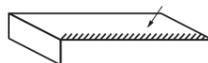
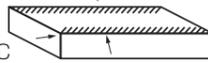


## Weldability

### ◆ Weldability test results

	Specimen condition	Welding conditions	Presence or absence of cracks	HV hardness of overlay (HRC hardness conversion)
1	Flame-hardened steel	One-layer cladding on the flame hard part 	None	669HV (58.7HRC)
2	Quenched and tempered steel	One-layer cladding 7C 	None	700HV (60.1HRC)
3	Quenched and tempered steel	Three-layer cladding 7C 	None	697HV (60.0HRC)

Specimen : 50W×30t×150L  
Weld rod : Equivalent to JIS DF3B-B  
Weld rod diameter : φ3.2  
Welding current : 105A  
Pre-heating : 300°C  
After-heating : 400°C

If the number of overlay layers exceeds 3-4, an under-layer of austenitic stainless steel must be deposited.

## Physical properties

Quenching : 950°C×1h, Gas cooling  
Tempering : 180°C×1h, Twice  
Hardness : 60HRC

### ◆ Thermal expansion rate

Temp.	20~100°C	20~200°C	20~300°C	20~400°C	20~500°C	20~600°C
×10 <sup>-6</sup> /K	12.4	13.4	14.3	14.7	12.1	13.1

### ◆ Thermal conductivity

Temp.	25°C	100°C	200°C	300°C	400°C	500°C	600°C
W/m·K	16.0	17.1	18.0	19.8	21.7	22.4	24.5

\*Accuracy of repeated measurements is about ±10%.

### ◆ Specific heat

Temp.	25°C	100°C	200°C	300°C	400°C	500°C	600°C
J/kg·K	450	456	474	524	587	636	740

### ◆ Young's modulus / Rigidity modulus / Poisson's ratio (25°C)

Young's modulus	Rigidity modulus	Poisson's ratio
201GPa	76GPa	0.32

## Daido's Cold Work Die Steel Series

# GO5™

## Reducing Mold-Making Processes and Costs with Cold Work Tool Steel Featuring Outstanding Flame Hardenability

### Features

#### ◆ Simplified Flame Hardening

This steel achieves sufficient surface hardness and depth of hardening through air cooling after flame heating. Thanks to a broad suitable quenching temperature range, the risk of overheating and grain coarsening is minimized.

#### ◆ Superior Machinability

Proper spheroidizing annealing ensures excellent machinability.

#### ◆ Enhanced Wear Resistance

Achieving higher uniform hardness, it offers wear resistance on par with SKS type die steel.

#### ◆ Reduced Risk of Cracking and Chipping under Use

Its toughness surpasses that of molds made from SKS and SKD steel.

#### ◆ Facilitated Die Repair Through Overlay Welding

Designed with weldability in mind, the alloy composition greatly reduces the risk of cracking during overlay welding, making repairs easier and more reliable.

### Main applications

Punching dies, drawing dies, bending dies  
Other cold forming dies

### Chemical composition

Cr-Mo-V series steel

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#### ■ Document Disclaimer

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# Heat treatment

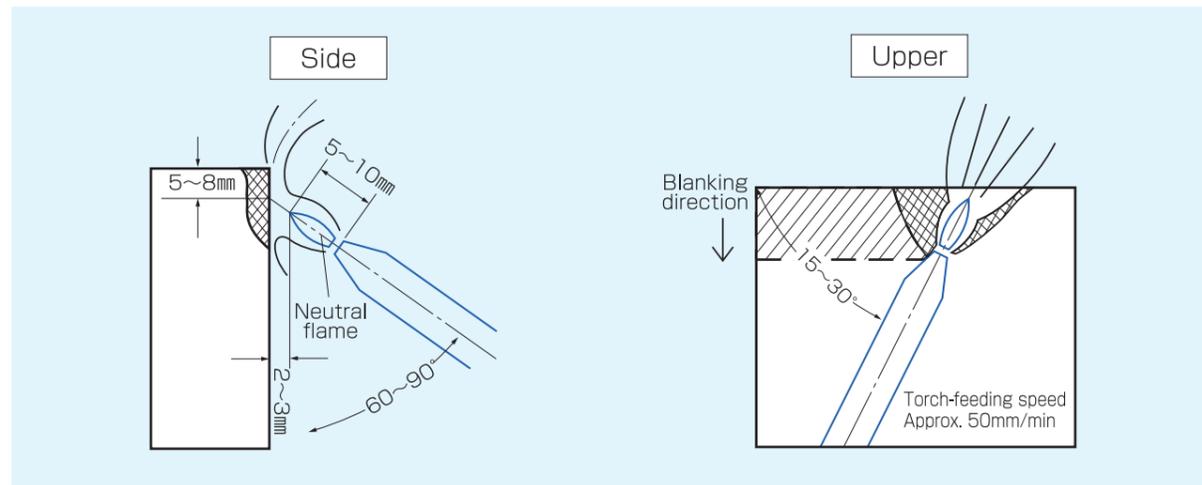
## In case of flame hardening (mainly applied to the case of cutting edges)

