ROVALMA

THE STEEL INNOVATOR

RV-2379
Cold Work Tool Steel

EN/DIN 1.2379

RV-2379

RV-2379 is a high hardness cold work tool steel which combines high toughness with high wear resistance. It presents easier machinability and a better dimensional stability during the heat treatment compared to other high alloyed cold work tool steels. The best combination of toughness and hardness is obtained at a hardness level of 60-62 HRc. For higher hardness levels, the tool surface can be nitrided reaching micro-hardness values up to 1100 a 1200 HV.

Applications

Typical applications for RV-2379 cold work tool steel are: roll mills and jaws for thread lamination, stamping tools and coinage punches, inserts and punches for hard cutting, inserts and punches for deep drawing (often better with nitride coating), punches for cold stamping, die inserts for plastic injection molding reinforced with fiber glass, tools and punches for powder sintering, shear-cutting blades, circular cutting tools, calibers and gauges, burnish rolling mills, dies for cold extrusion of steels and light alloys and other cold work application for which a high wear resistance is required from the tool.

Typical Composition

C	Si	Mn	Cr	Mo	V	P	S
1.50 - 1.60	0.10 - 0.40	0.15 - 0.45	11.0 -12.0	0.60 – 0.80	0.90 - 1.10	< 0.030	< 0.030

Physical and Mechanical Properties

Properties	300 K	Unit
Density	7.70	g/cm^3
Elastic Modulus	210	GPa
Mechanical Resistance	2550	MPa

The values given in the table are typical values (neither maximum nor minimum values), for properly heat treated material at a hardness level of 60 HRc.

Thermal Properties

Properties	300 K	373 K	Unit
Linear Thermal Expansion Coefficient		10.5	$x\ 10^{-6}/K$
Thermal Conductivity	20		W/m·K
Specific Heat Capacity	0.46		J/g·K

The values given in the table are typical values (neither maximum nor minimum values), for properly heat treated material at a hardness level of 60 HRc. Thermal conductivity values are calculated on the basis of thermal diffusivity values measured by laser flash.

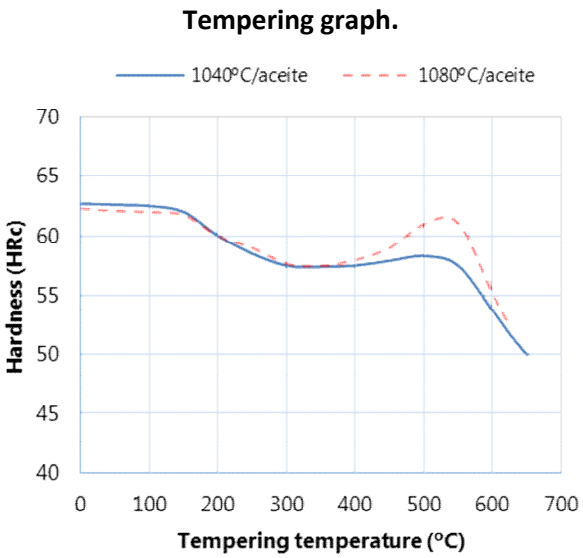
Heat Treatment

Like most tool steel grades, RV-2379 tool steel obtains its optimized mechanical and physical properties through a corresponding heat treatment after the before final machining. The following provides a general heat treatment guideline:

Austenitization

For the austenitization of tools built of RV-2379,
It is recommended to consider the following step:

- Heating from room temperature to 500 ˚C (during 2 hours).
- Hold for homogenization at 500 ˚C for 2 hours.
- Heating from room temperature to 850 ˚C (during 2 hours).
- Hold for homogenization at 850 ˚C for 2 hours.
- Heating to temperature of austenitization: 1020-1080 ˚C.
- Hold at austenitization temperature for 20 minutes minimum.
- Cool down in oil or salt bath at 500 ˚C, nitrogen or inert gas.
- Air cooling is not recommendable for very big parts.
- At any case, the decarburized layer should be removed.



Notes

- Holding times start when the core reaches specified temperature levels, if no thermocouple is available, allow ½ minute for every millimetre of thickness.
- In order to relieve tensions from rough-machining and minimize the risk of bigger and potentially irregular distortions in the heat treatment previous to final machining, ROVALMA, S.A. recommends the implementation of a stress relieving treatment after rough-machining.

Tempering

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

- Select the tempering cycle temperature according to the desired hardness (see the tempering graph above).
- Holding time recommendation: 2,5 minutes for every millimetre of thickness, with a minimum holding time of 1 hour.
- A second tempering cycle is recommended to improve mechanical properties.

Cryogenic Treatment

In order to ensure maximum dimensional stability after the heat treatment, and considering the allowance variations in the piece during its utilization, along with improving mechanical properties, such as hardness, toughness, fatigue resistance, etc., it can be recommendable to perform a cryogenic treatment at -70 ˚C or -200 ˚C , with a holding time of 1 hour, to improve maximum transformation of residual austenite.

After the cryogenic treatment, once the piece is at room temperature, a tempering cycle has to be applied at a minimum temperature of 480 ˚C. This procedure should be followed to recover tools with low hardness due to an excess of retained austenite, caused by an excessive quench temperature.

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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