

PARWELD GAS WELDING AND CUTTING EQUIPMENT INSTRUCTIONS FOR USE

TERMINOLOGY

Sniffing: - The practice of opening and closing cylinder valves quickly to remove debris before fitting regulators.

Cutter: - A piece of equipment that facilitates the mixing and control of the gases to perform a welding or cutting operation.

Regulator: - A device fitted to the cylinder outlet to reduce the cylinder pressure to that required by the cutter.

Hose Assemblies: - Used to connect the regulator to the cutter. Hoses are colour coded to match the gas type.

Non Return Valve: - A valve that prevents reverse gas flow (Hose check valve).

Flashback Arrester: - Quenches a flame front and prevents it reaching the Cylinder.

Pressure Relief Valve: - Vents excess pressure from the regulator when the system pressure exceeds a predetermined level.

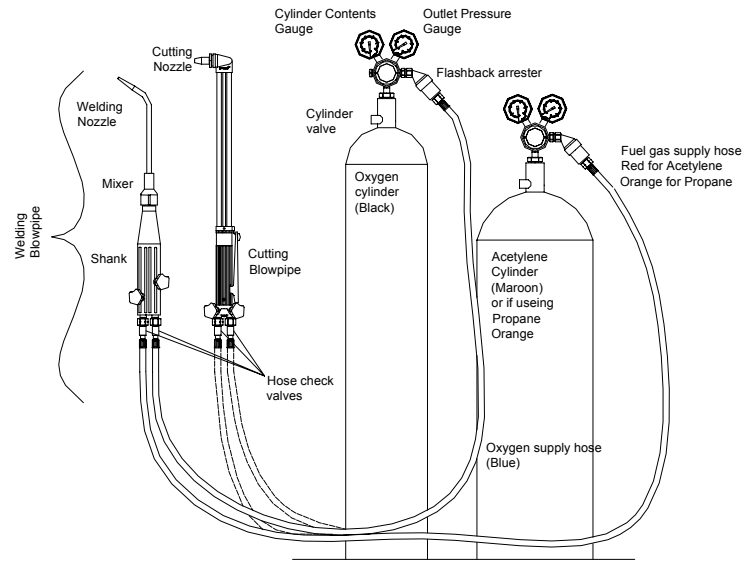
Backfire: - Return of the flame into the cutter usually accompanied by a hissing sound or a bang.

SAFETY

- Trained personnel should only use gas welding and cutting equipment.
- Always ensure Gas cylinders are safely secured.
- Ensure hoses are kept tidy on the floor to reduce the risk of tripping on the hoses.
- Ensure the working area is well ventilated to ensure there is no risk of asphyxiation.
- Ensure the working area is clear of flammable materials as sparks from the process can travel long distances.
- The site safety officer should control work in dirty or greasy environments.
- Flash back, in the event of a flash back immediately turn off the oxygen flow followed by the fuel gas, switch off the cylinder valves and check all equipment for overheating.
- Ensure no oil or grease is present on any of the parts used in the system.
- Do not sniff Hydrogen cylinders.
- Oxygen is an accelerant; do not use Oxygen to blow off work pieces or clothing, as there is a high risk of explosion or fire.
- Wear protective clothing, gauntlets and eye protection.
- Keep fire extinguishers near by.
- Never work on drums that have been used for the storage of flammable materials unless they have been made safe.
- Ensure Acetylene cylinders are safe after a flashback, check for hot spots or vibration; there is a risk of explosion.

CONNECTION OF THE SYSTEM

- Check the cylinder valves are clean and the threads are in good condition. Sniff the valve to remove debris from the valve seat (Never Sniff Hydrogen cylinders).
- Connect the pressure regulator to the cylinder, ensure the regulator is the correct type for the gas and cylinder pressure.
- Ensure the regulator knob is fully unscrewed.
- Connect the flashback arrester to the outlet of the regulator
- For hoses greater than 6.3mm bore or longer than 3m the following is recommended:
Non-return valves fitted to the blowpipe ends of the hose and a flash back arrester connected to the regulator outlet that has the following functions: - Flame arrester, Temperature activated cut-off, Pressure activated cut off.
- Connect the gas hoses to the flashback arrester outlet, ensure the non return valve is fitted to the blowpipe end of the hose, connect the blowpipe to the hoses connections and fit the correct nozzle and mixer (welding/heating) and ensure all control valves are closed.
- Slowly open each cylinder valve (only open acetylene cylinder valves 1 turn) and adjust the regulator to the correct operating pressure for the operation (turn clockwise to increase pressure).
Never stand in front of the regulator when opening the cylinder valve.
- Check the system for leaks using a suitable leak detection fluid. Recheck the pressures with the gas flowing.
- Purge each hose to ensure the hoses and blowpipe are primed with gas. Ensure this is conducted in a well-ventilated place away from sources of ignition. Purging should be carried out after each period of non-use.



