



BICO STEEL

Elite P20

BICO Elite P20 is a premium mold steel that meets or exceeds standards for grades AISI P20 and P20+Ni.

Material Properties

Prehardened steel for medium and very large-size molds and tools with good machinability. Consistent texturing and polishing improved by very low sulphur content. Reliable repair welding and high thermal conductivity.

For which tools

Plastic injection mold cores and cavities, large-size molds for bumpers, dashboards, television panels, bottle crates, etc.

For which plastics

Thermoplastics, thermosetting plastics, ABS, transparent melts. Injection molding, compression molding, RIM molding, etc.

Chemical Analysis - % Weight

C	Si	Mn	S	Ni	Cr	Mo	B
0.26	0.10	1.40	0.002	0.030	1.40	0.045	+

Delivery Condition

Elite P20 is delivered quenched and tempered to 290 - 320 HB (30 - 34 HRC).

Test Thickness	Test Hardness	Yield Strength	Tensile Strength
15.75"	32 HRC	130 ksi	145 ksi

Physical Properties

		77°F	212°F	392°F	572°F
Thermal expansion coefficient (from 77°F)	10 ⁻⁶ /°F		5.8	7.0	7.2
Thermal Conductivity	Btu inch/ft ² -h-°F	290	284	278	250
Young Modulus	kN/mm ²	205			

BICO AKRON, INC.
 Mogadore, OH
 330.794.1716 / 800.321.0983
 F: 330.733.7189
www.bicoakron.com
plate@bicoakron.com

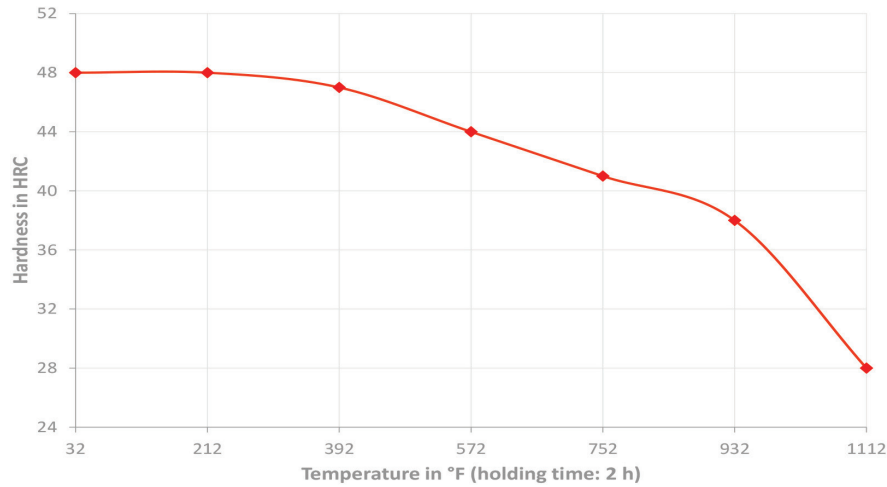
BICO MICHIGAN, INC.
 Grand Rapids, MI
 616.453.2400 / 800.962.4140
 F: 616.453.2929
www.bicomichigan.com
plate@bicomichigan.com

INTEGRITY FAB & MACHINE
 Breckenridge, MI
 989.481.3200
 F: 989.481.3204
www.ifabm.com
rfq@ifabm.com

Heat Treatment

Elite P20 is delivered ready for use. Please contact us for further information about heat treatment.

	Temperature	Soaking Time	Cooling
Stress Relieving	960 °F	30 min. per inch	Air or Furnace
Hardening	1650 °F	30 min. per inch	Gas, Salt Bath, Water
Tempering	See Tempering Chart	60 min. per inch	Air or Furnace



NOTE: Water quenching
Sample size: 2" x 2"

Welding

Cores and cavities can be polished and/or textured following welding data provided below. Please consult the user guide for detailed information.

