



Diesel Powered Equipment

Underground Mine Safety - The Role of Insulation



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Firwin Industry Series – Underground Mining

From scoops and scalers to pallet handlers and personnel carriers, underground mining relies on diesel-powered equipment to get the job done. Diesel power provides the mine with a rugged, reliable, and cost effective energy source; overall, diesel accounts for 72 percent of the energy used by the mining sector.* With developing economies such as China and India fueling demand and contributing to record high prices for aggregates, precious metals, and other natural resources, mining equipment manufacturers are experiencing an increasingly strong demand for diesel powered vehicles that can extract, load, and transport.

(* Diesel Service and Supply website, Industrial_Industry_Usage)

Diesel Powered Equipment in an Underground Environment: The Challenges

As can be imagined, underground mining poses a number of challenges when it comes to the safe and efficient use of diesel powered mining equipment:

- Exposed exhaust and engine components: Diesel exhaust can get extremely hot. With work in an underground mine often taking place within confined spaces, workers are at risk from severe burns from uncovered exhausts and engine components.
- Diesel particulate matter: Exhaust from diesel powered mining equipment must be properly filtered in order to protect personnel from noxious fumes. Fire Safety: Oil from a burst hydraulic hose, or from an engine leak, can start to smoke upon contacting exposed exhaust components.
- High ambient heat: The heat generated by diesel powered equipment can heat up an already sweltering underground environment. Furthermore, it can cause heat-sensitive cables and sensors to malfunction.



Meeting the Challenges: How Insulation Blankets Can Help

Blanketing the exposed engine and exhaust components is an important step in meeting the challenges of operating diesel powered equipment. Once properly insulated, ambient heat is reduced, and workers are shielded from burns. A good ventilation system is of course essential in ensuring that hot air is removed and cooler air is brought in, and to remove noxious fumes from the mine. As regards the latter, pollution control equipment, such as catalysts and particulate filters, are essential in removing much of the noxious material before it leaves the exhaust. Proper insulation can even help catalysts burn exhaust pollutants more effectively by maintaining an optimal high exhaust temperature as the exhaust travels along the piping and into the catalyst.



Mining Vehicle, Exhaust & Catalyst Insulated

Standard Insulation Blankets: Why They Sometimes Fall Short

Standard insulation blankets have 2 features which can make them less than ideal for an underground mining environment:

The underside of a regular-issue insulation blanket is typically fiberglass material, which is non-combustible, held in place by wire mesh. While fine for most applications, in an underground mine, oil from a burst hydraulic hose line, or an engine leak, can seep underneath an insulation blanket and lodge in the insulation material. Separated from the hot component by only a wire mesh, this mixture of oil and insulation material can become a fire hazard, the last thing you want in a underground mine.



Standard Insulation Blanket Interior

The second limitation of standard insulation blankets is the outer cover. Typically a silicone impregnated fiberglass, the outer cover is designed to be durable and withstand normal wear and tear for years. In an underground mine, however, the confined spaces and potential rock falls can lead to sharp objects coming into contact with the insulation blankets. Not designed to withstand this kind of treatment, regular insulation blankets can be prone to tearing or puncture.

MineWrap™ Insulation Blankets: Designed for the Underground Mine

To meet these concerns, Firwin's R & D department designed a blanket with the specific needs of underground mining in mind. Known as MineWrap™, this blanket features a stainless steel inner liner, which seals off the insulation material and prevents any oil from seeping in.



Stainless Steel Inner Liner



To reinforce its outer cover, the MineWrap™ blanket features a reinforced stainless steel foil exterior, which in turn is covered with a stainless steel mesh.



MineWrap™ Covering Exhaust and Catalyst

With its added dimensions of increased fire safety and rugged exterior, MineWrap™ has become the insulation blanket of choice for a number of mines and equipment manufacturers.