

CTL Provisional DECISION SHEET (PDSH)

Standard(s) (incl. year)	Subclause(s)	Tracking No.	Publication date
IEC 60335-2-24:2020	22.117	2227	2023
Category			
HOUS			
Subject	Keywords	Developed by	To be approved
Thermal insulation to be encased in and in contact with 5VA polymeric material	Thermal Insulation	ETF 1	2024 CTL Plenary Meeting

Question

Clause 22.117 requires thermal insulation be encased and in contact with metallic material having thickness not less than 0,2 mm with melting point temperature of not less than 1000 °C, or a polymeric material classified as 5VA, or non-polymeric material that has been tested in accordance with Annex EE.

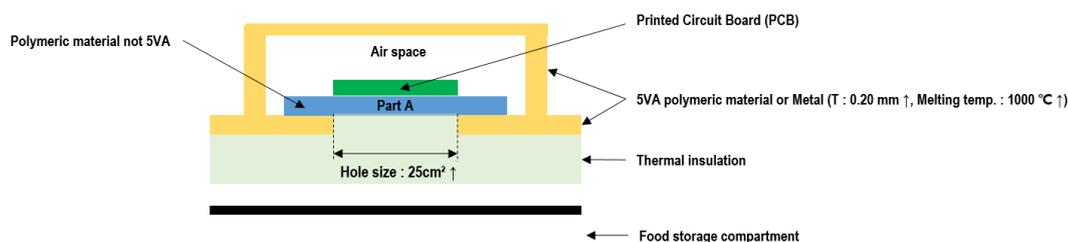
In the construction below (picture), thermal insulation is covered with metallic material having thickness of not less than 0,2 mm with a melting point temperature of not less than 1000 °C, or a polymeric material classified as 5VA (yellow part).

There is, however, a hole in the encasing material with an area exceeding 25 mm² where the thermal insulation is in direct contact with Part A (blue part) that is a polymeric material which is not 5 VA grade. On part A, a printed circuit board is mounted that is a live part, not SELV and not a low-power circuit.

Part A and the PCB are covered by a metallic material enclosure with a thickness of not less than 0,20 mm with a melting point temperature of not less than 1 000 °C, or a polymeric material classified as 5 VA.

Does this construction comply with the requirement of clause 22.117?

Clause 22.117 does not clearly mention if no air space or electric parts are allowed to be within the enclosing material.



Original text of clause 22.117:

22.117 In refrigerating appliances, thermal insulation shall be encased in and be in contact with

- metallic material having a thickness not less than 0,20 mm and having a melting point temperature of not less than 1 000 °C; or*
- a polymeric material classified as 5VA according to IEC 60695-11-20 provided that the test sample used for the classification was no thicker than the relevant part of the appliance; or*
- a single layer non-polymeric material that has been tested in accordance with Annex EE; or*
- a material with multiple layers, at least one of which is non-polymeric, that has been tested in accordance with Annex EE.*

A hole or the combined area of holes within 150 mm of each other shall not exceed 25 cm².

The total combined area of the holes shall not exceed 125 cm². Holes up to 3 mm² and material that join overlapping metal parts are ignored. The area of holes that have metallic objects such as pipes protruding from them are calculated omitting the area taken up from the metallic material.

These requirements are also applicable to material encasing thermal insulation between the compressor compartment and food storage compartments.

These requirements are not applicable to:

- parts in food storage compartments such as compartment liner, partition of the cabinet;*
- parts providing access to the food storage compartment such as doors, drawers and lids;*
- parts within 150 mm from the top surface of the appliance, the top surface being a horizontal plane from the highest point of the appliance, unless the inlet opening for the supply cord is within 150 mm of the exempt area;*
- parts within 50 mm of food storage compartment seals;*
- portable appliances with no motor-compressor.*

Compliance is checked by inspection, measurement and the appropriate tests.

Decision

The thermal insulation is completely enclosed, the risk of flame spreading outside the appliance is limited and the construction complies with 22.117 in the conditions described.

Explanatory notes

IEC TC61C experts confirmed the content of the decision at 2023-11-20.

There are two ways to look at it:

1. Since the thermal insulation is completely enclosed, the risk of flame spreading outside the appliance is limited and the construction complies with 22.117.
2. Since the enclosing material is not in direct contact with the thermal insulation and there is a live part (not SELV and not low-power circuit) mounted inside the enclosing material which is a potential ignition source, the insulation is not adequately protected, and the construction does not comply with 22.117.

To decide on it, the following shall be taken into consideration:

- a) *There are two situations to consider,*
 - *the propagation of fire generated inside the appliance, which is duly covered by Cl 30, that is always applicable, and*
 - *any fires coming from external sources, which is the main intention of 22.117.*
- b) *In the construction shown there are no external holes. There is no exposed thermal insulation. From the outside, only metal (or 5VA polymeric material) can be seen in the refrigerator. If there were an external fire, there would be no propagation, because the thermal insulation is not exposed.*
- c) *In terms of 22.117, the outer metal cover (or 5VA polymeric material), air, PCB and part A, can be considered as the 4th dash item "multiple layers".*
- d) *In the first sentence of Cl 22.117, the wording "and in contact" is intended to avoid air/oxygen between external enclosure and the thermal insulation. In the construction under evaluation and considering the above item c), there is no air gap between thermal insulation and the multiple layer construction. Only inside the multiple layers, in a small surface for the electronic, there is an air gap, and for cases in which the fire starts from the PCB, the external enclosures (metal / 5VA) will stop the propagation.*

Then the option 1 described above is the interpretation to be considered for the construction proposed.