

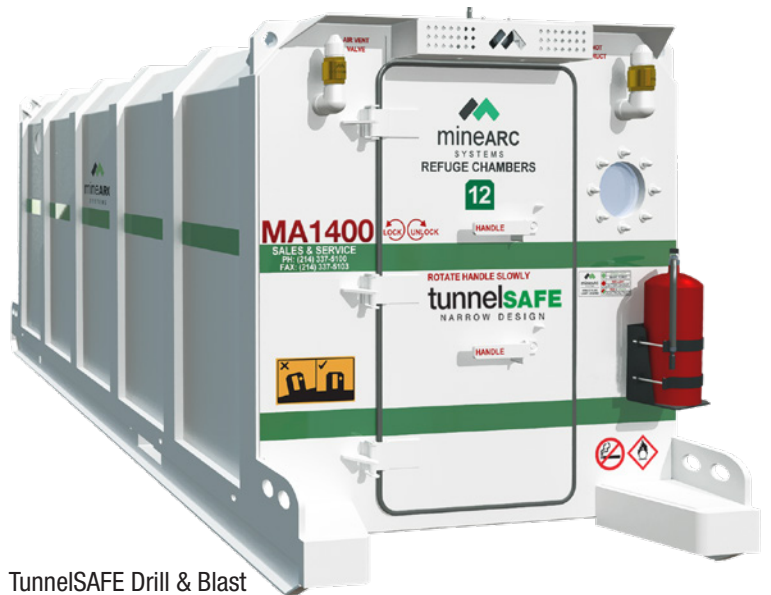


# Tunnelling Refuge Chambers

Designed to provide a refuge or 'safe-haven' for tunnel personnel trapped in a hazardous or toxic environment.



**tunnelSAFE**



TunnelSAFE Drill & Blast  
Refuge Chamber

MineARC Systems - Built for Safety.

[www.minearc.com](http://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 over 15 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 several 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.

[www.minearc.com](http://www.minearc.com)



# 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 Refuge Chambers 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 "Guidelines for the Provision of Refuge Chambers Under Construction".



Bureau Veritas ISO 9001:2008 Quality Management Systems



BSI (British Standard) BS 6164:2011 Health and Safety in Tunnelling



Member of the ITA (International Tunnelling Association)



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

# TunnelSAFE Gantry Design Standard Features

Providing safety at the rear of the cutting head infrastructure, MineARC TunnelSAFE Gantry Design Refuge Chambers offer a fixed safety solution for the life of the project.

ITA or BS EN 16191 compliant models available



TunnelSAFE Gantry Design Refuge Chamber

Regardless of size constraints, MineARC Engineers can custom design and manufacture each refuge chamber to meet the specific needs of the project, without compromising on occupancy potential or safety features.

## Features

- Designed specifically to be mounted on a tunnel boring machine
- ELV CO and CO2 scrubbing
- Medical O2 regulator and backup
- Positive pressure maintenance system with visual reference
- Audio visual warning for pneumatic disruption
- Aura-FX Digital Gas Monitoring
- Air conditioning and dehumidifying
- 5mm steel plate construction with reflective signage
- Water based fire extinguisher (optional for non-Australian orders)
- Full UPS 24hr battery backup system
- Ergonomically designed seating
- Radio power supply
- External strobe lighting; internal fluorescent lighting

