

EXOTHERMIC CUTTING EQUIPMENT



Objectives

By the end of this session, you will be able to:

- Identify the difference between the Arcair packages that are available to EU customers.
- Recognise the main components within the Arcair SLICE® package.
- Demonstrate how to correctly assemble Arcair equipment, initiate the arc and complete various cuts using various 'setups'.
- Understand how to maintain the equipment before, whilst in use and post cutting application.

The Combustion Triangle

Fuel – SLICE® Rod

Heat – 12 Volt Battery



Oxygen

- Arcair SLICE utilises the exothermic reaction between oxygen and metal when ignited.
- Oxygen although not flammable is an aid to burning.
- Temperatures in excess of 3400°C can be achieved.
- It burns, melts and vaporises nearly any metallic, non-metallic and composite material.

Exothermic Cutting Operation – What is it?

- A lever on the torch opens a valve to feed 80 psi of pure Industrial Oxygen through a steel rod.
- Breaking and making the electrical circuit between rod and striker causes an arc (via 12V DC battery).
- Once lit the electric circuit is broken and no current flows during use.
- The rod will only burn whilst it is being fed with oxygen.
- Operator must release the lever to stop the reaction.



ARCAIR SLICE® EQUIPMENT EU MARKET

SLICE® Utility Pack 63-991-026CE

Includes inside a rugged tool box carrying case:

- SLICE Torch assembly.
- Industrial oxygen 'blue' hose connected to the torch with UK standard 3/8 BSP standard fittings used to connect to oxygen regulators.
- SLICE Striker assembly.
- Red & Black Tong style battery clamps makes power connection quick and easy.
- Collet Extension
- Extension Shield



SLICE® Battery Pack 63-991-007CE

Includes inside a rugged tool box carrying case:

- SLICE Torch assembly.
- Industrial oxygen 'blue' hose connected to the torch with UK 3/8 BSP standard fittings used to connect to oxygen regulators.
- SLICE Striker assembly.
- Collet Extension
- Extension Shield
- 1/4 x 22" Cutting Rods (x25)
- 12 Battery Box Assembly
- Charging Cable 240 VAC/50Hz



SLICE® Complete Pack 63-991-005CE

Includes inside a rugged tool box carrying case:

- SLICE Torch assembly.
 - Industrial oxygen 'blue' hose connected to the torch with UK standard 3/8 BSP standard fittings used to connect to oxygen regulators.
 - SLICE Striker assembly.
 - Collet Extension
 - Extension Shield
 - Outfit Wrench – Hose Nut and Regulator Nut
 - Outfit Wrench – Oxygen Hose Nut and Male Adapter
 - ¼ x 22" Cutting Rods (x25)
-
- 12 Battery Box Assembly
 - Charging Cable 240 VAC/50Hz

This package does not include oxygen cylinder and regulator





IDENTIFYING THE EQUIPMENT

Charging The Battery



- The battery comes fully charged before shipping.
- Place battery into 'CHARGE' mode before connecting.
- Use the correct charging lead for the correct voltage lead. Each charging lead is wired per voltage charging medium.
- Recommended to charge for a minimum of 12 hours before use.
- The charger is designed not to harm the battery by 'over charging' but it is recommended to disconnect after a max 16 hours.
- Peak performance is best obtained by charging 4 - 8 hours each week when not in use.
- It is recommended to recharge the battery 'after use' and 'before storage' even if only 1 or 2 rods have been ignited.

NOTE

- Experience operator can average over 100 strikes.
- The casual user between 30 – 40 strikes.

Exothermic Cutting Equipment - SLICE® Torch

The SLICE torch is supplied with 1/4" (6mm) diameter rods. By changing the collet nut and collet chuck this can be converted to use 3/8" (10mm) rods.



Comfortable and easy to use pistol grip design handle.

