



## **Essentials Fabrication**

### **Quality Plan Sample**

**Selected pages not a complete plan**

**Includes Standards and Forms for Structural Steel  
Fabrication**

**Contact:**

**First Time Quality**

**410-451-8006**

[ImagePlaceholder]

# [CompanyName]

## Fabrication Quality Assurance/Quality Control Plan

[ProjectName]

[ProjectNumber]

Version: 20150308

Effective Date: 20150308

Version	Version notes
20150308	Initial issue

Approved

\_\_\_\_\_  
[QualityManagerName], Quality Manager

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# PROJECT-SPECIFIC WELDING QUALITY PLAN

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## G. WELD PROJECT QUALITY SPECIFICATIONS

Fulfilling customer contract expectations is a primary objective of the [CompanyName] Quality System. To ensure that customer expectations will be fulfilled, [CompanyName] clearly defines the requirements for each contract before it is approved.

The Project Manager ensures that the information in customer contracts clearly defines customer expectations and that the necessary details are provided to set requirements for fabrication.

[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.

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

### COMPLIANCE WITH INDUSTRY WELDING STANDARDS

Codes that may apply to this project include those listed below.

Regulatory Codes and Industry Standards			
Division	Description	Reference Standard No.	Reference Standard Title
5	Minimum spacings and edge distances for screws	AISI SG02-KIT	North American Specification for the Design of Cold-Formed Steel Structural Members
5	Installation of bracing and permanent bracing and bridging	CFSEI	Field Installation Guide for Cold-Formed Steel Roof Trusses
5	Installation of chimneys, vents, and smokestacks	NFPA 211	Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances
5	Framing and reinforcing openings through a steel deck	SDI DDP	Deck Damage and Penetrations
5	Install high-strength bolts		RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts"
5	Welding standards	AWS B2.1/B2.1M	Specification for Welding Procedure and Performance Qualification
5	Standard practices for structural steel fabrication – bound series of standadards	AISC Code of Standard Practice for Steel Buildings and Bridges	AISC Code of Standard Practice for Steel Buildings and Bridges
5	Specification for steel fabrication for structural steel buildings	AISC Specification for Structural Steel Buildings	AISC Specification for Structural Steel Buildings
5	Structural steel joints	RCSC Specification for Structural Joints Using ASTM A325 or A490 Bolts	RCSC Specification for Structural Joints Using ASTM A325 or A490 Bolts

5	Standar design symbols	ANSI/AWS A2.4	Symbols
5	Standard terms	ANSI/AWS A3.0	Terms and Definitions
5	QA recommended practices	AWS Welding Quality Assurance Guideline for Fabricators (WQAG)	Welding Quality Assurance Guideline for Fabricators (WQAG)
5	Coating of steel	SSPC Steel Structures Painting Manual, Volume I, Good Painting Practice	Steel Structures Painting Manual, Volume I, Good Painting Practice
5	Coating of steel	SSPC Steel Structures Painting Manual, Volume II, Systems and Specifications	Steel Structures Painting Manual, Volume II, Systems and Specifications
5	Special provisions for seismic applications	AISC Seismic Provisions for Structural Steel Buildings	Seismic Provisions for Structural Steel Buildings
5	Detailing standards for the design of structural steel details	AISC Detailing for Steel Construction	Detailing for Steel Construction
5	Workmanship and techniques for welded construction	AWS D1.1/D1.1M	Structural Welding Code – Steel

## PROJECT - 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.

## Form N-1 Welding Procedure Specification Prequalification

ANNEX N

AWS D1.1/D1.1M:2010

**WELDING PROCEDURE SPECIFICATION (WPS) Yes**   
**PREQUALIFIED \_\_\_\_\_ QUALIFIED BY TESTING \_\_\_\_\_**  
**or PROCEDURE QUALIFICATION RECORDS (PQR) Yes**

