

SYLLABUS WELD 110 Thru 250 (Clustered)

(Effective April 2012)

16 Credits

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COURSE DESCRIPTIONS and LEARNING OUTCOMES

Weld 110, Beginning Welding 16 credits *Prerequisites: Placement in ENGL 060, READ 080, a grade of "B" or better in MATH 060 or placement in MATH 100 or BMCT score of 38 or higher, and instructor permission.* 8 lecture hours, 16 lab hours. Vocational program course. May be used as a general elective in the AA degree. A lecture-lab course to provide an introduction to safe industrial work practices, work ethics, oxy-fuel cutting, and common manual and semi-automatic welding processes.

To meet the course standards and demonstrate the ability to meet the outcomes expectation of this course (A4-Competency in the Discipline, B2-Literacy, C2-Critical Thinking, D4-Social and Personal Responsibility, and E1-Information Use), the welder will:

- Demonstrate social and personal responsibility necessary for success in the workplace. (D)
- Demonstrate ability to comply with organizational rules and policies. (D)
- Demonstrate safe work habits and safety awareness. (A, C, D)
- Access technical data from reference publications and charts. (A, B, E)
- Troubleshoot and fix machinery that is incorrectly configured. (A, C)
- Measure accurately with a tape and scale. (A, B)
- Add, subtract, multiply, and divide numbers in feet, inches, and fractions of an inch. (A, B)
- Safely set up and operate common manual and semi automatic welding and cutting equipment. (A, C, E)
- Apply fillet and groove welds with backing. (A)

Weld 120, Intermediate Welding 16 credits *Prerequisites: Placement in ENGL 060, READ 080, a grade of "B" or better in MATH 060 or placement in MATH 100 or BMCT score of 38 or higher, and instructor permission.* 8 lecture hours, 16 lab hours. Vocational program course. May be used as a general elective in the AA degree. A lecture-lab course to build upon skills learned in Weld 110. The course promotes work habits and safe work practices. Training increases skills with oxy-fuel cutting and common manual and semi automatic welding processes.

To meet the course standards and demonstrate the ability to meet the outcomes expectation of this course (A4-Competency in the Discipline, B2-Literacy, C2-Critical Thinking, D4-Social and Personal Responsibility, and E1-Information Use), the welder will:

Demonstrate social and personal responsibility necessary for success in the workplace. (D)
Demonstrate ability to comply with organizational rules and policies. (D)
Demonstrate safe work habits and safety awareness. (A, C, D)
Access technical data from reference publications and charts. (A, B, E)
Troubleshoot and fix machinery that is incorrectly configured. (A, C)
Measure accurately with a tape and scale. (A, B)
Add, subtract, multiply, and divide numbers in feet, inches, and fractions of an inch.
(A, B)
Safely set up and operate common manual and semi automatic welding and cutting equipment.
(A, C, E)
Select, prepare, and apply V and Bevel groove welds with and without backing, and with and
without back gouging, in position. (A)

Weld 130, Advanced Welding 16 credits *Prerequisites: Placement in ENGL 060, READ 080, a grade of "B" or better in MATH 060 or placement in MATH 100 or BMCT score of 38 or higher, and instructor permission.* 8 lecture hours, 16 lab hours. Vocational program course. May be used as a general elective in the AA degree. A lecture-lab course to build upon skills learned in Weld 120. Work habits and safety are emphasized. Advanced joint configurations are cut, fit, and welded in all positions with common manual and semi automatic cutting and welding processes.

To meet the course standards and demonstrate the ability to meet the outcomes expectation of this course (A4-Competency in the Discipline, B2-Literacy, C2-Critical Thinking, D4-Social and Personal Responsibility, and E1-Information Use), the welder will:

Demonstrate social and personal responsibility necessary for success in the workplace. (D)
Demonstrate ability to comply with organizational rules and policies. (D)
Demonstrate safe work habits and safety awareness. (A, C, D)
Access technical data from reference publications and charts. (A, B, E)
Troubleshoot and fix machinery that is incorrectly configured. (A, C)
Measure accurately with a tape and scale. (A, B)
Add, subtract, multiply, and divide numbers in feet, inches, and fractions of an inch.
(A, B)
Safely set up and operate common manual and semi automatic welding and cutting equipment.
(A, C, E)
Select, prepare and apply V, Bevel, and U groove joints with and without backing, and with and
without back gouging, out of position. (A)

Weld 240, Pipe Welding 16 credits *Prerequisites: Placement in ENGL 060, READ 080, a grade of "B" or better in MATH 060 or placement in MATH 100 or BMCT score of 38 or higher, and instructor permission.* 8 lecture hours, 16 lab hours. Vocational program course. May be used as a general elective in the AA degree. A lecture-lab course to build upon skills learned in Weld 110 through Weld 130. Pipe is stick and TIG welded in all positions.

To meet the course standards and demonstrate the ability to meet the outcomes expectation of this course (A4-Competency in the Discipline, B2-Literacy, C2-Critical Thinking, D4-Social and Personal Responsibility, and E1-Information Use), the welder will:

Demonstrate social and personal responsibility necessary for success in the workplace. (D)
Demonstrate ability to comply with organizational rules and policies. (D)

Demonstrate safe work habits and safety awareness. (A, C, D)
Access technical data from reference publications and charts. (A, B, E)
Troubleshoot and fix machinery that is incorrectly configured. (A, C)
Measure accurately with a tape and scale. (A, B)
Add, subtract, multiply, and divide numbers in feet, inches, and fractions of an inch.
(A, B)
Safely set up and operate common manual and semi automatic welding and cutting equipment.
(A, C, E)
Perform basic fit-up of pipe butt joints. (A)
Weld steel pipe in all positions. (A)

Weld 245, Fabrication 16 credits *Prerequisites: Placement in ENGL 060, READ 080, a grade of "B" or better in MATH 060 or placement in MATH 100 or BMCT score of 38 or higher, and instructor permission.* 8 lecture hours, 16 lab hours. Vocational program course. May be used as a general elective in the AA degree. A lecture-lab course to build upon skills learned in Weld 100 through Weld 130. Course covers basic layout and fitting. Welder will be assigned projects to design, draw, and build.

To meet the course standards and demonstrate the ability to meet the outcomes expectation of this course (A4-Competency in the Discipline, B2-Literacy, C2-Critical Thinking, D4-Social and Personal Responsibility, and E1-Information Use), the welder will:

Demonstrate social and personal responsibility necessary for success in the workplace. (D)
Demonstrate ability to comply with organizational rules and policies. (D)
Demonstrate safe work habits and safety awareness. (A, C, D)
Access technical data from reference publications and charts. (A, B, E)
Troubleshoot and fix machinery that is incorrectly configured. (A, C)
Measure accurately with a tape and scale. (A, B)
Add, subtract, multiply, and divide numbers in feet, inches, and fractions of an inch.
(A, B)
Safely set up and operate common manual and semi automatic welding and cutting equipment.
(A, C, E)
Perform basic layout and fitting techniques. (A)
Build a project following a shop drawing or basic blueprint. (A)
Demonstrate prior planning, workmanship, and attention to detail. (A)

(Weld 248 effective Summer Quarter 2012)

Weld 248, Code Welding 16 credits *Prerequisites: Placement in ENGL 060, READ 080, a grade of "B" or better in MATH 060 or placement in MATH 100 or BMCT score of 38 or higher, and instructor permission.* 8 lecture hours, 16 lab hours. Vocational program course. May be used as a general elective in the AA degree. A lecture-lab course to build upon skills learned in Weld 110 through Weld 245. Course emphasizes code quality fillet welding in all positions with restricted access, and practice for certification testing.

