INTERNATIONAL STANDARD

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Welding and allied processes — Flux and gas shielded electrical welding processes — Procurement guidelines for consumables

Soudage et techniques connexes — Procédés de soudage électrique sous protection gazeuse et par flux — Lignes directrices relatives à l'approvisionnement en produits consommables

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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 3.

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 International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 14344 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.

Welding and allied processes — Flux and gas shielded electrical welding processes — Procurement guidelines for consumables

1 Scope

This International Standard is a tool for communication between a purchaser and a supplier of welding consumables within quality systems as might, for example, be based upon ISO 9001. This International Standard, together with an ISO or other recognized welding consumable standard, provides a method for preparing those specific details needed for welding consumable procurement which consist of the following:

a) the welding consumable classification (selected from the pertinent ISO or other welding consumable standard);

b) the lot classification (selected from Clause 5 of this International Standard);

c) the testing schedule (selected from Clause 6 of this International Standard).

Selection of the specific welding consumable classification, lot classification and testing schedule will depend upon the requirements of the application for which the welding consumable is being procured.

2 Normative reference

The following normative document contains provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of this publication do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the normative document indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 9001, *Quality management systems — Requirements*

3 Terms and definitions

In production, the components of welding consumables are divided into discrete, predetermined quantities so that satisfactory tests with a sample from that quantity will establish that the entire quantity meets specification requirements. These quantities, known by such terms as *heats, lots, blends, batches* and *mixes,* vary in size according to the manufacturer. For identification purposes, each manufacturer assigns a unique designation to each quantity. This designation usually consists of a series of numbers or letters, or combinations thereof, which will enable the manufacturer to determine the date and time (or shift) of manufacture, the type and source of the raw materials used, and the details of the procedures used in producing the welding consumable. This designation stays with the welding consumable and can be used to identify the material later, in those cases in which identification is necessary.

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

3.1
dry batch
quantity of dry ingredients mixed at one time in one mixing vessel

NOTE Liquid binder, when added to a dry batch, produces a wet mix. A dry batch may be divided into smaller quantities, in which case addition of the liquid binder produces as many wet mixes as there were smaller quantities.

3.2
dry blend
two or more dry batches from which quantities of each are combined proportionately, then mixed in a mixing vessel to produce a larger quantity in which the ingredients are as uniformly dispersed as they would have been had the entire quantity been mixed together at one time in one large mixer

NOTE A dry blend, as in the case of a dry batch, may be used singly or divided into smaller quantities which, when the liquid binder is added, produce one or more wet mixes.

3.3
wet mix
combination of liquid binder and a dry batch or dry blend, or a portion thereof, mixed at one time in one mixing vessel

3.4
heat
for consumable inserts, solid electrodes and rods, core wire for covered electrodes, and the sheath (strip or tubing of tubular cored electrode wire and rod), one of the following, depending on the method of melting and refining of the metal:

— the material obtained from one furnace melt, where slag-metal or gas-metal reactions occur in producing the metal (e.g., open hearth, electric arc, basic oxygen, argon-oxygen processes);

— an uninterrupted series of melts from one controlled batch of metals and alloying ingredients in one melting furnace under the same melting conditions, each melt conforming to the chemical composition range approved by the purchaser of the material (i.e., the producer of the welding consumable) where significant chemical reactions do not occur in producing the metal (e.g., induction melting in a controlled atmosphere or in a vacuum);

— an uninterrupted series of remelts in one furnace under the same remelting conditions using one or more consumable electrodes produced from a heat, as defined, each remelt conforming to the chemical composition range approved by the purchaser of the material (i.e., the producer of the welding consumable) in processes involving continuous melting and casting (e.g., consumable electrode remelt).

4 Identification

4.1 General

Identification of consumable inserts, solid electrode wire and strip, rods, core wire for covered electrodes, and the sheath (strip or tubing) of tubular cored electrodes and rods shall be applied as listed in 4.2 to 4.5.

4.2 Heat Number

Solid wire, electrode core wire, rod, strip and consumable inserts, identified by heat number, shall consist of material from a single heat of metal.

4.3 Controlled chemical composition

Solid wire, electrode core wire, rod, strip and consumable inserts identified by controlled chemical composition, rather than by heat number, shall consist of mill coils of one or more heats from which samples have been taken for chemical analysis. The results of the analysis of each sample shall be within the manufacturer's composition limits for that material. Coils from mills that do not permit spliced-coil practice need be sampled on only one end. Coils from mills that permit spliced-coil practice shall be sampled on both ends and shall have no more than a single splice per coil.

4.4 Covering mix

In the production of covered electrodes, the covering mix shall be identified in one of the following two manners:

a) wet mix:

a covering identified by wet mix shall consist of a single wet mix for each lot of electrodes;

b) controlled chemical composition:

a covering identified by controlled chemical composition (rather than by wet mix) shall consist of one or more wet mixes and subjected to sufficient tests to assure that all wet mixes within the lot are equivalent. These tests shall include chemical analysis, the results of which shall fall within the manufacturer's acceptance limits. The identification of the test procedure and the results of the tests shall be recorded.

4.5 Core ingredients

In the production of tubular cored electrode wire or rod (flux cored or metal cored welding consumables), the core ingredients shall be identified in one of the following manners:

a) dry blend:

core ingredients identified by dry blend shall consist of a single dry batch or dry blend;

b) controlled chemical composition:

core ingredients identified by controlled composition shall consist of one or more dry blends and be subjected to sufficient tests to assure that all dry blends within the lot are equivalent. These tests shall include chemical analysis, the results of which shall fall within the manufacturer's acceptance limits. The identification of the test procedure and the results of the tests shall be recorded.