Company Name _____ Welding Process(es) _____ Supporting PQR No.(s) _____ <hr/> <b>JOINT DESIGN USED</b> Type: Single <input type="checkbox"/> Double Weld <input type="checkbox"/> Backing: Yes <input type="checkbox"/> No <input type="checkbox"/> Backing Material: _____ Root Opening _____ Root Face Dimension _____ Groove Angle: _____ Radius (J-U) _____ Back Gouging: Yes <input type="checkbox"/> No <input type="checkbox"/> Method _____ <hr/> <b>BASE METALS</b> Material Spec. _____ Type or Grade _____ Thickness: Groove _____ Fillet _____ Diameter (Pipe) _____ <hr/> <b>FILLER METALS</b> AWS Specification _____ AWS Classification _____ <hr/> <b>SHIELDING</b> Flux _____ Gas _____ Composition _____ Electrode-Flux (Class) _____ Flow Rate _____ Gas Cup Size _____ <hr/> <b>PREHEAT</b> Preheat Temp., Min. _____ Interpass Temp., Min. _____ Max. _____	Identification # _____ Revision _____ Date _____ By _____ Authorized by _____ Date _____ Type—Manual <input type="checkbox"/> Semiautomatic <input type="checkbox"/> Mechanized <input type="checkbox"/> Automatic <input type="checkbox"/> <hr/> <b>POSITION</b> Position of Groove: _____ Fillet: _____ Vertical Progression: Up <input type="checkbox"/> Down <input type="checkbox"/> <hr/> <b>ELECTRICAL CHARACTERISTICS</b> Transfer Mode (GMAW) Short-Circuiting <input type="checkbox"/> Globular <input type="checkbox"/> Spray <input type="checkbox"/> Current: AC <input type="checkbox"/> DCEP <input type="checkbox"/> DCEN <input type="checkbox"/> Pulsed <input type="checkbox"/> Power Source: CC <input type="checkbox"/> CV <input type="checkbox"/> Other _____ Tungsten Electrode (GTAW) Size: _____ Type: _____ <hr/> <b>TECHNIQUE</b> 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: _____ <hr/> <b>POSTWELD HEAT TREATMENT</b> 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)

ANNEX N

AWS D1.1/D1.1M:2010

**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)

## Form N-3 WPS QUALIFICATION TEST RECORD ELECTROSLAG and ELECTROGAS WELDING

ANNEX N	AWS D1.1/D1.1M:2010			
<b>WPS QUALIFICATION TEST RECORD FOR ELECTROSLAG AND ELECTROGAS WELDING</b>				
<p style="text-align: center;"><b>PROCEDURE SPECIFICATION</b></p> <p>Material specification _____</p> <p>Welding process _____</p> <p>Position of welding _____</p> <p>Filler metal specification _____</p> <p>Filler metal classification _____</p> <p>Filler metal _____</p> <p>Flux _____</p> <p>Shielding gas _____ Flow rate _____</p> <p>Gas dew point _____</p> <p>Thickness range this test qualifies _____</p> <p>Single or multiple pass _____</p> <p>Single or multiple arc _____</p> <p>Welding current _____</p> <p>Preheat temperature _____</p> <p>Postheat temperature _____</p> <p>Welder's name _____</p> <p>Guide tube flex _____</p> <p>Guide tube composition _____</p> <p>Guide tube diameter _____</p> <p>Vertical rise speed _____</p> <p>Traverse length _____</p> <p>Traverse speed _____</p> <p>Dwell _____</p> <p>Type of molding shoe _____</p> <p><b>VISUAL INSPECTION (Table 6.1, Cyclically loaded limitations)</b></p> <p>Appearance _____</p> <p>Undercut _____</p> <p>Piping porosity _____</p> <p>Test date _____</p> <p>Witnessed by _____</p>	<p style="text-align: center;"><b>TEST RESULTS</b></p> <p><b>Reduced-section tensile test</b></p> <p>Tensile strength, psi</p> <p>1. _____</p> <p>2. _____</p> <p><b>All-weld-metal tension test</b></p> <p>Tensile strength, psi _____</p> <p>Yield point/strength, psi _____</p> <p>Elongation in 2 in, % _____</p> <p><b>Side-bend tests</b></p> <p>1. _____ 3. _____</p> <p>2. _____ 4. _____</p> <p><b>Radiographic-ultrasonic examination</b></p> <p>RT report no. _____</p> <p>UT report no. _____</p> <p><b>Impact tests</b></p> <p>Size of specimen _____ Test temp _____</p> <p>Ft-lb: 1. _____ 2. _____ 3. _____ 4. _____</p> <p>5. _____ 6. _____ Avg. _____</p> <p>High _____ Low _____</p> <p>Laboratory test no. _____</p>			
<b>WELDING PROCEDURE</b>				
Pass No.	Electrode Size	Welding Current		Joint Detail
		Amperes	Volts	
<p>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, ( _____ ) <i>Structural Welding Code—Steel</i>.</p> <p style="text-align: center;">(year)</p> <p>Procedure no. _____ Manufacturer or Contractor _____</p> <p>Revision no. _____ Authorized by _____</p> <p>Form N-3 Date _____</p>				
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<http://www.aws.org/technical/forms/N-3.pdf>



