

## **Brief Information of Metal Active Gas Arc Welding (MAG)**

MAG welding for mild steel and low alloy steel in this book including active gas CO<sub>2</sub> welding and mixed gas arc welding of inert gas Ar add 5% or more CO<sub>2</sub> gas or inert gas Ar add 2% or more O<sub>2</sub> gas.

### **A) Shield Gas for MAG Welding**

In MAG welding the chemical composition and mechanical properties of welded metal not only is affected by welding wire but also by shield gas. In the wake of increase the rate of inert gas Ar the activity of shield gas is weaken and better integrative mechanical properties can be obtained, burn loss alloys will be smaller, spatter will be smaller, susceptibility of blowhole will be better and appearance of weld joint will be better but the resistance for impurities of oil contamination, rust and moisture of weld joint will be weaker and the cost of welding will be higher. Following is the quality requirement for the shield gases:

Gas	Purity	Moisture	Others
CO <sub>2</sub>	≥99.50%	≤0.005%	O <sub>2</sub> ≤0.10%
Ar	≥99.99%	≤0.002%	H <sub>2</sub> 0.0002%-0.007%
O <sub>2</sub>	≥99.90%	≤0.005%	H <sub>2</sub> ≤0.002%

### **B) Matters Need Attention for MAG Welding**

- 1) Following decreasing activity of the shield gas the resistance for impurities of oil contamination, rust and moisture of weld joint will be weaker so it is very important to clean away impurities of oil contamination, rust, and moisture from the weldment strictly before welding.
- 2) When use mixed gas Ar+CO<sub>2</sub> to be shield in welding the weld performance and mechanical properties of weld joint will be affected by the collocation ratio of the two gases. We would like to recommend 80%Ar+20%CO<sub>2</sub> and the flowrate of the shield gas should be 15L-20L/minute, if lower atmosphere would infiltrate the shield area and if higher it would be turbulent fluid.
- 3) The wire extention will affect welding performance and welding technology, such as more spatters, much rougher ripple and appearance, sensitivity of blowhole will be bigger etc. So 10mm-18mm of wire extention when current under 250A in welding is recommended and it should be 20mm-25mm when current higher than 250A.
- 4) In order to guaranty the quality of welding joint not be affected by the crater at the ending stage it is better to stay the welding gun several seconds after blow-out, or moving back the arc to fill the crater fully.
- 5) It should keep out the wind when welding and when wind speed up to 1.8m/second should using wind screen, neither more to fan the welding zone.
- 6) The welding site must use facility of aeration, especially in the closed region, so that to reduce harm to welders.
- 7) In welding the welding gun slope slightly by one side of the weld joint to reduce penetration and it is useful for sheet welding.

8) Sweep the spatters and slag away from current contact nozzle or kort nozzle duly, particularly when overhead welding or heavy current welding, when high quality appearance welding joint is required also.

9) The diameter of current contact nozzle must match the welding wire. If it is much bigger than the wire conductive will be bad, spatter will be more and appearance of welding joint will not be good.

10) Spotless surface to be welded is very important when welding. Exposed wire must be avoided impurities of oil contamination or moisture. Pay more attention to spatters fire the materials of package around the welding site.

11) The wire has strong elasticity so when it will be cut one hand must clench the position of wire between cutting nippers with spool/reel to avoid the wire disentwine from the spool/reel dispersedly.

### **C) Storage of the Welding Wire and Preventive Measures for Oxidation**

1) The storeroom should be arefaction and ventilated. The temperature is better 10°C-40°C and relative humidity (RH)  $\leq 60\%$ . Moisture should be avoided and repulsing any liquid or mordant effumability materials, such as water, acid, alkali and so on, far away from fire also.

2) The welding wires can not be put on ground directly and it should be put on pallet that made by wooden/metal/ plastic and the distance of the wire against the wall of storeroom at least 300mm.

3) Moving wire must be careful and do not damage any package of the wire. Shifting a full spool/reel of uncovered wire with short distance should use fingers of two hands to hook two ends of the inner bore instead to shift it when it flatwise.

4) Using crane to moving drum packing wire should hook the two rings slowly and evenly. Do not stand under the lifting drum and do not open off the cover of the drum when moving.

5) When open a package of the wire it is better to run out of it in short time and it can not be exposed in atmosphere exceed 40 hours if not it easy be oxidation particularly in the environment with moisture and mordant.

6) To shorten the storage time in the storeroom and take the principle of first-in, first-out to use the wire.

7) It is important to store the wires respectively according to the types and specifications and do not misapplication.