Piping & Metals Fabrication Quality Manual Sample

Selected pages (not a complete manual)

Sample includes:

- ✓ Quality Manual Pages
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[CompanyName]

Piping and Metals Fabrication

Quality Manual

Operating Policies of the [CompanyName] Quality System

Effective Date: [Date]

Version	Version notes
[Date]	Initial issue

Approval Signature and Date: _____ _____

President/ Date

QUALITY MANUAL

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5. JOB-SPECIFIC QUALITY STANDARDS

APPLICABLE REGULATIONS, INDUSTRY, and COMPANY STANDARDS

5.1. OVERVIEW

[CompanyName] personnel and subcontractors and suppliers are accountable for compliance to standards-based written specifications.

To achieve expectations reliably and consistently, specifications are clearly spelled out, not only for results but also for processes. Specifications apply to materials, work steps, qualified personnel and subcontractors and suppliers, safe work rules, and environmental work conditions.

Standards ensure that results are specified rather than left to discretionary practices.

5.2. REGULATORY CODES

All [CompanyName] fabrication activities comply with the relevant regulations. The Quality Manager identifies regulatory requirements applicable to the jurisdictions served, including:

- Applicable Federal regulations
- Applicable State regulations
- Applicable building codes and local addenda to building codes
- Applicable Fire Code
- Applicable Fuel and Gas Code
- Applicable Mechanical Code
- Applicable Plumbing Code
- Additional regulations specified by the customer contract

The Quality Manager identifies regulatory requirements that apply to a specific Job on the Job Quality Assurance/Quality Control Plan.

The Superintendent have access to relevant codes and government regulations.

5.3. INDUSTRY QUALITY STANDARDS

All [CompanyName] fabrication activities comply with generally accepted good workmanship practices and industry standards.

The Quality Manager identifies supplemental requirements for industry standards that apply to a specific Job on the Job Quality Assurance/Quality Control Plan when it is not otherwise specified by the contract, contract technical specifications, or approved drawings.

COMPLIANCE WITH INDUSTRY WELDING STANDARDS

Description	Reference Standard No.	Reference Standard Title
Minimum spacings and edge distances for screws	AISI SG02-KIT	North American Specification for the Design of Cold-Formed Steel Structural Members
Beveling, alignment, heat treatment, and inspection of weld	ASME B31.1	Power Piping
Requirements for piping of fluids	ASME B31.3	Process Piping
Welding standards	AWS B2.1/B2.1M	Specification for Welding Procedure and Performance Qualification
Workmanship and techniques for welded construction	AWS D1.1/D1.1M	Structural Welding Code – Steel
Installation of bracing and permanent bracing and bridging	CFSEI	Field Installation Guide for Cold-Formed Steel Roof Trusses
Installation of chimneys, vents, and smokestacks	NFPA 211	Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances
Framing and reinforcing openings through a steel deck	SDI DDP	Deck Damage and Penetrations
Install high-strength bolts		RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts"

5.4. JOB - SPECIFIC WELDING PROCEDURE STANDARDS

The Quality Manager approves welding procedures before they can be used to fabricate metal.

Welding procedures shall be qualified and approved, in accordance with the applicable AWS Welding Code(s) or Specification(s) (i.e., D1.1., D1.5) or AWS B2.1, Specification for Welding Procedure and Performance Qualification.

The welding procedure must identify the filler material.

When the governing AWS Welding Code(s) mandates that welding procedures be qualified by test, the Welding Fabricator shall have PQRs that support the applicable WPSs. When prequalified WPSs or Standard Welding Procedure Specifications (SWPSs) published by the AWS are permitted, PQRs are not required.

The Quality Manager or Certified Welding Inspector (CWI) reviews and approves the welding procedure before being used in production welding operations.

The WPSs and PQRs are controlled by the Quality Manager according by the document and record control procedures specified in the relevant section of this Quality Manual.

The applicable WPSs shall be available to welders or welding operators during testing and production welding.

5.5. MATERIAL AND EQUIPMENT SPECIFICATIONS

The Quality Manager ensures that all types of materials and equipment that affect quality are identified and controlled.