To meet the course standards and demonstrate the ability to meet the outcomes expectation of this course (A4-Competency in the Discipline, B2-Literacy, C2-Critical Thinking, D4-Social and Personal Responsibility, and E1-Information Use), the welder will:

Demonstrate social and personal responsibility necessary for success in the workplace. (D)
Demonstrate ability to comply with organizational rules and policies. (D)

Demonstrate safe work habits and safety awareness. (A, C, D)
Access technical data from reference publications and charts. (A, B, E)
Troubleshoot and fix machinery that is incorrectly configured. (A, C)
Measure accurately with a tape and scale. (A, B)
Add, subtract, multiply, and divide numbers in feet, inches, and fractions of an inch.
(A, B)
Safely set up and operate common manual and semi automatic welding and cutting equipment.
(A, C, E)
Apply fillet welds to code standards in all positions on plate, structural shapes, and pipe. (A)
Prepare specimens for destructive testing. (A)
Visually examine and evaluate welds to acceptance criteria. (A)

Weld 250, Certification 16 credits *Prerequisites: Placement in ENGL 060, READ 080, a grade of "B" or better in MATH 060 or placement in MATH 100 or BMCT score of 38 or higher, and instructor permission.* 8 lecture hours, 16 lab hours. Vocational program course. May be used as a general elective in the AA degree. A lecture-lab course to build upon skills learned in Weld 110 through Weld 245. Course covers selected industry certification test requirements, procedures, and acceptance standards. Successful welders will practice and pass selected certification tests. Testing fees apply for each certification test. Course includes a capstone exam to ensure retention of competency in previous Welding Technology program course topics.

To meet the course standards and demonstrate the ability to meet the outcomes expectation of this course (A4-Competency in the Discipline, B2-Literacy, C2-Critical Thinking, D4-Social and Personal Responsibility, and E1-Information Use), the welder will:

Demonstrate social and personal responsibility necessary for success in the workplace. (D)
Demonstrate ability to comply with organizational rules and policies. (D)
Demonstrate safe work habits and safety awareness. (A, C, D)
Access technical data from reference publications and charts. (A, B, E)
Troubleshoot and fix machinery that is incorrectly configured. (A, C)
Measure accurately with a tape and scale. (A, B)
Add, subtract, multiply, and divide numbers in feet, inches, and fractions of an inch.
(A, B)
Safely set up and operate common manual and semi automatic welding and cutting equipment.
(A, C, E)
Weld to industry standards in all positions on structural plate and pipe. (A)
Prepare specimens for destructive testing. (A)
Visually examine and evaluate welds to written acceptance criteria. (A)
Demonstrate mastery and retention of skills and knowledge from Weld 100 through 248. (A)

COURSE RESOURCES - TEXTBOOKS AND OTHER INSTRUCTIONAL MATERIALS

The texts are Welding Principles and Practices, latest edition, by Sacks and Bohnart, and WABO Standard 27-13 (on line), by Washington Association of Building Officials.

See tool list for other instructional materials required.

ACADEMIC INTEGRITY

All forms of cheating, falsification, and plagiarism are against the rules of this course and of Grays Harbor College. Students who are unsure what constitutes academic dishonesty

are responsible for asking the instructor for clarification. Instances of intentional academic dishonesty will be dealt with severely.

DISABILITIES

Students who have documented disabilities that require accommodations in compliance with the Americans with Disabilities Act should contact the Disability Support Services coordinator as well as the instructor of the course in order to ensure that together we create an optimal environment for educational achievement.

TEACHING / LEARNING METHODS

The methods of instruction are lecture, discussion, classroom exercises, written homework, demonstrations, and lab work. Lab work is emphasized with one-on-one instruction when possible.

GRADING SYSTEM

To earn any letter grade below, you must accomplish both of the minimum requirements listed directly below each letter. For example a “B” would require at least 90% for Work Habits and at least a “B” qualification based on the specific course assignment list. When different, Work Habits and Welding Assignments grades are NOT averaged. ***The lower of the two letter grades earned is the overall grade earned.***

Pluses and minuses are not used for grades “C” and above. The minimum requirements listed are for whole grades. Any decimals are dropped from point scores - scores are not rounded up. Final grade computed will be lowered by one full letter if absent on the last day of class (shop clean up day). Grade will also be lowered by one full letter if you accept a local scholarship and fail to attend the donor recognition ceremony in the spring.

WELD 110 – 250 MINIMUM REQUIREMENTS FOR GRADE OF:

	A	B	C	D
Work Habits points	94%	90%	85%	80%
Welding and Other Assignments / Requirements	See specific course assignment list.			

WORK HABITS

Attendance, punctuality, and other appropriate work habits are critically important for success on the job. Industry is demanding and so are the standards of this welding program. You are expected to be here everyday, on time, clean, fed, wide awake, thinking about welding, and with neatly and correctly completed homework ready for turn in. You will need to bring a pen, notebook, the “Grey Book”, the calculator listed on the tool list, and this handout with you into the classroom each day. You will not normally need to bring your text books – if they will be needed you will be told so in advance. You are to keep safety first, treat the equipment well, and be conscientious of the other welders.

Efficient use of time is vital. The Welding Assignment Lists are designed to require effective time management for successful completion. Just like on the job, you can expect to have to plan out your tasks and periodically work on two or more connections simultaneously to avoid unnecessary delays waiting for hot metal to cool, or for shared equipment. Welders will progress through the shop assignments at different rates. If you need to put in extra time to be successful, then putting in additional time during Friday afternoon “office hours” is what you need to do. The time to start is immediately.

This is a fulltime training program. The main goal is to build technical and workplace skills. The quantity and skill level requirements of the welding assignments and homework, combined with the strict enforcement of work habits standards, grading criteria, and shop rules, is intended to maximize your likelihood of success in the industry. Focus, a “can-do” attitude, and prioritization of your education is both expected and necessary in order to be successful.

ATTENDANCE POLICY

Attendance is graded. There are no excused absences. Lost points cannot be made up except in the case of Parley.

Parley may be requested twice during the time you are in the welding program... not per quarter, but during the entire time you are in the program. If you request Parley you may make up the time missed for an absence or for multiple *consecutive* absences. A request for make up under Parley can only be made on the day of your return, and you can't change your mind or “un-request” it later. The time must be made up immediately and consecutively upon your return. Available make up time is limited, and make up can only be done during the quarter in which the time was missed.

As a second option, a Parley can be cashed in at any time for 5 points, no make-up time necessary. Parley or not, if more than 10 regular class days are missed in a quarter the highest grade you can earn is a “D” and you must repeat the course to continue in the program.

Regardless, for each day you are going to be absent, you need to call in and leave a message on the shop answering machine by 7:00 AM. You will then score 0 points for the day. An absence without a call in by 7:00 AM will score a -5 for the day. The additional 5 points lost for failing to call in 30 minutes early cannot be made up under any circumstance.

Please ask a friend or family member to call in and communicate any emergency immediately in the event you become incapacitated.

If a problem arises that causes you to miss enough class to do poorly in the course you must obtain an official withdrawal through admissions to avoid a “D” or “F” on your transcript.

TARDINESS / LEAVING EARLY

Arriving late or leaving early will result in the loss of 3 daily points.

Arriving 1 hour or more late, or leaving 1 hour or more early will result in the loss of 5 daily points. Whatever the case, notify Rod or Terry as soon as you arrive or immediately before you leave.

HOME WORK

Reading and Written Assignments

In order to receive credit, written assignments will be word processed, 12 font, double spaced, 1 ¼" margins, and in the case of narrative assignments be at least 14 lines in length. Provided questions will be included on the answer sheet.

Written assignments will be collected and checked for completion daily. They will also be spot checked for technical correctness and quality of writing. They will be thoroughly evaluated during the quarter at random times. Reading assignments must be read and questions must be answered with due diligence to receive full credit. Due diligence means that thorough and specific answers or information is provided *based on the content of the assigned reading section(s)*. Assignments that contain technically incorrect answers or that lack due diligence will lose 1 - 3 points for the day. Correct, neat, and legible assignments that are not word processed will lose 1 point for the day. Sloppy work or work that is hard for Tricia or me to read will not be accepted.

Summaries and narratives will not include any copying, quoting, or citing of the text. Their entire content is to be in your own words.

Math Assignments

For math assignments the heading (described below), problem numbers, and answers will be word processed. Correct assignments that are not word processed will lose 1 point for the day. Work will be done by pen or pencil, neatly, and will be easily legible. Each problem number will be circled, and the work will be stapled behind the word processed list of answers. If your work is missing or it doesn't show how you got to your answers you will not receive credit for the assignment. All assignments must be completed entirely to receive credit. You will be allowed a maximum of one typo correction on your answer sheet provided your work clearly shows how you computed the correct answer. Completed math assignments will be scored as follows:

<90% correct = -1 daily point, <80% = -2, <70% = -3

All Homework Assignments

Homework assignments will have a 3 line heading in the upper left corner which includes your name, the due date of the assignment, and the assignment number (as well as pages covered for text book assignments). Homework assignments will not be typed out or printed on welding program equipment on the day that they are due.

