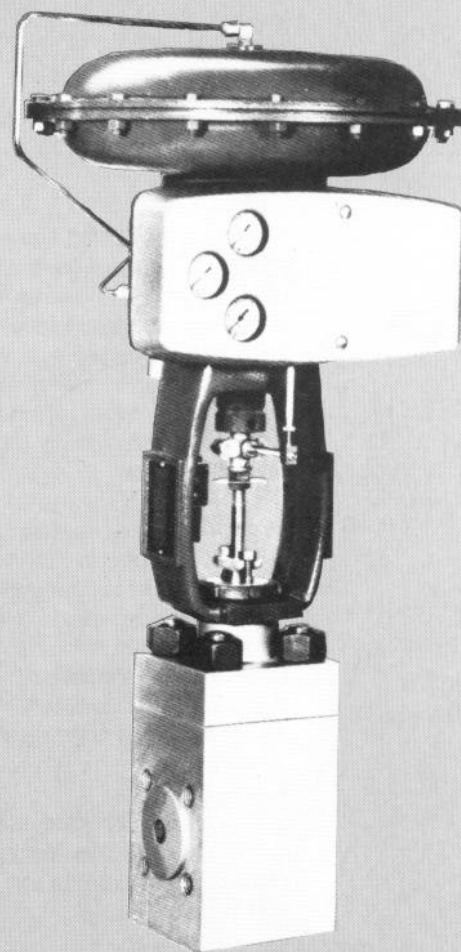


# 78000 and 78011 Series High Pressure Control Valves

Anti-Cavitation & Low Noise  
Multiple Stage  
Control Valves



**Masoneilan**

**DRESSER**

## Table of Contents

---

|  |       |
|--|-------|
| Numbering System .....                 | 3     |
| Ratings (ANSI Class) .....             | 3     |
| General Data .....                     | 3     |
| Temperature Ranges/Seat Leakages ..... | 4     |
| Connections .....                      | 4     |
| Flow Coefficients—rated $C_v$ .....    | 4     |
| $C_v$ vs. Travel .....                 | 5     |
| Materials .....                        | 7     |
| Allowable Pressure Drops .....         | 8     |
| Optional Materials .....               | 9     |
| Optional Designs .....                 | 10-11 |
| Dimensions & Weights .....             | 12    |
| Line Bolting .....                     | 13    |
| Availability .....                     | 14    |
| Options and Accessories .....          | 14    |
| How to Specify .....                   | 15    |

## Foreword

---

The 78000 and 78011 Series valves provide control of high pressure fluids without the erosion, vibration and high noise levels associated with conventionally designed control valves. Because of their relatively large flow passages and a shearing action provided by their multiple step plug and cage designs, these valves are particularly well suited for applications involving fluids with entrained particles.

The 78000 Series multiple step plug and cage design uses the principal of "Adiabatic Flow With Friction" to reduce pressure, much like pressure loss occurring in a pipe line. When type "A" or "B" trim is utilized, an additional variable restriction feature is provided to minimize pressure drop in the last pressure reducing stages. In these ways, cavitation, velocity and noise are effectively controlled.

### **specialty valves**

A wide variety of engineered valve products based on the multi step trim design can be provided to satisfy specific process conditions. See pages 10 and 11 for examples.

### **low pressure recovery**

Low pressure recovery, as indicated by the high critical flow factors shown on page 4, minimizes

potential for cavitation of liquids and contributes toward reduction of noise for all fluids.

### **tight shutoff**

Protection from seat erosion is insured by provision of ANSI B16.104, Class V Seat Leakage when standard metal seats are furnished and Class VI Seat Leakage when optional soft seats are supplied.

### **high allowable pressure drops**

With a balanced trim option for valve sizes 2" through 4", a wide range of allowable pressure drops are available with conventional spring diaphragm or positioning cylinder actuators.

### **variation of body configuration offerings**

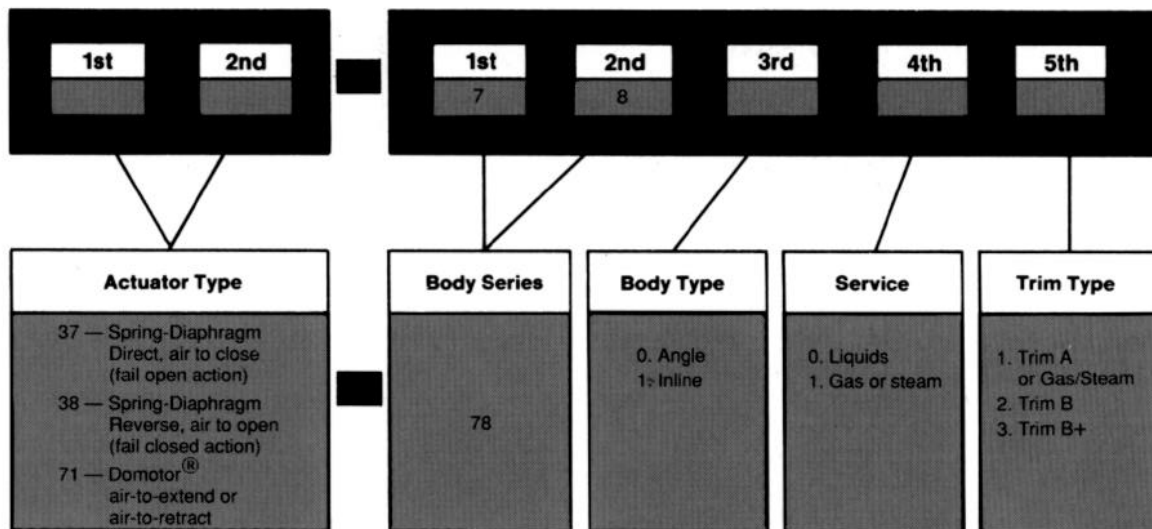
A standard angle body and optional in-line body styles are offered to accommodate a variety of piping requirements.

### **simple trim maintenance**

The multiple step trim, made from specially chosen hard materials gives maximum service life and the quick change seat ring design provides ease of trim replacement.

For additional information, contact your local Masoneilan representative. A list of the various locations is provided on the back cover.

## Numbering System



## Ratings (ANSI Class)

| Valve Size in. | ANSI class body ratings |     |                |                |
|----------------|-------------------------|-----|----------------|----------------|
|                | 600                     | 900 | 1500           | 2500           |
| 1              | •                       | •   | •              | •              |
| 1 1/2          | •                       | •   | •              | •              |
| 2              | •                       | •   | •              | •              |
| 3              | •                       | •   | •              | •              |
| 4              | •                       | •   | • <sup>①</sup> | • <sup>①</sup> |

① Only available with butt weld line connections.

