ArcelorMittal

Dimensional program

Industeel produces TENASTEEL®℗ in different shapes :

Plates	2000 x 4000 mm - Thicknesses 15 to 75 mm *6.56' x 13.1' - Thicknesses .59 to 2.95"*
Bars	Width 500 mm x Thicknesses < 300 mm *Width 19.7" x Thicknesses < 11.8"*

For non standard sizes or shapes,
please consult us.
(including castings and forgings)

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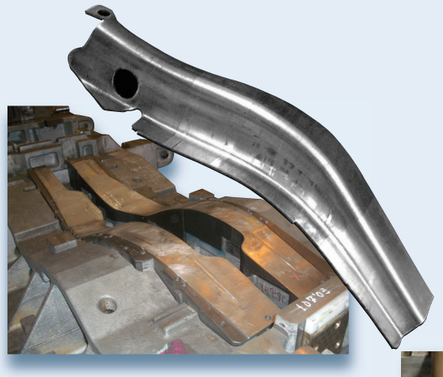
www.industeel.info
www.arcelormittal.com



www.tenasteel.com

transforming
tomorrow

MKT Special steels - 12-2010 issue

Industeel

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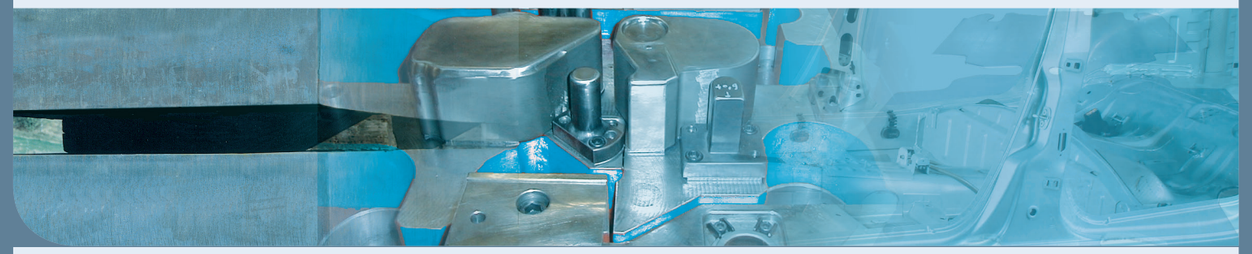
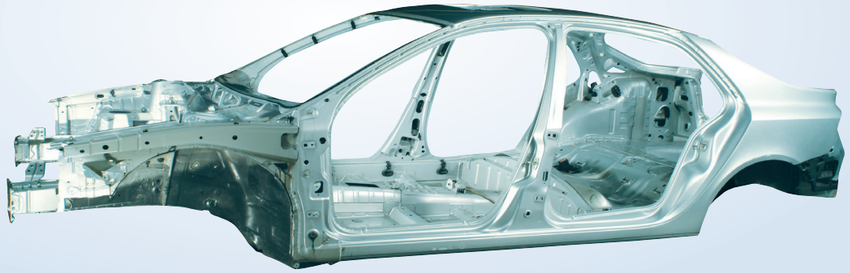


TENASTEEL®℗

Cold work tool steel

TENASTEEL®®

A multi-purpose cold work tool steel



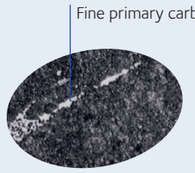
Looking for a new concept

Materials are in evolution and rates of production increasing. Consequently, cutting and stamping tools need to be made from a tool steel with a reduced risk of cracking and chipping.

At present, a difficult compromise has to be made, using
- Conventional steels which require a choice between wear resistance and toughness
- Powder metallurgy steels which are multi-purpose steels, but expansive.

This requires the development of a new, more universal steel concept, able to couple high tensile strength with wear resistance.

TENASTEEL®® has been designed to answer these demands.



A new chemical balance

Low level of carbon and chromium with titanium additions produce a finer carbide structure.

Molybdenum additions maintain the wear resistance structure.

