BRITISH STANDARD

BS EN 10340:2007

Steel castings for structural uses

The European Standard EN 10340:2007 has the status of a British Standard

ICS 77.140.80

BSI British Standards

National foreword

This British Standard is the UK implementation of EN 10340:2007.

The UK participation in its preparation was entrusted to Technical Committee ISE/6, Steel castings.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Steel castings for structural uses

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Stahlguss für das Bauwesen

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Foreword

This document (EN 10340:2007) has been prepared by Technical Committee ECISS/TC 31 “Steel castings”, the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 2008, and conflicting national standards shall be withdrawn at the latest by July 2009.

This document has been prepared under a mandate M120 given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s) "Construction Products Directive (89/106/EEC)".

For relationship with EU Directive(s) "Construction Products Directive (CPD)”, see informative Annex ZA, which is an integral part of this document.

This document is intended to be read in conjunction with EN 1559-1:1997 and EN 1559-2:2000 and the referenced test Standards.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EC Directive(s).

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

This draft European Standard retains the same format for clauses as EN 1559-1:1997 and EN 1559-2:2000. It is intended to be used in conjunction with these standards. Where no text is given under a paragraph heading, the corresponding paragraph of EN 1559-1:1997 and EN 1559-2:2000 applies.

The structure of this standard is as follows:

— clauses and subclauses preceded by ■ indicate no additional conditions to EN 1559-1[1)] and EN 1559-2[1)];

— clauses and subclauses marked with a single dot ● indicate that the conditions shall be agreed at the time of enquiry and order in so far as such conditions do no conflict with the regulatory requirements of the European Union State or EFTA of destination;

— subclauses marked with two dots ●● indicate that conditions may be agreed at the time of enquiry and order (optional) in so far as such conditions do no conflict with the regulatory requirements of the European Union State or EFTA of destination;

— subclauses without dot marking are a requirement of this standard.

1) When complementary information is given in a clause or subclause of this standard (versus the same clause or subclause of EN 1559-1:1997 or EN 1559-2:2000) it is preceded by "in addition to EN 1559".

1 Scope

This European Standard applies to steel castings:

— for structural uses in buildings and civil engineering works. Its uses include housing and service buildings, bridges, roads, pipe network.

In cases where castings are joined by welding by the founder, this European Standard applies.

This European Standard does not apply in cases where castings are welded:

— to wrought products (plates, tubes, forgings...);

— or by non founders.

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.

EN 1559-1:1997, *Founding - Technical conditions of delivery - Part 1: General*

EN 1559-2:2000, *Founding - Technical conditions of delivery - Part 2: Additional requirements for steel castings*

EN 10204, *Metallic products - Types of inspection documents*

EN ISO 8062-3, *Geometrical Product Specifications (GPS) - Dimensional and geometrical tolerances for moulded parts - Part 3: General dimensional and geometrical tolerances and machining allowances for castings (ISO 8062-3:2007)*

EN ISO 9001:2000, *Quality management systems - Requirements (ISO 9001:2000)*

EN ISO 11970, *Specification and approval of welding procedures for production welding of steel castings (ISO 11970:2001)*

■3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1559-1:1997 and EN 1559-2:2000 apply.

•4 Information to be supplied by the purchaser

In cases of grades with different mechanical properties relating to heat treatment conditions the manufacturer shall obtain from the purchaser the heat treatment symbol in accordance with Clause 5.

5 Designation

In addition to EN 1559-2:2000:

— for a steel grade which can be delivered to different strength levels, according to the heat treatment, a suffix shall be added in accordance with Table 2. For example: G24Mn6+QT1.

6 Manufacture

■6.1 Manufacturing process

■6.1.1 Melting

6.1.2 Heat treatment

6.1.2.1 Unless otherwise agreed, the type of heat treatment represented by its symbol shall comply with Table 2. For some grades there are different options with different mechanical properties given in Table 2.

■6.1.2.2

6.2 Welding operations

■6.2.1 General

6.2.2 Production welding

6.2.2.1 Unless otherwise specified welding is permitted, provided that all welds shall comply with the same criteria for non-destructive testing as the relevant part of the casting and shall be carried out according to a qualified welding procedure (see EN ISO 11970).

