

## Physical properties

### ◆ Thermal expansion rate

Temperature(°C)	30 – 100	30 – 200	30 – 300	30 – 400
×10 <sup>-6</sup> /K	11.9	12.3	12.5	12.8

### ◆ Thermal conductivity

Temperature(°C)	24	100	200	300	400
W/m·K	33.8	34.3	34.4	34.2	33.5
[cal/cm·sec·°C]	[0.0807]	[0.0819]	[0.0822]	[0.0817]	[0.0800]

### ◆ Specific heat

Temperature(°C)	24	100	200	300	400
J/kg·K	455	472	504	546	591
[cal/g·°C]	[0.109]	[0.113]	[0.120]	[0.130]	[0.141]

### ◆ Young's modulus

Temperature(°C)	25	100	200	300	400
GPa	208.4	204.5	198.3	190.9	182.3
[kgf/mm <sup>2</sup> ]	[21,251]	[20,853]	[20,221]	[19,466]	[18,589]

## Tensile properties (Room Temp.)

Hardness (HRC)	Tensile strength (MPa)	0.2% Yield (MPa)	Elongation (%)	Reduction in area (%)
40	1,244	1,127	15.9	61.7

Specimen: JIS14A (φ 6 x 30mm)



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### Document Disclaimer

The product characteristics included in this brochure are the representative values based on the result of our measurements, and do not guarantee the performance in use of the products.  
Please inquire the latest information to our department in charge as the information of this brochure is updated without previous notice as needed.

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# PAC5000

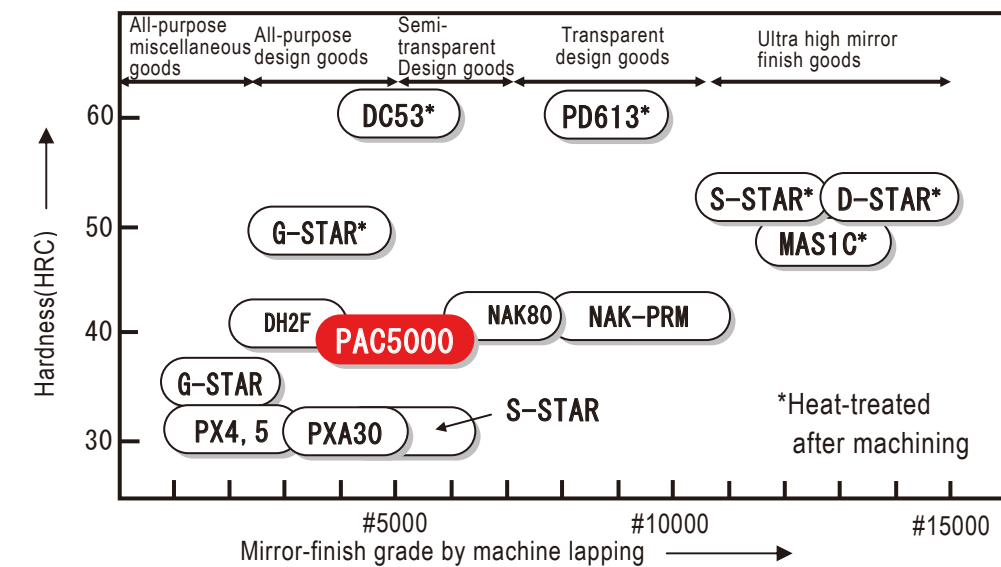


40HRC Pre-hardened type, General-purpose Plastic Mold Steel

## Features

PAC5000 is general-purpose plastic mold steel that outperforms P20 improved grades in wear resistance and mirror polishing.

- ◆ Polishability : In spite of single melt steel, it polishes up to #5000 or higher.
- ◆ Texture processing: Suitable for various types of processing.



## Applications

- ◆ Automobile related (for lens cover etc.)
- ◆ Home electric appliances, Audio set, Information equipment, Office automation equipment
- ◆ Other plastic molds required higher hardness than 30HRC for wear resistance

