



EUROPEAN WORK ON LV ABC ACCESSORIES STANDARD

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(see also § acknowledgments to TC20-WG11)



ABSTRACT

Cenelec TC20/WG11 elaborated an Harmonisation Document HD 626 about the Low Voltage Insulated Overhead lines (LV ABC) used in Europe. This document covers the 3 main technologies used for this application: bare neutral messenger system insulated neutral messenger system & self supporting system. A sub group "SG ABC Accessories" has been nominated to review all existing National standards in order to issue a European Standard on the accessories (clamps and connectors) used in LV ABC.

Starting in September 1996, the group is now ready to circulate the draft under the Enquiry stage to the National committees. This draft, registered under prEN 50 483 Part 1 to 6, contains the main requirements requested by the Utilities and could be the reference for demanding countries willing to use LV ABC worldwide. The paper will present the content of this standard detailing the main selected type tests.

INTRODUCTION

When the first insulated conductors appeared in the 1950's, the insulation layer was rubber (neoprene) and the conductor was copper (for example in France). The connectors were not reinsulated and mechanical bolted connectors were the most common items. Soon utilities discovered that conductors with insulation were safe for linemen and customers, however, the insulation material was not resistant enough to climatic conditions (neoprene deteriorated) and failures appeared due to the poor quality of the insulation.

In the 1960's, Utilities (EdF Electricité de France), changed to PVC insulation and aluminium conductors. Although the insulation problems seemed to be solved, connector failures appeared due to the aluminium oxide layer formed from exposure to the air and the knife stripping process. This operation damaged the strands and started the wire necking process and was amplified by the vibration of the conductor.

During this time, crimped connectors were used with heat shrinkable cable accessories but it became apparent that PVC was not resistant to the temperature variations and cracked due to the tensile load on the neutral messenger.

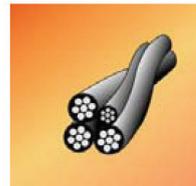
In order to eliminate the inconveniences above, Utilities, in association with Aluminium & Cable producers and connector manufacturers, investigated three main issues:

- 1) Find a more resistant insulation layer
- 2) Improve contact and installation reliability
- 3) Connect customers under voltage and in safe conditions.

CABLE DESIGN

1. XLPE cross linked polyethylene was chosen in the 70's (France in 1977) and is now the most well known insulation material used in LV insulated overhead lines due to its high environmental and mechanical resistance.
2. Three main techniques for low voltage insulated overhead distribution lines were identified in Europe as LV ABC (Low Voltage Aerial Bundled Conductors) systems:
 - Insulated Neutral messenger
 - Bare Neutral Messenger
 - Self supporting

BUNDLED CABLE WITH AN INSULATED NEUTRAL MESSENGER



BUNDLED CABLE WITH 4 SELF SUPPORTING CONDUCTORS



BUNDLED CABLE WITH A BARE NEUTRAL MESSENGER



3. In addition to the above, several utilities' specifications and standards appeared. In the 90's, Cenelec TC 20 consolidated all existing ABC under an Harmonization Document reference HD 626 and requested to create a working group for ABC Accessories. TC20/WG11 SG ABC Accessories was born in September 1996.

SUCCESSIVE WORKING STEPS

The elaboration of an European standard for ABC accessories has been defined according to the following steps:

Scope of the work

This standard applies to overhead line fittings for anchoring, supporting and connecting Aerial Bundled Cables (ABC) of rated voltage $U_o/U(U_m)$: 0,6/1(1,2) kV. The objective is to provide a method of testing the suitability of accessories when used under normal operating conditions with low voltage aerial bundled cables (ABC) complying with HD626.

This scope was based on Vilamoura notifications.