# PUBLIC SUMMARY REPORT OF THE EGOLF CEN/TS 1187:2012 ROUND ROBIN 2013

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# 1 Purpose of the round robin

The aims of this round robin exercise have been:

- to confirm that EGOLF laboratories are able to perform test 1 and 2 of CEN/TS 1187 in a proper way
- to provide information about the reproducibility and repeatability for CEN/TS 1187 test 1 and 2
- to give an indication for each participating laboratory regarding its performance when performing tests according to CEN/TS 1187
- to provide an indication of the variability in equipment, procedures and tools

# 2 Scope of the round robin

## 2.1 Method

*CEN/TS 1187:2012 Test methods for external fire exposure to roofs* is a technical specification containing 4 different fire test methods. Test 1 is the former German test method (test with burning brands), while test 2 is the former Nordic test method (test with burning brands and wind).

The statistical analysis was performed according to ISO 5725:1994/ Cor 1 2002 *Accuracy (trueness and precision) of measurement methods and results*.

## 2.2 Test 1 – Method with burning brands

The tests in the round robin were performed according to the procedure for test 1 described in clause 4 of CEN/TS 1187. The observations and test results according to CEN/TS 1187 clause 4.8 have been reported, and represent the basis for analysing the performance of the different laboratories.

## 2.3 Test 2 - Method with burning brands and wind

The tests in the round robin were performed according to the procedure for test 2 described in clause 5 of CEN/TS 1187. The observations and test results according to CEN/TS 1187 clause 5.8 have been reported, and represent the basis for analysing the performance of the different laboratories.

## 3 Test specimens

The same 4 products were tested in both test 1 and test 2:

**Sample 1**

- **PVC roof waterproofing sheet / substrate EPS**:
  - Supporting deck: 10 mm thick reinforced calcium silicate board (870 ± 50) kg·m$^{-3}$
  - Intermediate layer of glass fleece between the waterproofing sheet and substrate
  - Substrate type: EPS insulation, thickness 100 mm
  - Roof covering: single layer roof waterproofing system of PVC roof waterproofing sheet
  - Test specimen types: 1, 2, 3 and 3 according CEN/TS 1187 § 4.4.3.1 (the longitudinal joint in test specimen type 1 has a width of 90 mm / the transverse joint in test specimen type 2 has a width of 40 mm, welding with hot air)

The glass fleece layer was by a mistake from the organizers not mentioned in the first test instructions sent to the participants. An updated version of the instructions was circulated in the end of March 2013. However, 3 participants had then already tested the specimens without glass fleece, and the results from these laboratories (labs 2, 10 and 17) are therefore differing significantly from the others, and thus discarded from the statistical analysis.

**Sample 2**

- **PVC roof waterproofing sheet / substrate mineral wool**:
  - Supporting deck: 10 mm thick reinforced calcium silicate board (870 ± 50) kg·m$^{-3}$
  - Substrate type: MWR insulation, thickness 100 mm
  - Roof covering: single layer roof waterproofing system of PVC roof waterproofing sheet
  - Test specimen types: 1, 2, 3 and 3 according CEN/TS 1187 § 4.4.3.1 (the longitudinal joint in test specimen type 1 has a width of 90 mm / the transverse joint in test specimen type 2 has a width of 40 mm, welding with hot air)

**Sample 3**

- **Bitumen roof waterproofing sheet / substrate EPS**:
  - Supporting deck: 10 mm thick reinforced calcium silicate board (870 ± 50) kg·m$^{-3}$
  - Substrate : EPS insulation, thickness 100 mm
  - Roof covering: single layer roof waterproofing system of SBS bitumen roof waterproofing sheet
  - Test specimen types: 1, 2, 3 and 3 according CEN/TS 1187 § 4.4.3.1 (the longitudinal joint of test specimen type 1 has a width of 100 mm / the transverse joint of test specimen type 2 has a width of 150 mm, welding by torching (open flame))

**Sample 4**

- **Bitumen roof waterproofing sheet / substrate mineral wool:**
  - Supporting deck: 10 mm thick reinforced calcium silicate board (870 ± 50) $kg \cdot m^{-3}$
  - Substrate: MWR insulation, thickness 100 mm
  - Roof covering: single layer roof waterproofing system of SBS bitumen roof waterproofing sheet
  - Test specimen types: 1, 2, 3 and 3 according CEN/TS 1187 § 4.4.3.1 (the longitudinal joint of test specimen type 1 has a width of 100 mm / the transverse joint of test specimen type 2 has a width of 150 mm, welding by torching (open flame))

No specific instructions were given regarding use of mechanical fasteners for roofings in the tests.