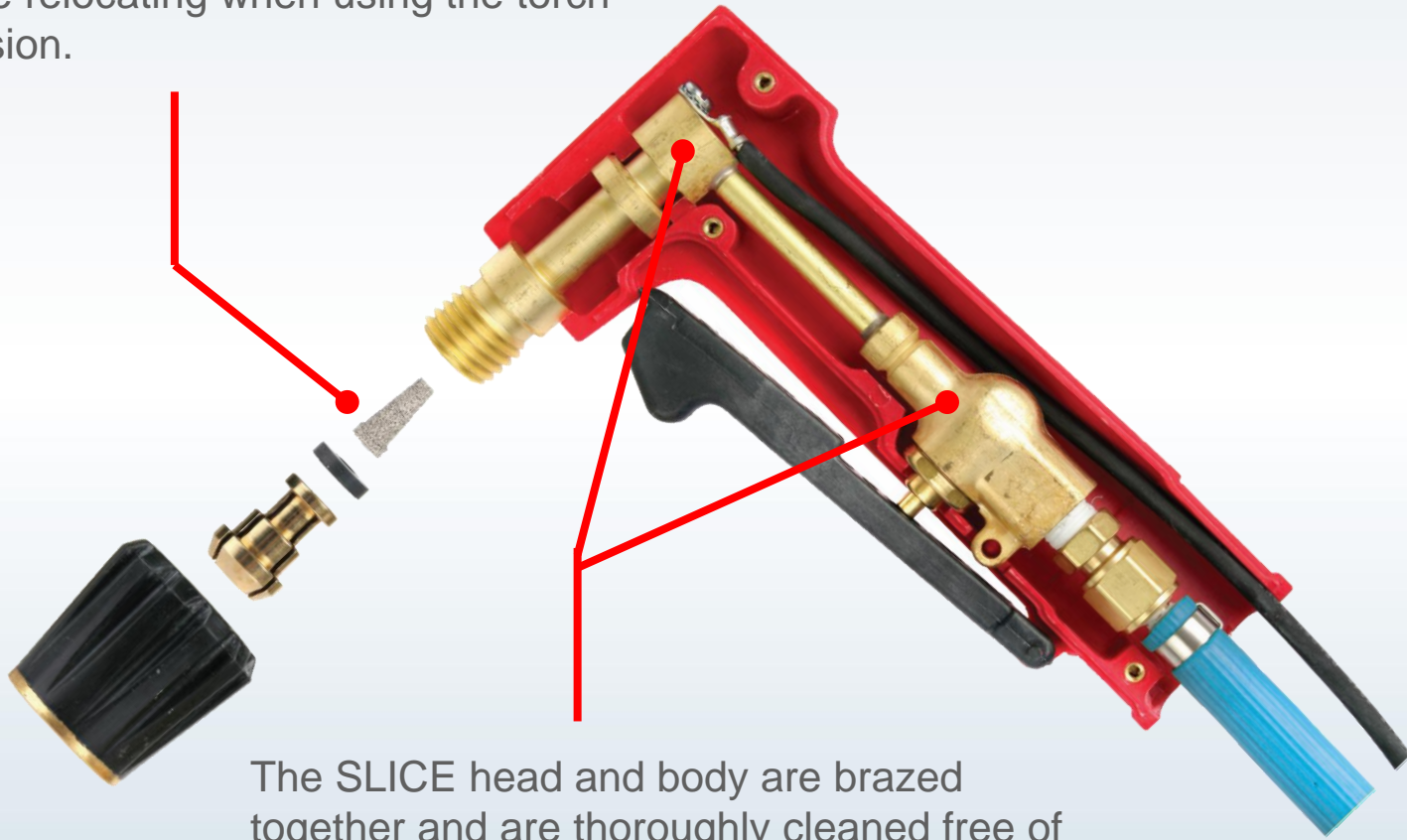
Lightweight heat shield designed to protect hands during cutting operation.

Easy to squeeze oxygen trigger which allows flow of oxygen through cutting rods.

Blue 3 meter industrial gas hose.

Exothermic Cutting Equipment - SLICE® Torch

Spark arrestor are included in all SLICE torch kits for safety reasons. The location of these require relocating when using the torch extension.