OPERATING PROCEDURES

NM 250 BLOWPIPE

Lighting up

- Check all valves on the blowpipe are closed.
- Open the fuel gas knob and light the gas using a spark lighter, adjust the gas flow until the flame stops smoking.
- Open the Oxygen valve and adjust the flame to a neutral condition.
- Press the cutting lever and adjust the flame as necessary.

Shutting down

- Close the fuel gas control valve on the blowpipe.
- Close the oxygen gas control valve on the blowpipe.
- Close both cylinder valves.
- Reopen the control valves on the blowpipe to vent the gas in the system.
- Unscrew the pressure adjusting knobs on the regulators, and when the system is fully relieved of pressure, close the gas control knobs on the blowpipe.

LIGHTWEIGHT AND TYPE 5 WITH WELDING OR HEATING NOZZLE

Lighting up

- Check all valves on the blowpipe are closed.
- Open the fuel gas knob and light the gas using a spark lighter, adjust the gas flow until the flame ceases to smoke.
- Open the Oxygen valve and adjust the flame to a neutral condition. Note some operations may require a different flame configuration as detailed in Figure 1.

Shutting down

- Close the fuel gas control valve on the blowpipe
- Close the oxygen gas control valve on the blowpipe
- Close both cylinder valves
- Reopen the control valves on the blowpipe to vent the gas in the system
- Unscrew the pressure adjusting knobs on the regulators and when the system is fully relieved of pressure, close the gas control knobs on the blowpipe.

LIGHTWEIGHT AND TYPE 5 WITH CUTTING ATTACHMENT AND NOZZLE

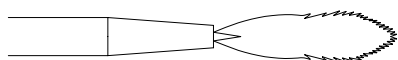
Lighting up

- Check all valves on the blowpipe are closed.
- Open the fuel gas knob and light the gas using a spark lighter, adjust the gas flow until the flame ceases to smoke.
- Open the Oxygen valve on the shank fully, and adjust the flame to a neutral condition using the oxygen valve on the cutting attachment.
- Press the cutting lever and readjust the flame accordingly.

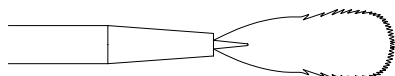
Shutting down

- Close the fuel gas control valve on the blowpipe.
- Close the oxygen gas control valve on the blowpipe.
- Close both cylinder valves.
- Reopen the control valves on the blowpipe to vent the gas in the system.
- Unscrew the pressure adjusting knobs on the regulators and when the system is fully relieved of pressure close the gas control knobs on the blowpipe.

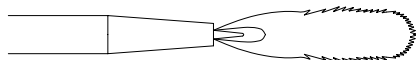
FIGURE 1: FLAME TYPES



Oxidizing flame:- Sharp center cone, roaring flame for Brazing and welding brass



Neutral flame:- rounded center cone, for Welding and heating



Carbonizing flame:- Double centre cone, for Hardfacing

FLASH BACK ARRESTERS

- Ensure the flash back arrester is fitted in the direction of gas flow arrow on the unit.
- Ensure the flashback arrestor is the correct type for the gas in use.

TROUBLE SHOOTING

- Torch Bangs or snaps out during ignition
 - A- Ensure hoses are purged correctly
 - B- Increase fuel gas flow before lighting
 - C- Check torch for leaks
 - D- Check nozzle is properly seated
 - E- Ensure sufficient flow of Acetylene for the nozzle size in use
- Torch bangs or snaps during use
 - A- Check gas flow and pressure is correct for the nozzle size
 - B- Check the nozzles is not blocked, clean with nozzle cleaners
 - C- Replace nozzle
- Torch bangs when switching off
 - Ensure the fuel gas supply is switched off first

MAINTENANCE

Daily

Check the condition of all equipment checking for damage, especially hose sets

Weekly

Pressure test the system and check the system for leaks using a 0.5% Teepol detergent solution in water (or other oil free leak detection fluid)

