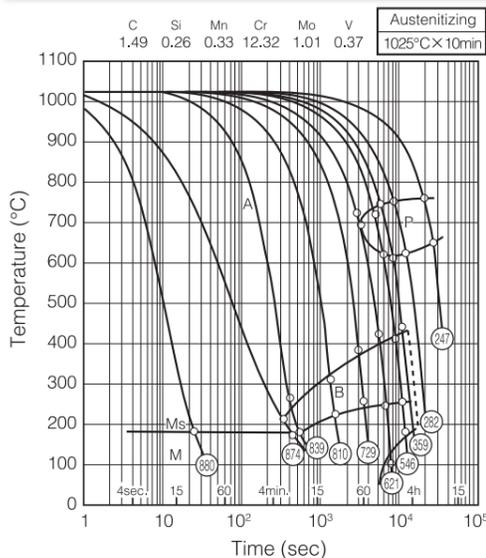


CCT diagram



Physical properties

Quenching: 1030°Cx1h, Gas cooling
Tempering: 180°Cx1h, Twice
Hardness: 62HRC

Temp.	20~100°C	20~200°C	20~300°C	20~400°C	20~500°C	20~600°C
Thermal expansion rate × 10 ⁻⁶ /K	10.6	11.9	11.8	12.0	12.2	12.2

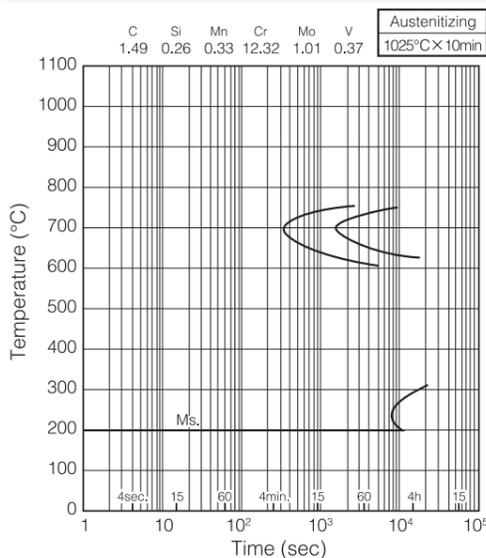
Temp.	25°C	100°C	200°C	300°C	400°C	500°C	600°C
Thermal conductivity W/m · K	16.9	19.7	21.1	22.5	24.0	25.2	28.2

* Accuracy of repeated measurements is about ±10%.

Temp.	25°C	100°C	200°C	300°C	400°C	500°C	600°C
Specific heat J/kg · K	467	525	559	587	644	686	779

Young's modulus	Rigidity modulus	Poisson's ratio
204GPa	78GPa	0.30

TTT diagram



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Daido's Cold Work Die Steel Series

DC11™



Excellent Wear Resistance & Air Hardening General-Purpose Cold Work Die Steel

Features

- ◆ High cleanliness by vacuum degassing in refining process
- ◆ Favorable machinability: 20% better than that of SKD1
- ◆ High hardenability: Hardened by air cooling without the fear of quenching crack
- ◆ Small dimensional change by heat treatment: Suitable for precision dies
- ◆ High wear resistance: Suitable for trimming dies for stainless steel or high-strength steel
- ◆ High toughness

Main applications

Application	Hardness	Application	Hardness
Trimming dies	58~62HRC	Precision gauges	60~65HRC
Forming rolls	58~63HRC	Thread rolls	60~63HRC
Philips head forming dies	57~62HRC	Cold hobbing press hobs	58~65HRC
Fuller	58~63HRC	Cold forging dies	58~62HRC
Shearing blades	50~65HRC	Thermo-setting resin forming dies	56~61HRC

Chemical composition

DAIDO Brand	Applicable JIS	Chemical composition (%)									
		C	Si	Mn	P	S	Cu	Ni	Cr	Mo	V
DC11	SKD11	1.40 ~ 1.60	≤0.40	≤0.60	≤0.030	≤0.030	≤0.25	≤0.50	11.00 ~ 13.00	0.80 ~ 1.20	0.20 ~ 0.50