## Standard Configurations

Part #		Shell	Occupancy	Duration	H (m)	W (m)	L (m)		Weight (kg)*	
ITA	BS EN						ITA	BS EN	ITA	BS EN
TS-GD1-10-ELV-24-I	TS-GD3-10-ELV-24-E	Gantry Design	10	24	2.00	1.60	5.60	7.00	4,800	5,950
TS-GD2-12-ELV-24-I	TS-GD4-12-ELV-24-E		12				6.30	7.95	5,400	6,200
TS-GD3-14-ELV-24-I	TS-GD5-14-ELV-24-E		14				7.00	9.00	5,950	6,450
TS-GD4-16-ELV-24-I	TS-GD6-16-ELV-24-E		16				7.95	9.80	6,200	6,700
TS-GD5-20-ELV-24-I	TS-GD8-20-ELV-24-E		20				9.00	11.70	6,450	7,200
TS-GD7-24-ELV-24-I	-		24				10.50	-	6,920	-
TS-GDW1-10-ELV-24-I	TS-GDW3-10-ELV-24-E	Gantry Design Wide	10	24	2.00	2.00	4.80	5.80	4,900	5,450
TS-GDW2-12-ELV-24-I	TS-GDW4-12-ELV-24-E		12				5.30	6.40	5,200	5,900
TS-GDW3-14-ELV-24-I	TS-GDW6-14-ELV-24-E		14				5.80	7.75	5,450	6,500
TS-GDW4-16-ELV-24-I	TS-GDW7-16-ELV-24-E		16				6.40	8.12	5,900	6,750
TS-GDW5-20-ELV-24-I	TS-GDW8-20-ELV-24-E		20				6.80	9.86	6,150	7,300
TS-GDW6-24-ELV-24-I	TS-GDW9-24-ELV-24-E		24				7.75	11.40	6,500	7,650

\*Indicative weights only. Custom variations will impact final refuge chamber weight.



## Optional: EnviroLAV Waste Management System

Also available is the electrically powered EnviroLAV Waste Management System that can be positioned at the rear of the TBM gantry, allowing for quick and simple installation and service on site.

The Compact model EnviroLAV features a small footprint of less than 1.5m<sup>2</sup>; an ideal size for the tight confines of the TBM where space is a limiting factor. Removable steps allow for further maximisation of space.

The EnviroLAV's unique waste breakdown process reduces emptying requirements to just once per year based on standard usage.

For more information please visit [www.minearc.com/EnviroLAV](http://www.minearc.com/EnviroLAV)

# TunnelSAFE Rail Design Standard Features

MineARC can custom engineer and manufacture refuge chambers to be rail mounted or fixed to a tunnelling rescue train; providing a portable safe haven for workers during routine inspections and maintenance works. As a long term safety option for the entire life of the tunnel, these chambers are robust and fully serviceable.

ITA or BS EN 16191 compliant models available



TunnelSAFE Rail Design Refuge Chamber

TunnelSAFE Rail Design Refuge Chambers can also be fitted with remote monitoring systems, or the client's own remote control system. MineARC offers full after-market care for refuge chambers, from commissioning to on-site servicing and training.

## Features

- Designed specifically to be mounted on a rail trolley or rescue train
- ELV CO and CO2 scrubbing
- Medical O2 regulator and backup
- Positive pressure maintenance system with visual reference
- Audio visual warning for pneumatic disruption
- Aura-FX Digital Gas Monitoring
- Air conditioning and dehumidifying
- 5mm steel plate construction with reflective signage
- Water based fire extinguisher (optional for non-Australian orders)
- Full UPS 24hr battery backup system
- Ergonomically designed seating
- Radio power supply
- External strobe lighting; internal fluorescent lighting

## Standard Configurations

Part #		Shell	Occupancy	Duration	H (m)	W (m)	L (m)		Weight (kg)	
ITA	BS EN						ITA	BS EN	ITA	BS EN
TS-RD1-10-ELV-24-I	TS-RD3-10-ELV-24-E	Rail Design	10	24	2.00	1.60	5.60	7.00	4,800	5,950
TS-RD2-12-ELV-24-I	TS-RD4-12-ELV-24-E		12				6.30	7.95	5,400	6,200
TS-RD3-14-ELV-24-I	TS-RD5-14-ELV-24-E		14				7.00	9.00	5,950	6,450
TS-RD4-16-ELV-24-I	TS-RD6-16-ELV-24-E		16				7.95	9.80	6,200	6,700
TS-RD5-20-ELV-24-I	TS-RD8-20-ELV-24-E		20				9.00	11.70	6,450	7,200
TS-RD7-24-ELV-24-I	-		24				10.50	-	6,920	-

\*Indicative weights only. Custom variations will impact final refuge chamber weight.

