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BONOMI INDUSTRIES SRL

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**TECHNICAL DATA SHEET
STAINLESS STEELS**

TDS 0006

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Many people in the valve business are confused by two specs commonly used for stainless steel valves – CF8M and 316. The confusion is compounded because people often use “316” when speaking of stainless valves, without any distinction between the two specs. That’s not surprising because 316 and CF8M are essentially the same stainless material. The different specs exist only because 316 is a spec for wrought (i.e. barstock or sheetmetal) forms while CF8M is for the (almost) same material made by casting it to a shape in a mold.

Here are the chemical requirements:

	C	Mn	P	S	Si	Cr	Ni	Mo	Fe
	Max	max	max	max	max				
ASTM A 351 – Grade CF8M	.08	1.5	.040	.04	1.5	18~21	9~12	2~3	bal
ASTM A 276 – Grade 316	.08	2	.045	.03	1	16~18	10~14	2~3	bal

As you can see, the differences are small. And for that reason the corrosion behaviour of the cast and wrought versions is the same.

Most stainless ball valves are made with cast (i.e. CF8M) bodies, but the stems (and in smaller sizes the balls too) are made from bar stock (316).

The stainless ball valves which BONOMI INDUSTRIES SRL buys from vendors in China or Taiwan are carefully checked by BONOMI INDUSTRIES SRL before we qualify the vendor. For each batch of valves the vendors ship to us, they send also MTR’s (Material Test Reports) and these are kept in our files and are available to our customers to examine. We also check initial samples for correct heat treat, which see below.

Besides 316/CF8M there are many other types of stainless steel. The most common types after 316/CF8M are

<u>Wrought*</u>	<u>Cast*</u>	<u>Use</u>
AISI 304	ASTM CF8	Cheaper than 316. Has less corrosion resistance
Alloy 20	ASTM CN7M	Extra corrosion resistant for acids. Costly.

*The wrought and cast versions of each alloy are functionally the same.

About Heat Treat

Many people don’t realize it – but the stainless property of these alloys does not come from their chemical recipe alone. If the material isn’t **heat treated** correctly, it isn’t “stainless” at all. In fact in some services it will corrode worse than plain carbon steel!

Un-heat-treated stainless looks the same as heat treated. Since the material looks correct, and contains the correct chemicals, it is tempting for some of our competitors to sell un-treated stainless, and save the cost of the heat treat. This is particularly common in valves made in Taiwan or China.

BONOMI INDUSTRIES SRL stainless (in our s.130 valves or in our brass valves with the stainless trim) is properly heat treated. We know because we test.

Correct heat treat can be determined by taking a sample of the material, polishing a surface, etching it with acid, and examining it with a microscope. The difference then is obvious. But of course most people don’t check, so bogus stainless valves remain in the market.

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Since the corrosion damage normally starts from the inside, a bogus valve may last for months or years without visible problems, depending on what media is flowing through it. I have seen a 2" "stainless" valve body (not ours) which had begun to leak acid through the sidewall. When the valve was sawed in half, the inside looked like the Luray Caverns. The wall had finally broken through – but the outside of the valve except in that spot looked OK. The AISI and ASTM specs for stainless clearly require heat treat. If a competitor sells a stainless valve which has not been properly heat treated, he is selling bogus goods.

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