

Industrial gases for the mining industry and specialty gases

Many times when people hear the word "mining" they think of historical times and usually say "people are still mining today?" Things like that. Well, as a matter of fact, yes. Mining is almost as ancient a practice as the earliest mining activity was about 20, 000 years ago. But it wasn't until about 10, 000 years ago that it started to become a more important industry.

Back then, metals and minerals were usually found only in nature. When people mined and found metals like silver and gold, they were often considered prized. Civilization grew and further developed thanks to mining. As countries dug up more metals and minerals, they became richer. Fire was incorporated into the mining industry, which was a technological breakthrough at the time. Since then, more advanced technologies have emerged.

Today, coal is still one of the world's major energy sources. In fact, with the increased demand for energy abroad, the profits from coal mining have recently boomed.

Let's take a look at some of the different mining processes and the gases that are utilized once the metals and minerals are excavated from the earth. But first, we'll get some background on the different types of mining processes.

Mining Processes

Open Pit Mining

Open pit mining is the most common type of mining. It starts at the surface and then a pit is formed as the earth is dug. Typically, in open pit mining, copper is the most abundant metal mined in this process. When looking for the metal, excavators look for green rock, which indicates the presence of copper. Electric shovels are used to scoop up the rock and dirt, which are then dumped into trucks that transport the material to the ore plant. The ore mill is where the metal is cleaned and processed. The ore itself is the material that is excavated, which contains the metals and minerals.

Underground Mining

When it comes to ore that is too deep to dig from the surface, underground mining is required. This is the type of mining we are all used to seeing in movies and on TV. In order to access the underground area, shafts or tunnels are built to bring miners to the excavation site.

Underground mining is more expensive than surface mining because it requires more resources to access the ore being mined. Underground mining is most commonly used to extract coal.

Underwater Mining

When mining minerals and metals, you can also find them on the ocean floor. Underwater mining can be tricky because miners must take into account the ecosystem. Boats or underwater vehicles are used to drill into the seafloor and can go as deep as 140 meters below sea level.

While there are not many detailed and strict regulations for underwater mining, there are many untapped opportunities for finding minerals, metals and gems on the seafloor. However, it poses risks to marine life and is not the most sustainable way to extract assets.

Now that you have a basic understanding of the types of mining processes, let's take a look at how industrial gases can be utilized in various applications in the mining process.

Providing an inert environment

During mining excavations, especially underground mining, the risk of explosion is high. Particularly in coal mines, two types of explosions can occur: methane and coal dust explosions.

Methane explosions occur when a buildup of methane gas comes from the coal itself. If it is exposed to heat and there is not enough air to dilute it, it can cause an explosion. The same is true for coal dust. The same result can happen if fine particles come in contact with a heat source. This is why it is so important to provide an inert environment.

To ensure that these things do not happen, abandoned areas or areas that have been mined are sealed and kept in an inert state. This is done by adding inert gases such as nitrogen or carbon dioxide to reduce the amount of oxygen. These sealed areas are isolated from other areas that are being mined to ensure the safety of workers.

It is well known that nitrogen generation systems are used in underground mining to extract nitrogen from the atmosphere and deliver it to the sealed mining area. These systems have been commercialized for the mining industry and are an effective solution for creating an inert environment in coal mines.

Mineral Processing

When processing the minerals and metals found in a mine, various stages are required to obtain the final product. First, the collected ore is crushed into a powdery substance. This powder is then enriched by a process called froth flotation.

Froth flotation essentially gets rid of any unwanted material. In this process, the ore is suspended in water, and then the solid minerals and metals attach to a gas such as air or nitrogen and rise to the surface to be recovered.

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