



**GROUP OF TESTING LABORATORIES
GRYFITLAB**

ul. Prosta 2, Łozienica, 72-100 Goleniów
tel. (091) 431 82 29, fax (091) 418 97 57, mobile:+48 607-900-480
www.gryfitlab.com, e-mail: contact@gryfitlab.com

Fire resistance classification No. LBO – 066 – KZ/20E

Classified product:

**Wooden roofs with cladding made of gypsum plasterboards
Norgips GKF type DF and Norgips GKFI type DFH2**

Sponsor:

Norgips Sp. z o.o.
ul. Raławicka 93
02-634 Warszawa

Prepared by:

Group of Testing Laboratories Gryfitlab
ul. Prosta 2, Łozienica
72-100 Goleniów

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1. This classification has been prepared based on the following documents:

- 1.1. Standard PN-EN 1365-2:2002 Fire resistance tests for loadbearing elements – Part 2: Floors and roofs.
- 1.2. Standard PN-EN 1365-2:2014-12 Fire resistance tests for loadbearing elements – Part 2: Floors and roofs.
- 1.3. Standard PN-EN 1363-1:2020-07 Fire resistance tests – Part 1: General requirements.
- 1.4. Standard PN-EN 13501-2: 2016-07 Fire classification of construction products and building elements – Part 2: Classification using data from fire resistance tests, excluding ventilation services.
- 1.5. Standard PN-EN 520+A1:2012 Gypsum plasterboards – Definitions, requirements and test methods.
- 1.6. Report No. LZP02-6041/15/R32NP Roof ZP-2x15 GKF DF/CD 60 W 20, with the roof pitch angle of 30 degrees, clad with 2 x 15 mm thick gypsum plasterboards Norgips GKF type DF and filled with 20 cm thick mineral glass wool URSA DF 39. Fire resistance test. Building Research Institute (Instytut Techniki Budowlanej), Warsaw 2016.
- 1.7. Technical documentation provided by Norgips Sp. z o.o.

2. Technical description of the roof casing made using the Norgips cladding system (gypsum plasterboards Norgips GKF type DF or Norgips GKFI type DFH2)**2.1 Roof casing ZP-2x15 GKF DF/CD 60 W 20 and ZP-2x15 GKFI DFH2/CD 60 W 20, with double cladding made of 2 x 15 mm thick gypsum plasterboards Norgips GKF type DF or Norgips GKFI type DFH2, and placed on the framework made of profiles CD 60**

The roof casing is built on wooden elements of the roof truss. The constructional elements of the roof truss are designed according to Polish Standards and can be placed maximally every **104 cm**. One can apply any sheathing and cover of the roof, which are consistent with Polish Standards. The framework of the roof casing is made of profiles **CD 60** which were made of cold bent galvanized steel (the nominal thickness of the steel used: **0.55 mm ± 0.06 mm** or **0.6 mm ± 0.06 mm**). Profiles **CD 60** are fixed to wooden beams (e.g. rafters); the beams are placed maximally every **104 cm** and this distance is measured between the axes of the adjacent beams. The CD 60 profiles are fixed to the beams by means of hangers type **ES 60**, **ES 60 plus** or **flat hangers type L** fixed to wooden beams by means of screws for wood **Ø 3.5 x 35 mm** – two screws are applied per each connection. Profiles **CD 60** are connected with hangers type **ES 60** or **ES 60 plus** by means of sheet steel screws **Ø 3.9 x 11 mm** or **Ø 3.5 x 9.5 mm** – four such screws are applied per each hanger. **Flat hangers type L** are connected with profiles **CD 60** in such a way that they are slid into the inside of profiles **CD 60** and locked therein. The maximum distance between profiles **CD 60**, as measured between the axes of the adjacent profiles, cannot exceed **40 cm**.

The first layer of **15 mm thick** boards **Norgips GKF type DF** or **15 mm thick** boards **Norgips GKFI type DFH2** is fixed perpendicularly to profiles **CD 60** using system screws **Ø3.5 x 25 mm** placed maximally every **40 cm**. The shorter edges of the boards of the first layer are shifted in relation to one another by at least **40 cm** while the joints between the shorter edges of the boards have to be

placed within the axes of profiles **CD 60**. The second layer of **15 mm thick boards Norgips GKF type DF** or **15 mm thick boards Norgips GKFI type DFH2** is fixed perpendicularly to profiles **CD 60** using system sheet steel screws **Ø3.5 x 45 mm** placed maximally every **17 cm**. The shorter edges of the boards of the second layer are shifted in relation to one another and in relation to the shorter edges of the boards of the first layer by at least **40 cm** while the joints between the shorter edges of the boards have to be placed within the axes of profiles **CD 60**. The longer edges of the boards of the second layer are shifted in relation to the longer edges of the boards of the first layer by at least **40 cm**.

