



Certificate of Type Approval

This is to certify that the product detailed below will be accepted for compliance with the applicable Lloyd's Register Rules and Regulations and with the International Convention for the Safety of Life at Sea, (SOLAS), 1974, as amended, for use on ships and offshore installations classed with Lloyd's Register, and for use on ships and offshore installations when authorised by contracting governments to issue the relevant certificates, licences, permits etc.

Manufacturer	VIKING LIFE-SAVING EQUIPMENT A/S
Address	Sædding Ringvej 13, 6710 Esbjerg V, Denmark
Type	Novel Life Saving Appliance
Description	Novel Evacuation System, Vertical passage evacuation system with direct access battery powered survival craft – Type “LifeCraft™”
Trade Name	LifeCraft™
Specified Standard	IMO Resolution A.520(13) MSC.1/Circ.1328

This certificate is not valid for equipment, the design or manufacture of which has been varied or modified from the specimen tested. The manufacturer should notify Lloyd's Register EMEA of any modification or changes to the equipment in order to obtain a valid Certificate.

The attached Design Appraisal Document forms part of this certificate.

This certificate remains valid unless cancelled or revoked, provided the conditions in the attached Design Appraisal Document are complied with and the equipment remains satisfactory in service.

Lijo Thomas

Senior Surveyor to Lloyd's Register EMEA
A member of the Lloyd's Register group

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ATTACHMENT TO CERTIFICATE OF TYPE APPROVAL No. LR22187870SS-02

The undernoted documents have been appraised for compliance with the relevant requirements of International Conventions, and this Design Appraisal Document forms part of the Certificate.

This Design Appraisal Document forms part of the Certificate.

This Certificate is an amendment to Certificate No. LR22187870SS-01

EXAMINED DOCUMENTS

Design Appraisal Document for davit, Document no: LAMH 6250-1/WP40721692, issue 1, dated 3rd February 2021 and plans listed thereon.

Design Appraisal Document for winch, Document no: UKITSO/40686563/ENG, issue 0, dated 18th December 2020 and plans listed thereon.

Proficiency in LifeCraft™ operation.

General Data and Specifications

General Arrangement, Drawing No 43002554

Report of a Novel Life Saving Appliance Design against the requirements of Resolution A.520 (13) for the VIKING LifeCraft™ Survival Crafts, Lloyd's Register Report No: WP9736198, dated 24th March 2012

Report of a Novel Life Saving Appliance Design against the requirements of Resolution A.520 (13) for the VIKING LifeCraft™ launching device, Lloyd's Register Report No: WP11151434, dated 4th April 2014

TEST REPORTS

- 1.03 Quality assurance, Test report dated 18/ 03/2014.
- 1.04 Electrical installations, Test report dated 18/ 03/2014.
- 1.05 Visual inspection, Test report dated 13/ 03/2014.
- 1.06 Visual inspection, Test report dated 13/ 03/2014.
- 1.07 Jump test, Test report dated 01/ 06/2018.
- 1.08 Towing test, Test report dated 19/ 06/2018.
- 1.09 Operational test- helpless person recovery, Test report dated 28/ 06/2012.
- 1.10 Pressure test, Test report dated 03/ 10/2013.
- 1.11 Loading and seating test, Test report dated 12/ 10/2012.
- 1.12 Closing arrangement test, Test report dated 27/ 06/2018.
- 1.12 Container door release test, Test report dated 11/ 08/2016.
- 1.13 2 x Times Sliding Test - Standard Vertical Passage, Test report dated 10/05/2019.
- 1.13 Stability test, Test report dated 12/10/2012 & 19/12/2012.
- 1.14 2 x Times Sliding Test – Oversize and disabled passengers, Test report dated 10/05/2019.
- 1.14 Swamp test, Test report dated 18/08/2012.
- 1.15 Canopy closure test, Test report dated 27/06/2018.
- 1.15 Load test of passage to container, Test report dated 14/07/2016.
- 1.16 Cold Passage test, Test report dated 06/09/2018.
- 1.16 Damage test, Test report dated 12/09/2012.
- 1.17 Inflation test, Test report dated 12/10/2012.
- 1.17 Wet descent test, Test report dated 06/09/2018.
- 1.18 Pressure test, Test report dated 03/10/2013.