The Quality Manager evaluates the expected use of materials and equipment and identifies types of materials and equipment that may affect Job quality. For each item, the Quality Manager sets specifications for their intended use, including:

- Compliance to contract requirements
- Compliance to code and industry standards and listing requirements
- Structural integrity
- Performance
- Durability
- Appearance
- Product identification for traceability.

The Quality Manager identifies controlled material and equipment that apply to the Job.

The Quality Manager ensures that purchase orders for listed materials and equipment include the relevant specifications as specified in section 6.7 Purchase Order Requirements.

Only approved materials are used in the fabrication process.

5.6. Work Process Specifications

The Quality Manager ensures that work processes are controlled to ensure that the specified requirements are met. When appropriate, the Quality Manager will specify Job quality standards for work processes that may include:

- References to documented procedures such as manufacturer's installation instructions
- Procedures for carrying out process steps
- Methods to monitor and control processes and characteristics
- Acceptability criteria for workmanship
- Tools, techniques and methods to be used to achieve the specified requirements.

5.7. Controlled Material Identification and Traceability

The Quality Manager determines types of Job materials that require quality controls.

For each type of quality-controlled material, the Quality Manager determines lot control traceability requirements, if any, and specifies the means of lot identification. Identification methods may include physical labels, tags, markings and/or attached certification documents.

When lot-controlled materials are received, the Superintendent verifies that materials have the specified lot identifications.

The Superintendent maintains lot identification at all production phases from receipt, through production, installation, or assembly, to final completion. Acceptable methods for preserving lot identification include physically preserving observable lot identifications, recording the lot identification on a work task quality inspection form or other work record, or collecting the physical lot identifier as a record along with supplemented with location.

If lot-controlled materials are without lot identification, the Superintendent deems the materials as nonconforming and segregates them and/or clearly marks them to prevent inadvertent use. The Superintendent treats the material according to the company policy for nonconformances. Only the Quality Manager can re-identify or re-certify the materials.

5.8. Measuring Device Control and Calibration

The Quality Manager evaluates the Job requirements and determines if there are measuring devices that require controls to assure quality results.

For each type of device, the Quality Manager identifies:

- Restrictions for selection
- Limitations on use.
- Calibration requirements including the frequency of calibration. All calibrations must be traceable to national measurement standards.

When a measurement device is found not to conform to operating tolerances, the Quality Manager validates the accuracy of previous measurements.

5.9. [CompanyName] Quality Standards

[CompanyName] quality standards supplement contract requirements when they are necessary to ensure quality.

The Quality Manager identifies supplemental requirements for [CompanyName] Quality standards that apply to a specific Job on the Job Quality Assurance/Quality Control Plan.

When [CompanyName] quality standards differ from industry standards or product manufacturer instructions, the Quality Manager justifies that the standard reliably achieves quality results and then documents the justification.

All [CompanyName] fabrication activities conform to the company quality standards.

5.10. Application of Multiple Sources of Specifications

Should multiple sources of specifications apply to a work task, the higher level of specification applies. When there are equal levels of specifications that conflict, the specifications are applied in this order:

- Submittals approved by the customer
- Contract technical specifications
- Contract drawings
- Government regulations that exceed requirements of items below
- [CompanyName] quality specifications, including subcontract specifications
- [CompanyName] Quality Manual
- Product installation instructions
- Industry standards
- Generally accepted practices

Should multiple sources of conflicting specifications apply to a Job, the Quality Manager defines the standards that apply to the specific Job on the Job Quality Assurance/Quality Control Plan.

9. NONCONFORMANCES AND CORRECTIVE ACTIONS

9.1. OVERVIEW

Should a nonconformance be identified by an inspection there is a systematic method to control the item, correct it, and ensure that Job quality is not adversely impacted by the event.

A nonconformance is any item that does not meet Job specifications or [CompanyName] Quality System requirements.

9.2. NONCONFORMANCES

9.2.1. MARKING OF NONCONFORMANCES AND OBSERVATIONS

When the Quality Manager, Superintendent, inspector, or customer identifies a nonconformance or an observation, the item is quickly and clearly marked by tape, tag, or other easily observable signal to prevent inadvertent cover-up.

