

SPECIALIZED IN POWDER MATERIALS

Providing The Best Alternative of Powders

STAINLESS STEEL FOR MIM

Steel that has been termed ‘stainless’ means that it has corrosion and discoloration resistances. Stainless Steels were also among the early materials adopted by the MIM process on an industrial level. We can see that in Japan and European countries, that over half of all MIM parts are made with stainless steels. That clearly shows that in terms of manufacturing volumes Stainless Steels are very important for MIM.

MEDICAL



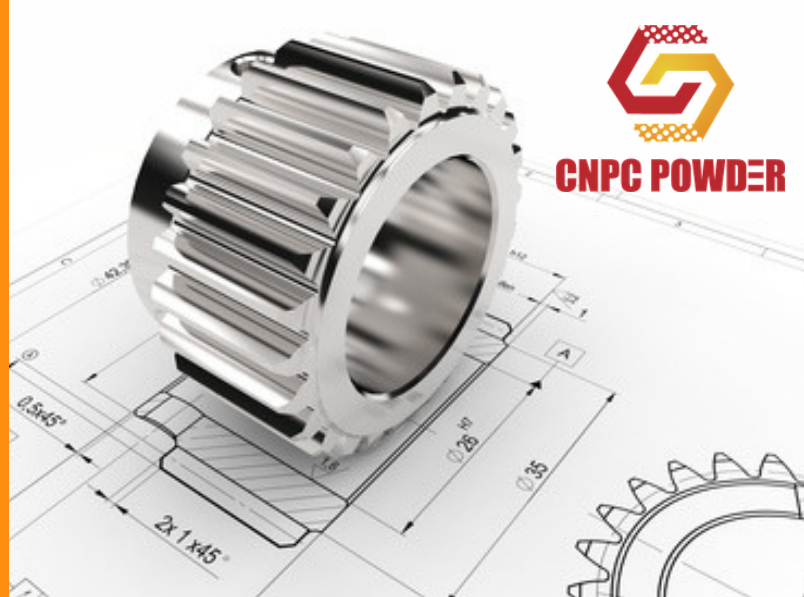
AUTOMOTIVE



AIRCRAFT ENGINE



Stainless Steels form part of the Iron-Carbon Alloy family. These steels resist corrosion and oxidation to varying amounts, however, stainless steels have better resistances than other Iron-Carbon alloys. The capabilities of stainless steels to resist corrosion come from the Chromium content, at a minimum of 12% by weight in the alloy solution.



We are able to divide Stainless Steels in to three groups based on their unique microstructures. The three commercially used groups consist of the: Austenitic, Ferritic, and Martensitic.

Austenitic Stainless steels:

- Grade 303, 303L, 303 LSC (Sulfur added steel to improve machining, Carbon reduced grade, Special grade)
- Grade 304, 304L, 304 LSC (general purpose grade, Carbon reduced grade, Special grade)
- Grade 316, 316L, 316 LSC (“Mo” added steel to increase corrosion resistant, Carbon reduced grade for welding, Special grade)
- Grades 317L, 314, 310 (“C” reduced for welding, “Si” increased for highest heat resistance, Cr & Ni for increased for high temperature).

Martensitic Stainless steels:

- Grade 410, 410L (general purpose martensitic grade, reduced carbon content martensitic grade)
- Grade 420 (high carbon martensitic grade)

Ferritic Stainless steels:

- Grade 430 (most used non-hardenable ferritic grade, reduced carbon content ferritic steel, more stabilized ferritic grade to retain ferritic structure at all temperatures).
- Grade 434 434L, 434 LNb (non-hardenable ferritic grade with added “Mo” to increase corrosion resistance, reduced carbon content ferritic steel, more stabilized ferritic grade to retain ferritic structure at all temperatures).

Other grade Stainless steels:

- Grade 440 (highest carbon grade from 400 series grade)

Main Advantages of MIM for Stainless steels.

