

NEW PRODUCTS

Valve Seat Insert (VSI) Material with High Wear Resistance for Gas Engines

Technical background

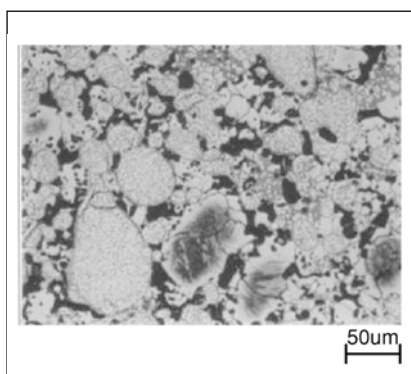
Because sintered alloys allow a high degree of freedom in alloy design, various performance features such as heat resistance, wear resistance, etc. can be added to products easily in comparison with wrought materials. For this reason, sintered alloys are widely used in valve seat inserts (VSI) for automobile engines, etc.

Considering the dry service environment in gas engines (CNG, LPG), extremely high wear resistance is required in VSIs for this application. Therefore, Hitachi Powdered Metals developed a VSI material with the highest wear resistance for use in gas engines.

Features of the new product

- (1) An Mo-steel matrix is applied, as this material shows no hardness deterioration at high temperatures :
> 350MHV@400
- (2) Hard particles with higher wear resistance than the conventional material were developed and adopted. In addition, the largest amount of hard particle dispersion to date was achieved.
- (3) A high self-lubricating effect is imparted by causing precipitation/dispersion of CrS in the matrix.
- (4) An oxide film forms readily on the material, preventing metal-to-metal contact with the partner valve.

(High wear resistance valve seat insert material for gas engines: EH-52HRD)



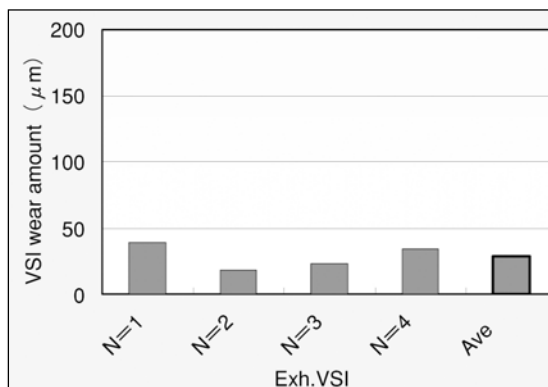
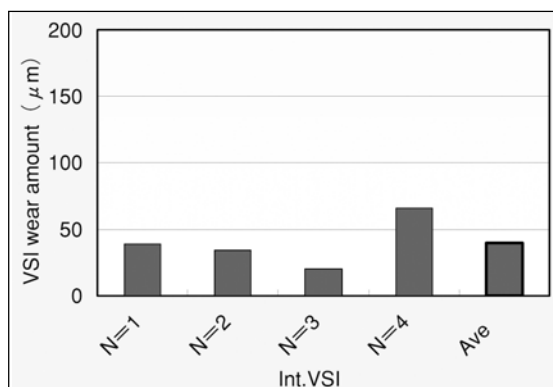
Chemical Composition (mass%)

Fe	Co	Mo	Cr	Ni	Si	S	C	Other
Balance	18	26	5	3	1.5	1	1.3	<1

Density (g/cm ³)	7.0<
Apparent Hardness HRA	60<

(Wear resistance of EH-52HRD)

Test condition: 400h durability test in CNG engine



The amount of VSI wear was slight, even in a severe durability test using a CNG engine. This result confirmed the excellent wear resistance of EH-52HRD.

Typical applications of the new technology

- Valve seat inserts for CNG and LPG engines

Possible applications of the new product

- VSI for gas heat pumps
- VSI for fork lifts
- Other parts which require heat resistance and wear resistance