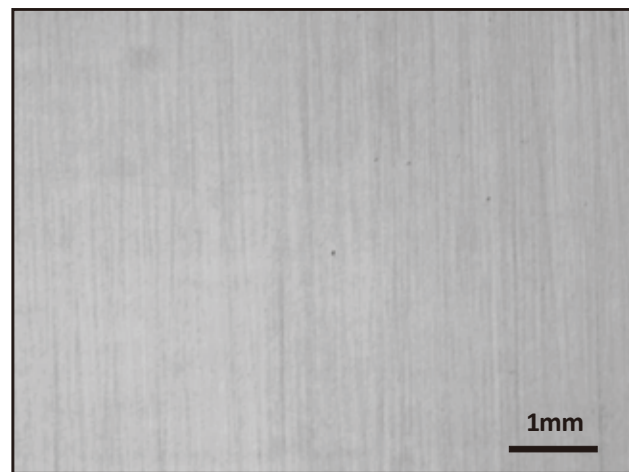
## Chemical composition

Grade	Hardness (HRC)	Chemical composition					
		C	Si	Mn	Cr	Mo	V
PAC5000	36 - 40	Patent pending					

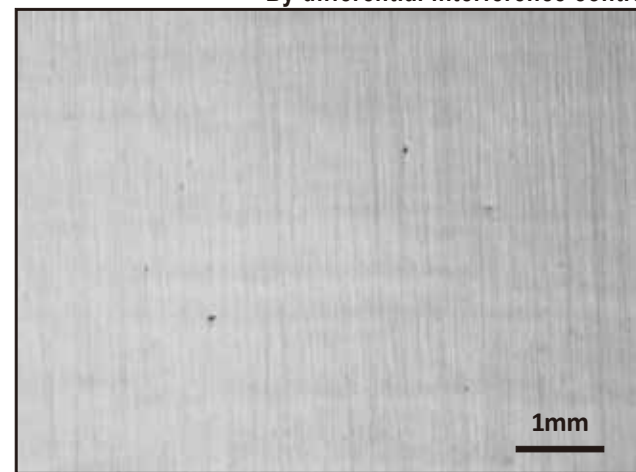


# Properties

## Polishability (When polished to #5000)



PAC5000



P20 improved (40HRC)

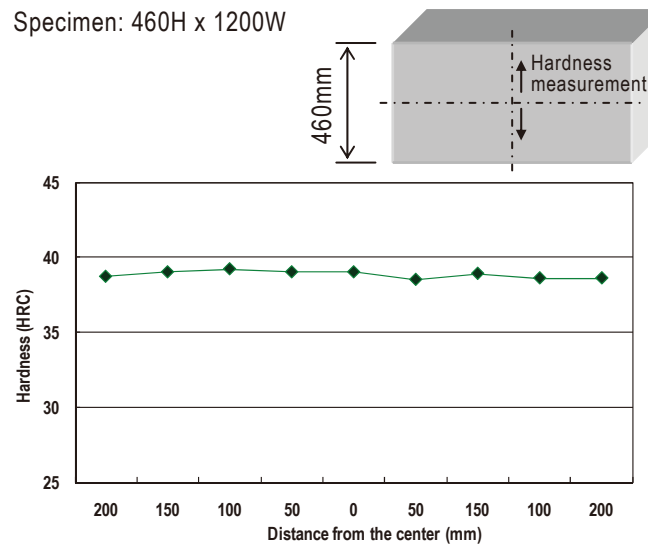
< Polishing procedures >

Turning, Milling → Grinding (- #220-#320-#400) → Emery paper polishing (#320-#400-#600-#800-#1000-#1200-#1500) → Diamond paste finishing (#1200-#1800-#3000-#5000)

