

Welding consumables — General product standard for filler metals and fluxes for fusion welding of metallic materials

The European Standard EN 13479:2004 has the status of a
British Standard

ICS 25.160.20

National foreword

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The UK participation in its preparation was entrusted to Technical Committee WEE/39, Welding consumables, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
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Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 16, an inside back cover and a back cover.

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Welding consumables - General product standard for filler metals and fluxes for fusion welding of metallic materials

Produits consommables pour le soudage - Norme produit générale pour les métaux d'apport et les flux pour le soudage par fusion de matériaux métalliques

Schweißzusätze - Allgemeine Produktnorm für Zusätze und Pulver zum Schmelzschiessen von metallischen Werkstoffen

This European Standard was approved by CEN on 12 November 2004.

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Foreword

This document (EN 13479:2004) has been prepared by Technical Committee CEN/TC 121 "Welding", the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by June 2005, and conflicting national standards shall be withdrawn at the latest by June 2005.

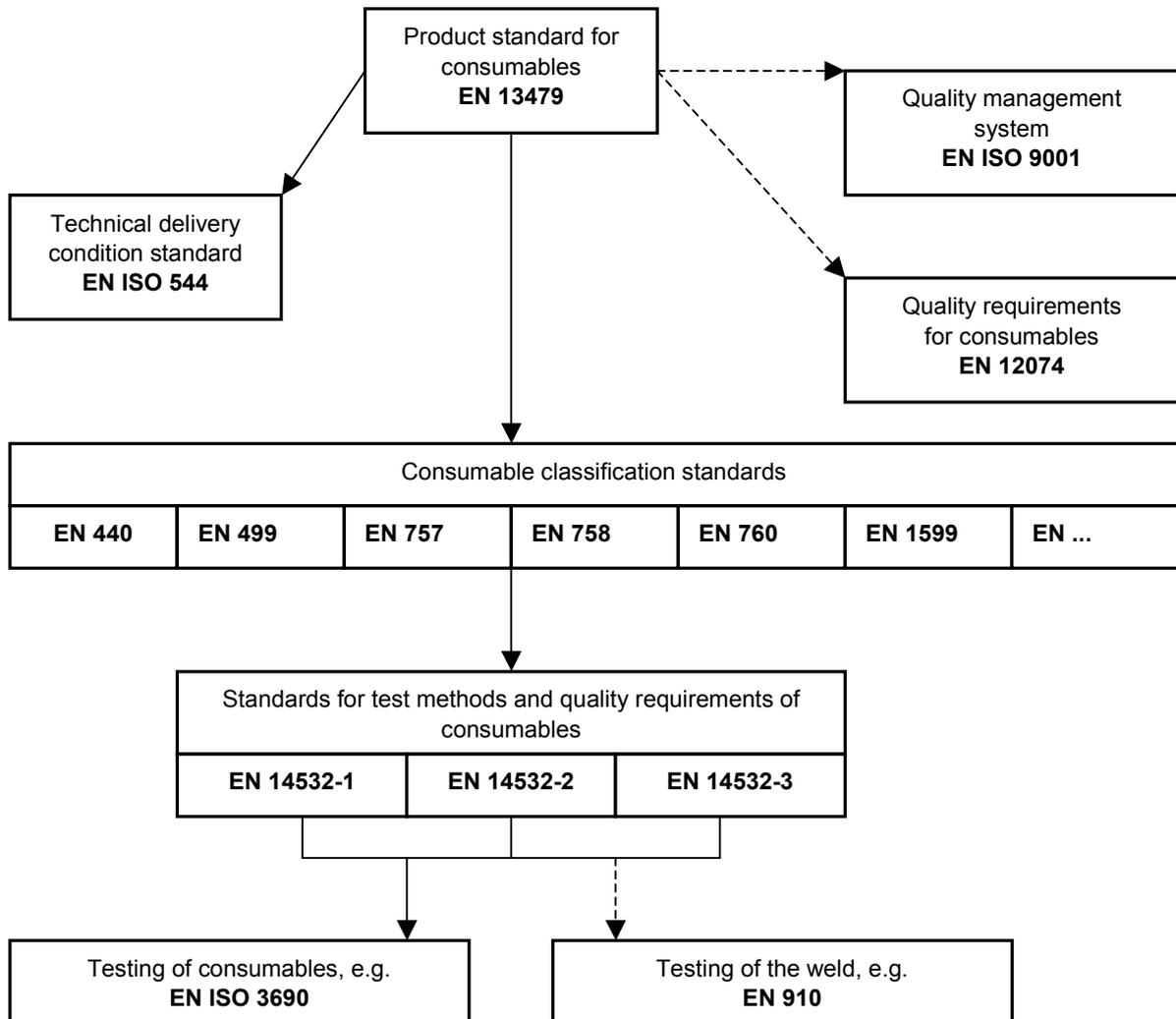
This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive.

