

GTAW

Emmett Beaver

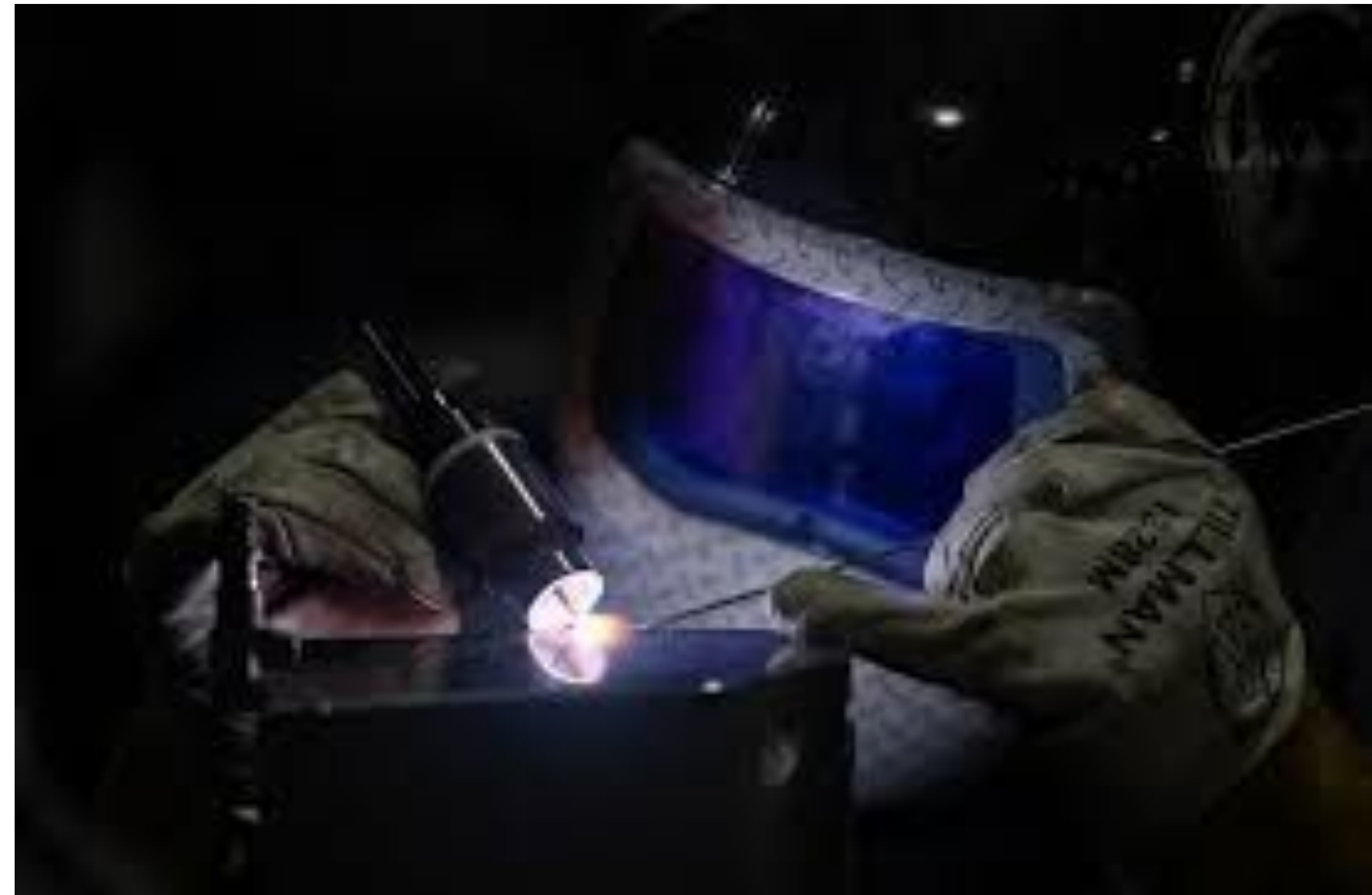
Electrodes

- Pure tungsten (green) is used for AC welding and works best on aluminum and magnesium. It forms a round tip and is good for basic welding jobs.
- Thoriated tungsten (red) is used for DC welding and is best for steel, stainless steel, and nickel alloys. It starts easily and lasts a long time, but needs careful handling.
- Ceriated tungsten (gray) is good for low current welding on thin materials and pipe. It works on both AC and DC and is easy to control.
- Lanthanated tungsten (blue or gold) can be used on both AC and DC. It is very versatile and works well on steel, stainless steel, and aluminum.
- Zirconiated tungsten (white or brown) is used for AC welding, mainly on aluminum and magnesium. It resists contamination and keeps a stable tip.
- Rare earth tungsten can be used for both AC and DC welding. It is strong, lasts a long time, and is often used for high-performance or automated welding.



Polarity and Its Effects

- Polarity has multiple effect on the welding process, DCEN(Direct Current Electrode Negative) most of the heat goes into the workpiece, this gives better penetration.
- DCEP(Direct Current Electrode Positive) more heat goes into the filler rod which reduces the penetration.
- DCEP provides a cleaning effect that removes oxide layers.
- DCEN has little to none cleaning action.
- DCEN gives better control by keeping the rod cooler. DCEP heats the rod very hot which causes to loss of control.
- DCEN is the most common used in TIG.
- DCEP is rarely used for anything besides alluminum.



Typical Gases

- Argon: Most commonly used in TIG welding; easy to work with, produces a smooth, stable arc, and creates clean welds on most metals.
- Helium- Produces a hotter arc for deeper penetration and faster welding, but is harder to start and control.
- Argon + Helium- Combines easy arc starting with added heat, making it useful for thicker materials and improving welding speed.
- Argon + Hydrogen- Increases heat and improves weld flow for smoother, shinier results; mainly used for stainless steel and not suitable for all metals.
- Argon + Nitrogen- Can improve weld strength in certain steels; not as commonly used as other mixtures.



Works Cited

[Image 1](#)

[Image 2](#)

[Image 3](#)

[Electrode Info](#)

[Gas information](#)

[Polarity Info](#)