WEARCOMP® passes the ASTM G 65 test

Compared to conventional wear materials such as Hardox 600 and AISI D2, the test results of a "Dry Sand Rubber Wheel" test speak for themselves. MMC WEARCOMP® with its composite particles and additives is an attractive alternative material for wear components in the recycling industry.

WEARCOMP® is a MMC (Metal Matrix Composite) material, sinter forged to full density with embedded hard particles. The purpose of the matrix is to optimise the ductility, while the composite is to optimise the wear resistance. The material has been designed to resist high abrasive wear. With WEARCOMP®, you can therefore manufacture wear parts with full density, high hardness, good toughness and a wear resistance that has been compared to the best wear-resistant steel types on the market.

The material is shaped to net-shape wear components in a process without need for further processing and thus cheap compared to processed rolled steel. The basic powder may be a molybdenum pre-alloyed powder with added carbon – depending on the required ductility – which is mixed with rapidly solidifying hard particles containing hard carbides or cermets. After forging, the material is heat-treated to obtain the required hardness. It is thus possible to tailor the material to the purpose with regard to toughness, hardness and wear resistance.

Dry Sand Rubber Wheel Test

The material has been tested against known wear-resistant materials in a wear test called "Dry Sand Rubber Wheel Test". Various compositions of WEARCOMP® have been tested with HARDOX 600 and AISI D2. The test has been performed on materials with approximately the same hardnesses. People normally expect high-hardness materials to have high wear resistance.

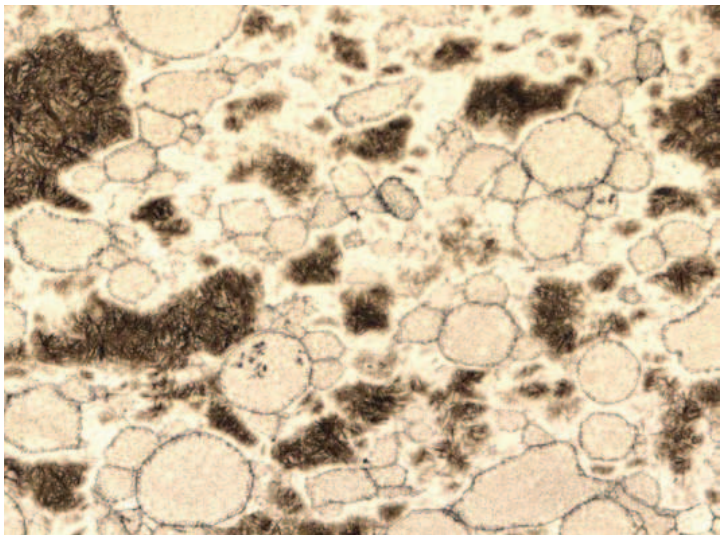
Matrix no.	%C	CMo	%Ni	%Mn	
A	1.0	1.50			
B	1.0	0.55	1.90	0.20	
Comp.no.	%C	%Mo	%Mn	%Cr	%V
Y	2.8	2.3	0.7	7.0	8.9

The chemical composition of two WEARCOMP® materials.

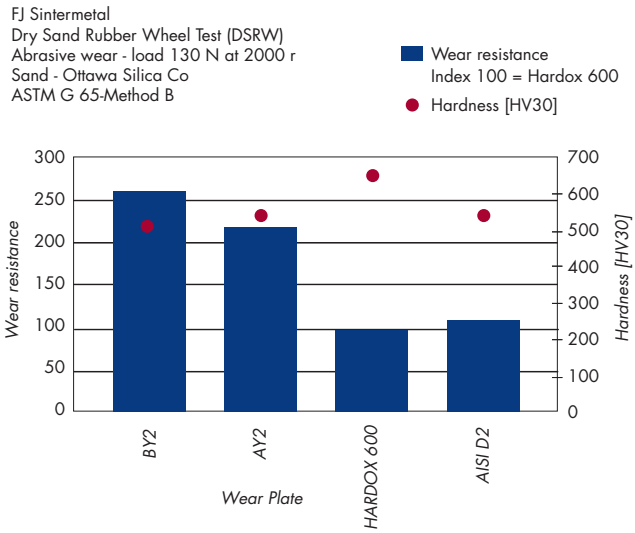
WEARCOMP®	Composite [HV0.1]	Matrix [HV0.1]	Macro [HV30]
AY	809	630	547
BY	752	538	511

The hardness of two WEARCOMP® materials.