You are highly encouraged to do the assignments before leaving campus, and also to compare answers with the other welders the day before they are due. An OK to compare

answers is not an OK to copy, cheat, or provide answers. In all cases you must do your own work. Copying answers, copy / pasting text, emailing or providing answers for someone else, or otherwise cheating or facilitating cheating by someone else will result in a minimum penalty of the loss of a full letter grade for all involved. Maximum penalty is an “F” and expulsion. You are responsible for doing your own work and also for protecting it from plagiarism by somebody else. Please help your classmates if you can, but don’t let someone take advantage of you and ruin your grade.

Homework is due when class begins. Any homework assignment not completed on time will result in the loss of 3 daily points *per day* until such time it is turned in. Completed assignments that contain excessive writing mistakes, wrong answers, or other errors may or may not lose points, as outlined above. Those points cannot be earned back. However those assignments may still be returned one or more times for a “redo”. “Redos” must be turned in the next day or 3 (more) points will be lost. Staple the original assignment to the back of the redo.

In case of an absence, it is your responsibility to find out what homework assignments were given. All homework that is or was required of the rest of the class will also be due from you the day you return. Therefore it is highly recommended that you exchange phone numbers with a few of the other welders in the class.

TESTS

Grey books will not be opened in or around the weld building on test days prior to the test.

First quarter welders: <80% correct = -1 daily point, <70% = -2, <60% = -3

2nd – 6th quarter welders: <100% = -1, <90% = -2, <80% = -3, <70% = -4, <60 = -5

WORK HABITS POINT SHEET

Work Habits Point Sheet will be filled out completely and correctly each day. Errors and/or omissions can cost 1 point per daily occurrence. If you aren't sure about how to fill it out correctly on a given day, it is your responsibility to ask. Please be sure to fill out the "Extra Hours" column as appropriate.

HONOR CODE

GHC welders will not lie, cheat, steal, or tolerate those who do. If you are caught, expect consequences up to an "F" grade in the course. You may also lose registration priority for any future welding courses. Additionally, you may be barred from attending the remainder of the quarter.

Some sample violations follow: welding over a bad root pass on a certification test and claiming the second weld is the root pass, reorienting or rotating a piece from its required position, claiming someone else's weld or work as your own, falsely denying the use of drugs or alcohol, or withholding firsthand knowledge of someone else lying, cheating, or stealing.

INCLEMENT WEATHER

The college President may cancel early morning classes, or delay the opening of the college due to weather conditions. If main campus classes start or resume during the time period our classes are normally in session, our classes will start at that same time.

PROJECTS

All projects are assigned – see assignment lists.

A TEAM

Welders earning 3 consecutive "A's" in the 16 credit core welding courses will be inducted into the A Team. A Team members will be awarded the coveted brown hat and be included in the annual spring A Team photo.

LETTERS OF RECOMMENDATION

Letters of recommendation will be provided for high performing students seeking scholarships from the AWS. Letters will not be provided for on-campus scholarships. Completing welders who have behaved honorably, demonstrated appropriate mental toughness and professionalism, and who have prioritized their training will be provided letters of recommendation for employment, upon request. I am happy to talk to employers about the performance of any GHC welder.

IBEST

All students enrolling in the welding program will be IBEST tested. Welders who qualify will be allowed to participate in IBEST, including the IBEST support class 12 – 1 M-F in the welding classroom. IBEST offers additional training and help in skills that are important to success in industry, such as math.

This training is outside of normal welding class hours. It is voluntary, free, and participation and performance is not a part of the evaluated grade criteria in the welding courses. Participation is highly encouraged. Effort is made to keep the training useful and applicable to welding trade problems. Also, it can be helpful in achieving a higher CPT score, and therefore possibly eliminating the need to take one or more general education course.

COURSE SCHEDULE

All courses are taught for an average of 4 hours and 5 minutes per day, plus a 15 minute break (hours adjusted during the shorter summer session).

During finals week, Monday is the last day to work in the shop, the last day to process certification test samples, and the last opportunity to take Weld 250 written tests. Tuesday the shop is closed. Wednesday is shop cleanup day.

CONTINUOUS ENROLLMENT

Once you enroll in a 16 credit welding course, continuous enrollment must be maintained to retain priority for reenrollment. If you take a quarter off (fall, winter, or spring), you will not automatically have a spot held for you in the program. If you are going to take a quarter or more off and you intend to return, you must get yourself placed on the program waiting list for reentry once a spot again becomes available.

Former welding students who return to complete the degree after a break in enrollment may need to retake previously completed welding courses. Students with a break of 2 or more years since successful completion of a degree applicable welding course must retake any courses above Weld 120 (Intermediate Welding).

This policy will not apply if the student can document that he/she has been employed full-time as a welder during such a break without a single employment break exceeding 1 year, or cumulative employment breaks which exceed 2 years, prior to the time he/she reenters the welding program core course series.

SATISFACTORY PROGRESS

You must maintain satisfactory progress to retain priority and remain eligible for reenrollment. If you do not maintain satisfactory progress, you will be dropped from the program. If you are dropped and wish to return, you must get yourself placed on the program waiting list for reentry. Keep in mind that you can't be placed back on the waiting list if you are on Low Scholarship Status (see definition in college catalogue).

You will be dropped from the program for the following reasons:

1. Any occurrence of an "F" or "V" grade in a 16 credit welding course due to or combined with vanishing from the program
2. Two consecutive occurrences of a grade less than a "C", including "W's", in a 16 credit welding course or courses

3. Three occurrences of a grade less than a “C”, including “W’s”, in a 16 credit welding course or courses (An exemption may be granted if Work Habits scores have been at the “A” level for the courses in which grades less than a “C” have been earned)
4. Any subsequent occurrence of a grade less than a “C”, including “W’s”, in a 16 credit welding course, upon reentry of program after having been dropped for less than satisfactory progress.

Additionally, if an “Assignments” grade is lower than a “C” in any course, the course must be repeated and a “C” or better earned before enrollment in the next course in the program sequence will be allowed.

Please be aware that the degree and all certificates in Welding require at least a 2.0 grade point average both in core courses and overall.

COMPLETION

When you pass Weld 250 with a D or better you have completed your eligibility period for enrollment priority in the daytime welding program courses. Your former spot will go to someone on the waiting list. If you desire further training you may sign up for a night course.

If you complete a certification test, yet do not pass Weld 250 due to a failing score on one or more of the capstone written tests, you will receive an incomplete grade. This will complete your eligibility period for enrollment priority in the daytime welding program courses. You may retake the test(s) again later by arranging a date to do so. Once the test(s) is/are passed an appropriate grade change will be made. An incomplete grade not finished up within 1 year will revert to an “F” grade. If you desire further training you may sign up for a night course.

STRATEGIES FOR SUCCESS

1. Remember: Honor, Professionalism, and Mental Toughness.
2. Weld to build your proficiency, not just to complete the assignments.
3. Study to build your understanding, not just to complete the homework.
4. Get physically fit.
5. Get good glasses.

TOOL LIST FOR WELDING TECHNOLOGY

Weld 110 and Above (Effective Spring 2010)

You must have the listed personal protective gear to begin welding training. You will need each tool at the quarter specified in parenthesis.

Personal Protective Gear

Hard hat (example: Fibre-Metal E-2), hard hat style non-electronic hood (example: Fibre-Metal 52090) with shade 10 lens (electronic hoods are an option for 2nd year welders), ear plugs, welding jacket, welding gloves, safety glasses with side protection, cutting glasses or hard hat mounted face shield (shade 3, 4, or 5), lock for locker, and leather boots with 6” minimum height (lace-up style recommended). A welder’s cap and either chaps or an apron are also recommended.

