BULLETIN D-505
METRIC

UNS J93254 FOR WATER DESALINATION

254SMO SERIES

HABONIM
Industrial Valves & Actuators

DEDICATED TO INNOVATION

UNS J93254 FOR WATER DESALINATION

254SMO SERIES

Habonim is responding to the challenge of Water Desalination plant facilities by introducing a new line of Ball Valves 47P Series, made from the rich Molybdenum Stainless-Steel 254SMO® (UNS J93254) especially developed for use in corrosive environments.

Size Range:	¼" - 8" (DN8-DN200)
End Connections:	Screwed, Socket weld, Flanged
Applications:	Desalinization plant, Saltwater handling, Food and chemical processing equipment
Operation:	Manual or Actuated

Introduction

254 SMO® (UNS J93254) 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 desalinization, saltwater handling plant, petroleum production, food processing and chemical processing equipment, pulp and paper mill bleach systems, fuel gas desulfurization scrubbers and tall oil distillation columns.

Material specifications

Item	Description	Material specification	Qty.
1	Body	Stainless St. ASTM A351 Gr CK3MCuN (UNS J93254)	1
2	End connector	Stainless St. ASTM A351 Gr CK3MCuN (UNS J93254)	2
3	Ball	Stainless St. 254 SMO® ASTM A182-F44	1
4	Stem	Stainless St. 254 SMO® ASTM A182-F44	1
5	Seat ring	VIRGIN PTFE, Glass filled PTFE NRG, PEEK	2
6	Body seal	VIRGIN PTFE, NBR, VITON, EPDM Expanded Graphite	2
7	Stem thrust seal	25% Carbon filled PTFE	1
8	Stop pin	Stainless St. ASTM A582 303	1-2
9	Stem packing	25% Carbon filled PTFE Expanded Graphite	1
10	Follower	Stainless St. ASTM B783 316L	1-2
11	Disc spring	Stainless St. 17-7PH	2
12	Stem nut	Stainless St. ASTM A194 316	1
13	Locking clip	Stainless St. ASTM A164 304	1
14	Handle	Stainless St. ASTM A240 430	1
15	Serrated washer	Stainless St. 410	1
16	Body bolt	Stainless AISI 316	4-8
17	Body nut	Stainless AISI 316	4-8

For dimensions, refer to **BULLETIN P-111** "47P SERIES"

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.

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