



# ELLWOOD

YOUR METALS PARTNER, FROM MELT TO DISTRIBUTION

## ExELL™ P20 LTQ

Lens/Texture Quality is a vacuum arc re-melted premium quality Cr-Ni-Mo alloy tool steel supplied in a pre-hardened condition and engineered for plastic mold applications which require an SPI A polish or fine textured finish to produce parts of the highest surface clarity and quality.

### CHEMISTRY

	C	Mn	Si	Ni	Cr	Mo
Typical Analysis %	.34	1.3	.30	.55	2.0	.60

### DELIVERY CONDITION

Pre-hardened to Brinell 345 - 400 = Rockwell C 37 - 43

### CHARACTERISTICS

- Steelmaking practice using vacuum degassing, ladle metallurgy, and vacuum arc re-melting yields a clean and consistent structure free of elemental segregation and inclusions
- Heavy forge reduction and ultrasonic testing assures sound structure throughout
- Alloy chemistry enables deep hardening capability
- Consistent machinability
- Higher hardness for faster, easier polishing
- High thermal conductivity reduces mold cycle time
- Excellent weldability
- Capable of further surface treatments for improved wear resistance

### BLOCK SIZES

ESS stocks ExELL™ P20 LTQ in thicknesses to 30 inches.



### POLISHING AND TEXTURING

ExELL™ P20 LTQ exhibits high polishability in the pre-hardened condition and is capable of standard SPI A level finishes when proper polishing techniques are followed.

Fine surface textures using acid or laser processes can be achieved due to LTQ's clean and consistent structure.

### WELDING

ExELL™ P20 LTQ can be welded for repairs. Proper procedure and choice of consumables must be considered to assure quality results and acceptable post-weld surface finish.



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## MATERIAL PROPERTIES

Typical values for thickness 4" and greater  
In hardness range Brinell 345-400:

### ExELL™ P20 LTQ Material Properties

Ultimate Tensile	180 KSI	1200 MPa
.2% Yield Strength	162 KSI	1120 MPa
Elongation	15	%
Elastic Modulus	29 x 10 <sup>6</sup>	psi
Charpy V Impact	Transverse	Longitudinal
@ Room Temperature	30 Joules	44 Joules
	23 foot pounds	33 foot pounds



## MICROCLEANLINESS

ASTM E45	A	B	C	D
Thin/Heavy	0/0	0/0	0/0	0.5/0.5



## THERMAL CONDUCTIVITY

34 W/m deg K - 20 BTU/hr. ft. deg F

## THERMAL EXPANSION COEFFICIENT

Range 25 - 300 deg C = 13.0 x 10<sup>-6</sup> deg K

## HARDENED MICROSTRUCTURE

Tempered martensite and fine bainite enables stable consistent machining.

## STRESS RELIEF

To minimize any dimensional movement during tool build or service, a stress relief treatment is recommended. After rough machining heat the part to 50 - 100 degrees F below the final tempering temperature noted on the raw material certification, equalize temperature and hold for 1-2 hours, and then slow cool. Stress relief is also recommended after any welding.

## SURFACE TREATMENTS

ExELL™ P20 LTQ can be surface flame hardened to HRC 50 – 55 with air cooling. Mold surfaces can also be nitrided, chrome or nickel plated to enhance surface properties. After plating the mold, it should be held at an appropriate temperature and time to avoid hydrogen embrittlement.

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