## General Data

### body

**type:** 1" – 4" forged angle or in-line

**flow direction:** flow-to-open

**C<sub>v</sub> ratio:** See Flow Coefficient Table page 4.

### bonnet

**type:** stud bolted

### trim

**type:** multiple step

**flow**

**characteristic:** linear

### actuator

**type:** Conventional spring diaphragm or throttling piston (Domotor<sup>®</sup>)

\* For other types of actuators please consult Masoneilan.

## Temperature Range / Seat Leakage

| Valve Size in. | Design                         | Temperature Range |        | Seat Leakage ANSI B16.104 Class |
|----------------|--------------------------------|-------------------|--------|---------------------------------|
|                |                                | min.              | max.   |                                 |
| 1 thru 4       | Standard unbalanced metal seat | -20°F             | +500°F | V                               |
|                | optional balanced              | -20°F             | +450°F |                                 |
|                | optional soft seat             | -20°F             | +400°F | VI                              |

Contact Masoneilan for operating temperatures not shown.

## Connections

- ▲ Threaded
- Socket Weld
- Butt Weld
- RF Flange ①
- △ RTJ Flange ①

| Valve Size in. | ANSI Class |     |      |      |
|----------------|------------|-----|------|------|
|                | 600        | 900 | 1500 | 2500 |
| 1 & 1/2        | ▲●■□△      | —   | ■□△  | ■□△  |
| 2              | ▲●■□△      | —   | ■□△  | ■□△  |
| 3              | ■□△        | □△  | ■□△  | ■□△  |
| 4              | ■□△        | □△  | ■    | ■    |

① Mates with ANSI bolting and gasketing

## Flow Coefficients — Rated $C_v$ , Critical Flow Factor — $C_f$

| Valve Size in. | Orifice Dia. in. | Travel in. | Trim Type      |       |       |       |       |       | Gas or Steam (78011) |       | Minimum Operable $C_v$ |
|----------------|------------------|------------|----------------|-------|-------|-------|-------|-------|----------------------|-------|------------------------|
|                |                  |            | Liquid (78000) |       |       |       |       |       |                      |       |                        |
|                |                  |            | A              |       | B     |       | B + ② |       | $C_v$                | $C_f$ |                        |
|                |                  |            | $C_v$          | $C_f$ | $C_v$ | $C_f$ | $C_v$ | $C_f$ |                      |       |                        |
| 1              | 0.500            | 0.13       | 0.3            | .998  | 0.6   | .992  | 0.9   | .985  | —                    | —     | 0.03                   |
| 1 1/2          | 1.000            | 0.25       | 1.2            | .997  | 2.4   | .991  | 3.6   | .982  | 3.5                  | .970  | 0.06                   |
| 2              | 1.875            | 0.50       | 4              | .997  | 8     | .991  | 12    | .982  | 13                   | .970  | 0.12                   |
| 3              | 3.250            | 0.88       | 15             | .997  | 30    | .988  | 45    | .978  | 40                   | .970  | 0.61                   |
| 4              | 3.250            | 0.88       | 15             | .997  | 30    | .988  | 45    | .978  | 40                   | .970  | 0.61                   |

② Consult Masoneilan for greater capacities or higher turndown ratios.

## C<sub>v</sub> vs. Travel

### Trim Type A, Liquid

| Percent of Plug Travel |                      |            | 10                   | 20  | 30  | 40  | 50  | 60  | 70   | 80   | 90   | 100 |
|------------------------|----------------------|------------|----------------------|-----|-----|-----|-----|-----|------|------|------|-----|
| Valve Size in.         | Orifice Diameter in. | Travel in. | Rated C <sub>v</sub> |     |     |     |     |     |      |      |      |     |
| 1                      | .500                 | 0.13       | .03                  | .06 | .09 | .12 | .15 | .18 | .21  | .24  | .27  | .30 |
| 1½                     | 1.000                | 0.25       | .12                  | .24 | .36 | .48 | .60 | .72 | .84  | .96  | 1.08 | 1.2 |
| 2                      | 1.875                | 0.50       | .40                  | .80 | 1.2 | 1.6 | 2.0 | 2.4 | 2.8  | 3.2  | 3.6  | 4.0 |
| 3                      | 3.250                | 0.88       | 1.5                  | 3.0 | 4.5 | 6.0 | 7.5 | 9.0 | 10.5 | 12.0 | 13.5 | 15  |
| 4                      | 3.250                | 0.88       | 1.5                  | 3.0 | 4.5 | 6.0 | 7.5 | 9.0 | 10.5 | 12.0 | 13.5 | 15  |

### Trim Type B, Liquid

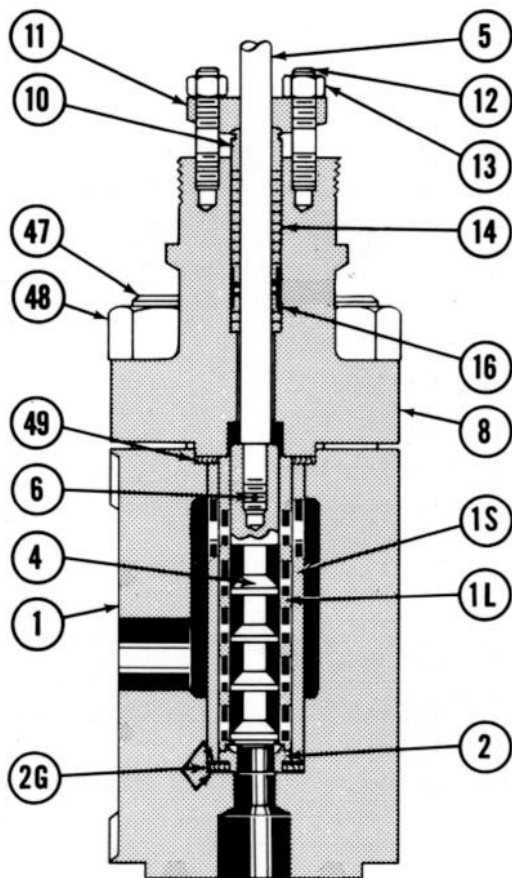
| Percent of Plug Travel |                      |            | 10                   | 20  | 30  | 40  | 50  | 60  | 70  | 80  | 90  | 100 |
|------------------------|----------------------|------------|----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Valve Size in.         | Orifice Diameter in. | Travel in. | Rated C <sub>v</sub> |     |     |     |     |     |     |     |     |     |
| 1                      | .500                 | 0.13       | .06                  | .12 | .18 | .24 | .30 | .36 | .42 | .48 | .54 | .60 |
| 1½                     | 1.000                | 0.25       | .24                  | .48 | .72 | .96 | 1.2 | 1.4 | 1.7 | 1.9 | 2.2 | 2.4 |
| 2                      | 1.875                | 0.50       | .80                  | 1.6 | 2.4 | 3.2 | 4.0 | 4.8 | 5.6 | 6.4 | 7.2 | 8.0 |
| 3                      | 3.250                | 0.88       | 3                    | 6   | 9   | 12  | 15  | 18  | 21  | 24  | 27  | 30  |
| 4                      | 3.250                | 0.88       | 3                    | 6   | 9   | 12  | 15  | 18  | 21  | 24  | 27  | 30  |

