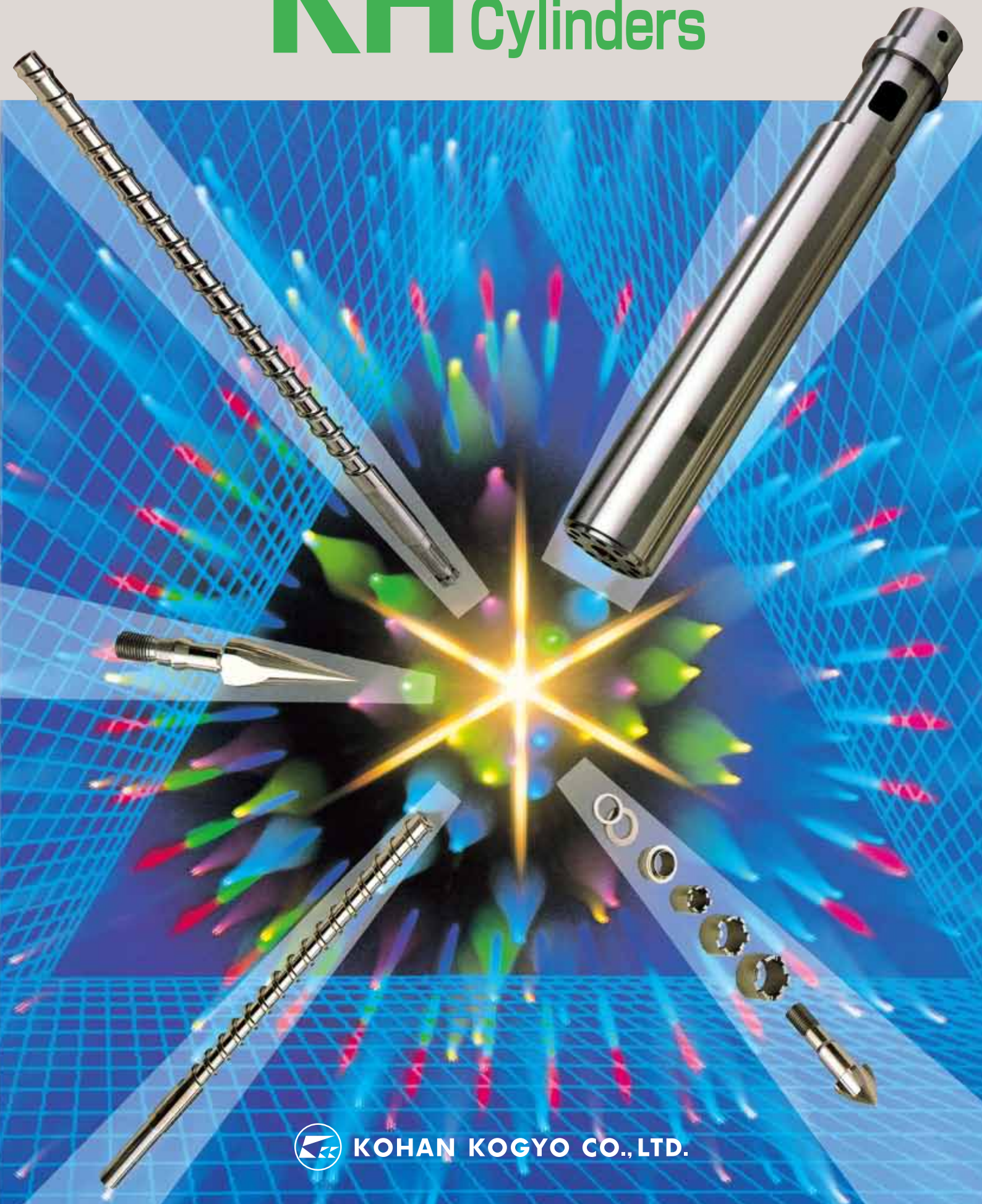
HARD NEW MATERIALS

KH Screws Cylinders



KOHAN KOGYO CO., LTD.

