



AWS B5.17:2014 Fabrication Shop Quality Manual Sample

Selected pages (not a complete manual)

Sample includes:

- ✓ **Quality Manual Pages**
- ✓ **Forms Examples**

**Conforms to the Quality Management System requirements in
accordance with AWS B5.17:2014**

**Contact:
First Time Quality
410-451-8006**

www.firsttimequalityplans.com

1. COVER PAGE

[CompanyName]

[CompanyAddress1] | [CompanyAddress2]
[CompanyPhone]

Quality Manual

Operating Policies of the
[CompanyName] Welding Quality Program

Version	Version notes
[Date]	Initial issue

Review and Approval Signature and Date:

President/ Date

Documents provided by [CompanyName] disclose proprietary information as well as copyright information registered with the U.S. Patent and Trademark Office. Please hold these documents in confidence and do not share them with other organizations, even if you do not charge a fee. Submittal of documents does not transfer copyright ownership.

QUALITY MANUAL TABLE OF CONTENTS

The Quality Manual conforms to the quality management system requirements in accordance with AWS B5.17:2014, *Specification for the Qualification of Welding Fabricators Clause 6*.

1. Cover Page	1
2. Management Support and Responsibility	3
2.1. Statement of Authority and Responsibility	3
2.2. Quality Manual Conformance	3
2.3. [CompanyName] Quality Program Support.....	3
2.4. Quality Duties, Responsibilities, and Authority	4
3. Organization	7
3.1. Organization Chart.....	7
3.2. Delegation of Authority	7
4. Document Control.....	8
4.1. Quality Manual	8
4.2. Contract Documents.....	8
4.3. Drawings	9
4.4. Quality Records, Forms, and Reports	9
4.5. Records Retention	10
4.6. Document Control Procedure.....	10
5. Material Control.....	12
5.1. Material Specification	12
5.2. Material Purchase Order Approvals	12
5.3. Material Receiving	12
5.4. Material Inspection and Test Status	13
5.5. Material storage	13
5.6. Controlled Use of Materials.....	13
5.7. Controlled Material Identification and Traceability	13
6. Welding Procedure Specifications and Procedures for Qualification Records.....	15
6.1. Welding Procedure Specifications (WPS)	15
6.2. Welder Performance Qualifications	16
6.3. Filler Metal.....	16
7. Inspection and Nondestructive Testing	19
7.1. Inspection of Welding Work	19
7.2. Weld Inspector Qualifications	21
7.3. NDE Inspector Qualifications	21
7.4. NDE Procedures.....	21
8. Nonconformances and Corrective Actions	23

8.2. Corrective Actions	24
8.3. Preventive Actions	24
8.4. Overview	24
8.5. Identify Preventive Actions for Improvement	25
8.6. Train Preventive Actions for Improvement	25
9. Measuring and Testing Equipment	26
9.1. Calibration	26
9.2. Verification and Validation of Welding Machines	26
9.3. Calibration Identification	26
9.4. Calibration Records	27
10. Internal Quality Audits	28
10.1. Quality Program Audit	28
10.2. Quality Program Performance Measures	28
10.3. Customer Satisfaction Performance Measures	29
11. Contract Specifications	30
11.1. Overview	30
11.2. Contract Technical Specifications	30
11.3. Contract Drawings	30
11.4. Contract Submittals	30
11.5. Customer Submittal Approval	32
11.6. Contract Warranty	33
11.7. Contract Review and Approval	33
11.8. Exceptions	33
12. Sample Forms	34

2. MANAGEMENT SUPPORT AND RESPONSIBILITY

STATEMENT OF AUTHORITY AND RESPONSIBILITY

2.1. STATEMENT OF AUTHORITY AND RESPONSIBILITY

Responsibilities for quality are specified not only for compliance with policies and procedures but also so that decisions are based on principles that ensure quality.

Documented responsibilities ensure that expected behaviors are communicated throughout the company rather than left to discretionary interpretation.

2.2. QUALITY MANUAL CONFORMANCE

For this Quality Manual, the following codes determine the rules for controlling welding process including weld acceptance at the [CompanyName] facility.

Reference Standard No.	Reference Standard Title
D1 .1/D1.1 M	Structural Welding Code – Steel

2.3. [COMPANYNAME] QUALITY PROGRAM SUPPORT

Quality is everyone's responsibility. The President holds everyone in the organization personally accountable for adhering to the [CompanyName] Quality Program policies and procedures.