The SLICE head and body are brazed together and are thoroughly cleaned free of oil to be used with oxygen

Exothermic Cutting Equipment - SLICE® Torch



1/4" Collet Nut	94-168-022
1/4" Collet Chuck	94-158-048
3/8" Collet Nut	94-168-024
3/8" Collet Chuck	94-158-045
3/8" Conversion Kit	94-463-032

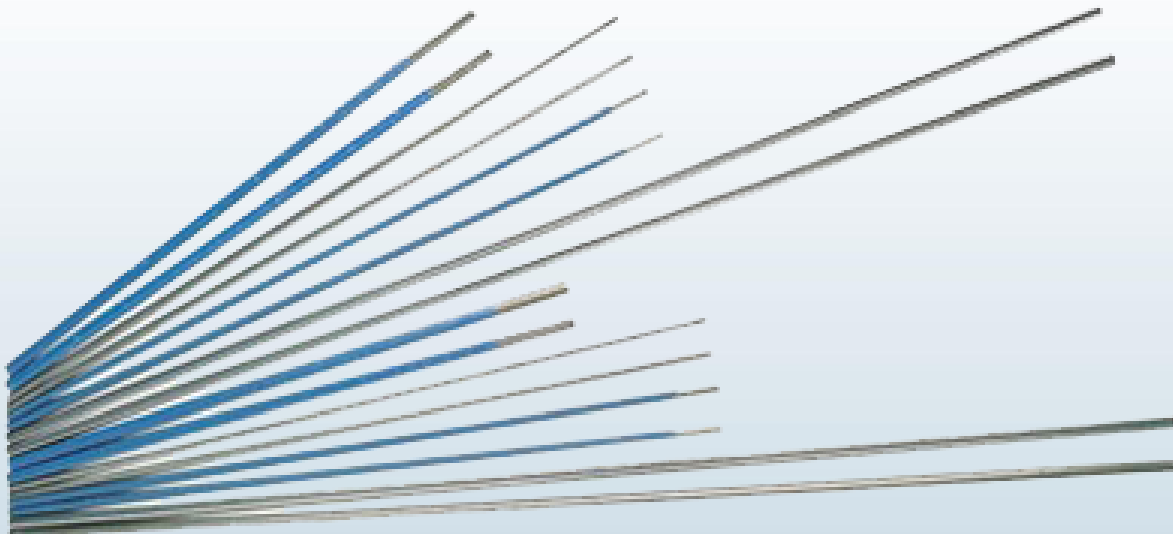
ARCAIR
AN ESAB BRAND

Exothermic Cutting Equipment - Cutting Rods



Uncoated/Coated

- Uncoated rods are used in applications when igniting with a battery source
- Coated rods are used when cutting with DC power (< 200 amps). The coating prevents side wall shortening when using an electrical power source.
- No CE certification required.



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Exothermic Cutting Equipment - Cutting Rods



ARCAIR SLICE CUTTING RODS

Part No.	Description	Pieces Per Box
	<i>All SLICE Cutting Rods should be ordered per box</i>	
42-049-002	Coated SLICE Rod (7 x 559mm) (1/4 x 22)	25
42-049-003	Coated SLICE Rod (7 x 559mm) (1/4 x 22)	100
42-049-005	Coated SLICE Rod (10 x 457mm) (3/8 x 18)	50
43-049-002	Bare SLICE Rod (7 x 559mm) (1/4 x 22)	25
43-049-003	Bare SLICE Rod (7 x 559mm) (1/4 x 22)	100
43-049-005	Bare SLICE Rod (7 x 1118mm) (1/4 x 44)	25
43-049-007	Bare SLICE Rod (10 x 457mm) (3/8 x 18)	50
43-049-009	Bare SLICE Rod (10 x 914mm) (3/8 x 36)	25



OPERATING INSTRUCTIONS

Operating Instructions - Maintenance

Never try to ignite a rod in any other position than cut or with AC input cable connected. This burns out the charge circuit protection fuse located inside the charger/battery container. It should be replaced with a lamp quick acting 1/4" x 1 1/4" (6mm x 31mm) fuse.

WARNING

Disconnect all power cables before opening

Fuse failure has occurred when the meter reads right in the charge mode but doesn't indicate in test mode.

Remember Safety First, refer to manual for recommended protection equipment and contact the local HSE for current legislation.

Operating Instructions - Pre Use Checks

- Visually inspect the following :
 - torch
 - striker
 - electric cables
 - oxygen supply hose for damage.
- Check the fittings on electrical cables to the torch and striker are tight.
- Check that the oxygen hose is tight in the torch.

Operating Instructions - Inspecting the Spark Arrestor



- Remove Collet Nut assembly.
- Remove Collet Chuck and Washer.
- Inspect for presence of Spark Arrestor (no need to remove).
- If removed, replace Spark Arrestor pointed end first.
- Seat Washer in torch.
- Replace Collet Chuck.
- Hand tighten Collet and assembly.



