



# Astaloy® CrS

For sustainable stability

Astaloy CrS is developed to meet the increasing future demands for sustainability, such as recycled raw materials, circularity, high material utilisation and low CO<sub>2</sub> footprint.

Astaloy CrS is a lean Cr pre-alloyed metal powder, based on recycled iron scrap, with mechanical properties similar to Fe-Cu-C after sintering in N<sub>2</sub>/H<sub>2</sub>.

Astaloy CrS gives high dimensional stability and improved machining characteristics compared to copper steels.

Astaloy CrS is truly circular which means it can be recycled. This is in contrast to copper alloyed steels which must be diluted with virgin material in order to be recycled as copper cannot be removed from Fe-alloys. Without dilution, the copper content will continue to accumulate over time in the scrap which poses challenges to meet low copper specifications and mechanical properties in steel.

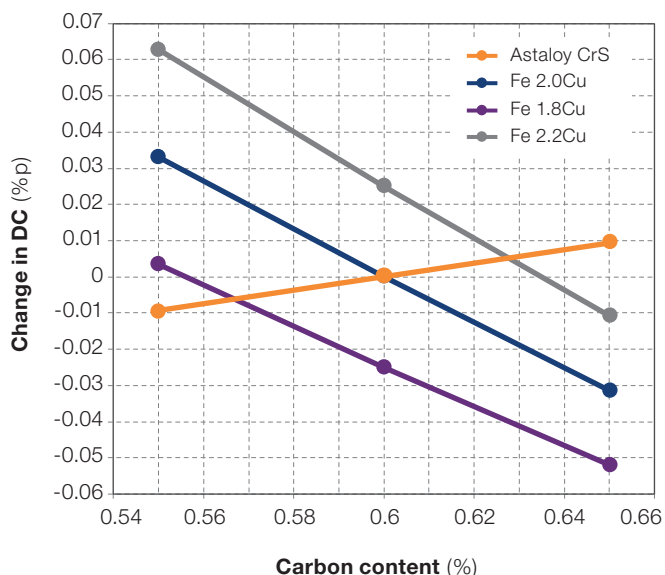
Astaloy CrS has a low CO<sub>2</sub> footprint, around 40% lower than copper alloyed steel materials produced with the global energy mix. The CO<sub>2</sub> footprint for Astaloy CrS aims to become net zero before 2037 in line with Höganäs sustainability roadmap.

## Main product benefits

- » Sustainable/circular
- » Same mechanical properties as Fe-Cu-C
- » High DC stability
- » Improved machining characteristics compared to Fe-Cu-C

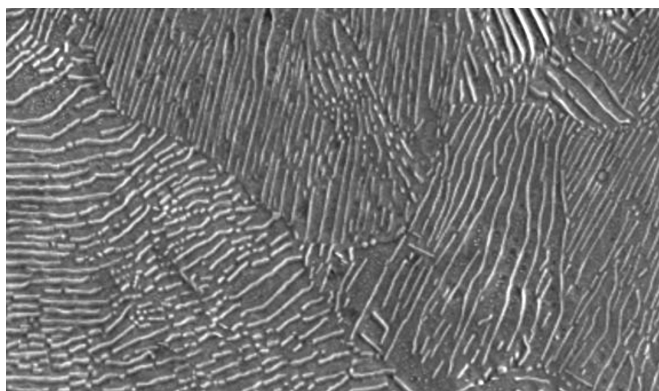
## Properties compared to copper alloyed steels

Astaloy CrS will have high dimensional stability compared to copper alloyed steels since there will be no liquid phase sintering. Without the risk of alloy segregation and a low sensitivity to carbon content, Astaloy CrS is an ideal material system where dimensional precision is required.



DC variation with carbon and copper content

Astaloy CrS has a homogeneous fine pearlitic microstructure.



Homogeneous fine pearlitic microstructure

Machining of Astaloy CrS by turning has shown advantages compared to copper alloyed steel materials. The use of suitable machining additive will improve the results significantly. Höganäs will support you in the selection of machining additive.

## Basic product characteristics

### Chemical composition

Cr	Mo	Fe
0.85%	0.15%	Bal.

### Powder properties

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

### Compressibility [g/cm<sup>3</sup>]

	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

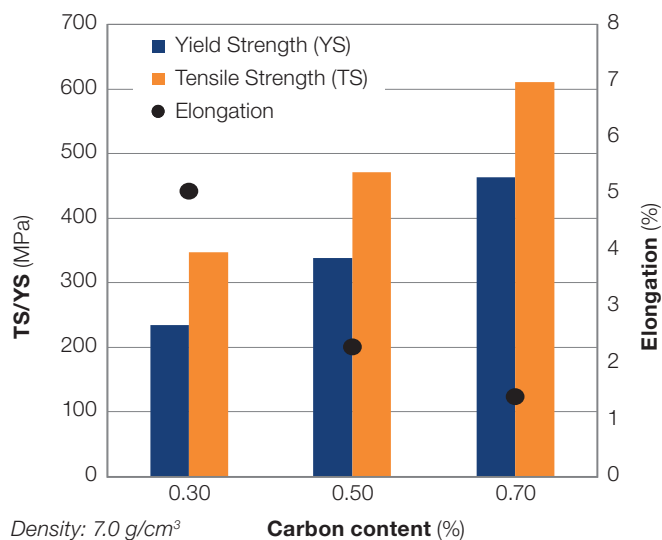
Cold die

The green density is high for being a chromium pre-alloyed powder and, in contrast to Fe-Cu-C, Astaloy CrS is not swelling during sintering.

### Mechanical properties

Some typical properties for Astaloy CrS as TS, YS and elongation can be seen in the figure below and are similar to Fe-Cu-C.

Plane bending fatigue tests show similar results between Astaloy CrS and Fe-Cu-C both as un-notched and notched.



Density: 7.0 g/cm<sup>3</sup>