

ROVALMA

THE STEEL INNOVATOR



FASTCOOL[®]-50

New Revolutionary Approach on High Thermal Conductivity and High Wear Resistance Tool Steel

FASTCOOL[®]-50

FASTCOOL[®]-50 is a new grade of the high thermal conductivity tool steel family, specially designed to feature very high thermal conductivity and high hardness at reduced costs. It is particularly advantageous for moulds, inserts and tools of applications like hot stamping, plastic injection moulding and other applications, where a combination of very high thermal conductivity and wear resistance are particularly beneficial. The working hardness range after application of the proper heat treatment is typically between 44 HRC to 53 HRC.

High Thermal Conductivity High Wear Resistance Tool Steel

The microstructure configuration of FASTCOOL[®]-50 results from a revolutionary approach in tailoring the tool material properties to feature very high thermal conductivity and abrasive wear resistance. FASTCOOL[®]-50 has been developed in response to the market demand for cost-effective high thermal conductivity tool steels with high hardenability. FASTCOOL[®]-50 is a disruptive innovation in hot work tool steels, featuring high wear resistance and very high thermal conductivity combined with very good through-hardenability and low cost.

Applications

- Moulds and inserts of plastic injection moulding, especially when high hardness levels of > 50 HRC are required. It can be also used for moulds and inserts with lower hardness level requirements.
- For demanding applications, such as tooling and inserts for hot stamping processes, especially direct hot stamping process, where a high level of hardness is required. Furthermore, it can be used for tooling and inserts of indirect hot stamping process.
- Tools and inserts of plastic extrusion.
- Other engineering applications, where a combination of high thermal conductivity and wear resistance is required.

Physical and Mechanical Properties

Properties	300 K	Unit
Density	7.81	g/cm ³
Mechanical Resistance	1400	MPa
Yield Strength 0.2 %	1070	MPa
Elongation	17	%
Reduction of Area	50	%
Elastic Modulus	210	GPa

The values given in the table are typical values (neither maximum nor minimum values), for properly heat treated materials at a hardness level of 44 HRC. All specimens are taken from the mid-radius of a 660 x 430 mm section bar. Samples have been austenitized at 1040 °C, air cooled and subjected to three tempering cycles.

Thermal Properties

Properties	300 K	475 K	Unit
Linear Thermal Expansion Coefficient		11.7	$\times 10^{-6}/K$
Thermal Diffusivity	13.5		mm^2/s
Thermal Conductivity	50		$W/m\cdot K$
Specific Heat Capacity	0.47		$J/g\cdot K$

The values provided in the table are typical values (neither maximum nor minimum values), for properly heat treated materials at a hardness level of 44 HRc. Thermal conductivity values are calculated on the basis of thermal diffusivity values measured by laser flash method.

Heat Treatment

Like most tool and other specialty tool steels FASTCOOL® grades obtain their optimized mechanical and physical properties through a corresponding heat treatment of the material prior to final machining. FASTCOOL®-50 can be heat treated by means of oil or vacuum gas quenching. The following indications provide a general heat treatment guideline:

Hardening

- Hold for austenization at 1040 °C.
- Cooling in pressurized gas (N₂, He, ...), oil or air.

Tempering

- Three tempering cycles should be carried out immediately after the hardening, when the piece has cooled down to room temperature.

Polishability

- Unique microstructure features allow for very high polishability levels.
- Optical polish is possible.

Processing of FASTCOOL®-50

Welding

Bear in mind that when welding a working zone and High Thermal Conductivity and High Toughness are to be maintained in the weld:

- The usage of FASTCOOL® welding consumables is recommended.
- If welding has been carried out at places between the object to be cooled and the cooling media, the whole piece should be tempered twice after welding in order to restore the thermal properties in the welded area.

Machining

The machining of FASTCOOL®-50 is similar to that of other hot work tool steels. During the tool steel design, special attention has been put into good machinability and thereby reducing the manufacturing costs of the tools.

Designer & Provider of First-Class Tool Materials

ROVALMA, S.A. provides innovation in tool materials. Thanks to comprehensive research, innovative design and development, most recent production techniques as well as in depth quality control, we have achieved significant advances in the knowledge about material forming processes and generated important know-how regarding the production and optimal usage of our materials for a specific application. As a result, we can provide you with **first-class tool steels** for cold and hot work material forming processes and outstanding technical assistance.

We are proud to make our High Performance Tool Steels available to you for your specific applications. Do not hesitate to contact us for the latest information.

Application Engineering Service

In order to fully exploit the advantages and the potentials of ROVALMA's High Performance Tool Steels, we offer our customers the support of our Application Engineering Service. Our highly qualified and dedicated engineers can assist you in selecting the optimized grade for your application and provide you with the corresponding technical recommendations. It is our mission to increase the competitive-advantage of our customers and support them in achieving the highest possible cost-effectiveness.

You can access our service directly by sending an email to: ae-fast@rovalma.com.



ROVALMA, S.A. carries out ongoing research for many applications regarding the usage of the materials here presented. This research often brings along significant advances in the knowledge of a given process and thus important information regarding the best possible usage of the materials for a specific application. We strongly recommend to get in contact with ROVALMA, S.A. for the latest information regarding a specific application.

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