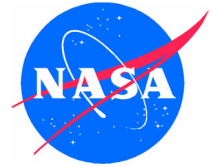


# Lincoln Electric Achieves Major Cost Reductions with NASA Technology

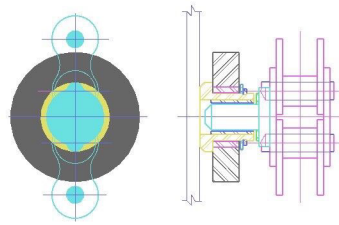


## TECHNOLOGY

NASA Glenn created PM300, a high temperature, oil-free bearing material containing chromium oxide, which ADMA Products, Inc. licensed in order to create new commercial products.

## COMMERCIAL APPLICATION

Lincoln Electric designs, develops and manufactures arc welding products, robotic welding systems, and plasma and oxyfuel cutting equipment. As part of its commitment to provide quality products at competitive prices, Lincoln recognized a need to replace a set of bronze bushings that were an integral part of a dryer oven used in a manufacturing line. These bushings were unreliable and caused system failures leading to system down time and frequent repair costs. ADMA Products, Inc., a licensee of NASA's PM300 high temperature bearing material through GLITeC, was contacted by Lincoln for a better solution. ADMA, based on input from both Lincoln and NASA Glenn, generated a set of bearings from this material which Lincoln installed, tested, and evaluated in its manufacturing operations.



NASA Glenn material has been used to generate cost-savings for Lincoln Electric.

## SOCIAL/ECONOMIC BENEFIT

Lincoln found that the bearings based on PM300 exhibited such a superior reliability that the company has decided to retrofit all sintering furnaces with PM300 bearings. Lincoln estimates that they will achieve cost savings of over \$200,000 each year through the use of PM300. Initial estimates indicate that the lifetimes of these bushings should be between 10 and 20 years.

## NASA APPLICATIONS

The NASA Glenn Research Center is interested in high-temperature oil-free bearings, seals, and solid lubricants to enable a next-generation class of turbomachinery. By improving efficiency, lowering friction, and reducing emissions, NASA Glenn's work could be used in advanced aeropropulsion engines, refrigeration compressors, turbochargers, and "hybrid" electrical turbogenerators.

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