## Form N-4 WELDER, WELDING OPERATOR, OR TACK WELDER QUALIFICATION TEST RECORD

AWS D1.1/D1.1M:2010	ANNEX N
<b>WELDER, WELDING OPERATOR, OR TACK WELDER QUALIFICATION TEST RECORD</b>	
Type of Welder _____	Identification No. _____
Name _____	Date _____
Welding Procedure Specification No. _____	Rev _____

Variables	Record Actual Values Used in Qualification	Qualification Range
Process/Type [Table 4.12, Item (1)]		
Electrode (single or multiple) [Table 4.12, Item (7)]		
Current/Polarity		
Position [Table 4.12, Item (4)]		
Weld Progression [Table 4.12, Item (5)]		
Backing (YES or NO) [Table 4.12, Item (6)]		
Material/Spec.	to	
Base Metal		
Thickness: (Plate)		
Groove		
Fillet		
Thickness: (Pipe/tube)		
Groove		
Fillet		
Diameter: (Pipe)		
Groove		
Fillet		
Filler Metal (Table 4.12)		
Spec. No.		
Class		
F-No. [Table 4.12, Item (2)]		
Gas/Flux Type (Table 4.12)		
Other		

<b>VISUAL INSPECTION (4.9.1)</b>			
Acceptable YES or NO _____			
<b>Guided Bend Test Results (4.31.5)</b>			
Type	Result	Type	Result
<b>Fillet Test Results (4.31.2.3 and 4.31.4.1)</b>			
Appearance _____	Fillet Size _____		
Fracture Test Root Penetration _____	Macroetch _____		
(Describe the location, nature, and size of any crack or tearing of the specimen.)			
Inspected by _____	Test Number _____		
Organization _____	Date _____		

<b>RADIOGRAPHIC TEST RESULTS (4.31.3.2)</b>					
Film Identification Number	Results	Remarks	Film Identification Number	Results	Remarks

Interpreted by _____	Test Number _____
Organization _____	Date _____

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)

Manufacturer or Contractor _____	Authorized By _____
Form N-4	Date _____

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<http://www.aws.org/technical/forms/N-4.pdf>

## Form N-9 STUD WELDING APPLICATION QUALIFICATION TEST DATA

ANNEX N
AWS D1.1/D1.1M:2010

**STUD WELDING APPLICATION QUALIFICATION TEST DATA FORM PER SUBCLAUSE 7.6** Yes   
**PRE-PRODUCTION TEST PER SUBCLAUSE 7.7.1 (WPS)** Yes   
**OR PROCEDURE QUALIFICATION RECORD (PQR)** Yes   
**OR WELDER QUALIFICATION RECORD (WQR)** Yes