Protective Gear Approximate Total \$250 - \$400

Tools Required for Training

- (1st) Tape measure, 25 or 30 foot, 1” wide blade
- (1st) Lineman’s pliers (9” minimum)
- (1st) Tip cleaner, foldout style
- (1st) File, 6” mill bastard
- (1st) Cold chisel – medium size (Long handled recommended)
- (1st) Center punch
- (1st) Scribe
- (1st) Pipe wrap (Contour Mfg. for 3”-10” pipe recommended)
- (1st) Grinder, 4 ½” or 5”, 5/8-11 spindle, with 5 each knotted wire wheels, ¼” fast cut hard wheels, and 40g flap discs (2 grinders recommended. Any new grinder selling for less than about \$60 is discouraged)
- (1st) TI 30X II S calculator (Available in book store or downtown)
- (1st) Fillet weld gauge (Fiber Metal brand recommended)
- (1st) Flash light with batteries (Surefire LED type recommended)
- (1st) Compressed air blowgun attachment
- (1st) ¼” Tru-flate / “T-type” male thread/male plug air fittings (2 each)
- (1st) Portable toolbox with lock

- (2nd) Combination square with 12, 16, or 18 inch blade, 4R graduation, (Hardened blade and heads, contrasting colored numbers and lines, and additional protractor head recommended)
- (2nd) Torpedo level, magnetic (Stabila type 81 SM recommended)
- (2nd) Die grinder, ¼”, straight line with large diameter parallel sided, round end steel burr, and pad mandrel with 5 each 3” coarse “Scotch-Brite” pads
- (2nd) ¼” Tru-flate / “T-type” male thread/male plug air fittings (2 each)
- (2nd) Screw driver, Standard & Phillips (4 in 1 or 10 in 1 style)
- (2nd) Allen wrench set (standard)
- (2nd) Adjustable wrenches (8” and 12”)
- (2nd) Weld gage, cam type (G.A.L. recommended)

Approximate total based on high quality free world manufactured tools \$1,100

Additional Tools – Recommended But Not Required

Compass that will hold silver pencils
Aluminum burr for die grinder
Deburring tool, triangular scraper (General #478 recommended)
Automatic prick punch (Starrett or General recommended)
Water pump pliers – “Channel Locks” (Extra large)
Carpenter’s squares, 16” x 24” and 8” x 12”, graduated in 8ths
Chalk line
Plumb bob
Tapered line up tool
Utility knife
Rubber, dead blow hammer, 3 lb. (Nupla/Strike Force SF-3 recommended)
Ball peen hammer, 12 or 16 oz
Locking C clamp, 3 ¾ opening, 11’ long (Vice Grip recommended)
C clamp, heavy duty, 4” or 6” (Bessey or Wilton recommended)
Crow/Wrecking bar, 24 inch and 12 inch or similar size pry bars
Combination wrench set, standard (1/4” to 1 ¼”) and metric (8mm to 17mm minimum)
Allen wrench set, metric
Adjustable wrench (15”)
Files, 6” 3 square (triangular), 10” round bastard, 12” or 14” half round bastard, with handles
Squaring magnets
Sledge, short handled, 3 lb. or larger (Nupla/Strike Force HD-4, 4 lb. recommended)
Socket set, standard, ¼” drive (down to at least ¼” socket size)
Chipping hammer (Atlas recommended)
Wire brushes, large (V type bristle arrangement recommended) and small stainless
Striker with extra flints
Air slag scaler (Top Cat TC1L or Texas Pneumatic, chisel type recommended)
Die grinder, ¼”, 90 degree head

Recommended Tool Approximate Total \$1,050

Weld 110 – 250 Criteria

Attached are assignment lists for each course. First quarter welders and returning welders who earned less than an “A” grade the previous quarter must complete all “C” level assignments before beginning “B” level assignments, and must complete all “B” level assignments before beginning “A” level assignments. Please try to complete assignments for which we have the fewest welding stations first.

The following guidelines apply to all assignments:

*All cuts made on flat material under 1” thick will be made with a manual OFC or PAC torch unless specified otherwise.

*Run off tabs will be removed and ends finished on all joints.

*All 2F, 4F, 5F, 5G and 6G pipe, round tube, and square tube assignments will have at least 18” of material on either side of the joint in order to restrict access. All assignments with unspecified material lengths will use pieces of the largest size practical, and the welded area will be cut out for turn in. Ask Rod or Terry for particulars.

*Beam ends on beam splices and column connections are not to be brought closer than 1 foot apart until the bolt up plate is full strength welded top and bottom on one web, and the other web has been drilled.

*On beam to plate connections, bolt up plates will be drilled and full strength welded to the vertical 1” plate on both sides, and the beam webs drilled, before the beam ends are brought within 1 foot of the vertical 1” plate.

*2G and 6G 8” pipes and square tubes are not to be brought together until all alignment plates, angle iron clips, and/or bolt up plates are full strength welded on to the lower member.

*All joints will stay put in the same orientation and location once welding begins. If grinding or gouging is necessary, it will be done in place.

*Any bead exceeding 1” in width will be gouged out. Any flat weld exceeding $\frac{3}{4}$ ” will be gouged out. Any visible inclusion will be gouged out. Joint ends will not be concave or “dished”. No part of a cover pass will be below base metal height.

*Welds must meet the size specified, or be equal to the base metal thickness if size is not specified.

* No assignment will be accepted for grading unless it has been approved for fit up and back weld preparation (if applicable) prior to welding. Cover passes and end finishing must be OK’d prior to destructive testing or turning in.

*Assignments that require preparation for destructive testing must be OK'd for visual inspection before testing or preparing test samples. Test sample preparation must also be approved before testing.

*All assignments will be thoroughly wire brushed and be free of smoke, slag, rust, and dingle berries prior to turn in.

* Name and assignment number will be written on assignments using a contrasting felt pen. Completed assignments will be placed on the grading table.

*Bevels will be torch cut on any material over 3/8" thick.

*The following fit up tolerances apply:

Hand cuts straight +/- 1 degree along length of cut

Hand cuts to length within 3/32"

1/8" diameter wire cannot go under cut surface as cut (do not grind before inspection)

Manual bevels +/- 5 degrees of angle specified

Machine bevels +/- 2 degrees of angle specified

Saw cuts to length within 1/32"

Sheared parts to size within 1/32"

Parts centered or aligned within 1/32"

Roots and lands within 1/32"

Parts will fit square

Assignments that are incomplete or incorrect will be rejected until they have been completed correctly.

Weld 110 Assignment List

- *1. X joint, 2F, 7018, $\frac{3}{4}$ " fillet. 2 plates @ $\frac{3}{8}$ x 2 x 10, 1 @ $\frac{3}{8}$ x 4 x 10.
- *2. X joint, 3F, 7018, $\frac{3}{4}$ " fillet. 2 plates @ $\frac{3}{8}$ x 2 x 10, 1 @ $\frac{3}{8}$ x 4 x 10.
- *3. X joint, 4F, 7018, $\frac{1}{2}$ " fillet. 2 plates @ $\frac{3}{8}$ x 2 x 10, 1 @ $\frac{3}{8}$ x 4 x 10.
- *4. Square tube splice with backing, 5G, 7018. 8" x 8" tube outside, fit with crane, hand cut 22.5 degree bevel, 45 degree groove, $\frac{1}{4}$ " minimum root, $\frac{3}{8}$ x 1 backing bar. Cut out and perform lengthwise weld metal burn test.
- *5. Square tube splice with backing, 5G, E71T-1. 8" x 8" tube outside, fit with crane. Hand cut 22.5 degree bevel, 45 degree groove, $\frac{1}{4}$ " minimum root, $\frac{3}{8}$ x 1 backing bar. Cut out and perform lengthwise weld metal burn test.
- *6. Column splice, E71T-1, full pen, backweld, finish ends. Hand cut W8 x 48 (ask for length). Outside, fit with crane. Bevel flanges of upper piece at 45 degrees with both bevels opening outwards. $\frac{1}{4}$ " root, ratholes 1" deep and 1" tall. Hand burn a $\frac{3}{8}$ " x 4" x 6" bolt up plate. 6" length will run vertically. Use 2" spacing for two $\frac{13}{16}$ " holes, locate holes $1\frac{1}{4}$ " from 4" edge of plate – see example. Mag drill two $\frac{13}{16}$ " holes centered 2" from end of beam. All 4 holes will be made and bolt up plate will be welded in place with two full strength vertical fillets BEFORE beam ends are brought together. Don't forget the backgouge inspection. Cut out 3 welds and perform lengthwise weld metal burn test.
- *7. Pipe through 2 plates, 5F all sides, $\frac{3}{32}$ " 7018, $\frac{3}{8}$ " fillet. 3" sch 40 pipe, $\frac{3}{16}$ " x 7" x 7" plates. Bulkhead restricted.
- *8. 8" schedule 80, 2G, 6010 root, 7018 out, 3 joints total. 30 – 32.5 degree bevel, 60 - 65 degree groove, $\frac{3}{32}$ root, $\frac{3}{32}$ land. Outside, fit with crane. Cut out weld, refit and weld, repeat, cut out weld. Turn in 3 approx. $1\frac{1}{2}$ " wide welded rings.
- *9. "5 piece" aluminum, 2F, GTAW. 5 pieces $\frac{1}{4}$ " sheared 2" x 6".

