



TunnelSAFE Rescue Vehicle

Designed to provide mobile refuge for tunnel personnel trapped in a hazardous or toxic environment.



tunnelSAFE



MineARC Systems - Built for Safety.

www.minearc.com



Company Profile

MineARC Systems is the global leader in the manufacture and supply of emergency safe refuge solutions for the mining, tunnelling, chemical processing and disaster relief industries.

With 20 years' experience, our dedication to ongoing research and development is driven by our key focus to continually offer the best and most advanced safety solutions on the market.

Our team of qualified engineers, electrical designers and technical experts form a global network across seven international locations including;

- Perth, Western Australia
- Johannesburg, South Africa
- Dallas, Texas
- Santiago, Chile
- Beijing, China
- Hamburg, Germany
- Leon, Mexico

This allows MineARC to provide 24 hour service and engineering support to our expanding list of clients in over 60 countries across the globe.

All MineARC Refuge Chambers and Safe Havens comply with the highest international regulations and recognised 'world's best practice' industry guidelines. Our key focus on quality control and product advancement has meant that MineARC Refuge Chambers have successfully saved lives in multiple real life industrial emergencies around the globe.

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tunnelSAFE



ISO 9001:2015
Quality
Management
Systems



MineARC® HRM
Refuge Live Risk
Assessment Testing



Australian C-Tick
Standards: AS4100-
1998, AS3570.1-18,
AS2208, AS3000,
AS1716-15



Canadian
Standards
Association
(CSA)



United States
National Electrical
Code (NEC)
2013/14



European CE
Certified to
Machinery Norms

MineARC

Tunnelling Chambers

Emergency refuge forms an integral part of a tunnelling project's wider Emergency Response Plan (ERP). Fires, fall of ground, flooding, and the release of smoke and other forms of toxic gas are the types of incidents that can occur all too frequently, despite the high levels of planning and safety precautions in place.

In these types of emergencies, where personnel become trapped without adequate ventilation and evacuation is no longer safe or practical, emergency refuge is designed to provide a secure 'go-to' area for personnel to gather and await extraction.

MineARC TunnelSAFE Rescue Vehicles have been successfully used around the world in multiple real-life tunnelling emergencies to save lives.

MineARC's TunnelSAFE Range of Refuge Chambers are highly customisable to suit any project and can be built to comply with British Standard (BS EN 16191:2014) *Safety Requirements for Tunnelling Machinery*.

They can also comply with the ITA's "*Guideline for the Provision of Refuge Chambers Under Construction*"



TunnelSAFE Rescue Vehicle

Designed for the tunnelling environment, the TunnelSAFE Rescue Vehicle is the ultimate asset in emergency response.

MineARC will custom engineer and manufacture our refuge chamber to be integrated with any multi-service vehicle; providing a portable safe haven for workers during construction or routine tunnel inspections and maintenance works. As a long term safety option for the entire life of the tunnel, these vehicles are robust and fully serviceable.



The TunnelSAFE Rescue Vehicle can also be fitted with GuardIAN Remote Monitoring, or the client's own remote control system.

Features

- Designed specifically to be integrated with a Multi-Service Vehicle
- Internal Aura-FX Digital Gas Monitoring
- Positively pressurised integrated chamber and cab
- CO and CO₂ scrubbing
- Oxygen supply
- Air conditioning and dehumidifying
- 5mm steel plate construction with reflective signage
- Full UPS battery backup system
- Sealed acrylic windows
- Escape hatch
- Entrance ladder access rails
- Ergonomically designed fold up seating
- External strobe lighting; internal fluorescent lighting
- GuardIAN Refuge Chamber Monitoring via Wi-Fi (optional)
- External Aura-FX (optional)
- Insulation (optional)



TunnelSAFE Rescue Vehicle



Emergency refuge should always be considered within the broader context of an entire emergency response/management plan and in conjunction with a range of other important design and safety factors including; overall tunnel design, ventilation systems, means of egress, emergency procedures and available rescue equipment.

Virtually all aspects of a MineARC TunnelSAFE Rescue Vehicle can be customised by MineARC Engineers, including; shape, standard dimensions, blast resistance, internal features, occupancy and minimum entrapment durations.



Rescue Vehicle Features

Inside a MineARC TunnelSAFE Rescue Vehicle, a number of vital life support systems combine to create a safe, ongoing environment for occupants.

Systems include primary and secondary oxygen supplies, air conditioning and dehumidifying, positive pressure maintenance, electrical and communications, gas detection and CO/CO₂ absorption (referred to as 'scrubbing' systems).

CO & CO₂ Scrubber

The TunnelSAFE Rescue Vehicle uses active chemicals and MineARC's Scrubbing System to 'scrub' the build-up of harmful CO₂ and CO from the air inside the refuge chamber.

In high enough concentrations, both CO₂ and CO can cause serious injury leading to a loss of consciousness and eventually, death. CO₂ and CO are expired by occupants as part of their normal breathing activity. Carbon Monoxide can also enter the main chamber as occupants enter and/or exit, making CO/CO₂ scrubbing a vital necessity.

ELV Chemical Cartridges

The MineARC ELV Scrubbing System uses pre-packaged MARCISORB chemical absorber cartridges.

MineARC's MARCISORB CO₂ and MARCISORB CO cartridges provide superior scrubbing capacity, are easy to load, safe to handle, and can store for long periods.