The [CompanyName] Quality Policy describes the [CompanyName] commitment to quality and reinforces compliance with the Quality Program.

The President communicates the Quality Policy message throughout the company so that all employees understand their respective quality responsibilities.

The President reviews the [CompanyName] Quality Policy with all employees at least annually.

The President ensures that a copy of the [CompanyName] Quality Policy is distributed to all employees and is posted in all offices.

2.3.1. QUALITY POLICY

[CompanyName] is committed to quality. Our objective is to safely deliver 100 percent complete fabrication projects that meet all contract and customer expectations the first time, every time. Our commitment to quality means:

- Every [CompanyName] employee is responsible for fully implementing and complying with all provisions of the [CompanyName] Quality Program.
- Our quality standards meet or exceed all applicable regulations, codes, industry standards, and manufacturer specifications as well as with our customers' contract and individual requirements.
- We stand behind our work. We inspect every work task to assure conformance to the project requirements. Should problems be found, we correct them.
- We are always improving. All employees receive regular training to make systematic improvements to remove quality risks and enhance quality performance.

5. MATERIAL CONTROL

5.1. MATERIAL 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 project 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 ensures that purchase orders for listed materials and equipment include the relevant specifications as specified in section 11 Contract Specifications in this Quality Manual.

5.2. MATERIAL PURCHASE ORDER APPROVALS

Only approved materials are used in the fabrication process. Only approved materials are specified in purchase and/or subcontracts. Specifications for procurement will vary depending on material and will be in conformance with this code.

The Operations Manager ensures that contracts and purchase orders are issued only to qualified outside organizations. The Operations Manager reviews, approves, and signs each purchase order to ensure the correct equipment and materials are purchased.

5.2.1.1. WELD FILLER MATERIAL PURCHASE ORDERS

For all weld filler material purchase orders, the relevant specifications will be included in the Terms and Conditions of procurement. Specifications for procurement will vary depending on material and will be in conformance with ANSI/AWS A.5, *Filler Metal Procurement Guidelines*. If AWS filler metals are not used, then procedure qualification testing is required.

The supplier must agree to the purchase order terms and specifications, and then sign the contract or purchase order.

A Purchase Order Form is included in the Forms section at the end of this Manual.

[Include an example of your Purchase Order Form (showing weld filler material specifications if applicable) in the Forms section at the end of the document]

5.3. MATERIAL RECEIVING

The Superintendent or qualified receiving inspector inspects materials for conformance to the purchase order and project quality requirements. The receiving inspection includes a verification that the

- Correct material has been received

- The material is identified and meets the traceability requirements for the material
- Material certifications and/or test reports meet the specified requirements if required
- Materials are tested and approved for the specific application if required

Material receiving inspections are recorded on the Material Inspection and Receiving Report in section 12 Sample Forms in this Quality Manual.

Metals material receiving inspections are recorded on the Metals Material Receiving Inspection Report in section 12 Sample Forms in this Quality Manual.

For additional details on weld filler material receiving, see section 6.3.2. Filler Material Receipt in this Quality Manual.

5.4. MATERIAL INSPECTION AND TEST STATUS

The status of each material quality control inspection or test is clearly marked by type, tag, or other easily observable signal to ensure that only items that pass quality inspections are used.

For each quality-controlled material, the Quality Manager determines the appropriate method for identifying quality inspection and test status.

5.5. MATERIAL STORAGE

The Superintendent ensures that all materials received and inspected will be stored and handled in a manner that protects them from damage, moisture, dirt and intrusion of foreign materials.

Filler materials of different filler metal types, sizes and heat numbers (if applicable) will be labeled and stored separately to prevent intermixing.

Filler materials will be stored in a controlled environment to prevent contamination and degradation. The storage environment will conform to any elevated temperature holding requirements of the filler metal manufacturer and the applicable AWS code or filler metal specification.

For additional details on weld filler material storage, see section 6.3.3. Filler Material Storage in this Quality Manual.

5.6. CONTROLLED USE OF MATERIALS

The Superintendent ensures that fabrication uses only materials specified in the contract technical specifications, contract drawings, and approved submittals. Substitutions are made only by agreement of the customer and documented by a Change Order. A Change Order form is included in section 12 Sample Forms in this Quality Manual. For more details, see section 11.4 Contract Submittals in this Quality Manual.

