



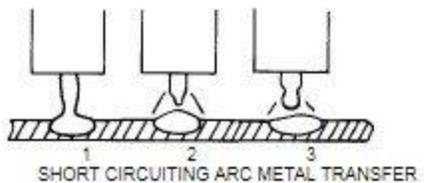
PULSE WELDING

Welding machine manufacturers are proudly announcing, that pulse welding capabilities are being put into certain welding machines. Car manufacturers are telling auto body shops, who are repairing their vehicles, that when they have to do welding, to use pulse welding machines. The car insurance companies, who are paying for the repairs, are wanting to see a pulse welding machine in the auto body shop before they send their clients there. And training schools are teaching their students how to weld with pulse.

So, the question that's being asked is: what's pulse welding? And is this an essential thing for my business?

The best way to answer what's pulse welding, is to describe the current popular mig welding methods: short circuit (sometimes called short arc) and spray welding

Short Circuit Welding



Short circuit welding is when the electrode shorts out on the base material. It's the "coldest" form of mig welding. This ability to use less heat makes it possible to overcome the problem of too much heat: distortion.

- With reduced heat, there's less chance of warpage in the base material
- It reduces the risk of burning through thin material
- You can do out of position welding: vertical and overhead
- Works well for poor fit ups
- Doesn't require expensive equipment to produce the low amperage

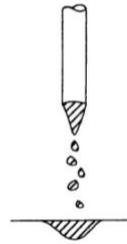
But, like in most things, there are somethings it's not good at

- It creates a lot of spatter. As the wire shorts out on the base metal, it creates spatter
- You are using a smaller diameter of wire so, you get a small welding puddle
- Travel speed is slow because you're limited in wire feed speed
- Because the heat is low, you need to be aware of the danger of cold lapping. Your weld can look good, but it hasn't fused with the base metal.

Spray Welding

Free flight -Spray Transfer/streaming transfer

- At current > critical level → No individual drops
- Tip of the consumable electrode becomes pointed → cylindrical stream of liquid metal flows toward the work piece in line with the electrode.
- Near its tip (nearest the work piece), this cylinder disperses into many very small droplets → Electromagnetic pinch effect
- The rate at which droplets are transferred is hundreds per second.



68

Spray welding is addressing the disadvantages of short arc.

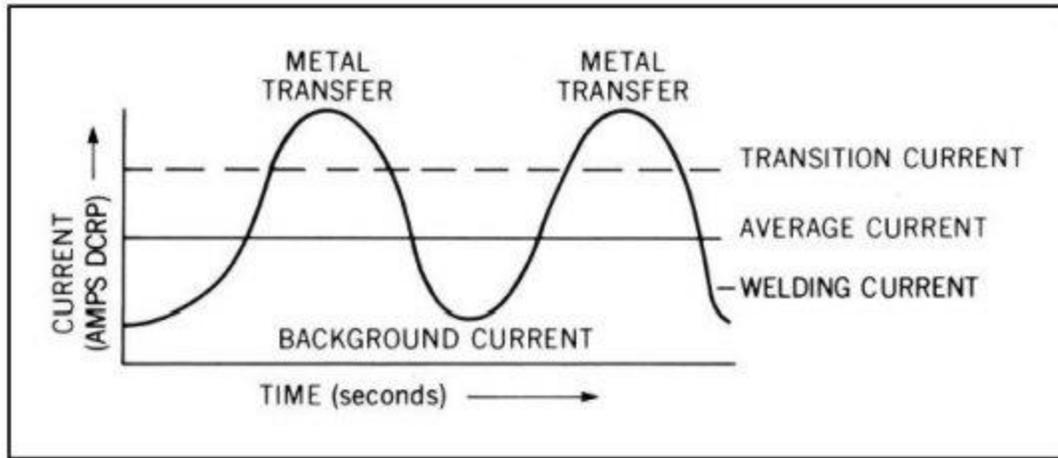
Spray welding uses more heat on the electrode. This produces small molten droplets that are propelled onto the base metal. This action enables welding to be more productive and cost efficient.

- The big fat welding puddle produces a Higher deposition
- Good penetration
- Strong fusion
- Weld appearance is good
- Little welding spatter

The problems with spray welding are:

- You can only weld in the flat and horizontal position
- The high heat prevents you from welding on thin gauge material
- Because you need lots of heat, you must always consider possibility of warpage in the base material

Pulse Welding



The goal with pulse was to combine the best of short circuit and spray welding. Reduce the heat and still be a productive and cost-effective method of mig welding.

Pulse welding does reduce the amount of heat. It alternates between a high and low current. The high current creates a metal droplet. Once the droplet is created, the current drops. Once it's dropped, current is increased to form another metal droplet. It is this rapid switching back and forth with the current that enables the heat to be reduced.

When pulse welding is done correctly, it opens up new doors of productivity. You can now use a larger diameter of wire (you have the necessary heat to melt it), increase your deposition (thanks to the larger diameter wire) and weld out of position (thanks to the alternating of current).

Pulse welding is not a new concept. It has been around for awhile. The big difference between now and then is the technology. In the old days, it took a very smart welder to know how to manipulate the wire feed speed to make pulse welding work. But now a new welder can achieve what the very smart welder did, thanks to the new technology.

The ability to quickly master pulse welding is because the machine is reacting to what the welder is doing. The welder, using 1 knob, picks the wire feed speed he wants, and the machine does the rest of the adjusting: wave form and frequency.

So, this has made pulse welding very appealing.

- It's easier for new welders to have success – the learning curve isn't so steep
- Some of the machines can automatically adjust to the stick out or torch angle
- Can weld out of position in a spray mode
- Spatter free – the electrode doesn't touch the puddle
- Have a hot fluid puddle
- Prevents burn through – this is why the auto manufactures like this mode of welding. The new high strength steels are thin and need to be welded without the burn through
- Less fumes
- Better quality weld – the welds have a good appearance
- Improved production of welding – you can go faster



Is pulse welding essential for my business? Yes, for certain industries: auto body shops. The insurance companies will make it mandatory to have a pulse welding machine in your shop.

For other industries, it'll be dependent on how important it is to be: more efficient in out of position welding; better deposition on thin material; less fumes; less post clean up; new welders being more productive. If those are your goals, yes, pulse welding will help.

If we can help you, please give us a call.

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