The space between the beams is filled with **mineral glass wool (at least 150 mm thick)** of the A1 class of reaction to fire or with **mineral rock wool** of any thickness and the A1 class of reaction to fire. The self-weight load of mineral wool cannot be less than **0.1 kN/m³**.

In the roof and in the Norgips roof casing it is permitted to use roof foil, or wind protection insulation and vapour insulation.

Screw heads and joints between boards **Norgips GKF type DF** or **Norgips GKFI type DFH2** are covered with gypsum filler e.g. **Norgips Start** or **Norgips Super Filler**, while the joints in the second layer of the boards are additionally reinforced with self-adhesive reinforcing system tape made of glass fibre or with reinforcing tape made of interlining. For final covering, it is recommended to use ready mix jointing compound e.g. Norgips Extra Finish, putty Norgips Start & Finish or gypsum finish Norgips Finish.

Constructional details of the roof casing made of **2 x 15 mm thick gypsum plasterboards Norgips GKF type DF** or **2 x 15 mm thick gypsum plasterboards Norgips GKFI type DFH2** are presented in **Figures 1 ÷ 6**.

2.2 Roof casing ZP-2x15 GKF DF/KAPEL W 20 and ZP-2x15 GKFI DFH2/KAPEL W 20, with double cladding made of 2 x 15 mm thick gypsum plasterboards Norgips GKF type DF or Norgips GKFI type DFH2, and placed on the framework made of hat profiles

The roof casing is built on wooden elements of the roof truss. The constructional elements of the roof truss are designed according to Polish Standards and can be placed maximally every **104 cm**. One can apply any sheathing and cover of the roof, which are consistent with Polish Standards. The framework of the roof casing is made of **hat** profiles which were made of cold bent galvanized steel (the nominal thickness of the steel used: **0.55 mm ± 0.06 mm** or **0.6 mm ± 0.06 mm**). **Hat** profiles are fixed directly to wooden beams (e.g. rafters); the beams are placed maximally every **104 cm** and this distance is measured between the axes of the adjacent beams. The hat profiles are fixed to the beams by means of screws for wood **Ø 3.5 x 35 mm** – two screws are applied per each connection. The maximum distance between **hat** profiles, as measured between the axes of the adjacent profiles, cannot exceed **40 cm**.

The first layer of **15 mm thick boards Norgips GKF type DF** or **15 mm thick boards Norgips GKFI type DFH2** is fixed perpendicularly to **hat** profiles using system sheet steel screws **Ø3.5 x 25 mm** placed maximally every **40 cm**. The shorter edges of the boards of the first layer are shifted in relation to one another by at least **40 cm** while the joints between the shorter edges of the boards

have to be placed within the axes of **hat** profiles. The second layer of **15 mm thick** boards **Norgips GKF type DF** or **15 mm thick** boards **Norgips GKFI type DFH2** is fixed perpendicularly to **hat** profiles using system sheet steel screws **Ø3.5 x 45 mm** placed maximally every **17 cm**. The shorter edges of the boards of the second layer are shifted in relation to one another and in relation to the shorter edges of the boards of the first layer by at least **40 cm** while the joints between the shorter edges of the boards have to be placed within the axes of **hat** profiles. The longer edges of the boards of the second layer are shifted in relation to the longer edges of the boards of the first layer by at least **40 cm**.

The space between the beams is filled with **mineral glass wool (at least 150 mm thick)** of the A1 class of reaction to fire or with **mineral rock wool** of any thickness and the A1 class of reaction to fire. The self-weight load of mineral wool cannot be less than **0.1 kN/m³**.

In the roof and in the Norgips roof casing it is permitted to use roof foil, or wind protection insulation and vapour insulation.

