



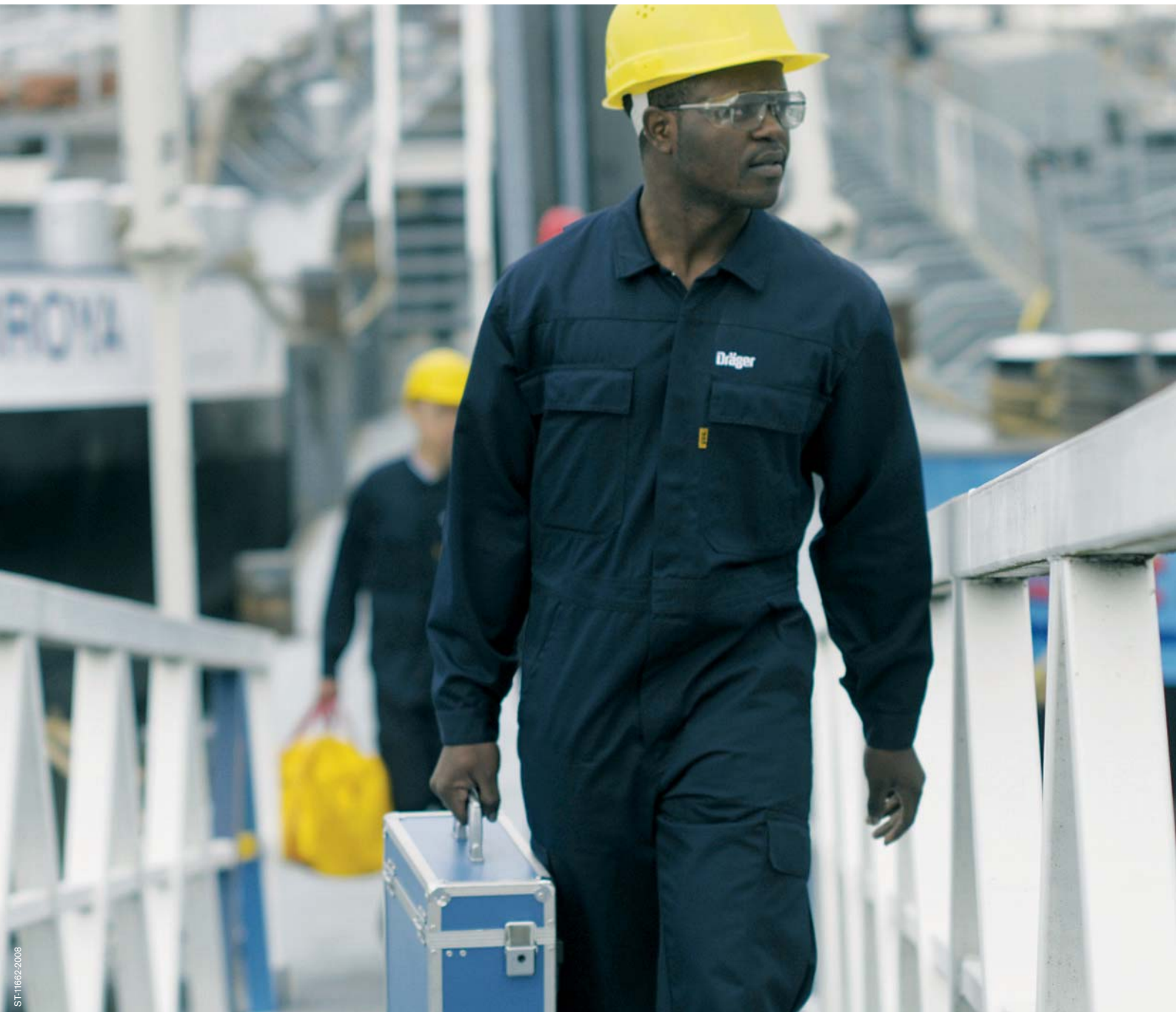
**Steering a course to safety**  
The specialists in the marine industry



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## Safety on board

For almost 120 years, Dräger has been synonymous with safety and quality right across the globe. Constant improvements to processes, products and services aim to maintain this good reputation in the future.

Wherever people or assets are subject to danger, those who are responsible for their safety rely on respiratory and personal protective equipment as well as gas measurement solutions from Dräger. Here at Dräger we have always recognised our responsibility as a supplier of safety systems and will continue to do everything we can to meet the needs of our customers, and keep users of Dräger equipment and products safe.

Every product in our comprehensive portfolio is manufactured in accordance with Dräger's demanding quality criteria. We know and understand the special requirements that relate to safety equipment on board sea vessels, and we take these into account. Easy handling, rapid deployment and high reliability are essential, as is value for money. Furthermore quality is of particular importance when it comes to personal protection and the measurement of hazardous substances. Used around the world, Dräger products are known for their quality and functionality in demanding environments.

Safety on board is a daily concern for shipping companies and their crews, as well as for ship chandlers and shipping agents. The first priority is to avoid accidents at high sea, to protect the lives of the crew and passengers, and to prevent environmental disasters and damage to either the vessel or the cargo. Products that are used to protect and save lives and minimise damage must function 100%.

Dräger offers a complete service portfolio of fire rescue, and safety equipment in our Marine Service Centers where safety defects can be remedied, and if necessary, equipment can be replaced. Designed to bring you peace of mind, this service is available for all products, it does not matter whether they are from Dräger or another manufacturer. What matters most is that you receive complete service from a single source, simplifying the documentation, the organisational requirements and, of course, the invoicing.

Dräger stands for the highest possible safety standards – whether at sea, on inland waterways or in harbours.

**Dräger. Technology for Life.**

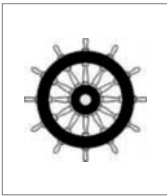




## The significance of approvals

Safety demands the very best standards, not just in terms of equipment design and performance, but also in the selection and use of that equipment in line with specific applications. The shipping and marine industry is subject

to a wide variety of legislation and approvals relating to safety at sea as well as safety standards for specific types of equipment.



D:\18925\2010

### MED

The Marine Equipment Directive was issued by the European Commission. Approved equipment carries the MED "Wheelmark". Equipment from the categories listed in Annex 1 of the MED has to be type approved to the listed standards before it can be sold to ships sailing under the flag of an EU member state, Norway or Iceland.

### SOLAS

The International Convention for the Safety of Life at Sea (SOLAS) is the single most important treaty dealing with safety at sea. It encompasses the International Maritime Organization (IMO) and sets the safety standards for the construction and operation of ships as well as the equipment used on board.

### MSC

As a technical body of the IMO, the Marine Safety Committee (MSC) is responsible for amending the SOLAS and for issuing interpretations and guidelines on safety-related matters in the form of resolutions or circulars.

### BG VERKEHR

The Ship Safety Division has been accorded the status of federal authority under the German Federal Ministry of Transport and represents the German flag state.

### CLASS NK (Nippon Kaiji Kyokai)

Japanese ship classification society

### DNV (Det Norske Veritas)

Norwegian ship classification society

### GL (Germanischer Lloyd)

German ship classification society

### CE

The CE mark signifies that a product meets all applicable EU Directives.

### ATEX

The EU Directive 94/9/EC defines the requirements for equipment to be used in potentially explosive atmospheres.

### IECEX

Awarded by the International Electro-technical Commission, this mark of conformity is given to products that are tested and manufactured.

### CSA

CSA International provides product testing and certification services.

### UL

This denotes approval by Underwriters Laboratories Inc., an organisation providing independent product safety certification.