Heat treatment

Re-forging Temp. (°C)	Heat treatment (°C)			Hardness			Transformation Temp. (°C)*	
	Annealing	Quenching	Tempering	Annealed (HBW)	Quenched (HRC)	Tempered (HRC)	Ac	Ar
900~1100	830~880 Slow cooling	1000~1050 Air cooling	150~200 Air cooling (500~550) Air cooling	≤ 255	≥ 62	≥ 61 (56~58)	815~875	765~705

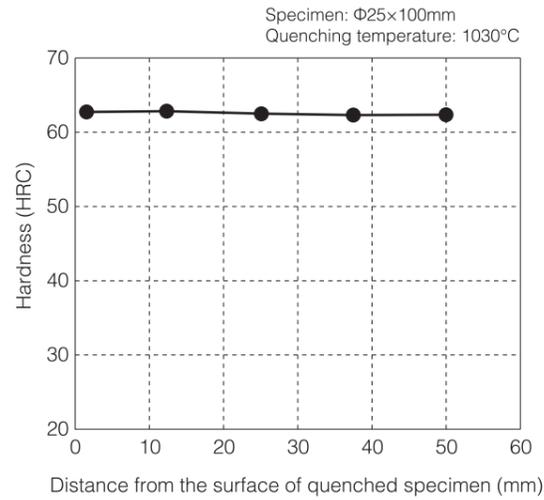
* Maximum heating temperature: 1030°C, Cooling rate: 100°C/h



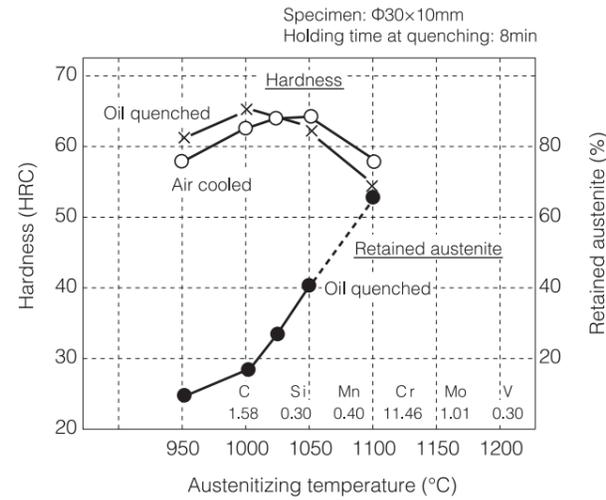
Properties

Material size: $\Phi 36$
(Except for Dimensional changes)

