ELSTER Jeavons

Catalogue and Performance Literature for

J78

Gas Pressure Regulators

½", ¾" and 1" Sizes

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June 2005

J78R & RS Low Pressure Regulators

½" – ¾" – 1"

For inlet pressures up to 350mbar (5psig).

The J78 range is a compact, accurate and economical regulator. It is suitable for a wide range of commercial and industrial applications, including such OEM equipment as boiler and burner trains. The J78 offers positive lock up, and is available in a number of sizes, with a comprehensive range of regulator springs for different requirements.



APPLICATION

The J78 range is suitable for inlet pressures up to 350mbar (5psig). It meets the essential requirements of the European Gas Directive (90/396/EEC). All units are designed for natural, liquified petroleum and manufactured gases and can be installed in horizontal or vertical pipelines.
The regulators may be utilised for domestic meter service applications with inlet pressures up to 75mbar (30"wg) complying with British Gas specifications.
High efficiency has been obtained by careful design of the internal gasways. Thus ensuring maximum flow with minimum pressure loss.

OPTIONS

The J78 range is available in two variants. The J78R has a plain breather port. The J78RS is fitted with a ¼" threaded breather port that can be used to ventilate to atmosphere where this additional safety feature is required.

PRESSURE

Maximum Inlet Pressure: 350mbar (5 psig)
Maximum Outlet Pressure: Please refer to spring table

CONTROL

A comprehensive range of springs is available, as described overleaf. The outlet pressure can be easily and accurately adjusted by turning the spring adjustment unit located under the top cap. The cover and top cap are drilled so that a sealing wire can be easily fitted if required.

TEMPERATURE

The J78 range is suitable for operation in a wide range of temperatures from - 20° C to +70° C.

CONNECTIONS

The J78 range is supplied as standard with a tapered screwed thread to BS21 (ISO 7) or NPT. Other threads may be available upon request.

SIZES

½", ¾", 1"

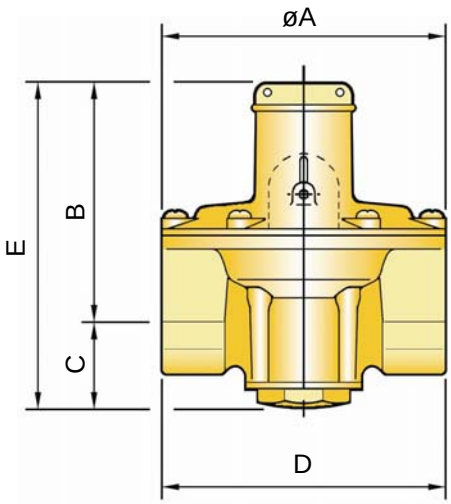
SERVICING

The J78 range has been designed for ease of access, inspection and servicing of all internal components. A standard soft spares kit is available for all sizes.

½ " – ¾"	reference number SK7805-01
1 "	reference number SK7806-01

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J78R & RS Low Pressure Regulators



DIMENSIONS & WEIGHTS

SIZE	A		B		C		D		E		Weight	
	R	RS	R	RS	R	RS	R	RS	R	RS	R	RS
½"	100	100	82	90	30	30	100	100	112	120	521g	543g
¾"	100	100	82	90	30	30	100	100	112	120	480g	502g
1"	100	100	82	90	40	40	105	105	122	130	534g	556g

MATERIAL SPECIFICATION

A summary of the material specification for the J78 is given for reference. All material has been selected to provide maximum durability and reliability in service.

Components	Specification
Body, cover, bottom plug (1"), diaphragm spacer (1").	Aluminium Alloy
Top cap.	Zinc Alloy
Spring holder, valve spacer, diaphragm spacer (¾"), valve, valve disc holder (1"), valve spacer (1").	Acetal Resin
Diaphragm plate, secondary diaphragm clamping plate.	Mild Steel
Main diaphragm, secondary diaphragm, valve seat (¾"), valve disc (1") and "O"ring seals.	Nitrile (Buna)
Springs.	Carbon Steel
Impulse tube, bottom plug (¾").	Brass

PERFORMANCE

Detailed performance data is provided on separate technical datasheets.

