DHA1

Excellent Wear and Heat Check Resistance Hot Work Die Steel

Features

1. Finely distributed spherical carbides
2. Excellent quenching nature
3. Excellent softening resistance under high temperature
4. Excellent heat impact and fatigue resistance
5. Excellent erosion resistance to molten metal

Applications

Application	Hardness	Application	Hardness
A1, Zn, die caster mold	41~48HRC	Hot work shearblade	35~45HRC
Mold's accessories (Plunger sleeve, chip etc.)	45~50HRC	Hot work press mold	42~50HRC
Hot work pressing die	43~48HRC	Same as other Hot work equipment	-----

DAIDO STEEL

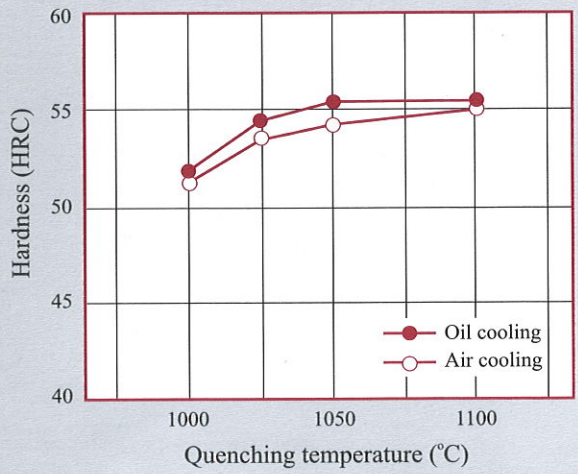
Chemical Composition

Daido	JIS Equivalent	C	Si	Mn	Cr	Mo	V
DHA1	SKD61	0.32-0.42	0.80-1.20	≦ 0.50	4.50-5.50	1.00-1.50	0.80-1.20

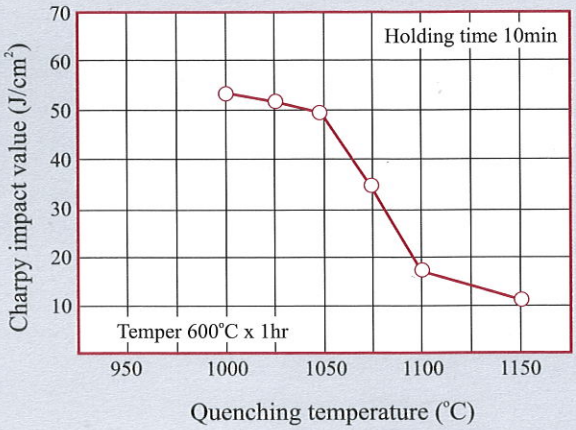
Heat Treatment

Forging Temperature (°C)	Condition for heat treatment °C			Hardness		Transformation Temp °C		
	Annealing	Hardening	Tempering	Supply Condition	Q.T.	Ac	Ar	Ms
1200~900	820~870 slow cooling	1000~1050 air cooling (oil cooling)	550~650 air cooling	≦ 229 HB	≦ 53 HRC	847~918	769~725	320 γ : 1030

