

ESAB ARCAIR SLICE: cuts, burns or pierces anything, anywhere

Eugene van Dyk of ESAB South Africa unpacks the company's Arc SLICE exothermic cutting solution, an alternative cutting process that is highly portable and much more suitable for onsite and difficult to access cutting work.

Most exothermic cutting processes use a combustion process to generate the heat needed to melt and remove material along the cut line. ESAB's ARCAIR SLICE process uses a hollow steel rod as the fuel and industrial oxygen as the exciter. Once ignited, which is done under battery power, the ESAB SLICE system maintains a flow of oxygen through the torch and rod, which causes the rod to continuously burn and be consumed. This creates heat at temperatures of between 4 425 and 5 540 °C (8 000 and 10 000 °F), which quickly melt the material being cut.

This process allows cutting, piercing and gouging on almost any ferrous or non-ferrous material, including steel, iron, aluminium and magnesium. And with the SLICE torch, virtually anything placed in front of it can be cut, including copper, brass, concrete and brick.

Used predominately for plant maintenance, building renovation or demolition, scrap clean-up and salvage work, ESAB's SLICE cutting process is routinely used to remove edges on loaders for repair or replacement and it even burns through mud or rust-covered machinery frames.

One of the biggest applications for SLICE cutting is pin removal on heavy equipment. When a pin in heavy machinery will not budge, it must either be cut or have a hole burned through its centre for removal. When piercing a hole right through the middle of the pin, the metal from the pin is physically removed, so the pin will actually shrink allowing for easy removal once cooled.

Another application for which SLICE cutting is becoming more popular is fire and rescue incidents. SLICE cutting packs come complete with a torch, power supply and oxygen cylinder case, all of which can be worn as a backpack or carried using handles, making them practical and easy-to-use. This feature allows firefighters and rescue teams to more easily gain access to any obstacles in front of them.

While many may understand the basics of exothermic cutting strategies, real pro-

fessionals must know how to safely and effectively use the technology. Below are some helpful tips on how to get the most out of SLICE cutting equipment.

Tips for cutting using the SLICE process

While cutting procedures vary from job to job, normal cutting is done using a drag technique, where once the rod is in contact with the piece to be cut, the professional drags the rod in the direction of the cut. The tips below will be useful:

- Maintain a consistent travel speed that is slow enough to slice through the material. The speed of the cut is too fast if the operator can't see the kerf and molten material is being blown back up towards the operator.
- Always remember that the steel cutting rods continue to consume as long as the oxygen is flowing. If the rod is not kept in contact with the work piece, cutting will stop but the rod will continue to be consumed. To stop combustion of the rod, the oxygen must be shut off.
- Use a sawing motion when the material to be cut is thicker than 75 to 100 mm (1½ to 2-inch) to ensure complete melt through the material.
- Be sure to use a smooth motion to complete the cut.
- After completing the cut, releasing the oxygen control lever on the handle will stop the oxygen flow and stop the combustion.

Note: Because the cutting rod will continue to burn as long as oxygen is supplied, be sure to hold the torch safely away from your body until the rod cools.

Special procedures must be used when piercing to promote safety for the end user and a high-quality finish on the product. When piercing, use a collet extension, which will extend the life to the torch. In addition, a hand shield will greatly improve

operator safety and comfort. Be sure to hold the torch at arm's length and wear plenty of protective clothing, along with eye and ear protection.

If possible, remove the cutting rod from the pierced hole before releasing the oxygen lever. This helps prevent the cutting rod from getting stuck inside the pierced hole.

For hole piercing, these steps should be followed:

- Strike the cutting rod on the striker.
- Hold the torch at arm's length.
- Keep the cutting rod at a 90° angle (perpendicular) to the pierce point.
- Slowly push the cutting rod in at the pierce point until it is at the required depth or until you've achieved burn through.

Another crucial aspect of exothermic SLICE cutting is oxygen usage. The cutting process uses standard industrial grade oxygen to support the exothermic reaction and to remove the molten metal. All SLICE equipment uses standard oxygen fittings.

The most commonly recommended operating pressure is 5.5 bar (80 psi) but some applications, such as cutting material sections of 75 mm (3-inch) and thicker, might require higher operating pressures. Pressures as low as 2.75 bar (40 psi) have also been successfully used for operations such as washing off rivet heads and scarfing out small cracks for repair.

Even the best techniques for exothermic cutting equipment will change from job to job. Please be aware, as in any applications, some adjustments in operating conditions may be necessary in order to ensure you get the most out of your ESAB SLICE cutting equipment, while meeting optimal safety requirements. ■