- *10. “5 piece” 12 Ga. HRS, 2F, GMAW. 5 pieces sheared 2” x 6”.
- **11. Square tube splice with backing, 6G, 7018. 8” x 8” tube, outside, fit with crane. Hand cut upper tube with 45 degree bevel, 45 degree groove angle, ¼” minimum root, 3/8 x 1 backing bar. Cut out and perform lengthwise weld metal burn test
- ***12. Butt joint, 1” plate, 3G, E71T-8. 2 plates 1” thick x 12” wide, ask for length, 45 degree bevel groove, ¼” root, 3/8” x 1 backing bar, runoff tabs flush with top of plate, 1” thick strong back. 2 joints, 1 on ground, 1 at high work stations. Perform lengthwise weld metal burn test on both joints.

Notes:

- * Completion of this assignment required to be eligible for a “C”.
- ** Completion of this assignment required to be eligible for a “B”.
- *** Completion of this assignment required to be eligible for an “A”.

WELD 120 Assignment List

- *1. T joint, 1/4" plate, 2F, GMAW. 2 plates sheared 2" x 6".
Fillet weld 1/4" + 50% - 0. Must pass fillet weld break test.
- *2. T joint, 1/4" plate, 3F, GMAW. 2 plates sheared 2" x 6".
Fillet weld 1/4" +50% - 0. Must pass fillet weld break test.
- *3. Beam splice, fixed horizontally, 7018. Full pen, backweld, finish ends. Hand cut 2 pieces W8 x 48 (ask for length). Hand burn single bevel 45 degrees, 1/4" root, bevel on top and bottom flanges open the same way (up). Ratholes 1" deep and 1" tall. Hand burn a 3/8" x 4" x 6" bolt up plate. 6" length will run horizontally. Use 2" spacing for two 13/16" holes, locate holes 1 1/4" from 4" edge of plate – see example. Mag drill two 13/16" holes centered 2" from end of beam. All 4 holes will be made and bolt up plate will be welded in place with two full strength fillets (2F and 4F) BEFORE beam ends are brought together. Don't forget the backgouge inspection. Cut out connection. Perform lengthwise weld metal burn test.
- *4. T joints, 1 w/ 1/8" and 1 w/ 1/4" alum, 2F, GTAW. Pieces sheared 2" x 6". Fillet weld material thickness +50% - 0. Must pass fillet weld break test.
- *5. Corner joints, 1 w/ 1/8" and 1 w/ 1/4" alum, 1F, GTAW. Pieces sheared 2" x 6". Fillet weld material thickness, must pass fillet weld break test.
- *6. Lap joints, 1 w/ 1/8" and 1 w/ 1/4" alum, 2F, GTAW. Pieces sheared 2" x 6". 1/4" fillet weld +50% / - 0. 1/8" fillet weld +100% / - 0. Must pass fillet weld break test.
- *7. T joints, 1 w/ 1/8" and 1 w/ 1/4" alum, 2F, GMAW. 2 pieces sheared 2" x 6". 1/4" fillet weld +50% / - 0. 1/8" fillet weld +100% / - 0. Must pass fillet weld break test.
- *8. Square tube splice with backing, 6G, E71T-1. 8" x 8" tube outside, fit with crane. Hand cut upper tube with 45 degree bevel, 45 degree groove angle, 1/4" minimum root, 3/8 x 1 backing bar. Cut out. Perform lengthwise weld metal burn test.

- *9. Square tube splice with backing, 5G, E71T-8 CV. 8" x 8" tube outside, fit with crane. Hand cut 22.5 degree bevel, 45 degree groove, 1/4" root, 3/8 x 1 backing bar. 3 rings. Perform lengthwise weld metal burn test on last ring.
- *10. Square tube splice with backing, 5G, 7018. 8" x 8" tube outside, fit with crane. Hand cut 22.5 degree bevel, 45 degree groove, 1/4" root, 3/8 x 1 backing bar. 3 rings. Perform lengthwise weld metal burn test on last ring.
- **11. Angle iron to plates (3" x 3" x 1/4" angle), 5F, FCAW E71T-11 CV. Bulkhead, restricted access. 1/4" weld size.
- **12. Lap joint, 1 w/ 1/8" and 1 w/ 1/4" alum, 2F, GMAW. 2 pieces sheared 2" x 6". Do not overweld. Must pass fillet weld break test.
- **13. T joint, 1/4" plate, 4F, GMAW. 2 plates sheared 2" x 6". Fillet weld 1/4" +50% - 0. Must pass fillet weld break test.
- ***14. Tube brazing assignment, see example. Must pass tensile test.
- ***15. Square tube splice with backing, 2G, E71T-1. 8" x 8" tube outside, fit with crane. Hand cut 45 degree bevel on upper tube, 45 degree groove, 1/4" minimum root, 3/8 x 1 backing bar. Cut out. Perform lengthwise weld metal burn test.

Notes:

- * Completion of this assignment required to be eligible for a "C".
- ** Completion of this assignment required to be eligible for a "B".
- *** Completion of this assignment required to be eligible for an "A".

Weld 130 Assignment List

- *1. 8" sch 80, 6G, backing ring, 7018. Outside, fit with crane. Bevel at 30 degrees, 60 degree groove, no land.
- *2. 8" sch 80, 6G, backing ring, E71T-1. Outside, fit with crane. Bevel at 30 degrees, 60 degree groove, no land.
- *3. Angle iron splice, 3" x 3" x 1/4" angle, stock fixed horizontally, 7018. Ask for dimensions and sample prep. Must pass tensile pull.
- *4. Angle iron splice, 3" x 3" x 1/4", stock fixed horizontally, GMAW. Ask for dimensions and sample prep. Must pass tensile pull.
- *5. Beam splice, fixed horizontally, E71T-8. Outside, fit with crane. Full pen, backweld, finish ends. Hand cut 2 pieces W8 x 48 – ask for length. Hand burn single bevel 45 degrees, 1/4" root, bevel on top and bottom flanges opening the same way (up). Ratholes 1" deep and 1" tall. Hand burn a 3/8" x 4" x 6" bolt up plate. 6" length will run horizontally. Use 2" spacing for two 13/16" holes, locate holes 1 1/4" from 4" edge of plate – see example. Mag drill two 13/16" holes centered 2" from end of beam. All 4 holes will be made and bolt up plate will be welded in place with two full strength fillets (2F and 4F) BEFORE beam ends are brought together. Don't forget the backgouge inspection. Cut out connection. All 3 joints of the last splice must pass lengthwise weld metal burn test. (3 splices).

OR

Skip number 5 and assignment number 13 can be done instead.
Assignment number 13 is required to be eligible for an "A".