### Trim Type B+, Liquid

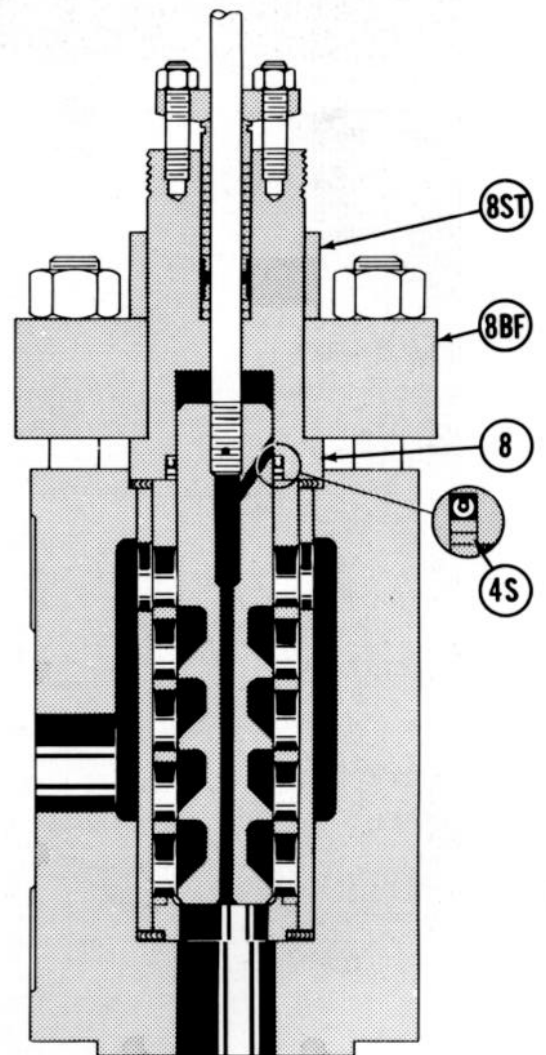
| Percent of Plug Travel |                      |            | 10                   | 20  | 30   | 40   | 50   | 60   | 70   | 80   | 90   | 100 |
|------------------------|----------------------|------------|----------------------|-----|------|------|------|------|------|------|------|-----|
| Valve Size in.         | Orifice Diameter in. | Travel in. | Rated C <sub>v</sub> |     |      |      |      |      |      |      |      |     |
| 1                      | .500                 | 0.13       | .09                  | .18 | .27  | .36  | .45  | .54  | .63  | .72  | .81  | .90 |
| 1½                     | 1.000                | 0.25       | .36                  | .72 | 1.08 | 1.44 | 1.80 | 2.16 | 2.52 | 2.88 | 3.24 | 3.6 |
| 2                      | 1.875                | 0.50       | 1.2                  | 2.4 | 3.6  | 4.8  | 6.0  | 7.2  | 8.4  | 9.6  | 10.8 | 12  |
| 3                      | 3.250                | 0.88       | 5                    | 9   | 14   | 18   | 23   | 27   | 32   | 36   | 41   | 45  |
| 4                      | 3.250                | 0.88       | 5                    | 9   | 14   | 18   | 23   | 27   | 32   | 36   | 41   | 45  |

### Trim Type — Gas or Steam

| Percent of Plug Travel |                      |            | 10                   | 20  | 30   | 40   | 50   | 60   | 70   | 80   | 90   | 100 |
|------------------------|----------------------|------------|----------------------|-----|------|------|------|------|------|------|------|-----|
| Valve Size in.         | Orifice Diameter in. | Travel in. | Rated C <sub>v</sub> |     |      |      |      |      |      |      |      |     |
| 1½                     | 1.000                | 0.25       | .35                  | .70 | 1.05 | 1.40 | 1.75 | 2.10 | 2.45 | 2.80 | 3.15 | 3.5 |
| 2                      | 1.875                | 0.50       | 1.3                  | 2.6 | 3.9  | 5.2  | 6.5  | 7.8  | 9.1  | 10.4 | 11.7 | 13  |
| 3                      | 3.250                | 0.88       | 4                    | 8   | 12   | 16   | 20   | 24   | 28   | 32   | 36   | 40  |
| 4                      | 3.250                | 0.88       | 4                    | 8   | 12   | 16   | 20   | 24   | 28   | 32   | 36   | 40  |



**Standard Valve Construction**



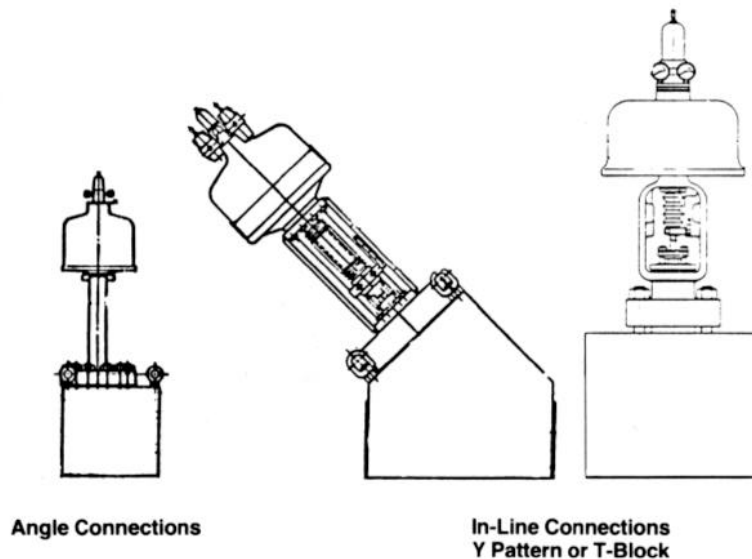
**Optional Pressure Balanced Valve Construction  
2", 3" & 4" valves**



