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INCH-POUND

MIL-E-22200/10C(SH)
AMENDMENT 1
27 March 2003

MILITARY SPECIFICATION

ELECTRODES, WELDING, MINERAL COVERED, IRON-POWDER
LOW-HYDROGEN MEDIUM, HIGH TENSILE AND HIGHER-
STRENGTH LOW ALLOY STEELS

This amendment forms a part of MIL-E-22200/10C(SH), dated 27 June 1994, and is approved for use by the Naval Sea Systems Command, Department of the Navy, and is available for use by all Departments and Agencies of the Department of Defense.

PAGE 3

2.1.1, line 19: Delete "MIL-STD-271 - Requirements for Nondestructive Testing Methods".

Add as new paragraph:

"2.1.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

PUBLICATIONS

T9074-AS-GIB-010/271 - Requirements for Nondestructive Testing Methods."

2.2, last line: Delete "1916 Race Street, Philadelphia, PA 19103" and substitute "100 Barr Harbor Drive, West Conshohocken, PA 19428-2959".

PAGE 4

2.2, line 8: Delete address for American Welding Society and substitute "American Welding Society, 550 N.W. LeJeune Road, Miami, Florida, 33126".

PAGE 6

TABLE III, Column 2, Row 2: Delete "72" and substitute "75".

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PAGE 7

TABLE III, 9/: Delete and substitute:

"9/ For each testing temperature, the average value of 5 tests shall be equal to or greater than the minimum average value specified. Only one specimen may have a value below the minimum average specified and that specimen can have a value no more than 10 foot-pounds below the minimum average specified.

For MIL-7018-M, no more than two specimens may have values below the minimum average specified, but each specimen must have a value greater than or equal to 20 foot-pounds."

PAGE 13

4.3.1 (c): Add the following: "A sketch is acceptable, as is the use of written format for bead placement, such as 1 full, 2 split, 3 triple and 5 quad layers."

PAGE 15

4.4.3.1: Delete and substitute:

"4.4.3.1 Retests. When an original chemical or mechanical property test or a radiographic (RT) or magnetic particle (MT) test, representing a lot of material, fails to meet specification requirements, the lot may be retested at the manufacturer's discretion. If the manufacturer chooses to retest the lot, the retests shall be as follows:

(a) If the test failed due to one (or more) of the conditions listed in 4.4.3.1.1, lot shall be retested according to the requirements in 4.4.3.1.2.
(b) If the test failed due to conditions other than those listed in 4.4.3.1.1, then the lot shall be retested according to the requirements in 4.4.3.1.3.

Note that all the specimens in a single test, whether the test involves a single specimen (such as for RT) or multiple specimens (such as for CVN impact tests), shall be considered a set.

4.4.3.1.1 Testing/specimen preparation error retests. Retests to correct errors in testing and/or test specimen preparation are permitted under the following conditions:

(a) Improperly fabricated test welds. This applies to test welds that have not been fabricated in accordance with the applicable specification and not fabricated in accordance with the published welding operating ranges for the product under test.

(b) Improperly prepared specimens. This applies to test specimens that are not in compliance with applicable standards.

(c) Test equipment malfunction in the process of conducting a test.

(d) Flaws in test specimens that are not indicative of inferior or

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defective product. Flaws at weld starts and stops at the ends of the test assembly, lack of fusion at the root and slag due to operator technique are normal weld artifacts and do not count as flaws indicative of inferior or defective products. Cracks, clustered porosity, flakes, and ruptures are flaws that may be indicative of inferior or defective products and shall not qualify a lot for a testing/specimen preparation error retest.

4.4.3.1.2 Testing/specimen preparation error retest requirements. Retests for conditions listed in 4.4.3.1.1 shall be as follows:

(a) For each original test that failed due to one (or more) of the conditions in 4.4.3.1.1, only one testing/preparation error retest is permitted.

(b) A testing/preparation error retest shall consist of one replacement specimen for each specimen that failed due to the conditions in 4.4.3.1.1. For VT, MT and RT, the specimen is the entire weld. If the testing error is due to a malfunction of MT and/or RT equipment or to a flaw not indicative of inferior or defective products (see 4.4.3.1.1.d), removed by grinding or other suitable methods within 1/16 inch of the surface, the original test assembly may be retested.

(c) Results of all retests and reasons for all retests shall be reported on the certification of quality conformance.

