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WARTUNGSHANDBUCH
SERVICE MANUAL FOR

LR05

SOLAS STYLE LIFERAFTS

THROW OVERBOARD & DAVIT LAUNCH TYPES

This Manual: Part Number 08196009

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STATEMENT OF CERTIFICATION
**(for 6-25 Persons Throwover type liferafts
and 12-25 Persons Davit Launch type liferafts)**

SOLAS STYLE LIFERAFTS

THROW OVERBOARD & DAVIT LAUNCH TYPES

The equipment described in this manual has been accepted by the Department for Transport and refers to inflatable liferafts which comply with the following international conventions and regulations:

1. SOLAS 74 as amended by Regulation III/4, 34, 35, 36 and MSC/Circ 809 as amended.
2. LSA Code, regulations I/1.2, IV/4.1 and 4.2.
3. IMO resolution MSC 81(70) Part 1.

and has been type approved in compliance with the Marine Equipment Directive, (Council Directive 96/98/EC and amendments up to and including CD 2002/84/EC).

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The technical accuracy of this manual has been verified and is certified as correct.

Approved by:

Date approved: ... 22/03/06

Design Manager Design Authority

While DSB takes reasonable care to ensure that this manual is accurate and complete, it does not accept liability for errors contained herein. Please refer to DSB's sales terms and conditions relevant to the product for further information. Nothing herein seeks to exclude or limit DSB's liability for anything which cannot be excluded or limited by law.

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Important Notice

This publication is for reference purposes and its use restricted to trained service technicians in lawful possession of a current marine liferaft servicing certificate granted by DSB GMBH ('entitlement'). It is not a stand-alone text embodying the basic techniques or skills appropriate to liferaft servicing.

DSB GMBH accepts no responsibility for loss, injury or death resulting from the partial, improper or unlawful application of the instructions herein.

If the requirements within this publication are believed to be contrary to legislated national or international requirements, DSB GMBH must be consulted prior to release into service of affected product.

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If no longer required or if entitlement ceases, DSB GMBH must be contacted to arrange for the disposal of this publication.

Communications regarding this publication should be addressed to the Technical Services Department or the Technical Publications Department at DSB GMBH.

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Letter of Transmittal

To: All holders of Manual Part No. 08196009

Title: LR05 Solas Style Liferafts

Revision: 2

Dated: Feb/09

The technical accuracy of this revision has been verified and is certified as correct.

Signed



Date

5-3-09

Design Manager Marine

Pages Affected**Revision Highlights**

This revision includes the Leafield inflation option. Also Klappe, USDoT and ESSO introduced. Various other sundry changes added.

RECORD OF REVISION	Revision added
EFFECTIVE PAGES Pg 1-4	Effective pages updated
Associated Publications	Leafield details added
TOC Pg1	Contents updated
CHAPTER 1, Pg 110	Leafield torque values added
CHAPTER 2, Pg 201, 206-208	Contents, Leafield Op head added
CHAPTER 4, Pg 401, 403-414	Contents, Leafield, Light/Powerunit added
CHAPTER 5, Pg 501-503 Pg 505-508 & 510-517	L/R test schedule added, FIGURES & text amended
CHAPTER 6, Pg 601,606-610 Pg 617-624	General text amended Inflation valve, Buoyancy liner, Container repair
CHAPTER 7, Pg 703-706 Pg 717-720	Epak TABLES updated Extra foam protection
CHAPTER 8, Pg 801, 803-841 Pg 842-854 Pg 855-868	Lighting sys, L'field, Page nums added Board ramp fold, Page nums added L'field, Page nums added
CHAPTER 10 Pg 1003-1006	Leafield tools added
ILLUSTRATED PARTS LIST P1105-1109 P1111-1136	Light unit added, Part.Nums updated TABLES updated
Appendix 2	Davit launch liferafts Klappe
Appendix 3	USDoT cylinders
Appendix 4	DSB liferafts stowed on ESSO platforms

RECORD THE INCORPORATION OF THIS REVISION ON THE REVISION RECORD.
RETAIN THIS LETTER OF TRANSMITTAL, FILE IT BEHIND THE REVISION RECORD.

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Letter of Transmittal

To: All holders of Manual Part No. 08196009

Title: LR05 Solas Style Liferafts

Revision: 1

Dated: Dec/06

The technical accuracy of this revision has been verified and is certified as correct.

Signed



Date

21-12-06

Design Manager Marine

Pages Affected

Revision Highlights

This revision includes the Leafield inflation option and introduction of Mk10 and Mk14 containers.

RECORD OF REVISION	Revision 1 added
EFFECTIVE PAGES Pg 1,2&3	Effective pages updated
Associated Publications	Leafield added
CHAPTER 1, Pg 108 Pg 110	MK 10 &14 container added Leafield torque values added
CHAPTER 6, Pg 614-616	Repair to Leafield PRV.
CHAPTER 7, Pg 713-715	Epacks for Mk10 and Mk14
CHAPTER 8, Pg 824-829 Pg 839-845 Pg 854-858	MK 10 &14 container prep. MK 10 &14 Davit launch packing MK 10 &14 Throw over packing
CHAPTER 10 Pg 1004 & 1005	Leafield tools added
ILLUSTRATED PARTS LIST P1116-1121 P1131-1136	P1108 Leafield parts added Mk10 & Mk14 containers Leafield inflation parts

RECORD THE INCORPORATION OF THIS REVISION ON THE REVISION RECORD.
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D-37632 Eschershausen
Germany

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REVISION RECORD
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RECORD OF REVISIONS

Arrangement of the Service Manual

This Manual is made up in loose-leaf form. This form allows modifications and supplements to be added to the Manual by replacing or adding pages and consequently keeping the Manual always up-to-date.

Modifications, Supplements, Delivery

As occasion demands we shall send you a "modification notice" with a list of the pages to be exchanged or added together with the new pages. The cancelled pages have to be returned to DSB together with the acknowledgement of receipt of the new pages. It is absolutely necessary to file modifications at once and to inform all servicing personnel without delay.

The number of the modification notice, chapter/page no., issue old/new, the date of filling and the name of the person who exchanged or added the page(s) have to be recorded in the schedule below.

SERVICE BULLETIN LIST

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LIST OF ASSOCIATED PUBLICATIONS

INFLATION EQUIPMENT

- | | |
|--------------|---|
| QA Doc. 2017 | Instruction Manual for Thanner Operating Head DK94 and cylinder adaptor CV DK94 and CV DK99 system. |
| QA Doc. 0050 | Installation Manual - Thanner Mk III Inflation Valve. |
| QA Doc. 2045 | Instruction Manual for Thanner Operating Head DK99. |

The above manuals are published by the manufacturer:-

Thanner & Co. A/S, Randersvej 8-10,
DK-6700, Esbjerg, Denmark.

Tel.: (45) 7513 0066
Fax: (45) 7545 2993
E-mail: admin@thanner.dk
Web site: www.thanner.dk

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- | | |
|--------------|--|
| M-07-IS-GIVT | Gas Inflation System (Torsional) Inlet Valve Installation Instructions |
|--------------|--|

- | | |
|--------------|--|
| M-07-UM-GIST | General user manual for gas inflation system (Torsional) |
|--------------|--|

The above manuals (latest versions) are published by the manufacturer:-

Leafield Marine Limited
Leafield Way, Corsham, Wiltshire, SN13 9SS

Tel: +44 (0)12 2581 0771, Fax: +44 (0)12 2581 2057
E-mail: lml@leafield.co.uk

MISCELLANEOUS

- | | |
|----------------------|---------------------------------------|
| User Guide (Issue 5) | SART S4 Search And Rescue Transponder |
|----------------------|---------------------------------------|

The above manual is published by the manufacturer:-

McMurdo Pains Wessex
Rodney Road, Portsmouth
Hampshire, PO4 8SG
United Kingdom

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INTRODUCTION TO THE MANUAL

1 General

- A This manual is intended for use by the people who will do the regular servicing work on the equipment. They will normally be employees of the Manufacturer or of Service Stations appointed by the Manufacturer. The manual describes the procedures used to disassemble, inspect, repair and reassemble the equipment. These procedures must be strictly obeyed.
- B DSB GmbH is the Design Authority for the equipment. The company has invested much effort to create the equipment and its servicing procedures, so that the equipment will be capable of reliable use, regardless of climate, weather conditions or circumstances.
While comments intended to improve the efficiency of servicing procedures are always welcome, you must not make any changes to the servicing procedures without the permission of DSB GmbH. Unauthorised changes may cause the equipment to malfunction. They may also void the approval of the equipment.
- C This manual covers the DSB LR05 range of inflatable liferafts.
- D Wheel-mark instruction - European Council Directive 96/98/EC (Marine Equipment) mark of conformity, is known as the 'Wheelmark'. An inflatable liferaft which bears the Wheelmark, embodies wheel-marked components (pyrotechnics, TPA's, position indicating lights, retro reflective tape and HRU). Items not wheel-marked may be subject to approval by the National authority.

2 Manual Breakdown

A Chapters and Page Numbers

- (1) The Chapter and Page Number blocks are as follows:

Chapter	Page Nos.	Title
-	1 - 99	Introduction
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2	201 - 299	Removal and Unpacking
3	301 - 399	Cleaning
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8	801	-	899	Assembly and Repacking
9	901	-	999	Storage Conditions and Instructions
10	1001	-	1099	Tools, Equipment and Materials
11	1101	-	1199	Illustrated Parts List

Appendices - Appendix covering variations to basic configuration manual for various national requirements.

B List of Effective Pages

- (1) The List of Effective Pages details all the pages that are contained in the manual and indicates the issue dates of those pages allowing the manual content to be checked for completeness and currency. This list is included in the introductory pages of the manual.

C Record of Revisions

- (1) Modifications to the equipment will be embodied under the approval of a notified body or national authority, as appropriate. When required, the pages of this manual will be amended, approved and reissued as a revision.
- (2) A revision to the manual consists of a transmittal letter, a revised List of Effective Pages, and new or revised text and illustrations. Revised contents lists are issued when necessary.
- (3) The transmittal letter carries at its head the certification statement which authorises the revision. It describes, in general terms, the contents of the revision in the manual. All pages that are required to be removed without replacements are listed. All other out of date pages are to be removed when superseding pages of the same number are inserted. All additional pages to be inserted are also listed where applicable.
- (4) The transmittal letters are to be filed behind the Record of Revisions page at the front of the manual.

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D Associated Publications

- (1) The list of Associated Publications containing details of the manuals published by the manufacturer of a component fitted to, or used in conjunction with, the equipment described in this manual. This list, where applicable, is located at the front of the manual.

3 WARNINGS, CAUTIONS and NOTE

WARNING: A WARNING CALLS ATTENTION TO A PROCEDURE WHICH IF INCORRECTLY PERFORMED IS LIABLE TO CAUSE INJURY OR DEATH TO PERSONNEL.

CAUTION: A CAUTION CALLS ATTENTION TO A PROCEDURE WHICH IF INCORRECTLY PERFORMED IS LIABLE TO CAUSE DAMAGE TO THE EQUIPMENT OR ITS COMPONENTS.

NOTE: A NOTE calls attention to methods which make the job easier.

4 Health and Safety

- A DSB GmbH shall not be deemed by virtue of any of these instructions to have assumed any of the responsibilities of the service agent or operator under the HEALTH AND SAFETY AT WORK ACT or any such enactment.

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5 List of Abbreviations

AR	-	As required
assy.	-	Assembly
C	-	Celsius
cc	-	Cubic Centimetre(s)
cm	-	centimetre(s)
c/w	-	Complete With
dia.	-	Diameter
g	-	Gramme
g/cm ²	-	Grammes per square centimetre
iaw	-	In accordance with
i/d	-	Inside Diameter
instl.	-	Installation
kg	-	Kilogramme
kgf	-	Kilogramme force
L.H.	-	Left Hand
R.H.	-	Right Hand
m	-	metre(s)
mm	-	millimetre(s)
mm WG	-	millimetres of Water Gauge
max.	-	Maximum
min.	-	Minimum
Mod.	-	Modification
Nm	-	Newton Metre(s)
o/d	-	Outside Diameter
Spec.	-	Specification
P/N	-	Part Number
PU	-	Polyurethane
PVC	-	Polyvinylchloride
RF	-	Reference

6 Service Provision

- A The provision of service on liferafts, at the intervals required by governing legislation or by the Design Authority, is detailed in Chapters 2 to 8 of this manual.
- B Servicing work must not be done to DSB GmbH products except by or under the direct supervision of DSB certificated service technicians employed by and working in the approved premises of DSB accredited service agents.

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C In brief, the following tasks shall be carried out:

- (1) The servicing record chart on reverse of the Liferaft Identification Label is to be completed at each servicing including;
 - The stamp of the Certified Operator who serviced the liferaft in the place designated.
 - The number of the Annual Certificate is to be written in the space provided.
 - The Service Station Manager or Chief Inspector is to sign this card in the space provided.
- (2) Liferafts shall be unpacked in accordance with Chapter 2.
- (3) Liferafts and constituent items shall be cleaned and inspected in accordance with Chapters 3 and 4.
- (4) Testing appropriate to the age of the liferaft shall be carried out according to Chapter 5.
- (5) Required repairs shall be carried out according to Chapter 6 provided the appropriate techniques are described there. In all other cases procedural advice shall be obtained from DSB GmbH. Technical Services.
- (6) Sub-assembly processes and repacking of the liferaft shall be in accordance with Chapters 7 and 8.

D Installation and Removal (See also Chapter 1).

- (1) Satisfactory installation of liferafts on board is the responsibility of the vessel's master and operator. In relation to servicing, however, DSB servicing agents must ensure that the responsibility for reinstallation following servicing is identified within their contractual agreement and that, when the DSB agent reinstalls liferafts, the resulting installation is according to DSB recommendations and is in all respects satisfactory.

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E Special Tools, Equipment, Replacement Parts and the ‘MED’.

- (1) The special tools and equipment listed in Chapter 10 or in associated publications may not be substituted except by the explicit permission of DSB.
- (2) No replacement parts or materials other than those of DSB supply or approval may be used in the servicing of DSB products. Replacement parts are listed in Chapter 11, materials in Chapter 10 or in current service bulletins.
- (3) Liferafts that are labelled – ‘wheel-marked’ – indicating compliance with the Marine Equipment Directive of the European Union (‘the MED’) shall contain items which are themselves wheel-marked; these are:
 - (a) Position indicating lights
 - (b) Retro-reflective material
 - (c) Thermal Protective Aids
 - (d) Pyrotechnics (hand flares, rocket parachutes flares and buoyant smoke signals)

Note that MED compliant items must be accompanied by an MED ‘declaration of conformity’.

Locally obtained substitutes may be used only upon approval by DSB GmbH and only if they are MED compliant. Application to DSB GmbH, must make it perfectly clear that they are wheel-marked and quote the complete technical specification.

At present the MED governs the following countries:

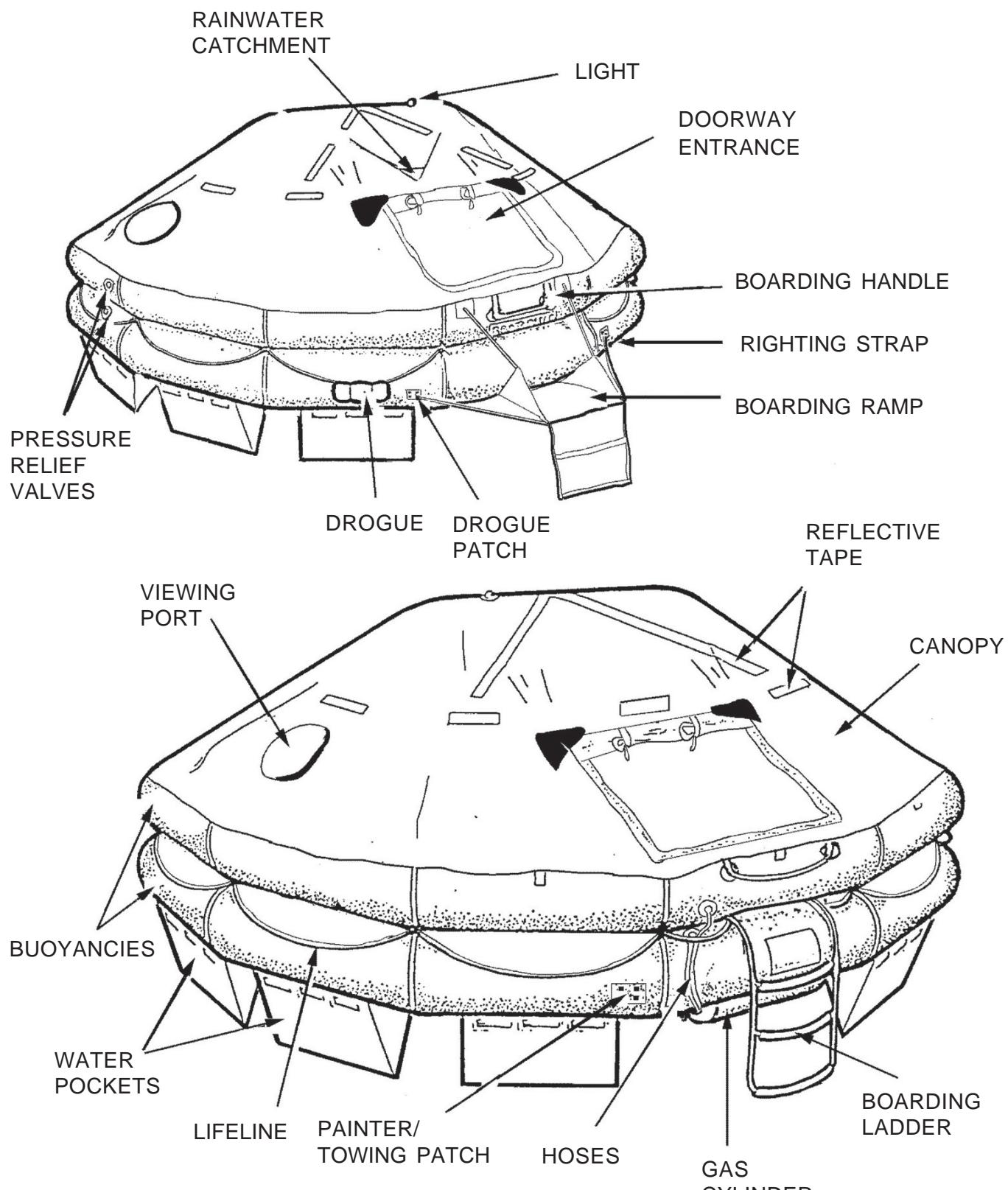
- Nations of the European Union
- Norway

Some emergency equipment items (for example, first aid kits) may be subject to explicit approval by the relevant administration of the flag state.

CHAPTER 1

DESCRIPTION AND DATA

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SOLAS style Throw Over Liferaft
FIGURE 101

CHAPTER 1

DESCRIPTION AND DATA

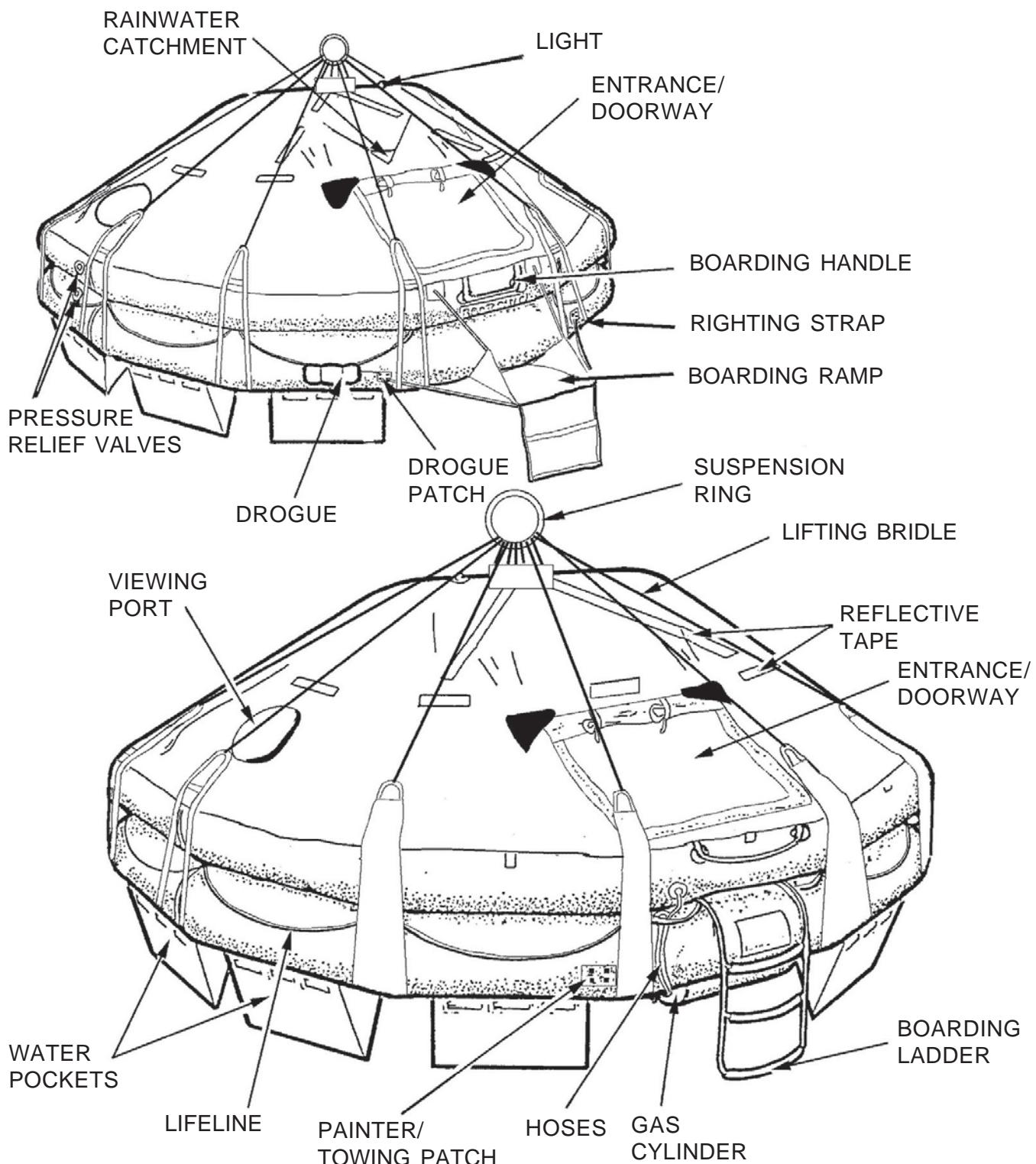
1 Description

- A The LR05 SoLaS style range of Throw Overboard liferafts are high capacity liferafts rated for 6, 8, 10, 12, 16, 20 or 25 persons (FIGURE 101).

The range is complemented by Davit Launch versions sized 12, 16, 20 or 25 persons (FIGURE 102).

- B The design consists of two buoyancy chambers forming a high freeboard, an insulated floor and an automatically erected canopy for all-weather protection that incorporates doors, vents and rainwater catchment systems. The canopy is double skinned for insulation purposes and is supported by an arch tube which is inflated via the upper buoyancy chamber.
- C Polyurethane adhesive (Bostic 1520), is used during manufacture. Polychloroprene adhesive (Bostic 486) must be used for service repairs.
- D The liferaft is made from the following parts, (FIGURE 101 or FIGURE 102):
- (1) Two buoyancy tubes: one installed on top of the other with a floor suspended below them. This gives a high freeboard.
 - (2) A canopy, which is erected automatically by an inflated arch tube.
 - (3) Water pockets, which are installed on the base, make the liferaft stable and control the drift subsequent to the launch.
 - (4) The liferaft is made from polyurethane-proofed Nylon fabric. The buoyancy chambers of the liferaft are black and the canopy is a high visibility colour.

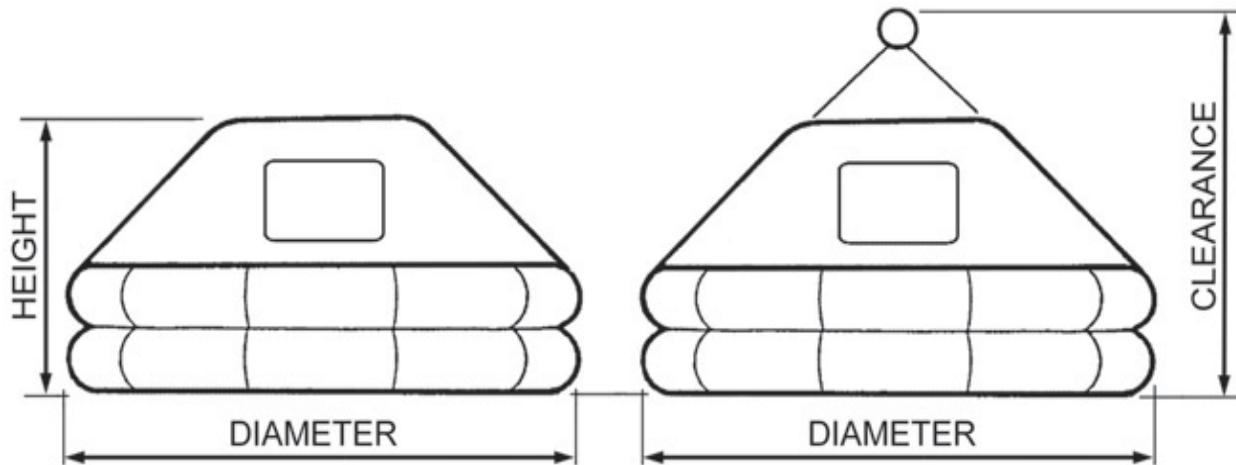
- E The liferaft has the internal and external equipment as follows, (FIGURE 101 or FIGURE 102):
- (1) Lifelines which are attached around the interior and exterior of the buoyancy tubes.
 - (2) A rescue line and quoit which are located inside the liferaft.
 - (3) Automatically deployed internal and external lights.
 - (4) Drogue (sea anchor).
(Automatically deployed on Throw Over liferafts).
(Manually deployed on Davit Launch liferafts).
 - (5) Survival equipment, which is contained in emergency pack valise(s), are stowed inside the liferaft.
 - (6) A righting ladder on the base used to right an upturned Liferaft.
 - (7) Boarding means by ladder or ramp.
 - (8) Rainwater catchment device on canopy exterior.
 - (9) Illustrations are given, (where possible), on the liferaft to show operation of the equipment.
 - (10) Immediate action leaflets are provided in English and appropriate foreign language.
 - (11) Lifting Bridle. (Only on Davit Launch liferafts).



SOLAS Style Davit Launch Liferaft
FIGURE 102

2. LIFERAFT: Nominal Dimensions (mm):

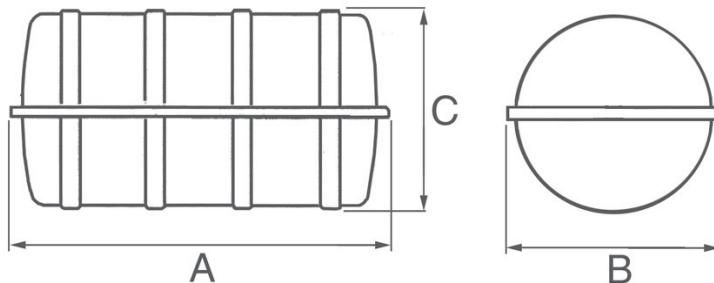
RATED CAPACITY	LIFERAFT DIMENSIONS		
	THROW OVER		DAVIT LAUNCH
	Nominal Dimensions (mm)	Diameter	Height
6	2400	1120	
8	2740	1230	
10	2900	1460	
12	2900	1460	
16	3310	1600	
20	3710	1680	
25	4110	1900	



3. CYLINDRICAL CONTAINERS:

(a) F&G Range

Nominal Dimensions (mm) TO and DL and E-PACK weights



	All measurements in MM		
Container type	A	B	C
4N	1050	610	580
6/8F	1244	650	580
10/12F	1304	680	610
16/20F	1354	710	640
25G	1400	780	710

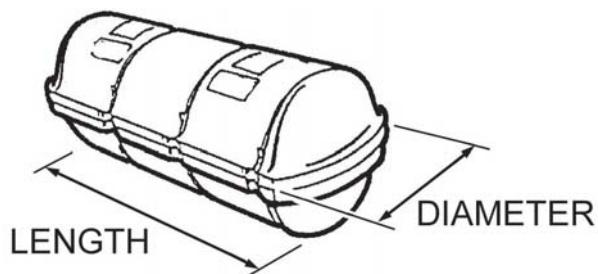
Raft size	Container size	THROW OVER		DAVIT LAUNCH	
		A-Pack (Kg)	B-Pack (Kg)	A-Pack (Kg)	B-Pack (Kg)
6	6/8F	85			
	4N		61		
8	6/8F	90			
	4N		62		
10	10/12F	115.3			
	6/8F		95		
12	10/12F	119.3		124.3	103.2
	6/8F		95		
16	16/20F	147.4		151.9	
	10/12F		112.3		118.3
20	25G	161.4		174.4	
	10/12F		119.3		
	16/20F				144.9
25	25G	177.4		184.4	
	16/20F		137.9		144.9

- (b) MK10 & 14 Range
Nominal Dimensions (mm) TO and DL

MK10 CONTAINER DIMENSIONS THROW OVER RAFTS						
RATED CAPACITY	MK 10 CONTAINER SOLAS A pack			MK 10 CONTAINER SOLAS B pack		
	Length mm	Diameter mm	Operational Weight Kg	Length mm	Diameter mm	Operational Weight Kg
6	1260	485	74			
8	1260	485	79			
10				1260	485	84
12				1260	485	84

MK14 CONTAINER DIMENSIONS THROW OVER RAFTS						
RATED CAPACITY	MK 14 CONTAINER SOLAS A pack			MK 14 CONTAINER SOLAS B pack		
	Length mm	Diameter mm	Operational Weight Kg	Length mm	Diameter mm	Operational Weight Kg
16	1156	584	137			
20	1273	685	161			
25	1273	685	177	1273	685	127

MK14 CONTAINER DIMENSIONS DAVIT LAUNCH RAFTS						
16	1273	685	141			
20	1273	685	174	1273	685	134
25	1273	685	184	1273	685	134



4. Inflation system and Gas charges :

Liferaft Working Pressure	2.8 Psi
.....	77.5 in WG
.....	1970mm WG

THROW OVER RAFTS		
RATED CAPACITY	INFLATION SYSTEM and GAS CHARGES	
	Kg Cylinder CO ₂	Kg Cylinder N ₂
6	2.50	0.16
8	3.51	0.23
10	5.94	0.18
12	5.94	0.18
16	8.44	0.37
20	8.44	0.37
25	11.26	0.36

DAVIT LAUNCH RAFTS		
RATED CAPACITY	INFLATION SYSTEM and GAS CHARGES	
	Kg Cylinder CO ₂	Kg Cylinder N ₂
12	5.94	0.18
16	8.44	0.37
20	11.26	0.36
25	11.26	0.36

5. Period to Overhaul

Liferafts 12 months

Inflation System See Associated Publications
at the front of this manual

6. Torque wrench settings:

ITEM (USAGE)	VALUE		Special tool required
	Nm	(lb ft)	
Valve, Topping-up, A8	16	11.8	No
Hose, Inflation (cylinders to raft)	20.3	15	No
Banjo bolt, inflation	23	17	No
Valve nut, inflation valve MKIII	30	22.1	No
Vave pressure relief, Thanner OTS65	27	19.9	Yes
Head, operating, DK99	50	37	No

LEAFIELD INFLATION SYSTEM	Nm	(lb ft)	
M24 nut (inlet check valve)	30	22.1	Yes
M16 connector (inlet check valve)	9	6.6	No
Cylinder valve/gas cylinder:	200	147.5	No
Cylinder valve/hose	12.2	9	No
Break stem seal assy./valve body	40	29.5	Yes
Torque drive assy./valve body	4	2.95	Yes
Operating head/cylinder valve	1.12	0.83	No
A10 pressure relief valve (inner)	27	19.8	Yes

Torque settings
TABLE 101

Power unit activation cord lengths

RATED CAPACITY	Cut length (mm)	Tie length (mm)
6 TO	450	250
8 TO	450	250
10 TO	900	700
12 TO	900	700
16 TO	1000	800
20 TO	1200	1000
25 TO & DL	1300	1100

Powerunit activation cord lengths
TABLE 102

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7. Installation notes:

CAUTION: USE ONLY GENUINE DSB PARTS FOR INSTALLATIONS.

A When more detailed instructions are necessary, refer to DSB Customer Service Department.

(1) Stowage positions

- (a) Stow the liferafts in a position which will make sure they will be serviceable when necessary. Make sure they can be easily launched (manually) or can float-free from a sinking ship.

NOTE: The liferafts must be stowed away from the propellers, side thrust apertures and stabilisers. The stow position must not prevent the operation of a survival craft or rescue boat at any other launching station.

In cases where Davit Launch liferafts are to be fitted they should be positioned at least 9m forward of the ships propellers.

(2) Protection of stowed liferafts

- (a) Stow the liferafts in a position which will give the maximum possible protection from fire, smoke, vibration, funnel deposits, sparks, oil, heat, explosion, flooding and weather.
- (b) In conditions when ice is present, stow the liferafts in protected positions (adjacent to casings) so that they will not be frozen over.
- (c) Do not stow the liferafts in positions where they can be in a pool of water.
- (d) Do not let the liferafts touch any material that has copper or copper compounds.
- (e) When using a power hose to wash the ship's deck and liferaft installation, do not point the hose directly at the liferaft container.

(3) In deciding on the stowage position of the liferafts, particularly in small vessels, consideration should be given to the possible effect on the ship's compass of any ferrous metal in the liferaft or its stowage arrangements. Under these conditions, liferafts and their stowage should, if necessary, be regarded as fixed magnetic material.

(4) Secure the painters

The end of the painter on every liferaft should be secured to a suitable strong point, so that on being launched the liferaft is held to the vessel. The securing arrangement for the painter will normally include a float free arrangement, such as a hydrostatic release unit, (HRU). Where a HRU is fitted the painter line should be attached only to the HRU weak link.

WARNING: IT SHOULD BE IMPRESSED UPON ALL MEMBERS OF THE CREW THAT, IF FOR ANY REASON A LIFERAFT PAINTER HAS TO BE UNFASTENED BEFORE A LIFERAFT IS LAUNCHED, THEN IT SHOULD BE MADE FAST AGAIN TO SOME OTHER SUITABLE STRONG POINT BEFORE LAUNCHING TAKES PLACE.

(5) Height of stowage above the waterline.

- (a) The liferafts should be stowed as close to the waterline as is safe and practical.

NOTE: The painter line of the liferaft is at minimum 10 metres more than the installation height as listed on the exterior of the container.

- (b) Make sure the liferaft is approved to be dropped from the height of its stowage point.

(6) Installation and removal of liferafts

- (a) Be very careful when installing or removing the liferafts at their stowage positions. The glass-reinforced plastic (the container) can be damaged and subsequently, the liferaft. They must not be rolled or dropped during removal/installation.

(7) Stowage of liferafts in rigid containers

NOTE: Liferafts are usually packed in rigid *containers* with no other protection.

- (a) Install the *container* the correct way up with the drainage apertures at the bottom. Keep the drainage apertures clear of obstructions such as the launching cradle support structure.

NOTE: Each cradle must be of the correct dimensions for the type of container installed. The rack must be attached to the ship's structure.

- (8) Attachment of stowed liferafts
 - (a) Make sure the liferaft can be released easily when a manual launch is necessary or for float-free operation (refer to Step 10).
 - (b) Make sure the mechanism which holds the liferaft on the rack can be removed easily in an emergency:
A slip-link (Senhouse slip) or other release mechanism which can be operated by a single swift action should be provided.
 - (9) Ramp Stowage
 - (a) On passenger ships which have a large number of inflatable liferafts installed, the liferafts must be stowed away from the lifeboat positions along the ship's side.
 - (b) The liferafts should be installed on vertical racks or racks that slope outboard to the sea. If the liferafts are installed in this way, make sure each liferaft can be released independently and that the float-free attachment is satisfactory (refer to Step 10).
 - (10) Float-free attachment (hydrostatic release)
 - (a) A float-free launch is operated by a mechanism which inflates and releases the liferaft automatically from a ship that is sinking.
- NOTE: The hydrostatic release must be installed as per manufacturer's instructions.
- NOTE: If the hydrostatic release is a type which requires servicing, it must be serviced by an approved servicing station. The service station must record the date of servicing on the data plate attached to the unit.
- NOTE: If the hydrostatic release is a type that must be discarded (lifed item) it must be identified with the date of expiry and must be replaced by that date. They usually have an operational life which does not include a servicing period.

- (b) A weak-link must be installed in the hydrostatic system to make sure a liferaft is not pulled under the water by a sinking ship. The weak-link in the system must have a breaking strength of 1.8 - 2.6 kN to pull the painter from the liferaft container and activate its inflation system.
- (c) If it is necessary to launch the liferaft manually, make sure the painter line is attached to a strong point on the ship. The strong point must be sufficient to support the pull of the painter line to operate the inflation system.
- (d) A slip link, lashed to the holding down straps, should be provided between the hydrostatic release and the straps. This will enable manual quick release for the liferaft.

B. Coordination; Cradle and hydrostatic release unit

Mounting the container (FIGURE 103)

1. With restraint strap and senhouse slip only

WARNING: RAFTS WITHOUT HYDROSTATIC RELEASE UNIT ATTACHED, ARE FOR TRANSPORT PURPOSES ONLY. A HRU MUST BE FITTED WHEN INSTALLING ON THE VESSEL.

- (a) Put the container into the proper cradle, (TABLE 103).
- (b) Place the restraint strap over the container and open the hook of the tensioner screw as far as possible.
- (c) Place the hook of the tensioner screw into the hole on the cradle. Fasten the slip hook on the cradle.
- (d) Tighten the tensioner screw to ensure a firm lashing on the container.

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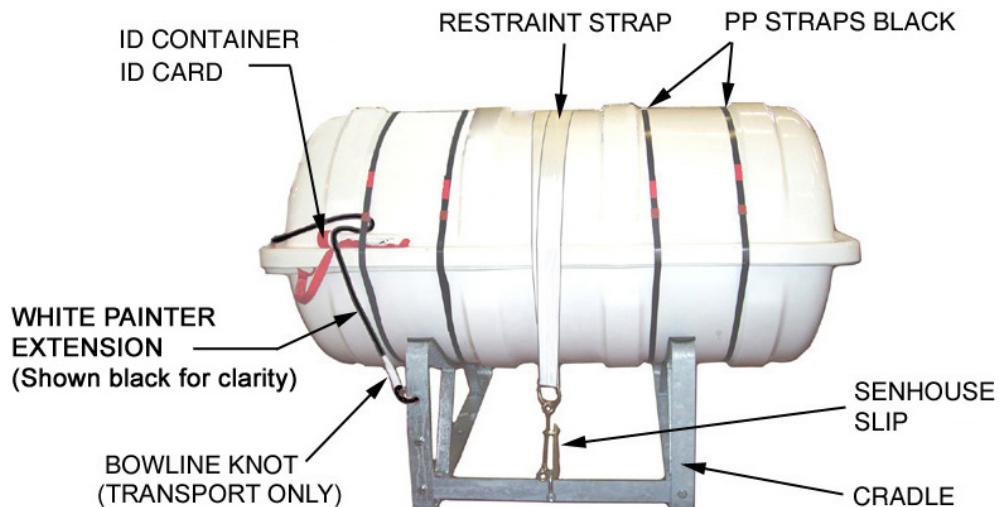
Container	Cradle type	Cradle galvanised Part Num.	Restraint strap Part Num.
4N	6/8	00725400	80303840
MK10 Sz4 or 6/8F	6/8		
10/12F	10/12	00725490	
MK14 Sz17 or 16/20F	16/20	00725410	80303850
MK14 Sz17 or 25G	25	00725420	

Cradles and restraint straps
TABLE 103

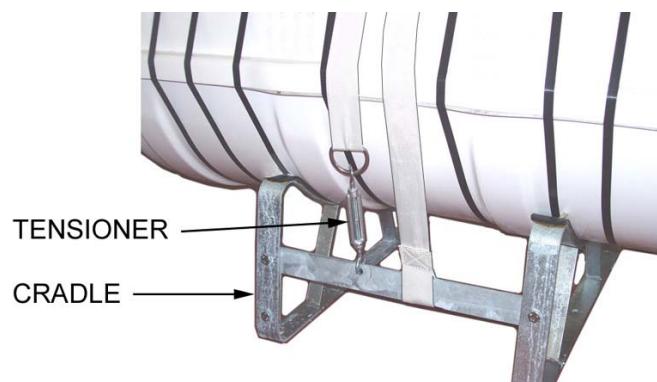
Description	QTY (mm)	Where used
Cord	2000	Painter extension cord

Painter extension cord
TABLE 104

- (e) Obtain the painter extension cord, (TABLE 104).
- (f) Using the loop of the painter, created at the container end, insert the painter extension cord through it.
- (g) Measure 300 mm from this end of the painter extension line. Form a loop using a bowline knot and tail to be 100 mm (+/- 50 mm), (FIGURE 9). Tape the flying end with 25 mm self adhesive tape.
- (h) Attach the remaining end of the painter extension line to the cradle. Use a bowline knot and tape the flying end. This will be temporary, for transport purposes only.



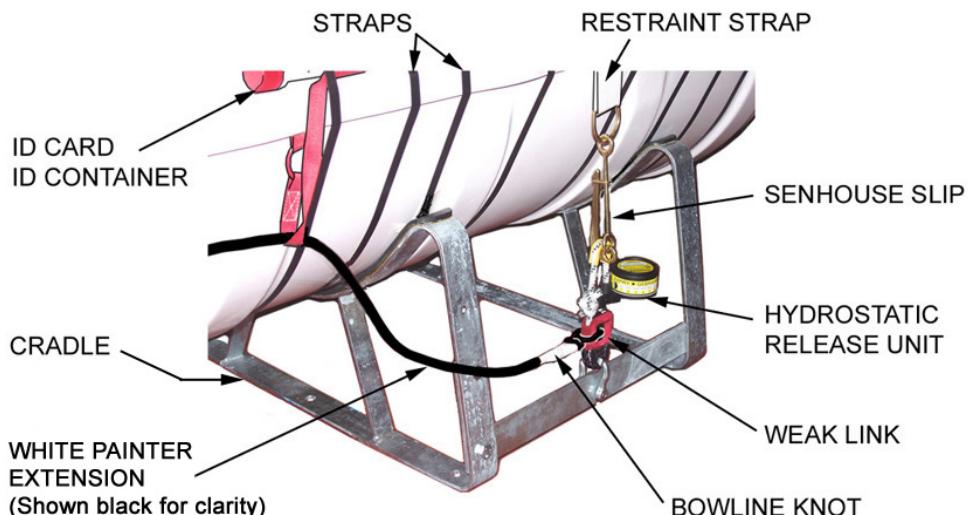
Front view without hydrostatic release unit (transport only)
Cradle with restraint strap and senhouse slip
FIGURE 103



Rear view of all container types
Cradle with restraint strap and tensioner
FIGURE 104

**2. With restraint strap and hydrostatic release unit,
(FIGURES 104/105)**

- (a) Put the container with restraint strap and hydrostatic release unit into the proper cradle.
- (b) Place the restraint strap over the container and open the hooks of tensioner screw as far as possible.
- (c) Place one hook of the tensioner screw into the hole on the cradle and the other hook into the D-ring of the restraint strap.
- (d) Lead the slip hook through the eye of the hydrostatic release unit and fasten, then tighten tensioner screw until the container is firmly restrained.
- (e) Obtain the painter extension cord, (TABLE 104).
- (f) Using the loop of the painter, created at the container end, insert the painter extension cord through it.
- (g) Measure 300 mm from this end of the painter extension line. Form a loop using a bowline knot and tail to be 100 mm (+/- 50 mm), (FIGURE 9). Tape the flying end with 25 mm self adhesive tape.
- (h) Attach the remaining end of the painter extension line to the weak link on the HRU. Use a bowline knot and tape the flying end.



**Front view of container with
Cradle, restraint strap and hydrostatic release unit**
FIGURE 105

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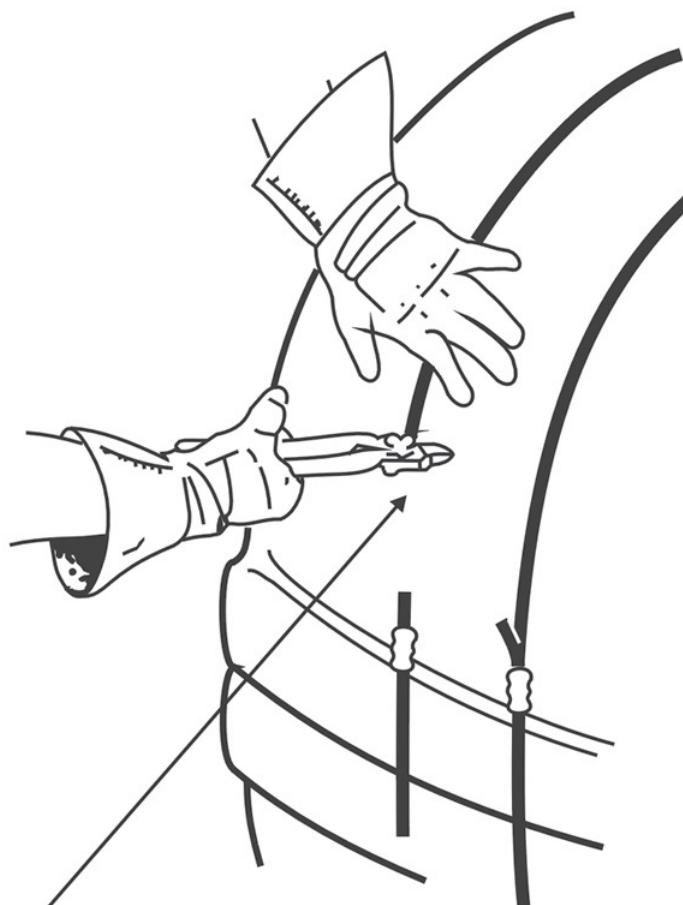
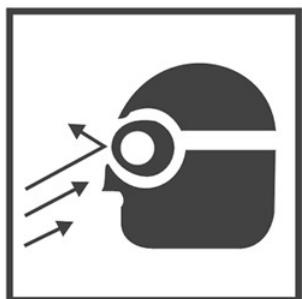
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CHAPTER 2

REMOVAL AND UNPACKING

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2 Removal/Date of Manufacture	204
3 Unpacking procedure	204
A. Container and Liferaft	204
B. Gas inflation system	205

WEAR EYE, FACE AND HAND PROTECTION

CUT CAREFULLY

**Safety procedure
FIGURE 201**

CHAPTER 2

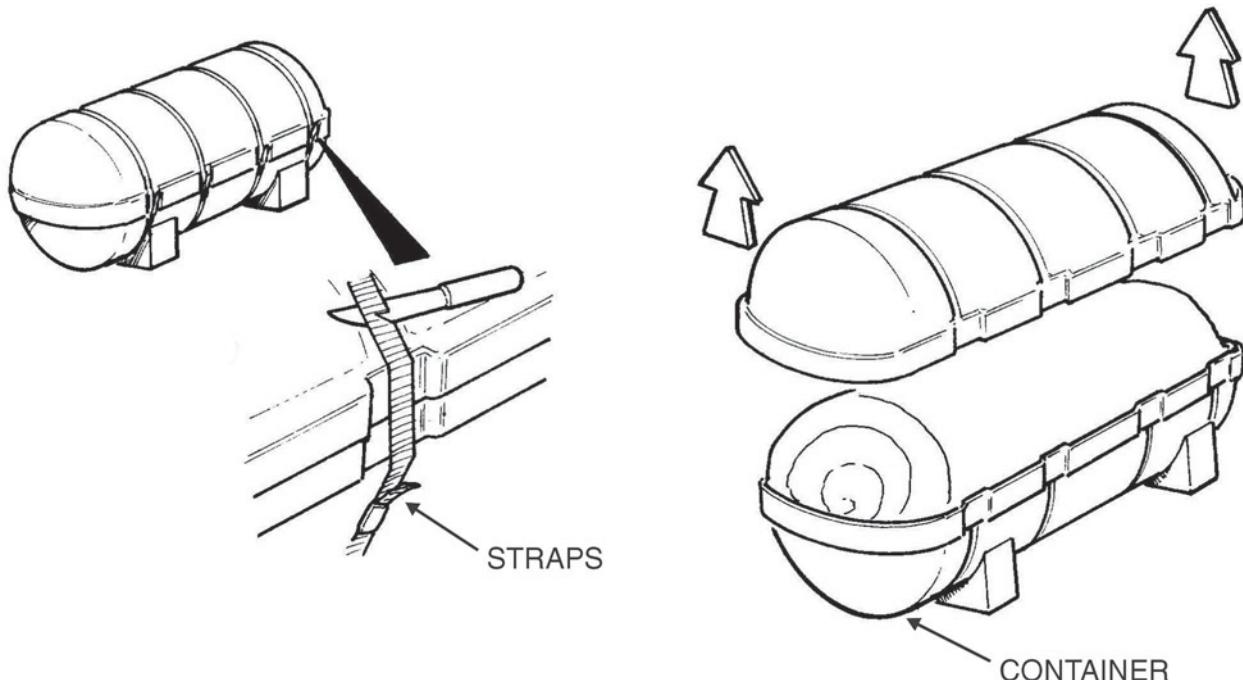
REMOVAL AND UNPACKING

1 Safety Procedures

- A Make sure the work area is clean and the lighting is sufficient.
- B Use the following procedure if cutting container straps:

WARNING: PUT ON FACE PROTECTION EQUIPMENT SUCH AS GOGGLES OR A FACE SHIELD AND GLOVES WHEN CUTTING THE STRAP AROUND THE CONTAINER. THE STRAP CAN CAUSE INJURY TO FACE AND HANDS WHEN CUTTING IT.

- (1) Make sure personnel are at a safe distance from the container when cutting the strap.
- (2) Stand to one side of each strap when cutting it.
- (3) Hold the strap against the container before cutting it.
- (4) Cut each strap between the seal and the position where the strap is held, (FIGURE 202).



**Container and Liferaft
FIGURE 202**

2 Removal/Date of Manufacture

- A Remove the liferaft containers from the ship, 12 months from the date of manufacture and subsequently at 12 month periods. Send them to an approved service station for inspection, testing and repair (if necessary).
- B Check the date of manufacture and servicing period of the gas inflation system. Refer to Chapter 5 for the test procedure. If a test is not necessary, continue this procedure at Step 3.

3 Unpacking Procedure

A Container and liferaft (FIGURE 202).

- (1) Put the container onto a suitable trolley or cradle. Make sure it is held securely with the top uppermost. Position the trolley so that the container is next to the packing table.
- WARNING:** OBEY THE SAFETY PROCEDURES IN STEP 1.
- (2) First inspect the container. Examine for any damage, such as splinters etc. Remove any foreign bodies if possible before unpacking.
- (3) Cut the black plastic closing strap.

NOTE: Davit launch only: Do not damage the black tear strip which will be re-used when re-packing the liferaft.

- (4) Cut the straps which hold each half of the container together as given in the safety procedure (Refer Step 1 & FIGURE 202).
Cut the straps of the container at the end grooves first and then the centre grooves, (FIGURE 202).
- (5) Remove the moulded rubber grommet seal or foam block from the top half of the container. This will prevent the painter line from firing the liferaft as the top is lifted off.
- (6) CAREFULLY lift off the top part of the container, (FIGURE 202).
- (7) CAREFULLY remove the polythene sheet covering the packed liferaft.

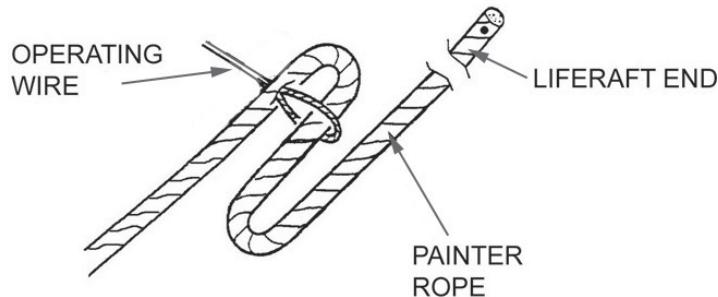
NOTE: Davit launch only: Unbuckle the two, 40 mm wide fabric straps. Both straps will be used for re-packing.

B Gas inflation system (FIGURE 203).

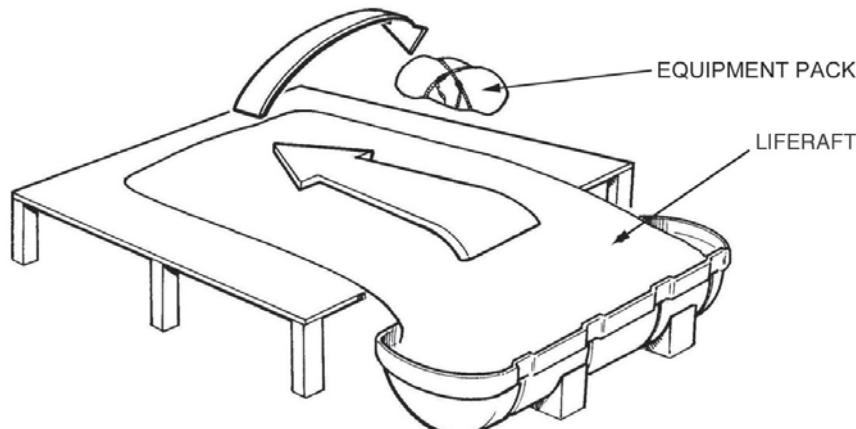
- (1) Locate the painter patch. Untie the painter line from the painter patch.
- (2) Detach the painter line from the towing bridle.
- (3) CAREFULLY remove the liferaft until the operating head is exposed.

WARNING: TAKE CARE WITH THE NEXT STEP OR LIFERAFT COULD INFLATE UNINTENTIONALLY.

- (4) Exercising due caution, CAREFULLY untape the painter line from the operating head actuation cable. Untie the painter line and pass it back through the actuation cable, then gently remove the painter line, (FIGURE 203). Bend the actuation cable back against the operating head and tape into place. This prevents accidental deployment.



**Gas inflation system
FIGURE 203**

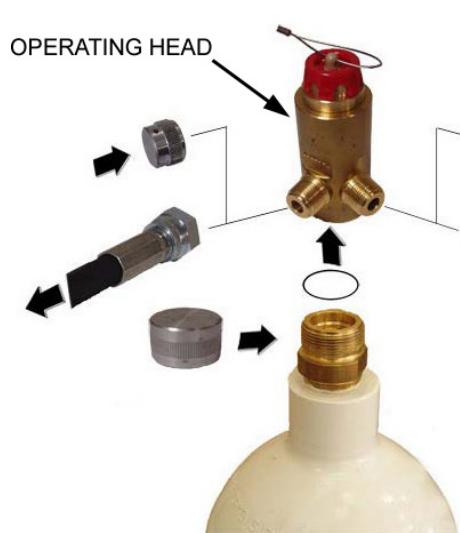


**Liferaft and Equipment pack
FIGURE 204**

- (5) Lift the bulk of the liferaft out of the container and onto the packing table, (FIGURE 204).
- (6) Unroll the liferaft completely. Fold the liferaft buoyancies and canopy out of the way, (FIGURE 204).
- (7) Remove the equipment pack(s) and set them aside, (FIGURE 204).
- (8) Check to ensure that the liferaft and container are dry.
- (9) Detach the hoses from the operating head/cylinder assembly. Fit two caps on the operating head immediately, (FIGURE 205).
 - (a) On a Thanner operating head, install the cylinder caps, (FIGURE 205a).
 - (b) On a Leafield operating head, install the cylinder caps, (FIGURE 205b).
- (10) Fit dust caps onto the ends of the inflation hoses, (FIGURE 206).

NOTE: Hold the gas cylinder in a vice or safe clamping mechanism when installing or removing an operating head.

- (11) Carefully remove the operating head/cylinder assembly from the liferaft. For a Leafield operating head, two 3mm Hex bolts must be removed.
- (12) Carefully remove the operating head from the cylinder, (FIGURE 205).
- (13) Untie the holding cord and remove the paddles from the liferaft.
- (14) Disconnect the power unit “activation cords” from the attachment patch on the floor. Keep the pins in their switch blocks.



(a) Thanner inflation system



(b) Leafield inflation system

Operating head removal
FIGURE 205



Fitting dust caps
FIGURE 206

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CHAPTER 3

CLEANING

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CHAPTER 3

CLEANING

1 General

CAUTION: DO NOT USE ANY SOLVENTS, OTHER THAN THOSE GIVEN IN TABLE 301. DAMAGE CAN BE CAUSED TO THE FABRIC.

ITEM	DESCRIPTION	APPLICATION
1	Toluene or Petroleum rubber solvent	To clean proofed fabrics
2	Hard soap (NOT detergent)	To wash the liferaft
3	Lint-free cloth (clean and dry)	To dry the liferaft
4	Sodium Hypochlorite (25 parts water, 1 part 14%-15% solution)	Anti mould treatment

**Cleaning Solvents and Materials
TABLE 301**

2 Procedure

WARNING: DO NOT USE THE SOLVENTS NEAR A FLAME OR OTHER SOURCE OF IGNITION. THE SOLVENT IS FLAMMABLE.

WARNING: USE A BARRIER CREAM ON HANDS AND WASH THEM AFTER USING SOLVENTS. THE SOLVENT IS DANGEROUS AND CAN CAUSE DAMAGE TO SKIN. REFER TO THE MANUFACTURER'S SAFETY DATA SHEET.

WARNING: USE THE SOLVENT IN AN AREA THAT HAS GOOD AIR FLOW. AVOID BREATHING VAPOUR FROM THE SOLVENT AND AVOID CONTACT WITH THE EYES. THE SOLVENT IS DANGEROUS AND CAN CAUSE DAMAGE TO PERSONNEL. REFER TO THE MANUFACTURER'S DATA SHEET.

A Liferaft

CAUTION: DO NOT LET PUDDLES OF CLEANING SOLUTION STAY ON THE LIFERAFT. TOO MUCH SOLVENT CAN CAUSE DAMAGE.

- (1) Wash the liferaft with a solution of hard soap and water.
- (2) Dry the liferaft with a clean, lint-free cloth.
- (3) Use toluene or petroleum rubber solvent to remove any oil or similar substance. Wash and dry the area as given in steps A1 and A2 above.

B Rigid container (anti-mould treatment)

- (1) Wash the container outer surfaces with a solution of hard soap and water.
- (2) Perform the following anti-mould treatment on all rigid containers, at the normal overhaul period of the liferaft and on all containers that have been in damp storage conditions:
 - (a) Use a solution of hard soap and water to clean the inside of the container.
 - (b) Mix a solution of Sodium Hypochlorite, (25 parts water to 1 part of 14% to 15% solution).
 - (c) Use a sponge to apply the solution evenly over the inner surface of the container.
 - (d) Let all surfaces dry before packing the liferafts into the container.

CHAPTER 4

INSPECTION AND CHECKING

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DSB

LR05

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Deutsche Schlauchboot
D-37632 Eschershausen
Germany

Service Manual SOLAS
LR05 6-25 Persons
Part No. : 08196009

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CHAPTER 4

INSPECTION AND CHECKING

1 General

A Using the intervals specified in Chapter 5, inspect the liferaft as follows to make sure:

- (1) The inflatable chambers maintain the specified pressure.
- (2) The inflation system functions efficiently. Refer to Chapter 5, Section 3 for test procedures.
- (3) All the components and equipment are maintained in a serviceable condition.

B Fabric components

- (1) Inspect all fabric components for:
 - (a) Slits, tears, apertures or abrasion.
 - (b) Proofing removal.
 - (c) Deterioration.
 - (d) Adhesion of seams and components.
 - (e) Separation of seam welds.
 - (f) Broken or worn stitching.
 - (g) Instructions and labels (make sure all of the pictograms are legible).
 - (h) Unwanted bonds between fabrics.

C Metal and plastic components

- (1) Examine for:
 - (a) Cleanliness.
 - (b) Cracks.
 - (c) Distortion.
 - (d) Scoring and burrs.
 - (e) Damaged threads.
 - (f) Frayed cables.
 - (g) Corrosion.

D Webbing, ropes, cordage and ‘Velcro’ strips

(1) Check for:

- (a) Damage and fraying.
- (b) Discolouration and deterioration (including any material in contact with them).
- (c) Incomplete bonds to fabric.
- (d) Broken or worn stitching.

E MED (Marine Equipment Directive) Marking

(1) Introduction

Service Station personnel must check that the Ship's wheel label, as required when a product is approved in accordance with the Marine Equipment Directive, is fitted to the product, is marked correctly and is legible.

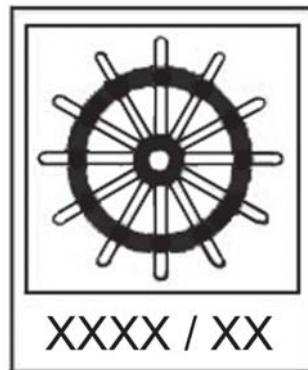
- (2) Whenever the equipment is being serviced, the Marine Equipment Directive labelling and data labels are to be checked for legibility, for correct information and for secure attachment.
- (3) The Ship's Wheel mark label must be completed as shown (FIGURE 401). The first four digits, denote the product's Notified Body.

The second set of digits are the reference to the date of original manufacture of that particular assembly/date the label was attached to the product, e.g. for an LR05 originally assembled in 2005, the last two digits would be 05.

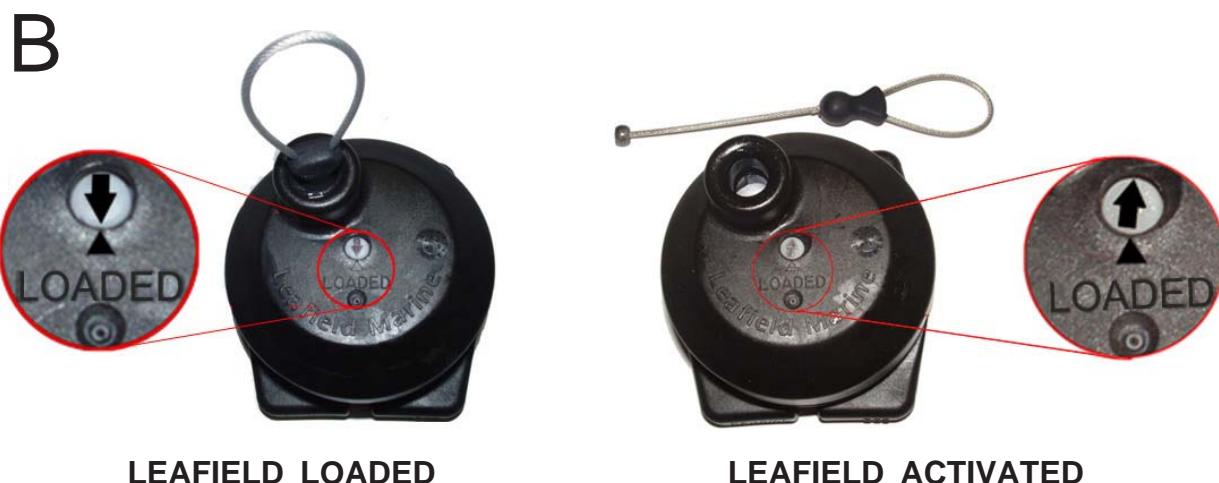
NOTE: These digits are not to be updated at subsequent services.

