

# Powder Metal Automotive Components

*“Stackpole’s rapid growth is based on the accelerated adoption of innovative technologies. Our goal is to increase the mechanical strength and performance of powder-metal (PM) automotive parts so that these PM components represent a viable alternative to conventional steel. The assistance from the Ontario Ministry of Environment and Energy and Natural Resources Canada has been critical, enabling us to reach our ambitious material property targets far sooner than would have been possible, thereby further sharpening Stackpole’s — and Canada’s — edge in intensely competitive markets, worldwide.”*

Peter Jones  
Vice President, Technology  
Stackpole Limited  
Mississauga, Ontario



*Powder metal transmission sprockets*

## THE COMPANY

Stackpole has become a world leader in high-performance powder metal components for the automotive and appliance industries. The company has grown 20 per cent per year over the past decade. This was the result of the focused research and development which was assisted by the Ontario Ministry of Environment and Energy and Natural Resources Canada. This research led the company to introduce several new net-shape products that have replaced conventionally machined parts, at significant cost and energy savings.

In 1982, Stackpole had one plant in Toronto, employed 85 people and recorded sales of \$18.5 million. In 1994, sales reached \$104.8 million, a 34.5 per cent increase over 1993. The company has four plants in Ontario, one in the USA, one in England and is working on plans for another plant in Mississauga.

Further, the company forecasts that total sales for 1995 will be \$135 million and employment will reach 750 people.

Based on the firm orders in hand, the company estimates that in five years, it will employ more than 1,000 people in Ontario and will have total sales of \$250 million. Total capital expenditures between 1992 and 2000 will exceed \$100 million and will be mainly in Ontario.

## THE CHALLENGE

The powder metal industry is a young technology compared to conventional fabrication methods such as forging and casting. Since the 1940's, however, the industry has gained a firm hold on the complex, high-precision, high-volume parts end of the business.

Still, one of the problems of powder metal parts is that they have lower mechanical properties compared to steel. This weakness has limited the industry's expansion into markets for highly stressed components.

## SOLUTION

Research and development at Stackpole has focused on this end of powder metal metallurgy. Recently, the company has developed new alloys and processes and, as a result, has introduced several high-strength components. This commitment to high strength powder metal — without losing the benefits of powder metal — has paid handsome dividends. Stackpole's Mississauga plant now produces more than 60,000 high-strength parts each day.

The company's research and development into eliminating the performance gap between powder metal and steel is now at an advanced stage. The new products being developed today will answer the problems associated with making highly stressed components from powder metal. These new products will offer the greatest opportunities for sustaining rapid growth in the long term.

## RESULTS

Stackpole's strategy in research and development resulted in a recent order from General Motors Corporation for transmission sprockets with unique shape and performance characteristics. In 1998, this part will generate \$50 million per year in sales, representing the single largest order in the history of powder metal.

Stackpole's powder metal process offers energy savings of up to 60 per cent over conventional fabrication methods. The new process also:

- \* reduces solid waste and emissions;
- \* reduces the amount of scrap metal to less than five per cent by eliminating all of the machining operations;
- \* reduces the amount of combustion gases released by cutting out melting and hot-forging operations.

## OPPORTUNITIES

Stackpole's unique powder metal technologies continue to attract increasing attention from new and existing customers. A significant proportion of the company's future growth will come from the automotive market segment with proven new technologies.

For example, the North American transmission gear market totals about \$1 billion annually. Gaining a fraction of this very large market will represent a major breakthrough for powder metal.

## MINISTRY OF ENVIRONMENT AND ENERGY SERVICES

For information on Ministry of Environment and Energy assistance to industry, please contact the Industry Conservation Branch at (416) 327-1492, Fax (416) 327-1261.

For more project profiles and other publications, visit the ministry's website at <http://www.ene.gov.on.ca>

## PARTNERSHIP IN POLLUTION PREVENTION AND RESOURCE CONSERVATION

Industrial companies located in Ontario may seek ministry/industry services that will help them to:

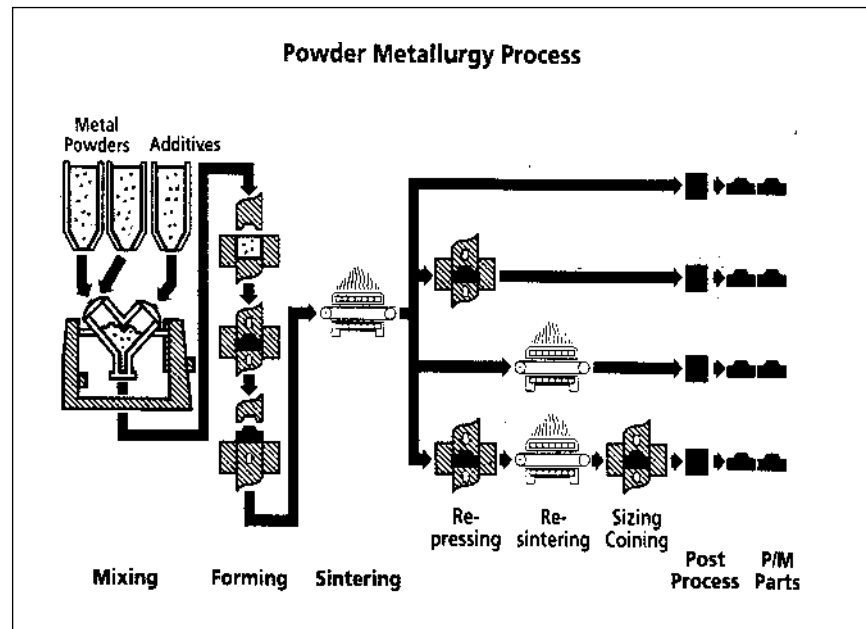
- \* use energy and water more efficiently;
- \* reduce, reuse and recycle solid waste;
- \* reduce or eliminate liquid effluents and gaseous emissions.

Equipment and services supply companies can benefit from the information provided on technologies identified for business development.

## FOR FURTHER INFORMATION, PLEASE CONTACT

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*Powder metallurgy process*

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