	Rules
END-USE PARAMETERS FOR ROOF COVERINGS/ROOF SYSTEMS	
End-use parameters-general	
Number of layers (details see for each product)	As tested
Order of layer in the waterproofing system	As tested
Orientation of each layer	Not relevant
End-use parameters-support	
Roof pitch	See general rules
Substrate or under-laying construction details	See CEN/TS 1187 and EN 13501-5
Application on existing roofs ("renovation")	New layer of shingles can be added directly to the existing bituminous shingle roof without testing if the shingles used for renovation are classified according to $B_{roof}(t2)$ on the same substrate used in the construction under renovation, (otherwise "as tested")
Spacing of frame elements (non-standard-support)	Not relevant
End-use parameters-mounting and fixing	
Mounting method	Not relevant
Fixing method (e.g. adhesive)	As tested. Results from tests without adhesives apply to products fixed using adhesives.
Spacing and type of mechanical fixing (fasteners)	As tested, narrower spacing included; type of fastener not relevant
Joints	Test result with overlapped joints allows for overlaps wider than tested.
Air gaps	Not relevant

B.3.2.3 Miscellaneous small elements

Products dealt with in this subclause are miscellaneous small elements such as wooden and polymeric shingles.

No additional rules have been developed in this document.

B.3.3 Reinforced bitumen sheets

This subclause applies to reinforced bitumen sheets for roof waterproofing, which are covered by the following standard: EN 13707.

NOTE No common rules are currently available if existing single or multi-layer roof waterproofing systems will be improved by adding different layers on top.

The rules shall be applied to every single layer within the multilayer roofing system in the same way as it is done with other layers belonging to a roof system.

Table B.4 — General rules and parameters for reinforced bitumen sheets

	Rules
PRODUCT PARAMETERS FOR ROOF COVERINGS/ROOF SYSTEMS	
Type of product	As tested
Product composition	As tested
Reaction-to-fire classification according to EN 13501-1	Not relevant
Colour (consider also pigments)	Colour of mineral finishing (e.g. slates, granules) not relevant
Binder content	Not relevant
Thickness	See general rules
Mass per unit area	See general rules
Density	Not relevant (covered by thickness and mass per unit area)
Geometry (structure, shape and constitutive layers of multi-layer product)	Not relevant
Air gaps (perpendicular to surface)	Not relevant
Joints	Not relevant
Surfacing on lower side (backing)	Not relevant
Surfacing on upper side (facing)	Higher amount of non-combustible mineral granules or thicker metal foil surfacing accepted.
Factory (pre-)applied adhesive	As tested
Reinforcement: mass per unit area, type of product; position within layer etc.	For filaments: a) If the test report includes a value for polyester per unit area, the result is valid for a mass per unit area of polyester up to 50 % above the tested condition (however, usually the DOP does not mention this value). For lower mass of polyester per unit area the test result is valid. b) For woven glass or glass fleece with a higher mass per unit area of the same type of product the test result is valid. c) For polyester reinforcement the results are also valid for the same type of sheet with additional glass fleece (e.g. 2 reinforcements or combination).
END-USE PARAMETERS FOR ROOF COVERINGS/ROOF SYSTEMS	
End-use parameters-general	
Number of layers (details see for each product)	As tested
Order of layer in the waterproofing system	As tested
Orientation of each layer	Not relevant

	Rules
End-use parameters-support	
Roof pitch	See general rules
Substrate or under-laying construction details	See CEN/TS 1187 and EN 13501-5
Application on existing roofs ("renovation")	New layer of bitumen membrane(s) can be added directly to the existing bituminous roof without testing if the membrane(s) used for renovation is classified according to B_{roof} (t2) on the same system (same in terms of thickness, type of bitumen, reinforcement and type of insulation) build-up as used in the construction under renovation, (otherwise as tested)
Spacing of frame elements (non-standard-support)	Not relevant
End-use parameters-mounting and fixing	
Mounting method	Not relevant
Fixing method (e.g. adhesive)	If tested loose laid this is not as applied in practice. So this may be thought of as a worse case. Test results then apply to mechanically fastened, or partially torched systems or fully self-adhesive or fully bonded systems. If tested partially self-adhesive or partially bitumen bonded the results also apply to fully bitumen bonded applications.
Spacing and type of mechanical fixing (fasteners)	Not relevant
Joints	Not relevant
Air gaps	Not relevant

B.3.4 Plastic and rubber sheets

This subclause applies to plastic and rubber sheets for roof waterproofing, which are covered by the following standard: EN 13956.