9.2.2. CONTROL THE CONTINUATION OF WORK

After the item is marked, the Superintendent determines if work can continue in the affected area:

CONTINUE WORK: When continuing work does not adversely affect quality or hide the defect, work may continue in the affected area while the disposition of the item is resolved. The Superintendent may place limitations on the continuation of work.

STOP WORK ORDER: When continuing work can adversely affect quality or hide the defect, work must stop in the affected area until the disposition of the item resolved. The Superintendent identifies the limits of the affected area. The Superintendent quickly and clearly identifies the boundaries of the stop work area.

9.2.3. NONCONFORMANCE REPORT

9.2.3.1. RECORDING OF NONCONFORMANCES

If nonconformances or observed items exist by the work task completion inspection, the Superintendent or inspector records the nonconformances on a nonconformance report.

The Superintendent sends the nonconformance report to the Quality Manager.

9.2.3.2. QUALITY MANAGER DISPOSITION OF NONCONFORMANCE REPORTS

When the Quality Manager receives a Nonconformance Report, he or she assesses the affect the reported nonconformance has on form, fit, and function. The Quality Manager may assign a disposition of either:

REPLACE: The nonconformance can be brought into conformance with the original specification requirements by replacing the nonconforming item with a conforming item.

REPAIR: The nonconformance can be brought into conformance with the original requirements through completion of required repair operations.

REWORK: The nonconformance can be made acceptable for its intended use, even though it is not restored to a condition that meets all specification requirements. The Quality Manager may specify

standards that apply to the completion of rework. Rework nonconformances must be approved by the customer.

USE AS-IS: When the nonconforming item is satisfactory for its intended use. Any use as-is items that do not meet all specification requirements must be approved by the customer.

9.2.4. Correction of Nonconformances

The Superintendent verifies that corrective actions eliminate the nonconformance to the requirements of the original specifications or as instructed by the disposition of the nonconformance report, and then removes, obliterates, or covers the nonconformance marker.

Furthermore, the Superintendent ensures that previously completed work is reinspected for similar nonconformances and corrective actions are taken to avert future occurrences (see section 9.3 Corrective Actions).

9.3. Corrective Actions

9.3.1. Control of Corrective Actions

When a nonconformance is found, the Superintendent ensures that:

- Previously completed work is reinspected for similar nonconformances
- Corrective actions are taken to avert future occurrences

The Quality Manager identifies requirements for corrective actions with respect to frequency, severity, and detectability of quality nonconformances items found during and after completion of work activities.

When a solution requires changes to [CompanyName] quality standards, the Quality Manager makes modifications as necessary by making changes to:

- Material specifications
- Personnel qualifications
- Subcontractor and Supplier qualifications
- Company standards
- Inspection processes

9.3.2. Corrective Action Training

The Superintendent initiates corrective action training to address quality nonconformances. Personnel and subcontractors and suppliers performing or inspecting work participate in the training.

Heightened awareness during quality inspections verifies and documents compliance with the corrective action improvement items. A qualified Superintendent inspects corrective actions during regular quality inspections and records observations on the quality inspection form.

The Superintendent notifies affected subcontractors and suppliers of selected preventive action training requirements.

The Superintendent evaluates the effectiveness of the improvements. The Quality Manager reviews improvement results recorded on quality inspection records and monthly field reviews. When the Quality Manager determines that the improvement actions are effective, the item is no longer treated as a preventive action.

14. FORMS

Form QW-483 Welding Procedure Qualification Record

QW-483 SUGGESTED FORMAT FOR PROCEDURE QUALIFICATION RECORDS (PQR)
(See QW-200.2, Section IX, ASME Boiler and Pressure Vessel Code)
Record Actual Variables Used to Weld Test Coupon

Company Name _____
Procedure Qualification Record No. _____ Date _____
WPS No. _____
Welding Process(es) _____
Types (Manual, Automatic, Semi-Automatic) _____

JOINTS (QW-402)

Groove Design of Test Coupon
(For combination qualifications, the deposited weld metal thickness shall be recorded for each filler metal and process used.)