# Chamber Exterior - Front



**DRIVER WINDOW**

- AS 2208
- Blast resistant upon request

**SIREN**

- 112 dBA

**STROBE LIGHTING**

- Extra low voltage
- Green & red LED

**SEALING DOOR**

- Outward opening
- Vacuum tested seal
- Double locking rotating handles

**mineARC SYSTEMS**

+61 8 9333 4966  
info@minearc.com.au

**FLUCHT KAMMERN**

**REFLECTIVE SIGNAGE**

- Safety & operational
- Optional extra: Multiple languages

**PAINT**

- Sand blasted to 2.5 grit

# TunnelSAFE MSV Design Standard Features

MineARC can custom engineer and manufacture refuge chambers to be mounted to a multi-service vehicle; providing a portable safe haven for workers during routine tunnel inspections and maintenance works. As a long term safety option for the entire life of the tunnel, these chambers are robust and fully serviceable.

ITA or BS EN 16191 compliant models available



TunnelSAFE MSV Design Refuge Chambers can also be fitted with remote monitoring systems, or the client's own remote control system.

TunnelSAFE MSV Design Refuge Chamber

## Features

- Designed specifically to be mounted on a multi-service vehicle
- ELV CO and CO<sub>2</sub> scrubbing
- Medical O<sub>2</sub> regulator and backup
- Positive pressure maintenance system with visual reference
- Audio visual warning for pneumatic disruption
- Aura-FX Digital Gas Monitoring
- Air conditioning and dehumidifying
- 5mm steel plate construction with reflective signage
- Water based fire extinguisher (optional for non-Australian orders)
- Full UPS 24hr battery backup system
- Ergonomically designed seating
- Radio power supply
- External strobe lighting; internal fluorescent lighting



### REFLECTIVE SIGNAGE

- Safety & operational
- Optional extra: Multiple languages

### DRIVER WINDOW

- AS 2208
- Blast resistant upon request

### ROTATING HANDLES

- Double locking

### SEALING DOOR

- Outward opening
- Vacuum tested seal

### DRIVER CONTROL PANEL CONNECTION

### INSULATED FLOORING (OPTIONAL)



# TunnelSAFE Drill & Blast Standard Features

For drill and blast tunnelling operations, MineARC has developed a standard range of portable refuge chambers that can be positioned and repositioned with ease, providing an ongoing safety solution for the life of the project.

They offer an ideal solution for projects involving feeder tunnels and single-entry development headings, including sub-surface railway stations, hydro-power stations and other complex tunnel networks.

