

CE Marking of Structural Steelwork

Stakeholder Responsibilities

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CE Marking of Structural Steelwork

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- 30 years structural steelwork experience in various sectors.
- Experience profile extends to construction, design, welding, quality and CE marking requirements.
- Set up WQMS in July 2012 to offer welding quality management services to the structural steelwork sector.
- Clients include fabricators, consulting engineers and main contractors.
- BEng degree from the UL, an MSc degree from the University of Strathclyde and an IWE diploma from the GSI SLV in Duisburg.
- Lead quality auditor for ISO 9001.
- Chartered Engineer and a Chartered Member of the Welding Institute.

CE Marking of Structural Steelwork

CE Marking of structural steelwork will become a legal requirement in Ireland on
1st July 2014.

Implications

The harmonised European standard that applies to structural steelwork is **IS EN 1090-1** and it will be an **offence** to supply structural steelwork after the **1st of July 2014** unless it conforms to this standard and carries a legitimate CE mark.

CE Marking is regulated by criminal law and the penalties for not CE Marking or incorrect CE Marking, if found guilty, are a fine, imprisonment or both.

Implications

The requirement for fabricated steelwork to be CE marked represents a major development for

Designers & Specifiers

Steelwork Contractors

Clients & Main Contractors

and demands careful attention to the new obligations imposed.

Responsibilities for: Designers / Specifiers

Since the implementation of the Structural Eurocodes in Ireland in March 2010, Eurocode 3 (IS EN 1993) became the relevant code for the design of building works using structural steel.

Part A (Amendment) of the Building Regulations has also commenced since 1 July 2013. Technical Guidance Document A 2013 makes reference to the Eurocodes. Where works are carried out in accordance with this guidance, this will, prima facie, indicate compliance with Part A of the Building Regulations.

Conflicting standards with the same scope and field of application, e.g. BS 5950 and BS 5400 were withdrawn by the relevant standards body on that date.

Responsibilities for: Designers / Specifiers

In order to help secure the safety of the designed structure using the Eurocodes, designers are also required to follow the execution code which specifies the requirements for all activities performed for the physical completion of the works, i.e. procurement, fabrication, welding, mechanical fastening, transportation, erection, surface treatment and the inspection and documentation thereof.

The relevant execution standard covering fabricated structural steelwork is;

IS EN 1090 - Execution of steel structures and aluminium structures.

Responsibilities for: Designers / Specifiers

For any project, the required quality of fabrication or Execution Class must be specified.

IS EN 1090-2 requires the Execution Class to be specified for the works as a whole, an individual component and a detail of a component.

In some cases, the Execution Class for the structure, the components and the details will be the same while in other cases the Execution Class for the component and the details may be different to that for the whole structure.

Execution Class

There are 4 Execution Classes (EXC) which range from Execution Class 1 which is the least onerous through to Execution Class 4 which is the most onerous.

It is down to the designer / specifier to select the EXC required for the structure, an individual component or a particular detail of a component.

The EXC is derived by determining

Consequence Class (CC)

and defining the

Service Category (SC)

and the

Production Category (PC).

Determine the Consequence Class

The purpose of categorising the Consequence Class is to ensure that the buildings/structures are constructed with the appropriate level of quality control within the fabrication process.

Table B1 from EN 1990:2002 – Eurocode – Basis of structural design		
Table B1 – Definition of consequence classes		
Consequence classes	Description	Examples of buildings and civil engineering works
CC3	High consequence for loss of human life, or economic, social or environmental consequences very great	Grandstands, public buildings where consequences of failure are high (e.g. a concert hall)
CC2	Medium consequences for loss of human life, economic, social or environmental consequences considerable	Residential and office buildings, public buildings where consequences of failure are medium (e.g. an office building)
CC1	Low consequences for loss of human life, and economic, social or environmental consequences small or negligible	Agricultural buildings where people do not normally enter (e.g. storage buildings), greenhouses

Define the Service Category

Service categories are the method used in EN 1090-2 to consider the risk from the actions to which the structure and its parts are likely to be exposed to during erection and use, such as fatigue and likelihood of seismic actions.