For relationship with EU Directive, see informative Annex ZA, which is an integral part of this document.

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Introduction

This document is part of a family comprising the following:



1 Scope

This document specifies general delivery conditions for filler metals and fluxes for fusion welding of metallic materials. This document does not apply to auxiliaries such as shielding gases. This document is intended for application in a number of situations:

- The manufacturer should use this document to establish the product's characteristics.
- This document may be used for contractual purposes, as a reference document.
- This document should also be used as a reference document for product conformity assessment.

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 760, *Welding consumables — Fluxes for submerged arc welding — Classification*

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

EN 12074, *Welding consumables — Quality requirements for manufacture, supply and distribution of consumables for welding and allied processes*

EN 14532-1:2004, *Welding consumables — Test methods and quality requirements — Part 1: Primary methods and conformity assessment of consumables for steel, nickel and nickel alloys*

EN 14532-2, *Welding consumables — Test methods and quality requirements — Part 2: Supplementary methods and conformity assessment of consumables for steel, nickel and nickel alloys*

EN 14532-3:2004, *Welding consumables — Test methods and quality requirements — Part 3: Conformity assessment of wire electrodes, wires and rods for welding of aluminium alloys*

EN ISO 544, *Welding consumables — Technical delivery conditions for welding filler materials — Type of product, dimensions, tolerances and markings (ISO 544:2003)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

product specification

manufacturer's document which specifies requirements for a welding consumable including, as applicable, chemical composition and mechanical properties of deposited metal, coating type, flux composition, range of welding parameters, and the designation according to the appropriate classification standard

3.2

manufacturer

party who has legal responsibility for the finished quality of the product placed upon the market

3.3

deposited metal

filler metal that has been added during welding

4 Manufacturing process

The manufacturing processes used are at the discretion and responsibility of the manufacturer.

5 Requirements

5.1 General

Products claiming compliance with this document shall meet the requirements of this Clause.

5.2 Product specification

The product specification shall include the following information, as a minimum:

- manufacturer's brand name for the consumable;
- dimension;
- technical delivery conditions in accordance with EN ISO 544;
- description of the covering, flux or filling material in terms of those major constituents which define the characteristics of the consumable (e.g. oxides, carbonates, fluorides and metals);
- classification of the consumable according to the relevant standard;
- information to the user on the intended use in accordance with the welding consumable classification standard.

5.3 Dimensions and shape

Tolerances on dimensions and shape shall be in accordance with EN ISO 544.

5.4 Mechanical properties

The mechanical properties shall be in accordance with the specific requirements in the relevant welding consumable classification standards (see Introduction). In cases where the requirements for the specific property are not defined in the classification standard, the relevant sub-clause in EN 14532-1, EN 14532-2 or EN 14532-3 shall be used. Tests on butt welds are not required by this document, except in the case of consumables classified for single or two run welding technique.

5.5 Chemical composition

Chemical composition shall be in accordance with the appropriate welding consumable classification standard.

5.6 Durability

Deposited metals are deemed durable when the consumables comply with the requirements of this standard.

5.7 Dangerous substances

Deposited metals shall not release any dangerous substances in excess of the maximum permitted levels specified in a relevant European Standard for the material or permitted in the national regulations of the member state of destination.

