



ChemSAFE

Blast Resistant Buildings

MineARC's ChemSAFE Blast Resistant Buildings are engineered to withstand the hazards associated with working in a blast, toxic or flammable zone at a petrochemical facility.



ChemSAFE Blast Resistant Building
PS-BR-9-12-40-10P

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 several international locations including;

- Perth, Western Australia
- Johannesburg, South Africa
- Dallas, Texas
- Santiago, Chile
- Beijing, China
- Barcelona, Spain
- Guanajuato, 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

ChemSAFE Blast Resistant Buildings

MineARC's ChemSAFE Blast Resistant Buildings are multi-use facilities designed to provide protection from an industrial hazard such as blast, toxic or flammable gas release. The open space pre-fabricated steel buildings can serve as work spaces, change room, or break rooms for general day-to-day use.

Fully customizable, MineARC Blast Resistant Buildings can be produced in a short period of time and a fraction of the cost of traditional ground up construction. Installation consists of simply electricity and water (if needed).

Additionally, all units meet ASHRAE standards for fresh air quality for day-to-day use but can rapidly isolate outside air to become a fully sealed environment - protecting occupants against a toxic or flammable gas cloud. The integration of true shelter-in-place functionality in a building is a first in the industry and a means of fully complying with **API RP 753.5 for buildings used for shelter-in-place.**



PS-BR-9-12-40-1P

Standard Features

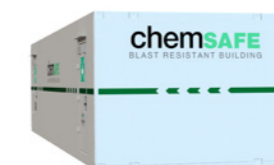
- Engineered steel construction
- ISO container corner castings for transport (stackable)
- Severe environment finish paint
- UV resistant signage
- Closed cell spray foam insulation on all surfaces
- FRP laminated OSB panels for walls and ceiling
- Sealing doors with overpressure relief
- Split system air conditioning/heating system
- Fresh air intake with emergency isolation
- Exposed electrical with tamper proof fluorescent lighting
- Smoke detectors & fire extinguishers
- Aura-FX Gas Monitoring (CO2, O2, Toxic)
- Network Ethernet connections



PS-BR-9-12-12-1P



PS-BR-9-8-20-1P



PS-BR-9-12-40-1P



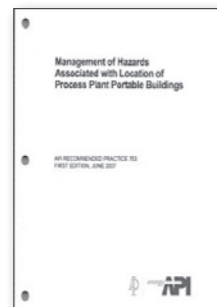
PS-BR-9-20-40-1P

Standard Dimensions

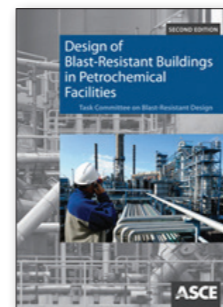
Model	Rating (psi)	Height (ft/m)	Width (ft/m)	Length (ft/m)	Weight (lbs/kgs)
PS-BR-9-12-12-1P	1	9 / 2.75	12 / 3.65	12 / 3.65	13,700 / 6,300
PS-BR-9-8-20-1P	1	9 / 2.75	8 / 2.44	20 / 6.10	13,100 / 6,000
PS-BR-9-12-40-1P	1	9 / 2.75	12 / 3.65	40 / 12.20	29,200 / 13,300
PS-BR-9-20-40-1P	1	9 / 2.75	20 / 6.10	40 / 12.20	46,900 / 21,300



TRC ISO 9001:2015 Quality Management Systems



API 753 Management of Hazards Associated with Location or Process Plant Portable Buildings



2009 ASCE Design of Blast Resistant Buildings in Petrochemical Facilities



BakerRisk Blast Assessment Third Party Testing



Voluntary Protection Programs Participants' Association



National Safety Council



Canadian Standards Association (CSA)



Quality Management System (QMS)



United States National Electrical Code



Global Supply Chain Risk Management Solutions



Contractor Management Services



Contractor and Supplier Management



Mine Safety and Health Administration

ChemSAFE Blast Resistant Buildings

All MineARC Blast Resistant Buildings include Aura-FX Fixed Gas Monitoring as standard. Following an external gas release, the building is placed in emergency mode by isolating the fresh air intake. While sheltering-in-place, gas monitoring is critical in determining the amount of time occupants can safely remain inside the building. It is also used to determine if any external gases are potentially entering the sealed building following a blast.