## DRÄGER MEETS THE REQUIREMENTS

Our wealth of experience in the marine and shipping industry has enabled us to develop and manufacture a wide range of products that are designed to meet both

your needs and the regulatory standards required by numerous authorities. The following list features some of these products and highlights the relevant standards.

## APPROVALS

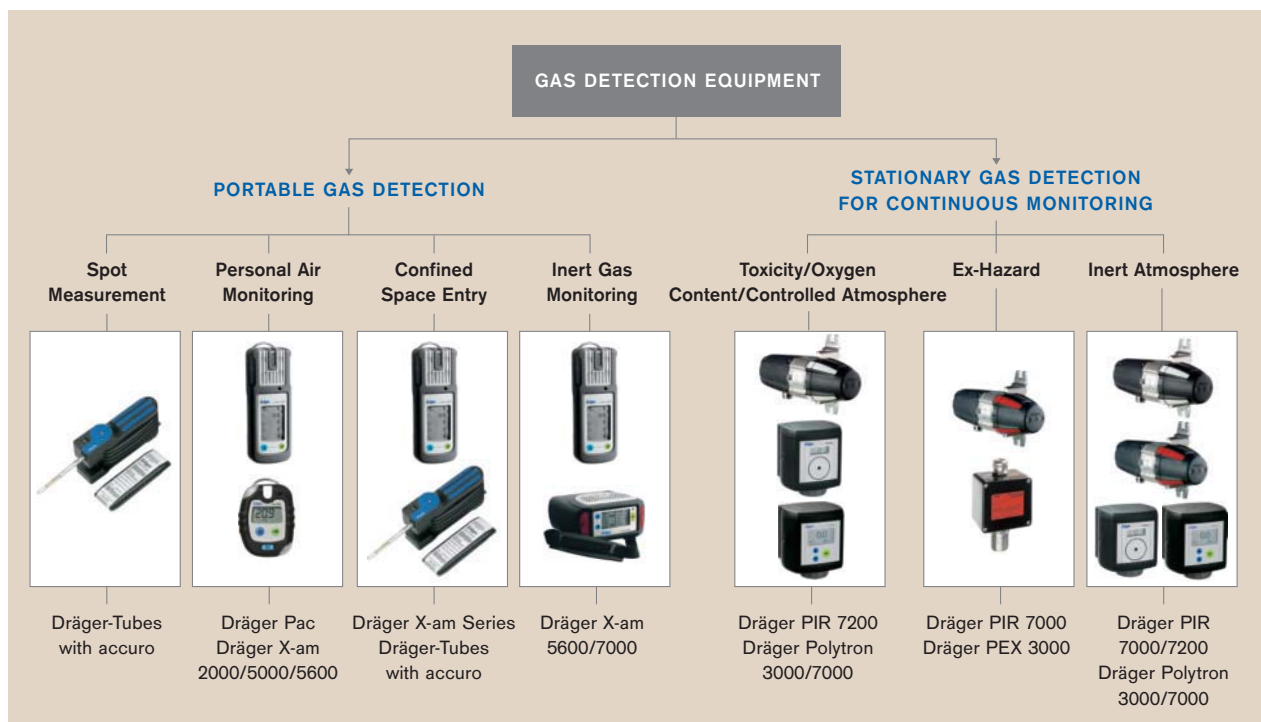
Portable Gas Detection	Dräger accuro	MED, ATEX, CE
	Dräger PAC 3500	ATEX, CE, IECEx, UL
	Dräger PAC 5500	ATEX, CE, IECEx, UL
	Dräger PAC 7000	MED, ATEX, CE, IECEx, UL
	Dräger X-am 2000	MED (pending), ATEX, CE, IECEx, UL, CSA
	Dräger X-am 5000	MED, ATEX, CE, IECEx, UL, CSA
	Dräger X-am 5600	MED (pending), ATEX, CE, IECEx, CSA (pending)
	Dräger X-am 7000	MED (pending), ATEX, CE, IECEx, UL, CSA
Stationary Gas Detection Systems	Dräger Polytron 7000	DNV, ATEX, CE, UL, CSA, IECEx
	Dräger Polytron 3000	DNV, ATEX, CE, UL, CSA, IECEx
	Dräger PEX 3000	DNV, ATEX, CE
	Dräger REGARD	DNV, ATEX, CE
	Dräger Regard 3900	ATEX, CE
	Dräger PIR 7000	DNV, GL, ATEX, CE, IECEx, UL, CSA
	Dräger PIR 7200	DNV, GL, ATEX, CE, IECEx, UL, CSA
Compressed Air Breathing Apparatus, including mask	Dräger PAS Marine	SOLAS, MED, CE
	Dräger PAS Lite	SOLAS (pending), MED (pending), CE
	Dräger PSS 7000	MED, ATEX, CE
	Dräger PAS Micro	CE
	Dräger PAS Colt	CE
	Dräger PAS Airpak	CE
Chemical Protective Suits	Dräger SPC 3800	SOLAS, CE
	Dräger CPS 5800	SOLAS (pending), CE
	Dräger WorkMaster pro-ET	SOLAS, BG Verkehr, NK, CE
	Dräger CPS 7900	SOLAS, CE
Escape Devices	Dräger Saver CF	SOLAS, MED, CE
	Dräger Parat C	CE
	Dräger Oxy K 30	SOLAS, MED, CE
Fire-fighting Helmets	Dräger HPS 4300	SOLAS, MED, CE
	Dräger HPS 6200	SOLAS, MED, CE
Filtering Half-Masks	Dräger X-plore 1300	CE
	Dräger X-plore 3500	CE
	Dräger X-plore 5500	CE



## Dräger Gas Detection Technology

When it comes to detecting hazardous substances, Dräger offers everything from classic Dräger-Tubes® through to stationary gas detection systems. Convenient and easy to use, the instruments allow oxygen, toxic gases and explosive mixtures to be monitored with fast, reliable precision. Amongst other applications, they allow pre-entry measurements to be taken before entering confined spaces such as tanks and other void spaces. In addition, they enable process monitoring to be carried out in cargo holds with inert gas atmospheres.

Dräger has the ideal solution, whether it be for personal protection in hazardous areas or during the transportation of dangerous goods.



General overview depending on current hazards and gases in the environment.

### GAS DETECTION PUMP AND DRÄGER-TUBES®

Dräger-Tubes are the embodiment of short-term measurement systems – and for good reason. As the market leader for more than seventy years, Dräger has

perfected the “laboratory behind the glass”. The proof of our customers’ satisfaction lies in the fact that more than 100 million Dräger-Tubes have been sold in the last ten years alone.



ST-6732-2006

#### DRÄGER accuro®

- Robust gas detection pump for short-term measurements
- Ideal for use in difficult or inaccessible locations
- Easy, single-handed operation
- Clear and easily visible stroke end indication



ST-1983-2004

#### DRÄGER-TUBES®

More than 350 other Dräger-Tubes are available to detect more than 500 substances e.g. BG Verkehr tube kit:

- Dräger-Tubes for nitrous gases 0.5/a (0,5-10 ppm)
- Dräger-Tubes for oxygen O<sub>2</sub> (5-23 vol.-%)
- Dräger-Tubes for Polytest (qualitative)
- Dräger-Tubes for carbon dioxide CO<sub>2</sub> (0,1-6 vol.-%)
- Dräger-Tubes for carbon monoxide CO (5-150 ppm / 100-700 ppm)



ST-1694-2003

#### DRÄGER FUMIGATION KIT

- Handy set designed to check for fumigants in containers and loading areas
- Simultantest Fumigation (formaldehyde, phosphine, hydrocyanic acid, methyl bromide, ammonia)
- Simultantest Container Fumigation (formaldehyde, phosphine, hydrocyanic acid, methyl bromide, ethylene oxide)
- Identifies fumigants without the need to open the container, even where labels are incorrect or missing
- Uses Dräger-Tubes to measure the concentration levels of the most common fumigants

For more information regarding hazards, please use the Dräger VOICE database.