**Optional Soft Seat Seat Ring**

## Materials

| Part No. | Part Name                       | Temperature   | Standard Materials |
|----------|---------------------------------|---|--------------------|
|          |                                 | - 20°F  | 450°F + 500°F      |
| 1        | Body                            | Carbon Steel ASTM A105  |                    |
| 8        | Bonnet                          | Chrome Moly ASTM A182 Gr F-5a (5% chrome - 0.5% moly)<br>316 St. ASTM A182 Gr F-316 |                    |
| 1L       | Liner                           | 17-4 PH St. St. ASTM A564 Gr 630 Cond. H 1075                                       |                    |
| 1S       | Spacer Tube                     |   |                    |
| 2        | Seat Ring                       | 316 St. St. with Hard Faced Seat  |                    |
|          |                                 | 316 St. St. with PTFE Seat  |                    |
| 2G       | Seat Ring Gasket                | 304 St. St. with Asbestos or Grafoil or TFE Filler (Spiral Wound)                   |                    |
| 4        | Plug                            | 440-C St. St. ASTM A276 Type 440C Hardened  |                    |
| 4S       | Balancing Seal Set              | Carbon-Graphite Filled PTFE (spring energized)                                      |                    |
| 5        | Valve Plug Stem                 | 17-4 PH St. St. ASTM A564 Gr 630 Cond. H1075  |                    |
| 6        | Plug Pin                        | 316 St. St. ASTM A276 Type 316  |                    |
| 8BF      | Bonnet Flange (2" thru 4" only) | Carbon Steel ASTM A515 Gr 70  |                    |
| 8ST      | Bonnet Spacer (2" thru 4" only) | Carbon Steel ASTM A106 Gr B   |                    |
| 10       | Packing Follower                | 303 St. St. ASTM A582 Type 303  |                    |
| 11       | Package Flange                  | Carbon Steel ASTM A668CL B Cadmium Plated   |                    |
| 12       | Packing Flange Stud             | Alloy Steel ASTM A193 Gr B7   |                    |
| 13       | Packing Flange Nut              | 304 St. St. ASTM A194 Gr 8  |                    |
| 14       | Packing                         | PTFE Aramid Fibre-Crane 285K  |                    |
| 16       | Packing Spacer                  | 303 St. St. ASTM A582 Type 303  |                    |
| 47       | Body Stud                       | Alloy Steel ASTM A193 Gr B7   |                    |
| 48       | Body Stud Nut                   | Alloy Steel ASTM A194 Gr 2H   |                    |
| 49       | Bonnet Gasket                   | 304 St. St. with Asbestos or Grafoil or TFE Filler (Spiral Wound)                   |                    |



## Allowable Pressure Drops (psi)

Trim: metal seat, unbalanced  
 Temperature: -20°F to + 500°F  
 Flow Direction: flow to open

Seat Leakage: ANSI B16.104, Class V

| Valve Size In. | Maximum Rating ANSI Class | Stroke In. | Spring-Diaphragm Actuator |                   |             |                             |                   |                             | Domotor® |        |                      |                       |                             |
|----------------|---------------------------|------------|---------------------------|-------------------|-------------|-----------------------------|-------------------|-----------------------------|----------|--------|----------------------|-----------------------|-----------------------------|
|                |                           |            | Size                      | air to close      |             |                             | air to open       |                             |          | Series | Supply Pressure psig | Loading Pressure psig | Allowable Pressure Drop psi |
|                |                           |            |                           | Spring Range psig | Supply psig | Allowable Pressure Drop psi | Spring Range psig | Allowable Pressure Drop psi |          |        |                      |                       |                             |
| 1 <sup>①</sup> | 2500                      | 0.13       | 13                        | 6-10              | 25          | 3000                        | 12-16             | 3000                        | A        | 50     | 40                   | 3000                  |                             |
|                |                           |            |                           | 6-10              | 30          | 6000                        | 18-22             | 6000                        | A        | 70     | 60                   | 6000                  |                             |
| 1½             | 2500                      | 0.25       | 15                        | 6-12              | 30          | 3000                        | 14-20             | 2500                        | C        | 50     | 40                   | 3000                  |                             |
|                |                           |            |                           | 6-12              | 50          | 6000                        | 24-31             | 4500                        | C        | 70     | 60                   | 6000                  |                             |
| 2              | 2500                      | 0.50       | 15                        | 6-16              | 40          | 1000                        | 16-25             | 500                         | C        | 100    | 90                   | 2500                  |                             |
|                |                           |            |                           | 6-16              | 60          | 2000                        | 23-33             | 850                         | D        | 80     | 70                   | 4000                  |                             |
| 3              | 2500                      | 0.88       | 18                        | 3-15              | 30          | 400                         | 15-25             | 250                         | D        | 100    | 90                   | 1500                  |                             |
|                |                           |            |                           | 3-15              | 60          | 1000                        | 18-29             | 400                         | DD       | 80     | 70                   | 3000                  |                             |
| 4              | 2500 <sup>②</sup>         | 0.88       | 18                        | 3-15              | 30          | 400                         | 15-25             | 250                         | D        | 100    | 90                   | 1500                  |                             |
|                |                           |            |                           | 3-15              | 60          | 1000                        | 18-29             | 400                         | DD       | 80     | 50                   | 3000                  |                             |

with balanced trim, Temperature: -20°F to + 450°F

|   |                   |      |    |      |    |      |       |      |   |     |    |      |
|---|-------------------|------|----|------|----|------|-------|------|---|-----|----|------|
| 2 | 2500              | 0.50 | 15 | 6-16 | 25 | 3000 | 16-25 | 3000 | B | 80  | 70 | 3000 |
|   |                   |      |    | 6-16 | 40 | 6000 | 23-33 | 5500 | B | 100 | 90 | 6000 |
| 3 | 2500              | 0.88 | 18 | 3-15 | 35 | 3000 | 15-25 | 2000 | C | 80  | 70 | 3000 |
|   |                   |      |    | 3-15 | 50 | 6000 | 18-29 | 3250 | C | 100 | 90 | 6000 |
| 4 | 2500 <sup>②</sup> | 0.88 | 18 | 3-15 | 35 | 3000 | 15-25 | 2000 | C | 80  | 70 | 2160 |
|   |                   |      |    | 3-15 | 50 | 6000 | 18-29 | 3250 | C | 100 | 90 | 6000 |

Trim: soft seat, unbalanced  
 Temperature: -20°F to + 400°F  
 Flow Direction: flow to open

