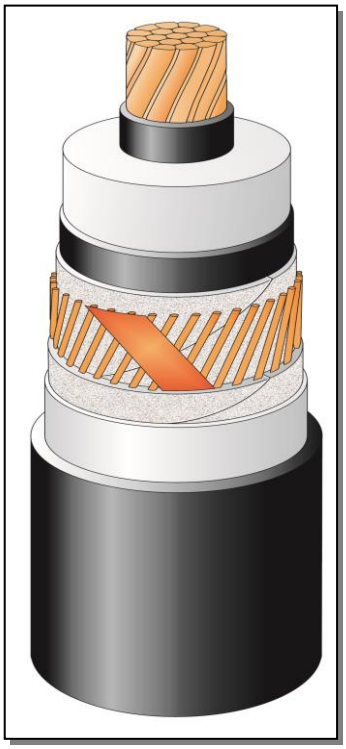
# TECHNICAL SPECIFICATION
# 2XS(FL)2Y 1x400RM/105 40/69kV IEC 60840

## CONSTRUCTION (x)

- Round, stranded and compacted copper conductor. Class 2.
- Extruded semi-conducting conductor screen
- Insulation XLPE – dry cured
- Extruded semi-conducting insulation screen
- Semi-conducting swelling tape
- Metallic screen:
  copper wires screen and
  copper equalizing tapes
- Semi-conducting swelling tape
- Longitudinal aluminum foil
- Outer sheath – black HDPE type ST7

## MARKING

TF KABLE, product name, date of manufacture, standard, meter marking



The picture is informative only – not in scale

## APPLICATION

- Laying in ground (wet or dry locations)
- Laying in air
- Laying in ducts

## Highest permissible conductor temperature

- Continuous operation 90°C
- Overload 105°C
- Short circuit 250°C (duration max 5s)

Laying is possible without any special measures at natural cable temperatures and ambient temperature not lower than -5ºC, with Tele-Fonika supervising

| DESCRIPTION | UNIT | DETAILS |
|---|---|---|
| **CONSTRUCTION DATA** | **$U_o/U/U_m$** | **40/69(72,5) kV** |
| Conductor<br>❑ material<br>❑ number of wires | <br><br>No | <br>Copper<br>60 |
| Nominal cross sectional area | $mm^2$ | 400 |
| Conductor diameter and tolerance | mm | $23.5^{-0.2+0,4}$ |
| Min./Nom. thickness semi-conducting XLPE on conductor | mm | 0.4 / 0.8 |
| Nominal insulation thickness XLPE | mm | 9.0 |
| Insulation thickness: minimum at a point | mm | 8.1 |
| Diameter over insulation – nominal | mm | $43.1^{\pm0,5}$ |
| Min./Nom. thickness semi-conducting XLPE on insulation | mm | 0.4 / 0.8 |
| Thickness of semi-conducting swelling tape | No x mm | 1 x ~ 0.35 |
| Metallic screen<br>❑ Copper wires<br>❑ Copper equalizing tape | $mm^2$<br>No x mm<br>No x mm x mm | 105<br>66 x 1.44<br>2 x 10 x 0.18 |
| Mean diameter over metallic screen | mm | 47.8 |
| Thickness of semi-conducting swelling tape | No x mm | 1 x ~ 0.35 |
| Thickness of aluminum foil | mm | 0.2 |
| Diameter over aluminum foil | mm | 49.0 |
| Nominal thickness of outer sheath / min. | mm | 2.7 / 2.19 |
| Approximate overall diameter completed cable ($D_e$) | mm | 54.8 |
| Weight of complete cable (approx.) | kg/km | 6180 |
| **DELIVERY DATA** | | |
| Diameter of wooden drum<br>❑ type | m | 2.8<br>28OP |
| Maximum length per drum | m | 1000 |
| Weight of heaviest reel, including cable | kg | 7600 |