QUALITY

Elster Jeavons is committed to a programme of continuous quality enhancement. All equipment designed and manufactured by Elster Jeavons benefits from the company's quality assurance standards which are approved to BS EN ISO9001.

Elster Jeavons has a programme of continuous product development and improvement and in consequence the information in this leaflet may be subject to change or modification without notice.

SPRINGS

All springs are colour coded for ease of identification

SPRING	Spring Range (mbar)				COLOUR CODE
	J78RS		J78R		
	½" – ¾"	1"	½" – ¾"	1"	
J7805-050	2 - 14	4 – 12	6 - 9	8.3 - 13	Dark Green / Red
J7805-038A	2 - 16	6 – 21	9 - 17	13 - 19	Yellow
J1105C-035A	10 - 20	13 – 26	15 - 23	20 - 24	Black
J1105C-016A	16 - 28	18 – 36	22 - 31	27 - 32	Orange
J7805-042A	22 - 40	28 – 48	31 - 42	37 - 46	Brown

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REGULATING CAPACITIES

All capacities in SCMH 0.64 s.g.

REGULATOR SIZE: ½”

Setting Flow Rate: 1.4 SCMH

OUTLET PRESSURE SETTING (mbar) / DROOP (%)

	10		17.5		20		27.5		35	
	10%	20%	10%	20%	10%	20%	10%	20%	10%	20%
Pin mbar										
15	3.5	4.6	-	-	-	-	-	-	-	-
20	4.8	6.0	4.0	5.1	-	-	-	-	-	-
25	5.6	7.0	4.8	6.8	4.4	6.3	-	-	-	-
35	7.1	9.3	5.3	7.4	5.4	8.0	6.3	7.5	-	-
53	7.3	8.8	5.8	8.4	6.1	8.1	7.0	11.3	8.0	10.4
70	4.4	5.9	6.3	8.8	6.5	8.4	9.4	13.1	8.2	12.5
105	4.2	5.6	7.8	9.1	7.8	9.6	9.6	11.6	8.4	15.6
140	4.1	5.5	7.0	8.8	7.1	9.4	10.0	11.2	9.0	18.1
210	3.4	5.4	6.4	8.4	6.6	9.1	8.5	10.8	8.8	19.4
350	8.8	10.1	7.4	12.5	8.1	14.0	10.4	20.0	10.0	21.3

REGULATOR SIZE: ¾”

Setting Flow Rate: 1.4 SCMH

OUTLET PRESSURE SETTING (mbar) / DROOP (%)

	10		17.5		20		27.5		35	
	10%	20%	10%	20%	10%	20%	10%	20%	10%	20%
Pin mbar										
15	3.8	7.1	-	-	-	-	-	-	-	-
20	4.3	8.3	6.3	8.4	-	-	-	-	-	-
25	4.6	9.8	7.0	11.5	6.9	10.3	-	-	-	-
35	5.3	6.8	8.9	15.6	9.6	15.0	9.1	12.9	-	-
53	5.0	6.6	11.0	22.5	11.8	22.5	14.4	21.3	10.3	19.4
70	4.5	6.3	7.8	16.9	11.5	26.3	19.4	28.1	11.2	28.1
105	3.5	9.9	7.6	16.5	7.9	21.9	15.0	31.3	11.4	21.3
140	3.4	9.4	6.9	10.4	7.5	14.4	7.5	25.0	12.5	25.9
210	4.9	8.1	6.8	11.3	7.1	11.3	9.4	15.0	11.0	28.0
350	6.6	8.5	7.0	12.5	10.4	14.4	11.9	19.0	11.9	25.0

REGULATOR SIZE: 1”

