

Breather in power transformer

I'm not robot!





In power transformer breather is necessary why. Use of breather in transformer. What is the function of breather and explosion vent in the power transformer. What is the function of breather in a transformer. In a power transformer the breather is provided in order to. What is a breather in a transformer. In power transformer breather is used to.

Transformer dehydrating breathers are being used for liquid immersed transformers in order to protect the insulating liquid and prevent the harmful moisture absorption from ambient air, which occurs when the load on the transformer fluctuates. The transformer dehydrating breather removes practically all moisture from the air that flows through it.

into the transformer when the transformer is cooling down. This largely prevents any reduction of the dielectric strength and the formation of condensation in the expansion tank. Thus, the dehydrating breathers increases the operational safety of transformers.Our dehydrating breathers are either screwed to the transformer or appropriated by a flange. We offer a variety of different breather types: Our transformer dehydrating breathers meet the requirements of EN 50216-5.By default, our housing parts are made of die casted aluminiumand have a premium class corrosion and UV-resistant C5-M powder coating. Upon request, we offer the housing parts made of EN-GJL-200 grey cast iron (DIN 42562). Your benefits at a glance Best corrosion protection ensures longest operation Attachment parts are either in A2 or A4 quality depending on environmental conditions Lightweight aluminium design with premium powder coating. Quality indicating silica gel made by BASF in favour of long maintenance intervals upon request The oil container in the lower part of the transformer dehydrating breathers prevents any contact with ambient air as long as the transformer doesn't breathe. In order to ensure this permanently, it is absolutely necessary that the oil container is always filled with oil up to the marked line. Ambient air Temperature drops Temperature rises No residues The transformer is surrounded by moist air. As long as the temperature of the cooling and insulating liquid does not change, no ambient air sucks in or sucks out. The cooling and insulating liquid in the transformer cools down, the transformer sucks in humid ambient air through the conservator. The drying agent extracts moisture from the inflowing air and ensures that only the dried air will be aspirated into the transformer. The temperature inside the transformer increases. The cooling and insulating liquid expands and displaces the air. The air in the expansion vessel escapes through the conservator and passes the dehydrating breather. If the dehydrating breather is used properly, no moisture will remain in the transformer, which can lead to condensation any damage. Transformer dehydrating breather - Silica gel As a drying agent, we only use silica gel due to the good adsorption properties.The drying crystals are minimum 3mm in size. In activated condition they have a orange crystalline appearance as they absorb moisture the colour changes to colourless, beginning at the bottom and spreading progressively to the top. Functional check of silica gel The indications of proper function of the transformer dehydrating breather during changes of temperature are as follows: Rising air bubbles in the oil bowl Colour of drying crystals changing from orange to colourless beginning at the bottom and spreading slowly upwards In order to completely exclude any possibility of moisture reaching the conservator, the drying agent should be renewed when there is still a layer of active orange crystals approximately 5 cm thick at the top. Regenerating the drying crystals Drying crystals which have absorbed moisture can be regenerated by heating to a temperature of 120-130 °C. A temperature of 140°C should not be exceeded otherwise hydrogen chloride gas will be given off by the colour indicator that could combine with the moisture present to form a dangerous hydrochloric acid. For more detailed information please find downloads mentioned below. Silica gel Breather is cylindrical type container which is fitted to the conservator tank through a pipe line which is totally filled with silica gel crystals used for absorbing any moisture present in the air during breathing action of transformer due to expansion and contraction of transformer oil in the transformer. The size of Breather depends on the volume of transformer main tank as well as quantity of transformer oil in the transformer. A oil pot is connected under the breather. The details of silica gel Breather is shown in figure. Fig. 1 (Before moisture absorbed) When the Silica gel breather is first installed, the crystals have a blue tint, and after a period of operation, the colour of the tinted crystals gradually changes to pink . This is an indication that the silica gel is becoming saturated and losing its absorbent properties. When there is a preponderance of pink crystals the silica gel should be changed or reactivated. Fig. 2 (after moisture absorbed) Silicagel may be reactivated by heating in a thin pan at a temperature of 1500C to 2000C for two to three hours when the crystals should have regained their original blue tint. Before filling the container