



Certificate no.:  
**TAE000053U**

# TYPE APPROVAL CERTIFICATE

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**This is to certify:**

**that the Low Voltage Cable**

with type designation(s)

**Armoured (optional) Fire Resistant (optional) Hybrid cable**

issued to

**TecniKabel S.p.A.**

**Torino, TO, Italy**

is found to comply with

**DNV rules for classification – Ships, offshore units, and high speed and light craft**

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**Application:**

**Hybrid cable. Combined data, fiber optic and low voltage control, instrumentation and power.**

**Products approved by this certificate are accepted for installation on all vessels classed by DNV.**

**Rated voltage (V) 150/250V, 0,6/1 kV**

**Temp. class (°C) 90**

Issued at **Høvik** on **2025-12-10**

This Certificate is valid until **2030-12-09**.

for **DNV**

DNV local unit: **Italy/Malta CMC**

Approval Engineer: **Ivar Bull**

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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.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to USD 300 000.

## Product description

Armoured (optional) Hybrid cable composed of combinations of valid DNV type approved cables as listed below:

| DNV TAC numbers: | Rev. | Listed type approved cable elements may be included in hybrid cable | Fire Resistant IEC 60331 | Almese fact. | Volpiano fact |
|------------------|------|---------------------------------------------------------------------|--------------------------|--------------|---------------|
| TAE000055A       |      | 150/250V Control and instrumentation cables IEC60092-376            |                          |              | V             |
| TAE000055B       |      | 150/250V Control and instrumentation cables IEC60092-376            |                          |              | V             |
| TAE000055C       |      | 150/250V Control and instrumentation cables IEC60092-376            |                          |              | V             |
| TAE000055D       |      | 150/250V Control and instrumentation cables IEC60092-376            |                          |              | V             |
| TAE0000556       |      | 0,6/1kV LV power cables IEC 60092-353                               |                          |              | V             |
| TAE0000557       |      | 0,6/1kV LV power cables IEC 60092-353                               |                          |              | V             |
| TAE0000558       |      | 0,6/1kV LV power cables IEC 60092-353                               |                          |              | V             |
| TAE0000559       |      | 0,6/1kV LV power cables IEC 60092-353                               |                          |              | V             |
| TAE00002WZ       | 3    | LAN cables                                                          |                          | A            |               |
| TAE000045X       |      | LAN cables                                                          |                          | A            |               |
| TAE000045Y       |      | LAN cables                                                          |                          | A            |               |
| TAE000045Z       |      | LAN cables                                                          |                          | A            |               |
| TAE0000460       | 2    | LAN cables                                                          | FR                       | A            |               |
| TAE00002X0       | 5    | LAN cables                                                          |                          |              | V             |
| TAE00002X2       | 3    | LAN cables                                                          | FR                       |              | V             |
| TAE0000461       |      | Profibus cable                                                      |                          | A            |               |
| TAE0000462       |      | Profibus cable                                                      |                          | A            |               |
| TAE00002Z3       | 4    | Profibus cable                                                      |                          |              | V             |
| TAE000046A       |      | Profibus cable                                                      | FR                       |              | V             |
| TAE000046B       | 1    | Profibus cable                                                      | FR                       |              | V             |
| TAE0000463       |      | CANBUS cable                                                        |                          | A            |               |
| TAE00002Z4       | 2    | CANBUS cable                                                        |                          |              | V             |
| TAE000046C       |      | CANBUS cable                                                        |                          |              | V             |
| TAE000046D       |      | CANBUS cable                                                        |                          |              | V             |
| TAE000046E       |      | CANBUS cable                                                        | FR                       |              | V             |
| TAE0000463       |      | CANBUS cable                                                        | FR                       |              | V             |
| TAE00003SF       | 3    | RS 485 cable                                                        |                          | A            |               |
| TAE00003SH       | 3    | RS 485 cable                                                        | FR                       | A            |               |
| TAE0000466       |      | RS 485 cable                                                        |                          |              | V             |
| TAE0000467       |      | RS 485 cable                                                        |                          |              | V             |
| TAE0000468       |      | RS 485 cable                                                        | FR                       |              | V             |
| TAE0000469       |      | RS 485 cable                                                        | FR                       |              | V             |
| TAE00002Z7       | 4    | Fiber optical cable                                                 |                          | A            |               |
| TAE0000464       | 1    | Fiber optical cable                                                 |                          |              | V             |
| TAE0000465       |      | Fiber optical cable                                                 |                          |              | V             |
| TAE000046F       |      | Fiber optical cable                                                 |                          |              | V             |
| TAE000046G       |      | Fiber optical cable                                                 | FR                       |              | V             |
| TAE000046H       |      | Fiber optical cable                                                 |                          |              | V             |
| TAE000046J       |      | Fiber optical cable                                                 | FR                       |              | V             |

- Type approved Hybrid cable shall consist of type approved cable elements
- *Fire resistance will be limited to the fire-resistant properties of each element*
- Overall fire resistance will be limited to the lowest fire temperature and duration among elements
- Complete hybrid cable can only be marked as fire resistant if all elements are fire resistant.
- Please refer to DNV TAC numbers listed above for details on cable elements
- If cross sectional area is listed as AWG, at least same cross section as required by IEC shall be used.