A vast improvement on current digital gas monitors on the market, Aura-FX has the ability to individually monitor apparent temperature, oxygen, carbon dioxide, and toxic gases via a series of user-friendly, digital screens.

Audible voice alarms will prompt occupants to exit the building, replace scrubbing chemicals or adjust oxygen supply levels as required.



Major Features

- Apparent temperature monitoring
- Oxygen (O2), carbon dioxide (CO2) and toxic gas (NH3, CL2 etc.)
- Graphical displays with trend lines
- Audible alarm and voice prompts
- Ethernet connectivity for remote monitoring (Optional Guardian)
- Yearly calibration
- Long sensor lives

ChemSAFE Blast Resistant Buildings

MineARC understands the importance of blast protection for personnel working at a petrochemical facility. Third party testing has been performed by professional blast engineers, in accordance with ASCE: Design of Blast-Resistant Buildings in Petrochemical Facilities (2nd).

As part of their in-depth analysis, third-party blast engineers tested the performance of the MineARC Blast Resistant Building, taking into consideration the orientation of the unit with respect to the explosion source. Blasts that can impact either the long or short side of the structure, as well as both sides at an angle were tested.

The results of these studies show that MineARC's blast resistant structure can withstand a long-duration, free-field blast load of up to 10psi for 200ms.



PS-BR-9-12-40-10P

Optional Features

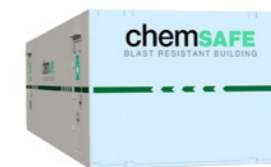
- 10psi for 200ms blast resistant structure
- Blast resistant windows
- Extreme temperature applications (Hyper Heat, R45 insulation, energy recovery ventilation)
- Intrinsic safety for hazardous locations
- Fire resistance (1,100°F/600°C for 30 minutes)
- UPS battery backup on electrical
- External toxic/flammable gas monitoring
- External/Internal vestibule



PS-BR-9-12-12-10P



PS-BR-9-8-20-10P



PS-BR-9-12-40-10P



PS-BR-9-20-40-10P

Standard Dimensions

Model	Rating (psi)	Height (ft/m)	Width (ft/m)	Length (ft/m)	Weight (lbs/kgs)
PS-BR-9-12-12-10P	10	9 / 2.75	12 / 3.65	12 / 3.65	21,000 / 9,600
PS-BR-9-8-20-10P	10	9 / 2.75	8 / 2.44	20 / 6.10	22,500 / 10,300
PS-BR-9-12-40-10P	10	9 / 2.75	12 / 3.65	40 / 12.20	49,900 / 22,700
PS-BR-9-20-40-10P	10	9 / 2.75	20 / 6.10	40 / 12.20	74,700 / 33,900



ChemSAFE Optional Features

Depending on the nature of a toxic or flammable gas hazard, the time in which occupants may need to shelter can vary from a matter of minutes to several hours. The MineARC Blast Resistant Building cannot be occupied for long periods without the risk of occupants producing a high level of carbon dioxide and reducing oxygen levels. Carbon dioxide is an asphyxiate gas that can reduce or displace the normal oxygen concentration in breathing air and causes serious injury, leading to a loss of consciousness and eventually death. If a high occupancy or long shelter-in-place duration is required, the inclusion of optional life support equipment is necessary to control internal gas concentrations.

