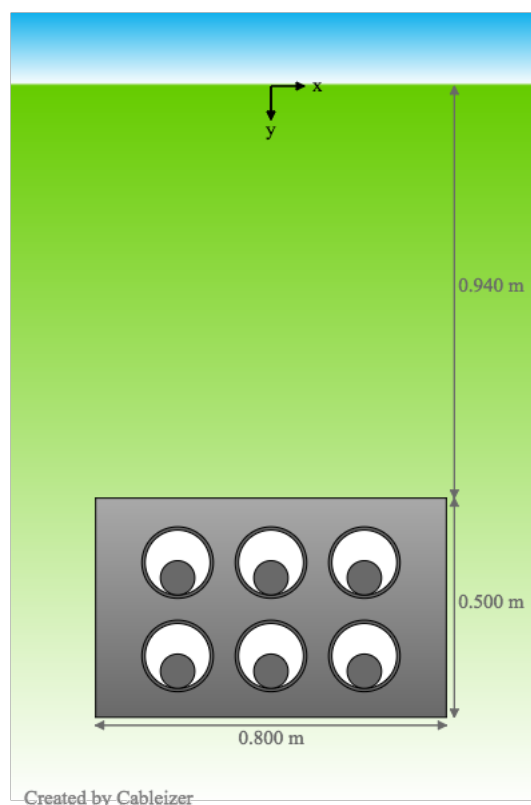


# Results of ampacity calculation

Title	2x(3x1)_flat
Project	blog
Description	
Created	2016-06-07 20:25

## Cable arrangement

Type	Buried cables
Ambient temperature	20.0 °C
Soil thermal resistivity	1.2 K.m/W
Active cable systems	G
Sum of currents from all systems	1000.0 A
Iterations	5



<b>Backfill</b>	
Calculation method	El-Kady 1985
Height of the backfill area	500.0 mm
Width of the backfill area	800.0 mm
Horizontal center position of backfill	0.0 mm
Vertical center position of backfill	1190.0 mm
Thermal resistivity backfill	0.8 K.m/W
Geometric factor for backfill $G_b$	1.80

**Cable system G****Cable**

Repower XDRCU-ALT 800Al/95RCu mm2 110/64kV

**Current rating**

2 x 500.0 A (with phase splitting)

**Temperatures**

Conductor temperature

1: 60.1 | 2: 58.7 | 3: 58.3 | 4: 59.2 | 5: 57.9 | 6: 57.4 °C

Screen/Sheath temperature

1: 55.7 | 2: 54.4 | 3: 54.0 | 4: 54.9 | 5: 53.6 | 6: 53.2 °C

Oversheath temperature

1: 55.0 | 2: 53.7 | 3: 53.3 | 4: 54.2 | 5: 52.9 | 6: 52.5 °C

Temperature in duct

1: 52.9 | 2: 51.5 | 3: 51.1 | 4: 52.0 | 5: 50.7 | 6: 50.3 °C

External temperature of duct

1: 50.1 | 2: 48.7 | 3: 48.3 | 4: 49.2 | 5: 47.8 | 6: 47.5 °C

**Losses**

Conductor losses

1: 11.15 | 2: 11.10 | 3: 11.09 | 4: 11.12 | 5: 11.07 | 6: 11.06 W/m

Dielectric losses

1: 0.33 | 2: 0.33 | 3: 0.33 | 4: 0.33 | 5: 0.33 | 6: 0.33 W/m

Screen and sheath losses

1: 0.06 | 2: 0.25 | 3: 0.06 | 4: 0.06 | 5: 0.25 | 6: 0.06 W/m

Armour losses and losses in steel pipe

0.00 W/m

Total losses per cable

1: 11.55 | 2: 11.69 | 3: 11.48 | 4: 11.52 | 5: 11.66 | 6: 11.45 W/m

**System parameters**

Number of cables

3

Operating voltage and frequency

110.0 kV, 50.0 Hz

Earthing

Single side

Continuous load with load factor

1.0

**Arrangement parameters**

Material of duct pipe

Plastic (PE)

Inside / outside diameter of duct

148.0 mm, 163.0 mm

Center position of duct 1

0.0 mm, 1300.0 mm

Center position of duct 2

-213.0 mm, 1300.0 mm

Center position of duct 3

213.0 mm, 1300.0 mm

Center position of duct 4

0.0 mm, 1087.0 mm

Center position of duct 5

213.0 mm, 1087.0 mm

Center position of duct 6

-213.0 mm, 1087.0 mm

Separation of conductors  $s_c$ 

213.0 mm

**Other characteristics**

AC resistance of conductor

1: 0.0446 | 2: 0.0444 | 3: 0.0444 | 4: 0.0445 | 5: 0.0443 | 6: 0.0442  $\Omega/\text{km}$ Skin effect factor of conductor  $y_s$ 

1: 0.044 | 2: 0.044 | 3: 0.044 | 4: 0.044 | 5: 0.044 | 6: 0.044

Factor  $x_s$ 

1: 1.7 | 2: 1.7 | 3: 1.7 | 4: 1.7 | 5: 1.7 | 6: 1.7

Proximity effect factor of conductors  $y_p$ 

1: 0.0028 | 2: 0.0028 | 3: 0.0029 | 4: 0.0028 | 5: 0.0029 | 6: 0.0029

Factor  $x_p$ 

1: 1.5 | 2: 1.5 | 3: 1.5 | 4: 1.5 | 5: 1.5 | 6: 1.5

Loss factor for sheath and screen  $\lambda_1$ 

1: 0.0058 | 2: 0.023 | 3: 0.0054 | 4: 0.0058 | 5: 0.023 | 6: 0.0054

Factor  $\lambda_{1c}$  for circulating currents

0

Factor  $\lambda_{1e}$  for eddy-currents

1: 0.0058 | 2: 0.023 | 3: 0.0054 | 4: 0.0058 | 5: 0.023 | 6: 0.0054

Resistance of screen  $R_{sc}$ 1: 0.207 | 2: 0.206 | 3: 0.206 | 4: 0.206 | 5: 0.205 | 6: 0.205  $\Omega/\text{km}$ Resistance of sheath  $R_{sh}$ 1: 0.590 | 2: 0.587 | 3: 0.586 | 4: 0.588 | 5: 0.585 | 6: 0.585  $\Omega/\text{km}$

