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AN OVERVIEW OF ANCHOR CASTING PROPERTIES, AND A GUIDE TO SELECTING THE PROPER ANCHOR CASTING GRADE:

Casting Grade	HTAC Ferritic Ductile Iron	HF	HH	HK	316 SS	Inconel 625
Service Limit (Deg. F)						
Continuous Service Limit	1600	1600	1800	1900	1700	2200
Intermittent Service Limit	1800	1700	2100	2100	1800	2400
Chemistry						
Carbon	3.300	0.060	0.150	0.150	0.060	0.080
Sulpher	<0.200	0.030	0.030	0.030	0.030	0.030
Phosphorus	<0.600	0.045	0.045	0.045	0.045	0.045
Manganese	0.076	2.000	2.000	2.000	2.000	0.400
Silicon	1.8 - 2.4	1.000	1.000	1.500	1.000	0.400
Chromium	Up to 1.00	18.00	25.00	24.00	19.00	21.00
Nickel	0.6 to 0.7	8.000	12.000	20.000	19.750	68.000
Molybdenum	N/A	N/A	N/A	N/A	2.300	9.000

As you can see from a review of the above table, the service limit of castings generally go up as a function of the grade of iron or steel.

The Ferritic Ductile casting achieves it properties and good service limit from the relatively high content of Silicon. In service, the Silicon promotes the development of an "oxide scale" which, in effect, prevents further oxidation, and protects the casting from the service environment. The conversion of the iron to a ductile grade converts the carbon content of the iron from a "flake" morphology to a "nodularized" morphology. This promotes volume stability through a variety of temperature ranges, and further limits oxidation penetration. It should be noted that this grade of casting tends to be somewhat brittle at ambient temperatures, but that the "toughness" increases as the casting temperature rises over 600deg.F.

The primary considerations in selecting an *iron* casting instead of a stainless casting are as follows:

1. **The atmosphere the casting is exposed to will not be corrosive, or contain elements which could foster corrosive condensates**
2. **The casting will not be "buried" in the ceramic substrate. (That is, the casting where it attaches to the furnace superstructure, and the ceramic anchor are left exposed to the open atmosphere)**
3. **In cases where it is possible that the casting may be "buried" in insulation materials, it is always wiser to upgrade to a stainless casting.**
4. **The casting will be subjected to static loads only, and no shock loading or sustained vibration will not be a factor.**

In cases where the above criteria are not assured, the selection of a stainless grade of casting is a better choice. The main obstacle to selecting stainless grades of castings are cost, which can vary from 3 times the cost of cast irons up to a 7 fold increase in price.

You will note that there is no service temperature improvement as you move from a "Ferritic Ductile High Temperature" cast iron (Meehanite" type casting) to 304 SS. The service improvement comes from the much greater resistance to corrosive furnace atmospheres that the additional Chrome and Nickel in the Stainless Steel provides, along with substantial increases in the hot tensile strengths of Stainless grades of castings. (Like refractoriness, hot strength is the important characteristic, not the cold strength numbers.)

Generally speaking, higher contents of Chromium and Nickel improve the service limits and corrosion resistance of the castings. You will note that the greatest temperature rating comes from an Inconel type steel casting, which has a 68% Ni content, as well as a substantial 9% Mo (Molybdenum) addition.

Also, generally speaking, the cost of the casting goes up with the addition of these alloys. It is always a trade off between service environment, cost and length of expected service that helps to determine the correct anchor metallurgy.

In all cases, it is wise to know as much as possible about the furnace environment, the service temperatures anticipated, the fuels to be used, and the physical loading expected. When in doubt regarding the selection of an anchor, it is important to consult with an expert.

PLEASE NOTE THAT THE SELECTION OF AN EXPENSIVE GRADE OF STAINLESS STEEL CASTING IS NOT A GUARANTEE THAT MATERIAL WILL BE COMPATIBLE WITH THE FURNACE ENVIRONMENT.

If you have questions or require additional information, please contact;

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