KH Screws Cylinders

The advanced technology has produced the ideal screw & cylinder for the 21st century.

Superb performance in applications such as injection moulding of super engineering plastics, ceramics, and powdered hard metals.

Superb wear resistance 20 times higher than nitride steel more than 5 times higher than the world most wear-resistant materials

Screw & cylinder with superb wear and corrosion resistance

A great alloy consisting of sintered iron-based, multi-boride cermet.
Bimetallic structure with the hardness of ceramics and the toughness of steel

Property	Grade	Hardness HRC(Hv)	Applications	
			Material	Parts
Superior wear resistance	V30 C30	74(1300) 74(1300)	Ceramics Engineering plastics, super engineering plastics	Segment screw rotor for kneading disk screws
Wear and corrosion resistance	V50 C50 C70	69(960) 69(960) 63(770)	Ceramics Plastic magnet Engineering plastics, super engnieering plastics, espacially in the case of higher glass fiber content such as fourty percent and higher.	Segment screw for kneading disk screws, cutter blade for pelletizer, Check ring sealing ring, screwhead, screw, cyclinder, open nozzle, shut off nozzle, cylinder liner, runner, gate for injection moulding machine.
Superior corrosion resistance (nonmagnetic)	H50 H70	63(770) 58(650)	Fluorine polymers	Same as above, plus nonmagnetic metallic mould for plastic magnets

Superior Characteristics

1. **Resists wear overall.**
2. **Dose not react readily with contacting materials.**
3. **Wear is reduced with KH as a contacting material.**
4. **Resists wear by powder.**
5. **Resists corrosion and oxidation at high temperatures.**
6. **Performs well at high temperatures.**
7. **Resists wear and corrosion from nonferrous metals.**
8. **Tough, strong parts resist wear.**
9. **Moving parts are lighter, compared with WC parts.**
10. **Ferromagnetic properties can be specified.**
11. **Bonds readily to steel.**

Structure and Mechanical Properties

The microstructure of hard alloys, composed of a fine-boride hard phase (colored fine grains) and a ferrous-base binding phase to fill up the former phase, represents 100% density and homogeneous fine structure.

Fig. 1 Microstructure of KH-V50

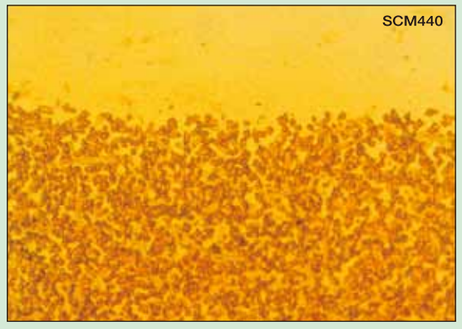
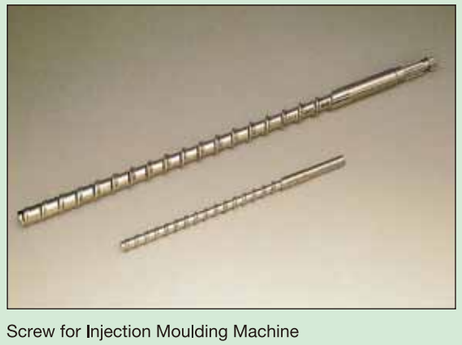


Fig. 2
Microstructure of Diffusion Bonded KH
(Steel is not etched intentionally.)



Screw for Injection Moulding Machine

●There are two types of screw damage : one is caused by corrosion in the metering section, while another is abrasion on the boundary between the feed zone and compression zone. The use of sintered hard alloy **KH** solves these problems of abrasion.
●90% or more cylinder abrasion occurs at the area about 10mm or more back from the tip at L/D4~5. It is better to use sintered hard alloy **KH** for this area.
●It is important to take measures to counter screw head abration. Diffusion bonding of sintered alloy **KH** onto the part where reinforcement is most needed solves the screw head abrasion problem as shown in Fig. 5.