BASE METALS (QW-403)
Material Spec. _____
Type/Grade, or UNS Number _____
P-No. ____ Group No. ____ to P-No. ____ Group No. ____
Thickness of Test Coupon _____
Diameter of Test Coupon _____
Maximum Pass Thickness _____
Other

POSTWELD HEAT TREATMENT (QW-407)
Temperature _____
Time _____
Other

GAS (QW-408)

	Percent Composition Gas(es)	(Mixture)	Flow Rate
Shielding			
Trailing			
Backing			
Other			

FILLER METALS (QW-404)	1	2
SFA Specification		
AWS Classification		
Filler Metal F-No.		
Weld Metal Analysis A-No.		
Size of Filler Metal		
Filler Metal Product Form		
Supplemental Filler Metal		
Electrode Flux Classification		
Flux Type		
Flux Trade Name		
Weld Metal Thickness		
Other		

ELECTRICAL CHARACTERISTICS (QW-409)
Current _____
Polarity _____
Amps. _____ Volts _____
Tungsten Electrode Size _____
Mode of Metal Transfer for GMAW (FCAW) _____
Heat Input _____
Other

POSITION (QW-405)
Position of Groove _____
Weld Progression (Uphill, Downhill) _____
Other

TECHNIQUE (QW-410)
Travel Speed _____
String or Weave Bead _____
Oscillation _____
Multipass or Single Pass (Per Side) _____
Single or Multiple Electrodes _____
Other

PREHEAT (QW-406)
Preheat Temperature _____
Interpass Temperature _____
Other

07/10

QW-483 (Back)

PQR No. _____

Tensile Test (QW-150)

Specimen No.	Width	Thickness	Area	Ultimate Total Load	Ultimate Unit Stress, (psi or MPa)	Type of Failure and Location

Guided-Bend Tests (QW-160)

Type and Figure No.	Result

Toughness Tests (QW-170)

Specimen No.	Notch Location	Specimen Size	Test Temperature	Impact Values			
				ft-lb or J	% Shear	Mils (in.) or mm	Drop Weight Break (Y/N)

Comments _____

Fillet-Weld Test (QW-180)

Result — Satisfactory: Yes ☐ No ☐ Penetration into Parent Metal: Yes ☐ No ☐

Macro — Results _____

Other Tests

Type of Test _____

Deposit Analysis _____

Other

Welder's Name _____ Clock No. _____ Stamp No. _____

Tests Conducted by _____ Laboratory Test No. _____

We certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in accordance with the requirements of Section IX of the ASME Boiler and Pressure Vessel Code.

Manufacturer or Contractor _____

Date _____ Certified by _____

(Detail of record of tests are illustrative only and may be modified to conform to the type and number of tests required by the Code.)

03/08

http://files.asme.org/asmeorg/Codes/Publications/BPVC/14033.pdf

Form N-1 Welding Procedure Specification Prequalification

WELDING PROCEDURE SPECIFICATION (WPS) Yes ☐
PREQUALIFIED _____ QUALIFIED BY TESTING _____
or PROCEDURE QUALIFICATION RECORDS (PQR) Yes ☐

Identification # _____
Revision _____ Date _____ By _____
Authorized by _____ Date _____
Company Name _____
Welding Process(es) _____
Type—Manual ☐ Semiautomatic ☐
Mechanized ☐ Automatic ☐
Supporting PQR No.(s) _____

JOINT DESIGN USED
Type:
Single ☐ Double Weld ☐
Backing: Yes ☐ No ☐
Backing Material:
Root Opening _____ Root Face Dimension _____
Groove Angle: _____ Radius (J–U) _____
Back Gouging: Yes ☐ No ☐ Method _____

POSITION
Position of Groove: _____ Fillet: _____
Vertical Progression: Up ☐ Down ☐

ELECTRICAL CHARACTERISTICS
Transfer Mode (GMAW) Short-Circuiting ☐
Globular ☐ Spray ☐
Current: AC ☐ DCEP ☐ DCEN ☐ Pulsed ☐
Power Source: CC ☐ CV ☐
Other _____
Tungsten Electrode (GTAW)
Size: _____
Type: _____

BASE METALS
Material Spec. _____
Type or Grade _____
Thickness: Groove _____ Fillet _____
Diameter (Pipe) _____