Every Five Years

Ensure the product is removed from service and replaced or refurbished by a qualified person (refer to the date stamp on the equipment)

STANDARDS

Gas Equipment conforms to the following relevant standard

- Pressure Regulators BS EN ISO 2503 1998
- Flashback arresters BS EN 730 2002
- Hose Assemblies BS EN 1256 1996
- Rubber Hose BS EN 559 2003
- Manual Cutting and Welding Blowpipes BS EN ISO 5172 1997

FURTHER INFORMATION

For further information on the Safe Operation of Gas Welding and Cutting Systems refer to the British Compressed Gas Association Code of Practice CP 7. The HSE publication "Safe Use of Compressed Gases in Welding, Flame Cutting and Allied Process.

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Gas Consumption and Setting Pressures for ANM, AMNE, PNM, PMNE Cutting Nozzles										
Nozzle Size	Plate Thickness	Acetylene Pressure	Propane Pressure	Heating Oxygen pressure	Cutting Oxygen pressure	Preheat Gas Consumption		Preheat Gas Consumption		Cutting Oxygen Consumption L/m
	mm	Bar	Bar	Bar	Bar	Oxy	l/m Act	Oxy	l/m Prop	
1/32	3-6	0.14	0.2	1.5	1.5-2.0	8.7	8	23	6	20-25
3/64	5-12	0.14	0.2	2.0	2.0-3.0	10	9.5	30	8	40-50
1/16	10-75	0.15	0.2	2.5	3.0-4.0	13	11.5	41	10	80-110
5/64	70-100	0.14	0.3	2.5	3.5-4.5	14.5	13	50	12	130-160
3/32	90-150	0.21	0.4	3.0	4.0-5.0	20	18	68	17	170-200
1/8	190-300	0.28	0.6	4.0	6.0-7.0	27	24	96	24	350-400

Gas Consumption and Setting Pressures for VVC Cutting Nozzles							
Nozzle Size	Plate Thickness	Propane Pressure	Heating Oxygen Pressure	Cutting Oxygen Pressure	Preheat Gas Consumption		Cutting Oxygen Consumption L/m
	mm	Bar	Bar	Bar	Oxy	l/m Prop	
5/0	1.5	0.1	0.55-1.0	2.75	14	2.8	7.0
4/0	6	0.1	0.7-1.0	3.45	16.5	3.3	18.8
3/0	9	0.1	0.7-2.41	5.17	16.5	3.3	37.8
2/0	12	0.1	0.7-2.41	5.17	16.5	3.3	42.5
0	18	0.1	0.7-2.41	6.42	16.5	3.3	59
1/2	32	0.1	0.82-2.41	6.9	18.8	3.7	80
1	64	0.1	0.82-2.41	6.9	18.8	3.7	94.4
11/2	75	0.1	0.82-2.41	6.9	18.8	3.7	118
2	127	0.1	0.82-2.41	6.9	18.8	3.7	153
21/2	150	0.1	0.82-2.41	6.9	18.8	3.7	186
3	178	0.1	0.82-2.75	6.9	18.8	3.7	200
4	203	0.1	0.82-2.75	6.9	18.8	3.7	248
5	225	0.1	0.9-2.75	6.42	47	9.4	274

Swaged Welding Nozzles					
Nozzle Size	Plate Thickness	Acetylene Pressure	Oxygen Pressure	Gas Consumption	
	mm	Bar	Bar	Oxy	l/m Act
1	0.9	0.14	0.14	0.47	0.47
2	1.2	0.14	0.14	0.94	0.94
3	2	0.14	0.14	1.4	1.4
5	2.6	0.14	0.14	2.4	2.4
7	3.2	0.14	0.14	3.3	3.3
10	4	0.21	0.21	4.7	4.7
13	5	0.28	0.28	6	6
18	6.5	0.28	0.28	8.5	8.5
25	8.2	0.42	0.42	12	12

Super Heating Nozzles				
Nozzle Size	Propane Pressure	Oxygen Pressure	Gas Consumption	
	Bar	Bar	Oxy	l/m Prop
2H	0.21-0.56	1.1-2.5	145	35
3H	0.28-1.1	1.8-5.0	275	68
4H	0.35-1.3	2.5-5.7	310	77
5H	0.85-2.1	3.5-8.7	467	117