Setting Flow Rate: 1.4 SCMH

OUTLET PRESSURE SETTING (mbar) / DROOP (%)

	10		17.5		20		27.5		35	
	10%	20%	10%	20%	10%	20%	10%	20%	10%	20%
Pin mbar										
15	5.0	8.1	-	-	-	-	-	-	-	-
20	6.0	9.5	7.3	12.9	-	-	-	-	-	-
25	6.8	10.9	10.0	16.3	9.4	17.5	-	-	-	-
35	7.3	13.0	15.9	21.3	15.0	22.5	12.1	25.0	-	-
53	7.4	18.8	24.4	27.5	21.3	27.5	21.3	33.8	21.3	35.0
70	22.5	25.0	27.5	30.0	25.0	32.5	27.5	41.3	30.6	45.0
105	16.3	27.5	30.0	37.5	26.3	37.5	30.0	53.8	50.0	53.8
140	26.3	33.8	31.3	32.5	30.0	36.3	50.0	61.3	56.3	61.3
210	30.0	35.0	38.8	41.3	38.8	41.3	47.5	65.0	66.3	70.0
350	3.4	5.1	6.8	12.5	5.6	9.3	6.8	12.8	9.6	41.3

The tests on the previous page are performed with the regulator set at a constant inlet pressure, a predetermined flow rate and the required outlet pressure. The flow rate is then increased whilst keeping the inlet pressure constant. The capacities are recorded when the outlet pressure has fallen by 10% and 20% from the set point.

The capacities are for natural gas (0.64 SG).
For other gases multiply the capacity by:

$$\sqrt{\frac{0.64}{\text{gas sg}}}$$

GAS	SG
Air	1.00
Towns Gas	0.50
Propane	1.53
Propane / Air	1.20

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FULL OPEN CAPACITY

All capacities in SCMH 0.64 s.g.

REGULATOR SIZE: ½"

"K" Factor = 0.053

	OUTLET PRESSURE (mbar)				
	10	17.5	20	27.5	35
Pin mbar					
15	5.4	-	-	-	-
20	7.7	3.8	-	-	-
25	9.4	6.7	5.4	-	-
35	12.2	10.2	9.4	6.7	-
53	16.0	14.6	14.1	12.4	10.4
70	19.0	17.8	17.4	16.0	14.6
105	24.1	23.2	22.8	21.8	20.8
140	28.4	27.6	27.4	26.5	25.7
210	35.8	35.2	35.0	34.3	33.7
350	48.1	47.6	47.5	47.0	46.5

REGULATOR SIZE: ¾"

"K" Factor = 0.086

	OUTLET PRESSURE (mbar)				
	10	17.5	20	27.5	35
Pin mbar					
15	8.7	-	-	-	-
20	12.4	6.2	-	-	-
25	15.2	10.7	8.8	-	-
35	19.6	16.5	15.2	10.8	-
53	25.9	23.5	22.7	20.0	16.8
70	30.7	28.7	28.1	25.9	23.6
105	38.9	37.4	36.9	35.3	33.6
140	45.9	44.6	44.2	42.9	41.5
210	57.8	56.8	56.5	55.4	54.4
350	77.7	77.0	76.7	75.9	75.2

REGULATOR SIZE: 1"

"K" Factor = 0.154

	OUTLET PRESSURE (mbar)				
	10	17.5	20	27.5	35
Pin mbar					
15	15.6	-	-	-	-
20	22.1	11.1	-	-	-
25	27.1	19.2	15.7	-	-
35	35.1	29.4	27.2	19.3	-
53	46.2	42.0	40.5	35.7	30.1
70	54.8	51.3	50.1	46.3	42.1
105	69.5	66.8	65.9	63.0	60.0
140	81.9	79.7	78.9	76.5	74.1
210	103.2	101.5	100.9	99.0	97.1
350	138.7	137.4	137.0	135.6	134.2

The above capacities are for natural gas (0.64 SG).
For other gases multiply the capacity by:

$$\sqrt{\frac{0.64}{\text{gas sg}}}$$

GAS	SG
Air	1.00
Towns Gas	0.50
Propane	1.53
Propane / Air	1.20

The tables above were produced by physically holding the regulator fully open, setting the inlet and outlet pressures to the values stated in the tables and then recording the flow rate.

