**Performance Accreditation Tasks**

The American Welding Society (AWS) School Excelling through National Skills Standards Education (SENSE) program is a comprehensive set of minimum Standards and Guidelines for Welding Education programs. The following performance accreditation is aligned with and designed around the SENSE program.

The Performance Accreditation Tasks (PATs) correspond to and support the learning objectives in *AWS EG2.0, Guide for the Training and Qualification of Welding Personnel: Entry-Level Welder*.

Note that in order to satisfy all learning objectives in *AWS EG2.0*, the instructor must also use the PATs contained in the second level of the NCCER Welding curriculum.

PATs 1 and 2 correspond to *AWS EG2.0, Module 8 – Thermal Cutting Processes, Unit 1 – Manual OFC Principles*, Key Indicators 5, 6, and 7.

PAT 3 corresponds to *AWS EG2.0, Module 8 – Thermal Cutting Processes, Unit 1 – Manual OFC Principles*, Key Indicators 3 and 4.

PATs provide specific acceptable criteria for performance and help to ensure a true competency-based welding program for students.

The following tasks are designed to test your competency with an oxyfuel cutting torch. Do not perform these cutting tasks until directed to do so by your instructor.
SETTING UP, IGNITING, ADJUSTING, AND SHUTTING DOWN OXYFUEL EQUIPMENT

Using oxyfuel equipment that has been completely disassembled, demonstrate how to:

• Set up oxyfuel equipment
• Ignite and adjust the flame
  – Carburizing
  – Neutral
  – Oxidizing
• Shut off the torch
• Shut down the oxyfuel equipment

Criteria for Acceptance:

• Set up the oxyfuel equipment in the correct sequence ____________
• Demonstrate that there are no leaks ____________
• Properly adjust all three flames ____________
• Shut off the torch in the correct sequence ____________
• Shut down the oxyfuel equipment ____________
CUTTING A SHAPE

Using a carbon steel plate, lay out and cut the shape and holes shown in the figure. If available, use a machine track cutter to straight cut the longer dimension.

Criteria for Acceptance:

- Perform this task in the flat position (1G)
- Outside dimensions ±\(\frac{1}{8}\)" (3.2 mm)
- Inside dimensions (holes and slots) ±\(\frac{1}{8}\)" (3.2 mm)
- Square ±5 degrees
- Minimal amount of dross sticking to plate which can be easily removed
- Square kerf face with minimal notching not exceeding \(\frac{1}{16}\)" (1.6 mm) deep

Copyright © 2015 NCCER. Permission is granted to reproduce this page provided that copies are for local use only and that each copy contains this notice.
CUTTING A SHAPE

Using a carbon steel plate, lay out and cut the shape and holes shown in the figure. If available, use a machine track cutter to bevel and straight cut the longer dimension.

NOTE: MATERIAL – CARBON STEEL ¼" (>6 MM) THICK OR GREATER
HOLES ¾" (19.1 MM) DIAMETER
SLOTS ¾" (19.1 MM) × 1 ½" (38.1 MM)

Criteria for Acceptance:

- Perform this task in the horizontal position (2G)
- Outside dimensions ±¼" (3.2 mm)
- Inside dimensions (holes and slots) ±½" (3.2 mm)
- Square ±5 degrees
- Bevel ±2 degrees
- Minimal amount of dross sticking to plate which can be easily removed
- Square kerf face with minimal notching not exceeding ¼" (1.6 mm) deep
**Performance Accreditation Tasks**

The American Welding Society (AWS) School Excelling through National Skills Standards Education (SENSE) program is a comprehensive set of minimum Standards and Guidelines for Welding Education programs. The following performance accreditation tasks are aligned with and designed around the SENSE program.

The Performance Accreditation Tasks (PATs) correspond to and support the learning objectives in *AWS EG2.0, Guide for the Training and Qualification of Welding Personnel: Entry-Level Welder*.

Note that in order to satisfy all learning objectives in *AWS EG2.0*, the instructor must also use the PATs contained in the second level of the NCCER Welding curriculum.