ITA or BS EN 16191 compliant models available



TunnelSAFE Drill & Blast Narrow Design Refuge Chamber

## Features

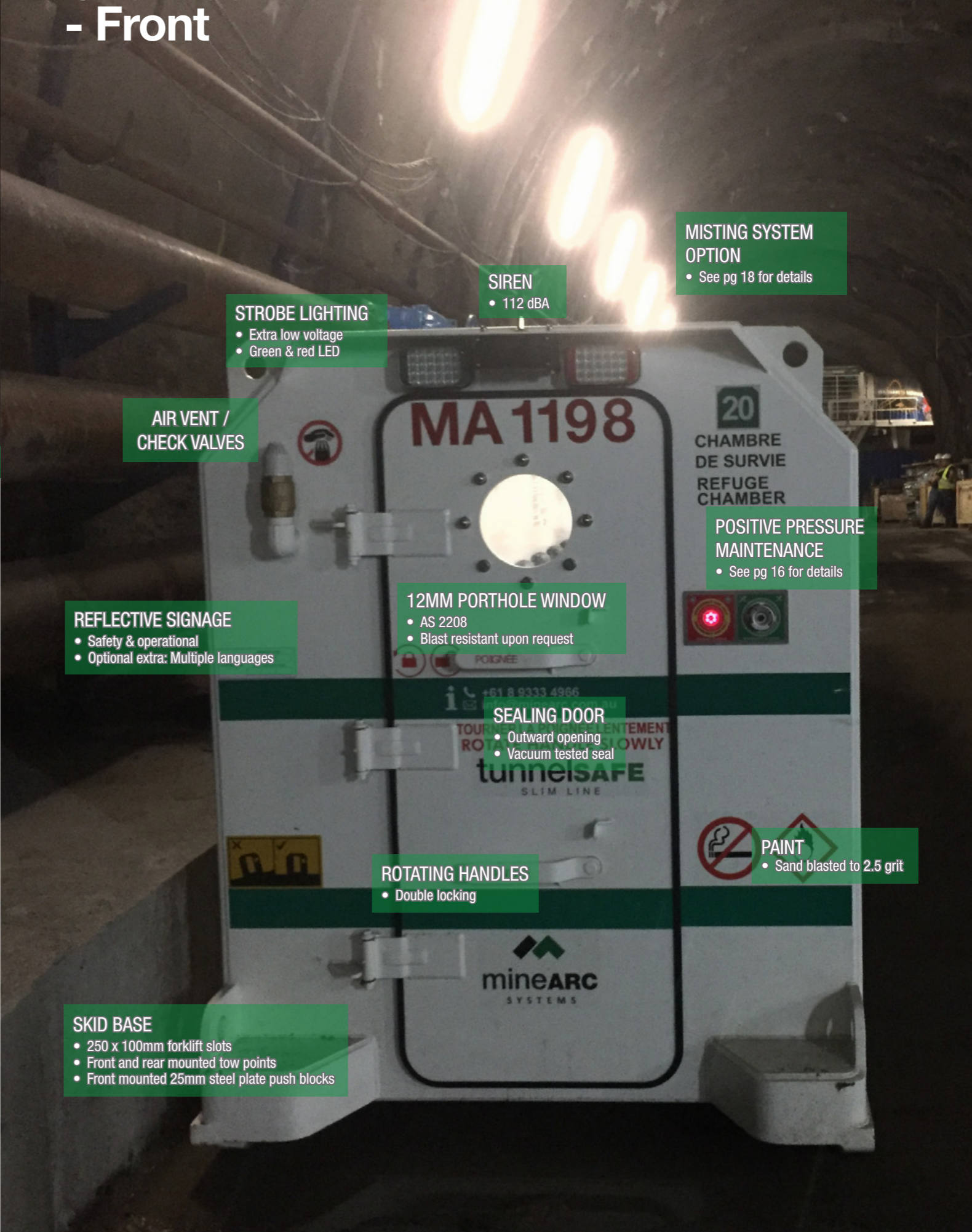
- Self-regenerative ELV CO and CO2 scrubbing
- Medical O2 regulator and backup
- Positive pressure maintenance system with visual reference
- Audio visual warning for pneumatic disruption
- Aura-FX Digital Gas Monitoring
- Air conditioning and dehumidifying
- 5mm steel plate construction with reflective signage
- Water based fire extinguisher (optional for non-Australian orders)
- Full UPS 24hr battery backup system
- Ergonomically designed seating
- Radio power supply
- External strobe lighting; internal fluorescent lighting

## Standard Configurations

Part #		Shell	Occupancy	Duration	H (m)	W (m)	L (m)		Weight (kg)	
ITA	BS EN						ITA	BS EN	ITA	BS EN
TS-SD1-08-ELV-24-I	TS-SD2-08-ELV-24-E	Standard Design	08	24	2.21	2.25	3.89	4.80	4,300	4,700
TS-SD2-12-ELV-24-I	TS-SD3-12-ELV-24-E		12				4.80	6.02	4,700	5,400
TS-SD3-16-ELV-24-I	TS-SD4-16-ELV-24-E		16				6.02	7.23	5,400	6,000
TS-SD4-20-ELV-24-I	-		20				7.23	-	6,000	-
TS-ND6-12-ELV-24-I	TS-ND4-12-ELV-24-E	Narrow Design	12	24	2.00	1.90	5.60	7.24	5,250	6,668
TS-ND7-16-ELV-24-I	TS-ND8-16-ELV-24-E		16				6.70	8.80	6,200	7,550
TS-ND5-20-ELV-24-I	TS-ND9-20-ELV-24-E		20				8.44	10.40	7,348	8,400
TS-ND8-24-ELV-24-I	TS-ND10-24-ELV-24-E		24				8.80	11.90	7,550	8,900
TS-SL1-12-ELV-24-I	TS-SL3-12-ELV-24-E	Slim Line	12	24	2.00	1.60	6.30	8.50	5,400	6,300
TS-SL2-16-ELV-24-I	TS-SL5-16-ELV-24-E		16				7.70	10.50	6,050	6,920
-	TS-SL6-18-ELV-24-E		18				-	11.50	-	7,100
TS-SL4-20-ELV-24-I	TS-SL7-20-ELV-24-E		20				9.00	11.90	6,450	5,790
TS-SL5-24-ELV-24-I	-		24				10.50	-	6,920	-

\*Indicative weights only. Custom variations will impact final refuge chamber weight.