If the tables above do not provide sufficient information a formula is provided to calculate the fully open capacity for all sizes of regulator at any pressure drop. It is not possible to provide formula for calculating the regulating capacity as this data relates to a dynamic condition which can only be provided by actual test. Regulating capacity tables are available on another data sheet.

The full open formula is: $Q = K\sqrt{(Pi^2 - Po^2)}$

Where:
- Q = Flow rate corrected to standard pressure and temperature conditions (SCMH).
- Pi = Inlet Pressure (mbar absolute units)
- Po = Outlet Pressure (mbar absolute units)
- K = Flow constant for each size of regulator (see table).

PRESSURE DROP

The natural loss of pressure from the inlet to the outlet of a regulator due to friction in the full open condition.

PRESSURE DIFFERENTIAL

The difference between the working inlet pressure to a regulator and the working outlet pressure from a regulator.

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FULL OPEN CAPACITY

All capacities in SCMH 0.64 sg

FLOW RATE VERSUS PRESSURE DROP

For the data below the regulator was physically held open. With the outlet pressure at atmospheric the listed full open capacities were set through and the pressure drop recorded.

PRESSURE DROP (mbar)

Size	½"	¾"	1"
FLOWRATE (scmh)			
"K" Factor	0.053	0.086	0.154
3	1.6	0.6	0.2
5	4.3	1.7	0.5
7	8.4	3.2	1.0
10	17.2	6.6	2.1
15	38.2	14.8	4.7
20	67.0	26.2	8.3
40	246.8	101.1	32.7
50	366.4	154.1	50.7

PRESSURE DROP VERSUS FLOW RATE

For the data below the regulator was physically held open. With the outlet pressure at atmospheric the listed pressure drops were set and the full open capacities recorded.

CAPACITY (SCMH)

Size	½"	¾"	1"
PRESSURE DROP (mbar)			
"K" Factor	0.053	0.086	0.154
1.0	2.4	3.9	6.9
3.0	4.2	6.7	12.0
5.0	5.4	8.7	15.5
8.0	6.8	11.0	19.7
10.0	7.6	12.3	22.0
15.0	9.3	15.1	27.0
20.0	10.8	17.5	31.2
30.0	13.3	21.4	38.3
40.0	15.4	24.8	44.3

The above capacities are for natural gas (0.64 SG).
For other gases multiply the capacity by:

$$\sqrt{\frac{0.64}{\text{gas sg}}}$$

GAS	SG
Air	1.00
Towns Gas	0.50
Propane	1.53
Propane / Air	1.20

The tables above were produced by physically holding the regulator fully open, setting the inlet and outlet pressures to the values stated in the tables and then recording the flow rate.

If the tables above do not provide sufficient information a formula is provided to calculate the fully open capacity for all sizes of regulator at any pressure drop. It is not possible to provide formula for calculating the regulating capacity as this data relates to a dynamic condition which can only be provided by actual test. Regulating capacity tables are available on another data sheet.

The full open formula is: $Q = K\sqrt{(Pi^2 - Po^2)}$

Where:
- Q = Flow rate corrected to standard pressure and temperature conditions (SCMH).
- Pi = Inlet Pressure (mbar absolute units)
- Po = Outlet Pressure (mbar absolute units)
- K = Flow constant for each size of regulator (see table).

