

related test method **EN 1366-1**

subject **Clarification of test procedures related to:**

- **the type of floor construction used in tests according to EN1366-1 and the fixation of the duct**
- **position of thermocouples when over steel ducts**
- **position of thermocouples at joints**

reference of N460 report of duct workshop

original query N433 Helpdesk 2007-01

 N434 Helpdesk 2007-02

Problem:

During the last couple of years a number of helpdesk items related to test of ducts have been discussed. Decisions have been taken in the EGOLF meetings and they have been added to the minutes of the meetings (N442 item 10.2.2, N472 item 8.3). At the spring 2008 meeting it was agreed to put these in an EGOLF Recommendation.

1 Fixation of the duct (N460, duct workshop)

Labs have interpreted the EN 1366-1 §7.4.1 "All ducts shall be fully restrained in all directions..." in different ways.

Recommendation

EN 1366-1 §7.4.1 "All ducts shall be fully restrained in all directions implies that for vertical and horizontal duct:

- It is not allowed to build the end of the duct flush to the lining without any mechanical connection.
- No flexible material can be installed between the lining of the furnace and the end of the duct (incl. for steel ducts).
- "Fully restrained in all directions" means fully restrained in all directions (expansion, contraction and side ways movement).

2 Type of floor construction used when testing horizontal ducts (N460, duct workshop)

The floor type used to suspend horizontal ducts from can have large influence on the result if the floor deflects during the test. The fact that labs use different types of floors with different deflection creates a spread on the result.



Recommendation

When testing horizontal ducts the type of roof used when strapping the duct, can be chosen freely by the labs (furnace roof, Aerated concrete slabs reinforced on the unexposed side, concrete slabs etc.).

3 Positioning of thermocouples on steel pins (N434, Helpdesk 2007-02)

It is unclear how the thermocouples should be positioned when testing insulated steel ducts, where the insulation is fixed using pins and washers. Do the pins and washers fall under the definition minor hotspots? (for a square meter approximately 10 pins and washers are used this means that they will cover 1% of the area when using Ø 38 mm washers).

Recommendation

No thermocouple should be applied on pins if the diameter of the pin is not exceeding 3.5 mm. In case the diameter is bigger than 3.5mm, then a thermocouple should be positioned according to fig. 1 on a pins located approx. 300mm from the penetration and on the top the duct.

4 Positioning of thermocouples over steel duct joints (N433, Helpdesk 2007-01)

It is unclear how the thermocouples T_1 as described in EN 1366-1, 9.1.2.2 Maximum temperature rise should be positioned.

9.1.2.2 reads

Additional thermocouples T_1 for determining maximum temperature rise shall be located in positions on the outer surface of the fire protection material to coincide with all joints (inner layer joints also).

9.1.2.2 only refers to joints in the fire protection material, and not duct joints. Do this means that thermocouple on thermocouple should be positioned over the duct?

Recommendation

Thermocouples shall be placed over steel duct joints as illustrated on fig. 2. Due to limits in space the junction does not have to be position between 400 mm to 700 mm from the penetration seal.

5 Positioning of thermocouples near joints (N433, Helpdesk 2007-01)

The thermocouples near joints can be positioned directly over the joint or 15 mm from the joint depending on the interpretation of the word coincide.

Recommendation

Thermocouples should be placed 15 mm from the joint as illustrated on fig. 2. The decision was taken based on the following.

1. The word coincide cannot be interpreted as directly above.
2. EN 1363-1, 9.1.2.3 page 20 reads:When positioning a thermocouple near a discontinuity e.g. between adjacent panels in a wall, the centre of the disc shall not be placed closer than 15 mm to the discontinuity.
3. In practical all other resistance to fire standards thermocouples are not placed directly over joint.

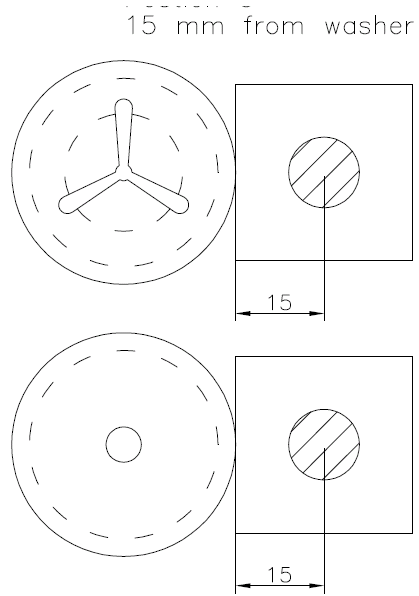


Fig. 1 Position of thermocouples near washers with pin diameter exceeding 3.5 mm

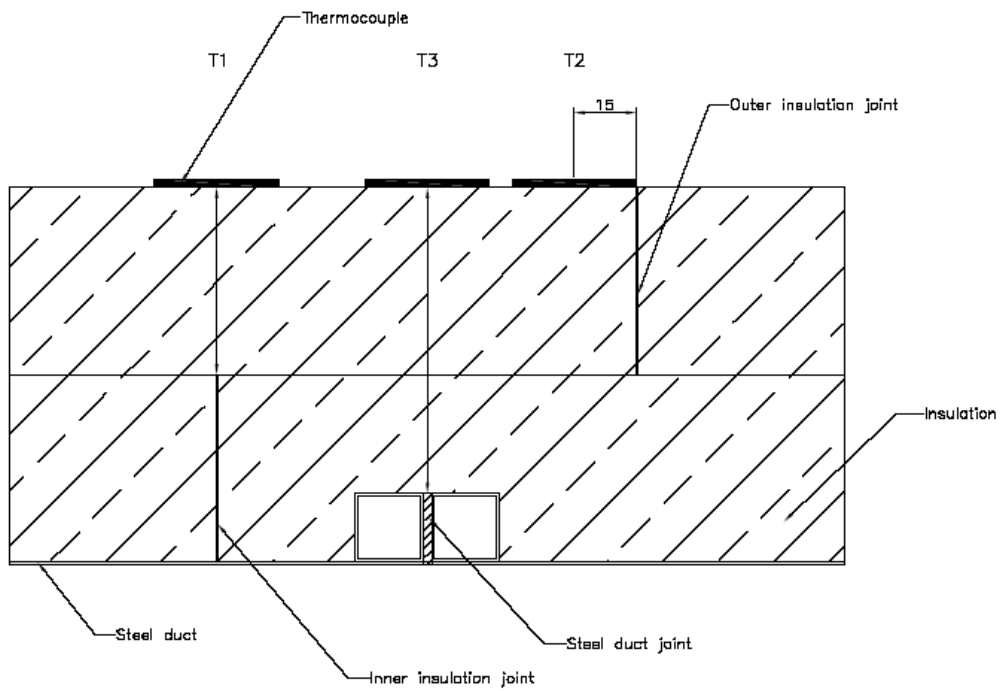


Fig.2 Illustration of positioning of thermocouples near joints and over steel duct joints