

## Underground networks MV and LV - Certification of jointers

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### ABSTRACT

The reliability of electrical networks and the proper functioning of accessories depend on many parameters ranging from the correct product specification to the quality of installation of the accessories.

Indeed, 49% of the failures observed on the medium and low voltage underground network result from poor implementation.

In order to consolidate the efficiency of the training of fitters and to guarantee the reliability of underground networks, Enedis has set up a system of certification of fitters by COFRAC accredited organizations or equivalent according to the NF EN ISO/IEC 17-024 standard on the certification of persons.

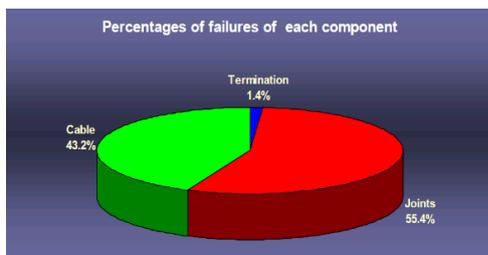
### 1/ INTRODUCTION:

Reliability of the electricity networks:

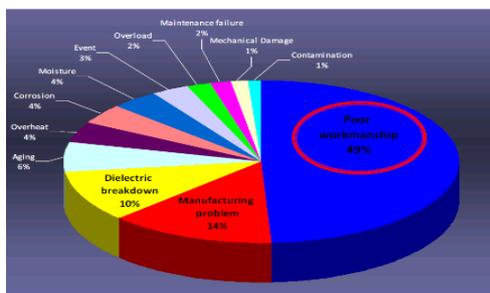
The correct working of accessories is dependent upon many issues from the correct specification of the product through to competent installation.

For example:

Failures on Medium Voltage Network



Origins of these failures :



Source: A history of medium & high voltage cables – Georgia Tech & Neetrac

There are:

#### ➤ 5 main sources of failures:

- Poor installation (installation instruction with mistakes/unclear, instruction not followed, lack of training, incompetent jointers)
- Poor manufacturing (quality problems, poor materials, parts with defects)
- Premature ageing (life conditions neglected or more severe than expected, temperature, pressure, humidity, pollution)
- Inappropriate selection of accessories (wrong voltage, excessive electrical stress\*, wrong dimensions)
- Conditions of use badly estimated (lack of specification from customer)

#### ➤ 7 Typical modes of failures due to :

- the partial discharge
- the insulating materials puncture /breakdown
- the breakdown along the creepage /leakage distance/path
- the surface tracking
- the connector overheating
- to the water/humidity ingress
- to the screen short circuits

**49% of these failure result from poor installation:**

Examples:

#### Heat shrink joint

Cross-section cut through a heat-shrink joint.

There is a large void at the 7 o'clock position where the joint hasn't shrink correctly.

Caused by under-heating of this area during installation.

Typical defect as the area has a difficult access for the torch. Electrical stress in the void will result in partial discharges that will probably lead to breakdown of the joint.



Source: Sicame