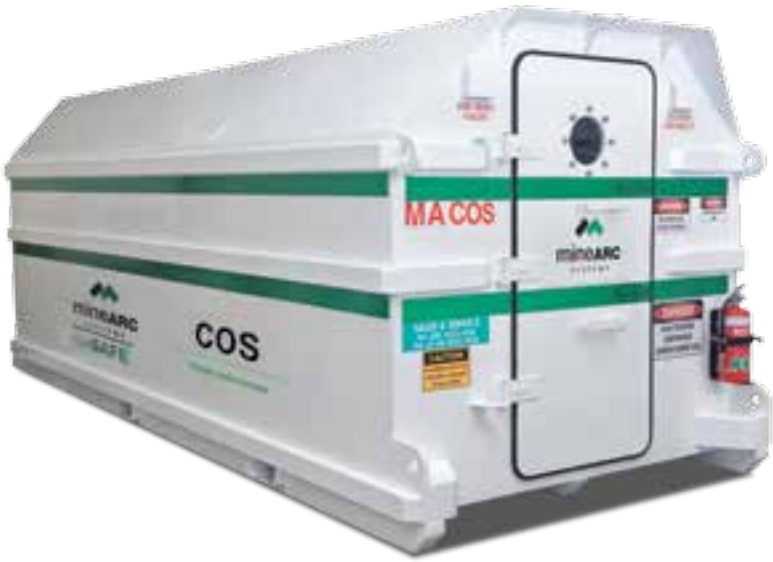
Coal Mine Change-Over-Station (COS)

Designed to provide a safe and secure area for miners to rest and change breathing apparatus as they step their way out of a hazardous and/or toxic environment.



MineARC CoalSAFE
Change-Over-Station (COS)

The world's leading manufacturer of emergency life-saving refuge

mineARC SYSTEMS
www.minearc.com

Company Profile

MineARC Systems is the global leader in the manufacture and supply of emergency refuge chambers used in the underground mining, tunnelling, and chemical processing industries.

With over 15 years experience in the industry, our dedication to ongoing research and development has kept us at the forefront of safe refuge technology.

MineARC refuge chambers have been successfully used around the world in multiple mine and tunnelling emergencies to save lives.

MineARC has offices and manufacturing facilities in Australia, South Africa, Chile, China, the United Kingdom and the United States, as well as a strong distribution network worldwide.

MineARC manufactures and supplies refuge chambers to operations in over 40 countries world-wide.

All MineARC refuge chambers comply with the highest international industry regulations and guidelines.

MineARC is the only refuge chamber manufacturer in the world with an ISO: 9001 quality rating.

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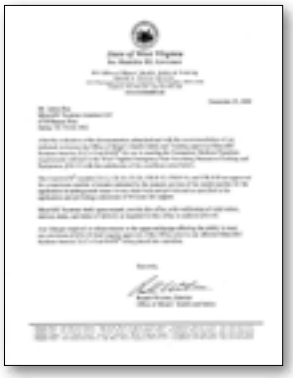
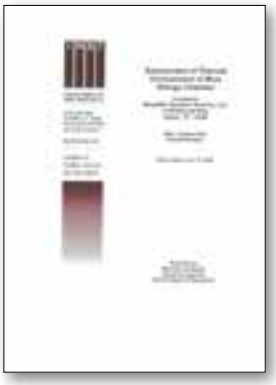
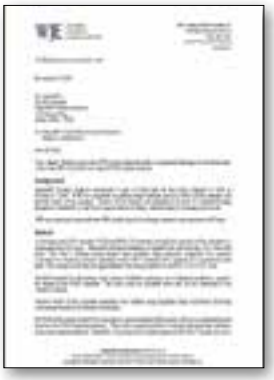


