

Material Data sheet

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Hardened tool steel W.-Nr. 1.2379**1. Application examples**

A small addition of higher wear resistance and better through hardenability in large cross-sections.

With a Rockwell hardness of 59-62 HRC, this material is very well suited for all types of tools.

In the thickness range between 0.60 and 5.03 mm, the hardened tool steel W.-Nr. 1.2003 available, but only with a hardness of 48-50 HRC.

2. Material codes

German Norm:	1.2379 (X155CrVMo12-1)
AISI:	D2
ASTM:	D2
English Norm:	BD2
Franz. Norm:	AFNOR Z 160 CDV12
Japanese Norm:	SKD11 (Norm G 4404)

3. Alloy Composition *

C:	1,50-1,60%
Si:	0,35-0,40%
Mn:	0,30-0,60%
P:	max. 0,03%
S:	max. 0,02%
Cr:	11,0-12,0%
V:	0,70-0,90%

* the exact composition of each batch can be documented by a material certificate 2.2 or 3.1 according to DIN EN 10 204.

4. Delivery condition

Zustand:	hardened and tempered (ledeburitic structure)
Surface:	scaled
flatness:	max. 0,20% of the strip width
Härte:	59-62 HRC

Further mechanical data: see chapter 7 and 8.

5. Sizes

thicknesses: 2,30-4,50 mm
Standardformat: please see table
edges: cut (in the non hardened condition)

The following sizes are available from stock (without obligation):

<i>thickness in mm</i>	<i>Current size in mm</i>	<i>Hardness in HRC</i>	<i>Annotation</i>
2,30	660 x 1000	59-61	scaled surface
3,50	710 x 1000	59-61	scaled surface
4,40	650 x 975	59-61	scaled surface

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6. Tolerances

thickness tolerance: usually -0/+0,50mm (hot rolled)
width tolerance: -
straightness: normal

7. Further mechanical data

Yield strength Rp0,2 : no data available
Elongation A80: no data available

The highest application temperature is around 200° Celsius, depending on the load.
Please note that Young's modulus values drop as temperature increases.

For higher operation temperatures we suggest the stainless hardened steels like the alloys 1.4031Mo (up to 0.80 mm thickness) and 1.4034 (from 1.0 to approx. 10.0 mm thickness)

8. Physical properties

Density: ca. 7,7 g/cm³
Thermal conductivity: 16,7 W/(m °C) bei 20 °C
Heat capacity: etwa 470 J/(kg °C) medium value bei 50 – 100 °C
Thermal expansion: 10,5 x 10⁻⁶ (between 30 - 100 °C)
11,5 x 10⁻⁶ (between 30 - 200 °C)
11,9 x 10⁻⁶ (between 30 - 300 °C)
Electric resistance: ca. 0,55 Ohm x mm²/m (value for the alloy 1.1231 hardened)

Relative permeability μ : maximal 400 (value for the alloy 1.1231 hardened)

The given values can be used as indication for the alloy 1.2379.

9. Blanking

Due to the high hardness and thickness this material should not be blanked.
We suggest to produce pieces by laser cutting or water jet cutting.

10. Laser cutting

As the material melts at the edge, a higher hardness and therefore a lower toughness at the cutting zone is possible.

As alternative we recommend water jet cutting.

11. Photo etching

Due to the thickness of more than 1 mm it is not economical to produce parts by photo etching.

12. Bending

We suggest not to bend this steel in the hardened condition due to its very high hardness.

13. Flat grinding

The alloy 1.2379 is magnetic and can be fixed by magnetic clamping devices of flat grinding machines. Due to the bad thickness tolerance from hot rolling and a scaled surface from piece hardening, the pieces need to be grinded.

14. Welding

Due to the high content of carbon the alloy 1.2379 should not be welded.

15. Korrosionsbeständigkeit

Despite a content of Chromium of about 11-12% this alloy is not corrosion resistant as Chromium carbides are generated during hardening. The manufactured pieces must be protected by an oil film against corrosion. A painting or galvanic coating is only reasonable when the pieces are not used as wear resistant parts.

Important Annotation

The specifications which are given in this technical information sheet about the condition and application of the alloys are only for reference and are no confirmation about certain performances and characteristics.

The information correspond to our own experiences and experiences of our suppliers. We can not guarantee for the results during processing and utilisation.