For more up-to-date information on more than 1,600 hazardous substances register under [www.dreager.com/voice](http://www.dreager.com/voice)

## SINGLE GAS INSTRUMENTS

Innovative in design, the Dräger Pac 3500, Dräger Pac 5500 and Dräger Pac 7000 single-gas detection instruments combine compact size and reliability with

tremendous robustness. Providing the crew with immediate warning of a gas hazard, the range features visual as well as audible and vibrating alarms.



### DRÄGER PAC 3500 (O<sub>2</sub>, CO or H<sub>2</sub>S)

- Small size incorporates miniature Dräger XXS sensors
- Compact, lightweight, robust design
- Meets IP 66 for dust and water ingress, insensitive to electromagnetic interference
- Large numeric display with event logger for up to 60 events
- Triple alarms: visual, audible and vibrating
- Gas access at top and front minimises the risk of inadvertently covering the gas inlet
- Instrument life: 2 years



### DRÄGER PAC 5500 (O<sub>2</sub>, CO or H<sub>2</sub>S)

- As 3500 but with unlimited instrument lifetime
- O<sub>2</sub>, CO, H<sub>2</sub>S sensors with an expected lifetime > 5 years



### DRÄGER PAC 7000 (e.g. CO<sub>2</sub>, Cl<sub>2</sub>, HCN, H<sub>2</sub>S, NH<sub>3</sub>, NO<sub>2</sub>, O<sub>2</sub>, PH<sub>3</sub> or SO<sub>2</sub>)

- As Pac 5500 but also for special gases
- Data logger – all concentrations and events
- MED approved

D-1328-2009\_k / D-1346-2009\_k / ST-1743-2005\_k

## MULTI-GAS INSTRUMENTS

Be on the safe side with Dräger multi-gas detection instruments. Whether you choose the flexibility of a

multi-purpose model or an all-encompassing solution with a built-in pump, you can be sure of durable, comprehensive protection.

ST-7461-2005



### DRÄGER X-AM 2000 (EX, O<sub>2</sub>, CO, H<sub>2</sub>S)

- Gas detector for 1 to 4 gases (EX, O<sub>2</sub>, CO, H<sub>2</sub>S)
- Ideal for personal air monitoring and confined space entry (with optional external pump)
- Meets IP 67 for dust and water ingress, and is insensitive to electromagnetic radiation
- Also offers high sensitivity to flammable organic vapours
- Gas inlet at the top and front (minimises the risk of inadvertently covering the gas inlet)
- Long-life O<sub>2</sub>, CO, H<sub>2</sub>S sensors with an expected lifetime > 5 years
- MED approval pending

ST-9468-2007



### DRÄGER X-AM 5000

- Gas detector for 1 to 5 gases
- Flexible sensor installation (retrofit, conversion or setup for other gases)
- Ideal for personal air monitoring and confined space entry (with optional external pump)
- Meets IP 67 for dust and water ingress, insensitive to electromagnetic radiation
- Gas inlet at the top and front (minimises the risk of inadvertently covering the gas inlet)
- Long-life electro-chemical sensors (O<sub>2</sub>, H<sub>2</sub>S, CO with an expected lifetime > 5 years)
- MED approved
- Possibility to measure H<sub>2</sub> in ppm or %LEL range with DrägerSensor XXS H<sub>2</sub> or H<sub>2</sub> HC

D-29638-2009



### DRÄGER X-AM 5600

- As Dräger X-am 5000 but with the possibility to use Dual IR sensor technology for up to 6 gases
- Suitable for monitoring the hydrocarbon and oxygen content in inert atmospheres (with DrägerSensor IR-Ex and DrägerSensor XXS O<sub>2</sub>)
- Innovative IR technology offers lower cost of ownership due to a long expected sensor life of 8 years
- Possibility to measure H<sub>2</sub> in ppm or %LEL range with DrägerSensor XXS H<sub>2</sub> or H<sub>2</sub> HC

ST-9477-2007



### PUMP FOR DRÄGER X-AM 2000, 5000 AND 5600

- Simple to use
- Ideal for pre-entry measurements and/or monitoring of confined spaces and tanks
- Starts automatically and initiates a controlled flow test
- Fast and easy change-over between pump and diffusion operation
- Integrated dust and water filter protects the pump and sensors against contamination
- Easy filter replacement without tools

ST-4985-2005 / ST-131-2004

**DRÄGER X-AM 7000**

- Ideal for monitoring the hydrocarbon and oxygen content in inert atmospheres (with IR-Ex sensor 0-100 vol.-% HC and O<sub>2</sub>-LS 0-25 vol.-%)
- Gas detector for 1 to 5 gases
- Flexible adaptation with more than 25 sensors for detection of more than 100 gases and vapours
- optional integrated pump for up to 45-metre hose length
- Protected against splash water and dust, can also be submerged or dropped from a height of 1.5 metres without damage
- Large graphic display provides information at a glance
- Triple warnings with audible, visual and vibrating alarms
- Long-life electro-chemical sensors
- MED approved (renewal pending)

## DRÄGER SENSORS

The heart of every measuring instrument is its sensor. The sensor is crucial for determining the quality of measurements, and therefore it has a fundamental influence on the safety of the user. The development and production of sensors is part of Dräger's core competence. With highly innovative IR-, Cat-Ex and long-life electrochemical sensors, Dräger aims for the highest safety level at low cost of ownership. Selecting the correct measuring principle of the sensor is essential when detecting dangerous gases:

### Risk of explosion

- Measurement in LEL (lower explosive limit) range: CatEx or IR Ex sensor (depending on substance)
- Monitoring of inert atmospheres: IR-Ex sensor (0-100 vol.-%)

- IR-Ex sensors have an expected lifetime of up to 8 years as opposed to 3-4 years for Cat-Ex sensors (depending on contamination), but cannot detect all flammable gases, e.g. hydrogen ( $H_2$ )

### Lack or excess of oxygen

- Electrochemical sensors
- Dräger sensors for oxygen have an expected lifetime of more than 5 years. This is unique in the market.

### Toxicity

- Electrochemical or PID sensor
- Dräger electrochemical sensors are optimised for both measurement performance as well as long lifetime to reduce both false alarms and cost of ownership. For example, the  $H_2S$  and CO electrochemical sensors have an expected lifetime of more than 5 years.



#### DRÄGER SENSORS FOR DRÄGER X-AM 7000

- IR sensors: Ex,  $CO_2$ ,  $CO_2$  HC
- Cat-Ex sensor
- Cat-Ex sensor HC
- PID sensor
- XS R sensors: CO,  $H_2S$ ,  $O_2$
- XS EC sensors: CO,  $H_2S$  100,  $H_2S$  HC,  $O_2$  LS,  $O_2$  100, NO,  $SO_2$ ,  $NO_2$ ,  $COCl_2$ ,  $NH_3$ , HCN,  $Cl_2$ , Hydride,  $CO_2$ , OV, OV-A, Odorant,  $PH_3$  HC, Amine, CO HC,  $H_2$
- XS 2 sensors: CO,  $H_2S$ ,  $O_2$

#### DRÄGER X-AM 2000

- CatEx 125
- XXS-sensors:  $O_2$ , CO,  $H_2S$

#### DRÄGER X-AM 5000

- CatEx 125
- XXS sensors: Amine,  $O_2$ , CO, CO HC,  $H_2S$ ,  $H_2S$  LC,  $H_2S$  HC,  $CO_2$ ,  $Cl_2$ , HCN,  $NH_3$ , NO,  $NO_2$ ,  $PH_3$ ,  $PH_3$  HC,  $SO_2$ , OV, OV-A,  $H_2S/CO$ ,  $CO$   $H_2$  (compensated),  $H_2$ ,  $H_2$  HC, Odorant