#### Construction:

|                                    |                                                                                                                                              |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| Cable elements:                    | Cable Elements bundled together in one or more groups                                                                                        |
| Overall screen (if any):           | Aluminium/polyester tape with tinned copper drain wire                                                                                       |
| Inner sheath:                      | SHF1 or SHF2                                                                                                                                 |
| Overall metal covering (Optional): | Plain/tinned copper wire braid or copper alloy wire braid or galvanized steel wire braid or steel wires armour or corrugated metal covering. |
| Outer sheath:                      | SHF1 or SHF2 or SHF2 MUD                                                                                                                     |

Thickness of braid wires and sheaths as per IEC 60092-350 Annex A Fictitious calculations.

### Application/Limitation

If power conductors are operated with voltage above 50V, as a safety measure the braid and/or screen of all copper instrument and data cables shall be connected to earth potential. Conversely, when power conductors are operated below 50V the earthed braid/screen is not required.

If one power core trips on overcurrent or short circuit, all power cores shall trip simultaneously.

All power, control and data elements of hybrid cable shall serve same consumer.

System designer shall ensure that hybrid cable provides sufficient signal integrity for reliable operation of equipment. Special care shall be taken if analogue signals are transmitted in combined power and data cable. Please refer to guidelines in IEC 60533(2015) Table B.1.

### Type Approval documentation

#### Tests carried out

| Standard      | Release | General description                                                                                                                                                                                                                                                         | Limitation                                                                                                                                                                                              |
|---------------|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DNV CP-0399   | 2021-08 | Electric cables.                                                                                                                                                                                                                                                            |                                                                                                                                                                                                         |
| IEC 60092-350 | 2020-01 | Electrical installations in ships - Part 350: General construction and test methods of power, control and instrumentation cables for shipboard and offshore applications                                                                                                    |                                                                                                                                                                                                         |
| IEC 60092-360 | 2021-01 | Electrical installations in ships - Part 360: Insulating and sheathing materials for shipboard and offshore units, power, control, instrumentation and telecommunication cables                                                                                             |                                                                                                                                                                                                         |
| IEC 60092-353 | 2024-06 | Electrical installations in ships - Part 353: Power cables for rated voltages 1 kV and 3 kV                                                                                                                                                                                 |                                                                                                                                                                                                         |
| IEC 60092-376 | 2025-04 | Electrical installations in ships - Part 376: Cables for control and instrumentation circuits 150/250 V (300 V)                                                                                                                                                             |                                                                                                                                                                                                         |
| IEC 60331-1/2 | 2018-03 | Tests for electric cables under fire conditions - Circuit integrity - Part 1/2: Test method for fire with shock at a temperature of at least 830 °C for cables of rated voltage up to and including 0,6/1,0 kV and with an overall diameter exceeding / not exceeding 20 mm | Overall fire resistance will be limited to the lowest fire temperature and shortest duration of test among elements                                                                                     |
| IEC 60332-1-2 | 2025-06 | 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                                                                                  | Flame retardant small scale. Distance between the lower edge of the top support and the onset of charring > 50 mm and charring not to extend downwards > 540 mm from the lower edge of the top support. |

| Standard      | Release | General description                                                                                                                                                                                                      | Limitation                                                                                                                                                                                                                                                                  |
|---------------|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IEC 60754-1   | 2019-11 | 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                                                                                                                                                                                                                                               |
| IEC 60754-2   | 2019-11 | 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   | 2025-05 | Flexible insulating sleeving – Part 2: Methods of test<br>Clause 47.1 Methods of determination of low levels of chlorine, and/or Bromine and/or iodine<br>Clause 47.2 Methods of determination of low levels of fluorine | HF max 0,1%<br>[0,02% can be detected]                                                                                                                                                                                                                                      |
| IEC 61034-1/2 | 2019-11 | Measurement of smoke density of cables burning under defined conditions –<br>Part 1: Test apparatus<br>Part 2: Test procedure and requirements                                                                           | Low smoke<br>Light transmittance >60%                                                                                                                                                                                                                                       |
| NEK TS606 Ed7 | 2025-03 | Cables for offshore installations - halogen-free low smoke flame-retardant / fire-resistant (HFFR-LS). Technical specification.                                                                                          | Mud resistance test:<br>Required Max variations ±:<br>IRM902 & 903 100°C 7d.<br>TS & E@B,<br>Weight & vol.: ±30%<br>Calc. Bromide 70°C 56d.<br>TS & E@B: ±25%,<br>Weight: ±15%, vol.: ±20%<br>Oil based mud:<br>EDC 95/11 70°C 56d<br>TS & E@B ±30%,<br>Weight & vol.: ±25% |

Please refer to DNV TAC numbers listed for details on test standards of individual cable elements.

## Marking of product

Tecnikabel - Factory - Number x Type of cable elements, Voltage class, IEC 60331 (optional but all elements shall comply) - IEC 60332-3-22/24 – Batch – meter mark

## 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