- (4) The MED labels are located in the following positions on the LR05 product:
 - ID label at doorway entrance
 - outside surface of container
- (5) If a label has become damaged or illegible, replace it with a new label containing the original information or request a replacement from DSB.
- (6) If a label is to be updated, use an indelible marker pen.

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MED marking label
FIGURE 401



Operating heads - actuation
FIGURE 402

2 Detail

A Gas inflation system:

NOTE: Refer to the manufacturer's manual listed at the front of this manual, in Associated Publications section.

WARNING: A GAS CYLINDER CAN BE A LETHAL PROJECTILE IF IT DISCHARGES TO ATMOSPHERE. ALWAYS ATTACH A RECOIL CAP TO THE GAS OUTLET WHEN HANDLING A FULLY CHARGED CYLINDER. HOLD THE CYLINDER IN A VICE OR SAFE CLAMPING DEVICE WHEN ATTACHING OR REMOVING AN OPERATING HEAD.

WARNING: OPERATING HEADS MUST NOT BE CHECKED UNTIL THEY HAVE BEEN REMOVED FROM THEIR CYLINDERS.

- (1) Operating heads are 'single-shot' devices. It is therefore essential that they are removed from the cylinders when testing.
- (2) **Thanner operating head**
If the tab, on the red safety cap (FIGURE 402A), is broken or missing this indicates that the head may have been actuated.
If the tab is not broken, the head has not been actuated.

Leafield operating head

If the loaded indicator is not aligned with the arrow or the actuator cable is removed, this indicates that the head may have been actuated (FIGURE 402B).

- (3) When the operating head is removed from its cylinder, pull the operating wire. The mechanism of the operating head must act immediately.

On a Thanner operating head:

- (a) The wire loop will separate completely from the operating head.
- (b) The central shaft inside the operating head will move rapidly downwards.
- (c) The plastic tab on the safety cap will break.

On a Leafield operating head:

WARNING: THE OPERATING HEAD IS INTENDED AS A SEALED FOR LIFE UNIT AND MUST NOT BE DISASSEMBLED. IT MUST NOT BE CLEANED WITH SOLVENTS, SOAPS OR CHEMICAL CLEANING AGENTS. THESE MAY DEGRADE SYSTEM COMPONENTS AND CAUSE A MALFUNCTION.

- (a) The wire loop will separate completely from the operating head.
- (b) The gear mechanism on the bottom of the head will rotate.
- (c) The indicator arrow will rotate to display that the device is no longer loaded.

- (4) It is now necessary to service and reset the operating heads. The procedure used to service operating heads is given in the manufacturer's manual listed in the Associated Publications Section of this manual.
- (5) Compare the weight of the cleaned cylinders against the weight printed on the cylinder label. Cylinders are to be weighed without the transit cap.
- (6) The tolerance for the full weight is +0 g to -56 g. Record the actual weight on the log card if fitted and the packing certificate.
A cylinder found to be outside the acceptable tolerance must be inspected and recharged.
- (7) Make sure the siphon tube inside the cylinder is still serviceable. Shake the cylinder. If the tube is still flexible, it will strike the wall of the cylinder with a ringing sound. If there is a noticeable delay before the sound is heard, the tube has stiffened, and is no longer serviceable. You must therefore reject the cylinder.

CAUTION: ALWAYS USE CO₂ TO SPECIFICATION BS4105, TYPE 1, AND N₂ TO SPECIFICATION BS4366, TYPE 1, WHEN RECHARGING A GAS CYLINDER.

- (8) If a cylinder needs to be recharged, you must charge the correct quantities of gases (as specified in Chapter 1, Inflation System and Gas Charges section).
- (9) Find the date of the last hydraulic pressure test. The cylinder will require a re-test five years after this date.

- (10) The external condition of the cylinder must be checked in accordance with local standard. This standard gives the limits for surface damage. If the damage is more than the limits, reject the cylinder. The standard gives the following conditions for rejection and destruction of a cylinder:
- (a) Visible swelling of a cylinder.
 - (b) A dent which is deeper than 2 mm.
 - (c) A dent which has a diameter of less than 30 times its depth.
 - (d) A cut or gouge which is more than 2% of the cylinder's length.
 - (e) A cut or gouge which is deeper than 5% of the cylinder's wall thickness.
 - (f) A crack in the metal.
 - (g) Any delamination of the metal.
 - (h) The wear of the base end of the cylinder has reduced the thickness to less than 75% of the original.
 - (i) Heat damage has caused burning of the metal or distortion of the cylinder.
 - (j) Stamp marks have been made by a metal punch on the parallel section of the cylinder.
 - (k) Stamp marks are illegible.
- (11) Cylinders that have been submerged in water, i.e. those attached to liferafts that have been used in an actual emergency, must be returned to the cylinder manufacturer (or an approved agent) for reconditioning and re-test before reuse.
- (12) Examine hoses, inlet valves and top-up valves for visual defects. Make sure all components are correctly attached.

B Light unit and Power unit assembly**RL1/RL4/RB2 lighting system**

- (1) Check the outer light / flasher unit. Make sure the leads and connections have no signs of damage or deterioration.

NOTE: The flasher unit is not a serviceable item.

- (2) Use a circuit with a 3 volt supply, to test the light for operation.
- (3) If the inner light unit is unserviceable, replace the light as necessary:
- (a) Replace the filament.
- (b) If a sealed light unit is installed, replace the light assembly.
- (4) Examine the power unit for damage. If the power unit is emitting an odour, it is possible that the unit is damaged, (refer to Step 8).
- (5) Check the expiry date on the power unit. If the expiry date will be reached before the next scheduled service, replace the power unit.
- (6) Make sure the power units are stored at a temperature below 35°C.
- (7) Check the power unit for satisfactory operation as follows:
- (a) Make sure the operating pin is pushed fully into its socket.
- (b) Use a 0-10V Voltmeter (connected in parallel with a 15 ohm resistor) to measure the output of the battery. Remove the operating pin. The Voltmeter indication of the battery output must be between 2.7 and 3.0 volts.

NOTE: Lithium/sulphur dioxide cells have very high discharge rates. It is necessary to install a fuse to put a limit on the current output from the cell and the circuit wiring.

- (c) Install the operating pin again and check that the voltmeter reading is 0 (zero) volts. Make sure the operating pin retainer holds the pin in its socket.
- (d) Disconnect the voltmeter.

WARNING:

KEEP THE POWER UNIT AWAY FROM ANY SOURCE OF IGNITION. DO NOT HEAT THE POWER UNIT ABOVE 50 °C OR BURN IT. THE CONTENTS OF THE POWER UNIT ARE FLAMMABLE. REFER TO THE MANUFACTURER'S DATA SHEET.

WARNING:

DO NOT OPEN, CRUSH OR PUNCTURE THE POWER UNIT. THE CONTENTS OF THE POWER UNIT ARE TOXIC AND CORROSIVE. REFER TO THE MANUFACTURER'S DATA SHEET.

WARNING:

IF THE CHEMICALS FROM THE POWER UNIT BATTERIES TOUCH SKIN, CLOTHING OR EQUIPMENT, WASH THEM WITH LARGE QUANTITIES OF COLD WATER. REFER TO THE MANUFACTURER'S DATA SHEET.

NOTE:

The power unit cannot be recharged. When the life of the power unit is expired, reject it and fit a replacement.

- (8) If the power unit is damaged, or is emitting an odour, remove it as follows:

WARNING:

PUT ON PROTECTIVE CLOTHING AND EQUIPMENT TO COVER EYES, HANDS AND BODY. THE CONTENTS OF THE POWER UNIT CAN CAUSE INJURY. REFER TO THE MANUFACTURER'S DATA SHEET.

NOTE:

Make sure there is good air flow in the work area.

- (a) Put the defective unit in a cool area. Let it stand for approximately 24 hours. After this time the power unit should be odourless.
- (b) Insulate the electrical connections. Put the unit in a strong plastic bag or container to seal it from the atmosphere.
- (c) Discard the unit as given in the applicable regulations of the country.

RL5 lighting system

NOTE: The Internal and External lamp unit are not serviceable items. If either unit displays a fault, replace the unit.

- (1) Illuminate the Internal lamp using the switch marked 'internal' on the side of the internal lamp unit. (FIGURE 403). If the LED lamp on the internal lamp unit fails to illuminate, replace the unit.
- (2) Check the expiry date on the Internal lamp unit. If the expiry date will be reached before the next scheduled service, replace the unit.
- (3) Examine the battery compartment on the Internal lamp unit for damage. If it is emitting an odour, it is possible that the unit is damaged, (refer to Step 5).
- (4) Make sure the Internal lamp unit is stored at a temperature below 65°C.

WARNING: KEEP THE INTERNAL LAMP UNIT AWAY FROM ANY SOURCE OF IGNITION. DO NOT HEAT THE INTERNAL LAMP UNIT ABOVE 50 °C OR BURN IT. THE CONTENTS OF THE POWER UNIT ARE FLAMMABLE. REFER TO THE MANUFACTURER'S DATA SHEET.

WARNING: DO NOT OPEN, CRUSH OR PUNCTURE THE INTERNAL LAMP UNIT. THE CONTENTS OF THE BATTERY ARE TOXIC AND CORROSIVE. REFER TO THE MANUFACTURER'S DATA SHEET.

WARNING: IF THE CHEMICALS FROM THE INTERNAL LAMP UNIT BATTERY TOUCH SKIN, CLOTHING OR EQUIPMENT, WASH THEM WITH LARGE QUANTITIES OF COLD WATER. REFER TO THE MANUFACTURER'S DATA SHEET.

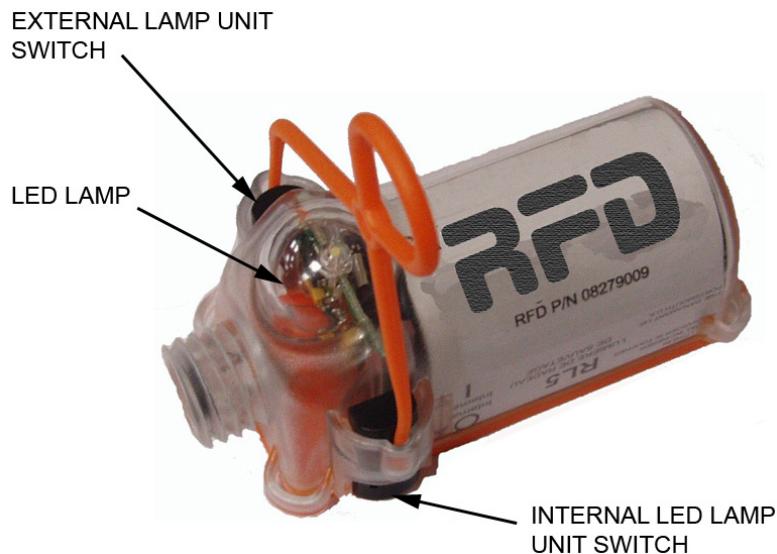
NOTE: The Internal lamp unit cannot be recharged. When the life of the battery is expired, reject the unit and fit a replacement.

- (5) If the Internal lamp unit is damaged, or is emitting an odour, remove it as follows:

WARNING: PUT ON PROTECTIVE CLOTHING AND EQUIPMENT TO COVER EYES, HANDS AND BODY. THE CONTENTS OF THE BATTERY CAN CAUSE INJURY. REFER TO THE MANUFACTURER'S DATA SHEET.

NOTE: Make sure there is good air flow in the work area.

- (a) Put the defective unit in a cool area. Let it stand for approximately 24 hours. After this time the power unit should be odourless.
 - (b) Insulate the electrical connections. Put the unit in a strong plastic bag or container to seal it from the atmosphere.
 - (c) Discard the unit as given in the applicable regulations of the country.
- (6) Check the External lamp unit. Make sure the leads and connections have no signs of damage or deterioration.
- (7) Illuminate the External lamp using the switch marked 'external' on the side of the Internal lamp unit, (FIGURE 403). If the LED lamp in the External lamp unit fails to illuminate, replace the unit.



**RL5 Internal lamp unit
FIGURE 403**

C Emergency pack (lifed items)

NOTE: Each of the items given below may not be supplied in some emergency packs. Refer to the contents label for the contents of the pack.

- (1) DSB recommend that any 'lifed' item that has less than 12 months life remaining, it MUST be replaced in the emergency pack.
- (2) Discard any stock which is out-of-date, as given in the applicable regulations of the country.
- (3) Check the pyrotechnics for general condition. Any pyrotechnics with dents, corrosion or other visible damage should be replaced.
- (4) Check the handbooks and leaflets. Make sure they are in good condition and legible.
- (5) Test the Whistle and Bellows. Make sure they function correctly and are not damaged. Ensure any adaptor required is fitted to the bellows and is suitable for the top up valve fitted.
- (6) Test the torch/flashlight and batteries. Make sure they function correctly and are not damaged.

NOTE: Check the expiry date on the torch batteries. If the expiry date will be reached before the next scheduled service, replace the batteries.

- (7) Check the first aid kit, bailers and paddles. Make sure they are not corroded or damaged. If necessary, replace any defective parts.
- (8) Examine the repair kit, for damage to the contents. If necessary, replace any damaged items.

NOTE: The repair kit items have a life of 3 years, but not the adhesive solution. The tube of solution has a storage life of 2 years (maximum) and must have a servicing life of more than 12 months when part of the repair kit.

- (9) Visually check water sachets for any signs of damage, squeeze sachets and check for leaks.
- (10) Ration packs are to be discarded if there is evidence of damage, defect or loss of vacuum which may affect the contents. Open a pack and check that the contents are fresh and fit for use.

- (11) Check can openers, heliographs, fishing kits and leak stoppers for condition, corrosion and damage. Renew as necessary.
- (12) Check the drogues. If damaged, replace. If not, re-pack (Please refer to Chapter 8).
- (13) Examine the capsules of anti-seasickness tablets for condition and damage. Renew as necessary.

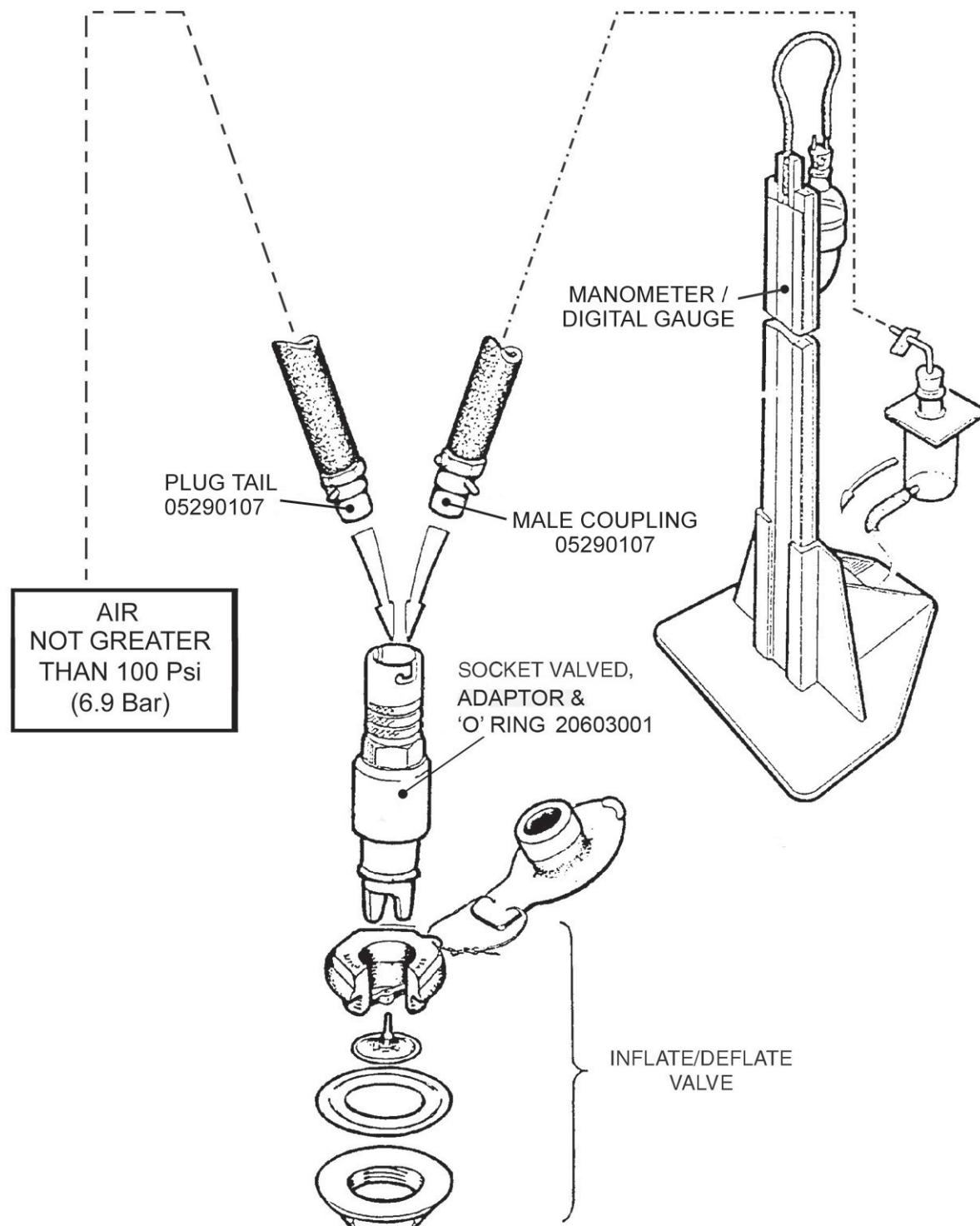
D Rigid Glass-Reinforced Plastic container

- (1) Examine the container as follows:
 - (a) Make sure the container is clean.
 - (b) Make sure there are no cracks. Minor gelcoat craze cracking is permitted.
 - (c) Examine the container for superficial and other damage.
 - (d) Check all the markings and the labels. Make sure they are legible.

CHAPTER 5

TESTING AND TROUBLESHOOTING

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**Test layout
FIGURE 501**

CHAPTER 5**TESTING AND TROUBLE SHOOTING****1 General**

- A The items described in CHAPTER 10 are necessary to test the liferaft. When not in use, keep the test equipment and all special tools in conditions that protect them from damage:

The liferaft shall be submitted to pressure and other physical tests according to its age as defined in TABLE 501 and as described in this chapter.

WP = Working Pressure test.
 B = Bridle Overload test. (DL's ONLY)
 GI = Gas Inflation test.
 FS = Floor seam test.
 NAP = Necessary Additional Pressure test.

Age in years from DoM	Test(s) required	Age in years from DoM	Test(s) required
1 and 3	WP	12 and 14	NAP, FS, B, WP
2 and 4	B, WP	15	GI, NAP, FS, WP
5	GI, WP	16 and 18	NAP, FS, B, WP
6 and 8	B, WP	17 and 19	NAP, FS, WP
7 and 9	WP	20	GI, NAP, FS, B, WP
10	GI, NAP, FS, B, WP	21 and 23	NAP, FS, WP
11 and 13	NAP, FS, WP	22 and 24	NAP, FS, B, WP

Liferaft test schedule
TABLE 501

NOTE:

Where, in years 5,10, 15 and 20, both the Gas inflation and Working pressure test are required, time may be saved by conducting the Gas inflation test first. If the test is satisfactory, continue with the Relief valve and Air holding tests required to complete the WP test. It is vital however that all CO₂ must be given time to evaporate.

Any part, whose operation which is critical to safety of life such as the lifting bridle, its attachment points on the liferaft or to the lifting ring, shall be replaced if any doubt exists as to its operating capability.

Non critical parts such as some minor pockets shall be repaired so as to make them fit for purpose. If doubt exists as to the repair required, contact DSB.

SURVEY RECORD			
LIFERAFT TYPE:		SERIAL No.:	
REPAIRS REQUIRED			
PART	DAMAGE	FORM of REPAIR	INSPECTED BY
UPPER BUOYANCY TUBE			
LOWER BUOYANCY TUBE			
FLOOR			
CANOPY SUPPORT TUBE			
INFLATION EQUIP.			
COMPONENTS			

INFLATION TEST RECORD					
LIFERAFT TYPE:		SERIAL No.:			
PACK LIFERAFTS WITHIN 48 HOURS OF TEST, UNLESS STORED UNDER APPROVED CONDITIONS. RE-TEST if not operationally packed within 30 days of test.					
Time/Date of Test	Manometer Reading	Thermometer Reading	Barometer Reading	Temp/Pres Variation	Corrected Pressure

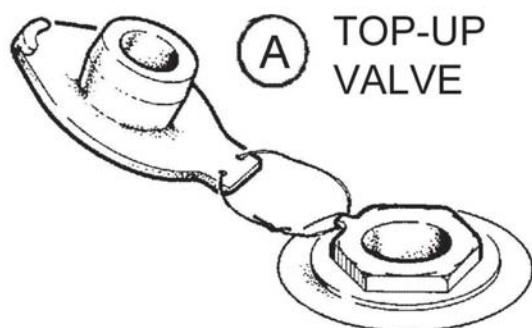
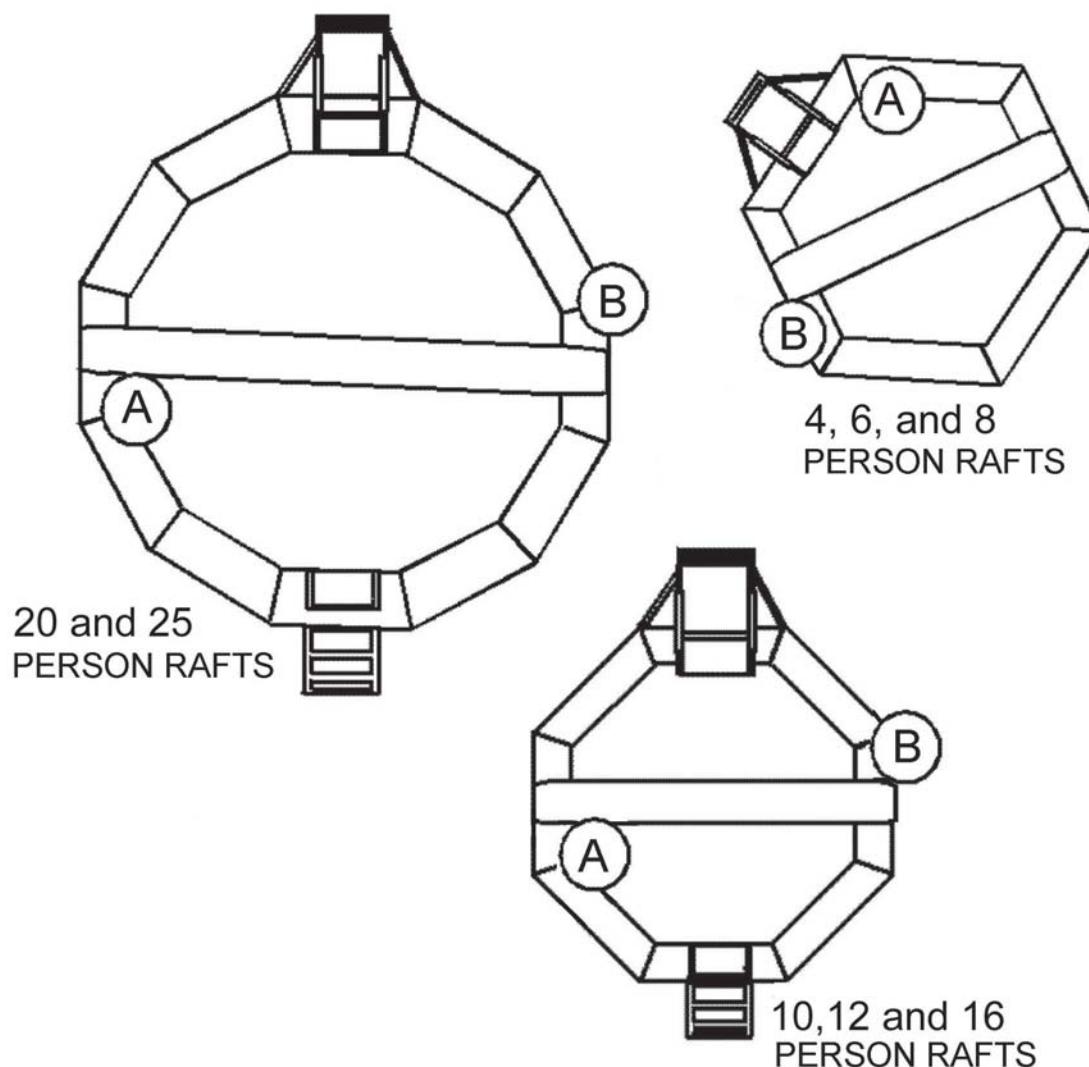
**Example of test Record cards
TABLE 502**

2 Preparation

- A Keep the records of all the inflation tests. A recommended format for the test cards is shown in TABLE 502.
- B Keep the liferaft away from draughts and direct sunlight, as change in temperature affects pressure.
- C Keep a solution of hard soap (not detergent), water, and a quantity of clean, dry, lint free cloths in the area.
- D If a buoyancy tube needs to be tested separately because of a repair, carry out a working pressure test, refer to Step 3E.
- E Calculate the change in the buoyancy tube pressure, caused by any change in temperature as follows:
 - (1) Subtract 38 mm WG from the manometer indication for each degree Celsius increase in temperature.
 - (2) Add 38 mm WG to the manometer indication for each degree Celsius decrease in temperature.

NOTE: The test result is not accepted if the temperature changes by more than 3.5° C.

- F Calculate the change in pressure caused by barometric pressure as follows:
 - (1) Subtract 10.2 mm WG from the manometer indication for each millibar decrease in pressure.
 - (2) Add 10.2 mm WG to the manometer indication for each millibar increase in pressure.



Location of valves
FIGURE 502

3 Test Procedures

A General

- (1) Test each compartment of the liferaft that inflates. Inflate the liferaft to the working pressure. The separate compartments of the liferaft that are inflated by the gas inflation system are:
 - (a) The lower buoyancy tube.
 - (b) The upper buoyancy tube and the arch tube, (if no transfer valve is fitted).
 - (c) The arch tube, (if transfer valve is fitted).

B Additional test time intervals

- (1) Carry out a gas inflation (GI) test on liferafts that are over 5 years old and then at 5 year intervals after that date.
- (2) Carry out a NAP test and test the floor seams on any liferaft that is over ten years old and subsequently at each 12 month service.

NOTE: It may be necessary to carry out the NAP test if the liferaft has been repaired, see Step D.

C Gas Inflation test

- (1) Unpack the liferaft, see Chapter 2, and put it on the packing table.
- (2) Reconnect the gas cylinder and operating head.
- (3) Pull the operating head actuator cable to inflate the liferaft.
- (4) Make sure the relief valves operate satisfactorily.
- (5) Let the liferaft settle for a minimum of 2 hours.

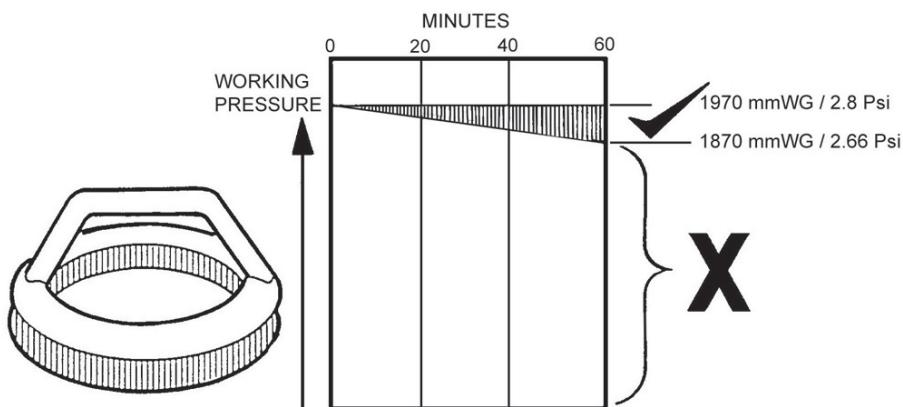
NOTE: This is regarded as the working pressure.

- (6) Use a manometer to make sure the gas pressure in each compartment of the liferaft is at or above working pressure. Record the gas pressure in each compartment. Record the temperature and barometric pressure.

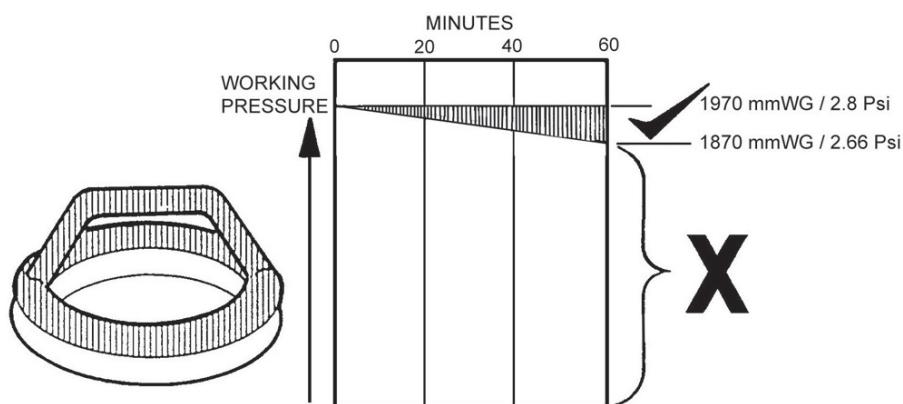
- (7) Leave the pressure in the each compartment for an additional 60 minutes. If the inflation pressure, corrected for temperature and barometric changes, decreases by more than 5% of the noted pressure, the liferaft fails this test.
- (8) If the pressure decrease is more than 5%, look for leaks and porous fabric. If possible, repair the liferaft within the limits given, refer to Chapter 6. Carry out a re-test of the buoyancy tubes again.

D Necessary Additional Pressure (NAP) test

- (1) Carry out a NAP test as follows:
 - (a) Install the caps on both relief valves, (FIGURE 505).
- (2) Inflate the liferaft slowly to twice the working pressure.
- (3) Leave it undisturbed for a minimum of 5 minutes after which there should be no seam slippage or cracking or other defects.
- (4) If the pressure decreases, allowing for temperature or barometric changes, by more than 5% the liferaft has failed the NAP test. Look for leaks and porous fabric. If possible, repair the liferaft within the limits given, refer to Chapter 6. Carry out a re-test of the buoyancy tubes again.
- (5) If the pressure decreases abruptly during the NAP test and there is audible 'cracking' from the liferaft, condemn the liferaft.
- (6) Sounds from the liferaft with no drop in pressure may be ignored.
- (7) After testing remove both PRV caps together.

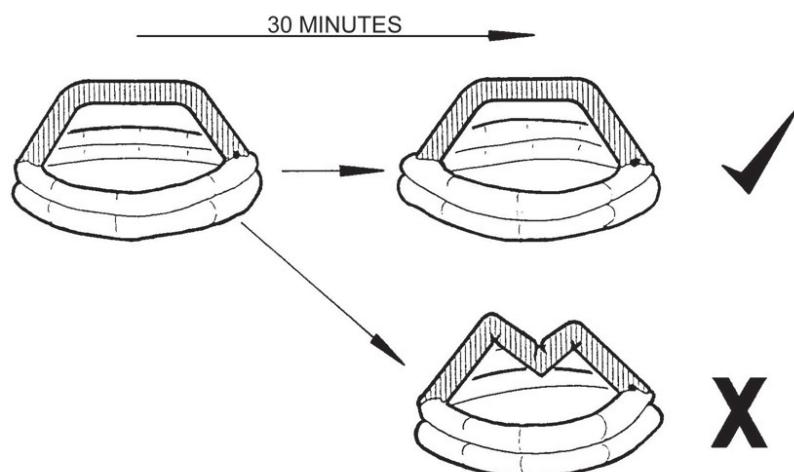


LOWER BUOYANCY TUBE



UPPER BUOYANCY TUBE

Working Pressure Test
FIGURE 503



ARCH TUBE (if fitted with a NON RETURN VALVE)

Transfer valve test (if fitted)
FIGURE 504

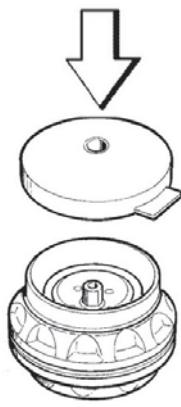
E Working Pressure test

NOTE: The arch tube and central strut (if fitted), are mounted on the upper buoyancy tube. These will be fully inflated when the upper buoyancy tube is tested. Therefore they will be checked with the upper buoyancy tube. Each compartment will be tested over a period of 60 minutes.

For each inflatable compartment defined in this Chapter, section 3A, carry out a working pressure test as follows, (FIGURE 503):

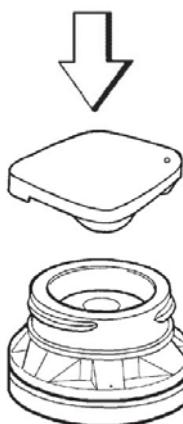
- (a) Install caps on both relief valves.
- (b) Inflate the compartments to between 1970 and 2100 mm water gauge. Record the temperature and barometric pressure.
- (c) Disconnect the air supply and connect the manometer (FIGURE 501).
- (d) Make sure there are no leaks at the test equipment connections. Use a brush to apply a solution of soapy water, if necessary, to carry out a test at each joint.
- (e) Leave pressurised compartments to settle, undisturbed for 30 minutes. Provided the pressure is not less than 2.8 Psi / 1970mm WG, note the pressure.
- (f) Leave the pressure in the compartments for an additional 60 minutes, (FIGURE 503).
If the inflation pressure, corrected for temperature and barometric changes, decreases by more than 5% of the noted pressure, the liferaft fails this test.
- (g) If the pressure decrease is more than 5%, look for leaks and porous fabric. If possible, repair the liferaft within the limits given, refer to Chapter 6.

OTS-65
PRESSURE
RELIEF VALVE

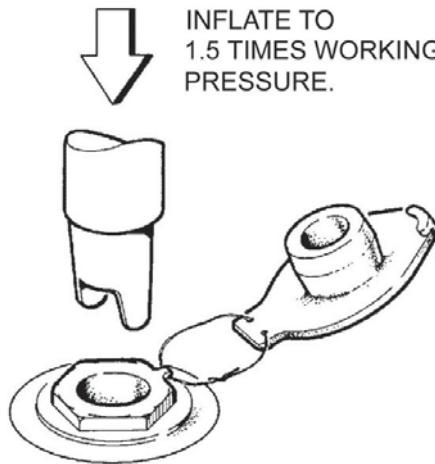


1

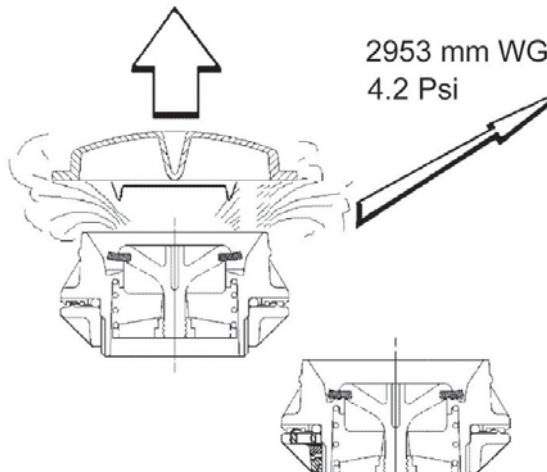
A10
PRESSURE
RELIEF VALVE



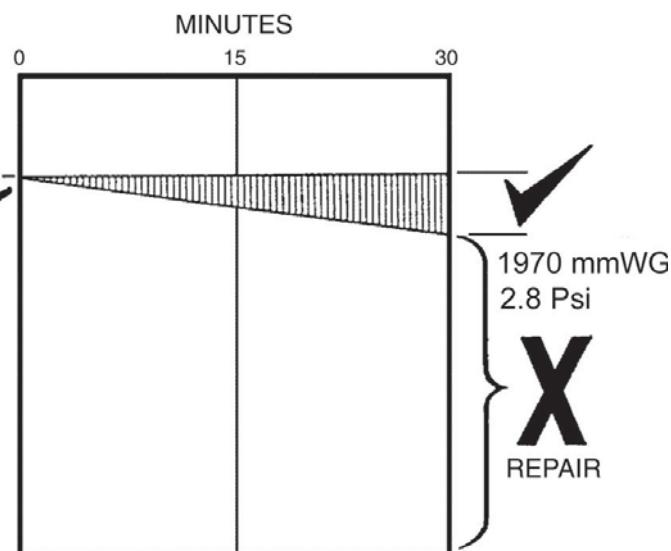
A8
INFLATE/DEFLATE
VALVE



2



3



4

Pressure Relief Valves
FIGURE 505

F Arch tube Transfer valve test (if fitted)

After the upper buoyancy tube has been deflated completely, the arch tube transfer valve can be tested.

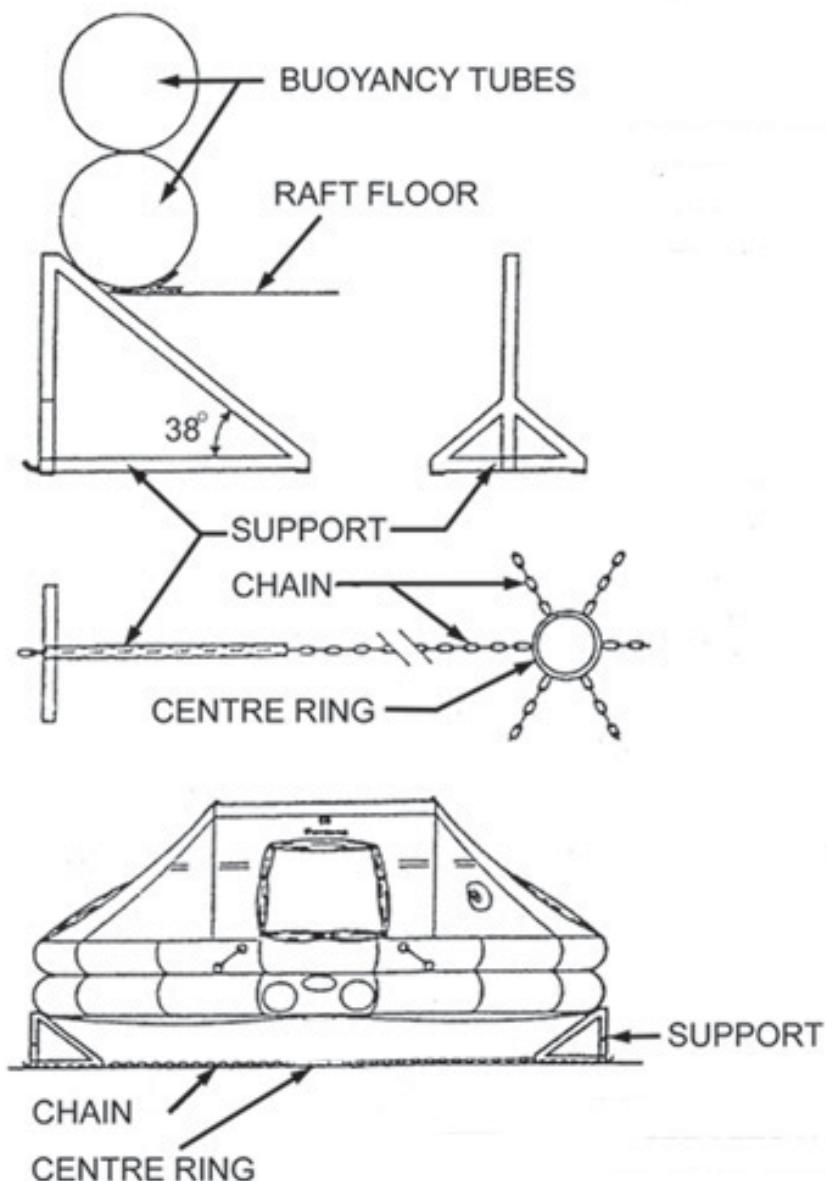
- (a) After 30 minutes the arch tube should maintain its full shape. Transfer valve which do not hold air must be replaced, (FIGURE 504).
- (b) If the arch tube does not maintain its full shape, look for leaks and porous fabric. If possible, repair the liferaft within the limits given, refer to Chapter 6.

G Pressure Relief Valves (PRV) test

- (1) Test the relief valves as follows:

- (a) Install the caps on the pressure relief valves, (FIGURE 505).
- (b) Connect the manometer to the liferaft (refer to FIGURE 501).
- (c) Inflate the liferaft to $1\frac{1}{2}$ times normal working pressure.
- (d) Remove the caps from the relief valves.
- (e) Make sure the valves open and release the excess pressure immediately. After 30 minutes recheck the PRV's. The indicated pressure on the manometer when the valves are closed must not be less than 1970 mmWG / 2.8 Psi, (FIGURE 505).

NOTE: Any valves which do not close correctly, must be replaced (Refer to Chapter 6, Section 6).



**Floor seam test supports
FIGURE 506**

H Floor seam test

- (1) A floor seam test is to be carried out on each liferaft at yearly intervals after the tenth year of the liferafts life, unless earlier servicing is deemed necessary as a result of visual inspection.
- (2) To facilitate the test, a proper test frame as shown is recommended, (FIGURE 506).
- (3) Perform the floor seam test as follows:
 - (a) Make sure the liferaft is inflated to working pressure.
 - (b) Put the inflated liferaft on top of the floor seam test frame.
 - (c) A person of at least 75 Kg weight must walk around the perimeter of the floor for the entire circumference, close as possible to the buoyancy.
 - (d) Examine the floor seam around the underside of the lower buoyancy. If the floor has detached from the buoyancy at any point, repair within the limits of Chapter 6.

	DL Test Loads			
	RAFT SIZE (No. OF PERSONS)			
	12DL	16DL	20DL	25DL
$W_{1\min}$ (Kg)	1115	1473	1840	2266
$W_{1\max}$ (Kg)	1165	1523	1890	2316
W_{hull} (Kg)	35.2	40	56.4	56.4
$W_{2\min}$ (Kg)	1080	1433	1784	2210
$W_{2\text{nom}}$ (Kg)	1105	1458	1809	2235
$W_{2\max}$ (Kg)	1130	1483	1834	2260

$W_{1\min}$ =	Minimum combined weight of the liferaft hull and the ballast required
$W_{1\max}$ =	Maximum combined weight of the liferaft hull and the ballast required
W_{hull} =	Maximum weight of bare liferaft hull (less all Equipment schedule items, cylinder, emergency packs, hoses, paddles etc)
$W_{2\min}$ =	Minimum weight of the ballast required
$W_{2\text{nom}}$ =	Nominal weight of the ballast required
$W_{2\max}$ =	Maximum weight of the ballast required

Liferafts DL test loads
TABLE 503

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I Function test

- (1) A full function test may be demanded by the local Inspecting Authority. This test may be done either with a packed or unpacked liferaft.
- (2) The load required to initiate inflation of the liferaft shall not exceed 15.3 kgf (33.7 Lbf), when measured on a spring balance.
- (3) All buoyancy chambers must fully inflate and pressure relief valves function. Working pressure must be obtained after no more than 60 seconds at an ambient temperature of 18°C to 20°C (64 to 68°F).
- (4) The working pressure should be determined by the reseat of the relief valves. The pressure relief valves should be fully operational.

J Suspension Overload test (Davit Launched Liferafts only)

- (1) This test shall be undertaken as required at the appointed age interval or after renewing any component or sub-assembly of the liferaft suspension arrangement, including the floor. It must be carried out before any pressure test(s).
- (2) The liferaft shall be inflated to working pressure and suspended normally by the lifting ring. The liferaft is loaded evenly using water or clean ballast bags. The total loads, (TABLE 503), are measured at the lifting ring and imposed for a minimum of 5 minutes.
- (3) The test is failed if:
 - (a) any suspension member, attachment or structural component breaks or is damaged, or
 - (b) the nominal working pressure or the basic shape of the buoyancy chambers is not maintained.
- (4) The liferaft shall be thoroughly checked and cleaned after testing to ensure there is no residual debris or dirt which could result in damage.

K Gas cylinders test

- (1) Check the cylinder weight. The weight must be the same as that given on the cylinder data label. The weight recorded on the cylinder data label does not include the cylinder recoil caps.

WARNING: INSTALL A RECOIL CAP ON THE OUTLET OF A FULLY CHARGED GAS CYLINDER BEFORE MOVING IT. THE GAS CYLINDER CAN BECOME A PROJECTILE IF IT IS DISCHARGED ACCIDENTALLY AND CAN CAUSE INJURY AND DEATH.

NOTE: Hold the gas cylinder in a vice or safety clamping mechanism when installing or removing an operating head.

L Radar Reflectors test - (if installed)

- (1) Examine the radar reflector.
- (a) Examine the radar reflector for damage.
- (2) Carry out the radar reflector test as follows:
- (a) Remove the radar reflector from its plastic bag.
- (b) Inflate the radar reflector to a pressure of 0.7 Psi. Let the pressure stay for a period of one hour. Make sure the pressure does not decrease to below 0.5 Psi.

M Search & Rescue Transponder (SART) - (if installed)

- A. The SART must be tested in accordance with the manufacturers instructions (refer to List of Associated Publications).

NOTE: If a SART is included in a liferaft, a radar reflector is not required.

4 Troubleshooting

A This TABLE is given to help you to find a fault if there is a malfunction during the function test. The TABLE shows the possible causes and the corrective action. If there is a failure or malfunction you should also look for signs of damage which could have caused the failure.

FAILURE	POSSIBLE CAUSE	CORRECTIVE ACTION
Failure to inflate.	The cylinder is not fully charged.	Install a fully charged cylinder.
	The cylinder is empty.	
	The hose is not installed.	Install the hose.
	The connections are loose.	Tighten the hose connections.
Pressure leaks.	Damaged or porous fabric.	Repair the fabric or seam, within limits given in Chapter 6.
	Damaged or porous seam.	
	Foreign body on a valve seat.	Clean or replace the relief/top up valves.
	Loose connections in the hose system.	Tighten all hose connections.
Relief valve does not relieve or reseat at the correct valve pressure.	Sealing cap is installed.	Remove sealing plug.
	A relief valve defect.	Replace the relief valve.
	Unwanted material.	Clean the relief valve on the valve seat.
Operating head is not operating correctly.	Various reasons.	Replace the operating head.

**Troubleshooting
TABLE 504**

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LR05

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CHAPTER 6

REPAIR

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CHAPTER 6

REPAIR

1 General

- A Repairs to fabrics normally consist of patching the damage with fabric patches. The patching fabric must be the same type of material as the item under repair (e.g. material 1015 must be replaced with 1015).
- B When marking fabrics, use a silver ballpoint pen (Schmidt 700) or BIC Crystal red Pen or wax (e.g. Chinagraph) crayon. If a 'major' repair is carried out record the repairs on the liferaft log card.
- C RAFT CONDEMNATION PROCEDURE:
If a raft has been condemned, it must be damaged further so that it cannot be used.
The raft identification label should be separated from the raft and returned with a completed condemnation form, to the manufacturer.
All remaining material must be disposed off according to the local legislation.

TABLE 601 lists a number of possible reasons, although further reasons may exist. A raft is condemned if;

POSSIBLE CAUSES OF RAFT CONDEMNATION	
Leakage -beyond economical repair	
Wear/Chafing	
Condemned after vessel casualty	
Damaged by strong heat (e.g. fire)	
Vandalism	
Damage by mould	
NAP test -NEGATIVE	
Floor Seam test -NEGATIVE	
Separation of adhesive / welded seams	

Raft condemnation
TABLE 601

2 Adhesive

WARNING: ADHESIVES ARE FLAMMABLE. KEEP WELL AWAY FROM NAKED FLAMES. USE ONLY IN A WELL VENTILATED ATMOSPHERE. AVOID CONTACT WITH EYES. AVOID BREATHING FUMES. USE BARRIER CREAM ON HANDS AND WASH AFTER USE.

- A The adhesive used for repairs to air-holding components and load-bearing components, is a two part polychloroprene mix to Specification Bostik 486.
- B Only the adhesive specified in Step 2A shall be used for repairs. Although other unspecified adhesives may apparently bond surfaces together, they may also have unexpected negative side effects which will eventually cause premature failure.
- C Mixing Instructions for Bostik 486 Adhesive

CAUTION: THE MIXING PROCEDURE MUST BE FOLLOWED EXACTLY SO THAT THE CURING AGENT WILL NOT SEPARATE FROM THE ADHESIVE.
THE MEASURED VOLUME OF THE CURING AGENT MUST BE POURED INTO THE APPROPRIATE QUANTITY OF THE ADHESIVE, STIRRING CONSTANTLY, AND FOR A MINIMUM OF FIVE MINUTES.
AVOID PARTIAL QUANTITY MIXES IF POSSIBLE. THE ADHESIVE CAN NOT BE STORED READY-MIXED AS IT BECOMES UNUSABLE AFTER A FEW HOURS.

- (1) Bostik 486 is a two-part adhesive. Part 1 is the adhesive, supplied in a can. Part 2 is the curing agent (Bostikure), supplied in a bottle. It is recommended that the constituents must be mixed together in these total quantities. After a bottle of curing agent has been opened, moisture will enter and the curing agent will soon deteriorate if it is not used.
- (2) Partial amounts of the mixture may be made up but, after the curing agent has been opened, the contents start to deteriorate. Any remaining curing agent must be discarded two weeks after it is opened.
- (3) If mixing partial amounts, put the cap back on the curing agent bottle immediately after taking the measured quantity. This prevents evaporation and entry of moisture. If there is any sign of cloudiness in the liquid, this indicates that moisture is present and the complete contents of the bottle must be discarded.

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- (4) Graduated measuring vessels must be used to make sure the two parts are mixed together in the ration of 25 measures (by volume) of adhesive to one measure of curing agent. The measuring vessels must be kept clean and dry.
- (5) Keep the adhesive, curing agent and mixed adhesive in completely sealed airtight containers.
- (6) Adhesive must not be used outside the temperature range +5° to +30° Celsius or when the relative humidity exceeds 70%.
- (7) After the adhesive has been used to join surfaces, it will cure in 2 to 4 days at 20° Celsius. At higher temperatures the curing time will be reduced, and at lower temperatures the curing time will increase.
- (8) For each batch of mixed adhesive, keep a sample and monitor it for development of cure. Use the sample to join two pieces of fabric. Keep the joined fabric as proof of the quality of the adhesive.

CAUTION: THE COMPONENTS AND MIXED ADHESIVE MUST BE KEPT IN COMPLETELY SEALED AIRTIGHT CONTAINERS. MIXED SOLUTION BECOMES UNUSABLE AFTER A FEW HOURS AND CAN NOT BE STORED FOR LONGER PERIODS.

- (9) The mixed adhesive will thicken and become unusable within four to six hours. This time depends on workshop temperature and the quantity of exposure to air. If the adhesive can be easily applied as a normal smooth and even layer, it is still useable.

3 Preparation of coated surfaces

WARNING: ONLY COATED SURFACES MAY BE INCLUDED IN REPAIRS.

A Polyurethane-proofed surfaces.

CAUTION: THOROUGHLY CLEAN POLYURETHANE-PROOFED SURFACES WITH TOLUENE SOLVENT AND/OR SOAP AND WATER TO REMOVE SURFACE CONTAMINATION COMPLETELY.

MEK (METHYL ETHYL KETONE) SOLVENT MUST BE USED TO CORRECTLY PRIME THE HEAVY DUTY POLYURETHANE COATING ON THE MATERIAL USED FOR THE BUOYANCY CHAMBERS (FLOOR, etc.). TOLUENE OR PETROLEUM TYPE CLEANING SOLVENTS ARE NOT EFFECTIVE FOR THIS PURPOSE.

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- (1) The Nylon fabric used for air-holding chambers has a heavy-duty Polyurethane coating which has been compounded to give a high resistance to abrasion.
- (2) These Polyurethane coated fabrics must be prepared for bonding by chemically priming the coated surfaces with the solvent MEK immediately as soon as the solvent has evaporated, but within 10-20 seconds before application of the first coat of adhesive.
You may experiment with identical fabrics to find the optimum time within which the adhesive must be applied, at any given temperature.

NOTE: After 10-20 seconds the prepared surface will become less receptive to the adhesive.

- (3) Apply the solvent with a clean lint-free fabric pad, wet but not dripping with the solvent. Adequate preparation of the surface is shown by the development of a matt appearance and a limited degree of tackiness. The pad should become discoloured.
- (4) Attempts to prime Polyurethane surfaces chemically in a hot humid environment can cause the formation of atmospheric dew. This is because rapid evaporation of the MEK solvent causes the surface temperature to decrease. **DO NOT ATTEMPT TO JOIN SURFACES IN THESE CONDITIONS, AS POOR ADHESION WILL RESULT.**
- (5) Repeated applications of MEK solvent on a clean polyurethane surface tend to become less effective. Apply the first coat of adhesive immediately after the first MEK wipe.
- (6) Do not remove residual adhesive from seaming surfaces which have been separated, unless it can be easily peeled off. To make a smooth surface, use toluene to rub off the old adhesive.

4 Application of Adhesive

A Bostik 486 adhesive:

- (1) For the purposes of repair, the words 'tacky' and aggressive tack' are defined thus:
 - (a) When the word 'tacky' is used, it means that if the fingers are lightly dragged across the adhesive, it tends to pull off the base material, or off the previous coat.

- (b) When the expression 'aggressive tack' is used, this means that when applying light finger pressure to the adhesive, the adhesive surface tends to retain (stick to) the fingers and does not transfer from the base fabric. When testing a surface with a finger, the adhesive must show aggressive tack, but no adhesive should remain on the finger.

WARNING:

NO TEXTILE JOINTS: WHEN JOINING TWO SURFACES TOGETHER, MAKE SURE THE SURFACES ARE PROOF SIDE TO PROOF SIDE. DO NOT USE THE TEXTILE SIDE FOR ANY REPAIRS.

- (2) Apply three coats of unthinned adhesive to each mating surface. Allow each coat to become tacky before applying subsequent coats.
- (3) When the third coat develops an aggressive tack, apply the patch or make the seam. Roll well, with a hand roller, to remove any air bubbles, rucks or creases.
- (4) Take care when rolling down seams and patches, particularly on curved edges. Avoid making rucks and creases. All seams MUST be rolled twice.
- (5) If a coat has dried, it may be relivened by a cloth dampened, but not dripping, with toluene solvent. Apply just enough solvent to recreate an aggressive tack on the surface. Relivening may be carried out, up to 3 hours after the application of the first coat of adhesive, but no later.
- (6) Each repair must be completed within 3 hours of commencement.

NOTE:

a DRY JOINT will result if:

- The adhesive becomes too dry between coats or at seam make-up.
- Any air bubbles are not completely rolled out.
- The mating surfaces are dry before patches are positioned.

A dry joint may appear good but will be easily pulled apart.

CAUTION:

DO NOT USE SOLVENTS TO REMOVE SURPLUS ADHESIVE FROM REPAIR AREAS, UNLESS THE JOINT HAS CURED THOROUGHLY.

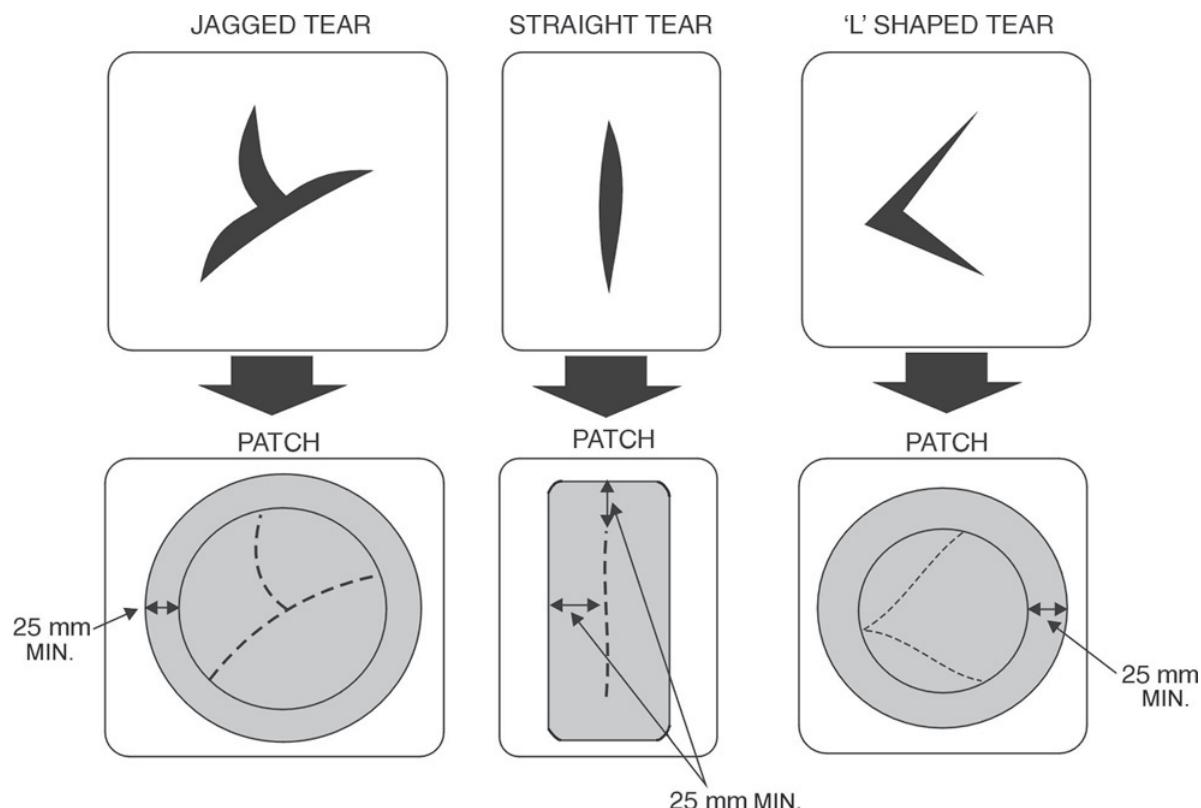
5 Repair damaged areas

- A** Many of the seams in LR05 liferafts, particularly the air holding seams, are of welded construction. Once welded, these seams can not be opened. In a correctly welded seam it is not possible to find the interface between the two polyurethane surfaces. For this type of construction, some of the traditional methods of repair, i.e. those which started with, "separating a structure joined by adhesive", have been replaced as described in this Section. The liferaft buoyancies, floor and canopy (non air holding joints) are held together with adhesive.
- B** Note that a correct adhesive-jointed seam or assembly of polyurethane proofed fabric and adhesive, is very strong. It is possible to cause damage to the proofed coat if careless attempts are made to tear apart two surfaces joined by adhesive, particularly if forces are applied in a manner not normally found during service.

WARNING: UNDER NO CIRCUMSTANCES SHOULD THE HOT AIR GUN BE USED IN CONJUNCTION WITH TOLUENE SOLVENT. TOLUENE IS EXTREMELY FLAMMABLE AND SHOULD BE KEPT AWAY FROM THE HOT AIR GUN.

NOTE: to RELEASE ADHESIVE JOINTED SEAMS or assemblies formed using polychloroprene adhesive, it is recommended that one of the following is used, together with the careful use of a spatula or other suitable tool.

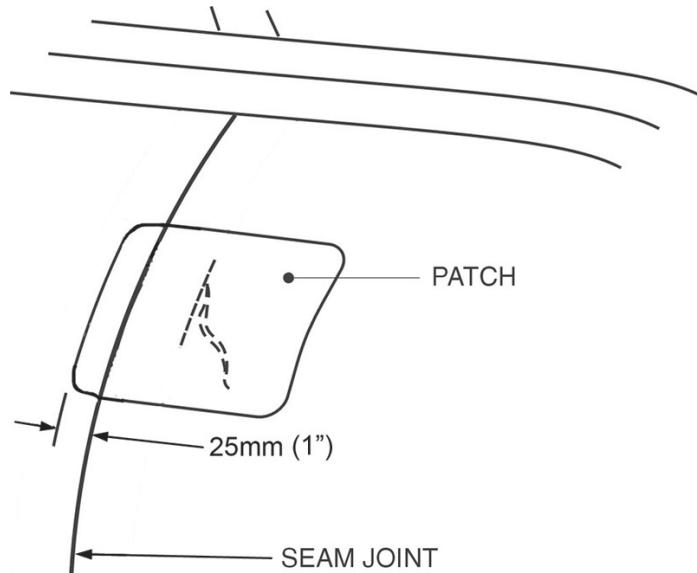
- A hot air gun (max.temperature 70°C) or
- Toluene solvent.



Patching
FIGURE 601

C Patches

- (1) Repair patches must overlap at least 25 mm beyond the edge of the damage, FIGURE 601 e.g:
 - (a) If the diameter of a jagged aperture is 25 mm, the patch must be at least 75 mm diameter.
 - (b) If a straight tear is 25 mm long, the patch must be at least 75 mm x 50 mm.
 - (c) Treat 'L' shaped tears as apertures; calculate the "diameter" as the distance between the ends of the tear.
- (2) Patches must be circular or rectangular with rounded corners, FIGURE 601.
- (3) Repair patches on air-holding components may be made from either nylon fabric, Type 1, (single-sided PU 'proofing') (see IPL, 2a) or nylon fabric, Type 2, (double-sided PU 'proofing'), (see IPL, 2a).
- (4) Where other components are to be bonded on top of the patch use only nylon fabric, Type 2, (double-sided PU 'proofing').



**Patch application over seams
FIGURE 602**

D Applying Patches and Tapes

- (1) To apply patches or tapes, the following procedure must be followed:
 - (a) Cut the patch to size.
 - (b) Prepare and clean the area as described in Step 3.
 - (c) When the final adhesive coat develops an aggressive tack, put the patch in position and use a hand roller to roll it into firm contact. Ensure the patch is orientated correctly i.e. 'proof' surface to 'proof' surface. Adhesive joints are not permitted to join one or more textile surfaces.
 - (d) Use a spatula to remove any air bubbles from under the patch.
 - (e) After a repair to an inflatable chamber has cured, the inflatable chamber must be subjected to a pressure holding test.
 - (f) If the patch repairs damage, that lies along the edge of a seam weld then the patch must extend across the width of the seam weld to the central seam joint , (FIGURE 602).
- (2) To apply tape, use exactly the same manner that is used for patches. Cut a radius on the corners of the tape ends before sticking the surfaces together; overlap tape ends by 50 mm.

