Technology for Life

Dräger

Dräger in profile

Employees:

16.598

Chairman of the Executive Board:

Stefan Dräger

Family-run

Form of business organization:

AG & Co. KGaA

Sales & Service

~50 countries

Figures from fiscal year 2024

Net sales:

3.37 billion €

Headquarters:

Lübeck

Germany

Development & Production:

Germany, Chile, China, France, UK, India, Sweden, South Africa, Czech Republik, USA, Norway, Switzerland, Lithuania, Serbia,

The company in figures

24
new products

212
patents issued

333.1
million euros per a year for research & development

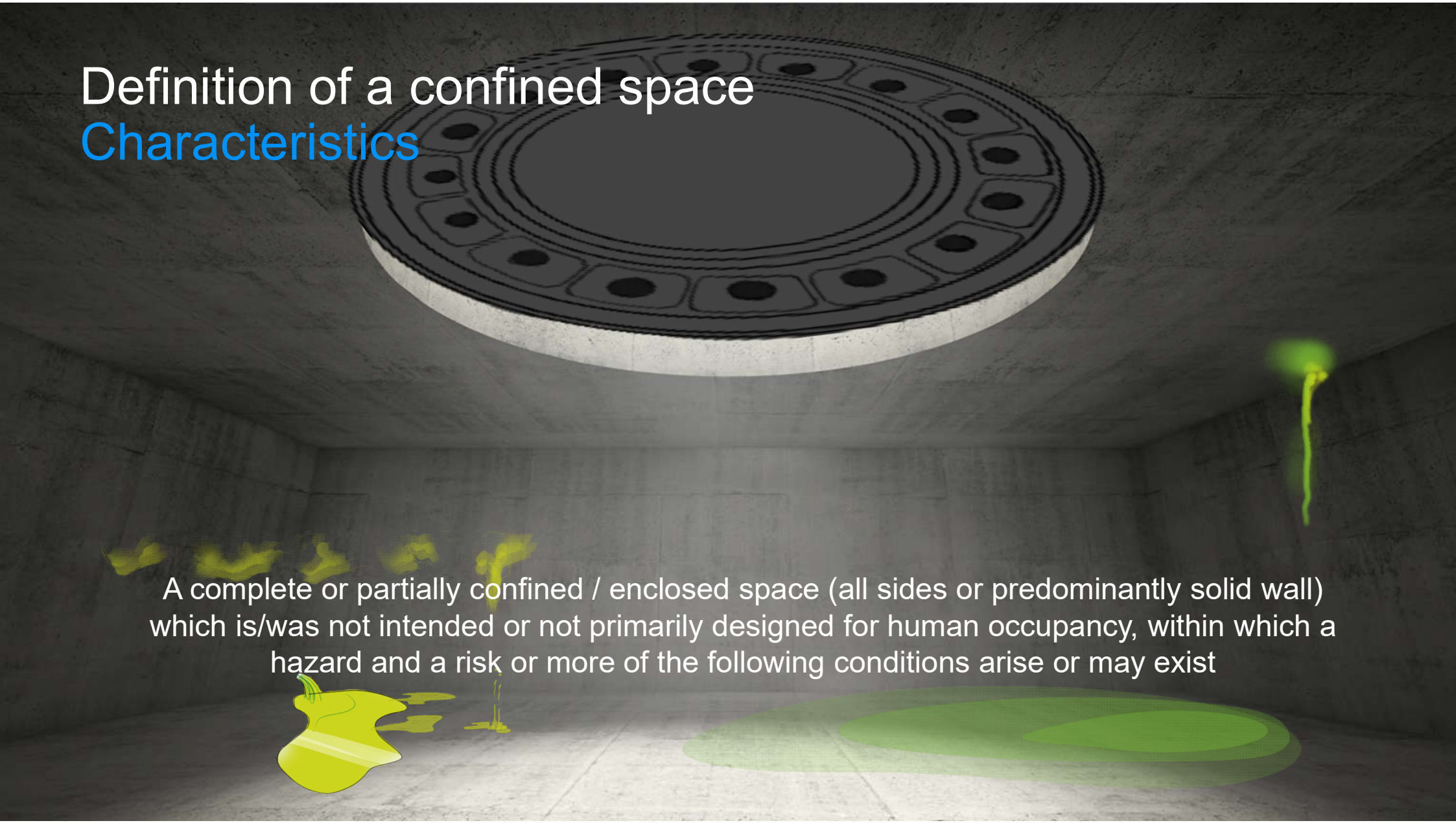
9.750
sales and service employees

Figures from fiscal year 2024

Confine d Space Entry

2025, Thessaloniki

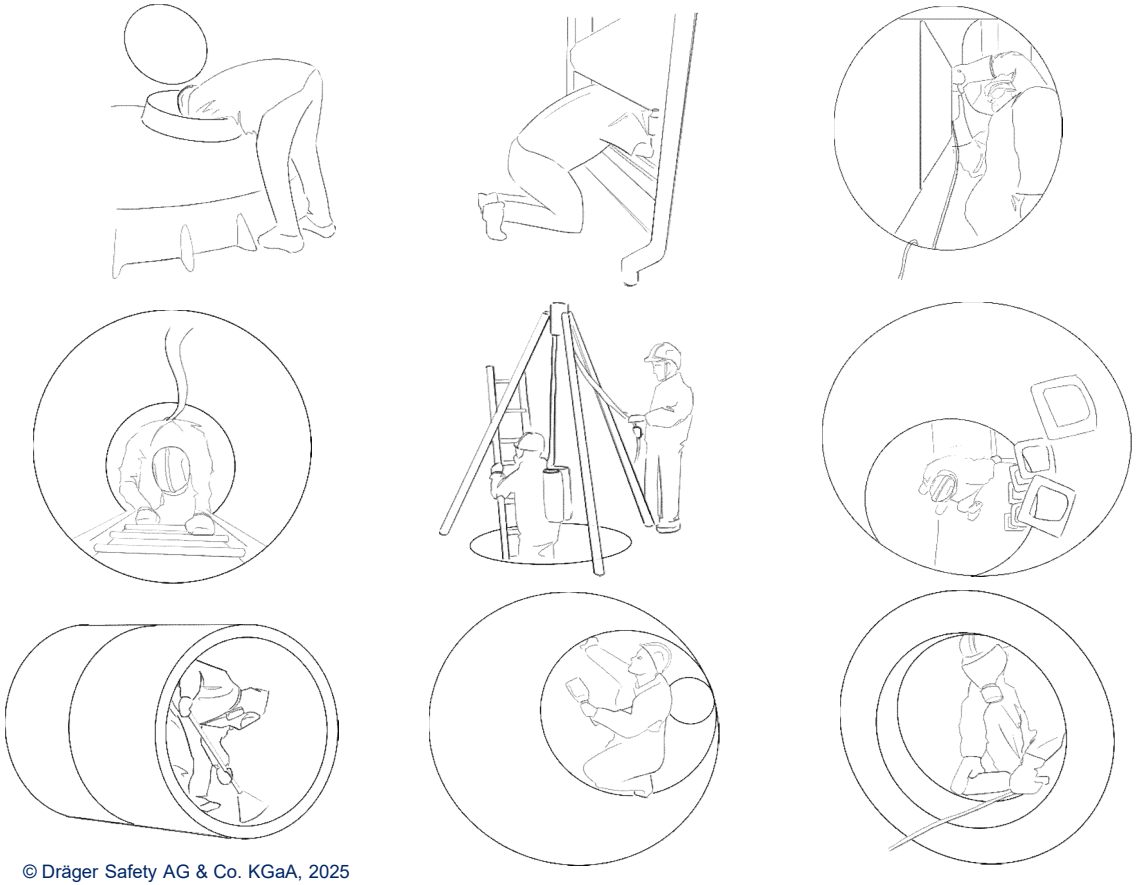
Definition of a confined space
Characteristics

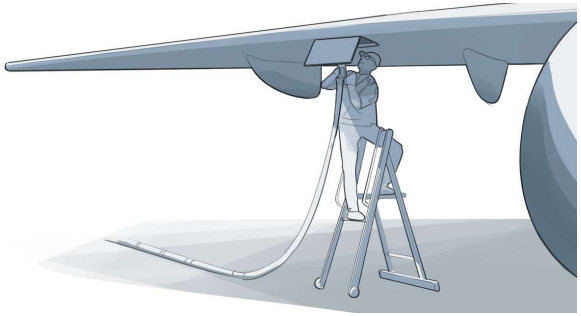


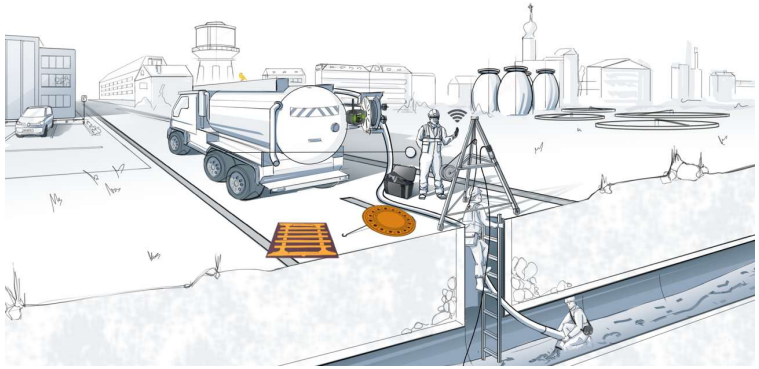
A complete or partially confined / enclosed space (all sides or predominantly solid wall) which is/was not intended or not primarily designed for human occupancy, within which a hazard and a risk or more of the following conditions arise or may exist

