

Environmental Monitoring - White Paper

Abstract

The rising number of fatalities within the mining sector caused by toxic gases puts a large strain on the industry. These gases are released in large amounts underground and cannot typically be detected by human senses. The air we breathe on the surface is a mixture of several gases including oxygen, nitrogen, argon, carbon dioxide, and other gases in trace amounts. When other gases contaminate the air, the oxygen levels drop, and that is when the trouble begins. This is a massive safety concern while working underground.

The mining sector benefits from Becker Mining Systems' ongoing research and development program, where close international ties guarantee the edge on product design, impeccable manufacturing standards, cost efficiency, safety, and reliability of equipment.

Becker Mining Systems is the only worldwide supplier of complete energy, automation, communication, and transportation infrastructure for the mining industry. It is one of the technology leaders in its markets.

Becker Mining Systems has over 1,500 employees globally. Our products, processes and customer service are continually evolving based on the same core values as held in 1964 to make underground mining operations safer, smarter, more efficient, and more environmentally sustainable. Becker Mining Systems is represented by its subsidiaries in France, Poland, Russia, China, South Africa, Australia, the United States, Canada, Mexico, and Chile.

Introduction

The air supply in mines can be contaminated by the presence of other gases such as carbon monoxide, hydrogen sulfide, methane, and excess carbon dioxide. Without being able to monitor the presence of these gases we would not be able to safely and efficiently perform daily tasks underground.

Working in a confined space these gases are not always able to disperse and can build up in the mine. Due to their combustible, explosive, and toxic attributes this is cause for a serious issue to arise – including the potential for fatalities. The dangerous mixture of different gases has varying effects on human health and mine safety.

Gases are released in mining operations including drilling and blasting by mining machinery such as diesel and gasoline motors; and by other means such as the decay of timbers, the aftereffects of mine fires, and chemical processes like oxidation.

The most efficient way of preventing build-up of these gases in mines is the incorporation of high-quality mining ventilation systems as well as the use of prevention and detection systems.

Current Trends in the Mining Industry

The mining sector benefits from Becker Mining Systems' continual product research and development. Becker's close international ties guarantee the edge on product design, impeccable manufacturing standards, cost efficiency, safety, and product reliability.

A continual trend in the mining sector is the improvement and maintenance of health and safety standards. Without a standard being upheld we would not have the thriving industry we do today. The mining industry relies on those who work the front lines, and we cannot operate without the good health and safety of our workers. Becker Mining Systems is continually improving these standards through the products and services we provide.

Becker Mining Systems' Solutions

The high accuracy Becker Mining Systems gas monitoring solutions has integrated features for the detection of ambient temperature, humidity, and barometric pressure. In addition to the accurate detection and monitoring of ambient temperature, humidity and barometric pressure, every device can monitor multiple gases, including oxygen, methane, carbon dioxide, carbon monoxide, hydrogen sulphide and nitrogen dioxide, etc.

smartsense® Fixed Gas Monitor SSFM-100

An advantage of the smartsense® SSFM-100 device over competing monitoring systems is that all features are integrated into one compact instrument. There is no need for complex cable connections, troublesome programming, or difficult calibration.

The smartsense® system addresses the operational needs of the modern mine – atmospheric and environmental monitoring systems that are reliable, robust, and low-maintenance. The smartsense® line of products has been designed to strict international standards to ensure a quality and reliable product for the harshest environments. The system layout is comprised of numerous measurement points where each point can measure up to four gases and a total of 10 parameters at a time. The main measuring unit – the smartsense® Fixed Monitor SSFM-100 – is mounted in areas of interest. It has integrated controller functions and acts as a black box on the spot for storing critical information such as calibration records, alarm history, and data logging for post-accident investigation. It is an all-in-one package that eliminates the need for complex cable connections and troublesome programming. The system is customisable to each client's installation requirements including copper (RS485/Ethernet), radio frequency (UHF-VHF Data Radio/Wi-Fi), and fiber optic data connectivity.

smartsense® Single Gas Monitor SSSG-100

Becker Mining Systems has released a new customisable gas monitoring unit that is reliable in all mining environments. The smartsense® Single Gas Monitor SSSG-100 has been manufactured for everyday safety, with the IS-designed terminal module available in two versions: either equipped with an on-board sensor to provide an all-in-one environmental monitoring solution, or as a display module to provide quick access to real-time data. Further system expansion is available through the optional external input/output ports for both versions of the terminal module.

Due to its modular architecture, robust multi-gas monitoring systems can be customised by adding up to six SSSG-100 sensor modules that stack easily and neatly together. Hot-swap capability simplifies sensor calibration and replacement. The customised SSSG calibration caps make for a quick and streamlined LED-guided calibration process.

The SSSG-100 Alarm Module allows for extra safety with its wide viewing angle, red-amber-green visual warning system, and 100 dBA audible alarm. The smartsense® Single Gas Monitor SSSG-100 functions like a black box as it stores critical information such as calibration and alarm history, and data logging for post-accident investigation.

Fully programmable set points for alarm and output controls, along with short term exposure limit and time weighted average limits for sensor modules, can be configured and viewed through RS-485 Modbus.

Other Products

Becker Mining Systems' product portfolio, which complies with stringent government mining regulations and mining house specifications, includes high-performance, fit-for-purpose communication and safety solutions for underground and surface mining such as Leaky Feeder, Wi-Fi Tagging and Tracking, Environmental Monitoring, and Proximity Detection Systems.

In addition to communication solutions, Becker Mining Systems also offers Intrinsically Safe and flameproof underground electrical reticulation products, as well as fluid transfer, rigging, rope attachments, steel arch tunnel supports and underground transportation systems. An important feature of all systems is that they are designed to facilitate future upgrades.

Becker's critical service encompasses the design and manufacture of products and systems, using the latest technologies and advanced materials. Mine safety is significantly enhanced by the implementation of one or a combination of Becker's specialised multi-technological solutions.

Becker Mining Systems' atmospheric and environmental monitoring system forms an essential part of critical underground and above-ground communications and safety solutions.

Conclusion

At Becker Mining Systems we strive to implement the highest quality products on the market. The continual product development and innovative system strategy allows us to deliver new products that improve the quality of health and safety in the industry. The Becker Mining Systems family is passionate and driven to provide safer and sustainable mining across the world through our smartsense® and smartcom® product lines.