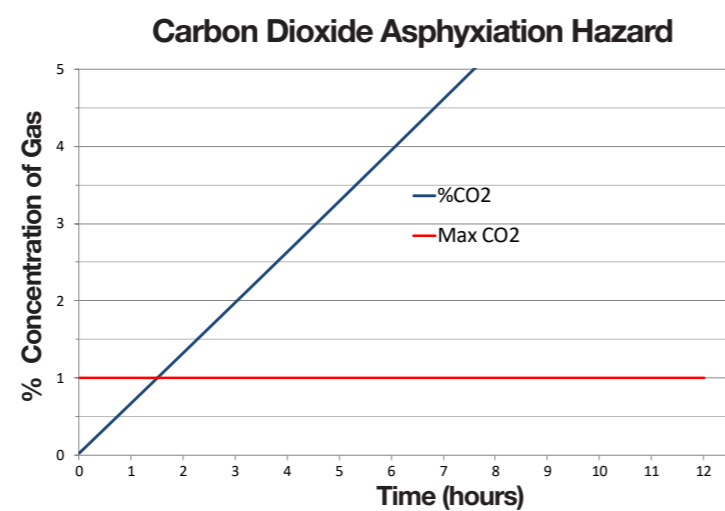
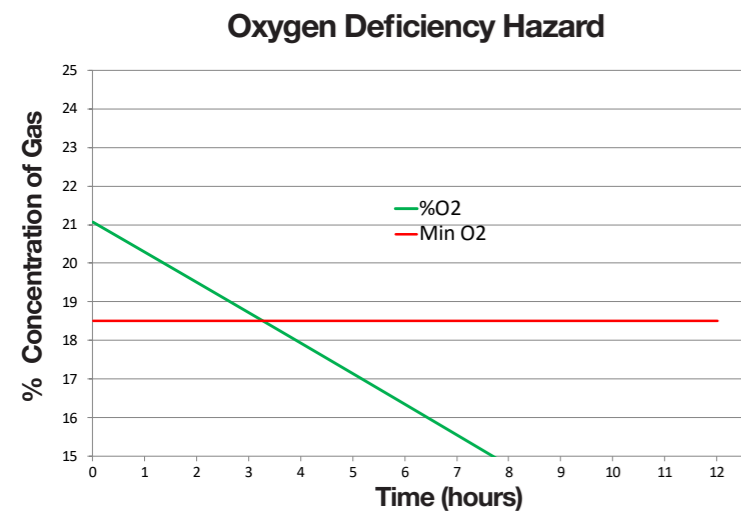
Optional features such as automated positive pressure systems, carbon dioxide scrubbing & oxygen generation, delivers full safe haven capabilities for up to 12 hours.

