

Final & Inst. manual for Loose Fire Fighting Appliance

Ship Yard :  **SAMSUNG** HEAVY INDUSTRIES CO. , LTD

Hull No. : HN2074

Ship Type : 170,000m³ LNG FSRU

IMO No. : 9684495

FOR FINAL

DATE : 2015. 04. 14.

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PLAN HISTORY

Approved :		Owner : -		
Checked : Nam-Kyun, Kim		Project : 170,000m ³ LNG FSRU		
Checked : N. K. KIM		Class : DNV		
Drawn : Y. S. PARK		Flag : BERMUDA		
Date : 2015. 04. 14.		Dwg. No. : 300-2074-000		
Rev. No.	Alt. Mark	Date	Description	Conf. By
0		2013. 11. 11.	Submit to yard for approval by Letter No. NK-13-55587	J. Y. KIM N.K.KIM
		2013. 11. 11.	Submit to yard for working by Letter No. NK-13-55587	J. Y. KIM N.K.KIM
		2015. 04. 14.	Submit to yard for final by Letter No. NK-15-64854	Y. S. PARK N.K.KIM

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DATA SHEET : 300-2074-010

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SCOPE OF SUPPLY

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SCOPE OF SUPPLY

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 NK CO., LTD 497, Shinpyeong-Dong, Saha-Gu, Busan, Korea TEL. : 82-51-204-2211~3, FAX.: 82-51-204-2215 www.nkcf.com			DATA SHEET : 300-2074-010 PART NO. : N/A SHEET : 3 / 3		

AIR BREATHING APPARATUS



SPECIFICATION

THE BREATHING APPARATUS IS DESIGNED AND CONSTRUCTED TO ENABLE THE WEARER TO BREATHE AIR ON DEMAND FROM A HIGH PRESSURE AIR CYLINDER. IT IS OF SELF-CONTAINED, OPEN CIRCUIT TYPE WITH TWO STAGE AUTOMATIC POSITIVE FEATURE. IT IS OF FIRST BREATH AUTOMATIC POSITIVE PRESSURE TYPE AND CAPABLE OF DELIVERING 1000 LITRES PER MINUTE AT FULL CHARGED CYLINDER PRESSURE AND 500 LITRES PER MINUTE AT < 20 BAR CYLINDER PRESSURE AND HAS A SUPPLEMENTARY SUPPLY AT THE DEMAND VALVE OF > 60 LITRES PER MINUTE FLOW RATE.

– CAPACITY & DURATION

THE APPARATUS HAS AN EFFECTIVE DURATION OF AT LEAST 30 MINUTES.

– FACEMASK

DO NOT CLEAN WITH HYDROCARBON/SOLVENT BASED CLEANERS AS THIS WILL WEAKEN THE VISOR. MATERIAL WITH FLAME RESISTANCE REQUIREMENT MEETING EN 136. WEIGHT: 0.56kg

THE PANORAMA FULL MASK ASSEMBLY IS WITH REVERTED EDGE SEAL AND MADE OF EPDM

– WHISTLE AND GAUGE ASSEMBLY

WARNING WHISTLE IS HIGHLY AUDIBLE AND SOUND CONTINUOUSLY WHEN THE CYLINDER PRESSURE HAS FALLEN TO BELOW 50 bars. WARNING WHISTLE PROVIDES A CONSISTENT SOUND IN EXCESS OF 90DBA DOWN TO CYLINDER PRESSURE OF 10 bar.

– BLACKPLATE AND HARNESS

ANTI-STATIC CARBON-FIBRE COMPOSITE MATERIAL BACKPLATE WITH A RUBBER SHOCKER AT THE BASE.

DIMENSIONS OF 590 X 290 X 160 mm, 2.7kg

– Demand Valve

DEMAND VALVE IS OF A BALANCED PISTON DESIGN AND POSITIVE PRESSURE TYPE.

– CYLINDER

AIR CYLINDER VOLUME : 6.8 LITERS

AIR CYLINDER DIA. : APPROX. 141.3 mm

AIR CYLINDER LENGTH : APPROX. 550 mm

AIR CYLINDER WEIGHT : 4.2kg(FILLED : APPROX. 7KG)

FREE AIR CAPACITY : 1800 LITERS AT ATMOSPHERIC PRESSURE

MAX CHARGING PRESSURE : 300 bar

THE COMPLETE BREATHING APPARATUS IS MANUFACTURED TO THE PROVISIONS OF COUNCIL DIRECTIVE 89/686/EEC AND AMENDING DIRECTIVES 93/95/EEC, 93/68/EEC AND 96/58/EC AND, WITH THE EUROPEAN STANDRD NO. EN 137:2006 TYPE 2(FOR THE PPE REFERRED TO IN ARTICLE 8(4))

– CYLINDER PART NO. : 130N0022

– TOTAL WEIGHT : 9.1kg

– APPROVAL : MED



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DATA SHEET : 310-101-302

PART NO. : 130N0016

SHEET : 1 / 1

CHEMICAL PROTECTIVE SUIT ASS'Y



SPECIFICATION

— MATERIAL	: NEOPRENE
— COLOR	: MAKER STANDARD
— BACK SIDE	: PES
— TOTAL WEIGHT	: 755 g
— SUIT SIZE	: M HIGHT 168cm~174cm
→	: L HIGHT 174cm~180cm
	: XL HIGHT 180cm~186cm (NK STANDARD)
— BOOT SIZE	: 46
— GLOVE SIZE	: 11
— APPROVAL	: GL
— COMPONENTS	: ONLY ONE PICE TYPE SUIT(WITH BOOTS AND GLOVES)

* REMARK

EXCEPT RIGID HELMET, MASK, BELT, S.C.B.A(THESE COMPONENTS ARE ONLY FOR BETTER UNDERSTANDING ABOUT PERSONNEL PROTECTION,)



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DATA SHEET : 350-020-501

PART NO. : 132N1017L

SHEET : 1 / 1

9L WET CHEMICAL FIRE EXTINGUISHER



SPECIFICATION

- MODEL : W9AKM
- CAPACITY : 9 LITRES
- TOTAL WEIGHT : 15 Kg
- EXTINGUISHER HEIGHT : 540 mm
- WIDTH : 280 mm
- TEMPERATURE RANGE : 0 °C TO 60 °C
- DISCHARGE RANGE : 3 ~ 4m
- DISCHARGE TIME : MORE THAN 23 sec
- TEST PRESSURE : 30 bar
- WORKING PRESSURE : 15 bar
- FIRE CLASS : A, F
- FINAL COLOR : RED (RAL3000)
- APPROVAL : MED



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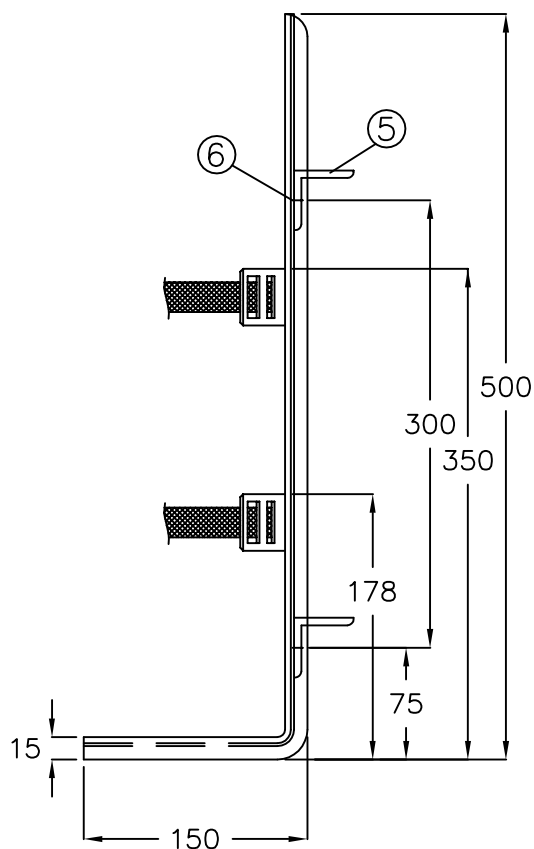
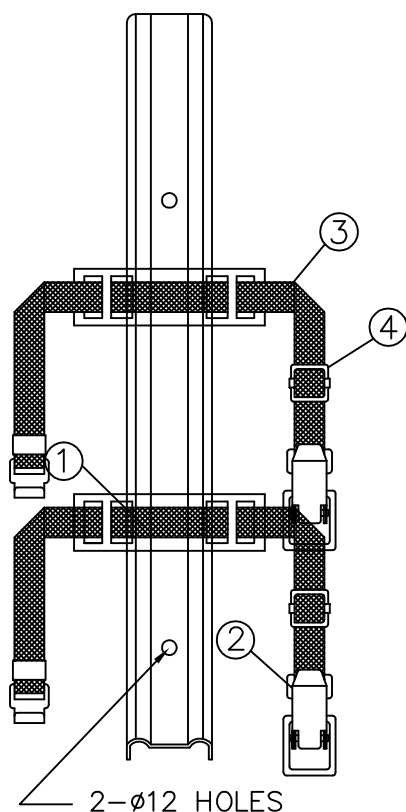
DATA SHEET : 320-400-401

PART NO. : 110N6503ME

SHEET : 1 / 1

MOUNTING BRACKET

Portable type



NO.	DESCRIPTION	MATERIAL	REMARK
1	SEAT	STEEL	RED PAINT
2	ADJUSTABLE CLIP	SUS316	
3	BAND	NYLON	
4	HOOK	SUS316	
5	ANGLE (5t×40×40-45L)	STEEL	YARD SUPPLY
6	BOLT / NUT / WASHER (M10×20L)	SUS	YARD SUPPLY