(x) Diameters are calculated values and subject to manufacturing tolerances

| | | | |
|---|---|---|---|
| **ELECTRICAL DATA at 50Hz** | | | |
| Maximum D.C. conductor resistance at 20°C<br>Maximum A.C. conductor resistance at 90°C | Ω/km<br>Ω/km | 0.0470<br>0.0620 | |
| Maximum D.C. metallic screen resistance at 20°C | Ω/km | 0.172 | 0.142 |
| Maximum D.C. aluminum foil resistance at 20°C | Ω/km | 0.815 | |
| Operating inductance<br>❑ trefoil formation<br>❑ flat formation (*) | <br>mH/km<br>mH/km | <br>0.360<br>0.545 | |
| Induction reactance<br>❑ trefoil formation<br>❑ flat formation (*) | <br>Ω/km<br>Ω/km | <br>0.113<br>0.171 | |
| Capacitance | μF/km | 0.250 (+ 8 %) | |
| Capacitance reactance | kΩ/km | 12.91 | |
| Impedance<br>❑ trefoil formation<br>❑ flat formation (*) | <br>Ω/km<br>Ω/km | <br>0.129<br>0.177 | |
| Zero sequence reactance | Ω/km | 0.061 | |
| Max. electric stress at conductor screen / (at insulation) | kV/mm | 5.90 / 3.45 | |
| Dielectric losses (tg δ = 0.001) – per phase | W/m | 0.124 | |
| Partial discharge test – at 1.5Uo | pC | ≤ 5 | |
| Charging current – per phase | A/km | 3.10 | |
| Charging power | kVA/km | 124 | |
| Earth fault current – per phase | A/km | 9.30 | |
| **MECHANICAL DATA** | | | |
| Recommended min. bending radius for laying | m | 1.37 | |
| Recommended permissible bending radius at final installation | m | 1.10 | |
| Maximum permissible pulling force: | kN | 20 | |
| **SHORT CIRCUIT CURRENTS** | | | |
| Maximum permissible thermal short-circuit (IEC 60949)<br>*Current for 1.0s*<br>Phase conductor 90 → 250°C<br>Metallic screen 80 → 350°C | <br><br>kA<br>kA | <br><br>57.8<br>21.5 | |
| **AMPACITY at 50Hz (**) – Bonding of the metallic screens** | | **Single-point / Both-ends** | |
| in earth<br>❑ flat formation (*)<br>❑ trefoil formation<br>in air (shaded)<br>❑ flat formation<br>❑ trefoil formation | <br>A<br>A<br><br>A<br>A | <br>747 / 657<br>695 / 674<br><br>984 / 870<br>842 / 822 | |
| **TESTS** | | | |
| Test voltage – ( 2.5Uo; 30min)<br>Impulse voltage<br>Partial discharge test | kV<br>kV<br>kV | 100<br>250<br>60 | |

**Marking: TF-KABLE 5 2XS(FL)2Y 1x400RM/105 40/69(72,5)kV IEC 60840 2021**

(*) Distance between cable axes laid in flat formation De+De mm (De – diameter of cable)

(**) Current rating guideline (Calculated with Cymcap 8.0 based on IEC Pub. 60287 and the following conditions)