The following table was developed from experience with single ply sheeting. For special purposes such as renovation, multi-layer roof waterproofing systems may be intended to be used. No common rules are currently available for this purpose.

The rules developed for single layers shall be applied to every single layer within the multilayer roofing system in the same way as it is done with other layers belonging to a roof system.

Table B.5 — General rules and parameters for plastic and rubber sheets

	Rules
PRODUCT PARAMETERS FOR ROOF COVERINGS/ROOF SYSTEMS	
Type of product	As tested
Product composition	As tested
Reaction-to-fire classification according to EN 13501-1	See general rules
Colour (consider also pigments)	As tested
Binder content	Not relevant
Thickness	See general rules
Mass per unit area	See general rules
Density	Not relevant (covered by thickness and mass per unit area)
Geometry (structure, shape and constitutive layers of multi-layer product)	As tested
Air gaps (perpendicular to surface)	Not relevant
Joints	Not relevant
Surfacing on lower side (backing)	See general rules
Surfacing on upper side (facing)	See general rules
Factory (pre-)applied adhesive	Smaller mass per unit area included; for the same material.
Reinforcement: mass per unit area, type of product; position within layer etc.	For filaments: a) For lower mass of polyester per unit area the test result is valid. b) For woven glass or glass fleece with a higher mass per unit area of the same type of product the test result is valid. c) For polyester reinforcement the results are also valid for the same type of sheet with additional glass fleece (e.g. 2 reinforcements or combination).
END-USE PARAMETERS FOR ROOF COVERINGS/ROOF SYSTEMS	
End-use parameters-general	
Number of layers (details see for each product)	As tested
Order of layer in the waterproofing system	See general rules
Orientation of each layer	Not relevant
End-use parameters-support	
Roof pitch	See general rules
Substrate or under-laying construction details	See CEN/TS 1187 and EN 13501-5

	Rules
Application on existing roofs ("renovation")	As tested
Spacing of frame elements (non-standard-support)	Not relevant
End-use parameters-mounting and fixing	
Mounting method	Not relevant
Fixing method (e.g. adhesive)	As tested
Spacing and type of mechanical fixing (fasteners)	As tested, narrower spacing included; type of fastener not relevant
Joints	Not relevant
Air gaps	Not relevant

B.3.5 Rooflights and Roof windows

Products covered in this subclause are defined in product standards such as EN 1873, EN 14963, EN 14351-1.

No additional rules have been developed in this document.

NOTE Test method 2 of CEN/TS 1187 is not applicable to geometrically irregular roofs or roof mounted appliances, e.g. rooflights and roof windows.

B.3.6 Glazing systems

Not applicable for test 2.

B.3.7 Profiled non-metallic sheets

B.3.7.1 Profiled fibre cement sheets

Products dealt with in this subclause are covered by the following standard: EN 494. No additional rules have been developed in this document.

NOTE Some of the products in this sector are covered by Commission Decision 2000/553/EC.

B.3.7.2 Profiled bitumen based sheets

Products dealt with in this subclause are covered by the following standard: EN 534.

No additional rules have been developed in this document.

B.3.7.3 Miscellaneous profiled non-metallic sheets

No additional rules have been developed in this document.

B.3.8 Composite metallic sandwich panels

Products dealt with in this subclause are covered by the following standard: EN 14509.

No additional rules have been developed in this document.

NOTE Some of the products in this sector are covered by Commission Decision 2006/600/EC.

B.3.9 Profiled metal sheets

Products dealt with in this subclause are covered by European Standards, such as EN 14782.

NOTE Some of the products in this sector are covered by Commission Decisions 2000/553/EC and 2005/403/EC.

B.3.10 Flat metal sheets

Products dealt with in this Clause are covered by European Standards, such as EN 14783.

NOTE Some of the products in this sector are covered by Commission Decisions 2000/553/EC and 2005/403/EC.

