

Corroplast®

C 0.05 Mn 1.30 S 0.15 Cr 12.50 Additions +

Steel properties

Corroplast® is a new corrosion-resistant steel for plastic moulding, featuring extremely good machinability at a supplied hardness of approx. 320 HB. The reduced carbon content endows Corroplast® with excellent welding properties.

Physical properties

Coefficient of thermal expansion

at °C	20 – 100	20 – 150	20 – 200	20 – 250	20 – 300	20 – 350	20 – 400	20 – 450	20 – 500
10 ⁻⁶ m/(m • K)	10.3	10.6	10.9	11.1	11.2	11.4	11.6	11.8	12.0

Precipitation hardened

Thermal conductivity

at °C	23	150	300	350	400	500
W/(m • K)	24.6	25.7	25.8	25.7	25.4	24.7

Precipitation hardened

Density

at °C	20
kg/dm ³	7.7

Modulus of elasticity

at °C	20	150	350
MPa	214600	208600	198000

Applications

Base plates, mould bases and plastic moulds with standard requirements on polishability, as well as being resistant to condensation and cooling water.

Typical mechanical properties

in as-delivered condition

Heat treatment diameter in mm Ø	Yield stress in MPa R _{p0.2} min.	Tensile strength in MPa R _m	Elongation at fracture in % A min.	Reduction of area at fracture in % Z min.
170	890	1100	13	42

Stock sizes Corroplast®

800.0 x 50.0 mm	31.5 x 2.0 inch
1,050.0 x 25.0 mm	41.3 x 1.0 inch
1,050.0 x 30.0 mm	41.3 x 1.2 inch
1,050.0 x 40.0 mm	41.3 x 1.6 inch
1,050.0 x 50.0 mm	41.3 x 2.0 inch
1,050.0 x 60.0 mm	41.3 x 2.4 inch
1,050.0 x 70.0 mm	41.3 x 2.8 inch
1,050.0 x 80.0 mm	41.3 x 3.2 inch
1,050.0 x 90.0 mm	41.3 x 3.5 inch
1,050.0 x 100.0 mm	41.3 x 3.9 inch
1,050.0 x 110.0 mm	41.3 x 4.3 inch
1,050.0 x 120.0 mm	41.3 x 4.7 inch
1,050.0 x 130.0 mm	41.3 x 5.1 inch
1,050.0 x 140.0 mm	41.3 x 5.5 inch
1,050.0 x 150.0 mm	41.3 x 5.9 inch
1,050.0 x 160.0 mm	41.3 x 6.3 inch
1,050.0 x 170.0 mm	41.3 x 6.7 inch
1,050.0 x 180.0 mm	41.3 x 7.1 inch
1,050.0 x 130.0 mm	41.3 x 7.5 inch
1,050.0 x 200.0 mm	41.3 x 7.0 inch
1,050.0 x 220.0 mm	41.3 x 8.7 inch
1,050.0 x 250.0 mm	41.3 x 9.8 inch

General note (liability)

All statements regarding the properties or utilization of the materials or products mentioned are for the purposes of description only. Guarantees regarding the existence of certain properties or a certain utilization are only ever valid if agreed upon in writing. No responsibility is taken for the correctness of this information.

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Corroplast®

The ultimate stainless steel for all stainless plastic moulds

DEUTSCHE EDELSTAHLWERKE

Providing special steel solutions



All stainless mould construction

The current trend in plastic mould manufacturing is towards the use of moulds using all stainless steel. This is partly due to the steel's resistance to condensation and cooling water, as well as the increasing use of corrosive plastics such as PVC or aminoplasts. Such materials corrode tool steel through the separation of acids during processing.

The benefits producers of plastic components obtain by the enhanced utilization of all stainless mould bases at the same time have constituted a disadvantage for mould constructors, on account of the considerable to extreme machining effort necessary to produce all stainless steel grades available to date. With mould frames in particular, where a machining volume of 60% is not rare, easy machinability and shape retention have therefore become the most important criteria.

As a result DEUTSCHE EDELSTAHLWERKE, in co-operation with several tool specialists, developed the unique Corroplast® steel, which is characterised by unparalleled machinability.

Corroplast® – no other stainless steel machines more easily

Corroplast® is the most excellent mould frame steel on the market and is machined more easily than any other stainless steel. The outstandingly good machinable tool steel Corroplast® is an innovation based on knowledge gained from experience with steel grade X33CrS16.

- Corroplast® necessitates less machining effort than any other stainless steel for plastic moulding known to date.

- Corroplast® is characterised by extremely low internal stress – due to a specific technology applied at production – and is of utmost dimensional stability.

- Corroplast® does not require any additional heat treatment, inasmuch as it is delivered at a standard hardness of approx. 320 HB.

- Corroplast® needs no electroplating to increase its corrosion resistance. This makes it a high-quality alternative to the previously customary mould frame steels like grade 1.2312, which necessitated additional anti-corrosion measures. This not only means shorter production times, but also lower production costs for the mould constructor.

- Corroplast® can also be utilized for mould inserts – provided that standard demands on the engraved surface are applied. In this way the mould constructor only needs one material for frame and insert.

- Corroplast® exhibits improved weldability, which is attained by the reduction of the carbon content.

The profitability of plastic production is dictated by the efficiency, reliability and quality of the steel used for the mould.

On account of the superior advantages of Corroplast® plastics manufacturers using the new steel achieve a noticeable increase in cost-effectiveness, productivity and quality.

Comparison of properties		
	Corroplast®	X33CrS16
Machinability	+++	+
Corrosion resistance	++	+
Thermal conductivity	++	+
Toughness	+	o
Weldability	++	o
Polishability	+	+
Shape retention	+++	+

Benefits for the plastics-manufacturing industry

The Corroplast® core operational area is base plates, mould bases and plastic moulds, with standard requirements on polishability and resistance to condensation and cooling water.

Corroplast® is in a position to substantiate its strengths emanating from low-level mould-maintenance needs which in turn are to the advantage of the manufacturers of plastic components:

- necessary maintenance and cleaning activities are reduced to a minimum, especially in demanding climatic conditions such as high humidity or sea air with a high salt content
- there is no risk of contact corrosion between mould frame and insert when using similar stainless materials

- water flow and heat dissipation are not impeded by substances resulting from corrosion in the cooling channels

- the substantially improved thermal conductivity facilitates shorter cycle times.

Machinability in % (hardness 325 HB)	
Roughing	X33CrS16 100% Corroplast® 140%
Finishing milling	X33CrS16 100% Corroplast® 135%
Grinding	X33CrS16 100% Corroplast® 135%
Drilling	X33CrS16 100% Corroplast® 150%
Thread cutting	X33CrS16 100% Corroplast® 140%

Standard machining of Corroplast® (hardness 290-332 HB)				
Tool	Level milling Ø 25	Edge milling Ø 120	Round plate Ø 66	Drilling solid carbide
Cutting material	K 15	P 40 coated	P 40 coated	17.5
Cutting speed vc [m/min]	80	140	140	60
Feed per tooth fz [mm]	0.3	0.7	0.6	0.2
Depth of cut ap [mm]	5.0	2.0	2.0	55.0
Width of cut ae [mm]	25.0	100.0	45.0	17.5
Stability of the machine, clamping and workpiece	+++	+++	+++	+++

