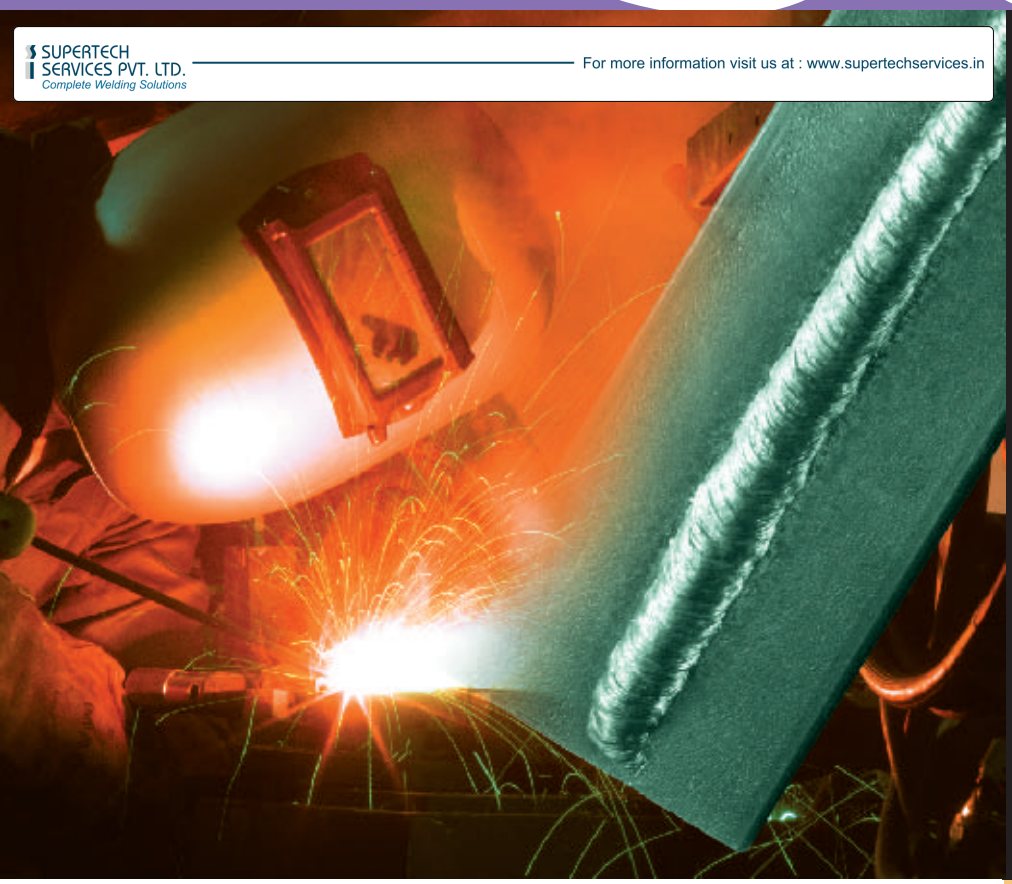
MAGNA™ WELDING ALLOYS

305

MAGNA 305 Super-Tough Alloy for High-Strength Steels



Super-Tough Alloy for High-Strength Steels

- *Engineered specially for welding high-strength low-alloy steels.*
- *Outstanding mechanical properties.*
- *Superior crack resistance – even without preheating.*

TRUST MAGNA FOR

- *Ease of Application*
- *Wide Versatility*
- *Outstanding Physical Properties*

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SPECIAL FEATURES

Magna 305 Super-Tough Alloy for High-Strength Steels enables you to weld higher tensile strength steels faster than ever before.

- **Magna 305** is quality engineered specially for outstanding results even on the most difficult-to-weld steels, including high-strength low-alloy steels.
- **Magna 305** offers superb mechanical properties.
- **Magna 305** provides superior crack resistance – even without preheating.

OUTSTANDING PROPERTIES

Magna 305 is the super-tough alloy for high-strength steels that:

- Provides 116,000 p.s.i. (81.6 kg/mm^2) tensile strength – 102,000 p.s.i. (71.7 kg/mm ^{2}) yield strength.
- Has self-annealing quality to eliminate under-bead cracking, fissures and defects.
- Gives extremely fast deposition rate – eliminates need to chip slag between passes.
- Is fully machinable – machines like free-machining steel.

USE FOR

Magna 305 (for AC & DC) is the right choice for welding low-alloy high-tensile construction steels. **Magna 305** also has superior welding properties when welding:

T-1 Steel	USS Con-Pac M	Van-80	N-A-XTRA 100
T-1 Type A	Jalloy S-90	HY-80	N-A-XTRA 110
Armco SSS-100	Jalloy S-100	Jalloy S-110	Jalloy AR-360
Armco SSS-100A	HY-90	SKF327	Carbon Manganese

Magna 305 gives great results on problem steel such as:
Painted Steel Rusty Steel Oily Steel Sulfur-Bearing Steel
"Tramp" Steel Free-Machining Steel Cold Rolled Steel

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MAGNA 305

DESCRIPTION:

Magna 305 is the electrode designed for all steel fabricated. It is a high alloy electrode for joining the newer construction steels such as T-1, and for general maintenance use in welding heavy-duty steels.

