DNV·GL

Certificate No:
**TAE00003MJ**

# TYPE APPROVAL CERTIFICATE

## This is to certify:

**That the Electric Power Cable**

with type designation(s)
**TIOI, TICI**

Issued to
**Suzhou Draka Cable Co. Ltd.**
**SUZHOU, JIANGSU, China**

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.**

| Type | Rated voltage (kV) | Temp. class (°C) |
|---|---|---|
| TIOI | 0,6/1 | 90 |
| TICI | 0,6/1 | 90 |

Issued at **Hamburg** on **2019-08-26**
This Certificate is valid until **2024-08-25**.
DNV GL local station: **Shanghai**

Approval Engineer: **Carsten Hunsalz**

for **DNV GL**

**Arne Schaarmann**
**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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## Product description

| | |
|---|---|
| Type: | TIOI & TICI 0,6/1 kV |
| Conductors: | Plain/Tinned, stranded copper class 2 or class 5 |
| Core insulation: | XLPE |
| Inner sheath: | SHF1 |
| Metal Covering: | Galv. steel wire braid (C) or plain or tinned copper wire braid (O) |
| Outer sheath: | SHF1 |

| Number of cores x conductor cross-section | Number of cores x conductor cross-section | Number of cores x conductor cross-section | Number of cores x conductor cross-section | Number of cores x conductor cross-section |
|---|---|---|---|---|
| $mm^2$ | $mm^2$ | $mm^2$ | $mm^2$ | $mm^2$ |
| 1 x 1,0 | 2 x 120 | 3 x 300 | 5 x 1,0 | 12 x 1,5 |
| 1 x 1,5 | 2 x 150 | 3 x 300* | 5 x 1,5 | 12 x 2,5 |
| 1 x 2,5 | 2 x 185 | | 5 x 2,5 | |
| 1 x 4 | 2 x 240 | 4 x 1,0 | 5 x 4 | 14 x 1,0 |
| 1 x 6 | 2 x 300 | 4 x 1,5 | 5 x 6 | 14 x 1,5 |
| 1 x 10 | | 4 x 2,5 | 5 x 10 | 14 x 2,5 |
| 1 x 16 | 3 x 1,0 | 4 x 4 | 5 x 16 | |
| 1 x 25 | 3 x 1,5 | 4 x 6 | 5 x 25 | 16 x 1,0 |
| 1 x 35 | 3 x 2,5 | 4 x 10 | 5 x 35 | 16 x 1,5 |
| 1 x 50 | 3 x 4 | 4 x 16 | 5 x 50 | 16 x 2,5 |
| 1 x 70 | 3 x 6 | 4 x 25 | 5 x 70 | |
| 1 x 95 | 3 x 10 | 4 x 35 | 5 x 95 | 19 x 1,0 |
| 1 x 120 | 3 x 16 | 4 x 35* | | 19 x 1,5 |
| 1 x 150 | 3 x 25 | 3 x 50 | 6 x 1,0 | 19 x 2,5 |
| 1 x 185 | 3 x 35 | 3 x 50* | 6 x 1,5 | |
| 1 x 240 | 3 x 35* | 4 x 70 | 6 x 2,5 | 24 x 1,0 |
| 1 x 300 | 3 x 50 | 4 x 70* | | 24 x 1,5 |
| | 3 x 50* | 4 x 95 | 7 x 1,0 | 24 x 2,5 |
| 2 x 1,0 | 3 x 70 | 4 x 95* | 7 x 1,5 | |
| 2 x 1,5 | 3 x 70* | 4 x 120 | 7 x 2,5 | 27 x 1,0 |
| 2 x 2,5 | 3 x 95 | 4 x 120* | | 27 x 1,5 |
| 2 x 4 | 3 x 95* | 4 x 150 | 8 x 1,0 | 27 x 2,5 |
| 2 x 6 | 3 x 120 | 4 x 150* | 8 x 1,5 | |
| 2 x 10 | 3 x 120* | 4 x 185 | 8 x 2,5 | 30 x 1,0 |
| 2 x 16 | 3 x 150 | 4 x 185* | | 30 x 1,5 |
| 2 x 25 | 3 x 150* | 4 x 240 | 10 x 1,0 | 30 x 2,5 |
| 2 x 35 | 3 x 185 | 4 x 240* | 10 x 1,5 | |
| 2 x 50 | 3 x 185* | 4 x 300 | 10 x 2,5 | 37 x 1,0 |
| 2 x 70 | 3 x 240 | 4 x 300* | | 37 x 1,5 |
| 2 x 95 | 3 x 240* | | 12 x 1,0 | 37 x 2,5 |

* Sector shaped 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.

General power and lighting, Control.

Flame retardant Cat. A. Halogen free. Low smoke.

## Type Approval documentation

### Tests carried out

| Standard | Release | General description | Limitation |
|---|---|---|---|
| IEC 60092-350 | 2014-08 | General construction and test methods of power, control and instrumentation cables for shipboard and offshore applications | |
| IEC 60092-353 | 2016-09 | Electrical installations in ships - Part 353: Power cables for rated voltages 1 kV and 3 kV | |
| IEC 60092-360 | 2014-04 | Electrical installations in ships - Part 360: Insulating and sheathing materials for shipboard and offshore units, power, control, instrumentation and telecommunication cables. | |
| IEC 60332-3-22 | 2018-07 | Tests on electric and optical fibre cables under fire conditions – Part 3-22: Test for vertical flame spread of vertically-mounted bunched wires or cables – Category A | Charred portion of sample does not exceed 2,5m above bottom edge of burner. |
| 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: <0,5% Halogen |
| 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: pH > 4,3 Conductivity < 10µS/mm |
| IEC 61034-1/2 | 2013-06 | Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements | Low smoke Light transmittance >60% |

## Marking of product

Draka 83 – TIOI or TICI – 0,6/1 kV – 90ºC – Size – 0,6/1kV – IEC 60332-3-22 – Lot no.

## 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