PAT 1 and 2 correspond to *AWS EG2.0, Module 8 – Thermal Cutting Processes, Unit 4 – Air-Carbon Arc Cutting*, Key Indicators 4, and 5.

PATs provide specific acceptable criteria for performance and help to ensure a true competency-based welding program for students.

The following tasks are designed to develop your competency in preparing base metal using A-CAC processes. Practice each task until you are thoroughly familiar with the procedure.

As you complete each task, take it to your instructor for evaluation. Do not proceed to the next task until instructed to do so by your instructor.
A-CAC WASHING AND GOUGING

Perform A-CAC Washing
Using any of the materials identified below, perform A-CAC washing to remove the portion identified by the instructor. Materials that can be used for this task include:

- Steel backing strip on a butt weld
- Excess buildup on the face of a weld
- Rivets or bolts in a plate
- Blocks, angles, clips, eyes, D-rings, or items welded to a plate

Criteria for Acceptance
- Material removed flush with the base metal surface
- No notching in the surface of the base metal

Perform A-CAC gouging
Using mild steel plate ½" (12.7 mm) thick or thicker, gouge a U-groove at least 8" (20 cm) long, as shown in the figure, in the 1G and 2G positions.

Criteria for Acceptance
- Groove width and depth are uniform
- Groove walls are smooth and uniform
- No dross within the groove
Appendix

Performance Accreditation Tasks

The American Welding Society (AWS) School Excelling through National Skills Standards Education (SENSE) program is a comprehensive set of minimum Standards and Guidelines for Welding Education programs. The following performance accreditation is aligned with and designed around the SENSE program.

The Performance Accreditation Tasks (PATs) correspond to and support the learning objectives in AWS EG2.0, Guide for the Training and Qualification of Welding Personnel: Entry-Level Welder.

Note that in order to satisfy all learning objectives in AWS EG2.0, the instructor must also use the PATs contained in the second level of the NCCER Welding curriculum.

PAT 1 corresponds to no AWS EG2.0 reference.

PAT 2 corresponds to AWS EG2.0, Module 8 – Thermal Cutting Processes, Unit 2 – Manual OFC (e.g., Track Burner), Key Indicators 4, 5, and 6.

PATs provide specific acceptable criteria for performance and help to ensure a true competency-based welding program for students.

The following tasks are designed to develop your competency in preparing base metal. Practice each task until you are thoroughly familiar with the procedure.

As you complete each task, take it to your instructor for evaluation. Do not proceed to the next task until instructed to do so by your instructor.
PREPARE PLATE JOINTS MECHANICALLY

Using a nibbler, cutter, or grinder, mechanically or manually prepare the edge of a ¼"- to ¾"- thick carbon steel plate (=6 to 20 mm metric plate) with a bevel angle of 22½ or 30 degrees, at the discretion of the instructor.

Criteria for Acceptance:

- Bevel angle ±2½"
- Bevel face smooth and uniform to ½e" (1.6 mm)
- Root face ±½e" (±0.8 mm)
PREPARE PLATE JOINTS THERMALLY

Using oxyfuel or plasma arc cutting equipment, thermally prepare the edge of a \( \frac{1}{4}'' \)- to \( \frac{3}{4}'' \)-thick carbon steel plate (≈6 to 20 mm metric plate) with a bevel angle of 22\(\frac{1}{2}\) or 30 degrees, at the discretion of the instructor.

**Criteria for Acceptance:**

- Bevel angle ±2\(\frac{1}{2}\)"
- No dross
- Minimal notching not exceeding \( \frac{1}{32}'' \) (1.6 mm) deep on the kerf face
- Root face ±\( \frac{1}{32}'' \) (±0.8 mm)
Appendix B

Performance Accreditation Task – Visual Weld Test Inspection

The American Welding Society (AWS) School Excelling through National Skills Standards Education (SENSE) program is a comprehensive set of minimum Standards and Guidelines for Welding Education programs. The following performance accreditation is aligned with and designed around the SENSE program.

The Performance Accreditation Tasks (PATs) correspond to and support the learning objectives in AWS EG2.0, Guide for the Training and Qualification of Welding Personnel: Entry-Level Welder.