- AirBANK Pressure System
- AirGEN Scrubbing
- Oxygen Supply

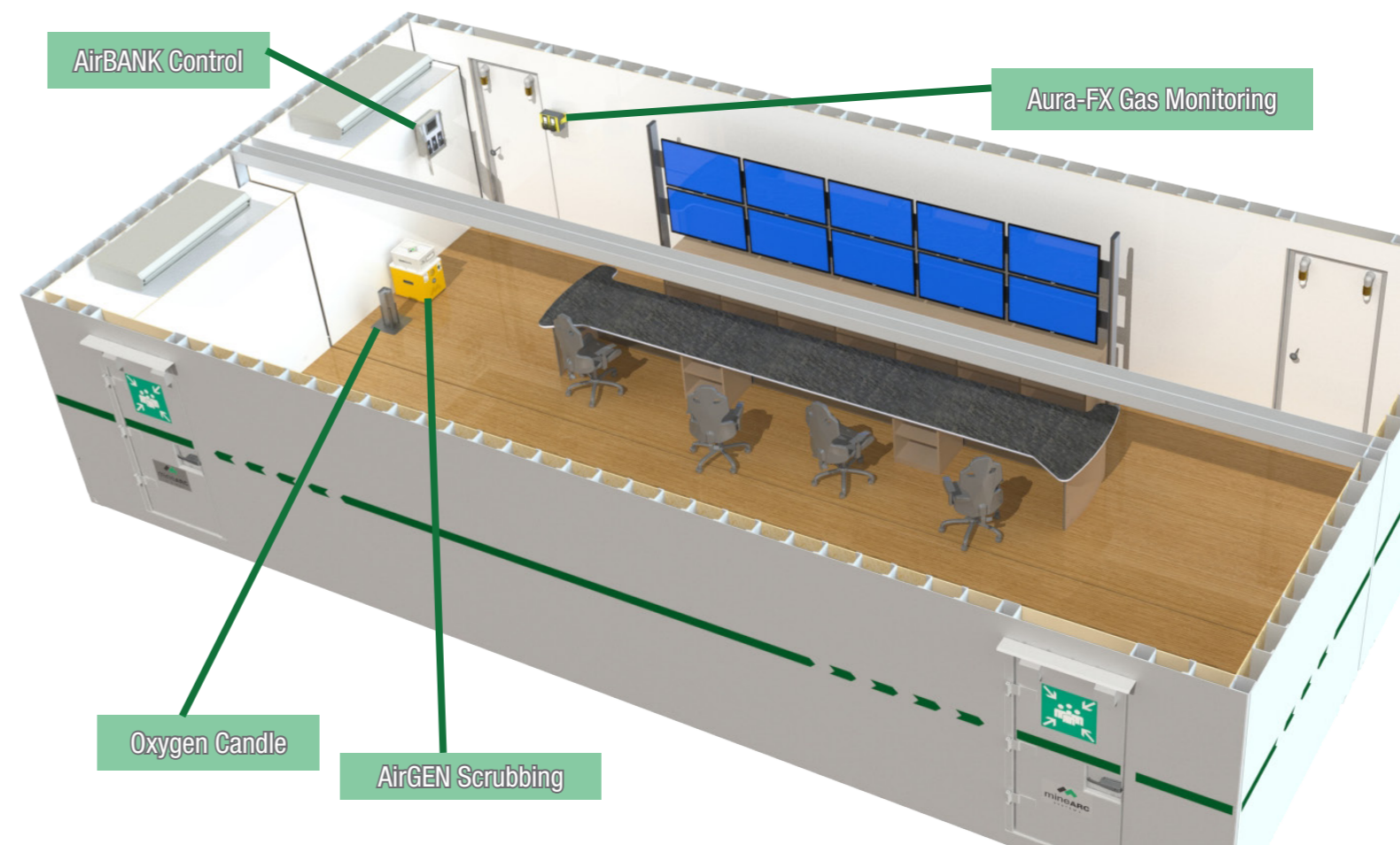
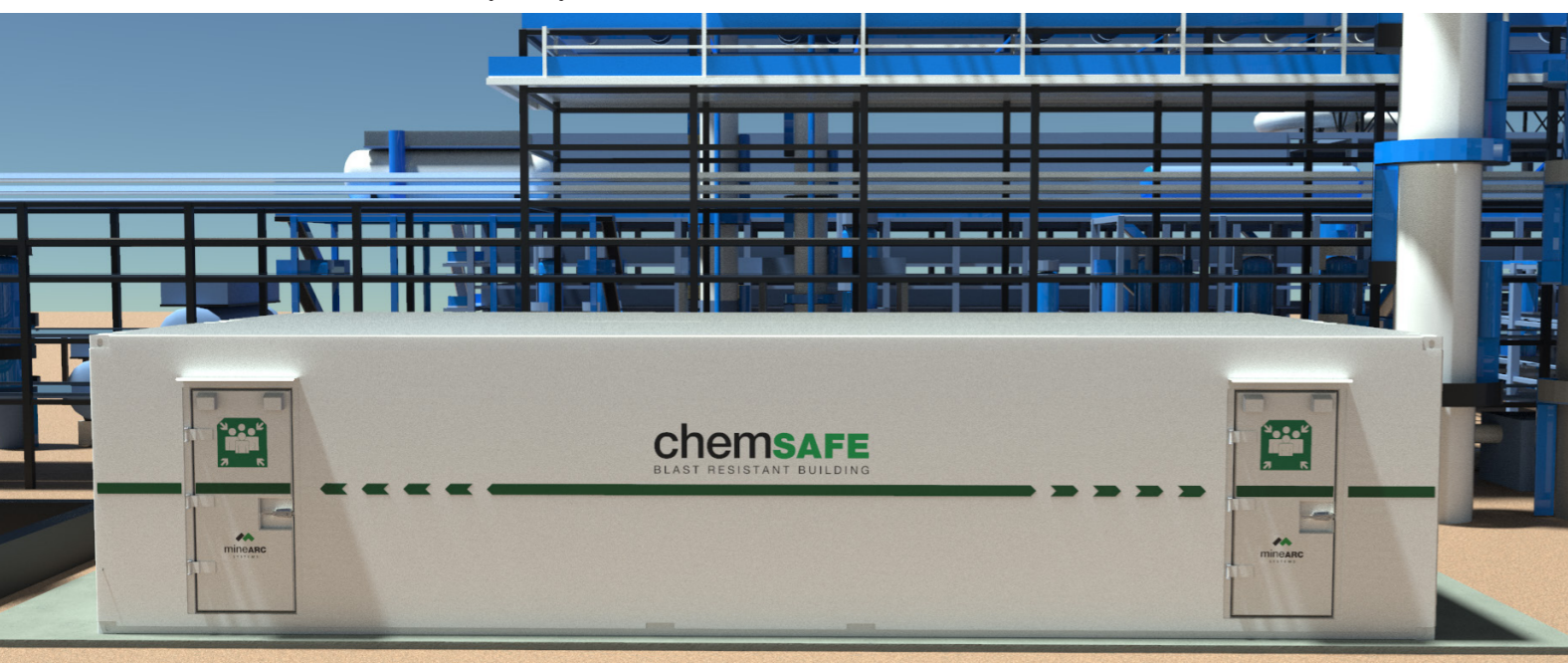
ChemSAFE Optional Features

MineARC understands that emergency response requirements differ depending on a site's processing conditions, location of personnel, dangerous goods inventory and a host of other important factors. With the inclusion of life support equipment, MineARC Blast Resistant Buildings offer a safe and secure 'go-to' area for multiple site personnel in the event of a toxic or flammable chemical release.

