



Formadur 320 and Formadur 400

The new benchmark for complex
and large-sized plastic moulds

New challenges for plastic moulds

Performance demands on plastic moulds are constantly expanding. Expectations are increasing, especially for large components, more complex moulds and their surfaces.

To meet the challenges of mould making and plastics industries, steels with high hardness, best polishability and texturing properties as well as excellent through hardenability are required.

Our special steels Formadur 320 and Formadur 400 exceed these high requirements by far.

Formadur 320 is a pre-hardened steel developed for plastic moulding. Due to the improved homogeneity of the microstructure and its uniform hardness profile, Formadur 320 offers better polishing results compared to the standard P20 grades 1.2311 and 1.2738. Apart from the homogenous structure Formadur 320 is characterized by an improved through hardenability, better toughness and texturing properties.

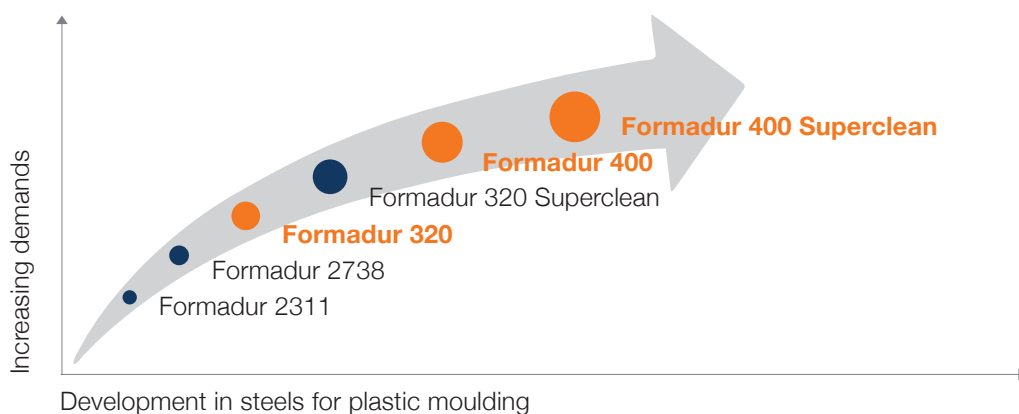
Formadur 400 provides new dimensions in quality, design and economic efficiency.

Due to modifications in the chemical composition, secondary metallurgy and heat treatment a pre-hardened innovative plastic mould steel with excellent properties is available now. In addition to its increased hardness, in combination with a very good through hardenability, Formadur 400 shows excellent polishing and texturing properties.

Based on the outstanding property profile Formadur 400 is the best choice for large-sized plastic injection and compression moulds with deep engravings and high demands on core strength as well as high polished plastic moulds.

Formadur 320 and Formadur 400 offer excellent product quality and reproducibility. Thus they are the ideal steel solutions for numerous plastic processing applications.

Plastic mould steels for increasing demands



Chemical composition (in weight-%)

	C	Mn	Cr	Ni	Mo	Additions
Formadur 320	0.34	0.8	1.7	0.5	0.4	
Formadur 400	0.36	0.9	1.9	0.5	0.5	+

Physical properties

Coefficient of thermal expansion in 10⁻⁶/K	
20 - 100 °C	11.1
20 - 200 °C	12.9
20 - 300 °C	13.4
20 - 400 °C	13.5
20 - 500 °C	13.8
20 - 600 °C	14.1
20 - 700 °C	14.3

Thermal conductivity in W/(m K)	
20 °C	36.0
350 °C	37.4
700 °C	33.0

As-supplied hardness

Formadur 320	310 - 355 HB
Formadur 400	365 - 410 HB

Delivery programme

You can find our complete delivery programme in the brochure „High-tech Steel Solutions for Tomorrow's World (Products and Services)“ on www.dew-stahl.com.

Heat treatment

Soft annealing	
Temperature	710 - 740 °C
Cooling	furnace
Hardness	max. 235 HB
Hardening	
Temperature	820 - 850 °C
Quenching	Polymer or oil
Hardness	hardness after quenching 51 HRC
Tempering temperature	500 - 620 °C

