

API Spec 5CRA WI 2407 Ballot 4633 Comment Resolution

[Yellow-highlight = Comment Resolutions; Accepted Changes = Gray-highlight]

3 Normative References

Add:

API Recommended Practice 578, *Guidelines for a Material Verification Program (MVP) for New and Existing Assets*

ASTM E1476, *Standard Guide for Metals Identification, Grade Verification, and Sorting*

4.3 Abbreviated terms

Add: PMI Positive Material Identification

5 Information to be supplied by the purchaser

For 5.2, insert new row r): in Requirement column add Positive Material Identification for Group 1; in Reference column add 7.1 and 9.17

7.1 Chemical composition

Add 5th paragraph: For Groups 2, 3 and 4, each length of all products shall receive PMI testing in accordance with 9.17. When agreed upon between purchaser and manufacturer, each length of Group 1 products shall receive PMI testing in accordance with 9.17. The purpose of PMI is the verification of the Material Category.

Add new sub-section, 9.17:

9.17 Positive Material Identification (PMI) testing for material verification program for Groups 2, 3 and 4

9.17.1 General

The PMI requirements are specified in 7.1 and the test method in 9.17.2 to 9.17.3. The test frequency for PMI is given in Table A.20 or Table C.20. The purchaser may conduct additional PMI tests to ensure compliance with this standard (see D.3). In case of dispute, an additional product chemical analysis in accordance with 7.1 shall be used as the referee method.

9.17.2 Products

All products shall be tested in accordance with API 578 or ASTM E1476.

All methods shall have validated and documented capability to detect at a minimum the following elements in the tolerance range for the applicable material category: Cr, Ni, Mo. The allowable range for the accuracy of each element shall be documented by the manufacturer.

PMI testing shall be carried out after final marking, or prior to final marking provided a validated and documented procedure that demonstrates traceability shall be maintained between PMI testing through final marking.

If testing produces an arc burn; the arc burn shall be treated as a defect as defined in 7.11.

9.17.3 Reference standards

Reference standards traceability to international or national measurement standards shall be documented. Where no such standards exist, the basis used for calibration or verification shall be documented.

A documented procedure to identify and record the serial number of each standard is required. A documented standardization procedure which includes a requirement to average two or more readings shall be used. **The PMI equipment calibration shall be verified to a reference standard once every lot and at least once every shift.**

9.17.4 Personnel qualifications

All personnel performing PMI testing by the manufacturer shall be qualified by the manufacturer to each applicable test method and material category. A record of training shall be made available to the purchaser upon request.

13.3 Test certificates

Move current m) to n) and add new m):

m) Statement of compliance to the PMI requirements and the method used **as applicable.**

Edit Tables A.20 and C.20 (below):

