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Specification for Welding of Industrial and Mill Cranes and Other Material Handling Equipment



American Welding Society



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Specification for
Welding of Industrial and
Mill Cranes and Other
Material Handling Equipment

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Abstract

Requirements are presented for the design and fabrication of constructional steel weldments that are used in industrial and mill cranes, lifting devices and other material handling equipment. Requirements are also included for modification, weld repair, and postweld treatments of new and existing weldments. Filler metal and welding procedure guidelines are recommended for the applicable base metals, which are limited to carbon and low-alloy steels. Allowable unit stresses are provided for weld metal and base metal for various cyclically loaded joint designs.



American Welding Society

550 N.W. LeJeune Road, Miami, Florida 33126

Table of Contents

	Page No.
<i>Personnel</i>	iii
<i>Foreword</i>	v
<i>List of Tables</i>	viii
<i>List of Figures</i>	viii
1. Scope and General Provisions.....	1
1.1 Scope.....	1
1.2 General Provisions.....	1
2. Normative References.....	2
2.1 American Welding Society (AWS) Standards.....	2
2.2 American Society of Mechanical Engineers (ASME) Standards.....	2
2.3 American Society for Testing and Materials (ASTM) Standards.....	2
2.4 American Society for Nondestructive Testing (ASNT) Standards.....	2
3. Definitions.....	3
4. Base Metals.....	3
4.1 Specifications.....	3
4.2 Proprietary Base Metals.....	3
4.3 Tensile and Yield Strengths of a Base Metal.....	3
4.4 Weldability.....	3
4.5 Quenched and Tempered Steels.....	3
4.6 Nonferrous Metals.....	3
5. Allowable Stresses.....	7
5.1 General.....	7
5.2 Fatigue.....	7
6. Weld Joint Design.....	7
6.1 General Requirements.....	7
6.2 Groove Welds.....	7
6.3 Intermittent Groove Welds.....	7
6.4 Fillet Welds.....	7
6.5 Intermittent Fillet Welds.....	9
6.6 Staggered Intermittent Fillet Welds.....	9
6.7 Plug and Slot Welds.....	17
6.8 Suggested Classification of Welded Joints.....	18
6.9 Weld Joint Classes.....	20
6.10 Joint Qualification.....	20
6.11 Transition of Thicknesses or Widths at Butt Joints.....	20
6.12 Material for Joint Extensions, Backing, and Spacers.....	20
6.13 Dimensional Tolerances.....	22
6.14 Lap Joints.....	22
6.15 Corner and T-Joints.....	23
6.16 Welds in Combination with Rivets and Bolts.....	23
6.17 Eccentricity of Connections.....	23

	Page No.
7. Workmanship	23
7.1 General	23
7.2 Preparation of the Base Metal	23
7.3 Visual Inspection and Repair of Plate and Wrought Steel Products	24
7.4 Assembly	25
7.5 Control of Distortion and Shrinkage Stresses	27
7.6 Stress Relief.....	27
7.7 Vibratory Conditioning	27
7.8 Peening.....	28
8. Processes and Filler Metals	28
8.1 General	28
8.2 Shielded Metal Arc Welding (SMAW).....	29
8.3 Submerged Arc Welding (SAW)	32
8.4 Gas Metal Arc Welding (GMAW) and Flux Cored Arc Welding (FCAW).....	34
8.5 Electroslag Welding (ESW) and Electrogas Welding (EGW).....	34
9. Qualification.....	36
<i>Part A—General Requirements</i>	36
9.1 Approved Procedures	36
9.2 Other Procedures	37
9.3 Welders, Welding Operators, and Tack Welders	37
9.4 Qualification Responsibility.....	37
<i>Part B—Procedure Qualification</i>	37
9.5 Qualification of Welding Procedures	37
9.6 Types of Tests and Purposes	41
9.7 Base Metal.....	41
9.8 Position of Test Welds	41
9.9 Joint Welding Procedure	42
9.10 Test Specimens.....	42
9.11 Method of Testing Specimens.....	49
9.12 Test Results Required.....	52
9.13 Records.....	55
9.14 Retests	55
<i>Part C—Welder Qualification</i>	55
9.15 General	55
9.16 Limitations	55
9.17 Qualification Tests Required.....	56
9.18 Groove Weld Plate Qualification Test for Plate of Unlimited Thickness.....	56
9.19 Groove Weld Plate Qualification Test for Plate of Limited Thickness	56
9.20 Groove Weld Qualification Test for Butt Joints in Pipe or Tubing	56
9.21 Groove Weld Qualification Test for T-, Y-, and K-Connections on Pipe or Tubing.....	56
9.22 Fillet Weld Qualification Test.....	63
9.23 Position of Test Welds	63
9.24 Base Metal.....	65
9.25 Joint Welding Procedure	65
9.26 Test Specimens.....	65
9.27 Method of Testing Specimens.....	65
9.28 Test Results Required.....	66
9.29 Retests	67
9.30 Period of Effectiveness.....	68
9.31 Records.....	68
9.32 Workmanship Qualification	68