Process	Filler Material	Preheating	Post Heating	PWHT
GTAW	SP P20 WELD-E AISI 4130	min. 302 °F	302 °F-2h	1020 °F-2h

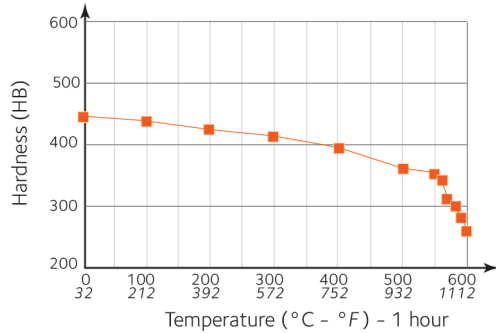
Typical Delivery Sizes

Manufacturing Process	Thickness	Width
Hot Rolling	0.59 - 5.90"	39.37 - 78.74"
Hot Forging	5.90 - 51.18"	47.24 - 98.42"

NOTE: Technical data and information are to the best of our knowledge at the time of printing. However, they may be subject to some slight variations due to our ongoing research program on steels. Therefore, we suggest that information be verified at time of enquiry or order.

Furthermore, in service, real conditions are specific for each application. The data presented here are only for the purpose of description, and considered as guarantees when written formal approval has been delivered by our company.

Heat Treatments Continued



Elite P20 is adapted for surface treatments like nitriding (ionic or gaseous), PVD coatings, providing that those processes do not request heating higher than 550°C (1020°F).

Elite P20 can also be nickel or chrome plated, electrolytic deposits have to be followed by degassing to get rid of the risk of hydrogen embrittlement.

E.D.M

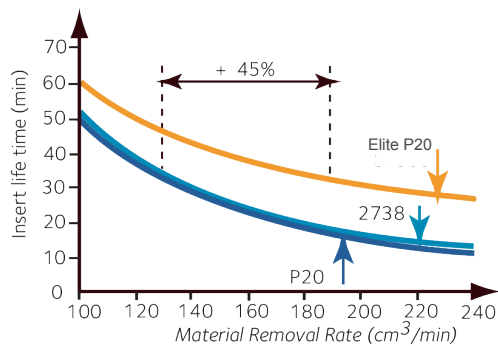
Elite P20 is suitable, in delivery conditions for all EDM processes (electrod or wire cutting).

If the cavity is left with an EDM surface it is necessary to perform a stress relieving at 530°C (986°F) or to perform a polishing in order to remove completely the white layer created by EDM. When the cavity is textured, polishing is absolutely necessary.

Machining

Elite P20 is very well adapted to machining (drilling or milling). Its machinability is much better than the one of W1.2738/ P20. Significant cost and time savings can be achieved using more productive machining parameters (cutting speed and feed).

Rough milling with a 40mm diameter toric tool.



Polishing and Texturing

Thanks to improved structure homogeneity and high cleanliness, Elite P20 is fully suitable for polishing up to a mirror finish. A2 level (as defined by SPI standard) is achievable.

Elite P20 is adapted to texturing.

Welding

Chemistry of Elite P20 is optimized to develop special aptitude to weld repair.

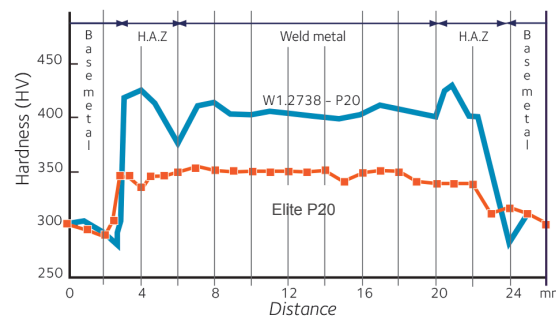
Compared to conventional 2738 / P20, it provides better cold cracking resistance and also better color match on the plastic part.

- Welding out of mold cavities (no polishing nor etching): Elite P20 can be welded without pre-heating with same welding wires as W1.2738 / P20.
- Welding in mold cavities: Elite P20 has to be welded using specific Elite P20 weld-E wires.

More details about welding procedure are given in the technical processing guide.

For more information, please contact Bico Steel.

	Pre-heating and Post-heating	PWHT
Polished zone	325 °C / 325 °C - 2h 617 °F / 617 °F	No PWHT
Etched zone	150 °C / 150 °C - 2h 302 °F / 302 °F	PWHT 550 °C - 2h 1022 °F



NOTE: Comparison of hardness uniformity throughout welded zone for Elite P20 and W1.2738-P20.