys. Offices not exceeding 4 storeys. Industrial buildings not exceeding 3 storeys. Retailing premises not exceeding 3 storeys of less than 2,000m² floor area in each storey. Single storey educational buildings. All buildings not exceeding 2 storeys to which the public are admitted and which contain floor areas not exceeding 2,000m² at each storey.			
2b Upper Risk Group	Hotels, blocks of flats, apartments and other residential buildings greater than 4 storeys but not exceeding 15 storeys.  Educational buildings greater than 1 storey but not exceeding 15 storeys.  Retailing premises greater than 3 storeys but not exceeding 15 storeys.  Hospitals not exceeding 3 storeys.  Offices greater than 4 storeys but not exceeding 15 storeys.  All buildings to which the public are admitted and which contain floor areas exceeding 2,000m² but less than 5,000m² at each storey.  Car parking not exceeding 6 storeys.			
3	All buildings defined above as Consequence Class 2a and 2b that exceed the limits on area and/or number of storeys. Grandstands accommodating more than 5,000 spectators. Buildings containing hazardous substances and/or processes.			

- 1. For buildings intended for more than one type of use the Consequence Class should be that pertaining to the most onerous type.
- 2. In determining the number of storeys, basement storeys may be excluded provided such basement storeys fulfil the robustness requirements of Consequences Class 2b buildings.
- 3. BS EN 1991-1-7:2006 with its UK National Annex also provides guidance that is comparable to Table 11.

As note 1 of Table 11 states, the Consequences Class for a mixed use building will be that pertaining to the most onerous occupancy type.

Table 11 presents the Consequences Classes for the buildings it considers in a helpful but generic way. Where a building falls just outside the threshold of CC2 in Table 11, designers may wish to determine the Consequences Class from first principles to see if CC2 can still be applied. Section 5.4 of Approved Document A sets out this alternative approach.

## 2. Selection of Execution Class

Having determined the Consequences Class for a building, the required Execution Class is simply derived from Table NA.4 of the National Annex to BS EN 1993-1-1:2005+A1:2014.

Parts of BS EN1993 which are applicable to the design of the structure <sup>1</sup>		All relevant Parts except Part 1-9 or Part 1-12	All relevant Parts including Part 1-9 and/or Part 1-12	
Other Eurocodes applicable to the design of the structure <sup>1</sup> (in addition	Required	-	-	BS EN 1998
to BS EN 1990 and BS EN 1991)	Optional	BS EN 1994	BS EN 1994	BS EN 1994
Execution Classes	RC1, CC1 RC2, CC2	Minimum EXC2	Generally EXC3	Generally EXC3
	RC3, CC3	EXC3	Minimum EXC3	Minimum EXC3

#### Note:

1. or a distinct, clearly identifiable zone of a structure

For the majority of buildings constructed in the UK, EXC2 will be the appropriate requirement. Where the Consequences Class is not specified clause NA2.27.2 of the National Annex to BS EN 1993-1-1:2005+A1:2014 states that it should be assumed that the design rules in BS EN 1993 are safe for Consequences Classes up to and including CC2.

The engineer should always derive the Execution Class based on the design parameters appropriate to each project. The requirements to each Execution Class are listed in Table A3 of BS EN 1090-2 and can be reviewed by the engineer if desired.

However, the engineer should avoid overspecification of the Execution Class wherever possible to avoid unnecessary costs being introduced. For example, EXC2 is the Execution Class derived for a project but the engineer requires full traceability (an EXC3 requirement) instead of the partial traceability requirement of EXC2. Rather than specifying EXC3 on the basis of achieving this single clause requirement, it is suggested that EXC2 is still specified but with the higher level of traceability added to the specification.

EXC2 will be appropriate for the majority of buildings constructed in the UK





# Client and/or main contractor's responsibility

For all fabricated structural steelwork delivered to site there is a legal requirement under the CPR that it is CE Marked.

In order to achieve this, the client or main contractor should appoint a steelwork contractor with an Execution Class equal to that required for the project. It should be noted that steelwork contractors with EXC3 capability can be used for EXC1, 2, & 3; and a steelwork contractor with EXC2 capability can only be used for EXC1 & 2.

