



Tech Talk Tech Talk

Welcome to the sixth issue of *Tech Talk*. This newsletter covers a range of topics on various welding products, applications, metallurgy, techniques, and economics. Previous issues are archived at www.unibraze.com. Submit any questions or comments to Leroy Billesberger, at leroy@unibraze.com or call 1-877-233-1375.

Over the past few months I have been asked various questions on welding machines. The one question that keeps coming up is what is the difference between the CC and CV settings on the machine. So, in this issue we will look at the difference between the Constant Current (CC) and Constant Voltage (CV) settings on your welding machine..

CONSTANT CURRENT OR CONSTANT VOLTAGE

Welding power sources are designed in many sizes and shapes. They may supply either AC or DC, or both, and they may have various means of controlling their voltage and amperage output. The reasons for this are that the power source must be capable of producing the proper arc characteristics for the welding process being used. A power source that produces a satisfactory arc when welding with coated electrodes will be less than satisfactory for welding with solid and flux cored wires.

Constant Current Characteristics - Constant current power sources are used primarily with coated electrodes. This type of power source has a relatively small change in amperage and arc power for a corresponding relatively large change in arc voltage or arc length, thus the name constant current. The characteristics of this power source are best illustrated by observing a graph that plots the volt- ampere curve. As can be seen in Figure 20, the curve of a constant current machine drops down- ward rather sharply and for this reason, this type of machine is often called a "drooper."

In welding with coated electrodes, the output current or amperage is set by the operator while the voltage is designed into the unit. The operator can vary the arc voltage somewhat by increasing or decreasing the arc length. A slight increase in arc length will cause an increase in arc voltage and a slight decrease in amperage. A slight decrease in arc length will cause a decrease in arc voltage and a slight increase in amperage.

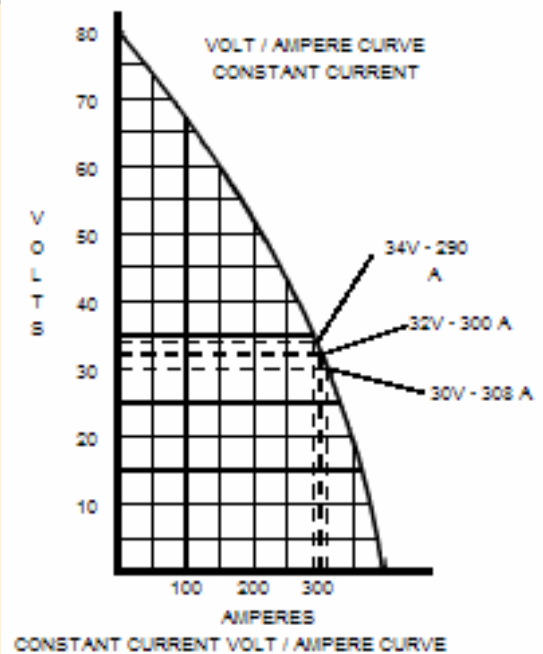


FIGURE 20

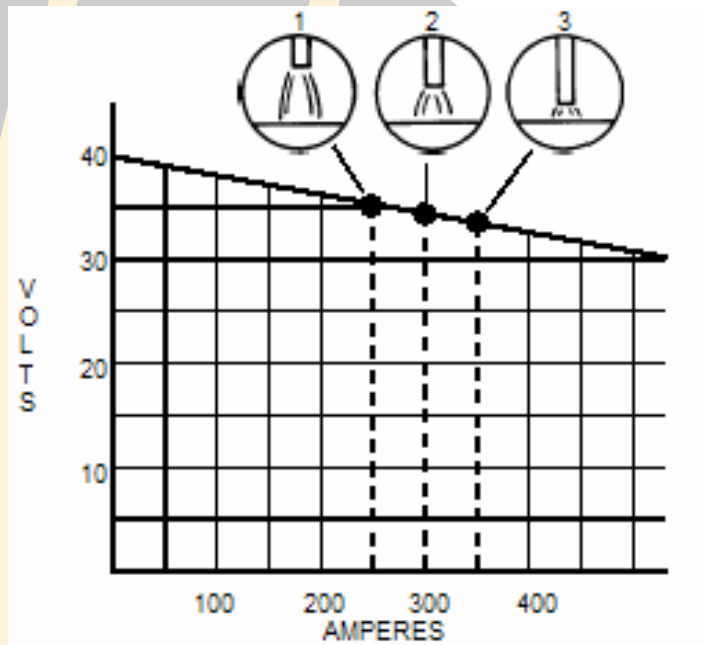


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Constant Voltage Characteristics - Constant voltage power sources, also known as constant potential, are used in welding with solid and flux cored electrodes, and as the name implies, the voltage output remains relatively constant. On this type of power source, the voltage is set at the machine and amperage is determined by the speed that the wire is fed to the welding gun. Increasing the wire feed speed increases the amperage. Decreasing the wire feed speed decreases the amperage.

Arc length plays an important part in welding with solid and flux cored electrodes, just as it does in welding with a coated electrode. However, when using a constant voltage power source and a wire feeder that delivers the wire at a constant speed, arc length caused by operator error, plate irregularities, and puddle movement are automatically compensated for by the characteristics of this process. To understand this, keep in mind that with the proper voltage setting, amperage setting, and arc length, the rate that the wire melts is dependent upon the amperage. If the amperage decreases, this melt-off rate decreases and if the amperage increases, so does the melt-off rate.

In Figure 21, we see that condition #2 produces the desired arc length, voltage, and amperage. If the arc length is increased as in #1, the voltage increases slightly; the amperage decreases considerably, and therefore, the melt-off rate of the wire decreases. The wire is now feeding faster than it is melting off. This condition will advance the end of the wire towards the work piece until the proper arc length is reached where again, the melt-off rate equals the feeding rate. If the arc length is decreased as in #3, the voltage drops off slightly, the amperage is increased considerably, and the melt-off rate of the wire increases. Since the wire is now melting off faster than it is being fed, it melts back to the proper arc length where the melt-off rate equals the feeding rate. This is often referred to as a self-adjusting arc. These automatic corrections take place in fractions of a second, and usually without the operator being aware of them.



VOLT / AMPERE CURVE - CONSTANT VOLTAGE
FIGURE 21