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B1-Batch

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Workshop - Welding Shop
Assignment - 1.

Fill in the blanks

- ① The principle of gas cutting is oxy-fuel cutting
- ② Ultraviolet & infrared rays will emit from welding arc.
- ③ Tongs are used to hold hot metal pieces.
- ④ Material formed on weld-bead is slag.
- ⑤ In slag inclusion defect, metallurgical oxide is mixed with weld metal.
- ⑥ Flux is used to protect weld metal from oxidation.
- ⑦ For thicker base metal, current will be direct (DC).
- ⑧ Wire brush is used for cleaning the welding surface.
- ⑨ In straight polarity base metal is at positive terminal.
- ⑩ Less thickness sheets will be welded in reverse ~~straight~~ polarity.
- ⑪ Gases used in gas welding are oxygen & acetylene.
- ⑫ Color code of argon cylinder is dark green shoulder.

- ⑬ Acetylene gas is dissolved in acetone liquid in cylinder.
- ⑭ Chipping hammer is used for removing welding spatter.
- ⑮ Slag is formed on weld joint surface.
- ⑯ Acetylene cylinder color code is maroon.
- ⑰ color code of oxygen cylinder is white shoulder.
- ⑱ Color code of acetylene hose-pipe is red.
- ⑲ ~~with~~ color code of oxygen hose-pipe is white.
- ⑳ with DC arc welding, arc blow effect occurs.
- ㉑ Light hammering on hot weld bead is called peening.

answers in brief

Q1 Explain about arc blow and its prevention methods.

A1 Arc blow is the situation when welding ferromagnetic steels, lack of fusion imperfections can be caused because of uncontrolled deflections of the arc. It tends to occur if the material being welded has residual magnetism at a certain level, particularly when the weld root is being made & welding current is in DC.

Prevention methods-

- Use as short an arc length as possible
- Use AC rather than DC for the root run
- Reduce residual magnetism in the steel to a tolerable level (less than 50 Gauss)

~~Q1~~

Q2 What is flux? Why flux is coated in the electrode?

Ans 2 Flux is a combination of carbonates & silicate materials used in welding process to shield the metal from atmospheric gases as these gases could oxidise the weld metal.

The flux is coated on the electrode because it gives off gases as it decomposes to prevent weld contamination, causes weld-protecting slag to improve the arc stability.

Q3 What is slag? How is slag formation helps in quality welding?

Ans 3 Slag is a vitreous material produced as a by-product of arc welding process. It is solidified remaining flux after the weld area cools.

It is helpful in welding as some of it burns off into a gas that shields the weld puddle from the atmosphere & also helps the weld metal to combine with base metal while pulling the impurities out of the weld.

Q4 What is the difference between rectifier & transformer?

Ans 4: A transformer is a device which changes both voltage and current of an AC power supply but only the magnitude changes & not the polarity. Power also remains constant.

A rectifier is a device that turns AC to DC i.e. the type of current changes, everything else remaining constant.

Q5 How electric arc will be produced in welding? Explain about the types of arc lengths.

Ans 5 An electric arc is often formed by 2 electrodes coming together, creating a lot of heat & then the electrodes being separated to form a small gap in which the arc is formed. The very high temperature created, causes a plasma to be formed b/w the electrodes.

There are 3 types of arc lengths →

- NORMAL: It is approximately equal to the diameter of the core wire of the electrode.
- LONG: In this, the distance b/w the tip of electrode & the base metal is more than the diameter of the core wire.
- SHORT: The distance b/w the tip of the electrode & the base metal is less than the diameter of the core wire.

- Q6 What are the types of oxy-acetylene flames?
- Ans 6 There are 3 types of oxy-acetylene flames-
- NEUTRAL: This flame has a 1:1 ratio of acetylene & oxygen & has a clear, well-defined cone indicating that combustion is complete. Inner cone temp is approx 3232°C
 - OXIDIZING: This flame have more than one volume of oxygen mixed with one volume of acetylene & the inner cone is pointed & slightly purple. This flame burns with a distinct hissing sound & inner cone temp is approx 3482°C .
 - CARBURIZING: This flame has excess acetylene, the inner cone has a feathery edge beyond it & has three different flame zones. The temp. of inner cone is approx 3149°C & burns with coarse sound.

