CASE STORY · CROMAX 482 IH · OGNIBENE POWER SPA

# STEERING WITH PRECISION

**About 20 years ago, Ognibene Power SpA, a leading manufacturer of hydraulics for power steering systems, started working closely with Ovako to develop hard-chrome bars for demanding hydraulic applications. Today, piston rods made from Cromax® (induction-hardened) bars play an important role in Ognibene's power systems for some of the world's best-known off-highway brands.**

The steering systems in tractors, suspension systems in vehicle cabins and the tilting mechanisms in forklifts typically have one critical component in common: hydraulic cylinders.

These cylinders and the hydraulic systems they support have long been taken for granted. But without their ability to withstand corrosion, dynamic loads and constant wear and tear over many years, these components and the piston rods that drive them would be subject to frequent failure.

Today, hydraulic cylinders from Ognibene are the choice component for many leading manufacturers of off-highway vehicles. And for good reason. These cylinders, built with hard-chrome rods manufactured from Cromax 482, are noted for their long-lasting and highly reliable performance even in extreme off-highway driving conditions.

Some 20 years ago, Ognibene and Ovako's mill in Molinella, Italy, initiated the development of what is today a niche product from the mill. Ideally suited for hydraulic cylinders, the bars made from this material can be downsized without loss of load-bearing capacity, significantly reducing weight and cost. One of Ognibene's main application for these cylinders is the steering system for some of the world's leading tractor brands.

"What is important to us is the cylinders' corrosion resistance, and the ability to handle dynamic loads, wear and, of course, extreme temperature changes. After all, these vehicles are constantly exposed to extreme environmental conditions including mud, dust and dirt," Vittorio Nobili, purchasing manager, explains.

"The graded material from Ovako was developed by our two companies for a reason. We needed material that would provide strength resistance and good machinability. We also needed a quality product that would provide a good compromise between cost and strength," he adds.

Vittorio Nobili, purchasing manager, Ognibene Power SpA

Critical to the end-product quality is the careful selection of the raw materials for the rods, according to Nobili. Using this approach, he adds, the quality of the steel must have a high level of consistency from batch to batch.

Random testing is vital to maintaining the hydraulic cylinder's performance. In addition to the "classic" metallurgical lab that examines the mechanical and chemical characteristics of the chrome-plated rods, Ognibene also runs the chrome-plated rods through what Nobili describes as "formation behavior."

"Let's say we make a test important for steering. We apply side loads on the rod to see if it breaks or bends in a plastic way. We do this not only on the Cromax bars, but also on other raw material. Our demand on quality is very high. "

Giancarlo Riva, who works in the purchasing department, also points to the service Ovako provides to Ognibene. "They have a very good supply chain, very good delivery performance. And any time we ask for something, they reply very quickly."

**Cromax 482 IH**
The material of Cromax 482 is based on a medium carbon, micro-alloyed steel, which is characterized by high strength in hot-rolled condition. Cromax 482 is a cost-effective alternative to traditional low-alloyed, quenched and tempered grades with, in the context of piston-rod applications, equivalent properties. The grade is well adapted to friction welding as well as induction hardening (IH), and a high and uniform hardness can be achieved.

Cromax 482, in combination with the chrome plating and hardening process in Ovako Molinella, provides consistency in quality, high service and cost efficiency in machining of piston-rods.

Key benefits are:
- Cost-efficient alternative to traditional low-alloyed quenched and tempered grades
- Excellent friction weldability
- Provides cost efficient piston-rod machining through skip hardening process by Molinella

**Ovako facts and figures**
- A leading producer of engineering steel for customers in the bearing, transportation and engineering industries
- Products: low-alloy steels and carbon steels in the form of bars, tubes, rings and pre-components
- Locations: Ovako has ten production plants and a number of sales companies in Europe, Asia and the USA
- Net sales 2015: 834 MEUR
- Employees: 2,905

**Ognibene Power SpA facts and figures**
- Headquarters in Regio Emilia, Italy
- Privately owned
- Employees 756
- Global leader in the field of off-highway power steering systems
- Steering systems developed for the world's largest manufacturers of tractors, excavators, material handling equipment, trucks, boats, machines for urban hygiene and various other applications
- Products include hydraulic cylinders, steering valves and cab tilting systems
- Manufacturing facilities in Italy, Brazil, China and India, a logistics and distribution brand in the U.S. and a sales office in Japan



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