



Primary Booster Fans.

Air ventilation solutions.



Underground ventilation solutions.

For almost 40 years, Minetek has delivered innovative and modular air management solutions to underground mining operations worldwide. Minetek has a well-established network of operations globally that enables us to provide comprehensive site services that ensure high levels of customer satisfaction and cost-effective solutions.

Our experience in mining ventilation enables operators to achieve safe and reliable operations while delivering guaranteed reductions in power consumption and increased profitability. Minetek aims to create the most sophisticated innovation & technology for underground mining ventilation through world-class engineering, breakthrough technology, and intensive research and development. As a result, our underground ventilation technology offers rich economic, operational, and safety benefits not seen elsewhere.

Ventilation concerns.

Ventilation is one of the most critical safety aspects of an underground mining operation. The main concerns involve air quality, temperature and humidity. Poor ventilation will result in high levels of dust and carbon dioxide gas build-ups with a limited oxygen supply, leading to shortness of breath, headaches and fatigue. Gas build-ups must be monitored closely at all times, with evacuation and shut down of the mine until the levels subside.

Air pollution remains the most significant problem for miners, with many at risk of developing a lung disease called pneumoconiosis, which occurs when exposed to airborne respirable dust for long periods. Pneumoconiosis can cause impairment, disability, and premature death. Confined spaces, minimal ventilation and underground vehicle emissions can all compromise air quality underground.

The temperatures range from extremity-numbing cold to such heat that dehydration can be caused in minutes by profuse sweating in underground mining operations. It's not just humans that are negatively affected, as machinery and equipment can overheat, freeze, or stop working in harsh environments. The main objective of an underground ventilation system is clear: provide air flow in sufficient quantity and quality, enabling safe underground operations.

Sources of toxic, explosive and asphyxiant gases.

Gases in mines can occur naturally as a by-product of combustible sedimentary rock or minerals along with vehicle exhaust fumes or through activities such as blasting. These toxic gases include methane, hydrocarbons, carbon monoxide, carbon dioxide, oxides of nitrogen, sulphur dioxide, hydrogen sulphide, radon and ammonia. Blast fumes can deplete oxygen levels with large quantities of nitrogen and carbon monoxide in the air. Blast clearing and adequate ventilation systems are required to remove airborne contaminants, with air testing conducted before underground operations recommence.

Vehicles used in underground mining operations can cause underground fires and are a significant source of fumes. Ammonium Nitrate Fuel Oil (ANFO) is an explosive oxidising agent and can promote underground fires if in contact with combustibles. This may generate ammonia if ANFO is to come in contact with cement. Diesel exhausts from vehicles and machinery must be monitored to help control emissions in underground mining operations, with harmful gas components present in air particles. Where practical, mines should exhaust contaminated air from any secondary ventilation circuit to the primary return air system.



Ventilation in an underground mine is of critical importance to the occupational health and safety of underground employees.

Government of Western Australia
Department of Mines, Industry
Regulation and Safety



Ventilation oxygen concentration levels.

> 19.5%

An effective ventilation system must provide a minimum of 19.5% oxygen concentration within confined spaces, with a maximum concentration level of 23.5%.

Underground ventilation legislation.

As mining operations become increasingly complex and hazardous, governments worldwide have implemented strict regulations to ensure adequate and safe underground ventilation. Although legislation differs slightly from country to country, the primary purpose of such legislation remains consistent with promoting healthy and safe working conditions for miners by preventing the accumulation of hazardous gases, dust particles, and other pollutants. In addition, such legislation also helps to regulate temperature and humidity levels in the mine, reducing the risk of heat stroke among workers. Furthermore, underground ventilation can reduce noise levels and protect miners from long-term hearing damage.

Underground ventilation legislation in the USA has different authorities with concurrent jurisdiction requiring compliance on multiple levels with different regulations. For example, mines on US federal land are typically subject to multiple layers of federal, state, local and administrative regulations. The surface and mineral ownership will dictate which level of government has jurisdiction over the mining operation and permitted activities.

