Powder Metal Contributions to Innovative Oilpump Designs

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Abstract

In the field of oil pumps for the automotive industry, the volumetric, mechanical, and therefore the total increase of efficiency is the driving force for all advanced development activities. Advanced oil pump systems are developed based on innovations related to design and application of the newest modeling and simulation tools, followed by testing for verification. Several refinements could be achieved by applying the following tactics: design improvements of oil pump gears, the application of alternative forming processes to improve precision and performance (e.g., size rolling instead of standard sizing), the introduction of complete new pump concepts (planetary pump) and the development of new materials with adapted coefficient of thermal expansion to maintain a better axial clearance and higher volumetric efficiency. This paper gives an overview about the state of the art and the new concepts of PM pump technologies.

Structural Resonance as an Automated NDT Method

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Abstract

Worldwide emphasis on defect free manufacturing within the automotive sector has driven manufacturers to seek out cost effective methods of 100% inspection. To achieve zero defect ("Zero PPM") output cost-effectively, manufacturers are making the commitment to move to online, automated nondestructive testing (NDT) methods. This type of online inspection requires accuracy, reliability, and high throughput. The Resonant Acoustic Method of Nondestructive Testing (RAM-NDT) is emerging as a very efficient method of structural defect discrimination and lends itself very well to automated online implementation. This paper will present the fundamental principles of the resonant acoustic method, on a structural, metallurgical, and return on investment basis.

Keywords: Resonant Inspection, Resonance, Resonant Acoustic Method, Zero Defect, PPM, Zero Nondestructive, Structural Resonance