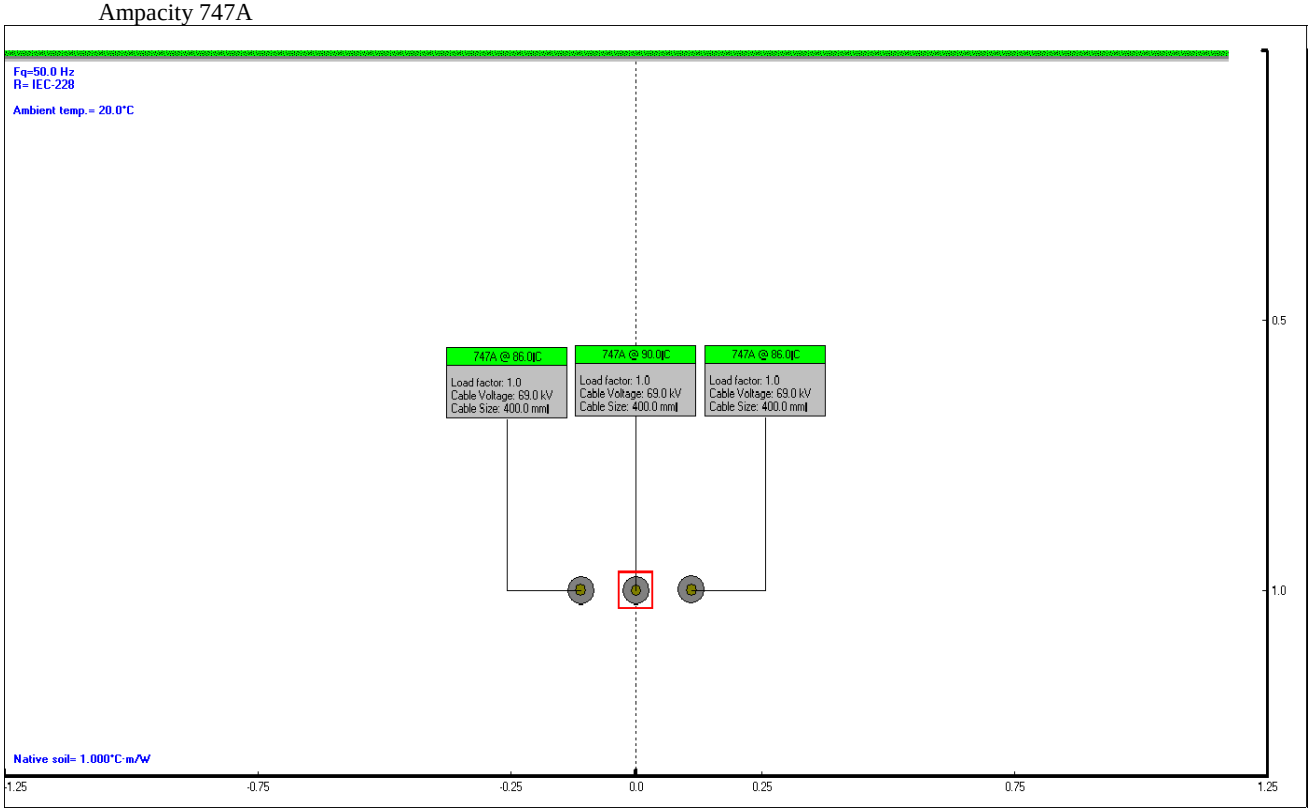
- ❑ Ground temperature +20°C
- ❑ Laying depth 1.0 m
- ❑ Ground thermal resistivity 1.0 K · m/W
- ❑ Load factor LF = 1
- ❑ Air temperature +35°C