PRESSURE DROP

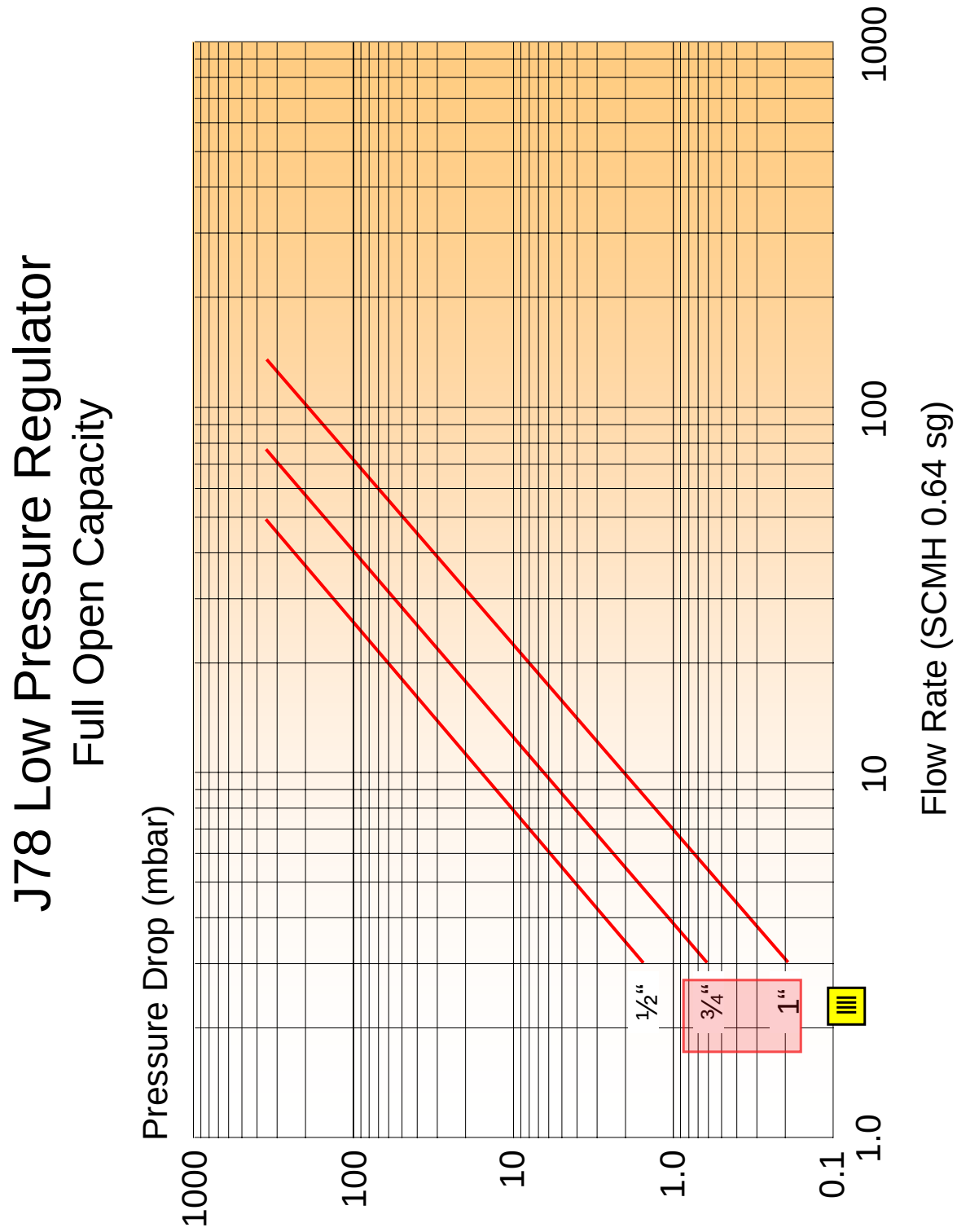
The natural loss of pressure from the inlet to the outlet of a regulator due to friction in the full open condition.

PRESSURE DIFFERENTIAL

The difference between the working inlet pressure to a regulator and the working outlet pressure from a regulator.

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