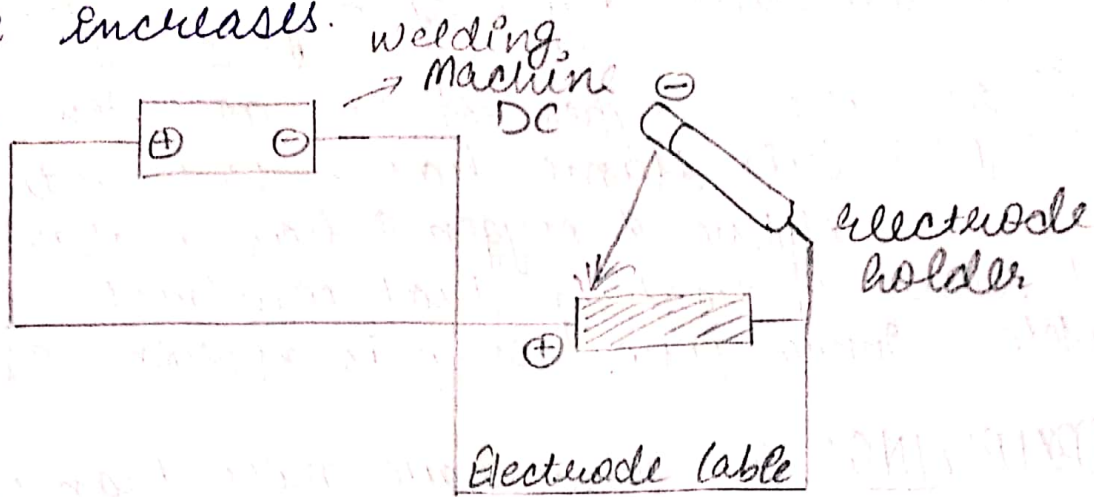
Q7 What is polarity & explain details about types of polarity in electric arc welding with circuit diagrams?

Ans 7. Polarity is used to define the electric connection of the electrode in relation to the terminal of power source.

Types of polarities involved are -

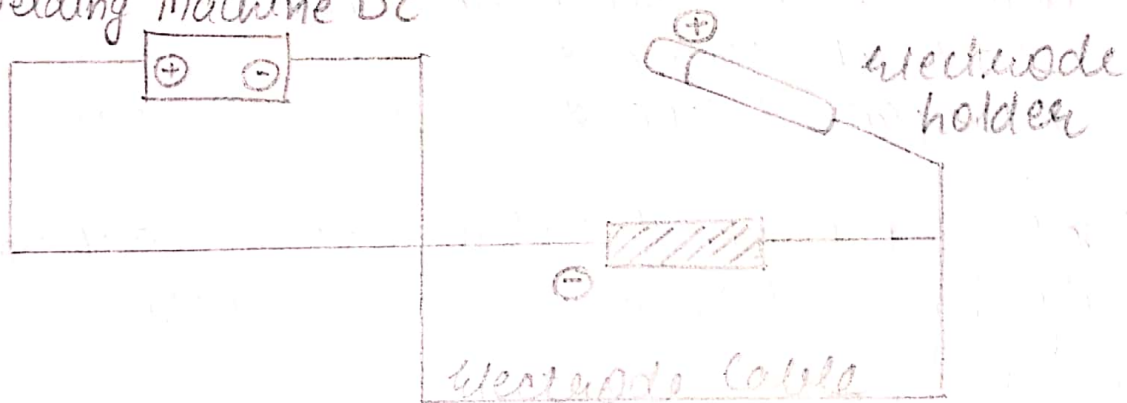
- DC Straight Polarity - In this, the electrode is connected with the positive terminal & the base plates with the negative terminal. $2/3^{\text{rd}}$ of the entire heat is generated at electrode, whereas only $1/3^{\text{rd}}$ of heat is generated at base plate. As a result, electrode melts quickly & metal decomposition

rate increases.



b) DC Reverse Polarity - In this, the electrode is connected with negative terminal & base plate with the positive terminal. Consequently more heat is generated at the base plate as compared to the electrode, so metal decomposition rate reduces.

Welding Machine DC



Q8 Difference b/w AC & DC welding machine?

AC welding

① It is cheaper, small in size, light in weight & simple to operate

② Maintenance is easier & more economical

③ Arc blow can be controlled easily

DC welding

① 2-3 times costly, larger in size, heavy & complicated to use.

② Maintenance cost is high

③ Severe & difficult to control

AC Welding

④ Heat generated is equal to at both poles. Does not require polarity changing

⑤ Efficiency is about 0.8 - 0.85.

DC Welding

④ Heat generated is diff. thus requires changing of polarity.

⑤ Efficiency is about 0.5 - 0.6

Q9 Define arc welding, arc voltage, bead, run (or) pass?

Ans 9 Arc Welding - It is a fusion welding process of used to join metals. An electric arc from an AC or DC power supply creates an intense heat of around 6500°F which melts the metal at the join b/w the 2 work pieces.

Arc voltage - It is defined as a function of an arc current and a gap distance.

Weld Bead - It is the result of a welding pass that deposits filler material

Weld Pass - It is a single progression of welding or surfacing along a joint or substrate.

Q10. Define Weld Undercut.

Ans 10. It is a groove that develops on base metal near the top or root of the weld. It happens when the weld metal fails to fill in that area. This results in a feeble weld that is grooved likely to have some cracks along the toes of the weld.

