



TLS Containerised Solutions For Temporary Refuge Shelter



Wherever you are in the world TLS can help you, contact us.

Head Office

Singapore

69 Ubi Road 1, Oxley Bizhub, Singapore,

E-mail: sales@tls-containers.com

Telephone: +65-65637288;

+65-31386967

UAE

TLS Containers International Limited

P.O. Box 85674, Dubai, United Arab Emirates

China

198 Wuzhou east road, Yangzhou, China

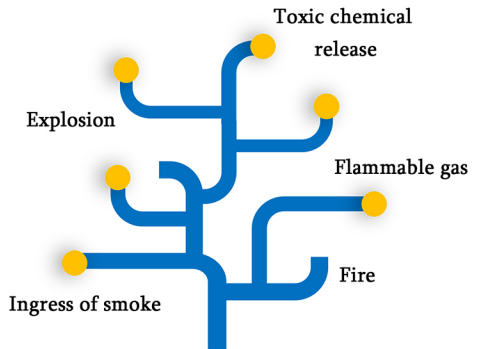


Why is the temporary refuge (TR) shelter (or called as toxic gas refuge (TGR), safe haven cabin, H2S temporary refuge shelter, TR pressurization unit (TR unit)) needed?

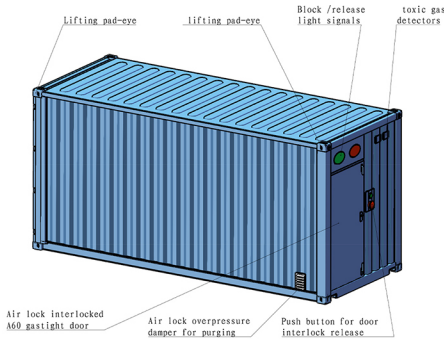
The purpose of a temporary refuge (TR) shelter (or called as toxic gas refuge (TGR), safe haven cabin, H2S temporary refuge shelter, TR pressurization unit (TR unit) is to keep the personnel safe.

At a facility, such as chemical processing plant or offshore platform or industrial manufacturer, there are typically large volumes of hazardous chemicals being used, stored, and transported. These pose potentially dangerous situations should an accident occur.

Depending on toxicity or intensity, a chemical release or blast can cause severe health effects. Toxic gases produced from an explosion or loss of containment, when inhaled, can lead to disorientation, incapacitation, or death.



In the event of a blast or chemical release, when evacuation is not possible, temporary refuge shelters provide a safe alternative and are an essential part of emergency management. Installing temporary refuge shelters such as safe havens, shelter-in-place and toxic gas refuge shelter, is a mitigation control to reduce the loss of life, and damage to property and equipment, when preventative control fails. When it comes down to it, these temporary shelters help to improve survivability.

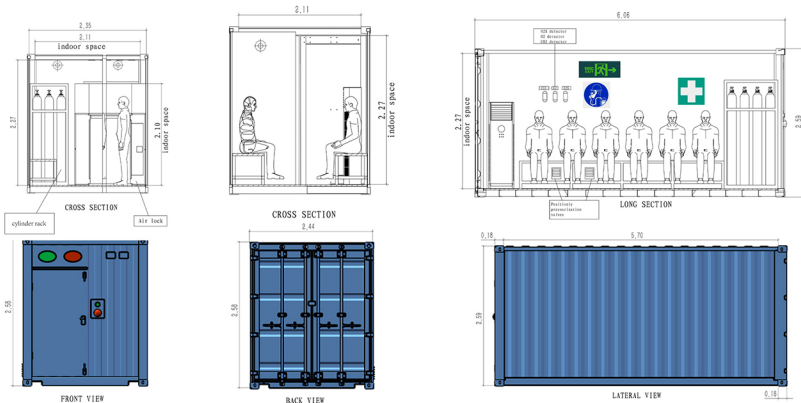


How does it work?

When escaping from hazardous area, the temporary refuge shelter is activated via alarm schedule during an emergency, will serve as a rest and care station for 1-4 hours or more hours. HVAC and positive pressure system protect person and equipment from critical outdoor conditions like extreme weather, dust, sand, storm, H2S, CH4 or other toxic gasses contamination, explosion etc. Creating a breathable atmosphere within a sealed room to protect your employees.