SPECIFICATION

– WEIGHT : Approx. 1.6 kg



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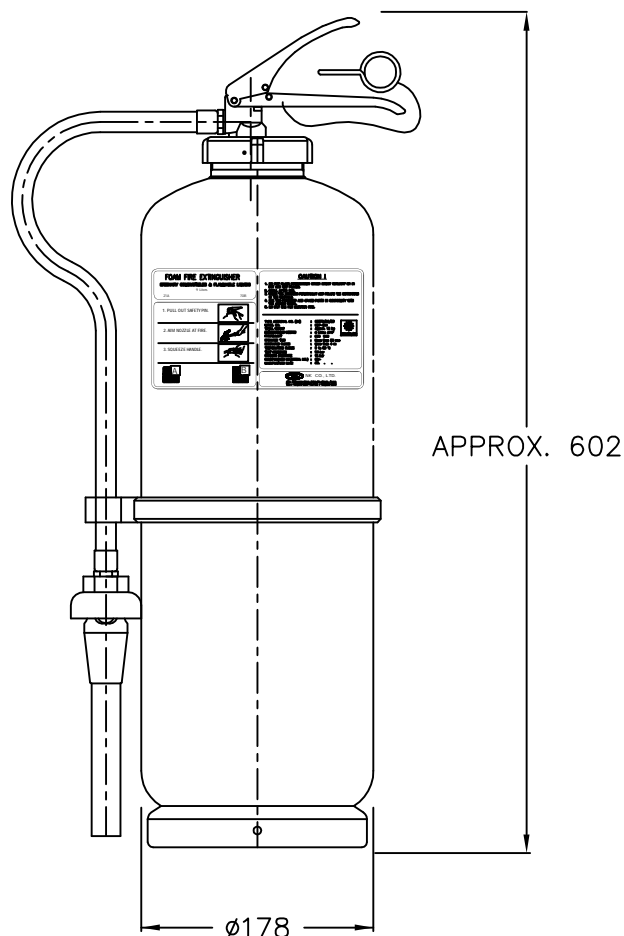
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DATA SHEET : 320-910-113

PART NO. : 315N0149

SHEET : 1 / 1

9L FOAM FIRE EXTINGUISHER



SPECIFICATION

- MODEL : EEF-9S
- TYPE : CARTRIDGE OPERATED TYPE
- FIRE EXTINGUISHANT : AFFF FOAM LIQUID
- EXPELLANT GAS : CO₂ (75g)
- CAPACITY : 9 LITER (MIXED SOLUTION)
- TOTAL WEIGHT : APPROX. 13.8 kg
- TEMPERATURE RANGE : 5°C TO +60°C
- DISCHARGE RANGE : MORE THAN 6 m
- DISCHARGE TIME : MORE THAN 50 sec
- TEST PRESSURE : 25 bar
- WORKING PRESSURE : 12 bar
- FIRE CLASS : A AND B FIRE
- PAINT COLOR : RED (RAL3000)
- APPROVAL : MED



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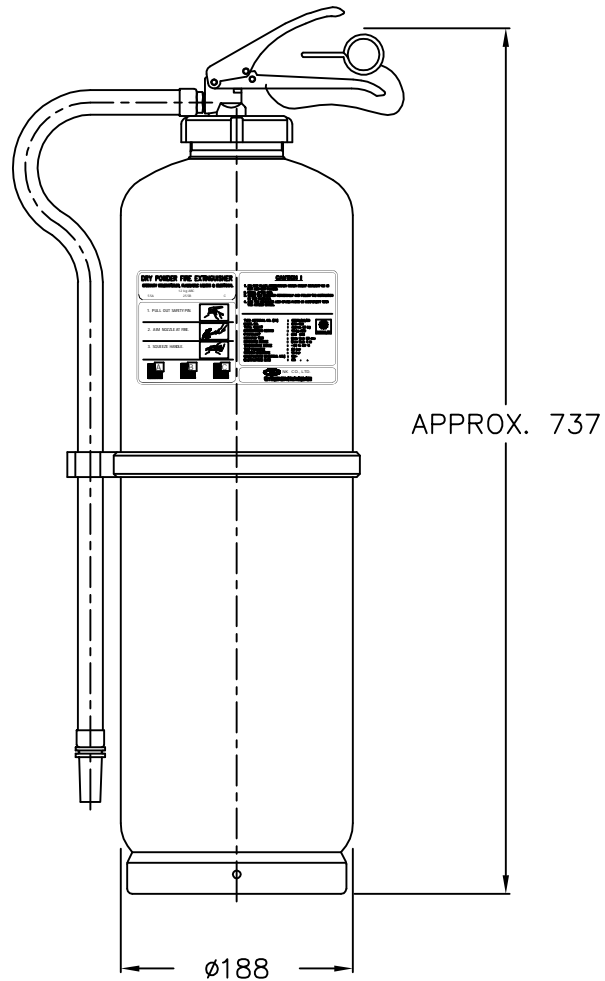
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DATA SHEET : 320-201-100

PART NO. : 112N60561ME

SHEET : 1 / 1

12 kg DRY POWDER FIRE EXTINGUISHER



SPECIFICATION

- MODEL : EED-12C
- TYPE : CARTRIDGE OPERATED TYPE
- FIRE EXTINGUISHANT : ABC POWDER
- EXPELLANT GAS : CO₂ (225g)
- CAPACITY : 12 kg
- TOTAL WEIGHT : Approx. 18.1 kg
- TEMPERATURE RANGE : -20 to +60 °C
- DISCHARGE RANGE : More than 4 m
- DISCHARGE TIME : More than 20 sec
- TEST PRESSURE : 25 bar
- WORKING PRESSURE : 12 bar
- FIRE CLASS : A,B,C + ELECTRICAL
- FINAL COLOR : RED (RAL3000)
- APPROVAL : MED



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DATA SHEET : 320-303-400

PART NO. : 111N60563ME

SHEET : 1 / 1

5 kg CO2 FIRE EXTINGUISHER



SPECIFICATION

- MODEL NO. : EEC-5e1
- CO2 CAPACITY : 5 kg CO2 GAS
- CYL.WATER CAPACITY : 7.5 LITRES
- CYL.DIAMETER : 138 mm
- TEMP. RANGE OF USE : -20 TO 60 °C
- DISCHARGE RANGE : 3 m
- DISCHARGE TIME : 23 sec
- TEST PRESSURE : 250 bar
- WORKING PRESSURE : APPROX. 56 bar at 20 °C
- APPROX.OVERALL HEIGHT : 747 mm
- APPROX.WIDTH : 200 mm
- APPROX.FULL WEIGHT : 16 kg
- FIRE CLASS : B & C
- PAINT COLOR : RED(RAL3000)
- APPROVAL : MED



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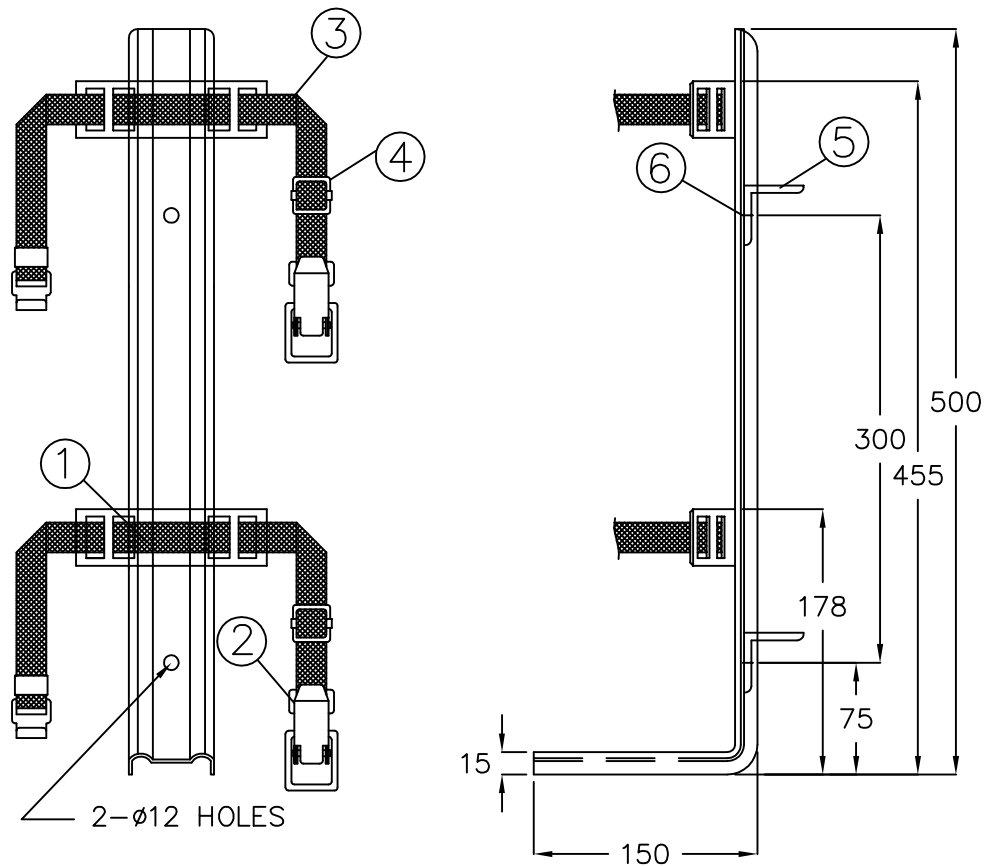
DATA SHEET : 320-109-100

PART NO. : 110N60561ME

SHEET : 1 / 1

MOUNTING BRACKET

PORTABLE TYPE



NO.	DESCRIPTION	MATERIAL	REMARK
1	SEAT	STEEL	RED PAINT
2	ADJUSTABLE CLIP	SUS316	
3	BAND	NYLON	
4	HOOK	SUS316	
5	ANGLE (5t \times 40 \times 40-45L)	STEEL	YARD SUPPLY
6	BOLT / NUT / WASHER (M10 \times 20L)	SUS	YARD SUPPLY

SPECIFICATION

- WEIGHT : APPROX. 1.6 kg



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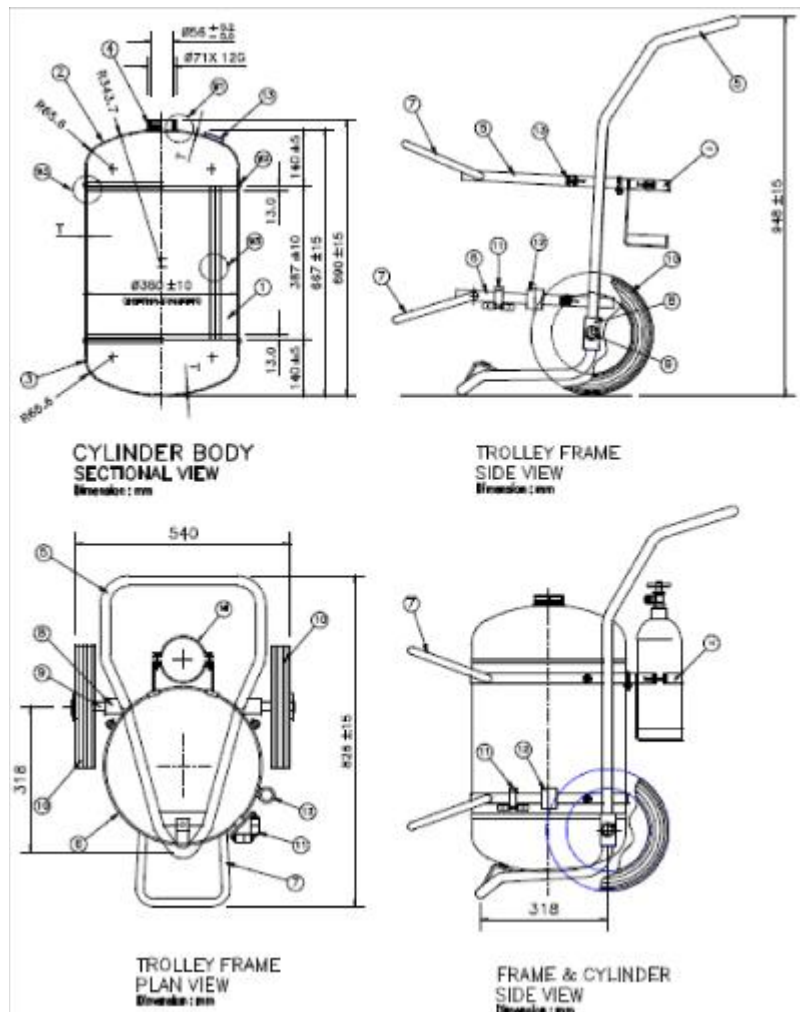
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DATA SHEET : 320-910-110

