



# WORKSHOP

ROMA, 9 NOVEMBER 2023 9.00-18.00  
Istituto Superiore Antincendi (ISA)  
Aula Magna  
Via del Commercio 13

## Use of natural and synthetic esters for retrofilling transformers: environment and fire risk reduction

### Presentation

Globally, many hundreds of mineral oil immersed transformers have been retrofilled with alternative insulating liquids. Retrofilling transformers with natural and synthetic esters can prolong technical life and provide a liquid insulation which is environmentally friendly with improved fire safety. Retrofilling old/healthy transformers had been practiced by global end users as an effective approach of asset management and was considered as a contribution to the circular economy. Moreover, retrofilling with ester liquids are recognized to be helpful for the carbon peak/neutrality prospective of many countries and regions. In some countries, the demand of retrofilling is growing with the size of power grids; it is also believed that thousands of units of mineral transformers will be retrofilled in coming years. However, a comprehensive international guideline for retrofilling is not yet available and for this reason, during the 2022 IEC TC10 Plenary Meeting, China National Committee proposed the preparation of an IEC Technical Report hoping for a larger participation of Experts of both IEC TC10 and TC14. Implementing this request, TC10 launched a new TC10/TC14 Joint Working Group which will start its activities in the following months. One scope of this technical work is to provide operators with good practices that will provide a high level of safety by limiting the content of residual mineral oil. The workshop at the Italian Firefighters Authority will bring together invited speakers with many electrical industry guests to better explore these current issues.

### Registration



The workshop will be in presence and it is free of charge for registered attendees.

Deadline for registration is November 6, 2023 on

<https://convegni.aeit.it/retrofillingtransformers2023/>

### Location

The workshop will be hosted by the Italian Firefighters Authority in cooperation with the University of Roma "La Sapienza".

The event will take place at the "Istituto Superiore Antincendi (National Fire Academy)" which is located in **Via del Commercio, 13 in Roma**.

The place is accessible by subway (line B) "Piramide" station which is a 10 minute walk and about 700 meters from the railway station Ostiense. This latter is well connected also by train with Fiumicino International Airport.

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## Program

- 8.30 Registration
- 9.00 Welcome  
*Authorities*
- 9.30 Natural and synthetic esters versus mineral transformer oils: technical comparison  
*Zhongdong Wang (UK)*  
*University of Manchester*
- 10.00 Natural Ester liquids: three decades history of applications, Retrofill experience in India with BIS Code of Practice  
*Kevin Rapp (USA) and Rajaram Shinde (India)*  
*Rapp Consulting International LLC*
- 10.30 Mineral oils and natural esters comparison fire tests  
*Michele Mazzaro\*, Domenico De Bartolomeo\*, Massimo Pompili\*\* and Luigi Calcara\*\**  
*\*Italian Firefighters Authority (IT)*  
*\*\* University of Roma "La Sapienza" (IT)*
- 11.00 Coffee Break
- 11.30 Learning from regenerating the oil of a 77-year-old distribution transformer  
*Qiang Liu (UK)*  
*University of Manchester*
- 12.00 Natural and synthetic ester liquids: environmental compatibilities  
*Attila Gyore (UK)*  
*M&I*
- 12.30 Engineering practices for transformers retrofilling: an Italian case history  
*Fabrizio Ferrari (IT)*  
*Tamini trasformatori srl*
- 13.00 Buffet
- 14.00 Natural and synthetic ester liquids retrofilling: numbers and results  
*Bruce Forsyth (US)*  
*Cargill*
- 14.30 Guide for retrofilling mineral oil immersed transformers with alternative insulating liquids  
*Yihua Qian (CN)*  
*China Southern Power Grid*
- 15.00 Transformer retrofilling: case histories (SE)  
*David Walker (UK)*  
*Scottish Power*
- 15.30 Mineral Oil to Natural Ester: A Validated Practice for Transformers Retrofilling  
*Fabio Scatiggio, Giorgio Campi (IT)*  
*A&A Fratelli Parodi*
- 16.00 Coffee Break
- 16.15 Biotrafo & EU Project  
*Alfredo Ortiz (ES)*  
*Cantabria University*
- 16.45 Risk Mitigation through Certified Transformer Fluids  
*Frederic Kravetz (FR)*  
*FM Approvals*
- 17.15 Attendees Q&A

Moderators: Massimo Pompili and Domenico De Bartolomeo