#### DRÄGER X-AM 5600

- IR Ex
- IR  $CO_2$
- IR  $CO_2/Ex$
- XXS sensors: Amine,  $O_2$ , CO, CO HC,  $H_2S$ ,  $H_2S$  LC,  $H_2S$  HC,  $CO_2$ ,  $Cl_2$ , HCN,  $NH_3$ , NO,  $NO_2$ ,  $PH_3$ ,  $PH_3$  HC,  $SO_2$ , OV, OV-A,  $H_2S/CO$ ,  $H_2$  (compensated),  $H_2$ ,  $H_2$  HC, Odorant

## CALIBRATION EQUIPMENT

Gas detection and warning instruments are developed and produced to protect you and your employees against invisible gas hazards in the ambient air. In critical situations,

you must be able to rely completely on your equipment. Therefore, regular maintenance, calibration and function (bump) testing are indispensable.

ST-4700-2005



### DRÄGER BUMP TEST STATION

- Ensures gas detection and warning equipment is functioning correctly in line with most country regulations
- Economical and easy to use
- Optional mobile printer
- Designed for use with Dräger PAC and Dräger X-am gas detectors

ST-578-2005



### DRÄGER E-CAL

- Portable automatic test and calibration station
- Saves time, reduces costs and minimises system management
- Modular format: master station for 6 or 12 gases with up to 10 instrument modules
- PC compatible using Dräger CC-Vision E-Cal software

ST-5026-2005



### DRÄGER CC-VISION

- Software to configure and calibrate portable gas detection instruments
- Enables measurement results to be compiled and evaluated
- Provides complete test result documentation
- Professional software solutions on site – saves time and cuts costs

ST-5080-2005



### TEST GASES

- Large number of disposable calibration gas cylinders for bump testing, zero or span calibration of portable and stationary gas detection devices
- Trigger or on-demand regulators

## STATIONARY GAS DETECTION SYSTEMS

Whether at sea or in port, continuous gas detection can be a major safety issue on board of oil and chemical tankers, gas carriers and salvage and pollution control vessels. From the monitoring of oxygen in inert

atmospheres through to the detection of toxic and flammable hazards or early warning of smouldering fires, Dräger fixed gas detection systems provide a safe, reliable solution.



ST-11659-2007

### DRÄGER PIR 7000

- Designed for continuous monitoring of flammable gases and vapours in harsh environments
- Explosion-proof infrared (IR) transmitter with rugged stainless steel SS 316L enclosure
- Innovative 4-beam technology offers drift-free, double-compensating, non-imaging optics
- Reliable, fast response of less than 1 second
- Maximum reliability, SIL2 certified
- Marine approved by Det Norske Veritas (DNV) and Germanischer Lloyd (GL)



ST-11660-2007

### DRÄGER PIR 7200

- Continuously monitors carbon dioxide (CO<sub>2</sub>) in harsh environments
- Rugged design with explosion-proof IR transmitter and SS 316L enclosure
- Innovative 4-beam technology offers drift-free, double-compensating, non-imaging optics
- Configurable response mode with fast response time of less than 1 second
- Maximum reliability, SIL2 certified
- Marine approved by Det Norske Veritas (DNV) and Germanischer Lloyd (GL)



ST-5671-2004

### DRÄGER PEX 3000

- Continuous monitoring of flammable gases and vapours
- Measuring range 0 to 100% LEL
- Particularly suited to detection of hydrogen (H<sub>2</sub>) in battery charging compartments
- Small, shock-resistant conductive glass-fibre-reinforced polyester (IP66) enclosure
- Simple two-button menu, guided calibration and self-lit two-digit, seven-segment display
- Marine approved by Det Norske Veritas (DNV)

ST-3812-2003



#### DRÄGER POLYTRON 7000

- Intrinsically safe, continuous monitoring of toxic substances and oxygen
- Flexible, modular concept with data interface and optional data logger
- Verified in accordance with SIL2
- Explosion-proof transmitter approved for use in zone 0
- Suitable for explosion prevention in accordance with EN 50104 (inert measurement)
- Intuitive operation and intelligent sensors enable monitoring of over 100 different gases
- Marine approved by Det Norske Veritas (DNV)

ST-3811-2003



#### DRÄGER POLYTRON 3000

- Continuous monitoring of oxygen and toxic substances
- Explosion-proof, intrinsically safe transmitter approved for use in zone 0
- Monitors more than 60 different gases
- Innovative docking station technology for simple installation and greater flexibility
- Marine approved by Det Norske Veritas (DNV)



ST-470-2003

#### DRÄGER REGARD CONTROL SYSTEM

- Flexible and proven control system for gas detection systems
- Modular concept with simple configuration ensures clear system structure
- Communication with 4-20 mA and HART transmitters
- Measurement values and alarm status can be transmitted to connected systems via MODBUS or PROFIBUS
- Marine approved by Det Norske Veritas (DNV)



D-27777-2009

#### DRÄGER REGARD 3900

- Stand-alone, autonomous control system for up to 16 gas detectors
- Robust IP65 enclosure enables the installation of the control system at virtually any location within a safe area
- Innovative modular system featuring simple and fast configuration



D-10344-2009

#### DRÄGER RVP 3900

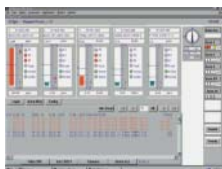
- High resolution 8.4-inch touchpanel
- Central visualisation and data processing from gas detection control units Dräger REGARD 3900 and 3910
- Very efficient and economic solution for visualisation for up to 128 channels
- Optional data logger, web interface, network connection



D-10344-2009

#### DRÄGER RVP 5000

- As RVP 3900 but for Regard control unit
- Visualisation for up to 99 channels
- Can be used as a communication interface to higher-level control systems



D-18820-2010

#### DRÄGER VISION 32 SOFTWARE


- Depicts all essential parameters of a gas monitoring system
- Multiple customer-specific zoom-in layers allow a quick overview of the complete system layout as well as point-by-point information
- Actual gas concentration, all functional states like calibration, warning or fault conditions, and a graphic concentration and alarm log are available at the touch of a finger

**ALCOHOL AND DRUG MEASUREMENT INSTRUMENTS**

Alcohol and drugs can also be hazardous to safety on board. Whether in the engine room, handling cargo or working on the bridge, everyone is entitled to a safe place of work. With the right instruments, the use of alcohol and drugs can be detected and the risks can

be reduced. According to the US Coast Guard regulation 46 CFR 4.06-5, marine employers have to ensure that alcohol testing of everyone involved in a serious marine incident is conducted. Dräger Alcotest instruments are approved for this purpose.


