SECTION 01 4444

OFFSITE WELDING & JOINING REQUIREMENTS

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Template available online at <http://engstandards.lanl.gov/specs.shtml>

In Word, USE TOOLS-OPTIONS-VIEW-HIDDEN TEXT TO SEE blue Authors notes

**This Section includes administrative and procedural requirements for offsite welding activities. This specification is designed to be used in conjunction with other LANL specifications that invoke project specific requirements as well as applicable codes & standards for welding.**

This template must be edited for each project.  In doing so, specifier must add job-specific requirements.  Brackets are used in the text to indicate designer choices or locations where text must be supplied by the designer.  Once the choice is made or text supplied, remove the brackets. The specifications must also be edited to delete specification requirements for processes, items, or designs that are not included in the project -- and specifier’s notes such as these.   To seek a variance from requirements in the specifications that are applicable, contact the Engineering Standards Manual (ESM) Welding [POC](http://engstandards.lanl.gov/ESM_Chapters.shtml#esm13). Please contact POC with suggestions for improvement as well.

When assembling a specification package, include applicable specifications from all Divisions, especially Division 1, General requirements.

Specification suitable for ML-1 through ML-4 projects.
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Verify that Section titles referenced in this Section are correct for this Project's Specifications; Section titles may have changed.

1. GENERAL
	* + 1. SUMMARY
				1. This Section includes requirements for offsite welding and joining as required by other sections of the Specification (e.g., items or assemblies fabricated specifically for LANL). This Section is not applicable to manufactured commercial items (“off-the-shelf”) where welding requirements are not subject to LANL approval, nor does it apply to mechanical joints (e.g., threaded, bolted or clamped).
				2. Pressure-retaining, code-stamped items shall only be welded on by organizations with the applicable ASME or National Board Certificate(s) of Authorization. Certificate holders are organizations that have been authorized by the ASME or The National Board to perform various activities in accordance with the requirements of the ASME Boiler and Pressure Vessel Code or The National Board.
				3. Onsite welding shall be in accordance with LANL Welding Program (ESM Chapter 13), Section 01 4455 for onsite welding, and applicable codes.
				4. The LANL Welding Program and General Welding Standards (GWSs) referenced are available here: <http://engstandards.lanl.gov/ESM_Chapters.shtml#esm13>
			2. SUBMITTALS
				1. The following documents shall be submitted and approved by LANL WPA prior to the start of welding:

Welding/Brazing/Bonding Procedure Specifications with the associated Procedure Qualification Records (PQRs)

Welder/Brazer/Bonder Performance Qualification Records

Weld Filler Material Control Procedure

Filler Material – Certified Material Test Reports

Heat Treatment Procedures (where applicable)

Inspector qualification records

Inspection Procedures

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Delete Design article if design is provided by LANL. When all welding is to a code, delete second half of design article regarding non-code equivalent work.

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* + - 1. Design - Design of welded Structures, Systems and Components (SSC) shall meet the requirements of LANL ESM and or as a minimum identify applicable codes and standards including requirements of graded application. For welding activities that would normally fall outside the defined scope of specified national consensus codes and standards for fabrication and welding, such codes and standards shall be adopted and used to the extent possible

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*Note- Numerous codes & standards define graded approaches which specify multiple levels of welding requirements. Designs which specify the codes & standards listed below shall also specify service or category and applicable welding requirements these codes identify:*

* + - * *ANSI B31.1 – Material, Temperature & Pressure*
			* *ANSI B31.3 – Service Categories, D, Normal, M, & High Pressure*
			* *ANSI B31.5 – Safety Group A3 & B3*
			* *49 CFR Part 192 -- Class, location*
			* *AWS D1.1 – Static, Cyclic, and Tubular Structures*
			* *AWS D1.6 – Static, Cyclic*

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* + - * 1. Engineering drawings shall specify all fillet weld sizes and partial penetration weld sizes.
				2. Shop drawings shall show weld symbols and requirements to define the work and enable design review and inspection this shall include fillet weld sizes and partial penetration weld sizes.
				3. Applications that are not similar in materials or processes to a specified Code or Standard shall define and produce the following:

Design basis; i.e., mechanical properties, part geometry, acceptance criteria.

A method to verify that the welding procedure can produce acceptable welds

A method to demonstrate that the welder has the skill to produce sound welds in accordance with the specified welding procedure (reference LANL GWS 1-02, *Administrative Control of Welding and Brazing*, *para 5.3.B*)

Identify methods and perform inspections, required to judge welds against predetermined acceptance criteria.

Provide documentation that these objectives have been defined and identified.

