



SLOVENSKI STANDARD SIST EN ISO 18276:2006

01-oktober-2006

8 cXUbj]a UHf]U]nUj UfYbYÉ GfÿYbg_Yÿ]W]nWj]nUcVc bc]j UfYbYbYfUj b]]b]c[bYcXdcfb] Y_Y]nUy]bYa d]bi]bVfYnUy]hYÉFUhj fy UbYfIGC % &+* .&\$ \$) Ł

Welding consumables - Tubular cored electrodes for gas-shielded and non-gas-shielded metal arc welding of high-strength steels - Classification (ISO 18276:2005)

iTeh STANDARD PREVIEW

Schweißzusätze - Fülldrahtelektroden zum Metall-Schutzgasschweißen mit und ohne Schutzgas von hochfesten Stählen - Einteilung (ISO 18276:2005)

SIST EN ISO 18276:2006

Produits consommables pour le soudage - Fils-électrodes fourrés pour le soudage a l'arc avec ou sans gaz de protection des aciers a haute résistance - Classification (ISO 18276:2005)

Ta slovenski standard je istoveten z: EN ISO 18276:2006

ICS:

25.160.20 Potrošni material pri varjenju Welding consumables

SIST EN ISO 18276:2006

en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN ISO 18276:2006](#)

<https://standards.iteh.ai/catalog/standards/sist/859fa83d-5b12-4807-b00c-63127e350db2/sist-en-iso-18276-2006>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN ISO 18276

June 2006

ICS 25.160.20

Supersedes EN 12535:2000

English Version

Welding consumables - Tubular cored electrodes for gas-shielded and non-gas-shielded metal arc welding of high-strength steels - Classification (ISO 18276:2005)

Produits consommables pour le soudage - Fils-électrodes fourrés pour le soudage à l'arc avec ou sans gaz de protection des aciers à haute résistance - Classification (ISO 18276:2005)

Schweißzusätze - Fülldrahtelektroden zum Metall-Schutzgasschweißen mit und ohne Schutzgas von hochfesten Stählen - Einteilung (ISO 18276:2005)

This European Standard was approved by CEN on 2 June 2006.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, 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 United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

EN ISO 18276:2006 (E)**Foreword**

The text of ISO 18276:2005 has been prepared by Technical Committee ISO/TC 44 "Welding and allied processes" of the International Organization for Standardization (ISO) and has been taken over as EN ISO 18276:2006 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 December 2006, and conflicting national standards shall be withdrawn at the latest by December 2006.

This document supersedes EN 12535:2000.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, 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 United Kingdom.

iTeh STANDARD PREVIEW
Endorsement notice
(standards.iteh.ai)

The text of ISO 18276:2005 has been approved by CEN as EN ISO 18276:2006 without any modifications.

[SIST EN ISO 18276:2006](https://standards.iteh.ai/catalog/standards/sist/859fa83d-5b12-4807-b00c-63127e350db2/sist-en-iso-18276-2006)

<https://standards.iteh.ai/catalog/standards/sist/859fa83d-5b12-4807-b00c-63127e350db2/sist-en-iso-18276-2006>

INTERNATIONAL STANDARD

ISO
18276

First edition
2005-02-15

Welding consumables — Tubular cored electrodes for gas-shielded and non-gas- shielded metal arc welding of high- strength steels — Classification

*Produits consommables pour le soudage — Fils-électrodes fourrés pour
le soudage à l'arc avec ou sans gaz de protection des aciers à haute
résistance — Classification*

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN ISO 18276:2006](https://standards.iteh.ai/catalog/standards/sist/859fa83d-5b12-4807-b00c-63127e350db2/sist-en-iso-18276-2006)

<https://standards.iteh.ai/catalog/standards/sist/859fa83d-5b12-4807-b00c-63127e350db2/sist-en-iso-18276-2006>



Reference number
ISO 18276:2005(E)

© ISO 2005

ISO 18276:2005(E)**PDF disclaimer**

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST EN ISO 18276:2006](https://standards.iteh.ai/catalog/standards/sist/859fa83d-5b12-4807-b00c-63127e350db2/sist-en-iso-18276-2006)

