

Emergency Refuge Chambers

For Tunneling



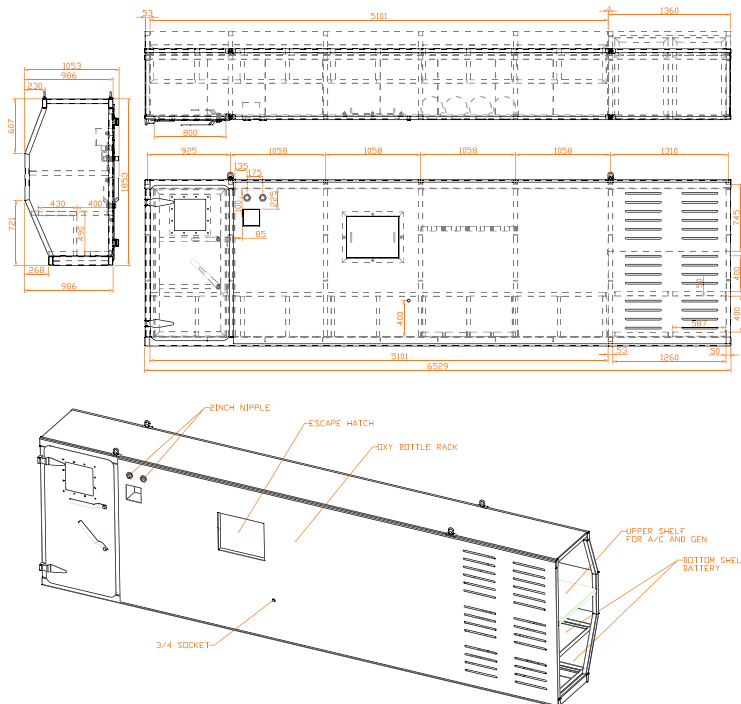


For Tunneling Applications

Strata Emergency Refuge Chambers are complete safety systems designed to provide immediate refuge and breathable air in the event that air quality in the working environment has been compromised. They are intended to be an alternative option when escape is not possible.

Construction

Refuge chambers are purpose-built to withstand harsh environments and designed to isolate people from potentially toxic environments. Chambers for tunneling applications are engineered and constructed specific to each TBM or tunnel specifications. They are narrower and shorter than standard mining chambers and have optional curved walls to suit the diameter of the roadway bore.



Breathable Air

PRIMARY SOURCE

Chambers connected to operations main air-compressors have an indefinite supply of breathable air. This air passes through a purifying filtration system before it enters the chamber. Specialized relief valves maintain a safe internal pressure for the occupants.



BACKUP SOURCE

An on-board backup air supply consisting of compressed oxygen cylinders and the Strata ActiveAir™ carbon dioxide scrubber supplies 12 – 96 hours of breathable air (Scalable to customer preference). Individual flow meters on each cylinder, control oxygen flow rates and soda lime packaged in spill-proof, dust-free cartridges scrubs CO₂. Strata ActiveAir is equipped with two Strata/Troxel Sentro 1 gas detectors that continuously monitor O₂ and CO₂ levels inside the chamber. Alarms will sound when gas levels rise or fall beyond safe ranges.

A timer on the scrubber, set according to the number of occupants in the chamber, will sound an alarm when it is time to exchange the soda lime cartridges





Electrical Power

PRIMARY SOURCE

Chambers connected to the mains power source have an indefinite supply of power to operate the lights, air conditioner, atmospheric monitoring system and carbon dioxide scrubber. A step-down transformer can be customized to meet individual power requirements and power management systems regulate power supply to protect chamber circuits from extreme power fluctuations. All external systems have an IP67 rating.

BACKUP SOURCE

A fully automatic 12/24-volt battery backup system is standard on all chambers. This system is a bank of gel, fiber mat, and crush-proof batteries independently wired with circuit breakers and connected via a charging module. In stand-alone backup mode, the batteries will provide power for 12 – 96 hours (scalable to customer preference).

Lighting and Alarm

Clear 12/24-volt LED lights are mounted on the interior ceiling of the chamber. Colored 12/24-volt indicator LEDs are mounted on the outside to notify users of chamber location, occupation and power status. If mains power is lost and the chamber is running on back-up battery power, a red warning light will illuminate.

Cooling System

Complete industrial grade air conditioning systems with dehumidifying control are available as needed. AC and DC systems available. *Note: The amount of heat produced by human occupants & CO₂ scrubbing over an extended period of time, along with other site-specific variables, may create a very hazardous environment. An air conditioning system is highly recommended.



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Seating and Storage

Storage facilities are provided under the seats and overhead shelves. The seats can be angled and/or tilted to meet individual structural configurations of the application and are constructed using high-grade materials for added comfort and durability. A portable chemical toilet is stored under the seats.

Food/Water

Six-year shelf life emergency food and water is supplied as required. Minimal quantities to meet government regulations (scalable to customer preference).

Escape Hatch

A 34in x 24in (86cm x 61cm) escape hatch with a polycarbonate viewing window is provided as a secondary escape route.

Optional Atmospheric Monitoring

- Simultaneous Gas Monitoring: (O₂, CO₂, CO, H₂S)
- Battery Voltage Indicator
- Battery Temperature indicator
- Temperature inside & outside the chamber
- Door "OPEN" Sensor (optional)
- Remotely Turn Emergency Chamber Lights on during emergency
- Remotely Turn Emergency Siren on during emergency
- Remote feedback of chamber status available