(x) Diameters are calculated values and subject to manufacturing tolerances

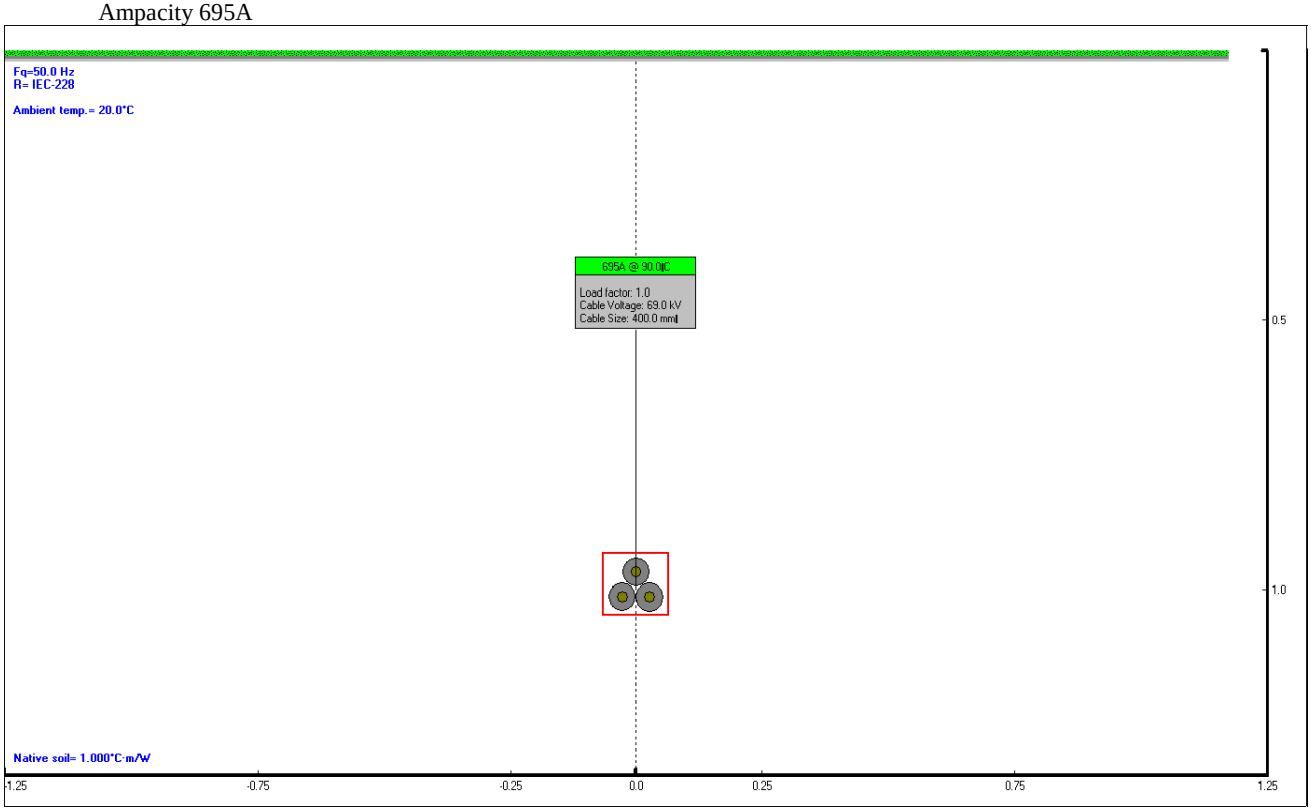
## Standard conditions of the work – cable in earth