(d) Retests of weld metal (e.g., mechanical properties) shall be from the same weld used for the original test, if feasible. If replacement test welds are needed, they shall be fabricated using consumables from the original sampling, if feasible. If sufficient material is not available from the original sampling or storage of an opened package is expected to influence results, another sample may be taken from the same lot and/or production run.

(e) Retests of product (e.g., diffusible hydrogen, moisture, and chem. pads) shall be from the same sampling as the original test, if feasible. If sufficient material is not available from the original sampling or storage of an opened package is expected to influence results, another sample may be taken from the same lot and/or production run.

(f) If the results of the testing/preparation error retest do not satisfy the applicable requirements, then a conformance retest shall be performed per 4.4.3.1.3.

4.4.3.1.3 Conformance retests. Retests for failure to meet test requirements shall be as follows:

(a) For each original test that failed due to conditions other than those listed in 4.4.3.1.1, only one conformance retest is permitted.

(b) A conformance retest shall consist of repeating the test that failed two times (i.e., two-for-one). Note that a mechanical property test such as tensile or impact toughness involves a set of test specimens and therefore two full sets of specimens for each test that failed are required under this two-for-one rule.

(c) Results of all retests and reasons for all retests shall be reported on the certification of quality conformance.

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(d) Retests of weld metal shall be from the same weld used for the original test, if feasible. If replacement test welds are needed, they shall be fabricated using consumables from the original sampling, if feasible. If sufficient material is not available from the original sampling or storage of an opened package is expected to influence results, another sample may be taken from the same lot and/or production run.

(e) Retests of product shall be from the same sampling as the original test, if feasible. If sufficient material is not available from the original sampling or storage of an opened package is expected to influence results, another sample may be taken from the same lot and/or production run.

(f) Unless the welding procedure was determined to be the root cause of the original test failure, any replacement test weld shall employ the same welding procedure as the original test weld. If a new procedure is used to correct the root cause of the original test failure, the retest shall include all tests conducted for the original weld. Two-for-one is only required for the test that failed. All future lots of the material must use the new procedure. The reason for changing procedure shall be justified to the customer and included on the certification.

(g) If the results of any conformance retest do not satisfy the applicable requirements, then the lot shall be rejected."

PAGE 18

4.5.1(j), last line: Following the word "sketch" add "or use of written format for bead placement, such as 1 full, 2 split, 3 triple and 5 quad layers".

PAGE 24

4.10.1, line 2: Delete "MIL-STD-271" and substitute "T9074-AS-GIB-010/271"

PAGE 25

Add as new paragraph:

"4.14 Tolerances for check mechanical property testing. Unless otherwise specified (see 6.2), retest as part of receipt inspection by a shipyard or other user of a product supplied in conformance with this specification may use the following mechanical property tolerances to verify acceptability of the product. The use of these tolerances by the shipyard or other user is at their option and should be so indicated in section 6.2.

(a) Tensile yield strength results may be higher or lower than the requirement by 3% (round off to nearest 1000 psi)

(b) Percent elongation test results may be lower than the requirement by up to 7% of the minimum required value (e.g., 24% minimum required value means that 22.3% is the lowest acceptable value for receipt inspection)

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(c) Charpy V-notch or Dynamic tear test results (both the average and the individual minimum value) may be lower than the requirement by 10%.

(d) No tolerance for the upper yield strength test is allowed for the 3/32" Dia. MIL-7018-M electrode."

PAGE 26

6.2: Add the following:

"(l) Whether mechanical property tolerances will be used upon receipt inspection (see 4.14)."

PAGE 31

TABLE XIV, last row: Under "Quality conformance" delete "2 bend".

PAGE 34

TABLE XV, row 9, first column: Add " - low cooling rate".

TABLE XV: Insert between rows 8 and 9 the following row:

Thickness (T) (inches) - high cooling rate	1	1

TABLE XV, last row: Under "Quality conformance", delete "2 Bend".

PAGE 35

TABLE XV, last row: Under "Quality conformance", delete "2 Bend".

PAGE 38

FIGURE 4, Note 1: Delete and substitute:

"1. The split-weave technique (the practice of depositing only two wide-weave beads per weld layer) shall be limited to the first 1/2T of weld joint thickness. Each weld layer beyond the first 1/2T of weld joint thickness shall contain three or more weld beads and weld beads shall be deposited in sequence from one side of the joint to the other. For MIL-10018-M1 and MIL-12018-M2 electrodes, groove-weld metal test plates shall be in accordance with TABLE IX."

Preparing Activity:
Navy - SH
(Project 3439-0970)