PART NO. : 315N0147

SHEET : 1 / 1

45L FOAM FIRE EXTINGUISHER



SPECIFICATION

- MODEL : MFG-45
- MEDIUM : PREMIX FOAM AFFF
- CAPACITY : 45LTR
- PROPELLANT : CO2 GAS CARTRIDGE(1kg)
- OVERALL HEIGHT : APPROX. 970mm
- OVERALL WIDTH : APPROX. 838mm
- CYLINDER DIAMETER : 380mm
- CYLINDER VOLUME : 65.6L
- TEST PRESSURE : 21.5 BAR
- WORKING PRESSURE : 12 BAR
- TEMPERATURE RANGE : 5 TO 60°C
- FIRE CLASS : A & B FIRE
- FINAL COLOR : RED
- APPROVAL : MED
- FLEXIBLE HOSE : 6 m



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DATA SHEET : 320-201-500

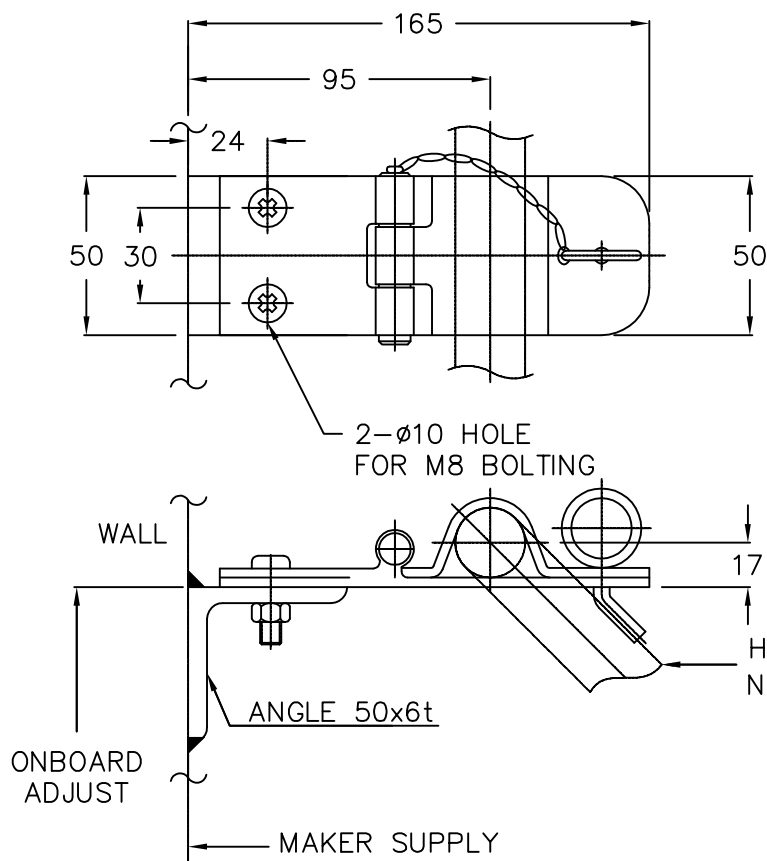
PART NO. : 112N60562ME-P

SHEET : 1 / 1

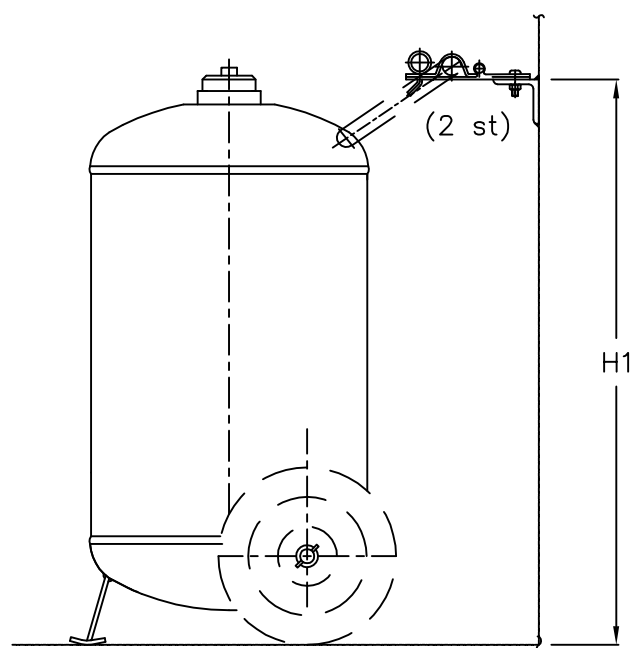
MOUNTING BRACKET

NON – PORTABLE TYPE

DESCRIPTION	H1
25kg D/P	APPROX.895
10kg CO2	APPROX.1020
20kg CO2	APPROX.950
20kg CO2	APPROX.1210
45L FOAM	APPROX.1000
135L FOAM	APPROX.1273



INSTALLATION



SPECIFICATION

- MATERIAL : SUS304
- FINISH : NATURAL
- WEIGHT : APPROX. 1.3 kg



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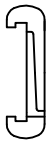
DATA SHEET : 320-910-226

PART NO. : 315N0054

SHEET : 1 / 1

PORTABLE FOAM APPLICATOR

COUPLING



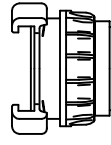
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ANSI



STORZ



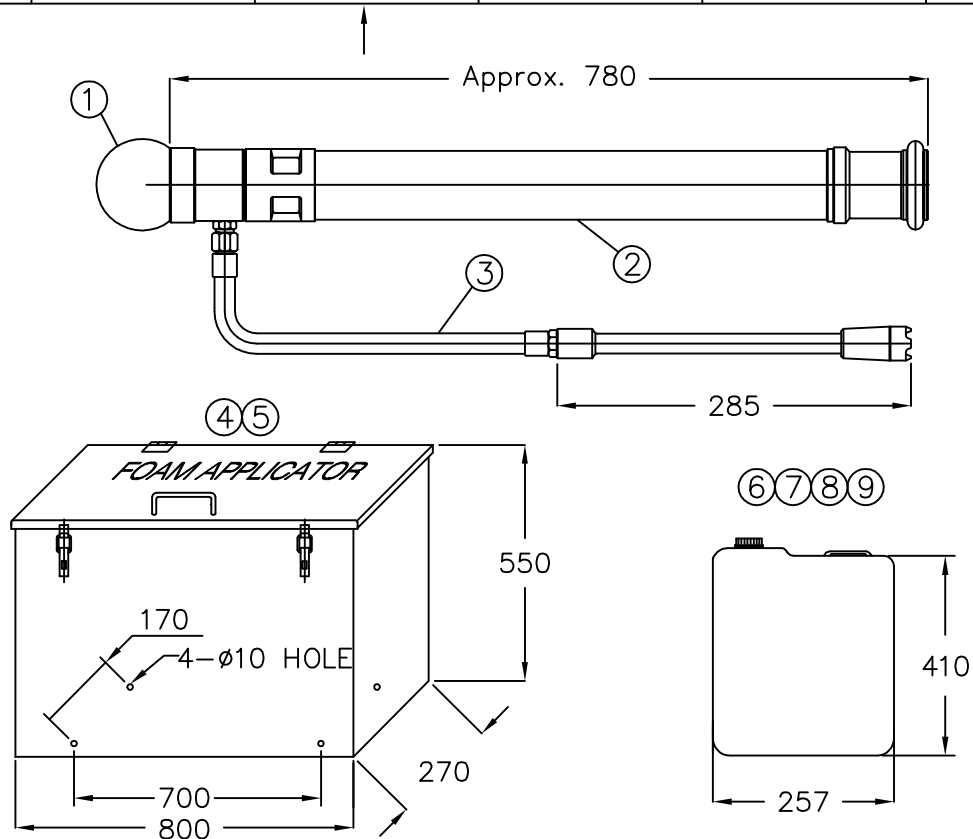
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SMS



BS



NO	DESCRIPTION	MAT'L	Q'TY	REMARK	WEIGHT
1	COUPLING	BC	1	STORZ C	Approx. 3.8 kg
2	DISCHARGE PIPE	SUS304	1	-	
3	SYPHONE TUBE WITH HOSE	RUBBER/BRASS	1	-	
4	STORAGE BOX	STEEL	1	ALL RED PAINTED WHITE LETTER (PART NO.123N4206)	Approx. 43 kg
5	OPERATION MANUAL	STICKER	1	294N1519	
6	20 LITERS FOAM TANK	PLASTIC	2	123N4209	Approx. 25 kg
7	FOAM LIQUID	3% PROTEIN	40L	WITH SPARE	
8	NAME PLATE FOR FOAM LIQUID	PC	1	290N7039	
9	FOAM CONCENTRATE FOR LIQUID	PC	1	261N00301ME	

- FIRE CLASS : A and B FIRE
- APPROVAL : KG



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DATA SHEET : 320-601-200

PART NO. : N / A

SHEET : 1 / 1

10 kg CO2 FIRE EXTINGUISHER



SPECIFICATION

- MODEL : TCO-10
- TEMPERATURE RANGE : -20 TO 60 °C
- DISCHARGE RANGE : APPROX. 4m
- DISCHARGE TIME : APPROX. 30 sec
- TEST PRESSURE : 250 bar(3625 psi)
- WORKING PRESSURE : APPROX. 56 bar(812 psi) AT 20°C
- FIRE CLASS : B AND C FIRE
- FINAL COLOR : RED
- APPROVAL : MED
- HOSE LENGTH : 9.5 x 6m