	Page No.
<i>Part D—Welding Operator Qualification</i>	70
9.33 General	70
9.34 Limitations	70
9.35 Qualification Tests Required.....	70
9.36 Base Metal.....	71
9.37 Joint Welding Procedure	71
9.38 Test Specimens.....	72
9.39 Method of Testing Specimens.....	72
9.40 Test Results Required.....	75
9.41 Retests	75
9.42 Period of Effectiveness.....	75
9.43 Records.....	75
<i>Part E—Qualification of Tack Welders</i>	75
9.44 General	75
9.45 Limitations	75
9.46 Qualification Tests Required.....	75
9.47 Base Metal.....	75
9.48 Test Specimen	76
9.49 Method of Testing	76
9.50 Test Results Required.....	76
9.51 Retests	76
9.52 Period of Effectiveness.....	76
9.53 Records.....	76
10. Weld Quality and Inspection.....	77
10.1 General	77
10.2 Owner’s Representative	77
10.3 Inspection of Welding Procedure Qualifications	77
10.4 Inspection of Welder, Tack Welder, and Welding Operator Qualifications	77
10.5 Inspection of Work and Records	77
10.6 Visual Examination.....	78
10.7 Welding Profiles.....	78
10.8 Nondestructive Examination	78
10.9 Radiographic Examination of Welds	80
10.10 Radiographic Procedure	80
10.11 Acceptability of Radiographed Welds	81
10.12 Examination, Report, and Disposition of Radiographs.....	81
10.13 Ultrasonic Examination of Welds	82
10.14 Ultrasonic Testing Equipment and Calibration.....	83
10.15 Ultrasonic Testing Procedure, Acceptance Criteria, and Reports.....	87
10.16 Magnetic Particle Examination of Welds.....	92
10.17 Liquid Penetrant Examination of Welds	92
11. Field Weld Repair and Modification.....	92
11.1 General	92
11.2 Field Repair—Manufacturer’s Responsibility	92
11.3 Field Repair—Owner’s Responsibility	93
12. Repair and Correction of Defects.....	93
12.1 Weld Repairs	93
12.2 Base Metal Repairs.....	93
12.3 Removal of Defective Areas	94
12.4 Distortion and Camber	94
12.5 Correction of Improperly Fitted and Welded Members.....	94

	Page No.
<i>Mandatory Annex</i>	95
<i>Annex I—Prequalified Weld Joints</i>	95
<i>Nonmandatory Annexes</i>	119
<i>Annex A—Suggested Forms</i>	119
<i>Annex B—Examples of Weld Quality Requirements</i>	129
<i>Annex C—Guidelines for Preparation of Technical Inquiries for AWS Technical Committees</i>	131
<i>Annex D—Bibliography</i>	133
<i>List of AWS Documents on Machinery and Equipment</i>	135

