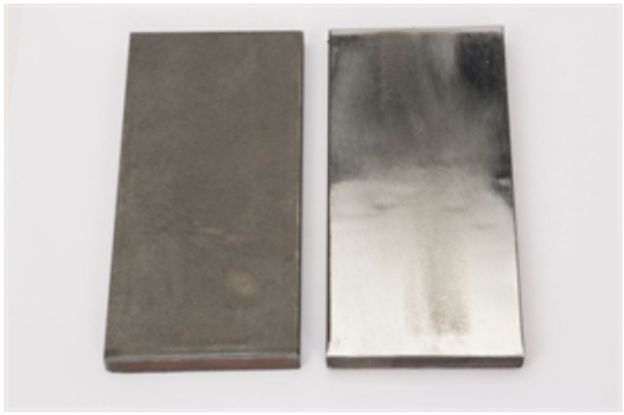
GMAW Additional Topics #1

- Recall - **GMAW** (mig) welding typically uses constant voltage (CV) power and direct current electrode positive (DCEP) polarity
- Can join most metals
- Base metal surfaces must be free from oil and other substances
- GMAW will actually do some cleaning during the process because the current breaks up materials on the surfaces, but it cannot have excessive oxide scale (a dull dark film formed on carbon steels and aluminum as a result of cutting processes) which can contaminate the weld. This oxide scale can be removed by sanding or with a liquid solution

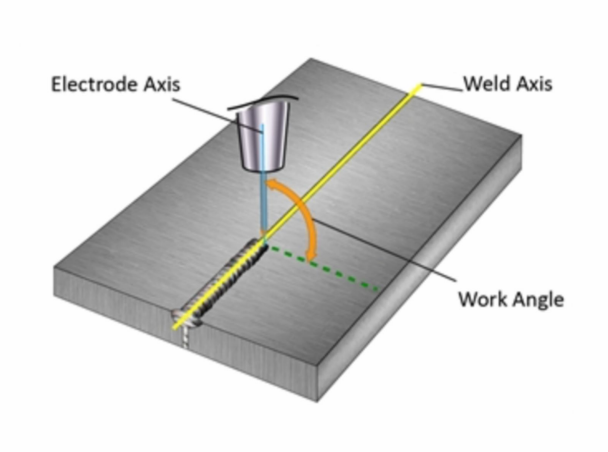


Mild steel with and without oxide scale.

- Stainless steel must be cleaned with a stainless wire brush
- Certain metals may require preheating, which can slow the cooling rate, increase ductility and prevent stress damage
    - Example:preheating some steels prevents brittle fracture because the temperature of the metal is raised above the point at which it may fracture

Electrode Orientation

- Refers to the work angle and travel angle of the mig welding gun



- GMAW commonly uses a travel angle in which the electrode axis is tilted between 5 degrees to 15 degrees away from vertical. This range provides good arc control and ensures proper shielding of the arc and puddle

- The forehand technique uses a push angle, meaning the electrode points in the direction of welding. This tends to create a flatter bead. This technique helps keep the gas over the puddle
- The backhand technique uses a drag angle, meaning the electrode points opposite the welding direction. This provides a more stable arc with deeper penetration and less spatter. Drag angles are more

commonly used for slag processes than GMAW because the drag angle tends to pull gas away from the puddle