Company name \_\_\_\_\_  
 Operator name \_\_\_\_\_  
 Test number \_\_\_\_\_  
 Weld stud material \_\_\_\_\_  
 Weld stud size and PN#/Manufacturer \_\_\_\_\_

**Base Material**  
 Specification \_\_\_\_\_  
 Alloy and temper \_\_\_\_\_  
 Surface condition HR  CR   
 Coating \_\_\_\_\_  
 Cleaning method \_\_\_\_\_  
 Decking gage \_\_\_\_\_

**Shape of Base Material**  
 Flat  Round  Tube   
 Angle  Inside  Outside  Inside radius   
 Thickness \_\_\_\_\_


**Ferrule**  
 Part No./Manufacturer \_\_\_\_\_  
 Ferrule description \_\_\_\_\_

**Equipment Data**  
**Application Settings, Current, and Time Settings**  
 Make \_\_\_\_\_ Model \_\_\_\_\_  
 Stud gun: Make \_\_\_\_\_ Model \_\_\_\_\_  
 Weld time (seconds) \_\_\_\_\_  
 Current (amperage) \_\_\_\_\_  
 Polarity: DCEN \_\_\_\_\_ DCEP \_\_\_\_\_  
 Lift \_\_\_\_\_  
 Plunge (protrusion) \_\_\_\_\_  
 Weld cable size \_\_\_\_\_ Length \_\_\_\_\_  
 Number of grounds (workpiece leads) \_\_\_\_\_

**Welding Position**  
 Flat (Down hand)  Horizontal (Side hand)  Angular—degrees from normal  Overhead

**Shielding Gas**  
 Shielding gas(es)/Composition \_\_\_\_\_  
 Flow rate \_\_\_\_\_

**Stud Base Sketch/Application Detail**



**WELD TEST RESULTS**

Stud No.	Visual Acceptance	Option #1 Bend Test	Option #2 Tension Test	Option #3 Torque Test*
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

\*Note: Torque test optional for threaded fasteners only.

Mechanical tests conducted by \_\_\_\_\_ Date \_\_\_\_\_  
(Company)

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 7 of AWS D1.1/D1.1M, (\_\_\_\_\_) *Structural Welding Code—Steel*.  
(year)

Signed by \_\_\_\_\_ Title \_\_\_\_\_ Date \_\_\_\_\_  
(Contractor/Applicator/Other)

Form N-9 \_\_\_\_\_ Company \_\_\_\_\_

## H. MATERIAL TRACEABILITY

Products and materials are controlled to assure the use of only correct and acceptable items. Controls include identification of the inspection status. Materials that require lot control traceability and the method of traceability are listed on the Controlled Materials form included as an exhibit in this subsection.

### IDENTIFICATION OF LOT CONTROLLED MATERIALS

The Quality Manager determines types of project 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.

Selected Pages

**[CompanyName]**  
**Controlled Materials Form**  
Version 20150308

Contract ID	Contract Name	Preparer	Date	
[ProjectNumber]	[ProjectName]			

Contract Section/ Activity ID	Material	Intended Use (if description is necessary)	Lot Traceability Requirements	Method for identification of Approved Inspection Status

Selected Pages

**[CompanyName]**  
**Material Inspection and Receiving Report**

Version 20150308

Contract ID	Contract Name	Purchase Order No.	Supplier			Bill of Lading No.	Date	
[ProjectNumber]	[ProjectName]							
Item No.	Stock/Part No.	Description	Quantity Received	Condition	Marking	Accept	Conditional Use	Reject
						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Receiving Quality Control**

ACCEPTANCE

Listed items have been accepted by me or under my supervision

- Conform to contract specifications EXCEPT as noted herein or on supporting documents.
- Received in apparent good condition EXCEPT as noted

Signature of authorized person and date: \_\_\_\_\_

EXCEPTIONS:

Questions? Call First Time Quality 410-451-8006



**For More Information:**

**Contact: FirstTimeQuality**

**410-451-8006**

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