MineARC's team of engineers work closely with each customer in developing the best options for their operation's requirements and needs. Standard buildings can be designated as high occupancy safe havens with the correct sizing and inclusion of MineARC's AirBANK, AirGEN, and oxygen systems.

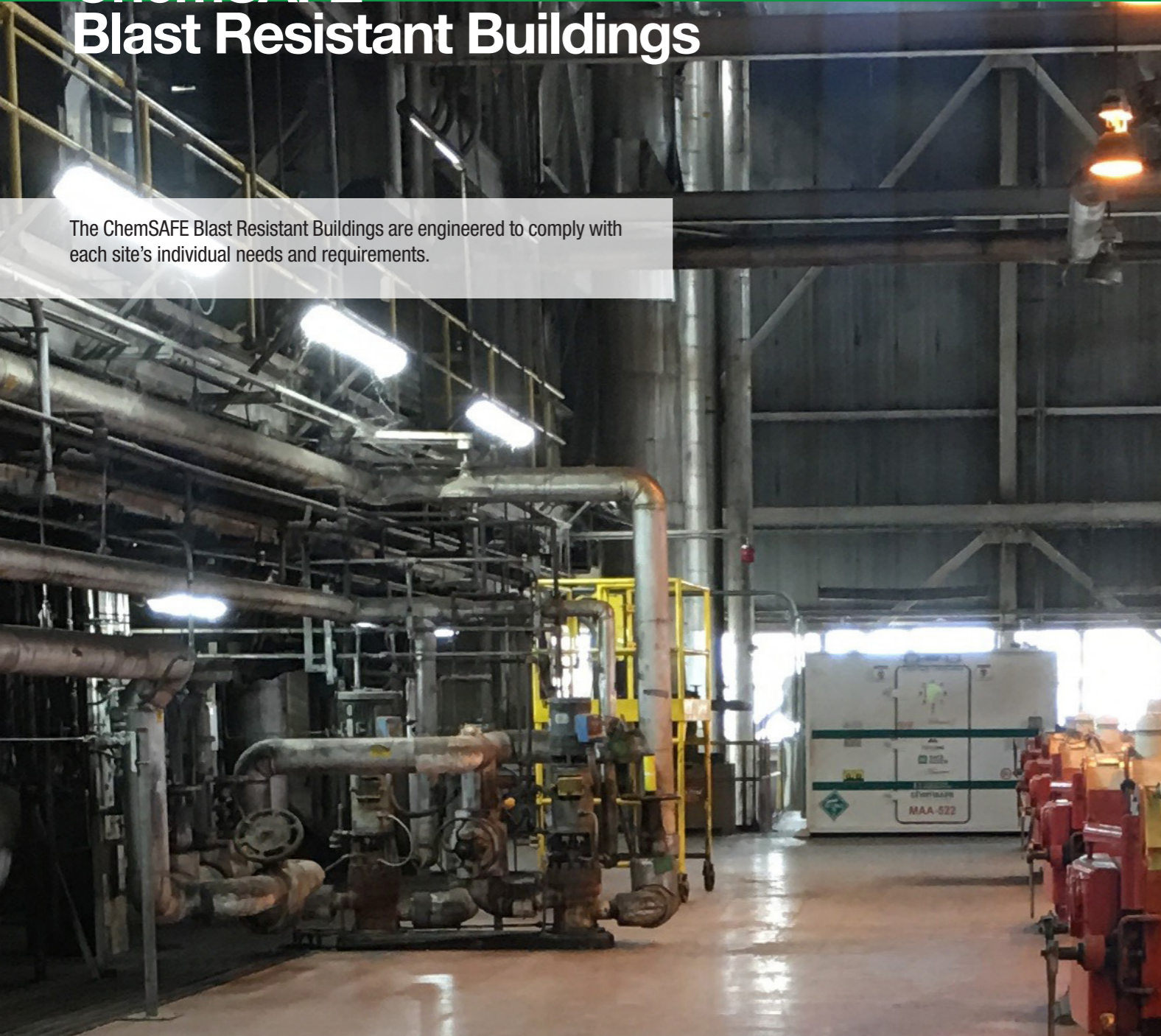


Model	Day-to-Day (Persons)	Safe Haven (Persons)
PS-BR-9-12-12-10P	5	< 12
PS-BR-9-8-20-10P	5	< 12
PS-BR-9-12-40-10P	10	< 40
PS-BR-9-20-40-10P	20	< 70