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DATA SHEET : 320-105-405

PART NO. : 110N60562ME

SHEET : 1 / 1

25 kg DRY POWDER FIRE EXTINGUISHER



SPECIFICATION

– MODEL	: MPG-25
– TYPE	: CARTRIDGE TYPE
– FIRE EXTINGUISHANT	: ABC POWDER
– CAPACITY	: 25 kg
– TOTAL WEIGHT	: APPROX. 58 kg
– TEMPERATURE RANGE	: -20 TO 60 °C
– DISCHARGE RANGE	: MORE THAN 6 M
– DIA MATER	: 250mm
– HEIGHT	: 895mm
– WIDTH	: 430mm
– FIRE CLASS	: A, B AND C FIRE
– DISCHARGE TIME	: MORE THAN 40 sec
– FINAL COLOR	: RED
– APPROVAL	: MED



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DATA SHEET : 320-307-001

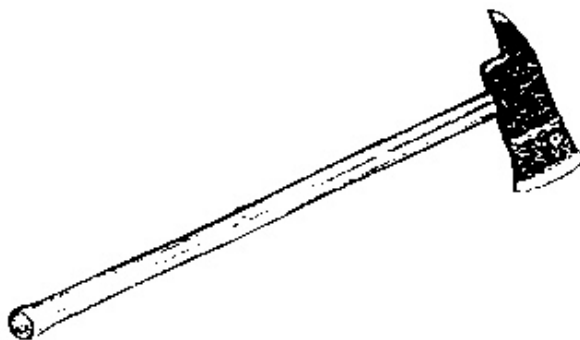
PART NO. : 111N60565ME

SHEET : 1 / 1

HELICOPTER RESCUE EQUIPMENT

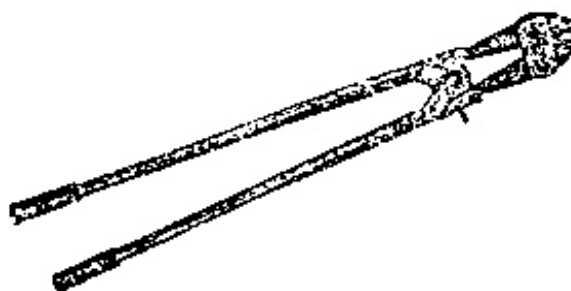
PICKHEAD FIRE AXE

– PART NO. : 130N3005



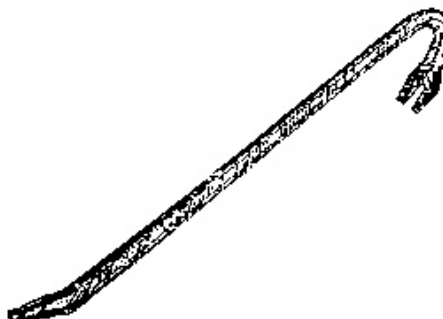
BOLT CUTTER 24"

– PART NO. : 132N9021



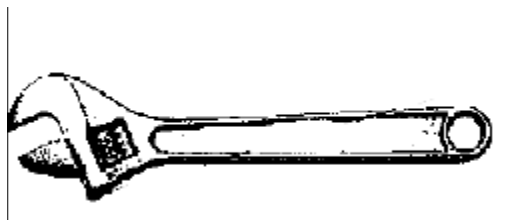
CROWBAR 36"

– MATERIAL : CARBON STEEL
– PART NO. : 132N9001



ADJUSTABLE WRENCH 14"

– PART NO. : 231N0038



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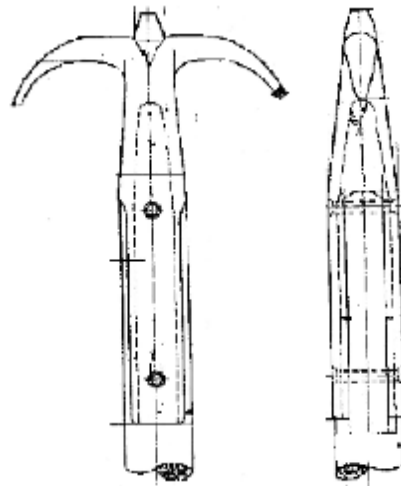
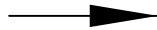
PART NO. : SEE ABOVE

SHEET : 1 / 1

HELICOPTER RESCUE EQUIPMENT

GRAB OR SALVING HOOK

- MATERIAL : ASH-WOOD&STEEL
- CHAIN SIZE: 4m
- PART NO. : 132N90231



HACKSAW

- PART NO. : 231N0039



LADDER

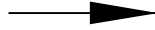
- MATERIAL : ALUMINIUM
- LENGTH : 435×1800mm (D×H)
- CAPACITY : 100kg, 5300mm
- PART NO. : 132N9060



HELICOPTER RESCUE EQUIPMENT

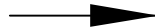
ASSORTED SCREW DRIVERS

– PART NO. 254N9200



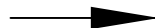
HARNESS KNIFE COMPLETE WITH SHEATH

– PART NO. : 139N0000



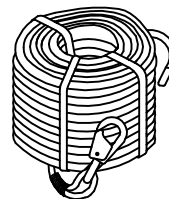
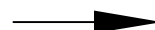
PLIERS, SIDE CUTTING

– PART NO. : 254N9123



LIFE LINE 15M

– PART NO. 130N0619



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PART NO. : SEE ABOVE

SHEET : 1 / 1

EMERGENCY SIGNAL TORCH WITH MARSHALLING BATON



MARSHALLING BATON

– UNIT INFORMATION

2 C-CELL SUBMERSIBLE FLASHLIGHT IN ORANGE
MODEL # : 2002201

– SPECIFICATIONS

POWER SOURCE : 2 C CELL
BULB / LAMP : XENON
BULB / LAMP LIFE : 15 HOURS
LIGHT OUTPUT : 30,000 BEAM CANDLEPOWER
WEIGHT (WITHOUT BATTERIES) : 6.7 oz
REPLACEMENT BULB : XPR2C
APPROXIMATE BURN TIME DURING CONTINUOUS USE : 5 Hours 40 Min

– SAFETY APPROVALS

ATTEX II 2 G EEX IB E IIBT3
CSA : CLASS I, DIVISION 2 GROUP A, B, C & D
CLASS II, DIVISION 2 GROUP G OPERATING TEMP T3A
MSHA : APPROVED FOR USE AS MINING EQUIPMENT
CLASS I, DIVISION 1, GROUP C & D OPERATING TEMP T3C
(WHEN USED WITH A KPR102, KPR104 OR PR2 BULB)
UL : CLASS I, DIVISION 1, GROUP D
CLASS I, DIVISION 2 GROUP A, B, C & D
CLASS II, DIVISION 2 GROUP G OPERATING TEMP T3A



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DATA SHEET : 360-060-101

PART NO. : 130N2010MK

SHEET : 1 / 1

FIRE BLANKET



BLANKET	CONTAINER
1800 x 1200	530 x 100 x 10

SPECIFICATION

- MATERIAL : WOVEN GLASS FIBRE
- COLOR : RED
- WEIGHT : 440g/m²
- NOMINAL THICKNESS : 0.36mm
- LOCATION : CAREERING ESTABLISHMENTS, SCHOOLS, HOSPITALS AND NURSING HOMES, LABORATORIES, GARAGES AND WORK SHOPS BOATS AND CARAVANS



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DATA SHEET : 360-040-101

PART NO. : 117N0501

SHEET : 1 / 1

FIRST - AID EQUIPMENT



Q'TY	Article	Q'TY	Article
5pcs	BAndage , 10cm	12pcs	Safety pin
8pcs	BAndage , 5cm	1 pc	Splint
3pcs	BAndage Gauze , 45cmx45cm	45g	Traumatic ointment
3pcs	Adhesive tape 10mmx3m	7g	Ophthalmic ointment
3pcs	Triangular bandage 105cmx105cmx105cm	2btl	Antiseptic solution, 25cc
3pcs	Eye dressing pad	100tablets	Acetaminophen
1pcs	Tourniquet	20tablets	Antiseptic antidiarrhea
1pcs	Scissors	12pcs	Vaselin gauze 7.5cmx70cm
1pcs	Pincette		

SPECIFICATION

- TYPE APPROVAL NO : 95-04
- TYPE : HYEL-113



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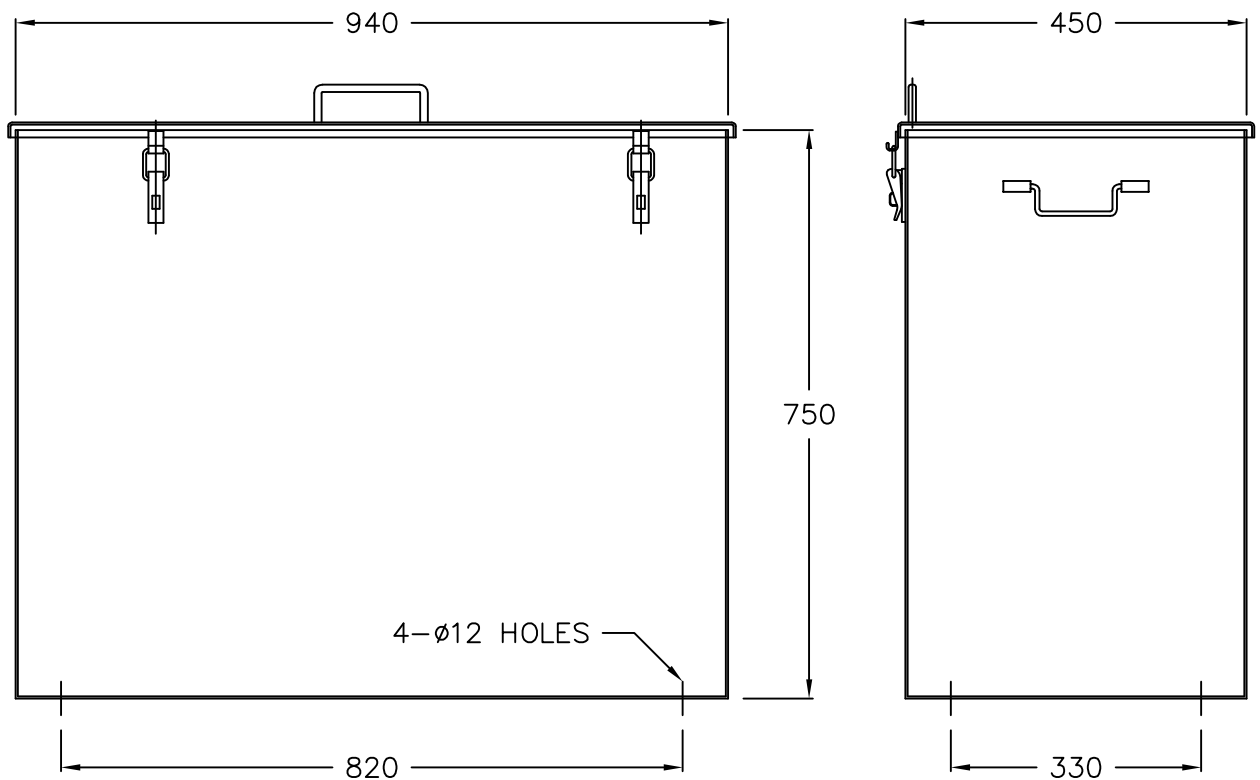
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DATA SHEET : 350-060-100

