

1985 P/M PART-OF-THE-YEAR DESIGN COMPETITION WINNERS

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ABSTRACT

Powder metallurgy's cost savings, reliability, strength and ability to perform in demanding applications are demonstrated by the winners of the 1985 Powder Metallurgy (P/M) Part-of-the-Year Design Competition. Winning parts made from steel, tool steel, tungsten heavy metal alloy and titanium are used in automotive transmissions, business machines, diesel engines, biomedical devices and helicopters.

The competition is sponsored annually by the Metal Powder Industries Federation to recognize outstanding applications of P/M.

HOUSING CLUTCH FOR FOUR-WHEEL DRIVE TRANSFER CASE WINS FERROUS GRAND PRIZE

A P/M steel housing clutch used in the transfer case of manual transmission four-wheel drive vehicles, won the Grand Prize in the ferrous category of the competition (Fig.1). The part is made by the Powder Metal Products Division of Imperial Clevite, Inc., Salem, Indiana for Pitts Industries, Inc. of Dallas, Texas. The transfer case is made by Warner Gear.

The P/M clutch is a new design that replaced a steel stamping and screw machine part, which required milling, broaching, welding and press fitting.

The part is fabricated to a minimum density of 6.7 g/cm^3 and has an ultimate tensile strength of 25,000 psi (172 N/mm^2) and a yield strength of 18,000 psi (124 N/mm^2).

The part is a complex design with two sets of kidney-shaped holes that make it difficult to fabricate because of the small webs. The roundness tolerance of .0015 inches (.0381 mm) on the spline detail is critical. So is the flatness of poles at .0005