Seat Leakage: ANSI B16.104, Class VI

| Valve Size In. | Maximum Rating ANSI Class | Stroke In. | Spring-Diaphragm Actuator |                   |             |                             |                   |                             | Domotor® |        |                      |                       |                             |
|----------------|---------------------------|------------|---------------------------|-------------------|-------------|-----------------------------|-------------------|-----------------------------|----------|--------|----------------------|-----------------------|-----------------------------|
|                |                           |            | Size                      | air to close      |             |                             | air to open       |                             |          | Series | Supply Pressure psig | Loading Pressure psig | Allowable Pressure Drop psi |
|                |                           |            |                           | Spring Range psig | Supply psig | Allowable Pressure Drop psi | Spring Range psig | Allowable Pressure Drop psi |          |        |                      |                       |                             |
| 1 <sup>①</sup> | 2500                      | 0.13       | 13                        | 6-10              | 25          | 3000                        | 12-16             | 3000                        | A        | 50     | 40                   | 3000                  |                             |
|                |                           |            |                           | 6-10              | 30          | 6000                        | 18-22             | 6000                        | A        | 70     | 60                   | 6000                  |                             |
| 1½             | 2500                      | 0.25       | 15                        | 6-12              | 30          | 3000                        | 14-20             | 2500                        | C        | 50     | 40                   | 3000                  |                             |
|                |                           |            |                           | 6-12              | 50          | 6000                        | 24-31             | 4500                        | C        | 75     | 65                   | 6000                  |                             |
| 2              | 2500                      | 0.50       | 15                        | 6-16              | 40          | 1000                        | 16-25             | 500                         | C        | 100    | 90                   | 2500                  |                             |
|                |                           |            |                           | 6-16              | 60          | 2000                        | 23-33             | 850                         | D        | 85     | 75                   | 4000                  |                             |
| 3              | 2500                      | 0.88       | 18                        | 3-15              | 40          | 400                         | 15-25             | 200                         | D        | 100    | 90                   | 1500                  |                             |
|                |                           |            |                           | 3-15              | 60          | 900                         | 18-29             | 300                         | DD       | 90     | 80                   | 3000                  |                             |
| 4              | 2500 <sup>②</sup>         | 0.88       | 18                        | 3-15              | 40          | 400                         | 15-25             | 200                         | D        | 100    | 90                   | 1500                  |                             |
|                |                           |            |                           | 3-15              | 60          | 900                         | 18-29             | 300                         | DD       | 70     | 60                   | 3000                  |                             |

with balanced trim, Temperature: -20°F to + 400°F

|   |                   |      |    |      |    |      |       |      |   |    |    |      |
|---|-------------------|------|----|------|----|------|-------|------|---|----|----|------|
| 2 | 2500              | 0.50 | 15 | 6-16 | 35 | 3000 | 16-25 | 3000 | B | 80 | 70 | 3000 |
|   |                   |      |    | 6-16 | 45 | 6000 | 23-33 | 4900 | C | 65 | 55 | 6000 |
| 3 | 2500              | 0.88 | 18 | 3-15 | 50 | 3000 | 15-25 | 1100 | C | 90 | 80 | 3000 |
|   |                   |      |    | 3-15 | 60 | 4700 | 18-29 | 1550 | D | 85 | 75 | 6000 |
| 4 | 2500 <sup>②</sup> | 0.88 | 18 | 3-15 | 50 | 3000 | 15-25 | 1100 | C | 90 | 80 | 3000 |
|   |                   |      |    | 3-15 | 60 | 4700 | 18-29 | 1550 | D | 85 | 75 | 6000 |

① 78011 series gas and steam valves are not available in 1" size.

② Flange mating end connections are only available up to ANSI Class 900 Rating.

③ Pressure drops must not exceed the ANSI body or end connection rating.



## Optional Materials

| Part No. | Part Name                       | Temperature   | - 20°F | + 450°F + 500°F |
|----------|---------------------------------|---|--------|-----------------|
|          |                                 | Standard Materials  |        |                 |
| 1        | Body                            | Carbon Steel ASTM A105 (HRC 22 max)   |        |                 |
| 8        | Bonnet                          | Chrome Moly ASTM A182 Gr F-5a<br>316 St. St. ASTM A182 Gr F-316 (HRC 22 max)  |        |                 |
| 1L       | Liner                           | Inconel 718, Inconel X750, Monel K500 (HRC 35 Max.)   |        |                 |
| 1S       | Spacer Tube                     | or Solid Stellite No. 6   |        |                 |
| 2        | Seat Ring                       | 316 St. St. ASTM A479 TP316 (HRC 22 Max.) with Hard Facing<br>316 St. St. with PTFE Seat (400°F limit)<br>or Solid Stellite No. 6   |        |                 |
| 2G       | Seat Ring Gasket                | 304 St. St. with Asbestos or Grafoil or TFE Filler (Spiral Wound)   |        |                 |
| 4        | Plug                            | Nitronic 60 ASTM 479 Type S21800 (HRC 22 Max.) with H.F. in Seat Area<br>Nitronic 50 ASTM 479-Type XM19 (HRC 35) with H.F. In seat and Guide Area<br>Nitronic 50 ASTM 479-Type XM19 (HRC 35 Max.) or ASTM 479 Type 316 (HRC 22 Max.) with Full Overlay of Wetted Area<br>Solid Stellite No. 6 |        |                 |
| 4S       | Balancing Seal Set              | Carbon-Graphite Filled PTFE (spring energized)  |        |                 |
| 5        | Valve Plug Stem                 | Inconel X750 ASTM A461 (HRC 35 Max.)  |        |                 |
| 6        | Plug Pin                        | Inconel 718   |        |                 |
| 8BF      | Bonnet Flange (2" thru 4" only) | Carbon Steel ASTM A515 Gr 70  |        |                 |
| 8ST      | Bonnet Spacer (2" thru 4" only) | Carbon Steel ASTM A106 Gr B   |        |                 |
| 10       | Packing Follower                | 304 St. St. ASTM A479 Type 304  |        |                 |
| 11       | Package Flange                  | Carbon Steel ASTM A668 CL B Cadmium Plated  |        |                 |
| 12       | Packing Flange Stud             | Alloy Steel ASTM A193 Gr B7   |        |                 |
| 13       | Packing Flange Nut              | 304 St. St. ASTM A194 Gr 8  |        |                 |
| 14       | Packing                         | PTFE Aramid Fibre-Crane 285K  |        |                 |
| 16       | Packing Spacer                  | 304 St. St. ASTM A479 Type 304  |        |                 |
| 47       | Body Stud                       | Alloy Steel ASTM A193 Gr B7   |        |                 |
| 48       | Body Stud Nut                   | Carbon Steel ASTM A194 Gr 2H  |        |                 |
| 49       | Bonnet Gasket                   | 304 St. St. with Asbestos or Grafoil or TFE Filler (Spiral Wound)   |        |                 |

**Note:**

Optional materials are intended for chlorides bearing water and sour service only.  
Certification to NACE MR01-75 1980 Revision is available,

Note: Partial or solid overlay of 316 St. St. or other material components or areas can be supplied upon specification.