6.2.2.2 Conditions for preheat, interpass and postweld heat-treatment related to welding operations are given in Annex A.

7 Requirements

■7.1 General

7.2 Material

7.2.1 Chemical composition

In addition to EN 1559-2:2000:

— chemical composition determined by a cast analysis shall comply with the values given in Table 1;

— permissible deviations between the specified cast analysis and the check analysis on test blocks are indicated in Table 1 of EN 1559-2:2000.

7.2.2 Mechanical properties

In addition to EN 1559-2:2000:

7.2.2.1 The mechanical properties shall comply with the values given in Table 2.

These values shall apply up to the maximum wall thickness given in Table 2. They shall be verified on test blocks of relevant thickness (see 8.4.1 of EN 1559-2:2000). In all cases the maximum relevant thickness of test blocks shall be limited to 150 mm.

7.2.2.2 The yield strength values at room temperature correspond to 0,2 % proof strength ($R_{p0,2}$).

●**7.2.2.3** In cases where two impact values are given, for different test temperatures in Table 2 the manufacturer shall ascertain from the purchaser which impact value is required. If there is no specified requirement, impact test shall be conducted at room temperature.

■**7.2.3 Other properties**

7.3 Casting

■**7.3.1 Chemical composition**

7.3.2 Mechanical properties

In addition to EN 1559-2:2000.

The values of yield and tensile strength given in Table 2 also apply to the casting itself up to the maximum relevant wall thickness stated.

■**7.3.3 Non destructive testing**

■**7.3.4 Conditions of the casting**

■**7.3.4.1 General (shape, dimensions and tolerances)**

■**7.3.4.2 Fettling and finishing**

■**7.3.5 Mass of the casting**

■**7.3.6 Additional requirements regarding the condition of the casting**

●●7.4 Corrosion behaviour

Durability is dependant on the chemical composition of the cast steel and can be improved by applying an appropriate surface treatment (e.g. specific coating, passivation).

Requirements for resistance to intergranular corrosion may be agreed between producer and purchaser for austenitic and austenitic-ferritic grades (see EN ISO 3651-2).

8 Testing and documents on material testing

■8.1 General

■8.2 Inspection and testing

■8.3 Test unit sampling

■8.4 Samples (test blocks)

8.5 Test methods

■a) tensile test at room temperature;

b) tensile test at elevated temperature (not applicable);

■c) impact test;

■d) ferrite content test (applicable to austenitic and austenitic-ferritic grades);

e) hardness test (not applicable);

■f) homogeneity of test units (hardness test);

g) pressure or leak testing (not applicable);

■h) intergranular corrosion test (applicable to austenitic and austenitic-ferritic grades);

■i) tests for magnetic properties (applicable to austenitic and austenitic-ferritic grades);

■j) other tests for any other properties may be agreed;

k) in addition to EN 1559-2:2000:

chemical analysis shall be carried out using appropriate established methods;

NOTE 1 The list of available European Standards on chemical analysis is given in CR 10261.

l) in addition to EN 1559-2:2000:

tolerances on dimensions and shape specified in accordance with EN ISO 8062-3 and additional tolerances shall be verified by measuring equipment with sufficient accuracy.

NOTE 2 Usually the accuracy of the measuring equipment is 1/10 of tolerance to be measured.

■8.6 Invalidation of tests

■8.7 Retests

■8.8 Sorting and reprocessing

■9 Identification and marking

■10 Packaging and surface protection

■11 Complaints

12 Dangerous substances

Materiels used in products shall not release any dangerous substances in excess of the maximum permitted levels specified in a relevant European Standard for the materials or permitted in the national regulations of the member state of destination.

13 Evaluation of conformity

Where evaluation of conformity is required for regulatory purposes, Annex B shall apply.