WV Office of Miners' Health, Safety & Training Approval

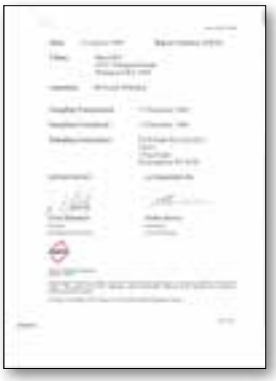
Built to MSHA 30 CFR Parts 7 and 75



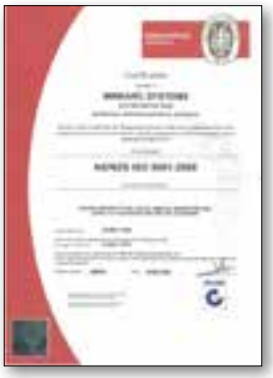
IHST, Inc. Independent Human Testing



WJE, Inc. Independent Blast and Structural Analysis



MineARC® Team Based Risk Assessment Testing



Bureau Veritas ISO 9001:2008 Quality Management Systems

ISO 9001
BUREAU VERITAS
Certification

MA

Chinese MA Centre Certified

MineARC®
Change-Over-Station

The MineARC Change-Over-Station (COS) is designed to aid miners as they exit the mine; providing a safe and secure 'staging-post' stocked with breathing apparatus, such as self-contained-self-rescuers (SCSR's).

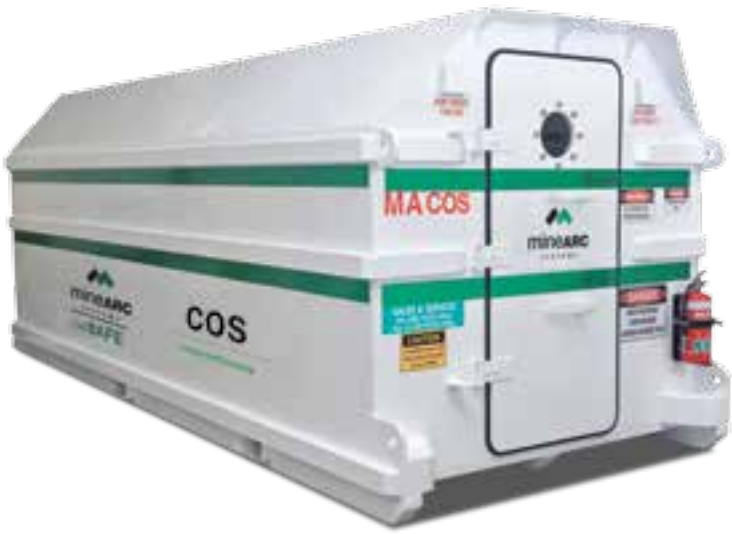
Inside a MineARC COS, breathing apparatus can be changed over in safety, while personnel compose themselves and continue to plan their escape. Each COS features custom-designed storage to accommodate specific makes/models of breathing apparatus.

Standard Dimensions

Model	Length	Height	Width	Occupancy Seated	Compressed Air cylinders *1	Rotating Total Occupancy *2
COS 8	3.2m	2.4m	2.3m	8	6 = 51600L	20 people for 20 mins
COS 12	4.4m	2.4m	2.3m	12	8 = 68600L	30 people for 15 mins
COS 16	5.5m	2.4m	2.3m	16	10 = 86000L	40 people for 15 mins
COS 20	6.9m	2.4m	2.3m	20	12 = 163200L	50 people for 15 mins
COS 26	9.2m	2.4m	2.3m	26	15 = 129000L	60 people for 16 mins
COS 30	10.4m	2.4m	2.3m	30	17 = 120400L	70 people for 15 mins

*1 Note: More cylinders will Increase duration of rotating occupancy

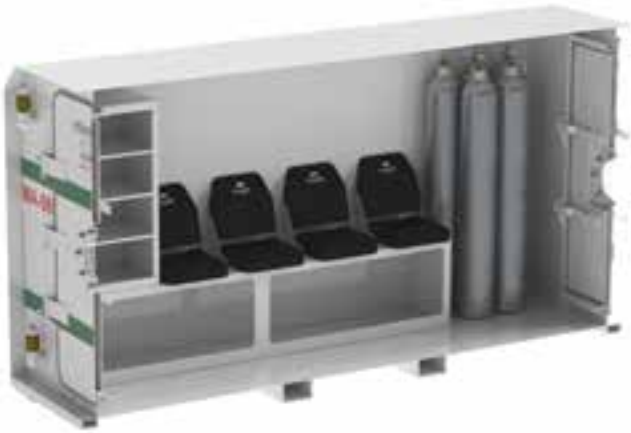
*2 Note: Fewer occupants will increase duration