By differential interference contrast

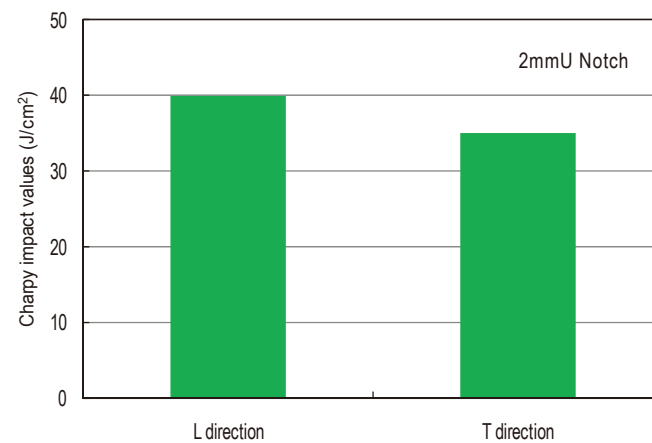
## Hardness distribution

Specimen: 460H x 1200W



## Toughness

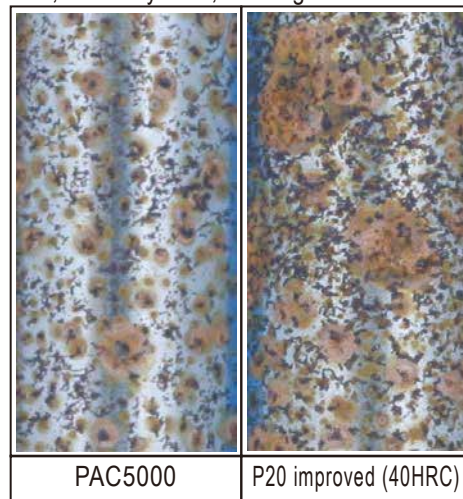
Specimen: 460H x 1200W Center 39HRC



## Humidity cabinet test

< Test conditions >

Temp.:50°C, Humidity:98%, Holding time:24hours

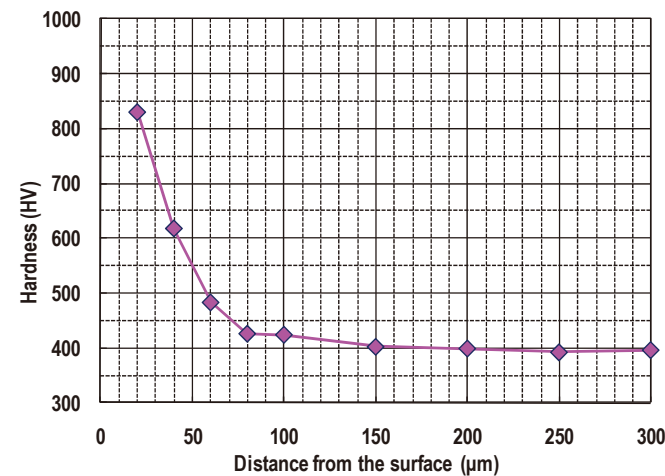


PAC5000

P20 improved (40HRC)

## Nitriding characteristics

Gas soft-nitriding: 510°Cx3hours

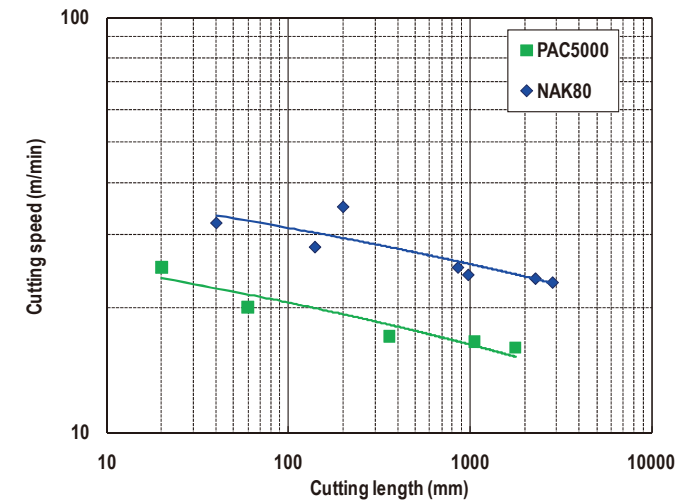


Dimensional change and hardness decrease may occur when processed at the higher than 520°C.

## Machinability

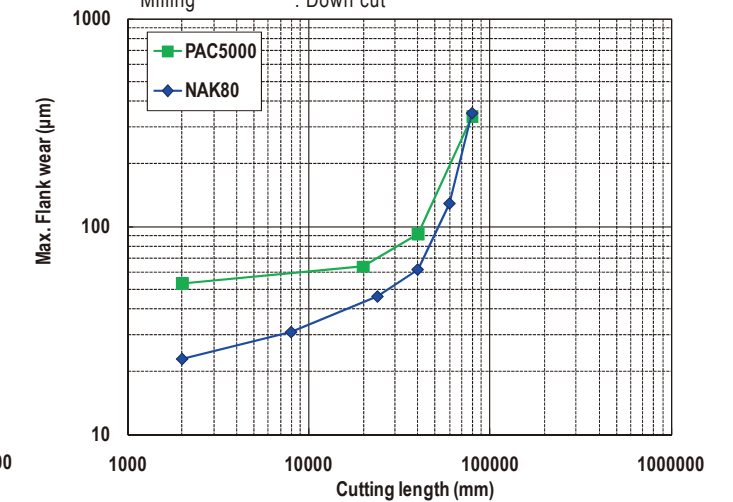
< Drilling condition > Hardness:40HRC

Tool : SKH51  
Shape : φ 5 Straight shank  
Feed : 0.15mm/rev  
Lubricant : Yushiro FGE360 (5% solution)  
Criteria : Breakage or corrosion