Table B.1, IS EN 1090-2 – Suggested criteria for service categories	
Categories	Criteria
SC1	Structures and components designed for quasi static actions only (Example: Buildings)
	Structures and components with their connections designed for seismic actions in regions with low seismic activity and in DCL*
	Structures and components designed for fatigue actions from cranes (class S ₀)**
SC2	Structures and components designed for fatigue actions according to EN 1993. (Examples: Road and railway bridges, cranes (class S ₁ to S ₉)**, structures susceptible to vibrations induced by wind, crowd or rotating machinery)
	Structures and components with their connections designed for seismic actions in regions with medium or high seismic activity and in DCM* and DCH*

Define the Production Category

Production categories are the method used in EN 1090-2 to consider the risk from the complexity of the fabrication of the structure and its components, e.g. application of particular techniques, procedures and controls.

Table B.2, EN 1090-2 - Suggested criteria for production categories	
Categories	Criteria
PC1	Non welded components manufactured from any steel grade products
	Welded components manufactured from any steel grade products below S355
PC2	Welded components manufactured from any steel grade products from S355 and above
	Components essential for structural integrity that are assembled by welding on construction site
	Components with hot forming manufacturing or receiving thermic treatment during manufacturing
	Components of CHS lattice girders requiring end profile cuts

Derive the Execution Class

Farm Buildings

Small Industrial Buildings

High Rise Buildings

Consequence Class		CC1		CC2		CC3	
Service Categories		SC1	SC2	SC1	SC2	SC1	SC2
Production Categories	PC1	EXC1	EXC2	EXC2	EXC3	EXC3	EXC3
	PC2	EXC2	EXC2	EXC2	EXC3	EXC3	EXC4

Industrial Buildings

Long Span Bridges

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 Ireland. If the Execution Class is not specified on a project, Clause 4.1.2 of IS EN 1090-2 states that EXC2 shall apply.

Consequence Class		CC1		CC2		CC3	
Service Categories		SC1	SC2	SC1	SC2	SC1	SC2
Production Categories	PC1	EXC1	EXC2	EXC2	EXC3	EXC3	EXC3
	PC2	EXC2	EXC2	EXC2	EXC3	EXC3	EXC4

Responsibilities for: Steelwork Contractors

From 1st July 2013 all products used in steelwork fabrication have to be CE marked.

This includes, steel beams, plates, welding wire, bolts etc.

From the 1st July 2014, it will be a legal requirement for all fabricated structural steelwork delivered to site to be CE Marked.

This includes all constructional steelwork from sheds and farm buildings up to bridges and stadia.

Responsibilities for: Steelwork Contractors

The basis for CE marking is that the manufacturer declares that its products meet specified performance characteristics that are defined as essential to the application of the products in the field of construction.

In order for a manufacturer to CE mark their products, they will require to be certified by a notified body. This means that they will have to set up a Factory Production Control system.