Underground ventilation legislation and safety standards differ from state to state in the USA. Code 512.154 of Nevada's underground mine requirements for fresh air and ventilation states;

- Underground mines require at least 200 cubic feet per minute of fresh air for each person working.
- Operators are strongly encouraged to utilise appliances for allaying dust.
- Sufficient volume and velocity are required for underground air currents to direct and exhaust smoke, dust and harmful gases.
- Mechanically produced and positively controlled air currents must be provided for the welfare of employees working underground.

In Australia, guidelines and legislation on underground ventilation are set on a state level. The New South Wales Work Health and Safety (Mines) regulation framework highlights the requirements for managing risks from airborne contaminants and hazardous atmospheres. An underground mine must ensure that its ventilation system provides air that is of sufficient volume, velocity and quality to ensure that the general body of air in the areas in which persons work or travel has a concentration of oxygen that is at least 19.5%. Dust and airborne contaminants must be kept to a minimum, with concentrations as low as reasonably practical.



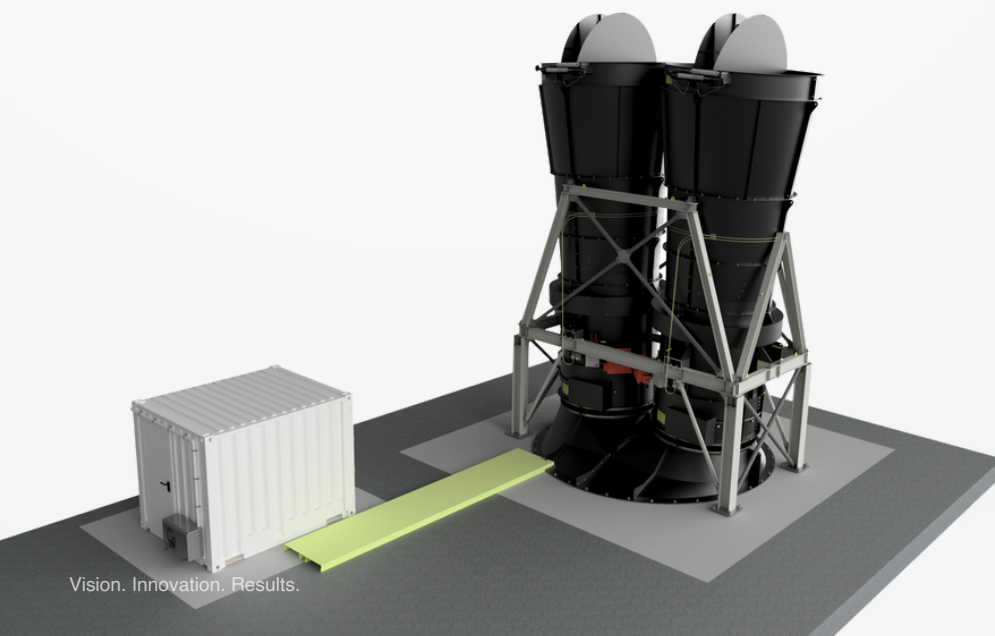
Ventilation & fan applications

- Primary Fans
- Booster / Intake Fans
- Development Fans
- Secondary / Auxillary Fans
- Bulkhead
- Long Duct Runs
- Tunnell Fans.



The installation was completed with no incidents or injuries, with no delays and ahead of schedule. The plan was for 10 shifts, and it was completed in 7 shifts.

Pit n Portal CEO
Mincor Resources



High Output Axial Primary Booster Fan.

Engineered with the mining industry at the forefront, Minetek's High Output Axial Fan series is a robust and reliable underground ventilation fan with a broad operating range. Our innovative steel-fabricated impeller allows for operation at pressures previously thought impossible for an axial fan with prolonged life, in even the harshest of environments.

