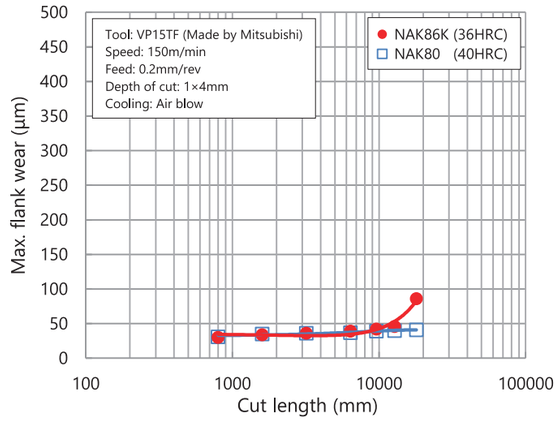
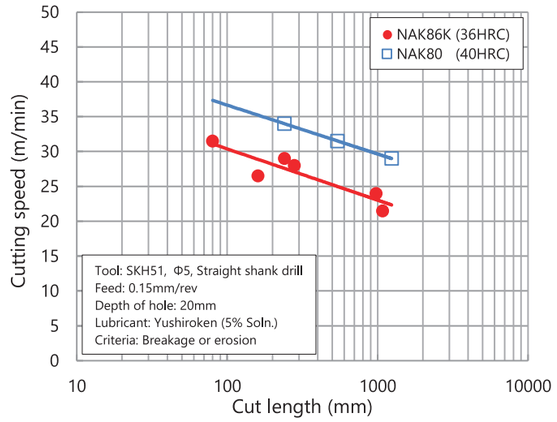
Machinability

◆Endmilling



◆Drilling



Build-up Welding Method

◆Build-up welding procedure (recommendation)

1. Preparation
   - Fully clean all oils, foreign material, and scales.
   - Remove all cracks and surface treatment layers.
   - Beveling: corner sections 3R or above.
2. Build-up Welding Rod
   - NAK86K
3. Welding
   - DC normal polarity, backward welding.
4. Precautions
   - If pre-heating and post-heating are conducted with a burner, the entire body should be heated to prevent cracking.
   - Pre-heating and post-heating is not necessary when build-up welding is very small. When welding in large quantities, pre-heating (300-350°C) and post-heating (400-450°C) is recommended.
   - Even if there is no problem when welding without post-heating, since there is a concern of cracking due to welding stress, post-heating is recommended.

Physical Properties

◆Thermal expansion rate

Temp.	20～100℃	20～200℃	20～300℃
$\times10^{-6}$/K	9.8	10.6	11.0

◆Thermal conductivity

Temp.	25℃	100℃	200℃	300℃
W/m·K	27.5	29.2	29.3	29.6

※Accuracy of repeated measurements is about ±10%.

◆Specific heat

Temp.	25℃	100℃	200℃	300℃
J/kg·K	484	529	550	583

◆Young's modulus / Rigidity modulus / Poisson's ratio (25℃)

Young's modulus	Rigidity modulus	Poisson's ratio
211GPa	82GPa	0.29

【Precaution for Use】

NAK86K has various features as plastic mold steel, but some features are different from NAK80. Should you have any questions or require additional information, please contact the following addresses.

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www.daido.co.jp

No.SC1908a 22.08.0,0 (DDD)

Daido's Plastic Mold Steel Series

NAK86K™

Pre-hardened type plastic mold steel with excellent corrosion resistance and toughness.

Features

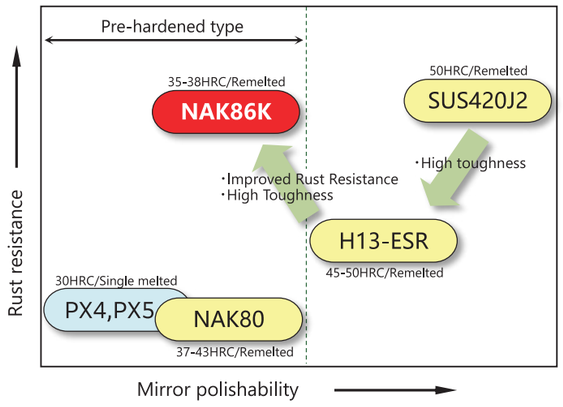
◆Improved corrosion resistance makes it possible to solve NAK80 or H13 molds' rust troubles.

◆Effective as countermeasure for cracking of molds made out of NAK80 or SUS420J2 because of its high toughness at molding temperature.