Factory Production Control

EN ISO 3834

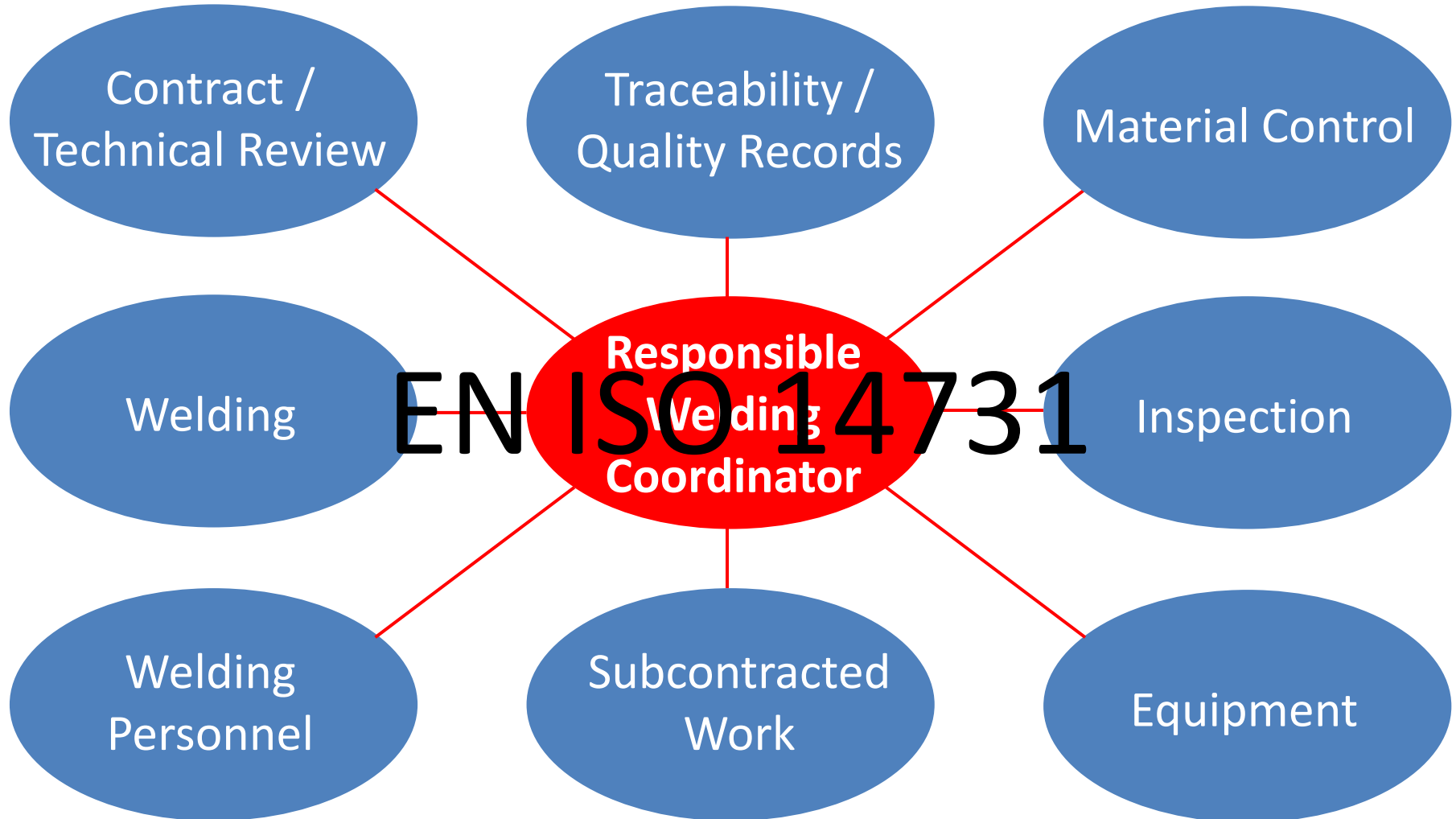


Management System – EN ISO 3834

According to the Execution Class, the following parts of EN ISO 3834 apply:

- EXC1 Part 4 “Elementary quality requirements”
- EXC2 Part 3 “Standard quality requirements”
- EXC3 & EXC4 Part 2 “Comprehensive quality requirements”

Management System – EN ISO 3834



Coordinator – EN ISO 14731

According to EN ISO 14731 the following levels of technical knowledge are defined as:

- B - Basic technical knowledge - International Welding Specialist
- S - Specific technical knowledge - International Welding Technologist
- C - Comprehensive technical knowledge - International Welding Engineer

Coordinator – EN ISO 14731

Table 14, IS EN 1090-2 – Technical knowledge of the coordination personnel Structural carbon steels					
EXC	Steels (steel group)	Reference Standards	Thickness		
			$t \leq 25^a$	$25 < t \leq 50^b$	$t > 50$
EXC2	S235 to S355 (1.1, 1.2 & 1.4)	EN 10025-2, EN 10025-3, EN 10025-4, EN 10025-5, EN 10149-2, EN 10149-3, EN 10210-1, EN 10219-1	B	S	C^c
	S420 to S700 (1.2, 2 & 3)	EN 10025-2, EN 10025-3, EN 10025-4, EN 10025-5, EN 10149-2, EN 10149-3, EN 10210-1, EN 10219-1	S	C^d	C
EXC3	S235 to S355 (1.1, 1.2 & 1.4)	EN 10025-2, EN 10025-3, EN 10025-4, EN 10025-5, EN 10149-2, EN 10149-3, EN 10210-1, EN 10219-1	S	C	C
	S420 to S700 (1.2, 2 & 3)	EN 10025-2, EN 10025-3, EN 10025-4, EN 10025-5, EN 10149-2, EN 10149-3, EN 10210-1, EN 10219-1	C	C	C
EXC4	All	All	C	C	C
a	Column base plates and end plates ≤ 50 mm				
b	Column base plates and end plates ≤ 75 mm				
c	For steels up to and including S275, level S is sufficient				
d	For steels N, NL, M and ML, level S is sufficient				

Clients / Main Contractors

Clients or main contractors who engage a steelwork contractor should carry out due diligence and should only appoint a steelwork contractor certified with an Execution Class equal to that for the project as determined by the designer through IS EN 1090-2.