with silica gel, clean and dry all parts of the breather. Verify that the oil level in the oil cup is correct or not -correct. Finally ensure that the breather is not choked and is free for passage of air. More details go to:- electrical4u.com silicagelpacks.com Youtube.com Recent Post Multiple Choice Question (MCQ) of Transmission and Distribution page-3:21. ACSR conductor implies A) Anodized Core Smooth Run B) Anode current sinusoidally run C) Aluminium conductor steel reinforced D) All conductors surface treated and realigned.Read more...Multiple Choice Question (MCQ) of Transmission and Distribution page-2:11. In overhead transmission lines the effect of capacitance can be neglected when the length of line is less than A) 80 km B) 100 km C) 160 km D) 200 km.Read more...Multiple Choice Question (MCQ) of Transmission and Distribution page-1:1. Which of the following is not the transmission voltage in India ? A) 400 kV B) 264 kV C) 132 kV D) 66 kV.Read more.... Option 3 : to arrest flow of moisture when outside air enters the transformer Free 20 Questions 20 Marks 25 Mins The function of a breather in a transformer is to arrest flow of moisture when outside air enters the transformer. Concept: The function of the breather in the transformer: Silica gel is used to absorb moisture and prevent entering the oil tank while breathing. It is used in an oil transformer breather. The Colour of fresh silica gel is blue. The moist silica gel became pink in color. A transformer consists of Breather, Conservator and Buchholz relay, etc. The breather is used in the transformer to filter out the moisture from the air. Breather consists of silica gel which absorbs moisture from the air. Conservator tank present at the top of the transformer which allows adequate space for expansion of oil. Therefore during an overloading condition, the oil moves to the conservator tank. Buchholz relay is used for the protection of transformers from the faults occurring inside the transformer. Whenever the transformer is loaded, the temperature of the transformer insulating oil increases. Consequently, the volume of oil is increased. As the volume of the oil is increased, the air above the oil level in the conservator will come out. At low oil temperature, the volume of the oil is decreased, causes air to enter into a conservator tank. The air consists of moisture in it and this moisture can be mixed up with oil. Hence to filter the air from moisture silica gel breather is used. India's #1 Learning Platform Start Complete Exam Preparation Daily Live MasterClasses Practice Question Bank Mock Tests & Quizzes Get Started for Free Download App Trusted by 3,01,73,016+ Students Oil immersed transformers have a simple system called transformer breather, this system lets the transformer oil expansion process to happen during load peaks. I came through transformer breatherWhat is transformer breathing?Oil immersed transformers has oil for cooling and isolating windings. Current In transformer windings generates heat, the main job of oil is to transfer this heat outside the transformer.Breathing in and out:Transformers breath in and out during oil expansion and volume reduction due to temperature rise and drop, this transformer breathing process pushes air out and draw it in. The air may contain water vapor and moisture.The temperature of the oil varies due to loads on the transformer secondary side. This temperature variation makes oil to expand, gets out to the conservator tank and pushes the dry air out of the tank through the transformer breather. This process is called transformer breathing out.When the oil gets cooled down, its volume decreases and gets back to its normal level. The air from outside the transformer is drawn in to the transformer tank, this process is called breathing in.Transformers Breathing is the process happens due to oil expansion and contraction by the effect of temperature rise. At this process the oil pushes air from the conservator tank, through the silica gel breather, into the surrounding atmosphere. And then draws air back from the outside into the transformer tank.What is Transformer Breather?Transformer breather is a simple system to let the expansion of the transformer oil, This system consists of a silica gel breather to prevent moisture from entering into the transformer tank. A small amount of transformer oil is used in a small cab in the breather.Silica gel has the ability of moisture absorbing and holding water vapor in it. This prevents water vapor and moisture from entering into transformer oil. Water in transformer oil decreases its isolation, and may cause transformer internal short circuit and breakdown.Why is Transformer Oil Used in Breather?A simple but effective protection method for both transformer oil and silica gel is by using oil cap, or transformer breather oil cup, at the bottom of breather and serves two purposes.Firstly, it absorbs the dust particles that are present in the air during breathing in process.Secondly, it acts as barrier between silica gel and air when there is no breathing in or out.Do All Transformers Have Breathers?Not every oil immersed transformer requires breather and conservator tanks. Breathers are required for transformers which are connected to load, as the varying load causes oil to expand and contract in the breathing in and out