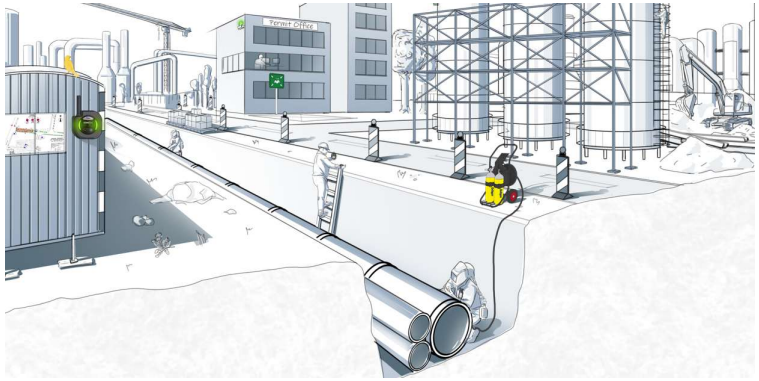
Safe Operation in Confined Space

Silos, Containers & Confined Spaces

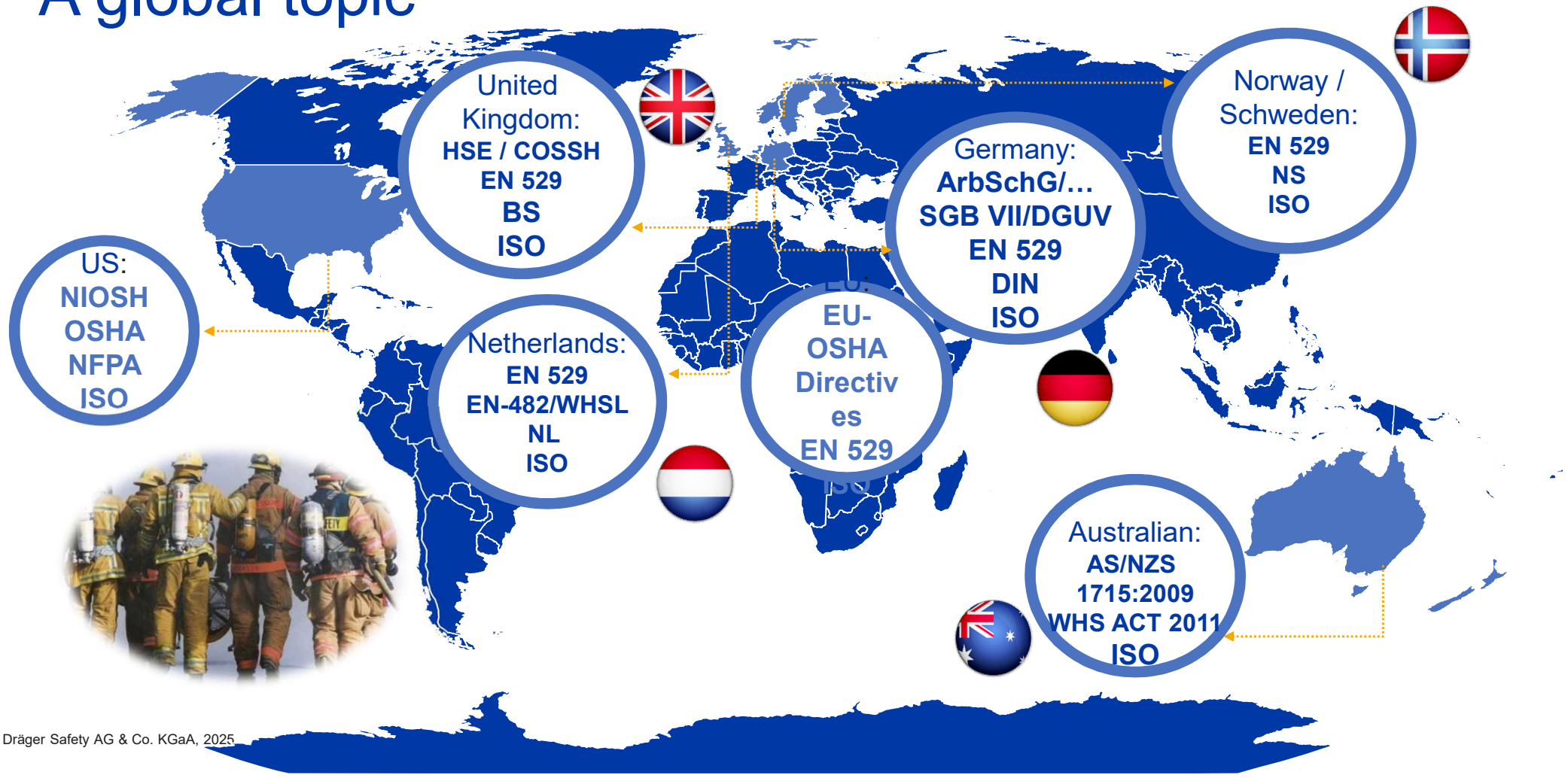








Safe Operation in Confined Space
A global topic



Definition of a confined space

Characteristics

1 

- **Ox**

2 

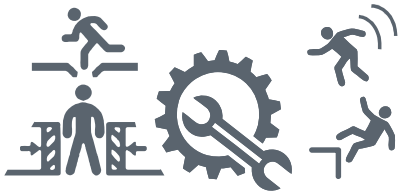
- **EX**

3 

- **Tox**

4 

Safe Operation in Confined Space
Fundamentals of Risk Assessment



1. Mechanical

2. Electrical

7. Physical effects (noise/vibration…)

8. Working environment conditions

3. Chemical Hazardous Substances

5. Fire & Explosion

6. Thermal Heat & Hot workload

9. Ergonomics & Mental workload

4. Biological

10. Psychosocial & Mental workload

11. Other or Hazards in combination

Enter Confined Space Working

Risk Assessment – Permit

Dräger

CSE Work Permit (sample)*

Site: Facility:_____ Section/Workplace:_____
Object/Container No./Description:_____

Current status:

	No	Yes	
Emptied:	❑	❑	
Purged:	❑	❑	with: ❑ water ❑ vapour ❑ air ❑ nitrogen ❑_____
Disconnected:	❑	❑	

Hazards according to risk assessment:

	No	Yes	
Mechanical:	❑	❑	Description/Safety measure:_____
Electrical:	❑	❑	Description/Safety measure:_____
Other:	❑	❑	Description/Safety measure:_____
Clearance measurement required?	❑	❑	Through department:_____ Name:_____
