

Sinter-Diffusion Bonded Wear Resistant Parts with High Strength and Wear Resistance

Technical background

For products, which requires excellent heat/wear resistance and strength, a new part is developed. This part applies sinter-diffusion bonding technology with wrought stainless steel and sintered material to achieve both high heat/wear resistance and strength. Additionally, new sintered material SUT-33 was developed to meet required excellent heat/wear resistance.

Conventional technology

SUT is a heat resistant/wear resistant material in which 20% of hard particles are dispersed in an austenitic stainless steel matrix. However, in some cases, wear resistance and strength were inadequate for the parts used under severe environment such as turbocharger parts.

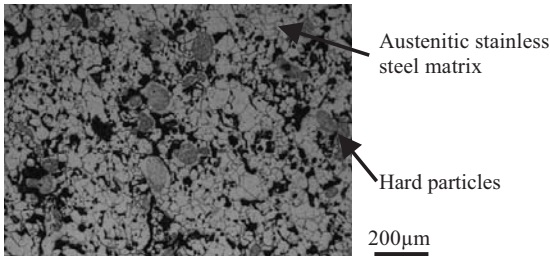


Photo 1 Microstructure of SUT

New technology

In the newly-developed material SUT-33, wear resistance is improved approximately 10 times in comparison with SUT by increasing the content of hard particles and densification. Strength requirements are satisfied by applying sinter-diffusion bonding with wrought stainless steel.

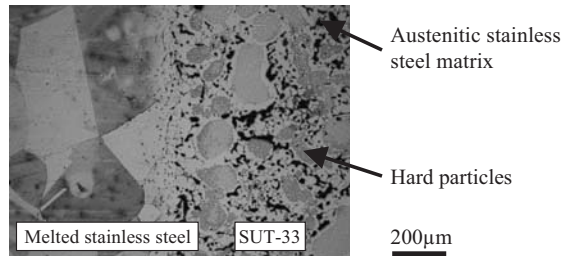


Photo 2 Microstructure of SUT-33

Features of the new technology

- (1) Excellent high temperature wear resistance: Newly-developed SUT-33 shows superior high temperature wear resistance to that of the conventional SUT and wrought Tribaloy (Fig. 1).
- (2) High strength: A high level of strength is achieved, which had been a problem with sintered materials, by sinter-diffusion bonding with wrought stainless steel to form a unitary body (Fig. 2). *Sinter-diffusion bonding is also advantageous for cost because there is no need for additional processes.

Table 1 Comparison of SUT and SUT-33

	Cr	Co	Ni	Mo	Si	Fe	Density (Mg/m ³)	Apparent hardness (HRB)
SUT	15	12	10	8	1	Bal.	6.7	80
SUT-33	13	31	5	22	2	Bal.	7.8	100

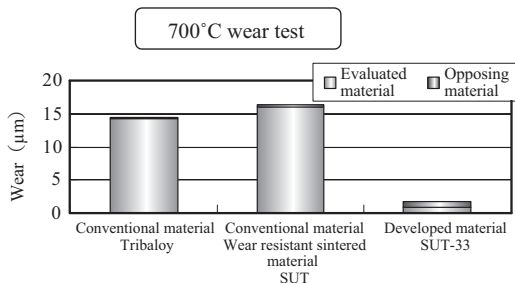


Fig. 1 Results of high temperature sliding wear test

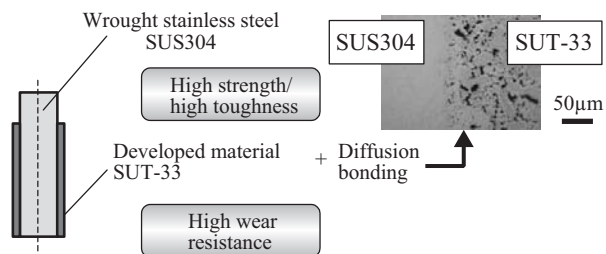


Fig. 2 Structure of sinter-diffusion bonded wear resistance part

Examples of applicable products

- All types of shaft-related heat-resistant, wear resistant parts
- Bushes for EGR (exhaust gas recirculation)
- Bushes for variable exhaust valves

Applied products

- Turbocharger parts