- *6. Round tube cross, SMAW (1 3/4 x .120 wall), in position, fixed axis horizontal. No burn through. Weld at least 8 crosses first – 2 with 3/32" 7018 up, 2 with 1/8" 6011 down, 2 with 1/8" 5P down, 2 with 3/32" 5P+ up. Then use electrode of choice to attempt joint that will be pulled after passing visual inspection. Must pass tensile test.
- *7. Round tube cross, SMAW (1 3/4 x .120 wall), in position, fixed axis vertical. No burn through. Weld at least 8 crosses first – 2 with 3/32"

- 7018 up, 2 with 1/8" 6011 down, 2 with 1/8" 5P down, 2 with 3/32" 5P+ up. Then use electrode of choice to attempt joint that will be pulled after passing visual inspection. Must pass tensile pull.
- *8. Square tubes to plate, 5G, E71T-1 with backing. 8" x 8" tubes outside, fit with crane. Hand cut 45 degree groove, 1/4" root spacing. All 4 joints of each connection must pass lengthwise burn test – ask for instructions on sample preparation.
 - **9. Butt joint, 1/4" alum, full pen open root, 1G, GTAW, finish ends. 2 pieces 6" wide. Grind 30 - 45 degree bevel angles, 60 - 90 degree groove. Use milled copper jig. Must pass tensile pull (with the grain).
 - **10. "5 piece" alum, GTAW. 5 pieces 3/32" or .090" sheared 2 x 6. Do not burn through or blow off ends.
 - **11. Pipe positioning jig. Ask for print & change orders (inner pipe size and 1 1/16" punched hole).
 - ***12. Beams to plate, E71T-8, full pen, backweld, finish ends. Prepare as number 5 above. Ask for direction on material to use. Hand burn a 3/8" x 3 3/4" x 4" bolt up plate. 3 3/4" dimension will run horizontally. Use 2" spacing for two 13/16" holes – see example. Mag drill two 13/16" holes centered 2" from end of beam. All 8 holes will be made and both bolt up plates will be welded in place with two vertical 1/4 fillet welds (each) BEFORE beam ends are brought to the plate. Don't forget the backgouge inspection. Perform lengthwise weld metal burn test.
 - ***13. High beam splices, fixed horizontally, E71T-8. Outside, 1 on ground, two up high. Raise using forklift. Full pen, backweld, finish ends. W14 x 48 – ask for lengths. Hand burn for bevel grooves at 45 degrees, 3/8" root, bevel on top and bottom flanges opening the same way (up). Ratholes 1" deep and 1" tall. Ask for bolt up plate particulars. Don't forget the backgouge inspection. Cut out connection. All 3 joints of the last splice must pass lengthwise weld metal burn test. (3 splices).

Notes:

* Completion of this assignment required to be eligible for a “C”.

** Completion of this assignment required to be eligible for a “B”.

*** Completion of this assignment required to be eligible for an “A”.

Weld 240 Assignment List

See Rod for pipe dimensional particulars. All pipe assignments will be repeated until the weld is approved.

- *1. 8" sch 40, 2G, 6010
- *2. 8" sch 40, 5G down, 6010
- *3. 8" sch 40, 5G up, 6010 root, 7018 out
- *4. 8" sch 80, 2G, E71T-1 with backing
- *5. 8" sch 80, 5G up, E71T-1 with backing
- *6. 8" sch 40, 5G up, GTAW
- *7. 3" sch 40, 2G, GTAW
- *8. 3" sch 40, 5G up, GTAW
- **9. 3" sch 40, 5G up, GTAW root, 7018 out
- **10. Round tube cross (1 ¾ x .120), GTAW, in position, fixed axis vertical. Lift arc or scratch start – no remote amperage control. No burn through. Must pass tensile test.
- **11. Socket weld, 1 1/2" sch 40 to 2" sch 80, 2F/4F, GTAW
- **12. Socket weld, 1 1/2" sch 40 to 2" sch 80, 2F/4F, 7018
- ***13. Socket weld, 1 1/2" sch 40 to 2" sch 80, 5F up, GTAW
- ***14. Socket weld, 1 1/2" sch 40 to 2" sch 80, 5F up, 7018
- ***15. 3" sch 40, 5G, GMAW, perform tensile test
- ***16. 3" stainless tubing, 1G, GTAW, Solar Flux B ("Mud")
- ***17. 3" stainless tubing, 1G, GTAW, Argon purge

Notes:

* Completion of this assignment required to be eligible for a “C”.

** Completion of this assignment required to be eligible for a “B”.

*** Completion of this assignment required to be eligible for an “A”.

Weld 245 Assignment List

Fabrication will be conducted in this general order unless there is a specific reason to do otherwise:

1. Test bends conducted and allowances figured
2. Layout
3. Holes punched or drilled and tapped
4. Parts cut
5. Parts deburred
6. Parts dimensions verified
7. Bending operations performed
8. Fitting and tack up
9. **STOP!** Recheck for square, level, plumb, straightness, parallelism, and symmetry
10. Fit up inspection and approval by Rod or Terry
11. Full welding
12. Remove all slag, dingle berries, smoke, etc.

Projects are graded pass or fail. The first 3 projects must be completed successfully to qualify for a "C", the first 4 to qualify for a "B", and all 5 to qualify for an "A".

1. Aluminum diamond plate trash can (Given: vertical height, outside width across flats at the top & bottom, and number of sides & of panels)
2. Aluminum sheet metal stool (from print)
3. 2 part precision steel layout / heavy bending project (from prints)
4. WABO Seismic practice test from print w/ 1/16" Dual-Shield. Top 3 plate parts burnt on pattern cutter. Ask for gusset specs and for weld size and location specs. Tolerance 1/16" unless noted otherwise on drawing. Conduct welding and destructive testing per Standard.
5. Pipe flange project. All fabrication work will be completed inside the shop. Flange ODs to match existing +/- 1/16". Punch 9/16" holes. 3/16" minimum fillet on both sides of each flange with SMAW or FCAW. Use parts rotator. Flanges flat to within 1/32" at outer edges after welding. Full strength weld on pipe to pipe joint with same process used for flanges. Assembly must be cleaned up "ready to ship" and pass visual inspection before going outside. Pipe section must go in place freely or with bare-handed force (1-man each end). All 16 bolts must go freely through holes at same time. Allowed undersize dimension for overall length at center of flange is < 1/8" with all bolts on smaller flange fully tightened.

Weld 248 Assignment List

Welders will be required to demonstrate code level process proficiency with fillet welds on plate, angle iron, pipe, square tube, and channel in all positions, with restricted access, before being allowed to practice for or attempt an all position certification plate test. Processes allowed are SMAW, FCAW-G, FCAW-S, and GTAW.

- *1. T-joint, 2F, max size single pass, break test
- *2. Angle to plate, 2F (single and multiple pass)
- *3. Angle to plate, 4F (single and multiple pass)
- *4. Angle to plate, axis horizontal (single and multiple pass)
- *5. Pipe or plate, 2F (single and multiple pass)
- *6. Pipe to plate, 4F (single and multiple pass)
- *7. Pipe to plate, 5F (single and multiple pass)
- *8. Square tube to plate, 2F (single and multiple pass)
- *9. Square tube to plate, 4F (single and multiple pass)
- *10. Square tube to plate, 5F (single and multiple pass)
- *11. Channel to plate, 2F
- *12. Channel to plate, 4F
- *13. Channel to plate, axis horizontal
- **14. Pass visual inspection on practice certification plate test, first process
- ***15. Complete 1 – 13, second process

Notes:

* Completion of this assignment required to be eligible for a “C”.

** Completion of this assignment required to be eligible for a “B”.

*** Completion of this assignment required to be eligible for an “A”.

Weld 250 Assignment List

To qualify to pass this course with a “C” or better each welder will pass a WABO certification test qualifying for groove welds in all positions with one process. To qualify for a “B” grade, the welder will pass 2 tests qualifying for groove welds in all positions with two processes. To qualify for an “A” grade, the welder will pass 3 tests qualifying for groove welds in all positions with 3 processes.

All welders must pass 3G and 4G tests on plate with SMAW or FCAW before qualifying to attempt that process on pipe. It is recommended to earn certification with at least two processes before attempting FCAW on pipe.

Test days are on Fridays. Each welder must have his driver’s license or state ID card, and current WABO card if applicable. Test joints will be fit and approved prior to test day. In the event of a test failure, at least 8 hours of practice is required before retesting.

Each test record submitted to WABO for issuance of a certification card will require a check payable to WABO for \$50.