E Testing repairs (Refer to Chapter 5)

- (1) Make sure the adhesive cures completely before testing.
- (2) When carrying out repairs to air holding compartments, carry out a working pressure test for each compartment.

F Repair limits

- (1) Patches (External)
 - (a) Use a patch to repair, if:
 1. The damage does not enter a seam.
 2. The damage does not pass under a major anchorage point, such as a towing point or bowsing patch, or within 100 mm one of these points.
 3. The maximum area of the patch is not more than one eighth of the total panel area.

G More extensive damage

- (1) Repairs not described in this manual are not permitted except by permission from the Design Authority. Separate application must be made for each occasion when repair is proposed.

6 Component Repair

A Pressure Relief Valve

A1 (Thanner PRV Type OTS-65)

Disassembly of the pressure relief valve is not permitted. Replace the complete assembly:

Removal Method

NOTE: If the recommended procedure is adhered to, there will be no requirement to cut or patch the liferaft fabric.

- (1) Inflate the liferaft to working pressure.
- (2) Using a ½" square drive ratchet and the appropriate adaptor tool (refer to Chapter 10), loosen both PRV bodies until it is possible to unscrew the PRV assembly by hand.
- (3) Deflate the upper and lower buoyancies.
- (4) Holding the PRV nut through the buoyancy fabric, unscrew the valve body. Remove all components of the faulty PRV, including the nut. The nut can be removed through the hole from which the valve body was removed. This is only possible with the liferaft in the deflated state.
- (5) Discard all parts of the faulty PRV. Do not reuse any of them.

Fitting a new PRV

WARNING: UNDER NO CIRCUMSTANCES SHOULD OLD COMPONENTS BE MIXED WITH NEW COMPONENTS. REPLACE THE ENTIRE PRV ASSEMBLY. DO NOT RE-USE ANY OLD COMPONENTS.

NOTE: Ensure all surfaces are clean and dry before fitting the new PRV.

- (1) Assemble the valve body as shown in (FIGURE 603).

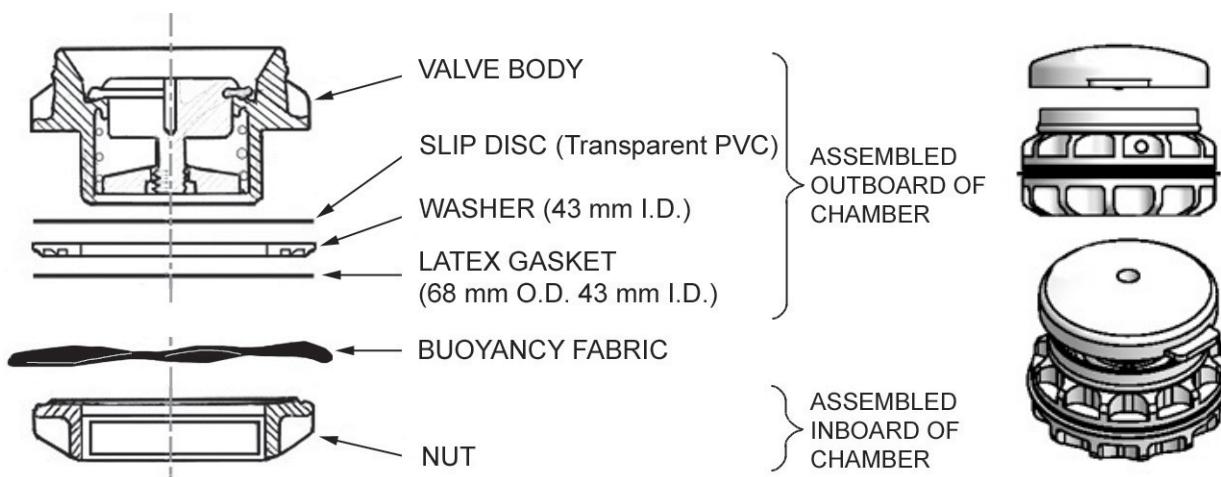
NOTE: The ridged face of the washer should be positioned towards the Latex gasket.

- (2) Push the nut into the hole from which the faulty one was removed.
- (3) Holding the nut in place, through the buoyancy fabric, hand-tighten the pre-assembled "outboard" components of the PRV onto the nut. Ensure the Latex gasket remains flat when it mates against the PRV doubler.
- (4) Slowly inflate the liferaft buoyancy. Using a calibrated $\frac{1}{2}$ " square drive torque wrench and the correct adaptor tool, tighten the PRV from the outside. Please refer to Chapter 1, TABLE 101 for torque settings.

NOTE: The pressure inside the buoyancy will prevent the nut from turning during the tightening process.

WARNING: ONLY THE TORQUE VALUE SPECIFIED SHOULD BE APPLIED. WHEN THE CORRECT TORQUE IS ACHIEVED FOR THE FIRST TIME, THE PRV MUST NOT BE TIGHTENED AGAIN. IF RE-TIGHTENING IS NECESSARY A COMPLETE NEW PRV MUST BE FITTED.

- (5) Complete and record an air-holding test as described in Chapter 5. Record the relief and reseat pressures of the new PRV.



**PRV OTS-65
FIGURE 603**

A2 (Leafield PRV Type A10)

CAUTION: ENSURE WHEN CONDUCTING THE REPAIR TO THE SLIT, NO MEK COMES IN CONTACT WITH THE PRV. THE PRV IS TO BE FITTED WITH THE SEALING PLUG ATTACHED. NO OTHER CAP OR PLUG IS TO BE USED. PLEASE REMOVE CAP AT THE END OF THE PROCESS.

Disassembly of the pressure relief valve is not permitted. The Leafield A10 valve has no serviceable components — a faulty valve must be replaced with a new unit. Replace the complete assembly:

CAUTION: IT IS NOT PERMITTED TO ATTACH THE LEAFIELD PRV, WHEN PREASSEMBLED INTO A DOUBLER, TO ANOTHER COMPONENT USING ADHESIVE.

Removal Method

- (1) A slit of approximately 150 mm, must be made in the buoyancy tube in the vicinity of the affected valve to enable access to the inside of the buoyancy tube. The slit should be made along the length of the buoyancy. The end of the slit should be no closer than 100 mm to the edge of the PRV doubler.
- (2) The slit should be made as small as possible and repaired subsequently by patching according to standard practice.
- (3) Loosen both parts of the valve using the appropriate tools.
- (4) Remove the valve.
- (5) Discard all parts of the faulty PRV. Do not reuse any of them.

Fitting a new PRV

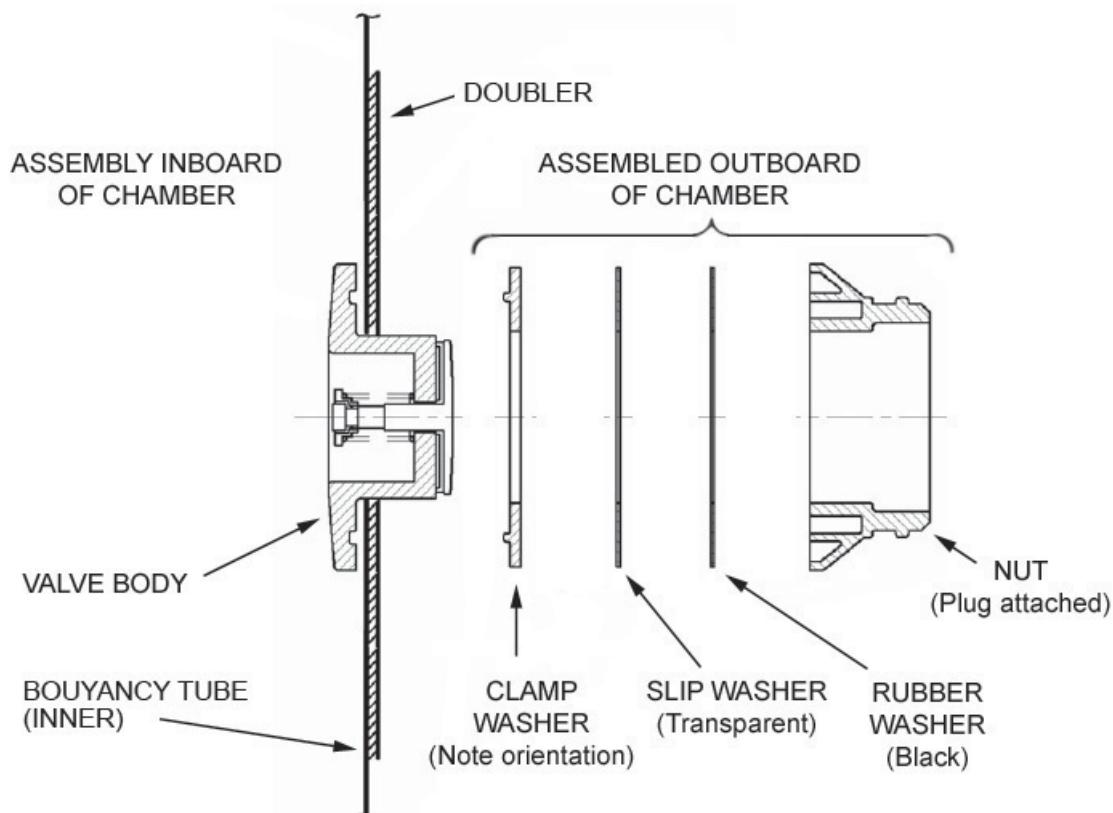
WARNING: UNDER NO CIRCUMSTANCES SHOULD OLD COMPONENTS BE MIXED WITH NEW COMPONENTS. REPLACE THE ENTIRE PRV ASSEMBLY. DO NOT RE-USE ANY OLD COMPONENTS.

NOTE: Ensure all surfaces are clean and dry before fitting the new PRV.

- (1) Push the valve body into the hole from which the faulty one was removed.
- (2) Assemble the valve body as shown in (FIGURE 604).

NOTE: The ridged face of the clamp washer should be positioned towards the buoyancy tube.

- (3) Holding the valve body in place, through the buoyancy fabric, hand-tighten the components of the PRV using the nut.



**PRV - Leafield
FIGURE 604**

- (4) While holding the PRV on the inside, use a calibrated torque wrench and the correct adaptor tools, to tighten the PRV from the outside. Please refer to Chapter 1, TABLE 101 for torque settings.

WARNING: ONLY THE TORQUE VALUE SPECIFIED SHOULD BE APPLIED. WHEN THE CORRECT TORQUE IS ACHIEVED FOR THE FIRST TIME, THE PRV MUST NOT BE TIGHTENED AGAIN. IF RE-TIGHTENING IS NECESSARY A COMPLETE NEW PRV MUST BE FITTED.

- (5) The slit must then be repaired as detailed in this Chapter.

CAUTION: ENSURE THE PRV CAP(S) HAVE BEEN REMOVED BEFORE INFLATION.

- (6) After waiting the required time for the repair to cure please complete and record an air-holding test as described in Chapter 5. Record the relief and reseat pressures of the new PRV.

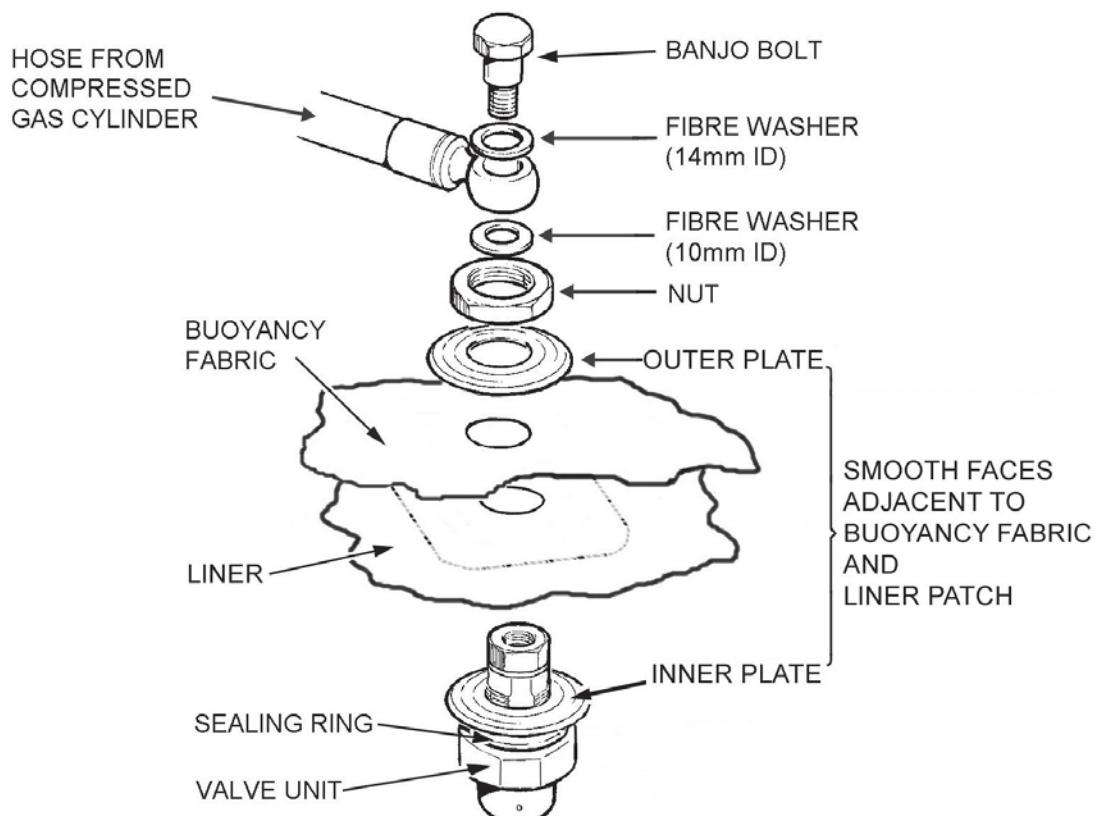
B Topping-up valve

- (1) Cut out the defective valve.
- (2) Make a circular patch of material of the correct size. The patch must have a minimum diameter 50 mm larger than the aperture cut, to remove the defective valve. Punch a star cut in the centre of the new patch. This must be done using tool stated in Chapter 10.
- (3) Attach the valve to the patch and tighten it to the stated torque value in Chapter 1, TABLE 101.
- (4) Use Bostik 486 adhesive to join this assembly to the liferaft so that it has a minimum 25 mm overlap, on the liferaft material.

C Inflation valve**(C1) Thanner type (FIGURE 605)**

1. The inflation valves have different jet bores, as stated below. The size of the jet bore is stamped in the flat surface of the valve body. The stamp also shows the direction of the jetholes.
 - (i) The bore size for the lower buoyancy is 2.2 mm.
 - (ii) The bore size for the upper buoyancy is 2.8 mm.
2. There is only one size of cross head bolt for this valve.
3. The assembly requires an aperture of 22 mm diameter in the buoyancy chamber. The aperture is reinforced at this point.
 - (1) Deflate the liferaft for this repair.
 - (2) To install an inflation valve access to the inside of the buoyancy chamber is required. This is achieved by making two slits in the buoyancy, approximately 150 mm long, (FIGURE 606).
 - (a) One slit is required close to the inlet valve position.
 - (b) One slit is required close to the inner lining retaining patch.
 - (3) Access the slit closest to the inner liner patch, untie one end of the liner and pull it through the slit closest to the inflation valve.
 - (4) To disassemble the inflation valve, remove the fixing nut and the outer plate from the valve.
 - (5) Reach inside the liner and pull the body of the valve to the inside of the liner, then remove it from the buoyancy chamber.
 - (6) To install a new inflation valve, first disassemble the nut and the outer plate from the valve, (FIGURE 605).
 - (7) The sealing ring and inner plate are attached permanently to the inflation valve body, (FIGURE 605).
 - (8) Using all new components assemble the inflation valve unit, complete with the sealing ring and inner plate, through the liner and the 22 mm hole in the buoyancy panel, (FIGURE 605).

- (9) Fit the outer plate and nut to the inflation valve unit, tightening them by hand, (FIGURE 605).
- (10) Align the jets in the inlet valve, by ensuring the arrows on the spanner are orientated, to point along the axis of the buoyancy tube and the liner.
- (11) Use a 30 mm torque spanner and 19 mm socket to tighten the assembly, to the stated torque value in, Chapter 1, TABLE 101. A special tool, (Chapter 10), is shaped to match the body of the valve. The tool can be used with a 19 mm socket.
- (12) Re-insert the liner through the inflation valve slit and tie the liner to its retaining patch, inside the buoyancy.
- (13) Use the patching procedure to repair both access slits.
- (14) At a later stage of assembly, assemble the hoses using the Banjo bolts.

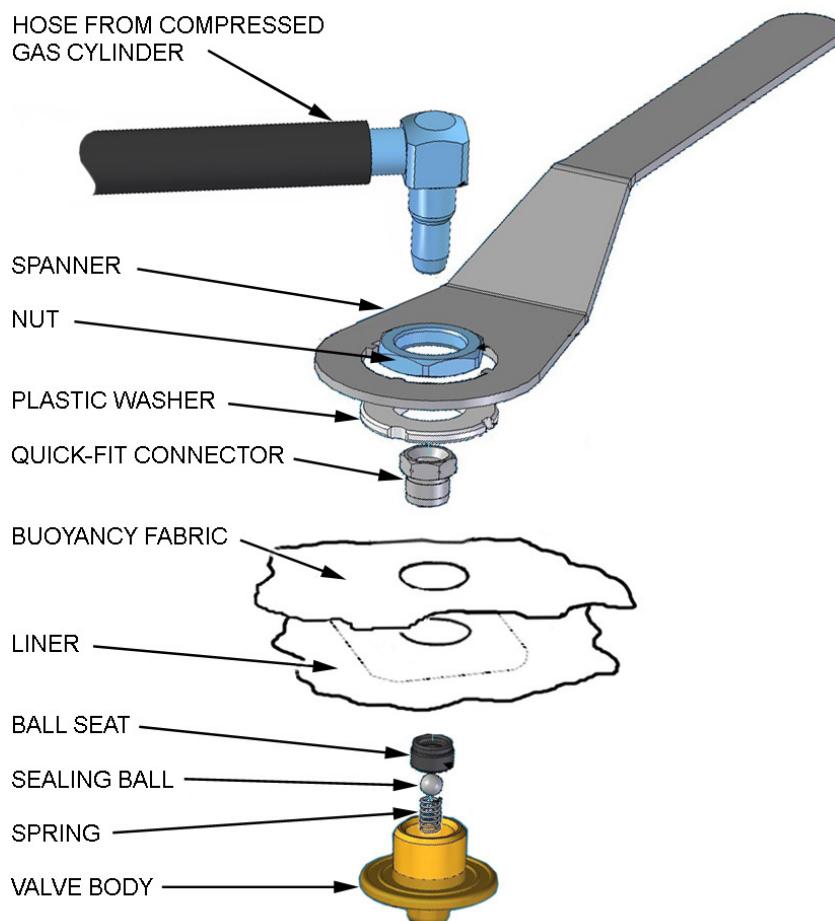


NOTE: EXPLODED VIEW IS FOR ILLUSTRATION ONLY- ACTUAL VALVE UNIT MAY VARY

Thanner inflation valve
FIGURE 605



Position of liner tie-off patches
FIGURE 606



NOTE: EXPLODED VIEW IS FOR ILLUSTRATION ONLY- ACTUAL VALVE UNIT MAY VARY

Leafield inflation valve
FIGURE 607

(C2) Leaflet type (FIGURE 606)

1. The inflation valves have different jet bores, as stated below. The size of the jet bore is stamped in the flat surface of the valve body. The stamp also shows the direction of the jetholes.
 - (i) The bore size for the lower buoyancy is 2.2 mm.
 - (ii) The bore size for the upper buoyancy is 2.8 mm.
2. There is only one size of hose for this valve.
3. The assembly requires an aperture of 24 mm diameter in the buoyancy chamber. The aperture is reinforced at this point.
 - (1) Deflate the liferaft for this repair.
 - (2) To install an inflation valve access to the inside of the buoyancy chamber is required. This is achieved by making two slits in the buoyancy, approximately 150 mm long, (FIGURE 606).
 - (i) One slit is required close to the inlet valve position.
 - (ii) One slit is required close to the inner lining retaining patch.
 - (3) Access the slit closest to the inner liner patch, untie one end of the liner and pull it through the slit closest to the inflation valve.
 - (4) To disassemble the inflation valve, remove the fixing nut and the plastic washer from the valve.
 - (5) Reach inside the liner and pull the body of the valve to the inside of the liner, then remove it from the buoyancy chamber.
 - (6) To install a new Inflation valve, first disassemble the nut and the plastic washer from the valve, (FIGURE 607).
 - (7) Using all new components assemble the inflation valve unit. Pass the valve body through the liner and the 24 mm hole in the buoyancy panel, (FIGURE 607).
 - (8) Fit the plastic washer and nut to the inflation valve body and tighten it by hand, (FIGURE 607).
 - (9) Align the jets in the inlet valve by ensuring the arrows on the spanner are orientated, to point along the axis of the buoyancy tube and the liner.

- (10) A special tool, (Chapter 10), is shaped to match the body of the valve. Using a 33mm A/F socket and torque wrench, tighten the nut to the stated torque value in, Chapter 1, TABLE 101.
- (11) Remove the red plastic dust cap from the top thread of the inlet valve. The valve is now ready to accept the quick fit connector on the end of the high-pressure hose. Push the connector firmly into the hole and make sure a click is heard. Check that the connection has been correctly made by tugging firmly on the hose connector.
- (12) If the hose has not been correctly snapped into place, it may blow out during inflation. In this case, check the O-Ring is still in place in the M16 connector before pushing together as described above. If it is not present, replace the M16 connector.
- (13) Re-insert the liner through the inflation valve slit and tie the liner to its retaining patch, inside the buoyancy.
- (14) Use the patching procedure to repair both access slits.

D Replacing the Inner buoyancy liner

Removal method

- (1) Deflate the liferaft for this repair.
- (2) To replace a liner, access to the inside of the buoyancy chamber is required. This is achieved by making three slits in the buoyancy, approximately 150 mm long, (FIGURE 606).
 - (i) One slit is required close to the inlet valve position.
 - (ii) A slit is required close to each liner retaining patch.
- (3) Access the slit closest to each liner patch, untie both ends of the liner and pull it through the slit closest to the inflation valve, (FIGURE 608).
- (4) To disassemble the inflation valve, please refer to Section C.
- (5) Reach inside the liner and pull the body of the valve to the inside of the liner. Remove the valve and the liner from the buoyancy chamber.

Fitting a new liner

- (1) Insert the new liner through the slit closest to the inflation valve, (FIGURE 606).
- (2) Tie each end of the liner to it's respective retaining patch, (FIGURE 606 & 608).
- (3) To fit a new inflation valve, please refer to Section C.
- (4) Use the patching procedure to repair all slits.

E Miscellaneous

- (1) Replace damaged painter, operating lanyard or doorway bowsing lines with new assemblies.
- (2) Should damage be found on any part of the lifting bridle, the entire lifting bridle must be replaced.

7 Rigid Containers**A Classification of structural repairs**

- (1) Only minor repairs to glass reinforced plastic (GRP) containers are permitted. These are listed below. When damage is more than these limits, send the container to an approved glass fibre repair depot for major repair.

B Repair limits

- (a) The limits of minor repairs are:
 - (1) Damage to the gelcoat only, which does not penetrate the glass fibre mat.
 - (2) Damage to the painted surface.

- (b) The limits of major repairs are:
- (1) Apertures or penetrating damage (i.e. through the glass fibre mat) over an area of less than 77 square centimetres on the outer surface of the container.
 - (2) Apertures or penetrating damage over an area of less than 58 square centimetres on the inner surface of the container.
 - (3) Breakage/cracks of the rims on either half of the container shell.

NOTE: The limits above, apply to the TOTAL area of damage, so that if, for example, repair is required at both ends of the container, then the permissible areas of repair for each end must not TOGETHER total more than the prescribed limits.

C Other repairs

WARNING: WHEN WORKING WITH GLASS FIBRE SURFACES, HANDS, ARMS AND FACES MUST BE PROTECTED. WEAR A FACE MASK.

- (1) Replace damaged or illegible labels. Re-stencil illegible markings.

D Gelcoat

- (a) This is the outer surface of the container. Damage to the gelcoat does not affect the GRP, although it may expose it to view. If only the gelcoat is damaged, repair it with a GRP filler, such as Isopon:
 - (1) Clean the damaged area with acetone to remove all contamination.
 - (2) Spread the GRP filler until it is higher than the adjacent surface of the container.
 - (3) Cover the GRP filler with adhesive tape and allow it to cure.
 - (4) Remove the tape and abrade the repaired area. Rub down the surface with abrasive papers until it is level with the container surface.

- (b) To paint the container:
- (1) Remove all loose labels.
 - (2) Remove grease, tar etc. with a suitable solvent, e.g. toluene.
 - (3) Wash the container with a solution of detergent and water and rinse with clean water.
 - (4) Fill any cracks or voids in the gelcoat with GRP filler as per Step 1 above.
 - (5) Spray paint one coat of white Epimide paint or Polyurethane paint.

E Major structural repairs

- (1) A major repair is required for any damage to a container that is more serious than damage to the gelcoat only. Major repairs to the glass fibre containers are not permitted except by specially trained and approved personnel.

The limits of repair are given as follows. If container damage is more than these limits, do not attempt to repair the container. The damaged shell or shells of the container must be replaced.

- (2) Repair limits

- (a) The limits of repair are:

1. Holes or penetrating damage (i.e. through the glass fibre mat) over an area of more than 77 square centimetres on the outer surface of the container.
2. Holes or penetrating damage over an area of more than 58 square centimetres on the inner surface of the container.
3. Breakage of the rims on either half of the container shell.

NOTE: The limits above, apply to the TOTAL area of damage, so that if, for example, repair is required at both ends of the container, then the permissible areas of repair for each end must not TOGETHER total more than the prescribed limits.

CHAPTER 7

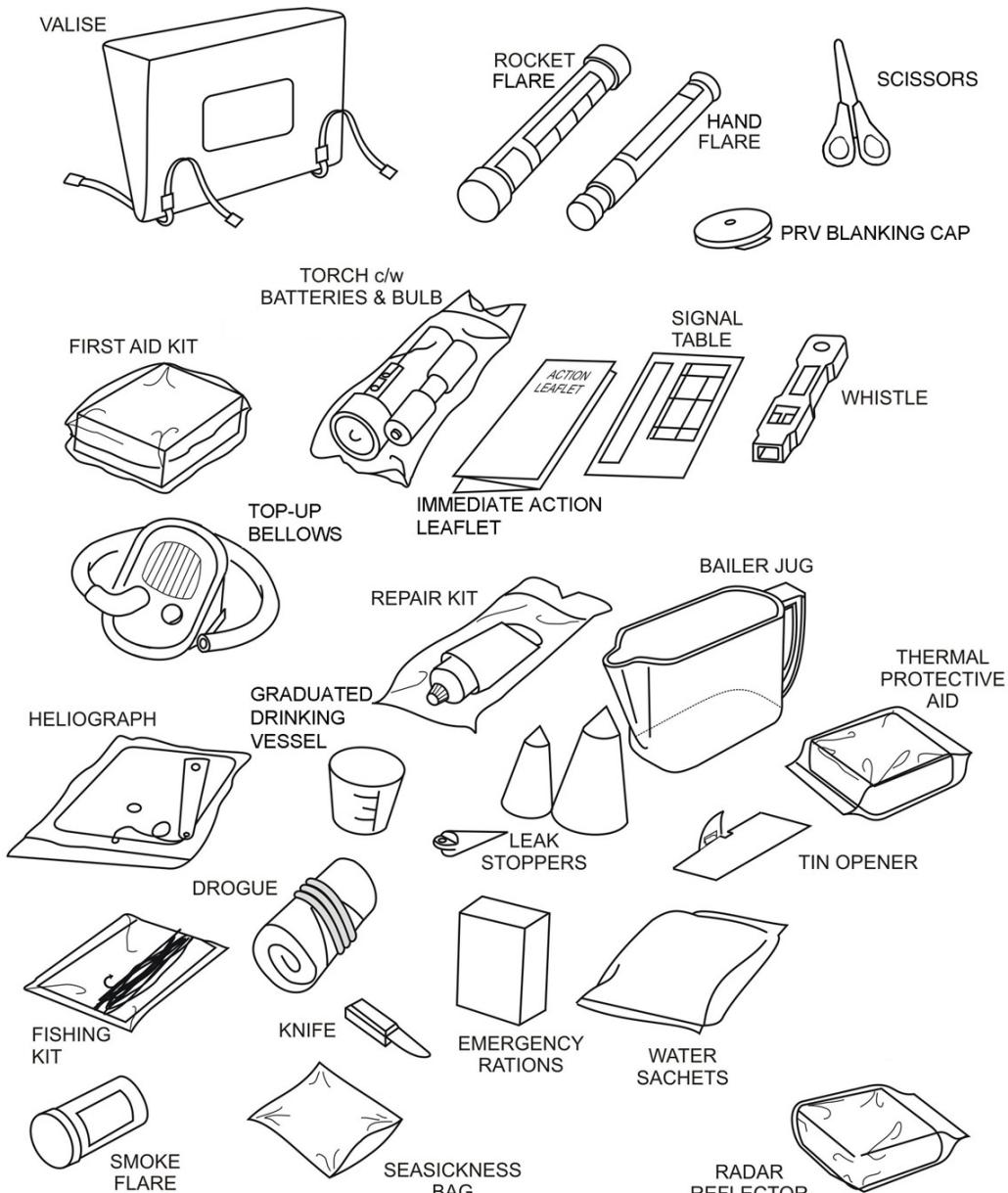
EMERGENCY PACKS AND EQUIPMENT

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1. EMERGENCY PACKS

CAUTION: SURVIVAL AIDS MUST BE PACKED WITH THEIR VALISE(S) POSITIONED EITHER IN THE CONTAINER OR A JIG THAT SIMULATES THE SHAPE OF THE CONTAINER AND CYLINDER.

- A. For liferafts packed into different containers pack the contents, of each emergency pack into it's valise, in accordance with TABLES 701-703.
- B. DSB recommend that any 'lived' item that has less than 12 months life remaining, it MUST be replaced in the emergency pack.



Typical Emergency pack items
FIGURE 701

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Liferaft size (Persons)	Part Number	6 TO	8 TO	10 TO	12 TO & DL	16 TO & DL	20 TO & DL	25 TO & DL
Anti seasickness tablets	*1	-	-	-	-	-	-	-
Bag, poly, 229 x 366 mm	00804400	6	8	10	12	16	20	25
Bailer, (Jug) PVC, 1 pint	00904210	1	1	1	1	2	2	2
Bellows	R45201001	1	1	1	1	1	1	1
Buoyant knife	00904040	0	0	0	0	1	1	1
Drinking vessel	00904190	1	1	1	1	1	1	1
Drogue (spare sea anchor)	00940470	1	1	1	1	1	1	1
First aid kit	*2	1	1	1	1	1	1	1
Fishing kit	R05720099	1	1	1	1	1	1	1
Flare, hand held	R08374009	6	6	6	6	6	6	6
Flare, parachute	R08375009	4	4	4	4	4	4	4
Signal, Lifesmoke	R08376009	2	2	2	2	2	2	2
Heliograph	*2	1	1	1	1	1	1	1
Leak stopper, No 1	R40318001	1	1	1	1	1	1	1
Leak stopper, No 3	R05720019	1	1	1	1	1	1	1
Leak stopper, No 5	R05720023	1	1	1	1	1	1	1
Cap blanking Thanner OTS-65	R06742009	2	2	2	2	2	2	2
Radar reflector	*2	1	1	1	1	1	1	1
Radar reflector mast	*2	1	1	1	1	1	1	1
Kit repair outfit	R50387001	1	1	1	1	1	1	1
Rescue signal table	R02176011	1	1	1	1	1	1	1
Scissors	00725220	1	1	1	1	1	1	1
Thermal protection aid	00940200	2	2	2	2	3	3	3
Tin opener	00904200	3	3	3	3	3	3	3
Torch (Long life) c/w spares	07966009	1	1	1	1	1	1	1
Whistle	00904130	1	1	1	1	1	1	1
Immediate action leaflet	*2	1	1	1	1	1	1	1
Foam lining E-Pack	R50385001	1	1	1	1	1	1	1
Valise- 800 mm	R20993031	1	1	1	1	1	1	1

Emergency Equipment A Pack -All Container Types
TABLE 701

Please note: *¹ see IPL

*² Denotes this item is country dependant so part numbers/quantity will vary. Please refer to the relevant appendix.

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Liferaft size (Persons)														
	Part Number	6 TO	8 TO	10 TO	12 TO & DL	16 TO & DL			20 TO & DL			25 TO & DL		
Valise Pack Number		2	2	2	2	2	3	4	2	3	4	2	3	4
Water sachet, 500ml	R05163009	18	24	30	36	24	24		30	30		37	38	
Food Rations 500g	R04776009	6	8	10	12			16			20			25
Valise - 700 mm	R20993021	1	1			1	1	1	1	1	1	1	1	1
Valise - 1050 mm	R20993051			1	1									

Emergency Equipment - Water & Food specific to A-pack
TABLE 702

Optional Equipment DSB Recommended			
ITEM	Part Number	Qty	Additional information
Search And Rescue Transponder	R08111009	1	SART (S4)

Optional Equipment
TABLE 704

Liferaft size (Persons)	Part number	6 TO	8 TO	10 TO	12 TO & DL	16 TO & DL	20 TO & DL	25 TO & DL
Anti seasickness tablets	*1	1	1	1	2	2	2	3
Bag, poly,	00804400	6	8	10	12	16	20	25
Bailer, (Jug) PVC, 1 pint	00904210	1	1	1	1	2	2	2
Bellows	R45201001	1	1	1	1	1	1	1
Buoyant knife	00904040	0	0	0	0	1	1	1
Drogue (sea anchor)	00940470	1	1	1	1	1	1	1
First aid kit	*2	1	1	1	1	1	1	1
Flare, hand held	R08374009	3	3	3	3	3	3	3
Flare, parachute	R08375009	2	2	2	2	2	2	2
Signal, lifesmoke	R08376009	1	1	1	1	1	1	1
Heliograph	*2	1	1	1	1	1	1	1
Leak stopper, No 1	R40318001	1	1	1	1	1	1	1
Leak stopper, No 3	R05720019	1	1	1	1	1	1	1
Leak stopper, No 5	R05720023	1	1	1	1	1	1	1
Cap blanking Thanner OTS-65	R06742009	2	2	2	2	2	2	2
Radar reflector	*2	1	1	1	1	1	1	1
Radar reflector mast	*2	1	1	1	1	1	1	1
Kit repair outfit	R50387001	1	1	1	1	1	1	1
Scissors	00725220	1	1	1	1	1	1	1
Thermal protection aids	00940200	2	2	2	2	2	2	3
Torch c/w spares	07966009	1	1	1	1	1	1	1
Whistle	00904130	1	1	1	1	1	1	1
Leaflet, immediate action	*2	1	1	1	1	1	1	1
Valise- 1050 mm	R20993051	1	1	1	1	1	1	1

Emergency Equipment B Pack
TABLE 703

2. ITEM PREPARATION

A Pyrotechnics wrapping (drop heights up to 36m)

It is important to wrap pyrotechnics correctly with Pillowflex and/or protective foam. The types of pyrotechnics used in emergency packs are smoke canisters, rockets and hand flares.

For drop heights not exceeding 36 metres, use the wrapping method as illustrated in (FIGURE 702).

Water sachet protection - Minimum of 4 layers of Pillowflex bubble wrap to be placed between food blocks and water sachets.

Hand flares and rocket parachute flares are to be individually wrapped with minimum 5 turns of pillowflex bubble wrap, see (FIGURE 702a).

Use rubber bands or tape to retain the bubble wrap.

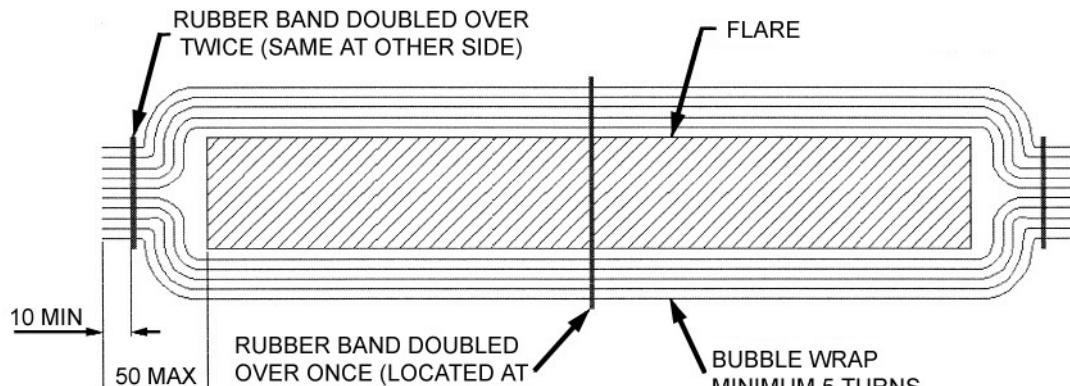
Smoke flares to be wrapped in one turn plastazote foam and 2 turns pillowflex bubble wrap, see (FIGURE 702b).

Use rubber bands or tape to retain the bubble wrap.

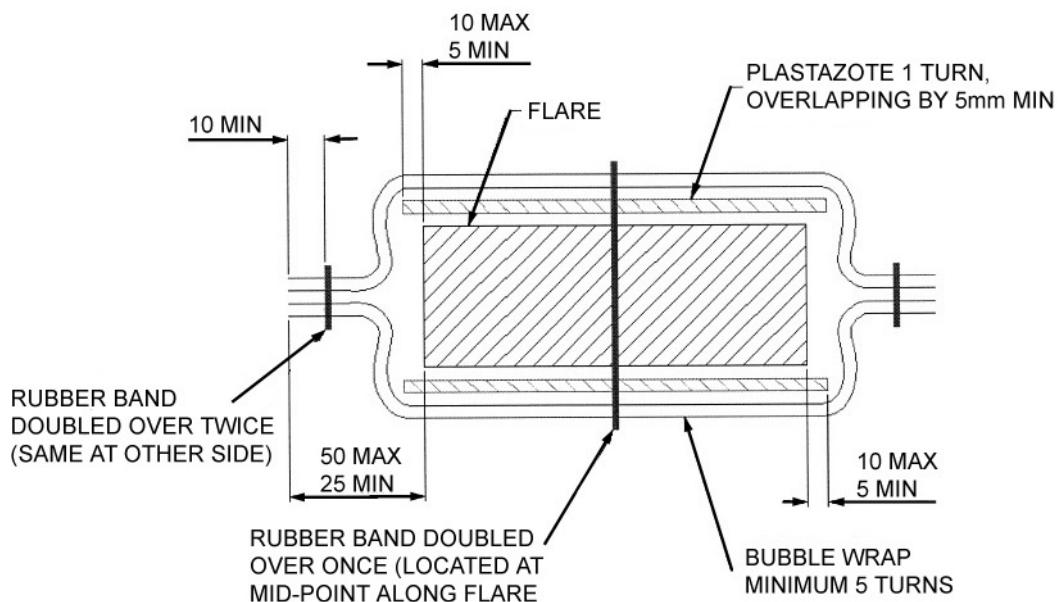
B. Radar reflector

- (1) Deflate the radar reflector allowing the seams of the outer balloon panels to line up with each other as far as possible, (FIGURE 703).
- (2) Fold the sides in to equal the width of the plastic stowage bag. Roll the reflector, excluding any residual air through the valve, (FIGURE 703).
- (3) Replace the valve stopper and put the deflated reflector into its plastic bag with the instruction sheet visible. Fold over one end of the bag and secure it with a short piece of adhesive tape, (FIGURE 703).
- (4) Put the radar mast (if fitted) alongside the paddles, so that the paddle end protection foam cover and protect the mast ends.

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(A) FLARE, HANDHELD & PARACHUTE



(B) LIFESMOKE

Pyrotechnics wrapping for drop heights less than or equal to 36 m
FIGURE 702

C. Search And Rescue Transponder (SART) - if included

Packing the SART into the emergency equipment pack

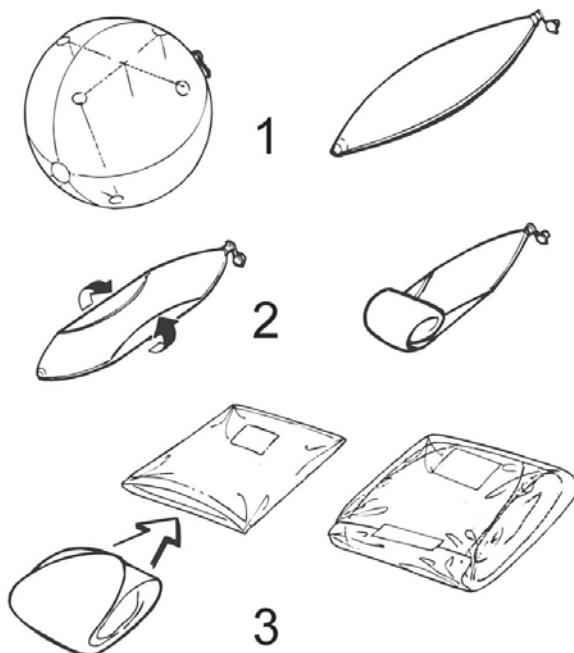
NOTE: If a SART is included in a liferaft, a radar reflector is not required.

- (1) Remove the SART from its mounting bracket, if supplied. Discard the mounting bracket.
- (2) Test the SART. Read the instructions on the SART. Pull the pin out and check the SART. Re-insert the pin correctly again.
- (3) Wrap the SART in five turns of pillowflex. Secure the pillowflex using an elastic band.
- (4) Place the SART, wrapped in pillowflex, between two thermal protection aids, for extra protective cushioning.

NOTE: If applicable, ensure that the container label has been marked to state that a SART has been included.

Documentation

- (1) Please refer to the manufacturer's manual listed at the front of this manual in, List of Associated Publications.
- (2) The outside of the container must be marked to indicate that a SART is present.



Radar reflector packing
FIGURE 703

3 Packing the valise

A. 6-12 Person, A & B-PACK

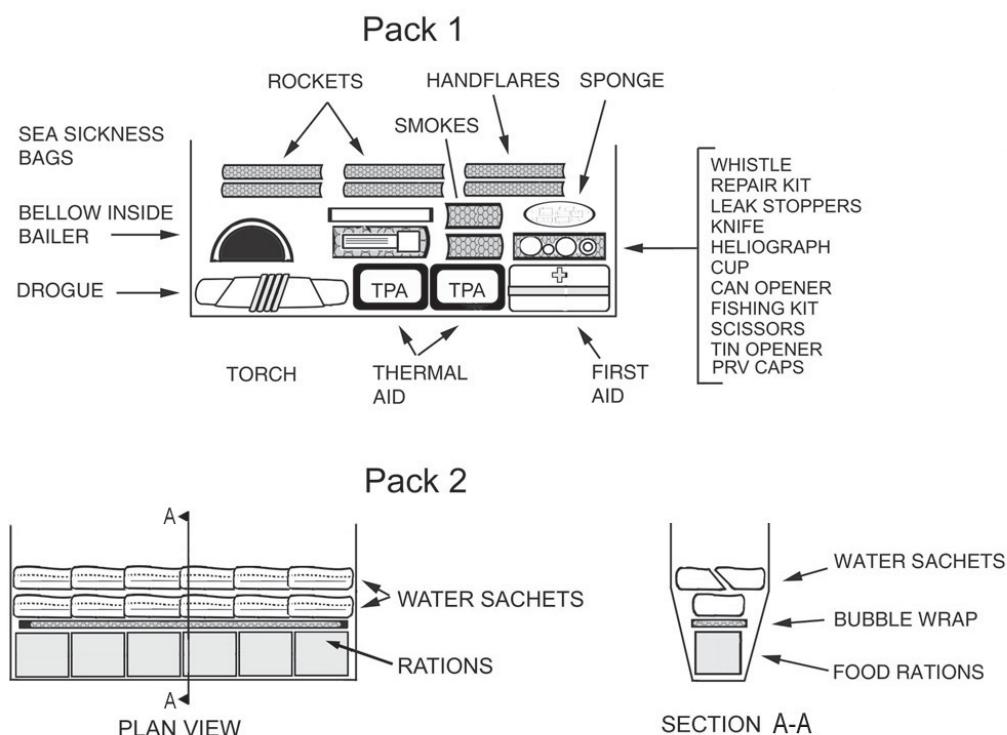
Arrange items into the valise as required, making sure the finished packs are long and thin. As a guide, a layout is shown but this can vary slightly, (FIGURE 704).

- (1) Pack 1, side view, shows the position and layout of the equipment, (FIGURE 704).

Applies A-PACK ONLY

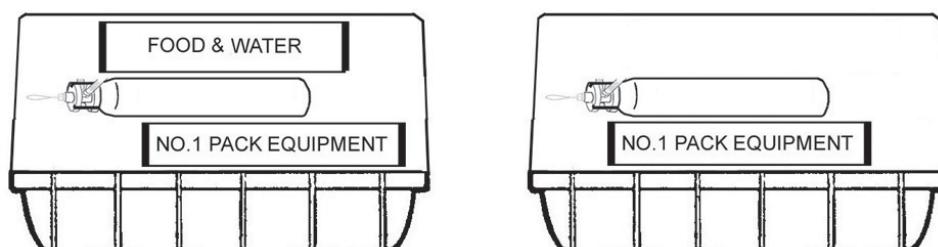
- (2) Pack 2, contains the water and food packs.

View AA shows the position and layout of both, (FIGURE 704).



NOTE: MAKE SURE WATER AND FOOD PACKS ARE EVENLY SPACED

Valise packing for 6-10 Person
FIGURE 704



Positioning of E-packs into the container (A& B Pack shown)
FIGURE 705

B. 16-20 Person, A & B-Pack

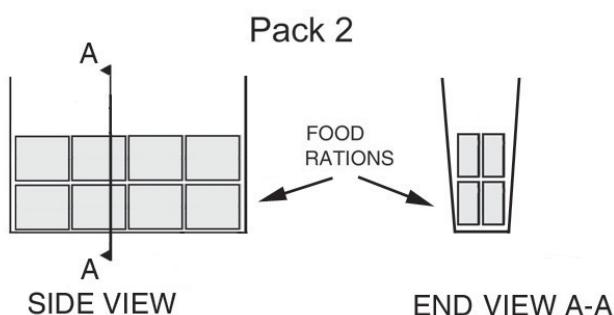
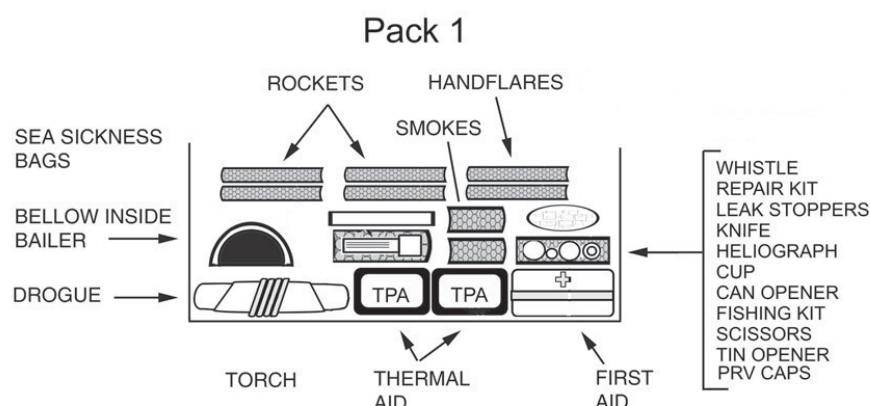
Arrange items into the valise as required, making sure the finished packs are long and thin. As a guide, a layout is shown but this can vary slightly, (FIGURE 706).

- (1) Pack 1, side view, shows the position and layout of the equipment, (FIGURE 706).

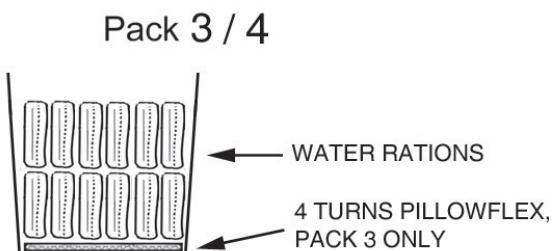
The following applies A-PACK ONLY

- (2) Pack 2, contains food rations only, (FIGURE 706).

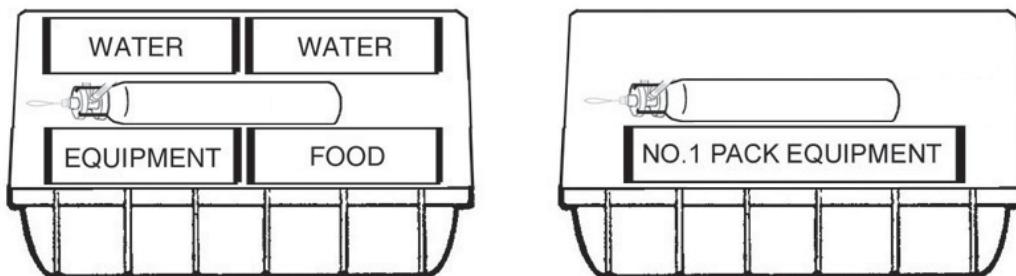
- (3) Pack 3 & 4, contains water only evenly split, (FIGURE 706).



NOTE: MAKE SURE WATER AND FOOD PACKS ARE EVENLY SPACED



Valise packing for 16 -20 Person, A & B-Pack
FIGURE 706



Positioning of E-packs into the container (A& B Pack shown)
FIGURE 707

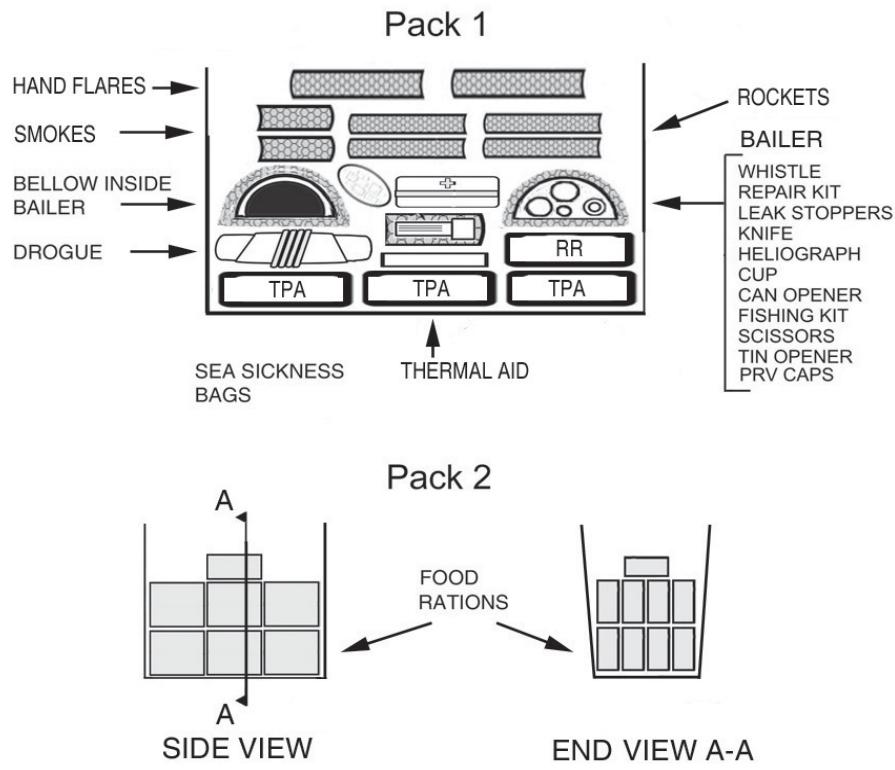
- (4) Placing the valises into the container for a 16-20 Person, A & B-Packs, is shown, (FIGURE 707).

C. 25 Person, A & B-Pack

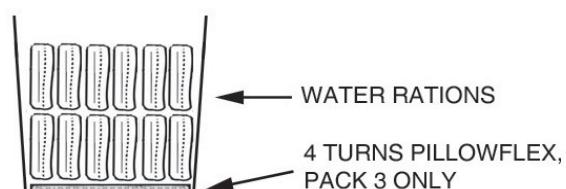
Place the equipment items into the Pack 1 valise as required, see (FIGURE 708), making sure the finished packs are long and thin:

- (1) Pack 1 side view, shows the position and layout of the equipment, (FIGURE 708).
 - Bellow is placed inside a bailer.
 - Small equipment is placed inside a bailer and wrapped with 5 turns pillowflex.
- (2) Pack 2 contains food rations, 25 off, (FIGURE 708).
- (3) Pack 3 contains water, 12 off, (FIGURE 708).
4 turns of pillowflex put into base first.
- (4) Pack 4 contains water, 13 off, (FIGURE 708).
- (5) Placing the valises into the container for a 25 Person, A & B-Pack, is shown, (FIGURE 709).

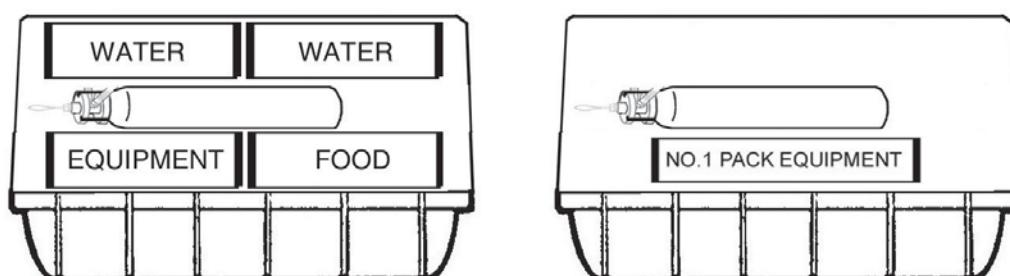
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Pack 3 / 4



Valise packing for 25 Person, A & B-Pack
FIGURE 708

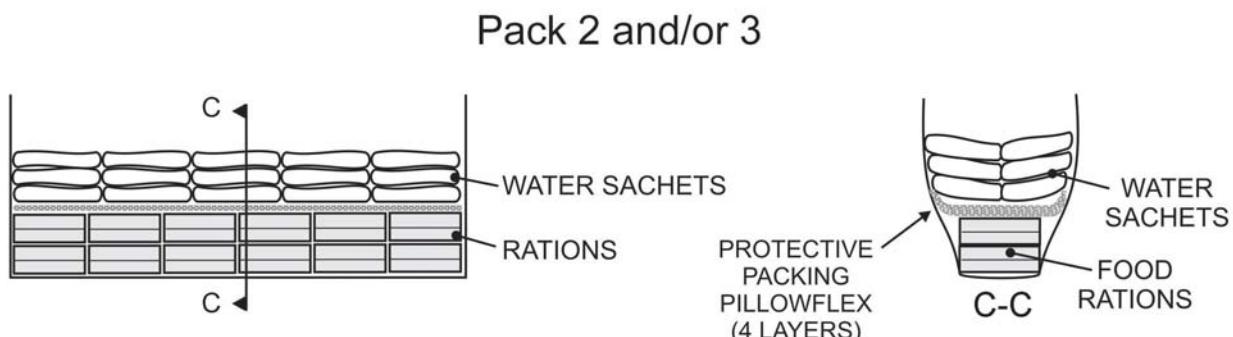
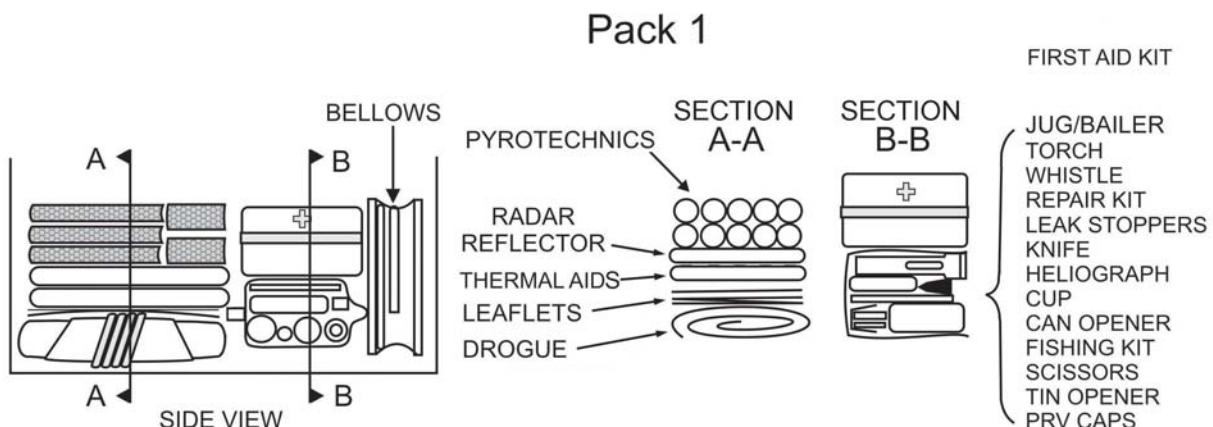


Positioning of E-packs into the container (A & B Pack shown)
FIGURE 709

D. Using a MK10 Size 4 container

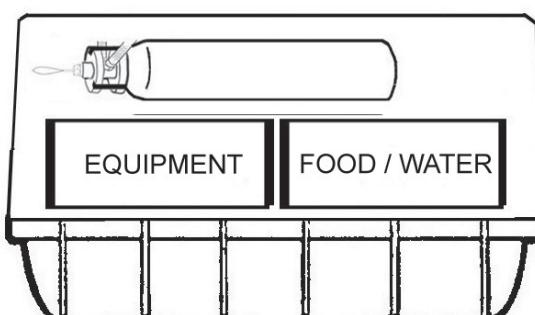
Place the equipment items into the Pack 1 valise as required, see (FIGURE 710), views AA and BB, making sure the finished packs are long and thin:

- (1) Pack 1, view AA and view BB, shows the position and layout of the equipment, (FIGURE 710).



NOTE: MAKE SURE WATER AND FOOD PACKS ARE EVENLY SPACED

**Valise packing for Mk10 (all sizes)
FIGURE 710**

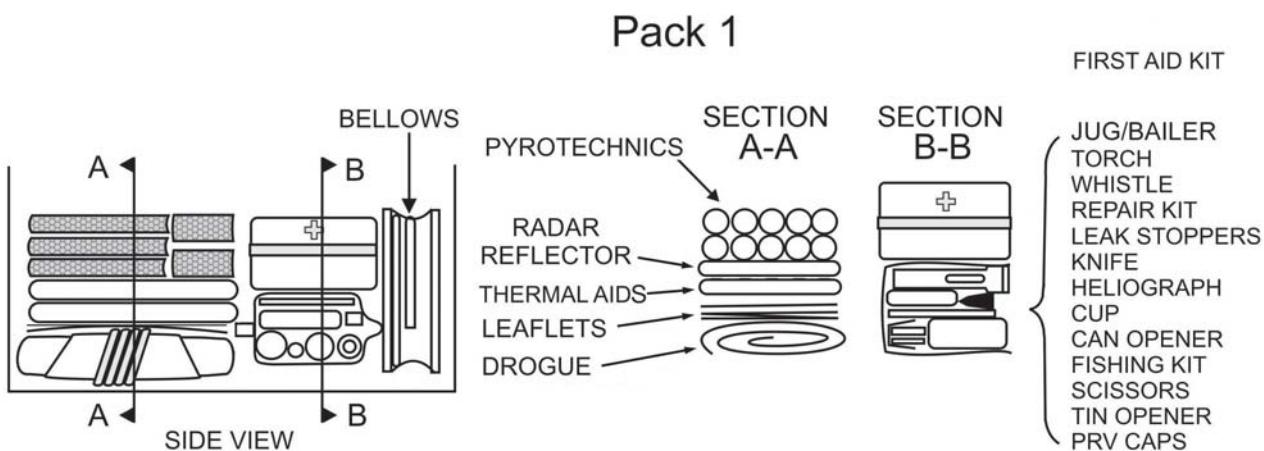


**Positioning the packs in MK10 container
FIGURE 711**

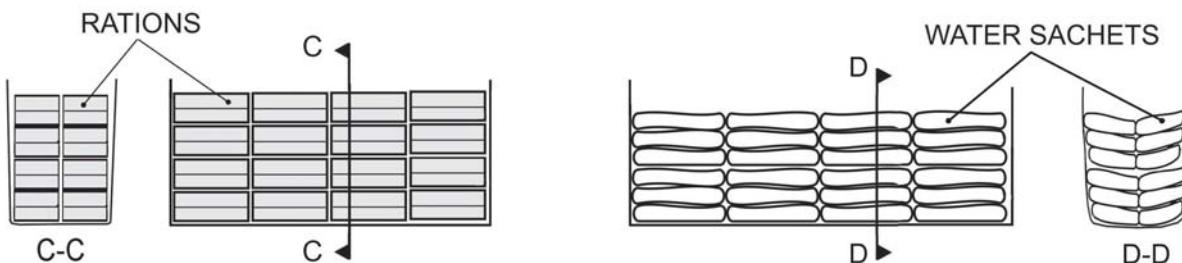
E. Using a MK14 Size 17 container

Place the equipment items into the Pack 1 valise as required, see (FIGURE 712), views AA and BB, making sure the finished packs are long and thin:

- (1) Pack 1, view AA and view BB, shows the position and layout of the equipment, (FIGURE 712).
- (2) Pack 2 and 3, view CC and view DD, shows the position and layout of the food and water, (FIGURE 712).