Table 1 — Chemical composition (cast analysis), (% by mass)

Designation		C		Si	Mn		P	S	Cr		Mo		Ni		V		N	Cu
Name	Number	min.	max.	max.	min.	max.	max.	max.	min.	max.	min.	max.	min.	max.	min.	max.		max.
GS200	1.0449	-	0,18	0,60	-	1,20	0,030	0,025	-	0,30[a]	-	0,12[a]	-	0,40[a]	-	0,03[a]	-	0,30[a]
GS240	1.0455	-	0,23	0,60	-	1,20	0,030	0,025	-	0,30[a]	-	0,12[a]	-	0,40[a]	-	0,03[a]	-	0,30[a]
G17Mn5	1.1131	0,15	0,20	0,60	1,00	1,60	0,020	0,020 [b]	-	0,30[a]	-	0,12[a]	-	0,40[a]	-	0,03[a]	-	0,30[a]
G20Mn5	1.6220	0,17	0,23	0,60	1,00	1,60	0,020	0,020 [b]	-	0,30[a]	-	0,12[a]	-	0,80[a]	-	0,03[a]	-	0,30[a]
G24Mn6	1.1118	0,20	0,25	0,60	1,50	1,80	0,020	0,015	-	0,30[a]	-	0,12[a]	-	0,40[a]	-	0,03[a]	-	0,30[a]
G10MnMoV6-3	1.5410	-	0,12	0,60	1,20	1,80	0,025	0,020	-	0,30	0,20	0,40	-	0,40	0,05	0,10	-	0,30
G18NiMoCr3-6	1.6759	0,17	0,22	0,60	0,80	1,20	0,020	0,015	0,40	0,90	0,40	0,70	0,60	1,00	-	0,05	-	0,30
GX4CrNi13-4	1.4317	-	0,06	1,00	-	1,00	0,035	0,015	12,00	13,50	-	0,70	3,50	5,00	-	0,08	-	0,30
GX4CrNiMo16-5-1	1.4405	-	0,06	0,80	-	1,00	0,035	0,025	15,00	17,00	0,70	1,50	4,00	6,00	-	0,08	-	0,30
GX2CrNi19-11	1.4309	-	0,030	1,50	-	2,00	0,035	0,025	18,00	20,00	-	0,50	9,00	12,00	-	-	0,20 max.	0,50
GX2CrNiMo19-11-2	1.4409	-	0,030	1,50	-	2,00	0,035	0,025	18,00	20,00	2,00	2,50	9,00	12,00	-	-	0,20 max.	0,50
GX2CrNiMoN25-6-3	1.4468		0,030	1,00	-	2,00	0,035	0,025	24,50	26,50	2,50	3,50	5,50	7,00	-	-	0,12 to 0,25	0,50

[a] Cr + Mo + Ni + V + Cu ≤ 1 %.

[b] For castings of ruling thickness < 28 mm, S ≤ 0,030 % (by mass) shall be permitted.

Table 2 — Mechanical properties

Designation		Heat treatment [a]			Thickness	Tensile test at room temperature			Impact test [b]	
Name	Number	Symbol [c]	Normalizing or austenitizing °C	Tempering °C	t mm	$R_{p0,2}$ MPa [d] min.	R_m MPa [d]	A % min.	KV J min.	Temperature °C
GS200	1.0449	+ N	900 to 980 [e]	-	$t \leq 100$	200	380 to 530	25	35	RT [f]
GS240	1.0455	+ N	900 to 980 [e]	-	$t \leq 100$	240	450 to 600	22	31	RT [f]
G17Mn5	1.1131	+ QT	920 to 980 [e g]	600 to 700	$t \leq 50$	240	450 to 600	24	27 70	-40 RT [f]
G20Mn5	1.6220	+ N	900 to 980 [e]	-	$t \leq 30$	300	480 to 620	20	27 50	-30 RT [f]
		+QT	900 to 980 [e g]	610 to 660	$t \leq 100$	300	500 to 650	22	27 60	- 40 RT [f]
G24Mn6	1.1118	+ QT1	880 to 950 [g]	520 to 570	$t \leq 50$	550	700 to 800	12	27	- 20
		+ QT2		600 to 650	$t \leq 100$	500	650 to 800	15	27	-30
		+QT3		650 to 680	$t \leq 150$	400	600 to 800	18	27	- 30
G10MnMoV6-3	1.5410	+ QT1	950 to 980 [e]	640 to 660	$t \leq 50$	380	500 to 650	22	27 60	- 20 RT [f]
					$50 < t \leq 100$	350	480 to 630	22	60	RT [f]
					$100 < t \leq 150$	330	480 to 630	20	60	RT [f]
					$150 < t \leq 250$	330	450 to 600	18	60	RT [f]
		+QT2	950 to 980 [g]	640 to 660	$t \leq 50$	500	600 to 750	18	27 60	- 20 RT [f]
					$50 < t \leq 100$	400	550 to 700	18	60	RT [f]
					$100 < t \leq 150$	380	500 to 650	18	60	RT [f]
					$150 < t \leq 250$	350	460 to 610	18	60	RT [f]
		+ QT3	950 to 980 [g]	740 to 760 + 600 to 650	$t \leq 100$	400	520 to 650	22	27 60	- 20 RT [f]