Right after the sinter forging, the components are hardened directly using the same heat as during the forging. After the hardening, the components have been tempered twice.

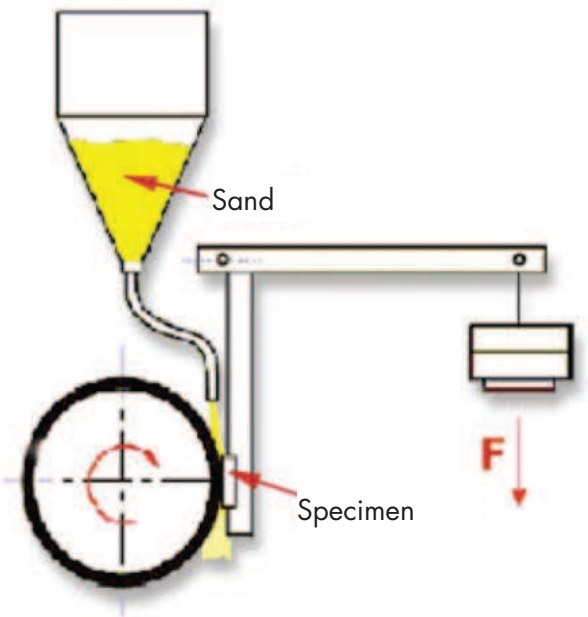


Microstructure of WEARCOMP® with the rounded hard particles in a background matrix.



BY2 and AY2 are sinter-forged WEARCOMP® materials.
The wear test – Wear resistance and hardness of four wear materials.

However, the result of the wear test shows that the wear resistance of WEARCOMP® is approx. double that of HARDOX 600 and AISI D2 in spite of lower hardnesses.



Sketch of arrangement – DSRW wear test.

FMT A/S increases its production with 25%

FMT A/S is a Danish company that uses machinery for e.g. the building industry, the wood industry and the so-called green sector. Three tough industries that pose challenging requirements on every single machine part, as the machines are daily exposed to stones, gravel, rubble and more than 100 tons of load an hour. Especially the bit of FMT's shredder has to have an extremely high tensile strength throughout the material.

FMT A/S therefore explored the possibilities of using sinter forged components in their shredder. As opposed to bits made of traditional material where hard metal has been welded onto mild steel to obtain ductility and wear resistance, sinter forged MMC materials have the same wear resistance and impact resistance throughout the component. The drawback of the traditional production method is that even minor damage to the bit means that it looses its full capacity. If a small part of the bit comes off, it therefore has to be replaced sooner.

The perfect bit for FMT's shredder was made at FJ Sintermetal from sinter forged MMC WEARCOMP® material, which as described above consists of an even distribution of hard embedded particles in a low-alloy steel matrix, which ensures that the final component gets the right wear resistance and the right toughness in the background material. During the sinter forging process, which takes place right after the sintering, the component is consolidated to a 100% relative density, and an expensive metal-cutting after-treatment process becomes unnecessary. The high tensile strength of the component has already been achieved. The sinter forged MMC WEARCOMP® bit has reduced FMT's production costs by 50%. Furthermore, the service life has been prolonged and the repair costs reduced.

Since FMT A/S changed from bits made of traditional hard metal to bits made of sinter forged MMC WEARCOMP®, the company has experienced a considerable process optimisation from 80 to 100 tons of waste an hour. This means that they are able to produce a larger amount of compost than earlier.