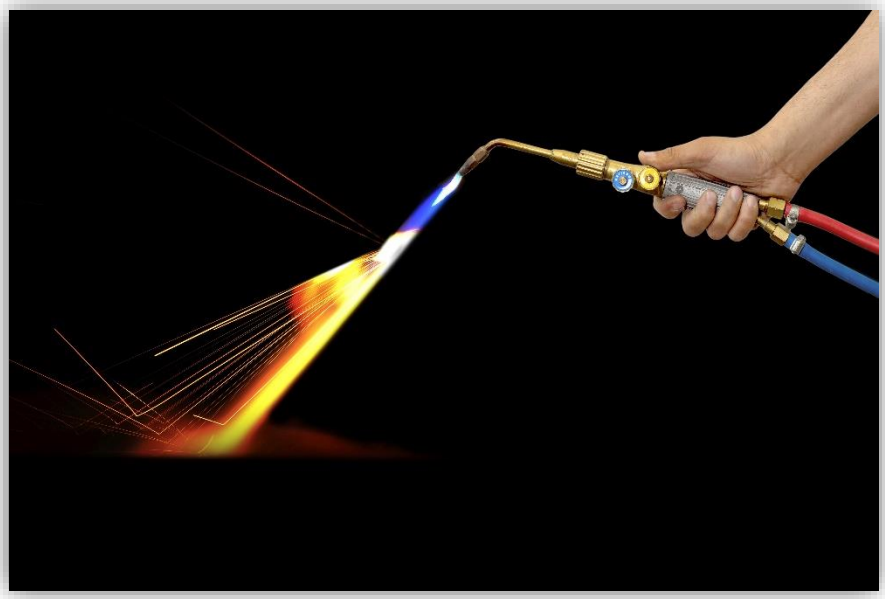
Safe use of Oxy-Fuel Gas Equipment



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Regulator Pressure Settings

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Acetylene Welding Nozzles				
Nozzle Size	Operating Pressure			
	Oxygen		Acetylene	
	Bar	psi	Bar	psi
1	0.14	2	0.14	2
2	0.14	2	0.14	2
3	0.14	2	0.14	2
5	0.21	3	0.21	3
7	0.21	3	0.21	3
10	0.28	4	0.28	4
13	0.28	4	0.28	4
18	0.35	5	0.35	5
25	0.4	6	0.48	7
35	0.66	9.5	0.66	9.5
45	0.4	6	0.4	6
90	0.62	9	0.62	9

AFN Nozzles				
Nozzle Size	Operating Pressure			
	Oxygen		Acetylene	
	Bar	psi	Bar	psi
1/32	2	30	0.14	2
3/64	2	30	0.14	2
1/16	3 - 3.8	45 - 55	0.28 - 0.35	4 - 5

Acetylene Heating Nozzles				
Nozzle Size	Operating Pressure			
	Oxygen		Acetylene	
	Bar	psi	Bar	psi
AHT 25	0.35	4	0.35	4
AHT 50	0.43	6	0.46	6
AHT 100	0.49	7	0.7	10

Propane Heating Nozzles				
Nozzle Size	Operating Pressure			
	Oxygen		Propane	
	Bar	psi	Bar	psi
H1	0.7 - 2.1	10 - 30	0.14 - 0.49	2 - 7
H2	1.1 - 2.5	15 - 35	0.21 - 0.56	3 - 8
H3	1.8 - 5.0	25 - 70	0.28 - 1.1	4 - 15
H4	2.5 - 5.7	35 - 80	0.35 - 1.3	5 - 18
H5	3.5 - 8.7	50 - 125	0.85 - 2.1	12 - 30

Acetylene (ANM) Cutting Nozzles						
Nozzle Size	Thickness		Operating Pressure			
			Oxygen		Acetylene	
	mm	Inch	Bar	psi	Bar	psi
1/32	6	¼	2.0	30	0.20	3
3/64	12	½	2.0	30	0.20	3
1/16	75	3	3.4	50	0.30	4
5/64	100	4	3.4	50	0.30	4
3/32	150	6	4.1	60	0.40	6
1/8	300	12	6.2	90	0.62	9

Propane (PNM) Cutting Nozzles						
Nozzle Size	Thickness		Operating Pressure			
			Oxygen		Propane	
	mm	Inch	Bar	psi	Bar	psi
1/32	6	¼	1.5	30	0.30	4
3/64	12	½	2.1	30	0.35	5
1/16	75	3	3.5	50	0.40	6
5/64	100	4	3.1	45	0.31	4.5
3/32	150	6	3.1	45	0.40	6
1/8	300	12	6.2	90	0.45	6.5