The Superintendent ensures that each work task that uses the inspected materials proceed only after the material has been accepted by the material quality inspection or test if required.

Materials that are defective, deteriorated, damaged, or not approved are not used. The Superintendent clearly marks such materials for non-use or otherwise holds them aside.

5.7. CONTROLLED MATERIAL IDENTIFICATION AND TRACEABILITY

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

6. WELDING PROCEDURE SPECIFICATIONS AND PROCEDURES FOR QUALIFICATION RECORDS

APPLICABLE REGULATIONS, INDUSTRY, and COMPANY STANDARDS

6.1. WELDING PROCEDURE SPECIFICATIONS (WPS)

Welding procedure specifications 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*. Table 6.1 lists the codes or specifications to which welding procedure and procedure qualification will be certified.

[Edit the table below to include codes relevant to your scope of work (remove this text when done)]

Table 6.1

Welding Procedure Codes, Specifications and Standards	
AWS D1.1	Structural welding (steel)
AWS D1.2	Structural welding (aluminum)
AWS D1.3	Structural welding (sheet steel)
AWS D1.4	Structural welding (reinforcing steel)
AWS D1.6	Structural welding (stainless steel)
AWS D1.7	Structural welding (strengthening and repair)
AWS D1.9	Structural welding (titanium)
AWS D9.1	Sheet metal welding
AWS D10.18	Pipe welding (stainless steel)
AWS D11.2	Welding (cast iron)

When the governing AWS Welding Code(s) mandates that welding procedures be qualified by test, the [CompanyName] 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 a Certified Welding Inspector (CWI) reviews and approves the welding procedure before being used in production welding operations.

Revisions to 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.

The Quality Manager is responsible for selecting and assigning welding procedures. The Quality Manager or qualified designee shall ensure that welding procedures are listed on applicable shop fabrication drawings.

6.2. WELDER PERFORMANCE QUALIFICATIONS

For each project, the Quality Manager will determine welder certification requirements for codes and welding procedures.

6.2.1. CERTIFIED WELDER QUALIFICATION REQUIREMENTS

Only certified welders may perform welding activities. Welders must be certified and maintain a valid certification in accordance with the AWS Welder Certification Program and have completed the necessary tests in accordance with QC7, *Standard for AWS Certified Welders*.

The Quality Manager or a Certified Welding Inspector (CWI) will review and approve the welder and welding operator's qualification record for compliance with the necessary code(s) before they begin welding on a specific project.

6.2.2. RETESTING BASED ON QUALITY OF WORK

In addition to welder certification, welding personnel may be required to be retested based on the following criteria:

- An interview of the welder
- Increased visual inspection for a limited time period
- Observation of the welding, or a simplified weld test developed to evaluate the issue of concern
- Requalification in compliance with Clause 6 or Clause 10 for tubulars of the D1.1/D1.1 M code

6.2.3. RETESTING BASED ON QUALIFICATION EXPIRATION

If evidence cannot be supplied that shows a welder, welding operator, or tack welder has used the welding process within the last six months, he or she is not considered qualified to weld using that process without new qualification testing.

6.2.4. WELDER ID

Welders must stamp their welds with their unique welder ID stamp, which may be a number, letter or symbol. **[Edit this policy or remove if not relevant]**

6.3. FILLER METAL

The Quality Manager ensures that filler material use will conform to the specifications of the D1.1/D1.1 M code.

6.3.1. WELD FILLER MATERIAL (WFM) CONTROL PROGRAM

[CompanyName] has a Weld Filler Material Control Program in place that includes procurement, receipt, storage, issuance, and return of filler materials. The Quality Manager ensures that issuers, welders and procurement / receipt inspectors are trained on the WFM controls.

6.3.1.1. FILLER MATERIAL PROCUREMENT

7. INSPECTION AND NONDESTRUCTIVE TESTING

ASSURE COMPLIANCE

7.1. INSPECTION OF WELDING WORK

7.1.1. DIMENSIONAL INSPECTIONS – SIZE, LENGTH, AND LOCATION OF WELDS

A qualified welding inspector inspects all weld dimensions to ensure that the size, length, and location of all welds conform to the requirements of the D1.1/D1.1 M code and to the detail drawings; and that no unspecified welds have been added without the approval of the contract Engineer.

