

## Dräger ERS-Chamber Refuge Chambers

Dräger Engineered Refuge Solutions (ERS) provide a safe haven for miners in emergency situations. The engineered chamber solution is fully customized to the individual mine requirements. It can be adapted to the mine conditions, mine emergency plan, and official requirements. Highest flexibility with one goal: maximum safety.



## Benefits

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### Customized to meet your mine requirements

The requirements of a mine refuge chamber can be as diverse as those of the mine itself. A comprehensive risk assessment or the mine conditions may for example demand a specially designed refuge chamber or additional features. Dräger has decades of engineering experience of allowing chamber solutions to be tailored to the individual requirements of a mine and of providing a worldwide service network for immediate support. This helps to reduce the cost of ownership.

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### Refuge chambers incorporating local standards and regulations

The local regulations around the world are as individual as the mine requirements. Dräger's engineered chamber solution offers the highest flexibility to meet the required standards and norms. Regardless of whether the requirements are imposed by official regulations, mine requirements, or environmental conditions, Dräger refuge chambers provide the highest levels of flexibility in their design. The concept considers all requirements, for example life support systems, electrical systems, and general conditions.

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### A safe haven without compromise

In emergency situations, miners taking refuge need a life support system they can rely on and which protects against danger. This might include protection against heat stress or rockfall, the uncompromised provision of safe and clean breathing air or gas detection system, and a reliable, independent electrical system. Dräger's engineered chamber solutions offer the highest quality and safety standards for all of its various internal and external configurations to keep miners safe during emergencies.

## Configurations: Prerequisites



D-48867-2015

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### Space or shaft restrictions incorporated in chamber design

Shaft restrictions are no hurdle to providing a safe haven underground. The chambers can be designed in segments with underground installation, but without compromising on air tightness. Underground mines often lack space, so the steel hull's design can be adapted in order to integrate the chamber into the mine's infrastructure.

## Configurations: Prerequisites

D-43908-2015



### Steel structure design to meet underground conditions

Emergency situations like rockfall or heat stress place specific requirements on the refuge chamber's design engineering. Purlins and insulation can help to provide a high level of protection to the miners and the chamber in such situations.

D-43286-2015



### Mobile or fixed solutions

Fixed and portable chambers have different benefits and meet different mine emergency scenarios. A portable chamber can follow the expansion of the mine, which makes it ideally suited for fast-expanding mines. Fixed chamber solutions can meet greater capacity demands and are adaptable to different requirements. If required, all subsystems can be integrated into mine media supply systems.

D-43270-2015



### Occupant capacity and operation time requirements

Refuge chambers are an integral part of the mine emergency plan, which is as individual as every mine. The safety concept of a mine determines the capacity requirements of each safe haven. The engineered chamber solution can flexibly meet these conditions without compromise.

D-38301-2015



### Airlock

An airlock helps to minimize the ingress of contaminated air into the main room. The shape and features might be subject to local regulations or mine requirements. An airlock can therefore be designed as flexibly as the whole system. Durable gas-tight doors, a reciprocal interlocking system to the main room, an air purging system, or different breathing air supply systems are only examples of possible configurations.

## Configurations: Requirements and Features



D-10884-2011

### Breathing air supply systems

Different systems are available according to the operating time and occupant capacity. For example the Dräger breathing protection unit is a redundant breathing air supply system with integrated CO<sub>2</sub> scrubbing, CO conversion, oxygen replenishment, and sustained automatic positive pressure.



D-46866-2015

### Climate and gas monitoring

Mine emergencies can involve various dangers. Heat or noxious vapours for example might pose a serious risk to the occupants inside the chamber. This is why the interior equipment, such as an air conditioning against heat stress or gas monitoring systems for hazardous materials, is especially selected or developed for the individual and specific risk analysis.



D-46865-2015

### Uninterruptible power supply (UPS)

In emergency situations, the external power supply is likely to fail. Dräger offers a dedicated battery-powered back up system with maintenance-free batteries. The UPS provides all electrical systems, including air conditioning, with electrical power for the entire foreseen duration of operation.

### Electrical system

Official regulations determine requirements of the electrical standards, which can be integrated into the chamber's design without compromising the interior features or power supply.

## Accessories and Service



D-16857-2009

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### Consumables

To meet the needs of occupants while they are in the shelter, there is a storage area for necessities such as water, food, a chemical toilet, and a first aid kit – all of which can be supplied with the chamber. Of course all consumables needed to operate the chamber and breathing air supply systems are available from a single source – Dräger.



D-43291-2015

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### Service without ifs and buts

The operational readiness of the chamber is essential for the miners' safety. Dräger's worldwide service network ensures that a technician can be on-site quickly for all your maintenance and repair needs, helping to reduce downtime. We offer a regular maintenance plan that includes on-site technical assistance – including the stocking of all required consumables, such as Dräger soda lime, filters, and gas detection components.

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### Air curtain

To reduce the ingress of contamination to a minimum when the entrance door is opened, the air curtain reduces thermally induced air exchange between the room and the surroundings. The air curtain is available as a circulating air unit or a single side unit.

## Related Products



D-38302-2015

### Dräger MRC 5000

The MRC 5000 is a configurable mine refuge chamber with a standard layout comprising high safety and quality levels. Configurations to the occupant capacity and operating time requirements or additional features make the chamber flexible to be part of the mine emergency plan.



D-40444-2015

### Dräger MRV 9000

The Dräger MRV 9000 is the answer in an ever-changing mining environment. This robust vehicle extends the mission time for mines rescue teams by providing safe transportation closer to the incident. Innovative and customer driven – this Mine Rescue Vehicle is a unique solution in the field of mines rescue worldwide.



D-5124-2014

### Dräger ChargeAir Station

The Dräger ChargeAir system opens up a new opportunity to enhance self-escape and first response capability of underground personnel. It offers good communication possibilities and allows the simultaneous charge of up to five SCBAs in minutes.



D-35121-2011

### Dräger Oxy 3000/6000

Thanks to the robust and state-of-the-art design, the Dräger Oxy 3000/6000 provides not only immediate oxygen supply for up to 30 or 60 minutes upon donning, but also a ten-year service lifetime without additional testing and maintenance.

## Notes

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