

**Interpretation Number:** 3-07/04  
**Topic:** Isolation  
**Relevant Clause:** 33.4.1  
**Classification:** Unambiguous

### **Interpretation Request**

The standard that we need to better understand is 33.4.1 "Isolation", and I have a few questions that may guide the interpretation the way we need it:

- 1) Clause 33.4.1 a) states that the electrical strength test should withstand "1500Vrms steady state at 50-60 Hz for 60 second" and then it refers to clause 6.2 of IEC 60950-1:2001.
- 2) First of all, we assume that the electrical strength test will be performed between input side of the converter (main supply side) and the output side of the isolated converter (Load side). Is this correct?
- 3) Clause 6.2.1 b) of IEC 60950-1:2001 categorize "parts that can be touched by the test finger" like our DC/DC Converter. Our converter is not on the category 6.2.1 a) where the part would be "expected to be held or touched during normal use (for example, a telephone handset or a keyboard)". Then clause 6.2.2.2 steady-state test states, "The electrical separation is subjected to an electric strength test according to 5.2.2" (where the a.c. test voltage for 6.2.1 b) is 1000Vrms). Is this applicable to our DC/DC converter? That is, can we test our converter's isolation from input to output with 1000Vrms instead of 1500Vrms and still meet the standard 33.4.1?
- 4) Then on Test Procedure clause 5.2.2 of IEC 60950-1:2001 (referenced on 6.2.2.2) it is stated "The insulation is subjected either to a voltage of substantially sine-wave form having a frequency of 50Hz or 60Hz, or to a DC voltage equal to the peak voltage of the prescribed a.c. test voltage". Is this applicable to our DC/DC converter? That is, can we test our converter's isolation from input to output with a DC voltage equal to the peak voltage of the prescribed a.c. test voltage?
- 5) On clause 5.2.2 of IEC 60950-1:2001 Note 2 it is stated "Where there are capacitors across the insulation under test it is recommended that d.c. Test voltages are used". We do have a common mode capacitor electrically connected in between the input side of the converter (main supply side) and the output side of the isolated converter (Load side). As before, can we test our converter's isolation from input to output with a DC voltage equal to the peak voltage of the prescribed a.c. test voltage?
- 6) On clause 5.2.2 of IEC 60950-1:2001 Note 1 it is stated, "For routine tests it is permitted to reduce the duration of the electric strength test to 1 second". Is this applicable to our DC/DC converter? That is, can we test our converter's isolation from input to output on production tests for 1 second instead of 60 seconds and still meet the standard 33.4.1?

7) On clause 5.2.2 of IEC 60950-1:2001 it is stated "Corona discharge or a single momentary flashover is not regarded as insulation breakdown". Is this clause applicable to our DC/DC converters?

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### **Interpretation for IEEE Std 802.3af-2003**

The first two sentences of subclause 33.4.1 state 'The PSE shall provide electrical isolation between the PI device circuits, including frame ground (if any), and all PI leads. The PD shall provide electrical isolation between all external conductors, including frame ground (if any), and all PI leads.'. This places the requirement for isolation between the PI leads and the frame ground, if any, and also the PI device circuits in the case of a PSE.

IEEE Std 802.3 Clause 33 doesn't specify DC/DC converters. In Clause 33 we are specifying PD and PSE devices.

Subclause 33.4.1 says clearly where the isolation requirement applies. In respect to the questions related to 60950, these do not constitute a request for interpretation of IEEE Std 802.3 but rather a request for consultation advice.