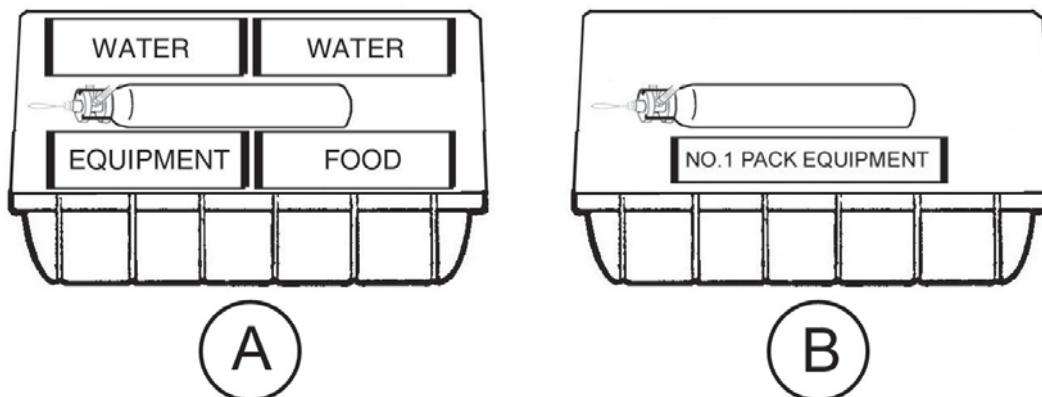


Pack 2 and 3



Valise packing for Mk14 (16-25 Person)
FIGURE 712

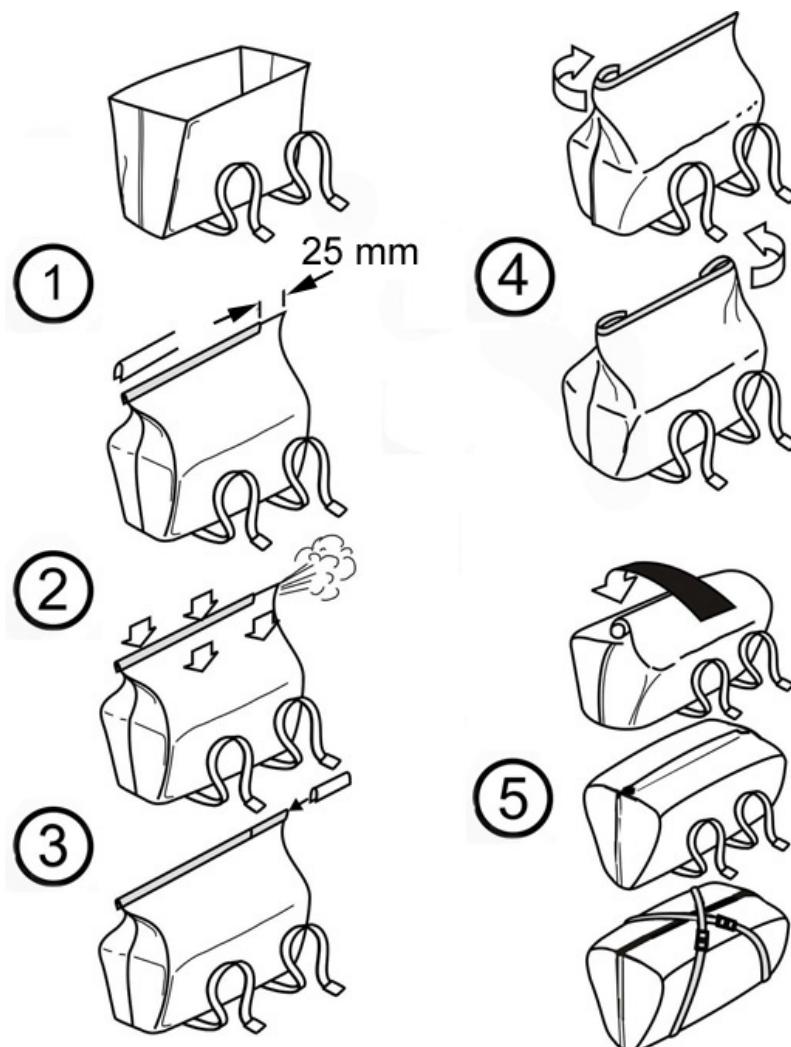
- (3) For 16, 20 and 25 Person the positions of the A-Packs in the MK14 container, (FIGURE 713A).
Pack 2 contains food rations only
Packs 3 & 4 contains only the water, (evenly spilt).
- (4) For 10 and 12 Person the position of the B-Pack, in the MK14 container, (FIGURE 713B).



Positioning the packs in MK14 container
FIGURE 713

4 Sealing the valise

1. Fold a length of 50 mm wide adhesive tape over the top opening of the valise leaving a 25 mm gap at one end, (FIGURE 714).
2. Insert a vacuum line and remove the air from the valise.
3. Withdraw the line and quickly seal the open part with tape.
4. Fold the 'ears' at the top of the valise inwards and down. Secure these with 50 mm wide adhesive tape, (FIGURE 714).
5. Roll down the excess valise tightly.
6. Attach the buckle straps together (FIGURE 714). Tie the flying ends together using a reef knot.



Sealing the valise
FIGURE 714

5 Extra foam protection

Drop height 18m-36m

- A. For liferafts with drop heights above 18 metres and below 36 metres, extra foam protection is added as follows;
Foam protection is used to protect Emergency packs that are in direct contact with the cylinder, (FIGURES 715, 716, 717 & 718).
Please refer to TABLE 705 for part numbers and quantities.

(i) Protection around No. 1 Emergency pack valise

NOTE: Use only where an “A-pack” emergency pack is used on raft sizes 10-25 Person Throw-Over, and 12-25 Person Davit Launch.

Protection Pad 1, is to be fitted as per FIGURE 715. The purpose of this pad, is to protect the No. 1 pack contents from both the liferaft inflation valves and the gas cylinder.

This Protection pad is to be fitted after the cylinder is positioned in the container and just prior to fitting the emergency pack.

(ii) Protection around No. 1 Emergency pack valise

NOTE: Use only where an “A-pack” emergency pack is used on raft sizes 4-8 Person.

Protection Pads 2 and 3 are to be fitted as per FIGURE 716. The purpose of these pads is to protect the No. 1 pack contents from both the liferaft gas cylinder and the inflation valves respectively.

Protection Pad 2, is to be fitted after the cylinder is positioned in the container and just prior to fitting the emergency pack.

Protection Pad 3, is to be fitted just after fitting the emergency pack.

(iii) Protection between Cylinder end & Emergency pack rations

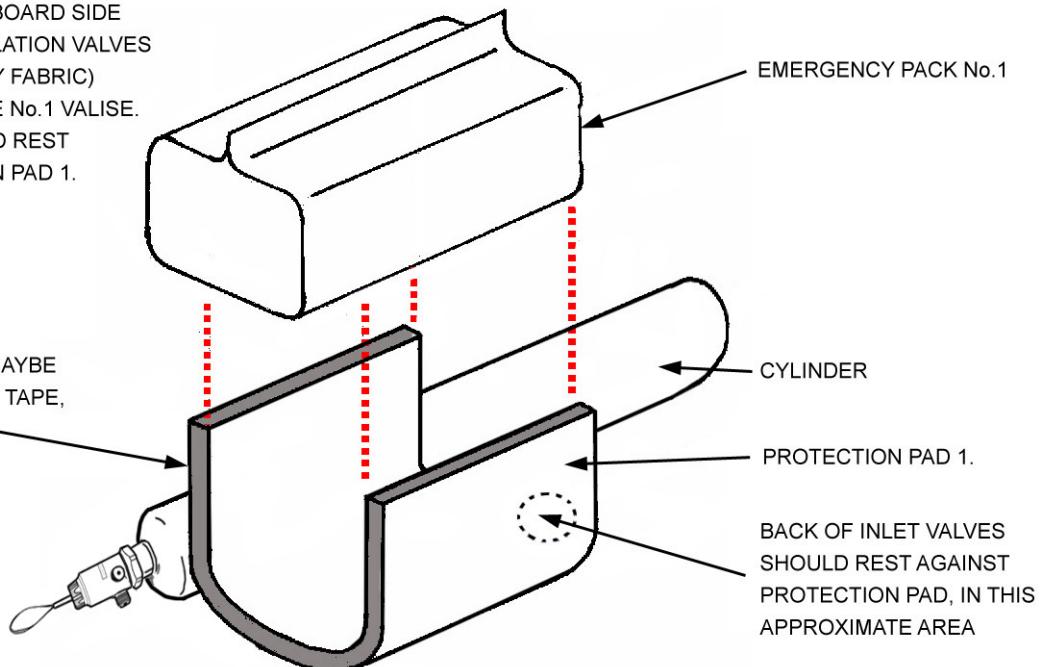
NOTE: Use only where an “A-pack” emergency pack is used on all raft sizes.

Protection Pad 4 is to be fitted as per FIGURE 717. The purpose of this pad is to protect the emergency pack rations from the end of the liferaft gas cylinder.

Protection Pad 4, is to be fitted after the cylinder is positioned in the container, just prior to fitting the emergency pack.

ENSURE THAT THE INBOARD SIDE OF THE LIFERAFT INFLATION VALVES (THROUGH BUOYANCY FABRIC) DO NOT CONTACT THE No.1 VALISE. INLET VALVES SHOULD REST AGAINST PROTECTION PAD 1.

PROTECTION PAD 1, MAYBE HELD IN PLACE USING TAPE, AS REQUIRED.



**Exploded view of Protection pad for A-Pack only.
(Raft sizes 10-25 Person Throw-Over, and 12-25 Person Davit Launch)**
FIGURE 715

EMERGENCY PACK FOAM PROTECTION SPECIFIC TO A-PACKS

Part Number	Description	Dimensions (mm)	Raft size	6	8	10	12	16	20	25
R50152002	Protection Pad 1	750 x 500 x 25	QTY	-	-	1	1	1	1	1
R50152003	Protection Pad 2	500 x 250 x 25	QTY	1	1	-	-	-	-	-
R50152004	Protection Pad 3	175 x 175 x 25	QTY	1	1	-	-	-	-	-
R50152001	Protection Pad 4	150 x 150 x 25	QTY	1	1	1	1	1	1	1

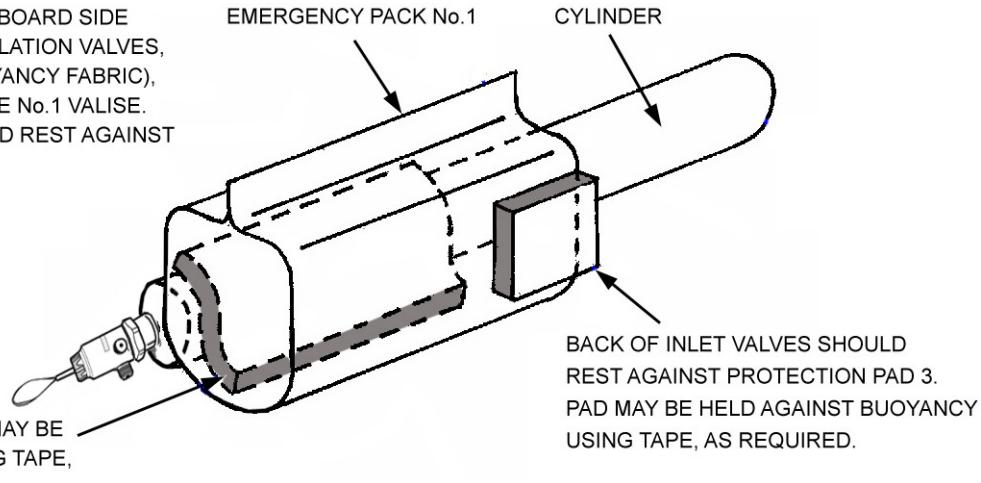
EMERGENCY PACK FOAM PROTECTION SPECIFIC TO B-PACKS

R50152005	Protection Pad 5	600 x 200 x 25	QTY	1	1	1	1	1	1	1
R50152006	Protection Pad 6	350 x 150 x 25	QTY	1	1	1	1	1	1	1

**Foam Protection for Emergency packs
TABLE 705**

ENSURE THAT THE INBOARD SIDE OF THE LIFERAFT INFLATION VALVES, (THROUGH THE BUOYANCY FABRIC), DO NOT CONTACT THE No.1 VALISE. INLET VALVES SHOULD REST AGAINST PROTECTION PAD 3.

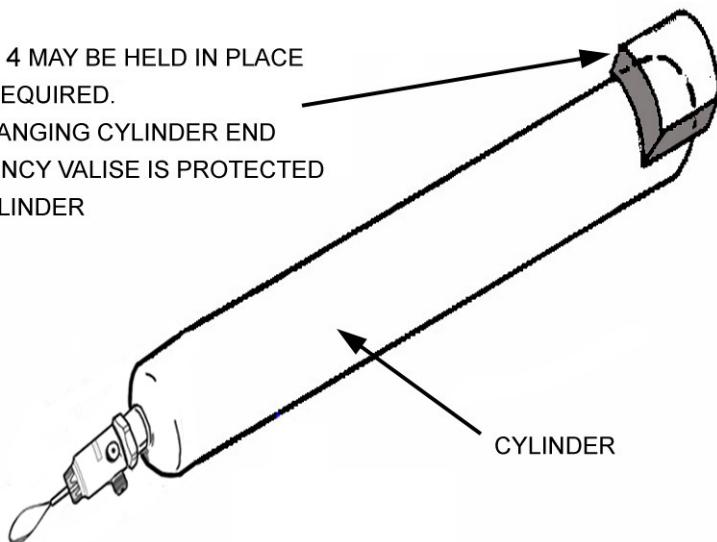
PROTECTION PAD 2 MAY BE HELD IN PLACE USING TAPE, AS REQUIRED.



**Assembled view of Protection pads for A-Pack only.
(Raft sizes 4-8 Person Throw-Over)**

FIGURE 716

PROTECTION PAD 4 MAY BE HELD IN PLACE USING TAPE, AS REQUIRED.
POSITION OVERHANGING CYLINDER END SO THAT EMERGENCY VALISE IS PROTECTED FROM END OF CYLINDER



**Assembled view of Protection pad for A-Pack only.
(All raft sizes)**

FIGURE 717

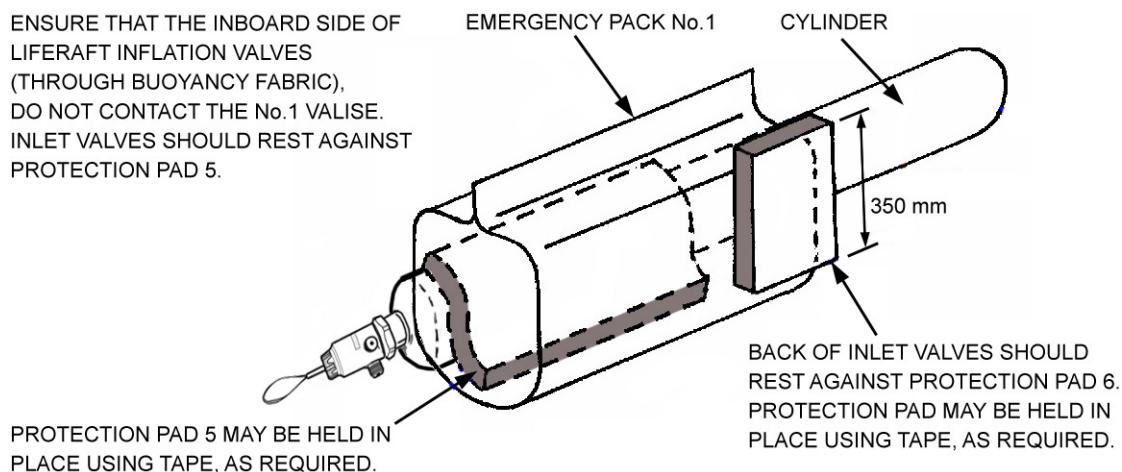
(iv) Protection around No. 1 Emergency pack valise

NOTE: Use only where a “B-pack” emergency pack is used on all raft sizes.

Protection Pads 5 and 6 are to be fitted as per (FIGURE 718). The purpose of these pads is to protect the No. 1 pack contents from both the liferaft gas cylinder and the inflation valves respectively.

Protection Pad 5, is to be fitted after the cylinder is positioned in the container and just prior to fitting the emergency pack.

Protection Pad 6, is to be fitted just after fitting the emergency pack.

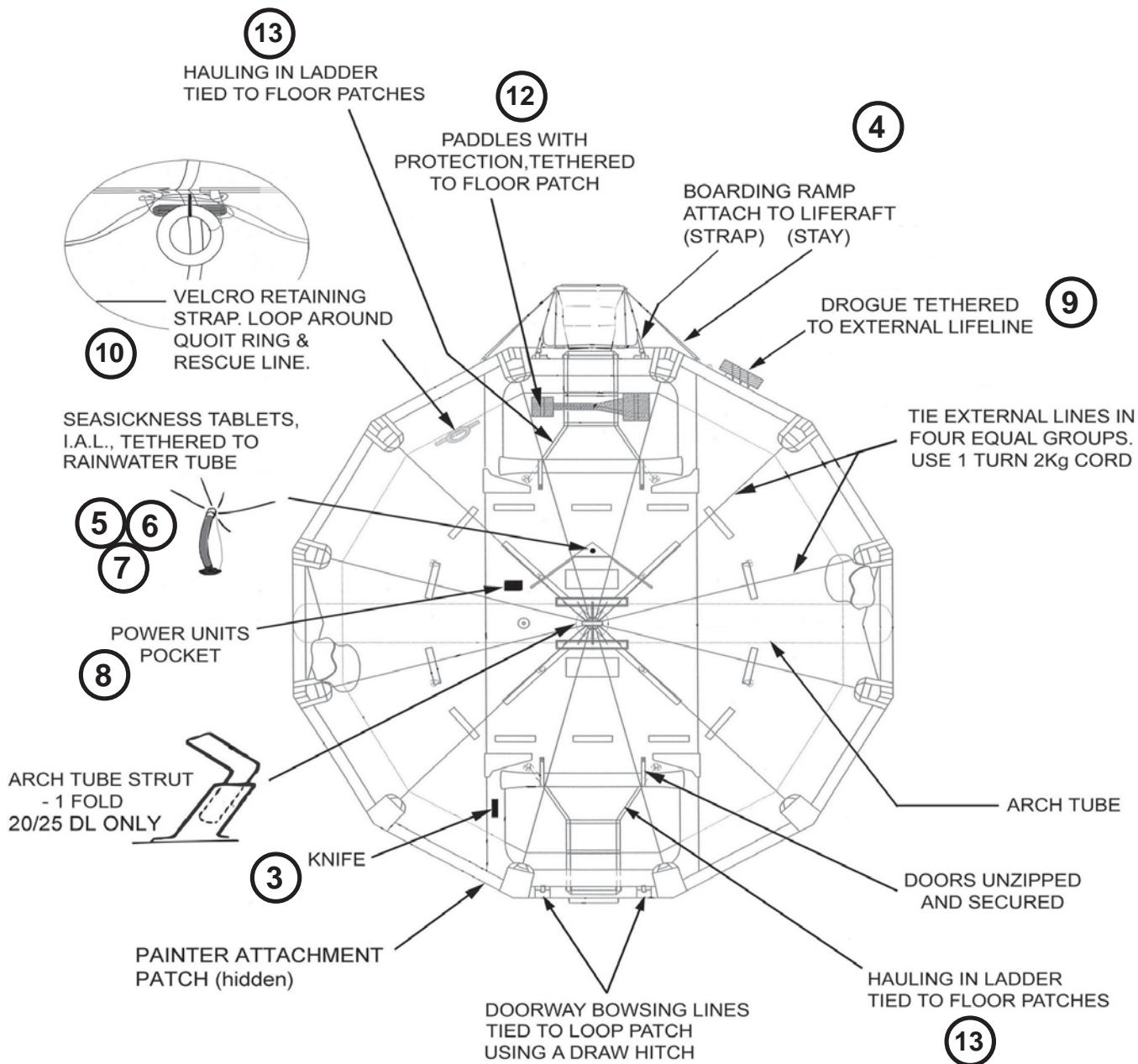


**Assembled view of Protection pad for the A-pack
(All Raft sizes)**

FIGURE 718

CHAPTER 8**ASSEMBLY**

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MK14 Size 17 Davit Launch liferafts	833
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7. Container Labelling	866



NOTE: The picture illustrated is 20/25 man raft.
Layout will be similar for other DL rafts.

**Preparation for packing assembly of Davit Launch
FIGURE 801**

SECTION 8 - ASSEMBLY

1. General

- A. The paragraphs of this chapter apply generally - unless a suitable qualification (in bold print) is present.
- B. The work area must be clean, dry and free from sharp projections, with a smooth working surface, preferably of vinyl material.
- C. Special Tools, Equipment and Materials:
 - (1) Refer to Chapter 10 for the list of relevant items that are required during the assembly and repacking of a liferaft.
- D. Throughout the description of packing, components which are listed within the Illustrated Parts List (Chapter 11) and consumables & equipment (Chapter 10) appear in *italic print*.
- E. Throughout preparation and packing of the liferaft and its associated equipment, all knots are to be bowlines with flying ends taped, using 25mm wide PVC self adhesive (SA) tape, unless stated otherwise. The ends of cords are to be heat sealed to prevent fraying.
- F. Ensure that during unpacking, preparation and repacking of the liferaft no moisture is introduced to the liferaft.
- G. The liferaft must be completely dry before packing.

2. Preparation of the Liferaft

For each liferaft, carry out the following operations (Refer to FIGURE 801 for Davit Launch or to FIGURE 835 for Throw Over):

- (1) Fit adaptors and valved sockets (female couplings) to the inflate/deflate valves.
- (2) Fit a plug, tail (male coupling) to a low pressure air line and to the manometer feed line. Connect the low pressure air line to each inflate/deflate valve as necessary. Inflate the liferaft to approximate working pressure.

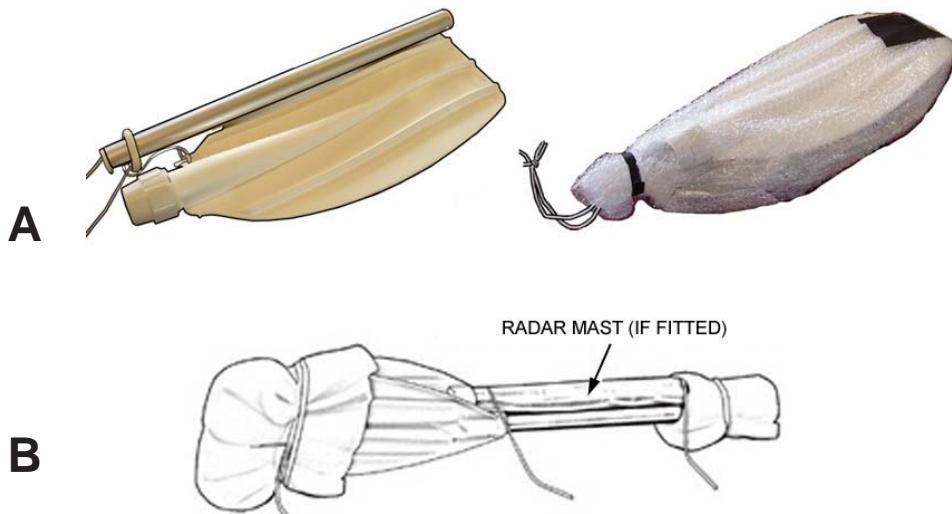
NOTE: Inflation of the liferaft is advised to ensure correct fitting and rigging of the equipment, and to ensure the liferaft is the right shape for packing after deflation.

DSB Deutsche Schlauchboot D-37632 Eschershausen Germany	Service Manual SOLAS - M260 LR05 6-25 Persons Part.No.: 08196009	ASSEMBLY Page 803 Issue2: Feb 09
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- (3) Tie off the *floating safety knife* to its appropriate patch (FIGURE 801). Wrap the tethering cord around the handle and place the blade through the elasticated loop and into its protective sheath. Ensure that the loop securely holds the handle and traps the tethering cord.
- (4) Using 23 Kgf cord, tie the *paddles* together at each end, with protection foam, (FIGURE 804A or B) and tie them to the internal lifeline (FIGURE 801).

If there is a radar reflector fitted, secure any mast along with the *paddles*. Tie the *paddles* and radar mast independently to the hauling in ladder patch for the rear door.

- (5) Tie off the *anti-seasickness tablets* in their *labelled bag*, (FIGURE 801).
- (6) Tie the *immediate action leaflet* to the rain-water tube using 23 Kgf cord.
- (7) Fit the *rubber plug* to the rain-water catchment tube.



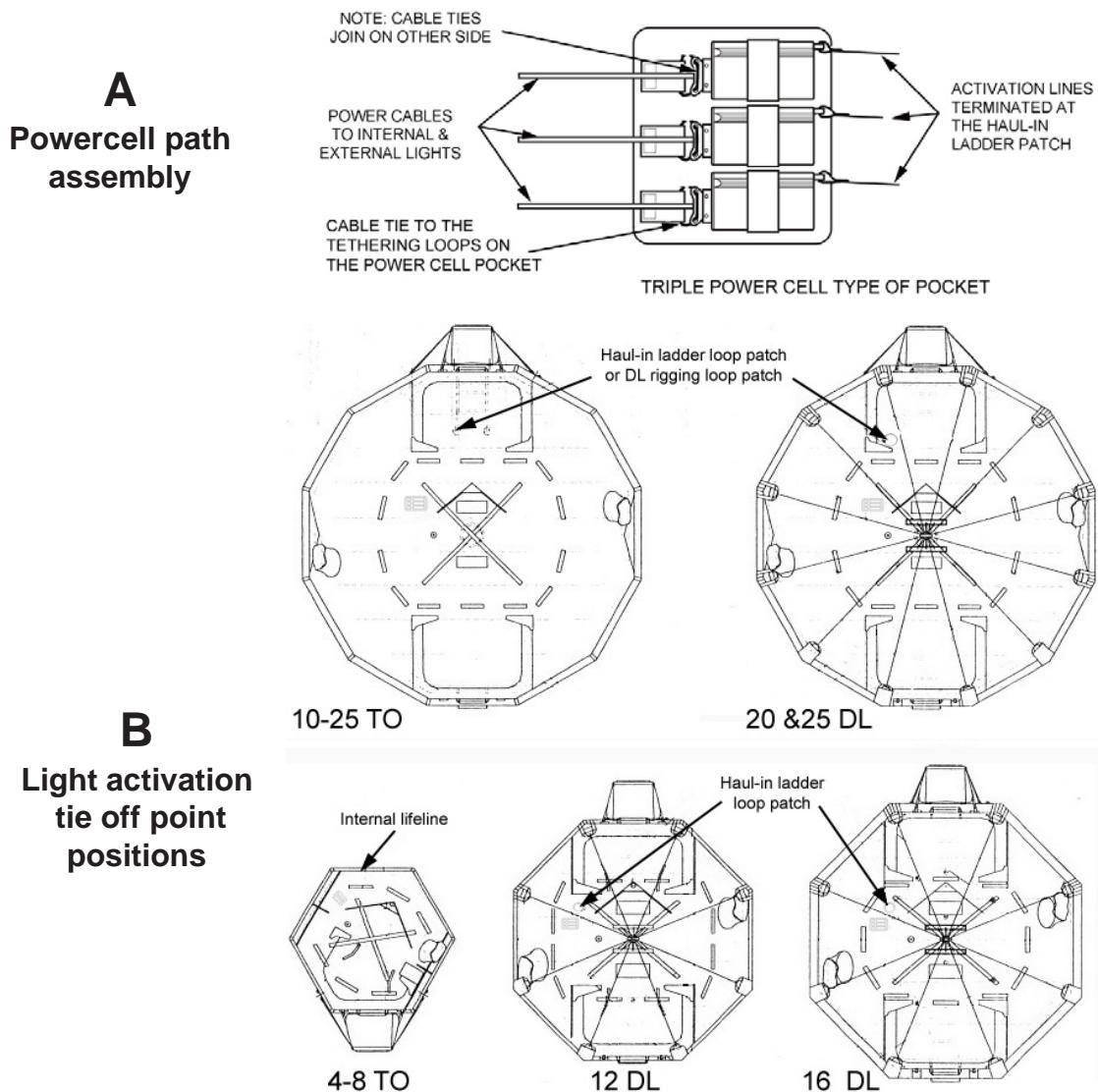
Paddles tied and padded
FIGURE 802

(8) Install the lighting system.

(a) RL1/RL4/RB2 lighting system

Insert three power units into each of the battery pockets (FIGURE 803A). Insert the lamp plugs into the power units ensuring the detents have engaged. Secure each plug to the adjoining tethering loop, using light cable ties, (05789009). Ensure the cable tie join is into the tethering loop.

Depress the test switches to check that each respective lamp unit illuminates. The external flashing unit shall not operate unless both power units are switched on. For each power unit, take the appropriate length of 23 Kgf thread, (please refer to Chapter 1, TABLE 102), and tie one end through the switch release pin. Secure them to the nearest Light activation tie off point (FIGURE 803B) with a bowline. Seal flying ends with 25mm PVC tape (02096004).



Preparation for packing - RL1/RL4/RB2 lighting system
FIGURE 803

(b) RL5 lighting system (external lamp unit)

Two types of top mounting patch are available for the RL5 external lamp unit. Both are located in the same position on the top of the liferaft canopy.

1. Top patch with slits

- (i) This operation is best performed with the arch-tube deflated.
- (ii) From outside the liferaft, pass the connector and all of the cable from the External lamp unit into the hole on the patch on the top of the liferaft, (FIGURE 804).
- (iii) Slide the External lamp unit into half the patch, (FIGURE 805a).
- (iv) Secure the remaining half of the External lamp unit into the patch, (FIGURE 805b).



(a) External lamp unit connector



(b) Top patch on Liferaft

**Top patch assembly
FIGURE 804**

(a) External lamp unit partially fitted.



(b) External lamp unit fully installed

**External lamp installation
FIGURE 805**

2. Top patch with velcro fasteners

- (i) This operation is best performed with the arch-tube deflated.
- (ii) Open the velcro fastener on the top patch.
- (iii) From outside the liferaft, pass the connector and all of the cable from the External lamp unit through the open fastener into the hole on the patch on the top of the liferaft, (FIGURE 806).
- (iv) Slide the External lamp unit into the patch, (FIGURE 807a).
- (v) Close the Velcro fastener to secure the External lamp unit in position, (FIGURE 807b).



**Top patch assembly, Velcro variant
FIGURE 806**



(a) External lamp unit partially fitted



(b) External lamp unit fully installed

**External lamp installation, Velcro variant
FIGURE 807**

(c) Installing the Internal RL5 lamp unit

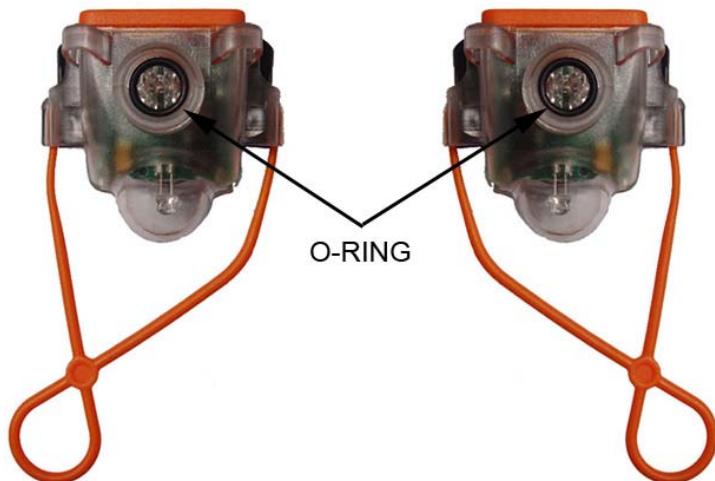
WARNING: KEEP THE INTERNAL LAMP UNIT AWAY FROM ANY SOURCE OF IGNITION. DO NOT HEAT THE INTERNAL LAMP UNIT ABOVE 65 °C OR BURN IT. THE CONTENTS OF THE POWER UNIT ARE FLAMMABLE. REFER TO THE MANUFACTURER'S DATA SHEET.

WARNING: DO NOT OPEN, CRUSH OR PUNCTURE THE INTERNAL LAMP UNIT. THE CONTENTS OF THE BATTERY ARE TOXIC AND CORROSIVE. REFER TO THE MANUFACTURER'S DATA SHEET.

WARNING: IF THE CHEMICALS FROM THE INTERNAL LAMP UNIT BATTERY TOUCH SKIN, CLOTHING OR EQUIPMENT, WASH THEM WITH LARGE QUANTITIES OF COLD WATER. REFER TO THE MANUFACTURER'S DATA SHEET.

The RL5 internal lamp is inserted into the existing retaining patch on the bottom centreline of the arch-tube, inside the raft. The existing patch on the inside of the canopy which held the RB2 batteries for the old lighting system is now obsolete.

1. Remove the protective cup and disc from the external lamp connector .
2. For 4-8 person liferafts attach the switch activator as shown in (FIGURE808a). For 10-25 person liferafts attach the switch activator as shown in (FIGURE 808b). Ensure the 'O' ring is seated correctly.



(a) Switch activator 4-8 person liferaft (b) Switch activator 10-25 person liferaft

External lamp installation, Velcro variant
FIGURE 808

3. Locate the Internal lamp retaining patch located on the bottom centreline of the arch-tube, inside the liferaft, (FIGURE 809).
4. Place the internal lighting unit in the patch and secure, (FIGURE 810a)
5. Attach the connector for the External lamp unit, (FIGURE 810b).
6. Locate the appropriate Battery activation line (please refer to Chapter 1, TABLE 102).
7. Tie one end to the Switch activator using a Bowline knot, tape flying end.
8. Tie the other end to the tying locations a Bowline knot, tape flying end. (4-8 person uses the rear lifeline, 10-25 person uses a haul-in ladder patch).



Internal lamp retaining patch
FIGURE 809



(a) Securing the Internal lamp unit



(b) Connecting the cable from the external lamp unit.

Internal lamp unit assembly
FIGURE 810

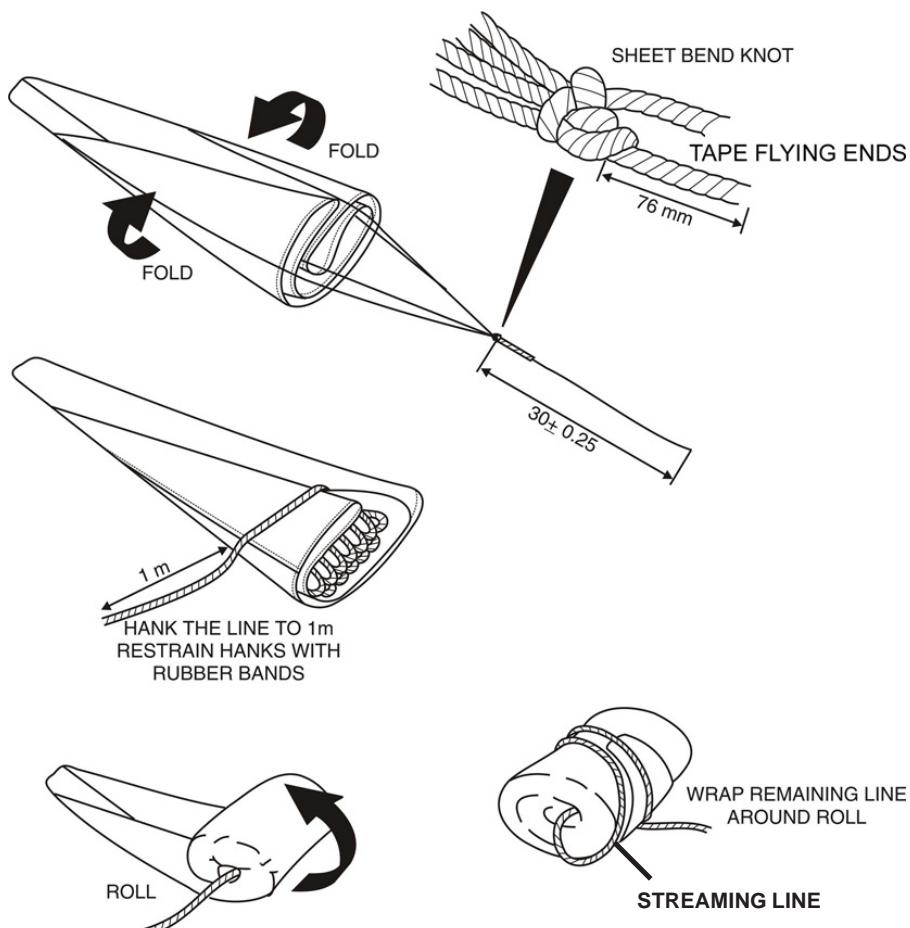
- (9) Fit the streaming line to the *drogue patch* adjacent to the *boarding ramp* using a bowline knot. Secure the flying end with 25 mm wide SA tape.

For DAVIT LAUNCH: Tie in the rolled *drogue* to the outer lifeline using 4 turns of *4 Lbs nylon breaking thread* and a reef knot. Carefully cut and discard the elastic bands.

For THROW OVER: Carefully cut and discard the elastic bands. The rolled *drogue* is placed on the raft fold, just before raft rolling.

If the *drogue* assembly has been unrolled for any reason, it must be reassembled as follows (FIGURE 811):

- Flake the six attached cords and the single streaming line into the body of the drogue until approximately 1.8 m of line remains outside.
- Roll up the drogue from the ends. Stop the drogue from unrolling by temporarily securing it with two elastic bands.

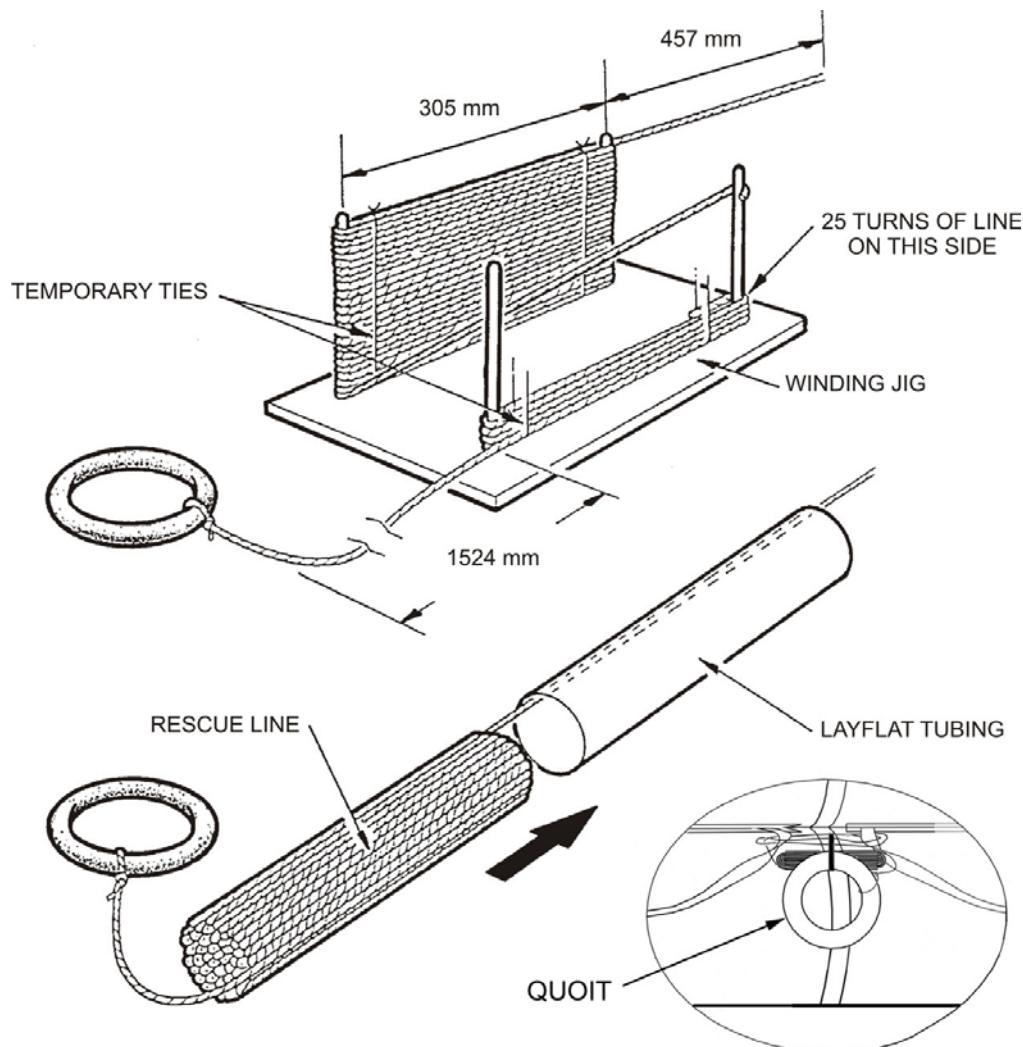


Preparation for packing the Drogue
FIGURE 811

- (10) Attach the end of the *rescue line and quoit* through the lifeline, using lark foot connection. Use the velco retaining strap to retain the quoit and rescue line to the liferaft, (FIGURE 801).

If the *rescue line and quoit* has been dismantled, it must be reassembled as follows, (FIGURE 812):

- (a) Construct a simple winding jig. Leaving 1.2 m free, wind the cord 25 times around the posts, finishing at the post furthest away from the spare cord. Temporarily secure the wound cord with ties or adhesive tape.
- (b) Take the cord diagonally across the jig to the bottom of the remaining front post and wind the cord a further 25 times around the posts finishing with approximately 450 mm of spare cord. Temporarily secure.
- (c) Attach the quoit to the cord at the end where winding started, using a bowline knot. Tape over the bowline and flying end with 25mm wide adhesive tape.
- (d) Bring the 450 mm end back to the same end as the quoit. Remove the ties or adhesive tape and push all the cord into the polythene layflat tube.
- (e) Make a loop on the rescue line cord, opposite end to the quoit attachment. This loop must be prepared using a bowline knot, followed by one overhand 'lock' knot. Tape over the tail end using 25 mm wide PVC (SA) tape, (FIGURE 813).

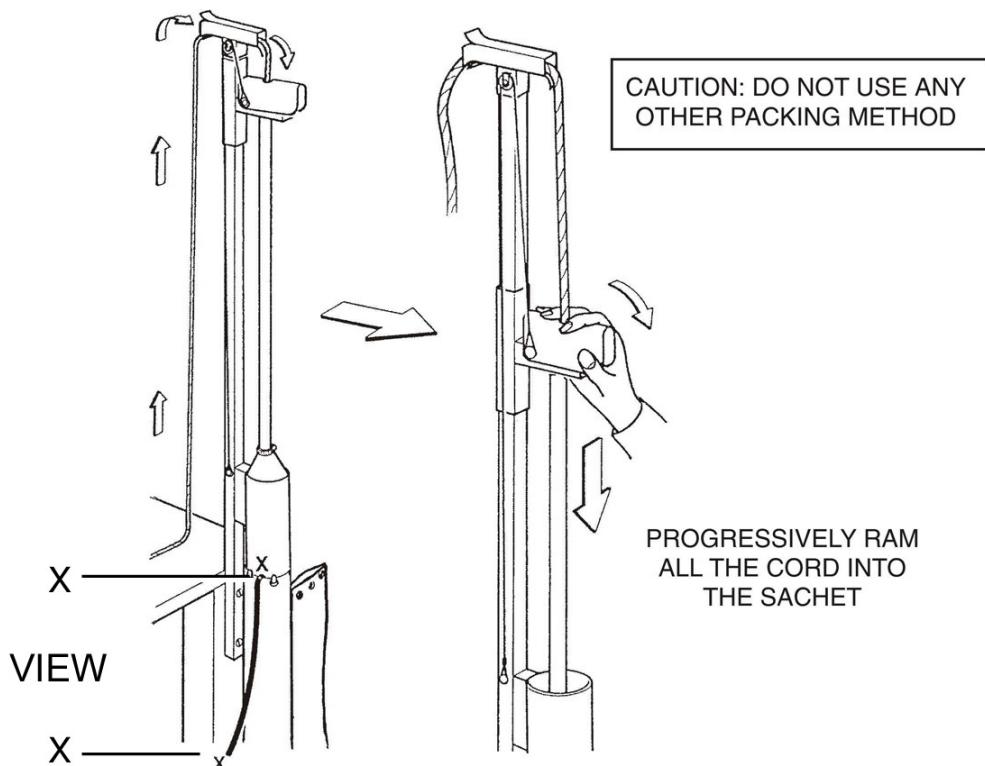


Preparation and fitting the Lifeline and Quoit
FIGURE 812

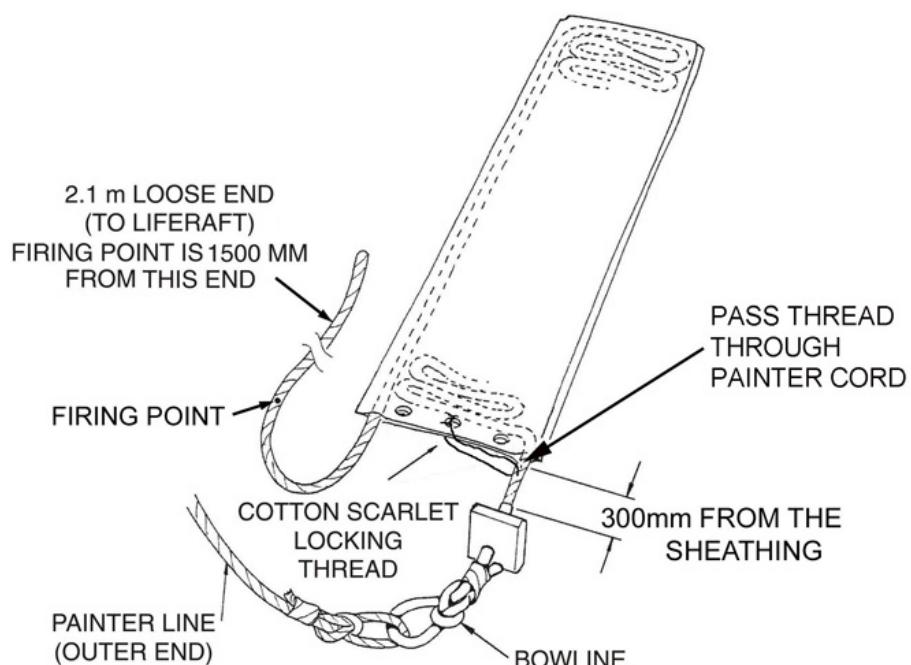


Rescue Line and Quoit assembly
FIGURE 813

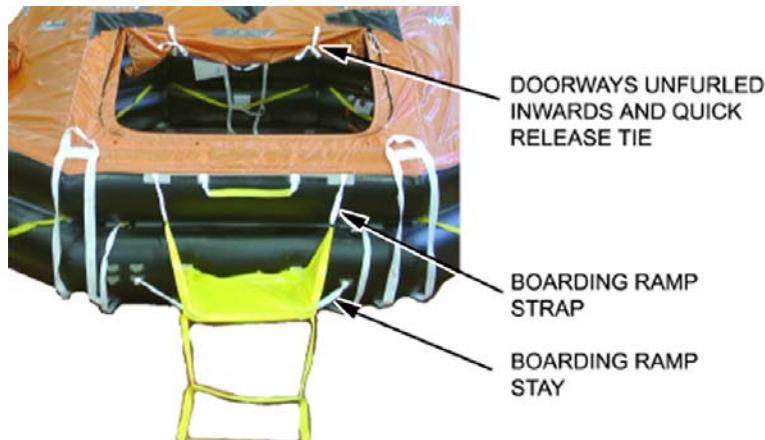
- (11) If the painter line has been removed from its sachet, it must be repacked as follows, (FIGURES 814 & 815):
- Take the painter line (FIGURE 814) and disconnect the painter extension. Pass the unsheathed end of the main painter through the top of the painter loading machine and into the sachet. Extract the end so that the firing point, marked in black, plus 600mm of cord protrude from the sachet, 2100mm in total (FIGURE 814 view X-X).
 - Holding the line in this position, push the main part of the line to the bottom of the sachet. Progressively ram the remaining length into the compartment, using the plunger of the loading machine, until the cordage protruding measures 300 mm to the start of the rubber sheathing, (FIGURE 815).
 - Double compartment sachets:
Proceed as for a single compartment sachet and when the first compartment is filled carefully detach the sachet from the machine and reattach it to the empty compartment.
Push the line down this compartment, keeping it next to the welded seam which separates the two compartments of the sachet. Again, using the loading machine, progressively ram the remaining line in and complete as above.
 - Pass cotton scarlet thread through each pair of holes in the end of the sachet and tie off using reef knots, 1 turn only. The tie at the holes nearest the painter outer end, must pass also through the painter cord, (FIGURE 815).
- (12) Check that all doorways are unzipped and properly furled (inwards). Tie the doorways using a half bow knot for quick release. Secure open with their tie tapes, (FIGURE 801 & 816).
- (13) Attach the boarding ramp straps and stays to the liferaft (FIGURE 801 & 816). Ensure each are attached correctly.
- (14) Tie the hauling-in ladders to the ladder floor patches using a draw hitch knot, (FIGURE 801). These should be taut when inflated.



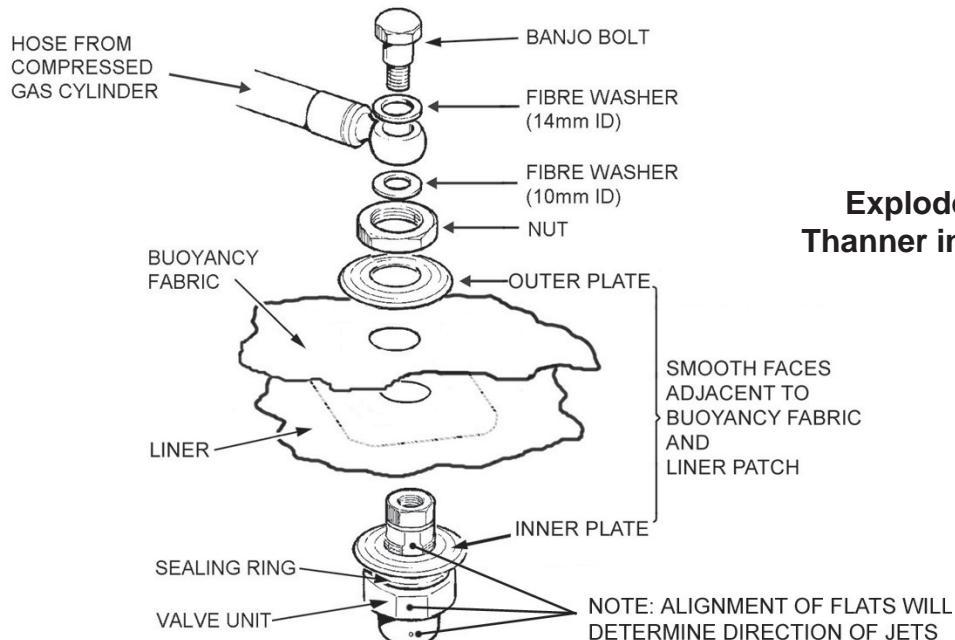
Painter sachet loading machine
FIGURE 814



Painter assembly detail
FIGURE 815



Boarding ramp and doorways
FIGURE 816



A
Exploded view of
Thanner inflation valve

B
Attaching a leafield
inflation valve



Exploded view of Inflation valve
FIGURE 817

3. Inflation system preparation

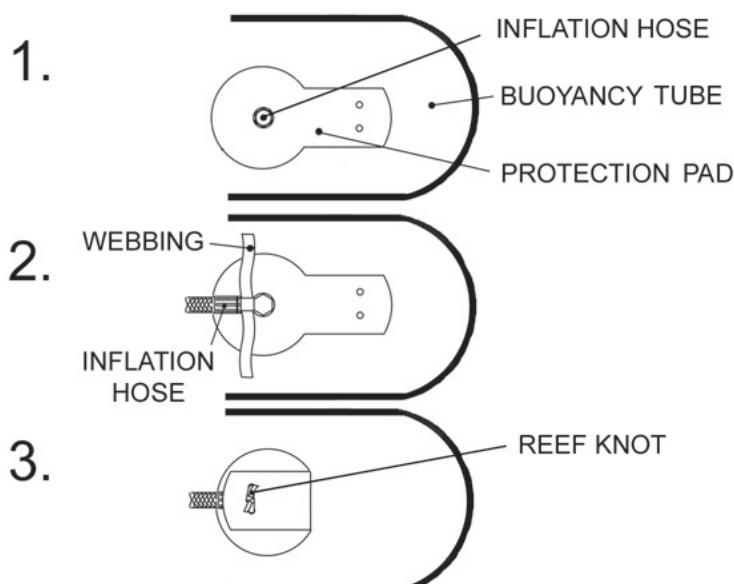
- (1) Insert deflators into the inflate/deflate valves of buoyancy chambers and deflate fully each compartment.
- (2) For a Thanner inflation system, attach an inner washer,a hose, a outer washer and banjo bolt to the inflation valves, (FIGURE 817A). Hoses should be aligned horizontally. For correct Torque value please refer to Refer to TABLE 101.

For a Leafield inflation system, check the 'O-ring' is located in the valve and attach a hose using the quick-fit connector (FIGURE 817B). Hoses should be aligned horizontally.

- (3) Ensure that the *inflation valve* has not rotated from its original position. Jets should be aligned axially along the buoyancy chambers.

CAUTION: USE ONLY A TEST CYLINDER AND HOSE DESIGNATED FOR THE FOLLOWING STEP.

- (4) While the liferaft is deflating and the tubes have become soft, check the function of each liferaft *inflation valve*. To do this use bursts of compressed CO₂ air or nitrogen for 5 to 10 seconds to ensure proper function. Check while test blasting that there are no leaks coming from the valves.
- (5) Fit the *valve protection pad*, (FIGURE 818), 1 for each *inflation valve*, 2 in total. Secure them with a reef knot.



**Inflation valve pad protection
FIGURE 818**

WARNING

A FULLY CHARGED CYLINDER CAN BECOME A LETHAL PROJECTILE IF DISCHARGED TO ATMOSPHERE WHEN NOT FITTED WITH A RECOIL CAP. ALWAYS FIT A RECOIL CAP TO A CYLINDER VALVE OUTLET WHEN HANDLING A FULLY CHARGED CYLINDER.

CAUTION:

RELIABLE FUNCTIONING OF AN OPERATING HEAD DEPENDS UPON SCRUPULOUSLY OBSERVED RESETTING PROCEDURES. DO NOT TRY TO RESET BY FORCING THE CABLE BACK INTO AN ASSEMBLED HEAD.

- A. Check and if required, reset *operating heads* in accordance with the manufacturer's instructions found in, List of associated publications.
- B. Refer to the List of Associated Publications for the correct filling data for gas cylinders and to the Illustrated Parts List for correct cylinder application. Check the weight of the gas cylinder against the data printed on the cylinder label. Reject a cylinder if the data on the label is illegible. Disassemble, check, test, assemble and charge cylinders as required. Ensure all work on gas cylinders, is carried out correctly by skilled and experienced persons.

4. Container preparation (F&G Range)

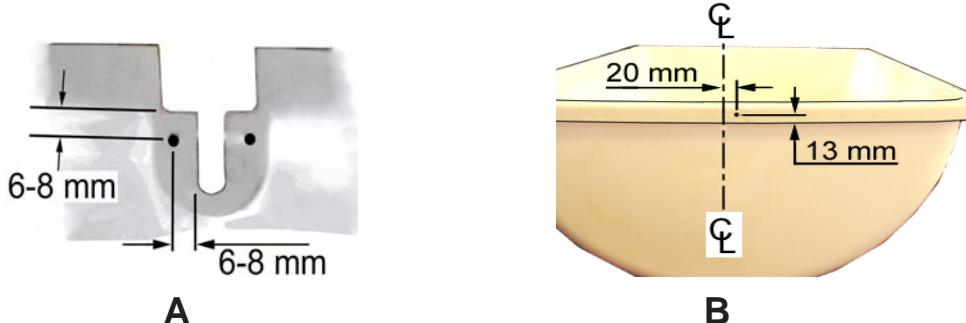
- A. The following preparation is used for all Throw Over liferafts with A-Pack. Containers 6/8F, 10/12F, 16/20F and 25G;

TABLE 801 shows the number of polystyrene blocks that are required to be inserted into the container lid. The polystyrene blocks prevent the liferaft from moving forward during the closing of the container.

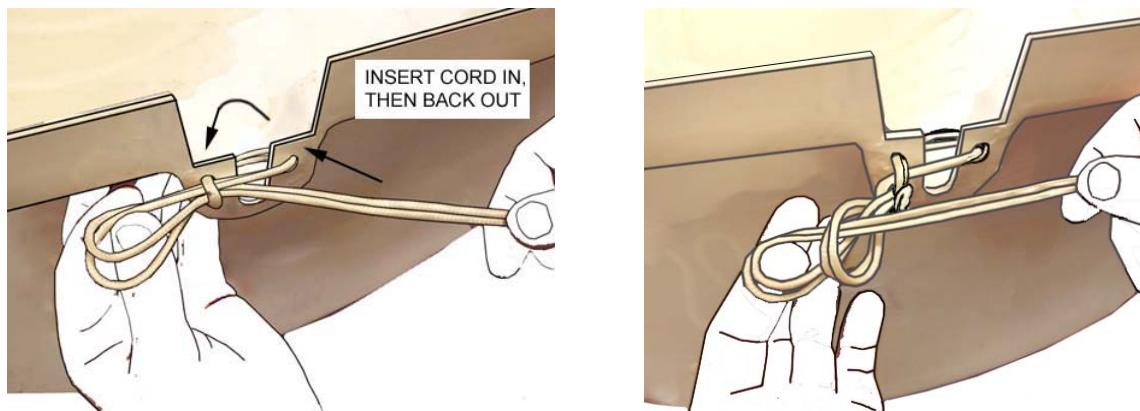
A-PACK	THROW OVER						
	6	8	10	12	16	20	25
6/8 F	2	2					
10/12 F			4	2			
16/20 F					4	4	
25 G							2

Number of foam blocks required
TABLE 801

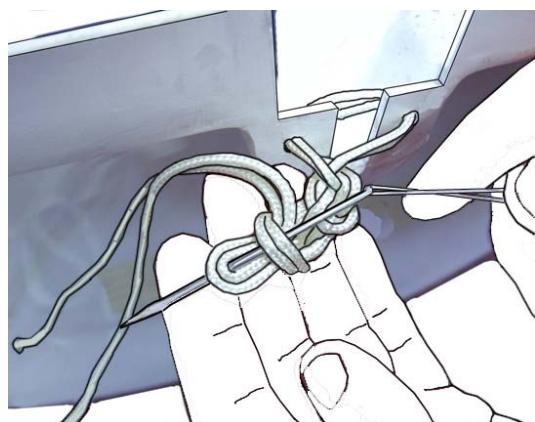
1. Drill two, 6 mm holes in the top half of the container, in the positions shown in, (FIGURE 819A).
2. Drill one, 6 mm hole in the bottom half of the container, in the position shown in, (FIGURE 819B).
3. Cut a length of 525 Lb cord, 1 meter long. Fold the cord in half and mark the centre.
4. Insert the doubled cord through the drilled hole in the container top half, in the direction shown, (FIGURE 820A). Push the cord back out through the remaining hole.



Container drilled
FIGURE 819

**A****B**

Dutch lacing
FIGURE 820



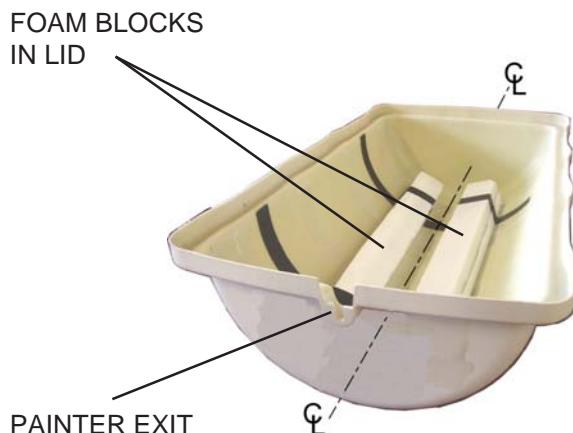
Secure the Dutch lacing
FIGURE 821

CONTAINER SIZE	POLYTHENE SHEET LENGTH
4N & 6/8F	2.3 Metres
10/12F & 16/20F	2.5 Metres
25G	2.7 Metre

Polythene sheet lengths
TABLE 802

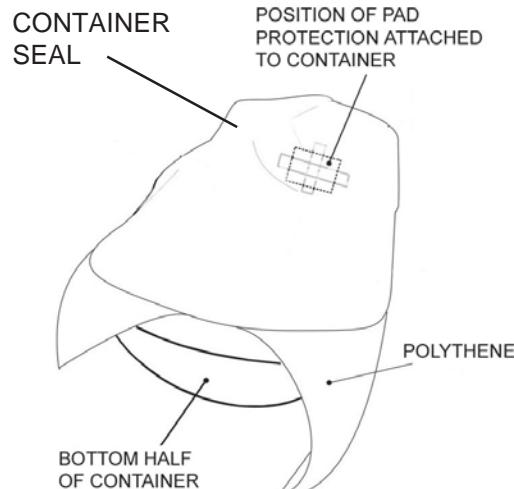
NOTE: Orientation of the container half.

5. Form a loop as shown in (FIGURE 820A). Using Dutch lacing, continue making a further two passes, FIGURE 820B). Ensure lacing is pulled tight after each pass.
6. Using 500 mm of 4 kg breaking thread, secure the Dutch lacing, (FIGURE 821). Sew through twice and tie with three overhand knots.
7. Tape the required *polystyrene blocks*, to the inside of the container lid (FIGURE 822A). The blocks are placed just off the centre line of the lid.
8. The container top half can now be set aside until it is required later.
9. The *container seal*, fitted to the lower container half, shall be replaced. Use grey self adhesive foam strip.
10. Fix 1 piece of pad protection foam to the container base, where the cylinder head is situated, (FIGURE 822B). This foam pad prevents the cylinder head from impacting the container during handling and deployment.
11. Line the bottom half of the *container* with a polythene sheet, (FIGURE 822B). Please refer to TABLE 802 for recommended lengths for each container type.
12. Make sure the polythene sheet overlaps the front edge of the *container* by 200 mm. Use temporary lengths of tape to secure the polythene in place.