Operating Instructions – Setting Up



- Wipe clean all fittings and cables.
- Connect oxygen hose to regulator, checking oxygen is off and regulator set to zero.
- Connect the torch and striker electrical leads to battery + (positive) to torch and – (negative) to striker.
- Open oxygen valve slowly - HP gauge indicates cylinder contents.
- Apply pressure to the torch trigger and slowly turn PA knob on regulator clockwise. Set working pressure to 80 psi (*refer to manual*).
- Release the trigger.

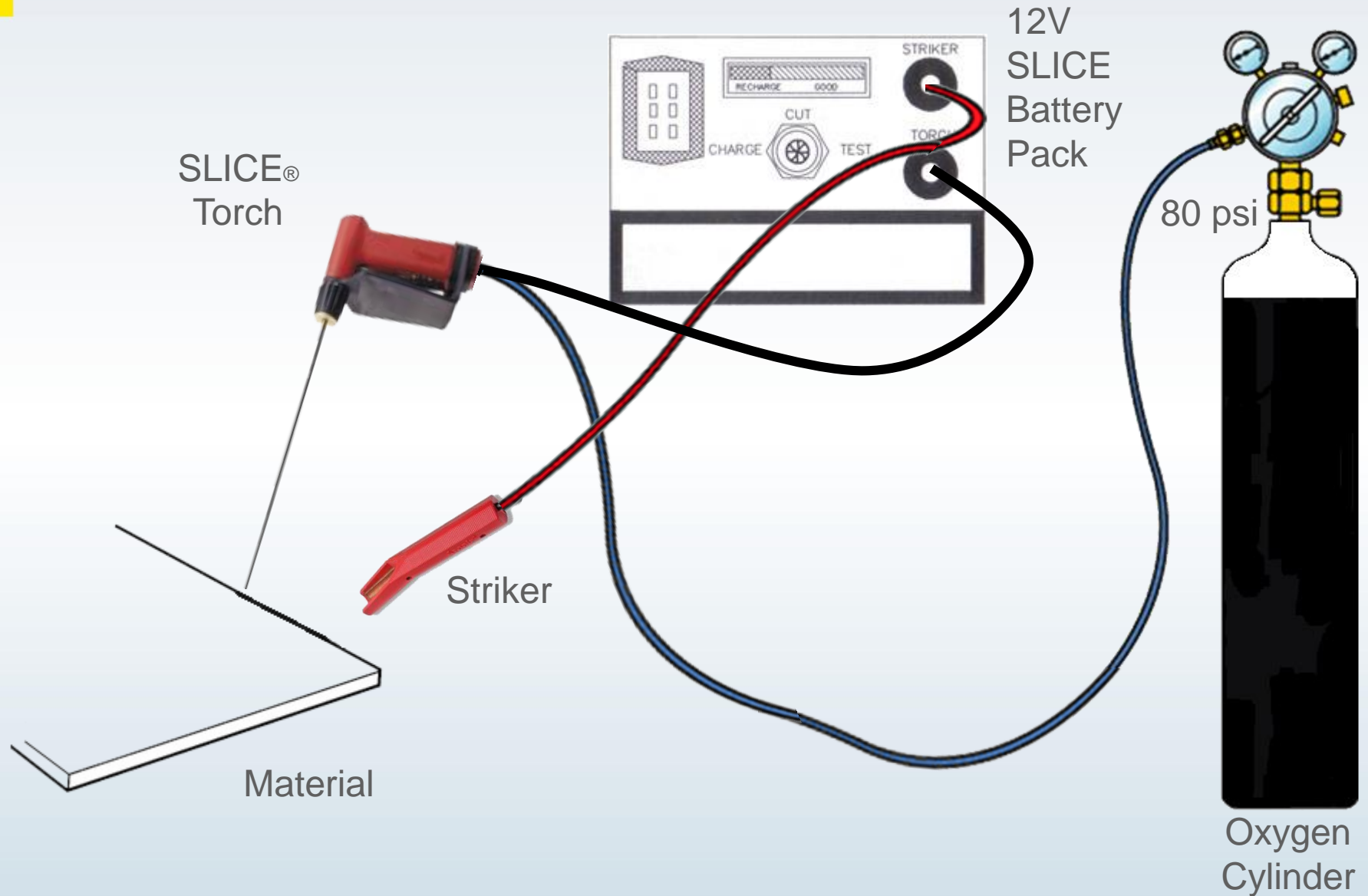
Operating Instructions – Oxygen Usage



This cutting process uses standard industrial grade oxygen to support the exothermic reaction and to remove the molten metal.

