

1982 P/M PART-OF-THE-YEAR
DESIGN COMPETITION WINNERS

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Winners in the 1982 P/M Part-of-the-Year Design Competition illustrate the continuing trend of powder metallurgy replacing components made by investment casting, machining and stamping. The winners also illustrate P/M's cost savings, precision and reliability in critical applications. Made from steel, brass, stainless steel, titanium carbide and a high performance Stellite alloy, the winning parts go into a broad range of end products: farm equipment, a microscope, aircraft hydraulic systems, an aircraft turbine engine, extrusion dies, sporting knives, a lathe chuck and an automobile transmission.

The competition is sponsored annually by the Metal Powder Industries Federation (MPIF). Awards are given in ferrous, nonferrous, stainless steel and "other P/M materials" categories.

LARGE PART WINS FERROUS GRAND PRIZE

A copper infiltrated steel (MPIF material FX-2010-T) manifold used in a cam lobe low speed high torque motor for self-propelled farm equipment won the Grand Prize in the ferrous category (Fig. 1). Burgess-Norton Mfg. Co., Geneva, Illinois, made the part for John Deere Component Works, Waterloo, Iowa.

The part weighs 32.5 pounds (14.7 kg); 26.5 pounds of iron and 6.5 pounds of copper infiltrant. Some of the infiltrant is lost in sintering. The part is compacted on a 1,000-ton press using dual upper punch motion and two lower punches with a stepped core rod. The radial location of the upper and lower punches is critical in addition to the location of the infiltrant. The top and bottom faces of the part must be free of residue and erosion.

The part is fabricated to a final density range of 7.2-7.6 g/cm³ and has an ultimate tensile strength range of 70,000-90,000 psi (483-620 MPa). The part must be pressure tight and have a maximum leakage not exceeding 7.0 LPM. Hardness range is RB 85-115.