Ex:	❑	❑	
Tox:	❑	❑	
Ox:	❑	❑	

Safety measures for clearance measurement:

Gas detector used: Type:_____ Serial no.:_____

	No	Yes	
Functionality test successful:	❑	❑	Date:_____

Measuring point: ❑ Top ❑ Centre ❑ Bottom
Measuring frequency: ❑ Before the first permit ❑ In each case, before starting work ❑ Every ___ hours/minutes

(Percentage of) substance to be measured		Ex ❑	Ox ❑	CO ❑	Methanol ❑	H_2S ❑	_____	_____
Time of measurement Date	Value for permit Time	< 10% LEL	≥ 19.5 ≤ 21.5 Vol %	< ___ ppm	< ___ ppm	< ___ ppm	< ___ ppm	< ___ ppm

	No	Yes	
Ventilation required?	❑	❑	Kind/duration:_____

Protective measures:

	No	Yes	
Head protection/eye protection:	❑	❑	Kind/type:_____
Body protection/hand protection:	❑	❑	Kind/type:_____
Respiratory protection:	❑	❑	Kind/type:_____
Fall protection:	❑	❑	Kind/type:_____
Personal gas detector:	❑	❑	Kind/type:_____
Monitoring by third parties:	❑	❑	Kind:_____
Other, e.g. fire extinguisher:	❑	❑	Kind/type:_____

Approval by: Name:_____ Dept.:_____
Date:_____ Time:_____ Signature:_____

*This is a sample template. It serves as a guide. Please observe other locally applicable rules or regulations and individual requirements as well as other hazardous substances to be measured and their limit values.

