UL94 V-0 Flame Retardant Polyurethane Wheel for Mining

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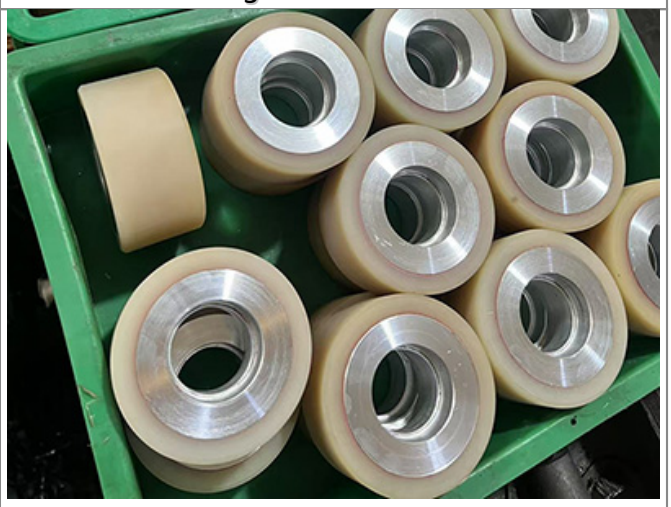
Thumb	
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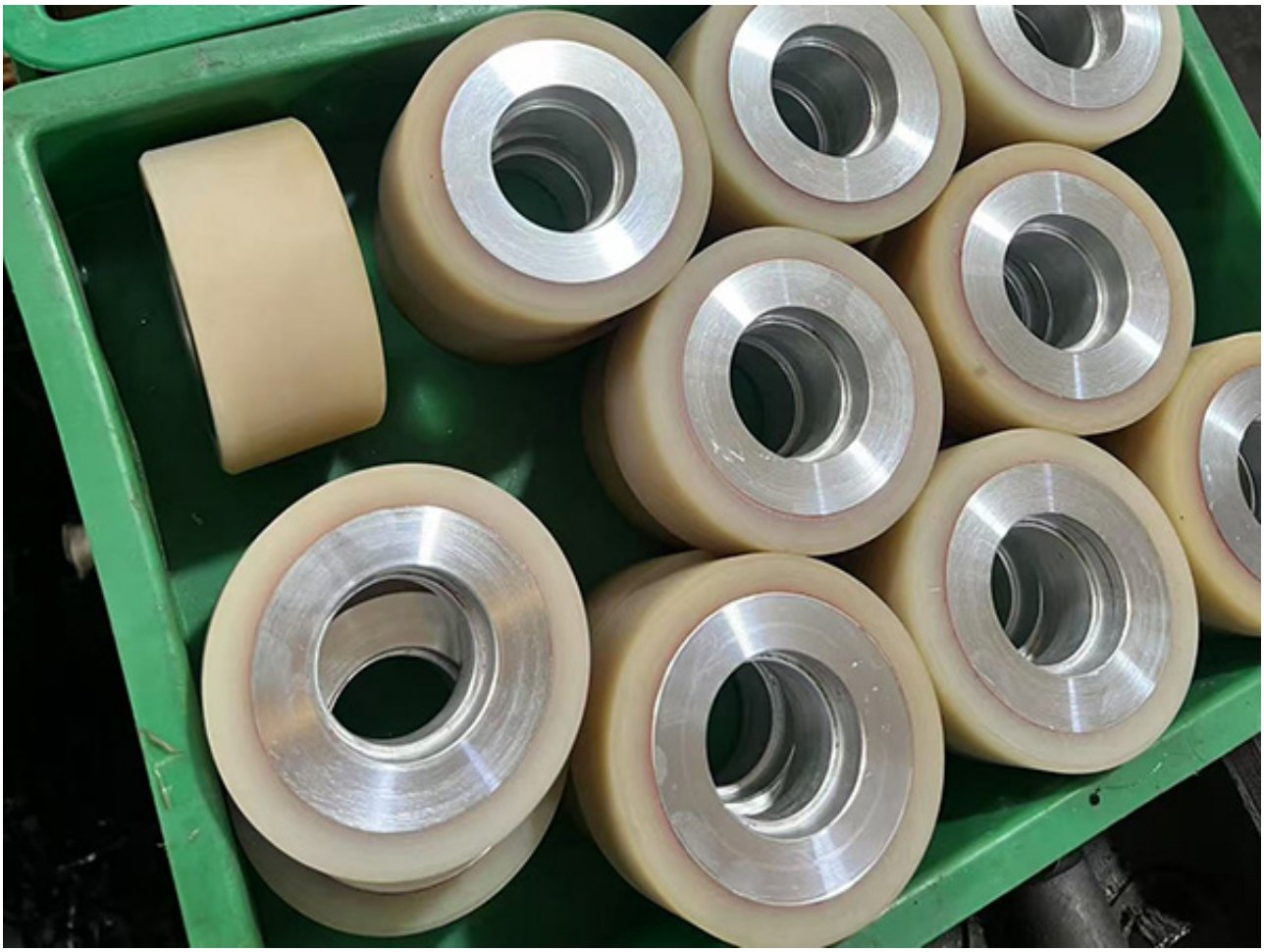
Description