Minetek's powerful single-speed fans, have been proven to reduce power consumption costs by up to 50% and improve underground mining ventilation systems. Compared to traditional larger fans, Minetek's compact units have the capability to outperform larger alternatives and then be re-deployed quickly and easily to other locations as the mine workings evolve.

Minetek Primary Booster Fan.

	Imperial	Metric
Power range	150 - 2,000 kW	200 - 2,700 HP
Volume	50 - 1,000 m3 /s	106,000 - 2,119,000 CFM
Pressure	200 - 8,000 Pa	200 - 27 in.wg



Fabricated with Minetek's high-quality steel impeller, enabling our equipment to operate in extreme conditions previously thought impossible for axial fans. Our fans last longer, reducing impacts on maintenance teams and improving overall mine profitability.

Minetek fans have been proven to operate 11dBA quieter than comparable twin fans in the same conditions and airflow. In underground mining, the effects of unwanted noise can be amplified by the enclosed conditions, and our fans help reduce overall operating noise and potential long-term hearing impacts.

Our Mine Air Control (MAC) system seamlessly integrates with the operating layer of the mine to optimize airflow across the entire air circuit. With the ability to ramp airflow up or down based on scheduling and vehicle movements, Minetek fans offer true performance on demand.

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We are always looking at new innovations and technologies that will benefit both us and our clients.

Minetek has been able to display that with the use of their modern ventilation technology, where we can look to see production increases through faster re-entry times and reduced capital costs in the total life of the development, delivering value to both us and Mincor.

Pit n Portal CEO
Mincor Resources

Ventilation efficiency

> 80%



Innovative ventilation technology.



Minetek Primary Fan benefits.

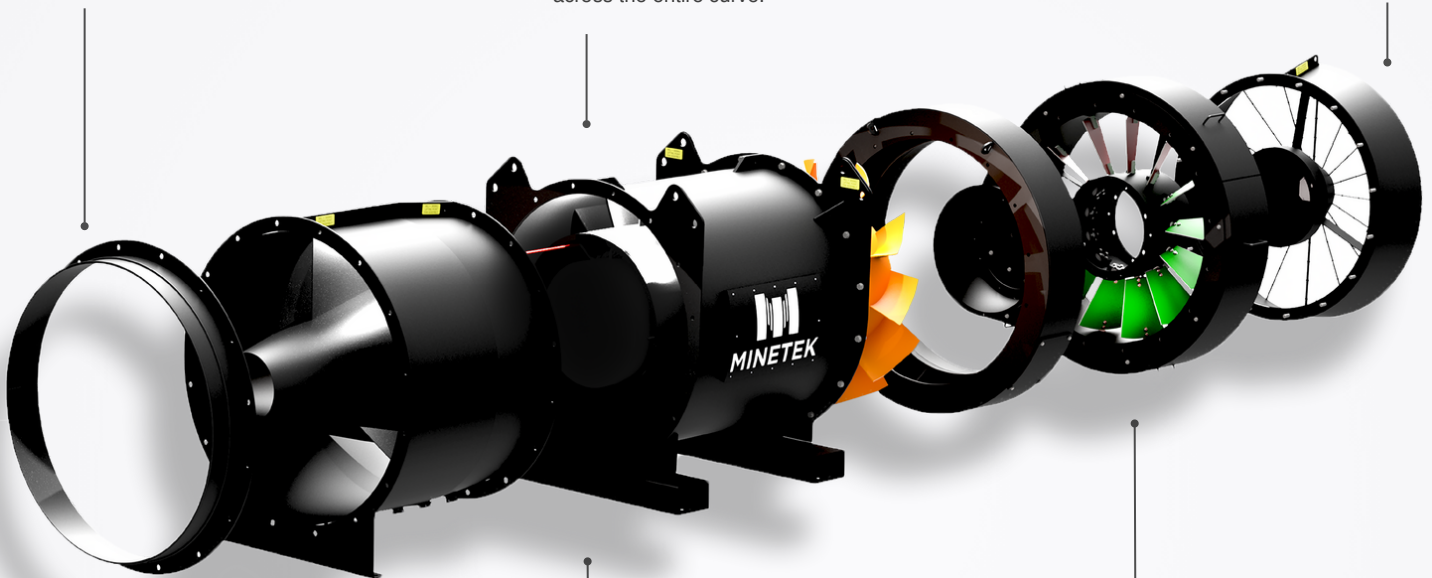
- Vast operating range
- Single-speed fan - regulated by the integrated Performance On Demand (POD) system.
- No fans stalls or Variable Speed Drive (VSD) controls.
- Halve required power consumption.
- No complex or expensive Ventilation On Demand (VOD) controls.
- Ability to provide the correct amount of air when and where you need it.
- Robust design utilizing blades impervious to wear.
- A safe solution with no loss of air.
- Reduce capital costs with less fans required.