### ABC Engineering Ltd

Buildings Categories: C, D, E, F, G, H, J, K, L, M,

N, R

Guide Contract Value: above £6,000,000

Accredited Certification: WQMS-C, EM, HSM, QM,

FPC EXC4

SCSC: Gold Member

Membership: SCCS | SCSC | BCSA

The directories for buildings and bridgeworks on BCSA's website include details of accredited certification levels achieved by each member. Clients and main contractors can use this to find steelwork contractors with an Execution Class equal to that required for their project.

The BCSA has made CE Marking compliance a condition of membership of the Association, so selection of a BCSA Member company ensures

that the steelwork contractor has the necessary accreditation to comply with the CPR requirements.

Contract documentation should also be updated to incorporate CE Marked version of NSSS 5th Edition, which incorporates the obligations of BS EN 1090-1 and BS EN 1090-2 on the steelwork contractor.

Selecting a
BCSA Member
ensures
CE Marking
compliance

It should be noted that if a non-EU steelwork contractor is used on a project, the CPR puts liability on clients and/or main contractors. In that instance, the party engaging the steelwork contractor would be classed as an importer under the CPR and must comply with 'Obligations of Importers' given in Article 13 of the regulations.

# **How to check compliance** with the CPR and CE Marking

In order for steelwork contractors to demonstrate their right to CE Mark their products, they must provide the following three documents:

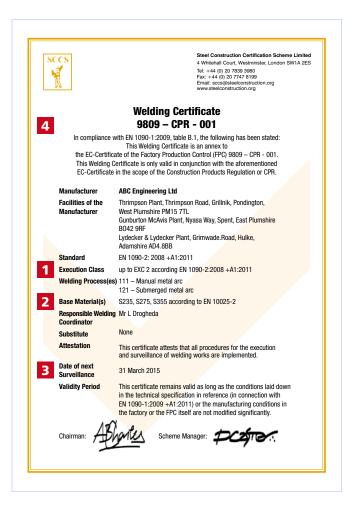
- Factory Production Control (FPC) Certificate issued by a notified body 1.
- Welding Certificate issued by a notified body 2.
- Declaration of Performance (DoP) issued by the steelwork contractor

The client or main contractor engaging the steelwork contractor should carry out due diligence before appointing them. Likewise, insurers should complete a similar due diligence process before giving Professional Indemnity insurance to steelwork contractors who wants to CE Mark their products.

CE Marked fabricated steelwork must be supported by a Factory Production Control Certificate, a Welding Certificate and a Declaration of Performance

> As the BCSA has made CE Marking compliance a condition of membership, simply selecting a BCSA Member will ensure compliance with the regulations. The client, main contractor or insurer would not need to carry out due diligence of the steelwork contractor in this case since it has already been undertaken by the BCSA as part of its membership audit.



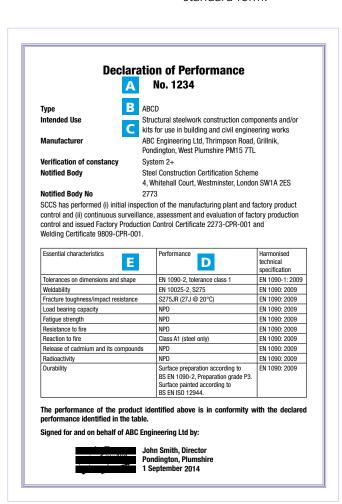


# What to check – Factory Production Control and Welding Certificates

- 1 Declared performance ensure that the steelwork contractor meets or exceeds the Execution Class requirements for the project.
- 2 Base materials the steelwork contractor is covered for welding with material strength and subgrades up to and including those declared on the Welding Certificate. Ensure that these are consistent with the requirements of the project.
- 3 Date of next surveillance check that the certificate is still current and covers the period of the contract.
- 4 Notified body number check on the EU's Nando website to ensure that it is a valid and current number associated with the notified body named on each certificate.

