

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Low Voltage Cable

with type designation(s)

**HFX-U/Cu-FRSW / FR WSR 250V & FHFX-U/Cu-FRSW / FR WSR 250V,
HFX-OSU/Cu-FRSW /FR WSR 250V & FHFX-OSU/Cu-FRSW / FR WSR 250V,
HFX-ISU/Cu-FRSW /FR WSR 250V & FHFX-ISU/Cu-FRSW / FR WSR 250V,
HFX-ISOSU/Cu-FRSW /FR WSR 250 V & FHFX-ISOSU/Cu-FRSW / FR WSR 250 V**

Issued to

Prysmian Cavi e Sistemi Italia S.r.l.
Milano, MI, Italy

is found to comply with

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

Application :

Control and instrumentation. Fire resistant with water spray/Water jet. Unarmored

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

Type	Rated voltage (V)	Temp. class (°C)
HFX-U/Cu-FRSW / FR WSR 250V & FHFX-U/Cu-FRSW / FR WSR 250V	150/250	90
HFX-OSU/Cu-FRSW /FR WSR 250V & FHFX-OSU/Cu-FRSW / FR WSR 250V	150/250	90
HFX-ISU/Cu-FRSW /FR WSR 250V & FHFX-ISU/Cu-FRSW / FR WSR 250V	150/250	90
HFX-ISOSU/Cu-FRSW /FR WSR 250 V & FHFX-ISOSU/Cu-FRSW / FR WSR 250 V	150/250	90

Issued at **Høvik** on **2023-07-03**

This Certificate is valid until **2028-07-02**.

for **DNV**

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

Approval Engineer: **Ivar Bull**

Frederik Tore Elter
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.

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 300,000 USD.



Product description

HFX-U/Cu-FRSW / FR WSR 250V & FHFX-U/Cu-FRSW / FR WSR 250V,
HFX-OSU/Cu-FRSW /FR WSR 250V & FHFX-OSU/Cu-FRSW / FR WSR 250V,
HFX-ISU/Cu-FRSW /FR WSR 250V & FHFX-ISU/Cu-FRSW / FR WSR 250V,
HFX-ISOSU/Cu-FRSW /FR WSR 250 V & FHFX-ISOSU/Cu-FRSW / FR WSR 250 V

Construction:	
Conductors:	Plain or tinned annealed copper cl. 2 or cl.5 (F as first letter)
Core insulation:	Mica Tape + XLPE/ Mica Tape + HF90
Individual Screen (if any):	Al-PET tape + copper drain wire
Common screen: (If any):	Al-PET tape + copper drain wire
Fire barrier/protection layer:	Inorganic tapes wrapped with overlap/ lapped tape(s)
Outer sheath:	SHF1

No of Elements:	Cross sectional area [mm ²]
4, 5, 7, 10, 12, 14, 16, 19, 24, 27, 30, 37 cores	1,0 1,5 mm ²
1, 2, 3, 4, 5, 6, 7, 8, 10, 12, 14, 16, 19, 24, 27, 30 pairs	0,75 1,0 1,5 mm ²
1, 2, 3, 4, 5, 6, 7, 8, 10, 12, 14, 16, 19 triples	0,75 1,0 1,5 mm ²
1 quad	0,75 1,0 1,5 mm ²

Application/Limitation

This cable type is fire resistant according to IEC 60331 + water spray EN50200 Annex E or Water Jet BS8491.

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

Type Approval documentation

Tests carried out

Standard	Release	General description	Limitation
IEC 60092-350	2020-01	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 60092-376	2017-05	Cables for control and instrumentation circuits 150/250 V (300 V)	
IEC 60331-1/2	2018-03	Fire resistance / Circuit integrity – Test for method for fire with shock at temperature of at least 830°C for cables rated up to and including 0,6/1 kV	180 min
IEC 60331-21	1999-04	Tests for electric cables under fire conditions – Circuit integrity – Part 21: Procedures and requirements – Cables of rated voltage up to and including 0,6/1,0 kV	90 min. + 15 min. cooling period.
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	Bunch test Category A
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: <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: pH > 4,3 Conductivity < 10µS/mm

Standard	Release	General description	Limitation
IEC 61034-1/2	2019-11	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke Light transmittance $\geq 60\%$
EN50200	2016-01	Method of test for resistance to fire of unprotected small cables for use in emergency circuits. Annex E: Guidance for using optional water spray protocol.	Cable OD < 20mm Water spray applied during last 15 minutes of test. No short circuit or earth fault.
BS 8491	2008	Method for assessment of fire integrity of large diameter power cables for use as components for smoke and heat control systems and certain other active fire safety systems	Cable OD > 20mm 5 water jets each 5 seconds duration last 5 minutes of test. No short circuit or earth fault.

Marking of product

PRYSMIAN(P) - SEAFLAME " cable type" 150/250 V nc x sect.
 IEC 60332-3-22 IEC 60331 FRSW or FR-WSR - year and metric marking

Factory code: (P) = Merlino factory

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