Certificate No: **2610091537578034**
TL Project No: **26-2086**

# TYPE APPROVAL CERTIFICATE

This is to certify that the

## Shipboard Power, General Instrumentation, Control and Communication Cables, Switchboard Cables

Manufacturer : **ÜNTEL KABLOLARI SANAYİ VE TİCARET ANONİM ŞİRKETİ**

Address : **Demirciler Köyü, Makine OSB, 6. Cadde, No:4, 41455 Dilovası/Kocaeli TÜRKİYE**

Product Type : **M2XH, M2XH-FFR, M2XCH, M2XCH-FFR, M2XCH-EMC (0.6/1 kV)**
**FM2XCH, FM2XCCH, FM2XCH-FFR (250 V)**
**M2X, M2XY-FR, M2XCY-FR (0.6/1 kV)**
**FM2XCY-FR, FM2XCCY-FR (250 V)**

Reference Rule : **TL Rules, Part E, Chapter 105 - Naval Ship Technology, Electrical Installations, 01.01.2022**

**IEC 60092-360 Insulating and sheathing materials for shipboard and offshore units, power, control, instrumentation and telecommunication cables , 04.01.2021**

**IEC 60092-350 General construction and test methods of power, control and instrumentation cables for shipboard and offshore applications, 28.01.2020**

**TL Rules, Part B, Chapter 5, Electric , 01.01.2024**

**IEC 60092-353 Power cables for rated voltages 1 kV and 3 kV, 06.06.2024**

**IEC 60092-376:2025, 28.04.2025**

Subject to the conditions referred to in the following pages, this certificate is valid until **22.06.2031**
Surveyor: **İbrahim Evren DAL**

Issued at **İstanbul** on **19.10.2026**

***This document is electronically signed and does not require a manual signature***

***Click here for the verification website***

**Emrah SÖĞÜTÇÜ**
*New Building Division Manager*
TÜRK LOYDU

Expire Date of Previous Certificate: 22.06.2026

**This certificate is subject to terms and conditions described below:**
Any significant change in design or construction may render this Certificate invalid. Certificate is not valid for equipment, the design or manufacture of which has been varied or modified from the specimen tested. This certificate is not valid for products without marking above mentioned. The manufacturer should notify TÜRK LOYDU of any modifications or changes to equipment in order to obtain valid certificate. This certificate shows that tested specimens as representative of the product complies of the TÜRK LOYDU rules, and relevant international instruments that apply to it.