Foam blocks in container lid

A



Container base lined with foam

B

Preparation of Throwover container with A-Pack
FIGURE 822

- B. The following preparation is used for all Throw Over liferafts with B-Pack. Containers 4N, 6/8F, 10/12F and 16/20F;**

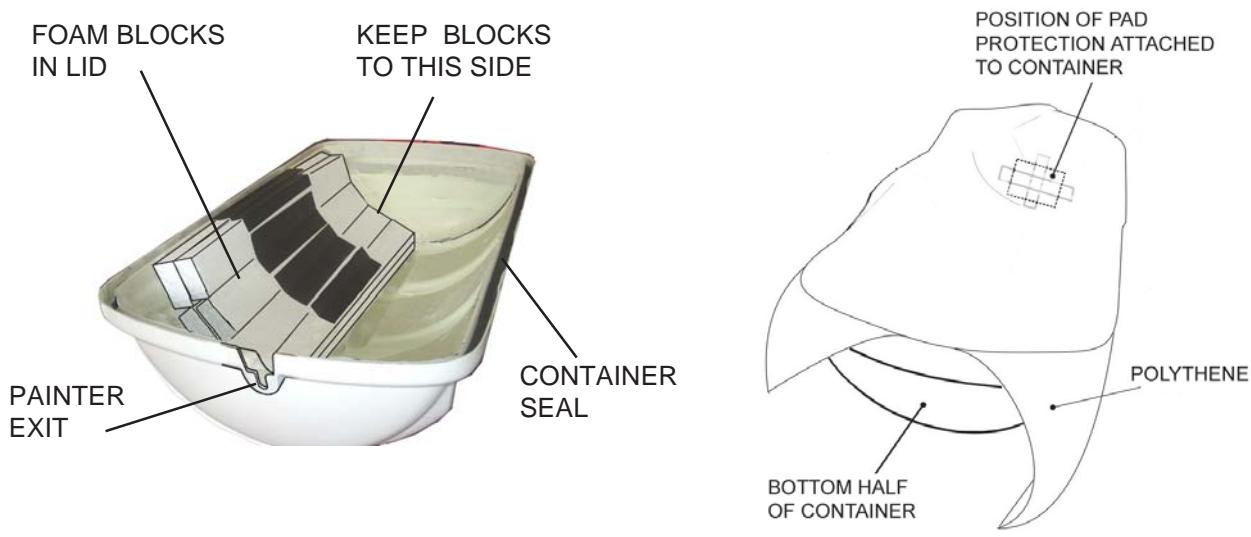
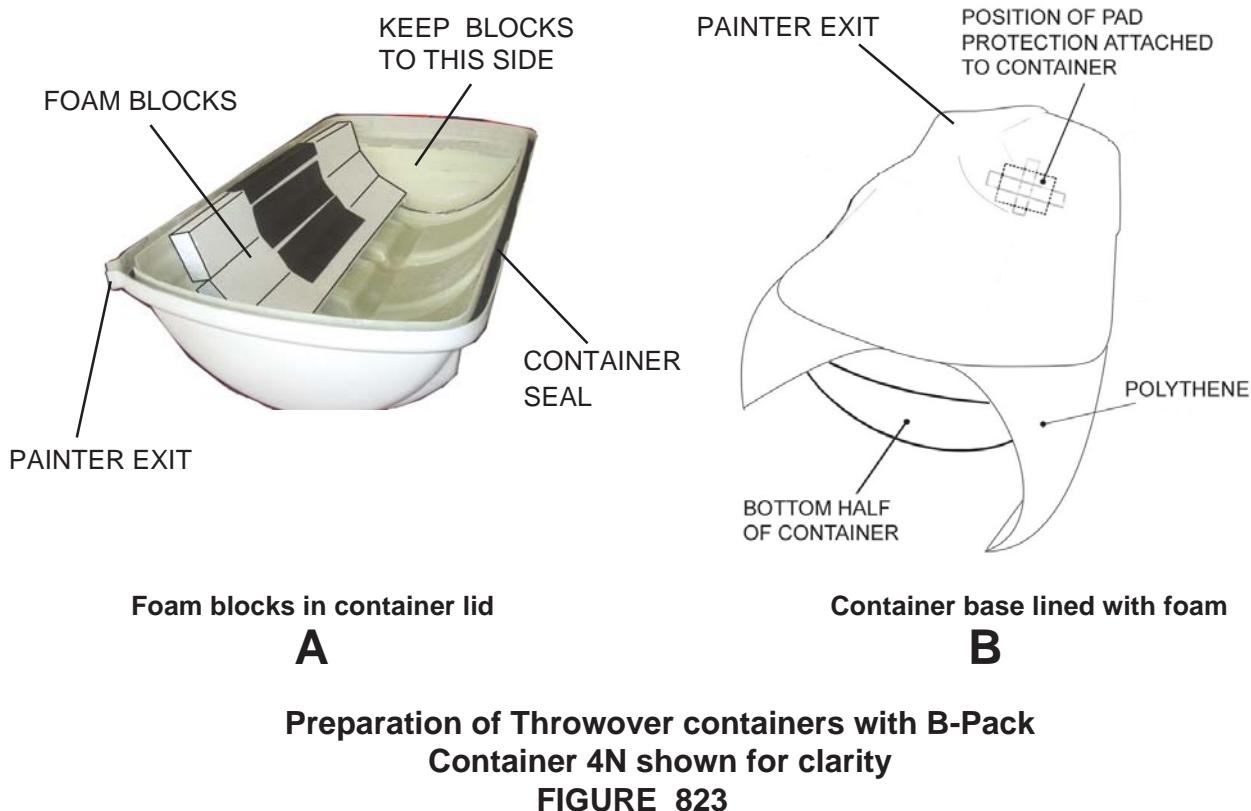
TABLE 803 shows the number of polystyrene blocks that are required to be inserted into the container lid. The polystyrene blocks prevent the liferaft from moving forward during the closing of the container.

B-PACK		THROW OVER						
Raft size		6	8	10	12	16	20	25
4 F	3	3						
6/8 F			3	3				
10/12 F					8	3		
16/20 F							3	

**Number of foam blocks required
TABLE 803**

NOTE: The drilling of the 2 holes in the top half of the container, does not apply to the 4N container.

1. Drill two, 6 mm holes in the top half of the container, in the positions shown in, (FIGURE 819A).
2. Drill one, 6 mm hole in the bottom half of the container, in the position shown in, (FIGURE 819B).
3. Cut a length of 525 Lb cord, 1 meter long. Fold the cord in half and mark the centre.
4. Insert the doubled cord through the drilled hole in the container top half, in the direction shown, (FIGURE 820A). Push the cord back out through the remaining hole.
5. Form a loop as shown in, (FIGURE 820A). Using Dutch lacing, continue making a further two passes, FIGURE 820B). Ensure lacing is pulled tight after each pass.
6. Using 500 mm of 4 kg breaking thread, secure the Dutch lacing, (FIGURE 821). Sew through twice and tie with three overhand knots.



Preparation of 10/12F Throwover containers 16 Person

FIGURE 824

7. Tape the required *polystyrene blocks*, to the inside of the container lid (FIGURE 823A). This applies to all liferaft sizes, with the exception of the 16 Person liferaft, where 8 foam blocks are used, (FIGURE 824). The blocks are placed well clear of the painter exit.
8. The container top half can now be set aside until it is required later.
9. The *container seal*, fitted to the lower container half, shall be replaced. Use grey self adhesive foam strip.

NOTE: Seal strip is on the upper half of a 4N container.
Lower half on all other containers.

10. Fix 1 piece of pad protection foam to the container base, where the cylinder head is situated, (FIGURE 823/824). This foam pad prevents the cylinder head from impacting the container during handling and deployment.
11. Place polythene sheet into the bottom half of the container. Please refer to TABLE 802 for recommended lengths for each container type.
12. Make sure the polythene sheet overlaps the front edge of the *container* by 200 mm. Use temporary lengths of tape to secure the polythene in place.

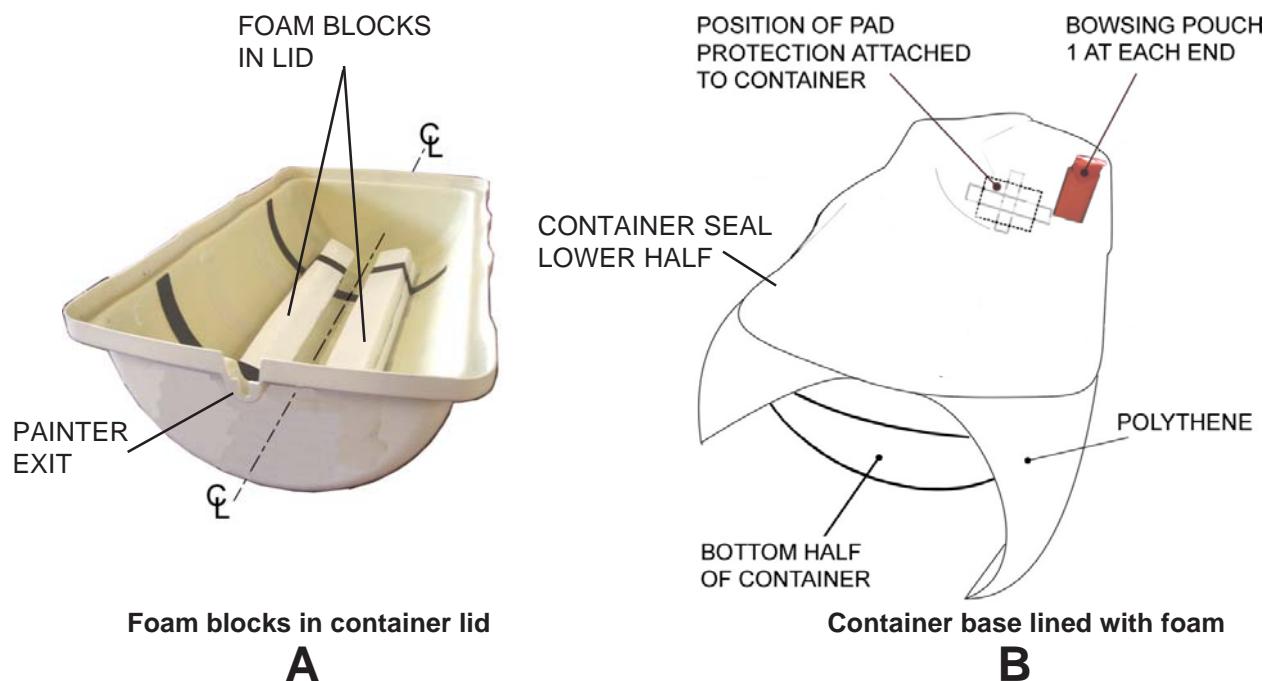
- C The following preparation is used for all Davit Launch liferafts with A-Pack. Containers 10/12F, 16/20F and 25G;

TABLE 804 shows the number of polystyrene blocks that are required to be inserted into the container lid. The polystyrene blocks prevent the liferaft from moving forward during the closing of the container.

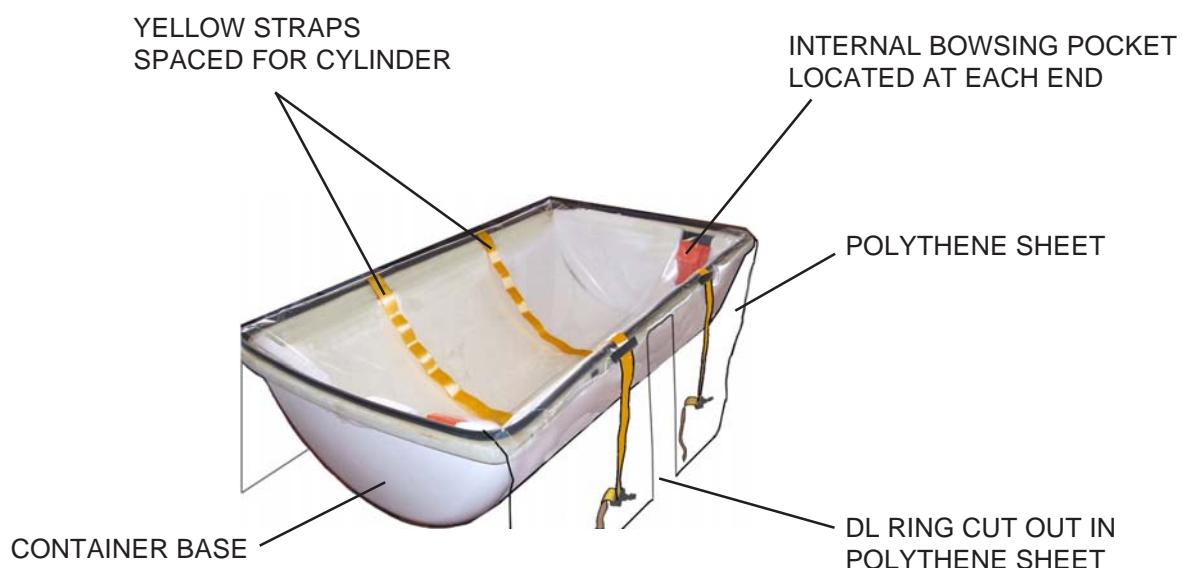
A-PACK	DAVIT LAUNCH			
Raft size	12	16	20	25
10/12 F	2			
16/20 F		4		
25 G			2	2

Number of foam blocks required
TABLE 804

1. Drill two, 6 mm holes in the top half of the container, in the positions shown in, (FIGURE 819A).
2. Drill one, 6 mm hole in the bottom half of the container, in the position shown in, (FIGURE 819B).
3. Cut a length of 525 Lb cord, 1 meter long. Fold the cord in half and mark the centre.
4. Insert the doubled cord through the drilled hole in the container top half, in the direction shown, (FIGURE 820A). Push the cord back out through the remaining hole.
5. Form a loop as shown in (FIGURE 820A). Using Dutch lacing, continue making a further two passes, FIGURE 820B). Ensure lacing is pulled tight after each pass.
6. Using 500 mm of 4 kg breaking thread, secure the Dutch lacing, (FIGURE 821). Sew through twice and tie with three overhand knots.



Preparation of Davit Launch containers with A-Pack
FIGURE 825



Preparation of Davit Launch container base
FIGURE 826

7. Tape the required *polystyrene blocks* to the inside of the container lid, (FIGURE 825A). The blocks are placed well clear of the painter exit and just off the centre line.

This applies to all liferaft sizes, with the exception of the 16 Person liferaft where 4 *polystyrene blocks* are used.

8. The container top half can now be set aside until it is required later.
9. The *container seal*, fitted to the lower container half, shall be replaced. Use grey self adhesive foam strip.
10. Fix 1 piece of pad protection foam to the container base, where the cylinder head is situated, (FIGURE 825B). This foam pad prevents the cylinder head from impacting the container during handling and deployment.
11. Place 2 yellow straps into the bottom half of the *container*, (FIGURE 826). Position them so that the cylinder will be placed onto them. Tape the straps into place.
12. Place polythene sheet into the bottom half of the container. Please refer to TABLE 802 for recommended lengths for each container type.
13. Make sure the polythene sheet overlaps the front edge of the *container* by 200 mm. Use temporary lengths of tape to secure the polythene in place.
14. Make a cut out for the Davit launch ring, (FIGURE 826).

- D The following preparation is used for all Davit Launch liferafts with B-Pack. Containers 6/8F, 10/12F and 16/20F;

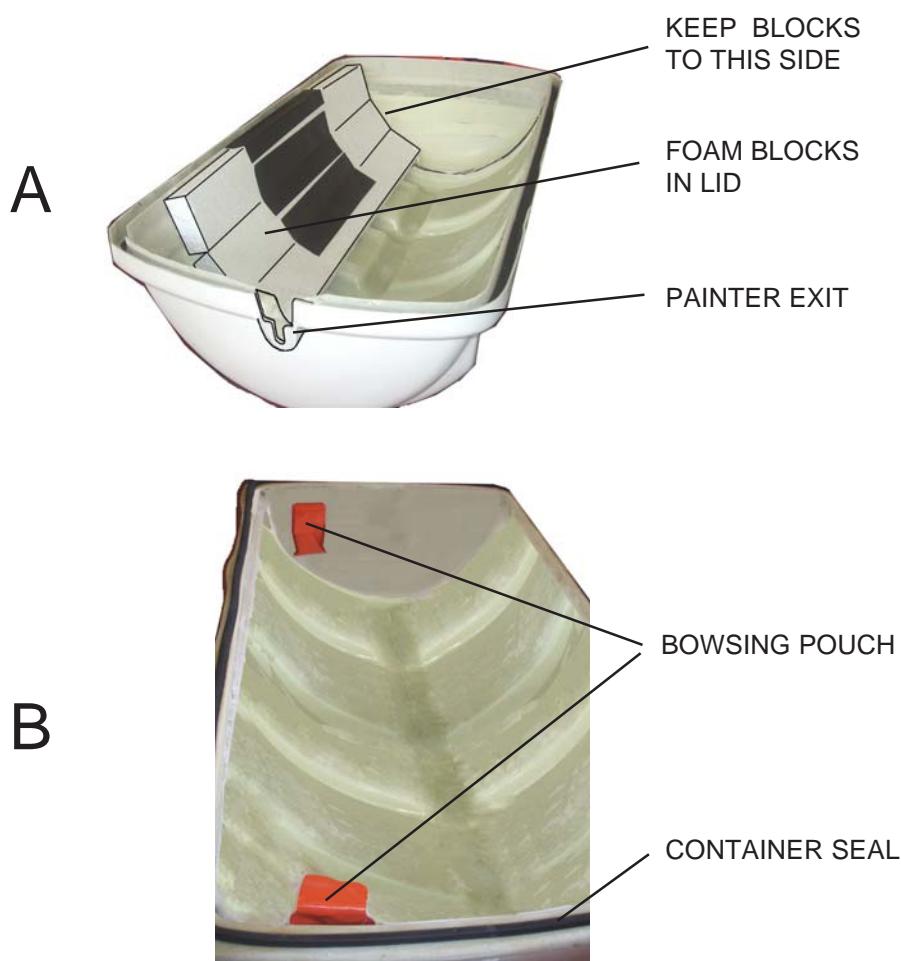
TABLE 805 shows the number of polystyrene blocks that are required to be inserted into the container lid. The polystyrene blocks prevent the liferaft from moving forward during the closing of the container.

B-PACK	DAVIT LAUNCH			
Raft size	12	16	20	25
6/8 F	3			
10/12 F		4	3	
16/20 F				3

**Number of foam blocks required
TABLE 805**

1. Drill two, 6 mm holes in the top half of the container, in the positions shown in, (FIGURE 819A).
2. Drill one, 6 mm hole in the bottom half of the container, in the position shown in, (FIGURE 819B).
3. Cut a length of 525 Lb cord, 1 meter long. Fold the cord in half and mark the centre.
4. Insert the doubled cord through the drilled hole in the container top half, in the direction shown, (FIGURE 820A). Push the cord back out through the remaining hole.
5. Form a loop as shown in, (FIGURE 820A). Using Dutch lacing, continue making a further two passes, (FIGURE 820B). Ensure lacing is pulled tight after each pass.
6. Using 500 mm of 4 kg breaking thread, secure the Dutch lacing, (FIGURE 821). Sew through twice and tie with three overhand knots.
7. Tape the required *polystyrene blocks* to the inside of the container lid (FIGURE 827A). The blocks are placed well clear of the painter exit. This applies to all liferaft sizes, with the exception of the 16 Person liferaft where 4 *polystyrene blocks* are used.
8. The container top half can now be set aside until it is required later.
9. The *container seal*, fitted to the lower container half, shall be replaced. Use grey self adhesive foam strip.

10. Fix 1 piece of pad protection foam to the container base, where the cylinder head is situated. This foam pad prevents the cylinder head from impacting the container during handling and deployment.
11. Place polythene sheet into the bottom half of the container. Please refer to TABLE 802 for recommended lengths for each container type.
12. Make sure the polythene sheet overlaps the front edge of the container by 200 mm. Use temporary lengths of tape to secure the polythene in place. .
13. Place 2 yellow straps into the bottom half of the container, (FIGURE 826). Position them so that the cylinder body will be placed onto them.
14. Make a cut out for the davit launch ring, (FIGURE 826).

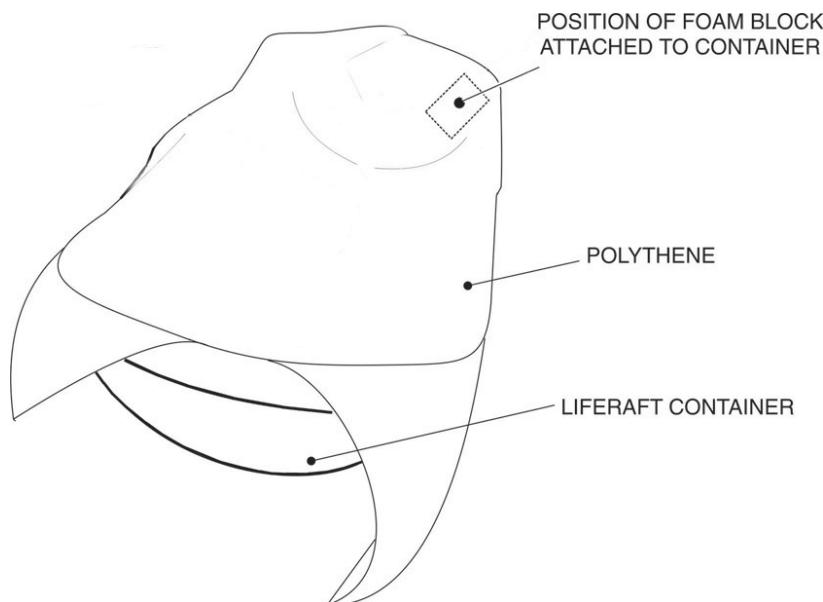


Preparation of 25 Person container base
FIGURE 827

E. Container preparation (MK10 Size 4 range)

The following preparation is used for Throw Over liferafts

1. The *container seal*, fitted to the upper container half, shall be replaced. Use grey self adhesive foam strip.
2. Fix *protection foam* to the inside of the lower half container (FIGURE 828). This foam block prevents the cylinder *operating head* from impacting the container side during handling and deployment.
3. Line the bottom half of the *container* with a polythene sheet, (FIGURE 828). Please refer to TABLE 806 for recommended lengths for each container type.
4. Make sure this sheet overlaps the front edge of the *container* by 200mm. Use temporary lengths of tape to secure the polythene in place.



Preparation of MK10 Size 4 container
FIGURE 828

CONTAINER SIZE	POLYTHENE SHEET LENGTH
MK10 Size 4	2.3 Metres
MK14 Size 17	2.3 Metres

Polythene sheet lengths
TABLE 806

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FIGURE 829 (to follow)

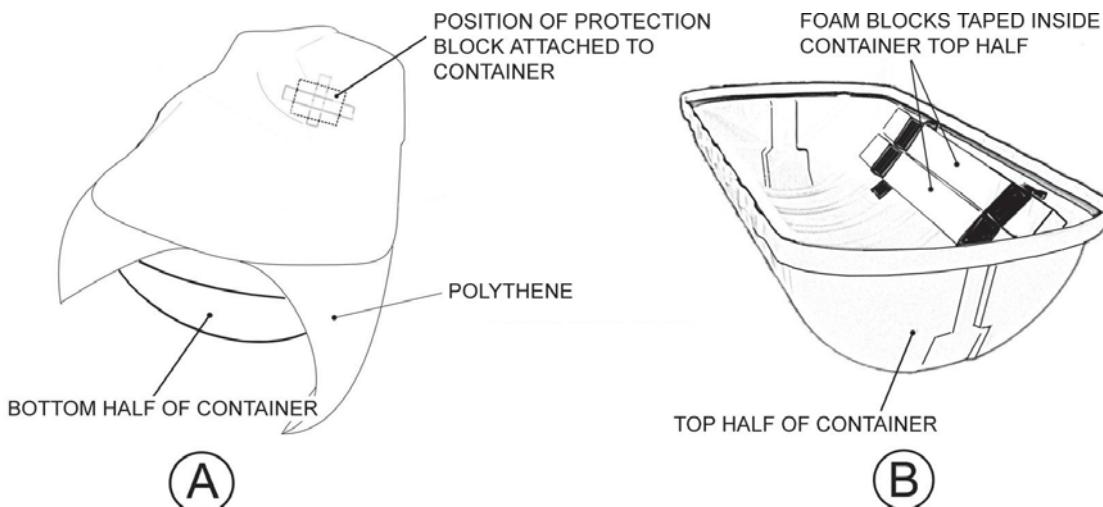
FIGURE 830 (to follow)

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F. Container preparation (MK14 Size 17 range).

The following preparation is used for Throw Over liferafts

1. The *container seal*, fitted to the upper container half, shall be replaced. Use grey self adhesive foam strip, (FIGURE 831B).
2. Foam blocks may be required in the upper container half, for various liferaft sizes. Please refer to (TABLE 807 and FIGURE 831B).
3. Fix *protection block* to the inside of the container base (FIGURE 831A). This foam block prevents the cylinder *operating head* from impacting the container side during handling and deployment.
4. Line the bottom half of the *container* with a polythene sheet, (FIGURE 831A). Please refer to (TABLE 806) for recommended lengths for each container type.
5. Make sure this sheet overlaps the front edge of the *container* by 200mm. Use temporary lengths of tape to secure the polythene in place.



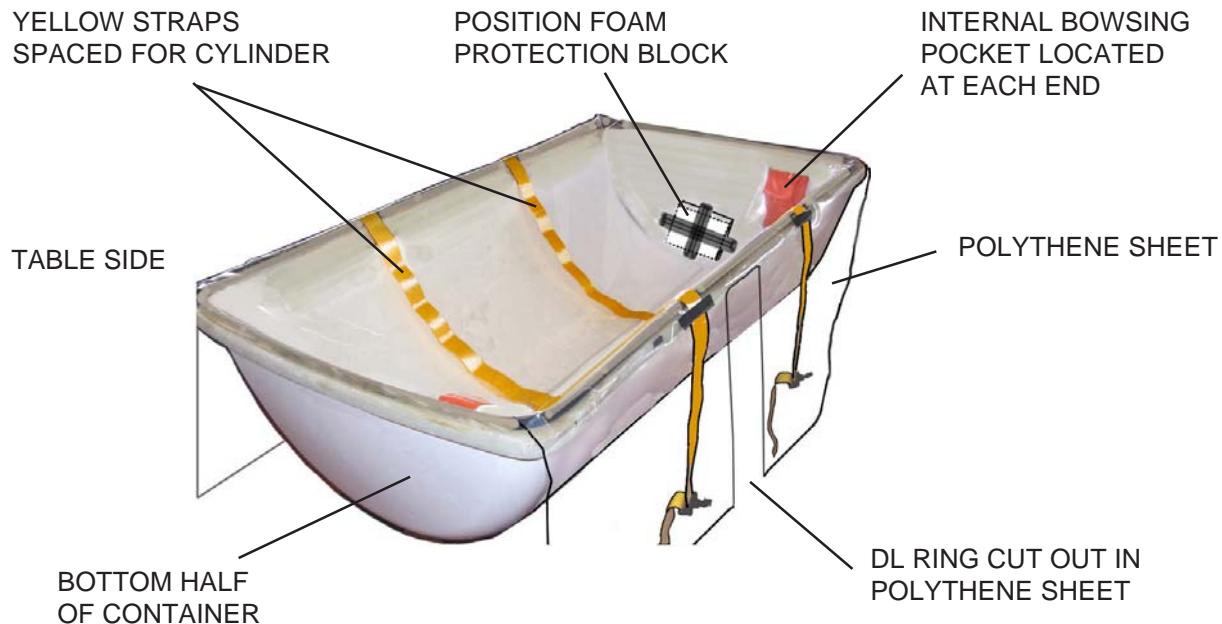
Preparation of MK14 Size 17 TO container
FIGURE 831

MK14 Sz 17	THROW OVER		DAVIT LAUNCH			
	Raft size	16	25	16	20	25
A-PACK		2		2		
B-PACK			2		2	2

Polythene sheet lengths
TABLE 807

The following preparation is used for Davit launch liferafts

1. The *container seal*, fitted to the upper container half, shall be replaced. Use grey self adhesive foam strip, (FIGURE 831B).
2. Foam blocks may be required in the upper container half, for various liferaft sizes. Please refer to (TABLE 807 and FIGURE 831B).
3. Fix *protection block* to the inside of the container (FIGURE 832). This foam block prevents the cylinder *operating head* from impacting the container side during handling and deployment.
4. Line the bottom half of the *container* with a polythene sheet, (FIGURE 832). Please refer to (TABLE 806) for recommended lengths for each container type.
5. Make sure the polythene sheet overlaps the front edge of the *container* by 200 mm. Use temporary lengths of tape to secure the polythene in place.



Preparation of MK14 Size 17 DL container base
FIGURE 832

NOTE: On Davit Launch liferafts, the excess polythene sheet is passed around the circumference of the entire liferaft . The cut -out for the davit ring is placed under the ring.

6. Place 2 yellow straps into the bottom half of the *container*, (FIGURE 832). Position them so that the cylinder will be placed onto them. Tape the straps into place.
7. Make a cut out for the Davit launch ring, (FIGURE 832).

5. Packing a Davit Launch liferaft into a container

CAUTION: DO NOT USE ANY OTHER PACKING METHOD.

1. Place the liferaft neatly on a packing table in an open area, with enough room to manoeuvre the container during packing. The inflation valves should be positioned adjacent to the edge of the packing table. Ensure all cordage is neat and tidy.

When most of the air has escaped naturally from the liferaft, it must be evacuated as follows:

- (a) Connect a vacuum device to a deflation adapter and evacuate all air from each compartments. Re-cap the inflate/deflate valves in each compartment.
 - (b) As each chamber is evacuated, adjust the buoyancies so that they lie flat on each other.
2. Tie the external lines in four equal groups, at their mid point. Do this for each quadrant of the raft, using 1 turn of *2 kgf breaking thread*, (FIGURE 801). This will keep lines away from the door openings and will also prevent entangling.
 3. Remove the transit plug from the *operating head* and fit the pre-set *operating head*, (FIGURE 833a & b). Ensure the threads on the body of the *operating head* and cylinder valve are clean.

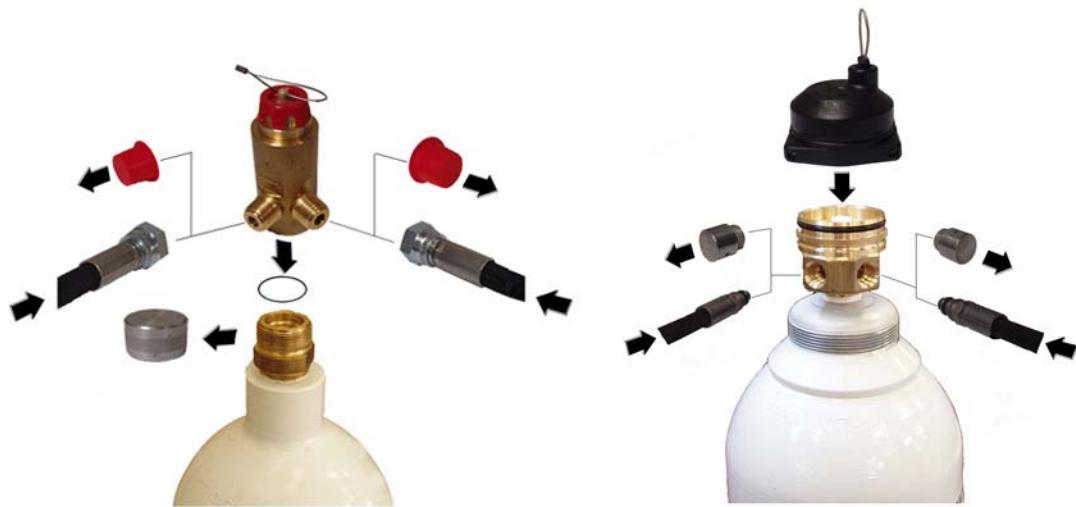
For Leafield equipment operating head, ensure the operating head is pushed firmly on. Using a torque screwdriver, tighten both screws to the correct torque see CHAPTER 1, TABLE 101.

The operating head must be tight on the cylinder valve, (FIGURE 823c).

WARNING: DO NOT REMOVE THE RECOIL CAPS FROM THE OPERATING HEAD YET.

4. Upturn the edge of the liferaft to reveal the cylinder stowage. Place the cylinder on the underside of the raft floor, taking care not trap the righting strap. Secure the cylinder with the velcro retaining straps, (FIGURE 834). The cylinder must be orientated, so that one of the operating head outlet/ port, runs parallel with the floor of the liferaft as per, (FIGURE 834).

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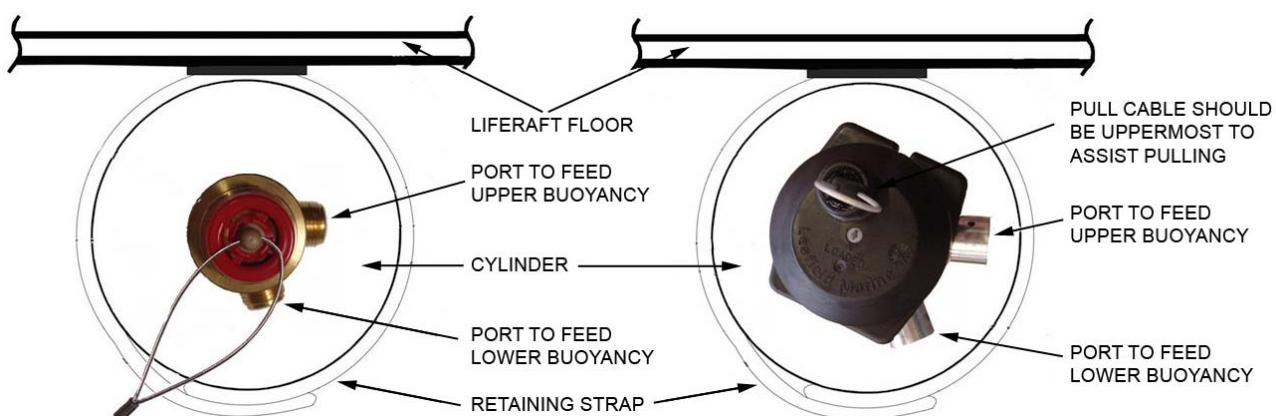


(a) THANNER INFLATION EQUIPMENT

(b) LEAFIELD INFLATION EQUIPMENT

(c) INSERTING RETAINING BOLTS
LEAFIELD OPERATING HEAD

Assembly of inflation equipment
FIGURE 833



(a) Thanner inflation equipment

(b) Leaffield inflation equipment

Cylinder attachment to liferaft
FIGURE 834

5. Tie the cylinder neck to the adjacent loop patch on the floor. Use a reef knot with 2 turns of 238 kgf / 525 Lbs *nylon cord*, 450 mm long and tape the flying ends.
6. Route both *inflation hoses* through *painter patch loops*, (FIGURE 835).

CAUTION: THIS ONLY APPLIES TO THE 10-25 PERSON LIFERAFTS.
DO NOT ROUTE HOSES THROUGH PAINTER PATCH
LOOPS FOR 6 & 8 PERSON LIFERAFTS.

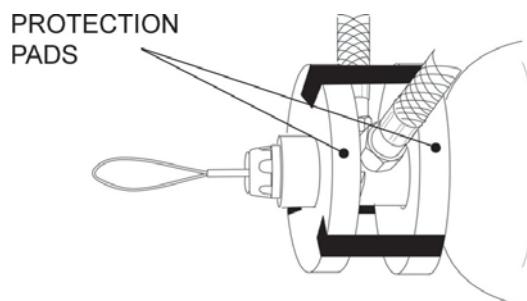
7. Connect up each inflation *hose*, (FIGURE 833). Torque the *hose* connections as stated in Chapter 1, TABLE 101. Cover each joint using 25 mm *white adhesive tape*. This will indicate that they have been torqued.
8. Insert two *protection pads* onto *operating head* and tape together, using 100 mm *adhesive tape*, (FIGURE 836). Lay the liferaft flat on the table again.
9. Mount the lower half of the *container* on a suitable strong trolley. Position the container next to the table with the painter exit hole to the left hand side. Leave a small gap (about 100 mm) between the table and the side of the container. Tilt the lower half of the container slightly towards the table to facilitate rolling and packing.
10. Grasp the edge of the liferaft and with the *cylinder*, drag the assembly over the *container*, so that the cylinder lies correctly in the container, (FIGURE 837).
11. The cylinder should be placed evenly, on top of the yellow straps. This ensures that cylinder will lift out of the container, with the raft, during Davit launch. Adjust the straps accordingly so that the cylinder body is well placed onto them, (FIGURE 837). Tape the straps into place.

CAUTION: ENSURE STRAPS ARE WELL CLEAR FROM THE CYLINDER NECK.

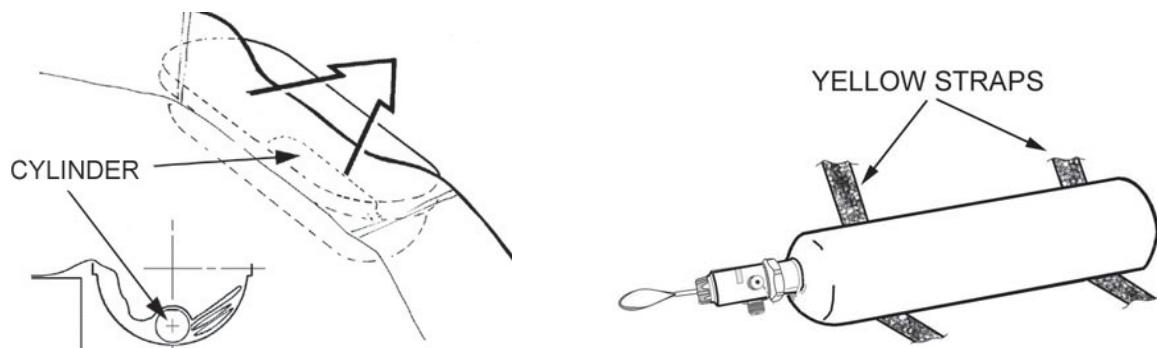
12. Work the liferaft floor area down into the recesses towards each end of the *container*.



Inflation hose routing (10-25 Persons only)
FIGURE 835



Assembly of inflation equipment
FIGURE 836



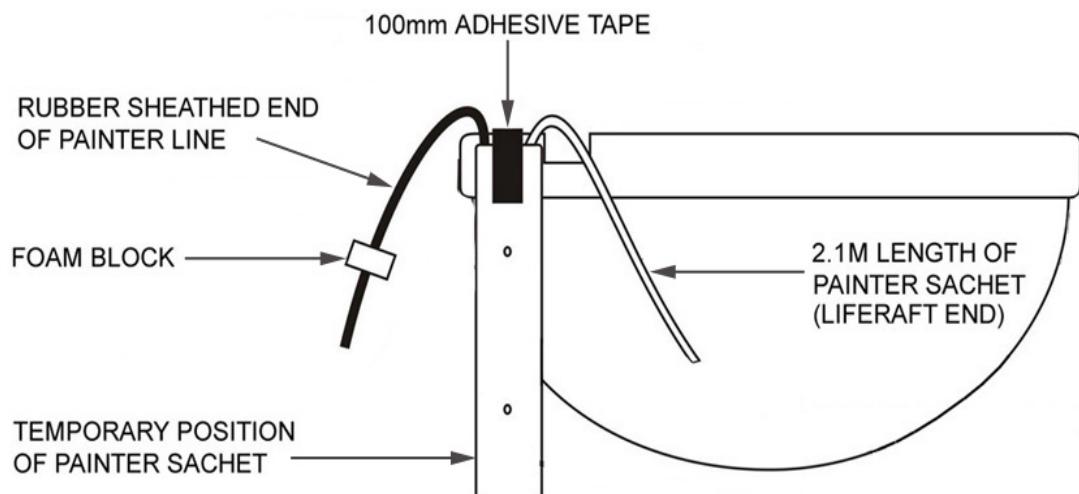
Cylinder position in the container
FIGURE 837

CAUTION: EXERCISE EXTREME CARE DURING THE NEXT OPERATION IN ORDER TO AVOID OPERATING THE INFLATION SYSTEM.

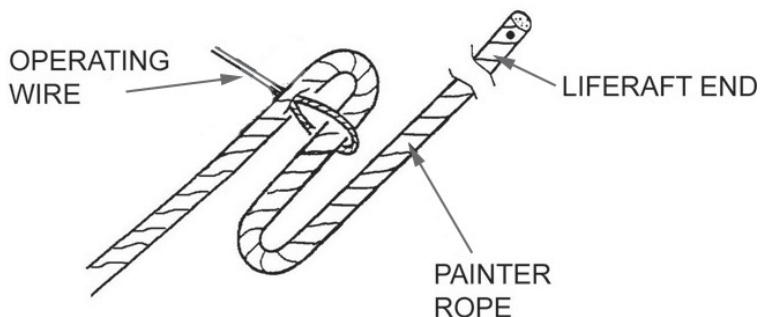
13. Fold back the liferaft so as to reveal the operating mechanism.
14. Obtain the painter sachet. Wrap a polyethylene sheet, 1000mm x 800mm, around the end of the painter sachet and tape it in place. The polyethylene sheet should extend over the open end of the sachet and the painter rope by at least 100 to 150 mm.
15. Temporarily attach the painter sachet to the rear of the lower half of the container using adhesive tape. Make sure that the open end of the painter sachet is at the edge of the container with the painter line cut-out, (FIGURE 838).
16. At the firing point (300 mm from where the line exits the sachet), pass the actuation cable of the operating mechanism through the painter line. Thread the remaining painter line back through the actuation cable, (FIGURE 839).

WARNING: THE OPERATING MECHANISM IS NOW ARMED. EXTREME CARE MUST BE TAKEN DURING ALL FOLLOWING ACTIONS.

17. Locate the painter attachment patch on the lower buoyancy, (FIGURE 840A). Tie the liferaft end of the painter to the painter patch, using a bowline knot. Tape the flying end.
18. Tie the liferaft identification tube red ribbon through the painter patch attachment, using a bowline knot.
19. Retrieve the two bowsing line cords, (which are white & yellow in colour). Tie a bowsing line to each of the bowsing line patches on the liferaft, using a draw hitch knot, (FIGURES 801& 840A).
20. Using 300 mm from the free end of both bowsing lines, create a bowline loop handle on the opposite end, (FIGURE 840B). Place the bowsing line along side the container.



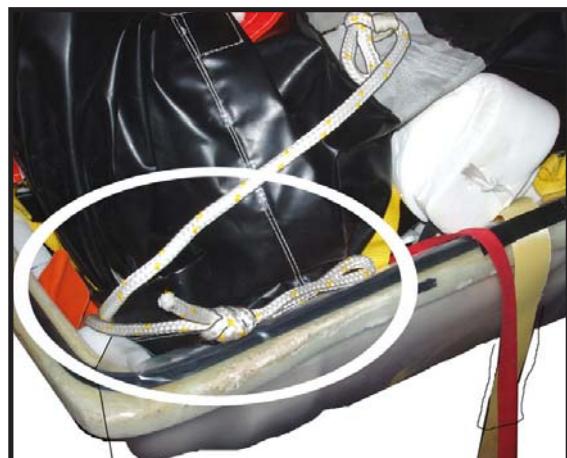
Attach painter sachet
FIGURE 838



Attach painter line to operating mechanism
FIGURE 839



**Bowsing line tied to liferaft
and overhand knot**
FIGURE 840A



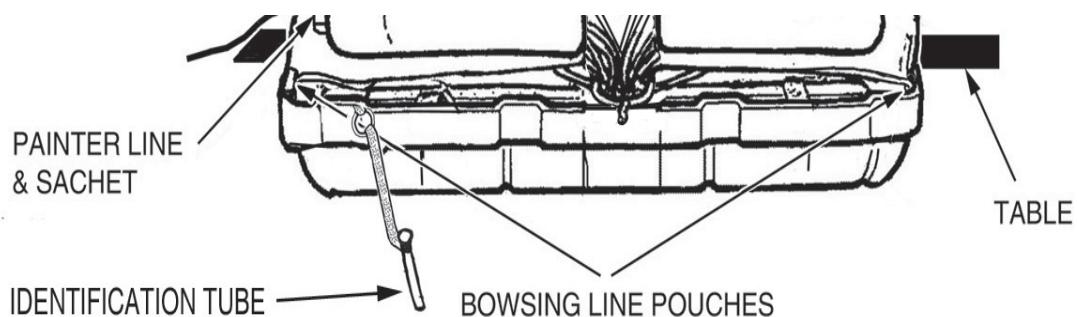
**Overhand knot in bowsing line
and place along side container**
FIGURE 840B

21. Flake fold the remaining bowsing line into the internal bowsing pockets, (FIGURE 840B).
22. Ensure cut outs have been made in the polythene sheet for the bowsing lines and the DL ring.
23. Pack the emergency pack valises for each liferaft as indicated in Chapter 7.
24. Position the valises around the cylinder as indicated in Chapter 7. Ensure the equipment leaflet has been attached to Equipment pack 1.
25. On each valise, tie the flying ends of the two straps to each other using a reef knot and then around the inner lifeline using an overhand knot, so as to secure the packs to the liferaft.

NOTE: Ensure that when inserting the equipment packs, no parts of the lifting bridle, canopy, door or hauling-in ladder are trapped beneath the packs.

26. Place the hauling in ladder over the valises and tie off to the hauling in ladder floor patches.
27. Using a vacuum hose deflate the raft.
28. Firmly grasp the floor and sides of the liferaft. Haul the assembly forward, so as to cover the emergency pack valises and form a transverse fold level with the front edge of the container.
29. Pull the Davit ring forward. Position the leading edge of the Davit ring as shown in, (FIGURE 841).
30. The Davit ring must have enough slack in the *lifting bridle* so that it can be presented to the Davit launch hook when the container lid is opened.

WARNING: REMEMBER THE OPERATING MECHANISM IS ARMED.
EXTREME CARE MUST BE TAKEN DURING ALL FOLLOWING ACTIONS.



Davit ring positioned
FIGURE 841



(a) COLLECT THE WEBBING LADDER



(b) INITIAL TWIST OF NIBR



(c) FURTHER TWIST OF NIBR

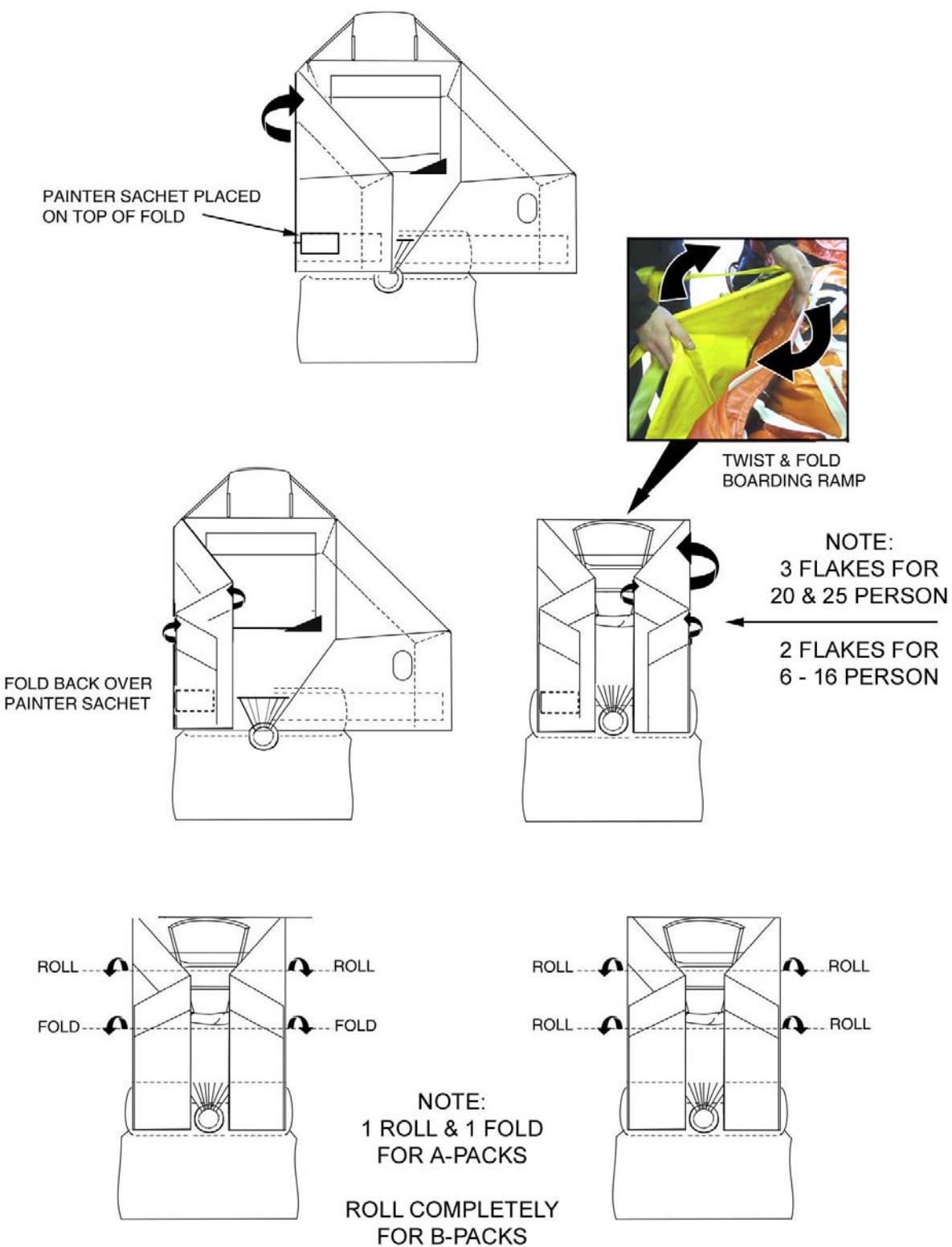


(d) HOLD DOWN AND START ROLLING
LIFERAFT FROM THE NIBR

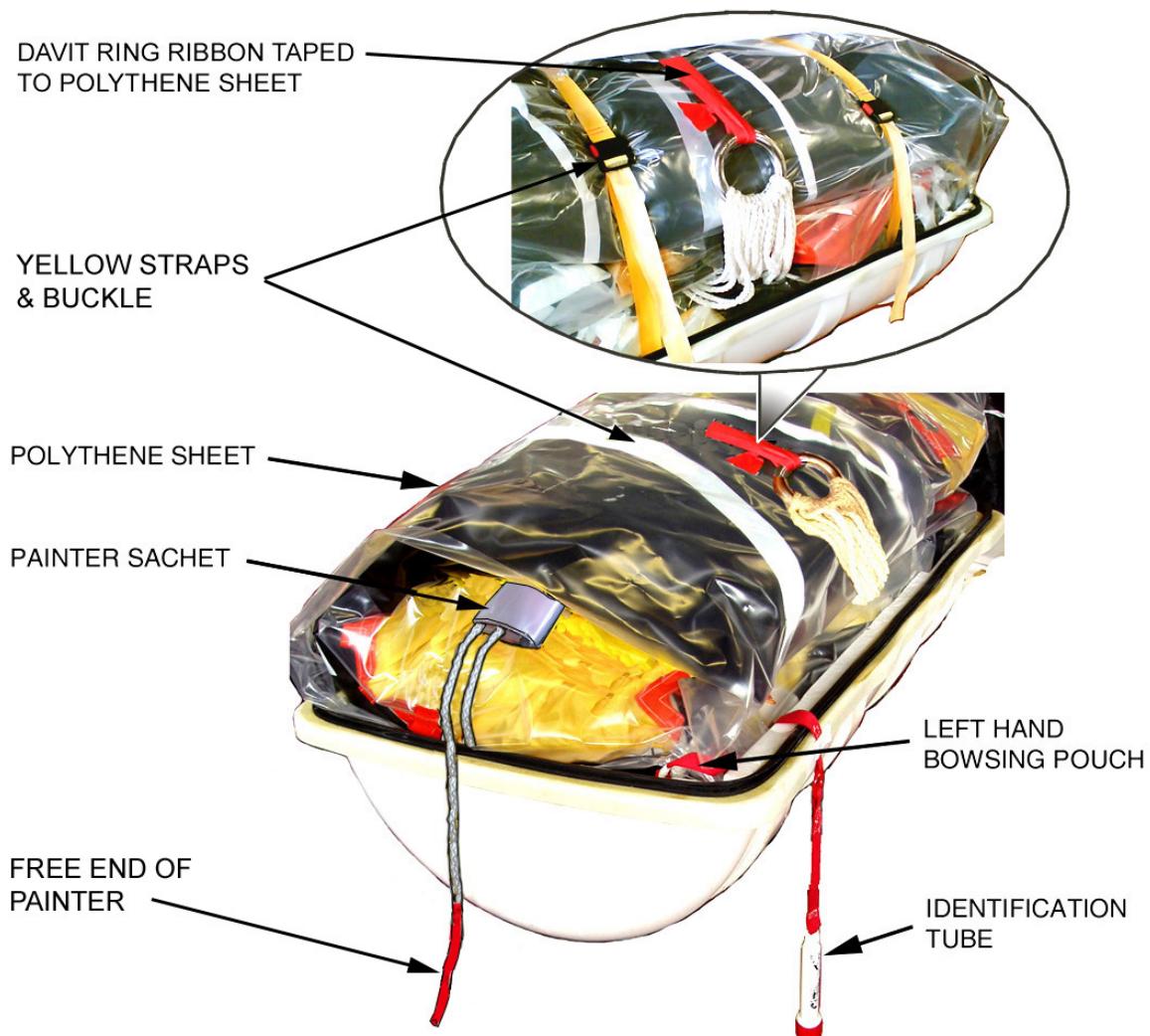
Folding the boarding ramp
FIGURE 842

31. Prepare the sequence of liferaft folding, (FIGURE 843).
32. Remove the *painter sachet* from its temporary position at the side of the *container*. Place the *painter sachet* on top of the left-hand fold, close to the *container*. Ensure the free run of painter from the sachet is not impeded, (FIGURE 843 & 844).
33. Holding the ends of the *Non Inflateable Boarding Ramp* (NIBR), in each hand, twist 180 degrees. Fold down on top of the liferaft. (FIGURE 842).
34. With the liferaft tighten down as far as possible, begin rolling towards the *container*. Keep liferaft tight at all times and then fold once into the *container*, (FIGURE 844).
35. Ensure the toggle is located in front of webbing (FIGURE 845).
36. Wrap the polythene sheeting around the outside of the folded liferaft, tucking the overlap into the bottom half of the *container*. Ensure that the *polythene sheet* does not obstruct the davit ring or other items, (FIGURE 844).
37. Take the Davit ring and place it high, up onto the folded liferaft. Tape the red ribbon to the polythene sheet, using 25 mm self adhesive tape, (FIGURE 844).
38. Immediately before closing the *container* make sure that the painter line sachet is:
 - a) in line with the painter exit.
 - b) almost level with the painter exit of the *container*.
39. Ensure that there is sufficient distance between the material of the liferaft and the painter line so that they do not touch when painter line is pulled. Adjust the open end of the painter sachet so that the distance between it and *container* inside edge is minimal.
40. Close and tighten both yellow straps by clipping them together. Keep buckles well above the *container* edge, (FIGURE 844).

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Folding the liferaft and position of Davit ring
FIGURE 843



Position of painter sachet
FIGURE 844



INCORRECT
TOGGLE SHOULD NOT BE BEHIND WEBBING



CORRECT
NIBR SUCCESSFULLY STOWED

Liferaft with top half rolled
FIGURE 845

41. Put the top half of the *container* on top of the folded liferaft, (FIGURE 846).

42a. F&G type containers:

Pass the *painter line* through the hole in the *painter retaining block*, (FIGURE 846). Slide the *painter retaining block* up the line, to within 25 mm from the end where the rubber sheath ceases.

42b. MK10 & MK14 type containers;

Put the the rubber sheathed end of the *painter line* through the *painter retaining block*. Put the block into the cut-out in the *container* lower half, (FIGURE 847).

43a. **F&G range:** Insert the *painter retaining block* into it's position in the container top half (FIGURE 846).

43b. **MK10 & MK14 range:** Insert the *painter retaining block* into it's position in the container bottom half, (FIGURE 847).

44. Measure 300 mm from the free end of the painter line. Form a loop handle using a bowline knot and tail to be 100 mm (+/- 50 mm), (FIGURE 846). Tape the flying end with 25 mm self adhesive tape.

45. Put two *ratchet straps* around the *container*, making sure the straps do not cover the grooves in the container, (FIGURE 846).

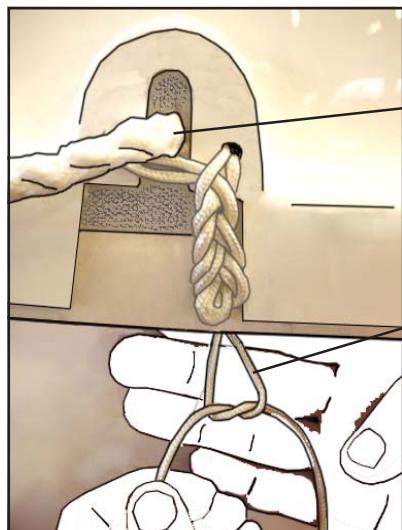
Tighten the *ratchet straps* uniformly around the *container*. Make sure the upper half of the container mates with the lower half of the *container* correctly.

46. Close the rear of the container first. The yellow straps should be tightened alternately, each time the ratchet straps are tightened.

47. Place the excess yellow straps in along side of the container.

CAUTION: THE EDGES OF THE SPATULA MUST ALL BE RADIUSED AND SMOOTH TO AVOID DAMAGING THE LIFERAFT. CHECK CONTINUOUSLY TO ENSURE THAT NO PART OF A LIFERAFT BECOMES TRAPPED BETWEEN THE CONTAINER LIPS AS THEY FINALLY CLOSE AND THAT THE SEAL IS MADE.

CAUTION: ENSURE THE PAINTER LINE IS NOT TRAPPED BETWEEN THE CONTAINER RIMS, AS THEY CLOSE.

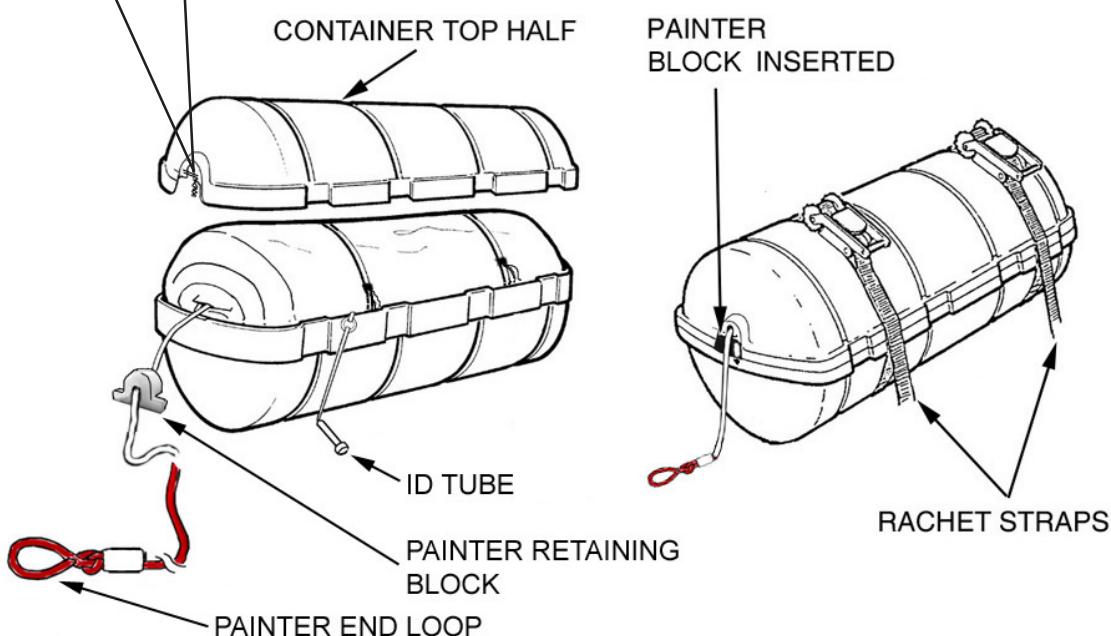


PUSH FREE END OF
PAINTER THROUGH
THE PAINTER EXIT

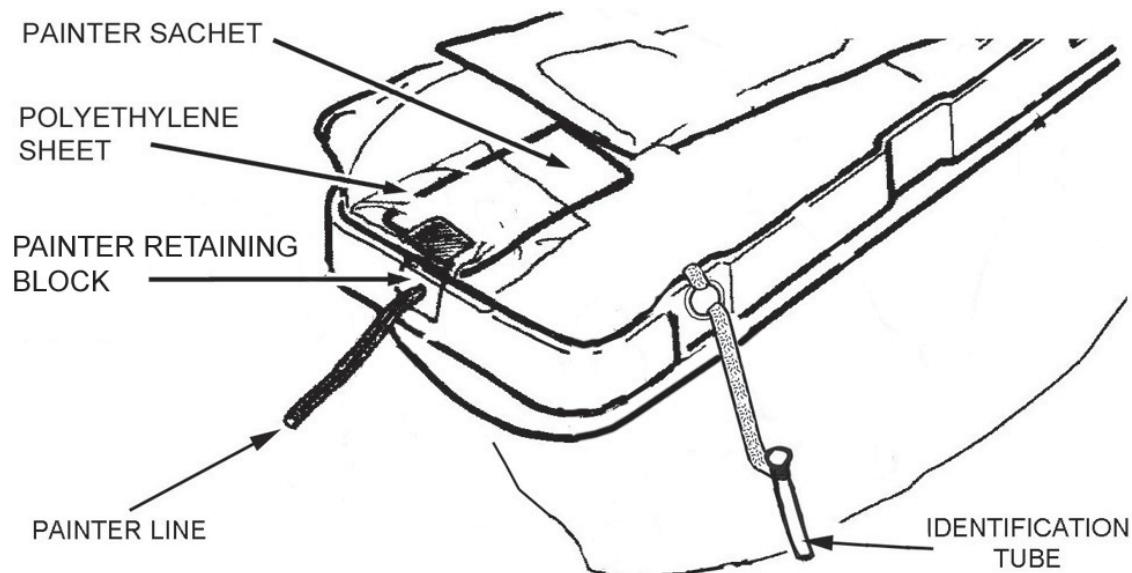


DUTCH LACING TIED
THROUGH THE BOTTOM
HALF OF CONTAINER

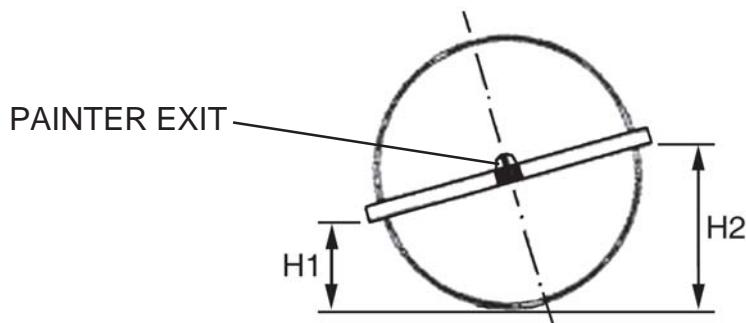
FINISHED VIEW



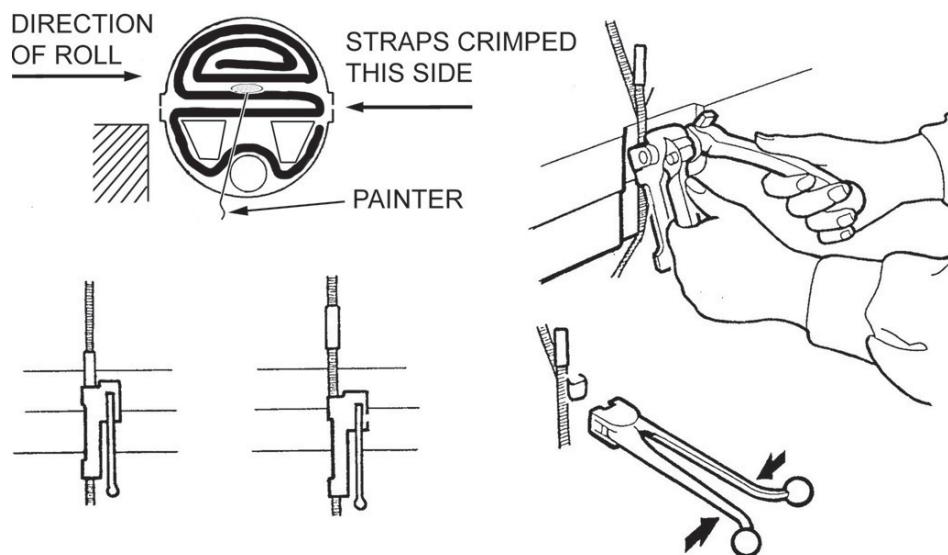
F&G range container closing
FIGURE 846



MK10&14 range position of painter sachet
FIGURE 847

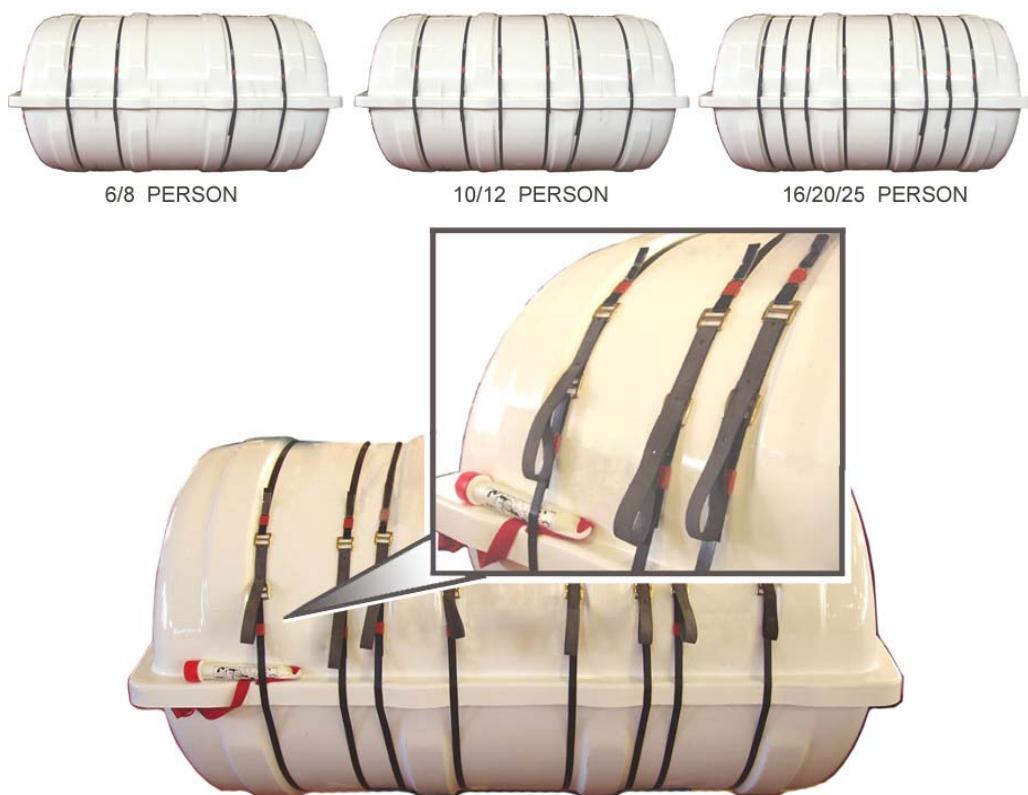


Container gravity for A and B-packs
FIGURE 848



Crimping container straps

FIGURE 849



F&G Type container straps

FIGURE 850

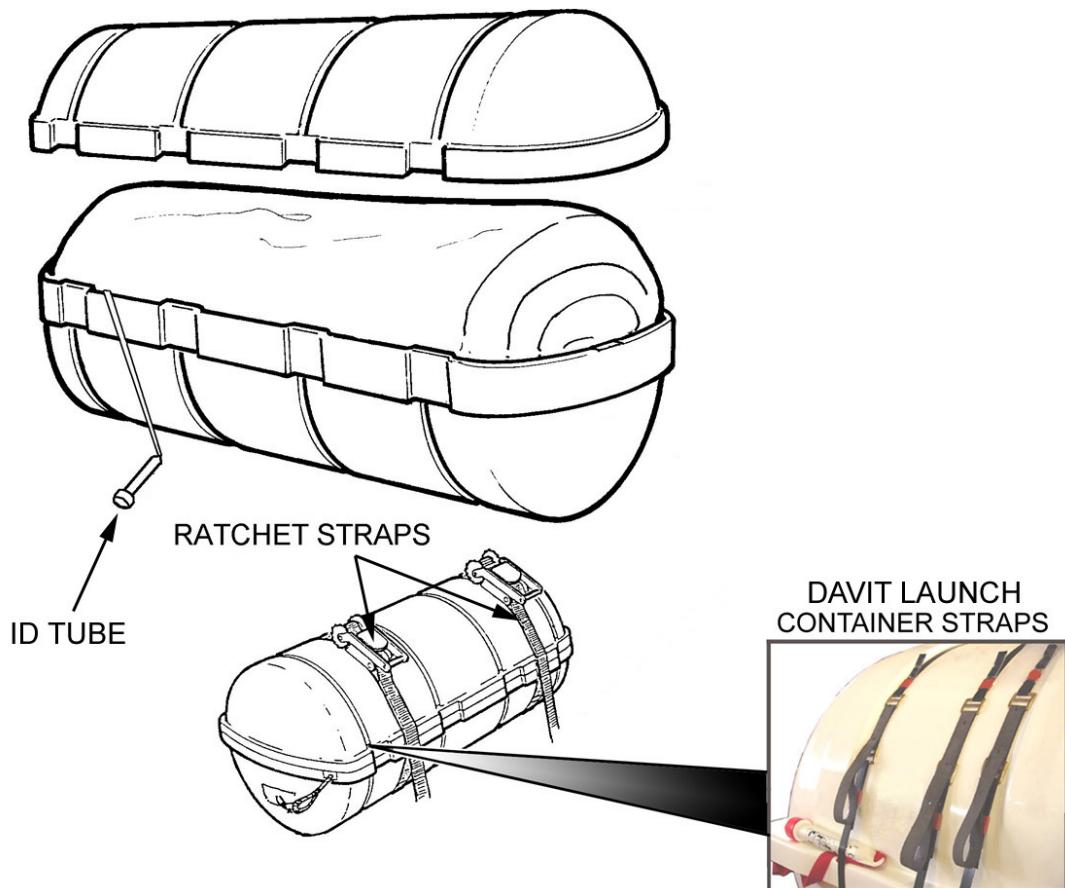
48. Continue closing the *container* slowly, while alternating from one strap to the other. When doing so, CAREFULLY position the top half of the container either by striking it with a rubber mallet or by levering it with a hardwood or metal spatula against the bottom half, (FIGURE 846).
49. Check that the *painter retaining block* has not become displaced.
50. Check that the container centre of gravity is correctly proportioned. Container should be at 20-30 degree angle, e.g. H1 is lower than H2, (FIGURE 848).