In hazardous mining environments, a single spark can lead to catastrophic explosions. With mining accidents still posing a critical threat to global operations, ensuring total equipment safety is no longer optional—it is a matter of life and death. Among the myriad of safety protocols, one often-overlooked yet vital component is the underground transport system. This is where explosion-proof polyurethane wheels become the ultimate line of defense, eliminating friction-induced sparks and safeguarding lives in the deep.



Product Specifications and Material Composition

The product features a dual-material composite design in its structure, with core specifications strictly executing precision industrial standards. The outer diameter of the polyurethane-coated wheel is 29mm, utilizing a high-purity, specially modified polyurethane material that delivers excellent load-bearing capacity and tear resistance. The internal bearing spindle has a diameter of 12mm and has been upgraded to SUS304 stainless steel. This high-quality stainless steel framework provides robust mechanical support for the entire roller body. In corrosive mine environments characterized by high humidity or the presence of acids and alkalis, it consistently maintains superior oxidation and rust resistance. This fundamentally eliminates rust contamination and ensures the mechanical precision of the equipment during long-term, high-frequency operations.

Core Performance and Technical Characteristics

By incorporating cutting-edge material modification formulas, this product has achieved comprehensive upgrades across physical, chemical, and electrical safety performance, highlighted by four core characteristics:

1. Temperature Range (-30°C to +100°C): Its operational temperature range spans from -30°C to +100°C. It resists brittle cracking and delamination in the freezing winter temperatures of alpine mining regions, while maintaining physical structural stability under high-temperature conditions generated by continuous high-load friction.

2. UL94 V-0 Flame Retardancy: As a specialty component applied in flammable/explosive gas and dust environments, the product meets the UL94 V-0 flame retardancy standard. When exposed to an accidental flame source, it self-extinguishes rapidly upon removal of the flame, and any burning drips fail to ignite surrounding media—strictly securing the safety redline underground.

3. Zero-Debris & Zero-Leaching: Engineered for long-term friction against stainless steel surfaces, the formulation strictly excludes ordinary rubber or recycled rubber. The modified polyurethane molecular chains possess extreme shear resistance, meaning they do not easily generate powder or debris under long-term, high-frequency friction. Furthermore, within the standard operating temperature range of -20°C to +80°C, the material is odorless, non-toxic, and exhibits zero chemical leaching (no oil bleeding). This prevents gas-phase deposition contamination on surrounding electronic chips and micro-sensitive components caused by chemical migration.

4. ESD Protection: To eliminate static spark hazards in high-concentration gas (methane) and dust environments underground, the surface resistivity of the polyurethane wheel is strictly controlled between 10^6 Ω ~10^9 Ω, falling precisely within the standard electrostatic dissipative range. This design allows static charges generated by friction to leak safely and slowly to the ground terminal, effectively preventing the accumulation of high-voltage static charges while avoiding potential system short circuits or leakage currents caused by overly low resistance.

Typical Application Scenarios

Leveraging its cross-industry high safety and extreme cleanliness, this polyurethane wheel has been widely adopted in various high-standard industrial equipment:

1. Mining Inspection Robots: Utilized in travel, drive, and guidance systems to guarantee long-term, stable robot operations on complex underground rail tracks.

2. Mining Monorail Locomotives: Utilized in the driving, guiding, or auxiliary support sections of monorail crane assemblies. During high-frequency, high-pressure friction against stainless steel rails or stainless steel reinforcements, it provides powerful traction and high-load support. Concurrently, its heavy-duty flame-retardant and anti-static

properties completely eliminate spark hazards during underground towing.

Conclusion

In summary, this high-performance polyurethane wheel introduces advanced flame-retardant and anti-static modified formulations to fulfill strict underground explosion-proof safety requirements while endowing the product with extreme physical wear resistance and chemical stability. Its zero-powdering, zero-leaching physical performance successfully resolves the industry bottleneck where precision internal components of high-end intelligent mining equipment are vulnerable to micro-contamination. It stands as an ideal industrial solution for ensuring the safe, efficient, and long-term stable operation of specialized automated equipment in modern digital mines.