- The recommended operating pressure is 80 psi. Applications such as cutting material sections 76.2 mm and thicker might require higher operating pressures.
- Operations such as washing off rivet heads and scarfing out small cracks for repair the pressures can be set as low as 40 psi.
- The oxygen consumption rate for the SLICE cutting rods at 80 psi is 7 to 7.5 cfm for the 6.4 mm diameter cutting rods and 11 to 12 cfm for the 9.5 mm diameter cutting rods. This rate will vary if a different operating pressure is used.

Operating Instructions - Basic Set Up



Operating Instructions – Loading the torch

- Loosen Collet Nut assembly but do not remove.
- Insert SLICE® cutting rod (USE only Arcair SLICE rods) into Collet Nut assembly.
- Tighten the Collet Nut by hand.
- Firmly tap the end of the rod on a hard surface this seat the rod in the washer.
NOTE: Ensure the material is not grounded to the power supply or battery.
- Press the torch trigger. If oxygen leaks at Collet Nut **STOP**. Never use a damaged rod.
- Tap again, if assembly still leaks remove from service for repair.

Operating Instructions – Igniting the rod

- Prior to striking the rod, ensure all flammable material is removed from the area.
- Touch rod on striker rotating your wrist and moving back and forth.

For cutting techniques, refer to owners manual.



Operating Instructions - Cutting Rates

Rod Burn Times

Listed are the approximate burn times for the various SLICE rod diameters and lengths:

6.4 Rod

55.9 cm 40 - 45 seconds
 111.8 cm 80 - 90 seconds

9.5 Rod

45.7 cm 30 - 35 seconds
 91.4 mm 60 - 70 seconds

Material Type	Material Thickness		Length of Cut Per Inch Rod Used		Cutting Speed	
	Inches	mm	Inches	cm	In/Min	cm/Min
Carbon Steel	1/8	3.2	2.25	5.7	72	183
	1/4	6.4	1.50	3.8	52	132
	3/8	9.5	1.38	3.5	42	106
	1/2	12.7	1.25	3.2	35	89
	3/4	19.1	0.75	1.9	22	56
Stainless	1/8	3.2	2.00	5.1	65	165
	1/4	6.4	1.13	2.9	36	91
Aluminum	1/4	6.4	1.75	4.4	58	147
	3/8	9.5	1.25	3.2	38	97
	3/4	19.1	0.75	1.9	23	58