ChemSAFE Blast Resistant Buildings

The ChemSAFE Blast Resistant Buildings are engineered to comply with each site's individual needs and requirements.



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.

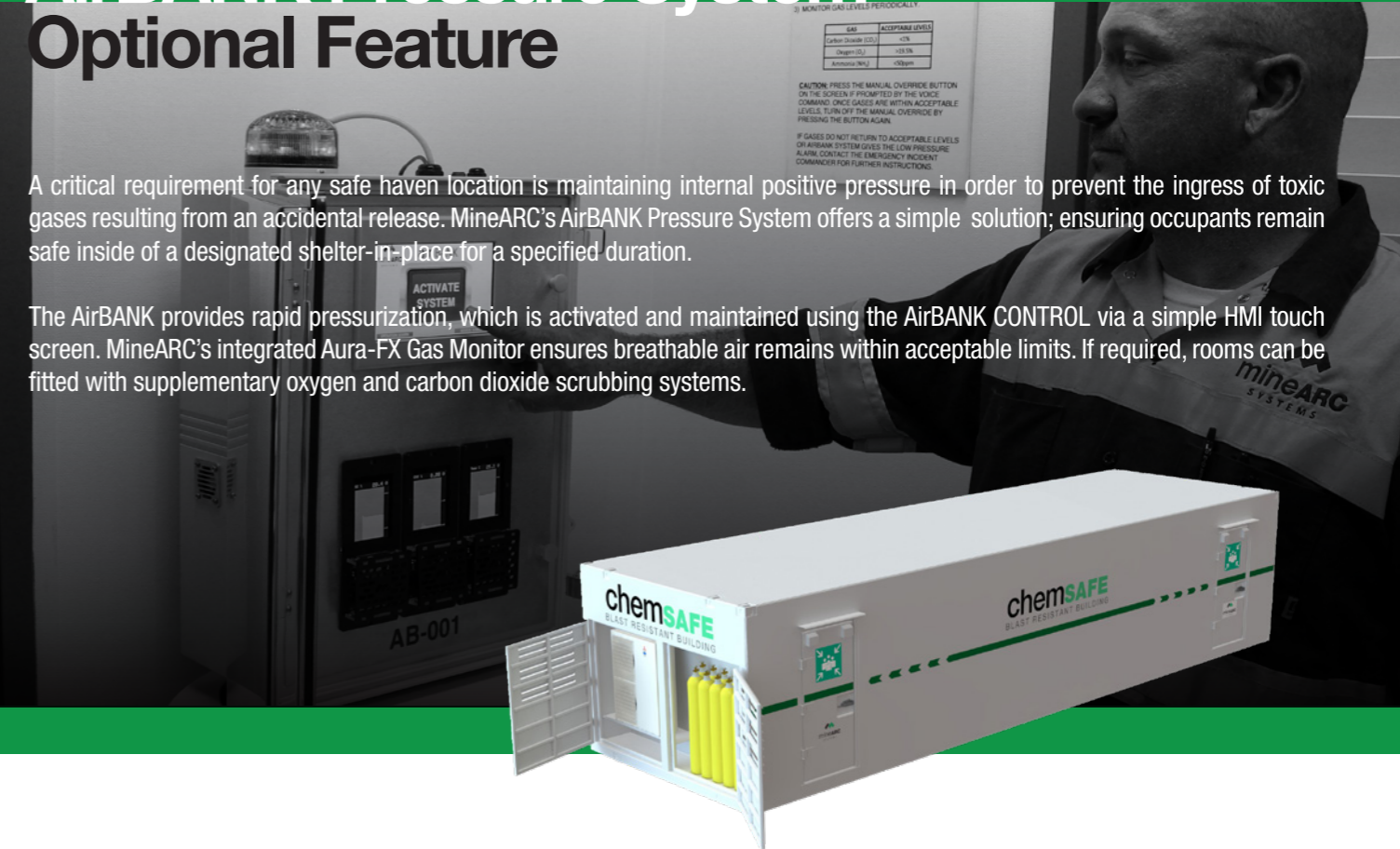
The **Rugged Oxygen Generator (ROG)** is a portable, lightweight oxygen generator that delivers 90 litres of breathable oxygen for 15 minutes. Easy-to-use and small enough to carry in a backpack, the ROG gives immediate access to a potentially life saving oxygen supply.