FILLER METALS
AWS Specification _____
AWS Classification _____

TECHNIQUE
Stringer or Weave Bead: _____
Multi-pass or Single Pass (per side) _____
Number of Electrodes _____
Electrode Spacing Longitudinal _____
Lateral _____
Angle _____
Contact Tube to Work Distance _____
Peening _____
Interpass Cleaning: _____

SHIELDING
Flux _____ Gas _____
Composition _____
Electrode-Flux (Class) _____ Flow Rate _____
Gas Cup Size _____

PREHEAT
Preheat Temp., Min. _____
Interpass Temp., Min. _____ Max. _____

POSTWELD HEAT TREATMENT
Temp. _____
Time _____

WELDING PROCEDURE

Pass or Weld Layer(s)	Process	Filler Metals		Current		Volts	Travel Speed	Joint Details
		Class	Diam.	Type & Polarity	Amps or Wire Feed Speed			

Form N-1 (Front)

Procedure Qualification Record (PQR) # _____
Test Results

TENSILE TEST

Specimen No.	Width	Thickness	Area	Ultimate Tensile Load, lb	Ultimate Unit Stress, psi	Character of Failure and Location

GUIDED BEND TEST

Specimen No.	Type of Bend	Result	Remarks

VISUAL INSPECTION
Appearance _____
Undercut _____
Piping porosity _____
Convexity _____
Test date _____
Witnessed by _____

Radiographic-ultrasonic examination
RT report no.: _____ Result _____
UT report no.: _____ Result _____

FILLET WELD TEST RESULTS

Minimum size multiple pass		Maximum size single pass	
Macroetch		Macroetch	
1. _____	3. _____	1. _____	3. _____
2. _____		2. _____	

Other Tests

All-weld-metal tension test
Tensile strength, psi _____
Yield point/strength, psi _____
Elongation in 2 in, % _____
Laboratory test no. _____

Welder's name _____ Clock no. _____ Stamp no. _____
Tests conducted by _____ Laboratory
Test number _____
Per _____

We, the undersigned, certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in conformance with the requirements of Clause 4 of AWS D1.1/D1.1M, (_____) *Structural Welding Code—Steel.*
(year)

Signed _____
Manufacturer or Contractor
By _____
Title _____
Date _____

Form N-1 (Back)

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http://www.aws.org/technical/forms/N-1.pdf

[CompanyName]
Work Task Quality Assurance/Quality Control Plan

Job ID	Job Name	Preparer	Date
[JobNumber]	[JobName]		

Work Task:	Performing Department/Crew/Subcontractor and Supplier:
Licensing / certification / qualification requirements of personnel or performing organization:	Work Task acceptance criteria:

Reference documents (contract specifications, contract drawings, submittals, quality standards, work instructions, product installation instructions)

ID #	Title or Description	Version / Issue Date

Required Inspections, process controls, and Tests

ID #	Inspection Protocol / Test Points	Acceptance Criteria

Required records of work task process and completion

[CompanyName] Metals Material Receiving Inspection Report				
Job ID	**Job Name**	**P.O.#**	**Supplier**	**Receipt Date**
[JobNumber]	[JobName]			
Type of Material (i.e., steel plate)	**Material Description (nominal dimensions)**	**Heat Number/ Serial Number/Markings**	**Condition / Damage**	**Color Code Marking**
Receiving Inspector Approval Signature / Date		**Government Representative Name/Approval Date**		
				❑ Material Receiving Inspection Passed

[CompanyName]
Inspection and Test Report

Inspection Report ID #	Job ID	Job Name	Preparer Signature	Date
	[JobNumber]	[JobName]		

Work Activity:	Item inspected and/or tested:

Ref#	Specification reference documents (titles or description with version/date)

Inspection/Test Record (additional items on next page)

Inspection/ Test/ ID #	Inspection/Test Points/Location	Acceptance Criteria / Ref#	Test Result, Nonconformance	Non-conformance Disposition rework/reject/Non-conformance Report	Corrections Made / Final Acceptance	
					Initial	Date

Acceptance of completed work activity (sign and date)

Inspector/Tester	Subcontractor and Supplier/Supplier	Superintendent

Questions? Call First Time Quality 410-451-8006

For More Information:

Visit our Online Store at:

www.firsttimequalityplans.com

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