# Chamber Exterior - Front



AIR VENT / CHECK VALVES

STROBE LIGHTING  
• Extra low voltage  
• Green & red LED

SIREN  
• 112 dBA

MISTING SYSTEM OPTION  
• See pg 18 for details

REFLECTIVE SIGNAGE  
• Safety & operational  
• Optional extra: Multiple languages

12MM PORTHOLE WINDOW  
• AS 2208  
• Blast resistant upon request

POSITIVE PRESSURE MAINTENANCE  
• See pg 16 for details

SEALING DOOR  
• Outward opening  
• Vacuum tested seal

ROTATING HANDLES  
• Double locking

PAINT  
• Sand blasted to 2.5 grit

SKID BASE  
• 250 x 100mm forklift slots  
• Front and rear mounted tow points  
• Front mounted 25mm steel plate push blocks

# Chamber Interior

## AIR CONDITIONING SYSTEM

- R410a refrigerant cooling
- UL listed Mitsubishi Split System

**AIR CONDITIONING  
RUN AT 30° (86°F)  
ON BATTERY ONLY**

6

## INTERIOR LIGHTING

- 8watt fluorescent

5

## OXYGEN SUPPLY #2:

MEDICAL GRADE OXYGEN CYLINDERS (Not pictured)

- Minimum capacity based on G size cylinder (8,580L); quantity required outlined below:

Model	4-Person	6-Person	8-Person
36 hr	1	1	2

\*Medical grade Oxygen cylinders to be provided by end user.

## OPTIONAL: OXYGEN SUPPLY #3:

OXYGEN CANDLE KIT (Not pictured)

- 2,600L oxygen produced / 60 mins ignition; Military approved
- Supplied separately as Dangerous Goods

## AIR (OXYGEN) SUPPLY #1:

COMPRESSED AIR

- Low pressure air supply (120psi; 830kPa)



## POWER FLUCTUATION PROTECTION



## ELV CO/CO2 SCRUBBING SYSTEM

9 MARCISORB CO 8 MARCISORB CO<sub>2</sub>

## DIGITAL CONTROLLER INTERFACE

2  
10

## AURA-FX DIGITAL GAS MONITOR



Inside a MineARC TunnelSAFE Refuge Chamber, 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/CO<sub>2</sub> absorption (referred to as 'scrubbing' systems).

MineARC TunnelSAFE Chambers use active chemicals and MineARC's Extra-Low-Voltage (ELV) Scrubbing System to 'scrub' the build-up of harmful CO<sub>2</sub> and CO from the air inside the refuge chamber.

In high enough concentrations, both CO<sub>2</sub> and CO can cause serious injury leading to a loss of consciousness and eventually, death. CO<sub>2</sub> and CO are expired by occupants as part of their normal breathing activity. Carbon Monoxide can also enter the main chamber via the compressed air intake (if it becomes compromised), and as occupants enter and/or exit the main entrance, making CO/CO<sub>2</sub> scrubbing a vital necessity.

## Air Conditioning

Air conditioning is vital to combat the potentially fatal effects of heat stress; caused by a build-up in occupant's own metabolic activity, as well as any ambient (external) heat affecting the refuge chamber's internal temperature.

## Extra-Low-Voltage Controller Interface

The controller interface is the operational hub of the refuge chamber. From here, all power, lighting and scrubbing can be managed with the flick of a switch.

## MARCISORB Chemical Cartridges

The ELV scrubbing system utilises pre-packaged MARCISORB chemical absorber cartridges. MineARC's MARCISORB CO and MARCISORB CO<sub>2</sub> cartridges provide superior scrubbing capacity, are easy to load, safe to handle, and can store for long periods.

## Optional: Standing Room Only

Designed for high personnel volume requirements.