Construction

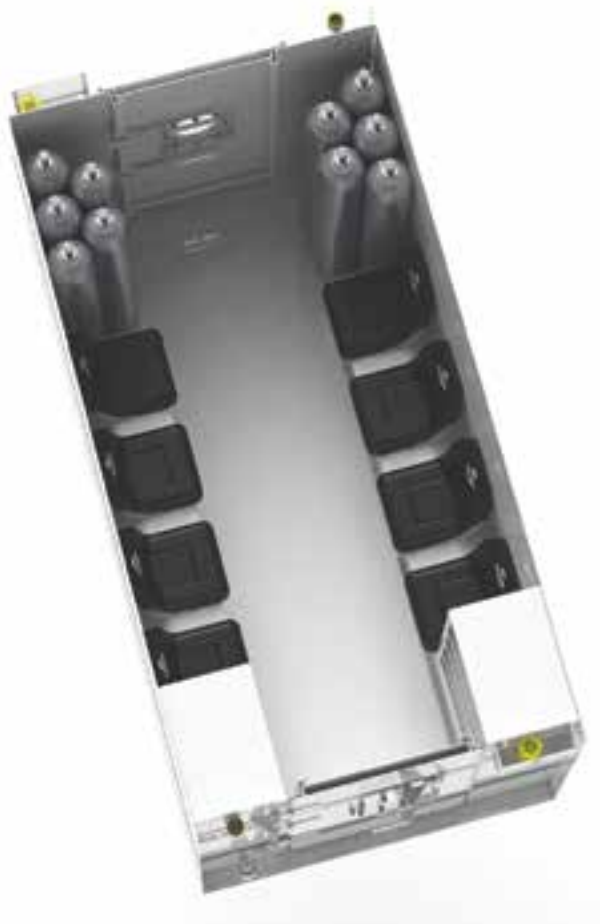
MineARC's Change-Out-Station (COS) has been designed and engineered to facilitate self-escape from the mine in the event of an emergency. The COS is constructed from 5mm steel plate with internal support wraps and surround package as standard.

The COS's floor plate is constructed from 6mm (1/4") steel plate with tubular skids. Push points and towing / lifting eyes are provided top and bottom at front and rear.



Main Chamber

The COS's internal main chamber area features durable high grade material seating on both sides, with ample under-seat and above head storage. Inside the COS is a dedicated storage area for housing SCSR's.



Features Summary

Entry / Exit Air Curtain

The walk-through layout of the COS features a pneumatic flushing air curtain system fitted to both the entry and exit doors. On entry both air curtains activate simultaneously, releasing 400L of compressed air per minute, for two whole minutes.

On activation, 200L per minute passes directly over the opening door, creating a barrier to help prevent toxins and smoke entering the main chamber. Once the door is closed, the remaining compressed air creates a positive pressure environment inside the main chamber, forcing any further toxins and/or smoke out of the main chamber via the one way check valves.

Positive Pressure Respirable Atmosphere

After entering the main chamber area, miners may require a rest break or some time to wait for others and re-group before donning there SCSR's and moving onto the next COS. In this instance, miners should activate the positive pressure system inside the main chamber.

The system comprises a simple compressed air regulator dial, which should be adjusted to reflect chamber occupancy. The regulator releases 85L of compressed air, per person, per minute, creating positive internal pressure inside the main chamber and clearing it of all toxins, as well as carbon monoxide (CO) and carbon dioxide (CO_2).

Positive internal pressure ensures occupants are provided with a clean respirable environment in which to change over their SCSR's.

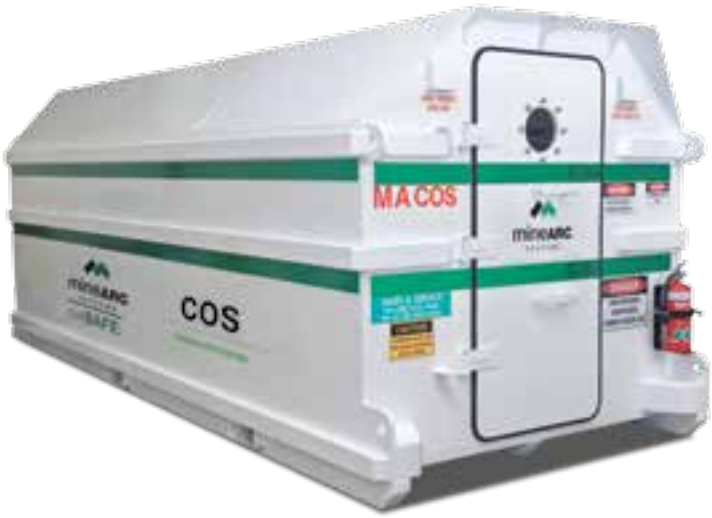
Service and Maintenance

The COS is easy to inspect and maintain, requiring minimal preventative maintenance. MineARC Systems has a dedicated service team with the capacity to undertake all servicing requirements as well as accredited training programs for site personnel to perform their own servicing.