7.1.2. WELD INSPECTIONS

During the welding process, at suitable intervals, weld inspections are performed by a qualified welding inspector. Such inspections will be conducted, on a sampling basis, prior to assembly, during assembly, and during welding. The welding inspector will observe joint preparation, assembly practice, and the welding techniques, and performance of each welder, welding operator, and tack welder to ensure that the applicable requirements of the D1.1/D1.1 M code are met.

7.1.3. FINAL INSPECTIONS

After completion of the work, a certified welding inspector performs a final visual inspection of every weld to ensure that the requirements of the applicable sections of code are met. Other acceptance criteria, different from those described in the D1.1/D1.1 M code, may be used when approved by the Engineer on the contract.

Size and contour of welds will be measured with suitable gages. Visual inspection for cracks in welds and base metal and other discontinuities will be observed with the aid of a strong light, magnifiers, or such other devices as may be found helpful.

7.1.4. WELD INSPECTION AND TEST STATUS

The inspector identifies final acceptance or rejection of the work either by marking on the work or with other recording methods.

Final product acceptance inspection shall be indicated by permanent stamping or marking adjacent to the weld or must be unambiguously identified in the inspection report.

7.1.5. WELD INSPECTION RECORDS

The inspector shall make a record of the inspection which shall include the following information:

- Unique part identifier (serial number, shop order, or batch number)
- Drawing number and revision
- Procedure and applicable acceptance criteria
- Inspector identity and date of inspection
- Record of defect findings
- Nominal
- Actual
- Tolerance

The Inspector will record inspection results on the Visual Weld Inspection Report or other form if approved by the contract Engineer.

An example of the Visual Weld Inspection Report is included in section 12 Sample Forms at the end of this Manual.

7.1.6. WELD TEST RECORDS

Test result data will include as appropriate:

- Reference to the inspection and test plan item
- Description or title of the inspection activity
- Drawing identification number and version, if applicable
- Technical specification number and version, if applicable
- Location of the inspection activity
- Acceptance criteria
- Nonconformances
- Validation that nonconformances are corrected, re-inspected or retested, and confirmed to meet Quality Program requirements.
- Any open items to be completed at a later date.
- Inspector's name and signature indicating compliance with all requirements of the Quality Program
- Quality rating scores as appropriate
- Date of inspection or test
- Certificate, if applicable
- Conspicuous statement of final result as either "CONFORMS" or "DOES NOT CONFORM"

AWS Forms will be used for recording Magnetic Particle Examination, Radiographic Examination, and Reporting of UT Welds unless otherwise specified by the contract or contract Engineer.

7.1.7. WELD INSPECTION AND TEST ACCEPTANCE CRITERIA

Inspections assess conformance of materials or work for each welding task to project quality requirements, including applicable:

- D1.1/D1.1 M code standards for Visual Inspections
- D1.1/D1.1 M code standards for NDT, RT, and UT
- Contract technical specification
- Contract drawings
- Approved shop drawings
- Approved product submittals
- Approved allowances and unit prices
- Product identification requirements
- Approved submittals
- [CompanyName] quality standards

The material or completed welding task is accepted only when it meets all project quality requirements.

Inspection and test acceptance criteria may include but are not limited to those listed in Table 7.1.

Table 7.1

Reference Standard No.	Reference Standard Title
AWS B1.11	Guide for the Visual Examination of Welds
ASTM E 164	Standard Practice for Contact Ultrasonic Testing of Weldments
ASTM E 165	Standard Practice for Liquid Penetrant Examination for General Industry
ASTM E 709	Standard Guide for Magnetic Particle Testing
ASTM E 94.D	Standard Guide for Radiographic Examination
AWS D1.1/D1.1M	Structural Welding Code – Steel
AWS D1.3	Structural Welding Code - Sheet Steel

7.2. WELD INSPECTOR QUALIFICATIONS

[CompanyName] uses only qualified weld inspectors. If an AWS Certified Welding Inspector is not used, the Quality Manager will ensure that the weld inspector is qualified and certified in accordance with [CompanyName]'s written practice based on current ASNT (American Society for Nondestructive Testing) SNT-TC-1A (VT). The certification process will include the educational, training, experience and testing provisions described in SNT-TC-1A (VT).

The Quality Manager will ensure that inspectors are knowledgeable with the code(s) which applies to the fabrication work being performed.