ST-1988-2004



**DRÄGER ALCOTEST 6510**

- Manual measurement instrument for fast, precise breath-alcohol analysis
- Microprocessor-controlled sampling
- Full text indication on the graphic display, 3 LED colours
- Result is indicated in different measurement units
- Short reaction times, even at high alcohol concentrations
- GL certified to meet the requirements of the US Coast Guard


ST-19217-2007



**DRÄGER DRUGTEST 5000**

- Detects 6 different substance categories (opiates, cocaine, cannabinoids, amphetamines, benzodiazepine designer drugs and tranquilisers)
- Easy, stress-free, hygienic sampling of oral fluid
- Result within 10 minutes
- Manipulation of the result is almost impossible
- Stores the number, progression and results of up to 500 tests

ST-6914-2006



**DRÄGER DRUGCHECK™**

- Oral fluid sampling with very high sensitivity
- Simultaneous, qualitative detection of up to 6 categories of illegal drugs
- Can be used any time, anywhere and by anyone
- Minimally invasive sampling
- Hygienic, individually packaged sample collectors
- Immediate availability of the result
- If necessary, the oral fluid sample can be secured in the test tube, stored and sent to a lab for analysis and result confirmation

**Dräger DrugCheck™ limit value concentrations (cut-off values)**

COC	OPI	AMP	MET	PCP	THC
Drug	ng/ml				
Cocaine	20				
Opiate	40				
Amphetamine	50				
Methamphetamine	50				
Phencyclidine	10				
Δ9 Tetrahydrocannabinol	50				



ST-6284-2006



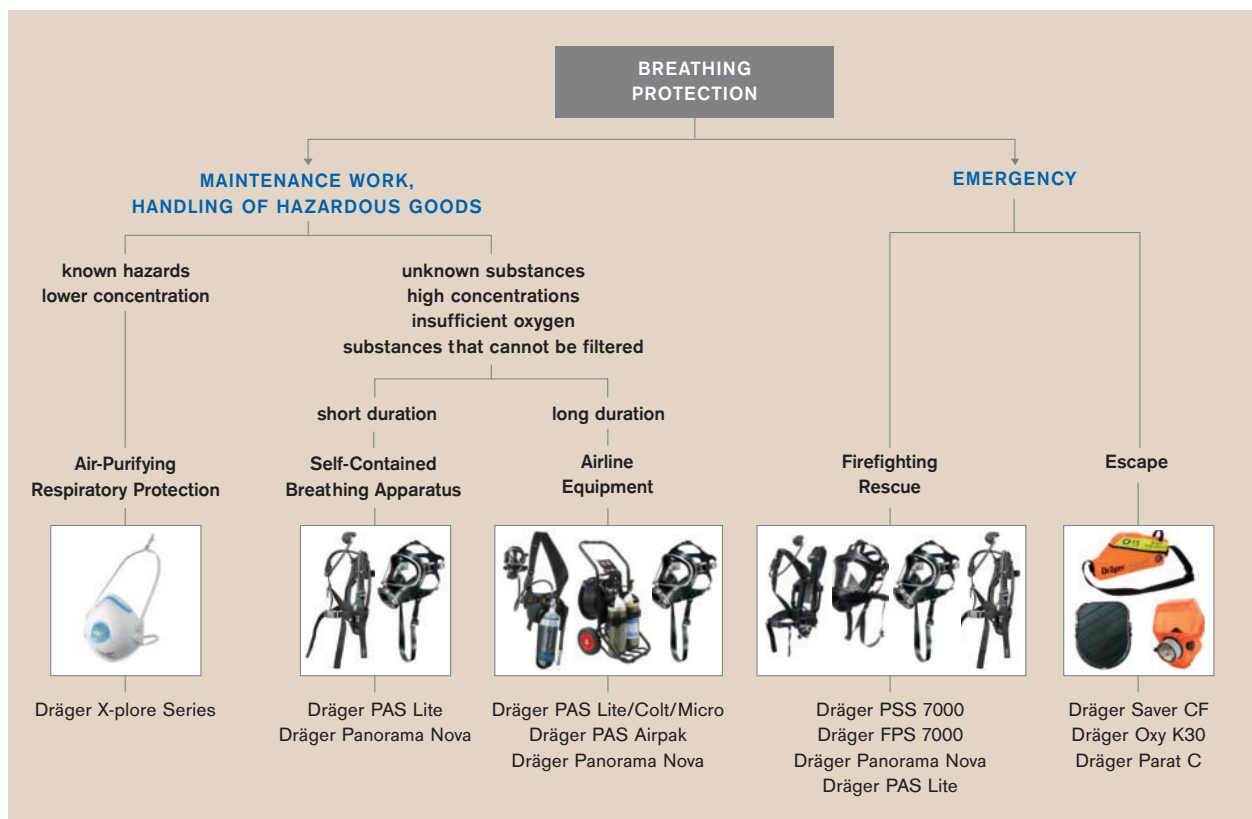
ST-6989-2007



ST-11207-2008

## Personal Protection products from Dräger – because there is nothing more valuable than pure air

An incident at sea means that people's lives are likely to be at risk. Quickly and effectively, Dräger products can help you to counter fires or deal with accidents involving dangerous goods. With our personal protective equipment, for instance, you can protect your crew from danger, help them to escape from contaminated or smoke-filled areas, or rescue and evacuate other personnel. But also during regular work procedures or maintenance tasks, such as cleaning spillages or loading of cargo holds crew members might get exposed to aggressive media or atmospheric conditions. Whatever the task, Dräger is there with a helping hand.



General overview depending on current hazards and gases in the environment.

## AIR PURIFYING RESPIRATORY PROTECTION

When something is in the air – regardless whether dust, gases or vapours – the use of respiratory protection is essential. When handling solid bulk cargoes or during

maintenance work such as welding, grinding or coating, air purifying respiratory protective equipment from Dräger keeps your personnel safe.



D-6416-2009

### DRÄGER X-PLORE® 1300 SERIES

- CoolSAFET™ filter material combines low breathing resistance and high filter performance in one mask
- Flexible nose clip and seal ensure a great fit in the most critical area
- Formed mask body offers comfortable and secure fit as well as easy donning
- Easy to don VarioFLEX™ head harness
- Optional CoolMAX™ exhalation valve for low breathing resistance
- Available with protection levels FFP 1, 2 and 3



ST-718-2006

### DRÄGER X-PLORE® 3500

- Premium quality half mask offering a new dimension of comfort and safety
- "FlexiFit" headcradle, almost unnoticeable under a safety helmet
- Innovative X-guided strap-system distributing weight evenly
- „Swept-back" design for a perfect fit under welding shields and visors
- Three sizes available ensuring a great fit for different face types
- Safe and easy to use bayonet connection, compatible with the extensive Dräger X-plore® filter range



ST-682-2002

### DRÄGER X-PLORE® 5500

- Full-face mask for added eye protection
- Wide range of filters to protect against particles, gases and vapours
- Double-layer face seal with triple sealing action provides secure fit for different face types
- Bayonet filter connection for easy and secure filter attachment
- "Low profile" design ensures an optimal field of vision and weight distribution with superb freedom of movement
- Excellent, wide field of vision
- 5-point harness is quick and easy to don without hair entanglement
- Universal size for ease of storage and spare parts handling

## COMPRESSED AIR BREATHING APPARATUS

Independent of ambient air, compressed air breathing apparatus provides the wearer with breathing air that is unaffected by the surrounding atmosphere. Designed to protect against air that is contaminated with hazardous substances, it also protects the user from oxygen depletion. The 4th and 5th Amendment of the Marine

Equipment Directive have changed the requirements for breathing apparatus used for fire-fighting purposes. Increasing safety on board, the amendment means that breathing apparatus must now pass the higher EN 137-2 standard. For long-duration work such as cleaning or maintenance tasks, airline systems from Dräger are the optimal choice.

