

ROVALMA

THE STEEL INNOVATOR



FASTCOOL[®]-55

High Yield Strength at Elevated Temperature
and High Wear Resistance Tool Steel with
Exceptional Thermal Conductivity

FASTCOOL[®]-55

FASTCOOL[®]-55 is a high performance hot work steel grade of ROVALMA's high thermal conductivity tool steel family, specially designed to feature very high thermal conductivity, high yield strength at high temperatures and high hardness, combined with good toughness, wear resistance and tempering resistance. 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 microstructural configuration of FASTCOOL[®]-55 results from a revolutionary approach in tailoring the tool material properties to feature very high thermal conductivity and mechanical properties. FASTCOOL[®]-55 is a disruptive innovation in hot work tool steels which has been developed in response to the market demand for cost-effective high thermal conductivity tool steels, optimized for different hot work applications, and combined with an easier made heat treatment processes.

Applications

- Dies and inserts of hot forging, especially when high hardness levels of > 48 HRC are required.
- Dies for light alloys casting.
- Tools of hot calibration processes.
- Tools and inserts of aluminum and brass extrusion.
- Other engineering applications that benefit from a combination of high thermal conductivity, high yield strength at high temperatures, good toughness, temper resistance and wear resistance.

Physical and Mechanical Properties

Properties	300 K	Unit
Density	7,81	g/cm ³
	28,2	lb/in ³
Mechanical Resistance	1.830	MPa
	255.266	psi
Elastic Modulus	210	GPa
	30.460.000	psi

The values given in the table are typical values (neither maximum nor minimum values), for properly heat treated materials at a hardness level of 51-53 HRC. All specimens are taken from the mid-radius of a 660 x 430 mm [26"x 17"] section bar. Samples have been austenitized at 980 °C [1796 °F], oil quenched and subjected to two tempering cycles.

Thermal Properties

Properties	300 K	475 K	Unit
Linear Thermal Expansion Coefficient		10,43	$\times 10^{-6} / \text{K}$
		5,79	$\times 10^{-8} \text{ in/in/}^\circ\text{F}$
Thermal Diffusivity	14,2		mm^2/s
	0,5		ft^2/h
Thermal Conductivity	54		$\text{W/m}\cdot\text{K}$
	375		$\text{BTU}\cdot\text{in}/\text{ft}^2\cdot\text{h}\cdot^\circ\text{F}$
Specific Heat Capacity	0,48		$\text{J/g}\cdot\text{K}$
	0,114		$\text{BTU}/^\circ\text{F}\cdot\text{lb}$

The values provided in the table are typical values (neither maximum nor minimum values), for properly heat treated materials at a hardness level of 46 HRC. Thermal conductivity values are calculated on the basis of thermal diffusivity values measured by laser flash.

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. The following indications provide general heat treatment guidelines. For the detailed heat treatment guidelines please contact ROVALMA S.A.

Hardening

- Hold for austenization at 980 °C [1796°F].
- Cooling in heated oil (70 - 80°C) with agitation.
- Interrupt cooling at 200°C [392°F]. Start tempering before the temperature reaches 80-100°C [176°F -212°F].

Tempering

At least two tempering cycles should be carried out immediately after the hardening.

Note: We recommend to directly consult with ROVALMA S.A. with regard to optimized heat treatment instructions for a given application, tool geometry or desired combination of properties.

Processing of FASTCOOL®-55

Welding

Bear in mind that when welding a working zone, where 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 component should be tempered twice after welding in order to restore the thermal properties in the welded area.

Machining

The machining of FASTCOOL®-55 is similar to that of other hot work tool steels. For detailed machining guidelines please contact ROVALMA S.A..

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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