ELLEVIO

Instruktion

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Författare Mats Bortas/Kjell Oberger och Sebastian Bengtsson	**Godkänd av, datum** Kjell Oberger, 2026-03-09:
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Technical specification of 36-245 kV XLPE cables and accessories

Revision history

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2.0	1.6 Documentation shall as minimum include all datasheets according to item A-G.	Kjell Oberger		Kjell Oberger	2026-03-09
1.0	New specification including all relevant voltage levels of Ellevio regional network.	Kjell Oberger and Sebastian Bengtsson	Nätkommitén	Kjell Oberger	2025-12-15
2.0	Earlier specifications for 36 kV, 123 kV and 245 kV respectively	Sebastian Bengtsson and Nils Magnusson	Nätkommittén	Kjell Oberger	2024-06-25
1.0	Earlier specification including voltage levels of 52 kV, 72,5 kV, 145 kV and 170 kV	Mats Bortas	Nätkommittén	Kjell Oberger	2024-03-27

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1 Common

1.1. General

This specification covers cable system in ground with highest system voltage (U_m) of 36 kV, 52 kV, 72,5 kV, 123 kV, 145 kV, 170 kV respectively 245 kV and cable systems installed in tunnel with highest system voltage (U_m) of 36 kV, 123 kV and 245 kV respectively, installed in Ellevios electrical network

If not otherwise specified, parallel groups with three cable phases will be bundled in close trefoil formation and the copper wire screens solidly earthed in both ends, i.e. the cable screens will not be cross-bonded or insulated from earth.

Please note that accessories for some system voltage levels have higher voltage level requirements:

Maximum voltage U_m for accessories for cable systems with 123 kV system voltage level	145 kV

The cable and the accessories shall be designed for at least 50 years' lifetime, and to withstand the electrical and mechanical stresses which will be experienced during the service life.

1.2. Standards

The cable and accessories shall meet the latest version of the applicable standards and national regulations. Special requirements beyond the standard are specified in this Technical Specification.

1.3. Testing

Testing of the XLPE-cable system and accessories) shall be performed in accordance with the following standards related to applicable voltage level:

- IEC 62067 - Power cables with extruded insulation and their accessories for rated voltages above 150 kV (Um = 170 kV) up to 500 kV (Um = 550 kV) – Test methods and requirements.
- IEC 60840 - Power cables with extruded insulation and their accessories for rated voltages above 30 kV (Um = 36 kV) up to 150 kV (Um = 170 kV) – Test methods and requirements.
- SS 424 14 16 and SS 424 14 45 for XLPE-cable system and accessories for rated voltage up to 30 kV (Um = 36 kV).

XLPE-cables and accessories shall have been type tested assessed by certification body.
Type testing may be excluded in the contract if the Contractor can present acceptable reports from previously performed type tests. Water penetration test of XLPE-cables according to annex E and annex F shall have been performed. Test of outer protection for joints according to Annex H shall have been performed. Reports covering requested cable and/or accessories shall be enclosed in the tender.

1.4. Cable design

1.4.1. General

The cable shall meet the requirements in the standards listed in 1.3 related to applicable voltage level, which shall be used as general engineering standards.

1.4.2. Conductor

The conductor shall be round, stranded and compacted according to SS-EN 60228, class 2. The conductor shall have a completely longitudinal water blocking construction and shall be blocked in all interstices. The conductor shall be longitudinal watertight by means of swelling powder, swelling yarn, or swelling tapes or equivalent. For larger conductor cross sections, a conducting tape can be used around the conductor if the longitudinal water blocking is maintained.

Conductor of cross section 1600 mm^2 can either be of round type, as described above, or of Milliken type. This will be stated by the client.

Conductor of cross section 2000 mm^2 (and above) shall be of Milliken type with minimum 4 segments.

Conductor resistance shall be according to SS-EN 60228, class 2.

1.4.3. Insulation system

The insulation shall be made of a cross-linked polyethylene compound XLPE. XLPE-material shall be well proven and classified by material supplier to be used for specified voltage level (U_m) of cable. It shall comply with requirements specified in IEC 60840-2020.

Both conductor screen and insulation screen shall be of cross-linked semi-conductive material and firmly bonded to the XLPE-insulation.

The insulation system, conductor screen, XLPE-insulation, and insulation screen, shall be triple extruded in a vulcanized, dry curing process.

The insulated system shall after extrusion be degassed in heated chamber.

1.4.3.1. Conductor screen and insulation screen

Conductor screen and insulation screen shall be of cross-linked semi-conductive material.
Minimum thickness $t_{min} \geq 0{,}3$ mm in accordance with SS 424 14 16 for cable with highest system voltage (U_m) of 36 kV.

Minimum thickness $t_{min} \geq 0{,}5$ mm for all other system voltage levels.

1.4.3.2. XLPE-insulation

Thickness of XLPE-insulation in minimum thickness $t_{min.}$ (mm).

Conductor cross section mm²			Highest system voltage U_m				
	36 kV	52 kV	72,5 kV	123 kV	145 kV	170 kV	245 kV
300	-	8,10	11,25	-	16,20	20,70	-
400	-	8,10	10,80	-	16,20	19,40	-
500	7,1	8,10	10,80	13,95	15,30	18,00	-
630	7,1	8,10	10,80	-	15,30	17,00	22,50
800	-	8,10	10,80	-	15,30	17,00	-
1000	-	8,10	10,80	-	15,30	17,00	-
1200	-	8,10	10,80	12,60	15,30	17,00	22,50
1600*	-	8,10	10,80	-	15,30	17,00	-
2000*	-	-	-	-	-	-	22,50

1.4.4. Metal screen

The metal screen is of SD-design. Radial water tightness is made by laminated foil and copper wires screen for carrying the full screen short circuit.

1.4.4.1. Screen of Cu-wires

Screen shall be of annealed circular copper wires. Stated resistance value refers to true screen length in the cable and not the length of the complete cable, i.e. with consideration taken to the screen lay/pitch.

Screen of copper wires, shall fulfil resistance requirement according to IEC 60228 class 2, annealed copper conductor:

Screen cross section of copper wires mm²	Maximum resistance at 20°C Ω/km
35	0,524
50	0,387
95	0,193
150	0,124

Screen cross section will be stated by Ellevio in tender documents.

1.4.4.2. Longitudinal and radial water sealing system

Longitudinal water sealing system shall be of semi conductive swelling tapes, both above and under screen of copper wires.

For underground cables, radial water sealing system shall be of laminated Al-foil firmly bonded to the oversheath.

For cables installed in tunnels, radial water sealing system shall be of laminated Al or Cu-foil firmly bonded to the oversheath.

1.4.5. Oversheath with outer conductive layer (CL)

Oversheath shall be of UV-stabilized MDPE or HDPE for underground cables.

Oversheath (including outer conductive layer) shall be of non-halogen polymer (HFFR) for cable installation in tunnel.