Screw heads and joints between boards **Norgips GKF type DF** or **Norgips GKFI type DFH2** are covered with gypsum filler e.g. Norgips Start or Norgips Super Filler, while the joints in the second layer of the boards are additionally reinforced with self-adhesive reinforcing system tape made of glass fibre or with reinforcing tape made of interlining. For final covering, it is recommended to use ready mix jointing compound e.g. Norgips Extra Finish, putty Norgips Start & Finish or gypsum finish Norgips Finish.

Constructional details of the roof casing made of **2 x 15 mm** thick gypsum plasterboards **Norgips GKF type DF** or **2 x 15 mm** thick gypsum plasterboards **Norgips GKFI type DFH2** are presented in **Figures 7 ÷ 9**.

3. Fire resistance tests

The fire resistance test of a roof with the Norgips roof casing and constructed as follows: wooden rafters, filling made of mineral glass wool and cladding made of 2 x 15 mm gypsum plasterboards Norgips GKF type DF, with the roof pitch angle of 30 degrees was carried out by the Fire Tests Laboratory of the Building Research Institute (Insytut Techniki Budowlanej) in Warsaw.

Test report: LZP02-6041/15/R32NP [1.6].

4. Fire resistance classification of wooden roofs with the Norgips roof casing

Based on the analysis of the fire resistance test results indicated in item 3, the following products:

roofs with the Norgips roof casing

prepared in accordance with the technical description presented in item 2, when exposed to fire from below, are classified in accordance with the criteria presented in standard PN-EN 13501-2:2016-07 [1.4] as belonging to fire resistance class **REI 60**.

5. Applicability

This classification is applicable to wooden roofs with the roof pitch angle of $15 + 45$ degrees, with the Norgips roof casing made of gypsum plasterboards Norgips GKF type DF or Norgips GKFI type DFH2.

The wooden constructional elements of the roof truss should be designed according to Polish Standards and should meet the requirements resulting from acceptable strength parameters of wooden constructions and conditions of their use.

6. Validity

The classification presented in item 4 is valid until 31.12.2025 on the condition that there are no changes in the construction or materials of the classified products.

Annex 1 – Drawings presenting wooden roofs with the Norgips roof casing and cladding made of gypsum plasterboards Norgips GKF type DF and Norgips GKFI type DFH2

