

**PRAXAIR'S STAR™ GASES – ARGON AND HELIUM;**  
**PRAXAIR'S HELISTAR™ A-25, A-50 AND A-75 – ARGON/HELIUM BLENDS;**  
**FOR GMAW (MIG/MAG WELDING) AND GTAW (TIG WELDING) OF ALUMINUM**

Argon is the most commonly used gas for MIG and TIG welding of aluminum and other non-ferrous materials. Argon provides good arc starting and stable metal transfer due to its low ionization potential. It is used for AC TIG welding where it offers superior cleaning action, arc stability, control over voltage and weld appearance.

Helium, due to its high thermal conductivity and high ionization potential, produces a hotter, broader arc which improves the depth of penetration and weld bead wetting characteristics. With TIG, it raises the average operating voltage when compared with argon. Helium-enhanced argon blends are generally preferred over pure argon for joining heavy sections of base metal which have high thermal conductivity. Helium can be used to reduce the level of ozone generation when welding aluminum.

Blends of argon and helium are frequently selected for either TIG or MIG welding to promote higher travel speeds.

Praxair's HeliStar™ A-75 blend is used where some additional heat input is required while maintaining the favorable arc-starting characteristics of pure argon. It is the most widely used blend for MIG welding thick aluminum sections. It is an excellent choice for the pulsed spray welding of aluminum and for use when 5000 series filler wires are necessary.

Praxair's HeliStar A-50 blend is used primarily for high-speed mechanized welding of non-ferrous materials under 3/4" thick.

Praxair's HeliStar A-25 blend enhances the speed and quality of mechanized welds in aluminum. This mixture is used with the TIG-Hot Wire process and also works well in MIG welding with constant current power and voltage sensing wire feeders.

**Product Features**

- Argon base.
- Helium enhancement.
- Optimized blend of Ar/He.

**Benefits**

- Easy arc starting, good arc stability.
- Good bead appearance and cleaning action (TIG).
- Higher heat input, fluid weld puddle, greater travel speed.
- Good bead wetting and bead shape.
- Deeper penetration.
- Minimum porosity/good x-ray quality welds.
- Best performance characteristics for the application and materials used.

**Typical Applications**

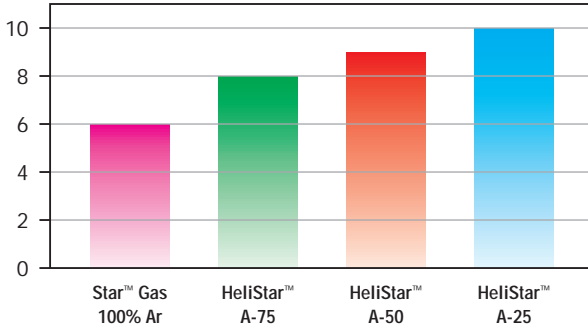
- Aluminum boats.
- Automotive panels/frames; hoods/body panels.
- Aluminum ladders.
- Aluminum tool boxes for pick-up trucks.
- Transformers.

## Performance Characteristics

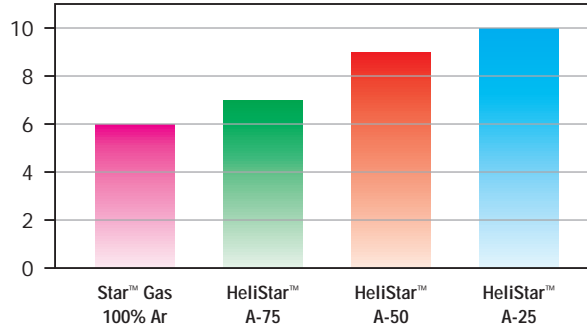
Illustrated below are comparisons between shielding gas blends used with the MIG process and 4043/5356 filler wires.

They are intended to show expected differences between blends in typical applications and should be used to aid in shielding gas selection for a specific job.

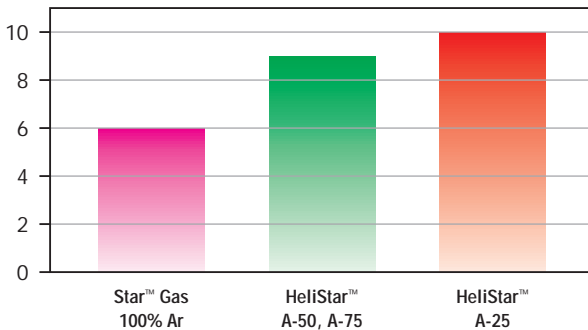
**Travel Speed** (10 = most, 1 = least)



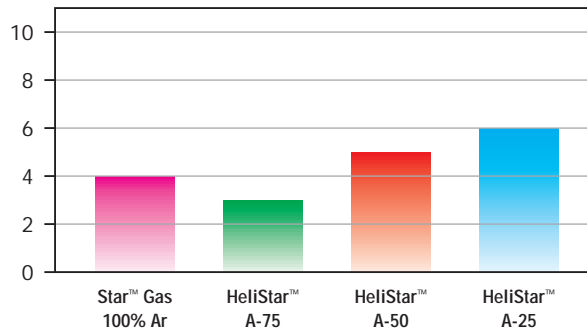
**Bead Shape** (10 = excellent, 1 = poor)



**Penetration** (10 = most, 1 = least)



**Fume Generation** (10 = most, 1 = least)



**Note:** The selection of the appropriate shielding gas can become quite complex due to the large variety of operating conditions (base metal, chemistry and thickness, metal transfer, wire

selection, welding position, etc). Please consult with your Praxair representative for the best option available for your application.

## Welding Conditions Selection Table

Wire diameter (inches)	Wire feed speed (ipm)	Current level (amps)	Voltage (volts)*
3/64 – 4043	225-375	140-170	23-25
3/64 – 5356	300-425	160-190	24-26
1/16 – 4043	225-275	175-230	25-26
1/16 – 5356	300-375	210-250	26-27

\* Voltage level for 60 Hz power supply. With 50 Hz, add 3 volts. For Ar/He, add 2 volts.



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