A black outer conductive layer (CL) shall be extruded and firmly bonded to the oversheath.
Thickness of outer conductive layer according manufacturers standard.

There shall be a clear visible difference of colours between oversheath and outer conductive layer.

Thickness of sheath is minimum thickness t_{min}, excluding thickness of outer conductive layer.

Conductor cross section mm²			**Minimum thickness of oversheath t_{min} (excluding thickness of outer conductive layer). mm**			
	52 kV	**72.5 kV**	**123 kV**	**145 kV**	**170 kV**	**245 kV**
300	2,11	2,28	-	2,62	2,88	-
400	2,20	2,37	-	2,71	2,88	-
500	2,28	2,45	3,50	2,71	2,88	-
630	2,37	2,54	-	2,88	2,96	-
800	2,45	2,62	-	2,96	3,05	-
1000	2,54	2,71	-	3,05	3,22	-
1200	2,62	2,79	3,50	3,13	3,30	3,85
1600	2,79	3,05	-	3,30	3,47	-
2000	-	-	-	-	-	4,00

For 36 kV cables, minimum thickness t_{min} in accordance with SS 424 14 16.

1.4.6. Fire propagation class

Cables for installations in tunnels and inside substations shall at least fulfil the following fire propagation class:

a) B2ca -s1, d1, a1.

The required fire propagation class shall include the complete cable construction including the outer protective layer. The fire propagation classes are defined in EN 13501-6.

1.4.7. Marking

All cables shall be marked on the outside of the sheath with two lines equally spaced around the circumference. At least one line shall be embossed on the sheath. The following information shall be included:

a) Manufacturer's name or logo
b) Rated voltage $U_o/U(U_m)$
c) Cable designation.
d) Cross section of conductor and screen.
e) Year of manufacturing
f) Fire propagation class, i.e. "B2ca -s1, d1 a1" (if applicable)
g) Meter marking (may be printed with indelible ink)
h) Batch number of individual lengths for traceability[1]

1.5. Delivery drums

Dimension of delivery drums for all cable lengths shall be according to SS 84 28 01.

Cable on delivery drum shall be prepared for DC-voltage test on oversheath according to 6.1, i.e. both ends of cable needs to be accessible for testing while being rolled up on drums.

Marking of the delivery drums shall be made with relevant information for the installation and identification of cable. Markings on the drums shall be indelible and made by weather resistant plastic laminated notes/documents on outside of both drum flanges. Minimum information shall be:

a) project name
b) project number
c) delivery length number
d) cable designation

[1] If batch number is not presented on sheath, manufacturer shall present how individual length traceability is done.

e) voltage level
f) cross section of conductor
g) cross section of screen
h) length of cable on drum
i) drum type
j) dimensions
k) weight with and without cable

1.6. Documentation

Documentation of cable and accessories shall as minimum include completed datasheets, drawings, type test reports, reference list etc according to item A-G in this document.

2. Terminations

2.1. General

For voltage level highest system voltage (U_m) of 36 kV, the termination shall meet the requirements in SS 4241445 and HD 629.1 in applicable parts, which all shall be used as engineering standards.

For all other voltage levels, the termination shall meet the requirements in IEC 60840:2020, IEC 60815 and IEC 60137, which all shall be used as engineering standards.

2.2. Outdoor termination specification

For voltage level highest system voltage (U_m) of 36 kV, the termination shall be of prefabricated type and fulfil geometrical field control design.

For all other voltage levels, the design of the termination shall be of dry type[2]. The termination shall be
- Highest system voltage (U_m) of 52 kV and 72.5 kV: Self-supporting or non-self-supporting type.
- Highest system voltage (U_m) of 145 kV, 170 kV and 245 kV. Self-supporting type.

The termination shall have a composite insulator with a creepage distance according to IEC 60815-3.

Voltage **kV**	**Minimum creepage distance** **Class Medium (c)** **mm**	**Minimum creepage distance** **Class Heavy (d)** **mm**
36	720	
52	1040	1300
72.5	1450	2060
123	2460	
145	2900	3620
170	3400	4250
245	4900	

[2] Note: For U_m = 170 kV and above, dry type are preferred, but fluid filled termination can be accepted.

Class of minimum creepage distance will be stated by Ellevio in tender documents.

The termination shall electrically and thermally be dimensioned in accordance with above construction parameters and be fully adapted with the XLPE-cable.

The termination shall have a system for insulated installation enabling DC-voltage tests of 10 kV DC on the oversheath.

Earth connections for screen wires, earthing bonds on the termination body/housing etc. shall be designed so that a short circuit current, in case of a fault, will not damage the termination.

The metallic laminate layer (for radial water tightness) shall be properly connected directly to the screen or the screen connection point on the termination body.

The termination shall be able to withstand normal mechanical axial and radial forces that occur due to wind, normal forces on jumper lines etc.

The termination shall withstand a surrounding air temperature outdoor of- 40°C to +40°C, solar radiation of 1000 W/m^2 and wind velocity ≤ 34 m/s.

2.3. Indoor termination specification for 36 kV cable system

For voltage level highest system voltage (U_m) of 36 kV, the termination shall be of prefabricated type and fulfil geometrical field control design.

The proposed termination shall have a system for insulated installation (support insulators etc.) so that regular voltage tests on the outer sheath of the cable phases can be performed.

Earth connections for screen wires, earthing bonds on the termination body/housing etc. shall be designed in such a way that a short circuit current in case of a fault will not damage the termination.

The metallic laminate layer (for radial water tightness) shall be properly connected directly to the screen or the screen connection point on the termination body.

The termination shall be able to withstand normal mechanical axial and radial forces that occur.

2.4. Gas-insulated Switchgear (GIS) termination specification

The design of the termination shall be of dry type for connection to a GIS switchgear (see definition in IEC 62271-209 §3.1.2).

The termination shall have a separating insulating barrier (epoxy-resin insulator or similar) between the cable insulation and the gas insulation of the switchgear (i.e. shall not be of a "naked" design).

The gas-insulated cable connection enclosures for the terminations will be of one-phase type and connected to switchgears of following types:
- Cable circuit end A / Not yet contracted
- Cable circuit end B / Not yet contracted

The termination shall have a completely dry construction and be of "plug-in" type which makes it possible to remove and reassemble the cable end and internal parts of the cable termination (except the insulator) without any switchgear gas-leakage. A suitable cover/protection lid for the exposed insulator shall be included in each termination kit to enable energization of empty cable connection.

The termination shall be able to withstand the mechanical axial/radial forces and pressure that occur inside the gas-insulated metal-enclosed enclosure and the requirements in IEC 62271-203 and IEC-62271-209 shall be fulfilled. The termination shall also be capable to withstand the vacuum conditions when the enclosure is evacuated as part of the filling process.

The termination will be installed in gas insulated switchgears of one-phase type with standardized dimensions according to IEC 62271-209 Figure 5.