EXTRAORDINARY MECHANICAL PROPERTIES:

Magna 305 provides the following physical properties:-

~ Up to 116,000 p.s.i. (81 kg/mm2) Tensile Strength

~ Up to 102,000 p.s.i. (73 kg/mm2) Yield Strength

~ Up to 24% Elongation

~ 63.2% Reduction of area

~ 237 Brinell Hardness

The high alloy content ensures the maximum toughness, strength, and other physical properties for ideal application on all steels where the weld will be used as welded without heat treatment.

NON-CRACKING FORMULA:

Magna 305 has high notch ductility and does not crack on problem steel applications, even including sulphur bearing and selenium bearing steels. The super – tough weld with moisture guard coating ensure elimination of cold cracking in the heat affected zone, even on air hardening steels. It is now possible for the maintenance welder to eliminate cracking and porosity, irrespective of the problem conditions such as hydrogen pick-up, improper rate of cooling and heating, stress and chemical composition of base metal.

PASS ON PASS WITHOUT SLAG REMOVAL – BUT NO SLAG INCLUSION:

Magna 305 has an advanced type of coating. It is all mineral containing no cellulose materials. The coating contains a high percentage of micronized and finely ground metals including ferro-alloy additions, and silicon derivatives as well as titanium derivatives. Most of the coating actually goes into the deposit increasing welding speed, reducing slag loss, and resulting in a slag blanket which has a light viscosity and floats completely to the top, leaving no slag inclusions. This slag is easily welded through.

This makes it possible for the welder to weld continuously in most instances without the usual time loss of chipping slag, which occurs with most ordinary electrodes.
Magna 305 was developed specially for the high yield strength steels.

SUPER MACHINABILITY:

In spite of providing a very high strength weld, Magna 305 produces a weld microstructure which is very easily machinable by normal tools. Magna 305 is ideal as an overlay on shafts and worn parts where good machinabilty is necessary.

EXCLUSIVE MAGNA MOISTURE GUARD COATING:

Ordinary electrodes such as mild steel, low hydrogen and other types, pick up moisture from atmosphere as soon as within 4 hours after opening of packets. This moisture dissociates at high temperature of the arc as free hydrogen. The free hydrogen enters the weld and creates problem of Hydrogen Induced Cracking (HIC) or Underbead cracking in welded structure. The hydrogen is also responsible for causing porosity in weld.
Magna 305 is specially formulated with a moisture guard coating which prevents such quick moisture pick up from atmosphere even the packet is open thereby greatly reducing the chance of cracking and makes it possible for the maintenance department personal to keep the electrodes under normal storage conditions for much longer period of time (without greatly affecting the quality of weld).

ANTI-POROSITY FORMULA:

Rust and scale act as a source of oxygen in welding and react with hydrogen to form water vapor (H2O) and with carbon to form carbon monoxide (CO) thus causing porosity. Grease and oil on steel cause hydrogen formation which in turn causes porosity. Magna 305 absolutely does not have start-up porosity which most ordinary electrodes have.

LOW TEMPERATURE STRENGTH:

Magna 305 is highly suitable where high- strength welds with excellent low-temperature impact properties are required.

APPLICATION:

Use DC reverse polarity or AC. In general, adjust the machine to the same amperage as is normally used with the same machine using ordinary electrodes of the same diameter.
In vertical up welding, the steady progression technique, as opposed to the whipping technique as used with ordinary electrodes, should be used. Do not draw the electrode from the molten puddle during upward progression. The correct weaving technique is not to lengthen the arc at the edges but to use a short uniform arc.

T-1 STEEL: Magna 305 was developed specially for the high yield strength steels such as T-1. Physical properties of Magna 305 will equal or exceed the physical properties of these high yield strength steels in either the “as welded” of “stress relieved” condition, thus giving 100% joint efficiency at all times.

In addition Magna 305 gives excellent performance for all fabrication and maintenance applications where high strength welds are required. The following ASTM steels are successfully welded with Magna 305:-

A148 - Gr. 120-95 A730 - Gr. N A469 - Class 5

A288 - Class 3,4 A291 - Class 4 A470 - Class 6

A471 - Gr. B2, B3 A354 - Gr. BC

A668-90 Classes A to F and AH to AF

A668-90 Classes G to N and GH to NH

Preheat is not required with Magna 305 in welding T-1 steel.

When Magna 305 is used to weld T-1 Steel, the weld metal is enriched by dilution from the T-1 base steel so that the yield and tensile strengths of the weld metal are higher. Joints welded under fully restrained conditions in T-1 with Magna 305 have shown the following mechanical properties:-

	Yield Point	**Tensile Strength**
Transverse Tensile Test as welded	103,000 p.s.i. (74.4 kg/mm2)	115,000p.s.i. (80.8kg/mm2)
Stress relieved 1 hr. @ 1025°F (552°C)	102,000 p.s.i. (73 kg/mm2)	116,000p.s.i. (81 kg/mm2)

(All Specimens tested broke in the base metal - not the Magna 305 weld)

WARNING:

Do not bevel T-1 steel, or groove it with a cutting torch. Use only Magna 100 (a cutting and chamfering electrode). For metal removal, use of a cutting torch on T-1 will cause cracking. Magna 100 is considered the only safe and economical tool for back chipping, beveling or metal preparation.

RECOMMENDED AMPERAGES:

		AC or DC Reverse	
Metric	**Inches**	**Gauge**	**Setting**
4.0 mm.	5/32	8	140 - 190 amps
3.2 mm.	1/8	10	90 - 140 amps

For more details :

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