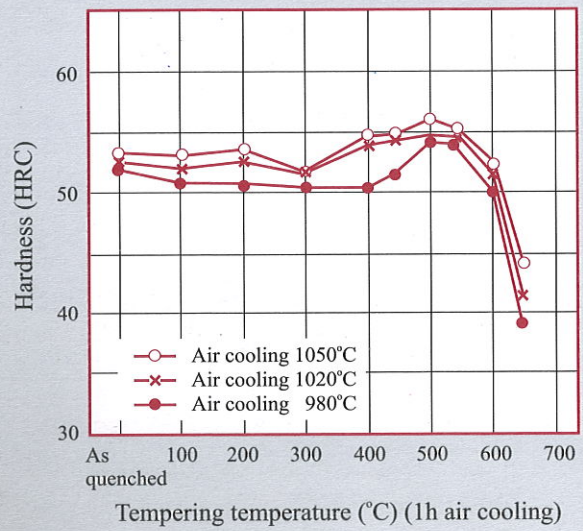
Quenching Hardness



Relationship Between Quenching Temperature and Toughness

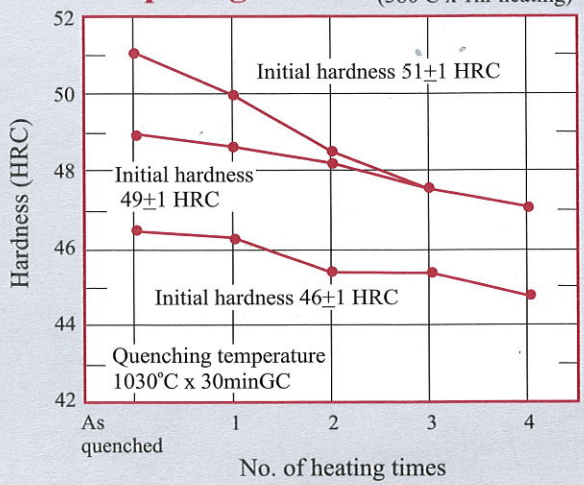


Tempering Hardness



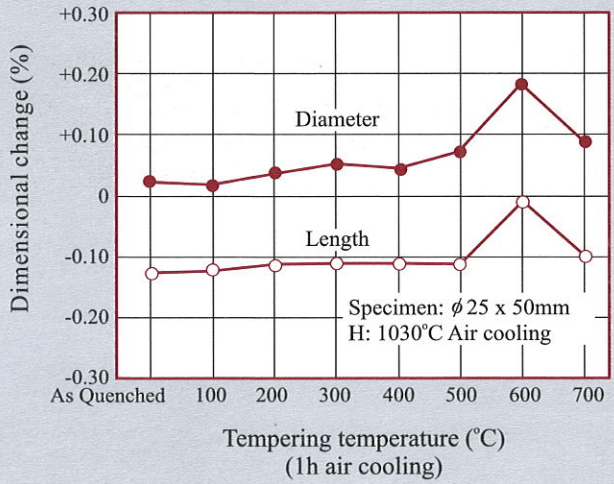
Resistance Against Softening by Tempering

(580°C x 1hr heating)

