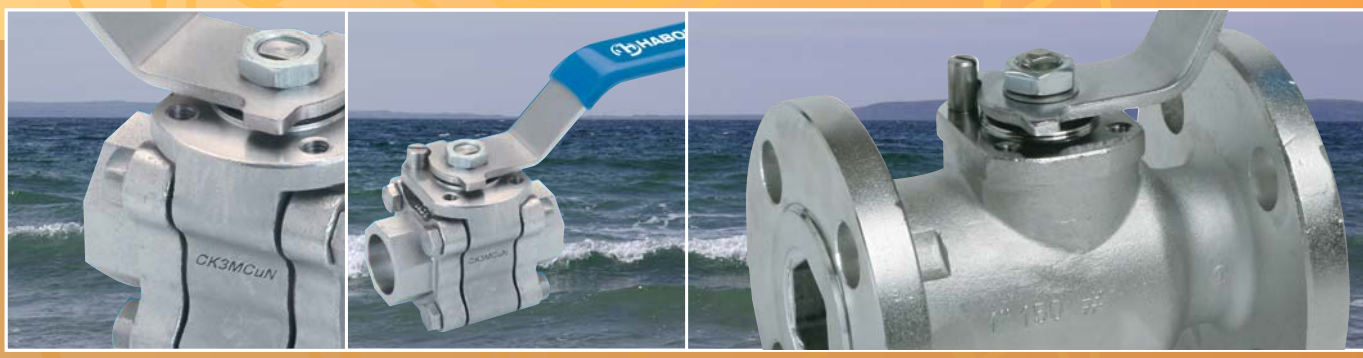
METRIC




# 254 SMO® Valves for Water Desalination

HABONIM
Industrial Valves & Actuators

DEDICATED TO INNOVATION

# 254 SMO® Valves for Water Desalination

**Habonim is responding to the challenge of Water Desalination plants by introducing valves made from the rich Molybdenum Stainless Steel 254 SMO® especially developed for use in corrosive environments.**

| | |
|---|---|
| **Size Range:** | ¼"- 8" (DN8-DN200) |
| **Available Series:** | 47P, 31P, 32P, 73P, 74P, H27 |
| **End Connections:** | Screwed, Socket weld, Flanged |
| **Applications:** | Desalination plant, Saltwater handling, Food and chemical processing equipment |
| **Operation:** | Manual or Actuated |

## Introduction

**254 SMO®** is an austenitic stainless steel, that consists impact toughness resistance to **pitting corrosion, crevice corrosion** and **chloride stress corrosion** cracking, and with strength nearly twice that of 300 series stainless steels. In some applications it has been found to be a more cost effective substitute for high nickel and titanium alloys.

## Applications

Water desalination, saltwater handling plant, petroleum production, food processing and chemical processing equipment, pulp and paper mill bleach systems, fuel gas desalination scrubbers and tall oil distillation columns.

## Material specifications

| Series | Description | Material Designation |
|---|---|---|
| 47P | Body | Casting ASTM A351 CK3MCuN UNS J93254 |
| | End connectors | Casting ASTM A351 CK3MCuN UNS J93254 |
| 31P / 32P | Body | Casting ASTM A351 CK3MCuN UNS J93254 |
| | Insert | Casting ASTM A351 CK3MCuN UNS J93254 |
| 73P / 74P | Body | Casting ASTM A351 CK3MCuN UNS J93254 |
| | End | Casting ASTM A351 CK3MCuN UNS J93254 |
| H27 | Body | Bar ASTM A479UNS S31254 |
| | End connectors | Bar ASTM A479UNS S31254 |
| All Series | Ball | Casting ASTM A351 CK3MCuN UNS J93254 |
| | | Bar ASTM A479 UNS S31254 |
| | | Forged Bar ASTM A182 UNS S31254 |
| | Stem | Bar ASTM A479 UNS S31254 |
| | | Forged Bar ASTM A182 UNS S31254 |

Other valve components are identical to standard Habonim valve components
Stainless Steel 316 Handle is available on request
For Dimensions refer to Bulletins P-111, P-211, P-213 & A-106

| Physical Properties @20°C | |
|---|---|
| **Density** | 8000 kg/m³ |
| **Thermal Conductivity** | 13 W/m°C |
| **Heat Capacity** | 500 J/kg°C |
| **Modulus of Elasticity** | 200 kN/mm² |

| Mechanical Properties @20°C | |
|---|---|
| **Ultimate Tensile Strength** | 550 N/mm² |
| **Yield Strength (0.2% offset)** | 260 N/mm² |

| Chemical Composition (%) | Boiling Point |
|---|---|
| **Carbon** | 0.025 max |
| **Chromium** | 19.5-20.5 |
| **Copper** | 0.5 - 1 |
| **Manganese** | 1.2 max |
| **Molybdenum** | 6 - 7 |
| **Nickel** | 17.5 - 19.5 |
| **Nitrogen** | 0.18 - 0.24 |
| **Phosphorus** | 0.045 max |
| **Silicon** | 1.0 max |
| **Sulphur** | 0.01 max |

## Pitting corrosion

A high localized attack of the metal creating pits varying in depth, width and quantity.
Pitting may often lead to complete perforation of the metal with little or no general corrosion of the surface.

## Crevice corrosion

Crevice corrosion is a form of localized corrosion and occurs under the same conditions as pitting, i.e. in neutral or acidic chloride solutions. However, attack starts more easily in a narrow crevice than on an unshielded surface. Crevices, such as those found at flange joints or at threaded connections, are thus often the most critical sites for corrosion. Any equipment likely to be exposed to an environment containing chlorides should be designed with as few crevices as possible. In narrow crevices, capillary forces make liquid penetrate into the crevice. Oxygen and other oxidants are consumed for the maintenance of the passive layer in the crevice just as on the unshielded surface. However, in the stagnant solution inside the crevice, the supply of new oxidant is restricted, causing a weakened passive layer. Small amounts of dissolved metal ions inside the crevice cause a decrease of the solution pH and the presence of chlorides facilitates the breakdown of the passive layer. Thus the environment inside the crevice gradually becomes more aggressive and repassivation becomes less likely. As a result, crevice corrosion attacks often propagate at a high rate, thereby causing corrosion failure in a short time. A higher chromium, molybdenum and nitrogen content in the steel increases the resistance to crevice corrosion.

## Chloride stress corrosion cracking (SCC)

One of the most important forms of stress corrosion is chloride stress corrosion. Chloride stress corrosion is a type of intergranular corrosion and occurs in austenitic stainless steel under tensile stress in the presence of oxygen, chloride ions, and high temperature. It is advisable to start with chromium carbide deposits along grain boundaries that leave the metal open to corrosion. This form of corrosion is controlled by maintaining low chloride ion and oxygen content in the environment and use of low carbon steels.



HABONIM
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**Headquarters Habonim ISRAEL**
Tel: +972-4-6914911, Fax: +972-4-6914902
sales_international@habonim.com

**ISRAEL**
Tel: +972-4-6914903
Fax: +972-4-6914935
sales_israel@habonim.com

www.habonim.com

**North America**
Toll Free Phone: 1-866-261-8400
Toll Free Fax: 1-866-243-9959
sales_usa@habonim.com

**Europe**
Habonim Europe
Tel: +972-4-6914733
Fax: +972-4-6914703
sales_europe@habonim.com

**U.K.**
Habonim UK
Tel: +44-1633-484554
Fax: +44-1633-482252
sales@habonimuk.com

**China**
Habonim China
Tel: + 86 21 5219 1139
Fax: + 86 21 5219 3780
sales_china@habonim.com.cn

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