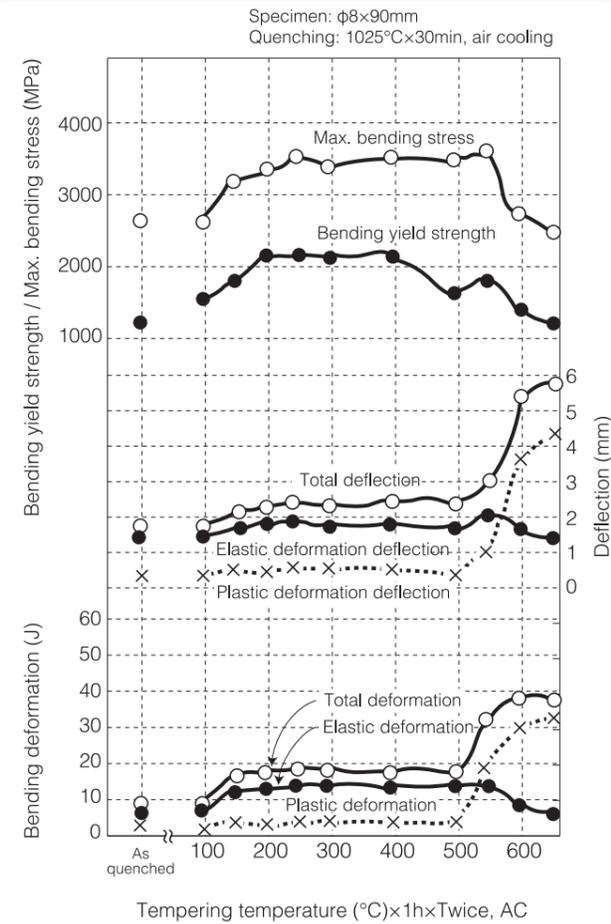
Hardenability



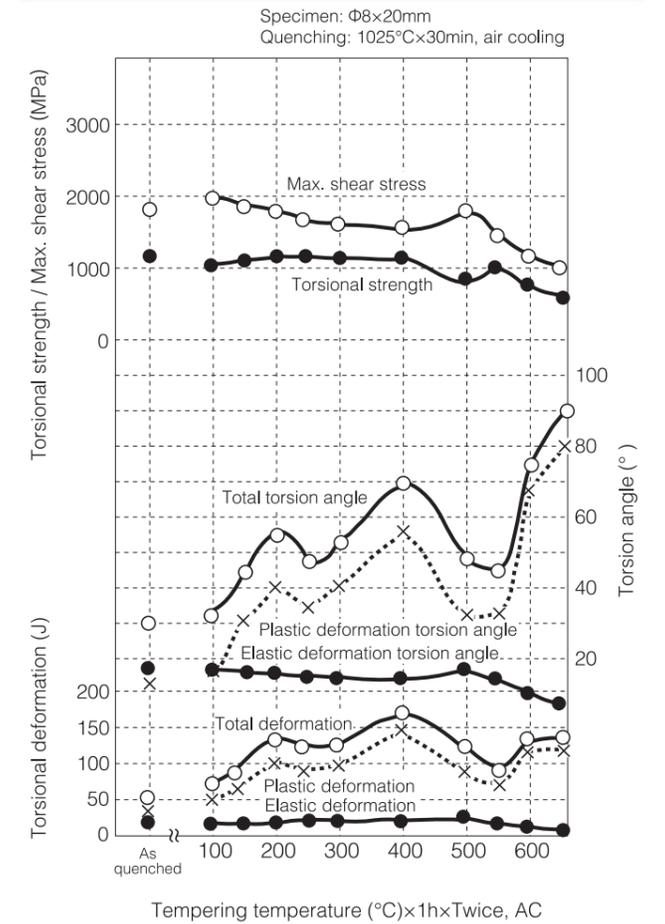
Quenched hardness curve and Retained austenite



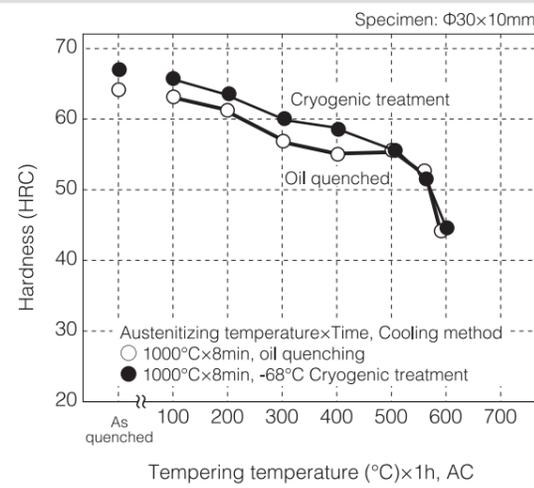
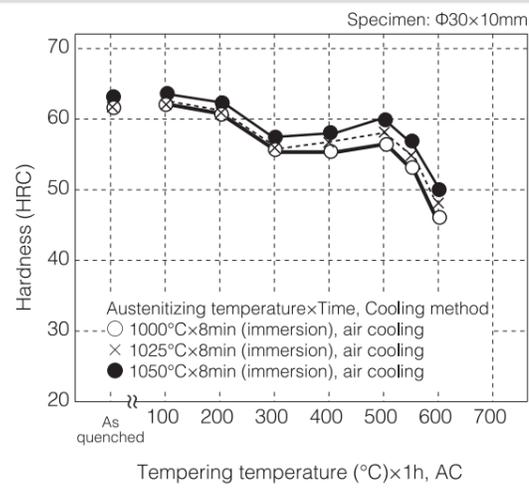
Static bending properties



