



Why is my Stainless Steel **Magnetic?**



...Or is it?

Several times a month we receive an inquiry from a concerned customer that the “stainless steel” they received from Summit Pump is magnetic and/or appears to be rusting.

We assure them there is no issue, and explain as follows.



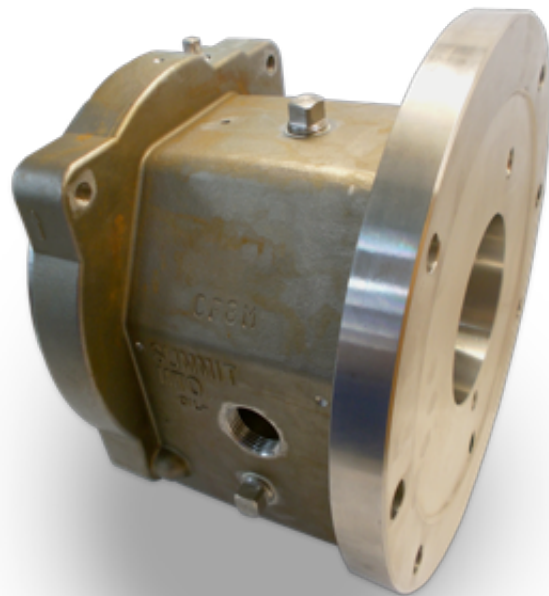
In the case of plain/standard **316-SS**, it is usually because the piece has been cold worked and will pick up some magnetic properties. Note if you were to compare the **316-SS** to a **400 series stainless** you would see an increase in magnitude of the magnetic attraction. It will not attract other ferritic metals, only

the magnet, as a result the material itself is not necessarily magnetic, it is ferrous. The magnetic response has no effect on any other property. **Austenitic 300 series steels** like cold drawn **304** (and to a lesser degree **316**) are slightly attracted to a magnet, but this has no effect on its corrosion resistance.

Cold Working: Parts that are highly worked (due to machine operations), such as sleeves and shafts that have been machined, ground and polished, will lend themselves even more to this phenomena.

Corrosion: In **316-SS** it is the chrome content that makes it stainless, but it is the nickel content that makes it nonmagnetic.

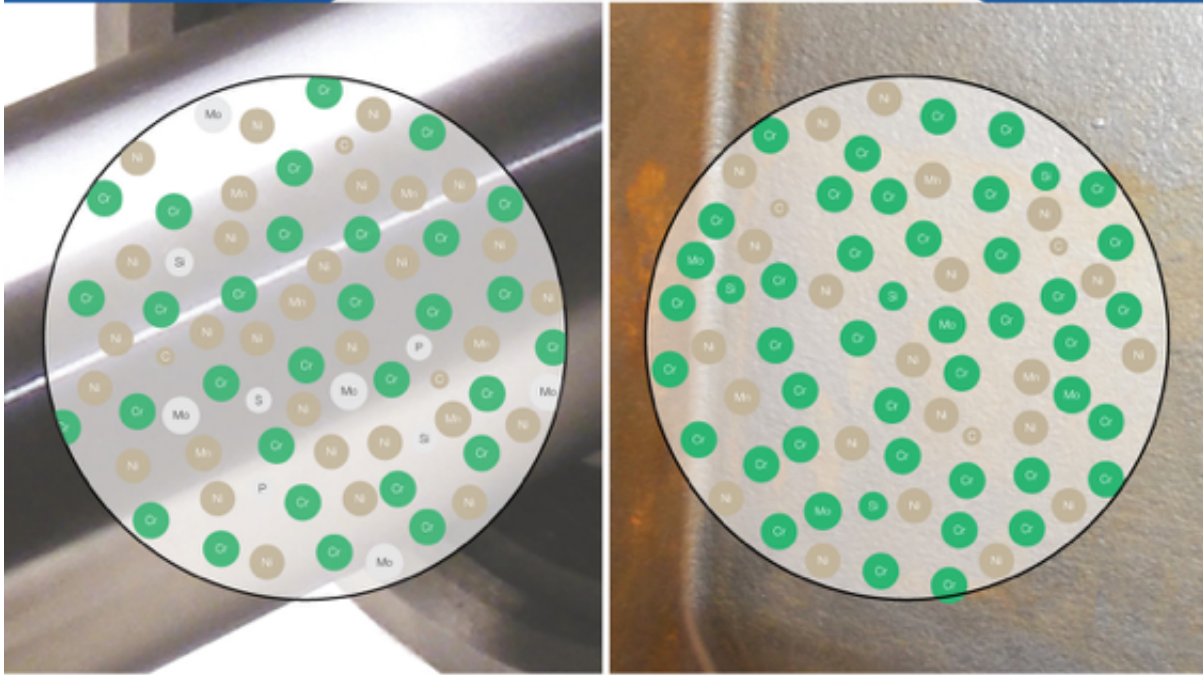
In the process of cleaning the materials at the foundry and the machine shop, there could be some residual ferrite (iron) from the cleaning process which temporarily alters the surface. The surface may become contaminated on the work site as well. The remedy is to pickle and passivate the surface once again. Stainless surfaces must be kept clean, so the surface can generate the passivation layer and remain as new. It is the chrome oxide film that stainless naturally forms that keeps it from corroding.



Rolled or Cast: There is a difference in cast stainless steels versus wrought stainless steels that aggravates and differentiates the issue of magnetic attraction. In the case of cast stainless steel, like **CF8M**, the chemistry and micro structure are purposely different from rolled steel, but the physical and corrosion properties are similar. **AISI 316-SS** is wrought steel and is notably less or nonmagnetic altogether, as compared to CF8M.

AISI 316 (Wrought)

CF8M (Cast)



CF8M has a higher ratio of elements promoting ferrite in material

	C Carbon	Mn Manganese	Si Silicon	Cr Chromium	Ni Nickel	P Phosphorus	S Sulfur	N Nitrogen	Mo Molybdenum
AISI 316 (Wrought)	.08%	2%	1%	16-18%	10-14%	.045%	.03%	0%	2-3%
CF8M (Cast)	.08%	1.5%	2%	18-21%	9-12%	0%	0%	0%	2-3%

■ Promotes Ferrite in Material
 ■ Promotes Austenite in Material

We want some ferrite in the **CF8M** cast steels to increase the strength and increase its resistance to corrosion cracking. The small amount of ferrite also reduces some forms of corrosion and helps with weldability.

Duplex and Super Duplex Materials: **CD4MCu** is a duplex stainless steel with magnetic attraction, due to its ferrite content.

If you remain concerned about the material’s magnetic properties, please discuss with engineering or your RSM. It’s possible to perform and document a witnessed PMI test at no charge.

-The Summit Pump Team

We are your Best Value by

"providing quality pumping products in a timely manner, at a fair market price."



SUMMIT™
PUMP, Inc



LinkedIn



Website



Email

Learn More!

Jim Elsey's Pumps and Systems Articles

Polymer Concrete **BASEPLATES**



Simplify installation and alignment
while increasing pump longevity



Excellent Corrosion Resistance



Vibration Dampening



Integrally Molded Catch Basin

[learn more>](#)



SUMMIT™
PUMP, Inc

Want to change how you receive these emails?
You can [update your preferences](#) or [unsubscribe from this list](#)