6 Testing, assessment and sampling methods

6.1 Dimensions and shape

Measurement of diameter shall be carried out with a micrometer screw gauge with a range of 0 to 10 mm and of length if applicable with a ruler, or other suitable apparatus. Five measurements shall be made within the smallest packaging unit taken at random from a batch, heat or lot. The accuracy shall be at least 0,01 mm for diameter measurement and 1 mm for length measurement.

6.2 Mechanical properties

The mechanical properties shall be verified according to the specific requirements in the relevant welding consumable classification standards. In cases where the requirements for the specific property are not defined in the welding consumable classification standard, the relevant sub-clause in EN 14532-1, EN 14532-2 or EN 14532-3 shall be used.

6.3 Chemical composition

Chemical analysis shall be carried out using appropriate established published methods. At least three determinations shall be made on each sample. The mean value shall meet the requirement.

7 Evaluation of conformity

7.1 General

The compliance of the products with the requirements of this document shall be demonstrated by:

- Initial type testing;
- Factory production control by the manufacturer.

7.2 Initial type testing

7.2.1 General

Initial type testing shall be performed to show conformity with this document. Tests previously performed in accordance with the provisions of this document (same product, same characteristic(s), test method, sampling procedure, system of attestation of conformity, etc.) may be taken into account. In addition, initial type testing shall be performed at the beginning of the production or at the beginning of a new method of production (where this may affect the stated properties).

All characteristics in Clause 5 shall be subject to initial type testing, with the exception of release of dangerous substances, which can be assessed indirectly by controlling the content of the substance concerned.

7.2.2 Initial type test program

The initial type testing programme shall be carried out in accordance with EN ISO 544 and, as relevant, in accordance with the welding consumable classification standard, EN 14532-1, EN 14532-2 or EN 14532-3.

7.2.3 Documentation

The results of the initial test programme shall be recorded and kept in a technical file for a period of at least 5 years after the date when the last product to which the test programme refers to was delivered.

7.2.4 Sampling

Chemical analysis shall be performed on samples of the product, the stock from which it is made or a deposited metal according to the relevant welding consumable classification standard. Samples shall be taken and tested in accordance with a prescribed plan. The report of the testing shall be an inspection document in accordance with EN 10204, minimum Type 2.2.

7.3 Factory production control (FPC)

7.3.1 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, the production process and the product.

An FPC system conforming to the requirements of EN ISO 9001 and made specific to the requirements of this document, shall be considered to satisfy the requirements of this document. Corresponding Clauses from EN 12074 which place the same or more stringent conditions than EN ISO 9001 shall be considered to satisfy those corresponding Clauses from this document.

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.

The manufacturer shall establish procedures to ensure that the product tolerances allow for the welding consumables' performances to be in conformity with the declared values, derived from initial type testing. The type of tests and frequency of testing shall be as described in EN 14532-1:2004, Annex N or EN 14532-3:2004, Annex H. Requirements, threshold values and tolerances shall be as specified in Clause 6 of this document.

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

- identification of the welding consumable tested;
- date of sampling and testing;
- test methods performed;
- test results.

7.3.2 Equipment

Testing – All weighing, measuring and testing equipment shall be calibrated and regularly inspected according to documented procedures, frequencies and criteria.

Manufacturing – 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.

7.3.3 Raw materials

The specifications of all incoming raw materials shall be documented, as shall the inspection scheme for ensuring their conformity.

7.3.4 Product testing and evaluation

The manufacturer shall establish procedures to ensure that the stated values of all of the characteristics are maintained. The characteristics are:

- a) dimension and shape;
- b) mechanical properties;
- c) chemical composition.

The means of control are defined in EN 14532-1:2004, Annex N or EN 14532-3:2004, Annex H, as relevant, for mechanical properties and chemical composition. For dimension and shape each batch or lot shall be tested.

7.3.5 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.

8 Marking, labelling, packaging

Filler metals shall be marked, labelled and packaged in accordance with EN ISO 544.

Fluxes shall be marked, labelled and packaged in accordance with EN 760.

Annex ZA (informative)

Clauses of this European Standard addressing the provisions of the EU Construction Product Directives – EU Directive 89/106/EEC

ZA.1 Scope and relevant characteristics

This European Standard has been prepared under a 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 Product Directive (89/106/EEC).

