

# Wescol Limited

## Operating Instructions for Pressure Regulators

**PLEASE ENSURE THESE INSTRUCTIONS ARE GIVEN TO THE OPERATOR**

The Health & Safety at Work Act 1974 states that manufacturers, importers and suppliers are “to take such steps as are necessary to secure that persons supplied by that person with the article are provided with adequate information about the use for which the article is designed or has been tested and about any conditions necessary to ensure that it will be safe and without risk to health. (Section 6 (2) as amended by the Consumer Protection Act 1987).

These instructions cover all Wescol single stage and two stage regulators used for welding, cutting, heating and allied processes, flow and pipeline regulators, including high pressure and special processes regulators for use with the following gases;

Acetylene	C <sub>2</sub> H <sub>2</sub>
Argon	Ar
Carbon dioxide	CO <sub>2</sub>
Carbon Monoxide	CO
Helium	He
Hydrogen	H <sub>2</sub>
Methane	CH <sub>4</sub>
Nitrogen	N <sub>2</sub>
Oxygen	O <sub>2</sub>
Propane	C <sub>3</sub> H <sub>8</sub>
Shielding gases	

### 1. Description

Regulators are precision instruments, containing delicate components which need to be handled with care. Avoid rough treatment which could dislodge sensitive springs and seats.

If these instructions are complied with, regulators will give long, safe, reliable service.

- a. A pressure regulator is a device which accepts gas at a higher pressure, which can vary, and reduce it to a reasonably constant lower pressure.
- b. The outlet pressure may be adjustable or pre-set.

### 2. How it works

Regulators operate on the indirect principle i.e. the inlet pressure which closes the regulating valve has to be overcome by pressure exerted by the pressure adjusting knob via a screw, spring, diaphragm and valve pin.

Gas enters the regulator at high pressure and feeds past the valve into a larger chamber where it expands to fill the available space, thereby lowering the pressure.

The smaller the gap between the valve seat and the valve, less gas will feed into the larger chamber and the greater will be the pressure drop. The greater the pressure exerted on the valve via the pressure adjusting knob, the further it moves from the seat and the greater the amount of gas feeding through to the larger chamber, giving less pressure drop. In this way the pressure available from the regulator outlet is fully controllable. A regulator not only controls the pressure of gas flowing through it, but will also ensure that the pressure of the gas down-stream of the regulator is controlled. This is achieved by one “wall” of the expansion chamber being flexible (the diaphragm) and coupled to the control valve.

If the pressure down-stream of the pressure regulator increases i.e. a down-stream control valve is closed or a hose is kinked, the resultant increase in back pressure causes the diaphragm to move away from the valve seat. This increases the size of the chamber and also allows the inlet pressure to close the valve until the downstream pressure is reduced.

If the pressure downstream of the regulator decreases, the diaphragm will sense this and move towards the valve, opening it and allowing gas to flow again.

A state of equilibrium between the pressure being exerted via the pressure adjusting knob and the incoming gas is controlled by the flexing of the diaphragm and the consequent opening and closing of the valve, giving a near constant outlet pressure.

### 3. Safety requirements

- a. Do not remove plugs, gauges, and relief valves. or transpose their positions.
- b. Ensure that the regulator inlet and nut are compatible with the seating and thread of the cylinder or pipeline outlet.
- c. Air or nitrogen regulators must not be used with oxygen, and similarly oxygen regulators must be never used with air or nitrogen. Air and nitrogen may contain traces of oil which can contaminate the regulator.

- d. Pressure regulator inlet pressure ratings must be equal or greater than that available from the gas source to which it is connected.
- e. Oil or grease must never be allowed to come into contact with any regulator, cylinder or pipeline valve or associated fittings. They should not be handled with oily or greasy hands, gloves or rags.
- f. Tape, jointing paste or addition gaskets shall NOT be used, with the regulator or on other outlet connections.

#### 4. Connection to the gas supply

- a. Cylinders should be located where they will not be knocked or contaminated with oil or grease and are securely supported in a vertical position.
- b. Cylinder and pipeline valves (except hydrogen) should be "sniffed" (open and close briefly) to dislodge water and foreign matter from the valve/ regulator inlet seating. Care should be taken to direct the released gas away from personnel or any flame or heat source. If there is evidence of oil present, the cylinder should be removed and equipment should be cleaned.
- c. Prior to fitting a regulator, the valve seating and the regulator inlet should be examined for signs of damage or contamination with oil, grease or paint. If present the regulator should be removed.
- d. Position the regulator so that there is minimum obstruction of the cylinder valve spindle key.
- e. Once the regulator is fitted to the cylinder or pipeline valve outlet, ensure the pressure adjusting knob is turned fully anti-clockwise and no resistance is evident when turning it. Diaphragms can rupture if the gas is fed to a regulator when the adjusting knob is screwed in.

#### 5. Operating the regulator

- a. SLOWLY open the cylinder or pipeline one full turn.
- b. Ensure contents pressure is registering on the contents gauge or indicator if fitted.
- c. Ensure sufficient gas is available for the job in hand. Once the gauge pointer has steadied, open the cylinder valve one further turn.
- d. Test the valve/regulator inlet joint with an approved leak detector solution. Ensure all surfaces are cleaned and no solution remains on the regulator.
- e. If oxygen or a fuel gas is to be used, fit the correct flashback arrestor/hose assembly to the regulator outlet.
- f. It must be recognised that all items fitted down-stream of the regulator will cause some pressure drop and this needs to be taken into account when selecting regulator, flashback arrestor and hoses.
- g. Hose assemblies for oxygen, air or fuel gas should be fitted with non return valves at the downstream end.
- h. Before connecting the hose non-return valve to the equipment down-stream, allow a small quantity of gas to blow through the system to ensure no foreign matter is trapped. Direct this away from people.

#### 6. Adjusting the regulator

- a. Screw the pressure adjusting knob in a clockwise direction to increase pressure and in an anti-clockwise direction to decrease pressure until the required working pressure is recorded on the outlet pressure gauge. If no gauge is fitted use the approximate markings on the bonnet, by aligning the knob with the markings.
- b. Further re-adjustment of outlet pressure may be required to ensure constant pressure once the gas is flowing. Particularly where single stage regulators are being used.

#### 7. Closing down the regulator

- a. On termination of the operation, close downstream valves followed by the cylinder or pipeline valve. When no further gas is being fed into the system and the gauge pointers remain constant, open all downstream valves to release the entrapped gas in that line. When the gas has vented totally the gauge pointers will be at zero.
- b. When the gas has been vented, release the regulator pressure adjusting knob by fully turning in an anti-clockwise direction and no spring resistance can be felt. Close all downstream valves.
- c. If regulators are taken out of service for a number of weeks, it is advisable to ensure that the valve is not compressed against the seat where it could adhere. This can be achieved by turning the pressure adjusting knob clockwise until some resistance is felt and then continue to turn for one more full turn.



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