WARNING: WHEN TENSIONING OR CRIMPING STRAPS, THE OPERATOR MUST STAND TO ONE SIDE OF THE STRAP. PROPER CLOTHING AND EYE PROTECTION MUST BE WORN. PROPER FOOTING AND BALANCE MUST BE MAINTAINED WHEN OPERATING THE EQUIPMENT. USE SHORT HAND STROKES ONLY DURING TENSIONING.

WARNING: TOO MUCH TENSION WILL BREAK THE STRAP. THIS MAY RESULT IN INJURY TO PERSONNEL.

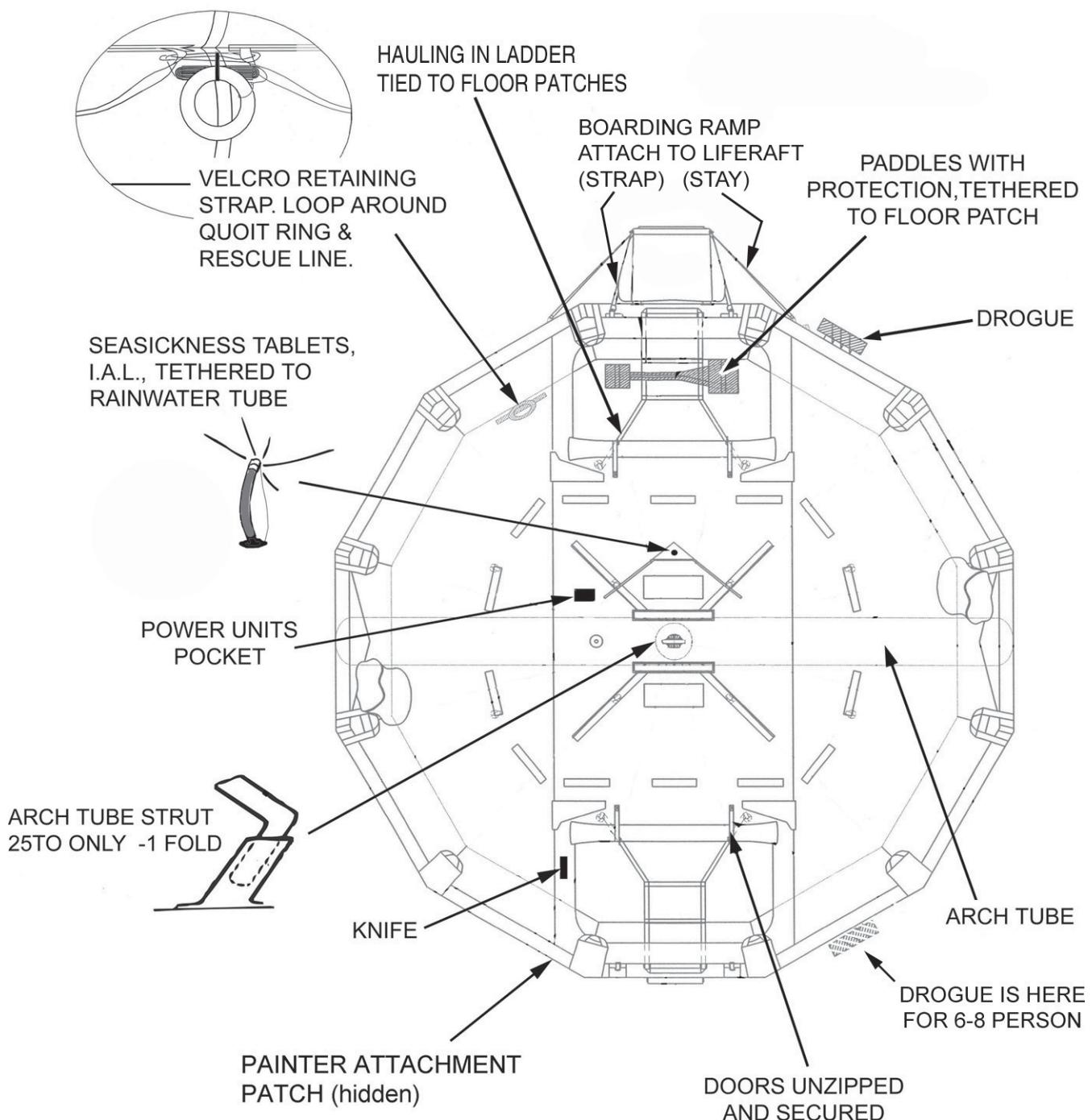
CAUTION: FOR ALL LIFERAFTS, IT IS ESSENTIAL THAT CRIMPS ARE ATTACHED ON THE OPPOSITE SIDE OF THE CONTAINER TO THE ROLL OF THE LIFERAFT, (FIGURE 849).

51. Obtain the *straps* and *crimps*. Tension and *crimp* each *strap* as follows:
 - (a) Strap crimps and handles must be positioned above the rim, (FIGURES 849 & 850 or 851).
 - (b) **F&G range only:** Adjust the ends of each *strap* so that the outer most strap end is facing upwards and is approximately 280 mm above the rim of the *container*, (FIGURE 850).
 - (c) **M10 & M14 container only:** Adjust the ends of each *strap* so that the outer most strap end is facing upwards and is approximately 280 mm above the rim of the *container*, (FIGURE 851).
 - (d) Apply the *tensioning tool* to each *strap* at a point half way across the two rims. Operate the handle to tension each *strap* until the base of the tensioning tool rests on the lower container rim. Secure the strap with a *crimp*, (FIGURE 849), using a *crimping tool*.



MK10 and 14 Container straps
FIGURE 851

52. Remove the *ratchet straps*.
53. Push both free ends of the Dutch lacing through the hole, in the lip, of the bottom half of the container, (FIGURE 846).
54. Tie off, using three half hitches and tape the flying ends. Trim to a minimum of 40 mm.
55. All exposed painter line external to the container must be coated in anti-wick plastic. Do not pull out further to expose the cord itself.
56. A *cord extension line*, is to be tied through the loop on the painter line. The other end is to be tied through the HRU weak link. Please refer to Chapter 1, Section 7B.
All knots on the extension line are to be bowlines with tails to be 100mm +/- 75mm. Tape the flying ends using 25mm wide white PVC self adhesive tape.
57. Where a HRU is not fitted (transportation purposes only), the painter extension should be tied to the painter line loop only and should be stowed neatly in a 150 mm length of 100 mm wide *layflat tubing*.
This layflat tubing is to be retained onto the painter itself using an elastic band. The layflat tubing is to be taped to the container upper half for transportation.
58. This completes the packing sequence for the Davit launch liferaft.
The container is now ready for labelling. Please refer section 7, of this Chapter.



NOTE: The picture illustrated is 25 man raft.
Layout will be similar for other TO rafts.

**Preparation for packing assembly of Throw Over
FIGURE 860**

6. Packing a Throw Over liferaft into a container

CAUTION: DO NOT USE ANY OTHER PACKING METHOD.

1. Place the liferaft neatly on a packing table in an open area, with enough room to manoeuvre the container during packing. The inflation valves should be positioned adjacent to the edge of the packing table. Ensure all cordage is neat and tidy.

When most of the air has escaped naturally from the liferaft, it must be evacuated as follows:

- (a) Connect a vacuum device to a deflation adapter and evacuate all air from each compartments. Re-cap the inflate/deflate valves in each compartment.
 - (b) As each chamber is evacuated, adjust the buoyancies so that they lie flat on each other.
2. Remove the transit plug from the *operating head* and fit the pre-set *operating head*, (FIGURE 861a & b). Ensure the threads on the body of the *operating head* and cylinder valve are clean.

For Leafield equipment operating head, ensure the operating head is pushed firmly on. Using a torque screwdriver, tighten both screws to the correct torque see CHAPTER 1, TABLE 101.

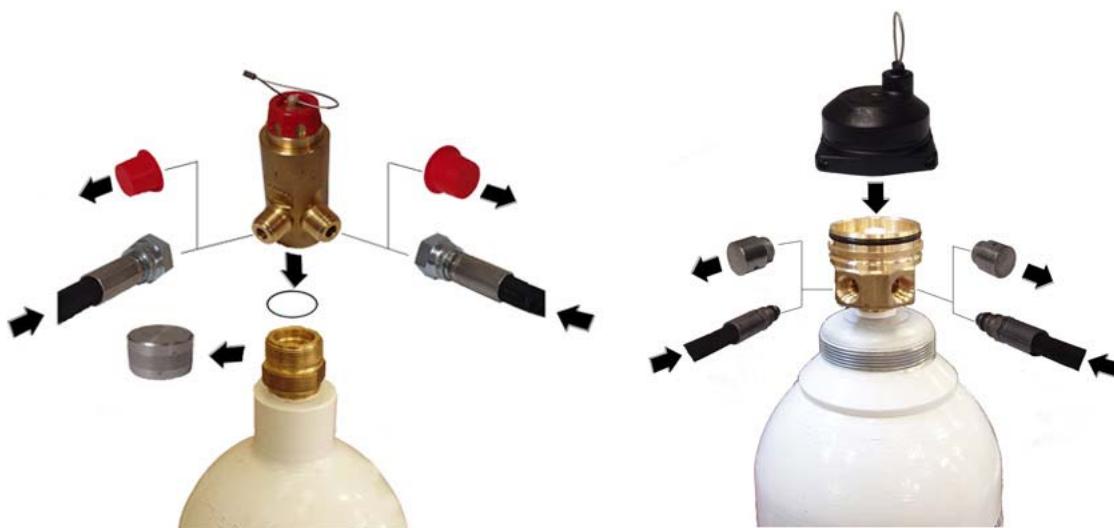
The operating head must be tight on the cylinder valve, (FIGURE 861c).

WARNING: DO NOT REMOVE THE RECOIL CAPS FROM THE OPERATING HEAD YET.

3. Upturn the edge of the liferaft to reveal the cylinder stowage. Place the *cylinder* on the underside of the raft floor, taking care not to trap the *righting strap*. Secure the cylinder with the velcro retaining straps, (FIGURE 862).

The cylinder must be orientated, so that one of the operating head outlet/ port, runs parallel with the floor of the liferaft as per (FIGURE 862).

WARNING: DO NOT REMOVE THE RECOIL CAPS FROM THE OPERATING HEAD YET.

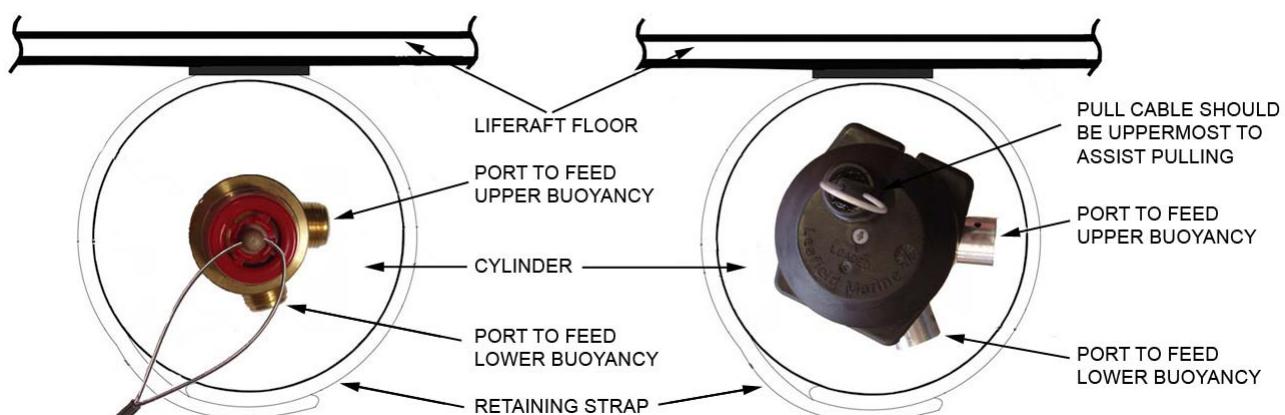


(a) THANNER INFLATION EQUIPMENT

(b) LEAFIELD INFLATION EQUIPMENT

(c) INSERTING RETAINING BOLTS
LEAFIELD OPERATING HEAD

Assembly of inflation equipment
FIGURE 861



Cylinder attachment to liferaft
FIGURE 862

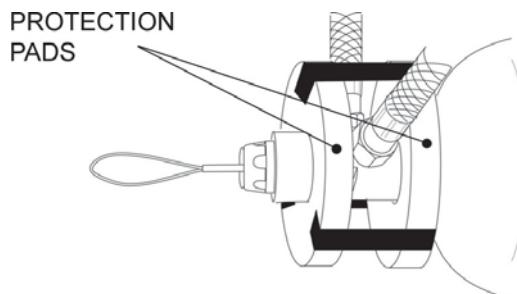
4. Tie the cylinder neck to the adjacent loop patch on the floor. Use a reef knot with 2 turns of 238 kgf / 525 Lbs nylon cord, 450 mm long and tape the flying the ends.
5. Route both *inflation hoses* through *painter patch loops*, (FIGURE 863).

CAUTION: THIS ONLY APPLIES TO THE 10-25 PERSON LIFERAFTS.
DO NOT ROUTE HOSES THROUGH PAINTER PATCH
LOOPS FOR 6 & 8 PERSON LIFERAFTS.

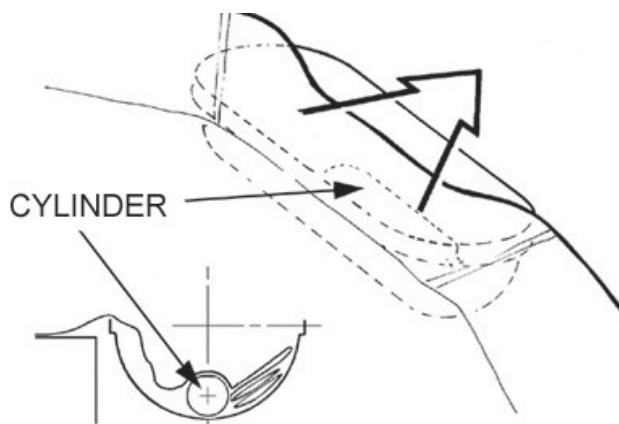
6. Connect up each inflation *hose*, (FIGURE 861). Torque the *hose* connections as stated in Chapter 1, TABLE 101. Cover each joint using 25 mm white adhesive tape.
7. Insert two *protection pads* onto *operating head* and tape together, using 100 mm adhesive tape (FIGURE 864). Lay the liferaft flat on the table again.
8. Mount the lower half of the *container* on a suitable strong trolley. Position the container next to the table. Leave a small gap (about 100 mm) between the table and the long side of the container. Tilt the lower half of the container slightly toward the table to facilitate rolling and packing.



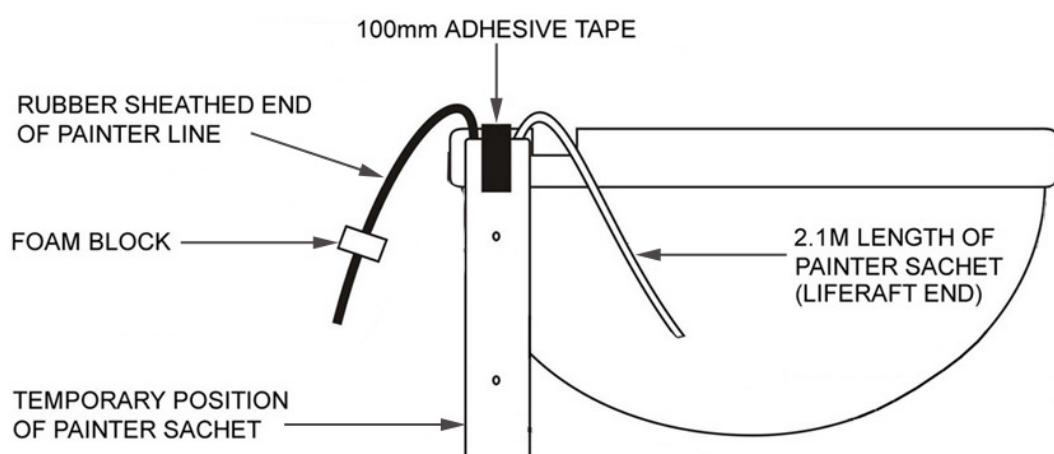
Inflation hose routing (10-25 Persons only)
FIGURE 863



Assembly of inflation equipment
FIGURE 864



Cylinder position in the cylindrical container
FIGURE 865



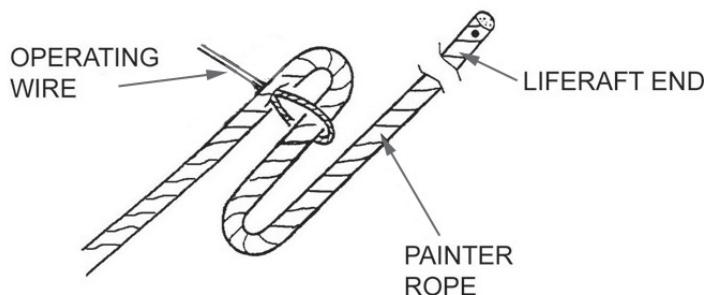
Attach painter sachet
FIGURE 866

9. Grasp the edge of the liferaft and with the *cylinder*, drag the assembly over the *container* so that the *cylinder* lies correctly in the *container*, (FIGURE 865).
10. Work the liferaft floor area down into the recesses towards each end of the *container*.

CAUTION: EXERCISE EXTREME CARE DURING THE NEXT OPERATION IN ORDER TO AVOID OPERATING THE INFLATION SYSTEM.

11. Fold back the raft so as to reveal the operating mechanism.
12. Obtain the painter sachet. Wrap a polyethylene sheet, 915mm x 800mm, around the end of the painter sachet and tape it in place. The polyethylene sheet should extend over the open end of the sachet and the painter rope by at least 100-150 mm.
13. Temporarily attach the painter sachet to the rear of the lower half of the container using adhesive tape. Make sure that the open end of the painter sachet is at the edge of the container with the painter line cut-out, (FIGURE 866).
14. At the firing point, (300 mm from where the line exits the sachet), pass the actuation cable of the operating mechanism through the painter line. Thread the remaining painter line back through the actuation cable, (FIGURE 867).

WARNING: THE OPERATING MECHANISM IS NOW ARMED. EXTREME CARE MUST BE TAKEN DURING ALL FOLLOWING ACTIONS.



Attach painter line to operating mechanism
FIGURE 867

15. Locate the *painter attachment patch* on the lower buoyancy. Tie the liferaft end of the *painter line* to the painter patch, using a bowline knot. Tape the flying end.
16. Tie the *liferaft identification tube red ribbon* through the *painter patch* attachment, using a bowline knot.
17. Pack the emergency pack valises for each liferaft as indicated in Chapter 7.
18. Position the valises around the cylinder as indicated in Chapter 7. Ensure the equipment leaflet has been attached to Equipment pack 1.

NOTE: Ensure that when inserting the equipment packs, no parts of the lifting bridle, canopy, door or hauling-in line are trapped beneath the packs.

19. On each valise, tie the flying ends of the two straps to each other using a reef knot. Tie the front valise straps around the inner lifeline using an overhand knot, to secure the packs to the liferaft.

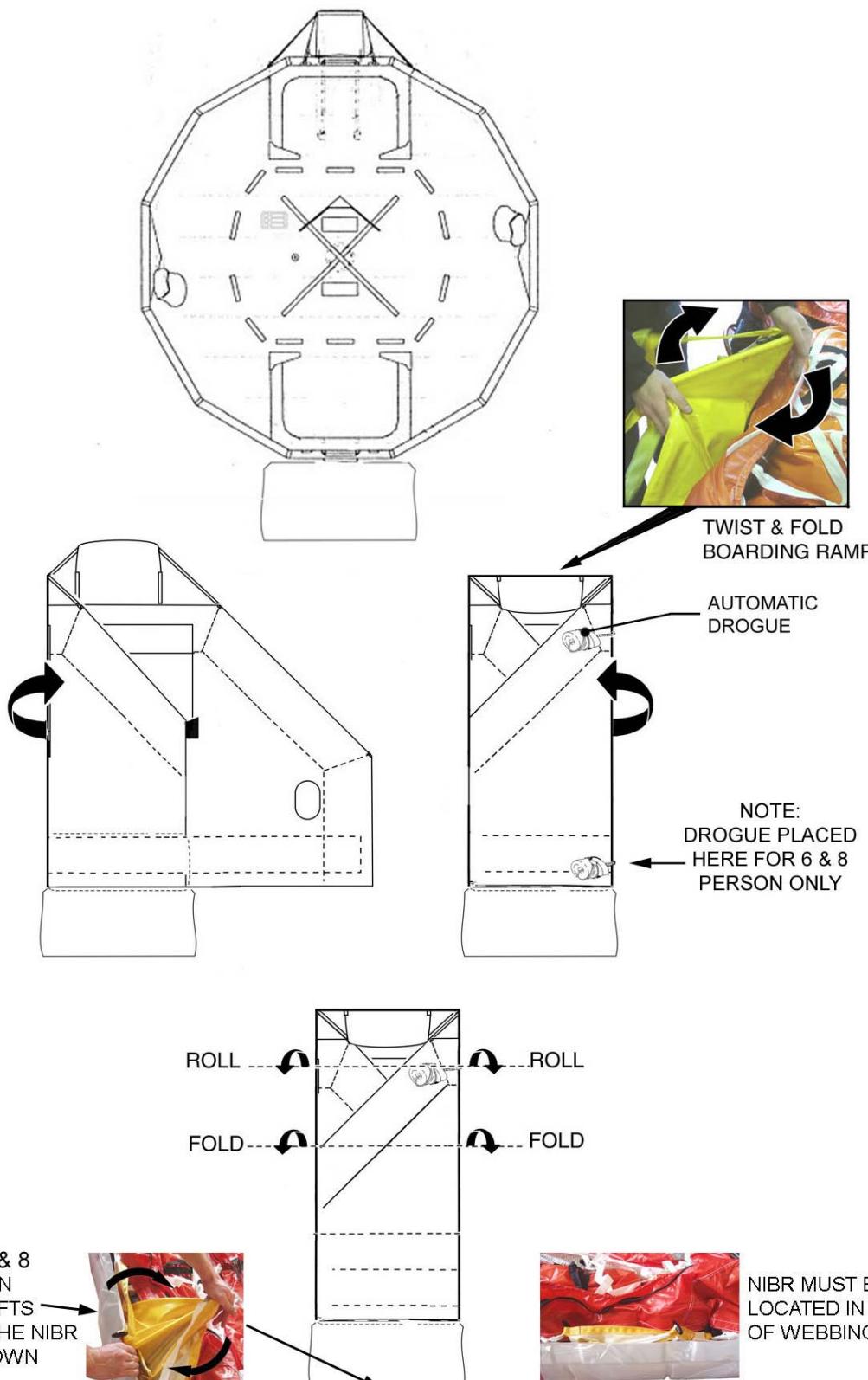
NOTE: Liferafts that contain emergency packs situated at the rear of the container, must be tied to the front emergency packs.

20. Place the hauling in ladder over the valises and tie off to the hauling in ladder floor patches.
21. Using a vacuum hose deflate the raft.
22. Firmly grasp the floor and sides of the liferaft. Haul the assembly forward, so as to cover the emergency pack valises and form a transverse fold level with the front edge of the container.

WARNING: REMEMBER THE OPERATING MECHANISM IS ARMED.
EXTREME CARE MUST BE TAKEN DURING ALL FOLLOWING ACTIONS.

23. Prepare the sequence of liferaft folding, (FIGURE 868).
24. Remember to insert the automatic *drogue* on top of the folds, just before the actual rolling of the liferaft takes place, (FIGURE 868).

NOTE: For 6 - 8 person only, drogue is placed at the front of the container.



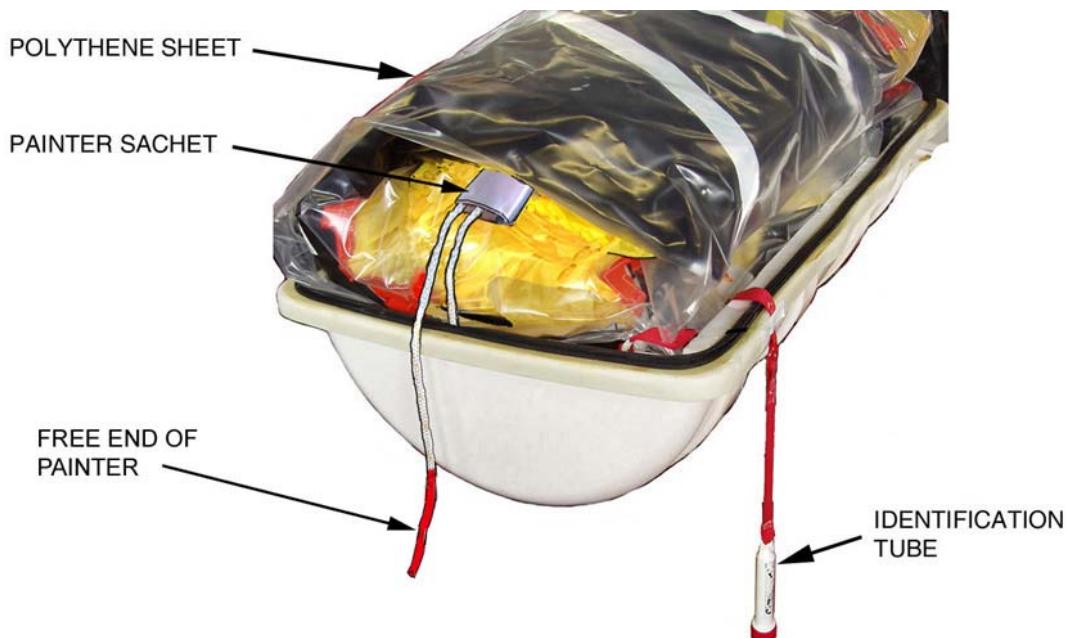
Folding the TO liferaft
FIGURE 868

25. Twist the *boarding ramp* and fold on top of the liferaft. Holding the ends of the ladder in each hand, twist 180 degrees, (FIGURE 868) and fold.

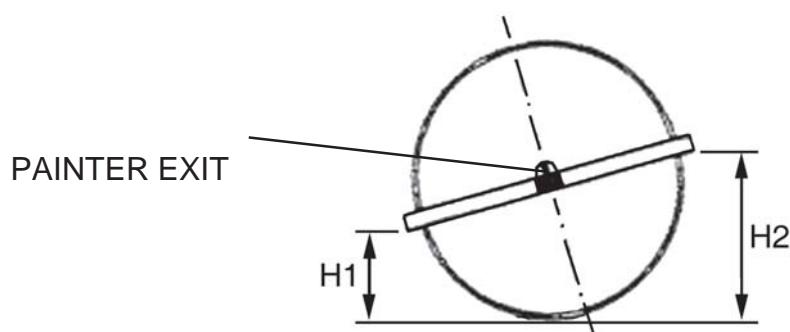
NOTE: Boarding ramp is at rear of liferaft for 10-25 Person and it is at front of liferaft for 6-8 Person.

26. Holding the ends of the *Non Inflateable Boarding Ramp* (NIBR), in each hand, twist 180 degrees. Fold down on top of the liferaft. (FIGURE 868).
27. With the liferaft tighten down as far as possible, begin rolling towards the container. Keep liferaft tight at all times and then fold once into the *container*, (FIGURE 868).
28. Ensure the toggle is located in front of webbing (FIGURE 868).
29. Remove the *painter sachet* from its temporary position at the side of the *container*. Place the *painter sachet* on top of the left-hand fold, close to the container. Ensure the free run of painter from the sachet is not impeded, (FIGURE 869).
30. Wrap the polythene sheeting around the outside of the folded liferaft, tucking the overlap into the bottom half of the container. Ensure that the *polythene sheet* does not obstruct other items, (FIGURE 869).
31. Immediately before closing the container make sure that the painter line sachet is:
 - a) in line with the painter exit.
 - b) almost level with the painter exit of the container.
32. Ensure that there is sufficient distance between the material of the liferaft and the painter line so that they do not touch when painter line is pulled. Adjust the open end of the painter sachet so that the distance between it and container inside edge is between 150 mm-170 mm.
- 33a. **F&G range:** Put the top half of the *container* on top of the folded liferaft, (FIGURE 871).
- 33b. **MK10/14 range:** Put the top half of the *container* on top of the folded liferaft, (FIGURE 872).

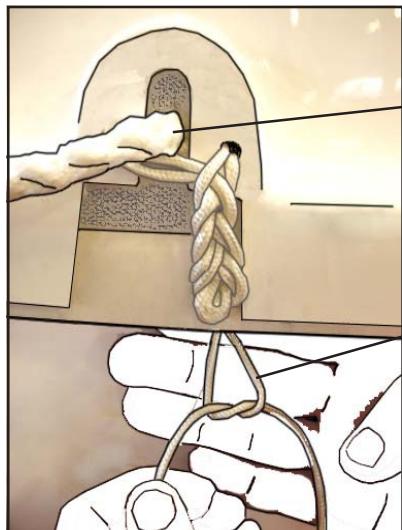
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Position of painter sachet
FIGURE 869



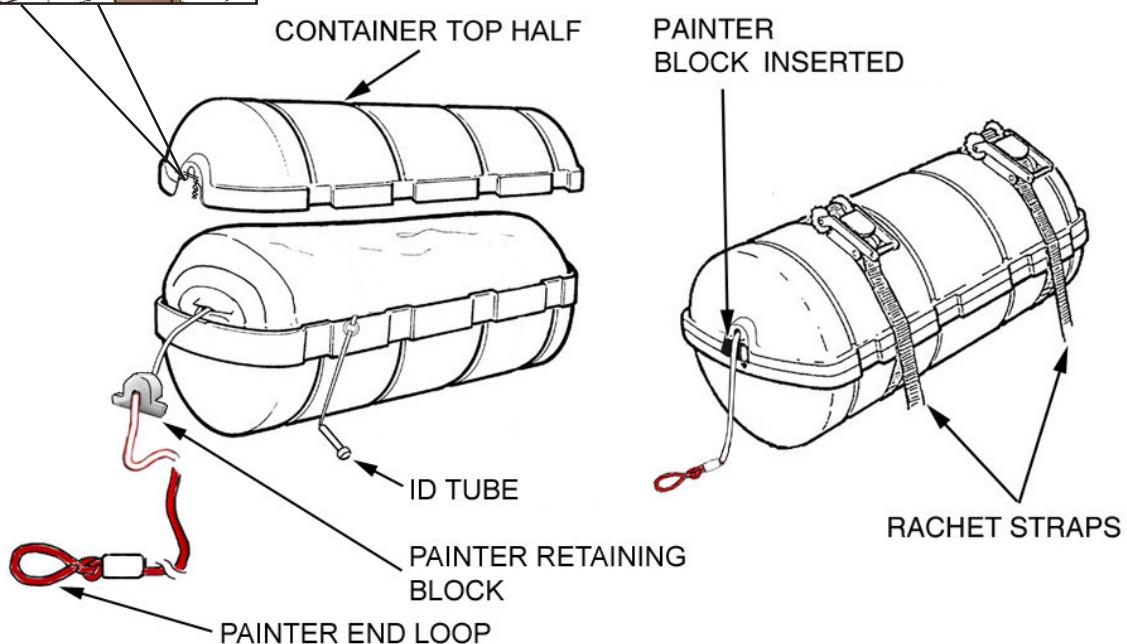
Container gravity for A and B-packs
FIGURE 870



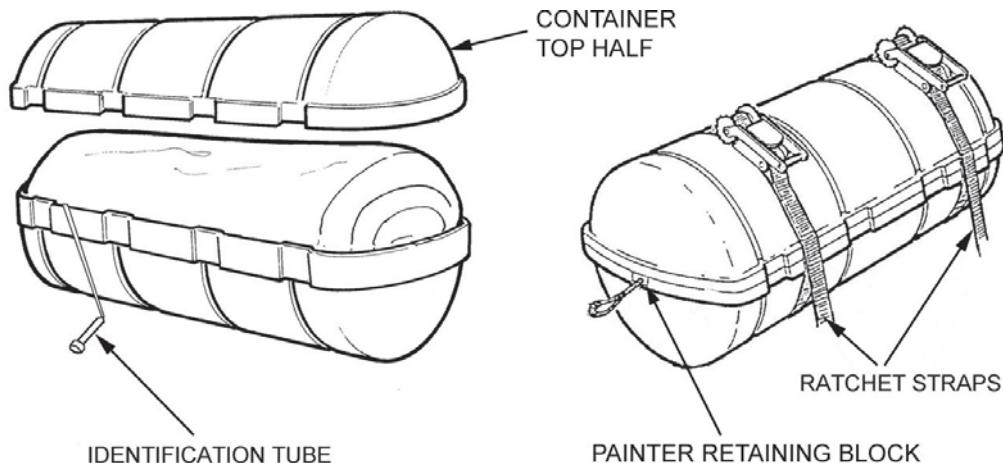
PUSH FREE END OF
PAINTER THROUGH
THE PAINTER EXIT



FINISHED VIEW



F&G range container closing
FIGURE 871



**MK10&14 range container closing
FIGURE 872**

- 34a. **F&G range:** Pass the *painter line* through the hole in the *painter retaining block*, (FIGURE 871). Slide the *painter retaining block* up the line, to within 25mm from the end where the rubber sheath ceases.
- 34b. **MK10/14 range:** Pass the *painter line* through the hole in the *painter retaining block*, (FIGURE 872).
- 35a. **F&G range:** Insert the *painter retaining block* into it's position in the container top half, (FIGURE 871).
- 35b. **MK10/14 range:** Insert the *painter retaining block* into it's position in the container bottom half, (FIGURE 872).
36. **F&G range:** Measure 300 mm from the free end of the painter line. Form a loop handle using a bowline knot and tail to be 100 mm (+/- 50 mm), (FIGURE 871). Tape the flying end with 25 mm self adhesive tape.
37. Put two *ratchet straps* around the *container*, making sure the straps do not cover the grooves in the *container*, (FIGURE 871 or 872). Tighten the *ratchet straps* uniformly around the *container*. Make sure the upper half of the *container* mates with the lower half of the *container* correctly.

CAUTION: THE EDGES OF THE SPATULA MUST ALL BE RADIUSED AND SMOOTH TO AVOID DAMAGING THE LIFERAFT. CHECK CONTINUOUSLY TO ENSURE THAT NO PART OF A LIFERAFT BECOMES TRAPPED BETWEEN THE CONTAINER LIPS AS THEY FINALLY CLOSE AND THAT THE SEAL IS MADE.

CAUTION: ENSURE THE PAINTER LINE IS NOT TRAPPED BETWEEN THE CONTAINER RIMS, AS THEY CLOSE.

38. Continue closing the *container* slowly, while alternating from one strap to the other. Whilst doing so, CAREFULLY position the top half of the container either by striking it with a rubber mallet or by levering it with a hardwood or metal spatula against the bottom half.
39. Check that the *painter retaining block* has not become displaced.
40. Check that the container centre of gravity is correctly proportioned. Container should be at 20-30 degree angle, e.g. H1 is lower than H2, (FIGURE 870).

WARNING: WHEN TENSIONING OR CRIMPING STRAPS, THE OPERATOR MUST STAND TO ONE SIDE OF THE STRAP. PROPER CLOTHING AND EYE PROTECTION MUST BE WORN. PROPER FOOTING AND BALANCE MUST BE MAINTAINED WHEN OPERATING THE EQUIPMENT. USE SHORT HAND STROKES ONLY DURING TENSIONING.

WARNING: TOO MUCH TENSION WILL BREAK THE STRAP. THIS MAY RESULT IN INJURY TO PERSONNEL.

CAUTION: FOR ALL LIFERAFTS, IT IS ESSENTIAL THAT *CRIMPS* ARE ATTACHED ON THE OPPOSITE SIDE OF THE CONTAINER TO THE ROLL OF THE LIFERAFT (FIGURE 873).

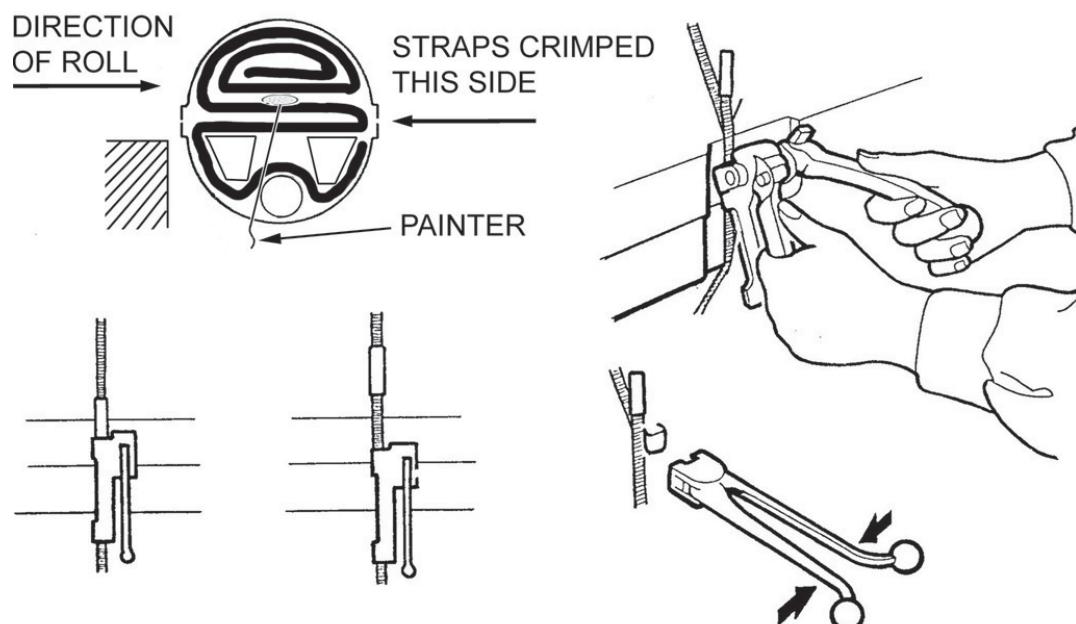
41. Obtain the *straps* and *crimps*. Tension and *crimp* each *strap* as follows:
 - (a) Adjust the ends of each *strap* so that the outer most *strap* end is facing upwards and is approximately 25 mm above the rim of the *container*, (FIGURE 873).
 - (b) Apply the *tensioning tool* to the *strap* at a point half way across the two rims. Operate the handle to tension the strap until the base of the tensioning tool rests in the lower container rim. Secure the strap with a *crimp*, (FIGURE 873), using the *crimping tool*.

42. Remove the *ratchet straps*.
43. All exposed painter line external to the container must be coated in anti-wick plastic. Do not pull out further to expose the cord itself.
42. **F&G range:** A *cord extension line*, is to be tied through the loop on the painter line. The other end is to be tied through the HRU weak link. Please refer to Chapter 1, Section 7B.
All knots on the extension line are to be bowlines with tails to be 100mm +/- 75mm. Tape the flying ends using 25mm wide white PVC self adhesive tape.
43. Where a HRU is not fitted (transportation purposes only), the painter extension should be tied to the painter line loop only and should be stowed neatly in a 150 mm length of 100 mm wide *layflat tubing*.
This layflat tubing is to be retained onto the painter itself using an elastic band. The layflat tubing is to be taped to the container upper half for transportation.
44. This completes the packing sequence for the Throw over liferaft.
The container is now ready for labelling. Please refer section 7, of this Chapter.

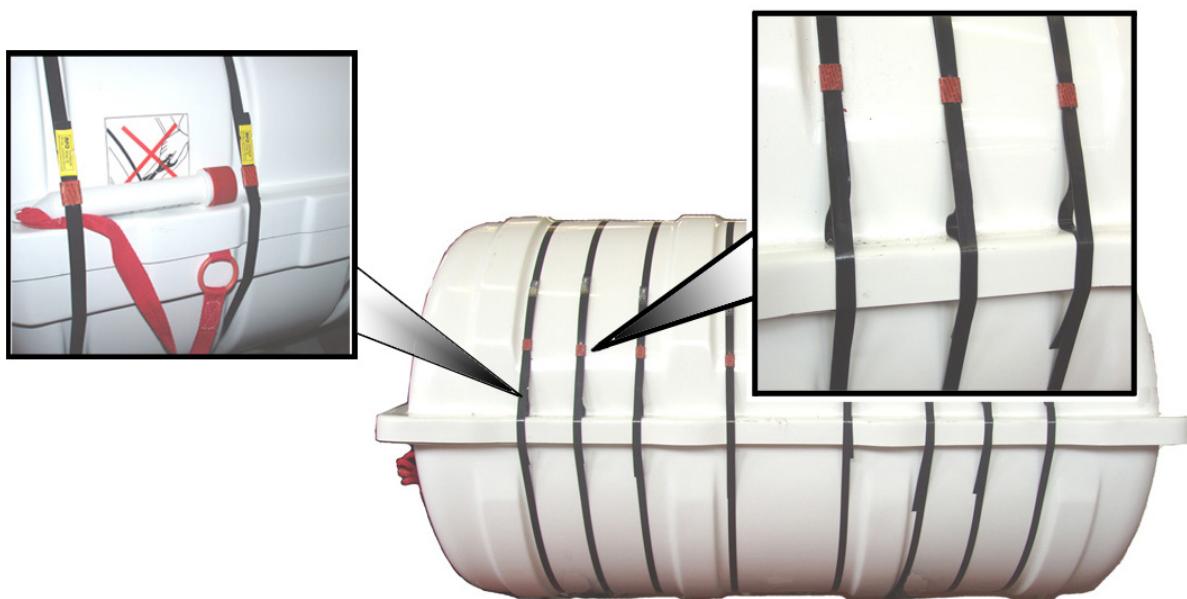
7. Container labelling

- a. Check that all *labels* are fitted and positioned correctly and securely.
Please refer to Chapter 11, Section 3 *Container label identification and position*.
- b. Record the liferaft details, onto the liferaft *identification label* and insert it into the *identification tube*. Check for legibility and correct details.
- c. The *liferaft identification* container and any excess tether webbing shall be tucked between the container strapping and the container, FIGURE 874).

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Crimping container straps
FIGURE 873



Throw over container straps
FIGURE 874

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CHAPTER 9

STORAGE CONDITIONS AND INSTRUCTIONS

<u>Section</u>	<u>Page</u>
1 General	903
2 Procedure for Liferafts not Operationally packed	903
3 Storage Limiting Period	904
4 Storage of Power Units	905

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CHAPTER 9

STORAGE CONDITIONS AND INSTRUCTIONS

1 General

- A Storage conditions for liferafts depend on whether they have been Operationally Packed.

2 Procedure for Liferafts that have not been Operationally packed

- A Liferafts that are not operationally packed must be stored in a room that:

- (1) Can be maintained at a temperature of 15 to 21 degrees Celsius.
- (2) Is free from direct sunlight.
- (3) Has a dry atmosphere.
- (4) Is free from corrosive fumes or other harmful contamination.

- B Remove components that are easily detachable. Attach transit and recoil caps to the cylinders. Obey the country's regulations in relation to the storage of gas cylinders.

- C Deflate the liferaft until the fabric creases are sharp and well defined (Refer Chapter 8).

CAUTION: DO NOT STORE MORE THAN THREE LIFERAFTS ON TOP OF ONE ANOTHER.

- D Fold the liferaft to a manageable size, enclose it in stiff waterproof paper and store it above floor level, preferably on slatted shelving to permit air circulation.

- E Tie a label to the liferaft recording the following:

- (1) Liferaft Type, Mark and Serial Number.
- (2) Date of last inflation test.
- (3) Date of last service.

- F Store the liferaft accessories, except the gas cylinders, with the liferaft.

- G Attach dust caps to the delivery hoses. If caps for the hoses are temporarily not available, use adhesive tape to keep dirt out of the hoses.

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3 Storage Limiting Period

- A Following a service, the storage limiting period for the liferaft is 12 months, provided that the storage conditions comply with approved standards (Paragraph A above) and meet with the concurrence of the approval authority of the country concerned. At the end of that period the liferaft must be:
 - (1) unfolded and inspected, before further storage.
 - (2) serviced and tested, prior to being operationally packed for installation on vessel stowages.
- B Liferafts not operationally packed and placed in store (for more than 30 days) must be re-tested before being operationally packed and installed on a vessel (Chapter 5).
- C If a liferaft is operationally packed in a container, it can operate in a wide range of temperature and humidity, equivalent to those found in service worldwide. Always make sure the drainage apertures in the bottom of the container point straight down; make sure they are not blocked by dirt. Do not deliberately make containers wet.
 - (1) Do not direct water from hoses at *containers*.
 - (2) Do not leave *containers* in flooded places.
- D All lines which go through the *container* to the Liferaft must have protective sheaths at their outer ends. These sheaths will prevent water from seeping into the container. If a line has been pulled from the container to expose a part of the line which is not covered by a sheath, call a Service Station to rectify the packing as soon as possible.
- E Do not roll a *container* when it is necessary to move it.
- F Operationally packed Liferafts are approved for use on board ship for at least twelve months. National Authorities may grant extensions to the original operational period. At the end of a period of operational use, DSB recommend that all liferafts should immediately be opened for inspection and service. Any contaminants which may have entered the container will be removed before they cause damage.

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4 Storage of Power Units

A The built-in power source, is a lithium-sulphur dioxide balanced cell. The component chemicals of the cell become neutralised after the cell is fully discharged. Obey these guidelines:

- (1) Store power units at temperatures less than 65°C.
- (2) For storage, the units must be isolated from materials which are flammable. Subject to satisfactory condition on receipt, they may remain in their original transit containers.
- (3) If a unit is damaged, or suspected to be damaged, refer to Chapter 6 for the necessary actions.

WARNING: THE UNITS ARE NOT A FIRE RISK, BUT THEY COULD CAUSE A HEALTH RISK IF INVOLVED IN A FIRE. DISPOSAL OF DAMAGED UNITS SHALL BE IN ACCORDANCE WITH LOCAL REGULATIONS.

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CHAPTER 10

SPECIAL TOOLS, EQUIPMENT AND MATERIALS

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B Equipment and materials.....	1004

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CHAPTER 10

SPECIAL TOOLS, EQUIPMENT AND MATERIALS

A	<u>Special Tools</u>	<u>Part No.</u>
1	Steel hand roller	R05290024
2	Spatula (125mm x 25mm x 3mm) (5 in x 1 in x 1/8 in)	R05290055
3	Solution brushes: 12 mm wide	R05290004
	25 mm wide	R05290006
	38 mm wide	R05290007
4	'Instantair' couplings: Female	R20603001
	Male (plug tail)	R05290107
5	Adapter (inflate/deflate valve)	R20944001
6	DC voltmeter (0-10V)	—
7	Resistor (15 ohm/5 watt)	—
8	Torque spanner	R06754009
9	Spanner - open end (3/8" BSP hose connector)	—
10	Packing machine (painter/operating line)	R15389001
11	Ratchet strap	R05654009
12	Tensioning tool - container straps	R04876009
13	*Crimp securing tool - container straps	R04877009
14	Torque tool - Thanner OTS-65 valves	R06744009 R06745009
15	Operating head torque fitting (DK99)	R08007009
16	Resetting tool, Thanner operating heads	R06753009
17	Thanner torque tool, (Cylinder valve).....	R08390009

*Please note this tool must be serviced regularly.

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18	Safety cap, Thanner operating head	R06257009
19	Punch star tool	R20354001
20	PRV adaptor tool	R06745009
21	Grease, Aero Shell 14	R07968009
22	Silicone grease, 4 compound	R09050003
23	*Torque tool - Leafield (Inlet check valve)	R08200009
24	*Torque tool - Leafield (valve body)	R08253009
25	*Torque tool - Leafield (valve body resetting tool)	R08254009
26	*Torque drive assembly, Leafield	R08218009
27	Filling bung - Leafield	R08252009
28	*Torque tool - Leafield A10 valves (Inner)	R08320009
	(Outer)	R08321009

*Please note this tool must be serviced regularly.

B	<u>Equipment and Materials</u>	<u>Part No.</u>
1	Vacuum cleaner c/w Hose	—
2	Digital Pressure gauge (0-2000 mb)	R08304009
3	Thermometer (hang on manometer)	—
4	Rubber Tubing - $1\frac{1}{8}$ in x $3\frac{3}{8}$ in i/d x $1\frac{1}{2}$ in o/d (manometer connection)	—
5	Dry, Oil-free air supply of 80 to 100 psig .. (5.6 to 7.0 kg/cm ²) regulated to 2 psig (140 g/cm ²) for inflation purposes.	—
6	Solution of non-detergent soap and water	—
7	Lint-free Cloth, clean and dry	—
8	Adhesive Bostik 486 a. 5 litre container	Bostik 486 R02868009
	b. 1 litre container	R04929009

- 9 Methyl Ethyl Ketone (MEK) R04528009
- 10 Self-adhesive waterproof tape, 4" / 100 mm wide
Cloth Backed, Black R04834009
- 11 Self-adhesive waterproof tape, 1"/ 25 mm wide
PVC, White R02096004
- 12 Fabric, Polyurethane/Nylon, 1015/1, Black R10772009
Single PU proofing (main structure and buoyancies)

Alternative fabric, Polyurethane/Nylon, 1015/2, Black R10773009
Double PU proofing (main structure and buoyancies)
- 13 Fabric - Nylon, Single-ply (canopy outer fabric) R06785009
(1044/1)
or
Fabric - Nylon, Single-ply (canopy outer fabric) R08006009
(1044/2)
- 14 Fabric - Nylon, Single-ply (canopy inner fabric) R06315009
- 15 Toluene solvent (500 ml) R41445001
- 16 Tubing, Polythene, Layflat, 50 mm R03224012
(DL Lanyard & Bowsing line)
- 17 Tubing, Polythene, Layflat, 100 mm R05815009
(Painter line, painter extension)
- 18 Cord, Terylene, 22.5 kg/ 50 Lbs R02236006
- 19 Cord, Nylon, 238 kg/ 525 Lbs R00933009
- 20 Cord, Polyester, 2250 kg/ 4960 Lbs R06959009
(Cord extension line/painter, 2 metres)
- 21 Thread, Nylon, 4 kgf R02426001
- 22 Thread, linen, breaking, 3.2 kgf R02414006
(Bowsing line & Drogue)
- 23 Thread, scarlet, cotton R02403001
(Painter sachet tie-off)

- 24 Seal Mk10/Mk14 container S/A (10 x 19 mm) R05606009
- 25 Seal Mk16/ Mk18 container S/A (10 x 38 mm) R06475009
- 26 Packing M14 container (50 x 100 x 1000 mm) R04884009
- 27 Tape S/A (Do Not Cut) R15384002
- 28 Webbing 13mm Polyester undyed RWE11
- 29 Lubricant, Molykote 111 (GIST) R07945009

DSB

LR05

ILLUSTRATED PARTS LIST

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1. GENERAL

- A. The parts list has been prepared for the sole purpose of identifying and/or ordering replacement parts, it should not be used for any other purpose.

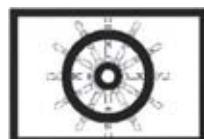
NOTE: Drawings are not to scale; dimensions, where given are in millimetres (mm).

2. SUB-CHAPTERS

- A. For ease of identification this chapter is broken down into the following sub-chapters.
- (1) DSB LR 05
 - (2) Hull Assembly
 - (3) GRP Container Assembly
 - (4) Inflation equipment
 - (5) Mechanical fixings

NOTE: Information on Emergency Pack types, contents and part numbers is given in Chapter 7 of this document.

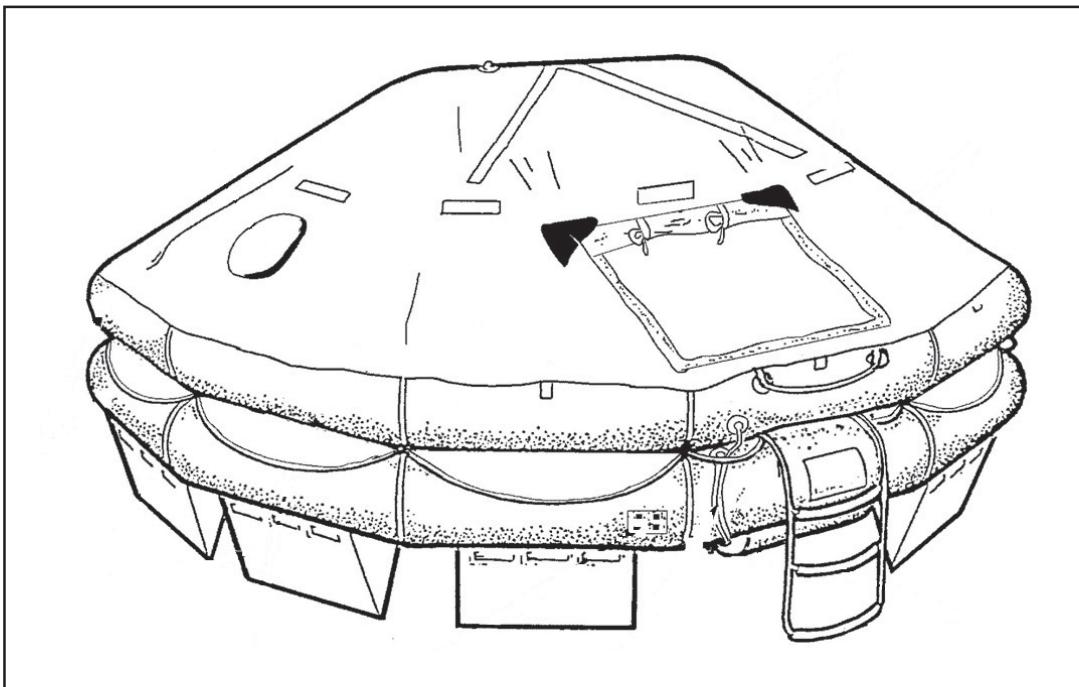
NOTE: The 'Wheelmark' symbol (shown below) indicates an MED compliant item.



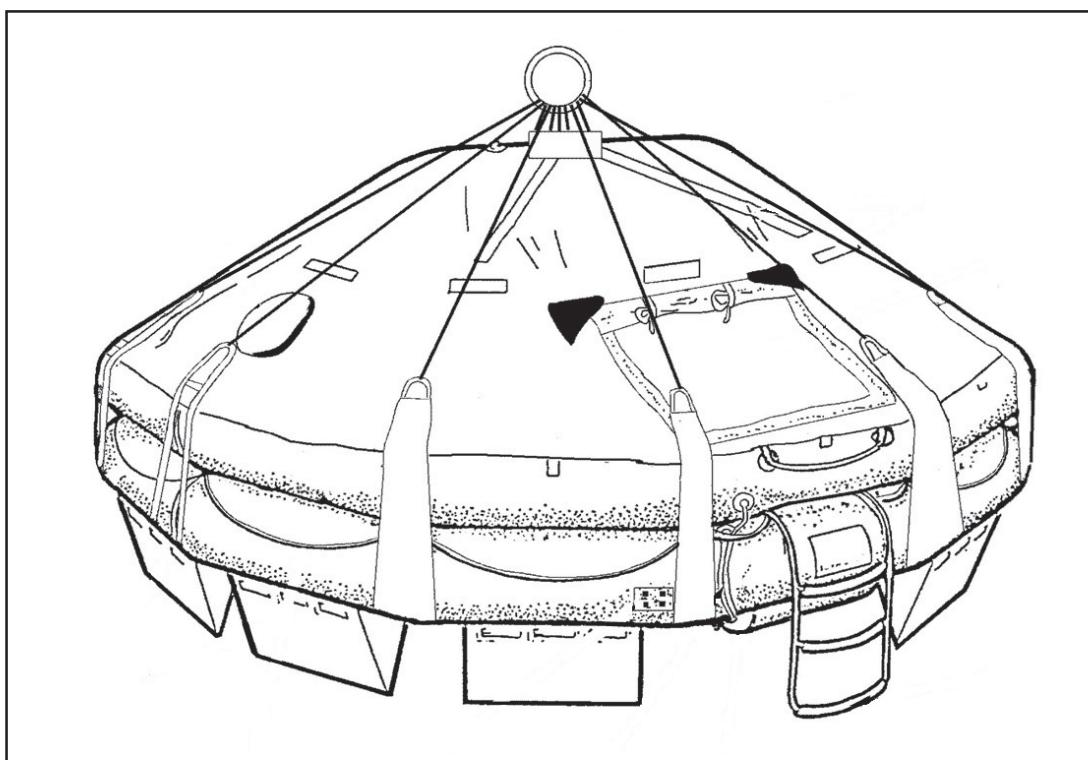
DSB

LR05

(1) DSB LR05



Typical DSB LR05 Throwover Liferaft
FIGURE 1101



DSB LR05 Davit Launch Liferaft
FIGURE 1102

(2) HULL ASSEMBLY

The following details the hull level spares in two sub-sections:

- (2a) All-raft spares** - defined as those items (including valves and fabrics) which are **common to all raft sizes**.

