

## Dewatering Pumps Meet Tough Conditions at Underground Coal Mines in Bosnia & Herzegovina

The company faced flooding problems, and its existing pumps were old, with many of them out of operation.

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Various underground coal mines—part of the holding company JP Elektroprivreda BiH d.d. – Sarajevo, Bosnia and Herzegovina—needed nearly a dozen horizontal and vertical pumps for dewatering purposes. The project was a priority for JP Elektroprivreda because the company had experienced problems with flooding in its mines, and its existing pumps were old, with many of them out of operation.

The new pumps were to be permanently installed, electric-driven pumps that would be part of the mine's dewatering system. The deadline for finishing was 120 days from signing the contract. These pumps were critical, so meeting the deadline was a main goal of the project.

The hydraulic parameters for the designated pumps included a requested capacity from 1,000 liters per minute (l/min) to 3,360 l/min and the head ranging from 120 meters (m) to 260 m.

All selected pumps were multistage centrifugal pumps.

The possibility existed for the suction and discharge pump body to be rotated according to the site requirements. The axial thrust was relieved, and the fully shrouded impellers were statically and dynamically balanced.

The pumps covered a range of sizes with motor ratings from 37 to 220 kilowatts with revolutions

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per minute at either 1,450 or 2,900. Most of the pumps were intended for 500 volts except for the vertical pump that was intended for high voltage at 6,000 volts.

The working conditions presented a challenge. The working medium was abrasive and, in some mines, corrosive. The mine air atmosphere was also aggressive on the pump parts. This data was used in the pumps' design stage.



Because of the new pumps' challenging working conditions, the company paid close attention to the resistance of the pump materials to meet the operating conditions. Part of the solution involved the design for the pump bearings—especially for the vertical pump—which were low friction and resistant to wear and insufficient water lubrication.

Sealing of all pumps involved soft packing sealing. It also was critical that all of the supplied pumps would work in explosive conditions and that all pumps were prepared for explosion category IM2 EXde I. All pump materials needed to be specially selected for this explosion category.

Following design and production of these subjected pumps as well as mounting of the pumps, testing was performed according to International Organization for Standardization (ISO) 9906. After delivery of the pumps, the end



Image 1. Various pumps awaiting delivery to the user (Courtesy of MZT PUMPI A.D.)

user installed and commissioned the pumps in the presence of the pump manufacturer.

The end user experienced reduced operating costs with the new pumps in comparison with the previously used pumps. The new pumps were designed and produced with greater coefficient of efficiency, which delivers lower energy consumption costs for the user.

The new pumps also require less maintenance, which contributes to lower costs for the user. All of the pumps performed to their requested hydraulic parameters, meeting the end user's dewatering demands. ■

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