Case Study #183

Comprehensive Redesign of the Pumping System with Pexgol at the Sossego Mine

Replacing HDPE pipes with Pexgol allowed Vale to simplify operations, eliminate auxiliary equipment, and achieve a permanent installation under extreme conditions.

Vale
Brazil | 2024

• Working Conditions
Temperature: 25–38 °C
Flow rate: 600 m³/h
Pressure: 18.5 bar
Fluid components: Water

• Pexgol Pipe
Pexgol PE-Xa Ø355 mm Class 30

• Application
Open-pit dewatering (pumping recovered water)

• Length
1,750 m (7 lines)

The Challenge

With the depletion of the tailings dam at the Sossego mine, located in Canaã dos Carajás (Brazil), Vale needed to implement a new, reliable, and cost-effective pumping system capable of transporting recovered water back to the processing plant.
The main challenge lay in the extremely demanding geographical conditions of the open-pit mine, with significant elevation differences and very rocky terrain.
Vale initially considered using conventional HDPE PE100 PN25 pipes. However, due to the excessive number of welds required, the system presented high risk, especially given the flow and pressure fluctuations within the mine.
This equipment posed additional operational hazards and demanded constant dismantling and relocation of pipe sections and supports by the personnel.
The total scope included more than 5,600 meters of piping, 466 unions, and a highly complex infrastructure with numerous electrofusion fittings and electrical controls.
Vale required a more reliable, simple, resistant, and faster alternative—one capable of ensuring long-term operational continuity and minimizing shutdown times.

The Solution

Choosing Pexgol Ø355 mm Class 30 was a key decision for the project. Thanks to its unique mechanical properties—high flexibility, abrasion resistance, creep resistance, and durability under aggressive conditions—the pipe could fully withstand the demands of the new pumping system.
The redesign reduced the critical 250-meter section to 1,750 m of Pexgol pipe installed in seven independent lines, placed directly on rocky soil without the need for additional supports.
The new system includes:

- 7 pumps of 542 HP each, operating with float switches.
- 1,750 meters of Ø355 mm Pexgol pipe on 100 m and 50 m coils.
- A fully automated system with frequency inverters and transformers for continuous operation.
- ANSI Series 300 flanges, electrofusion saddles, and stiffening rings at each pump.
- Local installation support from distributor local Rolcon, and weekly coordination with Vale, excavation, and operational teams.

Flexibility of Pexgol pipe minimized on-site unions thanks to long coil lengths, reducing welds and installation times, as well as significantly lowering potential failure points.

Results

Description	Before (HDPE)	After (Pexgol)
Total length	5.600 m	1.750 m
Welds	466	28
Floaters	175	7
Electrical centers	2	1
Distribution network	19 km	12 km
Total platform weight	130 tons	61,5 tons
Booster system	7 × 250 HP	Eliminated

The Advantages of Pexgol Pipe Systems

High resistance to wear
Pexgol is the preferred solution for abrasive materials transportation. Typically resists three times more than HDPE and twice more than steel.

Excellent chemical and corrosion resistance
Pexgol pipes can resist a wide range of chemical agents, slurries, toxic and radioactive materials.

High temperature resistance
Working temperatures can range from -50°C / -58°F up to 110°C/230°F.

Superb internal and external corrosion resistance
Our pipes are proven to withstand decades of exposure to corrosive environments, with nonstop performance in some of the world's harshest environments.

Long pipe sections
Pexgol pipes can be supplied in long coil lengths, reducing number of joints, installation time and risks.

Creep and impact resistance
Pexgol pipes can withstand high amounts of axial and radial stresses and are highly resistant to impact, fracture and fatigue. Furthermore, Pexgol pipes are completely resistant to cracks even when dragged over sharp rocky terrain and coagulated salt crystals.

For more information please visit:
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