In addition to the certification tests, to receive any passing grade you must pass the 4 hour written part of the capstone examination (in one sitting) with a score of 90% or higher, and pass the measuring part (tape, scale, dial caliper, and micrometer) and math part of the capstone examination, within the prescribed time limits, with scores of 100%. It is your responsibility to arrange with Terry the times when you can take these tests.

Finally, regardless of the quarter you will actually complete the welding program, to qualify for a “B” or an “A”, you must agree to participate in the June graduation ceremony provided you are still residing in Grays Harbor or Pacific Counties at that time.

WELDING PROGRAM RULES and PROCEDURES

Failure to comply with program rules and / or oral instructions may result in disciplinary action up to and including expulsion. Daily points will be deducted when reminders are necessary to correct minor infractions of program rules. Some examples: Take off jewelry, put on glasses, put side shields on glasses, put on hard hat, cover up with long sleeves or gloves, turn off machine at break, remove electrode from holder, etc.

1. No alcohol or illegal drugs on you or in you. You are strictly banned from the welding building if you contain either. Your presence for class represents your word to me and your classmates that you have neither in your system. If that is found to not be the case, you have lied to all of us and can expect to be processed under the Honor Code.
2. Safety glasses with side protection will be worn at all times in the indoor and outdoor shop.
3. No horseplay.
4. Report all injuries immediately. Contain your blood to the extent practical in order to prevent contamination of the work area.
5. Report broken equipment or equipment that is out of adjustment immediately.
6. Smoking is only allowed at break time, out front, 25' from the building doors. Butts go in the butt can.
7. No spitting inside or on the paved or concrete areas outside.
8. Clean up spills immediately. Ask for disinfectant to clean up blood.
9. No butane or plastic cased lighters in the shop.
10. No food or liquids in the work areas. Food and drinks are OK in the classroom, but no eating when class is in session. Small capped / air tight spitters are OK if kept inside of your tool box at all times and thrown away directly into the outside dumpster (not the shop garbage cans). No spitting in classroom or during shop lessons.
11. Personal belongings (tools, papers, hoods, jackets, gloves, coffee cups, etc.) will be stored in your locker or inside of your closed tool box only. Do not store company property (including metal) in your locker. No personal belongings, stock, or projects will be stored here over quarter breaks without prior approval.
12. Radios OK in the shop if sound remains inside of welding booth, or if tuned to 104.7. No earphones.

13. No writing, welding, or cutting on anything except your assignment or scrap from the recycle bin. Do not tack weld to tabletops, poles, etc. – use a clamp. Do not warm up on still useable metal. Use scrap steel from the recycle bin to set your amperage and get warmed up before welding on your assignment. Put scrap you got from recycle bin back at end of class.

14. Don't bring project materials, repair jobs, or donated materials into the shop without prior approval.

15. Burn stick electrodes to within 1" from the numbers. Do not use a new electrode if you have a partially burned one. Stubs will not be thrown on the ground where they may create a slip hazard. At the end of the shift you should have no more than one partially burned electrode, discard it with the rest of your stubs, do not put it back in the rod oven or box. Remove electrode from holder anytime the holder is not in your hand.

16. Burn filler (TIG and Oxy) rod down to 4" before using a new one. At the end of the shift you should have no more than one partially burned rod, discard it with the rest of your stubs, do not put it back. Do not cut a 3/6" rod in half until ready to weld with it. Use partials before grabbing new rods from the rod rack.

17. Do not throw out completed or botched assignments, put them in the designated spot for grading or ask for instructions on how to repair.

18. Report dirty, missing, or broken booths or equipment before you start.

19. Never enter office or supply room without permission (except to use the office phone for 911 calls). Do not take anything from supply room without asking / notifying Rod. We do not supply attachments or air fittings for your grinder(s) or die grinder(s), except for cutting discs when you are in the pipe welding course.

20. Cotton denim or duck long pants must be worn when in the shop. Cotton, wool, or leather long sleeves must be worn when welding. Welding gloves are also required on both hands when operating anything with an arc. Leather boots at least 6" high required – lace up recommended.

21. Aluminum will only be ground using a hand grinder with an aluminum grinding or sanding disc, or on the belt sander.

22. No machinery will be used until you have been given a block of instruction on its safe and proper use and you have been OK'd to operate it during the present quarter. Do not make adjustments to machinery without approval.

23. Negligent damage to equipment will be charged. Saw cut stainless pipe and tube, all thin wall tube, and all heat affected zones on the chop saw only. Never shear material that is not completely under the material hold down. Take necessary steps to prevent damage from your spark or molten metal streams. All streams will be directed downward

to the extent possible. Don't overload and spring clamp bodies – always use the largest clamp feasible.

24. Good personal hygiene is essential to career success. Please exercise common courtesy by doing the following every morning: bathing with soap and scrub pad, washing hair with shampoo, brushing teeth, and putting on washed clothing.

Repairs, stains, and some burn holes on clean clothing are normally acceptable for working tradesmen, but clothing must never be frayed or tattered to the point of creating a safety hazard. Long sleeves should be worn under leather jackets to prevent them from becoming a biohazard over time.

For everyone's health, please wash your hands after using the restroom. They should also be washed before putting anything in your mouth at break time, and must be if you have been handling thoriated tungsten.

While a short fresh haircut presents a professional and workmanlike appearance, any length is allowed as long as it does not present a safety hazard. Long hair will be tied up / back before entering shop. No jewelry, rings, bones, or other face or body accoutrements. No drawstrings on hooded shirts. Watches are not recommended but are allowed as long they have a breakaway type band.

25. A 15 minute break is signaled by an air horn. Anything other than working is a break – ie smoking, standing around with hands in pockets, talking on a phone, etc.

26. Don't leave shop without notifying Rod.

27. Cell phones, Blackberries, recorders, and other personal electronic devices will not be operated, seen, or heard in the classroom or shop when either is in operation. Talking on cell phones will only be done outside of the classroom or shop.

28. Rod's tools are not for loan, and it is poor form to ask others to use theirs – help support the industries you will be working in, buy your own good quality, free-world manufactured tools.

29. If you don't fully understand how to use something properly and safely, ask.

30. All hard disc grinding will be done outside, or inside of a welding booth. This will not be done inside of a booth that contains a TIG welder.

31. Parking is in the gravel parking area. Please don't tear up the gravel. The paved parking spots at the west end of the building belong to the automotive program. Please don't use them.

32. No torch cutting material on the material racks. Full-length sections will not be cut unless there are no partials anywhere in the shop.

33. Pieces will not be cut from the 4' lengths of 3/8" and 1" bar unless there are no partials anywhere in the shop. Ask before cutting from new stock.

34. Night class assignments that are in progress will be stored under the worktable closest to the office. Day class assignments that are in progress will be stored under the other worktable. Metal under either table without a name on it is free game... so identify your metal!

35. Don't step on, drag, or throw fire on cords, leads, air hoses, etc. Also be careful not to throw fire on air regulators, gas lines, light fixtures, electrical receptacles, etc. Do not allow molten metal to drop onto the concrete floors – the moisture content causes it to spall. Put down a sheet of steel to protect the floor. Leave the floor buildup in the pipe cutting room.

36. Always choke with a nylon strap when using crane to keep motor electrically isolated from welding current.

37. No chairs in the shop. If you have a medical condition that prevents you from standing for the entire length of the class period, please contact Disability Support Services, in the HUB on campus, so that documentation can be made of the disability and appropriate accommodations can be determined.

38. Be gentle with permanent fixtures such as the table tops, poles, pipe holding jigs, and so on. Do not beat metal against them, grind them excessively, etc. Allow booth curtains to hang down freely at all times.

39. All grinders, regardless of attachment, will have a guard installed. Die grinders with a cutting disc will also have a guard installed.

40. Class starts when the horn sounds. The timing device has a visible clock on it, and it is the official clock for the course. If you are not inside the classroom when the horn sounds, you will be counted late. When class starts you are to have yourself ready for work. That means you already have your work boots on and laced, already have used the restroom, already have any jewelry removed, already have your hair tied up, already have your personal protective items and tools retrieved and with you or placed where you will be working, etc. The locker room closes at 7:30.