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- 1.19 Detailed inspection, Test report dated 20/06/2018.
- 1.19 Survival Craft Release from Stowage Position, Test report dated 20/06/2019.
- 1.19 Survival Craft Release from Lifting Yoke and Vertical Passage, Test report dated 13/08/2018.
- 1.20 Wind velocity test, Test Report dated 27/08/2018.
- 1.21 Self draining test, Test Report dated 06/09/2012.
- 1.21 Timed Evacuation Test, Test Report dated 10/05/2019.
- 1.22-S Heavy Weather Sea Trial, Test Report dated 04/11/2018.
- 1.22 Viewing port/window material test, Test report dated 13/03/2014.
- 1.23 Ignitability of canopy material from smouldering or flaming source from falling embers, Test report dated 14/02/2022.
- 1.25 Drop test, Test report dated 26/10/2012.
- 1.26 Visual inspection - engine and starting system, Test report dated 13/03/2014.
- 1.27 Means of propulsion test, Test report dated 18/06/2018.
- 1.28 Operational test - endurance, speed & battery consumption, Test report dated 18/06/2018.
- 1.29 Loading and seating test, Test report dated 12/10/2012.
- 1.30 Boarding test, Test report dated 27/06/2018.
- 1.31 Helicopter recovery and stability test, Test report dated 19/06/2012.
- 1.32 Operational test- LifeCraft towing, Test report dated 19/06/2018.
- 1.33 Ventilation test, Test report dated 23/11/2012.
- 1.34 Manoeuvrability test, Test report dated 18/06.2018.
- 1.36 Operational test-Compass test, Test report date 28/06/2012.
- 1.38 Engine cold start test, Test report date 22/06/2018.
- 1.39 Static proof load test, Test report dated 22/06/2018.
- 1.25 Dynamic Operational load test, Test report dated 25/01/2022.
- 1.27 Winch Brake Test, Test report dated, 25/01/2022.
- 1.11 Container Door Dry Release Test, Test report dated 28/01/2022.

Material Testing

- 1.37.4.3.4.2 Fabric marking, Test report dated 15/03/2014.
- 1.37.4.3.4.3 Tensile strength, Test report dated 11/03/2014.
- 1.37.4.3.4.4 Tear strength, Test report dated 11/03/2014.
- 1.37.4.3.4.5 Surface receptiveness and adhesion of surface coating, Test report dated 11/03/20
- 1.37.4.3.4.6 Effects of ageing, Test report dated 05/03/2014.
- 1.37.4.3.4.7 Low temperature flexing, Test report dated 11/03/2014.
- 1.37.4.3.4.8 Flex cracking, Test report dated 11/03/2014.
- 1.37.4.3.4.9 Porosity, Test report dated 05/03/2014.
- 1.37.4.3.4.10 Oil resistance, Test report dated 11/03/2014
- 1.37.4.3.4.11 Weft distortion, Test report dated 11/03/2014
- 1.37.4.3.4.12 Resistance of blocking, Test report dated 11/03/2014
- 1.37.4.3.4.13 Hydrolysis resistance for thermoplastic coated material only, Test report dated 11/03/2014
- 1.37.4.3.4.14 Ozone resistance, Test report dated 11/03/2014
- 1.37.4.3.4.15 Tensile strength (Fabrics used for outer canopies), Test report dated 11/03/2014
- 1.37.4.3.4.16 Tear strength (Fabric used for outer canopies), Test report dated 11/03/2014
- 1.37.4.3.4.17 Low temperature Flexing,(Fabrics used for outer canopies), Test report dated 11/03/2014



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- 1.37.4.3.4.18 Waterproofness (Fabrics used for outer canopies), Test report dated 11/03/2014
- 1.37.4.3.4.19 Surface receptiveness and adhesion of surface coating, Test report dated 11/03/2014
- 1.37.4.3.4.20 Colour (Fabrics used for outer canopies), Test report dated 05/03/2014
- 1.37.4.3.4.21 Effects of ageing (Fabrics used for outer canopies), Test report dated 11/03/2014
- 1.37.4.3.4.22 Tensile strength (Fabrics used for inner canopies), Test report dated 11/03/2014
- 1.37.4.3.4.23 Porosity (Fabrics used for inner canopies), Test report dated 05/03/2014
- 1.37.4.3.4.24 Seam strength, Test report dated 11/03/2014

Extended Service Interval Testing

- MSC.1/Circ.1328 Vibration/shock test, test report dated 19-21/10/ 2021.
- MSC.1/Circ.1328 Recording of humidity test , test report dated 2/5/ 2022 & 11/05/2022
- MSC.1/Circ.1328 Floor seam test, Test report dated 23/05/2022
- MSC.1/Circ.1328 Detailed inspection, Test report dated 23/05/2022