Note that in order to satisfy all learning objectives in AWS EG2.0, the instructor must also use the PATs contained in the second level of the NCCER Welding curriculum.

PAT 1 corresponds to AWS EG2.0, Module 9 – Welding Inspection and Testing Principles, Unit 4 Welding Inspection and Testing, Key Indicators 1 and 2.

PATs provide specific acceptable criteria for performance and help to ensure a true competency-based welding program for students.

The following task is designed to develop your competency in performing a visual weld test inspection. Practice this task until you are thoroughly familiar with the procedure.

As you complete the task, take it to your instructor for evaluation. Do not proceed to the next task until instructed to do so by your instructor.
VISUAL WELD TEST INSPECTION

Obtain a completed fillet weld on ¼" plate (3.2 mm metric plate) a minimum of 6" (15.2 cm) long, and a complete joint-penetration groove weld minimum 6" (15.2 cm) long, and then perform a visual test inspection (VT) on each weld using the following guide and acceptance criteria.

### Visual Test Inspection Report

<table>
<thead>
<tr>
<th>Discontinuity Category</th>
<th>Acceptance Criteria</th>
<th>¼&quot; Fillet Weld</th>
<th>CJP Groove Weld</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crack Prohibition</td>
<td>Any crack shall be unacceptable regardless of size or location</td>
<td>Acceptable or Reason for rejection</td>
<td>Acceptable or Reason for rejection</td>
</tr>
<tr>
<td>Weld/Base Metal Fusion</td>
<td>Complete fusion shall exist between adjacent layers of weld metal and base metal</td>
<td>Acceptable or Reason for rejection</td>
<td>Acceptable or Reason for rejection</td>
</tr>
<tr>
<td>Crater Cross Section</td>
<td>All craters shall be filled to provide the specified weld size</td>
<td>Acceptable or Reason for rejection</td>
<td>Acceptable or Reason for rejection</td>
</tr>
<tr>
<td>Weld Profiles</td>
<td>Weld profiles shall be in accordance with page 6.15 figure 14</td>
<td>Acceptable or Reason for rejection</td>
<td>Acceptable or Reason for rejection</td>
</tr>
<tr>
<td>Fillet Weld Size</td>
<td>The specified nominal fillet weld size tolerance is ±1/64 inch</td>
<td>Acceptable or Reason for rejection</td>
<td>N/A</td>
</tr>
<tr>
<td>Undercut</td>
<td>Undercut shall not exceed 1/32&quot; for any accumulated length up to 2 inches</td>
<td>Acceptable or Reason for rejection</td>
<td>Acceptable or Reason for rejection</td>
</tr>
<tr>
<td>Porosity</td>
<td>The sum of visible porosity ≤1/32&quot; or greater shall not exceed 1/4&quot; in any linear inch and shall not exceed 3/4&quot; in any linear 12 inches of weld</td>
<td>Acceptable or Reason for rejection</td>
<td>Acceptable or Reason for rejection</td>
</tr>
<tr>
<td>Complete Weld</td>
<td>Circle accept or reject for fillet and groove final inspection</td>
<td>Acceptable or Reason for rejection</td>
<td>Accept or Reject</td>
</tr>
</tbody>
</table>

Trainee Inspector’s Signature ___________________________ Date _______________

Instructor’s Verification: PASS/FAIL Signature ___________________________
**PERFORMANCE ACCREDITATION TASKS**

The American Welding Society (AWS) School Excelling through National Skills Standards Education (SENSE) program is a comprehensive set of minimum Standards and Guidelines for Welding Education programs. The following performance accreditation tasks are aligned with and designed around the SENSE program.

The Performance Accreditation Tasks (PATs) correspond to and support the learning objectives in *AWS EG2.0, Guide for the Training and Qualification of Welding Personnel: Entry-Level Welder*.

Note that in order to satisfy all learning objectives in *AWS EG2.0*, the instructor must also use the PATs contained in the second level of the NCCER Welding curriculum.

