

“IMPROVED” MAGNA 303 AC-DC

SPECIAL MAINTENANCE QUALITIES

In maintaining heavy equipment, vehicles, and machinery it is continually necessary to weld a wide variety of different analysis of steel and frequently to weld steels of unknown analysis. A single piece of heavy equipment may have ten or more different steels making up its different components. Today's high speed, high powered equipment is built from higher alloy, higher yield strength steels.

In the past mild steel electrodes and low hydrogen electrodes have been standard for maintenance welding in many industries. This has resulted in much costly downtime since mild steel electrodes are not adequate for welding today's high yield strength steels or steels of unknown composition.

Mild steel and low hydrogen electrodes have proven their excellence for production welding where most of the variables of welding such as joint design, base metal analysis, and accessibility can be controlled. In general, superior electrodes have not been required for these repetitive controllable production applications. In maintenance, however, the problems are completely different. The maintenance man has to weld many different types of steel, the metal is usually dirty, rusty and oily and often he has only limited accessibility to the area to be welded. Ordinary electrodes are not adequate for the more difficult maintenance conditions.

Mild steel electrodes provide welds with only about 42 kg/mm² tensile strength. If the steel being welded is 63 kg/mm² the weld will probably fail in service. Just as a chain is no stronger than its weakest link, a machine is often no stronger than its weakest weld. If a high alloy steel is welded with mild steel or low alloy steel electrodes numerous problems can result. When Magna 303 AC-DC was introduced into the maintenance industry as a solution to the many problems of maintenance welding, its use spread rapidly throughout the world. Numerous users throughout the world have reported that Magna 303 not only provides superior welds on a variety of steels as compared to all electrodes they had previously tried, but additionally a diligent use of this electrode has prevented much costly equipment down time which previously had resulted from weld failures. Many users report that they have successfully welded many applications which had been difficult or impossible with the electrodes they had previously used.

MAGNA 303 HAS THE FOLLOWING INTERESTING QUALITIES:

1. High Physical Properties.

- * Approximately 238 Brinell hardness
- * High fatigue resistance
- * Extra high shock and impact resistance
- * Machinable
- * Yield strength is approximately one third higher than the tensile strength of mild steel.
- * Tensile strength is approximately one third greater than that of 25/30 stainless steel electrodes. The weld deposit in the as-welded condition shows exceptionally high tensile and yield strength.
- * Corrosion resistance equal to many stainless steels
- * High elongation
- * Super high notch toughness
- * Semi magnetic deposit
- * Not heat treatable but work hardens to Rockwell C44 hardness
- * Allows minimum of carbon migration because of low penetration and high alloy content

2. Two Phase Microstructure. Magna 303 provides a deposit consisting of soft Delta Ferrite in an austenitic matrix. This ferrite rich structure is highly resistant to fissures, cracking, hot cracking and underbead cracking. Welds of X-Ray quality can be obtained on a wide range of applications. Welds of outstanding quality are obtained even on dissimilar steel and composite steel structures. The high physical properties of Magna 303 are obtained without heat treatment.

This microstructure is so stable that a high percentage of ferrite occurs and the two phase structure exists even if a high amount of dilution occurs from austenitic forming elements such as may be encountered when welding some steels of unknown analysis, thus the weld deposit displays a remarkably high resistance to all types of cracking under practically all conceivable conditions.

3. Universal Application Feature. Magna 303 is capable of providing welds of excellent quality on virtually all steels including:

Spring Steel	Manganese Steel	High Carbon Steel
Vanadium Spring Steel	Stainless Steel	Tool and Die Steel
Sulphur Bearing Steel	Cast Steel	Galvanised Steel

A major benefit in using Magna 303 is that it eliminates guesswork. In maintenance often a steel of unknown analysis must be welded. If the welder "guesses" what the steel might be and uses the electrode which might be adequate for that steel, a weld failure will probably occur if he guessed wrongly. If Magna 303 is used, the guesswork is eliminated or at least minimized since this one electrode gives good results on the widest range of different steels.

Another benefit of Magna 303 is that it eliminates stocking of many different types of electrodes because of its versatility. In the past many maintenance departments found it necessary to stock many different kinds of electrodes in order to be prepared for any emergency. Many users have reported that Magna 303 has substantially reduced their inventory.

4. Cost Factor. Magna 303 AC-DC costs much more than mild steel electrodes but it does so much more. What difference does it make if a weld costs six cents or sixty cents? The important factor is whether the welding electrode will keep your machinery producing.

APPLICATION

No special preparation is necessary when using Magna 303. However, heavy sections are best chamfered to form a 90° angle.

Preheating to approximately 204°C (400°F) is advisable on high carbon content and crack sensitive tool steels.

Either AC or DC welding machines can be used. Do not use DC equipment on straight polarity. Set machine electrode positive.

Proceed with stringer bead welding until the section is completed.

RECOMMENDED AMPERAGES:

Metric	Inches	Gauge	(Reverse Polarity - Electrode +)
			DC Machines or AC Machines
2.4 mm.	3/32	12	40-80 amps
3.2 mm.	1/8	10	65-120 amps
4.0 mm.	5/32	8	90-150 amps

Methods which can be used to apply Magna 303:

- Vertical up: Reduce amperage 10 amps to that specified in table. Keep electrode in deposit and weave in an arc about twice the width of the electrode as you work the length of the seam.
- Vertical down: Increase amperage 10 amps above that shown on scale. Maintain a close arc and work quickly. Increased temperature will liquefy and transfer alloy much faster.
- Flat work: Use recommended temperature and apply using either long or short arc.
- Overhead application: Use recommended amperage and apply by direct contact or maintaining a short arc. Magna 303 will not stick, therefore can be placed directly onto base metal.

Special Note:

1. Because of Magna 303's high work hardening qualities, for optimum results always use a reduced speed and feed when machining.
2. Magna 303 can be used for overlaying applications on Cast Iron.
3. When cutting welds of Magna 303 with an oxyacetylene torch, due to its extremely high alloy nature you will find it easier if you first place a small piece of scrap steel over weld and direct torch on this piece of metal to begin oxidation. It is then possible to easily cut through weld. When necessary to cut welds, Magna 150 or 100 work perfectly.