AirBANK Pressure System Optional Feature

A critical requirement for any safe haven location is maintaining internal positive pressure in order to prevent the ingress of toxic gases resulting from an accidental release. MineARC's AirBANK Pressure System offers a simple solution; ensuring occupants remain safe inside of a designated shelter-in-place for a specified duration.

The AirBANK provides rapid pressurization, which is activated and maintained using the AirBANK CONTROL via a simple HMI touch screen. MineARC's integrated Aura-FX Gas Monitor ensures breathable air remains within acceptable limits. If required, rooms can be fitted with supplementary oxygen and carbon dioxide scrubbing systems.



AirBANK Pressure System

The rear of the MineARC Blast Resistant Building is designed to store 4,500psi or 6,000psi cylinders, and allows the cylinders to be daisy-chained as required. Each bank is leak protected by a check valve and electric valve, and features a panel mounted gauge to display the high and low pressure level of the unit.

- Stainless steel components throughout
- Leak protected
- Low pressure alarm

AirBANK Control

The remote activated AirBANK CONTROL is designed to maintain a life-sustaining environment via a differential pressure device. Contained in a wall-mounted NEMA-Rated enclosure, the unit features an HMI screen that monitors cylinder pressure levels; alarming when levels fall below the acceptable limit.

AirBANK CONTROL features an active by-pass of the system if internal gas levels are not within breathable air limits. The Aura-FX monitors and displays gas levels in real-time, including site-specific toxic gases if necessary.

- Regulated and silenced compressed air output.
- UPS battery backup for power loss.
- 120 or 240V input.
- 15.75" [400mm] x 16.69" [500mm] x 7.87" [200mm]
- 25lbs [11.3kg]



AirGEN Scrubbing & Oxygen

Optional Feature

Depending on the designated occupancy of the blast resistant building and its volume, CO2 scrubbing and supplementary oxygen may be required.

Humans consume oxygen (O2) and expire carbon dioxide (CO2) as part of normal respiration. In high enough concentrations, CO2 can cause serious injury, leading to a loss of consciousness and eventually death. Removal of CO2 is therefore a vital necessity for any safe haven, especially where CO2 concentrations exceed one percent over the duration.

The MineARC AirGEN is a standalone air regenerative system that 'scrubs' the air inside of an enclosed location, effectively cleaning it so occupants can rebreathe it. The AirGEN is simple to operate with only a single switch and is powered from its own internal battery supply.

In certain cases, it is necessary to also provide supplemental oxygen. MineARC offers either compressed oxygen cylinders or sodium chlorate (oxygen) candles. The delivery of compressed oxygen cylinders can be automated based on established low and high limits.



AirGEN Scrubber

The MineARC AirGEN is compact in size, stores for extended periods, and is easy to operate. The addition of a scrubbing system permits a building that is normally ventilated from the outside to be converted to a fully isolated environment, protected from external hazards.

- Simple single switch operation
- Easy fitment of chemical cartridges
- 18.75" [476mm] x 13.75" [349mm] x 22.6" [570mm]
- 90lbs [41kg]

Oxygen Supply

MineARC Scrubbers operate in conjunction with breathing grade O2 cylinders. Cylinders are generally supplied with a primary and backup oxygen regulator as well as Latex Gloves for handling. Cylinders can be housed securely in the rear of the MineARC Blast Resistant Building. An optional MineARC Automated Oxygen Delivery System (AODS) can be included to fully automate the delivery of oxygen between statutory limits.

- Breathable oxygen cylinders 303ft3 (8,580L)
- Medical grade oxygen regulator with flow selection from 1-30 persons Supplied with rubber gloves for regulator handling

MineARC's oxygen candle is a compact source of oxygen that can be easily stored for long periods. The oxygen candle is a backup oxygen supply, and provides 2,600L (92ft3) of pure oxygen upon ignition.

