

## **The new steel grade Uddeholm Vancron 40 – winner of EPMA Award of Merit**

Uddeholm Vancron 40 is the most exciting tool steel Uddeholm have launched in many years. This is a revolutionary tool steel for the powder compacting industry, offering low friction properties, excellent galling resistance and superior adhesive wear resistance. It is the winner of this years EPMA\* Award of Merit in the category Equipment/Materials.

Vancron 40 is different to the usual PM steels used for cold work operations. It is alloyed with nitrogen and this leads to a steel with an integrated "surface coating". The result is a tool surface with very low friction that guarantees a much better resistance to galling or cladding and adhesive wear.

In cold work applications like forming of e.g. Advanced High Strength Steels, stainless steel and mild steel, galling and adhesive wear are often the dominating tool failure mechanisms. This can also be the case in powder compacting, cold extrusion, deep drawing and blanking. Up to now the common way to increase galling resistance has been to nitride the tool or to apply surface coatings like CVD, PVD or TD (Toyota Diffusion).

Vancron 40 is the start of a new era. This steel does not have to be surface treated or coated as it already has a very effective integrated "surface coating". This means that the time and cost factors associated with the coating operation are eliminated.

Vancron 40 was designed with help of the Thermo Calc thermodynamic computer programme. Based on previous experiences, it was envisaged that a martensitic tool steel with a high volume of dispersed, hard nitrocarbides, primarily vanadium rich nitrocarbides, would have the demanded material and functional properties. It was then possible to calculate the steel composition having the requested amount and composition of the different phases.

The production of Vancron 40 involves solid state nitriding of the as-atomized powder. In this way it is possible to produce a tool steel with a nitrogen content several times higher than is possible when using the conventional technology involving nitrogen alloying of the steel melt. During the hot isostatic pressing stage, the nitrogen is evenly distributed throughout the steel.

The resulting Vancron 40 is a fully dense steel with the following material and functional properties;

- very high adhesive wear resistance
- very high resistance to galling/cladding
- good chipping and cracking resistance
- high compressive strength
- good through hardening properties and dimensional stability in hardening
- low friction properties
- good machining/grinding/polishing properties

Industrial experience with Vancron 40 in powder compacting tooling has been very good. The ejection force is up to 30% lower than for press tooling manufactured from the commonly used conventional tool steels. As a result of this, Vancron 40 is now being used for powder compacting punches, dies and core rods.

Benefits for the tool user include improved and consistent quality of the manufactured parts, especially regarding the surfaces. More reliable delivery time and higher utilization of the production equipment are also benefits, with fewer disturbances and interruptions in production. Further improvements include simplified maintenance, which can often be made in-house as no surface coating is required; and as well, total tool life is increased.

The tool maker can produce a high quality tool that does not require any surface coating, which means a shorter delivery time and freedom to make adjustments after the heat treatment.

In total this means that the product quality will be uniform from the first part produced to the last and that a tool manufactured in Uddeholm Vancron 40 will make it easier for you to keep your delivery time commitments.

This year therefore the EPMA Award of Merit in the category Equipment/Materials goes to Uddeholm Tooling AB of Sweden.

\*EPMA = European Powder Metallurgy Association

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