ROVALMA

THE STEEL INNOVATOR

FASTCOOL®-20

High Hardness, Pre-hardened Tool Steel with Exceptional Thermal Conductivity

FASTCOOL®-20

FASTCOOL®-20 is a new grade of the high thermal conductivity tool steel family. It is delivered in pre-hardened state of about 400 ± 20 HB. The combination of mechanical and thermal properties of FASTCOOL®-20, together with reduced material costs, offers excellent opportunities for a very cost-effective solution for tools and dies of many industrial applications, in particular plastic injection, composite and resin transfer moulding, or low pressure and gravity die casting of light alloys. The properties of FASTCOOL®-20 also offer important technological and economic advantages for dies and inserts of short series and prototyping of hot stamping processes, as well as other industrial applications, for which a combination of high mechanical resistance at pre-hardened state with high thermal properties is required.

Physical and Mechanical Properties

Properties	300 K	473 K	Unit
Mechanical Resistance	1240	1160	MPa
Yield Strength 0.2 %	1150	1100	MPa
Density	7.8	-	g/cm^3
Elastic Modulus	210	-	GPa

The values given in the table are typical values (neither maximum nor minimum values), at a typical hardness level of 400 ± 20 HB.

Thermal Properties

Properties	300 K	473 K	Unit
Linear Thermal Expansion Coefficient		11.5	$x10^{-6}/K$
Thermal Diffusivity	15.2	13.1	mm^2/s
Thermal Conductivity	54	49	W/m·K
Specific Heat Capacity	0.47		J/g·K

The values given in the table are typical values (neither maximum nor minimum values), at a typical hardness level of 400 ± 20 HB. Thermal conductivity values are calculated on the basis of thermal diffusivity values measured by laser flash.

Welding

The hot work tool steel FASTCOOL®-20 can be welded by conventional methods like laser, Arc and TIG techniques. It is recommended to use FASTCOOL®-welding consumables.

For detailed guidelines please refer to the document “Welding guidelines for FASTCOOL® materials”.

Heat Treatment

FASTCOOL®-20 is delivered in pre-hardened condition, which allows for considerable time savings in tool manufacture.

Polishability

- Unique microstructure features provide very high polishability.
- Mirror finish levels are possible.

Machining Parameters

The values presented herein are recommended for the machining of FASTCOOL®-20 in pre-hardened to about 400 ± 20 HB. The machining data given in this datasheet are general guidelines that may have to be adjusted to the actual conditions of a specific machining operation, employed machining equipment and tools.

Face Milling and Square Shoulder Milling

Test performed with tool: 214906 40 Z4 Insert: 214929 ST1400

	Rough Milling	Fine Milling	Unit
Cutting Speed (v_c)	140-190	160-220	m/min
Depth of Cut (a_p)	1-5	<1	mm
Feed (f_z)	0.12-0.2	0.05-0.12	mm/tooth
Tool Designation	P20 Coated Carbide	P10 Coated Carbide	ISO

End Milling

Solid Carbide: 206322 10/1.5 Carbide Indexable Insert: 212926 ST1400

		Cutting Parameters	Unit
Solid Carbide	Cutting speed (v_c)	190-250	m/min
	Feed(f_z)	0.05-0.09	mm/tooth
Carbide Indexable Insert	Cutting speed (v_c)	140-180	m/min
	Feed (f_z)	0.3-0.9	mm/tooth

Turning

Insert: 250158 HB7020

	Rough Turning	Fine Turning	Unit
Cutting Speed (v_c)	90-160	120-200	m/min
Depth of Cut (a_p)	0.5-5	0.3-2.5	mm
Feed (f_n)	0.2-0.5	0.1-0.35	mm/rev.
Tool Designation	P20 Coated Carbide	P10 Coated Carbide	ISO

Drilling

Drilling tool test HSS: 114400 6.9 Drilling carbide (Internal Cooling): 122776 6.9

Cutter Diameter		1 – 5	5 – 10	10 – 15	15 – 20	Unit
Uncoated HSS	Cutting Speed (v_c)	8-12	8-12	8-12	8-12	m/min
	Feed (f_z)	0.02-0.04	0.04-0.06	0.06-0.09	0.09-0.12	mm/rev
Carbide Drill (IC)	Cutting Speed (v_c)	60-90	60-90	60-90	60-90	m/min
	Feed (f_z)	0.03-0.1	0.1-0.14	0.14-0.18	0.18-0.22	mm/rev

Threading

Threading HSS TiCN 135370 M8

	M8	Unit
Threading speed	5-8	m/min

Machinability

FASTCOOL®-20 tool steel can be machined by conventional methods, using High Speed Steels, or by electrical discharge machining (EDM). Machining conditions are comparable to those employed for other conventional hot work tool steels.

For further recommendations regarding the machining parameters for specific application conditions, the technical department of ROVALMA, S.A. will gladly provide you further support.

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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