



Course Information

Instructor	Zachary Reddig
Phone	w:(406)243-7644
Email	Zachary.reddig@umontana.edu
Credits	4
Campus	Missoula College

Prerequisites

WLDG 180 SMAW, WLDG 117 Blueprint Reading and Welding Symbols; Corequisite: WLDG 215 Gas Tungsten Arc Welding

Description

Emphasis on skill development in welding of pipe sections to extremely high quality levels as required by national codes and standards. Pipe welding using SMAW E6010 root pass and SMAW E7018 fill and cover. Another setup is for GTAW root pass and SMAW E7018 for the remaining passes in all positions. Visual inspection and destructive testing used to evaluate work according to industry standards.

Relationship to Program(s)

Provides theory of fit-up and welding technique with skill development using two welding processes that are primary in the welding of pipe. This experience complements the other welding activities taught in the program to attain a solid, broad based understanding of welding as an industrial metals joining process.

Student Performance Outcomes

Upon completion of this course, the student will be able to:

1. Use E6010 electrodes to weld root pass on 3/8" plate and pipe that meets visual and destructive testing as provided in **American Welding Society (AWS), D1.1 Structural Welding Code-Steel**
2. Use E7018 electrodes weld fill and cover passes on 3/8" plate and pipe that meet visual and destructive testing as provided in **American Welding Society (AWS), D1.1 Structural Welding Code-Steel**
3. Demonstrate correct preparation and fit-up of pipe sections using specifications provided in **American Welding Society (AWS), D1.1 Structural Welding Code-Steel**
4. Demonstrate an understanding of the technical knowledge related to successful welding of pipe to a code or standard by scoring a 70% or better on a written exam covering this material
5. Demonstrate the successful welding of 5" or 6" schedule 80 pipe in 2G position (pipe axis is vertical), the 5G position (pipe axis is horizontal), and the 6G position (pipe axis is at a 45° angle) using a E6010 root and E7018 fill/cover passes
6. Demonstrate the successful welding of 3" or 4" schedule 80 pipe in the 2G position (pipe axis is vertical), the 5G position (pipe axis is horizontal), and the 6G position (pipe axis is at a 45° angle) using a E6010 root and E7018 fill/cover passes
7. Students will be able to successfully execute and pass a 2G or 3G limited thickness plate certification test to **ASW D1.1 Structural Welding Code-Steel**





Textbooks

Welding Principles and Practices, 4th Edition; Sachs and Bohnart, McGraw Hill.

Shielded Metal Pipe Welding – Uphill; Author: Hobart School of Welding Tech.; Publisher: Hobart School of Welding Tech

Suggested Reference Materials: The Welding Journal, published monthly by the American Welding Society

Student Performance Assessment Methods and Grading Procedures

Grading Scale

A = 100% - 90%

B = 89% - 80%

C = 79% - 70%

D = 69% - 60%

F = 59% - 0%

Grade Breakdown

Lab Work	50%
Exams	30%
Quizzes	10%
Notebook	5%
Professionalism	5%

Exams and Assignments

Practical Welding Tests: Hands-on welding tests based on lab assignments. Upon successful completion of lab assignments a hands on welding test derived from written specifications and graphics (drawings) will be administered. It will be graded based upon execution i.e. fit-up, weld profile, workmanship, etc. as prescribed by AWS standards and the instructions given at the time of the test. **All students have a chance to be certified to a 2G or 3G limited thickness test as to AWS D1.1-Structural Welding Code-Steel.**

Written Exams: Exams based on class lectures, reading assignments given in class, homework, notes from class video presentations, etc. **No make-up exams will be allowed.**

Quizzes: Short impromptu tests given on reading assignments, demonstrations, lectures. Composed of student name/date and three questions. Name and date are worth 25%. Each question is worth 25%. To receive credit for questions the question must be written out and answered correctly. Quizzes may be given at anytime during the course scheduled meeting time. **No make-up quizzes will be allowed.**





Notebook: Compilation of class notes and handouts. To receive the full 5% credit, the notebook must be neat and organized. It must also be contained or be found contiguous within a three ring binder.

Professionalism: Defined as a combination of attitude, motivation, participation, organization and work area cleanliness as demonstrated on a daily basis in the lab and classroom.

Safety

Safety is required to be practiced at all times. Disregarding safety practices, endangering yourself or others may result in your being denied access to the lab areas

Eye protection is mandatory at all times in the lab area.

Required Supplies

1. Welding Helmet with #10 or #11 Lens
2. Welding Gloves
3. Eye Protection
4. Pliers with wire-cutting capabilities
5. Full size "pipe" hand brush (has tapered grouping of bristles)
6. 4" or 4 ½" right angle handheld grinder
7. Upper body protection, leathers, coveralls, or equivalent
8. Lock for Locker

Academic Integrity

All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. All students need to be familiar with the Student Conduct Code. The Code is available for review online at <http://www.umt.edu/SA/VPSA/index.cfm/page/1321>.

Disability Accommodations Policy

Students with disabilities may request reasonable modifications by contacting me. The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and Disability Services for Students. "Reasonable" means the University permits no fundamental alterations of academic standards or retroactive modifications.





Course Outline

1. Typical fit-up for welded pipe
2. Welding codes as they apply to welded pipe
3. SMAW of welded pipe–technique
4. GTAW of welded pipe–technique
5. Techniques use to evaluate welded pipe
 - a. Visual inspection
 - b. Destructive testing
 - c. Non-destructive evaluation
6. Practical welding experience of pipe
 - a. Plate
 - b. Pipe 2G, E6010 root, E7018 fill/cover
 - c. Pipe 5G, E6010 root, E7018 fill/cover
 - d. Pipe 6G, E6010 root, E7018 fill/cover
 - e. Pipe 2G, GTAW root, E7018 fill/cover
 - f. Pipe 5G, GTAW root, E7018 fill/cover
7. Students will be able to take and pass a welding qualification test as to code procedure set from American Welding Society – D1.1 Structural Welding Code-Steel. This test will certify them to a determined process on carbon steel from prequalified variables.