Compliance with these Clauses confers a presumption of fitness of the welding consumables (filler metals and fluxes for fusion welding of metallic materials) 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 welding consumables 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 web site on EUROPA (accessed through <http://europa.eu.int/comm/enterprise/construction/internal/dangsub/dangmain.htm>).

This Annex establishes the conditions for the CE marking of the welding consumables intended for the uses indicated in Table ZA.1 and shows the relevant Clauses applicable:

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

Table ZA.1 — Relevant Clauses for welding consumables

Product: Welding consumables (filler metals and fluxes for fusion welding of metallic materials)		
Intended use: Metallic structures or composite metal and concrete structures		
Essential characteristics	Requirement Clauses in this European Standard	Notes
Tolerances on dimensions	5.3	mm
Elongation	5.4	%
Tensile strength	5.4	MPa
Yield strength	5.4	MPa
Impact strength	5.4	J
Chemical composition	5.5	% (m/m)
Durability	5.6	–
Dangerous substances	5.7	–
Emission of radioactivity	is not relevant	–

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 Procedures for attestation of conformity of welding consumables

ZA.2.1 System(s) of attestation of conformity

The system(s) of attestation of conformity of welding consumables indicated in Table ZA.1, in accordance with the Decision of the Commission 98/214/EC of 1998-03-11 as given in Annex III of the mandate for "Structural metallic products and ancillaries", is shown in Table ZA.2 for the indicated intended use.

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

Product	Intended use	Attestation of conformity system
Welding consumables	Use in metallic structures or in composite metal and concrete structures	System 2+ ^a
^a 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 welding consumables 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 European Standard.

Table ZA.3 — Assignment of evaluation of conformity tasks for welding consumables under system 2+

Tasks		Content of the task	Evaluation of conformity Clauses to apply					
Tasks for the manufacturer	Factory production control (FPC)	Parameters related to tolerances on dimensions; elongation; tensile strength; yield strength; impact strength; chemical composition; dangerous substances	7.3					
	Initial type testing by the manufacturer	All relevant characteristics of Table ZA.1 except durability and dangerous substances	7.2					
	Testing of samples taken at the factory	tolerances on dimensions; elongation; tensile strength; yield strength; impact strength; chemical composition	7.2					
Tasks for the FPC notified body	<table border="1"> <tr> <td rowspan="2">Certification of FPC on the basis of</td> <td>Initial inspection of factory and of FPC</td> <td rowspan="2">Parameters related to tolerances on dimensions; elongation; tensile strength; yield strength; impact strength; chemical composition; dangerous substances</td> <td rowspan="2">7.3</td> </tr> <tr> <td>Continuous surveillance, assessment and approval of FPC.</td> </tr> </table>	Certification of FPC on the basis of	Initial inspection of factory and of FPC	Parameters related to tolerances on dimensions; elongation; tensile strength; yield strength; impact strength; chemical composition; dangerous substances	7.3	Continuous surveillance, assessment and approval of FPC.		
Certification of FPC on the basis of	Initial inspection of factory and of FPC		Parameters related to tolerances on dimensions; elongation; tensile strength; yield strength; impact strength; chemical composition; dangerous substances			7.3		
	Continuous surveillance, assessment and approval of FPC.							

ZA.2.2 EC Certificate and Declaration of conformity

When compliance with the conditions of this Annex is achieved, and once the notified body¹⁾ has drawn up the certificate mentioned below, the manufacturer or his agent established in the 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 EN);
- particular conditions applicable to the use of the product (e.g. provisions for use under certain conditions);
- the 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 numbered 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;

1) The terms notified laboratory, inspection body or certification body is synonymous with the term "notified body" under the CPD.

