

High Strength, High Machinability Valve Guide Material: Nikalloy EB-22

Technical background

Sintered materials have been widely used for valve guides, taking advantage of their high wear resistance and sliding properties. To respond further customer needs on machinability, which had been a drawback of sintered valve guide materials, Hitachi Powdered Metals developed the high machinability valve guide material EB-21.

Additionally, in recent years, also stress on valve guides from the valves tends to become higher due to higher engine performance. As a result, higher strength was required on valve guide.

To meet these requirements, Hitachi Powdered Metals developed a high strength valve guide material EB-22, which possesses wear resistance. Also EB-22 has excellent machinability, which is same level to that of our high machinability material EB-21.

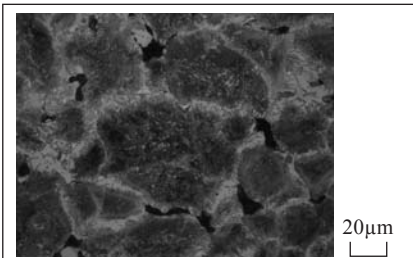
Features of the new product

- (1) Radial crushing strength is 900MPa, which is an increase of approximately 30% in comparison with our conventional material (EB-4).
- (2) The developed material shows excellent machinability on the same level as our high machinability material (EB-21).
- (3) The developed material also possesses excellent wear resistance equal to our conventional materials.

Measures for achieving development targets

- (1) To satisfy both strength and machinability, the amount of additional graphite powder and machinability enhance particle were optimized.
- (2) Strength was improved by applying an iron powder with an irregular particle shape and good compressibility.

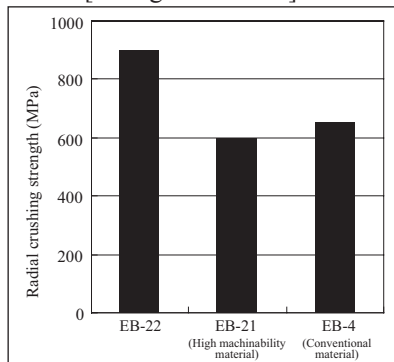
[High strength, high machinability valve guide material EB-22]



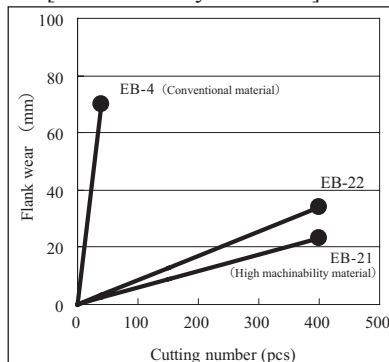
Chemical Composition (mass%)

	Fe	Cu	Sn	P	C	Mn	S
	Bal.	4.5	0.5	0.08	1.7	0.6	0.4
	EB-22		EB-4 (Conventional material)		EB-21 (High machinability material)		
Radial Crushing Strength(MPa)	900		650		600		
Density (g/cm ³)	6.8		6.6		6.5		
Hardness HRB	80		80		70		

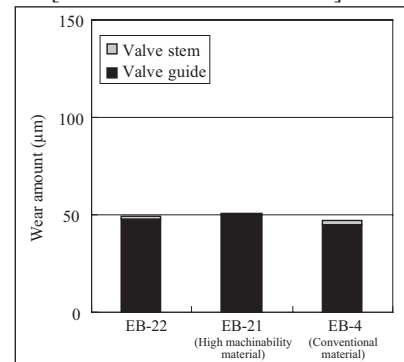
[Strength of EB-22]



[Machinability of EB-22]



[Wear resistance of EB-22]



(Unit wear test, 500°C, 10h)

Applied products

Valve guides for gasoline engines