From the 1st July 2014, it will be a legal requirement for all fabricated structural steelwork delivered to site to be CE Marked.

Clients / Main Contractors

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

Factory Production Control Certificate

Welding Certificate

Declaration of Performance

Factory Production Control (FPC) Certificate

EC Certificate of Factory Production Control (FPC)

2273 – CPR – 0046

In compliance with Regulation 305/2011/EU of the European Parliament and of the Council of 9 March 2011 (the Construction Products Regulation or CPR) it has been stated that the construction product:

Structural Components for Steel Structures

Harmonised	Type / Execution Class of the Construction Product	Declaration Method
BS EN 1090-1: 2009 + A1:2011	Load bearing and welded structural steel components up to EXC 4 according to BS EN 1090-2:2008+A1:2011	1, 2, 3a and 3b table A.1 of BS EN 1090-1: 2009 + A1:2011

placed on the market by

Jamestown Cladding and Profiling Ltd

and produced in the factory(ies)

Unit 20, Newbridge Ind Estate, Newbridge, County Kildare, Ireland

is submitted by the manufacturer to the initial type-testing of the product, a factory production control and to the further testing of samples taken at the factory in accordance with a prescribed test plan and that the notified body No. 2273 – Steel Construction Certification Scheme Ltd - has performed the initial inspection of the factory and of the factory production control and performs the continuous surveillance, assessment and approval of the factory production control.

Attestation This certificate attests that all provisions concerning the attestation of factory production control described in Annex ZA of the standard: **BS EN 1090-1: 2009 + A1:2011** were applied.

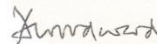
Date of first issue May 2013

Date of this issue 20th May 2013

Date of next Surveillance by 30th April 2014

Validity Period This certificate remains valid as long as the conditions laid down in the harmonised standard in reference or the manufacturing conditions in the factory or the FPC itself are not modified significantly.

Chairman:
D Woodward



Scheme Manager:
J Carmichael



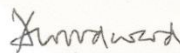
Welding Certificate

2273 – CPR – 0046 – WC

In compliance with BS EN 1090-1:2009+A1:2011, table B.1, the following has been stated:
This Welding Certificate is an annex to the EC-Certificate of the Factory Production Control (FPC) 2273 – CPR – 0046.
This Welding Certificate is only valid in conjunction with the aforementioned EC-Certificate in the scope of the Construction Products Regulation or CPR.

Manufacturer	Jamestown Cladding and Profiling Ltd
Facilities of the Manufacturer	Unit 20 Newbridge Industrial Estate Newbridge Co Kildare
Standard	BS EN 1090-2: 2008 + A1:2011
Execution Class	up to EXC 4 according BS EN 1090-2:2008+A1:2011
Welding Process(es)	121 – Submerged Arc Welding with one wire electrode 123 – Submerged Arc Welding with multiple wire electrodes 135 – Metal Active Gas Welding
Base Material(s)	Up to and including S355K2 according BS EN 10025-2
Responsible Welding Coordinator	Gerry McCarthy IWE
Alternate	Niall Fortune (BCSA) Tara Keaveney (BCSA)
Attestation	This certificate attests that all procedures for the execution and surveillance of welding works (in connection with BS EN 1090-1:2009+A1:2011) are implemented.
Date of first issue	May 2013
Date of this issue	20 th May 2013
Date of next Surveillance	by 30 th April 2014
Validity Period	This certificate remains valid as long as the conditions laid down in the harmonised standard in reference or the manufacturing conditions in the factory or the FPC itself are not modified significantly

Chairman:
D Woodward



Scheme Manager:
J Carmichael



Declaration of Performance (DoP) Certificate

Declaration of Performance

Contract Name

Type: Welded steel components in accordance with component specification No. 124384-YTR-ECV-SPE, Rev 0 & Drawing No 124384-YTR-ECV-DRG-115, Rev 0.

