POWDER METALLURGY BEARINGS FOR ADVANCED
ROCKET ENGINES

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Traditional ingot metallurgy has been pushed to
the limit for many demanding applications including
antifriction bearings. New systems require corrosion
resistance, better fatigue resistance, and higher
toughness. With conventional processing, increasing
the alloying level to achieve corrosion resistance
results in a decrease in other properties such as
toughness.

Advanced powder metallurgy affords a viable solu-
tion to this problem. During powder manufacture, the
individual particle solidifies very rapidly; as a
consequence, the primary carbides are very small and
uniformly distributed. When properly consolidated,
this uniform structure is preserved while generating
a fully dense product. Element tests including roll-
ing contact fatigue, hot hardness, wear, fracture
toughness, and corrosion resistance are underway on
eleven candidate P/M bearing alloys and results are
compared with those for wrought 440C steel, the cur-
rent SSME bearing material.

Several materials which offer the promise of a
significant improvement in performance have been
identified.