Standing Room

Retracting seats meet high personnel volume requirements without compromising space.





UPS Battery Backup

A secure cabinet within the rear of the TunnelSAFE houses the refuge chamber's UPS battery back up (Uninterruptible Power Supply). The UPS is a fail-safe system that can power the refuge chamber's internal life support systems for a minimum of 24 hrs, should mine power become cut-off.

Misting System (Optional)

To combat potentially high ambient temperatures on-site, MineARC has developed a unique, self-contained misting system that is available as an optional upgrade on all TunnelSAFE Rescue Vehicles.

The system assists in heat suppression of the external environment by emitting a fine mist of water around the exterior of the chamber. The mist is set to a droplet size that will flash evaporate under high temperatures, creating a temperature barrier around the chamber.



GuardIAN

Chamber Monitoring

MineARC's **GuardIAN Refuge Chamber Monitoring System** is an exciting development in refuge chamber technology. GuardIAN enables real-time monitoring; providing confidence that an operation's fleet of refuge chambers are emergency ready at all times.

GuardIAN Refuge Chamber Monitoring is an on-board system that continuously monitors all vital refuge operating systems. During standby mode GuardIAN checks for component faults and monitors refuge chamber usage or entry to the chamber.

The GuardIAN Chamber Monitoring system is hosted on an internal server within the refuge chamber so that no client software installation is required. The responsive webpage is easily accessible from any computer, tablet or smartphone and features a summary of your entire refuge chamber fleet and overall operational status, with the ability to drill down to a detailed report of each chamber.

GuardIAN Chamber Monitoring provides the added advantage of remote troubleshooting assistance by MineARC Engineers, who can login to view the chamber diagnostics dashboard with sites' permission.



GuardIAN Chamber Monitoring



Event Logging & Fault Diagnostics

MineARC's Digital Controller links directly to the GuardIAN Network, streaming real-time system data, including automated system checks, fault logging (battery, scrubber, temperature and inverter), system diagnostics, internal and external temperature measurements, and system actions such as scrubber activation. MineARC's Aura-FX also provides real-time gas monitoring data and analysis via the GuardIAN Network dashboard.

Live Video Monitoring and VOIP Video Phone

Internal video monitoring is provided by a remote controlled, motion activated GuardIAN IP camera. When activated, the camera will send out a live, recorded stream of the interior of the refuge chamber to the GuardIAN Network.

To assist occupants during an emergency or safety drill, chambers are also equipped with a VOIP video phone, facilitating face-to-face communication between the refuge chamber and the surface.

Gas Node

Real-time monitoring of site wide gas levels, with automated alerts.



Lighting Node

Emergency navigational lighting, complete with in-built tracking technology.



Tracking Node

Remote location tracking of all tunnelling personnel.



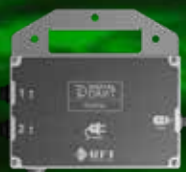
Quadport

Used to break out PoE+ network pots from the coaxial cable.



Portal

The bridge between the edge of the existing data network and the cable.



Branch

Taps a portion of the power and signal, enabling a QuadPort to be spliced in.



Pressure Systems

MineARC pressure systems are designed to help maintain a safe, breathable atmosphere within the refuge chamber. Systems include the Pressurised Access Safety System (PASS) to ensure safe entry into the refuge chamber, and the Positive Pressure Maintenance System (PPMS) to maintain positive internal pressure within the chamber.



Pressurised Access Safety System

The Pressurised Access Safety System (PASS) remote activation unit is located next to the door on the front exterior of the refuge, allowing personnel to pre-prepare the chamber for safe entry.

Should the chamber's fresh compressed air supply be disconnected or compromised, the system's external LED light will display red, indicating that the chamber is not positively pressurised and therefore unsafe for entry.

Once activated, the PASS will disperse controlled quantities of compressed air into the chamber until the internal pressure reaches 200 Pa. By ensuring that the pressure inside the refuge is slightly greater than outside, toxic contaminants are prevented from infiltrating the chamber during entry of personnel.



Positive Pressure Maintenance System

The Positive Pressure Maintenance System (PPMS) enclosure is securely mounted to the interior wall of the refuge chamber. Powered by a 24VDC power supply, the electric solenoid valve opens and closes to release measured amounts of breathable air from compressed air cylinders in order to maintain a positive internal pressure.

The quantity of compressed breathable air cylinders is configurable to suit various internal volumes and durations of operation.



ZOLL AED Plus Defibrillator

- Designed for EMS teams
- Real BVM Help integrates with existing ZOLL CPR technologies
- Zoll's Real CPR Help
- Remote View, enables access to data from external locations
- Optional RescueNet® CaseReview gives providers the ability to view data from the X Series Advanced post-case for effective QA/QI



Aura-PT Handheld Gas Monitor

- Digitally monitor up to four gases at any one time, with visual and vibration alerts
- Automatically feeds gas readings through to the Guardian Server via the closest Guardian Node
- Triggers visual alerts on surrounding Guardian Nodes in the event of dangerous gas levels



Rugged Oxygen Generator (ROG)

- Self contained chemical oxygen generator requires no maintenance during storage
- Unit activated via an integrated phosphorous match
- Produces a minimum of 90 litres of breathable oxygen @ NTP over approximately 15 minutes
- Associated with a high degree of safety due to the absence of pressurised gases





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Kanalenfortriebstechnik

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FLUCHTKAMMER
RECYCLE CHAMBER
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