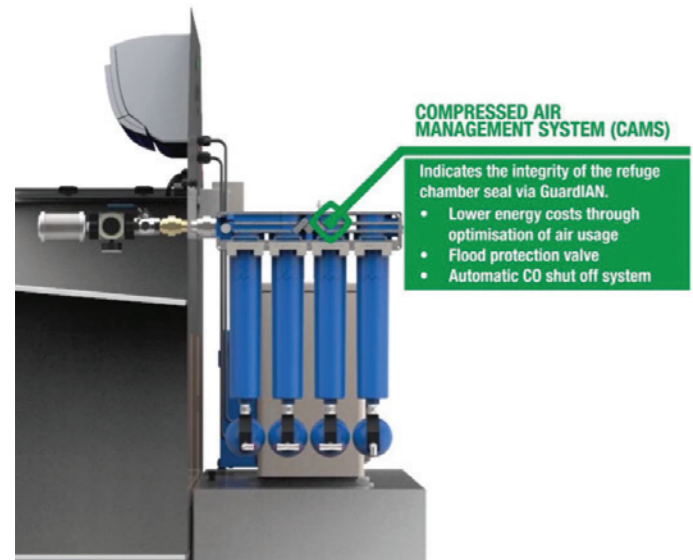
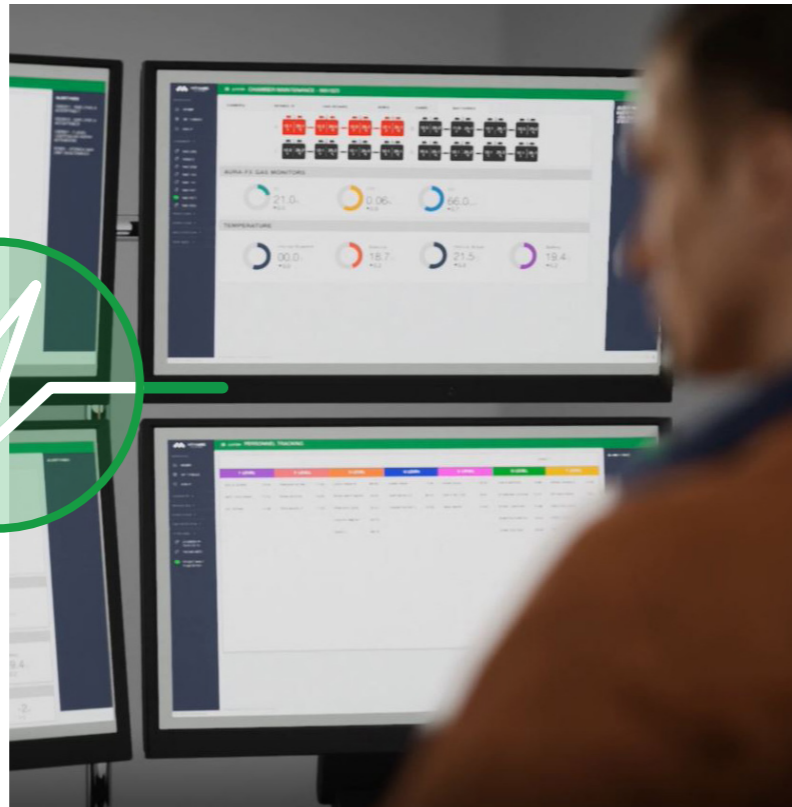
# GuardIAN Chamber Monitoring

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.



## COMPRESSED AIR MANAGEMENT SYSTEM (CAMS)

Indicates the integrity of the refuge chamber seal via GuardIAN.

- Lower energy costs through optimisation of air usage
- Flood protection valve
- Automatic CO shut off system

## Chamber Integrity Monitoring

The Compressed Air Management System (CAMS) communicates vital information relating to the integrity of the internal refuge chamber via the GuardIAN Network.

An increase in CAMS activity would indicate a breach of the refuge chamber seal, thus sending an alert to designated personnel that the chamber is compromised.

# GuardIAN Chamber Monitoring



## GUARDIAN VOIP VIDEO PHONE

Facilitates face-to-face communication with personnel in an emergency

## DIGITAL CONTROL SYSTEM

Automated system diagnostics, fault logging and activation alerts via GuardIAN

## AURA-FX DIGITAL GAS MONITOR

Provides real-time gas monitoring data and analysis via GuardIAN

- Reduced risk of human error in an emergency
- Monitor up to 11 gases at once
- Reduced calibration costs and easier servicing

## Event Logging & Fault Diagnostics

MineARC's Series IV 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.

