DNV·GL

Certificate No:
**TAE00001M0**

# TYPE APPROVAL CERTIFICATE

## This is to certify:

**That the Low Voltage Cable**

with type designation(s)
**ÖLFLEX HEAT 125 C MC**

Issued to
**U.I. Lapp GmbH**
**Stuttgart, Germany**

is found to comply with
**DNV GL rules for classification – Ships, offshore units, and high speed and light craft**

## Application :

**Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.**
**Voltage class (V) 300/500 + 450/750**
**Temp. class (°C) 125**

This Certificate is valid until **2021-12-19**.

Issued at **Hamburg** on **2016-12-20**
DNV GL local station: **Augsburg** for **DNV GL**

Approval Engineer: **Carsten Hunsalz**

**Duy Nam Le**
**Head of Section**

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.


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Job Id:
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## Product description

Type: ÖLFLEX® HEAT 125 C MC
Rated voltage: Up to 1.0mm² $U_0$/U 300/500 V from 1.5mm² $U_0$/U 450/750 V
Temperature range: -40 °C to +125 °C fixed installation (20.000 h)

Construction:

Conductors: Tinned flexible stranded copper class 5
Core insulation: Cross-linked polyolefin copolymer insulation EI5
Screen: Braid of tinned copper wires, coverage = 85%
Outer sheath: Cross-linked polyolefin copolymer insulation EM 104

| Article No. | Number of cores x conductor cross-section | Overall Diameter | Overall Diameter Tolerance |
|---|---|---|---|
| | mm² | mm | |
| 1024400 | 2 X 0,5 | 6,8 | -0,4/+0,6 |
| 1024401 | 3 G 0,5 | 7,1 | -0,4/+0,6 |
| 1024480 | 2 X 0,75 | 7,2 | -0,4/+0,6 |
| 1024407 | 2 X 0,75 | 7,2 | -0,4/+0,6 |
| 1024481 | 3 X 0,75 | 7,6 | -0,4/+0,6 |
| 1024408 | 3 G 0,75 | 7,6 | -0,4/+0,6 |
| 1024482 | 4 X 0,75 | 8,4 | -0,4/+0,6 |
| 1024409 | 4 G 0,75 | 8,4 | -0,4/+0,6 |
| 1024410 | 5 G 0,75 | 9,1 | -0,4/+0,6 |
| 1024483 | 7 X 0,75 | 10,0 | -0,4/+0,6 |
| 1024411 | 7 G 0,75 | 10,0 | -0,4/+0,6 |
| 1024412 | 12 G 0,75 | 13,4 | -0,5/+0,7 |
| 1024484 | 2 X 1 | 7,4 | -0,4/+0,6 |
| 1024415 | 2 X 1 | 7,4 | -0,4/+0,6 |
| 1024485 | 3 X 1 | 8,0 | -0,4/+0,6 |
| 1024416 | 3 G 1 | 8,0 | -0,4/+0,6 |
| 1024417 | 4 G 1 | 8,6 | -0,4/+0,6 |
| 1024418 | 5 G 1 | 9,6 | -0,4/+0,6 |
| 1024419 | 7 G 1 | 10,3 | -0,5/+0,7 |
| 1024420 | 12 G 1 | 14,0 | -0,5/+0,7 |
| 1024486 | 2 X 1,5 | 8,6 | -0,4/+0,6 |
| 1024423 | 2 X 1,5 | 8,6 | -0,4/+0,6 |
| 1024424 | 3 G 1,5 | 9,1 | -0,4/+0,6 |
| 1024487 | 4 X 1,5 | 10,0 | -0,4/+0,6 |
| 1024425 | 4 G 1,5 | 10,0 | -0,4/+0,6 |
| 1024426 | 5 G 1,5 | 11,1 | -0,5/+0,7 |
| 1024488 | 7 X 1,5 | 12,0 | -0,5/+0,7 |
| 1024427 | 7 G 1,5 | 12,0 | -0,5/+0,7 |
| 1024428 | 12 G 1,5 | 16,3 | -0,6/+0,8 |
| 1024433 | 2 X 2,5 | 10,0 | -0,4/+0,7 |
| 1024489 | 3 X 2,5 | 10,7 | -0,5/+0,8 |
| 1024434 | 3 G 2,5 | 10,7 | -0,5/+0,8 |
| 1024490 | 4 X 2,5 | 11,6 | -0,5/+0,8 |
| 1024435 | 4 G 2,5 | 11,6 | -0,5/+0,8 |
| 1024436 | 5 G 2,5 | 12,9 | -0,5/+0,8 |
| 1024437 | 7 G 2,5 | 14,4 | -0,5/+0,8 |
| 1024438 | 12 G 2,5 | 19,3 | -0,6/+0,9 |
| 1024441 | 4 G 4 | 13,7 | -0,5/+0,8 |

| | | | |
|---|---|---|---|
| 1024446 | 4 G 6 | 15,1 | -0,6/+0,9 |
| 1024451 | 4 G 10 | 19,3 | -0,6/+1,6 |

G = with protective earth conductor green/yellow
X = without protective earth conductor