Guidance of Inspection & Maintenance – Appendix 1 CP7					
Equipment	Intervals				
	At Assembly	Before Use	After Use	Annual	Replacement / Refurbishment Intervals
Regulators and their integral protective devices *CP7 – Sections 7.1, 9.9*	Check compatible with the gas. Ensure within life for use. Check the regulator inlet pressure is compatible with the maximum cylinder pressure. Ensure the Pressure Adjustment control is firmly fixed to the body and operates freely. Check the inlet and outlet connections sit square to the regulator's body. Check condition of threads and sealing surfaces. Ensure no signs of PTFE tape. Check both gauges on regulator naturally face the front and are undamaged. Ensure both gauge needles reset to zero. No oil, grease or other contamination.	Check body for any signs of soot, oil, grease or other contamination. Check compatible with the gas. Ensure the Pressure Adjustment control is firmly fixed to the body and operate freely. Ensure the regulator gauges start at zero prior to use. Ensure the pressure rises on the high pressure gauge when opening the cylinder outlet valve. Check the low pressure gauge rises smoothly when setting the gas pressure. Leak test all joints at working pressure.	Check for any damage, contamination, defects or faults. Check that gauges return to zero during the venting process.	Full visual inspection. Check life dates. Functional tests to ensure correct operation. Typically this will include a creep test to ensure regulator integrity.	5 years from date of manufacture or manufacturer's recommendations. Replace with a new, or refurbished unit

Guidance of Inspection & Maintenance – Appendix 1 CP7					
Equipment	Intervals				
	At Assembly	Before Use	After Use	Annual	Replacement / Refurbishment Intervals
FLAME ARRESTORS and their integral cut off valves. *CP7 - Sections 7.2, 9.10*	Check correct type fitted. Check manufacturing standard. Ensure within life for use. Check condition of threads and sealing surfaces. Check the direction of flow is correct. No oil, grease or other contamination. Leak test all joints at working pressure. Check the pressure sensitive cut-off valve button is not restricted / damaged / tied down.	Ensure flame arrestors are fitted. Leak test all joints at working pressure.	Check for any damage, contamination, defects or faults.	Check unit for leaks, flow restrictions and reverse flow to ensure correct operation of non-return valves. Where pressure sensitive cut off valves are fitted, they shall operate at a pressure of no greater than 1.2 bar. If of a pressure sensitive type, check shut-off in the tripped condition in the direction of flow. Check life dates.	5 years from date of manufacture or manufacturer's recommendations. Replace with a new, or refurbished unit

Guidance of Inspection & Maintenance – Appendix 1 CP7					
Equipment	Intervals				
	At Assembly	Before Use	After Use	Annual	Replacement / Refurbishment Intervals
HOSE ASSEMBLIES *CP7 - Sections 7.3, 9.11* (including NON-RETURN VALVES) *CP7 - Sections 7.2, 9.10.*	Check the manufacturing standard. Check suitability of hose colour, internal bore size and length Check threads and sealing surfaces. Check hoses condition for damage (e.g. kinking twisting or cracking). Ensure HCV and Nut & Tails are fitted using correct ferrules and are located in the correct place. Leak test of all joints at working pressure.	Ensure all the gas hose is unwound from gas cylinder trolley prior to use. Check hoses condition for damage (e.g. kinking twisting or cracking). Leak test of all joints at working pressure.	Check for any damage, contamination, defects or faults.	Reverse hose to ensure the correct operation of non-return valve where fitted. Bend hose in a tight radius to ensure reinforcement is not visible and there is no sign of collapse or distortion.	Determined by local operating conditions. Replace as required.

Guidance of Inspection & Maintenance – Appendix 1 CP7					
Equipment	Intervals				
	At Assembly	Before Use	After Use	Annual	Replacement / Refurbishment Intervals
BLOWPIPES *CP7 -Sections 7.4, 9.12*	Check compatible with the gas. Check the condition of the body, head and pipes. Check blowpipe nut is undamaged and is not oval. Ensure the blowpipe taps are undamaged and operate freely.	Ensure the blowpipe nozzle is correct for the type of gas being used. Check the condition of the body, head and pipes. Ensure the blowpipe taps are undamaged and operate freely.	Check for any damage, contamination, defects or faults.	Test valve functions. Blank exits and leak test for internal malfunction.	Determined by local operating conditions. Replace with a new, or refurbished unit

Mobile Oxy-Fuel Gas Equipment: Pre-Use Checklist

Operators should always follow company approved procedures

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Satisfactory
Report to Supervisor if unable to rectify

Gas Cylinders			Yes	No
Secured		Upright & securely chained.		
Labelling		Correctly labelled and colour coded.		
Outlet Valves		Cleaned & uncontaminated (free from oil & grease)		
Trolley		Trolley wheels rotate and stay on.		
Regulators				
Front Face		Labelled for gas being used; Manufacturer's name visible		
Body		Inlet & Outlet pressure appropriate		
		Standard marked ISO 2503. Regulator in date – 5 years		
Pressure Adjustment Knob		Fixed to body & operates freely		
Not applicable if equipment is already fitted	**Inlet Connection**	90° to regulator body		
		Undamaged; uncontaminated; unmodified		
	Outlet Connection	90° to regulator body		
		Undamaged; uncontaminated; unmodified		
Gauges		In place & correct type		
		Undamaged; Standard marked ISO 5171		
		Needles at zero; at correct side of stop; not bent		
		uncontaminated; unmodified		
Pressure Relief Valve		In place; unmodified (might NOT be visible); **NOT ON** Fuel gas		

