

AWS/SkillsUSA/WSC USOpen Weld Trials GENERAL INSTRUCTIONS 2007

Overall Project

- If the project does not pass visual inspection criteria they will not be subjected to more extensive destructive or non-destructive testing. This is standard inspection practice as outlined in the AWS D1.1 2006 Structural Welding Code-Steel.
- The instructions found on this page take precedence over any instructions found on the project prints. Any updates will be posted at the contest site and reviewed with the competitors.
- Grinding is only permitted on Root pass. Grinding is permitted only on weld starts and craters of Fill and Cap passes to insure proper fusion of subsequent passes. No grinding is allowed on final passes other than starts and stops. Any exposed grind marks on welds will deduct points. (This is a welding contest and not a grinding contest.)
- Tack weld sizes are specified and they shall be placed on the outside of all structures.
- **Material** Carbon steel to be of A36 or equivalent, SS to be 304 or 304L, AL to be 6061 T-6. In regard to thickness of material 150mm X 9mm pipe = 6" Sch 80 pipe, 50mm X heavy wall pipe = 2" Sch 80 pipe, Test pipe 1A is 4" Sch 80 pipe, 16mm plate = 5/8", 10mm plate = 3/8", 2mm sheet = 14 gauge 0.078", 3mm sheet/disk = 12 gauge 0.109", and the 6mm disc to be 1/4".
- **Process** SMAW (E7018-3/32 or 1/8") GTAW (ER70S-2, ER316L, ER5356 1/16-1/8 dia.) GMAW 75% Argon-25% Carbon Dioxide (0.035" ER70S-3) FCAW 75% Argon-25% Carbon Dioxide (0.045" E71T-1)

Test Plates/Pipe* Projects #1A, 1B and 1C Allow 1.5 Hours/Plate or Pipe

- Process and position will be selected randomly from the list following this page. These projects will be subjected to visual inspection followed by radiographic testing and/or bend testing.
- Tack welding is to be done with the process selected for the root pass. Length of tack should not exceed 15mm.
- Pre set the joints to allow for distortion, when finished they should lay flat on work bench
- Root pass must have melt through, excellent tie-ins at start and stops, and should compare to GTAW with consumable insert.
- Face must also be smooth and even, without excess reinforcement
- Test Plate #1B requires a start and stop in the final cap pass only. This is a "Hold Point" and must be stamped and verified by the judge. Location must be in the middle 50mm area of the joint.
- The test pipe #1C will only be 4 inch pieces for an overall length of approximately 8 inches.
- On the test pipe #1C if a 5G or 6G position is selected the top of the pipe (12:00 o'clock) will be marked by the judge after you have it tacked and in position for the root pass
- Final cleaning using wire brush and/or chipping hammer to remove all flux residue, spatter and smoke is permitted
- Bend tests, strive for no discontinuities
- Radiographs, strive for no discontinuities

Pressure Vessel Project #2 Allow 12 Hours

- Use good set-up and welding efficiency because of time constraints
- Processes are 111 SMAW, 135 GMAW, 136 FCAW, and 141 GTAW
- Final cleaning using wire brush or chipping hammer to remove all flux residue, smoke and spatter is permitted
- Tack weld the vessel as shown in the attached drawing, however do not attach part "D" until the judge has inspected and marked your vessel "This is a hold point" tack welds shall not exceed 15mm in length
- Once the vessel is tacked and inspected by the judge, proceed to weld the joints using the process indicated by the appropriate weld symbols
- Welding must take place with base 'X' in the flat position
- Grinding per overall project instructions at top of this page
- The pressure vessel will be visually inspected and then subjected to a pressure test (1000 psi)
- Fillets to have a leg size of 10mm (\pm 1mm) on the vessel itself, smaller connection should be as shown on the drawing, groove weld reinforcement shall be 3mm (\pm 1mm) and corner joint welds should have a full radius (-2mm)

Sheet Metal Projects Projects # 3 SS and # 4 AL Allow 2 Hours/Project

- Follow instructions on drawing
- All welding must be done with Base "X" and base plates "A" on the bottom toward the bench
- All butt joints and corner joints require complete joint penetration
- On the stainless steel project a temporary plate can be tack welded or taped with aluminum tape to allow purging of the structure.
- Do not puddle over weld faces with the GTAW process
- Fillets to have a leg size of 3mm (\pm 1mm) groove weld reinforcement shall be 2mm (- 2mm) and corner joint welds should have a full radius (-1mm)
- Off set pieces and use weld sequencing to compensate for distortion where applicable
- Do not grind, wire brush, or chemically clean the welds on sheet metal projects (tape residue can be removed)

These will be the position and processes used on the various pipe and plate test piece for the USOpen Weld Trials. They will be placed in respective containers marked pipe, 3/8 inch and 5/8 inch. One will be drawn from each of the three containers and that will be the test.

Test Pipe 4" Sch 80	2	Root GTAW	Fill and Cap GMAW
Test Pipe 4" Sch 80	2	Root SMAW	Fill and Cap SMAW
Test Pipe 4" Sch 80	5 Uphill	Root GTAW	Fill and Cap SMAW
Test Pipe 4" Sch 80	5 Uphill	Root GTAW	Fill and Cap GMAW
Test Pipe 4" Sch 80	6 Uphill	Root GTAW	Fill and Cap SMAW
Test Pipe 4" Sch 80	6 Uphill	Root GTAW	Fill and Cap GMAW
Test Pipe 4" Sch 80	6 Uphill	Root SMAW	Fill and Cap SMAW
Test Pipe 4" Sch 80	6 Uphill	Root GMAW	Fill and Cap GMAW
Test Plate 3/8 Inch	2	Root SMAW	Fill and Cap SMAW
Test Plate 3/8 Inch	2	Root GMAW	Fill and Cap GMAW
Test Plate 3/8 Inch	3 Uphill	Root GTAW	Fill and Cap SMAW
Test Plate 3/8 Inch	3 Uphill	Root GTAW	Fill and Cap GMAW
Test Plate 3/8 Inch	3 Uphill	Root SMAW	Fill and Cap SMAW
Test Plate 3/8 Inch	4	Root GTAW	Fill and Cap SMAW
Test Plate 3/8 Inch	4	Root SMAW	Fill and Cap SMAW
Test Plate 3/8 Inch	4	Root GMAW	Fill and Cap GMAW
Test Plate 5/8 Inch	1	Root GTAW	Fill and Cap FCAW
Test Plate 5/8 Inch	1	Root GMAW	Fill and Cap FCAW
Test Plate 5/8 Inch	2	Root GMAW	Fill and Cap FCAW
Test Plate 5/8 Inch	3 Uphill	Root GTAW	Fill and Cap FCAW
Test Plate 5/8 Inch	3 Uphill	Root GMAW	Fill and Cap FCAW
Test Plate 5/8 Inch	3 Uphill	Root SMAW	Fill and Cap FCAW