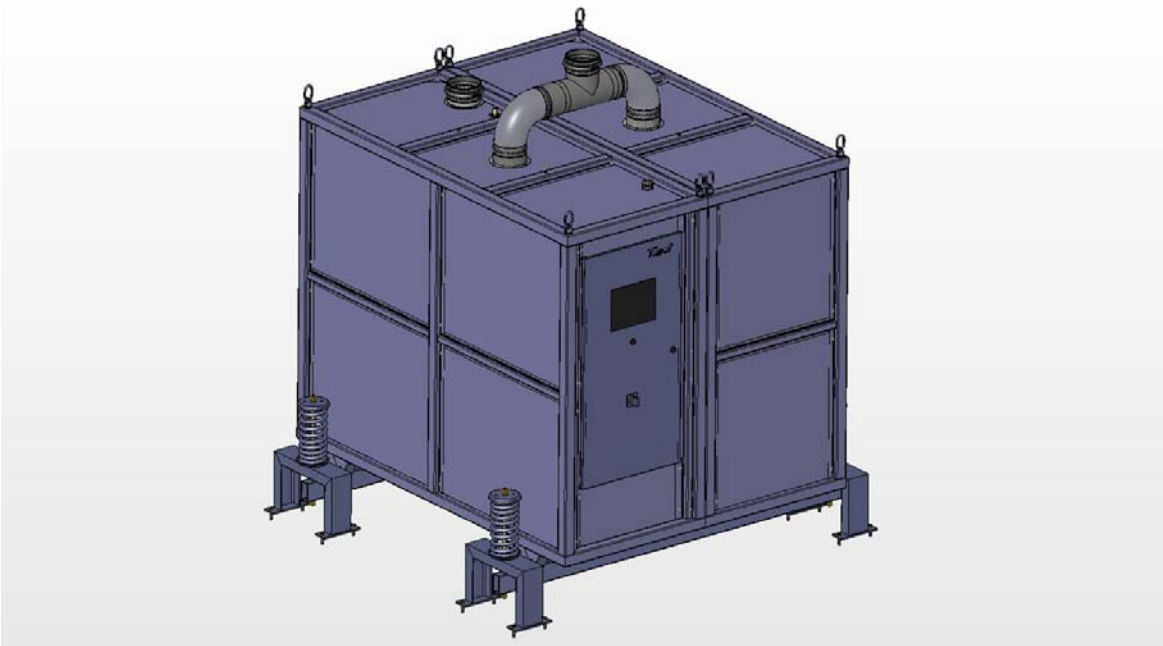
TEMET ESL-CO2-230-B CARBON DIOXIDE REMOVAL SYSTEM

Protective solutions



Temet ESL-CO2-230-B is fully automatic Regenerative Carbon Dioxide Removal System. The System is designed to be used in any facility having a gastight envelope that needs to be fully closed in dangerous situations. Removing carbon dioxide (CO_2) from the atmosphere is an important function of a life supporting system.

The ESL-CO2-230-B to ensures safe stay for persons duration a close-up mode, when no fresh, purified air is supplied to the facilities. This stand-alone system requires only connection to mains power and existing ventilation ductwork and occupies less space in the plant room than any other corresponding system. This is an important aspect especially in military hardened facilities where each square meter of shelter space has significant cost impact. The longer the mission duration or the larger the crew size, the more demand there is for regenerative methods.
The program included the following activities:

Applications

In the past, carbon dioxide removal has been based on non-regenerative soda-lime or lithium hydroxide systems. Temet ESL-CO2-230-B replaces these systems, where the material is continuously consumed and additional space is needed for stocking it. Since 1985, in a harmonized program supported by European Space Agency, ESA and the German National Space Agency, DARA, a regenerative carbon-dioxide removal system based on solid amine material has been developed.
Temet has further applied this technology to protective shelters with larger spaces.

Importance of carbon dioxide removal from the shelter facility grows when the close-up period is longer. The level of carbon dioxide inside the shelter starts to rise immediately after switching the shelter into close-up mode, because the air filtration is not used and no fresh air is entering the shelter. The carbon dioxide removal shall be controlled and at same time the shelter overpressure shall be maintained on positive side. Therefore it is essential that all of these controlled systems can be integrated to ensure maximum safety for personnel inside the shelter facility.