The proposed termination shall have a system for insulated erection against the metallic switchgear parts so that regular voltage-tests on the outer sheath of the cable can be performed.

The termination shall electrically and thermally be dimensioned in accordance with above construction parameters and be fully adapted with the XLPE-cable.

The termination shall have a system for insulated installation enabling DC-voltage tests of 10 kV DC on the oversheath.

Earth connections for screen wires, earthing bonds on the termination body/housing etc. shall be designed so that a short circuit current, in case of a fault, will not damage the termination.

The metallic laminate layer (for radial water tightness) shall be properly connected directly to the screen or the screen connection point on the termination body.

3. Joints

3.1. General

For voltage level highest system voltage (U_m) of 36 kV, the straight through joint shall meet the requirements in SS 4241445 and HD 629.1 in applicable parts, which all shall be used as engineering standards. The joint shall meet the requirements in IEC 60840, including § 12.4.2 g – test of outer protection for joints (Annex G), or other relevant standard.

For all other voltage levels, the straight through joint shall meet the requirements in IEC 60840, which shall be used as a general engineering standard.

3.2. Straight through joint construction and repair joint for underground system

The joint shall be of:
- - Highest system voltage (U_m) of 36 kV, 52 kV and 72,5 kV. Heat-shrink type or prefabricated joint where prefabricated rubber bodies are installed over the prepared cable ends.
- Highest system voltage (U_m) of 145 kV, 170 kV and 245 kV. Prefabricated joint where prefabricated rubber bodies are installed over the prepared cable ends.

The joint will be directly buried in soil.
The joint shall electrically and thermally be dimensioned to be fully adapted with the XLPE-cable.
The metallic laminate layer (for radial water tightness) shall be properly (electrical) connected to the copper wire screen.
The recovering of the copper wire screen wires over the joint area shall be made so that a short circuit current, in case of a fault, will not damage the joint (current level determined by the XLPE-cable screen).
If not otherwise specified, the screen wires on both sides of the cable shall be recovered straight through the joint, i.e. the joint shall not be of cross-bonded or insulated screen end type.
If required by Client, an earth bonding cable (connected to the wire-screen) shall be brought out from the joint. The bonding cable shall be a PE-insulated flexible bonding cable with a copper conductor of at least the same cross-sectional area as the cable screen. The bonding cable shall be connected to the screen wires and brought out from the joint to a grounding point.
Special attention shall be taken to stop water penetration along the bonding cable connected to the screen wires. The insulation of the bonding cable shall also be able to withstand regular voltage tests.

The metallic laminate layer (for radial water tightness) shall be properly connected to the screen.

The XLPE-cable shall be supplied with an extruded conductive layer on the oversheath and the joint shall therefore be supplied with a system for electrical connection of these layers on both sides.
The joint shall meet the requirements in IEC 60840, including § 12.4.2 g – test of outer protection for joints (Annex H).

3.3. Straight through joint and repair joint for tunnel cable system

The joint shall be of
- Highest system voltage (U_m) of 36 kV. Heat-shrink type or prefabricated joint where prefabricated rubber bodies are installed over the prepared cable ends.
- Highest system voltage (U_m) of 145 kV and 245 kV. Prefabricated joint where prefabricated rubber bodies are installed over the prepared cable ends.

The joint will be installed in tunnel.
The joint shall electrically and thermally be dimensioned to be fully adapted with the XLPE-cable.
The metallic laminate layer (for radial water tightness) shall be properly (electrical) connected to the copper wire screen.
The recovering of the copper wire screen wires over the joint area shall be made so that a short circuit current, in case of a fault, will not damage the joint (current level determined by the XLPE-cable screen).
If not otherwise specified, the screen wires on both sides of the cable shall be recovered straight through the joint, i.e. the joint shall not be of cross-bonded or insulated screen end type.
If required by Client, an earth bonding cable (connected to the wire-screen) shall be brought out from the joint. The bonding cable shall be a HFFR-insulated flexible bonding cable with a copper conductor of at least 95 mm^2 cross sectional area. The bonding cable shall be connected to the screen wires and brought out from the joint to a grounding point.
Special attention shall be taken to stop water penetration along the bonding cable connected to the screen wires. The insulation of the bonding cable shall also be able to withstand regular voltage tests.
The metallic laminate layer (for radial water tightness) shall be properly connected to the screen.

The joint shall be installed with a cable with the required fire propagation class in chapter 1.4.6. The fire propagation properties of the joint shall match that of the

cable and shall be proved with test reports. If this cannot be proven the proposal of fire propagation actions for the joint will be subject to Client's acceptance.

The XLPE-cable shall be supplied with an extruded conductive layer on the oversheath and the joint shall therefore be supplied with a system for electrical connection of these layers on both sides.
The joint shall meet the requirements in IEC 60840, including § 12.4.2 g – test of outer protection for joints (Annex H).

3.4. Transition joint

The joint shall be used for jointing cables where one cable is an underground cable, the other one is a tunnel cable, both with a construction according to this specification.
For 245 kV, the joint shall be used for jointing cables with 2000/1200 mm² conductor, where the 2000 mm² cable is an underground cable, the other one is a tunnel cable.
Conductor cross-section of the 36 kV and 123 kV cables to be specified separately.

The joint shall be of
- Highest system voltage (U_m) of 36 kV. Heat-shrink type or prefabricated joint where prefabricated rubber bodies are installed over the prepared cable ends.
- Highest system voltage (U_m) of 145 kV and 245 kV. Prefabricated joint where prefabricated rubber bodies are installed over the prepared cable ends.

The transition joints will be installed in a tunnel (i.e. in air) and the screen wires on both sides of the cable joint shall be connected to two bonding cables that are brought out from the joint and directly earthed, see principle in Figure. The joint shall therefore not be of straight through type.

The joint shall be supplied with an integrated screen separation.

The joint shall electrically and thermally be dimensioned to be fully adapted with the XLPE-cables.

<u>36 kV cable system:</u>
The bundle shall via a 35 mm² insulated copper bonding lead be connected to an earthing link-box or similar, see Figure 1.

<u>123 kV cable system:</u>
From each joint two HFFR-insulated 95 mm² copper bonding leads shall be brought out, one connected to the screen wires of the underground cable, and one

connected to the screen wires of the tunnel cable. After approved voltage test of each group of underground cable sheaths, the six (2x3) bonding leads shall, in pairs, be electrically connected by a permanent method. The length of the leads shall be chosen in such a way that they in case of a fault can be split apart (insulated) for fault location on the underground cable section and then connected again. The bundle shall via a 95 mm^2 insulated copper bonding lead be connected to an earthing link-box or similar, see Figure 1.