& Rescue Concept

Risk matrix = Likelihood (L) x Consequence (C)

Probability of occurrence **Likelihood (L)**		Severity of injury **Consequence (C)**: C5 Injuries resulting in one or more fatalities; C4 Injury with permanent disability; C3 Injury requiring extensive medical treatment; C2 Injury requiring medical treatment; C1 First aid treatment					Risk Matrix: tool for ranking and displaying risks by defining ranges for consequence (C) x likelihood (L)
		C 1	C 2	C 3	C 4	C 5	
		insignificant Injury	minor Injury	moderate Injury	severe Injury	catastrophic Injury	
L 5	fairly certain	severe 5	severe 10	very severe 15	very severe 20	very severe 25	
L 4	often	moderate 4	severe 8	severe 12	very severe 16	very severe 20	
L 3	possible	mild 3	moderate 6	severe 9	very severe 12	very severe 15	
L 2	unlikely	mild 2	mild 4	moderate 6	severe 8	very severe 10	
L 1	rare	mild 1	mild 2	moderate 3	severe 4	severe 5	

Identification & Signage
LOTO

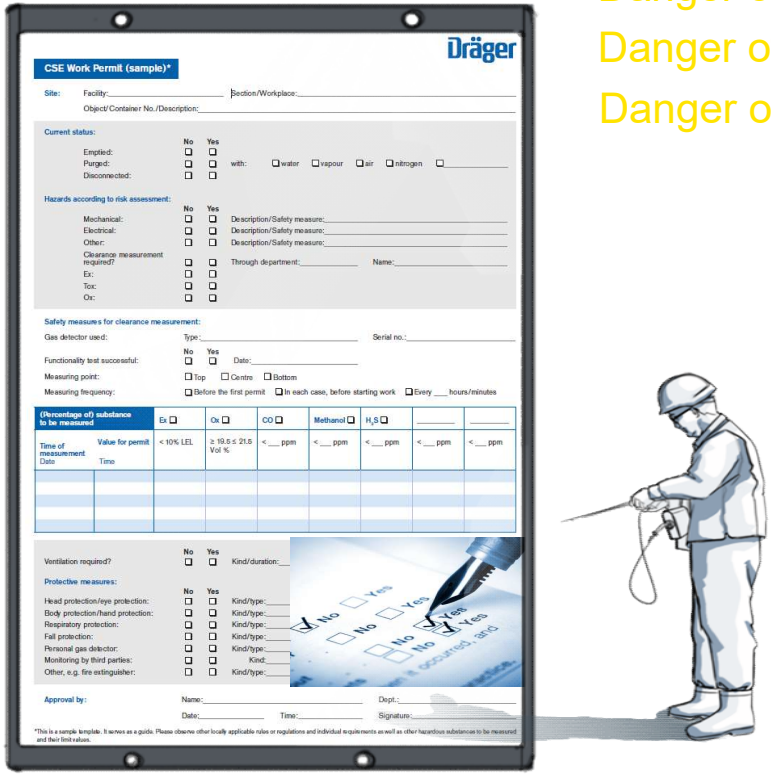
1. Lockout-Tagout (LOTO) - How the modern maintenance lockout works
2. Safe Operation of Confined Space - Examples of Safety Instructions
3. Safety Culture

Clearance Measurement
AGT - Authorized Gas Tester

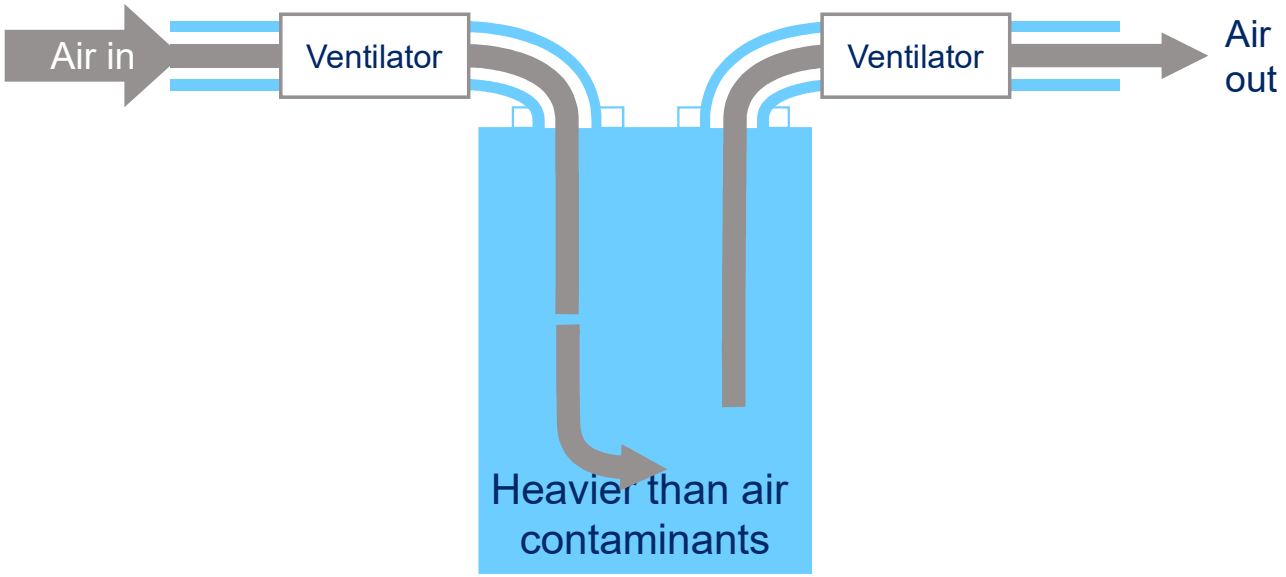
Danger of suffocation Due to absence of oxygen **Vol% level**