CONDITIONS OF CERTIFICATION

1. "LifeCraft™" is a Novel Evacuation System, consisting of:
 - a) A weatherproof enclosure with environmental controls for housing the survival crafts, the launching equipment to launch the survival crafts and the passageways required to board the survival crafts.
 - b) 4 x battery powered self-propelled inflatable canopied survival craft, - with 203 PAX capacity each, capable of 3 kts speed for 1.16 hours at full power.
 - c) The LifeCraft™ evacuation system was tested in Beaufort 9 wind speed and sea state with 4.2m significant wave height (Hs).
 - d) A davit based launching mechanism for deploying the yoke mounted crafts along with chute based vertical passageways.
 - e) An enclosed vertical passage to transfer passengers from vessel to the survival craft to enable dry shod evacuation and embarkation at water level.
2. Maximum installation height: 25 m(based on maximum chute length).
3. Maximum seating capacity in four LifeCraft™ units: 812 persons.
4. Service interval: 30 months .



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5. This novel marine evacuation system is certified for use onboard appropriate ships for the following capacities and heights based on the corresponding descent rate as demonstrated during the timed capacity evaluation done from a height of 15 m ;

Installation Height (m)	Evacuation Capacity (Persons)
15	1462
18.2	1200
25	884

Other installation heights/capacity combinations are accepted within the maximum limits.

6. Operating Conditions for LifeCraft Survival Craft

Dimensions overall:- (L x B x H)	12,174 x 7,812 x 4,020 m
Fully Equipped Weight	2,250 Kg
Maximum Number of Persons, per craft	203
Fully loaded Weight with max persons	18,750 Kg
Propulsion motor power	4 KW each, 4 units per craft
Battery bank type	Lithium Nickel Manganese Cobalt Oxide battery, 2x2.69 kWh bank powering each propulsion motor
Max towing force	220 Kg
Speed, fully loaded	3 knots
Speed, fully loaded and towing	2 knots
Inflation system design pressure	300 bar
Inflation temperatures	-30°C to 65°C

7. Operating Conditions for AES

	<u>Lowering</u>
SWL @full load (with yoke carrying LifeCrafts™, fully equipped)	14000Kg
Lowering Speed	1.0 m/s
List	20°
Trim	10°
Max Outreach, fully extended	5006 mm
Max Outreach, fully retracted	1913 mm
Davit maximum length, fully extended (pin to pin)	5598 mm
Hoisting winch line pull (per wire)	7000 kg
Bowsing winch SWL	5000 Kg
Minimum design temperature for davit	-30 °C
Fall rope (DynaOne HS 12-PB Dyneema SK78- MBL 606.7 KN)	24 mm dia
Container Dimensions (L X B X H)	18,109 x 2,687 x ,2,981 m

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8. As the LifeCraft™ is a Novel Evacuation system not defined by LSA code, it is to be confirmed that its use is acceptable to the Flag Administration (of the vessel on which the LifeCraft is installed) in each case, as it may be permitted under the provision of SOLAS III/Reg.38.
9. Should the above be acceptable to the Flag Administration, an “Engineering Analysis” shall be prepared and submitted to the Administration, based on MSC.1/CIRC.1212 by the ship Owner/Vessel Operator or the yard.
10. For each installation of the LifeCraft™, the “Company” (Ship Owner/Vessel Operator) should conduct and document a risk assessment taking into account the anticipated route specific conditions and ship-specific characteristics.
11. The LifeCraft™ survival craft is to be marked with the information required by LSA Code Chapter IV Paragraph 4.4.1.2. Additionally, the LifeCraft™ survival craft is to be marked in block capitals of the Roman Alphabet with the number of persons it is approved to carry, the name and port of registry of the ship to which the craft belongs; and means of identifying from above the ship to which the craft belongs along with the number of the LifeCraft survival craft.
12. The LifeCraft™ is approved and certified for extended service intervals pursuant to SOLAS regulation III/20.8.3 and shall be serviced at an approved servicing station at intervals not exceeding 30 months for the first 10 years of their service lives, and thereafter at the frequency required by SOLAS regulation III/20.8.1.1. This 10-year limitation may be extended if real time verification justifies acceptance by the Administration.
13. The LifeCraft™ shall be fitted with a label containing the text “The LifeCraft™ is permitted for extended service interval of 30 months if serviced at an approved service station” and “The LifeCraft™ must be inspected on board at intervals not exceeding 12 months by a person certified for such purpose by VikingLife”.
14. The humidity inside the AES enclosure shall be monitored using humidity meters and the dehumidifier shall be capable of sending an alarm to the bridge if there is a malfunction with its proper functioning.
15. Materials and manufactures:- as per technical file. Any change of material and components shall be notified to Lloyd’s Register.
16. The lifejackets used in conjunction with the LifeCraft™ are to be of an approved type, compatible with LifeCraft™ and recommended by the manufacturer.
17. Upon installation, the system shall be deployed as per section 6.2.2.2 of LSA Code to the satisfaction of the attending Surveyor. As part of this deployment, a partial evacuation trial should be carried out to ensure that the system does not interfere with the launching of other life-saving equipment fitted on board and the system and associated survival crafts are clear of all possible obstructions or dangers such as stabilisers or the ship’s propellers.
18. The LifeCraft™ system shall be installed at the designated embarkation station which shall not be located in way of the machinery spaces or other spaces with a high fire risk unless the boundaries between the high fire risk areas and the embarkation station/stowage position are insulated to the A-60 standard of fire protection.
19. The LifeCraft™ system shall be installed in such a way that all areas of the passage of the bowing line conduits on ship side are insulated to the A-60 standard of fire protection.
20. Drawings showing the LifeCraft™ system fully deployed on the specific vessel in side-view and cross-sectional view under required unfavourable conditions of trim and list in the final stage of flooding is to be submitted to the flag administration or approval body in each case, either by the yard, owner or equipment manufacturer. Every vessel proposed for the system shall be considered and evaluated individually on its own merit.
21. The arrangement of the LifeCraft™ system on board any vessel, including the passageway and embarkation areas, are subject to approval by the administration to ensure that the flow rate as stated above can be maintained throughout the total evacuation of the number of persons for which the LifeCraft™ system is certified for.