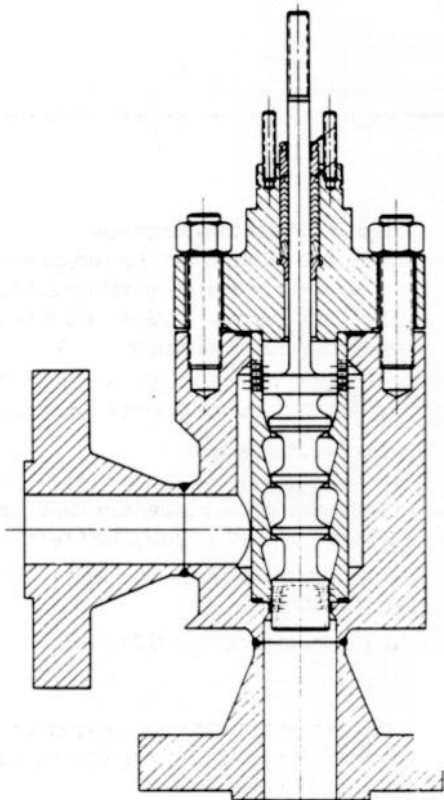


Figure 1

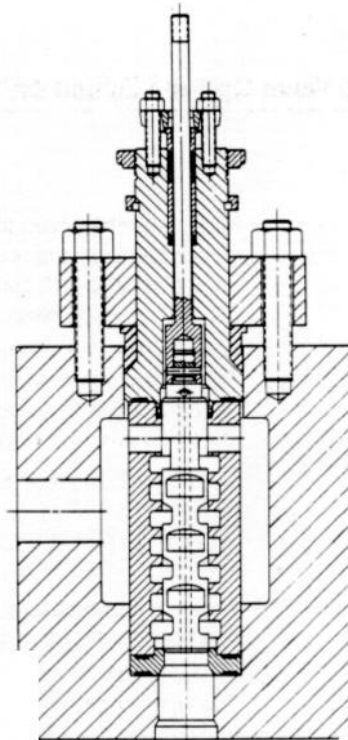


Figure 2

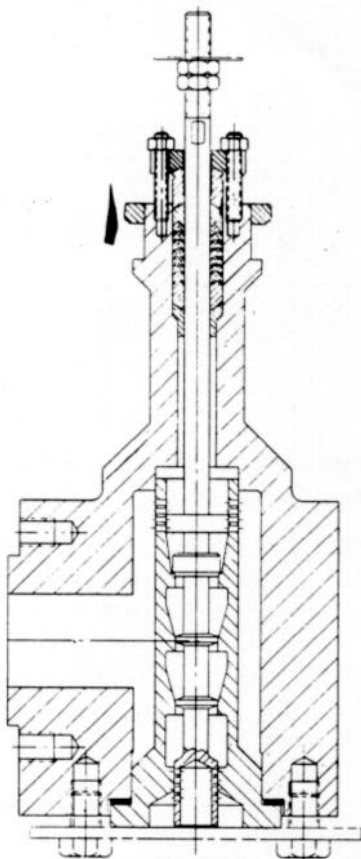


Figure 3

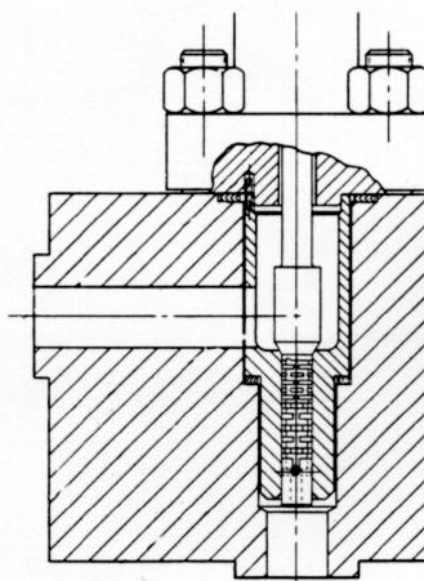


Figure 4

## Optional Designs

---

### Engineered Valve Options Based on 78000 Series

---

Masoneilan has manufactured a variety of special valves based on the original 78000 series design for applications with specific requirements not generally met by this product line.

**Low Downstream Pressures:**

The trim design shown in Fig. 1 lends itself particularly well to water injection applications with low outlet pressure conditions.

The product is available in angle, "Y" and "T" block pattern.

Sizes range from 1 thru 12 inch,  $C_v$  values from 3 thru 400.

The construction allows for many different alloys and body configurations.

**Extreme High Pressure Drop:**

The valve shown in Fig. 2 has been designed for pressure drops of 5000-6000 psi under continuous duty in a corrosive process stream, and has been successfully applied in highly erosive hydrocarbon with catalyst fines.

**High and Low Temperatures:**

The valve shown in Fig. 3 is particularly suitable for extreme low or high temperature applications. Thermal expansion is taken care of by the free expanding seat ring design.

Significant thermal shock can be handled without potential overstressing of the seat ring cage.

**Very Low  $C_v$  Values:**

The labyrinth design shown in Fig. 4 has been developed for extremely low  $C_v$  values, high turndown ratios and high pressure drop.

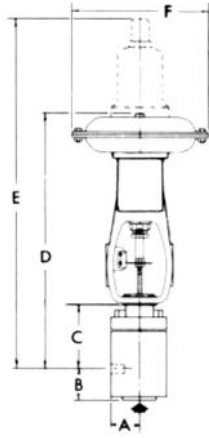
The valve is available with 1 and 1-1/2 inch connections.

$C_v$  values ranging from 0.01 thru 2.

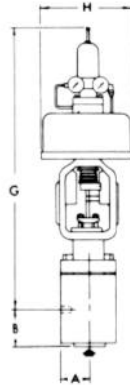
We encourage our customers to consider these products for applications outside the range of the standard product.

Consult Masoneilan for your applications.

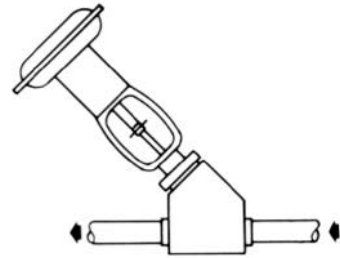
## Dimensions (Inches) and Weights (Lbs.)