List of Tables

Table		Page No.
1	Weldability Classification of Steels	4
2	Allowable Stress in Weld Metal	8
3	Allowable Stress Range	9
4	Stress Categories to Determine Allowable Stress Range.....	10
5	Minimum Effective Throat for Partial Joint Penetration Groove Welds	15
6	Minimum Fillet Weld Size.....	17
7	Limits on Acceptability and Repair of Edge Discontinuities in Cut Surfaces.....	25
8	Tolerances for Groove Weld Joint Preparations for Arc Welding.....	26
9	Matching Filler Metal Requirements	30
10	Minimum Preheat and Interpass Temperatures	31
11	Impact Property Requirements at 0°F [-18°C] for Electroslag and Electroslag Welds	35
12	All-Weld-Metal Tension Test Requirements for Electroslag and Electroslag Welds	36
13	Procedure Qualification—Type and Position Limitations.....	42
14	Number and Type of Test Specimens and Range of Thickness Qualified—Procedure Qualification; Complete Joint Penetration Groove Welds.....	46
15	Acceptable Reinforcement on Groove Welds in Pipe and Tubing	55
16	SMAW Electrode Groups	55
17	Number and Type of Test Specimens and Range of Thickness Qualified—Welder and Welding Operator Qualification.....	57
18	Welder Qualification—Type and Position Limitations	58
19	Penetrometer Requirements	81
20	Ultrasonic Testing Angle	89
21	Ultrasonic Acceptance and Rejection Criteria	91

List of Figures

Figure		Page No.
1	Illustrative Examples for Table 4.....	13
2	Fillet and Combined Weld Dimension.....	15
3	Size and Effective Throat Measurements for Fillet and Partial Penetration Groove Welds with Reinforcing Fillet Welds.....	16
4	Staggered Intermittent Fillet Weld.....	17
5	Classification of Welded Joints.....	18
6	Transition of Butt Joints in Parts Having Unequal Thickness.....	21
7	Transition of Width at Butt Joints of Parts Having Unequal Width.....	22
8	Edge Discontinuities in Cut Material.....	25
9	Pneumatic Hammer Peening.....	29
10	Unacceptable Submerged Arc Weld Pass where the Depth and Width Exceed the Face Width.....	32
11	Positions of Test Plates for Groove Welds.....	43
12	Positions of Test Pipe or Tubing for Groove Welds.....	44
13	Positions of Test Plates for Fillet Welds.....	45
14A	Location of Test Specimens on Welded Test Pipe 2 in. [50 mm] or 3 in. [75 mm] in Diameter.....	47
14B	Location of Test Specimens on Welded Test Pipe 6 in. [150 mm] or 8 in. [200 mm] in Diameter.....	47
14C	Location of Test Specimens on Welded Test Plate—Electroslag and Electrogas Welding— Procedure Qualification.....	48
14D	Location of Test Specimens on Welded Test Plate Over 3/8 in. [10 mm] Thick—Procedure Qualification.....	49
14E	Location of Test Specimens on Welded Test Plate 3/8 in. [10 mm] Thick and Under— Procedure Qualification.....	50
15A	Reduced-Section Tension Specimens.....	51
15B	All-Weld-Metal Tension Specimens.....	52
15C	Face- and Root-Bend Specimens.....	53
15D	Side-Bend Specimens.....	54
16	Fillet Weld Soundness Test for Procedure Qualification.....	54
17A	Test Plate for Unlimited Thickness—Welder Qualification.....	59
17B	Optional Test Plate for Unlimited Thickness, Horizontal Position—Welder Qualification.....	59
18A	Test Plate for Limited Thickness, All Positions—Welder Qualification.....	60
18B	Optional Test Plate for Limited Thickness, Horizontal Position—Welder Qualification.....	60
19A	Pipe Test Butt Joint without Backing—Welder Qualification.....	61
19B	Pipe Test Butt Joint with Backing—Welder Qualification.....	61
20	Test Joint for T-, Y-, and K-Connections on Pipe or Tubing—Welder Qualification.....	61
21	Location of Test Specimens on Welded Test Pipe—Welder Qualification.....	62
22	Fillet Weld Break and Macroetch Test Plate—Welder Qualification, Option 1.....	63
23	Fillet Weld Root-Bend Test Plate—Welder Qualification, Option 2.....	64
24A	Guided-Bend Test Jig—Standard Design.....	66
24B	Alternative Guided-Bend Test Jig—Wraparound Design.....	67
24C	Alternative Guided-Bend Test Jig—Roller-Equipped Design for Bottom Ejection of Test Specimens.....	68
25	Examples of Workmanship Samples.....	69
26	Test Plate for Unlimited Thickness—Welding Operator Qualification.....	71
27	Butt Joint for Electroslag and Electrogas—Welding Operator Qualification.....	72
28	Fillet Weld Break and Macroetch Test Plate—Welding Operator Qualification, Option 1.....	73
29	Fillet Weld Root-Bend Test Plate—Welding Operator Qualification, Option 2.....	74

