KEN-884-4120K
KEN-884-4140K
KEN-884-4200K
KEN-884-4300K

Inspection / Testing of Pressure Regulators to meet the Requirements of the Revised Standard EN ISO 2503:1998

All tests and checks performed are with respect to the minimum requirements of the standard all references relate to the clauses with the standard. The product detailed below has previously been certified to EN 585:1995 and testing perform is to ensure compliance with the revised standard detailed above.

Product Range: - Kennedy Everyday
Supplier: - Cromwell Tools
Models: - Oxygen, Acetylene, Argon and Propane

Definition of Regulator classed for the purpose of ISO 2503 tests.

Model	Part Ref	Pressure Range P1 / P2	Class	Measured Standard Discharge (Q1)
Oxy 10 BAR	E700102 E700122	300 / 10	3	80
Acet 1.5 BAR	E700101 E700121	25 / 1.5	2	17
Argon	E700141 E700113 E700140 E700123	300 / 3	1	31
Propane	E700104	25 / 4	1	39

Note: - all regulators use the same body design and construction detail differences are in the pressure gauges, pressure adjusting springs and pressure relief valves. For the purposes of inspection and testing the most complicated model of each type was selected i.e., with 2 pressure gauges.

6.1 **Materials** the materials used with in the regulator were checked in terms of chemical composition and surface finish and deemed to be suitable for use with the gasses involved.

6.2.1 **Oxygen Regulators**
Factory inspections were made by **Jonathan Websdell** and he was satisfied that the production area was clean and tidy and during assembly no contaminants were present, all parts were cleaned thoroughly before assembly. Ignition tests were performed in accordance with 11.5

Sample	Temp	P1	Pa Screw Out	Pa Screw In	Inspection
1	60.1	300 BAR	Y	Y	PASS
2	59.8	299.8	Y	Y	PASS
3	60.3	299.8	Y	Y	PASS
4	60.1	300	Y	Y	PASS
5	59.7	298.9	Y	Y	PASS

The results were deemed to be acceptable

6.2.1 **Acetylene Regulators**
The requirements that the outlet pressure does not exceed 1.5 is satisfied by the 100% testing of the production were every regulator is tested for operation characteristics. Pressure test equipment used in production is calibrated to traceable sources annually. Further testing was conducted with 3 samples a different inlet pressure to ensure compliance at all pressure ranges.

Sample	5 BAR	10 BAR	15 BAR	25 BAR
1	1.45	1.5	1.43	1.5
2	1.42	1.51	1.42	1.48
3	1.43	1.49	1.43	1.48

6.2.3 **Filter**

Sintered filters are fitted to the inlet connection of all models; tests were performed to ensure the discharge cross-section is greater than the regulator. Filter maximum flow rate was found to be 37.8m/h at a pressure of 300Bar at 20^{o}C which is greater than the maximum flow rate of the regulator which is 36m/h

6.2.4 **Outlet Valve**

Note applicable with this range

6.2.5 **Pressure Adjusting Devise**

Checks performed on the following models
E700122
E700121
E700123
E700104

In each case the pa knob is screwed fully in and the distance measured from the front face of the ring under the pa knob to the front face of the bonnet referring to drawings this measures at 26.4mm and was cross checked with samples. The coil bound length of the spring in a 10Bar Oxygen Regulator is 21.5mm.
The Oxygen regulator has the largest spring wire diameter and so produces the longest coil bound length.
The fully screwed in pa knob leaves a clearance of 4.9mm before the spring becomes coil bound.
The pressure adjusting screw is deemed to be non removable due to the use of a locking nut under the plastic cap.

6.2.6.2 **Relief Valve**

The gas tightness of the pressure relief valves were checked as per the following table

Model	P2	Prv	Required Qrv	Measured Qrv	P relief valve opening pressure	P relief valve closing pressure
E700122	10 BAR	20 BAR	80	80.75	15 BAR	12.7 BAR
E700121	1.5 BAR	3 BAR	17	80	2.8 BAR	1.7 BAR
E700123	3 BAR	6 BAR	31	80.25	5.3 BAR	5.0 BAR

Discharging of the gas is away from the operator and deemed to be safe.

6.2.7 **Pressure Gauges**

Conformance of pressure gauges where fitted is to ISO 5171 and so meets the requirements of the standard.

6.2.8 **Gas Tightness**

The following gas tightness tests were performed on a sample of 5 Regulators (E700122)

Gas tightness from the high to the low pressure

Sample	Leakage Measured	Pass / Fail
1	0	Pass
2	0	Pass
3	0	Pass
4	0	Pass
5	0	Pass

Gas tightness to atmosphere

Sample	Leakage Measured	Pass / Fail
1	0	Pass
2	0	Pass
3	0	Pass
4	0	Pass
5	0	Pass

6.2.9.1 **Fitness for Service**

In accordance with table 6 the following tests were performed using hydraulic test unit, where necessary the diaphragm was replaced with a stainless steel plate.

Regulator	Rated Pressure	HP Test Pressure	LP Test Pressure	Dimensional Inspection
Oxygen 1	300 BAR	450 BAR	60 BAR	Pass
Oxygen 2	300 BAR	450 BAR	60 BAR	Pass
Argon 1	300 BAR	450 BAR	60 BAR	Pass
Argon 2	300 BAR	450 BAR	60 BAR	Pass
Acetylene 1	25 BAR	300 BAR	30 BAR	Pass
Acetylene 3	25 BAR	300 BAR	30 BAR	Pass
Propane 1	25 BAR	300 BAR	30 BAR	Pass
Propane 2	25 BAR	300 BAR	30 BAR	Pass

6.2.9.2 **Safety**

In order to perform this test the main valve pin is removed and the outlet connection blanked off. The regulator is then enclosed in a closed metal box with numerous vent holes. The regulator is then exposed to full cylinder pressure (300 Bar) after the test check were made for any debris that may have been released.
As all the regulators in the range use the same body and bonnet the test was performed on one model only but repeated on 5 different samples. In no instances was material released from the regulator and in all cases pressure was vented through the PR relief valve.

7.1 **Inlet Connections**

Inlet connections were dimensional checked for compliance against ISO 3253

7.2 **Outlet Connection**

Measures up to ISO 3253 and at 90^{o} to the inlet connection, which is acceptable, the regulators are not supplied with nuts or tails.

9 **Marking**

The marking of the regulator is by use of metal stamping and adhesive labels; the presence of the following information was checked on the following models.

International Standard
Manufacturer Trade Mark
P2 Outlet Pressure
Inlet Pressure
Gas for Use

10 **Instructions for Use**

These were verified to contain the required information in accordance with ISO 2503

Conclusion

The E Range of regulators meet the essential requirements of EN ISO 2503:1998 and can be sold as such