< Endmilling condition > Hardness:40HRC

Tool : UTi20 (No-coated)  
Speed : 150m/min  
Feed : 0.15mm/rev  
Depth of cut : 1x4mm  
Cooling : Air blow  
Milling : Down cut



## Build-up Welding

- Preparation
  - Fully clean all oils, foreign material, and scales
  - Remove all cracks and surface treatment layers
  - Edge preparation: corner sections 3R or above
- Build-up Welding Rod  
PXA50-W is recommended.
- Pre-heating
  - 200 to 300°C
  - Gradually heat by furnace, or propane or natural gas burner

- Welding  
TIG welding is recommended.

< Conditions >

Electrode diameter (mm)	1.6	2.4
Rod diameter (mm)	1.6	2.4
Current (A)	70~150	150~250
Argon (ℓ/min)	6~9	7~10

- Post-heating  
500°C

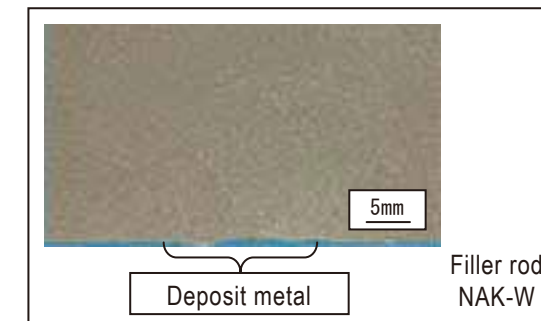
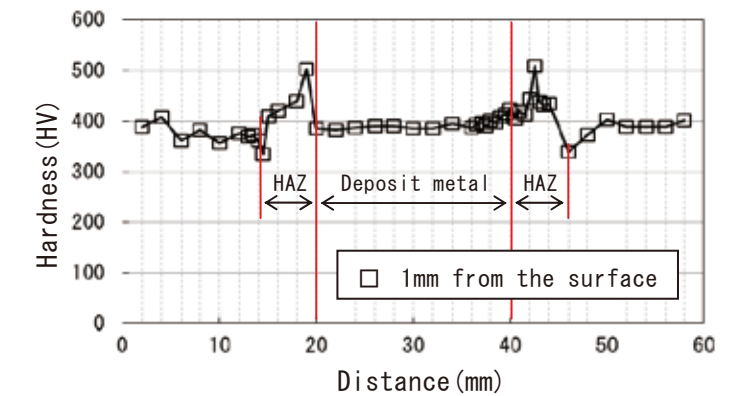
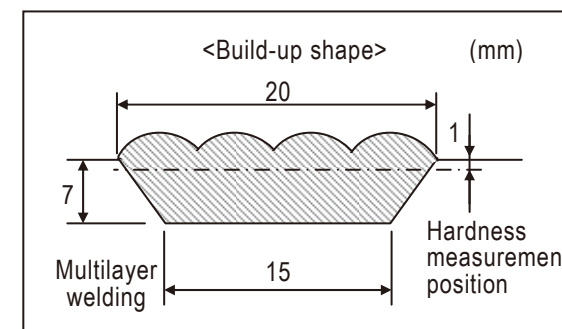
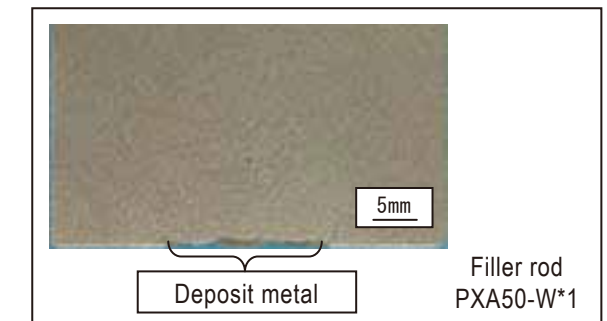


Photo etching after build-up welding (Photo etching: Pearskin finish)



\*1) When build-up welded with PXA50-W filler, PAC5000 shows superb photo-etched surface without unevenness. The small difference in hardness between the deposit metal and the base metal (around 40HRC) would reduce the risk of defects such as short-term mold life in the repaired part or polishing unevenness.