7.3. NDE INSPECTOR QUALIFICATIONS

[CompanyName] uses only qualified NDE inspectors. The Quality Manager will ensure that Radiographic Interpreters are certified in accordance with AWS B5.15, *Specification for the Qualification of Radiographic Interpreters*. Alternatively, Radiographic Interpreters may be qualified and certified in accordance with [CompanyName]'s written practice based on ASNT SNT-TC-1A. The certification process will include the educational, training, experience, and testing provisions described in SNT-TC-1A. These requirements will also apply to personnel performing other NDE methods, (e.g. MT, PT, and UT).

7.4. NDE PROCEDURES

The Quality Manager ensures that NDE shall be performed in accordance written NDE procedures by a certified NDE inspector.

The NDE procedures shall be approved by a Level III in the NDE method(s) that the procedure is based on. The Level III shall be qualified and certified in accordance with the [CompanyName]'s written practice based on ASNT SNT-TC-1A: *Personnel Qualification and Certification in Nondestructive Testing*. The certification process shall include the educational, training, experience, and testing provisions described in SNT-TC-1A.

The Quality Manager ensures that NDE test procedures will be issued, revised and distributed according the Documents and Record control procedures described in the Document Controls section of this Quality Manual.

7.4.1. NDE SUBCONTRACTOR

9. MEASURING AND TESTING EQUIPMENT

9.1. CALIBRATION

[CompanyName] uses measuring and testing equipment in its fabrication process to measure dimensions and perform flaw detection on sheet, tube, or pipe.

Prior to the start of every project, the Quality Manager evaluates the project 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.
- National measurement standard
- Calibration procedure requirements including the calibration technique, frequency of calibration or conditions when recalibration is required.

The Quality Manager ensures that measuring and test equipment is controlled, calibrated, and maintained. Calibration will be performed by qualified welding personnel using a written calibration procedure.

The Quality Manager ensures that all calibration procedures are traceable to national measurement standards.

A list of measuring and test equipment that [CompanyName] uses to control fabrication quality is included on Table 9.1 including reference to a written calibration procedure and the national measurement standards it complies with. **[Complete table 9.1 below and then remove this text]**

Table 9.1

Measuring and Test Equipment	Calibration Procedure #	National Measurement Standard

9.2. VERIFICATION AND VALIDATION OF WELDING MACHINES

At least annually, The Quality Manager ensures that welding machines are verified as specified by the manufacturer. At a minimum, the following will be checked:

- Condition of volt meters, amp meters and gas flow meters (if equipped)
- Condition of cables
- Condition of hoses (if equipped)
- Condition of wire feeders (if equipped)

9.3. CALIBRATION IDENTIFICATION

The Quality Manager ensures that a calibration identification label or tag is securely fixed to each piece of measuring and test equipment that will be controlled, calibrated and maintained. The label or tag will indicate the date of the last calibration and the due date of the next calibration.

The Quality Manager ensures that the information on the calibration identification label or tag matches the information on the Test Equipment Calibration Plan and Log form.

A sample Test Equipment Calibration Plan and Log form is included in section 12 Sample Forms at the end of this Manual.

9.4. CALIBRATION RECORDS

A record of all measuring and test equipment that will be controlled, calibrated, and maintained is listed on the Test Equipment Calibration Plan and Log included as an exhibit in the Sample Forms section of this Manual.

The Test Equipment Calibration Plan and Log includes the following information:

- Type of equipment
- Serial number
- Calibration frequency
- Calibration tolerance
- Date calibrated
- Next calibration due date
- Standard used

Calibration records will be controlled and maintained in accordance with the Document Control procedures in section 4 Document Control in this Manual.

[CompanyName] Test Equipment Calibration Plan and Log						
Type of measuring device	Device Serial Number	Calibration Type and Frequency	Calibration Tolerance	Calibrated By/ Calibration Date	Standard Used	Next Calibration Due Date

Selected Pages

Questions? Call First Time Quality 410-451-8006

[CompanyName] Visual Weld Inspection Report					
Report ID #	Unique Part ID (Serial #, Shop order, or batch number)	Project ID	Project Name	Drawing # & Rev.	Date of Inspection
Procedure and Acceptance Criteria / Ref#	Inspection Result Pass/Fail	Nominal	Actual	Tolerance	Comments
Final acceptance of completed work (sign and date)					
Inspector Sign and Date			Superintendent Sign and Date		

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)



For More Information:

Contact: First Time Quality

410-451-8006

edc@firsttimequality.com