PATs 1 and 2 correspond to *AWS EG2.0, Module 4—Shielded Metal Arc Welding*, Key Indicators: 3 and 4.

PATs 3 through 8 correspond to *AWS EG2.0, Module 4—Shielded Metal Arc Welding*, Key Indicators: 3, 4, and 5.

PATs provide specific acceptable criteria for performance and help to ensure a true competency-based welding program for students.

The following tasks are designed to evaluate your ability to run beads and fillet welds with SMAW equipment and techniques. Perform each task when you are instructed to do so by your instructor. As you complete each task, bring it to your instructor for evaluation. Do not proceed to the next task until instructed to do so.
BUILD A PAD WITH E6010 OR E6011 ELECTRODES IN THE FLAT POSITION

Using 3/32" to 5/32" (2.4 to 4.0 mm) E6010 or E6011 electrodes, build up a pad of weld metal on carbon steel plate as indicated.

Criteria for Acceptance:

- Weld beads straight to within 1/8" (3.2 mm) ____________
- Uniform rippled appearance on the bead face ____________
- Craters and restarts filled to the full cross section of the weld ____________
- Face of the pad flat to within 1/8" (3.2 mm) ____________
- Smooth flat transition with complete fusion at the toes of one bead into the face of the previous bead ____________
- No porosity ____________
- No overlap at weld toes ____________
- No excessive undercut ____________
- No inclusions ____________
- No cracks ____________

NOTE: BASE METAL = CARBON STEEL PLATE AT LEAST 1/4" (6.4 MM) THICK

FINAL SIZE OF PAD IS AT THE DISCRETION OF THE INSTRUCTOR, WITH A MINIMUM LENGTH OF 6" (152 MM)

Copyright © 2015 NCCER. Permission is granted to reproduce this page provided that copies are for local use only and that each copy contains this notice.
BUILD A PAD WITH E7018 ELECTRODES IN THE FLAT POSITION

Using \( \frac{3}{32} \)" to \( \frac{5}{32} \)" (2.4 to 4.0 mm) E7018 electrodes, build up a pad of weld metal on carbon steel plate as indicated.

**NOTE:** BASE METAL = CARBON STEEL PLATE AT LEAST \( \frac{3}{4} \)" (6.4 MM) THICK

FINAL SIZE OF PAD IS AT THE DISCRETION OF THE INSTRUCTOR, WITH A MINIMUM LENGTH OF 6" (152 MM)

**Criteria for Acceptance:**

- Weld beads straight to within \( \frac{1}{8} \)" (3.2 mm)
- Uniform rippled appearance on the bead face
- Craters and restarts filled to the full cross section of the weld
- Face of the pad flat to within \( \frac{1}{8} \)" (3.2 mm)
- Smooth flat transition with complete fusion at the toes of one bead into the face of the previous bead
- No porosity
- No overlap at weld toes
- No excessive undercut
- No inclusions
- No cracks

Copyright © 2015 NCCER. Permission is granted to reproduce this page provided that copies are for local use only and that each copy contains this notice.
HORIZONTAL (2F) FILLET WELD WITH E6010 OR E6011 ELECTRODES

Using 3/32" to 5/32" (2.4 to 4.0 mm) E6010 or E6011 electrodes, make a horizontal fillet weld as indicated.

Criteria for Acceptance:

• Uniform rippled appearance on the bead face
• Craters and restarts filled to the full cross section of the weld
• Uniform weld size, ±1/16" (1.6 mm)
• Acceptable weld profile in accordance with AWS D1.1
• Smooth transition with complete fusion at the toes of the weld
• No porosity
• No excessive undercut
• No inclusions
• No cracks
• No overlap

NOTE: BASE METAL = CARBON STEEL
PLATE AT LEAST 1/4" (6.4 MM) THICK

FINAL SIZE OF COUPONS IS AT THE DISCRETION OF THE INSTRUCTOR, WITH A MINIMUM LENGTH OF 6" (152 MM)
HORIZONTAL (2F) FILLET WELD WITH
E7018 ELECTRODES

Using $\frac{3}{32}''$ to $\frac{5}{32}''$ (2.4 to 4.0 mm) E7018 electrodes, make a horizontal fillet weld as indicated.