D-17037-2010



### DRÄGER PAS® LITE

- Compressed air breathing apparatus for jobs such as cleaning as well as firefighting
- Ergonomically designed lightweight carrying system offering excellent load distribution, and highly resistant to impact, heat and chemical corrosion
- Innovative space-frame with integrated hoses eliminates entanglement and facilitates cleaning and decontamination
- Available with integrated or interchangeable Lung Demand Valve as well as airline options
- SOLAS approval pending, MED approval pending

ST-587-2006



### DRÄGER PSS® 7000\*

- State-of-the-art professional fire-fighting breathing apparatus
- Ergonomic harness with comfort padding designed to minimise stress
- Lightweight, high-strength carbon composite back plate with integrated hose channels to eliminate entanglement
- Easy to adjust 3-point height adjustment
- MED approved

\*beside the Dräger PSS 7000 different BA-sets in flexible configurations are available

ST-465-2000



### DRÄGER PANORAMA NOVA

- Full-face mask offering reliable, secure protection in tough environments
- Comfortable to wear with double sealing line for maximum safety; adapts easily to different face and head shapes
- Various connectors for use with compressed air breathing apparatus, airline systems
- Wearer options include straps or helmet attachment, a spectacle kit and communication devices

ST-9475-2006



### DRÄGER FPS® 7000

- Newly designed full-face mask with exceptional field of vision
- Ergonomic head harness mask bodies in different sizes; the double sealing line ensures a secure and comfortable fit for all face shapes
- Mask body made of either hypoallergenic silicone or EPDM
- Optional HUD display or fully integrated communication system FPS-COM for added safety in an emergency

## DRÄGER FIRE-FIGHTING HELMETS

Facing a fire is one of the most dangerous situations a crew can face on board. In the narrow and confined structure of a ship, protection for the head is essential to perform the necessary actions with confidence and

speed. Dräger fire-fighting helmets offer exceptional protection against heat, flames and impact. The comfortable padding and secure fit of the lightest helmets in their class lead to maximum wearer comfort and stress reduction.



D-15693-2009

### DRÄGER HPS 4300

- Half-shell helmet, meets the new standard EN 443:2008 Type A
- Duroplast and aramid materials protect against heat, fire and mechanical impact
- Non-slip, exceptional fit with individual adjustment wheel, diagonal neck straps and padded head-retaining ring
- Comfortable and cool to wear even in high-heat environments
- Scratch-proof visor for optimum visibility
- Helmet shell glows in the dark for fast location in an emergency
- Wide range of accessories including neck protectors, lamps, visors and communication devices
- Solas and MED approved



D-12272-2009

### DRÄGER HPS 6200

- Maximum protection against penetration or impact
- Helmet made of high-temperature-resistant aramid duroplastic
- Visor made of high-temperature-resistant polysulfone material
- At the moment the lightest helmet according to EN 443:2008 Type B
- Solas and MED approved

ST-2453-2003



#### DRÄGER COMPRESSED AIR CYLINDERS

- 6L compressed air cylinder with an operating pressure of 200 or 300 bar
- Various other steel or CFK cylinder types available
- Suitable for all Dräger PAS or PSS breathing apparatus

ST-3559-2003



#### DRÄGER PAS MICRO

- Personal airline system for use as a short duration entry unit, airline emergency escape breathing apparatus or dual function unit
- Lightweight, ergonomic back-mounted harness improves wearer comfort
- Durable, robust design, resistant to abrasion, heat and flames
- Streamlined shape with integrated hose and pressure reducers (minimises risk of snagging)
- Machine washable and easy to maintain

ST-3557-2003



#### DRÄGER PAS COLT

- Personal airline system for use as a short-duration entry unit, airline emergency escape breathing apparatus or dual function unit
- Hip-mounted, ergonomically designed harness, retains its form during use
- Easy to wear and don, even by inexperienced users
- Machine washable and easy to maintain
- Unique modular drop-down facility enables the cylinder to be unclipped from the waist belt (ideal for confined space entry procedures)

ST-3560-2003



#### DRÄGER PAS AIRPACK

- Heavy-duty airline apparatus for extended-duration breathing air
- Ideal for use with Dräger PAS Micro or PAS Colt harnesses
- Easy to manoeuvre, trolley-mounted cylinders with up to 100 metres of hose
- Configuration: 4 x 12-litre compressed air cylinders, or 1 or 2 x 50 litres
- Reel handle facilitates easy rewinding; braking system reduces entanglement

**CHEMICAL PROTECTIVE SUITS**

Working with hazardous substances or handling dangerous chemicals can often seriously endanger human life and health. The nature and design of suitable protective clothing is determined, amongst other things, by the physical condition of the chemical. For example, gas-tight chemical protection clothing not only protects against solids and liquids, but also against gaseous hazardous substances. Dependent upon the respiratory protection equipment used, Dräger can offer a number of different designs.

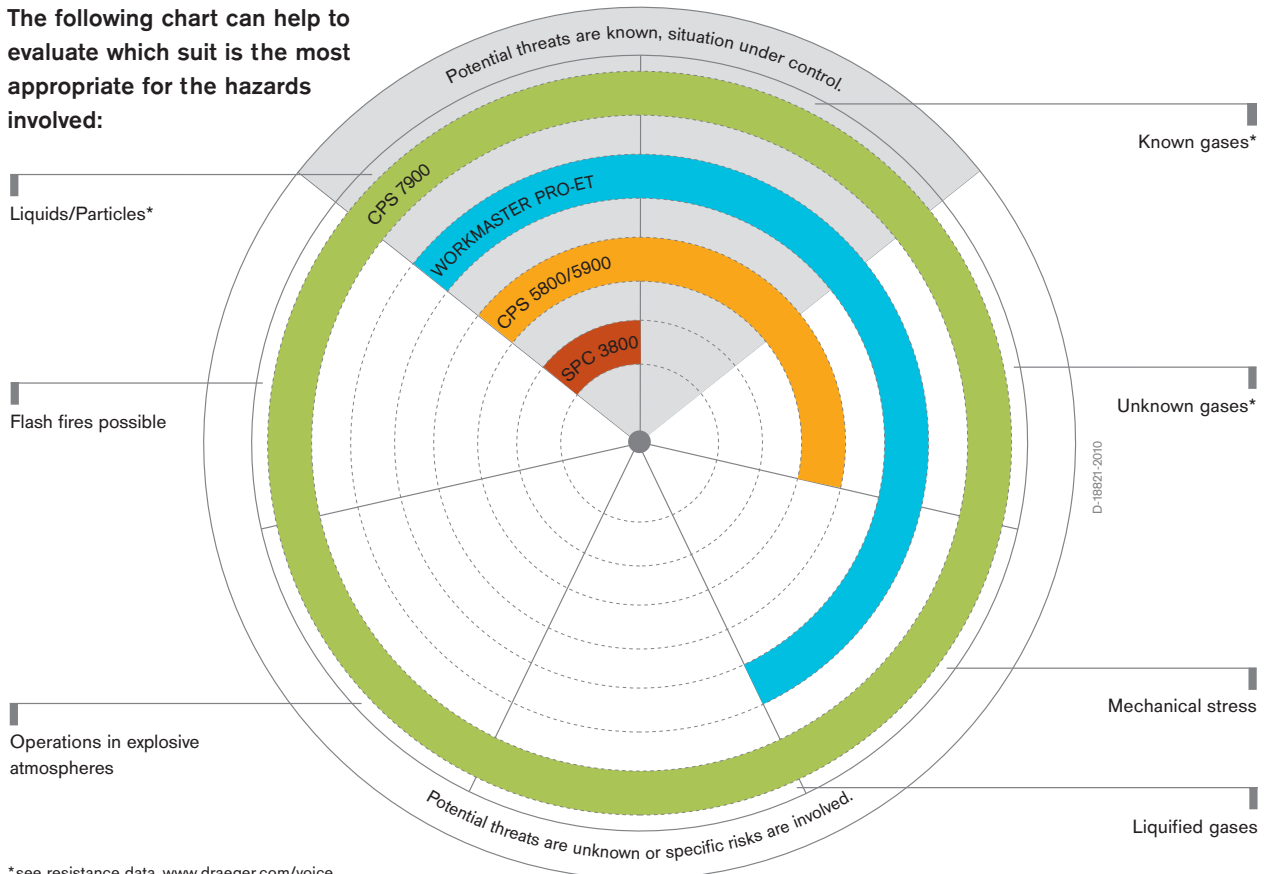
**APPLICABLE REGULATIONS**

A number of different regulations cover the use of chemical protective equipment in marine applications.  
 – In accordance with SOLAS and its relevant codes, such

as the International Gas Carrier (IGC), International Bulk Chemical (IBC) and International Maritime Solid Bulk Cargoes (IMSBC) codes, chemical protective clothing must be provided when transporting dangerous goods. However, no specific test standard is cited in these regulations.