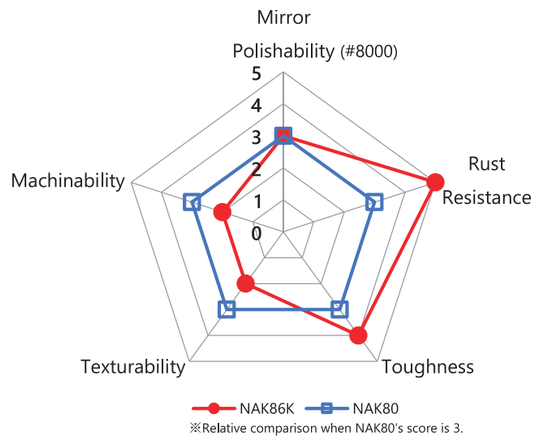
◆Excellent cleanliness by remelting makes it possible to have excellent mirror polishability equivalent to NAK80.

◆Direct machining is possible because NAK86K is pre-hardened with uniform hardness of 35-38HRC.

Conceptual Diagram of NAK86K



NAK86K and NAK80 Feature Comparison



※Relative comparison when NAK80's score is 3.

<Difference from NAK80>

◇Since NAK86K has better corrosion resistance than NAK80, caution is necessary when texturing process is applied.

◇NAK86K is hardened and tempered steel, thus it needs more removal allowance for rough machining than NAK80.

Chemical Composition

Daido Brand	Supplied Condition (Hardness)	Chemical Composition (%)						
		C	Si	Mn	Ni	Cr	Mo	V
NAK86K	Pre-hardened (35-38HRC)	Low C-8%Cr						

DAIDO STEEL

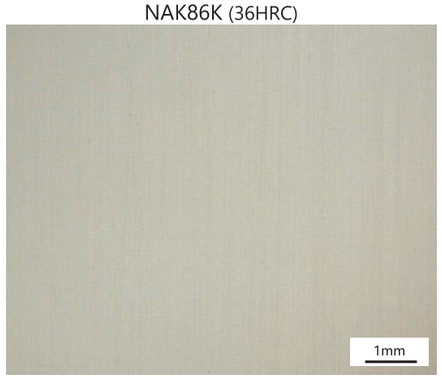
Properties

Material size：260H×610W×260L

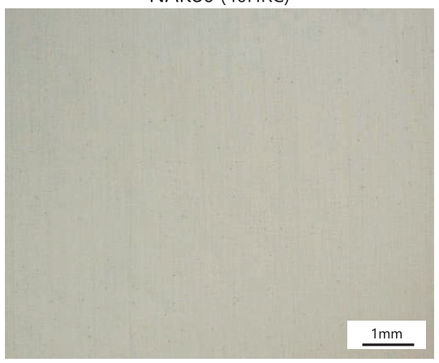
Mirror Polishability (#8000)

◆NAK86K mirror polishability is equivalent to NAK80.

NAK86K (36HRC)



NAK80 (40HRC)



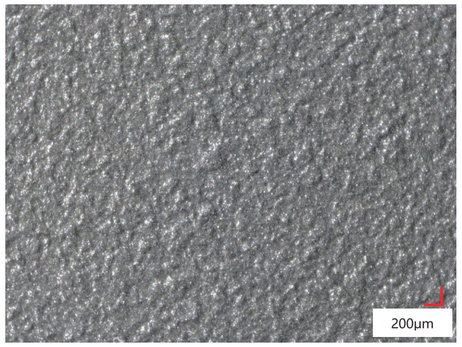
＜Polishing procedure＞
Carbon grinding (#1500-#3000) → Emery paper polishing (#1500-#2000-#2500) → Diamond paste finishing (#1800[9μm]-#3000[6μm]-#8000[3μm])

Texturability

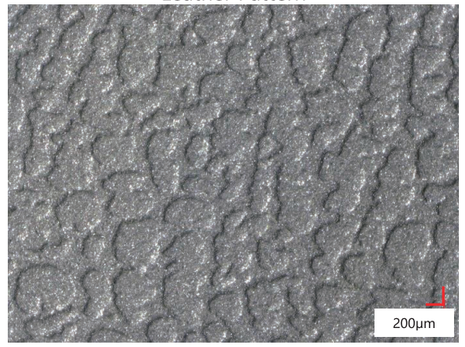
◆NAK86K is capable of being textured, but texture conditions are different from NAK80.

※Please ask texturing condition to texture processors.

Satin Pattern



Leather Pattern

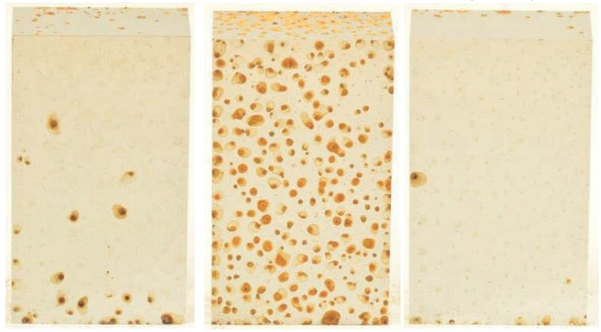


Texture processing: TANAZAWA HAKKOSHA Co., Ltd.