## UPS Battery Management

When used in conjunction with GuardIAN, the MineARC Satellite UPS System allows for real-time, remote monitoring of each individual battery. Battery faults can be identified immediately via the GuardIAN Dashboard and Alert Feed, with auto-generated event notifications sent directly to any personal device. Voltage and temperature diagnostics for each individual battery within a string can also be viewed via a graph, highlighting any fluctuations over the past 24 hours.



## SATELLITE UPS SYSTEM

Real-time battery monitoring and diagnostics via GuardIAN



## Complete your network with GuardIAN Connect

GuardIAN Connect, powered by RFI Technology Solutions is a high speed, fit for purpose, linear access layer network, allowing the connection of the GuardIAN Nodes, Smart Lighting and Refuge Chamber to the GuardIAN Intelligence Network.

Designed specifically for an underground mining environment, GuardIAN Connect uses a single coaxial cable to carry both power and data.



# 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.



# Chamber Exterior - Rear

A secure cabinet at 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 24hrs, should mine power become cut-off.

As an optional feature, the Compressed Air Management System (CAMS) allows regulated compressed air into the refuge chamber

when the pressure inside drops below 200Pa. This process optimises mine air usage and guarantees against over-pressurisation of the refuge chamber. CAMS' gas toxicity monitor automatically diverts compressed air if oxygen levels in the airline fall below a set level (18% oxygen in free air), signifying air contamination. Additionally, the incorporated flood protection valve automatically shuts down compressed air to avoid catastrophic and costly chamber damage in the event of water ingress.



## Optional: Satellite UPS System

MineARC's Satellite UPS System has been engineered specifically for use in conjunction with refuge chambers; designed to ensure batteries perform at full capacity for their expected life span.

By ensuring atmospheric conditions are optimal, monitoring battery activity and adding electronics to the charging system, the Satellite UPS System limits all primary aspects of battery degradation and allows MineARC's high quality batteries to operate as intended.

For more information please visit [www.minearc.com](http://www.minearc.com)



# Custom Design & Chamber Options

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 Chamber design can be customised by MineARC Engineers, including: shape, standard dimensions, blast resistance, internal features, occupancy, entry airlock/vestibule and minimum entrapment durations. MineARC can also engineer the refuge chamber to double as a control room, office area, rest station or blast room (used in drill and blast operations).



Custom TunnelSAFE Refuge Chamber

## Misting System

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 Refuge Chambers.

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 which, in turn, maintains a life-sustainable internal environment. The water supply tank is generally integrated into the refuge chamber floor or beneath the seats, and is activated via an internal control switch.



## 45° Angle Front Entry



## Permanent Refuge Solutions



## Auto-Retracting Seating



# Feature Summary



## Options

- Custom dimensions and transport configurations
- Blast shield protection (reinforced construction)
- Compressed Air Management System (CAMS)
- Fully flushing, pressurised airlock
- Misting system for external temperature control
- Battery backup UPS upgrade
- First aid kit

**Industry Compliance** ITA or BS EN 16191

**5mm (1/4") Steel Plate Construction**

**Breathable Air Supply**

**CO & CO<sub>2</sub> Scrubbing**

**Aura-FX Digital Gas Monitoring**

**Air-Conditioning**

**Stand Alone Battery UPS**

**PPMS & PASS**

- Internal LCD monitor screen
- Step-down transformer
- Carbon Monoxide Safety-Off-System (COSOS)
- Remote video camera monitoring
- Intrinsically safe MARCis Scrubber
- Automated Oxygen Delivery System (AODS)
- GuardIAN Intelligence Network

## Optional Add-Ons: Emergency Response Products

MineARC's **ZOLL AED Range** provides the best support to help save a life. Users are provided with real-time feedback for quality, depth and rate of chest compressions; providing confidence and clarity throughout the defibrillation process.

The **Rugged Oxygen Generator (ROG)** is a portable, lightweight oxygen generator that delivers 90 litres of breathable oxygen for 15 minutes. Easy-to-use and small enough to carry in a backpack, the ROG gives immediate access to a potentially life saving oxygen supply.





REIKNECHT  
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