<https://standards.iteh.ai/catalog/standards/sist/859fa83d-5b12-4807-b00c-63127e350db2/sist-en-iso-18276-2006>

© ISO 2005

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword.....	iv
Introduction	v
1 Scope.....	1
2 Normative references	1
3 Classification.....	2
4 Symbols and requirements	4
4.1 Symbol for the product/process.....	4
4.2 Symbol for tensile properties of all-weld metal	4
4.3 Symbol for impact properties of all-weld metal	4
4.4 Symbol for chemical composition of all-weld metal	5
4.5 Symbol for type of electrode core or the usability characteristics of the electrodes.....	8
4.6 Symbol for shielding gas	9
4.7 Symbol for welding position	9
4.8 Symbol for hydrogen content of deposited metal	10
4.9 Symbol for conditions of post-weld heat treatment.....	10
4.10 Rounding-off procedure.....	10
5 Mechanical tests	10
5.1 Preheating and interpass temperatures.....	11
5.2 Pass sequence	12
5.3 Post-weld heat treatment (PWHT) condition.....	12
6 Chemical analysis.....	13
7 Fillet weld test	13
8 Retest	14
9 Technical delivery conditions.....	14
10 Examples of designations.....	14
Annex A (informative) Classification systems.....	16
Annex B (informative) Description of composition designations for electrodes in the classification system based upon tensile strength and average impact energy of 27 J	19
Annex C (informative) Description of types of electrode core in the classification system based upon yield strength and average impact energy of 47 J.....	20
Annex D (informative) Descriptions of types of usability characteristics in the classification system based upon tensile strength and average impact energy of 27 J	21
Annex E (informative) Notes on hydrogen content.....	23

ISO 18276:2005(E)**Foreword**

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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

ISO 18276 was prepared by Technical Committee ISO/TC 44, *Welding and allied processes*, Subcommittee SC 3, *Welding consumables*.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN ISO 18276:2006](https://standards.iteh.ai/catalog/standards/sist/859fa83d-5b12-4807-b00c-63127e350db2/sist-en-iso-18276-2006)

<https://standards.iteh.ai/catalog/standards/sist/859fa83d-5b12-4807-b00c-63127e350db2/sist-en-iso-18276-2006>

Introduction

This International Standard proposes a classification system for tubular cored electrodes in terms of the tensile properties, impact properties, chemical composition of the all-weld metal, type of electrode core, shielding gas and welding position. The ratio of yield strength to tensile strength of the weld metal is generally higher than that of the parent metal. Users should note that matching weld metal yield strength to parent metal yield strength will not necessarily ensure that the weld metal tensile strength matches that of the parent metal. Where the application requires matching tensile strength, therefore, selection of the consumable should be made by reference to column 3 of Table 1A or Table 1B.

It should be noted that the mechanical properties of all-weld metal test specimens used to classify tubular cored electrodes will differ from those obtained with production joints because of differences in welding procedure such as electrode size, width of weave, welding position and parent metal composition.

The classification in accordance with system A is mainly based on EN 12535:2000, *Welding consumables — Tubular cored electrodes for gas shielded metal arc welding of high strength steels — Classification*. The classification in accordance with system B is mainly based upon standards used around the Pacific Rim.

Requests for official interpretation of any aspect of this International Standard should be directed to the Secretariat of ISO/TC 44/SC 3 via the user's national standardization body. A complete listing of these bodies can be found at <<http://www.iso.org>>.

ITEH STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN ISO 18276:2006](https://standards.iteh.ai/catalog/standards/sist/859fa83d-5b12-4807-b00c-63127e350db2/sist-en-iso-18276-2006)

<https://standards.iteh.ai/catalog/standards/sist/859fa83d-5b12-4807-b00c-63127e350db2/sist-en-iso-18276-2006>

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN ISO 18276:2006

<https://standards.iteh.ai/catalog/standards/sist/859fa83d-5b12-4807-b00c-63127e350db2/sist-en-iso-18276-2006>

Welding consumables — Tubular cored electrodes for gas-shielded and non-gas-shielded metal arc welding of high-strength steels — Classification

1 Scope

This International Standard specifies requirements for classification of tubular cored electrodes with or without a gas shield for metal arc welding of high-strength steels in the as-welded condition or in the post-weld heat-treated condition with a minimum yield strength higher than 550 MPa or a minimum tensile strength higher than 590 MPa. One tubular cored electrode can be tested and classified with different shielding gases, if used with more than one.