5 Lot classification

5.1 Bare solid electrode wires and strips, rods and consumable inserts

5.1.1 Class S1

A Class S1 lot of bare solid electrodes and rods or consumable inserts is the manufacturer's standard lot, as defined in the manufacturer's quality assurance programme.

5.1.2 Class S2

A Class S2 lot of bare solid electrodes and rods or consumable inserts is the quantity, not exceeding 45 000 kg, of one classification, size, form and temper produced in 24 h of consecutively scheduled production (i.e., consecutive normal work shifts). Class S2 solid electrodes and rods or consumable inserts shall be produced from one heat (4.2) or from material identified by controlled chemical composition (4.3).

5.1.3 Class S3

A Class S3 lot of bare solid electrodes and rods or consumable inserts is the quantity of one size produced in one production schedule from one heat (4.2).

5.1.4 Class S4

A class S4 lot of bare solid electrodes and rods or consumable inserts is the quantity, not exceeding 45 000 kg, of one classification, size, form and temper produced under one production schedule. Class S4 solid electrodes and rods or consumable inserts shall be produced from one heat (3.4) or from material identified by controlled chemical composition (4.3).

5.2 Tubular cored electrodes and rods

5.2.1 Class T1

A Class T1 lot of tubular cored electrodes and rods is the manufacturer's standard lot, as defined in the manufacturer's quality assurance programme.

5.2.2 Class T2

A Class T2 lot of tubular cored electrodes and rods is the quantity, not exceeding 45 000 kg, of one classification and size produced in 24 h of consecutively scheduled production (i.e., consecutive normal work shifts). Class T2 tubular cored electrodes and rods shall be produced from tube or strip identified by heat number (4.2) or by controlled chemical composition (4.3). Identification of the core ingredients shall be as specified in 4.5 a) or 4.5 b).

5.2.3 Class T3

A Class T3 lot of tubular cored electrodes and rods is the quantity produced from one heat (4.2) and one dry batch (3.1) or one dry blend (3.2) of core materials. Identification of the core ingredients shall be as specified in 4.5 a).

5.2.4 Class T4

A Class T4 lot of tubular cored electrodes and rods is the quantity, not exceeding 45 000 kg, of one classification and size produced under one production schedule from tube or strip identified by heat number (4.2) or controlled chemical composition (4.3). Identification of the core ingredients shall be as specified in 4.5 a) or 4.5 b).

5.3 Covered electrodes

5.3.1 Class C1

A Class C1 lot of covered electrodes is the manufacturer's standard lot, as defined in the manufacturer's quality assurance programme.

5.3.2 Class C2

A Class C2 lot of covered electrodes is the quantity, not exceeding 45 000 kg, of any one size and classification produced in 24 h of consecutively scheduled production (i.e., consecutive normal work shifts).

5.3.3 Class C3

A Class C3 lot of covered electrodes is the quantity, not exceeding 45 000 kg, of any one size and classification produced in 24 h of consecutively scheduled production (i.e., consecutive normal work shifts). Class C3 electrodes shall be produced from covering identified by wet mix [4.4 a)] or controlled chemical composition [4.4 b)] and core wire identified by heat number (4.2) or controlled chemical composition (4.3).

5.3.4 Class C4

A Class C4 lot of covered electrodes is the quantity of any one size and classification produced from one wet mix [4.4 a)] and one heat of core wire (4.2).

5.3.5 Class C5

A Class C5 lot of covered electrodes is the quantity of one size and classification produced from one dry blend of covering mixture [4.5 a)] and one heat of core wire (4.2).

5.4 Fluxes for submerged arc welding

5.4.1 Class F1

A Class F1 lot of flux is the manufacturer's standard lot, as defined in the manufacturer's quality assurance programme.

5.4.2 Class F2

A Class F2 lot of flux is the quantity produced from the same combination of raw materials under one production schedule.

6 Level of testing

6.1 General

The level of the testing schedule shall be selected by the purchaser from those listed in Table 1. If no level of testing schedule is specified, the level shall be Schedule 1.

6.2 Schedule 1

The level of testing shall be the manufacturer's standard. A statement, "the product supplied will meet the requirements of the applicable ISO standard (or other welding consumable standard), when tested in accordance with that standard" and a summary of the typical properties of the material, when tested in that manner, shall be supplied upon written request. The class of each lot will be the manufacturer's standard.

6.3 Schedule 2

Test results shall be supplied from any production run of the product made within the twelve months preceding the date of the purchase order. This shall include the results of all tests prescribed for that classification in the ISO or other applicable standard. The class of each lot is the manufacturer's standard.

6.4 Schedule 3

Chemical analysis of each lot shipped shall be supplied by the manufacturer. The analysis shall include those elements prescribed for that classification in the ISO or other applicable standard. The class of each lot shall be specified by the purchaser from those listed in clause 5 of this International Standard.

6.5 Schedule 4

Results of the tests called for in Table 2 shall be supplied by the manufacturer for each lot shipped. These tests represent a consensus of those frequently requested for consumables certification; however, they do not necessarily include all tests required for Schedule 5. The tests shall be performed as prescribed for that classification in the ISO or other applicable standard. The class of each lot shall be specified by the purchaser from those listed in clause 5.