

		Procedure No: TA 00051
		Authorised by: G Noble
TITLE: Top up Pauwels (Belgium) Air Cushioned Transformer		
Issue Date: JUL 2018	Revision Date:	Page 1 of 4

a. Purpose

This procedure highlights the method of measuring the oil level then topping the oil up. This procedure has been adapted from a brief provided by the OEM.

b. Scope

Measuring the oil level and topping up a Pauwels Slimline Silicon oil filled transformer that is low of oil. These works can only be completed on a de-energised and made safe to work on transformer.

c. References

- a. TA 00001 – Job Safety Analysis
- b. XIAMETER® _PMX-561 Transformer Liquid product sheet
- c. IEEE C57.111-1989 Guide for Acceptance of Silicon Insulating Fluid and its Maintenance in Transformers
- d. IEEE C57.146-2005 Guide for the interpretation of Gasses Generated in Silicon-Immersed Transformers
- e. I.S. EN 60475:2011 Method of Sampling Insulating Liquids IEC 60475:2011

d. Definitions /Abbreviations

JSA – Job Safety Analysis

Oil – Transformer insulating fluid – PMX-561 Transformer Liquid

PPE – Personal Protective Equipment

Tube – Tube designed for sampling oil from transformers complete with fittings

TX – Transformer

		Procedure No: TA 00051
		Authorised by: G Noble
TITLE: Top up Pauwels (Belgium) Air Cushioned Transformer		
Issue Date: JUL 2018	Revision Date:	Page 2 of 4

e. Health & Safety

General caution, health, safety and environmental protection.

This procedure does not purport to address all the safety problems associated with its use. It is the responsibility of the user of the standard to use appropriate health and safety practices and determine the applicability of regulatory limitations prior to use.

The mineral insulating oils which are the subject of this procedure should be handled with due regard to personal hygiene. Direct contact with the eyes may cause irritation. In the case of eye contact, irrigation with copious quantities of clean running water should be carried out and medical advice sought.

No work shall be carried out without first conducting an OHS study of the task in hand and the appropriate check sheets (TA 0001) filled out.

Transaudit Quick Check

Personal Protective Equipment (PPE) Required						
 Gloves	 Face Masks	 Eye Protection	 Face Shield	 Appropriate Footwear	 Hearing Protection	 Protective Clothing
☒	☐	☒	☐	☒	☐	☒

This quick check does not replace Job Safety Analysis TA 0001

	Procedure No: TA 00051
	Authorised by: G Noble
TITLE: Top up Pauwels (Belgium) Air Cushioned Transformer	
Issue Date: JUL 2018	Revision Date: Page 3 of 4

f. Environmental

Our commitment is to ensure that the environment is not damaged through any action that we may take now or in the future. Transaudit will provide the means to limit environmental damage through engineering, substitution or removal of and items or procedures that have the potential to impact the environment. Disposal of waste material, hazardous goods or items which have become contaminated will be done through the appropriate means or through a registered waste disposal company.

g. Procedure

Establish that the oil level at 20°C average liquid temperature is 70 mm under the lid. This void is known as the Air Cushion. Measure the oil temperatures at bottom, middle and top to establish the average temperature using a laser thermometer against the tank and compare to calculated result in step d below.

NOTE: If the transformer is hot, a pressure may be present at this could result in oil being ejected from the transformer in the following steps, so ensuring the temperature is close to 20°C before starting work is imperative.

The Air Cushion is measured between oil level and underside lid.

- Loosen the breather nut on the side of the oil level relay and release any vacuum that may exist on the transformer. Do this in a slow controlled manor. If dust or moisture is present, us a lint free filter such as a cotton cloth to stop the ingestion of debris during this process.
- Remove the 1" BSP oil filling nut located on the lid. Ensure no debris fall into transformer during this process.
- Through the 1 inch filling opening, using a plastic rule preferably measure the distance from the oil surface to the underside of the lid. See Figure 1
- Average liquid temperature should be calculated as follows:

$$(\text{top oil temp} - \text{room temp.}) / 1,3^* + \text{room temp.} = \text{average liquid temperature.}$$
- The Top oil temperature can be obtained from PT100 element. In case no power available PT100 resistance can be measured and the temperature calculated.



Figure 1. Measure oil level.

		Procedure No: TA 00051
		Authorised by: G Noble
TITLE: Top up Pauwels (Belgium) Air Cushioned Transformer		
Issue Date: JUL 2018	Revision Date:	Page 4 of 4

Refilling.

- h. Using a hose connected to a funnel (see figure 2), refill the transformer until the oil level is 70mm below the underside of the lid. Ensure the hose is against the tank wall and top up oil in small quantities – around 1000ml at a time avoiding bubbles. Test filling procedure into a bucket before attempting transformer fill.
- i. Continue to check the level of the oil as well as the average temperature if process is taking a while. If the temperature drops below 20, add 5mm of oil level per degree of temperature drop.



Figure 2. Oil filling funnel

- j. When the correct oil level is obtained, refit the 1" plug ensuring Teflon tape or Loctite 567 is used on the thread to ensure seal. Check the oil level switch contacts and ensure they are in the correct position (low oil level contacts should not be activated).
- k. Use a multi meter to check the contacts. See Figure 3.



Figure 3. Oil level contacts

The transformer can be put back into service 6 hours after topping-up works is completed. This to let the micro air bubbles disappear from the top layer insulation liquid. The first 12 hours the load should be limited to 50%, in order to absorb slowly the gas cushion.