These spares form an integral part of, or are attached to, the core raft *before* specific customer and individual authority requirements are applied.

- (2b) Raft specific spares** - defined as those items which **differ depending on raft size**.

These spares form an integral part of, or are attached to, the core raft *before* specific customer and individual authority requirements are applied.

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(2a) All-raft spares

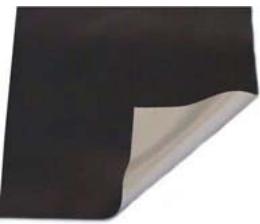
The following sub-section details the all-raft spares in terms of nomenclature, part number and the location of the item in relation to the hull assembly.

	Description:	Lamp unit, inner (RL1)
	Found on:	Archtube assy
	Part Number:	R06727009
	Description:	Lamp unit, position indicating (RL4)
	Found on:	Canopy assembly
	Part Number:	R06726009
	Description:	Power Unit, Marine
	Found on:	Inner Canopy
	Part Number:	R06729009
	Description:	Internal lamp unit (RL5)
	Found on:	Bottom centre line of archtube
	Part Number:	R08279009
	Description:	External lamp unit (RL5)
	Found on:	Top of canopy
	Part Number:	R08280009

	Description:	Line rescue and quoit assembly
	Found on:	Inner lifeline
	Part Number:	R45932001
	Description:	Quoit, handle
	Found on:	Line rescue and quoit assembly
	Part Number:	R11501009
	Description:	Strap, quoit line and rescue assembly
	Found on:	Quoit line and rescue assembly
	Part Number:	R45932011
	Description:	Water pocket
	Found on:	Floor assembly
	Part Number:	R19019002
	Description:	Ramp, Boarding, Marine
	Found on:	Upper/lower buoyancy
	Part Number:	R45894001

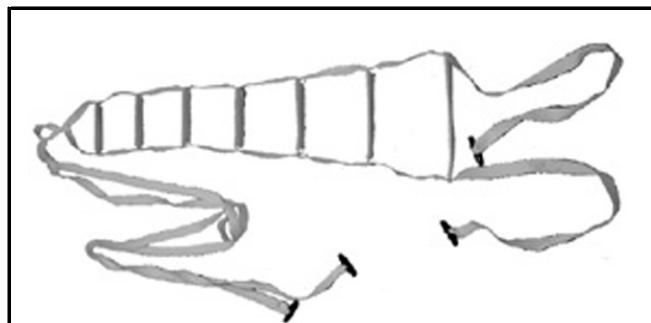
	Description:	Knife, floating, DoT (UK)approved
	Found on:	Upper buoyancy, inside raft
	Part Number:	R04503009
	Description:	Plug, rubber, 5/16 in
	Found on:	Rain catchment tube assembly
	Part Number:	R05390001
	Description:	Drogue (less swivel)
	Found on:	Drogue patch assembly
	Part Number:	R45510101
	Description:	Valve, inflation 2.8mm bore MkIII
	Found on:	Upper buoyancy
	Part Number:	R06716009
	Description:	Valve, inflation 2.2 mm bore Mk III
	Found on:	Lower buoyancy
	Part Number:	R06715009

	Description:	Valve, A8/1 modified
	Found on:	Upper and lower buoyancy
	Part Number:	R20431001
	Description:	Valve, pressure relief 2.90 p.s.i.
	Found on:	Upper and lower buoyancy
	Part Number:	R08152009
	Description:	GIST Inlet chk valves 2.2 mm (Yellow)
	Found on:	Lower buoyancy
	Part Number:	R08209009
	Description:	GIST Inlet chk valves 2.8 mm (Purple)
	Found on:	Upper buoyancy
	Part Number:	R08210009
	Description:	GIST PRV A10 2.8 Psi
	Found on:	Upper buoyancy & Lower buoyancy
	Part Number:	R08223009

	Description:	Nylon fabric to RFD1015/1 (Black single-ply nylon coated on one face with polyurethane)- minimum usable width 1500mm
	Part Number:	R10772009
	Description:	Nylon fabric to RFD1015/2 (Black single-ply nylon coated on both faces with polyurethane)- minimum usable width 1500mm
	Part Number:	R10773009
	Description:	Floor retaining tab
	Found on:	Liferaft floor
	Part Number:	R50288001
	Description:	Label, service record (attaches to exhausted Service Record Chart found on rear of Liferaft Identification Label)
	Part Number:	R50207001
	Description:	Tape, reflective (50mm)
	Part Number:	R07909009
	Alternative	R04760009
	Alternative	DSB00203000

(2b) Raft specific spares

The following sub-section details the raft specific spares in terms of nomenclature, part number, quantity and the location of the item in relation to the hull assembly.



Raft		Part Number
Size (persons)	Launch type	Strap, Righting
6	Throwover	R45766012
	Davit	
8	Throwover	R45766013
	Davit	
10	Throwover	R45766015
	Davit	
12	Throwover	R45766015
	Davit	
16	Throwover	R45766016
	Davit	
20	Throwover	R45766017
	Davit	R45766018
25	Throwover	R45766018
	Davit	

Strap, righting
TABLE 1101

Raft		Part Number			
Size (persons)	Launch type	Strap, attachment (Boarding Ramp)	Stay, (Boarding Ramp)	Strap, Cylinder Retaining	
6	Throwover	R45894112	R50065002	R45740001	
	Davit				
8	Throwover	R45894113	R50065003	R45740001	
	Davit				
10	Throwover	R45894115	R50065004	R45740002	
	Davit				
12	Throwover	R45894115	R50065005	45740002	
	Davit				
16	Throwover	45894116	50065006		
	Davit				
20	Throwover	45894117	50065007		
	Davit	45894118	50065008		
25	Throwover	45894118	50065008		
	Davit				



STRAP ATTACHMENT
(BOARDING RAMP)

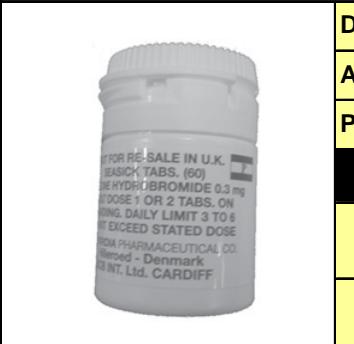
STAY (BOARDING RAMP)

Raft specific straps and stays
TABLE 1104



Paddles, one piece		
Part Number	Description	Raft / container application
R05121009	815 mm long	All types

Paddles
TABLE 1102

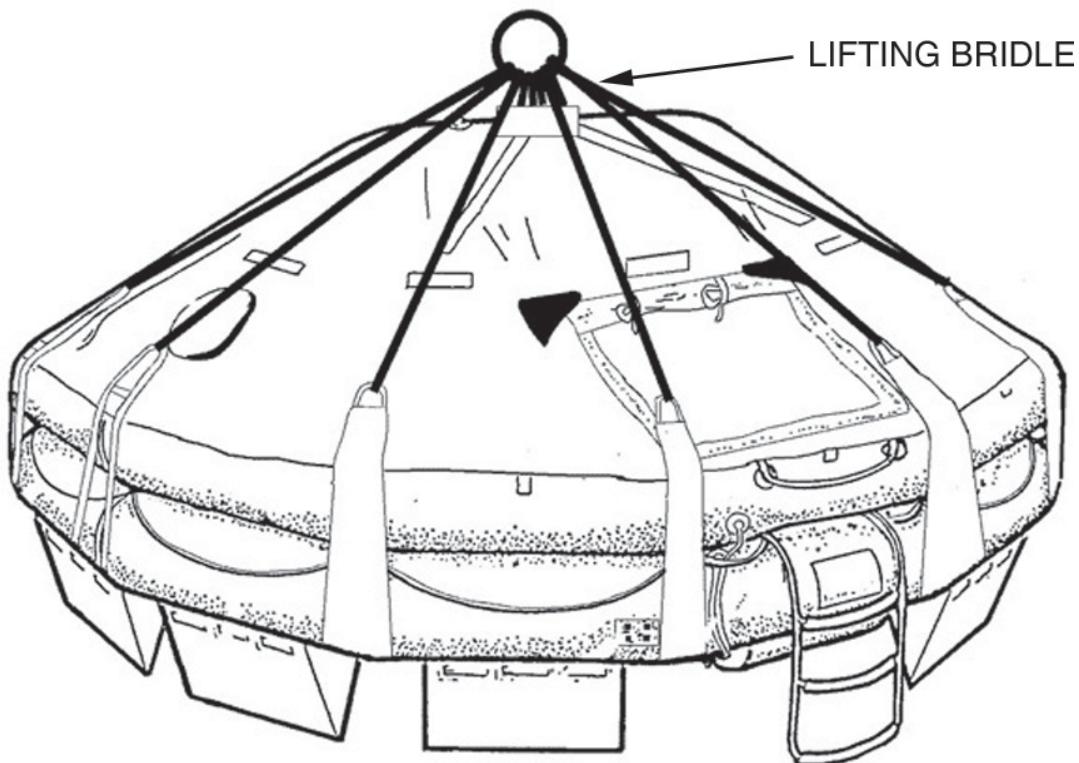


Description:	Tablet, Anti-seasickness (Pack of 60)		
Attached to:	Inner canopy		
Part Number:	00940350		
Allocation by Raft Size			
Raft Size	6-10 TO	12-20 TO and DL	20-25 TO and DL
Quantity (packs)	1	2	3

Anti-seasickness tablets - allocation by raft size
TABLE 1103

Typical insulated floor assembly appearance	Raft		Floor, Insulated
	Size (persons)	Launch type	Part No.
	6	Throwover	R45773001
		Davit	
	8	Throwover	R45774001
		Davit	
	10	Throwover	R45776001
		Davit	
	12	Throwover	R45776001
		Davit	R45776002
	16	Throwover	R45777001
		Davit	R45777002
	20	Throwover	R45778001
		Davit	R45779002
	25	Throwover	R45779001
		Davit	R45779002

Raft specific insulated floor assemblies
TABLE 1105



Typical lifting bridle - Davit launch liferafts only
FIGURE 1103

Bridle, Lifting (DL rafts only)	
Raft Size	Part Number
12 DL	R20794011
16 DL	R20794021
20 and 25 DL	R20871001

Davit launch raft specific lifting bridle assemblies
TABLE 1106

(3) GRP Container Assembly spares

NOTE: The part numbers contained in this section are for WHITE GRP containers.

The following sub-sections cover part numbers for the ordering of container assemblies in the form of complete containers or, sub-assemblies, that is, individual container halves (top or bottom) and the specific type and required quantities of Strap and Crimp assembly for each individual container.

The container requirement is determined in this section by one, or all, of the following criteria:

- 1) Launch method, that is, Throwover or Davit launch.
- 2) Drop height, which determines the 'weight' of container.
- 3) E-pack option(s) used.
- 4) Raft size.
- 5) Customer preference (container MK number).

The following sub-sections group the relevant part numbers for containers as follows:

- (3a) 4N
- (3b) 6/8F / Mk10 size 4
- (3c) 10/12F
- (3d) 16/20F / Mk14 size 17
- (3e) 25G / Mk14 size 17

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3a) DSB standard weight GRP containers

The following sub-section details the part numbers container spares:

**Size 4N****Size 6/8F****Size 10/12F****Size 16/20F****Size 25G****MK10 size 4****MK14 size 17**

GRP containers
FIGURE 1104

Containers				
Container size	Raft size	up to 36 metres stowed height		E-pack option
		Upper	Lower	
4N	6	R50371001	R50371002	B
	8			B
6/8F	6	R50371003	R50371004	A
	8			A
	10			B
	12			B
10/12/F	10	R50371005	R50371006	A
	12			A
	16			B
	20			B
16/20F	16	R50371007	R50371008	A
	25			B
25G	20	R50371009	R50371010	A
	25			A

F&G Range container information
TABLE 1107

Container extras			
Container size		Foam Strip	Polythene sheet
4N	Part No.	R05606009	R01999084
	Qty	1 x 3060 mm	1 x 4000 mm
6/8F	Part No.	R05606009	R01999084
	Qty	1 x 3460	1 x 4000 mm
10/12F	Part No.	R05606009	R01999084
	Qty	1 x 3640	1 x 4000 mm
16/20F	Part No.	R05606009	R01999084
	Qty	1 x 3800	1 x 4000 mm
25G	Part No.	R05606009	R01999084
	Qty	1 x 4000	1 x 4000 m

F&G Range container extras
TABLE 1108

STRAPS and CRIMPS				
THROW OVER LIFERAFT				
Container size	Raft size	E-pack option	Part Number and description	Qty
4N	6	B	R50406001 2.1MT RED DSB	4
	8	B		
6/8F	6	A	R50406001 2.1MT RED DSB	4
	8	A		
	10	B		
	12	B		
10/12F	10	A	R50406001 2.1MT RED DSB	6
	12	A		
	16	B		
	20	B		
16/20F	16	A	R50406001 2.1MT RED DSB	8
	25	B		
25G	20	A	R50406002 2.5MT CLR DSB	8
	25			

DAVIT LAUNCH LIFERAFT								
NOTE: Davit launch containers require double crimps.								
Container size	Raft size	E-pack option	Part Number and description	Qty	Hand loop	Additional crimps	Qty	
10/12F	12	B	R50406001 2.1MT RED DSB	4	4	R04874009	4	
10/12F	12	A	R50406001 2.1MT RED DSB	6	6		6	
	16	B						
16/20F	16	A	R50406001 2.1MT RED DSB	8	8	R04874009	8	
	20	B						
	25	B						
25G	20	A	R50406002 2.5MT CLR DSB	8	8	R04874009	8	
	25							

F&G Range container strap & crimp information
TABLE 1109

Containers						
Container size	Raft size	up to 36 metres stowed height				
		Complete	Upper	Lower	TO/DL	E-pack option
MK10 size 4	6	R17938041	R17938141	R17938241	TO	A
	8				TO	A
	10				TO	B
	12				TO/DL	B
MK14 size 14	12	R50973101	R50973012	R50973022	TO/DL	A
MK14 size 17	16	R50915012	R50915021	R50915032	TO/DL	A
	20				DL	B
	25				TO/DL	B
	20				TO/DL	A
	25				TO/DL	A

Mk10 & 14 Range container information
TABLE 1110

Container extras			
Container size		Container seal	Polythene sheet
MK10	Part No.	R05606009	R01999084
	Qty	3700 mm	1 x 2300 mm
MK14	Part No.	R05606009	R01999084
	Qty	3800 mm	1 x 2300 mm

Mk10 & 14 Range container information
TABLE 1111

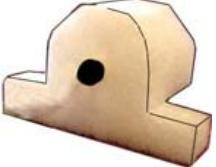
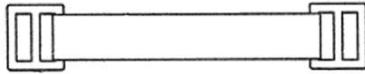
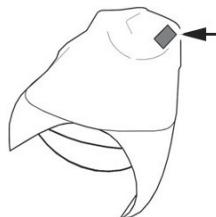
STRAPS and CRIMPS						
THROW OVER LIFERAFT						
Container size	Raft size	E-pack option	Part Number and description	Qty		
MK10 size 4	6	A	R50406001	4		
	8					
	10	B				
	12					
MK14 size 17	16	A	R50406002	8		
	20					
	25					
	25	B				

DAVIT LAUNCH LIFERAFT										
NOTE: Davit launch containers require double crimps.										
Container size	Raft size	E-pack option	Part Number and description	Qty	Additional crimps	Qty				
MK14 size 14	12	B	R50406002	4		4				
MK14 size 17	20	B	R50406002	8	R04874009	8				
	16	A								
	20									
	25									
	25	B								

Mk10 & 14 Range container extras
TABLE 1112

(3g) Common container spares

The following sub-section details the container spares common to all raft sizes:

	Description:	Block, Painter Retaining
	Applications:	All rafts
	Part Number:	R50369001
	Description:	Sachet Assembly, Painter
	Applications:	For applications and part numbers see: Table 1113
	Part Number:	
	Description:	Strap and Crimp
	Applications:	For applications and part numbers see: Table 1109 or 1112
	Part Number:	
	Description:	Container Assembly, Liferaft Identification c/w rope
	Applications:	All rafts
	Part Number:	R43858001
	Description:	Hand loop (band release)
	Applications:	All Davit launch rafts
	Part Number:	80303360
	Description:	Polystyrene block
	Applications:	All containers. Check Chapter 8 for quantities.
	Part Number:	R04884009
	Description:	PAD container protection
	Applications:	All rafts
	Part Number:	R43148001

(3h) Raft specific container spares

The following sub-section details the container spares which are specific to raft sizes.

Maximum installation height (metres)		
Raft launch type	25	36
Throwover	R15323121	R15323131
Davit		R21204041

Additional painter requirements		
Used	Description	Part Number
Painter extension cord	Cord, Polyester 2250 Kg	R06959009
Loop painter exit	Cord, Nylon 525 Lb	R00933009

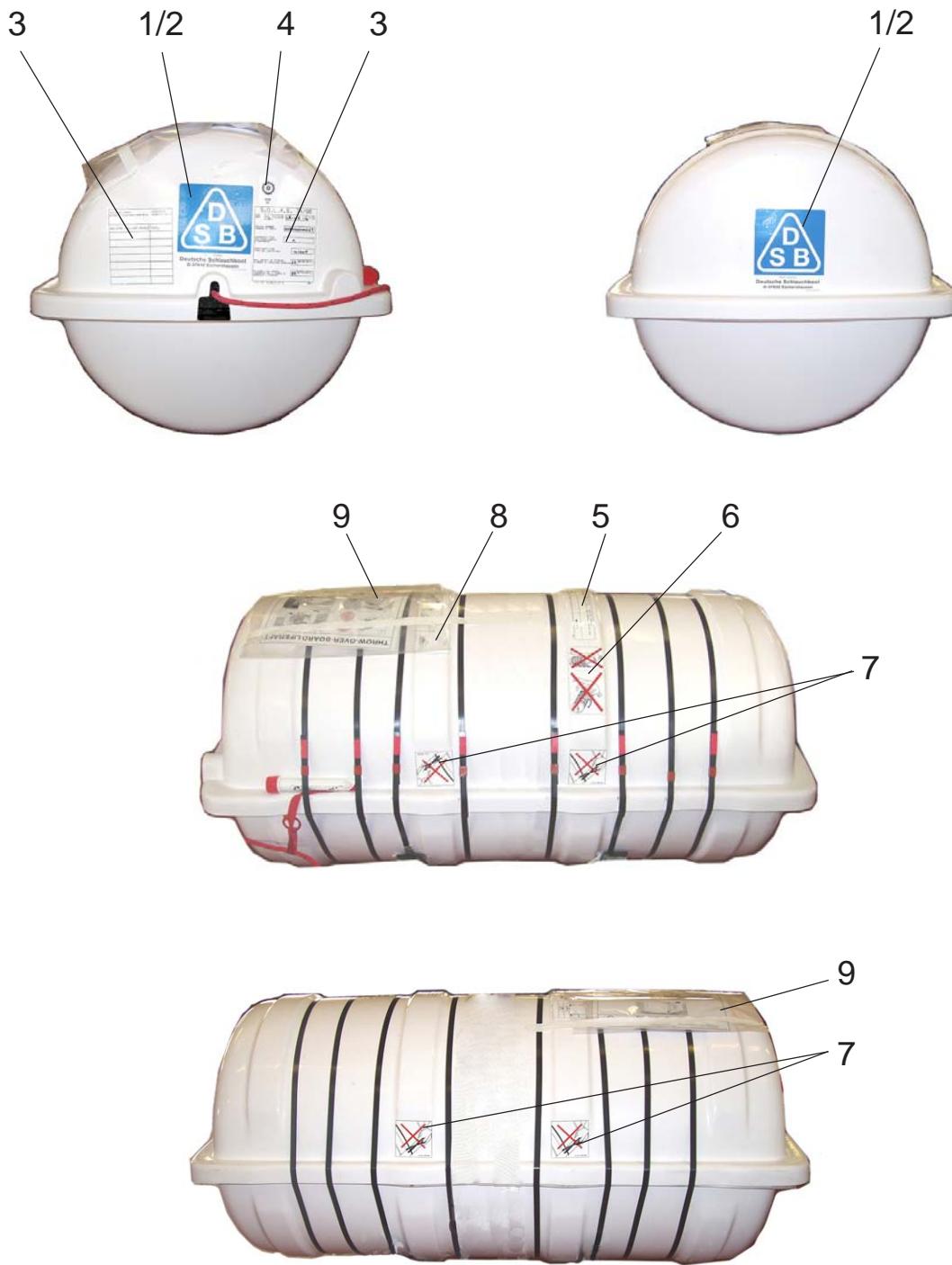
Sachet, painter assembly - applications
TABLE 1113

NOTE:

TABLE 1110 above quotes maximum Installation Height'. It should be understood that actual painter cord length is at least 10 metres longer than the maximum 'Installation Height'. For example, a throwover container at 25 metres Installation Height has an actual painter cord length of at least 35 metres.

(3i) Container label identification and position

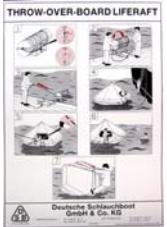
The following sub-section details the container label identification and position for the most commonly used container types:



Throw Over container label identification and label positioning
FIGURE 1105

1		Description:	Label, DSB trademark 115 x 135 mm
		Application:	Containers 4N -6/8F
		Part Number:	00904710
2		Description:	Label, DSB trademark 135 x 158 mm
		Application:	Containers 10/12F - 25G
		Part Number:	00904900
3		Description:	Label, sticker raft ID dates
		Application:	All rafts
		Part Number:	00941100
4		Description:	Label, Wheelmark
		Application:	All rafts
		Part Number:	43973001
5		Description:	Label sticker service
		Application:	All rafts
		Part Number:	00953440
6		Description:	Label, "Don't put container on edge/Don't roll"
		Application:	All liferafts
		Part Number:	00950270

Throw Over container label identification and positioning

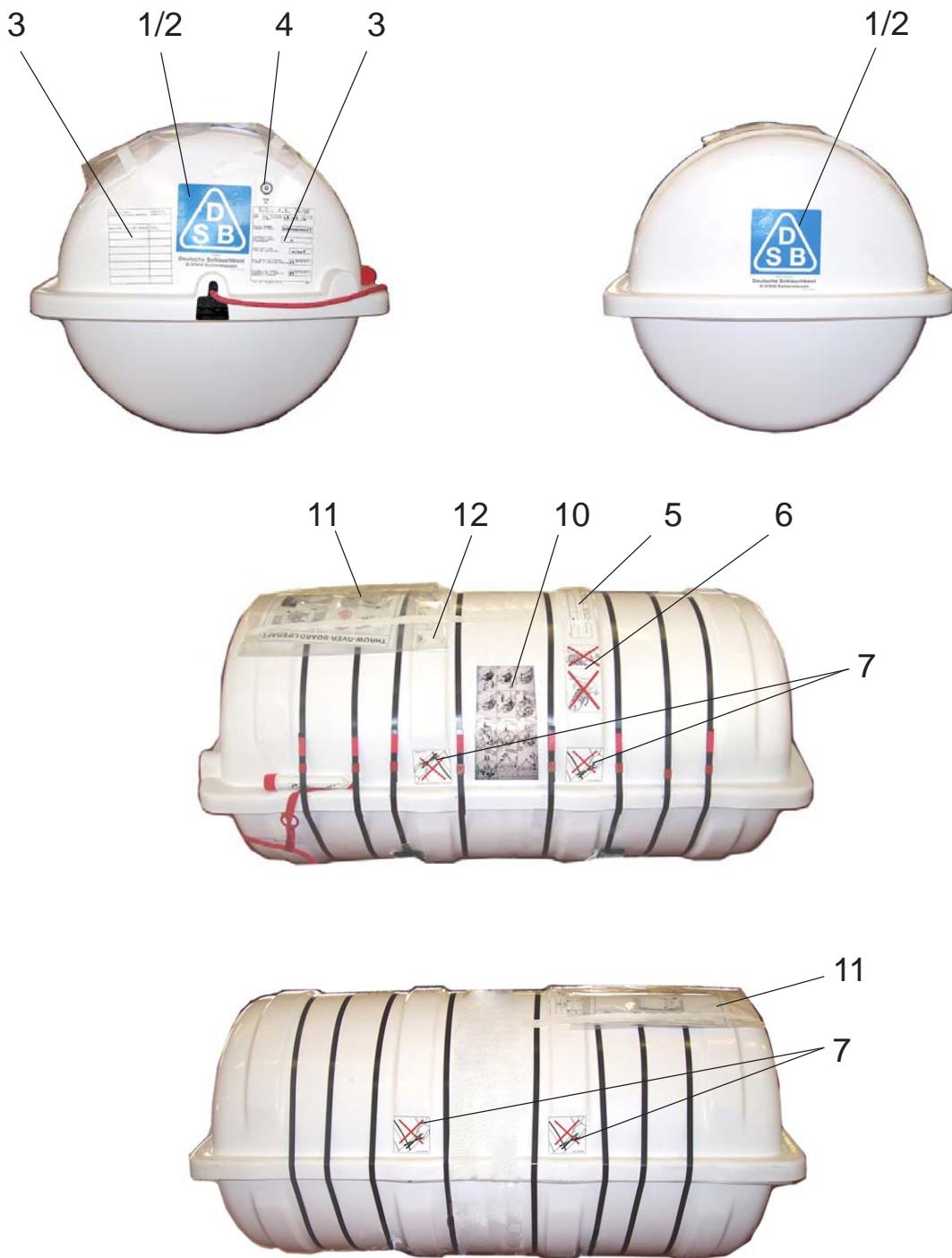
7		Description:	Sticker, Do not cut through plastic strap
		Application:	All rafts
		Part Number:	00941460
8		Description:	Throw over pictoral
		Application:	All rafts
		Part Number:	00941370
9		Description:	Instructions Throw over
		Application:	All Throw over rafts
		Part Number:	00952290

Throw Over container label identification and positioning

10		Description:	Davit launch pictoral
		Application:	All Davit launch rafts
		Part Number:	00941070
11		Description:	Instructions Davit launch
		Application:	All Davit launch rafts
		Part Number:	00952060

Davit Launch container label identification and positioning

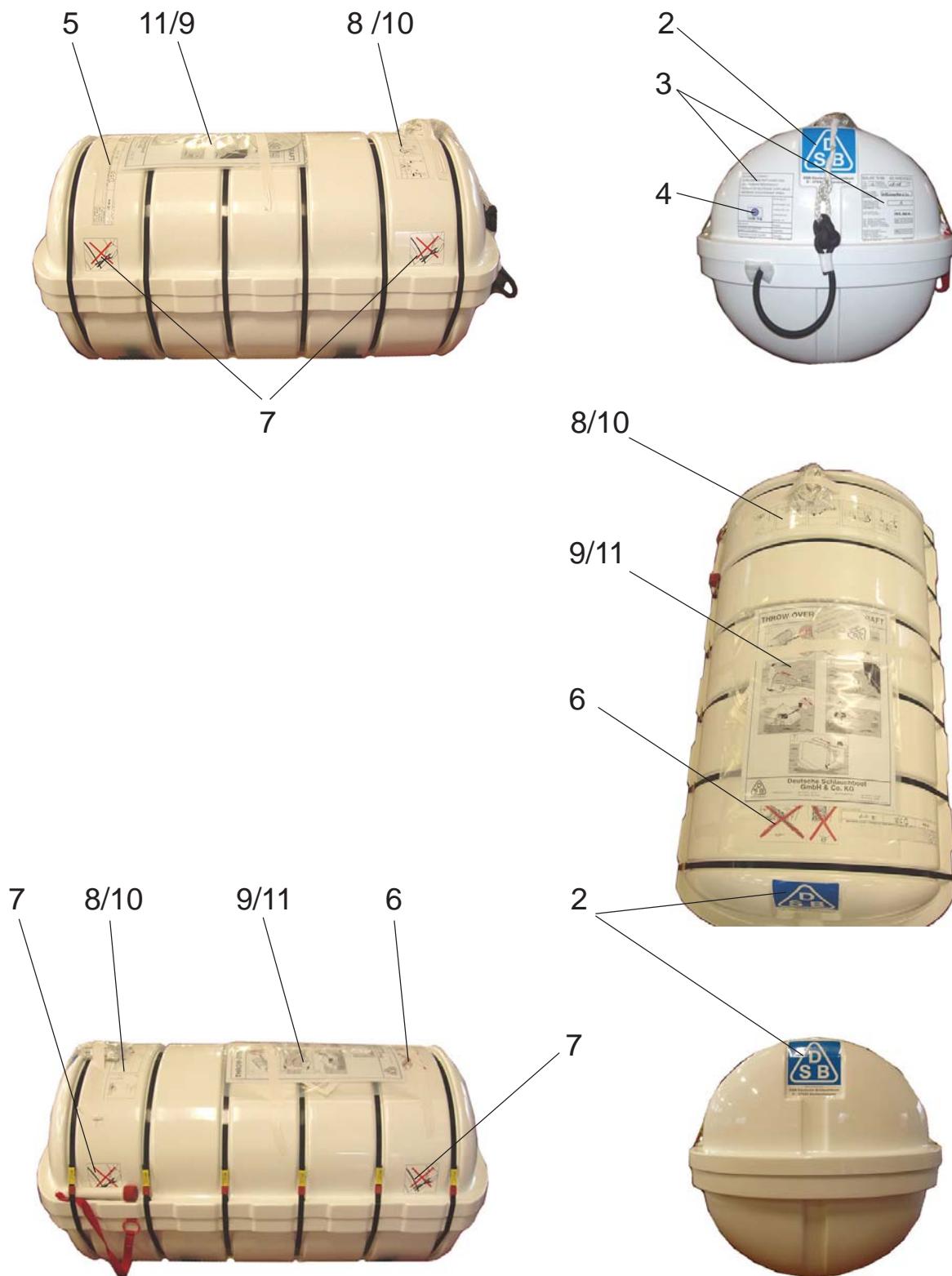
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Davit Launch container label identification and positioning
FIGURE 1106



**MK10 Size 4 Throwover container
Label identification and label positioning
FIGURE 1110**

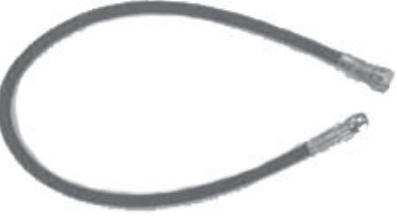


**MK14 Size 14 & 17 container Throw over/ Davit Launch
Label identification and label positioning
FIGURE 1110**

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(4a) Inflation equipment - common spares

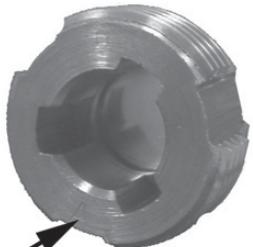
This sub-section lists the hoses and protection pads, associated with the cylinders, which are common across the entire range of liferafts regardless of size or type.

	Description: Hose, 800mm, (31.5") Thanner
	Found on: Inflation system
	Part Number: R06719009
	Description: Head, Operating, Thanner, DK99, 2 - outlet
	Found on: Cylinder
	Part Number: R08008009
	Description: Bolt, Banjo, Thanner, Mk3 inflation valve
	Found on: Inflation hose/buoyancy
	Part Number: R06760009
	Description: Washer, fibre, inner, Mk3 inflation valve Thanner
	Found on: Nut, Union
	Part Number: R06761009
	Description: Washer, fibre, outer, Mk3 inflation valve Thanner
	Found on: Nut, Union
	Part Number: R06762009

	Description:	GIST Hose assembly, 800 mm Leafield
	Found on:	Inflation system
	Part Number:	R08255009
	Description:	Head, Operating, GIST - outlet Leafield
	Found on:	Cylinder
	Part Number:	R08211009

(4b) Cylinders and inflation equipment - associated spares

This sub-section lists the spares associated with the cylinders and inflation equipment:

	Description:	Description: Adaptor, Cylinder, DIN477, Thanner
	Found on:	Used on TPED cylinders
	Part Number:	R08387009
	Description:	Membrane assembly, 250 bar, Thanner (A)
	Found on:	Used on TPED cylinders adaptor (R06772009)
	Part Number:	R06457009

(4c) Cylinders (European TPED Compliant)

TABLE 1114 lists the part numbers and applications of charged cylinders (including CO2 and N2 charges) and bare cylinders (including volume) with respect to the raft size/ launch method.

CYLINDERS - Thanner Inflation System								
Raft		Description Charged Cylinders			Bare Cylinder			
Size persons	Launch type	Part No.	CO2 Charge (Kg)	N2 Charge (Kg)	Part No.	Volume (Ltr)	Test Pressure (BAR)	QTY
6	Throw over	R41683002	2.50	0.16	R41713001	5.0	250	1
	Davit							
8	Throw over	R41684002	3.51	0.23	R41714001	6.7	250	1
	Davit							
10	Throw over	R41686002	5.94	0.18	R41716001	10.2	250	1
	Davit							
12	Throw over	R41686002	5.94	0.18	R41716001	10.2	250	1
	Davit	R41686002						
16	Throw over	R41687002	8.44	0.37	R41717001	15.5	250	1
	Davit	R41687002						
20	Throw over	R41687002	8.44	0.37	R41717001	15.5	250	1
	Davit	R41945002	11.26	0.36	R41947001	16.9	250	1
25	Throw over	R41945002	11.26	0.36	R41947001	16.9	250	1
	Davit	R41945002						

Cylinder information (European TPED Compliant)

(Thanner inflation)

TABLE 1114

Cylinders - associated equipment (European TPED Compliant)

TABLE 1115 lists the applications of operating heads, adaptors, membranes and labels with respect to the raft size/launch method and charged cylinder type.

CYLINDERS - Thanner Inflation System							
Raft		Charged cylinder type	Operating Head		Adaptor	Membrane	Rating (BAR)
Size persons	Launch type		DK99	DK94 (Option)			
6	Throw over	R41683002	R08008009	R06721009	R08387009	R06457009	250
	Davit						
8	Throw over	R41684002	R08008009	R06721009	R08387009	R06457009	250
	Davit						
10	Throw over	R41686002	R08008009	R06721009	R08387009	R06457009	250
	Davit						
12	Throw over	R41686002	R08008009	R06721009	R08387009	R06457009	250
	Davit						
16	Throw over	R41687002					250
	Davit						
20	Throw over	R41687002	R08008009	R06721009	R08387009	R06457009	250
	Davit	R41945002					
25	Throw over	R41945002					
	Davit						

Cylinders - associated equipment (European TPED Compliant) (Thanner inflation)

TABLE 1115

NOTE:

The part number for the cylinder label is common in all applications - R41674001

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(4d) Cylinders (European TPED Compliant) (Leafield inflation)

TABLE 1116 lists the part numbers and applications of charged cylinders (including CO2 and N2 charges) and bare cylinders (including volume) with respect to the raft size/ launch method.

CYLINDERS - Leafield Inflation System								
Raft		Description Charged Cylinders			Bare Cylinder			
Size persons	Launch type	Part No.	CO2 Charge (Kg)	N2 Charge (Kg)	Part No.	Volume (Ltr)	Test Pressure (BAR)	QTY
6	Throw over	R50463004	2.50	0.16	R41713001	5.0	250	1
	Davit							
8	Throw over	R50463005	3.51	0.23	R41714001	6.7	250	1
	Davit							
10	Throw over	R50463007	5.94	0.18	R41716001	10.2	250	1
	Davit							
12	Throw over	R50463007	5.94	0.18	R41716001	10.2	250	1
	Davit	R50463007						
16	Throw over	R50463008	8.44	0.37	R41717001	15.5	250	1
	Davit	R50463008						
20	Throw over	R50463008	8.44	0.37	R41717001	15.5	250	1
	Davit	R50463009	11.26	0.36	R41947001	16.9	250	1
25	Throw over	R50463009	11.26	0.36	R41947001	16.9	250	1
	Davit	R50463009						

**Cylinder information (European TPED Compliant)
(Leafield inflation)**
TABLE 1116

**Cylinders - associated equipment (European TPED Compliant)
(Leafield inflation)**

TABLE 1117 lists the applications of operating heads, adaptors, membranes and labels with respect to the raft size/launch method and charged cylinder type.

CYLINDERS - Leaffield Inflation System						
Raft		Charged cylinder type	Operating Head	Adaptor	Membrane	
Size persons	Launch type	Part Number				Rating (BAR)
6	Throw over	R50463004	R08211009	R08221009	R08217009	250
	Davit					
8	Throw over	R50463005	R08211009	R08221009	R08217009	250
	Davit					
10	Throw over	R50463007	R08211009	R08221009	R08217009	250
	Davit					
12	Throw over	R50463007	R08211009	R08221009	R08217009	250
	Davit					
16	Throw over	R50463008				
	Davit					
20	Throw over	R50463008	R08211009	R08221009	R08217009	250
	Davit	R50463009				
25	Throw over	R50463009				
	Davit					

**Cylinders - associated equipment (European TPED Compliant)
(Leafield inflation)**

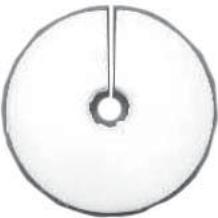
TABLE 1117

NOTE:

The part number for the cylinder label is common in all applications - R41674001

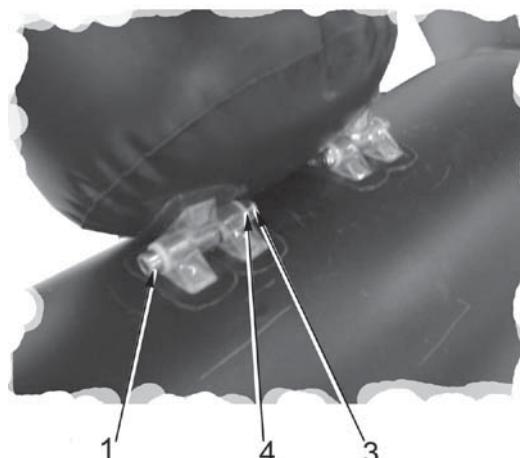
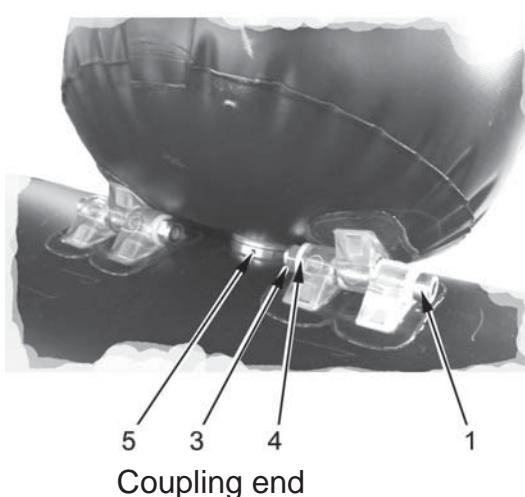
(4e) Foam protection - operating head and inflation system

The following sub-section details the foam protection pads directly associated with the operating head and inflation system.

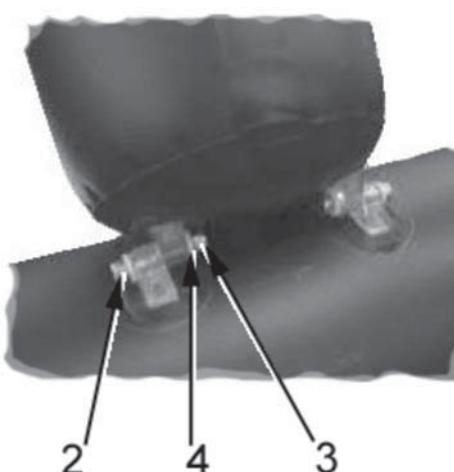
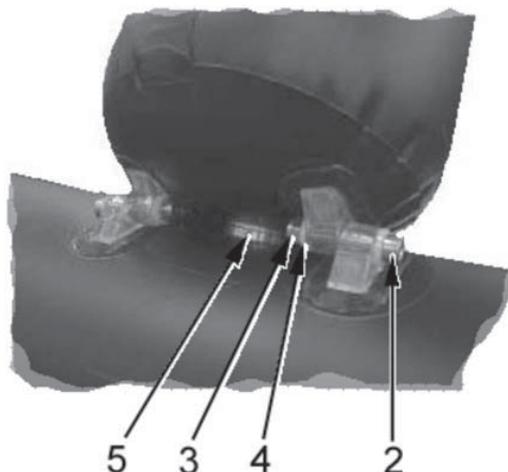
	Description:	Pad, protection, operating head (DK99) - inboard
	Found on:	Inflation system, (both types)
	Part Number:	R50067003
	Description:	Pad, protection, operating head (DK99) - outboard
	Found on:	Inflation system, Thanner
	Part Number:	R50067001
	Description:	Pad, protection, inlet check valve
	Found on:	Inflation system, (both types)
	Part Number:	R50067002
	Description:	Pad, protection, inlet check valve
	Found on:	GIST Inflation system, Leafield
	Part Number:	R50067006

(5) Mechanical fixings

This sub-section lists the mechanical fixings associated with the attachment of the archtube to the upper buoyancy.



Archtube to buoyancy attachment for 16, 20 and 25 person throwover and davit launch liferafts



Coupling end

Typical archtube to buoyancy attachment for 6, 8 and 10 person throwover liferafts and 12 person throwover and davit launch liferafts

**Archtube to buoyancy attachments
FIGURE 1107**

1		Description:	Screw, M10 X 80 socket head, stainless steel
		Found on:	Upper buoyancy/archtube interface
		Part Number:	R07961009
2		Description:	Screw, M10 X 60 socket head, stainless steel
		Found on:	Upper buoyancy/archtube interface
		Part Number:	R07962009
3		Description:	Nut, M10, Nyloc
		Found on:	Upper buoyancy/archtube interface
		Part Number:	R07972009
4		Description:	Washer, Nylon, M10
		Found on:	Upper buoyancy/archtube interface
		Part Number:	R07973009
5		Description:	Screw, grub, M4 X 8 stainless steel
		Found on:	Upper buoyancy/archtube interface
		Part Number:	R07974009

This sub-section lists the mechanical fixings associated with the attachment of the container to the cradle, (optional).

	Part Number		
	Description		
Container size	SENHOUSE SLIP	SHACKLE, M10 PIN	TENSIONER
4N			
6/8F			
10/12F	R00710030	R00710300	R00725120
16/20F			
25G			

	Part Number	
	Description	
Container size	HRU HAMMER H20	
4N		
6/8F		
10/12F		R00709310
16/20F		
25G		

DSB

LR05

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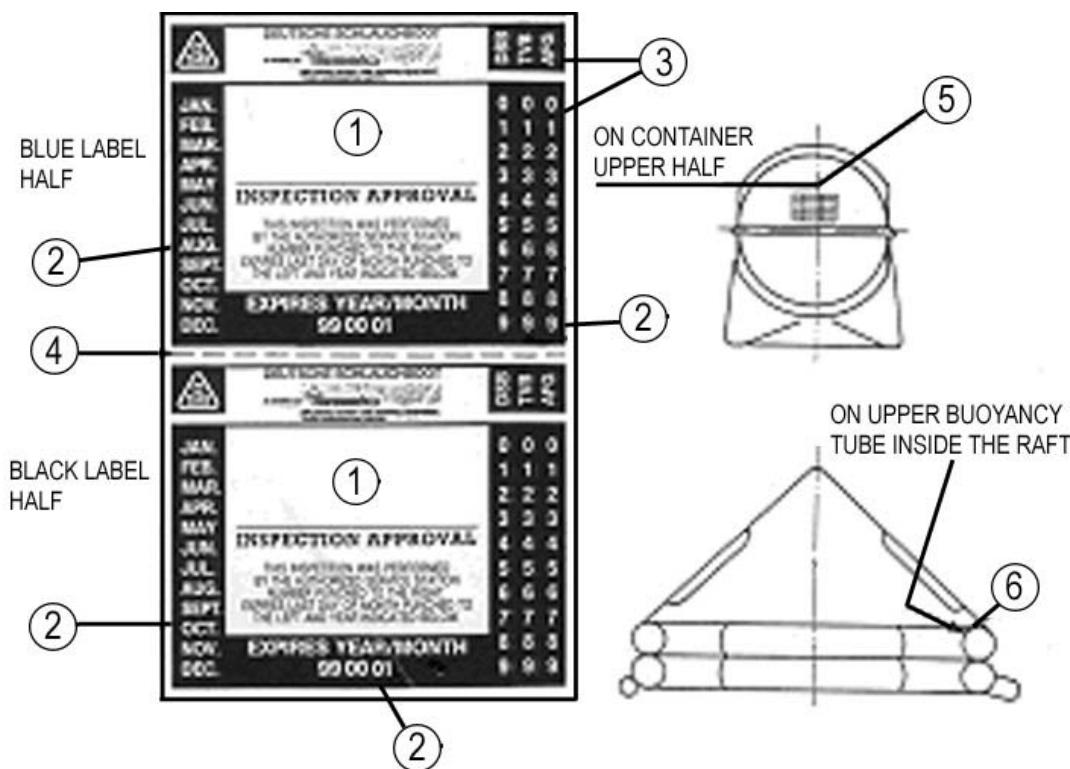
Appendix A-1**General**

Check the container data label. Make sure all details are clear and legible.
Please refer to (FIGURE A11) for positioning and marking of the Inspection Approval label.

1. Put in STATION ADDRESS by rubber stamp.
2. Punch MONTH and YEAR for next service.
3. Maker and makers station number (already punched).
4. Cut the label into two halves.
5. Blue label half stick on position.
6. Black label half stick on position.

NOTE 5 and 6 Before sticking on label:

Position on container and liferaft must be cleaned.
Press on self-sealing label firmly.



Inspection approval
TABLE A11

DSB

LR05

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Appendix A2

DSB LR05 Davit launch liferafts (KLAPPE)

Davit launchable liferafts packed in this configuration have an alternative launching method compared to that defined in Chapter 8.

NOTE: This Appendix applies to packing DL liferafts ONLY.

NOTE: Throwover liferafts packed in accordance with Chapter 8.

SECTION 1 Page

A	KLAPPE Container preparation	2
(i)	MK10 all sizes	2
(ii)	MK14 all sizes	3
B	Packing Davit Launch liferaft into a container.....	4
C	Container labelling	18

SECTION 2

A	KLAPPE - IPL	19
(i)	KLAPPE - Mk14 Davit-launch (DL) GRP containers	19
(ii)	KLAPPE - Container labels	20

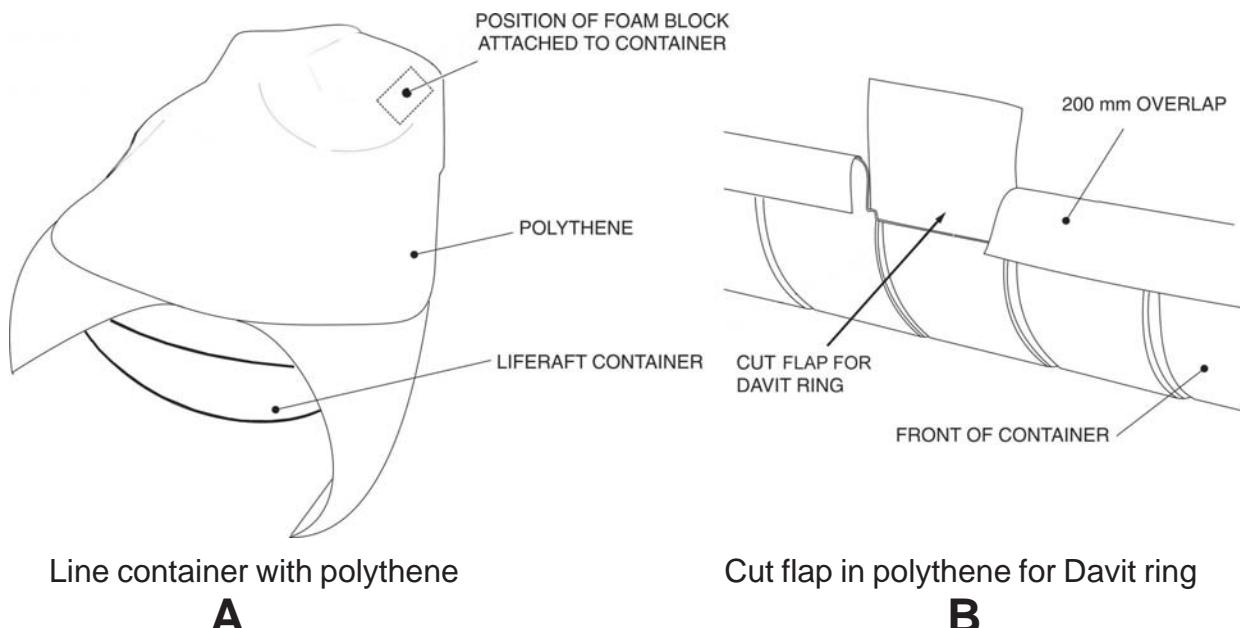
SECTION 1

A. KLAPPE Container preparation(i) **MK 10 container:**

The following preparation is used for Davit Launch liferafts.

1. The *container seal*, fitted to the upper container half, shall be replaced.
2. Fix *protection foam* to the inside of the container (FIGURE 1A). This foam block prevents the cylinder *operating head* from impacting the container side during handling and deployment.
3. Line the bottom half of the *container* with a polythene sheet, (FIGURE 1A). Make sure this sheet overlaps the front edge of the *container* by 200 mm (8").
4. For Davit Launch only, use a pair of scissors to cut the two sides in the polythene where the Davit ring will exit. (FIGURE 1B).

NOTE: On Davit Launch liferafts, the excess polythene sheet is passed around the circumference of the entire liferaft. The cut -out flap for the Davit ring will be placed under the ring.



Preparation of container MK 10
FIGURE 1

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(ii) MK 14 container:

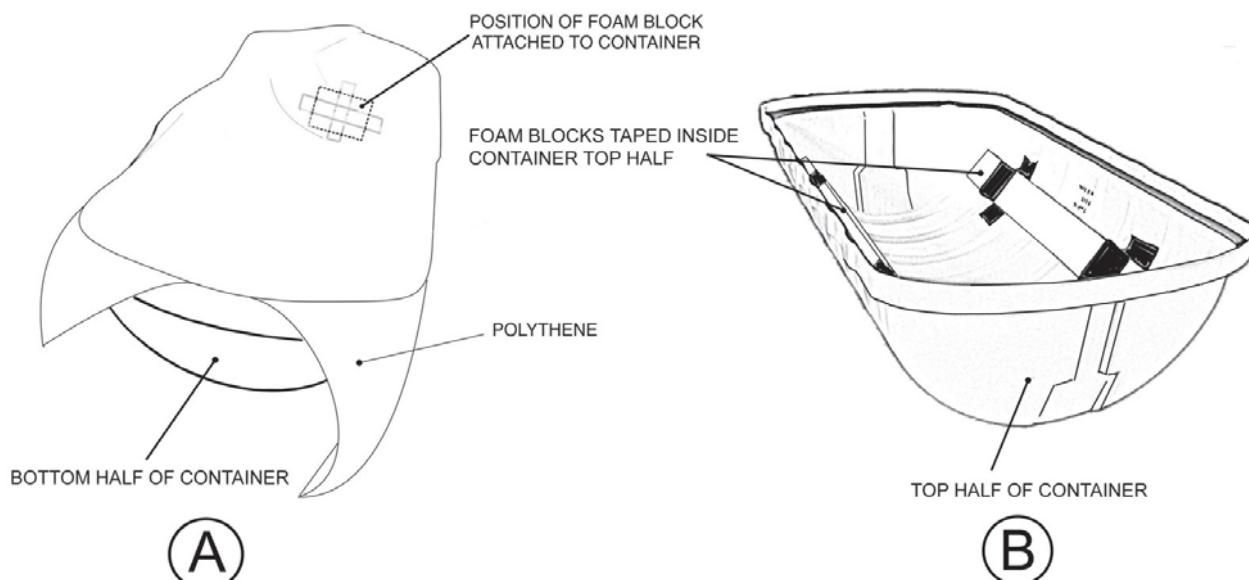
The following preparation is used for Davit Launch liferafts.

1. The *container seal*, fitted to the top half of the container, shall be replaced.
2. Fix *protection foam* to the inside of the *container* (FIGURE 2A). Position the foam block in the centre. This foam pad prevents the cylinder *operating head* from impacting the container side during handling and deployment.
3. Line the bottom half of the container with a polythene sheet, (FIGURE 2A). Make sure this sheet overlaps the front edge of the container by 200 mm (8"). Use temporary lengths of tape to secure the polythene in place.

NOTE:

The excess polythene sheet is passed around the circumference of the entire liferaft . The cut -out for the Davit ring is placed under the ring.

4. Fix two lengths of *polystyrene foam block* to the top half of the container, (FIGURE 2B).



Preparation of container MK 14
FIGURE 2

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CAUTION: DO NOT USE ANY OTHER PACKING METHOD.

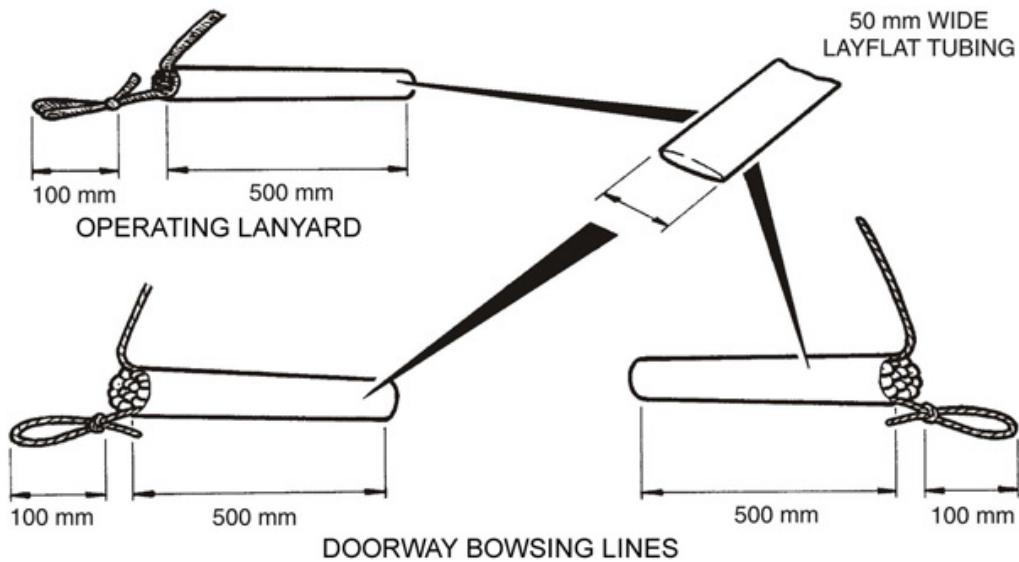
B. Packing a Davit Launch liferaft into a container

1. Place the liferaft neatly on a packing table in an open area, with enough room to manoeuvre the container during packing. The inflation valves should be positioned adjacent to the edge of the packing table. Ensure all cordage is neat and tidy.

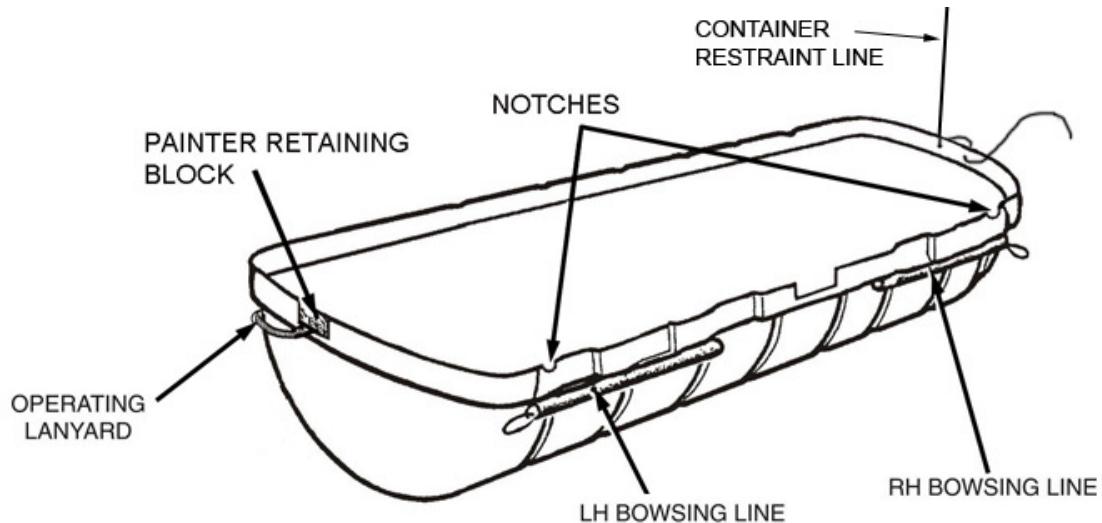
When most of the air has escaped naturally from the liferaft, it must be evacuated as follows:

- (a) Connect a vacuum device to a deflation adapter and evacuate all air from each compartments. Re-cap the inflate/deflate valves in each compartment.
 - (b) As each chamber is evacuated, adjust the buoyancies so that they lie flat on each other.
2. Check the red webbing ring pull and *container retaining line* is serviceable.
 3. Renew the *container restraint label* if it is torn or illegible, (FIGURE 801).
 4. Tie the external lines in four equal groups, at their mid point. Do this for each quadrant of the raft, using 1 turn of 2 kgf (4.41 lbf) *breaking thread*, (FIGURE 801).
This will keep lines away from the door openings and will also prevent entangling.
 5. Tie the *container retaining line*, (1818 kgf (4000 lbf) Nylon cord 5.5 m (216") long, to the suspension ring using a bowline knot. (FIGURE 801).
 6. Secure the *container retaining line* to the canopy, by taping it at two locations along the arch tube, using 100 mm (4") adhesive tape. Ensure it is routed outside the lifting bridle cords and passed through the lifeline, (FIGURE 801).
 7. Thread the free end of the *container retaining line* out through one of the holes in the bottom half of the container and back into the container using the other hole.
The container retaining line is then left until the top half of the container is in place, (FIGURE 801).
 8. If the operating lanyard has been removed from its sachet, it must be repacked according to (FIGURE 3).

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Preparation of doorway Bowsing lines & Operating lanyard
FIGURE 3



Doorway Bowsing lines & Operating lanyard location
FIGURE 4

9. If the doorway bowsing lines have been removed from their sachet, they must be repacked according to (FIGURE 3).
10. Attach the operating lanyard and doorway bowsing lines sachets to the outside of the container using adhesive tape (FIGURE 4).
11. Pass the inner end of the operating lanyard through the painter exit slot in the lower container and insert the *painter retaining block* on top, (FIGURE 4).
12. Remove the transit plug from the *operating head* and fit the pre-set *operating head* (FIGURE 5 a & b). Ensure the threads on the body of the *operating head* and cylinder valve are clean.
For Leafield equipment operating head, ensure the operating head is pushed firmly on, tighten the two screws in using a 3mm AF hexagon key to the desired torque, see CHAPTER 1, TABLE 101. The operating head must be tight on the cylinder valve (FIGURE 5c).

WARNING: DO NOT REMOVE THE RECOIL CAPS FROM THE OPERATING HEAD YET.

13. Upturn the edge of the liferaft to reveal the cylinder stowage. Place the *cylinder* on the underside of the raft floor, taking care not to trap the *righting strap*. Secure the cylinder with the velcro retaining straps, (FIGURE 6).
The *cylinder* must be orientated, so that one of the operating head outlets runs parallel with the base of the liferaft while the other runs perpendicular towards the water (FIGURE 6).
14. Tie the cylinder neck to the adjacent loop patch on the floor. Use a reef knot with 2 turns of 238 kgf (525 lbf) nylon cord, 450 mm (18") long. Tape the flying ends.
15. Remove the recoil caps from the *operating head*.
16. Route both *hoses* through the *painter patch loops* (FIGURE 7) .

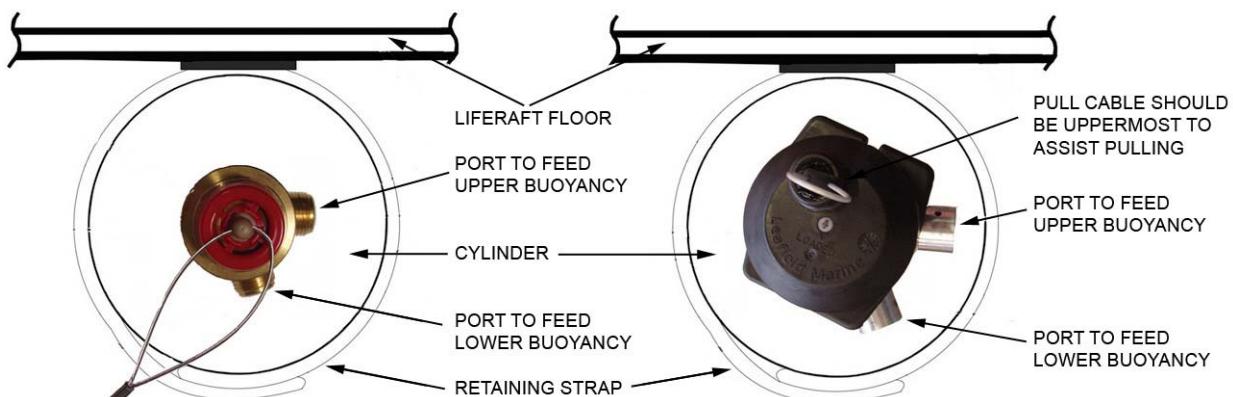
CAUTION: THIS ONLY APPLIES TO 10-25 PERSON LIFERAFTS.

17. Connect up each inflation *hose*, (FIGURE 5). Torque the *hose* connections as stated in Chapter 1, TABLE 101 and cover each hose hexagonal nut using 25mm (1") adhesive tape . This will indicate that they have been torqued.
18. Insert two *protection pads* onto *operating head* and tape together, using 100mm (4") adhesive tape (FIGURE 8). Lay liferaft flat on the table again.