**Cables in earth; single-point or cross-bonded**

Ampacity 747A




Ampacity 695A

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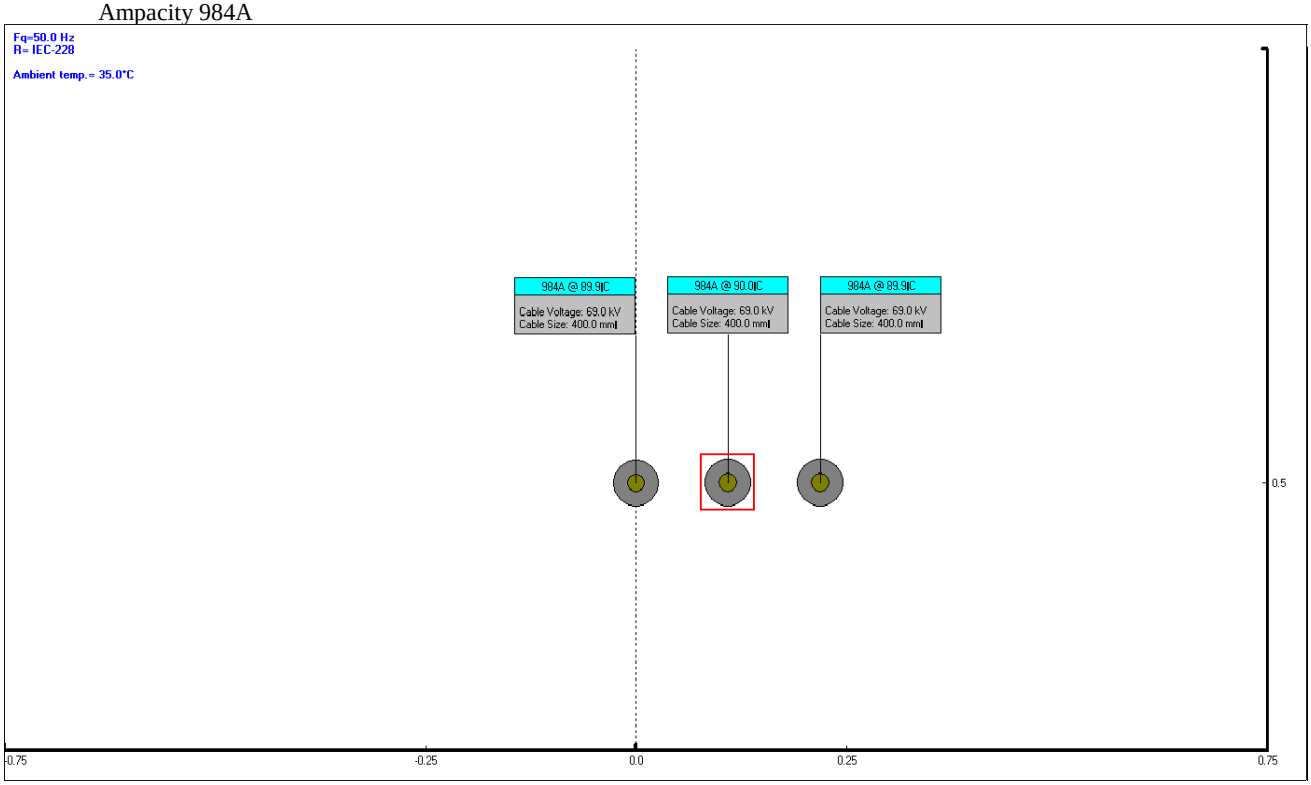
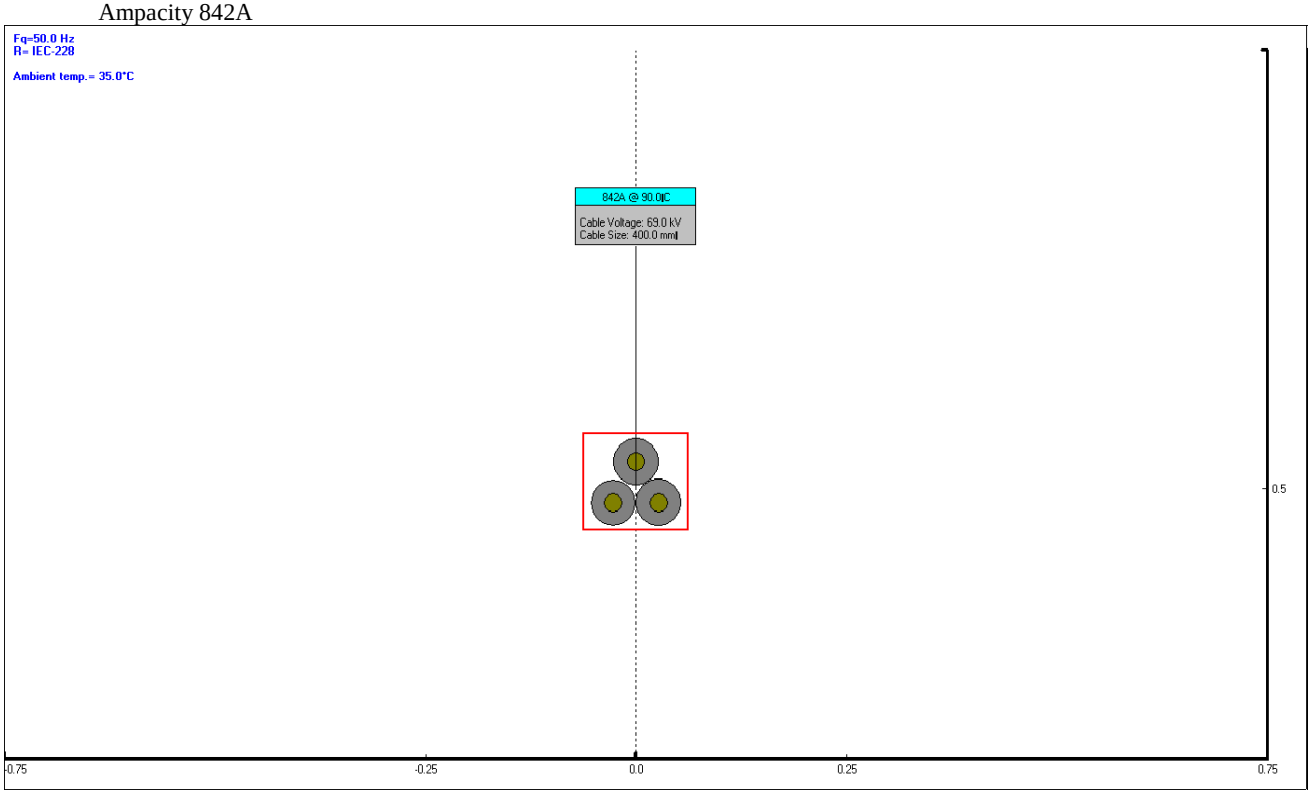
## Standard conditions of the work – cable in air (shaded)

**Cables in air; single-point or cross-bonded**
Ampacity 984A




Ampacity 842A




Date: 2021-09-06; Mp211842
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