process. This is important to make space for the expansion of oil caused by excessive temperature.Once such example is hermetically sealed transformers. These type of transformers are completely sealed and has no connection to outside atmosphere. For heat dissipation, Corrugated fins are used instead of breathers. Corrugated fins have enough flexibility to allow space for oil expansionSimilarly, in transformers where load is not connected to the secondary side e.g. Current Transformers (CT) and Potential Transformers (PT), there is no need of breathers as temperature inside the transformers remains within the limit.This leads us to another type of transformer oil protection system called hermetically sealed transformers.Hermetically Sealed Electrical TransformersHermetically sealed transformers have no contact to the outside environment. These transformers are designed without any conservator, and sealing is done in such perfection that zero moisture gets in to the tank causing any oxidation or slugging of the di-electric medium.Use of these transformers is very common in environments where rain or snow percentage is quite high also environments wiith high level of gases in air, and placing an open transformer in outside environment could cause destructive for transformer's life.Furthermore, these transformers require no maintenance at all (maintenance free), which is an ideal situation for chemical plants and terminals as it is quite difficult to access those places regularly for maintenance.Is Silica Gel Effective?Silica gel breather is a way to let the oil expansion and in the same time to prevent moisture from entering into the transformer. Breather and Silica Gel protect oil from moisture during transformer breathing. Silica gel crystals are capable of absorbing moisture from the air and passing on the dry air only into the transformer tank.Silica gel plays the main role to protect transformer oil from moisture. It has a great ability to absorb moisture from air. So, it is effective and does its role perfectly.Silica gel colorsWhite silica gel: is a non-indicating silica gel, which means no color changing will happen if it adsorbs water.Blue silica gel: This type of silica gel has cobalt chloride which changes its color to be pink after adsorbing water.When it becomes pink this means it reached its adsorption maximized capacity.Orange silica gel: This is an other color indicating type which suitable to be used in silica gel breather of transformers.Why to prevent moisture from entering into transformer?If transformer breather has no silica gel to absorb moisture from the air which comes from outside atmosphere, then transformer oil may contain water particles, Which decreases its insulation. Passing air through the silica gel ensure that only dry air to enter the transformer. I have written a detailed article about transformer moisture causes and solutions. You can find it here.When Should I Replace transformer Silica Gel?I recommended to change the breather at 1/3 stage of saturation, because waiting for complete saturation could lead into some moisture transferring inside of the transformer.Silica Gel keeps on absorbing moisture from the air flowing inside the conservator until it reaches a saturation point. The saturation point comes at different times for different transformers, but the principle of saturation is the same.Moisture starts from the bottom of the breather and keeps going upward, moisturizing all the silica present in the container.The color employed for silica in these days are orange and purple at dry stage. For Orange breather, saturation level changes the color to transparent, whereas in purple silica, the saturation color would be pink.General advice is to at least maintain 2-4 inches of silica buffer dry. However, replacing silica is not necessary always, because the alternative option of drying out the moisture through specific level of heat is more cost efficient.Process of Replace power Transformer Silica Gel?The conventionally used process for replacing silica gel from power transformers involves following steps:First thing is to remove the conservator from the transformer and take out all the absorbent i.e. Silica Gel present inside of it.Second step involves cleaning the glass cover to remove any dirt attached.In the next step, new silica gel is filled into the conservator. At this stage, it is preferred to use silica without any color impurities for monitoring the performance of absorbent.Finally, transformer oil used for absorbing impurities is poured into the seal cover attached down to the conservator. The level of oil is carefully maintained to the safe limit.Can We Change Silica Gel in Energized Transformer?I recommended never to change silica gel while the transformer is energized, specially for power transformers, for safety purposes. However, in some cases very experienced electricians can do this job while the transformer is in service. The main point to take into consideration is the safe distance between the breather and the power lines of the transformer. Besides, the expertise of the person is a vital key too.Also, I never recommend doing this job during windy days and high moisture hours of the day. In general, its better to do the job indoors i.e inside a workshop if possible.

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