- 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 and shall be shown on the welding consumable (or when not possible it may be on the accompanying label, the packaging or on the accompanying commercial documents e.g. a delivery note) [see 2.3.1]. 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;
- the last two digits of the year in which the marking is affixed;
- number of the factory production control certificate;
- reference to EN 13479;
- description of the product: generic name, material, dimensions, ... and intended use;
- information on tolerances on dimensions, elongation, tensile strength, yield strength, impact strength, chemical composition, durability and dangerous substances;
- declared values and, where relevant, level or class (including “pass” for pass/fail requirements, where necessary) to declare for each essential characteristic as indicated in "Notes" in Table ZA.1;
- “No performance determined” for characteristics where this is relevant.

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.

Figures ZA.1 and ZA.2 gives examples of the information to be given on the product, label, packaging and/or commercial documents.

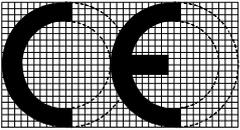
<div style="text-align: center;">  <p>1234</p> </div>	<p><i>CE conformity marking, consisting of the “CE”-symbol given in Directive 93/68/EEC.</i></p> <p><i>Identification number of the notified body (where relevant)</i></p>
<div style="text-align: center;"> <p>AnyCo Ltd, PO Box 21, B-1050</p> <p>03</p> <p>1234-CPD-00234</p> </div>	<p><i>Name or identifying mark and registered address of the producer</i></p> <p><i>Last two digits of the year in which the marking was affixed</i></p> <p><i>Certificate number (where relevant)</i></p>
<div style="text-align: center;"> <p>EN 13479 + EN 499</p> <p>Covered electrode EN 499 – E 46 3 1Ni B 54 H5</p> <p>Dangerous substance 'x' Less than 'n' 10⁻⁶ (ppm)</p> </div>	<p><i>No. of European Standards</i></p> <p><i>Description of product</i></p>

Figure ZA.1 — Example CE marking information – where relevant mandated characteristics are covered by the welding consumable classification standard

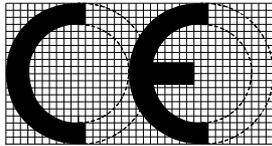
 <p>1235</p>	<p><i>CE conformity marking, consisting of the "CE"-symbol given in Directive 93/68/EEC.</i></p> <p><i>Identification number of the notified body (where relevant)</i></p>
<p>AnyCo Ltd, PO Box 21, B-1050</p> <p>03</p> <p>1235-CPD-00235</p>	<p><i>Name or identifying mark and registered address of the producer</i></p> <p><i>Last two digits of the year in which the marking was affixed</i></p> <p><i>Certificate number (where relevant)</i></p>
<p>EN 13479 + EN 12072</p> <p>Solid wire EN 12072 – W 19 9 L</p> <p>Elongation: 38 %</p> <p>Tensile strength: 620 MPa</p> <p>Yield strength: 450 MPa</p> <p>Impact strength: 150 J at RT</p> <p>Dangerous substance 'x' Less than 'n' 10⁻⁶ (ppm)</p>	<p><i>No. of European Standards</i></p> <p><i>Description of product</i></p> <p><i>and information on regulated characteristics</i></p>

Figure ZA.2 — Example CE marking information – where not all relevant mandated characteristics are covered by the welding consumable classification standard

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 440, *Welding consumables — Wire electrodes and deposits for gas shielded metal arc welding of non alloy and fine grain steels — Classification*
- [2] EN 499, *Welding consumables — Covered electrodes for manual metal arc welding of non alloy and fine grain steels — Classification*
- [3] EN 757, *Welding consumables — Covered electrodes for manual metal arc welding of high strength steels — Classification*
- [4] EN 758, *Welding consumables — Tubular cored electrodes for metal arc welding with and without a gas shield of non alloy and fine grain steels — Classification*
- [5] EN 910, *Destructive tests on welds in metallic materials — Bend tests*
- [6] EN 1599, *Welding consumables — Covered electrodes for manual arc welding of creep-resisting steels — Classification*
- [7] EN 12072, *Welding consumables — Wire electrodes, wires and rods for arc welding of stainless and heat-resisting steels — Classification*
- [8] EN ISO 3690, *Welding and allied processes — Determination of hydrogen content in ferritic arc weld metal (ISO 3690:2000)*
- [9] EN ISO 9001, *Quality management systems — Requirements (ISO 9001:2000)*

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