245 kV cable system:
From each joint two HFFR-insulated 150 mm^2 copper bonding leads shall be brought out, one connected to the screen wires of the underground cable, and one connected to the screen wires of the tunnel cable. After approved voltage test of each group of underground cable sheaths, the six (2x3) bonding leads shall, in pairs, be electrically connected y a permanent method. The length of the leads shall be chosen in such a way that they in case of a fault can be split apart (insulated) for fault location on the underground cable section and then connected again. The bundle shall via a 150 mm^2 insulated copper bonding lead be connected to an earthing link-box or similar, see Figure 1.

The recovering of the screen wires shall be made in such a way that a short circuit current in case of a fault will not damage the joint (current level determined by the XLPE-cable screen).

The metallic laminate layer on the underground XLPE-cable (for radial water tightness) shall be properly connected to the screen.

The proposed joint shall have a construction which makes it possible to perform voltage-tests on the outer sheath of the cable. This means that the recovered screen wires and the bonding cable must be sufficiently insulated from surrounding ground with a mechanically stable suitable outer cover that also fully prevents moisture penetration.

The proposed joint shall be used with a cable with fire propagation class B2ca -s1, d1, a1. Fire propagation properties of joint and/or proposal of fire propagation actions shall be submitted for approval by Ellevio.

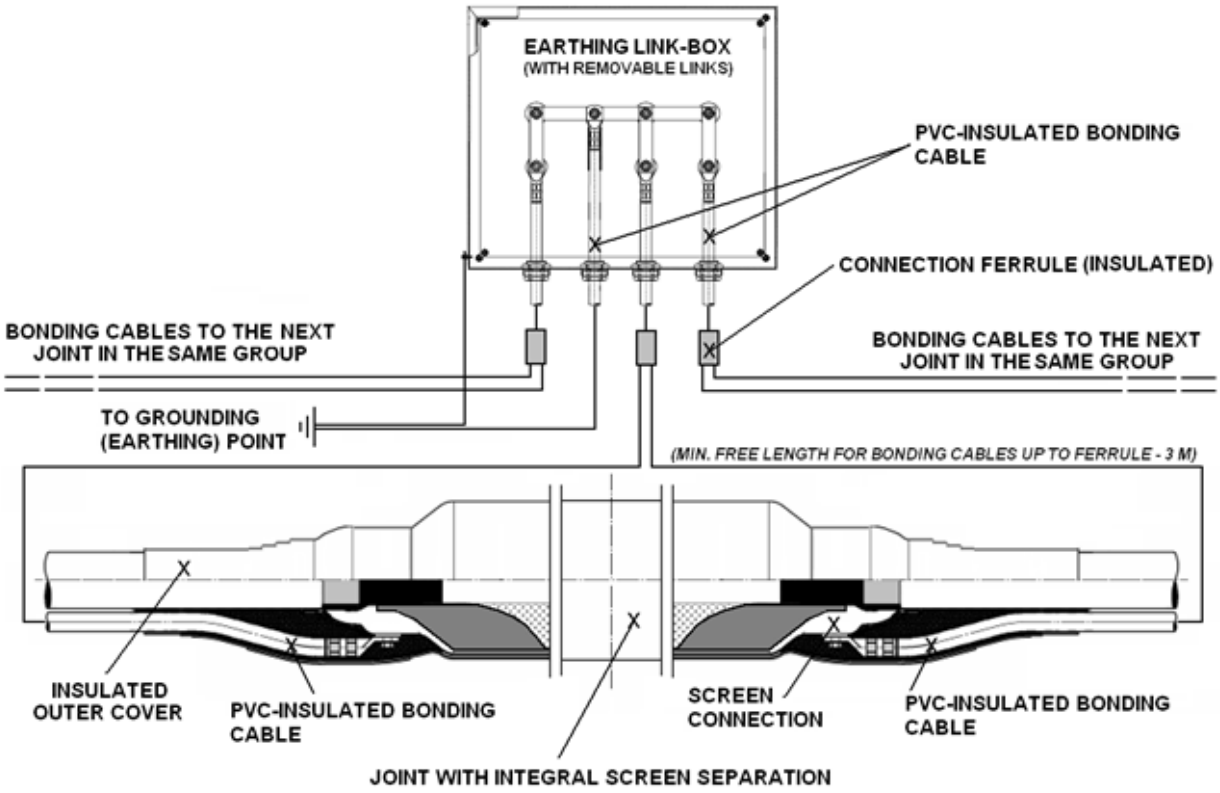


Figure 1 - Principle connection scheme for bonding cables at the transition joints.

4. Type, sample, and routine testing

4.1. General

This specification covers testing of cable system with one or several of the items in this specification:

a) Underground XLPE-cable
b) XLPE-cable for installation in tunnel
c) Outdoor termination
d) GIS termination
e) Straight through joint/ repair joint for underground cable
f) Straight through joint/ repair joint for tunnel cable
g) Transition joint for tunnel installation

All measurements for partial discharges shall be made with instruments with measurement sensitivity for ≤ 5 pC or better for both cables and accessories. The noise level shall be below 2,5 pC.

4.2. Type test

4.2.1. General

Tests shall be performed on a cable length including outdoor termination and joints:

- For voltage level highest system voltage (U_m) of 36 kV, according to SS 4241416 attachment A 10M §3.3.
- For voltage level highest system voltage (U_m) of 245 kV, according to IEC 62067 § 12.
- For all other voltage levels, according to IEC 60840 § 12.4.2.

Type testing may be excluded in the contract if the bidder can present acceptable reports from previously performed type testing. Reports that cover the requested cable-type and accessories shall therefore be enclosed with the tender. Note that the cost for a renewed type test must be separately stated in the tender.

Type test report shall not be older than 10 years.

4.2.2. Electrical tests

Tests shall be performed on a cable length including outdoor termination and joints.

For voltage level highest system voltage (U_m) of 36 kV, according to SS 4241416 attachment A 10M §3.3.

For voltage level highest system voltage (U_m) of 245 kV, according to IEC 62067 § 12.4.

For all other voltage levels, according to IEC 60840 § 12.4.2.

4.2.3. Non-electrical tests

Tests shall be performed on a cable length.

For voltage level highest system voltage (U_m) of 36 kV, according to SS 4241416 attachment A 10M §3.4.

For voltage level highest system voltage (U_m) of 245 kV, according to IEC 62067 § 12.5.

For all other voltage levels, according to IEC 60840 § 12.5.

4.2.4. Test under fire condition (for installation in tunnels)

Tests shall be performed according to EN 130501-6.

Alternatively, tests may be performed according to IEC 62067 § 12.5.14 in applicable parts. However, tests according to EN 130501-6 shall then be performed within a year after first delivery of a cable length.

4.3. Routine tests on cables and accessories

For voltage level highest system voltage (U_m) of 36 kV, electrical tests shall be performed on each manufactured cable length according to SS 4241416 attachment A 10M §3.1. Electrical tests on main insulation of termination(s) and prefabricated joint(s) shall be performed according to applicable parts of SS 4241445 which includes PD-test, AC and DC voltage test, etc.