**NOTE:** BASE METAL = CARBON STEEL
PLATE AT LEAST $\frac{1}{4}''$ (6.4 MM) THICK

FINAL SIZE OF COUPONS IS
AT THE DISCRETION OF THE
INSTRUCTOR, WITH A
MINIMUM LENGTH
OF 6'' (152 MM)

Criteria for Acceptance:

- Uniform rippled appearance on the bead face
- Craters and restarts filled to the full cross section of the weld
- Uniform weld size, $\pm \frac{1}{16}''$ (1.6 mm)
- Acceptable weld profile in accordance with *AWS D1.1*
- Smooth transition with complete fusion at the toes of the weld
- No porosity
- No excessive undercut
- No inclusions
- No cracks
- No overlap
VERTICAL (3F) FILLET WELD WITH E6010 OR E6011 ELECTRODES

Using \(\frac{3}{32}\)" to \(\frac{5}{32}\)" (2.4 to 4.0 mm) E6010 or E6011 electrodes, make a vertical fillet weld as indicated.

Criteria for Acceptance:

- Uniform rippled appearance on the bead face
- Craters and restarts filled to the full cross section of the weld
- Uniform weld size, \(\pm\frac{1}{16}\)" (1.6 mm)
- Acceptable weld profile in accordance with AWS D1.1
- Smooth transition with complete fusion at the toes of the weld
- No porosity
- No excessive undercut
- No inclusions
- No cracks
- No overlap at weld toes

Copyright © 2015 NCCER. Permission is granted to reproduce this page provided that copies are for local use only and that each copy contains this notice.
VERTICAL (3F) FILLET WELD WITH E7018 ELECTRODES

Using $\frac{3}{8}$" to $\frac{3}{4}$" (2.4 to 4.0 mm) E7018 electrodes, make a vertical fillet weld as indicated.

Criteria for Acceptance:

- Uniform rippled appearance on the bead face
- Craters and restarts filled to the full cross section of the weld
- Uniform weld size, ±$\frac{1}{16}$" (1.6 mm)
- Acceptable weld profile in accordance with AWS D1.1
- Smooth transition with complete fusion at the toes of the weld
- No porosity
- No excessive undercut
- No inclusions
- No cracks
- No overlap at weld toes

NOTE: BASE METAL – CARBON STEEL
PLATE AT LEAST $\frac{1}{4}$" (6.4 MM) THICK

FINAL SIZE OF COUPONS IS AT THE DISCRETION OF THE INSTRUCTOR, WITH A MINIMUM LENGTH OF 6" (152 MM)

Copyright © 2015 NCCER. Permission is granted to reproduce this page provided that copies are for local use only and that each copy contains this notice.
OVERHEAD (4F) FILLET WELD WITH E6010 OR E6011 ELECTRODES

Using 3/32" to 5/32" (2.4 to 4.0 mm) E6010 or E6011 electrodes, make an overhead fillet weld as indicated.

Criteria for Acceptance:

- Uniform rippled appearance on the bead face
- Craters and restarts filled to the full cross section of the weld
- Uniform weld size, ±1/16" (1.6 mm)
- Acceptable weld profile in accordance with AWS D1.1
- Smooth transition with complete fusion at the toes of the weld
- No porosity
- No excessive undercut
- No inclusions
- No cracks
- No overlap
OVERHEAD (4F) FILLET WELD WITH E7018 ELECTRODES

Using \( \frac{3}{32} \) to \( \frac{1}{8} \)\(^{\circ}\) (2.4 to 4.0 mm) E7018 electrodes, make an overhead fillet weld as indicated.