Figure		Page No.
30	Fillet Weld Break Specimen—Tack Welder Qualification	76
31	Method of Fracturing Fillet Weld Break Specimen—Tack Welder Qualification	76
32	Acceptable and Unacceptable Weld Profiles	79
33	Weld Quality Requirements for Discontinuities Occurring in Welds (Limitation of Porosity and Fusion-Type Discontinuities).....	82
34A	RC Resolution Reference Block (U.S. Units).....	84
34B	RC Resolution Reference Block (SI Units)	85
34C	Typical Transducer Positions.....	86
35	Plan View of UT Scanning Patterns	88
I.1	Prequalified Complete Joint Penetration Groove Welded Joints	95
I.2	Prequalified Partial Joint Penetration Groove Welded Joints	109
A.1	Sample Form E1, Front	120
A.2	Sample Form E1, Back	121
A.3	Sample Form E2.....	122
A.4	Sample Form E3.....	123
A.5	Sample Form E4.....	124
A.6	Sample Form E5.....	125
A.7	Sample Form E6.....	126
A.8	Sample Form E7.....	128
B.1	Examples of Weld Quality Requirements.....	129

Specification for Welding of Industrial and Mill Cranes and Other Material Handling Equipment

1. Scope and General Provisions

1.1 Scope. This specification applies to the welding of all principal structural weldments and all primary welds used in the manufacture of cranes for industrial, mill, power house, and nuclear facilities. Furthermore, the specification applies to other overhead material handling machinery and equipment that support and transport loads within the design rating, vertically or horizontally, during normal operations, and, when agreed upon between the Owner and Manufacturer, to loading caused by abnormal operations or environmental events, such as seismic loading.

Secondary welds that will be subjected to tensile stresses of less than 5000 psi [34.5 MPa] need only meet the requirements of Section 7, Workmanship, and Section 10, Weld Quality and Inspection. The engineering drawings shall specify the joint detail, type, and size of weld. This specification is not intended for application to construction- or crawler-type cranes. For the welding of rails, refer to AWS D15.2, *Recommended Practice for the Welding of Rails and Related Rail Components for Use by Rail Vehicles*.

All provisions of this specification are equally applicable to the strengthening and repairing of existing overhead cranes and material handling equipment as described above.

This specification makes use of both U.S. Customary Units and the International System of Units (SI). The measurements may not be exact equivalents; therefore each system shall be used independently of the other without combining in any way. The specification with the designation D14.1 uses U.S. Customary Units. The specification D14.1M uses SI Units. The latter are shown in appropriate columns in tables and figures or within brackets []. Detailed dimensions on figures are in inches. A separate tabular form that relates the U.S. Customary Units with SI Units may be used in tables and figures.

Safety and health issues and concerns are beyond the scope of this standard, and therefore are not fully

addressed herein. Safety and health information is available from other sources, including, but not limited to, ANSI Z49.1, *Safety in Welding, Cutting, and Allied Processes* and applicable federal and state regulations. Some other sources of safety and health information can be found in Annex D.

1.2 General Provisions. The Manufacturer's¹ adherence to this specification shall include responsibility for the following:

- (1) Welding, as defined in the Scope, in accordance with this specification;
- (2) Producing the welds designated on the drawings by appropriate welding symbols and notes containing sufficient detail to show joint preparations compatible with the designated welding processes;
- (3) Providing written welding procedures;
- (4) Recording results of all procedure and welder qualification tests;
- (5) Controlling the use of designated base metals and consumables; and
- (6) Inspecting the welds to the requirements of this specification.

1.2.1 Acceptance. Acceptance shall be as agreed upon between the Manufacturer and the Owner (purchaser). The fundamental premise of this specification is to provide general stipulations applicable to most situations. Acceptance criteria for production welds different from those stated in this specification may be used for a particular application, provided they are suitably documented by the proposer and approved by the Engineer. These alternate acceptance criteria can be based upon evaluation of suitability for service using past experience, experimental evidence or engineering analysis considering material type, service-load effects, and environmental factors.

1. Manufacturer refers to the organization responsible for the performance of the work covered by this specification (see definition in Section 3).