For voltage level highest system voltage (U_m) of 245 kV, according to IEC 62067 § 9.

For all other voltage levels, routine tests shall be performed according to IEC 60840 § 9.

4.4. Sample test

4.4.1. Tests on cables

The number of sample tests shall follow IEC 60840 § 10.2, however the number shall never be less than two, performed on two delivery lengths taken from start respectively end of XLPE manufacturing.

For voltage level highest system voltage (U_m) of 36 kV, sample tests shall be performed according to SS 4241416 attachment A 10M §3.2, with an addition:

- Tests on one cable length from manufacturing

a) IEC 60502-2 § 19.24 – Water penetration test
b) IEC 60840 § 12.5.15 – Tests on components of cables with longitudinally applied metal tape or foil, bonded to the oversheath

For voltage level highest system voltage (U_m) of 245 kV, according to IEC 62067 § 10.

For all other voltage levels, the sample tests shall be performed according to IEC 60840 § 10 with an addition:
- measurement of diameters, over core respectively over sheath, according to §10.8.
- clearing (transparency) test.
- measurement of copper screen cross section (number of copper wires, diameter, total cross section).

4.4.2. Tests on accessories

Shall be performed according to standard SS 424 14 45 for rated voltage of 30 kV (Um = 36 kV).

For voltage level highest system voltage (U_m) of 245 kV, according to IEC 62067.

Shall be performed according to IEC 60840 § 11 for all other voltages.

4.5. Witness of routine and sample testing

Ellevio shall have the right to witness the routine and sample test of the cable length(s). Notification shall be sent latest two weeks before start of testing. An ITP related to routine tests and sample tests, but not limited to these tests only, shall be enclosed to the notification.

5. Tests after installation

5.1. Tests on the complete installed cable system

a) Phase sequence test. Shall be performed according to an established standard method.

b) DC voltage test of the oversheath, IEC 60840 § 16.2 and IEC 62067 § 16.2 respectively.

For voltage level highest system voltage (U_m) of 36 kV, the following applies:

- MDPE, HDPE sheath: 5 kV DC, 1 min
- HFFR sheath: 2 kV DC, 1 min

Maximum permissible leakage currents at sheath test according to SELC-11:005 (see www.selcable.se), see summary in table below:

Sheath material	Test voltage (kV, DC)	Newly installed cable		Maximum leakage current, recurring revisions
		Recommended maximum leakage current	Maximum leakage current with remark	
PE	5	10 µA/km	1 mA/km	1 mA/km
PVC	2	0,5 mA/km	10 mA/km	50 mA/km
HFFR	2	2 mA/km	50 mA/km	500 mA/km

Table 1 – Maximum leakage current at testing of the outer sheath

c) Cable (system) impedance test.

Positive and negative sequence impedance.

In addition, zero sequence impedance for systems directly earthed with Um ≥ 123 kV.

d) AC-test with normal operation voltage[3] for 24 h, IEC 60840 and IEC 62067 respectively, § 16.3, for rated voltage above 30 kV (Um = 36 kV).

AC-test with normal operation voltage[4] for 12 h, IEC 60840 § 16.3 (in applicable parts) for rated voltage of 30 kV (Um = 36 kV).

[3] Generally performed by Ellevio.

[4] Generally performed by Ellevio

A.Data Sheet - Underground Cable

1. CONSTRUCTION DATA

1.1	**Conductor**		
1.1.1	Type (segmented, compacted etc.)		
1.1.2	Material		
1.1.3	Cross sectional area		mm^2
1.1.4	Nominal diameter		mm
1.1.5	Allowable tensile strength		N/mm2
1.1.6	Number of segments in the conductor		pcs.
1.1.7	Number of wires in each segment		pcs.
1.1.8	Longitudinal water sealing system: - type description (swelling powder/yarn etc.) - test report enclosed with bid (Y/N)		

1.2	**Insulation System**		
1.2.1	**Conductor screen**		
1.2.1.1	Material		
1.2.1.2	Nominal thickness		mm
1.2.1.3	Min. thickness		mm
1.2.2	**XLPE-Insulation**		
1.2.2.1	Material (type of quality etc.)		
1.2.2.2	Nominal insulation thickness		mm
1.2.2.3	Min. insulation thickness at any point around circumference		mm
1.2.2.4	Diameter over insulation		mm
1.2.3	**Insulation screen**		
1.2.3.1	Material		

1.2.3.2	Nominal thickness		mm
1.2.3.3	Min. thickness		mm
1.2.3.4	Type of extruding and vulcanisation process (cond. screen + insulation + insul. screen)		

1.3	**Screen, longitudinal and radial water sealing system**		
1.3.1	Longitudinal water sealing system underneath screen wires: - type description (swelling tapes etc.) - test report enclosed with bid (Y/N)		
1.3.2	Nominal thickness		mm
1.3.3	Screen, material and type		
1.3.4	Screen, nominal wire diameter		mm
1.3.5	Screen, number of wires		pcs.
1.3.6	Pitch angle		deg
1.3.7	Screen, cross-sectional area		mm^2
1.3.8	Longitudinal water sealing layers above screen wires: - type description (swelling tapes etc.) - test report enclosed with bid (Y/N)		
1.3.9	Nominal thickness of longitudinal water sealing layer		mm
1.3.10	Radial water sealing layer: - type description (Al-foil/Cu-foil/laminate/tape) - layer bonded to the outer sheath (Y/N)		
1.3.11	Radial water sealing layer: - nominal thickness of Al/Cu - nominal thickness of entire foil		mm mm
1.3.12	AL-foil/Cu-foil cross-sectional area		mm^2
1.3.13	Diameter (centre of screen and water sealing systems)		mm

1.4	**Outer PE-sheath**		
1.4.1	Material (extruded MDPE or HDPE)		
1.4.2	Material density		kg/dm^3
1.4.3	Nominal thickness		mm

1.4.4	Min. thickness (at any point around circumference)		mm
1.4.5	Colour		

1.5	**Outer conductive layer (for DC-voltage testing of outer sheath)**		
1.5.1	Material		
1.5.2	Nominal thickness		mm
1.5.3	Colour		
1.5.4	Application process	Extruded and bonded to the outer sheath	

1.6	**Reaction to fire Properties**
1.6.1	Class of reaction to fire
1.6.2	Smoke production classification
1.6.3	Flaming droplets/particles classification
1.6.4	Acidity classification

1.7	**Cable dimensions and weight**		
1.7.1	Nominal overall cable diameter		mm
1.7.2	Nominal weight of complete cable		kg/m
1.7.3	Nominal weight of aluminium in complete cable		kg/m
1.7.4	Nominal weight of copper in complete cable		kg/m
1.7.5	Nominal weight of polymer (XLPE, PE) in complete cable		kg/m

2. ELECTRICAL AND THERMAL DATA

Impedance and inductance calculations shall be based on the following:

Phases in trefoil formation, screens solidly earthed in both ends.