Rust Resistance

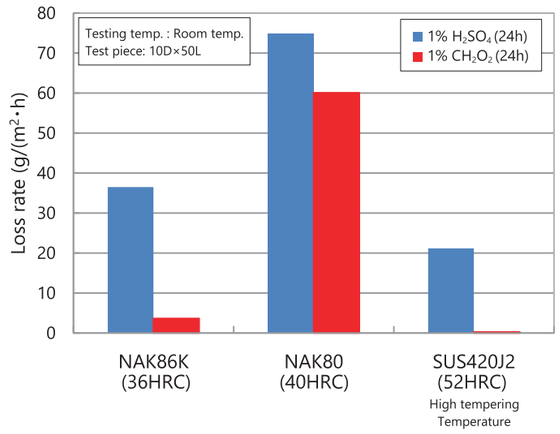
◆NAK86K has better rust resistance than NAK80.

NAK86K (36HRC) | NAK80 (40HRC) | SUS420J2 (37HRC)



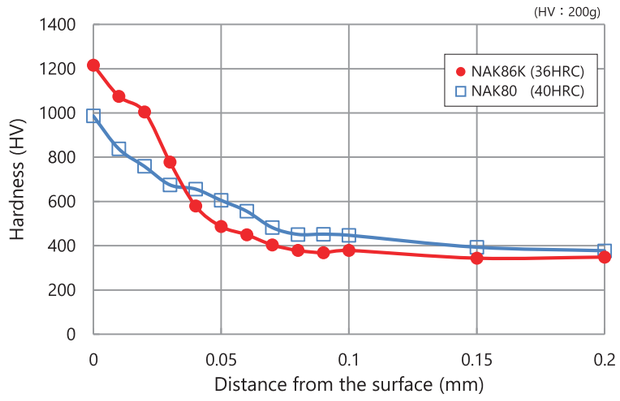
＜Wetting test condition＞Temp. 50°C, Humidity 98%, Time 48h

Corrosion Resistance

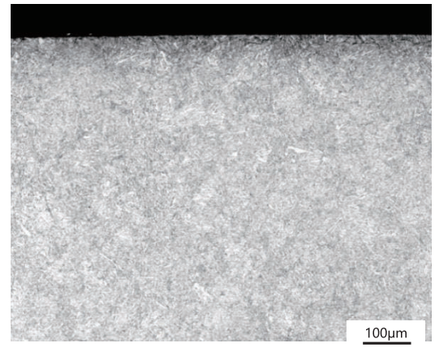


Nitriding Characteristics

◆Nitriding can be applied to NAK86K. ※Please process at 500°C or lower to prevent softening.



NAK86K



Nitriding process: LICHTSEIKO Inc. EDISON HARD PROCESS (Plastic mold specification)

Mechanical Properties

◆Toughness

	Testing temp.	Hardness (HRC)	Toughness (J/cm²)
SUS420J2 (Remelted)	Room temp.	53	Approx. 25
NAK80	Room temp.	40	Approx. 25
NAK86K	Room temp.	36	Approx. 30-150
	100°C※	36	≧Approx. 150

・Direction: L direction
・Test piece: 2mmU Notched

※Simulating molding temperature of 100°C

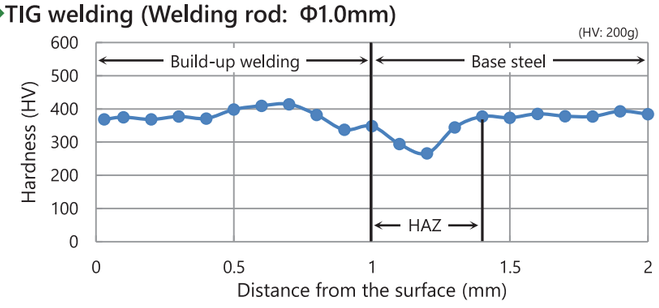
◆Tensile strength

	NAK86K (36HRC)
0.2% Proof stress (MPa)	880
Tensile strength (MPa)	1200

・Test piece: JIS No.14
・Direction: L direction
・Testing temp. : Room temp.

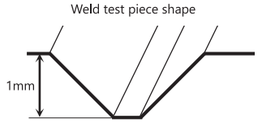
Weldability

◆TIG welding (Welding rod: Φ1.0mm)



＜Welding conditions＞
・Test piece dimension: groove angle 90°×depth 1mm
・Welding rod: NAK86K
・Current: 100A
・Shield gas: Argon
・Gas flow rate: 1.8L/min

Weld test piece shape



◆Surface condition after TIG welding
(No pre-heating and post-heating)

After mirror polishing (#8000)

Welding area