- When selecting chemical protective suits, close attention must be paid to the dangers posed by chemicals being transported. This is also stated in MSC Circular 1120.
- Since 2009, the MED does not require chemical protective clothing to bear the Wheelmark approval. This means that, for all vessels, the restrictions placed on the selection of chemical protective suits are those posed by the above SOLAS regulations and the respective flag state or class rules.

The following chart can help to evaluate which suit is the most appropriate for the hazards involved:



\*see resistance data [www.draeger.com/voice](http://www.draeger.com/voice)

D-18857-2010

**DRÄGER CPS 7900**

- Gas-tight, fully encapsulating, reusable suit, tailor-made for use under extreme conditions
- Made from new innovative D-mex™ material with flame-resistant, self-extinguishing properties
- High resistance to chemicals and mechanical stress
- Very flexible material, even when handling liquified gases as low as -80°C
- Integrated boots or gastight socks with boot flaps
- New ergonomic cut, available in 5 sizes
- Corresponds with all requirements for use in Ex-areas classified as class 0
- SOLAS approved

D-18858-2010

**DRÄGER WORKMASTER PRO-ET**

- Gas-tight, reusable suit for use with all forms of chemicals
- Incorporates Dräger gas-tight face cuff
- Made from flame-resistant, self-extinguishing Himex material
- High resistance to chemicals and mechanical stress
- Also available as a fully encapsulating suit
- Designed for frequent use with hazardous substances where there is a risk of ignition and high mechanical stress
- SOLAS and BG Verkehr approved

D-22672-2009

**DRÄGER CPS 5800**

- Gas-tight disposable suit
- Made from Zytron 500 material – offers high chemical resistance
- Very lightweight, soft and flexible
- Complete with Dräger gas-tight face cuff and socks with leg cuffs
- Ideal for changing chemically aggressive cargoes or as an emergency suit with limited mechanical stress
- SOLAS approval pending
- Suit is also available as Type A1 Dräger CPS 5900 (breathing protection is worn under the suit)

ST-720-2008

**DRÄGER SPC 3800**

- Liquid-tight disposable suit for use with solid or liquid chemicals
- Very lightweight (only 840g)
- Made from Tychem F material and offering high chemical resistance
- Incorporates Dräger gas-tight face cuff and socks with leg cuffs
- Ideal as a back-up suit with limited exposure to mechanical stress and chemicals
- SOLAS approved

## ESCAPE DEVICES

In emergencies you need equipment that actively and reliably supports the evacuation of crew members or passengers. In particular, emergency situations and work in extreme environmental conditions call for escape sets

that are easy to use. Whether an Emergency Escape Breathing Device (EEBD) is needed, as required by IMO regulations, or supplemental escape hoods are needed to support evacuation from inhabited areas, Dräger offers a convenient solution.



ST-6198-2007

### DRÄGER SAVER CF

- Emergency Escape Breathing Device as required by IMO regulations
- 15 minutes air supply
- Easy and fast to don, hood provides constant respiratory air flow
- Secure neck sealing
- Residual pressure warning near the end of the air supply
- SOLAS approved
- MED approved according to the new requirements of the 5th Amendment



ST-3475-2003 / ST-3474-2003

### DRÄGER OXY K 30 HS and HW

- Head, face and eye protection against smoke and heat
- Easy donning and breathing
- Verbal communication possible due to inner mask
- Suitable for wearers of glasses
- Immediate oxygen supply via quick starter
- Stored equipment does not require maintenance or service for 10 years
- Immediate detection of readiness via the service indicator
- Dräger OXY K 30 HW: fast deployment, device is removed from the wall and opened simultaneously
- SOLAS approved
- MED approved



ST-470-2003

### DRÄGER PARAT C

- Fire escape hood with single-point straps
- Increases the chances of survival during a fire
- Min. 15 minutes protection against fumes, vapours and smoke
- Protects the eyes and respiratory tracts

## DRÄGER BREATHING GAS MANAGEMENT SYSTEMS

Tailored to meet user requirements during design, production and assembly, Dräger respiratory air supply systems range from mobile compressors offering 100-320 litres per minute to complete breathing gas management systems. From 1 July 2010, SOLAS requires that newly

built passenger vessels with more than 36 passengers must fit additional means of fully recharging breathing apparatus, either through the use of breathing air storage systems or breathing air compressors. Dräger will help you to find the best solution to meet your demands.



D-90-2010

### DRÄGER DE 100

- Reliable and robust with a very low weight
- Extremely robust and durable compressor block
- Fan wheel cover made from special break-proof, UV-resistant plastic ensures optimum cooling
- All moving parts such as drive belts, discs and fan wheels are optimally protected
- Available for 200 and 300 bar



D-112-2010

### DRÄGER DE 200-TE, 250-TE AND 320-TE

- Available in three versions (200, 250 and 320 l/min)
- Very heavy-duty engine, designed for both short-term and constant operation
- Extremely robust and durable compressor block
- Oil pump allows operation up to a tilt angle of 15°, making it ideal for use on ships
- Safe, easy operation
- Filter system P21, P31 or P42 – conforms to the strict breathing air standard DIN EN 12021



ST-7001-2008

### DRÄGER AEROTEST SERIES

- Monitoring of the breathing air quality in accordance with DIN EN 12021 is performed by means of a quantitative measurement (of contamination) in the compressed air flow
- Suitable to fulfil the demands of MSC Circular 850 for annual breathing air quality tests
- Based on proven Dräger-Tube technology, hazardous substances such as carbon monoxide or dioxide, water vapour or oil can be detected in the compressed air outflow
- Fast, simple operation
- Ready for use and supplied in a convenient case

## FIRE-FIGHTING AND LIFE-SAVING EQUIPMENT

Should the worst occur, safety and even survival at sea can be dependent upon the crew having the right equipment or being able to deploy life-saving equipment without delay. As part of our Total Care Service in our Marine Service Centers, should any equipment prove

to be beyond repair it will be replaced as required – irrespective of whether or not it is included in the Dräger portfolio. In so doing, we can help you to make sure that appropriate fire-fighting and life-saving equipment is in the right place, at the right time.



ST-1242-2008

### PORTABLE FIRE EXTINGUISHERS

- Portable or wheeled fire extinguishers
- Variety of extinguishing agents, e.g. DP, CO<sub>2</sub>, foam, water
- Sizes from 2 to 50 kg and volumes from 9 to 135 liters
- SOLAS and MED approved



ST-1443-2004

### FIRE-FIGHTING HOSES AND NOZZLES

- SOLAS approved fire-fighting hoses from 1 to 3 inches in various lengths
- Broad range of couplings in, for example, brass and light alloy
- Various types of spray nozzles and monitors



D-18822-2010

### LIFE VESTS AND IMMERSION SUITS

- Inherently buoyant vests
- Inflatable vests with single or dual chambers
- Survival and anti-exposure suits
- Safety lights
- MED approved



D-18823-2010

### FIRE-FIGHTING, RESCUE AND SAFETY PACKAGES

- Fire-fighting, rescue and safety equipment designed to meet your needs
- Tailor-made for new-build vessels by our experts in the Marine Service Centre Rotterdam
- Everything from procurement and installation through to documentation
- One contact – everything you need from a single source



## Total Care Service – safety comes first

### FROM FIRE EXTINGUISHERS TO OXYGEN RESUSCITATORS

Where safety is concerned Dräger, with its new Total Care concept, is a reliable partner. Providing fast service during short berthing times, Dräger offers uncomplicated, efficient maintenance, repair and replacement of all your fire, rescue and safety (FRS) equipment.