PART NO. : 131N2000

SHEET : 1 / 1

STORAGE BOX



SPECIFICATION

- MATERIAL : STEEL, 2.3t
- FINISHED : INSIDE : RED
OUTSIDE : RED
LETTER : WHITE
- WEIGHT : APPROX. 90 kg



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DATA SHEET : 310-800-200

PART NO. : 123N4603

SHEET : 1 / 1

EMERGENCY ESCAPE BREATHING DEVICE



SPECIFICATION

— CAPACITY	: 400 L
— CYLINDER PRESSURE	: 200 bar
— DERATION	: 10 min
— MODEL NO.	: Saver CF10
— SIZE	: 490(L)x160(W)x250(H)
— TOTAL WEIGHT	: Approx. 4.2kg
— APPROVAL	: MED



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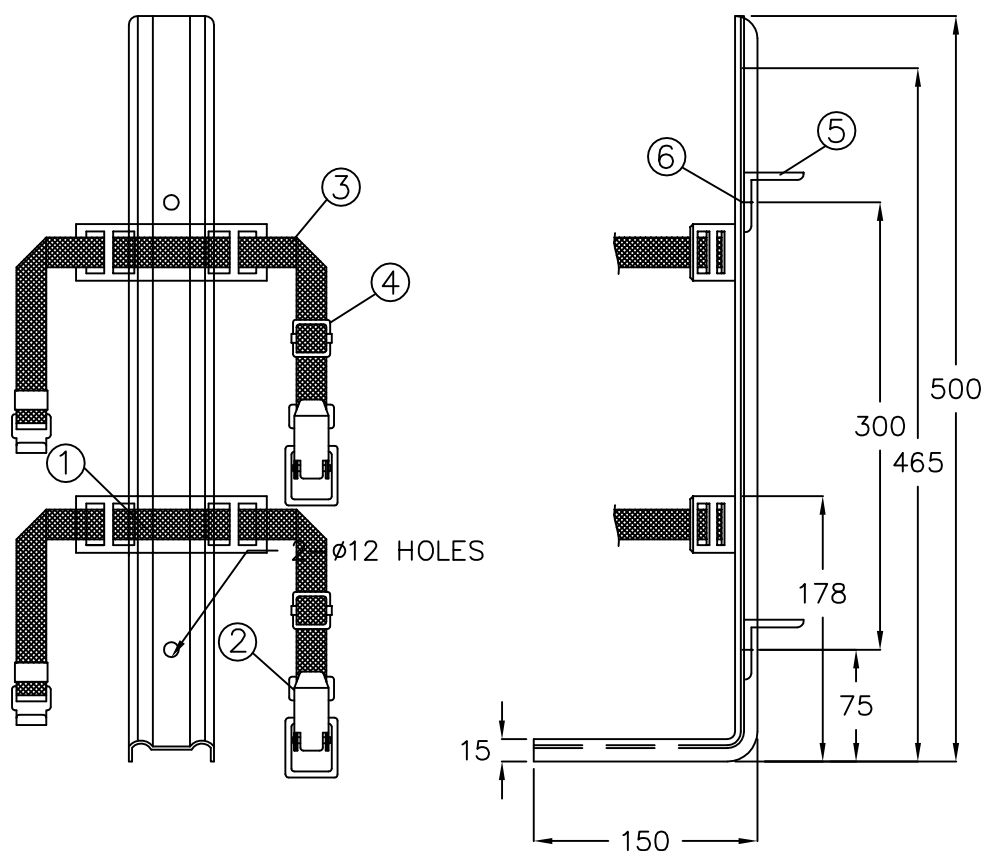
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DATA SHEET : 350-200-100

PART NO. : 132N0015UK

SHEET : 1 / 1

MOUNTING BRACKET FOR E.E.B.D



NO.	DESCRIPTION	MATERIAL	REMARK
1	SEAT	STEEL	ORANGE PAINT
2	ADJUSTABLE CLIP	SUS316	
3	BAND	NYLON	
4	HOOK	SUS316	
5	ANGLE (5t×40×40-45L)	STEEL	YARD SUPPLY
6	BOLT / NUT / WASHER (M10×20L)	SUS	YARD SUPPLY

SPECIFICATION

— WEIGHT : Approx. 1.6 kg



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DATA SHEET : 350-050-120

PART NO. : 315N0146

SHEET : 1 / 1



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Donning of Escape Set

- Place neck strap of carrying bag over the head
- Adjust length of strap until equipment sits in the centre of chest
- Fix waistbelt, if fitted, and adjust by pulling free end until equipment is secure and comfortable



Donning of Escape Set

- Grip the loop in the lid of carrying bag and pull firmly upward (Anti-tamper tag will break)
- Open flap of the bag which will release the locking clip from the valve. The air supply to the hood will be turned on



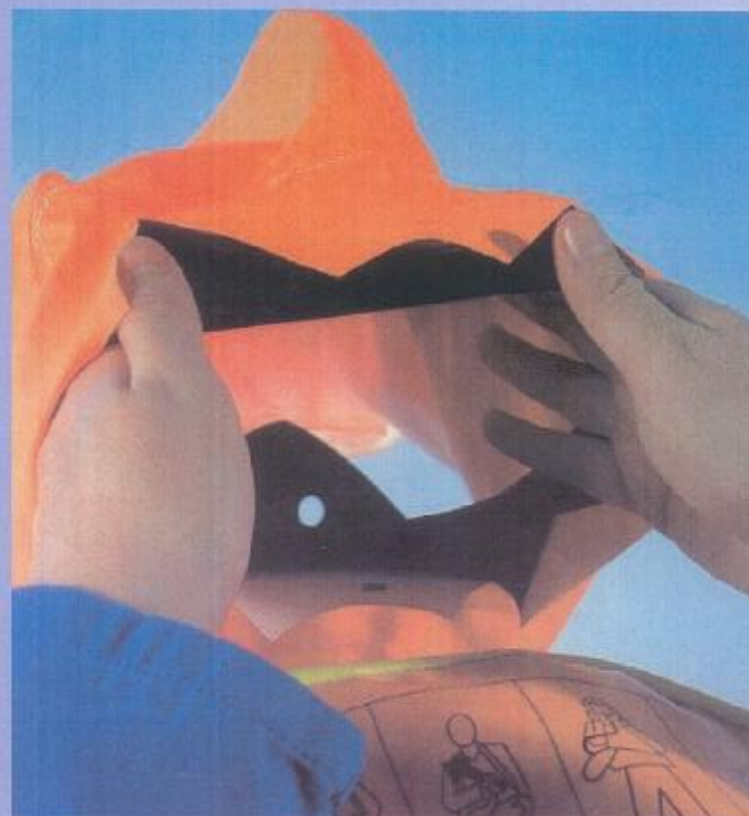
Donning of Escape Set

- Immediately remove the hood from the carrying bag



Donning of Escape Set

- Place both hands inside the hood neck seal, place chin inside half mask and pull hood over the head from front to back



Donning of Escape Set

- Position half mask over the nose and mouth and breathe normally

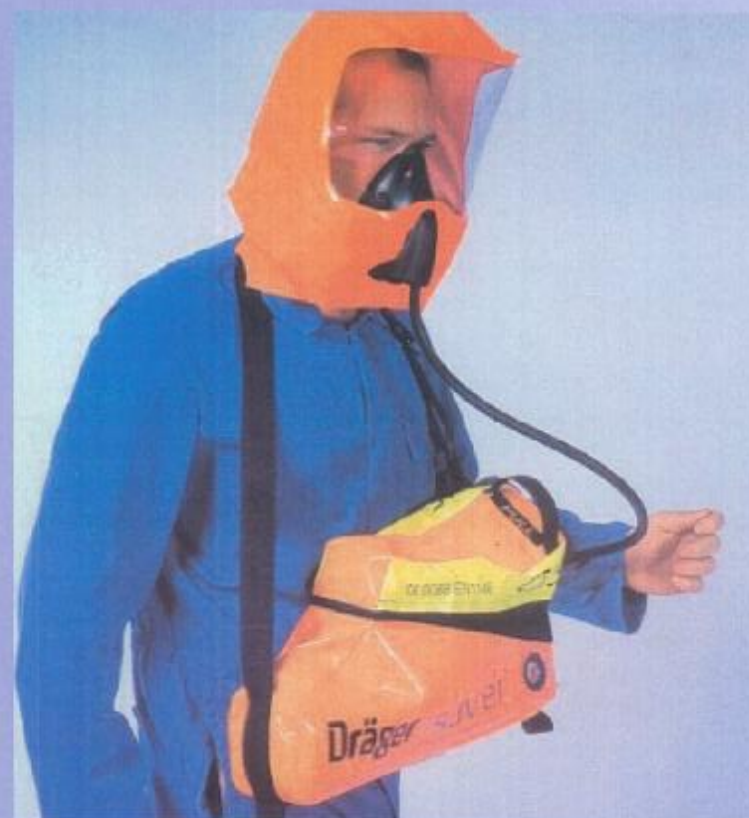


Donning of Escape Set

- Immediately leave the hazardous area by the shortest and safest route
- Air supply will last approx. 10 mins (Saver CF10); 15 mins (Saver CF15)