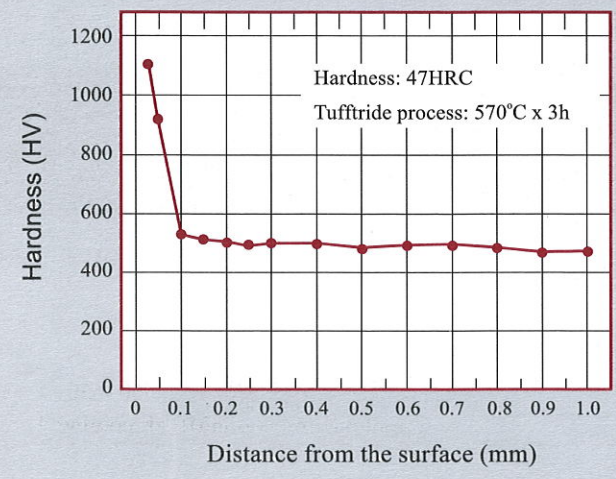


Quality Characteristics

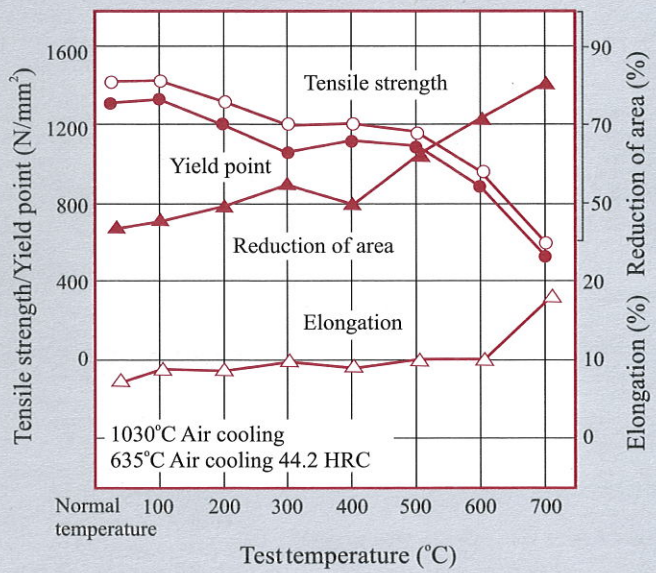
Dimensional change by Heat Treatment



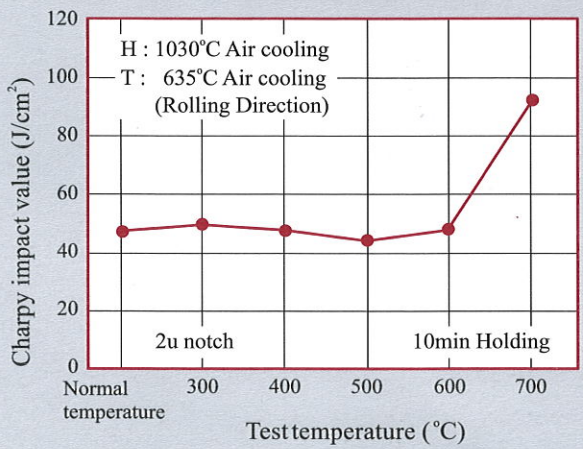
Nitriding Characteristics



Tensile Characteristics



Toughness



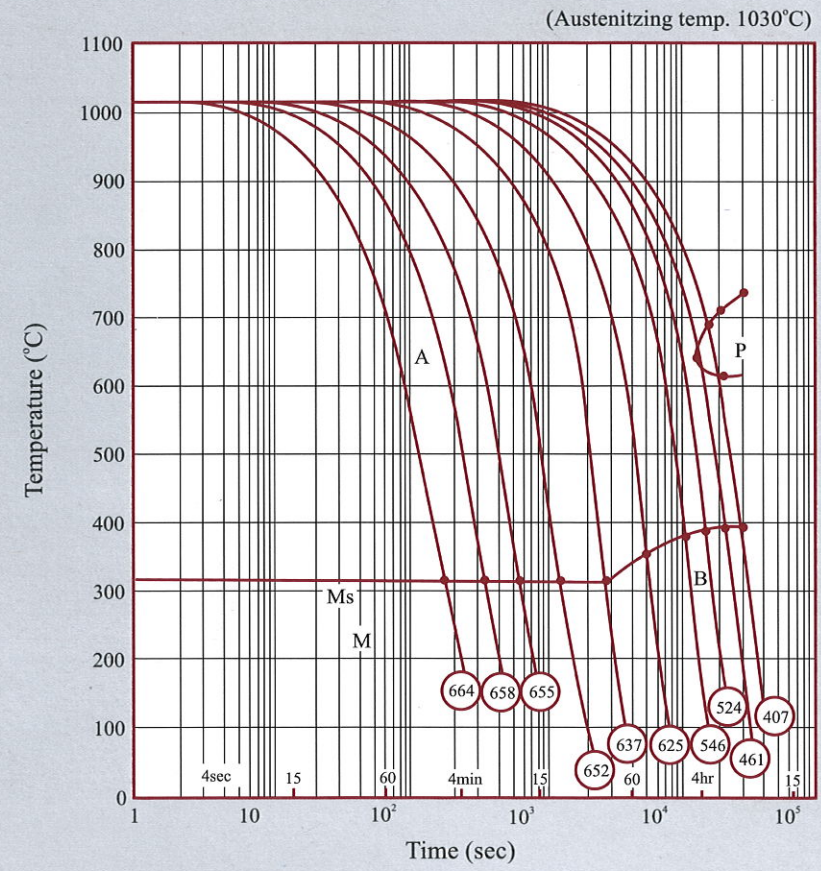
Thermal Conductivity (cal/cm·sec·°C)

Daido Brand	25°C	100°C	200°C	300°C	400°C	500°C	600°C	700°C
DHA1	0.0569	0.0605	0.0702	0.0707	0.0687	0.0624	0.0712	0.0721

Coefficient of Thermal Expansion (x 10^{-6} / °C)

Daido Brand	~100°C	~200°C	~300°C	~400°C	~500°C	~600°C	~700°C
DHA1	10.5	11.4	12.1	12.8	13.3	13.7	13.6

Continuous Cooling Transformation Curve



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