Table 2 *(continued)*

Designation		Heat treatment [a]			Thickness	Tensile test at room temperature			Impact test [b]	
Name	Number	Symbol [c]	Normalizing or austenitizing °C	Tempering °C	t mm	$R_{p0,2}$ MPa [d] min.	R_m MPa [d]	A % min.	KV J min.	Temperature °C
G18NiMoCr3-6	1.6759	+ QT1	900 to 980 [g]	580 to 620	$t \leq 80$	700	830 to 980	12	27	- 40
		+QT2	900 to 980 [g]	590 to 630	$t \leq 150$	630	780 to 930	12	27	- 40
GX4CrNi13-4	1.4317	+QT	1 000 to 1 050	590 to 620	$t \leq 300$	570	760 to 960	15	50	RT [f]
GXCrNiMo16-5-1	1.4405	+QT	1 020 to 1 070	580 to 630	$t \leq 300$	540	760 to 960	15	60	RT [f]
GX2CrNi19-11	1.4309	+ AT[h]	1 050 to 1 150	-	$t \leq 150$	185	440 to 640	30	80	RT [f]
GX2CrNiMo19-11-2	1.4409	+AT[h]	1 080 to 1 150	-	$t \leq 150$	195	440 to 640	30	80	RT [f]
GX2CrNiMoN25-6-3	1.4468	+AT[h]	1 120 to 1 150	-	$t \leq 150$	480	650 to 850	22	50	RT [f]

[a] Temperature and cooling medium (for information only).

[b] If two impact values are given, see 7.2.2.3.

[c] + N means: Normalizing, + QT or + QT1 or + QT2 or + QT3 means: Quenching + Tempering; + AT means: Solution Annealing.

[d] 1 MPa = 1N/mm^2.

[e] Cooling in air (for information only).

[f] RT means Room Temperature.

[g] Cooling in liquid (for information only).

[h] Solution annealing with quenching in water.

Annex A

Welding conditions

Annex A shall be normative for austenitic and austenitic-ferritic grades.

Annex A is informative for all other grades.

Table A.1 — Welding conditions

Designation Name	Number	Preheat temperature °C [a]	Interpass temperature °C max.	Post heat treatment °C		
GS200	1.0449	20 to 150	350	No heat treatment necessary		Informative
GS240	1.0455	20 to 150	350	No heat treatment necessary		
G17Mn5	1.1131	20 to 150	350	No heat treatment necessary		
G20Mn5	1.6220	20 to 150	350	No heat treatment necessary		
G24Mn6	1.1118	20 to 150	350	No heat treatment necessary		
G10MnMoV6-3	1.5410	20 to 150	350	[b]		
G18NiMoCr3-6	1.6759	20 to 200	350	[b]		
GX4CrNi13-4	1.4317	100 to 200	300	Same as normal tempering temperature		
GX4CrNiMo16-5-1	1.4405	No preheat	200	Same as normal tempering temperature		
				Minor welds [d]	Major welds [e]	normative
GX2CrNi19-11	1.4309	No preheat	[c]	No heat tr. necess[f]	No heat tr. necess[f]	
GX2CrNiMo19-11-2	1.4409			No heat tr. necess[f]	No heat tr. necess[f]	
GX2CrNiMoN25-6-3	1.4468	20 to 100	250[f]	+At[g,h]	+AT[g,h]	

[a] The preheating temperature is related to the geometry and the thickness of the casting and climate conditions.

