

APPLICATION PROFILE

Bridging the need for reliable power with Pauwels

Utilities across the world are increasingly relying on mobile transformers based on NOMEX® thermal protection to ensure continued and reliable service where the fixed network requires a quick patch.

Application

Power transformer for mobile substations

Requirements

26 MVA, 69/12.5 kV / 20 MVA,
138x69/12.5 kV

Configuration

Oil filled, hybrid insulation systems with NOMEX® brand paper and cellulosic pressboard

Characteristics

Powerful, reliable, robust yet light enough and with dimensions that allow quick transportation over existing infrastructures

that allows quick, easy and flexible transportation was designed and brought to market. These large transformers must be impervious to harsh weather conditions, dust, extreme temperatures and fluctuating voltages. They have to perform reliably and with very small maintenance requirements

over long periods of time. They must be lighter, less cumbersome, easier to move around and capable of crossing bridges and other limiting infrastructures.

Economic imperatives

In normal operations, not to talk about emergency or storm

Pauwels pioneers mobility

To replace redundancy with mobility, Pauwels turned to DuPont™ NOMEX® thermal protection. In a joint effort of development and testing, a new generation of mobile transformers



Big enough to do the job, small enough to wind through narrow roads and bridges, light enough not to cause their destruction. Those are the challenges mobile substations from Pauwels are designed to meet with the help of NOMEX® thermal protection.

conditions, there is always some place in the network where a power transformer must be taken down for maintenance or upgrading. Yet full power supply capability cannot be interrupted at the cost of shutting down industries and vital services that depend on a steady, stable and reliable supply of power. Up till recent years, a common solution was for at least partial duplication of the transformer facility. The capital costs incurred are considerable and only sporadically productive.

Power in a difficult time and place

Recently, two hybrid mobile transformers were put in service in the Dominican Republic by Edesur / Edenorte, subsidiaries of Spain's Union Fenosa group. Utilities on the Dominican Republic had already used mobile substations since the early 1980's. But reducing the overall dimensions and weight was very important because of difficult and inadequate access roads and limited space within the existing substations. Moving up to Pauwel's transformers with

NOMEX® thermal protection in mobile substations was well understood and trusted by the utilities.

Because space and weight in a mobile transformer are at a premium, it is desirable to increase the space factor by increasing the density of the windings while reducing duct space. The dimension of the coils can be reduced by decreasing

the space between conductors to the minimum required for dielectric strength. These changes lead to increased conductor temperatures. Insulating materials must therefore be able to work at higher temperatures while retaining their properties and durability. That is exactly the capability that DuPont™ NOMEX® brand paper brings to the equation.

Technical data

Table 1 **Power transformer 26 MVA, 69/12.5 kV**

Brand: Pauwels
Rating: Primary/secondary/tertiary 26/26/0.05 MVA
Cooling: ODAF
Frequency: 60 Hz
Primary voltage: 69 kV
Secondary voltage: 12.5 kV
Tertiary voltage 0.42 kV
Vector group: YNyn0
OLTC in HV winding
At Position 69 kV + 12 x 1.25 % = +15% / - 12 x 1.25 % = - 15 %
Temperature rise: 65/95 K
No load losses: 100 % (tol + 15%) 11 kW
Load losses (tol +15%) 350 kW at 115 °C, 26 MVA, 69/12.5 kV
Impedance: (tol 7.5%) 14.5 % at 26 MVA, 69/12.5 kV

Table 2 **Power transformer 20 MVA, 138x69/12.5 kV 20 MVA, 138x69/12.5 kV**

Brand: Pauwels
Rating: Primary/secondary/tertiary 20/20/0.05 MVA
Cooling: ODAF
Frequency: 60 Hz
Primary voltage: 138 x 69 kV
Secondary voltage: 12.5 kV
Tertiary voltage 0.42 kV
Vector group: YNyn0
OLTC in HV winding
At Position 69 kV + 12 x 1,25 % = + 15% / - 12 x 1.25 % = - 15 %
Temperature rise: 65/95 °C
No load losses: 100 % (tol + 15%) 12.5 kW
Load losses (tol +15%) 280 kW at 115 °C, 20 MVA, 138/12.5 kV
Impedance: (tol 7.5%) 14.5 % at 20 MVA, 138/12.5 kV

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Product safety information is available upon request.

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