## Application/Limitation

The requirements of SOLAS Amendments Chapter II-1, Part D, Reg. 45, 5.2 (provision to be taken to limit Fire Propagation along Bunches of Cables or Wires) are fulfilled without any additional measures.

## Type Approval documentation

Test report : LAPP KOREA LLC LKTR 161107 7-Nov-16
VDE 562800-9021-0001/207856_1 /_2 /_3 /_4 /_5 /_6

Specification: DB1024400EN

## Tests carried out

| Standard | Release | General description | Limitation |
|---|---|---|---|
| DNVGL-CP-0399 | 2016-03 | DNV GL Type approval program for Electric cables | partly |
| IEC 60228 | 2004-11 | Conductors of insulated cables | |
| EN 50363-5 | 2006-10 | Insulating, sheathing and covering materials for low voltage energy cables – Part 5: Halogen-free, cross-linked insulating compounds | |
| EN 50525-3-41 | 2012-01 | Electric cables - Low voltage energy cables of rated voltages up to and including 450/750 V. Cables with special fire performance - single core non-sheathed cables with halogen-free crosslinked insulation, and low emission of smoke | |
| EN 50525-2-51 | 2012-01 | Electric cables. Low voltage energy cables of rated voltages up to and including 450/750 V (U0/U). Cables for general applications. | |
| EN 50264-1 | 2009-03 | Railway applications - Railway rolling stock power and control cables having special fire performance -- Part 1: General requirements | |
| IEC 60332-1-2 | 2004-7 | Tests on electric and optical fibre cables under fire conditions - Part 1-2: Test for vertical flame propagation for a single insulated wire or cable - Procedure for 1 kW pre-mixed flame | |
| IEC 60332-3-22<br>IEC 60332-3-24<br>IEC 60332-3-25 | 2009-02 | Tests on electric cables under fire conditions - Part 3-22/24/25: Test for vertical flame spread of vertically-mounted bunched wires or cables - Category A/C/D | Bunch test<br>Category A/C/D |
| IEC 60754-1 | 2011-11 | Test on gases evolved during combustion of materials from cables - Part 1: Determination of the halogen acid gas content | Low Halogen:<br><0,5% Halogen |

| Standard | Release | General description | Limitation |
|---|---|---|---|
| IEC 60754-2 | 2011-11 | Test on gases evolved during combustion of materials from cables - Part 2: Determination of acidity (by pH measurement) and conductivity | Halogen free:<br>pH > 4,3<br>Conductivity < 10µS/mm |
| IEC 60684-2 | 2011-08 | Clause 45.2 Methods of determination of low levels of fluorine | HF max 0,1%<br>[0,02% can be detected] |
| EN 50305 | 2002-07 | Clause 9.2 Toxity | |
| IEC 61034-1/2 | 2013-07<br>2013-09 | Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements | Low smoke<br>Light transmittance ≥60% |
| NEK TS 606 | 2016 | Cables for offshore installations. Halogen-free and/or mud resistant. Technical specification. | Mud resistance test category c for cable types with EM 104 MUD sheath:<br><br>IRM902/IRM903<br>100°C 7d.<br>Calcium Bromide<br>70°C 56d.<br>EDC 95-11 base oil<br>70°C 56d. |

## Marking of product

LAPP KABEL STUTTGART ÖLFLEX® HEAT 125 C MC * size * voltage * IEC 60332-3-22/24/25
CE RV MM

## Place of Production

LAPP KOREA LLC., Hwaseong, Korea

## Periodical assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the Type approval are complied with and that no alterations are made to the product design or choice of materials.

The main elements of the assessment are:

- Inspection on factory samples, selected at random from the production line (where practicable)
- Results from Routine Tests (RT) checked (if not available tests according to RT to be carried out)
- Review of type approval documentation
- Review of possible change in design, materials and performance
- Ensuring traceability between manufacturer's product type marking and Type Approval Certificate.

Periodical assessment is to be performed after 2 years and after 3.5 years. A renewal assessment will be performed at renewal of the certificate.

END OF CERTIFICATE