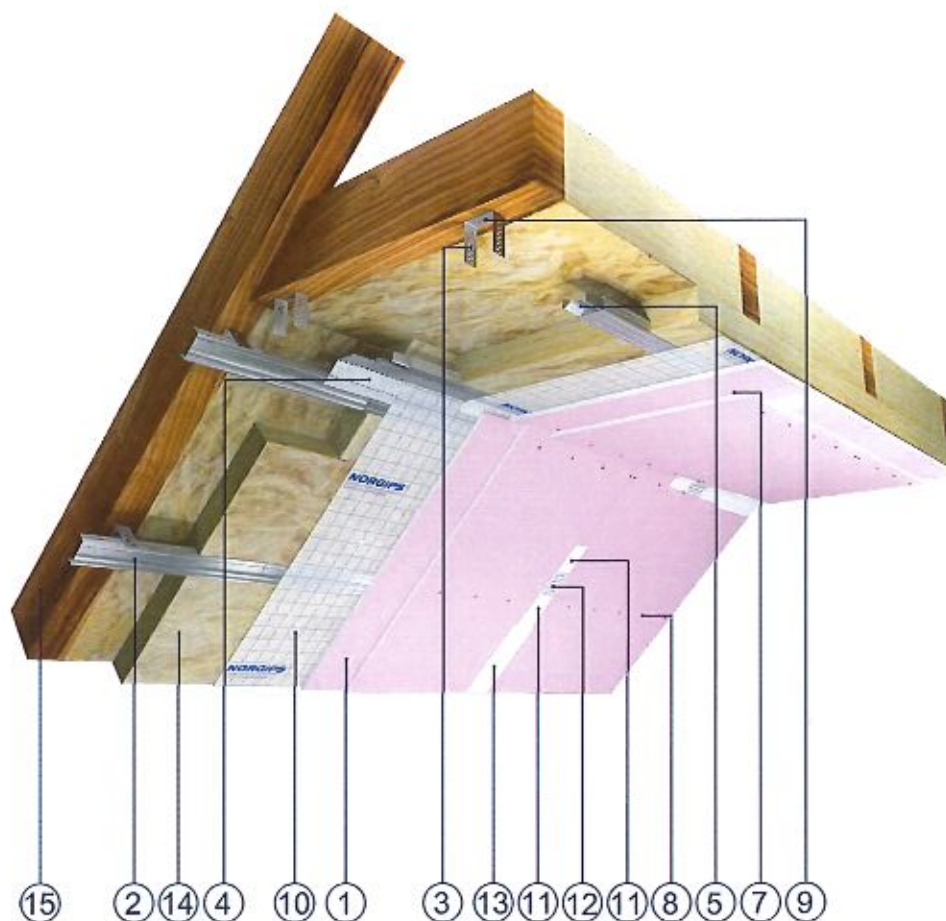

Prezes Zarządu
Andrzej Szarycki

GRYFITLAB Sp. z o.o.
Zespół Laboratoriów
Badawczych Gryfitlab
ul. Prosta 2, Łozienica
72-100 GOLENIÓW

Classification No. LBO – 066 – KZ/20E

Annex 1

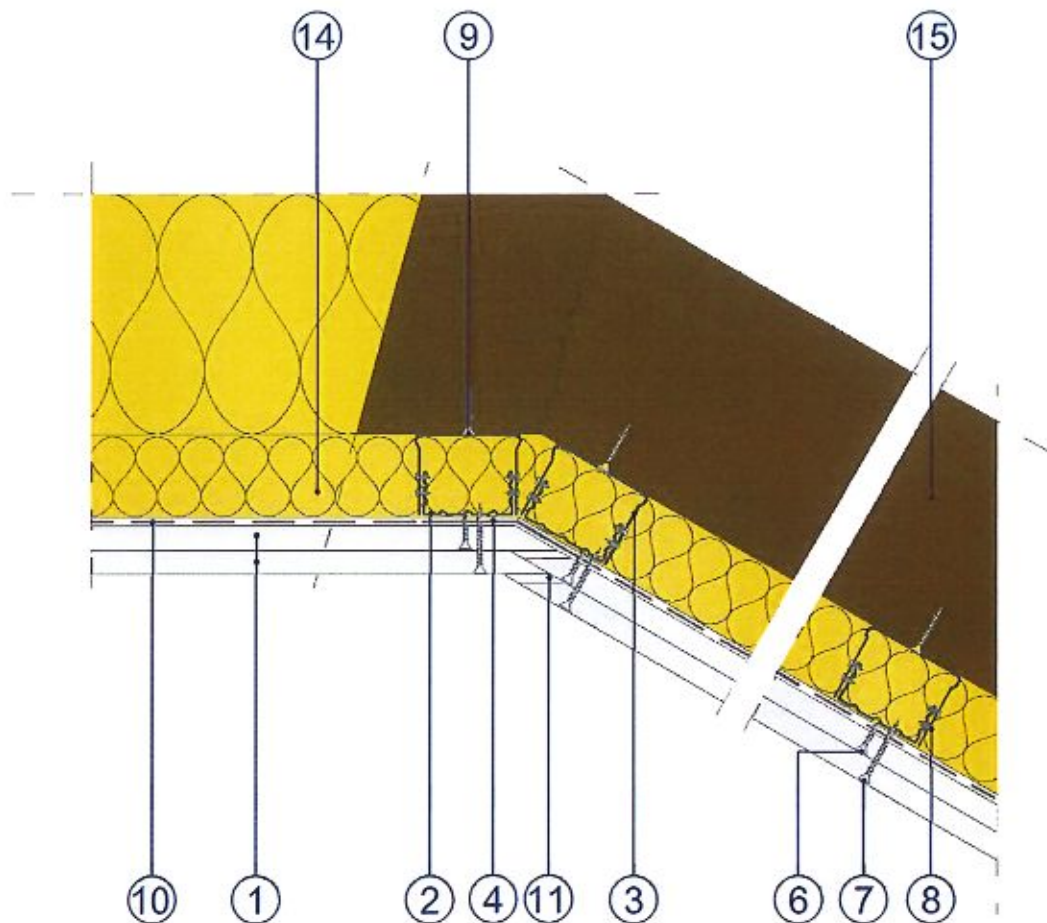
Drawings presenting wooden roofs
with the Norgips roof casing and
cladding made of gypsum plasterboards
Norgips GKF type DF and Norgips GKFI type DFH2