1	Work environment	The room must be at a constant brightness level.
2	Pre-heating	200-300°C (Hardening hardness may decrease if the temperature is too high)
3	Austenitizing	Heat until it becomes bright red (950°C target) and move the heating area sequentially (see the figure below).
4	Cooling method	Air cooling
5	Tempering	Tempering at 150-200°C improves toughness

### ◆ The standard of burner and gas pressure

Burner type	Nozzle number	Oxygen gas pressure (O <sub>2</sub> )	Acetylene gas pressure (C <sub>2</sub> H <sub>4</sub> )
Welding burner	#100~300	0.098MPa	0.017MPa
Thermal cutting burner	#1 ~ 2	0.490MPa	0.049MPa

### ◆ The method of flame hardening



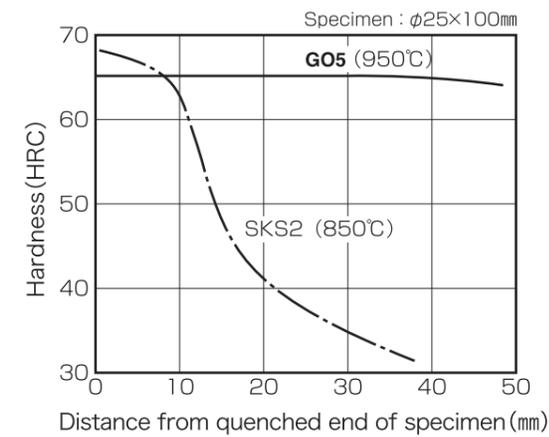
## In case of total quenching (mainly applicable to bending dies and drawing dies)

Heat treatment		Hardness	Transformation temp.		
Quenching	Tempering		Ac <sub>1</sub>	Ac <sub>3</sub>	Ms
900~950°C Oil quenching	150~200°C Air cooling	≥60HRC	752°C	808°C	188°C

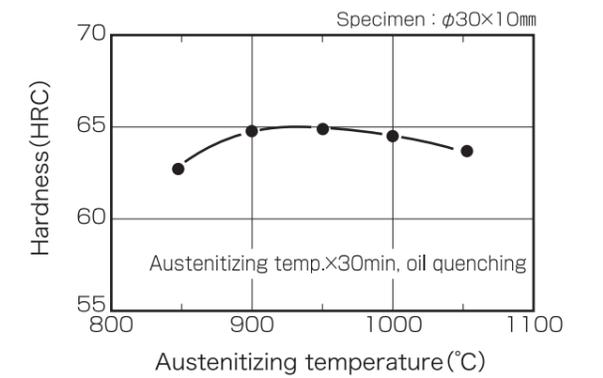
# Properties

Material size : φ36

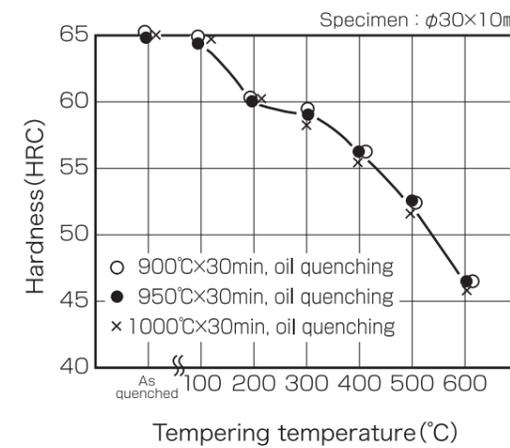
## Hardenability (End-quench test)



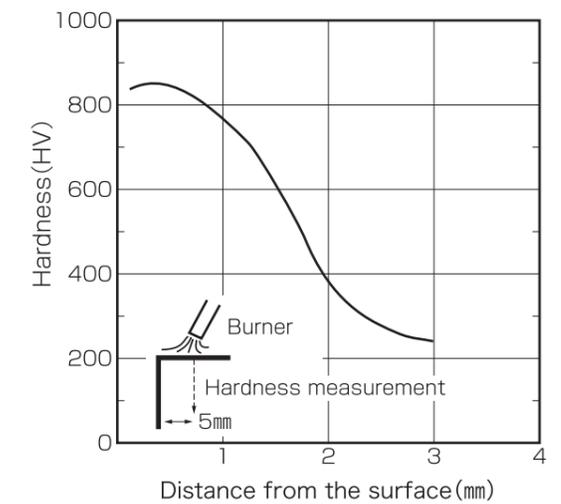
## Quenched hardness



## Tempering chart



## Hardness distribution (After flame hardening)



## Toughness