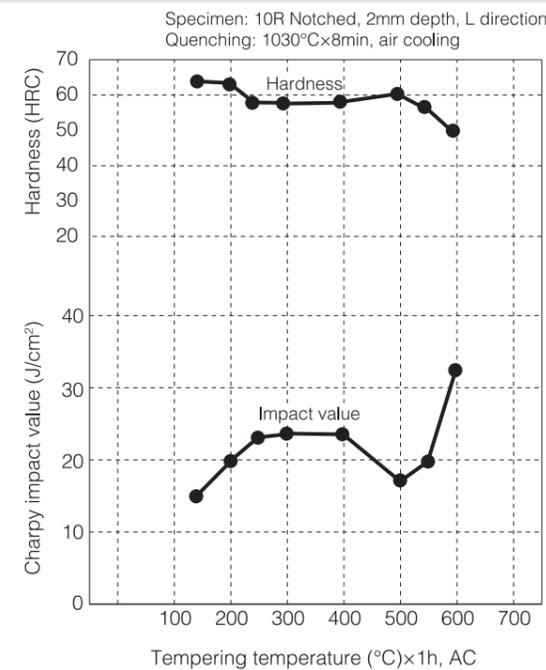
Static torsional properties



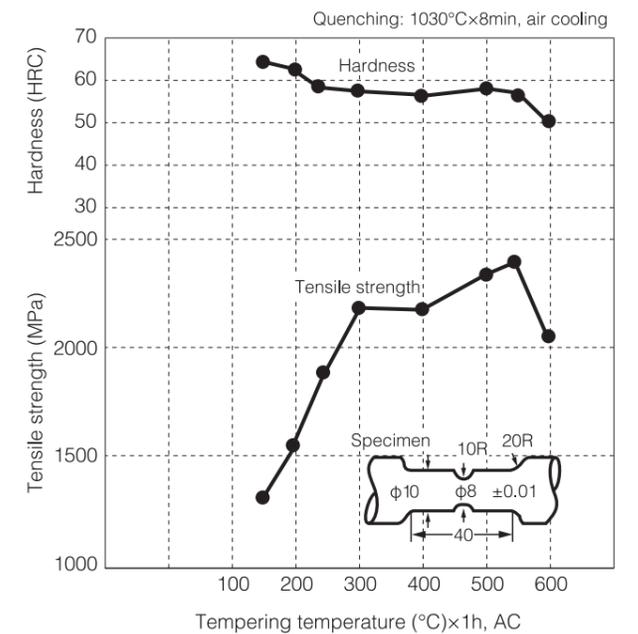
Tempered hardness



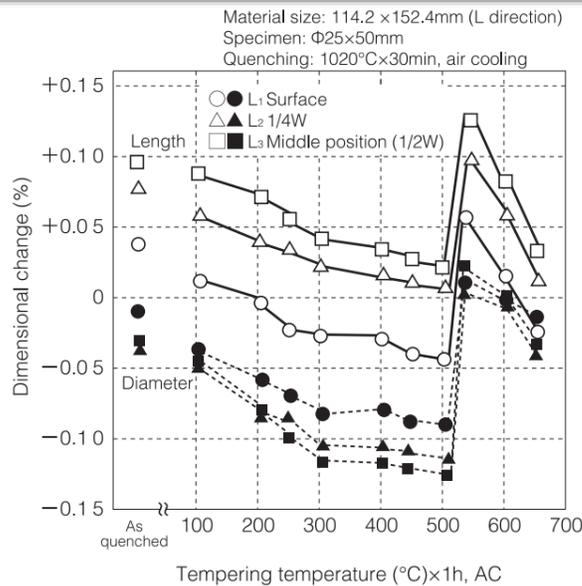
Toughness



Tensile strength



Dimensional change



Wear resistance