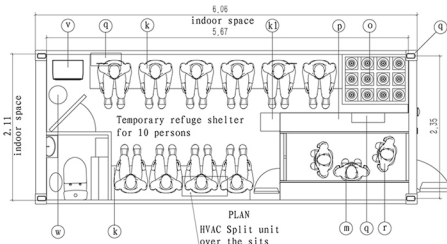
Main features

- Designed for an atmosphere during environmental contamination from poisonous gases
- To provide protection against fire and contaminated environment
- Resist to external Heat Stress due to fire caused by inflammable gas
- To provide recovery to people on board (POB) in case of detection of gas mix including at least: Hydrogen Sulfide, Sulphur Dioxide, inflammable gas such as Methane, Butane, Propane, non-flammable gases as Nitrogen, Carbon Dioxide, Oxygen Deficiency, hazardous exhaust and Temporary smoke with particles suspension
- To provide temporary medical assistance to injured personnel
- Completely automatically shut down auxiliary systems and dampers of the system after detecting poisonous gases in the outside environment

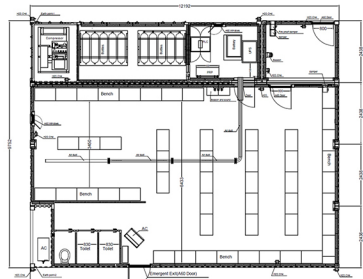


Operation sequence during emergency situations

- Fire and gas detection system send an alarm
- All the personnel run near the TR
- The TR F&G system run the emergency sequence operation, close the F&G dampers and lock the external doors
- TR electric power is switched from external power supply to UPS
- The HVAC system is switched from “fresh air” mode to “full recirculation” mode.
- Is activated the compressed air pressurization system and the BA system.
- The air lock BA washing system is ready to start
- The air lock doors are unlocked for the first mustering sequence
- A predetermined number of personnel go inside the air lock (the TR doors are still closed)
- Start the BA washing sequence inside the air lock (the air lock doors are now closed)
- A toxic gas analyzer verifies the absence of gas (if the gas is revealed, start an additional washing sequence)
- The TR rooms doors can be opened.
- Start another mustering sequence (during the mustering, people outside the TR complex waiting for their turn connected with the outdoor BA Cascade system)
- People inside the TR rooms take their sit or their numbered position, waiting for the rescue vehicle or for the end of the alarm.
- In case of TR evacuation (at the end of the 2 or 3 hours of emergency capacity of the TR), will



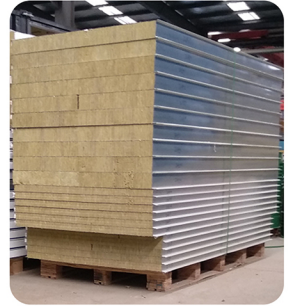
Stand along temporary refuge for 10-30 persons



Large area temporary refuge for 30 persons and above

Key specifications

- Structure design according to offshore DNV2.7-1 standard and certified by DNV-GL, LR & BV (option)
- A60 thermal insulation (flooring, walls, doors, ceiling)
- Blast rating: 5 psi
- Ambient range from -20°C/15%RH to +45°C/80%RH
- Casing leakage according to class L1, EN-1886
- Air lock entrance doors
- HVAC system (ATEX approved, Hazardous zone certified)
- Independent breathing air system



- Chemical toilet with hand wash station
- Toxic gas detection system
- CO2 Scrubbing system (optional)
- PA/GA system (optional)
- Telecommunication system (optional)
- CCTV monitoring (optional)
- UPS powered (optionally with battery power pack)
- All electrical equipment/bulk material outside TGR certified for hazardous areas (ATEX, IECEx)
- Easy service and maintenance access
- Customized dimension or specifications according to specific requirement (10 POB to 500 POB)



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Offshore containers
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E-mail: sales@tls-containers.com

Telephone: +65-65637288;

+65-31386967