Intended use/s: Steel structures or composite steel and concrete structures where the components can be made from hot rolled, cold-formed steel. Steel material from which components are made can be in various shapes/profiles e.g. plates, sheet, strip, bars, castings or forgings.

Manufacturer: Jamestown Cladding and Profiling Ltd
Unit 20 Newbridge Ind. Est.,
Newbridge, Co. Kildare, Ireland.

System of assessment and verification of constancy of performance: System 2+

Notified Body: Steel Construction Certification Scheme
4, Whitehall Court. Westminster
London, SW1A 2ES

Notified Body No: 2773

Steel Construction Certificate Scheme has performed (i) initial inspection of the manufacturing plant and factory product control and (ii) continuous surveillance, assessment and evaluation of factory production control and issued Factory Production Control certificate 2773-CPR-0046 and Welding certificate 2773-CPR-0046-WC.

Essential characteristics	Performance ¹	Harmonised technical specification
Tolerances on dimensions and shape	EN 1090-2, tolerance class 1	EN 1090-1: 2009 + A1: 2011
Weldability	EN 10025-2, S355J2 & EN 10025-5, S355J2W	EN 1090-1: 2009 + A1: 2011
Fracture toughness/impact resistance	S355J2 & S355J2W (27J @ -20°C)	EN 1090-1: 2009 + A1: 2011
Load bearing capacity	NPD	EN 1090-1: 2009 + A1: 2011
Fatigue strength	NPD	EN 1090-1: 2009 + A1: 2011
Resistance to fire	NPD	EN 1090-1: 2009 + A1: 2011
Reaction to fire	Class A1 (steel only)	EN 1090-1: 2009 + A1: 2011
Release of cadmium and its compounds	NPD	EN 1090-1: 2009 + A1: 2011
Radioactivity	NPD	EN 1090-1: 2009 + A1: 2011
Durability	NPD	EN 1090-1: 2009 + A1: 2011

¹ These characteristics should be interpreted in accordance with Component Specification No. 124384-YTR-ECV-SPE, Rev 0 & Drawing No 124384-YTR-ECV-DRG-115, Rev 0.

The performance of the product identified above is in conformity with the declared performance identified in the table.

Signed for and on behalf of Jamestown Cladding and Profiling Ltd by:

Responsible Welding Coordinator

Place and date of issue:
Jamestown Cladding and Profiling Ltd
Unit 20 Newbridge Ind. Est.,
Newbridge, Co. Kildare, Ireland.

Date: 18th June 2013

Current Situation

Designers / Specifiers

Project specifications for steelwork do not always refer to
EN 1090-2.

Designers / Specifiers do not usually audit steelwork contractors to
ensure compliance with specifications.

Some steelwork projects do not have a steelwork specification.

There is a significant gap in the knowledge of the standard
EN 1090-2 within the consulting engineering sector.

Current Situation

Steelwork contractors

Currently only 2 from approximately 75 steelwork contractors are certified to CE mark their steelwork.

It takes 6 to 12 months to implement a Factory Production Control system to IS EN 1090-1 and have it certified by a notified body.

There is no Irish notified body for the standard IS EN 1090-1 and as the number of UK & European notified bodies is limited, it is likely to become more difficult to book a certification audit as the deadline approaches.

Clients / Main Contractors

Clients & Main Contractors tend to select the steelwork contractor based on price.

Clients & Main Contractors do not always have the technical knowledge to ensure the steelwork contractor is working to the specification / standard.

Clients & Main Contractors seldom audit steelwork contractors to ensure compliance or competence with the requirements of the project.

Summary

From the 1st July 2014, it will be a legal requirement for all fabricated structural steelwork delivered to site to be CE Marked.

Designers and specifiers need to amend their specifications to include references to the new standards.

Designers and specifiers need to ensure that the requirements of the specification are adhered to for all aspects of the project.

Steelwork contractors need to implement FPC systems and become certified to IS EN 1090-1 for CE Marking.

Clients and main contractors should only consider steelwork contractors certified with an Execution Class equal to that required for the project.

Thank you

Gerry McCarthy

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