LEGEND

1. Gypsum plasterboards Norgips GKF type DF or Norgips GKFI type DFH2, thickness: 2 x 15 mm
2. Profiles e.g. Norgips CD 60 made of at least 0.55 mm thick sheet metal, placed maximally every 40 cm (the distance measured between the axes of the adjacent profiles)
3. Hangers e.g. Norgips type ES or ES plus
4. Universal profile Norgips Flex (recommended)
5. Lengthwise connectors e.g. Norgips
7. Sheet steel screws e.g. Norgips 3.5 x 25 mm placed every 40 cm
8. Sheet steel screws e.g. Norgips 3.5 x 45 mm placed every 17 cm
9. Screws for wood e.g. Norgips 3.5 x 35 mm (2 pieces)
10. Vapour insulation foil
11. Gypsum filler e.g. Norgips Start or Norgips Super Filler
12. Reinforcing tape Norgips made of glass fibre or interlining
13. Gypsum finish e.g. Norgips Finish or ready mix jointing compound e.g. Norgips Start & Finish or Norgips Extra Finish
14. Mineral glass wool or mineral rock wool
15. Roof rafters

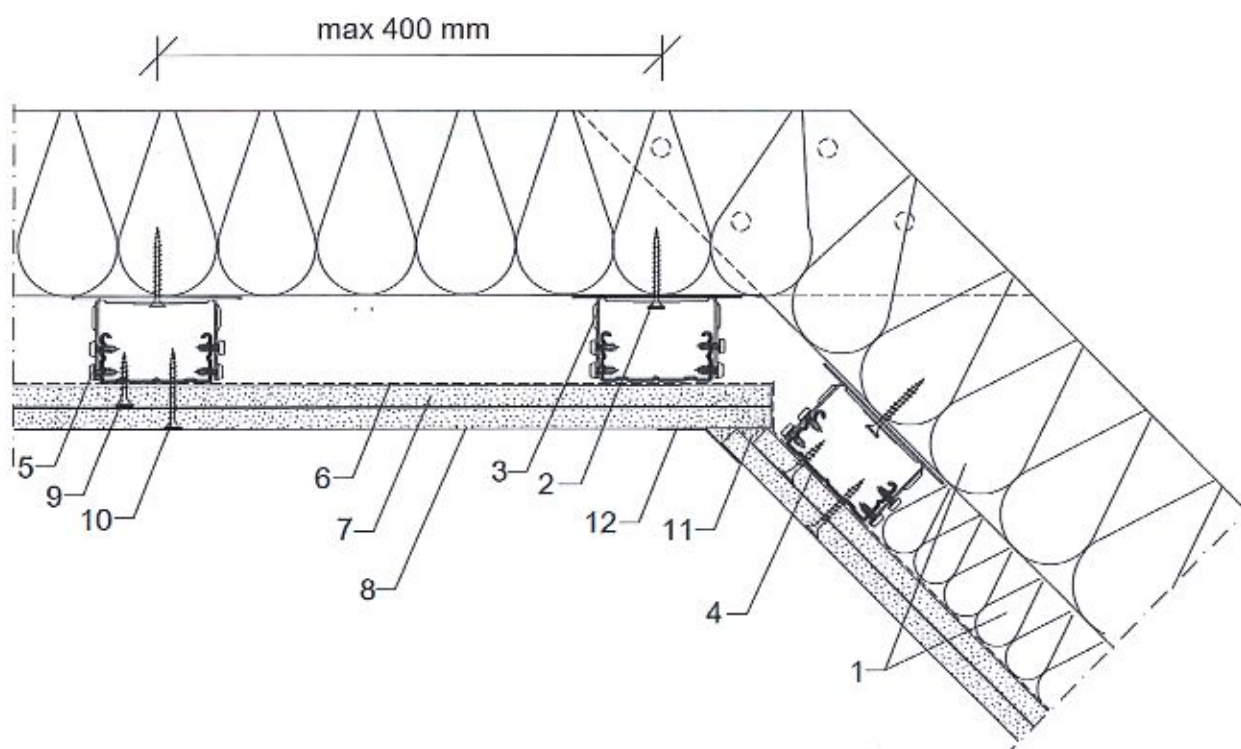
Figure 1 View of the roof casing with the framework made of profiles CD 60 and hangers ES and ES plus