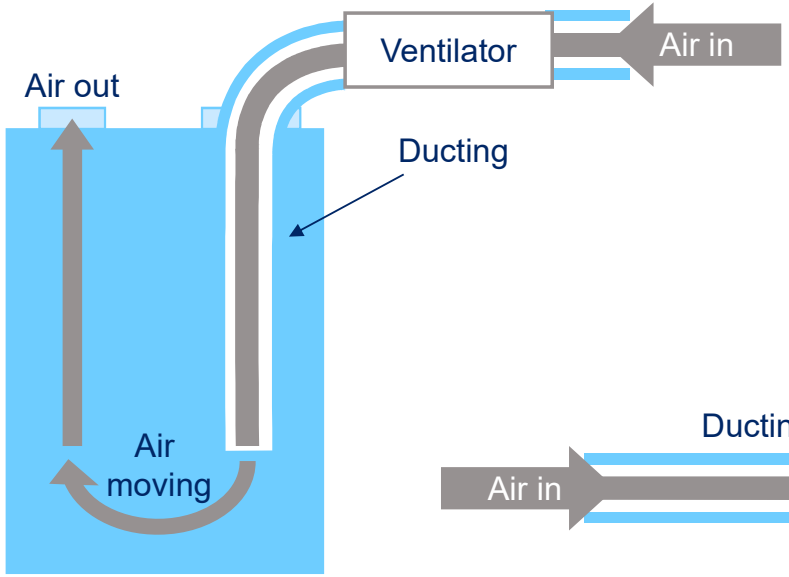
Danger of explosion By flammable gases and vapors **%LEL level**

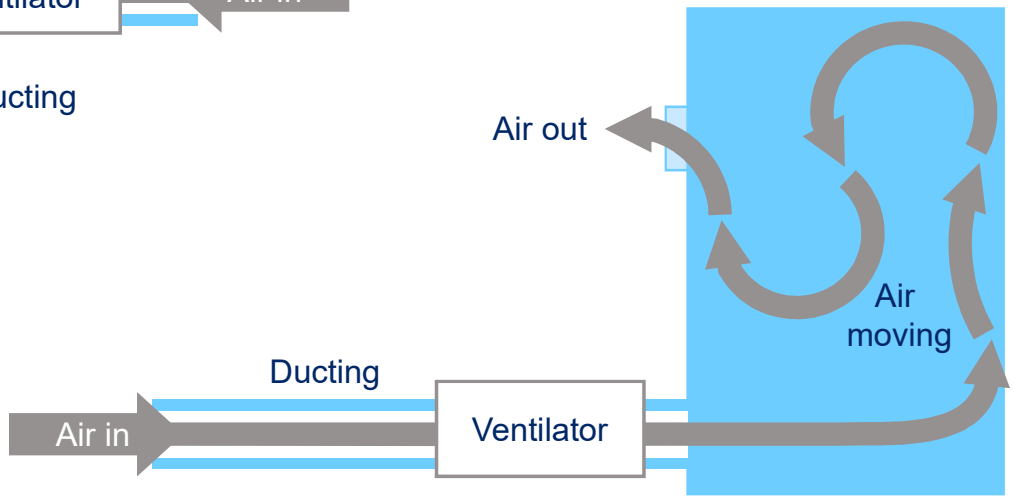
Danger of poisoning By toxic gases **PPM level**