B.3.11 Liquid applied waterproofing kits

At this stage, no additional rules have been developed in this document.

B.3.12 Miscellaneous

Products under this sector are meant to be roof coverings/roof systems not covered by B.3.1 to B.3.11.

Examples for this roof sector are thatched roofs and mastic asphalt.

At this stage, no additional rules have been developed in this document.

Annex C
(normative)

Application rules for test results from CEN/TS 1187, test 3, per product group

C.1 General

This annex gives guidance on the application of external fire test results arising from CEN/TS 1187, test 3. This is done to assist classification according to EN 13501-5.

Rules for product groups are arranged in this annex following the general structure outlined in Clause 7 of the main document, for product groups and/or components.

NOTE 1 The extent to which an individual component or layer is directly affected/damaged by the testing conditions will be influenced by those layers and components used around them. Consideration of any changes to the EN 13501-5 classification of the roof system by variations to the individual components have been addressed, when specific guidance is available, in the appropriate product groups, C.2 to C.3.12 below.

If rules listed in this annex do not apply for a specific product/end-use application parameter, the rule "as tested" applies.

Rules on the influence of individual parameters shall be developed by application of the procedure(s) outlined in Clause 5 of the main document.

The product groups and/or components are as detailed below.

The rules for individual product groups and/or components are preceded by:

C.2 General rules for test 3. The product groups include:

— C.3.1 Slates and Tiles;

  — C.3.1.1 Non-metallic slates and tiles (reaction-to-fire Class A1 to A2 – s3 d2, according to EN 13501-1);

  — C.3.1.2 Metallic Tiles;

— C.3.2 Small elements (reaction-to-fire Class B-s1 d0 to F, according to EN 13501-1);

  — C.3.2.2 Bitumen Shingles;

  — C.3.2.3 Miscellaneous small elements;

— C.3.3 Reinforced bitumen sheets;

— C.3.4 Plastic and rubber sheets;

— C.3.5 Roof lights and roof windows

— C.3.6 Glazing systems;

— C.3.7 Profiled non-metallic sheets;

- C.3.7.1 Profiled fibre cement sheets;
- C.3.7.2 Profiled bitumen-based Sheets;
- C.3.7.3 Miscellaneous profiled non-metallic sheets;

— C.3.8 Composite metallic sandwich panels;

— C.3.9 Profiled metal sheets;

— C.3.10 Flat metal sheets;

— C.3.11 Liquid applied roof waterproofing kits;

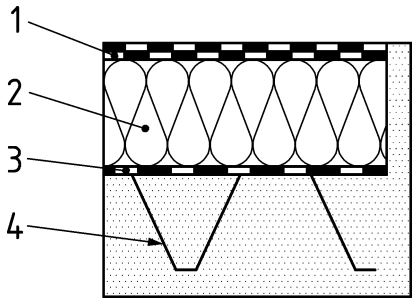
— C.3.12 Miscellaneous.

Clause 4, Table 1 lists the product and associated end-use application parameters that can influence the classification of external fire performance for each of the identified roofing systems. The following analysis indicates how each of these parameters may influence the classification from test results from CEN/TS 1187, test 3.

This annex considers the possible effect(s) of single or multiple changes to the individual product and end-use application parameters of the roof on the external fire-performance. Since a variation of several parameters at the same time may lead to unexpected results, the rules that are given for a specific product group shall be applied, without exclusion of any one of these rules. In principle, the rules are only valid, if they are applied to one parameter in the roofing system and the others are kept unchanged, unless otherwise stated.

For illustration purposes, Figure C.1 shows a possible combination of layers to form a roof system. In this example a roof is shown having flexible waterproofing sheets as uppermost layer (i.e. roof covering(s) as defined according to both CEN/TS 1187 and EN 13501-5). Within such a construction various combinations of layers are possible in practice.

Figure C.1 shows a combination of layers in a typical roofing system.



Key

1 roof covering system
2 insulation layer
3 vapour barrier
4 supporting deck

Figure C.1 — Example sketch

NOTE 2 The rules listed in the following tables only apply if the roof covering products/materials are used in accordance with national provisions on the design and execution of works.