LEGEND

1. Gypsum plasterboards Norgips GKF type DF or Norgips GKFI type DFH2, thickness: 2 x 15 mm
2. Profiles e.g. Norgips CD 60 made of at least 0.55 mm thick sheet metal, placed maximally every 40 cm (the distance measured between the axes of the adjacent profiles)
3. Hangers e.g. Norgips type ES or ES plus
4. Universal profile Norgips Flex (recommended)
5. Sheet steel screws e.g. Norgips 3.5 x 25 mm placed every 40 cm
6. Sheet steel screws e.g. Norgips 3.5 x 45 mm placed every 17 cm
7. Sheet steel screws e.g. Norgips 3.9 x 11 mm or 3.5 x 9.5 mm
8. Screws for wood e.g. Norgips 3.5 x 35 mm (2 pieces)
9. Vapour insulation foil
10. Gypsum filler e.g. Norgips Start or Norgips Super Filler
11. Mineral glass wool or mineral rock wool
12. Roof rafters

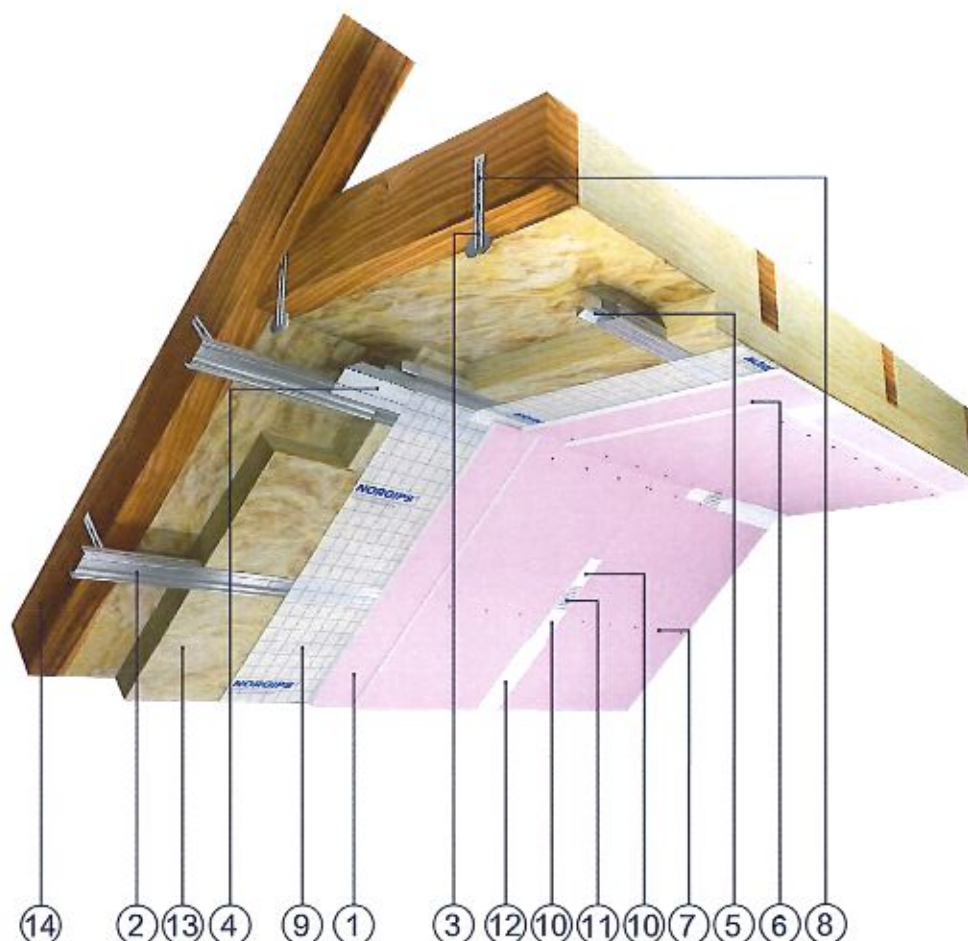
Figure 2 Section of the roof casing with the framework made of profiles CD 60 and hangers ES and ES plus



LEGEND

1. Mineral glass wool or mineral rock wool
2. Screws for wood e.g. Norgips 3.5 x 35 mm (2 pieces per hanger)
3. Hangers e.g. Norgips type ES or ES plus
4. Profile e.g. Norgips CD 60 made of at least 0.55 mm thick sheet metal
5. Sheet steel screws e.g. Norgips 3.9 x 11 mm or 3.5 x 9.5 mm
6. Vapour insulation foil
7. First layer of gypsum plasterboards Norgips GKF type DF or Norgips GKFI type DFH2, thickness: 15 mm
8. Second layer of gypsum plasterboards Norgips GKF type DF or Norgips GKFI type DFH2, thickness: 15 mm
9. Sheet steel screws e.g. Norgips 3.5 x 25 mm placed every 40 cm
10. Sheet steel screws e.g. Norgips 3.5 x 45 mm placed every 17 cm
11. Gypsum filler e.g. Norgips Start or Norgips Super Filler
12. Reinforcing tape e.g. Norgips made of glass fibre or interlining