Resistance of screen/sheath in parallel $R_s$	1: 0.153   2: 0.153   3: 0.152   4: 0.153   5: 0.152   6: 0.152 $\Omega/\text{km}$
Reactance X	0.000114
Mutual reactance $X_m$	4.36e-05
Factor $\lambda_0$	1: 0.0016   2: 0.0016   3: 0.0016   4: 0.0016   5: 0.0016   6: 0.0017
Factor $\Delta_1$	1: -0.0416   2: -0.0416   3: -0.0416   4: -0.0416   5: -0.0417   6: -0.0417
Factor $\Delta_2$	1: 0.0000   2: 0.0000   3: 0.0000   4: 0.0000   5: 0.0000   6: 0.0000
Factor $m_0$	1: 0.2050   2: 0.2060   3: 0.2063   4: 0.2056   5: 0.2066   6: 0.2069
Thermal resistance $T_4$	1: 3.034   2: 2.885   3: 2.898   4: 2.969   5: 2.821   6: 2.834 K.m/W
Correction of $T_4$ for backfill	1: 0.689   2: 0.681   3: 0.693   4: 0.691   5: 0.683   6: 0.695 K.m/W

## Cable data

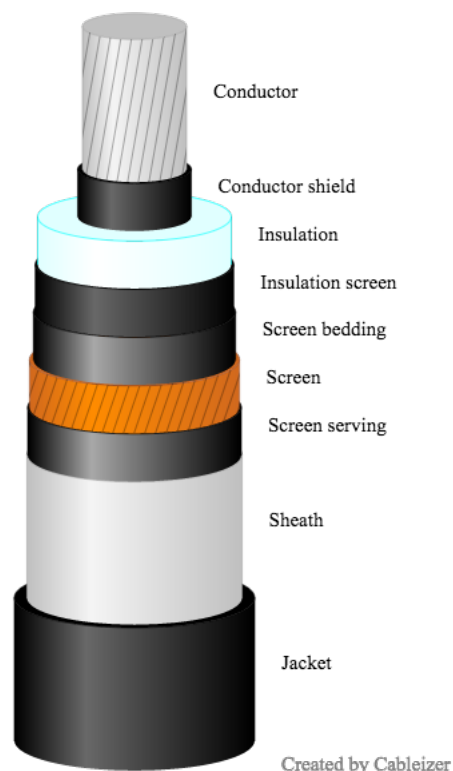
This section contains a summary of data from cables used in the above cable arrangements:

- [Repower XDRCU-ALT 800Al/95RCu mm2 110/64kV](#)

### Cable: Repower XDRCU-ALT 800Al/95RCu mm2 110/64kV

#### Cable

Cable is used in the systems	<b>G</b>
Cable rated voltage	110.0 kV
System frequency	50.0 Hz
Description	XDRCU-ALT



**Conductor**

Number of conductors in cable	1
Conductor cross-section	800.0 mm <sup>2</sup>
Material of conductor	Aluminium
Construction of conductor	Round, stranded
Skin effect coefficient of conductor $k_s$	1.0
Proximity effect coefficient of conductor $k_p$	0.8
El. resistivity of conductor material	2.8264e-08 $\Omega$ .m
DC resistance of conductor at 20 °C	0.03670 $\Omega$ /km
Temp. coefficient of conductor material	0.00403 1/K
Permissible pull force on conductor	2400 daN
External diameter of conductor	33.8 mm

**Insulation**

Thickness of conductor shield	1.6 mm
Material of insulation	Crosslinked polyethylene (XLPE) unfilled
Max. conductor temperature	90.0 °C
Max. emergency overload temperature	130.0 °C
Max. short-circuit temperature	250.0 °C
Relative permittivity of insulation	2.5
Loss factor of insulation	0.001
Thermal resistivity of insulation	3.5 K.m/W
Thickness of insulation	13.0 mm
Insulation thickness between conductors	30.80 mm
Capacitance of insulation	0.2610 $\mu$ F/km
Thickness of insulation screen	0.8 mm

**Screen/Sheath**

Thickness of screen bedding	0.6 mm
Material of screen	Copper, round wires
Thickness of the screen	1.27 mm
Number of screen wires	75
Resistance of screen at 20 °C	0.1815 $\Omega$ /km
Thickness of screen serving	0.6 mm
Material of sheath	Aluminium
Thickness of the sheath	0.25 mm
Mean diameter of sheath d	69.79 mm
Mean external diameter of the sheath $D_s$	70.04 mm
Resistance of sheath at 20 °C	0.5156 $\Omega$ /km

**Armour/Jacket**

Material of jacket	Polyethylene (PE)
Thickness of jacket	4.1 mm
External diameter of cable	78.24 mm
Minimal loaded bending radius	1.56 m
Minimal bending radius	1.25 m

**Internal thermal resistances**

Thermal resistance $T_1$	0.381 K.m/W
Thickness of insulation to sheath $t_1$	16.60 mm
Thermal resistance $T_2$	0.000 K.m/W
Thickness of bedding under armour $t_2$	0.00 mm
Thermal resistance $T_3$	0.062 K.m/W
Thickness of serving over armour $t_3$	4.10 mm