

2004 P/M DESIGN COMPETITION AWARDS

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GEAR ASSEMBLY WINS FERROUS GRAND PRIZE

ASCO Sintering Company, Commerce, California, and Deltran Inc., Amherst, New York, won the grand prize in the ferrous category for a gear assembly, consisting of four parts—an armature, rotor blank, bearing, and pinion gear, Figure 2 and Figure 3. The assembly operates in a motor drive for automatic sliding minivan doors and opening and closing tailgates. An electric motor transfers torque through the armature to the rotor via an electromagnetic clutch. The rotor is housed in an electromagnet and, when activated, the inner pole of the rotor attracts the armature, resulting in tooth engagement and torque transfer to the drive gear. Made from a P/M phosphorous iron material, the parts have a density of 7.0 g/cm^3 , an ultimate tensile strength of 310 MPa (45,000 psi), a yield strength of 221 MPa (32,000 psi), and a 7% elongation. The parts are made to a net shape, except for a turning operation on the hub on the rotor. Density control is critical for the required magnetic properties. Innovative tooling, including a special pneumatic-mechanical triple-upper-punch system, provided the 7.0 g/cm^3 density to satisfy magnetic and strength properties of the rotor. The teeth in the rotor must withstand a minimum torque of 21J (190 inch pounds).

COMPLEX PUMP LATCH WINS STAINLESS STEEL GRAND PRIZE

Webster-Hoff Corporation, Glendale Heights, Illinois, won the grand prize in the stainless steel category for a complex pump latch made for Phillips Plastics, New Richmond, Wisconsin, Figure 4. The complex 316 stainless steel latch is used at the end of a door handle for a medical infusion pump that dispenses intravenous solu-

Special properties, innovative tooling design, precision, reliability in demanding situations, performance, and cost savings characterize the winning entries of the 2004 International P/M Design Competition sponsored by the Metal Powder Industries Federation. The winning parts and components operate in automobiles and light trucks, industrial pumps, power tools, and medical products. Made by conventional press-and-sinter technology, warm compaction and metal injection molding, the winners replaced parts made by die casting, investment casting, machining and forging.



Figure 1. Grand Prize winners—the best of the best function in automobiles, medical equipment and power tools