

Astaloy[®] CrS Sophisticated Stability

Astaloy CrS is a lean Cr pre-alloyed metal powder, developed to meet rising demands for sustainability. Having similar mechanical performance as Fe-Cu-C, Astaloy CrS offers improvements on parameters important for PM processing, while maintaining the advantage of a high material utilization level.

Astaloy CrS is based on recycled iron scrap, with mechanical properties similar to Fe-Cu-C after pressing & sintering in N_2/H_2 . Astaloy CrS provides better dimensional stability and improved machining performance compared to copper steels.

Astaloy CrS can be fully recycled, since Cr and Mo are alloying elements used in conventional wrought steels. In contrast, copper alloyed steels would contaminate scrap with copper which cannot be removed.

Without dilution, over time, the copper content would accumulate in the scrap, making hot forming of wrought steels difficult, why such scrap would only be used in low grade rebar.

Astaloy CrS equals stability

As compared to Fe-Cu-C, Astaloy CrS offers:

- >> Equivalent mechanical performance
- >> No dimensional swelling during sintering
- >>> Less sensitivity to carbon content
- Better dimensional stability due to pre-alloyed elements
- >> Better machinability
- No deterioration of scrap quality at end of life (copper)



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Properties compared to copper alloyed steels

Astaloy CrS outperforms copper alloyed steels regarding dimensional stability, due to the absence of liquid phase sintering. By excluding the risk of alloy segregation while having a low sensitivity to carbon content variation, Astaloy CrS is an ideal material system when dimensional precision is required.



DC variation with carbon and copper content



Astaloy CrS has a homogeneous fine pearlitic microstructure.

Machining of Astaloy CrS by turning has shown advantages compared to Fe-Cu-C. Further on, the use of suitable machinability enhancing additives would improve the machinability further. Höganäs would be happy to support you selecting the appropriate machinability additive.

Basic product characteristics

Chemical composition

Cr	Мо	Fe	
0.85%	0.15%	Bal.	

Powder properties

Apparent density	Flow (Hall)	
2.90 g/cm ³	28 s/50 g	

Compressibility (g/cm³)

	400 MPa	600 MPa	800 MPa
Astaloy CrS – Lubricated die	6.58	7.07	7.35
Astaloy CrS + 0.6% Lube E	6.65	7.07	7.28

Cold die

Considering that Astaloy CrS is a powder which is prealloyed with chromium, the compressibility is excellent, and in contrast to Fe-Cu-C, Astaloy CrS is not swelling during sintering.

Mechanical properties

Typical mechanical properties for Astaloy CrS can be seen in the figure below and are similar to Fe-Cu-C.

Plane bending fatigue tests show similar endurance limit results between Astaloy CrS + 0.8%C (199 MPa) and Fe + 2%Cu + 0.8%C (195 MPa), (at 7.0 g/cc sintered density, two million cycles and a load ratio R=-1).





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