Fig. 3

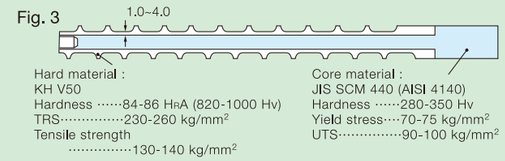
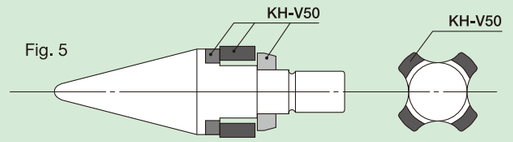


Fig. 4

Fig. 5



Mild to fellow materials

KH does not wear much and it does not couse wear the parts on which it slides.
The latter features makes KH authentically unique material in the world.

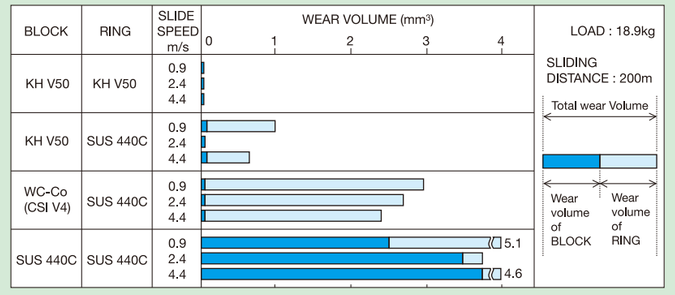


Fig. 6 Results of Ogoshi wear test on wear volume

Hardness — Surface hardness and thickness are required to resist wear. Recently, higher hardness than ever is required to meet the demands of new materials such as super engineering plastics and ceramics.

Strength — Bimetallic structure by sinter joining KH onto SCM with a tough steel core produces high torsional and buckling strength.

Test trial results

User	Polymer	Parts	Former material		KH Use		
			Material	Results	Grade	Structure	Test trial results
Moulding machine maker A	Ceramics	Check ring	SUS440C	——	V50	One-body V50	Lasted 30 times longer than SUS440C. Rec'd continuation order. (Used on super engineering plastics with high filer.)
Moulding machine maker B	Plastic magnet	Check ring Sealing ring Screw head	Special alloy tool steel (power sintered tool steel)	——	C50 C70	Screwhead is a product diffusion-joined with SKD 61.	Lasted 5 to 7 times longer. Rec'd continuation order.
Moulder A	Plastic magnet	Screw	High-speed, high-quality tool steel	After 3 months' use, flight part on head side of hopper was worn away	V50	V50 is diffusion-joined around a core of SCM 440	As of now, 6 months' use, working normally.
Moulder B	Phenol resin + GF 50%	Open nozzle	SKD 11 nitriding & treatment	After 2 months' use, the nozzle diameter was enlarged from φ6.0 to φ9.3	V50	One-body V50	After using 4 months, nozzle diameter increased from φ6.20 to φ6.23. Inside wall not damaged. Continue to use.
Moulder C	Phenol resin + GF 50%	Cylinder head Cylinder sleeve	Alloy (boride self-melting alloy for casting goods)	After 3 months' use, adhesive corrosion developed	V50	Wasted product reclaimed for recycling by sintered V50 sleeve on inside wall	As of now, 3 months' use, working normally.
Moulder D	Plastic magnet	Nonmagnetic mould	Special nonmagnetic steel	After 2 months' use, Cavity part was worn away (about 200,000 shots)	H50 H70	Use as liner for one-body KH	As of now, 6 months' use, working normally.
Other moulders	PBT + GF 30% PC + GF 30% PPS + GF 50%	Screw cylinder unit	Centrifugal superalloy (self-melting alloy)	——	V50	Cylinder, cylinder head, open nozzle, screw, check ring, sealing ring, screw head	As of now, more than 6 month's use, working normally.

A New Age of Injection Moulding.

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