

Material Data sheet

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Unalloyed steel DC04 W.-Nr. 1.0338**1. Application examples**

Unalloyed steels are very inexpensive materials for simple parts with no demands on corrosion resistance and mechanical loads. Depending on the area of application, the unalloyed steels DC01 to DC 05 are available in different tensile strength ranges from annealed to hard-rolled versions.

With a tensile strength of at least 490 N/mm² (+C490), the quality in stock at h+s can be stamped well, but can only be formed or deep-drawn to a limited extent. Formed parts should therefore be made from softer version such as +LC with tensile strengths of 270 - 350 N/mm². The grades DC06 or DC07 should be used for demanding deep-drawn parts such as spare wheel wells.

Further application examples:

Body panels, furniture fittings, painted sheet metal panels

Unalloyed steels are not permitted as spring materials. Hardened carbon steels such as C75S (1.1248) or C100S (1.1274) should be used for springs.

2. Material codes

German Norm: 1.0338 DC04 (former St2 K50)

ASTM: A 620 (1008)

English Norm: BS 1449 1 CR

AFNOR: ES

Japanese Norm: SPCE, HR4

3. Alloy Composition *

C: max. 0,08%

Mn: max. 0,40%

P: max. 0,03%

S: max. 0,03%

The composition is specified in the norm EN 10130.

* 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

Condition: cold rolled, not hardenable

Surface: MA (metallic bright)

Ultimate tensile strength: >590 N/mm² (at some thicknesses currently >490 N/mm²)

Further mechanical data: see chapter 7 and 8.

5. Sizes

thicknesses: 0,025 bis 1,00 mm
raw material width: 305mm
standard widths: 150 und 305mm
edges: cut
lengths: individual lengths from 5 to 10 000mm or as coil

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

<i>thickness</i>	<i>maximum width in mm</i>	<i>Ultimate tensile strength</i>
0,025mm	150mm	currently only available in the tensile range +C490
0,05mm	150mm	
0,075mm	150mm	
0,10mm	150 + 305mm	
0,15mm,	150 + 305mm	
0,20mm	150 + 305mm	
0,25mm	150 + 305mm	
0,30mm	150 + 305mm	
0,40mm	150 + 305mm	
0,50mm	150 + 305mm	
0,80mm	150 + 305mm	
1,00mm	150 + 305mm	

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6. Tolerances

thickness tolerance: DIN EN 10140
width tolerance: DIN EN 10140
straightness: normal
flatness: wave height max. 1,0 mm

The tolerances are specified in the norms EN 10130 and 10140.

7. Further mechanical data

Yield strength Rp0,2: depending of the ultimate tensile strength
Elongation A80: depending of the ultimate tensile strength

No information on the fatigue strength available.

The non-alloyed steels like 1.0338 should not be used for mechanically stressed parts.

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 heat resistant steels 1.4767 and 1.4828.

8. Physical properties

Density: 7,86 g/cm³
Thermal conductivity: 45-55W/(m °C) depending on the temperature

Heat capacity:	460 J/(kg °C) mean value at 50 – 100 °C
Thermal expansion:	12 x 10 ⁻⁶ (between 30 - 100 °C)
Electric resistance:	0,13 Ohm x mm ² /m
Modus of elasticity:	210 000 MPa bei 20 °C
Relative permeability μ r:	ca. 2000 (further information see chapter 13)

9. Blanking

We recommend a punch-to-die clearance of 4-10 % of the strip thickness.

The corner radius should be at least 0.25 mm and the punching die should be at least twice the strip thickness.

The pieces should then be tumbled to receive a good edge roundness.

10. Laser cutting

This alloy can be laser cut without problems.

11. Photo etching

This alloy is very easy to etch.

12. Bending

As this material is supplied in the temper rolled condition, the rolling direction is important regarding the bending. The suggested minimum bending radius depends on the tensile strength of the material.

Bending at right angle (90°) to the rolling direction:
minimum 2 times of the strip thickness.

Bending parallel to the rolling direction:
minimum 6 times of the strip thickness.

We suggest the tensile range +LC (annealed, slightly rerolled) for bent parts or the alloys DC06 or DC07 for critical parts.

13. Flat grinding

The non-alloyed steels are magnetisable and can be fixed by magnetic clamping devices of flat grinding machines.

14. Welding

The non-alloyed steels can be welded easily without problems.

15. Corrosion resistance

The alloy 1.0338 is not corrosion resistant. We supply this alloy with a light oil film. If used at normal conditions this alloy needs to be painted or galvanized.

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.