

Compact paperless joint for transition from LPFF to XLPE cables

Pietro **CORSARO**; Brugg Cables, Brugg, Switzerland, pietro.corsaro@brugg.com

ABSTRACT

This paper is about a new solution for transition joint between LLPF and XLPE cables. A new concept has been introduced allowing the use of single-piece pre-moulded silicone joint body for LLPF cables. Internal tests and FEM computer simulations have been carried out with satisfactory results and will end out in a type test in agreement with Cigré recommendation.

The presented innovative solution will have as main positive consequences the possibility to use factory tested joints and to require reduced installation crews and reduced installation time.

KEYWORDS

Transition joint, paperless, LPFF cables, XLPE cables, single piece pre-moulded silicone joint, factory tested.

INTRODUCTION

Network of underground low pressure fluid filled (LPFF) cables is under continuous transformation towards a full solid insulation cables, typically XLPE. There are multiple drivers of such transformation, e.g. aged cables, damage from third parties without spare cable of the same design, ampacity upgrade and many others. For such reason, replacement of LPFF cables may have place mainly in two different ways: either the whole circuit is replaced or only one or few spans of LPFF cables are replaced with XLPE cables with same or larger cross-section.

Last approach requires the use of so-called transition joints. Such joints looks typically almost like a back-to-back termination, are quite massive, long and requires jointing skills on both technology paper and XLPE and it is a matter of fact that such skills, for LPFF cables, are less and less easily available on the market.

This paper reports about the concept, the design, FEM simulation and development test of a new compact paperless transition joint.

Such solution has several advantages, the main being the fact that no specific skill for LPFF cables is required: no more hand paper lapping or pencil profiling is required. Such features dramatically reduce time of installation when compared to standard transition joints. The joint is extremely compact and comparable in size with a standard joint for XLPE cables. Such characteristic is extremely important mainly when has to be installed in an urban environment where space constrains for joint bay are extremely demanding. In addition such joint can be factory tested, therefore for quality of installation and reliability of the solution is comparable with joints for XLPE cables.

DEVELOPMENT OF PAPERLESS TRANSITION JOINT

State of the art

Almost all technical solutions provided by accessories manufacturer are based on back-to-back solution, i.e. coupling together two terminations, one for XLPE cable one for LPFF cable, in an enclosing chamber filled with gas, typically SF₆, or other insulating fluids. Some examples are reported in figg.1, 2 [1]. Others may imply the use of casted thermoset barrier, fig. 3 [1], but always with the back-to-back approach.

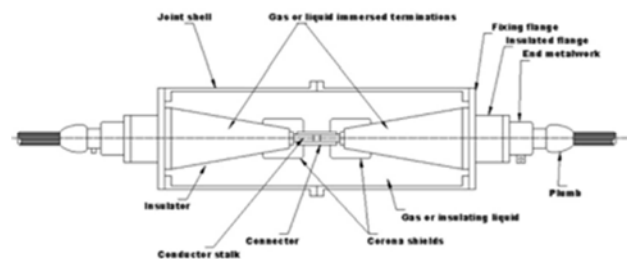


Fig. 1: Transition joint with two insulators and metallic housing[1]

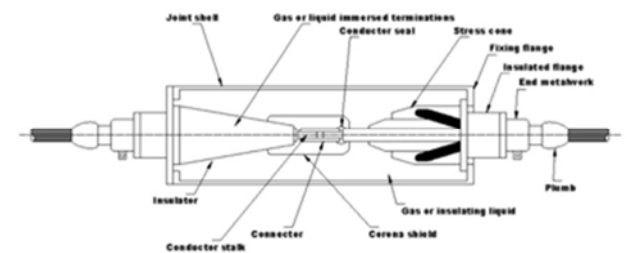


Fig. 2: Transition joint with one insulators and metallic housing [1]

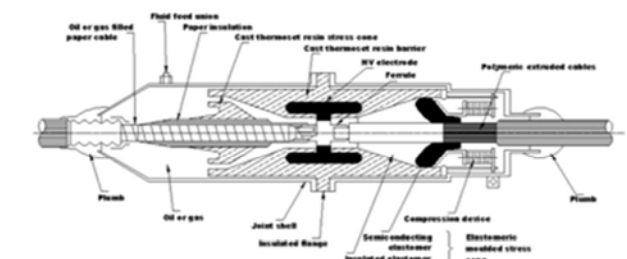


Fig. 3: Transition joint with resin barrier and metallic housing type [1]