

## PRAXAIR'S HELISTAR™ CS – ARGON/HELIUM/CARBON DIOXIDE BLEND FOR ALL FORMS OF GMAW (MIG/MAG WELDING) OF CARBON STEEL

Praxair's HeliStar™ CS is a specially formulated shielding gas blend of argon, helium, and carbon dioxide for high deposition welding of carbon steel. It can be used to join all thicknesses of carbon and low alloy steel in any welding position. The increased heat input associated with the helium component permits higher travel speeds while maintaining good control over bead shape.

Praxair's HeliStar CS blend is suitable for high deposition rate, high density spray arc welding and is ideal for robotic applications. Praxair's HeliStar CS blend has also been shown to be superior to two part blends for welding over light oil, rust and scale. Weld metal properties are very good, with superior low temperature impact properties.

### Product Features

- Balanced helium and CO<sub>2</sub> additions in argon-based blend.
- Broader arc shape.
- Hotter arc characteristics with helium/CO<sub>2</sub>.

### Benefits

- Good arc stability/arc starting characteristics.
- High deposition rates possible.
- Higher welding speeds possible with good bead shape control.
- Inert properties/low welding fume.
- Excellent gap bridging ability in flat and vertical positions/faster robotic welding speeds.
- Tolerates more mismatch and plate fit-up problems.
- Good over some mild surface contamination.
- Deeper penetration; less weld metal required in smaller included-angle joints.

### Typical Applications

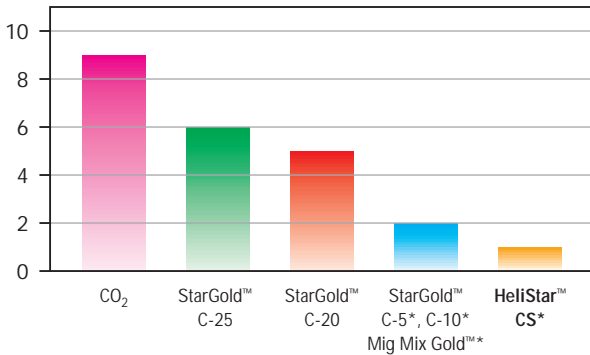
- Longitudinal and circumferential tank seams at higher welding speeds.
- Weld over some oil and rust while maintaining good weld quality.
- 10 to 20% higher welding speed in fillet welds on heavier plate.
- Joining dissimilar thickness joints.
- High speed robotic welding.
- Heavy single pass fillets in structural components.

## Performance Characteristics

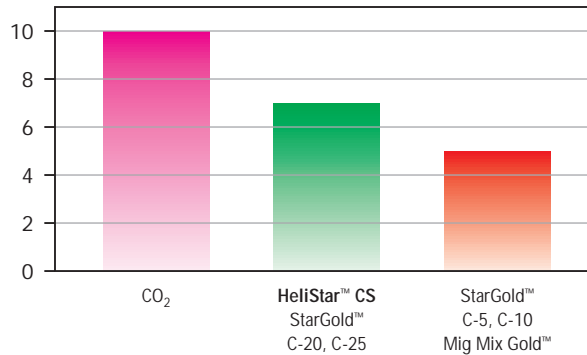
Illustrated below are comparisons between shielding gas blends used with ER70S-3 and ER70S-6 solid wire electrodes over a range of current levels.

They are intended to provide suggestions for gas blend selection based on the criteria indicated.

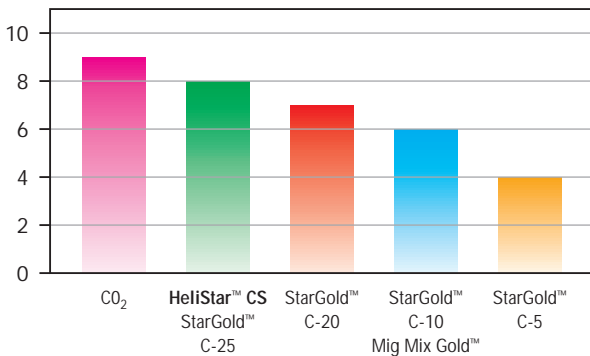
**Spatter** (10 = most, 1 = least) \* Spray arc transfer



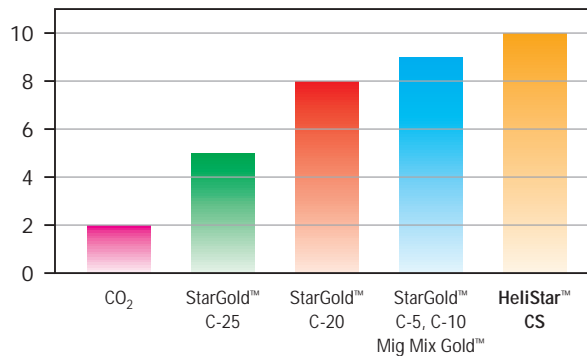
**Fume** (10 = most, 1 = least)



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



**Travel Speed** (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)*
0.035 (1.0 mm)	450-750	180-300 (spray)	28-33
0.035 (0.9 mm)	350-600	170-280 (pulsed)	24-31 (average))
0.035 (1.0 mm)	750-1000	300-450 (high deposition)	31-40
0.045 (1.2 mm)	300-550	270-330 (spray)	30-34
0.045 (1.2 mm)	275-550	180-330 (pulsed)	26-32 (average)
0.045 (1.2 mm)	550-750	300-450 (high deposition)	33-39

\* Voltage level for 60 Hz power supply. With 50 Hz, add 3 volts.



Praxair, Inc.  
39 Old Ridgebury Road  
Danbury, CT 06810-5113  
Tel: 1-800-PRAXAIR  
Fax: 1-800-772-9985  
Internet: www.praxair.com  
e-mail: info@praxair.com

The information contained herein is offered for use by technically qualified personnel at their discretion and risk, without warranty of any kind. PRAXAIR, the FLOWING AIRSTREAM design, MAKING OUR PLANET MORE PRODUCTIVE, HELI STAR, MIG MIX GOLD and STAR GOLD are trademarks, service marks or registered trademarks of Praxair Technology, Inc. in the United States and/or other countries. Copyright © 1999 Praxair Technology, Inc. All Rights Reserved. P-8357 5M 6/99