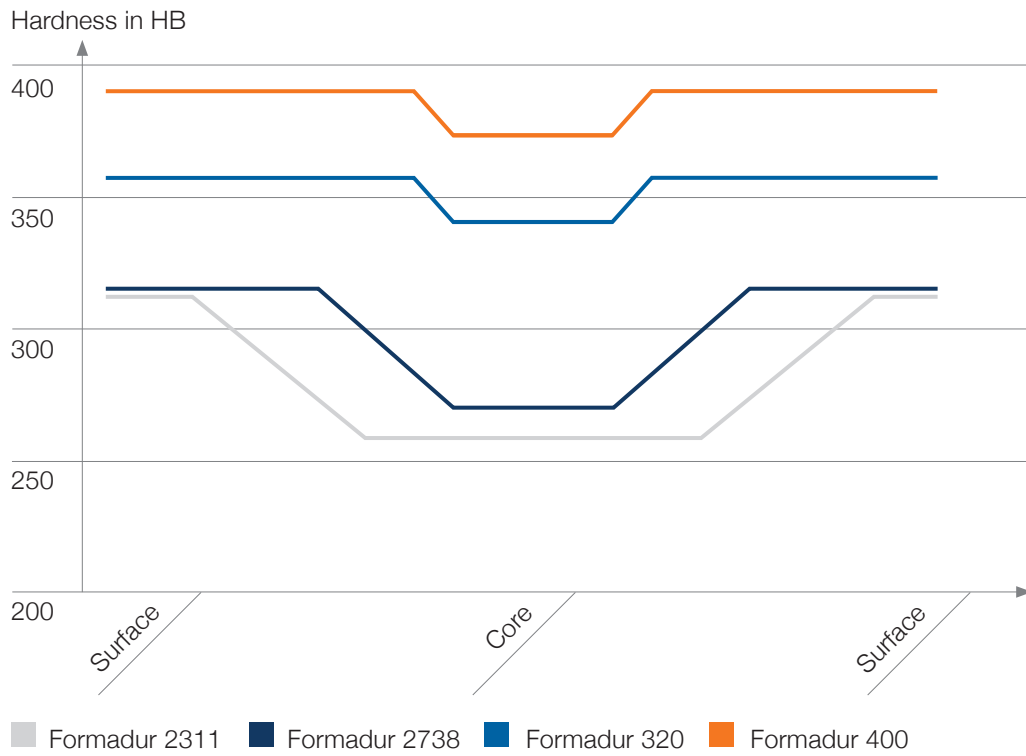
Superclean

We recommend the use of the remelted (ESR) Formadur 320 Superclean or Formadur 400 Superclean for highest demands.

Further information

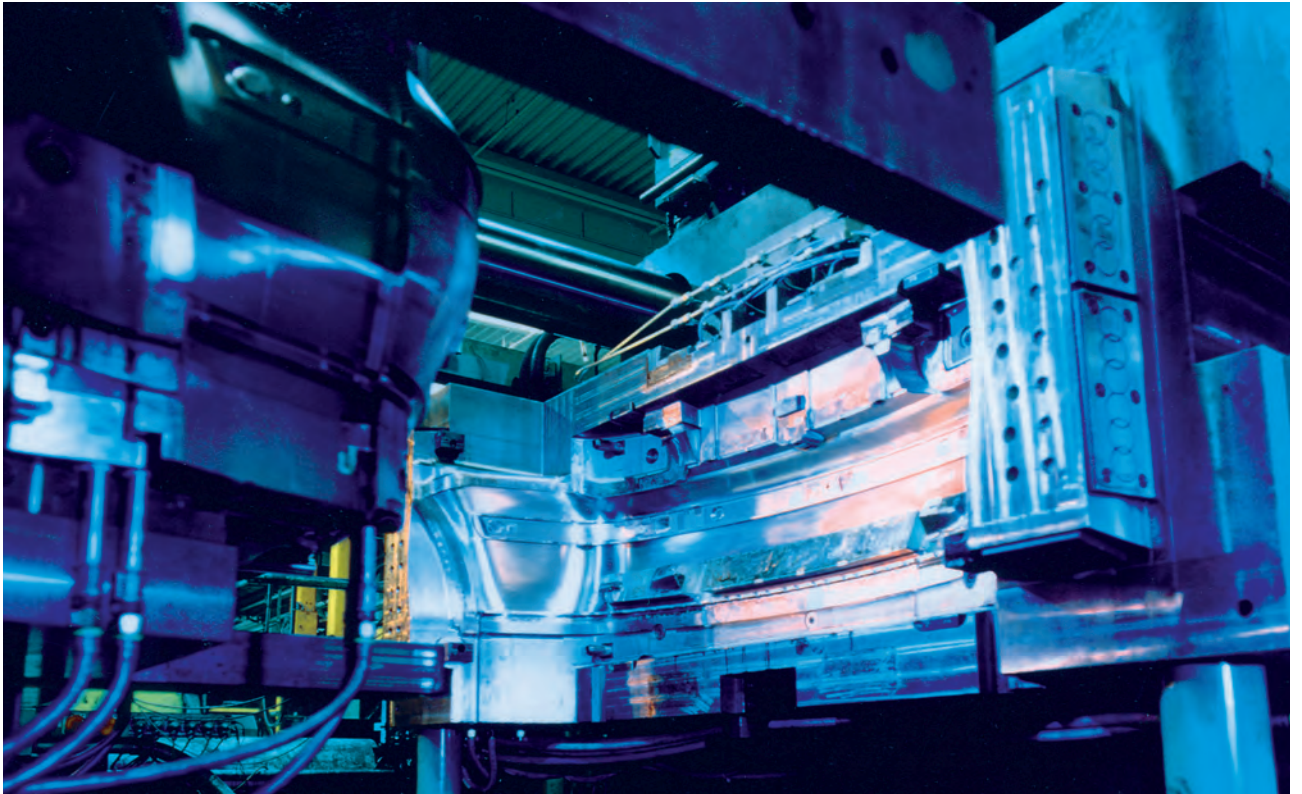
Further information about processing and application possibilities of our tool steels can be found in our catalogs on www.dew-stahl.com.