* + - 1. Qualified Procedures - Welding shall be performed in accordance with properly qualified and approved welding procedure specifications (WPS) that have been qualified in accordance with applicable codes and standards:
				1. AWS/ANSI Standard Welding Procedure Specifications and documented prequalified welding procedures may be used as allowed by applicable codes and standards.
				2. WPSs used on structures, systems and components (SSC) which are designated ML‑1, ML-2, safety class, or safety significant shall be approved by LANL Welding Program Administrator prior to welding.
			2. Joining (solvent bonding, adhesive, and electro-fusion joints): When required by consensus codes and standards (e.g., ASME B31.3 & 49 CFR Part 192), joining shall be done by qualified personnel following approved procedures.
			3. Certified Personnel - Welding and brazing shall be performed by certified welders and brazers who have demonstrated their welding brazing qualifications by test.
			4. Control of Consumables - Consumable welding materials shall be properly procured, received, stored, controlled, and issued to ensure weld quality and prevent use by unqualified personnel (reference LANL GWS 1-03).
				1. For structures, systems and components (SSC) which are designated ML-1, ML-2, safety class or safety significant welding consumables shall be provided with Certified Material Test Reports (CMTRs) traceable by heat/lot # to the point of use.

CMTRs shall meet the requirements of LANL Welding Program [1-03, Welding & Brazing Material Procurement & Control](http://www.lanl.gov/orgs/eng/engstandards/ESM_Chapters.shtml#esm13). Attachment 5, Filler Material Procurement, Table 1, Sch.I, Required Tests. Filler material inspection records shall be submitted and accepted prior to start of affected work.

* + - 1. Welding inspection - shall be performed by qualified personnel in accordance with applicable consensus codes and standards, and as specified in design drawings and/or specifications in the absence of applicable codes and standards.

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*Caution - Numerous codes & standards define two levels of inspection. Designs which specify the codes & standards listed in GWS 1-02 Attachment 4 (link below) are subject to two levels of inspection:* [*http://engstandards.lanl.gov/esm/welding/vol1/GWS%201-02-Att-4R0.pdf*](http://engstandards.lanl.gov/esm/welding/vol1/GWS%201-02-Att-4R0.pdf)

*Construction or fabrications which are designed to these codes shall be coordinated between the subcontractor/fabricator and LANL Inspection Manager for the required OWNER Inspection of in-process and final welding inspections.*

*Note: LANL Inspection Manager may assign LANL to perform both construction/fabrication & owners inspections.*

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* + - * 1. Inspector Qualification/Certification – When inspectors are required to be qualified/certified by the referenced code & standard, submit qualification/certification records for

Visual Inspectors (for welding & bonding)

NDE Inspectors

* + - * 1. Welding Inspections required by consensus codes and standards or design shall be documented. Welding Inspection Reports shall identify at least the following:

Method, Type and extent of Inspection or test

Acceptance/rejection as based on the criteria specified by the design documents

Code or Standard used for acceptance and class, category, or service

Record attributes inspected and severity

Identification and location of welds inspected

MT&E – Identification and date of calibration expiration for measuring and test equipment used

Name, ~~&~~ Date & signature of person who performed the inspection

Inspector’s qualification level

* + - * 1. Inspection Procedures - When inspection procedures are required by the referenced code & standard submit inspection procedures

NDE Procedure Qualification Records - When inspection procedures are required to be qualified by the referenced code & standard submit procedure qualification records

* + - * 1. Inspection results, including weld maps, shall be documented and provided within one day after completion of associated inspection work.
				2. When applicable codes and standards specify two levels of inspection, the qualification of the owners inspector and inspections will be done by LANL as specified in ESM, Chapter 13, Volume 1, GWS 1-02 Para. 5.9 see: <http://engstandards.lanl.gov/esm/welding/vol1/GWS%201-02_Procedure-R6.pdf>
				3. LANL reserves the right of access to all welding locations and to have its own qualified inspectors and personnel present during all welding activities.

At least five working days notice is required prior to inspection & testing activities planned by the fabricator so that LANL can arrange for its staff’s participation.

Hold Points may be identified in the construction/fabrication schedule to allow for LANL’s inspection activities.

* + - 1. Subcontracted Welding
				1. Subcontracted welding activities shall have all specifications and drawing and their applicable requirements flowed down to any sub tier subcontractors who perform those activities.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

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Do not delete the following reference information:

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THE FOLLOWING REFERENCE IS FOR LANL USE ONLY

This project specification is based on LANL Master Specification 01 4444 Rev. 1, dated October 15, 2015.