Spring Diaphragm



Domotor®



In-line valve "Y" pattern or "T" block dimensions on request.

| Valve Size (in) | ANSI Class | A        |        | B        |        | C    | Spring Diaphragm Actuator |              |                      |             |                      | Domotor® |        |       |       |                      |
|-----------------|------------|----------|--------|----------|--------|------|---------------------------|--------------|----------------------|-------------|----------------------|----------|--------|-------|-------|----------------------|
|                 |            | Fig. End | Weld ③ | Fig. End | Weld ③ |      | Size                      | Air-To-Close |                      | Air-To-Open |                      | F        | Series | G     | H     | Shipping Wt. (lbs) ① |
|                 |            |          |        |          |        |      |                           | D            | Shipping Wt. (lbs) ① | E           | Shipping Wt. (lbs) ① |          |        |       |       |                      |
| 1               | 600-2500   | 2.63     | 2.63   | 4.00     | 4.00   | 7.00 | 13                        | 27.25        | 185                  | 36.75       | 200                  | 15.00    | A      | 24.50 | 7.63  | 130                  |
| 1 1/2           | 600-2500   | 2.88     | 2.88   | 4.63     | 4.63   | 8.50 | 15                        | 34.25        | 280                  | 44.00       | 300                  | 17.50    | C      | 34.00 | 13.25 | 210                  |
| 2               | 600-2500   | 3.88     | 3.88   | 6.00     | 6.00   | 11   | 15                        | 36.75        | 400                  | 46.50       | 320                  | 17.50    | B      | 30.75 | 9.25  | 310                  |
|                 |            |          |        |          |        |      |                           |              |                      |             |                      |          | C      | 36.50 | 13.25 | 330                  |
|                 |            |          |        |          |        |      |                           |              |                      |             |                      |          | D      | 50.50 | 18.00 | 510                  |
|                 |            |          |        |          |        |      |                           |              |                      |             |                      |          | C      | 38.50 | 13.25 | 730                  |
| 3               | 600-2500   | 5.75     | 5.75   | 8.50     | 8.50   | 13   | 18                        | 40.00        | 860                  | 49.75       | 930                  | 20.75    | D      | 52.50 | 18.00 | 910                  |
|                 |            |          |        |          |        |      |                           |              |                      |             |                      |          | DD     | 66.00 | 18.00 | 960                  |
|                 |            |          |        |          |        |      |                           |              |                      |             |                      |          | C      | 38.50 | 13.25 | 730                  |
| 4               | 600-2500 ② | 5.75     | 5.75   | 5.75     | 8.50   | 13   | 18                        | 40.00        | 860                  | 49.75       | 930                  | 20.75    | D      | 52.50 | 18.00 | 910                  |
|                 |            |          |        |          |        |      |                           |              |                      |             |                      |          | DD     | 66.00 | 18.00 | 960                  |
|                 |            |          |        |          |        |      |                           |              |                      |             |                      |          | C      | 38.50 | 13.25 | 730                  |

① Weights are for complete valve and actuator assemblies.

② Flange mating ends are only available up to ANSI Class 900 rating.

③ Covers socket ends for 1" thru 2" valve sizes and butt weld for all sizes. For available pipe schedules, contact your Masoneilan Representative.

## Line Bolting Data

### Dimensions of Studbolts

| Valve Size (In.) |                  | ANSI CLASS    |                |                |                |
|------------------|------------------|---------------|----------------|----------------|----------------|
|                  |                  | 600 RF/RTJ    | 900 RF/RTJ     | 1500 RF/RTJ    | 2500 RF/RTJ    |
| 1                | Dia. (in.)       | $\frac{5}{8}$ | $\frac{7}{8}$  | $\frac{7}{8}$  | $\frac{7}{8}$  |
|                  | # Threads        | 11            | 9              | 9              | 9              |
|                  | Min. Lgth. (in.) | 3.19          | 4.13           | 4.13           | 4.38           |
| 1½               | Dia. (in.)       | $\frac{3}{4}$ | 1              | 1              | 1.12           |
|                  | # Threads        | 10            | 8              | 8              | 8              |
|                  | Min. Lgth. (in.) | 3.63          | 4.5            | 4.5            | 5.25           |
| 2                | Dia. (in.)       | $\frac{5}{8}$ | $\frac{7}{8}$  | $\frac{7}{8}$  | 1              |
|                  | # Threads        | 11            | 9              | 9              | 8              |
|                  | Min. Lgth. (in.) | 3.63          | 4.69           | 4.69           | 5.44           |
| 3                | Dia. (in.)       | $\frac{3}{4}$ | $\frac{7}{8}$  | $1\frac{1}{8}$ | $1\frac{1}{4}$ |
|                  | # Threads        | 10            | 9              | 8              | 8              |
|                  | Min. Lgth. (in.) | 4.13          | 4.56           | 5.44           | 6.63           |
| 4                | Dia. (in.)       | $\frac{7}{8}$ | $1\frac{1}{8}$ | $1\frac{1}{4}$ | $1\frac{1}{2}$ |
|                  | # Threads        | 9             | 8              | 8              | 8              |
|                  | Min. Lgth. (in.) | 4.69          | 5.53           | 6.19           | 7.56           |
| 6                | Dia. (in.)       | 1             | $1\frac{1}{8}$ | $1\frac{3}{8}$ | 2              |
|                  | # Threads        | 8             | 8              | 8              | 8              |
|                  | Min. Lgth. (in.) | 5.38          | 6.03           | 7.50           | 10.25          |

## Options and Accessories

Shaded areas indicate product combinations within standard delivery cycle. For other combinations, contact your Masoneilan Representative.