This document is a combined specification providing classification utilizing a system based upon the yield strength and an average impact energy of 47 J of the all-weld metal, or utilizing a system based upon the tensile strength and an average impact energy of 27 J of the all-weld metal.

- 1) Subclauses and tables which carry the suffix letter "A" are applicable only to tubular cored electrodes classified under the system based upon the yield strength and an average impact energy of 47 J of the all-weld metal given in this International Standard.
- 2) Subclauses and tables which carry the suffix letter "B" are applicable only to tubular cored electrodes classified under the system based upon the tensile strength and an average impact energy of 27 J of the all-weld metal given in this International Standard.
- 3) Subclauses and tables which do not have either the suffix letter "A" or the suffix letter "B" are applicable to all tubular cored electrodes classified under this International Standard.

It is recognized that the operating characteristics of tubular cored electrodes can be modified by the use of pulsed current but, for the purposes of this International Standard, pulsed current is not used for determining the electrode classification.

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.

ISO 31-0:1992, *Quantities and units — Part 0: General principles*

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

ISO 3690, *Welding and allied processes — Determination of hydrogen content in ferritic steel arc weld metal*

ISO 6847, *Welding consumables — Deposition of a weld metal pad for chemical analysis*

ISO 6947:1990, *Welds — Working positions — Definitions of angles of slope and rotation*

ISO 18276:2005(E)

ISO 13916, *Welding — Guidance on the measurement of preheating temperature, interpass temperature and preheat maintenance temperature*

ISO 14175:1997, *Welding consumables — Shielding gases for arc welding and cutting*

ISO 14344, *Welding and allied processes — Flux and gas shielded electrical welding processes — Procurement guidelines for consumables*

ISO 15792-1:2000, *Welding consumables — Test methods — Part 1: Test methods for all-weld metal test specimens in steel, nickel and nickel alloys*

ISO 15792-3, *Welding consumables — Test methods — Part 3: Classification testing of positional capacity and root penetration of welding consumables in a fillet weld*

3 Classification

Classification designations are based upon two approaches to indicate the tensile properties and the impact properties of the all-weld metal obtained with a given electrode. The two designation approaches include additional designators for some other classification requirements, but not all, as will be clear from the following subclauses. In most cases, a given commercial product can be classified under both systems. Then either or both classification designations can be used for the product.

The classification includes all-weld metal properties obtained with a tubular cored electrode and appropriate shielding gas combination as given below. With the exception of the symbol for welding position, which is based on ISO 15792-3, the classification of gas-shielded tubular cored electrodes is based on an electrode size of 1,2 mm or, if this size is not manufactured, the next larger diameter manufactured, and the classification of self-shielded tubular cored electrodes is based on a diameter of 2,4 mm or the largest diameter manufactured if less than 2,4 mm.

SIST EN ISO 18276:2006

3.1A Classification by yield strength and 47 J impact energy

The classification designation is divided into nine parts:

- 1) the first part (T) indicates a tubular cored electrode;
- 2) the second part gives a symbol indicating the strength and elongation of the all-weld metal in the as-welded or post-weld heat-treated condition (see Table 1A);
- 3) the third part gives a symbol indicating the impact properties of the all-weld metal (see Table 2);
- 4) the fourth part gives a symbol indicating the chemical composition of the all-weld metal (see Table 3A);

3.1B Classification by tensile strength and 27 J impact energy

The classification designation is divided into nine parts:

- 1) the first part (T) indicates a tubular cored electrode;
- 2) the second part gives a symbol indicating the strength and elongation of the all-weld metal in either the as-welded or the post-weld heat-treated condition (see Table 1B);
- 3) the third part gives a symbol indicating the impact properties of the all-weld metal (see Table 2). The symbol "U", added as an optional supplemental designator at or near the end of the complete tubular cored electrode designation, indicates that the deposit meets an average optional requirement of 47 J at the designated Charpy test temperature;
- 4) the fourth part gives a symbol indicating the usability characteristics of the electrode (see Table 4B);