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22. As per SOLAS Ch. III/Reg.21.1.3, It shall be verified by an evacuation analysis that the vessel on which the LifeCraft™ system is installed is able to complete the evacuation of full complement of persons within a period of 30 min from the time the abandon ship signal is given after all persons have been assembled, with lifejackets donned.
23. It is the responsibility of the manufacturer to inform the vessel owners of the proper methods of use, maintenance requirements of this product and the conditions of this approval.
24. For compliance with SOLAS Regulation III/35 & III/36 fully detailed operations and maintenance manuals with clear instructions on use shall be supplied with each system.
25. The installation and servicing of the system shall be done in accordance with the manufacturer's instructions by companies or person familiar with the device and accredited by the manufacturer.
26. In addition to or in conjunction with the servicing intervals, the system shall be deployed from the vessel on a rotational basis at intervals to be agreed by the Administration for testing as well as for the crew familiarisation and training, provided that each system is deployed at least once every six years.
27. The craft is to be marked with the maker's name and trademark, serial number, date of manufacture, approving authority, name and place of last servicing station and the capacity of each craft.
28. Installation on board: The installation of the equipment is not part of this Design Appraisal or Certificate. All such arrangements are to be to the satisfaction of the vessel's Administration and/or RO acting on their behalf on an installation-by-installation basis.
29. Alterations/modifications to the Type Approved LifeCraft™ system will invalidate the Type Approval Certificate which, in turn, will affect the validity of the related Statutory Certificate (of the vessel on which the LifeCraft™ system is installed). In such cases, where the equipment requires alterations/modifications, these are only to be carried out with the agreement/approval of the Flag State Administration (of the vessel on which the LifeCraft™ system is installed) on an installation-by-installation basis.
30. If the specified standards are amended during the validity of this certificate, the product is to be re-approved prior to it being supplied to vessels to which the amended standards apply.
31. Production items are to be manufactured in accordance with a quality control system which shall be maintained to ensure compliance with SOLAS Regulation III/5.
32. Production items are to be manufactured in accordance with a quality control procedure and records kept as required by MSC.81 (70) Part 2, Paragraph 1.2. Production tests are to be conducted to ensure compliance with SOLAS Chapter III Regulation 5. This does not preclude any further testing to additional requirements of the Marine Administration of the country where the ship is registered (i.e., the flag state) or those acting on behalf of that Administration.
33. Should a change of Place of Production from that stated below be required i.e., where the stages of manufacture/assembly/testing of this product take place, the new Place of Production is to be advised to us prior to the change taking place. This Certificate will require to be updated for Approval to be maintained.



DESIGN APPRAISAL DOCUMENT

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Certificate No: LR22187870SS-02
Issue Date: 21/12/2022
Expiry Date: 08/05/2027
Reference: UKITSO/LSA/TA/LT/RP/WP48129179/PRJ11100389770

ATTACHMENT TO CERTIFICATE OF TYPE APPROVAL No. LR22187870SS-02

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Supplementary Type Approval Terms and Conditions

This certificate and Design Appraisal Document relates to type approval, it certifies that the prototype(s) of the product(s) referred to herein has/have been found to meet the applicable design criteria for the use specified herein, it does not mean or imply approval for any other use, nor approval of any products designed or manufactured otherwise than in strict conformity with the said prototype(s)

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