You are encouraged to completely setup your work area before class. You can run leads, get your machine setup and dialed in, etc. If you save 10 minutes a day x ~300 days in the program, that equates to 50 extra hours of welding, or about 3 extra weeks of training.

41. Turn off your power source at break time and any time you leave the immediate area - such as to use the shear or a saw in another part of the shop. Don't flip disconnects off or unplug machines unless there is a reason to do so.

42. Use plywood to fashion flash & spark screens as needed. If you are not sure if you should put one up, you should.
43. Shop time is to be spent in the shop, not the classroom. The only time you should be in the classroom during shop time is to layout or cut a white paper pattern, or to look up parameters on the internet. Do metal layout in the shop.
44. Please don't waste good assignment metal and fit up time learning how to make a weld, or dialing in a machine... that is what scrap and *SMALL* odd shaped remnants are for – use them first. Use good metal only once you have the machine and weld figured out. Plan metal use to minimize waste.
45. Full strength weld each dog, angle iron clip, strong back, pad eye, bolt up plate, alignment plate, etc immediately upon tacking it in place. Do not move on to something else or walk away from a tacked load bearing device. Grind all weld residue smooth immediately upon removing these devices.
46. Die grinders with a burr bit (rotary file) will only be used for smoothing out rat holes once a web weld is complete, removing a bad weld start which occurred inside of a rat hole, to clean out a round or square hole in a fabrication course assignment, or to clean the ID of a pipe or tube. Any other use on program assignments is wasteful of time.
47. Date will be written on flux-cored wire tags when a new role is opened.
48. If you can use an air arc or air chisel instead of a grinder, do so.
49. Put your name clearly visible on your tool box. You are encouraged to lock your box when you are not here.
50. Booths containing TIG power sources will be used for TIG welding only, so long as the TIG welder is inside the booth. Roll the power source completely outside the curtains if you must stick weld in a TIG booth.
51. Booth priority: AC TIG booths go to guys welding aluminum first, then to guys doing DC TIG. FCAW booths go to guys using FCAW first, then to guys doing DC TIG.
52. Outside machine priority: Machines with adjustable dig go to guys TIG welding pipe first.
53. Power sources will not be plugged in or unplugged, and primary power cords will not be handled, unless the electrical disconnect for the wall receptacle is turned off. Power cords must be completely clear of any compressed gas bottles prior to being plugged in, whether the disconnect is turned off or not. In order to prevent breaking off of the small screws that attach the receptacle assemblies to the wall mount boxes, if you must jiggle a plug to get it in or out of a receptacle, do so vertically, not side to side.

54. Hard hats are required in the outdoor work area. Always look up before entering or leaving this area. Ground below the high work area is off limits when the high area is in use. Tape off area before beginning work. Make sure man basket is installed and chained to forklift before going up ladder. Ground below must be free of hazards such as OA bottles that could be damaged by falling equipment, or that could hurt falling men. Don't go up without approval. Only enter and exit using the ladder. You must be tied off at all times. Harness will be worn under leathers when welding, cutting, or gouging. Back of leather jacket will be slit to allow lanyard and upper harness back ring to penetrate. Nothing will be left laying loose on the steel overnight. All leads, hoses, tool buckets, and suitcases will be tied off. Keep fingers out of bolt holes, ask for spud to assist bolt up. Beams placed with forklift will be clamped to a fork. Weld 110 plate assignments will be raised using the man basket.

55. Bottle carts or anything else on wheels goes in and out through the roll up door, not through the man doors. Exercise caution to not scratch or ding the memorial plaque on the man door leading into the outdoor weld area. Cross under the roll up door quickly and always assume any roll up door could come crashing down at any second.

CLEAN UP REVIEW LIST

Clean up starts when signaled. You may clean up early if you desire, but you will be docked points same as for leaving early. Please let me know if you need to do this before you start cleaning up. Clean up continues for everyone until Rod or Terry prop open the shop doors to the hallway - do not go into the classroom until this happens.

First priority is getting personal items put away, out of the way. Second is blow down of all flat surfaces – Please don't start sweeping anything until after the area has been blown down completely.

Shut down gas cylinders, bleed lines, and then back out regulator screws, in that order.

Change cylinder if empty or almost empty (less than 25 PSI for acetylene, less than 50 PSI for all others).

Fix contact tip if it is fouled up.

Shut down power sources and remotes.

Grind spatter off table top.

Return unused electrodes, rods, coupons, scrap metal, and tools and equipment... even if they were in a booth before you used it.

Dump stubs into trash can and put the stub can back.

Brush down work area.

Blow down your booth if you used one, sweep in and around your work area.

Find a common area (aisle way, bay, etc.) that needs cleaning and sweep it.

Return brooms, brushes, and dust pans to their rack.

Write your name on your welding assignment and put it under the appropriate table.

If you are done, help someone else cleanup.

The garbage cans are to be dumped into the dumpster, not into the steel recycle bins!



**GRAYS HARBOR
COLLEGE**

**WASHINGTON ASSOCIATION OF BUILDING OFFICIALS
(WABO) WELDER CERTIFICATION TESTING AT GRAYS
HARBOR COLLEGE (R11)**

COST

Welding program students – Welding degree program students will be tested free of charge when they progress to Weld 250 provided they meet the requirements outlined in the course syllabus. Otherwise, the test fee is \$163.60 per test. An additional \$50 processing fee per passed test is required by WABO to issue a certification card. Free testing will only be done during the period of time that a student is enrolled in Weld 250.

Non-students – Certification testing resources are being reserved for our fulltime welding students who are currently enrolled in the Weld 250 course.

LOCATION

WABO only allows testing to be performed by WABO approved examiners at WABO approved testing sites. Testing through GHC can only be done in the welding shop at Grays Harbor College.

TESTS AVAILABLE AT GHC

Steel plate with backing, 3G and 4G. 1” thick for SMAW (E7018) and FCAW (.045” E71T-1 or .072” E71T-8).

Steel pipe, open root or backing ring, 6G. All pipe is 8” schedule 80. Pipe may be welded with SMAW with backing (E7018), SMAW (E6010 root, E7018 fill), SMAW/GTAW (ER70S-2 root, E7018 fill), GTAW (ER70S-2 root and fill), or FCAW with backing (.045” E71T-1 or .072” E71T-8).

A light gauge steel fillet weld test is also available with SMAW (6011). 16 gage galvanized will be welded 3F or 4F to 3/8” plate. Configuration is a tee joint with the galvanized as the riser.

DESCRIPTION OF THE TESTS

WABO qualifications consist of a hands-on test only (the former written test requirement has been suspended). Power sources will be “zeroed” before each test. Welders will have to properly set up their own power source. The welder will follow a Welding Procedure Specification (WPS) and written instructions for his test. The welder will receive a written copy of the inspection acceptance criteria. Welders will fit their own coupons.

There is a time limit of 4 hours for a single plate or pipe with backing done with FCAW or SMAW (4.5 hours for 2 plates), 5 hours for an open root pipe done with SMAW, and 6 hours for pipe done with GTAW.

REQUIRED EQUIPMENT

Checks for test fees (described under “Cost”), driver’s license, and personal protective gear. A hood, gloves, safety glasses, long pants, and long sleeves are required. Lineman’s pliers will be required for tests with GTAW and FCAW.

RESULTS

Allow 7 days for test results from GHC. Test results will be sent to WABO within 7 days of test. Cards are issued by WABO. The processing time for the cards is not under the control of GHC.

RETESTS

An immediate retest (within 7 days of notification of failure) may be made. The retest shall consist of 2 test welds of each type in each position on which the welder failed.

OR

A subsequent retest may be made provided the welder submits proof of 8 hours minimum further training or practice, in which case a single retest weld of each type and position failed shall be made.

LENGTH OF WABO CERTIFICATION

WABO certifications are issued for one year. To remain valid the certification card must be periodically endorsed and sent with a renewal fee to WABO before it expires. Details are described in WABO Standard 27-13 and are also described in instructions included with each certification card.

CONTACT INFORMATION

For more information contact Rod McDonald at (360) 538-4125. Test site is Grays Harbor College Weld Shop, 1900 Building, 1620 E.P. Smith Drive, Aberdeen, WA 98520.