Secure Cylinder Storage

High pressure compressed air cylinders provide air supply to the main chamber area, as well as powering the entry / exit air curtain systems. All cylinders are stored within the COS's, robust blast rated steel structure.

Features Summary



Intrinsically Safe Design

Breathable Air Supply

CO_2 and CO Scrubbing (Optional)

Flushing Air Curtains

SCSR Storage

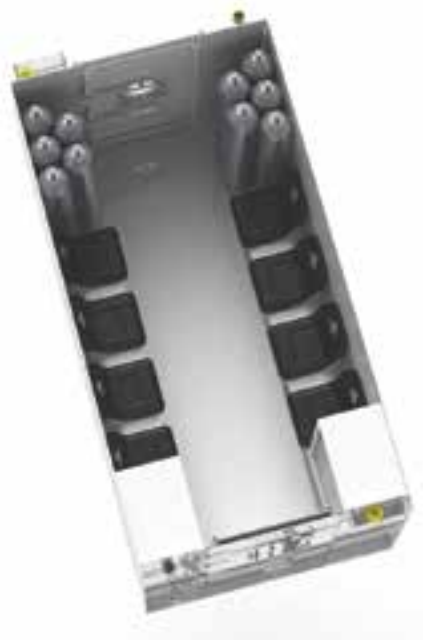
5mm Steel Plate Construction

Standard Features

- Intrinsically Safe Design
- Pneumatic Flushing Entry / Exit Air Curtain
- Breathable Air Supply
- 5mm Steel Plate Construction
- Ample SCSR Storage (Self Contained Self Rescuer)
- Explosion Proof Ballistic Glass Viewing Portal
- Vortex Cooling
- Communication Ports
- Ergonomicly Designed Seating
- Forklift Slots and Towing Eyes
- Non-Slip Flooring
- Cyalume® Light Sticks
- Secure Internal Storage Area
- Reflective Signage

Optional Features

- Compressed Mine Air Fliter Pack
- CABA Quick-Fill Station (Compressed Air Breathing Apparatus)
- MARCis
  - Carbon Dioxide & Carbon Monoxide Scrubbing
  - Intrinsically Safe Air Conditioning
- Emergency Escape Hatch
- Fire Proof Structure
- Intrinsically Safe Flashlight
- Fire Extinguisher
- First-Aid Kit
- Manual Gas Monitoring Device
- Intrinsically Safe Long-Life Strobe



Optional Features

The MARCis®

Through innovative design, the COS comes with the option of a powerless carbon dioxide / carbon monoxide scrubber, as well as a powerless air conditioning system - The MARCis (MineARC Air Refuge Chamber *intrinsically safe*).

Carbon Dioxide & Carbon Monoxide Scrubbing

MineARC's patented carbon dioxide (CO_2) and carbon monoxide (CO) scrubbing system requires no electrical power to operate. The active chemical scrubbing system is designed to clean the air of these harmful gases and toxins that build up over time within a sealed, occupied environment. MineARC developed the technology to provide the occupants with ease of use and extended time periods between chemical change outs.

MARCISORB CO_2 and CO chemical cartridges provide proven chemical scrubbing capabilities and are easy to handle. Sealed in a barrier film bag, the cartridges will store efficiently for long periods of time without degradation or requiring any maintenance.

Intrinsically Safe Air-Conditioning

Independent testing has verified that a cooling system is essential for combating the potentially fatal effects of long term metabolic heat buildup inside an occupied refuge. To maintain the internal atmosphere of the COS, the MARCis incorporates a non electrical air conditioning system that both cools and dehumidifies the COS's main chamber.

MineARC® Systems

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The world's leading manufacturer of emergency life-saving refuge

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