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Assembly of inflation equipment
FIGURE 5

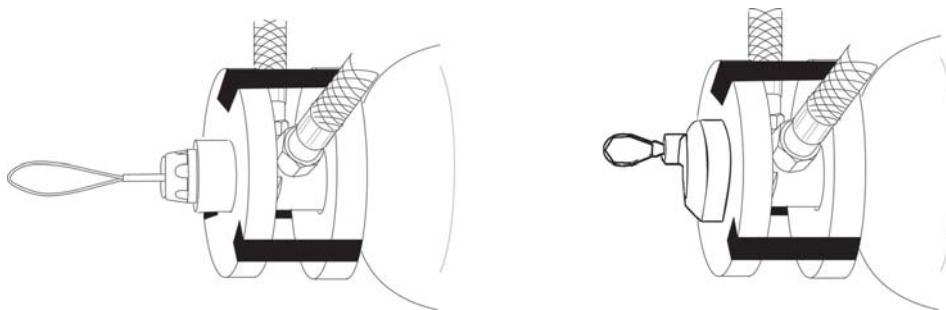


Cylinder attachment to liferaft
FIGURE 6

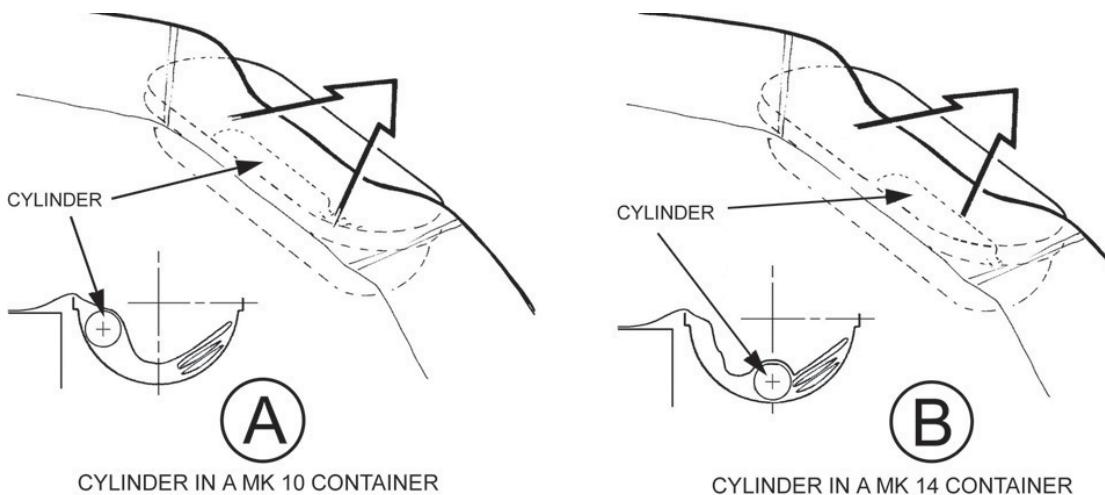
19. Mount the lower half of the *container* on a suitable strong trolley. Position the container next to the table with the Davit launch ring exit hole away from the table. Leave a small gap (about 100 mm (4")) between the table and the side of the container. Tilt the lower half of the container slightly towards the table to facilitate rolling and packing.
20. Grasp the edge of the liferaft and with the *cylinder*, drag the assembly over the *containers* so that the cylinder lies correctly in the container, (FIGURE 9).
 - (a) MK10 CONTAINER: The uppermost edge of the cylinder must be level with the inner container lip, (FIGURE 9A).
 - (b) MK14 CONTAINER: The cylinder must be placed in the centre and with the operating head close to container, (FIGURE 9B).
21. Work the liferaft floor area down into the recesses towards each end of the *container*.



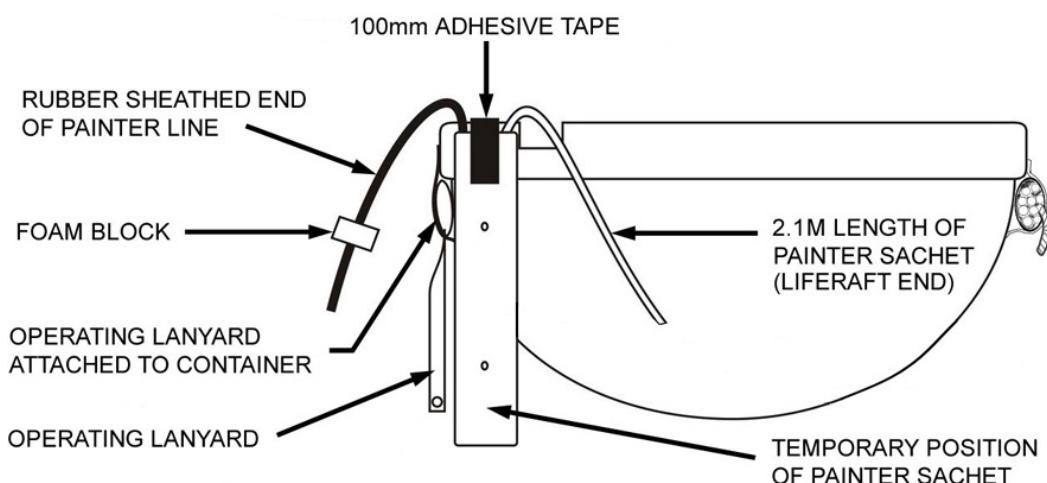
Inflation hose routing (10-25 Persons only)
FIGURE 7



Operating heads protection pads
FIGURE 8



Operating heads protection pads
FIGURE 9



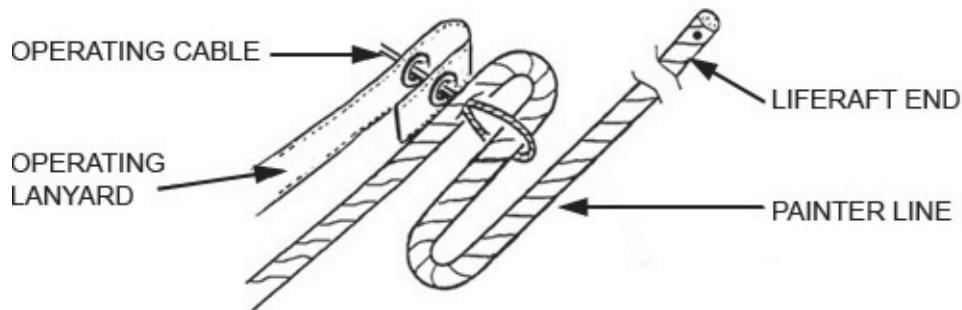
Cylinder position in the container
FIGURE 10

CAUTION: EXERCISE EXTREME CARE DURING THE NEXT OPERATION IN ORDER TO AVOID OPERATING THE INFLATION SYSTEM.

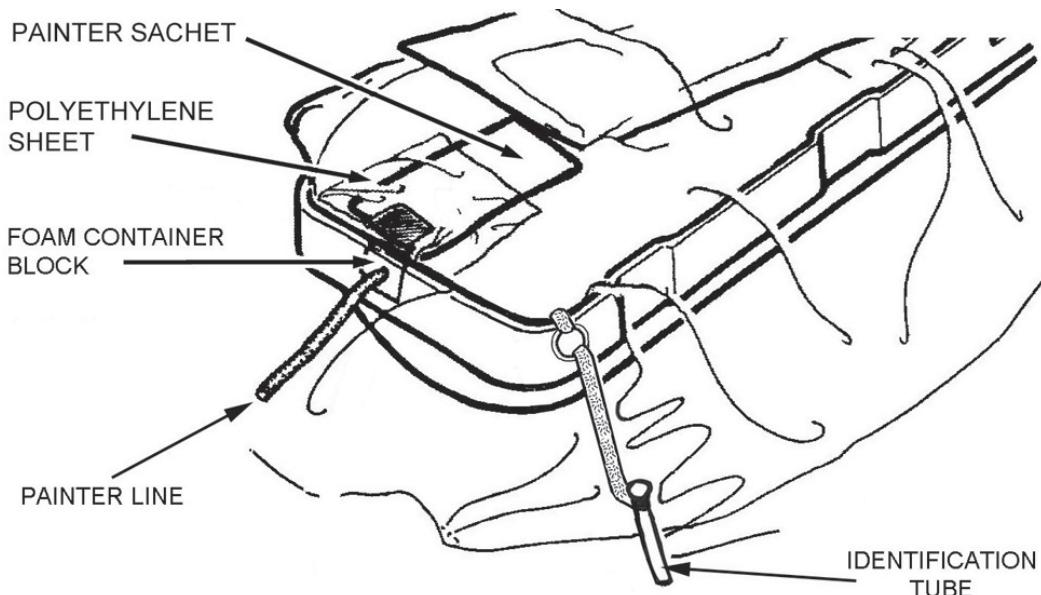
22. Fold back the liferaft so as to reveal the operating mechanism.
23. Obtain the *painter sachet*. Wrap a polyethylene sheet, 915mm x 800mm (36" x 31.5"), around the end of the *painter sachet* and tape it in place.
The polyethylene sheet should extend over the open end of the sachet and the painter rope by at least 100mm (4"), but no more than 150mm (6").
24. Temporarily attach the *painter sachet* to the rear of the lower half of the container using *adhesive tape*. Make sure that the open end of the *painter sachet* is at the edge of the container with the painter line cut-out, (FIGURE 10).
25. Pass a 300 mm (12") length of layflat tubing over the operating lanyard. Pull the operating lanyard taut and pass it under the *painter sachet* and through the cut-out in the container. Pass the eyelet in the end of the operating lanyard over the operating mechanism actuation cable, (FIGURE 11).
26. Pull the 1.5m (60") end of the operating lanyard line taut. At the firing point, (300 mm (12")) from where the line exits the sachet), pass the actuation cable of the operating mechanism through the painter line. Thread the remaining painter line back through the actuation cable, (FIGURE 11).

WARNING: THE OPERATING MECHANISM IS NOW ARMED. EXTREME CARE MUST BE TAKEN DURING ALL FOLLOWING ACTIONS.

27. Locate the *painter attachment patch* on the lower buoyancy. Tie the *liferaft identification* tube red ribbon through the *painter patch* attachment, using a bowline knot, (FIGURE 12).
28. Locate the *painter attachment patch* on the lower buoyancy. Tie the liferaft end of the *painter* to the painter patch bridle, using a bowline knot.
29. Pack the emergency pack valises for each liferaft (refer to Chapter 7). Position the valises centrally, outboard from the cylinder. If present, place the valise(s) containing rations and water positioned furthest from the operating head end of the cylinder.
Utilise the space available to minimise the vertical excursion of the valises.
Ensure the straps on each emergency pack valise are tight.



Attachment of Painter line & Operating lanyard to operating mechanism
FIGURE 11



Position of painter sachet
FIGURE 12



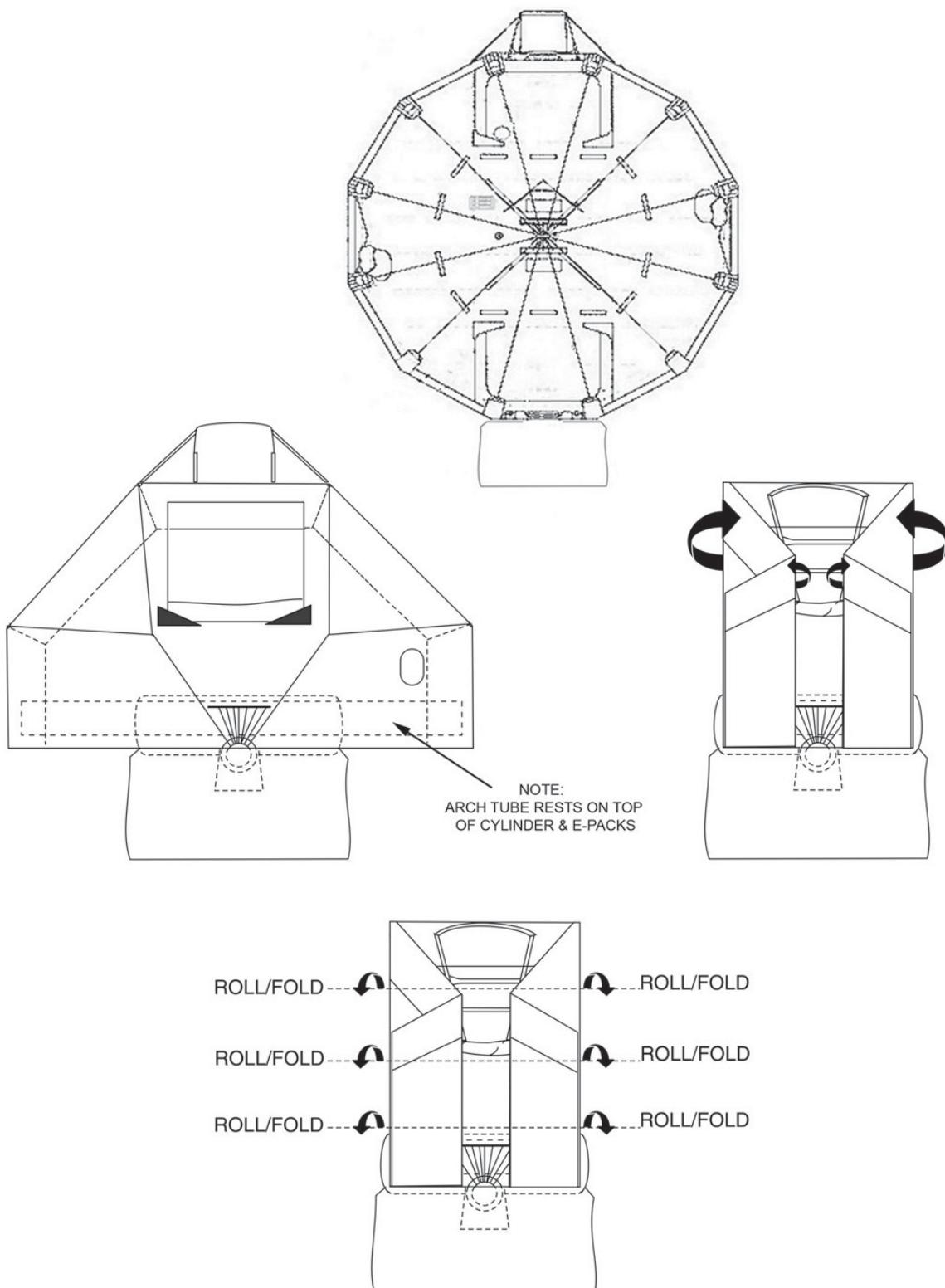
Position of Davit ring
FIGURE 13

30. On each valise, tie the flying ends of the two straps to each other using a reef knot and then around the inner lifeline using an overhand knot, so as to secure the packs to the liferaft.

NOTE: Ensure that when inserting the equipment packs, no parts of the lifting bridle, canopy, door or hauling-in ladder are trapped beneath the packs.

31. Place the hauling in ladder over the valises and and tie off to the hauling in ladder floor patches.
32. Place the *painter sachet* on top of the left-hand fold, in line with and facing, close to the painter exit hole of the container. Ensure the free run of painter from the sachet is not impeded, (FIGURE 12).
33. Pull the Davit ring forward. Tie a red ribbon through the Davit ring using a reef knot. Position the leading edge of the Davit ring just within the pre-cut notch in the *container*, (FIGURE 13).
34. Using a draw hitch knot, tie the left doorway bowsing line to the left doorway bowsing patch and the right doorway bowsing line to the right doorway bowsing patch, (FIGURE 801).
35. Put the the rubber sheathed end of the *painter line* through the *painter retaining block*. Put the block into the cut-out in the *container*. Make sure the operating lanyard passes into the container under the foam block, (FIGURE 12).
36. Prepare to start the sequence of liferaft folding, (FIGURE 14). Firmly grasp the floor and sides of the liferaft. Haul the assembly forward, so as to cover the emergency pack valises and form a transverse fold level with the front edge of the container. Bring Davit ring towards the cut out, (FIGURE 13).
37. The Davit ring should fit neatly against the cut-out but must have enough slack in the *lifting bridle* to extend at least 150 mm (6") beyond the edge of the container.
Ensure the rigging lines are neat and tidy and the red ring pull is projecting through the cut-out, (FIGURE 13).
38. The Davit lifting ring is to be positioned no lower than the centre point of the container cutout. From this position, the Davit lifting ring is easily accessible through the cut out provided on the *container* of the operationally packed liferaft, (FIGURE 13).

WARNING: REMEMBER THE OPERATING MECHANISM IS ARMED.
EXTREME CARE MUST BE TAKEN DURING ALL FOLLOWING ACTIONS.



Folding the liferaft (12-25 DL)
FIGURE 14

39. Twist the Non Inflateable Boarding Ramp (NIBR) and fold on top of the liferaft. Roll the assembly tightly and onto the top of the container lower half, (FIGURE 15).
40. Ensure the toggle is located in front of webbing (FIGURE 16).
41. With the liferaft folded and pushed down as far as possible, roll the raft tightly towards and then into the *container*, (FIGURE 17).
42. Wrap the polythene sheeting around the outside of the folded liferaft, tucking the overlap into the bottom half of the container. Ensure that the *polythene sheet* does not obstruct the Davit ring or other items, (FIGURE 17).
43. Fold the polythene cut out flap under the Davit ring.
44. Immediately before closing the container make sure that painter line sachet is:
 - a) in line with the painter exit,
 - b) level with the painter exit of the container,
 - c) attached to the liferaft with self adhesive tape.
45. Ensure that the open end of the *painter sachet*, is as close as possible to the painter exit position on the *container*. Adjust the painter sachet extension so that the distance from it to the painter exit is between 100 - 150mm (4" - 6").
46. Ensure that there is sufficient distance between the material of the liferaft and the painter line so that they do not touch when painter line is pulled.
47. Put the top half of the *container* on top of the folded liferaft, (FIGURE 18).
48. Taking the end of the container retaining line from the bottom half container, route the free end out through a hole in the top half container and back in again through the other hole, (FIGURE 18).
Tie a "figure of eight" knot on the end of the container retaining line and pull the line tight, so that the knot is against the inside of the *container*.
49. Insert the block ring retaining foam into the pre-cut notch. Make sure the Davit ring red ribbon passes between the top of block ring retaining foam and the container.
50. Put two *ratchet straps* around the *container*, making sure the straps do not cover the grooves in the container, (FIGURE 18).
Tighten the *ratchet straps* uniformly around the *container*. Make sure the upper half of the container mates with the lower half of the *container* correctly.

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(a) COLLECT THE WEBBING LADDER



(b) INITIAL TWIST OF NIBR



(c) FURTHER TWIST OF NIBR



(d) HOLD DOWN AND START ROLLING LIFERAFT FROM THE NIBR

**Folding boarding ramp
FIGURE 15**

INCORRECT
TOGGLE SHOULD NOT BE BEHIND WEBBINGCORRECT
NIBR SUCCESSFULLY STOWED

**Toggle positioning
FIGURE 16**

51. Continue closing the *container* slowly, while alternating from one strap to the other. Whilst doing so, CAREFULLY position the top half of the container either by striking it with a rubber mallet or by levering it with a hardwood or metal spatula against the bottom half, (FIGURE 19).

The edges of the spatula MUST ALL BE RADIUSED and smooth to avoid damaging the liferaft. Check continuously to ensure that no part of a liferaft becomes trapped between the container lips as they finally close and that the seal is made.

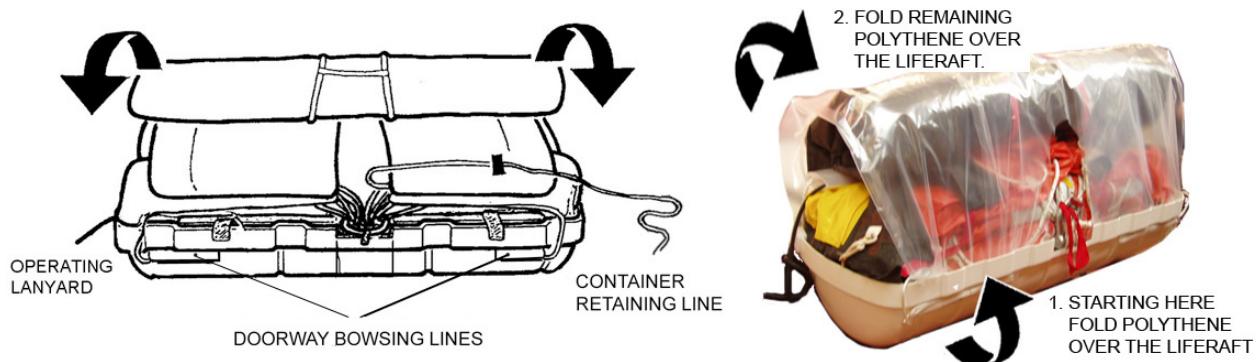
52. Check that the *painter retaining block* on the painter line does not become displaced.

WARNING: WHEN TENSIONING OR CRIMPING STRAPS, THE OPERATOR MUST STAND TO ONE SIDE OF THE STRAP. PROPER CLOTHING AND EYE PROTECTION MUST BE WORN. PROPER FOOTING AND BALANCE MUST BE MAINTAINED WHEN OPERATING THE EQUIPMENT. USE SHORTHAND STROKES ONLY DURING TENSIONING.

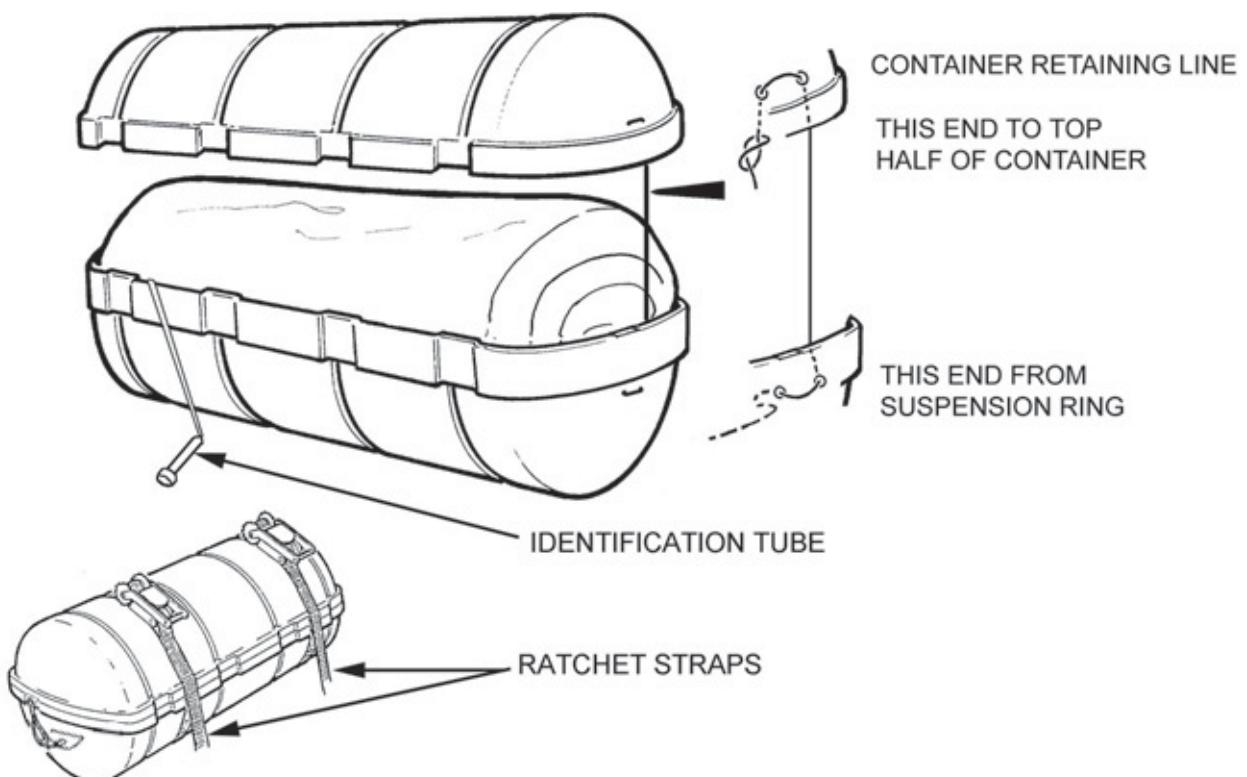
WARNING: TOO MUCH TENSION WILL BREAK THE STRAP. THIS MAY RESULT IN INJURY TO PERSONNEL.

CAUTION: FOR ALL LIFERAFTS, IT IS ESSENTIAL THAT CRIMPS ARE ATTACHED ON THE OPPOSITE SIDE OF THE CONTAINER TO THE ROLL OF THE LIFERAFT, FIGURE 19.
(I.E. ON A DL LIFERAFT THE CRIMPS ARE ATTACHED ON THE SIDE WHICH HAS THE DAVIT RING CUT-OUT).

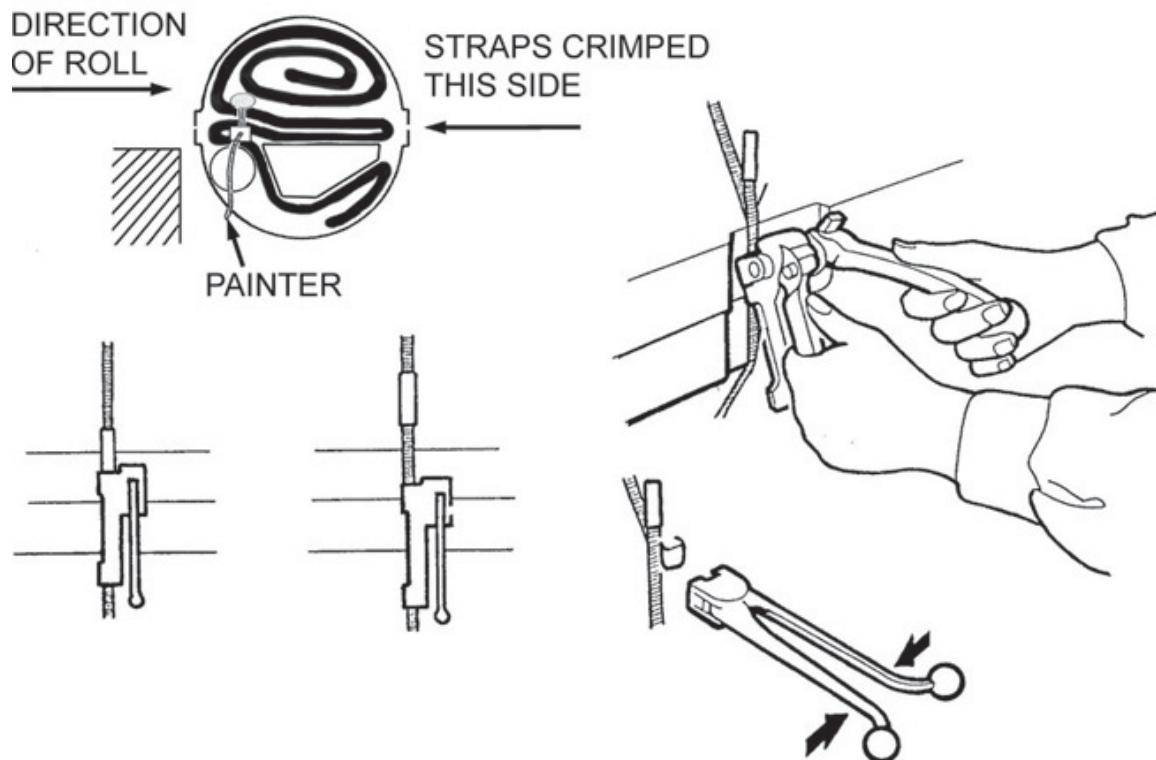
53. Obtain the *straps* and *crimps*. Tension and *crimp* each *strap* as follows:
 - (a) Adjust the ends of each *strap* so that the outer most strap end is facing upwards and is approximately 25mm (1") above the rim of the *container*, (FIGURE 19).
 - (b) Apply the *tensioning tool* to each *strap* at a point half way across the two rims. Operate the handle to tension each *strap* until the base of the tensioning tool rests in the lower container rim. Secure the strap with a *crimp*, (FIGURE 19), using a *crimping tool*.
54. Put 'DO NOT CUT' tape over the top of the *straps* in each recess of the *container* (FIGURE 19).
55. Remove the *ratchet straps*.



Liferaft with top half rolled
FIGURE 17



Container retaining line
FIGURE 18



Crimping container straps
FIGURE 19

C. Container labelling

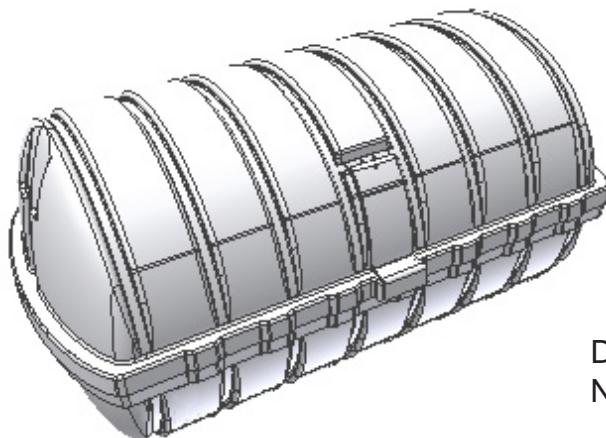
1. Check that all *labels* are fitted and positioned correctly and securely. Please refer to Chapter 11, Section 3 *Container label identification and position*.
2. Record the liferaft details, onto the liferaft *identification label* and insert it into the *identification tube*. Check for legibility and correct details.
3. The *liferaft identification* container and any excess tether webbing shall be tucked between the container strapping and the container.
4. Tape the IAL compact disc to the container.

This completes the packing sequence and the liferaft is now ready for installation.

SECTION 2

A. KLAPPE - IPL(i) **KLAPPE - Mk14 Davit-launch (DL) GRP containers**

The following sub-section details the part numbers for the Mk14 Davit-launch GRP container spares:

NOTE:

Double up straps on outer grooves.
No straps in middle 2 grooves.

Mk14 Davit-launch (DL) GRP container (Size 17 shown)

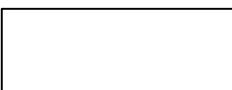
FIGURE 21

Mk14 Davit launch containers					
Container size	Raft size	up to 36 metres stowed height		Strap and crimp	
		Part Number Complete	E-pack option	Part Number & Description	Qty
14	12	50262042	A	50406002	6
17	16	50263042	A	50406002	8
17	20	50262042	A	50406002	8
17	25	50262042	A	50406002	8

Mk14 Davit-launch (DL) GRP container information
TABLE A2-1

(ii) Klappe - Containers labels

1		Description: Label, DSB Trademark Application: Davit Launch containers Part Number: 00904710
2		Description: Label, Raft ID & Dates Application: Davit Launch containers Part Number: 00941100
3		Description: Label Service Application: Davit Launch containers Part Number: 00953440
4		Description: Label, '1' Application: Davit Launch containers Part Number: R20085011
5		Description: Label, '2' Application: Davit Launch containers Part Number: R20085021
6		Description: Label, '3' Application: Davit Launch containers Part Number: R20085031
7		Description: Label, Launch DL Application: Davit Launch containers Part Number: R50413001

8		Description: Label, 'DON'T CUT STRAP' Application: Davit Launch containers Part Number: 00941460
9		Description: Label, 'DO NOT ROLL' Application: Davit Launch containers Part Number: 00950270
10		Description: Label Davit procedure 1-2 Application: Davit Launch containers Part Number: R20924011
11		Description: Label Davit procedure 3-4 Application: Davit Launch containers Part Number: R20924021

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Appendix A3**US DoT cylinders**

<u>SECTION 1</u>	<u>Page</u>
A. SOLAS USDoT Gas cylinder assemblies	2
1 Gas cylinder assemblies	2

SECTION 1**A. SOLAS USDoT Gas cylinder assemblies**

Solas compliant liferafts, fitted with USDoT compliant cylinders.

NOTE: Davit Launch liferafts fitted with USDoT cylinders, are packed in accordance with Appendix 2.

NOTE: Throwover liferafts are packed in accordance with Chapter 8 of this manual.

1. Gas cylinder assemblies

Raft		Charged cylinders			Bare cylinder	
Size (persons)	Launch type	Part No.	CO ₂ Charge (kg)	N ₂ Charge (kg)	Part No.	Volume (Cu In)
6	Throwover	50463012	3.17	0.39	42114001	475
	Davit					
8	Throwover	50463012	3.17	0.39	42114001	475
	Davit					
10	Throwover	50463013	4.36	0.53	42116001	650
	Davit					
12	Throwover	50463013	4.36	0.53	42116001	650
	Davit					
16	Throwover	50463014	6.34	0.77	42117001	942
	Davit					
20	Throwover	50463014	6.34	0.77	42117001	942
	Davit	50463017	9.41	0.75	50749001	1031
25	Throwover	50463017	9.41	0.75	50749001	1031
	Davit					

Cylinders and charge weights for the USA
TABLE A3-1

Cylinder associated equipment						
Raft		Part Number				
Size (persons)	Launch type	Charged Cylinder type	Operating Head GIST	Adaptor	Membrane	Rating (bar)
6	Throwover	50463012	08211009	08318009	08324009	230
	Davit					
8	Throwover	50463012	08211009	08318009	08324009	230
	Davit					
10	Throwover	50463013	08211009	08318009	08324009	230
	Davit					
12	Throwover	50463013	08211009	08318009	08324009	230
	Davit					
16	Throwover	50463014	08211009	08318009	08324009	230
	Davit					
20	Throwover	50463014	08211009	08318009	08324009	230
	Davit	50463017				
25	Throwover	50463017	08211009	08318009	08324009	230
	Davit					

Cylinder associated equipment for the USA
TABLE A3-2

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Appendix A4**DSB liferafts stowed on ESSO platforms**

	SECTION 1	Page
A.	General	2
B.	Container preparation	2
C.	Packing the Emergency packs	3
1.	Emergency pack 1	3
2.	Emergency pack 2	5
3.	Securing the Emergency pack	6

	SECTION 2	
A.	Packing the liferaft	7
1.	Inflation system	7
2.	Operating lanyard	10
3.	Bowsing lines	10
4.	Closing the container	10
5.	Container labelling	11

SECTION 1

A. General

The servicing procedure for DSB LR05 type liferafts which are stowed on platforms belonging to ESSO, should be followed as stated in this manual. The only differences are as follows;

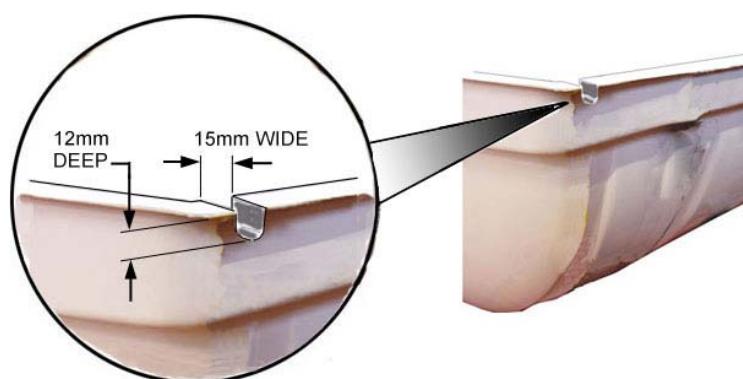
- | | |
|-------------------------------|---------------------------------------|
| · E-Pack valise (Large) | (05BAGL) |
| · E-Pack valise (Small) | (05BAGS) |
| · Bowsing line (yellow/green) | (BOWLE) |
| · Retro Reflective tape | (*) |
| · Sponge | (*) |
| · EPIRB | (*) |
| · Hand flares | (must be of type approved in SB03/01) |
| · Rocket flares | (must be of type approved in SB03/01) |
| · Smoke flares | (must be of type approved in SB03/01) |
| · Light sticks | (*) |
| · Waterproof matches | (*) |
| · Rescue signal table | (*) |
| · Container labels | (*) |
| · Liferaft Launch label | (*) |

* Supplied by 'Survival Offshore Systems'.

Any changes / modifications must be approved by RFD Beaufort.

B. Container preparation

Additional work is to be applied to the container as follows. The bowsing line exit slot is to be made larger, using a file. Make the notch 12 x 15mm with rounded corners, (FIGURE A4-1)

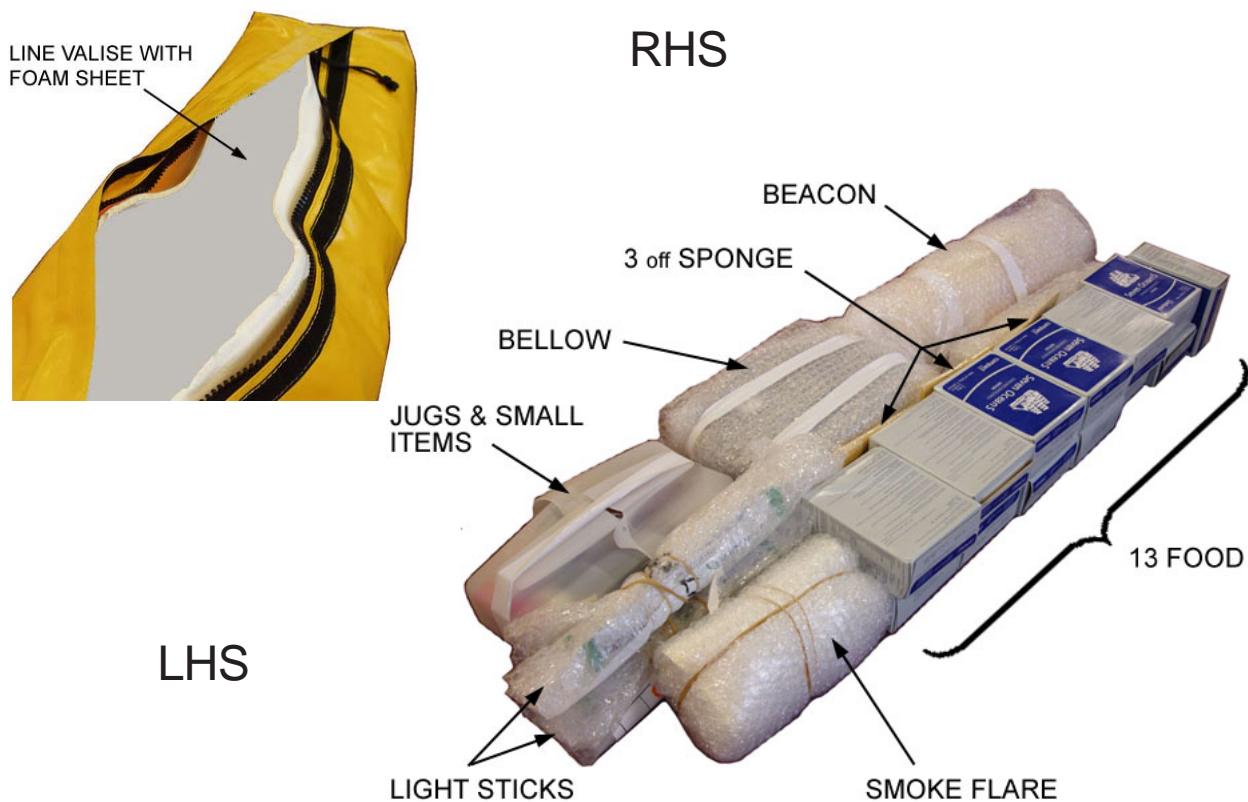


Container preparation
FIGURE A4-1

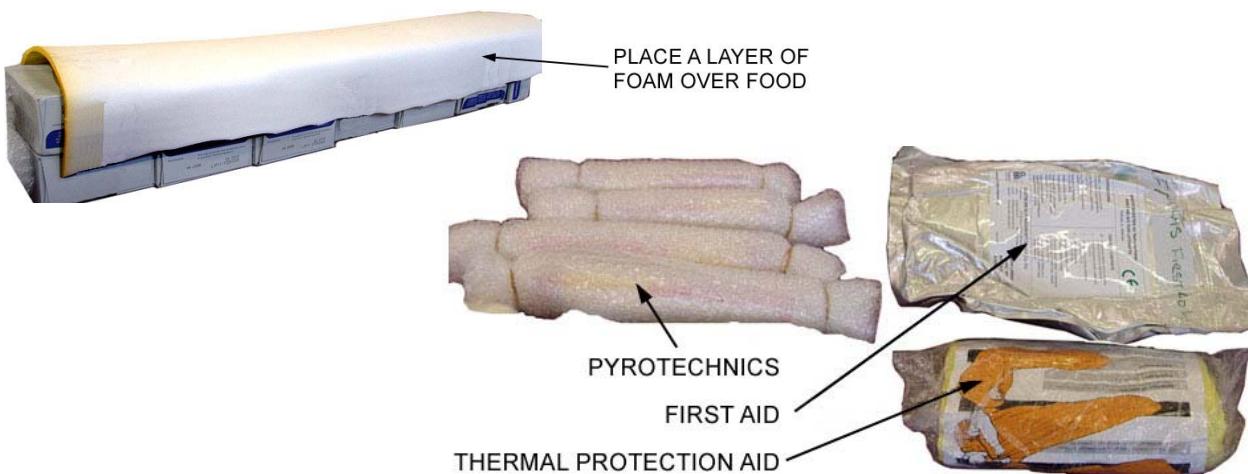
C. Packing the Emergency packs

1. Emergency pack 1 - Bottom layer

- (1) Line the valise with foam sheet, (P/n 05339009). Place the valise on a worktop.
Note left and right sides, (FIGURE A4-2).
- (2) Position the food, beacon, bellow, light sticks, sponges and packed jugs as shown, (FIGURE A4-2).
- (3) Place a foam sheet over the top of the food, (FIGURE A4-3) .
- (4) At the LHS of the valise, position the pyrotechnics, first aid kit and one TPA , (FIGURE A4-3).
- (5) At the RHS of the valise, position the remaining items, (FIGURE A4-4).
- (6) Zip the valise up fully and velcro the the valise closed, (FIGURE A4-4).



Emergency pack 1 - Bottom layer
FIGURE A4-2



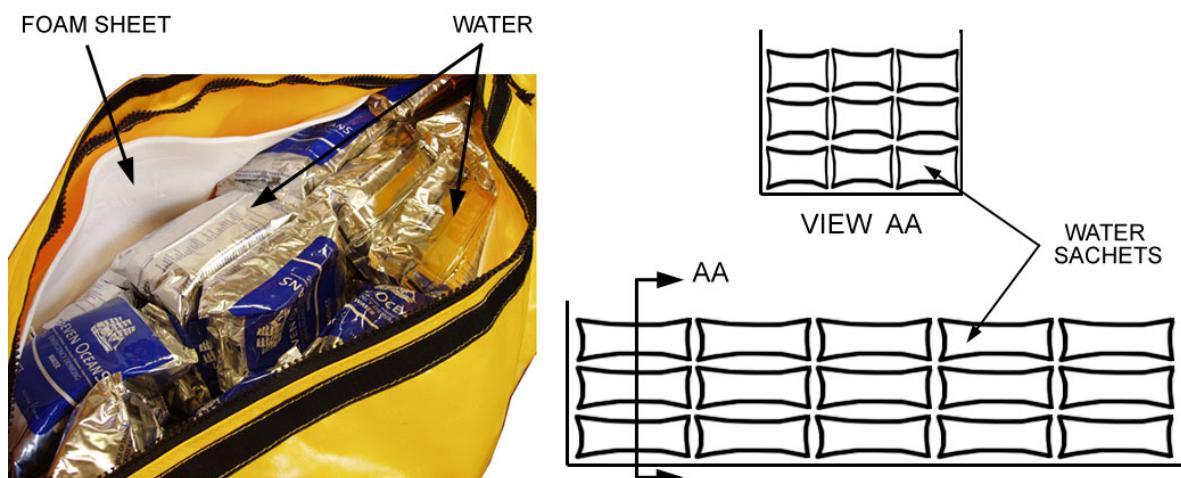
Emergency pack 1 - Top layer LHS
FIGURE A4-3



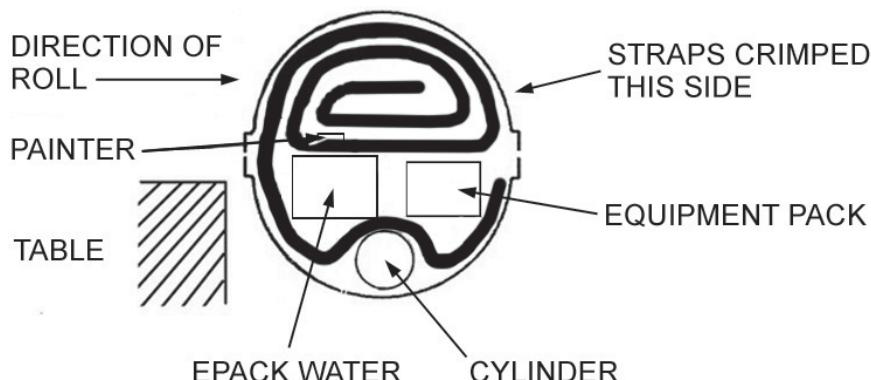
Emergency pack 1 - Top layer RHS
FIGURE A4-4

2. Emergency pack 2

- (1) Line the valise with foam sheet, (P/n 05339009).
- (2) Place all of the water sachets into the valise as shown, (FIGURE A4-5).
- (3) Zip the valise up fully and velcro the valise closed.



**Emergency pack 1 - Top layer RHS
FIGURE A4-5**



**Position of E-packs in the container
FIGURE A4-6**

3. Securing the Emergency pack

(1) Place Emergency pack 2, (containing the water), into the liferaft. It is positioned to the back of the container, (FIGURE A4-6).

(2) Place Equipment pack 1, into the liferaft. It is positioned to the front of the container, (FIGURE A4-6).

NOTE: Ensure both Emergency packs are placed under the hauling in ladder.

(3) Secure the No.1 E-pack, (containing the equipment), to the inner lifeline at the front of the liferaft. Use 50Lb (22Kg) cord and tie both ends of the valise using an overhand knot, (FIGURE A4-7).

CAUTION: DO NOT TIE VALISE ENDS TO THE SIDE LIFELINES.

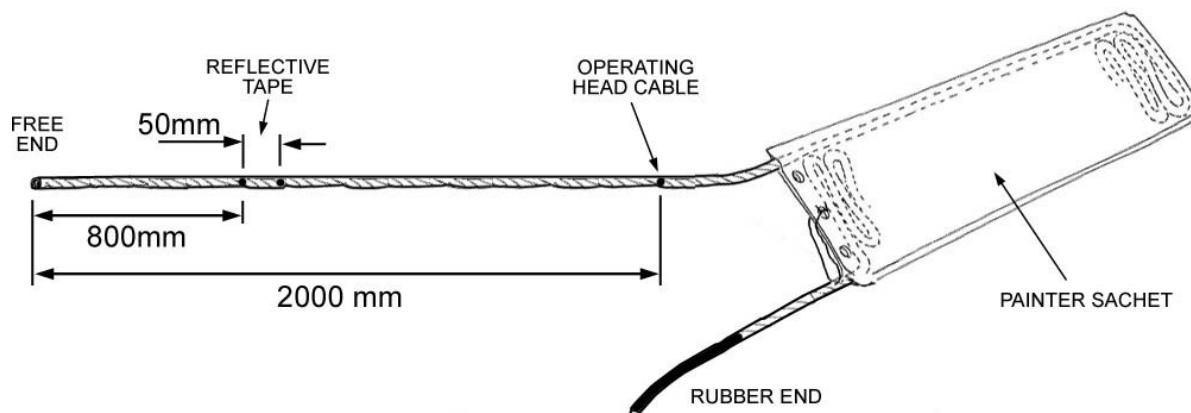
(4) Secure both E-packs together. Using 50Lbs (22Kg) cord, tie both ends of the valise together, using an overhand knot, (FIGURE A4-7).



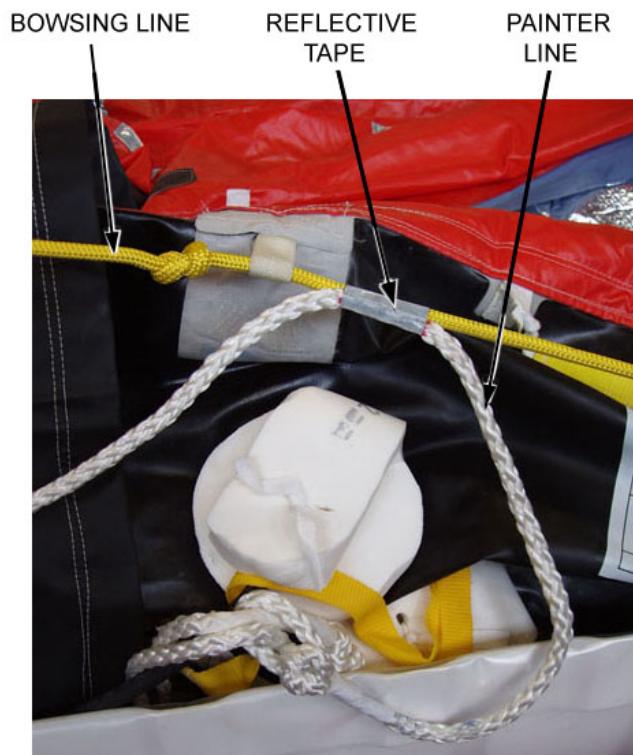
**Emergency packs tie off
FIGURE A4-7**

SECTION 2**A. Packing the liferaft****1. Inflation system**

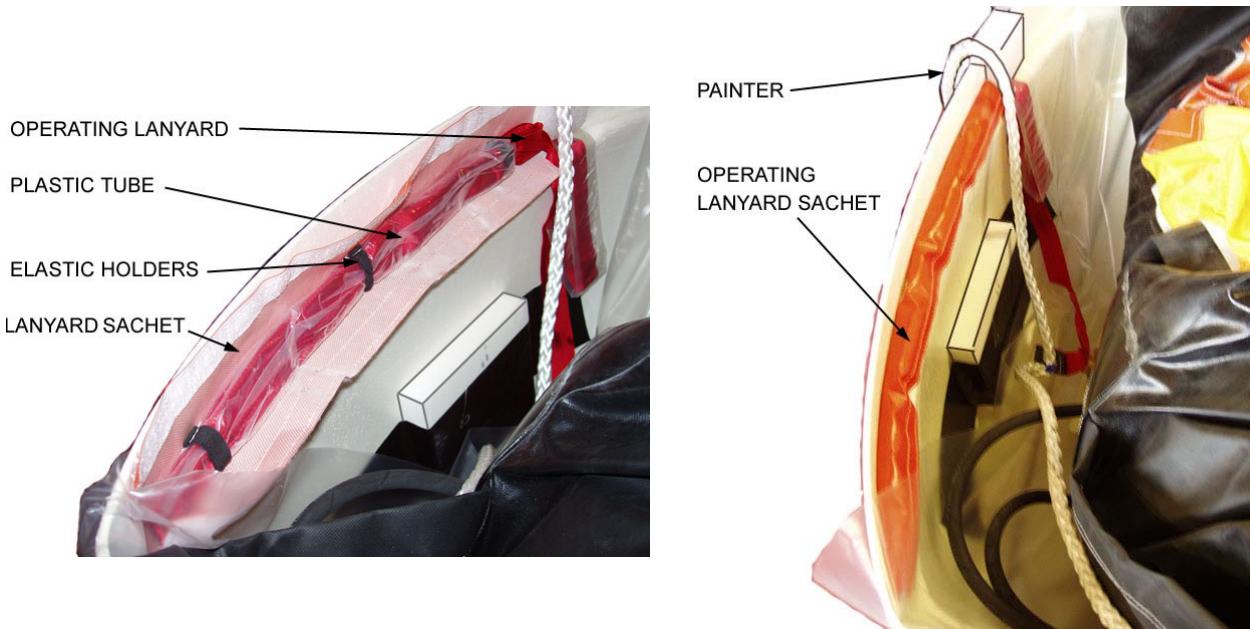
- (1) Lay the painter sachet on a worktop. Extract up to 2500mm of painter line from the painter sachet, (FIGURE A4-8).
- (2) Mark the painter line at the following positions. All measurements are taken from the free end, (FIGURE A4-8).
 - (a) 800 mm
 - (b) 850 mm
 - (c) 2000 mm
- (3) Attach the operating lanyard and painter line to the operating head, as detailed in this manual, Chapter 8.
- (4) Attach the free end of the painter line to the painter patch, (FIGURE A4-8).
- (5) Between the 800 / 850mm position, (FIGURE A4-8), tape painter line to the yellow bowsing line. Use one turn of 50 mm reflective tape, (FIGURE A4-9).



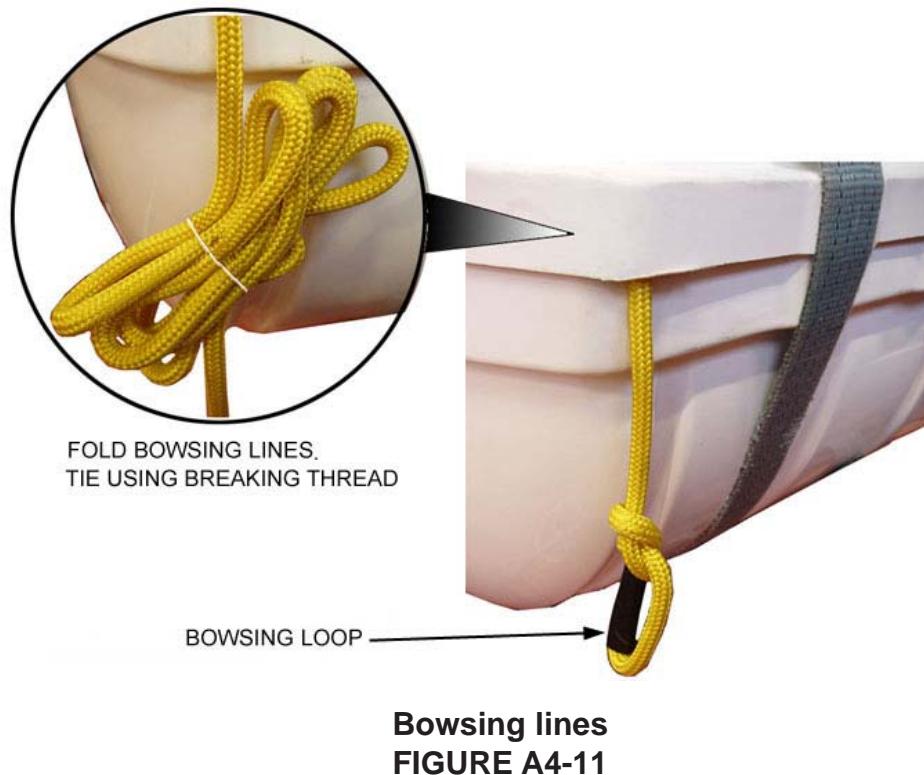
**Marking the painter sachet
FIGURE A4-8**



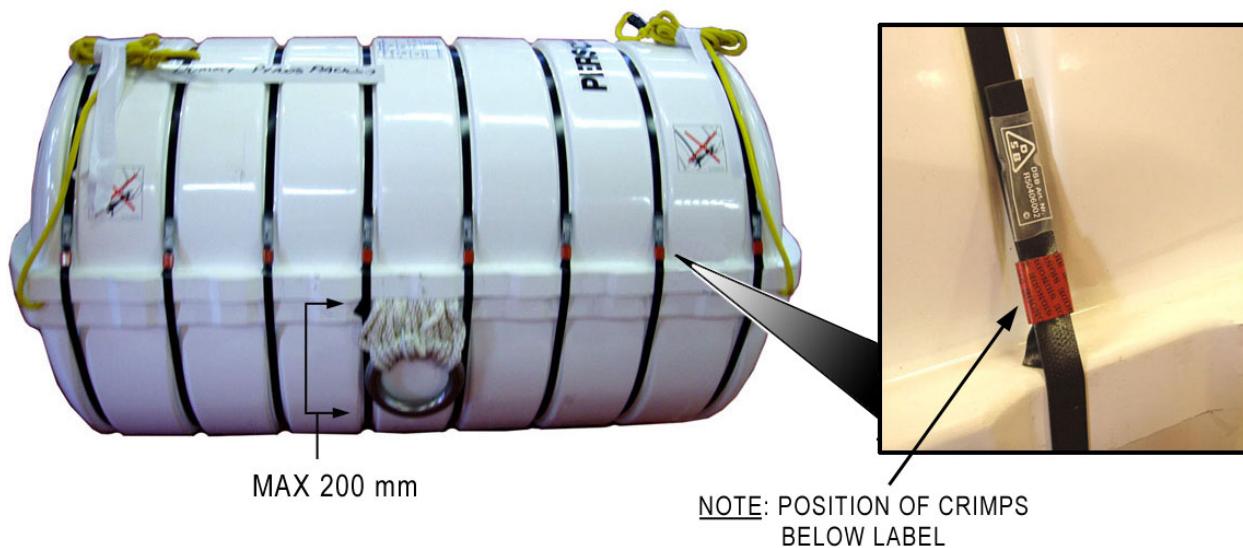
Painter line tie off
FIGURE A4-9



Operating lanyard
FIGURE A4-10



Bowsing lines
FIGURE A4-11



Container straps & crimps
FIGURE A4-12

2. Operating lanyard

- (1) Flake fold the remaining length of operating lanyard into a length of plastic tubing, (FIGURE A4-10).
- (2) Place the operating lanyard into the lanyard sachet. Secure in place using the elastic holders, (FIGURE A4-10).
- (3) Close the lanyard sachet fully using the velcro strip, (FIGURE A4-10).
- (4) Using double sided tape, position the lanyard sachet in place, (FIGURE A4-10). It should fit neatly at the end of the container, on top of the rim recess.

3. Bowsing lines

- (1) Neatly fold the bowsing lines and tie with 1 turn of breaking thread, (FIGURE A4-11).
- (2) Place the bowsing lines inside the container, close to the corners.
- (3) Form a large loop at the end of the bowsing lines, (FIGURE A4-11).
- (4) Allow a length of bowsing line to be displayed outside of the container. The bowsing lines should be long enough to be taped neatly on top of the container, (FIGURE A4-11).

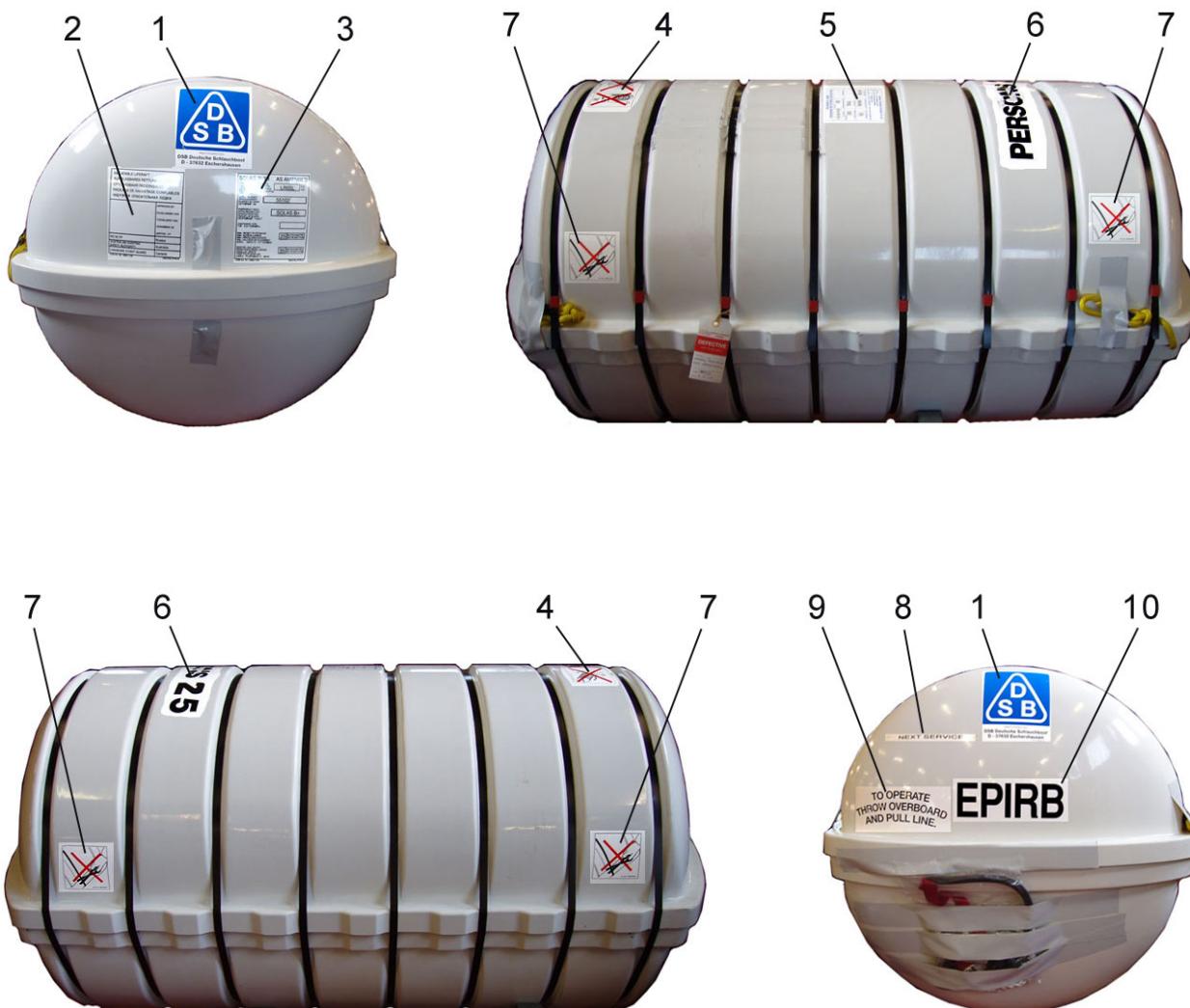
4. Closing the container

- (1) Allow the Davit launch ring to hang out of container. Measure up to a maximum of 200 mm from the bottom of the container rim to the bottom of the Davit ring.
- (2) Crimp the container strap above the rim as shown in, (FIGURE A4-12).

NOTE: Ensure the straps and crimps are positioned correctly.

5. Container labelling

- (1) Check that all labels are fitted and positioned correctly and securely.
Please refer to Chapter 11, Section 3 Container label identification and position.
- (2) Record the liferaft details, onto the liferaft identification label and insert it into the identification tube. Check for legibility and correct details.
- (3) The liferaft identification container and any excess tether webbing shall be tucked between the container strapping and the container.
- (4) This completes the packing sequence and the liferaft is now ready for installation.



1		Description: DSB Logo
		Application: All rafts
		Part Number: 00904900
2		Description: Label, data
		Application: ESSO rafts
		Part Number: 00941100
3		Description: Label, data
		Application: ESSO rafts
		Part Number: 00941100
4		Description: Label, Do Not Roll
		Application: All rafts
		Part Number: 00950270
5		Description: Label, data
		Application: ESSO rafts
		Part Number:
6		Description: Label, 25 Persons
		Application: ESSO rafts
		Part Number:

7		Description: Label, 'DO NOT CUT'
		Application: All rafts
		Part Number: 00941460
8		Description: Label, Next service
		Application: ESSO rafts
		Part Number:
9		Description: Label, Pull line
		Application: ESSO rafts
		Part Number: MLAB18
10		Description: Label, EPIRB
		Application: ESSO rafts
		Part Number:
11		Description: Label, DL procedure
		Application: ESSO rafts
		Part Number: 50271004
12		Description: Label, DL procedure
		Application: ESSO rafts
		Part Number: 50271005

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Deutsche Schlauchbootfabrik
Hans Scheibert GmbH & CO KG
D-37632 Eschershausen/Germany

Service Manual SOLAS
LR 05 6-25 Persons
Part No. : 08196009

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