Engineered to perfection.

Tested against a standard 1100kW Axial Fan used in underground gold and copper mines with the same duty and burden. Minetek fans lasted almost 7 times longer, with our robust steel impeller designed to withstand the most challenging environments on the planet.

Minetek's innovative anti-stall chamber cleverly controls the flow of air, capturing turbulent air flow and unstable pre-swirls. The technology not only eliminates critical stalls, but has been proven to extend the operating range and overall performance of the fan across the entire curve.

Minetek fans are fabricated using high-quality steel, enabling our equipment to operate in extreme conditions previously thought impossible for Axial Fans. Our fans last longer, reducing impacts on maintenance teams and improving mine profitability.



Our modular design enables operators to plan for the future with a range of Adaptors, Silencers, Booster Fans and additional controls available to optimise the solution and meet the evolving demands of the mine. As the mine grows so too can the ventilation solution offering a scalable approach to delivering air.

Minetek's Mine Air Control system seamlessly integrated with the operating layer of the mine to optimise air flow across the entire circuit, With the ability to ramp air flow up and down based on scheduling and vehicle movements. Minetek fans offer true performance on demand.

Our Performance On Demand (POD) technology allows operators to tailor pressure and power consumption without the need for VSD's. Minetek's fan vane inlets controls the POD system, adjusting the vent flow and power usage. The result is a seamless, responsive solution which optimizes performance, reduces power consumption costs, and increases overall operational efficiency

Customer case studies.

Mincor Kambalda Nickel Operations.

- Supply of an internal Primary Ventilation solution that can be repurposed into the secondary system as the mine expands.
- Customised solution to fit into existing fan chamber, saving money and time in the expansion of infrastructure.
- Modular design allowed onsite personnel to successfully carry out the installation with Minetek site support.
- Regulation of air has allowed the mine to increase ventilation as production requirements increase, saving energy consumption at the operation.

Fan	Minetek HO Model P.
Duty	350 m ³ /s 149,000 CFM 4,800 Pa 14 in.wg
Result	Ability to change fan duty with ongoing mine development. POD technology reduces power consumption and drives down energy costs.



Agnew Gold Mine.

- Debottlenecking was required to achieve Agnew's goal of increased production and expanded exploration.
- Minetek was commissioned to develop a Primary Booster Fan solution, with the full scope including removing redundant equipment and installing the new fans.
- Due to their size, the fans had to be tested before shipping, approval had to be granted from the Power Supply Authorities, and all other facilities in the Minetek complex had to be shut down to provide enough power.
- Minetek engineers worked tirelessly to achieve project goals within a tight timeframe. We removed the old equipment, installed the new fans and commissioned them in just four days.

