

Moisture inside switchgear cabinets

The autumn-winter period typically brings variable weather and significant temperature fluctuations. Such large temperature changes from plus to minus Celsius, are conducive to the formation of humidity in enclosed spaces, including freestanding electrical switchgear, a location where this phenomenon is particularly undesirable. Emitter, a manufacturer of cabinets and switchgear, recognising that this is a serious problem, has been working on a solution for several years.

Emiter has conducted many experiments and analysis that have resulted in an efficient method of minimising the moisture inside switchgear cabinets. This article, based on conducted experiments, depicts the mechanisms of moisture formation inside the freestanding cabinets, as well as the methods which can be helpful to limit these occurrences.

The moisture inside the cabinet is the result of steam condensation. The air in higher temperatures has more water vapour, which liquefies when the temperature drops. This can be seen for example, in the formation of water drops on inner walls of cabinets and also on electrical devices (pict. 1). This phenomenon increases in autumn and winter.

Positioning of the cabinet, the partition

Based on the experiments, it can be concluded that an essential factor in limiting the formation



pict. 1A
Condensation in the cabinet:
on cabinet's surface

of moisture is the correct installation of the cabinet and pedestal (pict. 2). The basic mistake made by installers is to leave an empty space inside the pedestal. After backfilling, it is important to fill in the pedestal interior using a special filler. The most suitable filler is a specially designed material with granular structure, tested by Emitter (pict. 3). It provides an effective barrier against moisture coming from the ground and at the same time, reduces the empty space inside the switchgear. This has a beneficial effect on the temperature



pict. 1B
Condensation in the cabinet:
on devices

difference, whereby the condensation is minimised. For maximum effectiveness it is important to follow the manufacturers guidelines strictly, especially in terms of the volume of filler required for each type and size of pedestal. A similar effect can be achieved by installing the optional Emitter horizontal partition which separates a cabinet and pedestal from each other.

Experimental field

As a result of the Emitter experiments, it is possible to conclude that both solutions are an effective way of fighting against the moisture inside switchgear cabinets. The Emitter research site was established in 2005, and is used regularly for moisture experiments (pict. 4).

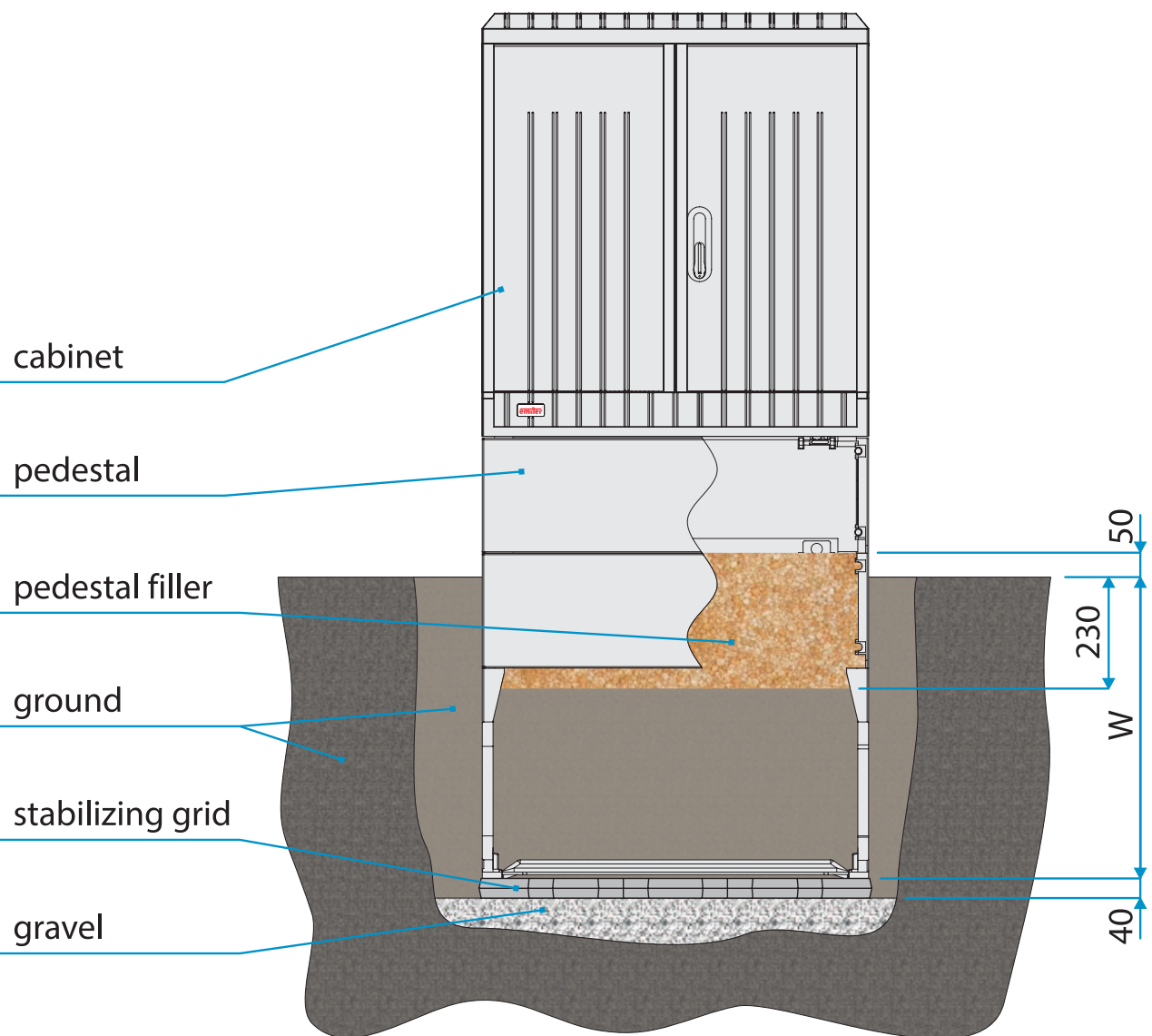
Analysis and conclusions are based on periodic visual inspection and photographic documentation. All the samples (cabinets and pedestals of the same size and type), are tested on the same area to maintain comparable climatic and terrain control conditions.

Table 1 presents the results of observations conducted in 2006. It shows the level of moisture

inside the cabinets comparing the positioning of each switchgear and the season. Three cases are presented sequentially.

Summary

Water vapour condensation inside electrical switchgear is a serious problem that should not be ignored. It can be the cause of malfunctions,



pict. 2
Correct positioning of the cabinet: dimension „W” depends on type of pedestal

corrosion and even failures. Additionally during the winter season, it may result in mechanical damage of the cabinet parts as well as equipment mounted inside, due to the freezing of accumulated water inside the interspaces. The result can be potentially dangerous.

Emitter research and experiments have shown that the above solutions are effective, inexpensive and easy to use at the same time. Both solutions fully eliminate the moisture inside the enclosure. Furthermore they do not require any additional work during the installation of freestanding cabinets, other than installing the optional horizontal partition, or the exact volume of filler necessary for each type and size of pedestal.



pict. 3
Pedestal filler



pict. 4
Freestanding cabinets during the test

Tab. 1 Results of the observations in the experimental site

	Sample no. 1	Sample no. 3	Sample no. 4
	cabinet + partition + pedestal	cabinet + pedestal + pedestal filler	cabinet + pedestal
13.02.2006			
Internal surface of the cabinet			
21.04.2006			
Internal surface of the cabinet			
25.08.2006			
Internal surface of the cabinet			
22.09.2006			
Internal surface of the cabinet			