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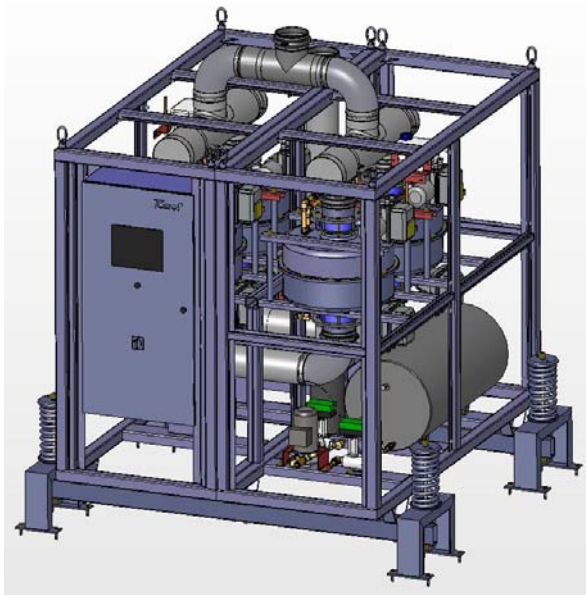
Specification

Temet ESL-CO2-230-B Regenerative Carbon Dioxide Removal System consists of filters of the adsorbent material, heating unit, control unit and support components for pumping air and monitoring flows. The carbon dioxide adsorbent material in the filters is based on a highly porous polystyrene matrix. The filters are arranged into two phases, where one is in purification mode, when the other is in regeneration mode. Heat is used to remove the collected carbon dioxide from the adsorbent material. The high concentration of CO_2 is then removed from the shelter via small pipe with help of vacuum pump.

Air flow in the purification mode is 230 m^3/h.

Power supply is 400 V / 3 phase / 16 A, UPS based back-up power can also be applied.

The system control unit provides communication capabilities for specific remote control and monitoring or for facility management systems.

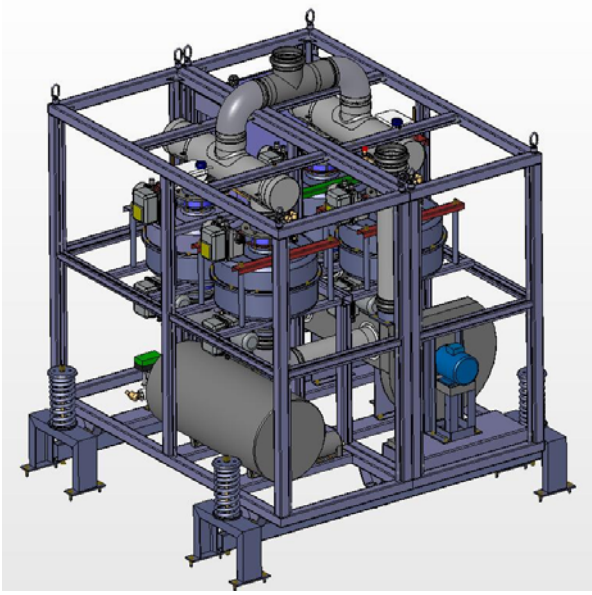


Related systems

For automated operation of carbon dioxide removal additional equipment is needed.

Replacement Gas Unit
When the ESL-CO2-230-B removes carbon dioxide, the persons in the closed space need to be provided with additional oxygen to replace the consumed part. This is arranged by Replacement Gas Unit, which comprises of
- pressure bottles of air, typically at pressure of 150 to 200 bar
- pressure control unit and
- supply control unit.

Additionally there may be pressurized oxygen to be mixed with the air.



CO2 level monitoring system
Sensors for monitoring the carbon dioxide content in the shelter air are needed for basic control and alarms. These are normally connected to facility management systems. However, the ESL-CO2-230-B operates independently of the sensors.

O2 level monitoring system
Sensors for monitoring the oxygen content in the shelter air are needed for basic control, alarms and to control the supply from the Replacement Gas Unit. These are also normally connected to facility management systems.

Manufacturer of ESL-CO2-230-B Regenerative Carbon Dioxide Removal System is Temet Oy, Helsinki Finland.

Design - Production – Installation – Maintenance - Consultation

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