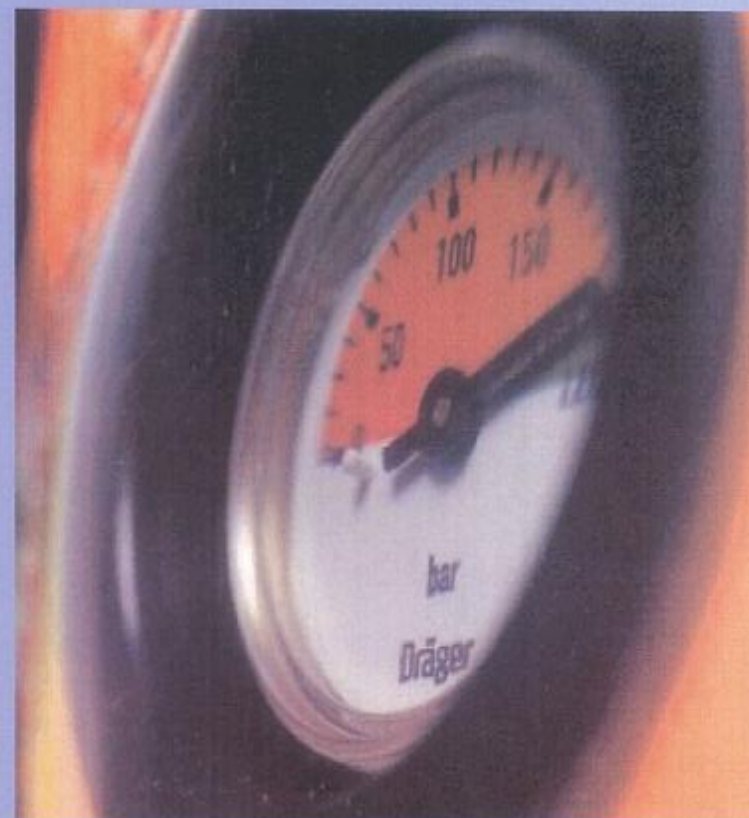
Note:

Do not remove the hood until in a safe area and clear of the hazard, unless the air supply has run out



Pre-Operational Checks

- Check contents gauge regularly to ensure the cylinder is full pressurised
- The gauge needle must be inside the green segment of the gauge face



Pre-Operational Checks

- Check that the anti-tamper tag is intact to ensure full performance whenever required
- If the tag is broken or missing, the escape set must be checked and refilled if necessary



PA90Plus Series with integral Plus LDV

Compressed Air Respiratory Protection Equipment Instructions for Use

PA91Plus

Advanced Breathing Apparatus for Industrial and Maritime Applications.



Instructions for Use

PA90Plus Series with integral Plus LDV

Compressed Air Respiratory Protection Equipment Instructions for Use

Approvals

PA90Plus Series compressed air respiratory equipment meets the requirements of EC Council Directive 89/686/EEC, BSEN 133, conforms to EN137, is CE Mark Approved and issued with EC Type Examination Certificate.

EC Type examiner:

SGS Yarsley ICS Limited, Camberley, Surrey, GU15 3EY, England.
Notified Body No. 0120.

For Your Safety

PA90Plus Series certified equipment incorporates Dräger preset and sealed pressure reducer. Dräger's guarantee is void should original seal caps be tampered with, removed, or broken. Correct operational condition is only valid if Dräger service, and re-seals pressure reducer.

Use of this equipment requires wearer training, knowledge, observance of these Instructions for Use, and compliance with National Regulations, Laws and Standards, governing the use of respiratory equipment in the country of use.

Use equipment only for the purpose specified in this manual, or as confirmed in writing by Dräger.

Only trained competent personnel should inspect and service equipment at regular intervals and a record kept of such inspections and service.

Dräger recommends a service contract be obtained from your Dräger Branch or Agent.

Contact Dräger for details of Service Contracts and Service Training Courses.

Use only original Dräger Spare Parts for service and maintenance.

Notify Dräger if there is component fault or failure.

PA90Plus Series with integral Plus LDV

Compressed Air Respiratory Protection Equipment Instructions for Use

Liability Statement

Responsibility for reliable function of equipment transfers to the owner or operator when serviced, or repaired by untrained personnel, (not employed or authorised by Dräger) or when used in a manner notconforming to its intended use.

Description

The **PA90Plus Series** of compressed air respiratory protection equipment, with integral Plus Lung Demand Valve, has been researched and designed to meet the specific needs of the end user.

All variants of this product use the same carbon composite backplate and high performance first stage pressure reducer fitted with a positive pressure lung demand valve. Variants are fully compatible with a range of facepieces and compressed air cylinders.

Details of equipment variants and approved accessories available from Dräger.

Intended Use

When used with approved facepiece and cylinder combinations the **PA90Plus Series** of compressed air respiratory protection equipment provide the wearer with respiratory protection when working in a contaminated, or oxygen deficient gaseous atmosphere.

Effective working duration of equipment dependant on capacity (volume) of cylinder selected and breathing rate of wearer.

In the presence of chemicals; some substances, e.g. Phosgene, may be absorbed by, or difusse through the material of the silicone diaphragm of the Plus series lung demand valve. When the lung demand valve is fitted with the non-silicone diaphragm fit the 'Green' cover (1) Fig. 7 for identification.

PA90Plus Series with integral Plus LDV

Compressed Air Respiratory Protection Equipment Instructions for Use

In temperatures below freezing; correct function of the lung demand valve will be impaired should water be trapped, then freezes inside the lung demand valve. It is important that water is removed from the lung demand valve and connection hose. Thoroughly dry after any cleaning operation.

Technical Data

High Pressure Connection

Standard G5/8 as per **DIN 477: Part 6.**

200bar or 300bar

Other connections available to National Standards.

Whistle Setting

Preset by Dräger to **55bar +/- 5bar (50bar to 60bar).**

Compressed Air Cylinders

4L to 12L capacity cylinders (**200bar or 300bar**) available in either steel or composite materials. Approved conversion kit for twin cylinder mounting is available. Contact Dräger for details.

Preparation for use

Fitting Cylinder

Check valve port and reducer handwheel threads are undamaged, connector O ring in position, and undamaged.

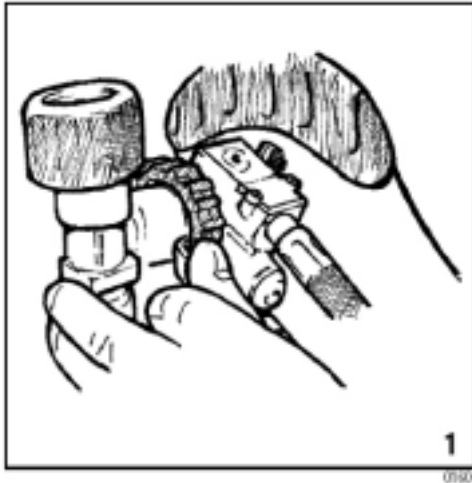
Place backplate horizontal, extend cylinder strap,

PA90Plus Series with integral Plus LDV

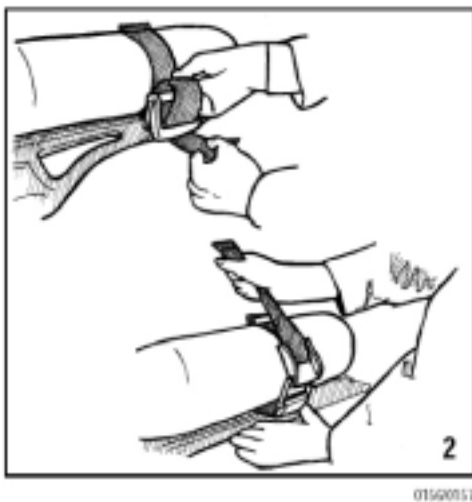
Compressed Air Respiratory Protection Equipment Instructions for Use

slide cylinder through strap locating valve port to reducer handwheel.

Lift unit upright, screw handwheel into valve port, (handtight), and, if fitted, hook anti-vibration strap to handwheel. (Fig. 1).



Place backplate horizontal, take up slack on cylinder strap, pull strap over cylinder to activate Camlock (Fig. 2) secure strap to Velcro.



Pre Operational Checks

High Pressure Leak Test

Note: Before opening the cylinder valve press the reset button to switch 'Off' positive pressure mechanism.

PA90Plus Series with integral Plus LDV

Compressed Air Respiratory Protection Equipment Instructions for Use

Open cylinder valve slowly but fully to pressurize system.
Close cylinder valve and observe the high pressure gauge.
Gauge reading shall not decrease more than **10bar** in **1 minute**.

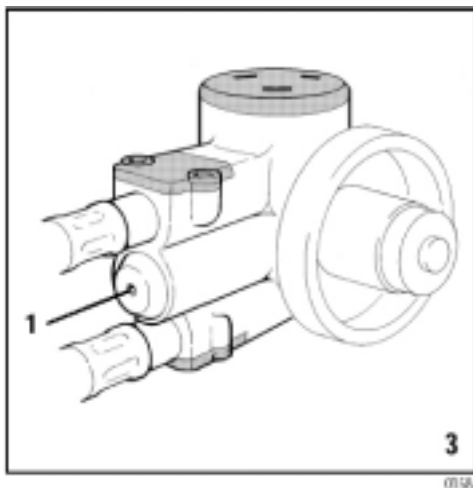
Whistle Warning Unit Test

Cover demand valve outlet with ball of hand, press centre of rubber cover turning 'On' the positive pressure. Slowly vent system by carefully lifting ball of hand maintaining a slow decrease in pressure.

Observe the high pressure gauge. Whistle should sound at preset pressure of 55bar +/- 5bar

Should whistle not sound at required pressure, whistle may be reset as follows:

Refer to Fig. 3.



Remove anti-tamper plug from adjuster (1) situated in the reducer body between high pressure hose and medium pressure hose connections, and using 3mm hexagon socket key;

- a. Turn adjuster clockwise to increase pressure.
- b. Turn adjuster anti-clockwise to decrease pressure.

Repeat whistle check from High Pressure Leak Test.

Note: Following satisfactory whistle test, press reset button to switch

PA90Plus Series with integral Plus LDV

Compressed Air Respiratory Protection Equipment Instructions for Use

‘Off’ positive pressure.

Connecting Demand Valve to Facepiece

Type A - Check facepiece port and demand valve O ring are clean and not damaged. Insert connector of demand valve into inhalation port of facepiece until it clicks into position. Check attachment is secure. Pull demand valve away from facepiece – there should be no axial movement.