## 4 Time frame

The tests were performed during the spring 2013.

## 5 Number of participants and tests

Below is a list of the 18 laboratories who participated and completed the round robin exercise. The laboratories are listed by the countries in alphabetical order The order given below does not correspond to the laboratory identification numbering given in the report.

| Country | Laboratory | Test 1 | Test 2 |
|---|---|---|---|
| Austria | IBS | x | |
| Belarus | RIFS | x | x |
| Belgium | Exova Warringtonfiregent | x | x |
| Denmark | DBI | x | x |
| Finland | VTT | | x |
| Germany | DMT GmbH & Co. KG | x | |
| | MPA Stuttgart | x | |
| | MPA NRW | x | |
| | Prüfinstitut HOCH | x | |
| Italy | LAPI | x | x |
| Lithuania | Fire Research Centre | x | |
| Netherlands | Kiwa BDA Testing | x | x |
| Norway | SINTEF NBL | | x |
| Poland | ITB | x | x |
| Spain | APPLUS LGAI | x | |
| | TECNALIA | x | |
| Sweden | SP | x | x |
| USA | FM Approvals | x | x |

Test method 1: 16 participants
Test method 2: 10 participants

# 6 Test results

The test results were analysed according to *ISO 5725-2. Accuracy (trueness and precision) of measurement methods and results – Part 2: Basic method for the determination of repeatability and reproducibility of a standard measurement method.* The data was analysed for consistency and outliers, using both graphical and numerical techniques.

The general mean values, the repeatability standard deviation $s_r$ and the reproducibility standard deviation $s_R$ were calculated for each of the measured variables after removal of outliers among the data.

## 6.1 Test results – Method 1 with burning brands

The following test results from test 1 according to clause 4.8 in CEN/TS 1187 were reported by the participating laboratories:

- External fire spread upwards
- Internal fire spread upwards
- External fire spread downwards
- Internal fire spread downwards
- Maximum burned length external
- Maximum burned length internal
- Burning material falling from the exposed side?
- Burning material penetrating the roof construction?
- Single opening area
- Sum of opening area
- Lateral fire spread to edges of measuring zone?
- Internal glowing combustion?
- Maximum radius of fire spread, external and internal

## 6.2 Test results – Method 2 with burning brands and wind

The following test results from test 2 according to CEN/TS 1187 were reported by the participating laboratories for wind speeds 2 and 4 m/s:

- Extent of damage in the roof waterproofing sheet [mm]
- Extent of damage in the substrate [mm]
- Maximum extent of damage in the roof waterproofing sheet[mm]
- Maximum extent of damage in the substrate [mm]

## 7 Assessment of the outcome of the round-robin

The round robin exercise has shown that most of the participating EGOLF laboratories will obtain results within acceptable limits when testing according to CEN TS 1187, test method 1 and test method 2. However, the repeatability and reproducibility of method 1 is assessed to be relatively low.

For both methods it has been found that there is a need for specific instructions and training in determining some of the test results based on observations. It could also be useful to propose changes to the technical specification CEN/TS 1187 that will help to avoid unnecessary variations in test results.

## References


EN 13501-5:2005 + A1: 2009. Fire classification of construction products and building elements - Part 5: Classification using data from external fire exposure to roofs tests. CEN, Belgium, 2009.

CEN/TS 1187:2012. Test methods for external fire exposure to roofs. CEN, Belgium, 2012.

ISO 5725-1:1994. Accuracy (trueness and precision) of measurement methods and results – Part 1: General principles and definitions. International Organization for Standardization, Switzerland 1994.

ISO 5725-2:1994/Cor 1 2002. Accuracy (trueness and precision) of measurement methods and results – Part 2: Basic method for the determination of repeatability and reproducibility of a standard measurement method. International Organization for Standardization, Switzerland 1994.