

Related test method	<b>EN 1363-1: 2012 Fire resistance tests – General requirements</b>
Subject	Fabrication and fixing of thermocouples

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**Problem:**

At the EGOLF TC2 Spring meeting 2012 held in Espoo the different methods for fabrication of the unexposed thermocouples and how to conduct the application was discussed (see N660 §8 on page 4). The outcome of the discussion was a suggestion to make small comparative test using the different fabrication and fixation methods.

The outcome of comparative test on fabrication and fixing of thermocouples (N709) was presented at the EGOLF TC2 Autumn meeting 2013 in Derio.

Based on the small comparative test following was concluded:

*Pad material*

For the thickness of the pad there is a weak tendency that an increase in thickness gives an increase in temperature.

There seems to be little correspondence between the stated nominal density values of the pad materials and the average weight of the pads.

It is suggested that EGOLF defines a nominal weight of the pad and an acceptable tolerance related to the value.

*Glue*

The best glue to use was found to be the silicate type in plastic bags like Conlit Fix glue from Rockwool or Klebepasta SB from Hüttenes Albertus.

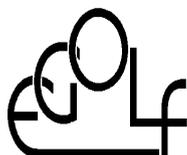
Based on the presentation of the test results from the project, it was suggested that a recommendation should be drafted on how to differences in the insulation pads.

**Recommendation:****Verification of pad material**

The following rules apply in relation to verification of the material used for thermocouple pad

In EN 1363-1 § 4.5.1.2 it is specified that Each thermocouple shall be covered with a  $(30 \pm 0,2)$  mm x  $(30 \pm 0,2)$  mm x  $(2.0 \pm 0,5)$  mm thick inorganic insulating pad, unless specified otherwise in the standards for specific elements. The pad material shall have a density of  $(900 \pm 100)$  kg/m<sup>3</sup>. The insulation pads shall be cut to accommodate the thermocouple wires.

According to EN17025 §4.6.2, The laboratory shall ensure that purchased supplies and reagents and consumable materials that affect the quality of tests are not used until they have been inspected or otherwise verified as complying with standard specifications or requirements defined in the methods for the tests concerned.



To reduce the uncertainty on our unexposed surface temperature measurements, EGOLF members shall implement the following rules in their quality control procedures related to verification of pad material.

- The thickness of the pad should be 2,0 mm ± 0,25 mm  
*Note: The tolerance of 0,5 mm equals 25% of the nominal thickness. This is a high tolerance. The results from the test showed that the large majority of labs were within the 0,25 mm tolerance.*
- When receiving a new batch of pad material it should be verified that the density and thickness is within the specified limits (as required by EN17025 § 4.6.2)  
*Note: For the pad material this is extra important because differences have been found when compared with the stated nominal values.*
- The weight of the final pad including any cuts for thermocouple wires shall be within 1,25 gram to 2,00 gram.

*Note: A pad that follows the nominal values given in EN1363-1 will have a weight of 1,62 gram, only 3 labs out of 16 had pads with a lower weight than 1,62 gram the rest were above. However only 3 labs had pads with thickness above 2 mm. This indicates what the pads are either cut to big or have a high density.*

<i>Weight</i>	<i>1,25 gram</i>	<i>2,00 gram</i>
<i>Density</i>	<i>800 kg/m<sup>3</sup></i>	<i>1000 kg/m<sup>3</sup></i>
<i>Thickness</i>	<i>1,75 mm</i>	<i>2,25 mm</i>
<i>Lengths</i>	<i>30,0 mm x 30,0 mm</i>	<i>30,0 mm x 30,0 mm</i>

*The higher the weight of the pad, the higher will the total heat capacity of the pad be.*

### **Type of glue:**

In case any labs are considering changing their type of glue. The following glues the following glues were evaluated to have good performance in the EGOLF project *Fabrication and fixing of thermocouples.*

- Conlit Fix glue from Rockwool
- Klebepasta SB from Hüttenes Albertus

It is of course not mandatory to use these types. It should be seen only as suggestions.