

MIG welder

Prep all tools and materials BEFORE you begin:

- Safety equipment including hoods, gloves and jackets
- Mild Steel 1/8"-1/4" thick cut approx.. 2"x4"
- It is important to remember that some students will be intimidated by the sights and sounds of electric welding.
- Remember to stay positive and encouraging!

•Review dress code/Personal protection

- Remind students that long hair must be tied back, loose clothing and/or jewelry must be removed
- Non-synthetic long sleeves and pants required: Cotton, Wool, Leather
- Welding hood must be worn at ALL times while welding or observing
- Leather gloves must be worn

•Briefly discuss Hazards (No Horror Stories)

- User condition can be hazard ie; lack of sleep, in a hurry
- Burns
- Eye injury/Flash-burn
- Flammable materials including rags
- Painted or Galvanized material is NOT allowed

•What is Welding?

- Discuss definition of welding.

weld¹

verb

1.join together (metal pieces or parts) by heating the surfaces to the point of melting using a blowtorch, electric arc, or other means, and uniting them by pressing or hammering

- Define Parent Material and Filler Material
- Briefly discuss definition of M.I.G. "**Metal Inert Gas**"
- Briefly describe the unique process pointing out:
 - Wire feed and shielding gas
 - Electrode/Heat source is also filler material
 - Ground Clamp

With Machine OFF

•Demonstrate Machine Setup

- Open Side Cover
- Point out wire and describe the material and size
- Walk students through how to read the chart for machine setup
 - Ask questions making sure students understand:
 - What material they are welding (mild steel)
 - What material the wire/filler material is (mild steel)
 - What shielding gas is being used (Argon/CO2)

•**Discuss and Demonstrate importance of:**

- Body and Hand Position
- Stick Out should be 3/8 inch
- Excess wire should be cut with pliers NEVER on side of table or workpiece
- Torch Angle and Height
 - Approx. 15 degrees
 - 3/8" distance (see "stick out")
- Warn those around you by loudly announcing "welding" before initiating arc.

Making Welds

•**Demonstrate running a Horizontal bead**

- Remind students to ***Stay In The Puddle***
- Make sure students are close enough to see...this will be a challenge
 - All the action is happening in approx. 1/4 square inch
- Briefly Review/Demonstrate
 - Body Position
 - Using non-dominate hand as a guide/anchor
 - Stick-Out/Torch Height
- Run a simple horizontal bead
 - Review weld appearance
 - Show 3/8" stick out after weld
- If the entire group did not see, have them adjust and run another bead.

•**Students make Horizontal Weld**

- If possible, have student sit on stool
- Help each student:
 - Get comfortable
 - Establish correct torch angle and height
 - Make sure non-dominant hand is in contact with table and torch
- Help/physically manipulate torch with them holding it to establish correct angle etc. if necessary
- When they are ready remind them to audibly say "welding"
- Physically hold torch handle with them during first attempt(s)
 - Correct torch angle/speed/height as necessary
- Carefully watch as they run bead by themselves and give POSITIVE constructive feedback.
- Repeat until all students in group have welded

•**Demonstrate Fillet Weld**

- Demonstrate how to tack weld parts together
- Demonstrate Horizontal Fillet Weld
 - Emphasize torch angle and "Crescent" pattern/motion
- Demonstrate Vertical Fillet on opposite side
 - Emphasize torch angle and "stop and go" pattern/motion

- Students Make Horizontal and Vertical Fillet Welds**

- Remind students to clean-up after themselves.**

Show them where the brooms, vacuum, etc. are located and what our expectations for clean-up are.

REMEMBER-We are here to help. If you have any questions ask!

Tips For Techs

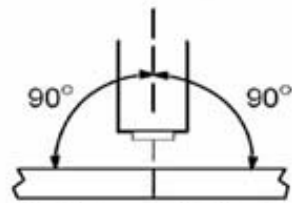
The TWO most common beginner mistakes:

- Moving too fast
- Torch too far away from weld puddle/backing up while welding

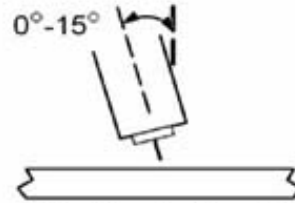
Other Problems and Causes:

- Frothy/Lava-like welds
 - No shielding gas
- Popping and Spitting
 - Incorrect machine setup
- Thin/Narrow beads
 - Incorrect machine setup (too cold) or moving too fast
- Tall, rounded beads
 - Incorrect machine setup
 - moving too fast
- Bead on only one side of weld
 - Incorrect torch angle or aim

FIGURE 1: Proper Work and Gun Angles

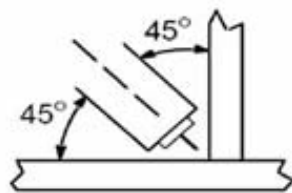


End View Of Work Angle

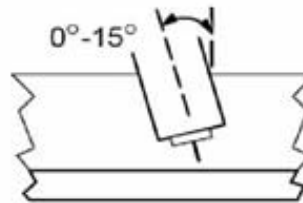


Side View Of Gun Angle

GROOVE WELDS



End View Of Work Angle



Side View Of Gun Angle

FILLET WELDS