Tables A.20 — Type and frequency of tests for non-upset and upset products

Type of test or requirements	Test requirements ^a	Frequency of testing ^b	Test methods	Requirements
1	2	3	4	5
Cast analysis	m ^d	1 per cast	9.3.2	7.1
Product analysis	Non-remelted alloy	2 per cast	9.3.2	7.1
	Remelted alloy	1 per ingot	9.3.2	7.1
Room-temperature tensile test	m ^d	1 per test lot ^c	9.5.2	7.2
Elevated-temperature tensile test	o ^d	1 per test lot ^c	9.5.2	7.2
Hardness test	m ^d	1 series/ test lot ^c	9.6.2	7.3
Impact or flattening test	m ^d	9.7.2	9.7.3 or 9.7.4.1	7.4, 7.5, 7.6, 7.7
Microstructure examination	m ^d	1 per test lot ^c	9.8.2	7.9
Visual inspection	m	Each product	9.15	7.10, 7.11, 8.4
Hydrostatic test	m ^d (o ^h) ^d	Each pipe	9.14	7.12
Dimensional testing:				
— Outside diameter	m	Each end	9.9.2	Table A.15 and Table A.17
— Wall thickness	m	Each end	9.9.3	Table A.15 and Table A.17
— Drift test ^e	m	Each pipe	9.10	Table A.15 and Table A.18 or Table A.19
— Length	m	Each product	9.11	Table A.16
— Straightness	m	Each pipe	9.12	8.3.3
— Mass	m	Each product	9.13	Table A.15 and Table A.17
Non-destructive examination:				
— UT for longitudinal defects	m ^d	Each product	9.16	7.11
— UT for transverse defects	m ^d	Each product	9.16	7.11
— UT for laminar defects	m ^d	Each product	9.16	7.11
— UT for wall thickness ^e	m ^d	Each product	9.16	7.11
— UT manual on upset L+T ^e	m ^d (o ^f) ^d	Each product	9.16	7.11
— EMI ^e	o ^{d,f}	Each product	9.16	7.11
— Liquid penetrant inspection	m (o ^f)	Only ground or machined area	9.16	7.11
— MT	o ^f (m ^g)	Only ground or machined area	9.16	7.11
— PMI	m (o ^f)	Each product for Groups 2, 3, and 4	9.17	7.1
^{ssa} “m” signifies mandatory; “o” signifies optional (an agreement is required). ^b For definition of “test lot”, see 4.1.19. See Table A.21 for the maximum number of product in a test lot. ^c Minimum 1 per cast. ^d It is required that records be retained. ^e Not applicable to coupling stock. ^f Option for group 1 only. ^g Mandatory for upset ends of group 1. ^h Option for CH only.				

Tables C.20 — Type and frequency of tests for non-upset and upset products

Type of test or requirements	Test requirements ^a	Frequency of testing ^b	Test methods	Requirements
1	2	3	4	5
Cast analysis	m ^d	1 per cast	9.3.2	7.1
Product analysis	Non-remelted alloy	2 per cast	9.3.2	7.1
	Remelted alloy	1 per ingot	9.3.2	7.1
Room-temperature tensile test	m ^d	1 per test lot ^c	9.5.2	7.2
Elevated-temperature tensile test	o ^d	1 per test lot ^c	9.5.2	7.2
Hardness test	m ^d	1 series/ test lot ^c	9.6.2	7.3
Impact or flattening test	m ^d	9.7.2	9.7.3 or 9.7.4.1	7.4, 7.5, 7.6, 7.7
Microstructure examination	m ^d	1 per test lot ^c	9.8.2	7.9
Visual inspection	m	Each product	9.15	7.10, 7.11, 8.4
Hydrostatic test	m ^d (o ^h) ^d	Each pipe	9.14	7.12
Dimensional testing:				
— Outside diameter	m	Each end	9.9.2	Table C.15 and Table C.17
— Wall thickness	m	Each end	9.9.3	Table C.15 and Table C.17
— Drift test ^e	m	Each pipe	9.10	Tables C.15 and Table C.18 or Table C.19
— Length	m	Each product	9.11	Table C.16
— Straightness	m	Each pipe	9.12	8.3.3
— Mass	m	Each product	9.13	Table C.15 and Table C.17
Non-destructive examination:				
— UT for longitudinal defects	m ^d	Each product	9.16	7.11
— UT for transverse defects	m ^d	Each product	9.16	7.11
— UT for laminar defects	m ^d	Each product	9.16	7.11
— UT for wall thickness ^e	m ^d	Each product	9.16	7.11
— UT manual on upset L+T ^e	m ^d (o ^f) ^d	Each product	9.16	7.11
— EMI ^e	o ^{d,f}	Each product	9.16	7.11
— Liquid-penetrant inspection	m (o ^f)	Only ground or machined area	9.16	7.11
— MT	o ^f (m ^g)	Only ground or machined area	9.16	7.11
— PMI	m (o ^f)	Each product for Groups 2, 3, and 4	9.17	7.1
^a “m” signifies mandatory; “o” signifies optional (an agreement is required). ^b For definition of “test lot”, see 4.1.19. See Table C.21 for the maximum number of product in a test lot. ^c Minimum 1 per cast. ^d It is required that records be retained. ^e Not applicable to coupling stock. ^f Option for group 1 only. ^g Mandatory for upset ends of group 1. ^h Option for CH only.				