Flashback Arrestors			
Body	Undamaged; Standard Marked EN 730 or ISO 5175		
Connections	Cleaned & uncontaminated		
Pressure Rating	Legible; Suitable for Cylinder & Gas Flow		
Stamped	Date stamp under 5 yrs. (or Manufacturer's Recommendations)		
Reset Button	Not tied down, restricted, modified or damaged		
	Present; accessible		

Gas Hoses		Yes	No
Hose	Correct Colour code as per gas type.		
	Standard Marked EN 559 or ISO 3821.		
	Undamaged (i.e. Burns, cracking, spatter holes).		
	Appropriate hose clips in use; no tapes or wires.		
	When in use - Uncoiled from cylinder.		
Connections	Undamaged. Correctly fixed (NOT Worm screw types). Uncontaminated.		

Hose Non-Return / Check Valves			
Non-Return Valves	In good condition; Fitted to the torch end of the hose.		
Connections	Undamaged. Correct type (NOT worm screw types). Uncontaminated		

Torch			
Torch Taps	Undamaged? 90° to torch body; Do they operate freely?		
Handle	No excessive play		
Inlet Connections	Clean; uncontaminated		
Body	Undamaged; uncontaminated.		
	No discolouration.		
Pipework	Straight; undamaged.		
Torch Head & Nut	Undamaged (Still use with a spanner); uncontaminated.		
	Threads in good condition.		
	Round in shape (not oval).		
Nozzle	Correct type; undamaged;		

System	All system joints should be leak checked using an approved Leak Detector Solution only.

Mobile Oxy-Fuel Gas Equipment

Operators should always follow the Manufacturer's instructions for the specific equipment in use.

Risk Assessments & Safety Data Sheets for the gases being used should be available & understood.

Lighting Up Procedure	
Safety Precautions	**Check:** ✓ Ensure local fire procedures are followed. ✓ Identify correct fire extinguishers are available. ✓ Ensure the use of appropriate PPE. ✓ Ensure Gas Cylinders are stood upright & secure. ✓ Identify the Correct Gas type & appropriate pressures.
System Checks	✓ Before use checks completed (see over). ✓ Ensure PA knob (anti clockwise) and torch valves are closed.
Cylinder Valves & Regulator	✓ Open Oxygen & Fuel Gas cylinder Valves 1 full turn. ✓ Open torch valve & set the regulator working pressure as per nozzle size.
ALWAYS Purge Fuel Gas & Oxygen Hoses before lighting	✓ Open Torch Valve. ✓ Check for gas flow & adjust regulator working pressure if necessary. ✓ Purge gas hose (3 seconds every 5m of hose) *Purging should only take place in well ventilated areas and not in confined spaces.*
Ensure Torch Valves are closed before proceeding.	
Lighting the System	✓ Use correct spark lighter for fuel gas being used. ✓ Open Fuel Gas Torch Valve. ✓ Light the Torch. ✓ For Acetylene increase fuel gas to reduce smoke if necessary. ✓ Slowly open the Oxygen Torch Valve until a Neutral flame is achieved.

Closing Down Procedure	
Extinguish the working flame at the torch	**Check:** ✓ Oxygen gas off. ✓ Fuel off.
Close Cylinders & Vent System (NO Gas)	✓ Close both Cylinder outlet valves. ✓ Open Torch Valves. ✓ Vent the gas from each of the hoses. ✓ Ensure both Regulator gauges return to zero.
Close Torch	✓ Close all Torch valves.
Close Regulator	✓ Close the Regulator Pressure Adjustment Screw. (anti clockwise)
Final Checks	✓ 1. Cylinder Outlet Connection closed. ✓ 2. Regulator PA Knob closed. ✓ 3. Torch Taps closed.
Safety Stow	✓ Preferably do not stow hoses around the Cylinders. ✓ Remove the cylinder from any confined space.

EMERGENCY PROCEDURE FOLLOWING FLASHBACK EXPLOSIONS & SUSTAINED BACK FIRE
The Oxygen may use the Torch internal components as a fuel causing it to continue to burn internally. ✓ Always turn the Oxygen off first. ✓ Turn Fuel gas off. ✓ Turn Oxygen back on preferably quenching in water with the oxygen tap open. ✓ Turn both cylinders off
✓ Check Acetylene cylinder (if used) for signs of heat. If the cylinder appears to be generating its own heat. Evacuate area & call the fire services. **DO NOT ATTEMPT TO MOVE THE CYLINDER.** ✓ Inspect all equipment for damage. Check if the Pressure valve or the Temperature Sensitive valve has closed on the Flashback Arrestor. ✓ When using Acetylene check all equipment for signs of soot, which will indicate the extent of a flashback
✓ Replace all damage equipment
If no equipment is damaged; purge & restart the following observations: ✓ Before Use Checks ✓ Light Up Procedure

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