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Recent Trends in Iron Powder for Powder Metallurgy

Ã ¸ $ Û (Yasuaki Morioka)

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†) Ó K S I } _>* q3Æ b9× I Ø!•) ¦ q b I Ø Þ Ë Ý>* ” º Ð – ¬5r(Š b0 4 •/¡>*
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Synopsis :
Recent trends in iron powder for powder metallurgy, especially the consumption of iron powder in Japan, manufacturing equipment and capacity of iron powder manufacturers in the world, and progress in powder metallurgy technology and iron powder manufacturing techniques in the past forty years, are outlined. The newly developed "KIP" (Kawasaki Steel iron powder) products, particularly high compressibility atomized iron powder, good compactibility atomized iron powder, no- segregation iron powder which prevents the segregation of graphite pow der, and low alloy steel powders for high strength sintered parts, are introduced. The recent level of strength obtainable with high strength sintered materials, and atomization techniques and mechanisms, are also described herein.

粉末冶金用鉄粉の現状と動向*

川崎製鉄技報
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Recent Trends in Iron Powder for Powder Metallurgy

要旨

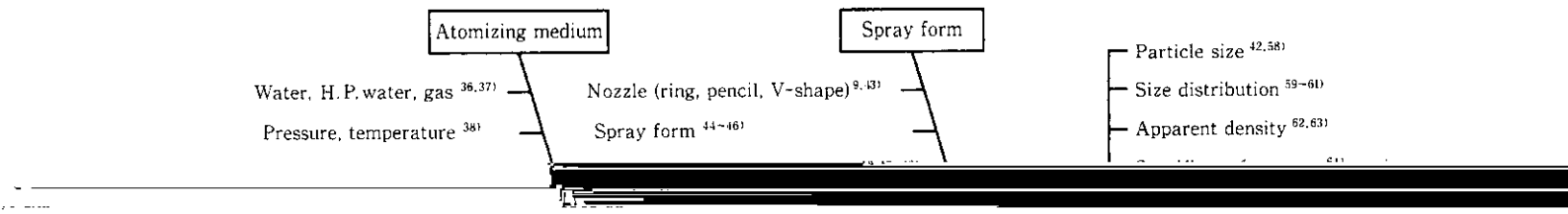
粉末冶金用鉄粉の動向，とくに日本における鉄粉の需要，世界の

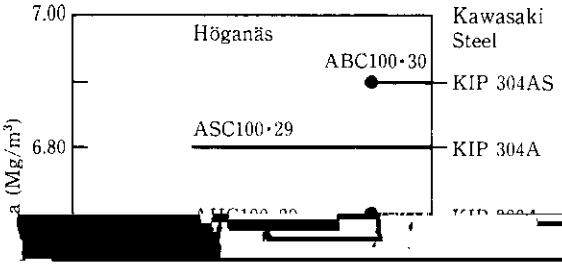
Table 1 History of powder metallurgy and Kawasaki Steel iron powder (KIP)

Table 2 Iron powder manufacturers in the world[4)]

Table 3 Manufacturing processes for atomized powders (by recently published literature)

Process	Content	Powder	Reference
Water atomization	Pressure≒5～20 MPa	Relatively irregular in shape High surface oxygen contents	5～7)
High pressure water atomization	Pressure: 50～100 MPa	Fine particle size <10 μm	8～10)
Gas atomization (N_2, Ar or air)	Pressure≒1～5 MPa	Spherical	11～19)


Atomizing medium
Spray form
Water, H.P. water, gas [36,37]
Pressure, temperature [38]
Nozzle (ring, pencil, V-shape) [9,43]
Spray form [44~46]
Particle size [42,58]
Size distribution [59~61]
Apparent density [62,63]


7.00
6.80
Höganäs
ABC100・30
ASC100・29
Kawasaki Steel
KIP 304AS
KIP 304A

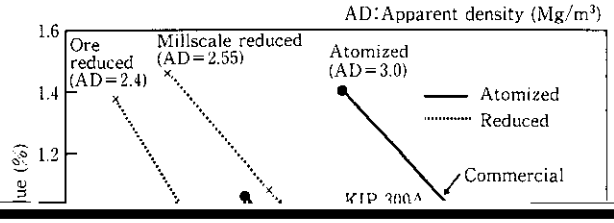
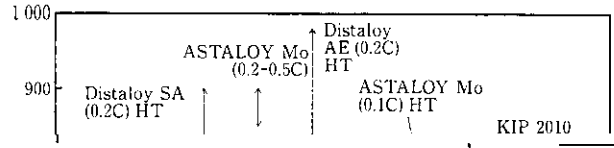

AD: Apparent density (Mg/m³)
1.6
1.4
1.2
Ore reduced (AD=2.4)
Millscale reduced (AD=2.55)
Atomized (AD=3.0)
Atomized
Reduced
Commercial

Table 5 Chemical compositions of KIP alloy steel powders (wt %)

Process	Powder	C	Si	Mn	P	S	Ni	Cu	Mo	Cr	N	O



焼　結：1 130°C あるいは 1 250～1 300°C，AX or RX ガス中
浸炭焼入れ：850～930°C，1～2 h
焼もどし：180°C，1～2 h

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