

## IEEE Standards Interpretation for IEEE Std C57.12.28™-2005 IEEE Standard for Pad-Mounted Equipment—Enclosure Integrity

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### Interpretation Request #1

**Topic:** Entry of water into enclosure

IEEE Std C57.12.28-2005, 4.1.2. titled "Enclosure Security," 'Water Resistance' states: "The enclosure shall restrict the entry of water (other than flood water) in the enclosure so as not to impair the operation of the apparatus inside."

This interpretation request concerns the construction of pad mounted equipment, specifically liquid-filled, pad mounted transformers with compartmental type construction. The transformers are specified to be accordance with IEEE Std C57.12.28-2005. Other relevant specifications are IEEE Std C57.12.00™-2010, General Requirements for Liquid Immersed Distribution, Power and Regulating Transformers.

Please define the term "restrict" in the context of the prevention of water entry (other than flood water) into the interior of the enclosure.

a. Please confirm that this enclosure should prohibit any water from entering interior of the enclosure from the top or side of the enclosure. It is understood that entry of water to the enclosure could be from the bottom of the enclosure.

### Interpretation Response

The pad mounted device should continue to operate when exposed to normal weather conditions. Examples of these weather conditions are rain, freezing rain, snow, wind and etc. Water may enter the enclosure, however, not in sufficient quantity/location to cause the equipment to malfunction. The one exception stated in the standard would be flooding where the device would be submerged in water.

**Interpretation Request #2****Topic:** Entry of water into enclosure

Please define the term "impair the operation of the apparatus inside."

a. Would the entry of water into the transformer enclosure causing tracking of contaminants to energized connections be considered a condition that could impair the operation of the apparatus inside?

**Interpretation Response**

The pad mounted device should continue to operate when exposed to normal weather conditions. Examples of these weather conditions are rain, freezing rain, snow, wind and etc. Water may enter the enclosure, however, not in sufficient quantity/location to cause the equipment to malfunction. The one exception stated in the standard would be flooding where the device would be submerged in water.

**Interpretation Request #3****Topic:** Water ingress **Clause, Subclause, Annex, Figure, or Table:** 5.1.2

Small holes in the side of the high voltage (34KV) connection cabinet allow water to enter and run down the inside during rain. Is this allowed, or should it be rain resistant like NEMA 3R?

**Interpretation Response**

The way the IEEE Std C57.12.28-2005 is currently written, it is acceptable to have holes in the cabinetry of pad mounted electrical distribution equipment. However, the holes cannot exceed the diameter of 14 AWG copper wire or 0.068 inches (1.628 mm). IEEE Std C57.12.28-2005 has an approved PAR and is currently under review by the C57 Enclosure Integrity Working Group. It is clear that the desire of the working group will be not to have holes in the equipment's cabinetry. During the October 2011 meeting, the issue of holes in cabinetry will be discussed and addressed.

The following additional commentary is offered. The pad mounted device should continue to operate when exposed to normal weather conditions. Examples of these weather conditions are rain, freezing rain, snow, wind, etc.

Water may enter the enclosure, however not in sufficient quantity/location to cause the equipment to malfunction. The one exception stated in the standard would be flooding where the device would be submerged in water.