[b] The post weld heat treatment temperature shall be at least 20 K but not more than 50 K below the tempering temperature, (e.g: for a tempering temperature 600 °C the post weld heat treatment temperature shall be beween 550 °C and 580 °C).

[c] At the discretion of the manufacturer unless otherwise agreed.

[d] For minor welds, where applicable, special arrangement shall be agreed upon according to corrosion conditions.

[e] In general production welds are considered major when the depth of the cavity prepared for welding exceeds 40 % of the wall thickness.

[f] Special arrangement may be agreed upon according to corrosion conditions.

[g] For low preheat and low interpass temperature (≤ 150 °C) the post weld heat treatment may be suppressed by agreement.

[h] + AT means solution annealing + water quenching (same as carried out on the base material) (see Table 2). Air quenching may be agreed for very small and thin castings, according to corrosion conditions.

Annex B
(normative)

Evaluation of conformity

B.1 General

The compliance of a steel casting to the requirements of this European Standard and with the stated values (including classes) shall be demonstrated by:

— initial type testing;

— factory production control by the manufacturer, including product assessment.

B.2 Initial type testing

B.2.1 General

An initial type test is a complete set of tests or other procedures, determining the performances of samples of products representative of the castings.

Initial type testing shall be performed to show conformity with this standard on first use of this standard for steel castings being put onto the market and:

— at the beginning of the production of a new or modified steel castings design (where this may affect the stated properties);

— at the beginning of a new or modified method of production (where this may affect the stated properties).

In case of type testing on steel castings for which initial type testing in accordance with this standard was already performed, type testing may be reduced if it has been established that the performance characteristics compared with the already tested steel castings have not been affected.

B.2.2 Characteristics

Initial type testing shall be performed on first application of this standard. Tests previously performed in accordance with the provisions of this standard (same product, same characteristic(s), test method, sampling procedure, system of attestation of conformity, etc.) may be taken into account.

The assessment of the following characteristics is required:

— tolerances on dimensions and shape;

— elongation;

— tensile strength;

— yield strength;

— impact strength;

— weldability may be assessed indirectly by controlling chemical composition of the steel castings concerned;

— durability may be assessed indirectly by controlling chemical composition of the steel castings concerned.

B.2.3 Initial type testing program

The initial type testing program comprises specific inspection and testing in accordance with 8.2 carried out on the first castings produced.

B.3 Testing of samples taken at the factory by the manufacturer

The testing of samples taken at the factory by the manufacturer in accordance with a prescribed plan as specified in this European Standard and in accordance with the requirements of prEN 10340:2007, Clause 8 shall be the means of evaluation of conformity of the steel product delivered in accordance with this European Standard. The reporting of such testing as carried out by the manufacturer shall be in an inspection document in accordance with EN 10204 and of a type of document as set out in Table B.1.

Table B.1 — Type of inspection document

Requirement	Inspection document
Specified minimum yield strength $\leq$ 355 MPa[a] and a specified impact energy tested at a temperature of 20 °C	2.2
Specified minimum yield strength $\leq$ 355 MPa[a] and a specified impact energy tested at a temperature less than 0 °C	3.1 or 3.2
Specified minimum yield strength > 355 MPa[a]	3.1 or 3.2
[a] 1 MPa = 1 N/mm^2.	

B.4 Factory production control (FPC)

B.4.1 General

The manufacturer shall establish, document and maintain an FPC system to ensure that the products placed on the market conform to the stated performance characteristics. The FPC system shall consist of procedures, regular inspections and tests and/or assessments and the use of the results to control raw and other incoming materials or components, equipment, the production process and the product. Records shall remain legible, readily identifiable and retrievable.

An FPC system conforming to the requirements of EN ISO 9001, and made specific to the products and requirements of this standard, shall be considered to satisfy the above requirements.

The results of inspections, tests or assessments requiring action shall be recorded, as shall any action taken. The action to be taken when control values or criteria are not met shall be recorded and retained for the period specified in the manufacturer's FPC procedures.

B.4.2 FPC requirements

B.4.2.1 General

The manufacturer shall establish procedures to ensure that the production tolerances allow for the steel casting performances to be in conformity with the declared values, derived from initial type testing.

The characteristics, and the means of verification, are given in Table B.2.