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|---|---|
| Product | **: Shipboard Power, General Instrumentation, Control and Communication Cables, Switchboard Cables** |
| Type of Product | **: M2XH, M2XH-FFR, M2XCH, M2XCH-FFR, M2XCH-EMC (0.6/1 kV)<br>FM2XCH, FM2XCCH, FM2XCH-FFR (250 V)<br>M2X, M2XY-FR, M2XCY-FR (0.6/1 kV)<br>FM2XCY-FR, FM2XCCY-FR (250 V)** |
| Approval No / Date | **: PAE-EPAS/025995/26-2086/MY , 11.09.2026** |
| Application | **: General power, lighting, general instrumentation, control and communication, switchboard cables for ships** |
| Design | **: Voltage class 0.6/1 kV for M type or 250V for F type Temp. class 90°C** |
| Cross Section | **: From 0,5mm² to 630mm² (0,75mm² cables only for general instrumentation, control and communication)** |
| Product Description | **: Shipboard Power, General Instrumentation, Control and Communication Cables, Switchboard Cables** |
| Type Designation | **: M2XH 0.6/1kV (con. + ins. + cov. + she.)<br>M2XH-FFR 0.6/1kV (con+ frm +ins+ cov. +she.)<br>M2XCH 0.6/1kV (con+ ins+ cov. +arm+ she.)<br>M2XCH-FFR 0.6/1kV (con+ frm +ins+ cov. +arm+ she.)<br>M2XCH-EMC 0.6/1kV (con+ ins+ cov. + arm /cutape +she.)<br>FM2XCH 250V (con + ins + cov. + arm + she.)<br>FM2XCCH 250V (con + ins+ ind.scr + cov. +arm+ she.)<br>FM2XCH-FFR 250V (con+ frm + ins+ cov. +arm+ she.)<br>M2X 0.6/1kV (con. + ins/she)<br>M2XY-FR 0.6/1kV (con. + ins. + cov. + she.)<br>M2XCY-FR 0.6/1kV (con+ ins+ cov. +arm+ she.)<br>FM2XCY-FR 250V (con+ ins+ cov. + arm + she.)<br>FM2XCCY-FR 250V (con+ ins+ ind.scr + cov. +arm+ she.)** |
| Material Used | **: Conductors (con.) : Stranded copper wire class 2 or class 5 acc. to IEC 60228<br>Fire resistant material (arm): Fire resistive tape around conductor<br>Insulation (ins.) : XLPE acc. to IEC 60092-360<br>Individual Screen: Copper braid<br>Armouring (arm.) : Copper braid<br>Inner Covering (cov.) : Filler or tape<br>Outer Sheath (she.): ST2 for Y type, SHF1 for H type acc. to IEC 60092-360** |
| Documentation | **: 1. Electrical test report, Report Number: 202625249-1, issued by ÜNTEL according to IEC 60092-350<br>2. Thickness of insulation test report, Report Number: 202625249-1, issued by ÜNTEL according to IEC 60811-202<br>3. Thickness of sheats and external diameter test report, Report Number: 202625249-1, issued by ÜNTEL according to IEC 60811-203<br>4. Tensile and elongation test report, Report Number: 202625249-1, issued by ÜNTEL according to IEC 60811-501<br>5. Mechanical properties after aging in air oven without conductor test report, Report Number: 202625249-1, issued by ÜNTEL according to 60811-401<br>6. Hot set test report, Report Number: 202625249-1, issued by ÜNTEL according to 60811-507<br>7. Heat shock test report, Report Number: 202625249-1, issued by ÜNTEL according to 60811-509<br>8. Behaviour at low temp. test report, Report Number: 202625249-1, issued by ÜNTEL according to 60811-505<br>9. Loss of moss for sheat test report, Report Number: 202625249-1, issued by ÜNTEL according to 60811-409<br>10. Fire test report, Report Number: 202625249-1, issued by ÜNTEL according to 60332-1-1<br>11. Flame speed test report, Report Number: 202625249-1, issued by ÜNTEL according to 60332-3-22<br>12. Smoke emission test report, Report Number: 202625249-1, issued by ÜNTEL according to 61034-2<br>13. Acid gas emission for insulation and sheat test report, Report Number:** |

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| | **202625249-1, issued by ÜNTEL according to 60754-1**<br>**14. PH and conductivity for insulation and sheat test report, Report Number: 202625249-1, issued by ÜNTEL according to 60754-2** |
| Performed Tests | **: Quality Audit**<br>**Electrical test**<br>**- Measurement of electrical resistance**<br>**- High voltage test**<br>**- Insulation measurement test**<br>**Constructional and dimensional test**<br>**- Thicknes of insulation**<br>**- Thicknes of sheats**<br>**- External diameter**<br>**Material test**<br>**- Mechanical properties of insulation before and after aging**<br>**- Mechanical properties after aging in air oven without conductor**<br>**- Hot set tests**<br>**Mechanical properties of sheat before and after aging**<br>**- Mechanical properties of insulation before and after aging**<br>**- Heat shock test**<br>**- Behaviour at low tempature test**<br>**- Loss of mass test**<br>**Fire test**<br>**- Flame spread on single cables test**<br>**- Flame spread test on bunched cables**<br>**- Smoke emission test**<br>**Acid gas emission**<br>**PH and conductivity** |
| Test Place | **: UNTEL Cable Factory- Dilovas Kocaeli** |
| Marking of Product | **: The product to be marked same as below mentioned.**<br><br>**ÜNTEL [Type] [Size] [volt.class] [related standards] [temp. class]** |
| Test Scope | **: Type Tests** |
| Last Inspection Date | **: 09.10.2026** |
| Approval Conditions | **: For each new building and in service ships under major moclifications, factory acceptance tests (routine tests) for cables shall be carried out before mounted to the ship with the witness of TL surveyor. Cables with a conductor cross section of 0.75 mm² may only used for general instumentation, control and communication with a maximum current consumption of up to 6 Amper. MX type of cable is only usable in switchboards and non-fused conductors leading from the main busbar to fuses and circuit breakers shall be as short as possible, but not longer than 1 m. These wires shall not be run and mounted together with other wires. If not possible, these wires shall be double insulated.** |