# What to check – Declaration of Performance

The scope of the DoP to be issued by the steelwork contractor for each project is set out in Article 6 of the CPR, with a standard form included as Annex III. The standard form in Annex III covers all aspects of the CPR, whereas the example below suggests what would be appropriate to include when CE Marking fabricated structural steelwork along with some comments that might be helpful in interpreting the intent of the DoP standard form.



- A Steelwork contractor's unique DoP Certificate identification number.
- B Steelwork contractor defined (may be omitted if not relevant).
- C Brief description of use, which may include project name and location.
- D Check that notified body and level of assessment declared is consistent with the FPC and Welding Certificates where appropriate.
- E Steelwork Contractors are not required to declare performance against all of the performance characteristics in Table ZA.1 of BS EN 1090-1 +A1:2011, but only those that are appropriate and for which they are responsible.

# Summary

#### Overview

It is a legal requirement to use CE Marked construction products. Manufacturers must publish declarations of performance for their products. Tata Steel has published declarations of performance for its Advance section range and Celsius® 355 and Hybox® 355 structural hollow sections at www.tatasteeleurope.com/dop.

It is also a legal requirement for all fabricated structural steelwork delivered to site to be CE Marked. To comply with the regulations, only steelwork contractors with an Execution Class equal to that required for a project should be considered.

Contracts for fabricated structural steelwork for buildings should include the NSSS for Building Construction 5th Edition CE Marking Version. This specification incorporates the obligations of the CPR and CE Marking on the steelwork contractor.

## Engineer's responsibility

The engineer is responsible for specifying the Execution Class for the structure as a whole, the components and the details that they have designed.

Procedure for specification of Execution Class for a building:

- 1. Determine Consequences Class Table 11 of Approved Document A [Usually 2a or 2b]
- 2. Select Execution Class Table NA.4 of the National Annex to BS EN 1993-1-1:2005+A1:2014 [Will typically result in EXC2]

Whilst each building needs to be considered on its own merits, EXC2 will be appropriate for the majority of buildings constructed in the UK.

If the Consequences Class is not specified clause NA.2.27.2 of the National Annex to BS EN 1993-1-1:2005 +A1:2014 states that it should be assumed that the design rules in BS EN 1993 are safe for Consequences Classes up to and including CC2.

#### Consequences Class

Table 11 Approved **Document A** 

#### **Execution** Class

**Table NA.4 National Annex to** BS EN 1993-1-1: 2005+A1:2014

## Client and/or main contractor's responsibility

For all fabricated structural steelwork delivered to site, there is a legal requirement under the CPR that it is CE Marked. In order to achieve this, the client or main contractor must appoint a steelwork contractor with an Execution Class equal to that required for the project, as determined by BS EN 1090-2. It should be noted that steelwork contractors with EXC3 capability can be used for EXC1, 2, & 3; and a steelwork contractor with EXC2 capability can only be used for EXC1 & 2.

The BCSA has made CE Marking compliance a condition of membership of the Association, so selection of any BCSA Member company ensures that the steelwork contractor has the necessary accreditation to comply with the CPR requirements. The directories for buildings and bridgeworks on BCSA's website include details of the accredited certification level achieved by each member.

It should be noted that if a non-EU steelwork contractor is used on a project, the CPR puts liability on clients and/or main contractors. In that instance, the party engaging the steelwork contractor would be classed as an importer under the CPR and must comply with 'Obligations of Importers' given in Article 13 of the regulations.

# Check compliance with the CPR and CE Marking

In order for steelwork contractors to demonstrate their right to CE Mark their products, they must provide the following three documents:

- 1. Factory Production Control Certificate
- 2. Welding Certificate
- 3. Declaration of Performance

The client or main contractor engaging the steelwork contractor should carry out due diligence before appointing them. Likewise, insurers should complete a similar due diligence process before giving Professional Indemnity insurance to steelwork contractors who want to CE Mark their products.

As the BCSA has made CE Marking compliance a condition of membership of the Association, simply selecting a BCSA Member will ensure compliance with the regulations. The client, main contractor or insurer would not need to carry out due diligence of the steelwork contractor in this case since it has already been undertaken by the BCSA as part of its membership audit.



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