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New generation of GIL. Characteristics and application
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Abstract:

A second generation of GIL technology is now emerging.

This paper describes its main performances and features. The qualification process and manufacturing process are presented.

This technology comes out of a domain of application limited only to connections purely internal to metal enclosed substations to be applied to cases of short sections of lines with high transmission capacity.

An actual example of an application where a 420kV transmission line is being constructed using GIL technology is also presented.

1- Introduction

The first generation of GIL has been developed with purely GIS technology. It has been directly used inside or in relation with gas insulated substations. The total world wide experience, all manufacturers and voltage cumulated from 72kV to 550kV, is estimated to be more than 300km single phase circuit.

A second generation of GIL technology is now emerging.

Application to transmission networks from 145kV to 550kV is now possible with the best economical performances probably for 420kV and 550kV networks.

This paper describes a typical 420kV GIL. Different aspects of the technology are presented:

- basic performances and main technical features,
- type testing,

Keywords: Gas Insulated Line

Résumé: Une seconde génération de technologie de ligne à isolation gazeuse fait son apparition.

Cette contribution décrit ses performances et ses caractéristiques principales. Les processus de qualification et de fabrication sont décrits.

Avec cette technologie, les LIG quittent le domaine d'application limité aux seuls postes sous enveloppe métallique pour être utilisé pour de courtes sections de lignes de transmission à capacité élevée.

Un exemple récent d'application à un tronçon de ligne 420kV en cours de construction est présenté.

Mots clés: Ligne à isolation gazeuse

- manufacturing and testing in factory,
- erection and testing on site,
- monitoring, maintenance and reparation.

GIL has an intrinsic very high transmission capability. Typically, in open-air conditions, it allows up to 5000A (~3500MVA) with a short time current of 63kA.

Numerous different arrangements such as above ground arrangement, trenches with or without cover, tunnels and directly buried arrangement are possible. The permissible transmission capability is of course depending on arrangement and on conditions such as temperature and ventilation.

Besides evident advantages of insensitivity to weather conditions and reduced visual impact, basic characteristics such as low resistance, low emitted electromagnetic field and low capacitance are given.

2. Basic performances and main technical features