Operating Instructions – Shutting down

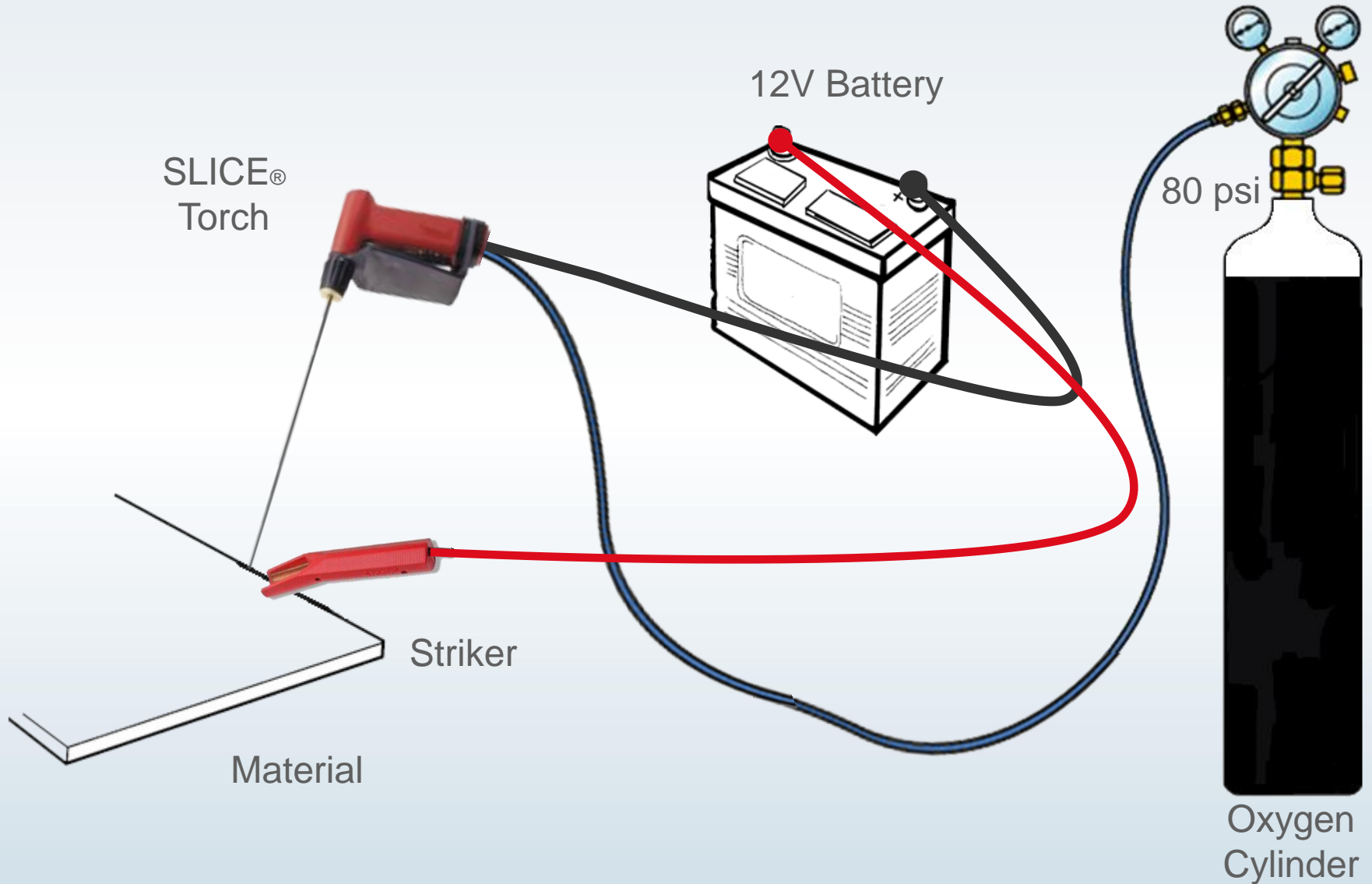
- Remove cutting rod.
- Remove from power source.
- Shut off the bottle supply.
- Vent the torch by depressing the oxygen lever. **NOTE:** Never vent oxygen near heat or flames.
- Turn the Pressure Adjustment knob anti clockwise on the oxygen regulator to fully open.
- Disconnect from the regulator.