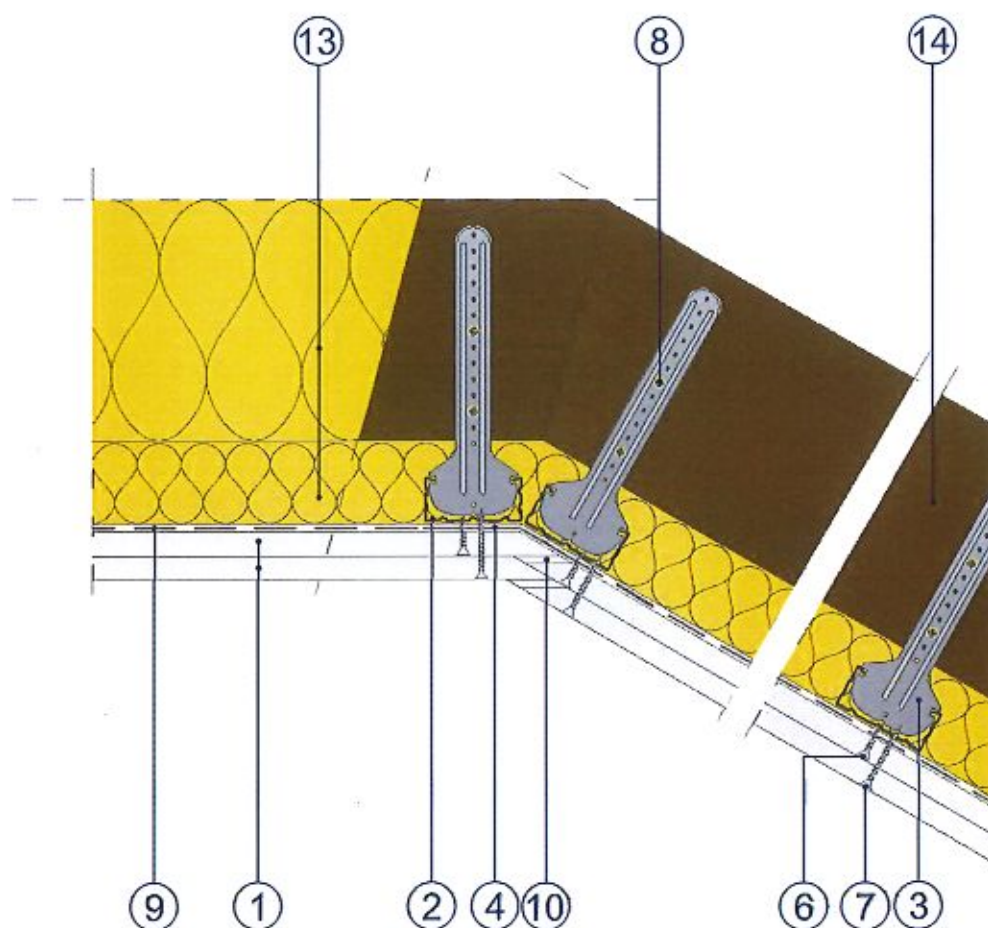
Figure 3 Section of the roof casing with the framework made of profiles CD 60 and hangers ES and ES plus



LEGEND

1. Gypsum plasterboards Norgips GKF type DF or Norgips GKFI type DFH2, thickness: 2 x 15 mm
2. Profiles e.g. Norgips CD 60 made of at least 0.55 mm thick sheet metal, placed maximally every 40 cm (the distance measured between the axes of the adjacent profiles)
3. Flat hangers e.g. Norgips type L
4. Universal profile Norgips Flex (recommended)
5. Lengthwise connectors e.g. Norgips
6. Sheet steel screws e.g. Norgips 3.5 x 25 mm placed every 40 cm
7. Sheet steel screws e.g. Norgips 3.5 x 45 mm placed every 17 cm
8. Screws for wood e.g. Norgips 3.5 x 35 mm
9. Vapour insulation foil
10. Gypsum filler e.g. Norgips Start or Norgips Super Filler
11. Reinforcing tape e.g. Norgips made of glass fibre or interlining
12. Gypsum finish e.g. Norgips Finish or ready mix jointing compound e.g. Norgips Start & Finish or Norgips Extra Finish
13. Mineral glass wool or mineral rock wool
14. Roof rafters