Dräger Marine Service Centers are at your disposal in the ports of Rotterdam, Hamburg, Singapore and Constanta. In addition, because Dräger is a globally active service provider, the Dräger network is able to provide product support as well as a range of services all over the world.

Meeting your everyday needs, Dräger offers comprehensive service, irrespective of whether the equipment is from Dräger or another manufacturer. Services might include: compressed air breathing apparatus maintenance, fire extinguisher service, testing of stationary fire extinguishing systems, checking escape sets, the test and calibration of gas measurement instruments, hydrostatic tests for air cylinders, and complete safety equipment inspection to ensure operational readiness.

Highly qualified, experienced technicians ensure Dräger's usual high quality standards, whilst making sure that all your needs are met and simplified by using a single source.

### TOTAL CARE IS AVAILABLE FROM DRÄGER MARINE SERVICE CENTERS

- **Around the clock:** service and product availability 365 days a year, 24 hours a day
- **All-round:** Maintenance, inspection, repair of all FRS equipment – whether portable or stationary, or a Dräger or third-party product
- **Fast:** immediate service, inspection and repair during berthing
- **Convenient:** Pick-up and delivery service
- **Flexible:** replacement equipment if necessary (replacement programme / fleet stock)
- **Simple:** one contract partner, one contact for all your FRS equipment
- **Reliable:** 90 days warranty on all work
- **Transparent:** one invoice, detailed documentation
- **Certified:** Quality in accordance with international standards and those of ship classification companies; ISO 9001 certificate

Other services, based on your specific needs and requirements, are also possible.



**FIRE-FIGHTING**

Maintenance, inspection, repair and, if necessary, replacement of mobile and fixed fire extinguishing and warning systems.

- Portable and movable fire extinguishers (DP, CO<sub>2</sub>, foam, water)
- Fixed fire extinguishing systems (CO<sub>2</sub>, DP, foam FM200, water)
- Fire-fighting hoses and couplings
- Fire detectors

**RESCUE**

Maintenance, repair and, if necessary replacement of the emergency and rescue equipment listed below. These tasks will be performed in cooperation with recognised test stations where applicable.

- Life jackets
- Immersion suits
- Life rafts, rescue boats and davits
- Oxygen resuscitator

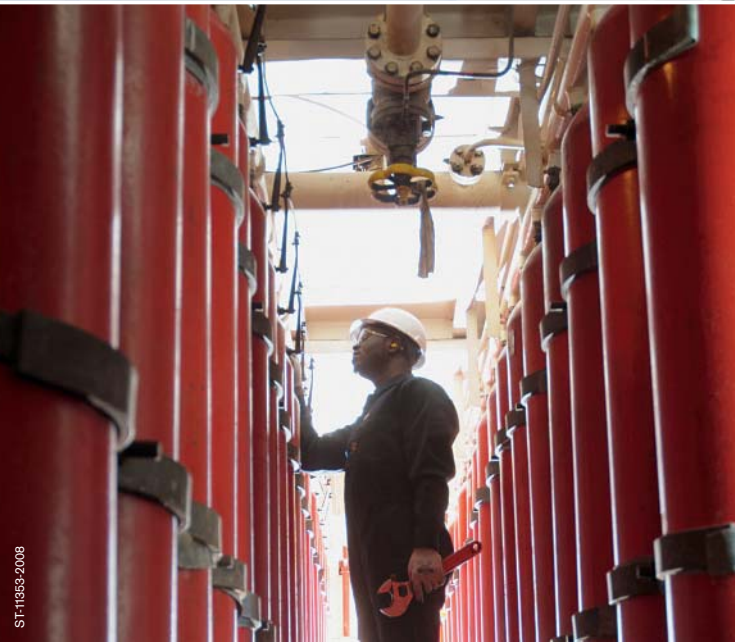
**SAFETY**

Maintenance, inspection, repair and, if necessary, replacement of the safety equipment listed below – irrespective of the manufacturer.

- Self contained / air line breathing apparatus and compressed air cylinders
- Filtering half-masks
- Emergency escape breathing devices (EEBD)
- Chemical protective suits (CPS)
- Breathing air compressors
- Portable and fixed gas detection systems
- Breath alcohol detectors
- Temperature and pressure gauges



ST-11438-2008



ST-11353-2008



ST-11626-2008

## Dräger – always a safe harbour

The maintenance, repair and replacement of any equipment is not the only thing that makes the Total Care Service special. You know what you need on board your ship and Total Care can help you to put together your own personal safety package from all the services on offer.

**Organisation:** If required, Dräger can monitor warranty periods and remind you when inspections are due. If you wish, we can even take over the management of all portable gas measurement instruments for your entire fleet.

**Around the clock:** No matter what time of day or night your ship enters the harbour – a Dräger Service technician will be waiting at the jetty. Equipped with all the necessary documentation, this service specialist will know where everything is and which repair, maintenance or replacement tasks have to be carried out. We know that speed is of the essence, and our technicians arrive with everything that is needed, ready to start work straightaway.

**Replacement equipment:** Whenever one of your portable gas detection instruments requires maintenance, we will arrange for a corresponding replacement device to be

waiting for you at your next port of call. The instruments belong to either your shipping company or your ship and, as part of our service, Dräger automatically meets your needs with stock from your own pool of equipment.

**Training:** With targeted and regular training you will be better equipped to handle any emergency situation. Dräger can bring you up to speed with a host of training issues from operating measurement instruments through to fire-fighting on board.

**Information:** VOICE is a hazardous substance information system for personal protective equipment and measurement instruments. 365 days – 24 hours, on CD or at [www.draeger.com/voice](http://www.draeger.com/voice).

**Certified:** With every device maintained by the Dräger Marine Service Center, you not only feel safe, but you also receive the necessary inspection reports and certificates. Whether SOLAS, Maritime Equipment Directive (MED) or Port State Control – with products and services from Dräger you can show your commitment to safety.



## Steering the right course – to safety

Customer trust is only gained by a continuous, high-quality performance. Since 1889 Dräger has gained and maintained this trust and, in so doing, has made a name for itself worldwide. Thanks to our own global network, Dräger is always on hand, ready to come to your aid quickly, wherever and whenever you need us.

A safe environment can easily be created with gas detection technology and personal protective equipment from Dräger. With us, you can be sure that you have found a reliable partner who will combine speed with high-quality service and, by using the comprehensive Dräger portfolio, you can be one hundred percent sure of the safety of your ship and your crew, both on land and at sea.

The Dräger Total Care concept guarantees your commitment to safety on board, even if budgets are getting tighter and time more limited. Dräger offers you the right solution for every requirement – whether you are interested in individual product solutions or want to hand over your complete safety sector to us.

Long after your ship has left port we will continue to work with you. Our aim is to be a reliable, long-term partner, taking care of your needs, keeping down costs and simplifying your processes.

For your next inspection, our four Marine Service Centers are at your disposal.

### THE TOTAL CARE SERVICE IS AVAILABLE FROM DRÄGER MARINE SERVICE CENTERS:

#### Germany

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