Table B.2 — Minimum frequency of testing for product testing and evaluation as part of FPC

Property	Clause, indicating the relevant test method (if any)	Minimum number of samples and minimum frequency of tests
Tolerances on dimensions and shape	EN ISO 8062-3 and 7.3.4.1	One per pattern
Elongation	EN 1559-2:2000	One per 10 melts
Tensile strength	En 1559-2:2000	One per 10 melts
Yield strength	EN 1559-2:2000	One per 10 melts
Impact strength	EN 1559-2:2000	One per 10 melts
Weldability	8.5 k) and Annex A	One per melt
Durability	8.5 k)	One per melt

The manufacturer shall record the results of the tests specified above. These records shall at least include the following information:

— identification of the steel castings tested;

— date of sampling and testing;

— test method performed;

— test results.

B.4.2.2 Manufacturer-specific FPC system requirements

B.4.2.2.1 Personnel

The responsibility, authority and the relationship between personnel that manages, performs or verifies work affecting product conformity, shall be defined. This applies in particular to personnel that need to initiate actions preventing product non-conformities from occurring, actions in case of non-conformities and to identify and register product conformity problems. Personnel performing work affecting product conformity shall be competent on the basis of appropriate education, training, skills and experience for which records shall be maintained.

B.4.2.2.2 Equipment

All weighing, measuring and testing equipment necessary to achieve, or produce evidence of, conformity shall be calibrated or verified and regularly inspected according to documented procedures, frequencies and criteria. Control of monitoring and measuring devices shall comply with the appropriate clause of EN ISO 9001:2000.

All equipment used in the manufacturing process shall be regularly inspected and maintained to ensure use; wear or failure does not cause inconsistency in the manufacturing process.

Inspections and maintenance shall be carried out and recorded in accordance with the manufacturer's written procedures and the records retained for the period defined in the manufacturer's FPC procedures.

B.4.2.2.3 Design process

The factory production control system shall document the various stages in the design of the steel castings; identify the checking procedure and those individuals responsible for all stages of design.

During the design process itself, a record shall be kept of all checks, their results, and any corrective actions taken. This record shall be sufficiently detailed and accurate to demonstrate that all stages of the design phase, and all checks, have been carried out satisfactorily. Compliance with EN ISO 9001:2000, 7.3 shall be deemed to satisfy the requirements of this clause.

B.4.2.2.4 Raw materials and components

The specifications of all incoming raw materials and components shall be documented, as shall the inspection scheme for ensuring their conformity. The verification of conformity of the raw material with the specification shall be in accordance with EN ISO 9001:2000, 7.4.3.

B.4.2.2.5 In-process control

The manufacturer shall plan and carry out production under controlled conditions. Compliance with EN ISO 9001:2000, 7.5.1 and 7.5.2 shall be deemed to satisfy the requirements of this clause.

B.4.2.2.6 Traceability and marking

Individual products or product batches shall be identifiable and traceable with regard to their production origin. The manufacturer shall have written procedures ensuring that processes related to affixing traceability codes and/or markings (see Clause 9) are inspected regularly. Compliance with EN ISO 9001:2000, 7.5.3 shall be deemed to satisfy the requirements of this clause.

B.4.2.2.7 Non-conforming products

The manufacturer shall have written procedures which specify how non-conforming products shall be dealt with. Any such events shall be recorded as they occur and these records shall be kept for the period defined in the manufacturer's written procedures. Compliance with EN ISO 9001:2000, 8.3 shall be deemed to satisfy the requirements of this clause.

B.4.2.2.8 Corrective action

The manufacturer shall have documented procedures that instigate action to eliminate the cause of non-conformities in order to prevent recurrence. Compliance with EN ISO 9001:2000, 8.5.2 shall be deemed to satisfy the requirements of this clause.

B.4.2.2.9 Handling, storage, packaging

The manufacturer shall have written procedures providing methods of product handling and shall provide suitable storage areas preventing damages or deterioration.

Annex ZA
(informative)

Relationship between this European Standard and the Essential Requirements of EU Directive 89/106/EEC, EU Construction Products Directive

ZA.1 Scope and relevant characteristics

This European Standard has been prepared under Mandate M/120 Structural metallic products and ancillaries, given to CEN by the European Commission and the European Free Trade Association.

