

PRAXAIR'S STARGold™ C-5 AND C-10 – ARGON/CARBON DIOXIDE BLENDS FOR CONVENTIONAL AND PULSED SPRAY GMAW (MIG/MAG WELDING)

Argon mixtures containing from 5-10% CO₂ by volume, are used for conventional and pulsed spray transfer welding of carbon and low alloy steels. Welds are less oxidized than those made with argon/oxygen blends and the penetration profile is broader. Bead shape is good. Weld metal mechanical properties are excellent. Welding fume levels are low with both solid and metal-cored wires. These mixtures can also be used for short-circuiting metal transfer on thin gauge material. At lower CO₂ levels, care should be taken in selection of welding parameters in the short-circuiting mode to ensure adequate heat is available for acceptable penetration.

* Always refer to the wire manufacturer's recommendation for shielding gas selection.

These gas blends can also be used with specially designed low fuming, flux-cored wires.* Depending upon the wire selected, excellent all-position performance can be obtained with a minimum level of welding fume. In some applications, when either metal-cored or these special all-position flux-cored wires are used with Ar/low CO₂ blends, it possible to complete multiple pass weld procedures without chipping or deslagging between passes.** Argon/carbon dioxide shielding gases can be readily mixed from liquid (bulk) storage tanks for reduced gas supply costs or supplied premixed in standard high pressure cylinders.

** Up to three passes.

Product Features

Praxair's StarGold™ C-5 gas blend is primarily used for pulsed spray transfer welding of plain carbon and low alloy steels:

- Lower CO₂ content.
- High argon content.

Praxair's StarGold C-10 gas blend is primarily used for spray transfer with solid and metal-cored wires:

- Slightly increased CO₂ content for improved puddle fluidity and broader penetration.
- Improved short arc performance.

Benefits

- Faster freezing weld puddle for all position welding.
- Good arc starting and stability in pulsed spray.
- Excellent weld metal mechanical properties.
- Low spatter and fume levels.

- Improved bead wetting and shape with fewer weld defects.
- Good arc stability.
- Lower fume levels compared with other argon/carbon dioxide blends and CO₂.
- Controlled penetration for good gap bridging.
- Offer improved penetration when compared to Ar/O₂ blends.

Typical Applications

- Praxair's StarGold C-5 gas blend – for all-position pulsed spray welding of thin and heavy carbon and low alloy steels such as HY-80.
- Praxair's StarGold C-10 gas blend – for conventional spray arc welding using either solid, metal-cored, or specially developed flux-cored wires, of farm implements, machinery and structural members where broader penetration is desired.

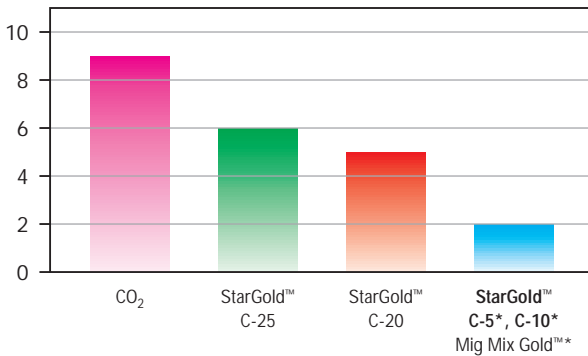
- Praxair's StarGold C-10 gas blend – for use with metal-cored wires in all applications. Arc stability is excellent and penetration is improved over argon blends with less CO₂ or with oxygen additions.
- Praxair's StarGold C-10 gas blend – for bridging gaps on light gauge material using short arc transfer.

Performance Characteristics

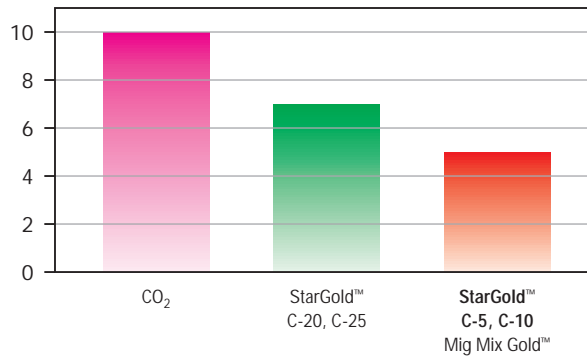
Illustrated below are comparisons between shielding gas blends used with ER70S-3 and ER70S-6 solid wire electrodes over a range of current levels.

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

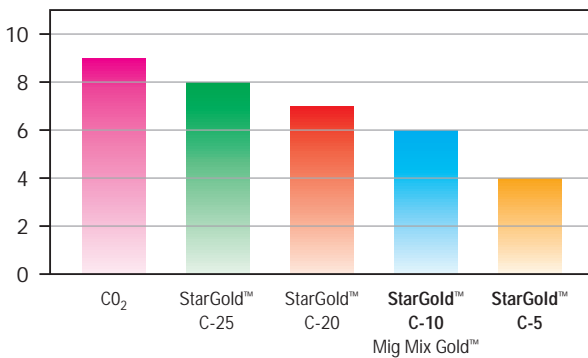
Spatter (10 = most, 1 = least) * Spray arc transfer



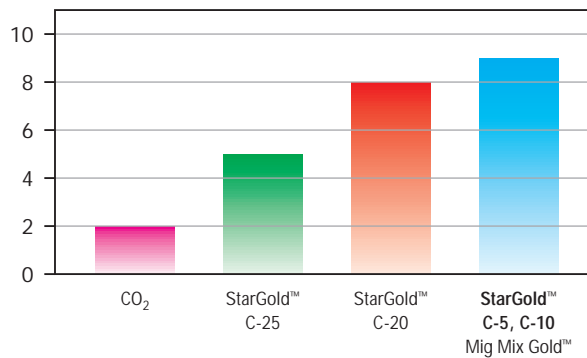
Fume (10 = most, 1 = least)



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 (0.9 mm)	275-400	100-150 (pulsed)	18-22 (average)
0.035 (0.9 mm)	275-400	100-175 (short arc)	16-20
0.035 (0.9 mm)	350-550	175-220 (spray)	26-28
0.045 (1.2 mm)	150-280	100-175 (short arc)	17-20
0.045 (1.2 mm)	200-250	175-200 (pulsed)	20-24 (average)
0.045 (1.2 mm)	300-500	260-320 (spray)	27-30
0.063 (1.6 mm)	150-300	250-400 (spray)	29-32

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



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