### Side Mounted Handwheels

|      |   |   |
|------|---|---|
| Type | 5A1 <input checked="" type="checkbox"/> | 5A2 <input checked="" type="checkbox"/> |
|      | 6A3 <input checked="" type="checkbox"/> | 8A <input type="checkbox"/>             |
|      | C <input checked="" type="checkbox"/>   | D <input type="checkbox"/>              |

### Enlarge Actuators—Spring Diaphragm

| Standard | to | Enlarge |
|----------|----|---------|
| 13       |    | 15      |
| 15       |    | 18      |
| 18       |    | 24      |

### Enlarge Actuators—Domotor®

|   |    |
|---|----|
| A | B  |
| B | C  |
| C | D  |
| D | DD |

7400 Series Positioner  
Instrument Signals—3-15, 6-30 psi  
3-9 and 9-15 psi  
Split and Special Ranges

8012 Electropneumatic Positioner  
Instrument Signals—10-50 mA; 104 ohms  
4-20 mA; 173 ohms

I/PEX 9000 Electropneumatic Transducer  
Input Range—4-20 mA or 10-50 mA  
Split range up to 3 times  
Output (Direct or Reverse)  
3-15 psi, adjustable to 0-20 psi

496 Rotary Switches  
496-1 (1 switch)  
496-2 (2 switches)

77-4 or 77-40 Airset  
77-6 Lockup Valve  
2" Gauge 0-30 psi

2700/3700 Controllers

### Solenoid Valves (ASCO)

| ASCO Ref.  | Voltage                |
|------------|------------------------|
| HBX8320A25 | 120V-60Hz or 110V-50Hz |
| HBX8320A26 | 120V-60Hz or 110V-50Hz |
| HPX8320A26 | 125DC                  |
| HBX8320A40 | 120V-60Hz or 110V-50Hz |

### Additional Options Available

|  |  |
|--|--|
| Other Body Materials                     |  |
| Other Flange Facings                     |  |
| N.A.C.E. Compliance                      |  |
| Custom Trim Materials                    |  |
| Non-Destructive Examination              |  |
| Electric and Electro-Hydraulic Actuators |  |

Refer to specific actuator and accessory specification literature for complete information.

## How to Specify your 78000 Series Control Valve

### Specification Data

The checklist provided below contains the necessary data to specify the basic 78000 Series Control Valve. The page references will refer you to the appropriate sections when a selection is to be made.

For Options and Accessories, see page 14.

| Quantity:                | Size                   | Model (page 3):   |  |
|--------------------------|------------------------|---|--|
| <b>Body</b>              | Type                   | Angle <input type="checkbox"/> In-line <input type="checkbox"/>   |  |
|                          | Material (pages 7 & 9) | Carbon Steel <input type="checkbox"/><br>Chr. Mo Gr F5a <input type="checkbox"/><br>316 St. St. <input type="checkbox"/>  |  |
|                          | Rating (page 3)        | 600 <input type="checkbox"/> 1500 <input type="checkbox"/><br>900 <input type="checkbox"/> 2500 <input type="checkbox"/>  |  |
|                          | Connections (page 4)   | Threaded <input type="checkbox"/> S/W Sched <input type="checkbox"/><br>RF Flanged <input type="checkbox"/> B/W Sched <input type="checkbox"/><br>RTJ Flanged <input type="checkbox"/>  |  |
| <b>Bonnet</b>            | Type                   | Standard  |  |
|                          | Packing (pages 7 & 9)  | PTFE Asbestos <input type="checkbox"/><br>Grafoil <input type="checkbox"/><br>Lubr & Iso Valve <input type="checkbox"/>   |  |
| <b>Trim</b>              | Size & Type (page 4)   | A (liquid) <input type="checkbox"/> B+ (liquid) <input type="checkbox"/><br>B (liquid) <input type="checkbox"/> Gas or Steam <input type="checkbox"/>   |  |
|                          | Spacer Tube & Liner    | Material (Pg. 7 & 9)<br>17-4 PH St. St.   |  |
|                          | Plug                   | Type  | Unbalanced <input type="checkbox"/><br>Balanced <input type="checkbox"/> |
|                          |                        | Guiding   | Cage   |
|                          | Material (pg. 7 & 9)   | 440-C St. St.   |  |
| Seat Ring                | Material (pg. 7 & 9)   | 316 St. St. Hard Faced Seat <input type="checkbox"/><br>316 St. St. w/PTFE Seat <input type="checkbox"/>  |  |
| <b>Leakage</b>           | ANSI Class (page 4)    | V <input type="checkbox"/> VI <input type="checkbox"/>  |  |
| <b>Actuator (Page 8)</b> | Type                   | Spring Diaphragm <input type="checkbox"/><br>Throttling Piston <input type="checkbox"/><br>(Domotor®)   |  |
|                          | Sizes                  | 13 <input type="checkbox"/> 15 <input type="checkbox"/> 18 <input type="checkbox"/><br>A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/><br>D <input type="checkbox"/> DD <input type="checkbox"/> |  |
|                          | Action                 | Flow to Air to Fail   |  |
|                          | Range① (page 12)       | Open <input type="checkbox"/><br>Close <input type="checkbox"/> Open <input type="checkbox"/><br>Close <input type="checkbox"/> Open <input type="checkbox"/><br>See Pressure Drop Tables   |  |

① Other spring ranges not listed in pressure drop tables are available. Consult your Masoneilan Representative.

ARGENTINA ■△ AUSTRALIA ■●△ BAHRAIN ■△ BELGIUM ■△ BOLIVIA ■ BRAZIL ■●△  
 CAMEROON (REPUBLIC OF) ■ CANADA ■●△ CHILE ■ COLOMBIA ■ DENMARK ■△ EGYPT ■△  
 FINLAND ■△ FRANCE ■●△ GERMANY ■●△ GREAT BRITAIN ■●△ GREECE ■ INDIA ■ IRAN ■△ IRAQ ■  
 ITALY ■●△ IVORY COAST ■△ JAPAN ■●△ JORDAN ■  
 KENYA ■ KOREA ■ KUWAIT ■△ MAURITIUS ■  
 MEXICO ■●△ MOROCCO ■△ NETHERLANDS ■△  
 NEW ZEALAND ■△ NIGERIA ■ NORWAY ■△  
 OMAN ■ PAKISTAN ■ PORTUGAL ■△ QATAR ■△  
 REUNION ISLAND ■ SAUDI ARABIA ■△ SENEGAL ■  
 SINGAPORE ■△ SPAIN ■●△ SWEDEN ■△  
 SWITZERLAND ■△ TAIWAN ■ TUNISIA ■  
 TURKEY ■△ UNITED ARAB EMIRATES ■△  
 U.S.A. ■●△ U.S.S.R. ■ VENEZUELA ■△  
 YUGOSLAVIA ■

List of Masoneilan Sales Offices, Stocking Centers and Manufacturing facilities on request.

Legend : ■ Sales Offices.  
 ● Manufacturing facilities.  
 △ Stocking Centers.



**Masoneilan**  
 Division of Dresser Produits Industriels



4, place de Saverne - 92971 Paris La Défense Cedex - Telephone : 33 1 49 04 90 00 - Fax :33 1 49 04 90 10 - Telex : 620046 F

Works : 3, rue Saint-Pierre - 14110 Condé-sur-Noireau - Tel. 33 2 31 69 59 00 - Fax 33 2 31 69 38 44 - Telex 170728 F FRANCE