**Criteria for Acceptance:**
- Uniform rippled appearance on the bead face
- Craters and restarts filled to the full cross section of the weld
- Uniform weld size, \( \pm \frac{1}{16} \) (1.6 mm)
- Acceptable weld profile in accordance with AWS D1.1
- Smooth transition with complete fusion at the toes of the weld
- No porosity
- No excessive undercut
- No inclusions
- No cracks
- No overlap

Copyright © 2015 NCCER. Permission is granted to reproduce this page provided that copies are for local use only and that each copy contains this notice.
FLAT (1F) FILLET WELD WITH E6010 OR E6011 ELECTRODES

Using $\frac{3}{16}$" to $\frac{1}{4}$" (2.4 to 4.0 mm) E6010 or E6011 electrodes, make a flat fillet weld as indicated.

**Criteria for Acceptance:**

- Uniform rippled appearance on the bead face
- Craters and restarts filled to the full cross section of the weld
- Uniform weld size, $\pm \frac{1}{16}$" (1.6 mm)
- Acceptable weld profile in accordance with *AWS D1.1*
- Smooth transition with complete fusion at the toes of the weld
- No porosity
- No excessive undercut
- No inclusions
- No cracks
- No overlap

*NOTE: BASE METAL = CARBON STEEL PLATE AT LEAST $\frac{1}{4}$" (6.4 MM) THICK*

**BEAD SEQUENCE**

Copyright © 2015 NCCER. Permission is granted to reproduce this page provided that copies are for local use only and that each copy contains this notice.
**Appendix**

**PERFORMANCE ACCREDITATION TASKS**

The American Welding Society (AWS) School Excelling through National Skills Standards Education (SENSE) program is a comprehensive set of minimum Standards and Guidelines for Welding Education programs. The following performance accreditation tasks are aligned with and designed around the SENSE program.

The Performance Accreditation Tasks (PATs) correspond to and support the learning objectives in *AWS EG2.0, Guide for the Training and Qualification of Welding Personnel: Entry-Level Welder.*

Note that in order to satisfy all learning objectives in *AWS EG2.0,* the instructor must also use the PATs contained in the second level of the NCCER Welding curriculum.

PATs 1 through 4 correspond to *AWS EG2.0, Module 4—Shielded Metal Arc Welding,* Key Indicators 3, 4, and 6.

PATs provide specific acceptable criteria for performance and help to ensure a true competency-based welding program for students.

The following tasks are designed to develop your competency in preparing base metal. Practice each task until you are thoroughly familiar with the procedure.

As you complete each task, take it to your instructor for evaluation. Do not proceed to the next task until instructed to do so by your instructor.
V-GROOVE WELDS WITH BACKING IN THE FLAT (1G) POSITION

Using 3/32", 1/8", or 5/32" (2.4, 3.2, or 4.0 mm) E7018 electrodes, make a V-groove weld with steel backing on carbon steel plate in the flat position as indicated.

Inspection Hold Points:
• Fit-up
• Root pass
• Final

Criteria for Acceptance:
• No arc strikes outside the weld area
• Uniform rippled appearance on the bead face with no valley between the beads and acceptable tie-in
• Craters and restarts filled to the full cross section of the weld
• Uniform weld size ±1/16" (1.6 mm)
• Acceptable weld profile in accordance with AWS D1.1
• Smooth transition with complete fusion at the toes of the weld
• No porosity
• No overlap
• No excessive undercut
• No inclusions
• No cracks

Note to Instructor: Make sure all trainees complete each pass before starting another.

Copyright © 2015 NCCER. Permission is granted to reproduce this page provided that copies are for local use only and that each copy contains this notice.
V-GROOVE WELDS WITH BACKING IN THE HORIZONTAL (2G) POSITION

Using 3/32", 1/8", or 5/32" (2.4, 3.2, or 4.0 mm) E7018 electrodes, make a V-groove weld with steel backing on carbon steel plate in the horizontal position as indicated.

