

H13 DATA SHEET

H13 is a 5% chromium hot work tool steel designed for applications that require extreme toughness combined with good red-hardness. H13 will allow an extra margin of safety in tools subject to heavy hammer blows, and those containing deep recesses or sharp corners. Although H13 was designed as a hot work steel, it has solved many cold work applications where extra toughness could be gained with some sacrifice of wear resistance.

TYPICAL APPLICATIONS

Aluminum Extrusion Dies, Die Casting Dies, Heavy Duty Compression Tools, Forming Punches, Hot Forging Dies, Shear Blades, Plastic Mold Dies, and Bolt Dies.

TYPICAL ANALYSIS TYPE H13 (UNST20813)

Carbon (C)	0.32-0.45
Manganese (Mn)	0.20-0.50
Silicon (Si)	0.80-1.20
Tungsten (W)	-
Molybdenum (Mo)	1.10-1.75
Chromium (Cr)	4.75-5.50
Vanadium (V)	0.80-1.20
Cobalt (Co)	-
*Nickel (Ni)	0.30 max
FORGING (a)	
Start forging at	1950-2100°F (1066-1149°C)
Do not forge below	1650°F (899°C)
NORMALIZING (b)	Do not normalize
ANNEALING (c)	
Temperature	1550-1650°F (843-899°C)
Rate of cooling, max. per hour	40°F (22°C)
Typical annealed hardness, Brinell	192-229
HARDENING	
Rate of heating	Moderately from preheat
Preheat temperature	1500°F (816°C)
Hardening temperature	1825-1900°F (996-1038°C)
Time at temperature, minutes	15-40
Quenching medium	A
TEMPERING	
Tempering temperature	1000-1200°F (538-649°C)

Approx. tempered hardness, Rockwell C	38-53
WEAR RESISTANCE	Medium
TOUGHNESS	Very High
RESISTANCE TO SOFTENING EFFECT OF ELEVATED TEMPERATURE	High
DEPTH OF HARDENING	Deep
MACHINABILITY	Medium to High
GRINDABILITY	Medium to High
DISTORTION IN HEAT TREATING	Very Low
SAFETY IN HARDENING	Highest
RESISTANCE TO DECARBURIZATION	Medium to High

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