

Mining: A high-risk activity

IECEX ensures protection and safety for Ex equipment and workforce

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Miners, especially those working in underground mines, live a highly risky existence. The dangers range from cave-ins and explosions to ones they cannot see, such as carbon monoxide and methane gas. Modern mining techniques, machinery and equipment provide better protection than ever before and mining is aeons away from the time when miners brought canaries into the pits to provide early warning of the presence of gas. If the canary struggled – or died – they knew they were at risk.



Machinery and equipment used in mining, such as excavators...

Since time immemorial men have been digging and searching for metals all over the world. Throughout the 19th century, Europe, with the introduction of industrial-type mining, dominated this sector, but by the end of the century, the European mining industry had declined dramatically. North America took the lead, only to experience the same downfall as Europe, when in the second half of the 20th century, developing countries, often ex-colonies, gained independence and started to exploit their own mineral resources. Africa, Latin America and Asia have emerged as big players in the mining sector in the past 20 or 30 years.

Despite the geographical shift in dominance, mining still takes place on all continents. Although the need for safety measures to prevent accidents and protect workers continues to grow, accidents still occur and kill far too many people. While the nature of the work itself makes it impossible to eliminate all risks, there are many areas where action can be taken to minimize potential hazards.

Multiple hazards

Gases can poison workers or displace oxygen in the mine, causing asphyxiation.



...or even mining trucks have extremely high noise power levels workers have to be protected from

Gas detection equipment has become mandatory in some countries. Miners that do not carry such equipment while underground are obviously deprived of an instant alert system that can save their lives, especially since some of the gases are totally odorless and invisible to the human eye.

Proper ventilation systems inside underground mines provide constant fresh air supplies to work areas and help avoid exposure to the harmful gases, heat and dust that can cause severe injury, illness or even death.

While roof bolters are among the loudest machines, most of the equipment used in mining exposes workers to extremely high levels of noise which can result in severe hearing loss.

Cave-ins and rock falls in the mine tunnels, pits and rooms are common and can trap miners underground. In 2010, 33 workers in a Chilean mine were trapped for 69 days about 700 metres underground and five kilometres from the mine entrance, before being brought back to the surface in a high-profile operation.



Modern roof bolters are automated to completely remove the risk of having the operator be exposed to falling rock while roof bolting is carried out

Specific Ex equipment

While mining continues to be one of the world's most dangerous occupations, the introduction of modern technology has helped reduce some of the risks associated with it. Automation and the remote operation of some of the machinery are now commonplace in the industry.

From the earmuffs that protect workers from exposure to high noise levels to excavators and roof bolters, all equipment used in mining activities has to be designed, manufactured, tested and certified to specific Ex requirements.

All players in the mining sector have a powerful tool at their disposal to ensure that all pieces of equipment, from the smallest to the largest and the heaviest, will perform in the safest and most reliable way.

And who provides this powerful tool? The IEC.

Built to IEC International Standards...

IEC International Standards prepared by IEC TC (Technical Committee) 31: Equipment for explosive atmospheres,

provide designers, manufacturers, installers, maintenance and repair specialists with the specifications and requirements against which Ex equipment has to be built, installed and repaired. Market demand for these standards has increased significantly in recent years and many countries have adopted them.

...tested and certified by IECEx

IECEX, the IEC System for Certification to Standards Relating to Equipment for Use in Explosive Atmospheres, has several solutions for manufacturers of equipment used in the mining sector. The System has put in place a number of Schemes that provide assurance that equipment and systems are manufactured and operated according to the highest International Standards of safety.

Safety and protection

A great number of companies rely on IECEx for the testing and certification of their products. Manufacturers have to meet the very strict requirements specified in the IEC 60079 series of International Standards on explosive atmospheres as well as those put in place by national or regional regulations

and legislation. Proving their adherence to those requirements can be costly and time-intensive. An IECEx certificate is like a passport for manufacturers of Ex equipment: it provides clear proof of compliance with International Standards and it certifies that the equipment in question carries the requisite level of protection.

Maintenance and repair of Ex equipment

Because Ex equipment has a much higher capital cost than the same equipment used elsewhere, repairing it is often more cost-effective than replacing it. The IECEx Certified Service Facilities Scheme assesses and certifies that organizations and workshops that provide repair and overhaul services to the Ex industry do so according to the strict requirements of IEC International Standard 60079-19, *Explosive atmospheres - Part 19: Equipment repair, overhaul and reclamation*. This ensures that unique Ex safety features are not compromised during the repair or overhaul process. The system includes on-site audits prior to issuing the IECEx Certificate and periodic audit reports.

Highly-skilled workforce

To cover all safety aspects in Ex environments and to complement the Certified Equipment Scheme, IECEx has developed the IECEx Certification of Personnel Competence Scheme for assessing and certifying individuals working in potentially hazardous areas. The IECEx CoPC (Certificate of Personnel Competence) provides independent proof that the certificate holder has the required qualifications and experience for working on electrical equipment located in hazardous areas and can implement IEC International Standards covering explosive atmospheres.

For the CoPC, competence is defined as "the ability to apply knowledge" rather than simply assessing knowledge. In this sense, the assessment of persons includes assessing their ability to perform certain Ex-related tasks.