NOTE: BASE METAL = CARBON STEEL PLATE

<table>
<thead>
<tr>
<th>Length</th>
<th>Width</th>
<th>Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-1/4&quot; (15.9 CM)</td>
<td>1/4&quot; (6.4 MM)</td>
<td>1/4&quot; (6.4 MM)</td>
</tr>
<tr>
<td>BACKING STRIP 1/4&quot; × 1&quot; × 8&quot; (6.4 MM × 2.5 CM × 20.3 CM) MINIMUM, EXTENDING 1/2&quot; (1.3 CM) BEYOND PLATES</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Inspection Hold Points:
- Fit-up
- Root pass
- Final

Criteria for Acceptance:
- No arc strikes outside the weld area
- Uniform rippled appearance on the bead face with no valley between the beads and acceptable tie-in
- Craters and restarts filled to the full cross section of the weld
- Uniform weld size ±1/16" (1.6 mm)
- Acceptable weld profile in accordance with AWS D1.1
- Smooth transition with complete fusion at the toes of the weld
- No porosity
- No excessive undercut
- No overlap
- No inclusions
- No cracks
- Acceptable guided bend test results per AWS QC-10

Copyright © 2015 NCCER. Permission is granted to reproduce this page provided that copies are for local use only and that each copy contains this notice.
V-GROOVE WELDS WITH BACKING IN THE VERTICAL (3G) POSITION

Using ½", ⅞", or 1/8" (2.4, 3.2, or 4.0 mm) E7018 electrodes, make a V-groove weld with steel backing on carbon steel plate in the vertical position as indicated.

NOTE: BASE METAL = CARBON STEEL PLATE

Inspection Hold Points:
- Fit-up
- Root pass
- Final

Criteria for Acceptance:
- No arc strikes outside the weld area
- Uniform rippled appearance on the bead face with no valley between the beads and acceptable tie-in
- Craters and restarts filled to the full cross section of the weld
- Uniform weld size ± ⅛” (1.6 mm)
- Acceptable weld profile in accordance with AWS D1.1
- Smooth transition with complete fusion at the toes of the weld
- No porosity
- No excessive undercut
- No overlap
- No inclusions
- No cracks
- Acceptable guided bend test results per AWS QC-10

Copyright © 2015 NCCER. Permission is granted to reproduce this page provided that copies are for local use only and that each copy contains this notice.
V-GROOVE WELDS WITH BACKING IN THE OVERHEAD (4G) POSITION

Using 3/32", 1/8", or 5/32" (2.4, 3.2, or 4.0 mm) E7018 electrodes, make a V-groove weld with steel backing on carbon steel plate in the overhead position as indicated.

**Inspection Hold Points:**
- Fit-up
- Root pass
- Final

**Criteria for Acceptance:**
- No arc strikes outside the weld area
- Uniform rippled appearance on the bead face with no valley between the beads and acceptable tie-in
- Craters and restarts filled to the full cross section of the weld
- Uniform weld size ± 1/16" (1.6 mm)
- Acceptable weld profile in accordance with AWS D1.1
- Smooth transition with complete fusion at the toes of the weld
- No porosity
- No excessive undercut
- No overlap
- No inclusions
- No cracks
- Acceptable guided bend test results per AWS QC-10
**PERFORMANCE ACCREDITATION TASKS**

The American Welding Society (AWS) School Excelling through National Skills Standards Education (SENSE) program is a comprehensive set of minimum Standards and Guidelines for Welding Education programs. The following Performance Accreditation Tasks (PATs) are aligned with and designed around the SENSE program. The PATs correspond to and support the learning objectives in *AWS EG2.0, Guide for the Training and Qualification of Welding Personnel: Entry-Level Welder*.

Note that in order to satisfy all learning objectives in *AWS EG2.0*, the instructor must also use the PATs contained in the second level of the NCCER Welding curriculum.

PATs 1 through 4 correspond to *AWS EG2.0, Module 4 – Shielded Metal Arc Welding*, Key Indicators: 3, 4, and 6.

PATs provide specific acceptable criteria for performance and help to ensure a true competency-based welding program for students.

The following tasks are designed to evaluate your ability to run open-root V-groove welds with SMAW equipment in all positions using E6010 and E7018 electrodes. Perform each task when you are instructed to do so by your instructor. As you complete each task, take it to your instructor for evaluation. Do not proceed to the next task until instructed to do so.
OPEN V-GROOVE WITH E6010 AND E7018 ELECTRODES IN THE FLAT POSITION

Using $\frac{3}{8}$" or $\frac{1}{4}$" (2.4 or 3.2 mm) E6010 electrodes for the root pass and $\frac{3}{8}$" or $\frac{1}{4}$" (2.4 or 3.2 mm) E7018 electrodes for the fill and cover passes, make an open-root V-groove weld on carbon steel plate in the flat position as indicated.