	C	Mn	Cr	Mo	V	Others
TENASTEEL®®	1	0.35	7.5	2.6	0.3	Ti
X160 CrMoV12 - *D2*	1.60	0.35	12.0	0.75	0.95	–

TENASTEEL®®

- Elaboration in electric furnace, vacuum refining,
- Specific and innovative chemical balance,
- Capable of standard heat treatments.

TENASTEEL®® allows an increase in tooling productivity with lower maintenance costs.

It is especially suited to surface treatments and surface coating.

Improved mechanical characteristics

Annealing Hardness	Austenitization temperature	Double tempering temperature	Hardness after treatment	Toughness* TENASTEEL®	Toughness* X160 CrMoV12-*D2*
≤255HB	1050°C	525°C	60/62 HRC	20 J	12 J
		550°C	59/61 HRC	30 J	15 J
		575°C	58/60 HRC	35 J	19 J
≤255HB	1922°F	*977°F*	60/62 HRC	*14.7 ft.lbs*	*8.8 ft.lbs*
		1022°F	59/61 HRC	*22.1 ft.lbs*	*11.1 ft.lbs*
		1067°F	58/60 HRC	*25.8 ft.lbs*	*14.0 ft.lbs*

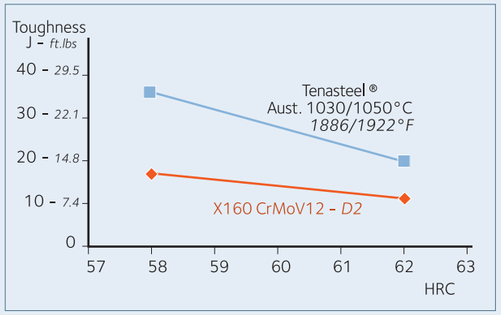
* Typical values on unnotched specimen for thickness < 100mm (*4"*)

Better tool performance

Cracking resistance

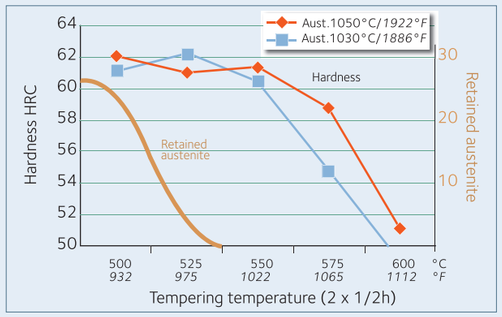
Whatever the hardness, TENASTEEL®® offers double the toughness of X160 CrMoV12 - *D2*.

- Less sharpening,
- Less in-service cracking.



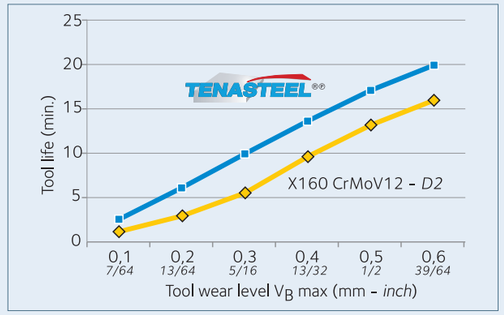
Versatile treatments

Treatments at high temperature are possible with TENASTEEL®®.
- Compatible with all surface treatments or coatings (PVD type),
- Ensures better dimensional stability.

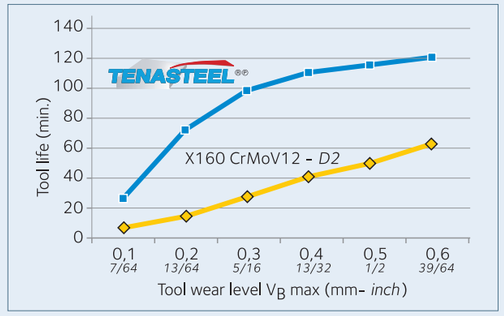


Improved machinability

Increasing tool life



Test on annealed sample



Test on hardened sample