

# Technical Specification

## Accessories for

### XLPE-insulated

## High Voltage Cables

This technical specification is valid for the business unit E.ON Sweden of the market unit E.ON Nordic.

With this specification, technical determinations were made beyond existing publications.

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## 1 Area of Application

This technical specification is valid for accessories used on XLPE insulated high voltage cables

- Single core: AXLJ 1 x 1 x ..... AXCLJ 1 x 1 x .....

Suffixes: F = bonded insulation screen

RE = solid conductor

RM = stranded compacted conductor

LT = longitudinal water tightness

TT = longitudinal and radial water tightness

F2 = flame retardant according to IEC 60332-1

F4 = flame retardant according to IEC 60332-3 A, B, C, D

with rated voltages  $U_0/U (U_m)$  of 26/45 (52), 38/66 (72,5), 76/132 (145) , 87/150 (170)kV

## 2 General Requirements

### 2.1 Standards, Regulations and Ordinances

The accessories must comply with the requirements of the standards and regulations listed in the appendix A1, as far as no divergent requirements are made in this specification.

Generally all standards, rules, regulations, provisions and laws applying in the country of the client have to be followed, even if they are not specifically required according to this specification.

The business and communication language is Swedish or English

### 2.2 Manufacturing Facilities

The relocation to another manufacturing facility for a running order is only admissible in case of mutual consent.

### 3 Further Requirements

#### 3.1 Construction of accessories

##### 3.1.1 Type of accessories

The accessories should be prefabricated and pre-tested before delivery. Only push-on stress-cones are allowed. Screw/bolt and nuts should be of stainless steel.

##### 3.1.2 Connection of waterproof shield and cable screen.

If the waterproof shield of metal in the cable not electrical is connected to the screen of the cable must there be a metallic connection between the waterproof shield and the cable screen both in the joint and termination.

#### 3.2 Terminations

Terminations for open air, Transformers and terminations for gas insulated switchgears should be made so it is possible to make a test of the cable screen.

Terminations for open air could be made either of porcelain or composite.

The connection tap should have a length of 125 mm either made of aluminium or tinned copper.

The diameter of the connection tap should be as shown in the table below.

Current Max A	Al Round mm	Tinned Cu Round mm
1 250	30	30
1 600	60	30
2 500	60	40

#### 3.3 Joints

The joint shall have at least the same mechanical strength as the cable.

The joint shall have the same protection against water penetrating as the cable. Shield for water protection and the cable screen must be insulated from earth so it is possible to make a test of the cable screen.

### 4 Approval and Testing

The conditions for the application of the product specified in this specification are the presence of a manufacturer-dependent technical product approval and the existence of a supplier inspection system.

The technical product approval may be given, if the manufacturer/supplier – at his own cost – delivers proof of the product characteristics required by the user and ensured by

the manufacturer or the supplier by means of a sample, if he delivers proof of the aptitude for operational use by a corresponding test run or by references, if he delivers the required test certificates and if he fulfils possible requirements of the user.

The realisation of the approval inspection, or the sampling, can also be performed by an inspector named by the users.

The user is entitled to inspect or to have inspected the product characteristics compliance as well as quality parameters.

Any change to a product approved on basis of this specification is subject to new approval or renewed negotiation. This is also valid for the manufacturing process and the used materials. Changes during a standing order are only allowed by mutual consent. Precondition for the consent and the positive assessment by the user is the proof of an equivalent or higher quality, or of improved benefit, respectively, e. g. in the scope of further technical development.

In certain, justified cases, possible subcontractors have to be disclosed upon the user's request.

If the contractor announces new developments, and if these cannot be realised within an agreed deadline, the mandate may cancel the order.

#### **4.1 Management Quality, Environmental and Health & Safety Control**

The manufacturer has to provide proof of an integrated quality management system according to the standard series EN ISO 9001, which guarantees a continuous assurance of the unchanging product properties as requested by the user and agreed upon by the manufacturer.

It is recommended to establish a certified environmental management system for the production sites according to the standard series EN ISO 14001.

It is recommended to check how far the health and safety issues of the production sites fulfil the requirements of the occupational health and safety assessment series (OHSAS 18001).

#### **4.2 Inspection and Testing**

The buyer reserves the right to inspect the ordered accessories himself or by appointed persons with respect to the compliance to all technical requirements and/or to accept them in the factory.

The acceptance of the accessories ordered depends on the result of the inspections and on the content of the documents stated in paragraph 5 of this specification.

The accessories must come from the current production.

Stock goods older than 18 months are only accepted in mutual consent.

##### **4.2.1 Partial Discharge Test (PD)**

The background noise level of the PD measuring equipment, including the specimen, must be less 1 pC with the test voltage disconnected. Individual, clearly distinctive noise pulses are exempt from this.

The test voltage shall be raised gradually to and held at 1,75 U<sub>0</sub> for 10 s and then slowly reduced to 1,5 U<sub>0</sub>.

The magnitude of the discharge at 1,5 U<sub>0</sub> shall not exceed 5 pC.

## 5 Documentation

The delivery note, or an appendix in form of an overall list accompanying the delivery note, must include the following information apart from the standard indications:

- Number of the accessories
- Routine tests report of each delivered accessorise
- Sample tests reports of each production lot of delivered accessories types

On demand of the user, the manufacturer / supplier must present the following:

- A valid QA-certificate for the manufacturing facility according to EN ISO 9001. The entity of certification must be accredited a member entity of the EAC.
- Type test reports
- The declaration of conformity of the manufacturer for additional requirements from this specification.

All kind of test reports are archived by the manufacturer for at least ten years.

All record, documents and descriptions as well as indication and type signs shall be executed in Swedish or English. Translations of other languages have to be handed over together with original text.

## 6 Packing and Transport

- On the accessories weatherproof and well legible labels shall be fixed, containing the information as follows:
  - accessories manufacturer
  - complete accessories identification according to applied standard
  - - overall weight

Protection films or other packing materials are admissible.

## 7 Disposal

With the delivery of the accessories, the manufacturer/supplier undertakes to indicate the possibilities for disposal/recycling based upon the corresponding laws, regulations and ordinances of Sweden.

## 8 Appendix

### 8.1 A-1: Applicable Standards

IEC 60840	Power cables with extruded insulation and their accessories for rated voltages above 30 kV ( $U_m=36$ kV) up to 150 kV ( $U_m=170$ kV)-Test methods and requirements.
SS 424 14 17	Power cables-HD 632 S1 XLPE-insulated cables and their accessories for rated voltage above 36 kV( $U_m=42$ kV) up to ( $U_m=170$ kV), part 3 section M, part 4 section M and part 5 section M. se bilaga A
HD 605 S1	Electric cables – Additional test methods
EN 60228	Conductors of Insulated Cables
EN 60811	Insulation and sheathing materials of electric cables - Common test methods –
IEC 60332-1	Test on electric and optical fiber cables under fire conditions.
IEC 60332-3	Test on electrical cables under fire conditions.