Criteria for Acceptance:

- No arc strikes outside the weld area
- Uniform rippled appearance on the bead face
- Craters and restarts filled to the full cross section of the weld
- Uniform weld size
- Acceptable weld profile in accordance with the ASME Boiler and Pressure Vessel Code
- Smooth transition with complete fusion at the toes of the weld
- Complete uniform root penetration at least flush with the base metal to a maximum buildup of $\frac{1}{4}$" (3.2 mm)
- No porosity
- No excessive undercut
- No inclusions
- No cracks
- Acceptable guided bend test results (instructor option)
OPEN V-GROOVE WITH E6010 AND E7018 ELECTRODES IN THE HORIZONTAL POSITION

Using 3/32" or 1/8" (2.4 or 3.2 mm) E6010 electrodes for the root pass and 3/32" or 1/8" (2.4 or 3.2 mm) E7018 electrodes for the fill and cover passes, make an open-root V-groove weld on carbon steel plate in the horizontal position as shown.

Criteria for Acceptance:

- No arc strikes outside the weld area
- Uniform rippled appearance on the bead face
- Craters and restarts filled to the full cross section of the weld
- Uniform weld size
- Acceptable weld profile in accordance with the ASME Boiler and Pressure Vessel Code
- Complete uniform root penetration at least flush with the base metal to a maximum buildup of 1/8" (3.2 mm)
- Smooth transition with complete fusion at the toes of the weld
- No porosity
- No excessive undercut
- No inclusions
- No cracks
- Acceptable guided bend test results (instructor option)
OPEN V-GROOVE WITH E6010 AND E7018 ELECTRODES IN THE VERTICAL POSITION

Using \( \frac{3}{32} \)" to \( \frac{1}{4} \)" (2.4 or 3.2 mm) E6010 electrodes for the root pass and \( \frac{3}{32} \)" or \( \frac{1}{8} \)" (2.4 or 3.2 mm) E7018 electrodes for the fill and cover passes, make an open-root V-groove weld on carbon steel plate in the vertical position as shown.

Criteria for Acceptance:

- No arc strikes outside the weld area
- Uniform rippled appearance on the bead face
- Craters and restarts filled to the full cross section of the weld
- Uniform weld size
- Acceptable weld profile in accordance with the ASME Boiler and Pressure Vessel Code
- Complete uniform root penetration at least flush with the base metal to a maximum buildup of \( \frac{1}{8} \)" (3.2 mm)
- Smooth transition with complete fusion at the toes of the weld
- No porosity
- No excessive undercut
- No inclusions
- No cracks
- Acceptable guided bend test results (instructor option)
OPEN V-GROOVE WITH E6010 AND E7018 ELECTRODES IN THE OVERHEAD POSITION

Using 3/32" to 1/8" (2.4 or 3.2 mm) E6010 electrodes for the root pass and 3/32" or 1/8" (2.4 or 3.2 mm) E7018 electrodes for the fill and cover passes, make an open-root V-groove weld on carbon steel plate in the overhead position as indicated.

Criteria for Acceptance:

- No arc strikes outside the weld area
- Uniform rippled appearance on the bead face
- Craters and restarts filled to the full cross section of the weld
- Uniform weld size
- Acceptable weld profile in accordance with the ASME Boiler and Pressure Vessel Code
- Complete uniform root penetration at least flush with the base metal to a maximum buildup of 1/8" (3.2 mm)
- Smooth transition with complete fusion at the toes of the weld
- No porosity
- No excessive undercut
- No inclusions
- No cracks
- Acceptable guided bend test results (instructor option)

Copyright © 2015 NCCER. Permission is granted to reproduce this page provided that copies are for local use only and that each copy contains this notice.