Operational Procedure – End Of Use Inspection

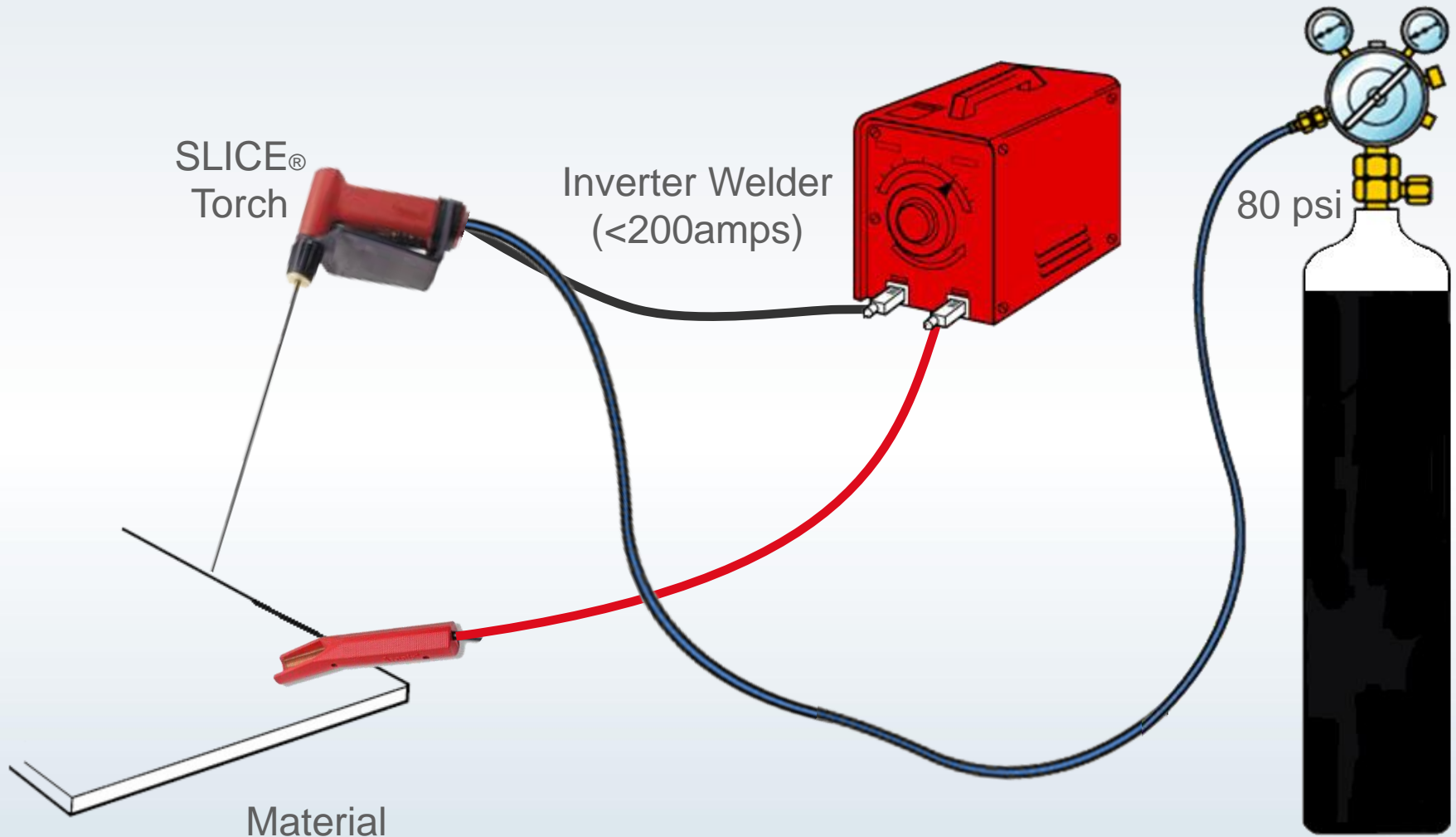


- Inspect torch for contaminants, dirt, oil, grease and wipe clean.
- Wire brush the striker if any build up.
- Check for damage or wear.

Exothermic Cutting Equipment - 12Volt Battery



Exothermic Cutting Equipment - Welding Inverter



SLICE[®]
Torch

Inverter Welder
(<200amps)

80 psi

Material

Oxygen
Cylinder

Never use a Constant Voltage power supply with this cutting process

Exothermic Cutting Equipment - Welding Inverter

SLICE[®]
Torch

Inverter Welder
(<200 amps)