Hardness profile across cross section (schematic diagram)



Property profile in comparison to standard P20 grades

	Hardness	Machinability	Polishability	Texturing properties	Laser texturing properties
Formadur 2311	+	++	+	++	++
Formadur 2312	+	++++	o	o	o
Formadur 2738	+	+	+	++	++
Formadur 320	++	++	++	+++	+++
Formadur 320 Superclean	++	++	+++	++++	++++
Formadur 400	+++	+	+++	+++	+++
Formadur 400 Superclean	+++	+	++++	++++	++++



Through-hardenability	Homogeneity	Toughness	Cleanliness	Weldability
+	++	++	++	++
+	0	0	0	+
++	+	++	++	++
++++	+++	+++	++	+++
++++	++++	++++	++++	+++
++++	+++	++	++	+++
++++	++++	+++	++++	+++

Formadur 320: Certified suitable for texturing

For reasons of look and feel, many steels for plastic moulding will have surface texturing applied by mean of photo chemical etching. Texturing is therefore an important characteristic of plastic mould steels.

Maximum product quality due to perfect texturing properties.

In recent years, requirements relating to the look and feel of plastic components have increased, particularly within the automotive industry.

As a result, the emphasis is on steel for plastic moulding which are suitable for photo etching, as well as being economical to machine.

In-depth testing has therefore been carried out on the etchability of sample plates made of Formadur 320.

With different textures, the plates were fully acid-treated and then sampled using the plastic polypropylene (PP). The two texturing specialists Standex International and Eschmann Textures International performed the optical assessment of the individual sample plate inserts and the visual evaluation of the samples made.

When the textured results were optically evaluated and the samples validated, they were deemed flawless and perfect.



CERTIFICAT
Chemical texturing of tool steel

Standex International GmbH
Standex ENGRAVING
MOLD-TECH



confirms that

Deutsche Edelstahlwerke Specialty Steel GmbH & Co. KG

DEUTSCHE EDELSTAHLWERKE 

Auestrasse 4, 58452 Witten

that the steel grade

Formadur 320

with a common etching procedure from

Standex ENGRAVING
MOLD-TECH

got approved for chemical engraving.

Standex International GmbH
Kölner Strasse 352 47807 Krefeld
Zellbaumweg 35 74613 Öhringen


Thorsten Miebach

ESCHMANN TEXTURES

Zertifikat

zur Narbfähigkeit von Werkzeugstählen
Hiermit bescheinigen wir dem Unternehmen:

Deutsche Edelstahlwerke Specialty Steel GmbH & Co. KG
Auestraße 4
D - 58452 Witten

Die Narbfähigkeit der Stahlspezifikation
Formadur 320

Die Bewertung erfolgte nach dem standardisierten Prüfverfahren der
Eschmann Textures International GmbH.


Jochen Lieke / Verkaufsleitung

05/05/2017
Datum

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voestalpine
-ONE STEP AHEAD-

* by Eschmann Textures II


Certificates

Having undergone various etching tests using sample plate inserts in tool steel, Formadur 320 is certified by Standex International and Eschmann Textures International.

This confirms that the steel stands up to the standard testing methods of two texturing specialists.

General note (liability)

Printing errors, omissions and changes accepted. Product-specific data sheets have priority over the information provided in this brochure. The desired performance characteristics are binding only if they are exclusively agreed upon at the conclusion in a contract.



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