2.1	**Electrical and thermal data**		
2.1.1	Max. AC system voltage		kV
2.1.2	Lightning impulse level		kV

2.1.3	Max. conductor DC resistance at 20 °C		Ω/km
2.1.4	Permissible conductor temperature: - at max. continuous current (≥ 90 °C) - at short circuit		 °C °C
2.1.5	Max. conductor AC resistance at: - 90 °C - 65 °C		 Ω/km Ω/km
2.1.6	Screen earthing system		
2.1.7	Nominal capacitance of cable		µF/km
2.1.8	Inductance of cable		mH/km
2.1.9	Positive and negative sequence impedance (R+jX) at 50 Hz and continuous conductor temperature 65 °C		Ω/km
2.1.10	Zero sequence impedance (R+jX) at 50 Hz and continuous conductor temperature 65 °C		Ω/km
2.1.11	Positive and negative sequence impedance (R+jX) at 50 Hz and continuous conductor temperature 90 °C		Ω/km
2.1.12	Zero sequence impedance (R+jX) at 50 Hz and continuous conductor temperature 90 °C		Ω/km
2.1.13	Nominal electric field strength at Um - at insulation screen - at conductor screen		 kV/mm kV/mm
2.1.14	Permissible short circuit current in copper wire screen at continuous current capacity (90 °C initial conductor temperature): - during 0.5 s - during 1.0 s		 kA kA

3. DOCUMENTATION, SERVICE EXPERIENCE ETC.

3.1	**Drawings and documents <u>to be enclosed</u>**	
3.1.1	Sectional drawing No.	
3.1.2	Type test reports No. (incl. documentation covering longitudinal water sealing systems)	
3.1.3	Reference list No.	

4. CABLE HANDLING AND DRUM DATA

4.1	**Cable handling data**		
4.1.1	Minimum cable bending radius: - at laying - when installed (single bending)		 m m
4.1.2	Maximum pulling force in conductor		kN
	Maximum pulling force with pulling stock applied on the outside of cable		kN

4.2	**Drum data (delivery lengths see separate documentation !)**		
4.2.1	Cable length on drum		m
4.2.2	Type of drums (wood/steel)		
4.2.3	Drum width		mm
4.2.4	Outer drum diameter		mm
4.2.5	Barrel diameter		mm
4.2.6	Spindle hole diameter		mm
4.2.7	Total weight (cable and drum)		kg

B.Data Sheet - Tunnel Cable

1. CONSTRUCTION DATA

1.1	**Conductor**		
1.1.1	Type (round, compacted etc.)		
1.1.2	Material		
1.1.3	Cross sectional area		mm^2
1.1.4	Nominal diameter		mm
1.1.5	Allowable tensile strength		N/mm2
1.1.6	Number of segments in the conductor		pcs.
1.1.7	Number of wires in the conductor		pcs.
1.1.8	Longitudinal water sealing system: - type description (swelling powder/yarn etc.) - test report enclosed with bid (Y/N)		

1.2	**Insulation System**		
1.2.1	**Conductor screen**		
1.2.1.1	Material		
1.2.1.2	Nominal thickness		mm
1.2.1.3	Min. thickness		mm
1.2.2	**XLPE-Insulation**		
1.2.2.1	Material (type of quality etc.)		
1.2.2.2	Nominal insulation thickness		mm
1.2.2.3	Min. insulation thickness at any point around circumference		mm
1.2.2.4	Diameter over insulation		mm
1.2.3	**Insulation screen**		
1.2.3.1	Material		

1.2.3.2	Nominal thickness		mm
1.2.3.3	Min. thickness		mm
1.2.3.4	Type of extruding and vulcanisation process (cond. screen + insulation + insul. screen)		

1.3	**Screen, longitudinal and radial water sealing system**		
1.3.1	Longitudinal water sealing system underneath screen wires: - type description (swelling tapes etc.) - test report enclosed with bid (Y/N)		
1.3.2	Nominal thickness		mm
1.3.3	Screen, material and type		
1.3.4	Screen, nominal wire diameter		mm
1.3.5	Screen, number of wires		pcs.
1.3.6	Pitch angle		deg
1.3.7	Screen, cross-sectional area		mm^2
1.3.8	Longitudinal water sealing layers above screen wires: - type description (swelling tapes etc.) - test report enclosed with bid (Y/N)		
1.3.9	Nominal thickness of longitudinal water sealing layer		mm
1.3.10	Radial water sealing layer: - type description (Al-foil/Cu-foil/laminate/tape) - layer bonded to the outer sheath (Y/N)		
1.3.11	Radial water sealing layer: - nominal thickness of Al/Cu - nominal thickness of entire foil		mm mm
1.3.12	AL-foil/Cu-foil cross-sectional area		mm^2
1.3.13	Diameter (centre of screen and water sealing systems)		mm

1.4	**Outer PE-sheath**		
1.4.1	Material (extruded HFFR)		
1.4.2	Material density		kg/dm^3
1.4.3	Nominal thickness		mm

1.4.4	Min. thickness (at any point around circumference)		mm
1.4.5	Colour		

1.5	**Outer conductive layer (for DC-voltage testing of outer sheath)**		
1.5.1	Material		
1.5.2	Nominal thickness		mm
1.5.3	Colour		
1.5.4	Application process	Extruded and bonded to the outer sheath	

1.6	**Reaction to fire Properties**
1.6.1	Class of reaction to fire
1.6.2	Smoke production classification
1.6.3	Flaming droplets/particles classification
1.6.4	Acidity classification

1.7	**Cable dimensions and weight**		
1.7.1	Nominal overall cable diameter		mm
1.7.2	Nominal weight of complete cable		kg/m
1.7.3	Nominal weight of aluminium in complete cable		kg/m
1.7.4	Nominal weight of copper in complete cable		kg/m
1.7.5	Nominal weight of polymer (XLPE, HFFR) in complete cable		kg/m

2. ELECTRICAL AND THERMAL DATA

Impedance and inductance calculations shall be based on the following:

Phases in trefoil formation, screens solidly earthed in both ends.