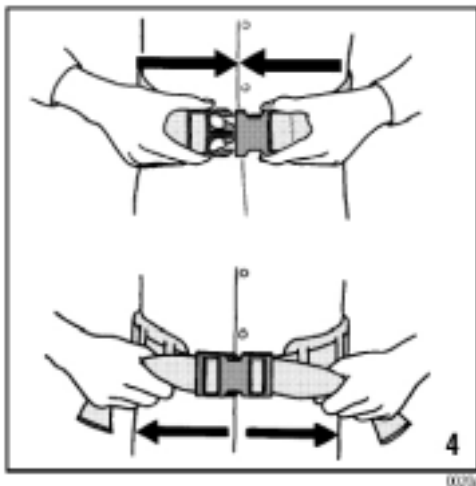
Type AE - Check facepiece port and sealing ring are clean and not damaged. Screw the demand valve into the inhalation port of facepiece. Hand tight.

Operation

Putting on equipment

Extend shoulder straps and waistbelt. Put on the equipment.

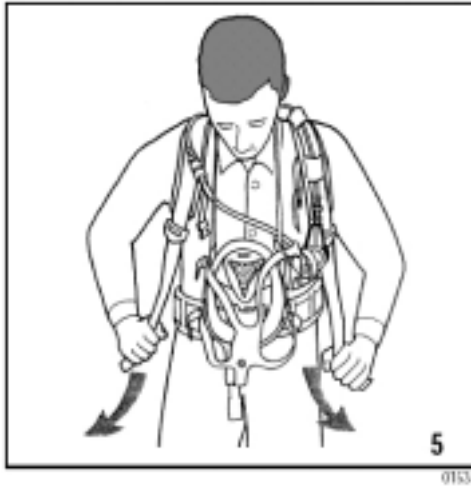
Fasten buckle then pull ends of waistbelt away from buckle (Fig. 4) until secure and comfortable on hip. Tuck ends in belt loops.



PA90Plus Series with integral Plus LDV

Compressed Air Respiratory Protection Equipment Instructions for Use

Pull down shoulder straps (Fig. 5) until equipment is secure and comfortable. Tuck strap ends under waistbelt.

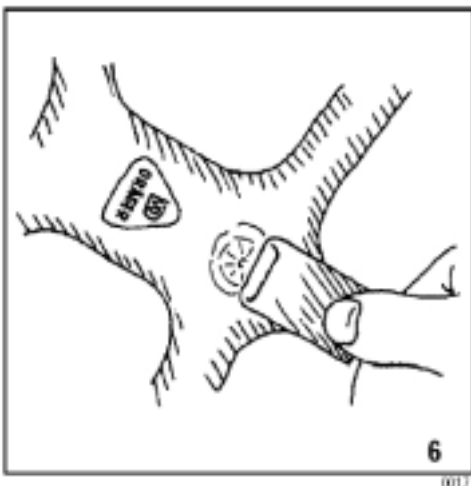


Extend facepiece head harness straps, leaving centre strap in position, (Fig. 6). Put neck strap over neck then insert neck strap stud into hole in centre strap in head harness.

Carry out High Pressure Leak Test.

Note: Cylinder pressure must not be less than **80%** full.

Note: Before opening cylinder valve press reset button (6) Fig. 6 to switch 'Off' positive pressure.



Open cylinder valve slowly, but fully, to pressurise system. Check gauge.

PA90Plus Series with integral Plus LDV

Compressed Air Respiratory Protection Equipment Instructions for Use

Putting on Facepiece

Note: Refer to Instructions for Use provided with Facepiece.

Safety Warning: Facial hair, beard stubble, side whiskers, and the wearing of spectacles will adversely affect and interfere with facepiece seal. Correct fit of facepiece only ensured if facepiece seal makes close contact with skin.

Breathe normally.

Before use perform function checks.

Function Checks

Close cylinder valve.

Breathe normally to vent system. During venting observe gauge - whistle alarm should sound at preset pressure of 55bar +/-5bar. When gauge indicates zero, hold breath. Facepiece should hold onto face indicating positive seal.

Note: If leak detected, open cylinder valve(s), readjust head harness and retest.

Open cylinder valve slowly, but fully to pressurise system.

Inhale and hold breath. Unit must balance, i.e. no audible leak.

Continue breathing. Expired air should easily flow out of exhalation valve.

Press centre of rubber cover on demand valve checking supplementary supply.

Use

Take gauge reading regularly. Whistle will sound at whistle warning unit pressure setting.

Go on to safe area, at least when whistle sounds, by shortest and safest route.

PA90Plus Series with integral Plus LDV

Compressed Air Respiratory Protection Equipment Instructions for Use

After Use

Safety Warning: Do Not remove equipment until in safe area, clear of hazard.

Remove facepiece and 'close' the cylinder valve(s).

Note: Press reset button to switch 'Off' the positive pressure.

Close the cylinder valve and remove facepiece.

Unbuckle waistbelt, lift shoulder strap buckles to loosen, remove equipment.

Note: Do Not drop or throw down equipment as damage could occur.

Press the centre of the rubber cover to vent system then press reset button to switch 'Off' the positive pressure.

Pass equipment to Service Department.

Routine Maintenance

To be performed after Use.

See also Maintenance and Test Intervals Chart.

Removal of cylinder

Safety Warning: Cylinder valve should be closed and system vented.

Lift free end of cylinder strap against Camlock to release, loosen strap. Unhook anti-vibration strap (if fitted) from reducer handwheel and unscrew handwheel from cylinder valve. Slide cylinder away from reducer, remove from equipment.

Recharge cylinder.

PA90Plus Series with integral Plus LDV

Compressed Air Respiratory Protection Equipment Instructions for Use

Charging Cylinder

Recharge to the rated pressure indicated on the label or stamped on the neck or shoulder of cylinder. Dräger recommend a charge rate of 27bar/minute. Rapid charging will induce an increase in temperature resulting in an incomplete charge - check pressure at ambient and if required 'Top Up' charge.

Safety Warning Air quality for compressed air breathing systems should conform to requirements of EN12021. Only charge compressed air cylinders which:

- Conform to National Standards.

- Feature original manufacturer's test date and test mark.

- Have not exceeded test date stamped on cylinder by last testing station.

Visual Inspection

Check integrity of:

- Carrying plate.

- All straps, buckles and harness.

- Valves, connectors and cylinder supports.

- Lung Demand Valve.

- Facepiece.

Cleaning, Disinfecting, Drying

Carefully clean, disinfect, and thoroughly dry contaminated dirty components as necessary.

To ensure correct operational condition of equipment, use only cleaning and disinfecting solutions recommended by Dräger. Use of other products invalidates Dräger's guarantee.

When using baths to contain cleaning and disinfecting solutions, immersed components and assemblies must be agitated manually. Dräger recommends that no form of mechanical agitation be used.

PA90Plus Series with integral Plus LDV

Compressed Air Respiratory Protection Equipment Instructions for Use

If using Ultrasonic cleaning baths, refer to, and follow strictly the manufacturer's instructions.

Note:

1. The diaphragm of the lung demand valve must not be ultrasonically cleaned as this will affect the bonded area of the diaphragm. Clean and disinfect manually.

2. Ultrasonic cleaning of the lung demand valve will eventually remove lubrication from moving parts. Duration and ultrasonic energy of the machine will affect the time for this to occur. Following cleaning, disinfecting and drying carry out functional tests. Re-lubricate moving parts as required.

Safety Note: Refer to manufacturers' usage instructions when using cleaning and disinfecting agents. It is important that attention be paid to concentration and reaction times. Do Not use organic solvents, such as Acetone, Alcohol, White Spirit, Trichloroethylene or similar.

Dräger recommends only the following:

1. Cleaning

Dräger Safety Wash.

Sekusept

Do Not exceed **30 degrees** Celsius.

Note: Before disinfecting, rinse off cleaning solution in clean water.

2. Disinfecting

Incidur

Do Not exceed **30 degrees** Celsius.

Note: Before drying, rinse off disinfecting solution in clean water.

Details of cleaning and disinfecting agents are available from Dräger on request.

PA90Plus Series with integral Plus LDV

Compressed Air Respiratory Protection Equipment Instructions for Use

3. Rinsing and Drying

Remove cleaning and disinfecting solutions by rinsing in clean water, followed by drying. **Do Not** exceed **60 degrees** Celsius when drying components. Immediately remove from drying cabinet when dry.

Reducer and Hose Assembly

Note: Refer to For Your Safety.

For cleaning and disinfecting, remove pressure reducer and hose assembly from backplate.

Remove locknut, washers and bolt to remove the reducer from the backplate mounting.

Unfasten hose loops, releasing hoses, and remove reducer and hose assembly.

Note: Do Not immerse pressure reducer in cleaning or disinfecting solutions.

Using clean cloth, moistened in cleaning, or disinfecting solution, remove dirt and contaminants from pneumatic assembly.

Using clean cloth, moistened in clean water, remove disinfecting residue, followed by drying.

Note: Do Not exceed **60 degrees** Celsius when drying components.

Re-assemble reducer and hose assembly to backplate and harness.

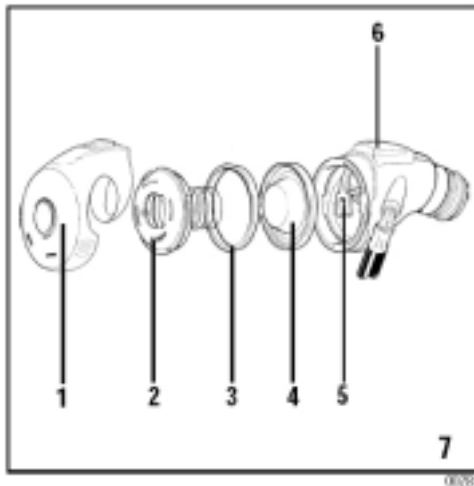
Lung Demand Valve

To internally clean and disinfect the lung demand valve it is important to follow these instructions.

Refer to Fig. 7. (Type A Illustrated)

PA90Plus Series with integral Plus LDV

Compressed Air Respiratory Protection Equipment Instructions for Use



Fold rubber cover (1) from front of body of demand valve. Grip bayonet cap (2), turn anticlockwise and remove bayonet cap.

Note: The positive pressure spring remains attached to the bayonet cap. **Do Not** remove, stretch or compress spring. Take care not to damage the spring during cleaning and disinfecting procedures.

Using thumb and forefinger carefully grip center plate of diaphragm (4) then tilt centre plate and lift the diaphragm from the body of lung demand valve. Remove slip ring (3).

Note: The diaphragm must not be ultrasonically cleaned, as this will affect the bonded area of the diaphragm. Clean and disinfect manually.

Fold rubber cover back over front of demand valve body to protect balanced piston lever.

Immerse, and manually agitate demand valve, diaphragm, slip ring, and bayonet cap in cleaning fluid. (Refer to cleaning fluid instructions.)

After cleaning, rinse components in clean water.