The clauses of this European Standard shown in this annex meet the requirements of the mandate given under the EU Construction Products Directive (89/106/EEC).

Compliance with these clauses confers a presumption of fitness of the steel castings covered by this annex for the intended uses indicated herein; reference shall be made to the information accompanying the CE marking.

WARNING - Other requirements and other EU Directives, not affecting the fitness for intended uses, can be applicable to the steel castings falling within the scope of this European Standard.

NOTE 1 In addition to any specific clauses relating to dangerous substances contained in this standard, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the EU Construction Products Directive, these requirements need also to be complied with, when and where they apply.

NOTE 2 An informative database of European and national provisions on dangerous substances is available at the Construction website on EUROPA (accessed through *http://europa.eu.int/comm/enterprise/construction/internal/dangsub/dangmain.htm).*

This annex has the same scope as Clause 1 of this standard and is defined by Table ZA.1.

This annex establishes the conditions for the CE marking of the steel castings intended for the uses indicated in Table ZA.2 and shows the relevant clauses applicable.

Table ZA.1 — Relevant clauses for steel castings used in building and civil engineering works

Essential Characteristics	Requirement clauses in this and other European Standard(s)	Levels and/or classes	Notes
Tolerances on dimensions and shape	7.3.4.1	-	-
Elongation	7.2.2	-	-
Tensile strength	7.2.2; 7.3.2	-	-
Yield strength	7.2.2; 7.3.2	-	-
Weldability	7.2.1 and Annex A	-	-
Durability(chemical composition)	7.2.1	-	-
Impact test	7.2.2.3	-	-

The requirement on a certain characteristic is not applicable in those Member States (MSs) where there are no regulatory requirements on that characteristic for the intended use of the product. In this case, manufacturers placing their products on the market of these MSs are not obliged to determine nor declare the performance of their products with regard to this characteristic and the option “No performance determined” (NPD) in the information accompanying the CE marking (see ZA.3) may be used. The NPD option may not be used, however, where the characteristic is subject to a threshold level.

ZA.2 Procedure(s) for attestation of conformity of steel castings

ZA.2.1 System(s) of attestation of conformity

The system(s) of attestation of conformity of steel castings indicated in Table ZA.1 in accordance with the Decision of the Commission 98/214/EC of 1998-03-18 as given in Annex III of the mandate for 120 Structural metallic products and ancillaries, is shown in Table ZA.2 for the indicated intended use(s) and relevant level(s) or class(es):

Table ZA.2 — System(s) of attestation of conformity

Product(s)	Intended use(s)	Level(s) or class(es)	Attestation of conformity system(s)
Structural metallic sections and profiles	To be used in metal structures or in composite metal and concrete structure		2+
System 2+: See Directive 89/106/EEC (CPD) Annex III.2.(ii), First possibility, including certification of the factory production control by an approved body on the basis of initial inspection of factory and of factory production control as well as of continuous surveillance, assessment and approval of factory production control.			

The attestation of conformity of the steel castings in Table ZA.1 shall be based on the evaluation of conformity procedures indicated in Table ZA.3 resulting from application of the clauses of this or other European Standard indicated therein.

Table ZA.3 — Assignment of evaluation of conformity tasks for steel castings under system 2+

<table>
<tr><th colspan="3">Tasks</th><th>Content of the task</th><th>Evaluation of conformity clauses to apply</th></tr>
<tr><td rowspan="5">Tasks under the responsibility of the manufacturer</td><td colspan="2">Factory production control (FPC)</td><td rowspan="5">Parameters related to all characteristics of Table ZA.1</td><td>B.4</td></tr>
<tr><td colspan="2">Initial type testing by the manufacturer</td><td>B.2</td></tr>
<tr><td colspan="2">Testing of samples taken at the factory</td><td>B.3</td></tr>
<tr><td rowspan="2">Certification of FPC on the basis of</td><td>Initial inspection of factory and of FPC</td><td rowspan="2">B.4</td></tr>
<tr><td>Continuous surveillance, assessment and approval of FPC</td></tr>
</table>