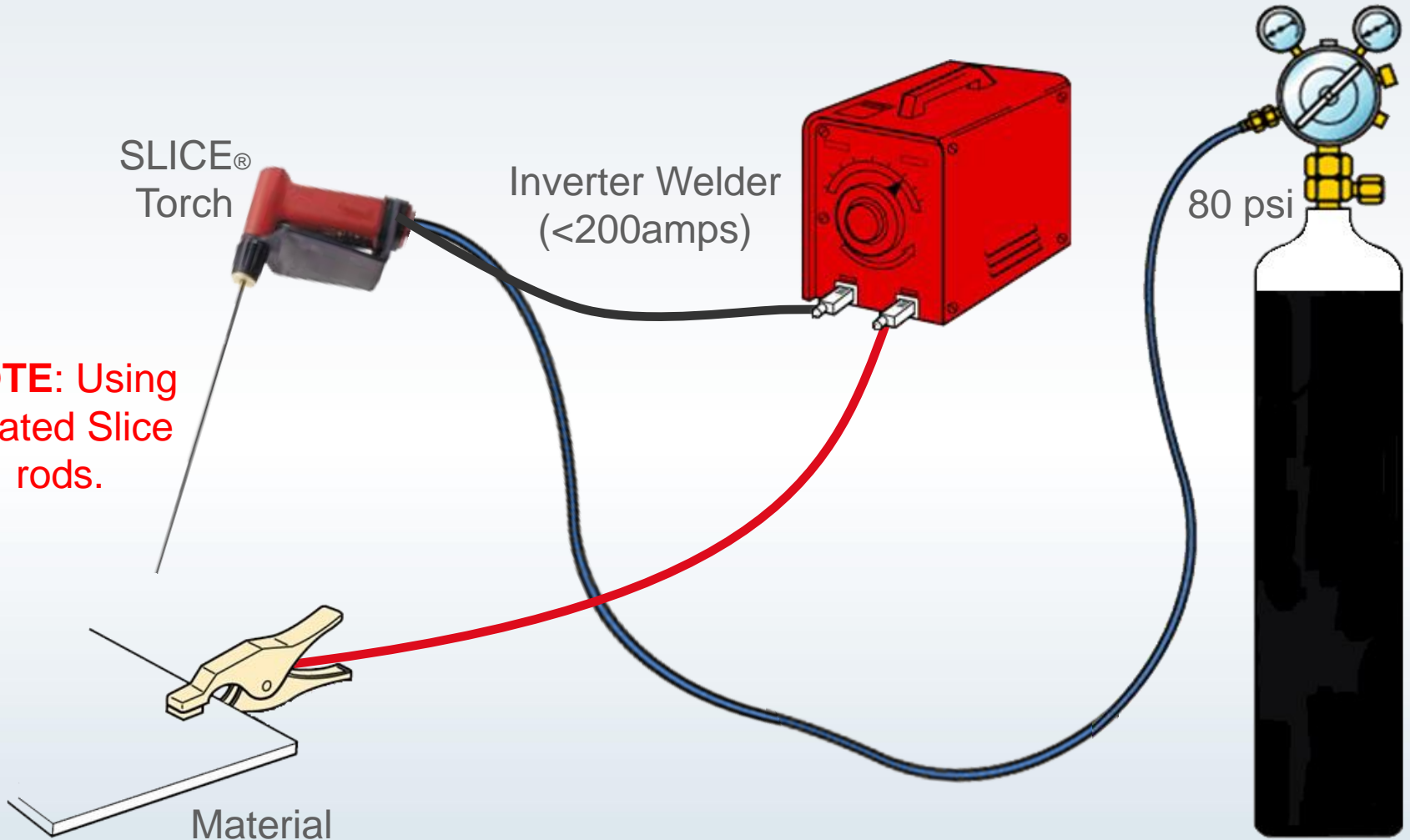
80 psi

NOTE: Using
Coated Slice
rods.

Material

Oxygen
Cylinder

Never use a Constant Voltage power supply with this cutting process





A GUIDE FOR MAINTENANCE

Maintenance – Inspection after heavy use

- Disconnect the torch from the battery assembly.
- Remove the Collet Nut, Collet, Washer, Spark Arrestor and the extension, if in place.
 - Wash in clean water and dry.
 - Do not use soap, solvents or any cleaning fluid.
 - If in doubt, replace Washer and Spark Arrestor.
- Remove Hand Shield and wash in clean water.
- Disassemble Handle and wash in clean water.
- Before removing oxygen hose, clean remaining parts in clean water and dry.

Maintenance - Inspection after heavy use

- Remove oxygen hose and inspect for water, soot, mud etc. If contaminated replace hose, do not clean.
- If there are any signs of dirt, disassemble the oxygen valve by removing the nut holding the plunger, remove the spring and washer. Clean components completely or replace.
- Dry all parts before reassembly.

NOTE: Oil, grease and other such substances can explode under pressure in oxygen.

- Test system before use.

Maintenance – Storage



- Never leave the cutting rod in the torch during storage.
- Slightly loosen nut before long term storage to prevent damage to internal washer.
- Do not expose the units to chemicals, water, grease, oil or excess heat.
- Never store the torch on oxygen tanks or on the floor.
- Be sure all components are dry and clean before use.

Maintenance - Quarterly Inspections

- The SLICE® equipment should be used at least once every 3 months to ensure battery has maintained its charge.
- Inspect for damage.
- Inspect the hoses for cuts, wear or burns.
- Remove Collet Nut and inspect for damage.
- Ensure Washer is in perfect condition, replace if necessary.
- Inspect Spark Arrestor to be sure it is clean, replace if damaged or dirty.

Any Questions ?



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