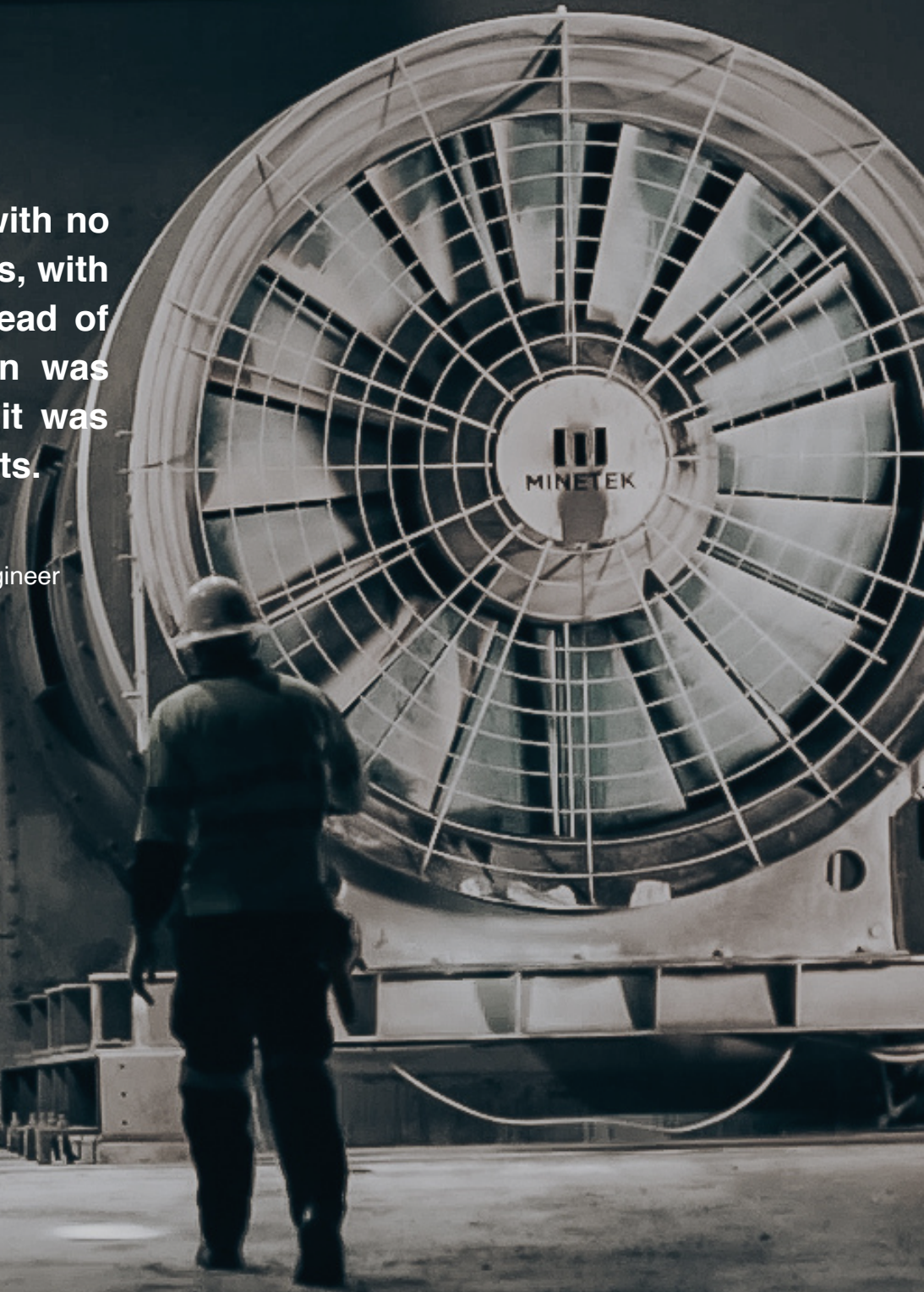
Fan	Minetek HO Series 2.
Power	31,100 kW / 1,000 V individual fan motors powered by renewable power station.
Result	Flow rate of 280 m ³ /sec @ 3700 Pa for current production needs with a maximum airflow capability of 350 m ³ /sec @ 4,200 kPa.



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It was completed with no incidents or injuries, with no delays, and ahead of schedule. The plan was for 10 shifts, and it was completed in 7 shifts.

**Adam Dardha - Electrical Engineer
Goldfields Agnew Mine**





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