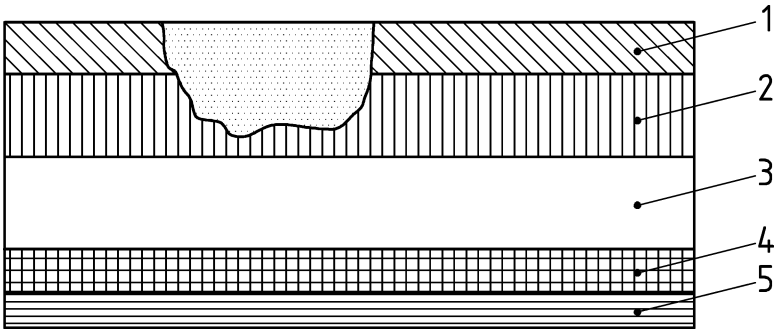
C.2 General rules, valid for every product within a product group

General application rules cannot be given for each parameter in Table 1 of Clause 4. Based on experience with the fire performance of widely used, but specific roof systems [e.g. roof systems built with flexible waterproofing layers, insulation boards, metal roof supporting deck (from top to bottom)], Table C.1 lists rules for a restricted set of parameters.

Whenever rules are available for a product group (as given in C.3.1 to C.3.12) then these shall be used in addition to rules given here, which may lead to overruling of a general rule by the individual rule.

Table C.1 — Rules for a restricted set of parameters

Parameter	Rules
Thickness	After testing of thinnest and thickest layer of product, resp., the test result is valid for all thicknesses between these margins, if not specified otherwise. This general rule is not valid for those products, which are made of numerous layers of different ingredients (like, for instance, reinforced bitumen sheets) in which a change in overall thickness does not describe how internal layers are reorganised.
Mass per unit area	After testing of heaviest and lightest layer of product, resp., the test result is valid for all masses per unit area between these margins, if not specified otherwise. This general rule is not valid for those products, which are made of numerous layers of different ingredients (like, for instance, reinforced bitumen sheets) in which a change in average mass per unit area does not describe variations of internal layers.
Density	After testing of heaviest and lightest layer of product, resp., the test result is valid for all densities per unit area between these margins, if not specified otherwise. This general rule is not valid for those products, which are made of numerous layers of different ingredients. Changes in overall density might not explain important internal variations.
Order of layers in the roofing system	The layer (and its supports) positioned below the lowest layer affected by the fire (influencing the test result) during the CEN/TS 1187 test, may be replaced by any other fire equivalent material. This fire equivalence is judged by having equal or better fire performance (e.g. reaction to fire, thermal capacity, thermal conductivity …). Layer(s) positioned below the uppermost layer that has not undergone a change relevant to the test result may be replaced by any other layer(s). NOTE Additional national requirements on reaction to fire could apply.

Parameter	Rules
	
Key	
1 ppermost layer (i.e. roof covering(s) as defined according to both CEN/TS 1187 and EN 13501-5) plus any layer between top and lowest affected layers, resp. 2 owest affected layer 3 ppermost unaffected layer 4 ny layer below 3 5 any layer below 4	
Reaction-to-fire classification according to EN 13501-1	Substitution is possible for a component or layer with the same or better reaction-to-fire classification when tested in the same end use application provided that the substitute component or layer is of the same generic product group. This rule excludes the substitution of the external (top) layer.
Surfacing on lower or upper side of a product.	A higher mass per unit area of material having a reaction-to-fire Class A1 to A2-s3 d2 is acceptable. A smaller mass per unit area of material having reaction-to-fire Class B-s1 d0 to F is also acceptable, if not specified otherwise. This rule excludes the substitution of the external (top) layer.
Roof pitch	Covered by CEN/TS 1187, test 3 or EN 13501-5

C.3 Product groups

C.3.1 Slates and tiles

C.3.1.1 Non-metallic slates and tiles (reaction-to-fire Class A1 to A2 – s3 d2, according to EN 13501-1)

This subclause applies to discontinuously laid non-metallic roofing products (reaction-to-fire Class A1 to A2 – s3, d2 EN 13501-1) that are covered by the following standards e.g. EN 490, EN 1304, EN 492, EN 12326-1.

NOTE Most products/materials in this sector are covered by EC Decisions such as 2005/553/EC.