2.1	**Electrical and thermal data**		
2.1.1	Max. AC system voltage		kV
2.1.2	Lightning impulse level		kV

2.1.3	Max. conductor DC resistance at 20 °C		Ω/km
2.1.4	Permissible conductor temperature: - at max. continuous current (≥ 90 °C) - at short circuit		 °C °C
2.1.5	Max. conductor AC resistance at: - 90 °C - 65 °C		 Ω/km Ω/km
2.1.6	Screen earthing system		
2.1.7	Nominal capacitance of cable		µF/km
2.1.8	Inductance of cable		mH/km
2.1.9	Positive and negative sequence impedance (R+jX) at 50 Hz and continuous conductor temperature 65 °C		Ω/km
2.1.10	Zero sequence impedance (R+jX) at 50 Hz and continuous conductor temperature 65 °C		Ω/km
2.1.11	Positive and negative sequence impedance (R+jX) at 50 Hz and continuous conductor temperature 90 °C		Ω/km
2.1.12	Zero sequence impedance (R+jX) at 50 Hz and continuous conductor temperature 90 °C		Ω/km
2.1.13	Nominal electric field strength at Um - at insulation screen - at conductor screen		 kV/mm kV/mm
2.1.14	Permissible short circuit current in copper wire screen at continuous current capacity (90 °C initial conductor temperature): - during 0.5 s - during 1.0 s		 kA kA

3. DOCUMENTATION, SERVICE EXPERIENCE ETC.

3.1	**Drawings and documents <u>to be enclosed</u>**	
3.1.1	Sectional drawing No.	
3.1.2	Type test reports No. (incl. documentation covering longitudinal water sealing systems)	
3.1.3	Reference list No.	

4. CABLE HANDLING AND DRUM DATA

4.1	**Cable handling data**		
4.1.1	Minimum cable bending radius: - at laying - when installed (single bending)		 m m
4.1.2	Maximum pulling force in conductor		kN
4.1.3	Maximum pulling force with pulling stock applied on the outside of cable		kN

4.2	**Drum data (delivery lengths see separate documentation !)**		
4.2.1	Cable length on drum		m
4.2.2	Type of drums (wood/steel)		
4.2.3	Drum width		mm
4.2.4	Outer drum diameter		mm
4.2.5	Barrel diameter		mm
4.2.6	Spindle hole diameter		mm
4.2.7	Total weight (cable and drum)		kg

C.Data Sheet - Outdoor Termination

1. CONSTRUCTION DATA

1.1	Type of termination (fluid filled, dry type etc.)	
1.2	Type designation and manufacturer	
1.3	Type of system for insulation of cable screen from earth at the termination	
1.4	Type of insulator	
1.5	Type of connection on termination for the screen wire bundle	
1.6	Description of connection of the metallic Al-laminate to the screen wires	
1.7	Colour of insulator body	

2. ELECTRICAL & CLIMATIC MAIN DATA

2.1	Maximum operating AC voltage		kV
2.2	Lightning impulse withstand voltage		kV
2.3	Continuous and overload current capacity		A
2.4	Creepage distance: - total - protected		 mm mm
2.5	Mechanical loads on the top bolt: - in 90° angle to the termination - axially		 N N
2.6	Top bolt: - material - surface treatment		
2.7	Top bolt dimensions: - ∅ (diameter) - length (for jumper-wire clamp)		 mm mm
2.8	Short circuit withstand for the bonding cable to screen connection at the termination		kA
2.9	Max. installation inclination		Degrees
2.10	Weight of complete termination (including filling compound)		kg
2.11	Nominal weight of aluminium in complete termination		kg

2.12	Nominal weight of copper in complete termination		kg
2.13	Nominal weight of polymer in complete termination		kg
2.14	Nominal weight of other main material in complete termination		kg
2.15	Rated ambient temperature conditions -min -max		 °C °C
2.16	Rated wind conditions -max		m/s

3. DOCUMENTATION, SERVICE EXPERIENCE ETC.

3.1	Enclosed reference list	
3.2	Enclosed sectional drawing	
3.3	Enclosed type test report	
3.4	Approximately number of 123 kV outdoor terr of act - in commercial c - first year of commercial c	

D.Data Sheet - GIS Termination

1. CONSTRUCTION DATA

1.1	Type of GIS-termination		
1.2	Type designation and manufacturer of GIS-termination		
1.3	Type and description of main-insulator body (epoxy etc.)		
1.4	Method for connection conductor-top bolt (welding, press sleeve, shear-off bolt connection etc.)		
1.5	Method for electric contact between top bolt and top terminal (silver plated electric contacts etc.)		
1.6	Material of stress cone (EPDM-rubber, Silicon e-rubber etc.)		
1.7	Minimum SF6 gas-pressure withstand (within the metallic enclosure, ≥ 0,85 MPa)		MPa (abs.)
1.8	Type of system for insulation of cable screen from earth at the termination.		
1.9	Type of connection on termination of the screen wire bundle and a 150 mm^2 bonding cable to be brought to an earthing point		
1.10	Description of connection of the metallic laminate (radial water sealing) to the screen wires within termination		
1.11	Method for removal of the outer conductive layer on the XLPE-cable at the termination		
1.12	Description and requirement for fastening/ clamping of XLPE-cable beneath the termination body (number of clamps, distance between clamps etc.)		
1.13	Weight of complete termination		kg
1.14	Nominal weight of aluminium in complete termination		kg
1.15	Nominal weight of copper in complete termination		kg
1.16	Nominal weight of polymer in complete termination		kg
1.17	Nominal weight of other main material in complete termination		kg

1.18	Dimensions of GIS-termination complies with IEC 62271-209/2007 (Y/N)		
1.19	Termination capable to withstand vacuum conditions occurring during the gas filling of metallic switchgear enclosure (Y/N)		
1.20	Description of considerations (assembly, handling, test voltage limits etc.) to be taken in case of a pre-installation of the main-insulator (epoxy etc.) during GIS-manufacturing, see IEC 62271-209 § 8.1		

2. ELECTRICAL MAIN DATA

2.1	Maximum operating AC voltage		kV
2.2	Lightning impulse withstand voltage		kV
2.3	Continuous and overload current capacity		A
2.8	Short circuit withstand for the bonding cable to screen connection at the termination		kA
2.10	Weight of complete termination (including filling compound)		kg
2.11	Nominal weight of aluminium in complete termination		kg
2.12	Nominal weight of copper in complete termination		kg
2.13	Nominal weight of polymer in complete termination		kg
2.14	Nominal weight of other main material in complete termination		kg

3. DOCUMENTATION, SERVICE EXPERIENCE ETC.

3.1	Enclosed reference list No./Nos.	
3.2	Enclosed sectional drawing No./Nos.	
3.3	Enclosed type test report No./Nos.	
3.4	Approximately number of 123 kV outdoor terminations of actual type: - sold - in commercial operation - first year of commercial operation	

E. Data Sheet - Underground Cable Joint

1. CONSTRUCTION DATA

1.1	Type of straight through/repair joint (e.g. prefabricated rubber type etc)		
1.2	Type designation and manufacturer of joint		
1.3	Continuous current capacity	Same as for the cable !	A
1.4	Maximum permissible conductor temperature in the joint: - at max. permissible continuous current - at short circuit		 °C °C
1.5	Method and material for conductor jointing (welding, press sleeve, bolt connection, sleeve with electric contacts etc.)		
1.6	Tensile load strength of the conductor joint		kN
1.7	Type and description of main insulation body (one-piece, multi piece, specific technical characteristics etc.)		
1.8	Material of main insulation body (EPDM-rubber, silicone-rubber, XLPE etc.)		
1.9	Method and material for recovering and connection of the copper wire screen at both ends of the joint		
1.10	Description of electric connection of the metallic laminate/tape (radial water sealing layer) to the screen wires within joint		
1.11	Method and material for connection of bonding cable to the screen wires		
1.12	One-phase short circuit current withstand for screen and bonding cable connection	Same or higher as for the cable screen !	kA
1.13	Description of protective outer cover (method, material etc.)		
1.14	Method and material for connection of the conductive layers (on cable outer covering) on both sides of the joint		

