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Welding consumables — Covered electrodes for manual metal arc welding of stainless and heat-resisting steels — Classification

Produits consommables pour le soudage — Électrodes enrobées pour le soudage manuel à l'arc des aciers inoxydables et résistant aux températures élevées — Classification

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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 3581 was prepared in collaboration with the International Institute of Welding which has been approved by the ISO Council as an international standardizing body in the field of welding.

This second edition cancels and replaces the first edition (ISO 3581:1976), which has been technically revised.

Introduction

This International Standard provides a classification system for stainless steel, covered welding electrodes in terms of chemical composition of deposited weld metal and type of electrode covering. Other properties of the electrodes are specified by reference to tables.

This International Standard has been prepared by the International Institute of Welding, Commission II "Arc Welding", Subcommission II-E. It recognizes that there are two somewhat different approaches in the global market, for classifying a given stainless steel, covered electrode, and allows for either or both to be used to suit a particular need. Application of either (or both) type(s) of classification designation identifies a product as classified according to this International Standard. It should be noted that the two systems are not exactly equivalent, therefore each system must be used independent of the other, without combining designators in any way.

The classification according to ISO 3581, system A, is mainly based upon EN 1600; the classification according to ISO 3581, system B, is mainly based upon standards used around the Pacific Rim.

Welding consumables — Covered electrodes for manual metal arc welding of stainless and heat-resisting steels — Classification

1 Scope

This International Standard specifies requirements for classification of covered electrodes, based on the all-weld metal chemical composition, the type of electrode covering and other electrode properties, and the all-weld metal mechanical properties, in the as-welded or heat-treated conditions, for manual metal arc welding of stainless and heat-resisting steels.

This International Standard is a combined standard providing for classification utilizing a system based upon classification according to nominal composition, or utilizing a system based upon classification according to alloy type.

a) Paragraphs and tables which carry the label “classification according to nominal composition” or “ISO 3581-A” are applicable only to products classified to that system.

b) Paragraphs and tables which carry the label “classification according to alloy type” or “ISO 3581-B” are applicable only to products classified to that system.

c) Paragraphs and tables which carry neither label are applicable to products classified according to either or both systems.

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 metals — Type of product, dimensions, tolerances and markings*

ISO 2401, *Covered electrodes — Determination of the efficiency, metal recovery and deposition coefficient*

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

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

ISO 8249, *Welding — Determination of Ferrite Number (FN) in austenitic and duplex ferritic-austenitic Cr-Ni stainless steel weld metals*

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

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 for indicating the chemical composition of the all-weld metal deposit obtained with a given electrode.

The “nominal composition” approach uses designation components indicating directly the nominal levels of certain alloying elements, given in a particular order, and some symbols for low but significant levels of other elements, whose levels are not conveniently expressed as integers. The “alloy type” approach uses tradition-based three- or four-digit designations for alloy families, and an occasionally additional character or characters for compositional modifications of each original alloy within the family. Both designation approaches include additional designators for some other classification requirements, but not entirely the same classification requirements, as will be clear from the following sections.

Table 1 lists the tests required for classification of an electrode in each approach.

In many cases, a given commercial product can be classified using both approaches. Then either or both classification designations can be used for the product.