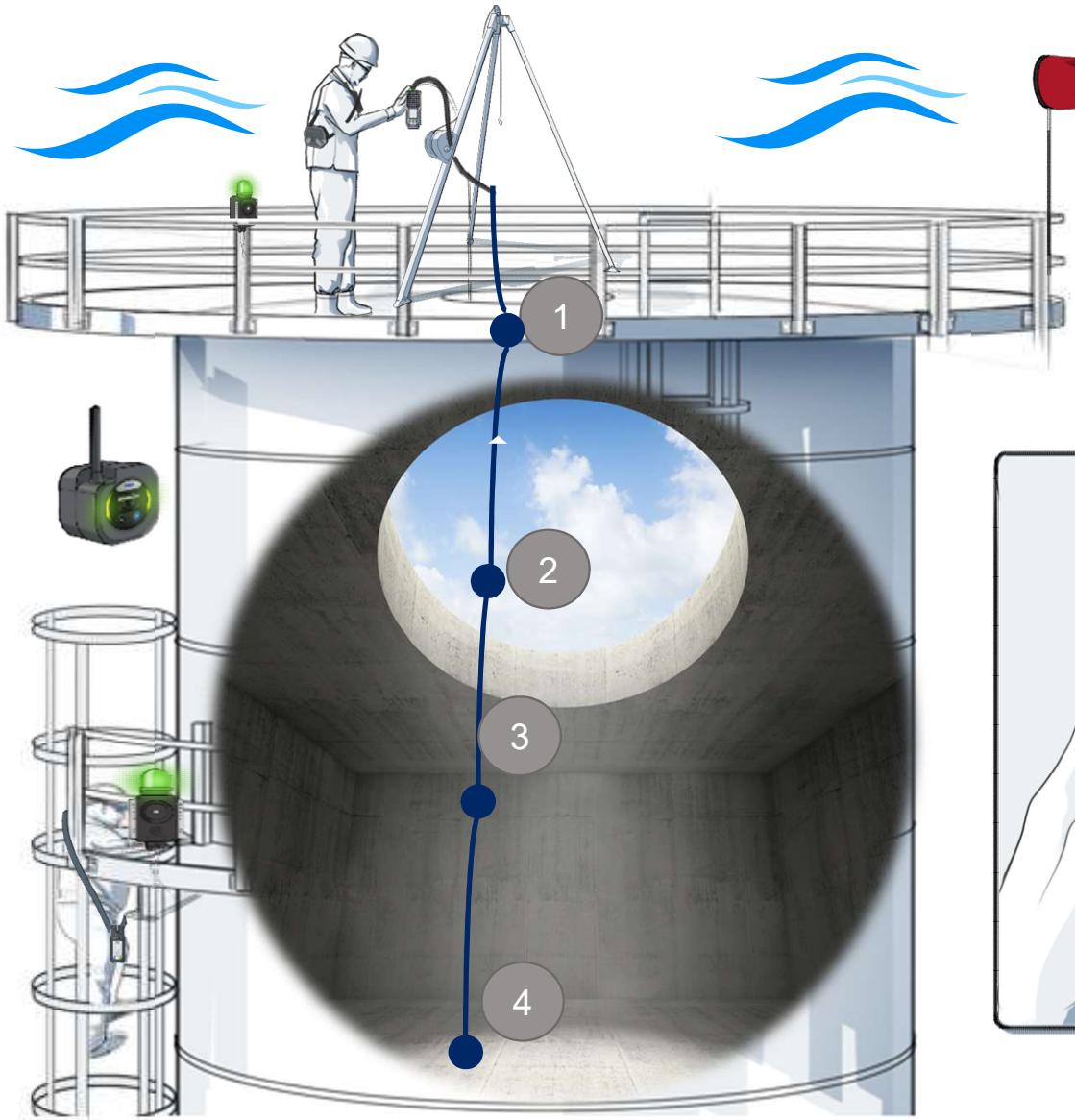
Ventilation
Approaches







Clearance Measurement



Confined
Space Work

Full Body Protection
Chemical suits

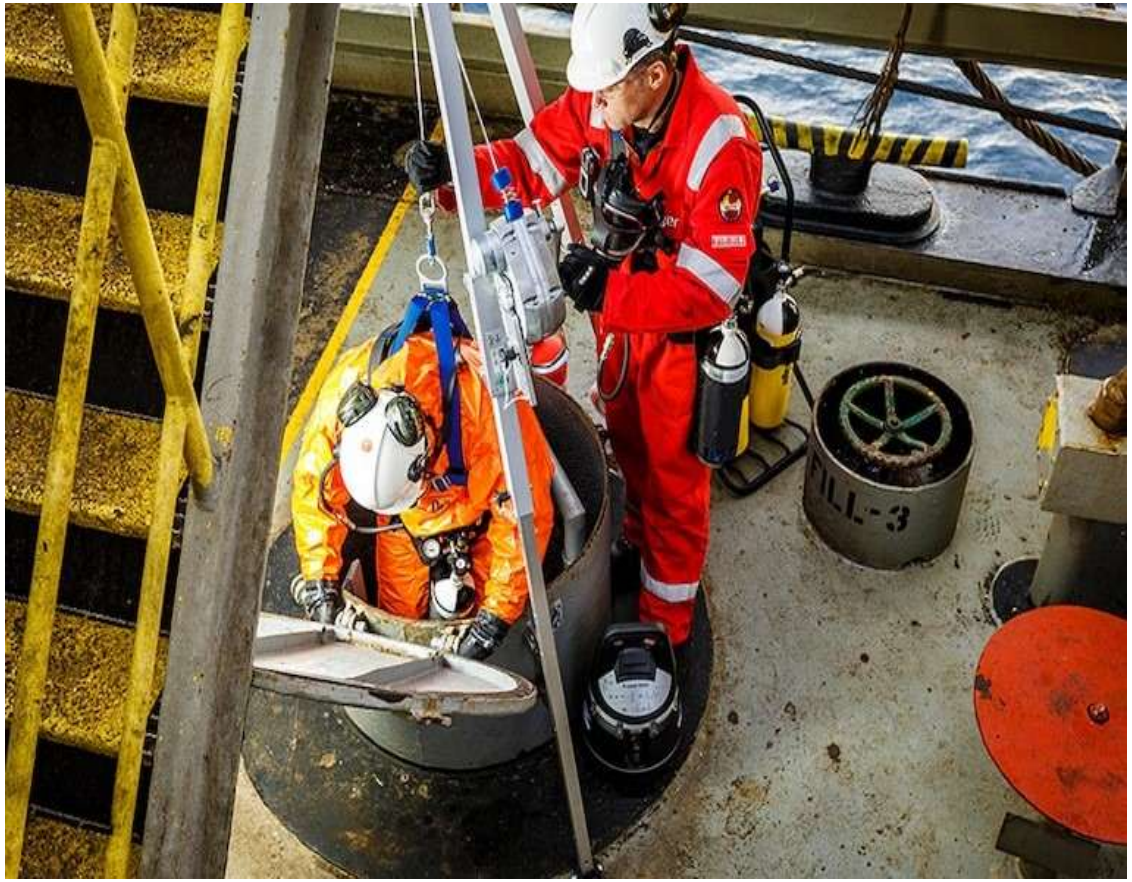
HOW DO YOU FIND THE RIGHT SUIT?

			SUBSTANCE IS KNOWN AND SITUATION IS UNDER CONTROL		SUBSTANCE AND SITUATION ARE UNKNOWN (E.G. FIRST SITE EVALUATION) OR SPECIAL HAZARDS ARE TO BE EXPECTED				
	Dräger protective suit	Breathing apparatus	Liquids/ Solids	Known gases*	Unknown gases*	Mechanical stress	Liquefied gases	Working in explosive zones	Flashfire
1	CPS 7900	Inside: SCBA	•	•	•	•	•	•	•
2	CPS 7800	Outside: F / SCBA	•	•	•	•			
3	CPS 5900	Inside: SCBA	•	•	•				
4	CPS 5800	Outside: F / SCBA	•	•	•				
5	CPS 6900	Inside: SCBA	•	•		•	•		
6	CPS 6800	Outside: F / SCBA	•	•		•			

	Main Approvals
1	EN 943-1+2 (type 1a), ISO 16602, BS 8467, SOLAS, etc.
2	EN 943-1+2 (type 1b), ISO 16602, BS 8467, SOLAS, etc.
3	EN 943-1+2 (type 1a), ISO 16602, NFPA 1994, SOLAS, etc.
4	EN 943-1+2 (type 1b), ISO 16602, SOLAS, etc.
5	EN 943-1 (type 1a), ISO 16602, SOLAS, etc.
6	EN 943-1 (type 1b), ISO 16602, SOLAS, etc.

Entry & Rescue Equipment
Harnesses, Davits, Tripod System

Application Training CSE
Rescue Concept



Application Training CSE
Rescue Possibilities

In an emergency, time is of the essence

- **All persons are instructed**
- **Emergency call is made**
- **Rescue is trained**
- **Rescue equipment is set up**
- **Skillful first aid measures**
- **Self-protection!**

Training Programs

- **Confined Space Entry (Awareness)**
- **Basic Confined Space Entry**
- **Advanced Confined Space Entry & Rescue**
- **Authorized Gas Tester (AGT)**
- **PPE Cleaning and Disinfection**

Thank you

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