2. ELECTRICAL AND THERMAL DATA

2.1	Maximum operating/system AC voltage		kV
2.2	Lightning impulse withstand voltage		kV

2.3	Lightning impulse levels for the integrated screen separation (IEC 60840) - Between parts - Each part to earth		 kV kV
2.3	Continuous and overload current capacity		A
2.4	Maximum permissible conductor temperature in the joint: - at max. permissible continuous current - at short circuit		 °C °C
2.5	One-phase short circuit current withstand for the straight through screen connection - during 0.5 s - during 1.0 s		 kA kA

3. DOCUMENTATION, SERVICE EXPERIENCE ETC.

3.1	Tests of outer protection of joint performed according to “IEC 60840” (Y/N)	
3.2	Sectional drawing Nos.	
3.3	Type test reports Nos.	
3.4	Reference list No.	
3.5	Approximately number of 123 kV joints of actual type: - sold - in commercial operation - first year of commercial operation	

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F. Data Sheet - Tunnel Cable Joint

1. CONSTRUCTION DATA

1.1	Type of straight through/repair joint (e.g. prefabricated rubber type etc)		
1.2	Type designation and manufacturer of joint		
1.3	Continuous current capacity	Same as for the cable !	A
1.4	Maximum permissible conductor temperature in the joint: - at max. permissible continuous current - at short circuit		 °C °C
1.5	Method and material for conductor jointing (welding, press sleeve, bolt connection, sleeve with electric contacts etc.)		
1.6	Tensile load strength of the conductor joint		kN
1.7	Type and description of main insulation body (one-piece, multi piece, specific technical characteristics etc.)		
1.8	Material of main insulation body (EPDM-rubber, silicone-rubber, XLPE etc.)		
1.9	Method and material for recovering and connection of the copper wire screen at both ends of the joint		
1.10	Insulated flexible bonding cable connected to the screen wires - Cross-sectional area - PVC/HFFR-insulation (Y/N)		 mm²
1.11	Description of electric connection of the metallic laminate/tape (radial water sealing layer) to the screen wires within joint		
1.12	Method and material for connection of bonding cable to the screen wires		
1.13	One-phase short circuit current withstand for screen and bonding cable connection	Same or higher as for the cable screen !	kA
1.14	Description of and material used for the protective outer cover (heat-shrinkable tubes, adhesive tapes, metallic casing, glass-fibre shells etc.)		
1.15	Method and material for the connection of the conductive layers (on the cable outer covering) on both sides of the joint		
1.16	Method and material for matching the fire propagation class of the cable.		

2. ELECTRICAL AND THERMAL DATA

2.1	Maximum operating/system AC voltage		kV
2.2	Lightning impulse withstand voltage		kV
2.3	Lightning impulse levels for the integrated screen separation, if applicable (IEC 60840) - Between parts - Each part to earth		 kV kV
2.3	Continuous and overload current capacity		A
2.4	Maximum permissible conductor temperature in the joint: - at max. permissible continuous current - at short circuit		 °C °C
2.5	One-phase short circuit current withstand for the straight through screen connection - during 0.5 s - during 1.0 s		 kA kA

3. DOCUMENTATION, SERVICE EXPERIENCE ETC.

3.1	Tests of outer protection of joint performed according to “IEC 60840” (Y/N)	
3.2	Sectional drawing Nos.	
3.3	Type test reports Nos.	
3.4	Reference list No.	
3.5	Approximately number of 123 kV joints of actual type: - sold - in commercial operation - first year of commercial operation	

G. Data Sheet - Transition Joint

1. CONSTRUCTION DATA

1.1	Type of transition joint (“Prefabricated rubber type”)		
1.2	Type designation and manufacturer of repair joint		
1.3	Continuous current capacity	Same as for the cable !	A
1.4	Maximum permissible conductor temperature in the joint: - at max. permissible continuous current - at short circuit		 °C °C
1.6	Method and material for conductor jointing (welding, press sleeve, bolt connection, sleeve with electric contacts etc.)		
1.6	Tensile load strength of the conductor joint		kN
1.7	Type and description of main insulation body (one-piece, multi piece, specific technical characteristics etc.)		
1.8	Material of main insulation body (EPDM-rubber, silicone-rubber etc.)		
1.9	Method and material for the sectionalizing parts of the joint		
1.10	Insulated flexible bonding cable connected to the screen wires - Cross-sectional area - PVC/HFFR-insulation (Y/N)		mm²
1.11	Description of electric connection of the metallic Al-laminate/tape (radial water sealing layer) to the screen wires within joint		
1.12	Method and material for connection of bonding cable to the screen wires		
	One-phase short circuit current withstand for screen and bonding cable connection	Same or higher as for the cable screen !	kA
1.14	Description of and material used for the protective outer cover (heat-shrinkable tubes, adhesive tapes, metallic casing, glass-fibre shells etc.)		
1.15	Method and material for the connection of the conductive layers (on the cable outer covering) on both sides of the joint.		

1.16	Construction makes it possible to perform regular voltage-tests on the outer sheath of the cable (Y/N)		

2. ELECTRICAL AND THERMAL DATA

2.1	Maximum operating/system AC voltage		kV
2.2	Lightning impulse withstand voltage		kV
2.3	Lightning impulse levels for the integrated screen separation, if applicable (IEC 60840) - Between parts - Each part to earth		 kV kV
2.3	Continuous and overload current capacity		A
2.4	Maximum permissible conductor temperature in the joint: - at max. permissible continuous current - at short circuit		 °C °C
2.5	One-phase short circuit current withstand for the straight through screen connection - during 0.5 s - during 1.0 s		 kA kA

3. DOCUMENTATION, SERVICE EXPERIENCE ETC.

3.1	Tests of outer protection of joint performed according to “IEC 60840” (Y/N)	
3.2	Sectional drawing Nos.	
3.3	Type test reports Nos.	
3.4	Reference list No.	
3.5	Approximately number of 123 kV joints of actual type: - sold - in commercial operation - first year of commercial operation	

6. Omfattning (Ellevio internal)

Denna instruktion är en teknisk specifikation som omfattar kabelsystem för spänningsnivåerna 36 – 240 kV.

7. Giltighet och revision (Ellevio internal)

Instruktionen är godkänd av ordföranden för Nätkommittén, och granskas och revideras vid behov.

8. Syfte (Ellevio internal)

Syftet med instruktionen är att vara materialspecifikation för FFU vid upphandling av kabelsystem.