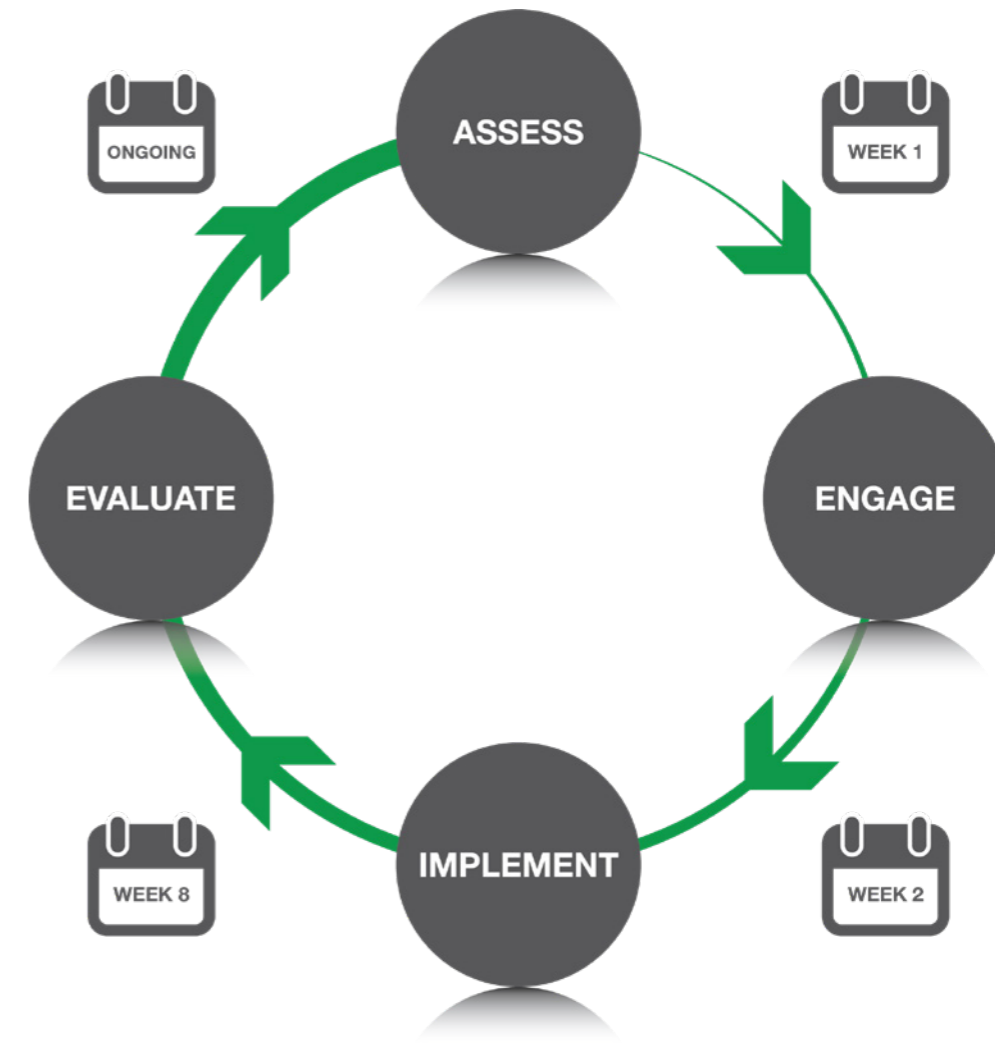
- Includes igniter, stainless steel stand, and Kevlar™ gloves.



Turnkey Project Execution

MineARC Systems specializes in providing engineering, construction and commissioning of safe havens for existing and new facilities. Our commitment to technical excellence and innovative solutions, drives MineARC to provide the highest caliber "turnkey" execution available. We offer our customers a wide range of specialized services built around our core belief of

providing proven safe haven for personnel during an emergency situation. We strive to meet each customer's exact engineering, procurement and construction requirements and deliver a lump sum turnkey (LSTK) project with minimal impact to an operating facility's day to day business.



All Aspects of Turnkey Project Execution are evaluated:

- ✓ Management
- ✓ Design
- ✓ Engineering
- ✓ Procurement
- ✓ Construction
- ✓ Testing
- ✓ Pre-Commissioning
- ✓ Commissioning
- ✓ Handover



MineARC Systems - Built for Safety. www.minearc.com