FLEXIBILITY

Provides great freedom to create fairly small but very intricate parts.

HIGH TOLERANCE

High dimensional tolerances.

TOUGHNESS

Similar to wrought grade when comparing mechanical properties

HIGH DENSITY

Offers the ability to produce products at near full densities.

CNPC POWDER has the capacity to supply a wide range of powders to produce most common commercial grades of stainless steel components. When selecting your powder, our high-quality irregular or spherical shape powders have the advantage to improve shape retention during sintering and dimensional control with better packing features.



When comparing PM to MIM, we see MIM demonstrates significant advantages in corrosion resistance and mechanical properties due to its low oxygen content and levels of porosity. For MIM materials, MIM's mechanical features are closer to the properties of the wrought steels than conventional PM steels. Especially the elongation, which is much more sensitive to the porosity than the tensile features and hardness.

CNPC POWDER is an experienced stainless steel powder manufacturer and supplier, with a range from SS304 to SS430L, including basic austenitic grades, martensitic grades, and ferritic grades. All these SS powders have two different shapes: irregular and spherical. CNPC-SS304 SS304L are austenite stainless steels that can be produced with either an irregular or spherical shape.

ITEM	Cr	Ni	Mo	Sn	Cu	S	P	C	Si	Mn	Fe
303	17/19	8/13	/	/	/	0.15/0.30	≤0.20	≤0.15	≤1	≤2	Bal
304	18/20	8/12	/	/	/	≤0.03	≤0.04	≤0.08	≤1	≤2	Bal
316	16/18	10/14	2/3	/	/	≤0.03	≤0.04	≤0.08	≤1	≤2	Bal
303L	17/19	8/13	/	/	/	0.15/0.30	≤0.20	≤0.03	≤1	≤2	Bal
304L	18/20	8/12	/	/	/	≤0.03	≤0.04	≤0.03	≤1	≤2	Bal
316L	16/18	10/14	2/3	/	/	≤0.03	≤0.04	≤0.03	≤1	≤2	Bal
317L	18/21	12/16	3/4	/	/	≤0.03	≤0.04	≤0.03	≤1	≤2	Bal
314	24/27	18/21	/	/	/	≤0.03	≤0.04	≤0.20	1.5/2.5	≤1.5	Bal
310	24/26	19/22	/	/	/	≤0.03	≤0.04	≤0.08	≤1	≤2	Bal
303LSC	17/19	8/13	/	1	2	0.15/0.30	≤0.20	≤0.03	≤1	≤2	Bal
304LSC	17/19	8/13	/	1	2	≤0.03	≤0.04	≤0.03	≤1	≤2	Bal
316LSC	16/19	10/14	2/3	1	2	≤0.03	≤0.04	≤0.03	≤1	≤2	Bal
410L	11.5/13.5	/	/	/	/	≤0.03	≤0.04	≤0.03	≤1	≤1	Bal
430L	16/18	/	/	/	/	≤0.03	≤0.04	≤0.03	≤1	≤1	Bal
434L	16/18	/	0.75/1.25	/	/	≤0.03	≤0.04	≤0.03	≤1	≤1	Bal
434LNb	16/18	/	0.75/1.25	Nb:0.4/0.6	/	≤0.03	≤0.04	≤0.03	≤1	≤1	Bal
410	11.5/13.5	/	/	/	/	≤0.03	≤0.04	≤0.25	≤1	≤1	Bal
420	12/14	/	/	/	/	≤0.03	≤0.04	0.25/0.35	≤1	≤1	Bal
430	16/18	/	/	/	/	≤0.03	≤0.04	≤0.08	≤1	≤1	Bal
434	16/18	/	0.75/1.25	/	/	≤0.03	≤0.04	≤0.08	≤1	≤1	Bal
440	16/18	/	/	/	/	≤0.03	≤0.04	0.9/1.2	≤1	≤1	Bal