Immerse and manually agitate components in disinfecting fluid. (Refer to disinfecting fluid instructions.)

After disinfection fold rubber cover from front of demand valve and rinse components in clean water. Take care not to damage balanced

PA90Plus Series with integral Plus LDV

Compressed Air Respiratory Protection Equipment Instructions for Use

piston lever (5).

Connect hose of demand valve to medium pressure air supply.

Press reset button (6) then turn 'ON' air supply.

Gently press balanced piston lever (5) blowing out fluid residue.

Safety Note: Wear suitable eye protection.

Disconnect from air supply, dry components and, if necessary remove excess fluid.

After drying, carefully locate outer bead of diaphragm into groove in demand valve body.

Carefully locate tapered side of slip ring into recess in bead of diaphragm.

Locate positive pressure spring of the bayonet cap in the centre of the diaphragm.

Refit bayonet cap then fold rubber cover back over front of demand valve. Press the reset button to switch 'Off' positive pressure mechanism.

Connect demand valve to equipment and perform Pre Operational Checks as detailed in Instructions for Use for equipment. Replacing Diaphragm Refer to Fig. 7.

Fold rubber cover (1) from front of body of demand valve. Grip bayonet cap (2), turn anticlockwise and remove bayonet cap.

Note: The positive pressure spring remains attached to the bayonet cap. Do Not remove, stretch or compress the spring.

Using thumb and forefinger carefully grip center plate of diaphragm (4) then tilt centre plate and lift the diaphragm from the body of lung demand valve. Remove slip ring (3). Discard diaphragm.

Carefully locate outer bead of new diaphragm into groove in demand valve body.

Carefully locate tapered side of slip ring into recess in bead of diaphragm.

Locate positive pressure spring of bayonet cap in the centre of the diaphragm and refit the bayonet cap.

Fold rubber cover back over front of demand valve then press the reset button to switch 'Off' the positive pressure mechanism.

Connect demand valve to equipment and perform Pre Operational

PA90Plus Series with integral Plus LDV

Compressed Air Respiratory Protection Equipment Instructions for Use

Checks as detailed in Instructions for Use for equipment.

Facepiece

Refer to Instructions for Use provided with Facepiece.

Storage - Ready for Use

Fully extend shoulder straps, waistbelt and head harness of facepiece.

Store equipment 'ready for use' in a cool dry environment, free from dust and dirt. Protect rubber parts from direct sunlight.

Safety Note: When stored 'ready for use', on wall or bulkhead mounting, e.g. Fire Tender, ensure equipment secured and supported by Dräger approved mounting system.

PA90Plus Series with integral Plus LDV

Compressed Air Respiratory Protection Equipment Instructions for Use

Fault, Cause, Remedy

FAULT	POSSIBLE CAUSE	REMEDY
Facepiece leakage (Leak test with apparatus in position)	Faulty or missing sealing ring for push-in connection Exhalation valve leakage Speech diaphragm defective Head straps not tight	Fit or replace sealing ring or O ring Clean and replace as required Replace Tighten straps
Unsatisfactory Communication	Speech diaphragm defective	Replace
High pressure leak	Check tightness of connections Check hose seals	Tighten as required Replace as required
Safety relief valve venting	Check relief valve O ring Pressure educer defective	Replace as required, re-test Return to Dräger Service
Demand valve vents (constant flow)	Banjo O rings worn Balanced piston leakage Diaphragm incorrectly fitted	Replace Replace Re-assemble correctly
Whistle not sounding correctly	Whistle dirty	Clean and re-test

PA90Plus Series with integral Plus LDV

Compressed Air Respiratory Protection Equipment Instructions for Use

Maintenance and Test Intervals

Carry out regular Inspection.

Testing and Servicing of Equipment in accordance with this table. Record all data in Equipment Log Book. These instructions also apply to non-used (in Storage) Equipment.

	Description	After Use	Every Month	Every Year	Every 6 Years
Complete Equipment	Clean and Disinfect				
	Visual Inspection				
	Functional and Leak Testing as defined in Instructions for Use				
	Flow and Static Tests per Manufacturer's instructions				
Demand Valve	Clean and disinfect as necessary				
Pressure Reducer	Medium Pressure Check				
	Replace Sintered Filter				
	Replace H.P. Connector O-ring				
	Basic Overhaul (Repair Exchange Scheme)				
Cylinder	Charge to correct pressure				
	Charged Pressure Check. Check Test Date Stamped on Cylinder				
	Re-Certification - Cylinder Pressure Test (According to National Standards).				
Cylinder Valve	Overhaul as necessary or at time of Cylinder Re-Certification.				

Dräger Recommendation

COSHH

Grease Demand Valve connector O-ring (Molykote 111) as required.

Order List

PA90Plus Series with integral Plus LDV

Compressed Air Respiratory Protection Equipment Instructions for Use

Description	Part No.
PA91 Plus (DIN) with Integral LDV - Type A	3350683
PA91 Plus (Italy) with Integral LDV - Type AE	3350685
PA91 Plus Basic (DIN) with Integral LDV - Type=A	3350687
PA91 Plus Basic Padded (DIN) with Integral LDV - Type A	3350692
HP Connector O-Ring-Reducer	D17409
Sintered Filter-Reducer	R51806
Diaphragm - Silicone (LDV)	3338747
Rubber Cover - Green	3338799
Non - Silicone Diaphragm (LDV)	3338751
Connector O-Ring (Type A LDV)	R18352
Sekusept Cleaner (4 bottles @ 2 litres)	7904071
Wipex Cloths (Pack of 50)	3380375
1 Litre Safety Wash and Dispenser	3380164
1 Litre Safety Wash Refill	3380165
5 Litre Safety Wash and Dispenser	3380166
5 Litre safety Wash Refill	3380167
Incidur Disinfectant(6 litres container)	7904072
Incidur Disinfectant (30 litres container)	7904073

PA90Plus Series with integral Plus LDV

Compressed Air Respiratory Protection Equipment Instructions for Use

PA91 Plus & PA94 Plus Basic

Donning Procedure

PA91 Plus



PA91 Plus (with fixed LDV)

3350683

PA91 Plus (with fixed LDV) 3350683

PA94 Plus Basic



PA94 Plus Basic (with Quick
Release Coupling LDV)

3338913

PA94 Plus Basic (with fixed LDV)

3350687

PA94 Plus Basic (with Quick Release Coupling LDV) 3338913

PA94 Plus Basic (with fixed LDV) 3350687

PA90Plus Series with integral Plus LDV

Compressed Air Respiratory Protection Equipment Instructions for Use



Extend the shoulder straps and the waistbelt – carefully lift the set onto your shoulders

Connect and adjust the waistbelt so that the apparatus sits comfortably on your hips

Place the mask carrying strap around your neck



Lightly pull down on the shoulder straps until the backplate makes contact with your shoulders

Tuck the loose ends of the straps into the waistbelt

The chest strap should also be connected if fitted; adjust for comfort

PA90Plus Series with integral Plus LDV

Compressed Air Respiratory Protection Equipment Instructions for Use



Locate the neck strap stud into the hole in the center strap of the head harness

Reset the lung demand valve by pressing the red button



With the gauge in your left hand fully open the cylinder valve with your right hand

The cylinder must not be less than 80% full

Perform the High Pressure leak test by fully closing the cylinder valve and ensuring that the pressure does not fall by more than 10 bar within 1 minute

PA90Plus Series with integral Plus LDV

Compressed Air Respiratory Protection Equipment Instructions for Use



Re-open the cylinder valve

Remove the stud from the head harness

Fully extend all the straps

Firmly push the facemask onto your face and into the chincup

Panorama Mask: (depicted) Firmly tighten the harness by pulling straight back; start with the lower two straps followed by the middle two straps. Adjust top strap as required

F2 Mask: Firmly tighten the harness by pulling out and backwards; start with the lower two straps followed by the middle two straps and top strap if required



Breathe in to activate the LDV

Ensure that the mask seals satisfactory onto your face

Inhale and exhale three times - hold your breath and listen for leaks; there should be no audible leaks when you are not breathing

With the gauge in your left hand fully close the cylinder valve with your right hand. Breathe very slowly exhausting air from the system; the

PA90Plus Series with integral Plus LDV

Compressed Air Respiratory Protection Equipment Instructions for Use

whistle should begin to sound between 50 and 60 bar

Continue to breathe until all of the air is exhausted – the gauge should read zero, and the mask should collapse onto your face

Turn the cylinder valve on. The equipment is now ready for use



After use

Reset the lung demand valve

Remove the facemask by gently pulling the head harness buckles forward and lift the mask off your face

Close the cylinder valve Activate the supplementary supply to exhaust the air from the system



Remove the set by releasing the waistbelt, (chest strap if fitted), then extending the shoulder straps

Remove the facemask neck strap from your neck and carefully remove the set from your shoulders

Clean the unit and recharge the cylinder in readiness for it's next use

PA90Plus Series with integral Plus LDV

Compressed Air Respiratory Protection Equipment Instructions for Use

Accessories

For PA91 Plus & PA94 Plus Basic	Order Code
Panorama Nova P Facemask (EPDM)	R52972
F2 Facemask (EPDM)	R54697
F2 Facemask 2nd LDV Connection/ Female Decontamination Hose	3337650
Decontamination Hose Quick Release Male	3337652
T Piece (for 2 x 6.8 litre 200 bar carbon cylinders)	3337662
LDV Retainer (push in)	3339270
Chest Strap	3339280
PVC Cylinder Cover 6.8 litre 300 bar	3310619
PVC Cylinder Cover 9.0 litre 200 bar	3310620
PVC Cylinder Cover 9.0 litre 300 bar	3310621
For PA94 Plus Basic Only	
Comfort Waist Pad	3337510
ChargAir™ Kit	3337702
Airline Belt Manifold (for use with Airline only)	3337600
Personal Line Loop	3334968
Shoulder D Ring Loop	3335241

PA90Plus Series with integral Plus LDV

Compressed Air Respiratory Protection Equipment Instructions for Use

For complete spare parts list please refer to your instructions

For Use Manual for Order Code

Cleaning Tips

Any combination of the following methods can be used:

Facemask and set can be washed with lanoli soap and rinsed with fresh water

Facemask and set can be washed with Safety Wash

Facemask can be cleaned/sterilised using a wipex cloth

Lung demand valve can be cleaned by immersing in Safety Wash

Dry components after cleaning

For complete care instructions please refer to your instructions

For Use Manual

For more information call: Customer Services on 01670 352 891

This donning poster is for guidance only.

For more detailed operating instructions please refer to the Instructions for Use (IFU) supplied with the equipment.

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