ZA.2.2 EC Certificate and Declaration of conformity

When compliance with the conditions of this annex is achieved, and once the notified body has drawn up the certificate mentioned below, the manufacturer or his agent established in the European Economic Area (EEA) shall prepare and retain a declaration of conformity, which entitles the manufacturer to affix the CE marking. This declaration shall include:

— name and address of the manufacturer, or his authorised representative established in the EEA, and the place of production;

— description of the product (type, identification, use, ...), and a copy of the information accompanying the CE marking;

— provisions to which the product conforms (i.e. Annex ZA of this European Standard);

— particular conditions applicable to the use of the product (e.g. provisions for use under certain conditions);

— number of the accompanying factory production control certificate;

— name of, and position held by, the person empowered to sign the declaration on behalf of the manufacturer or his authorised representative.

The declaration shall be accompanied by a factory production control certificate, drawn up by the notified body, which shall contain, in addition to the information above, the following:

— name and address of the notified body;

— number of the factory production control certificate;

— conditions and period of validity of the certificate, where applicable;

— name of, and position held by, the person empowered to sign the certificate.

The above mentioned declaration and certificate shall be presented in the official language or languages of the Member State in which the product is to be used.

ZA.3 CE marking and labelling

The manufacturer or his authorised representative established within the EEA is responsible for the affixing of the CE marking. The CE marking symbol to affix shall be in accordance with Directive 93/68/EC[2)] and shall be shown on the steel castings or when not possible it may be on the accompanying label, the packaging or on the accompanying commercial documents e.g. inspection document [see Table B.1]. The following information shall accompany the CE marking symbol:

— identification number of the notified body;

— name or identifying mark and registered address of the producer;

— last two digits of the year in which the marking is affixed;

— number of the factory production control certificate;

2) Council Directive 93/68/EEC of 22 July 1993 amending 12 Directives, including Directive 89/106/EEC harmonising the provisions for CE marking.

— reference to this European Standard;

— description of the product: generic name, material, dimensions, and intended use;

— information on those relevant essential characteristics listed in Table ZA.1 which are to be declared presented as:

  — “No performance determined” for characteristics where this is relevant;

  — the standard designation (see prEN 10340) which shows all of the relevant characteristics (where the designation covers only some characteristics, it will need to be supplemented with declared values for other characteristics as listed in Table ZA.1).

The “No performance determined” (NPD) option may not be used where the characteristic is subject to a threshold level. Otherwise, the NPD option may be used when and where the characteristic, for a given intended use, is not subject to regulatory requirements in the Member State of destination.

Figure ZA.1 gives an example of the information to be given on the product, label, packaging and/or commercial documents.

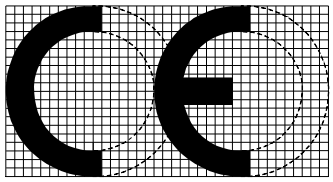 01234	*CE conformity marking, consisting of the "CE"-symbol given in Directive 93/68/EEC.* *Identification number of the certification body*
AnyCo Ltd, PO Box 21, B-1050 **07** 01234-CPD-00234	*Name or identifying mark and registered address of the producer* *Last two digits of the year in which the marking was affixed* *Certificate number (where relevant)*
prEN 10340 Steel castings for building and civil engineering **Steel casting 1.4309 - GX2CrNi 19-11** **Regulated substance : No performance determined**	*No. of European Standard* *Description of product* *and* *information on regulated characteristics*

Figure ZA.1 – Example CE marking information

In addition to any specific information relating to dangerous substances shown above, the product should also be accompanied, when and where required and in the appropriate form, by documentation listing any other legislation on dangerous substances for which compliance is claimed, together with any information required by that legislation.

NOTE European legislation without national derogations need not be mentioned.

Bibliography

[1] EN 1993, *Eurocode 3 - Design of steel structures.*

[2] EN 10002-1, *Metallic materials – Tensile testing – Part 1: Method of test at ambient temperature*.

[3] EN 10045-1, *Metallic materials – Charpy impact test – Part 1: Test method.*

[4] CR 10261, *ECISS Information Circular 11 – Iron and steel – Review of available methods of chemical analysis.*

[5] 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 (ISO 3651- 2:1998)*

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