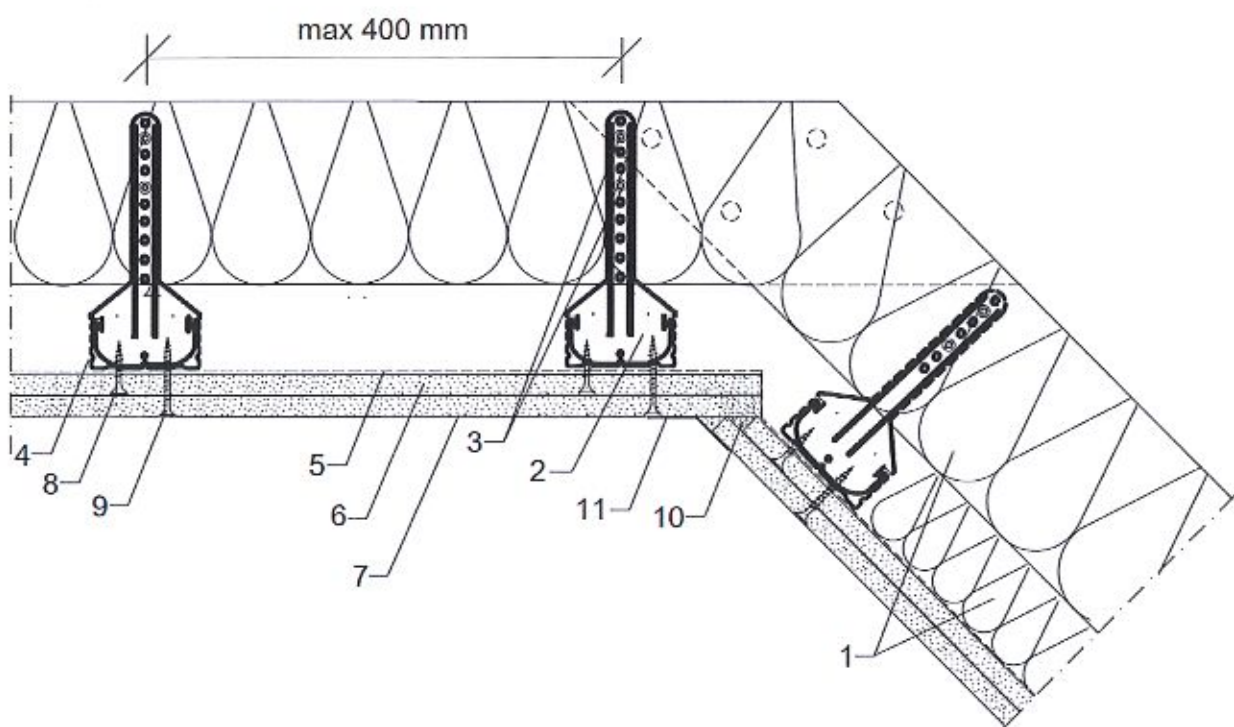
Figure 4 View of the roof casing with the framework made of profiles CD 60 and flat hangers type L



LEGEND

1. Gypsum plasterboards Norgips GKF type DF or Norgips GKFI type DFH2, thickness: 2 x 15 mm
2. Profiles e.g. Norgips CD 60 made of at least 0.55 mm thick sheet metal, placed maximally every 40 cm (the distance measured between the axes of the adjacent profiles)
3. Flat hangers e.g. Norgips type L
4. Universal profile Norgips Flex (recommended)
6. Sheet steel screws e.g. Norgips 3.5 x 25 mm placed every 40 cm
7. Sheet steel screws e.g. Norgips 3.5 x 45 mm placed every 17 cm
8. Screws for wood e.g. Norgips 3.5 x 35 mm
9. Vapour insulation foil
10. Gypsum filler e.g. Norgips Start or Norgips Super Filler
13. Mineral glass wool or mineral rock wool
14. Roof rafters

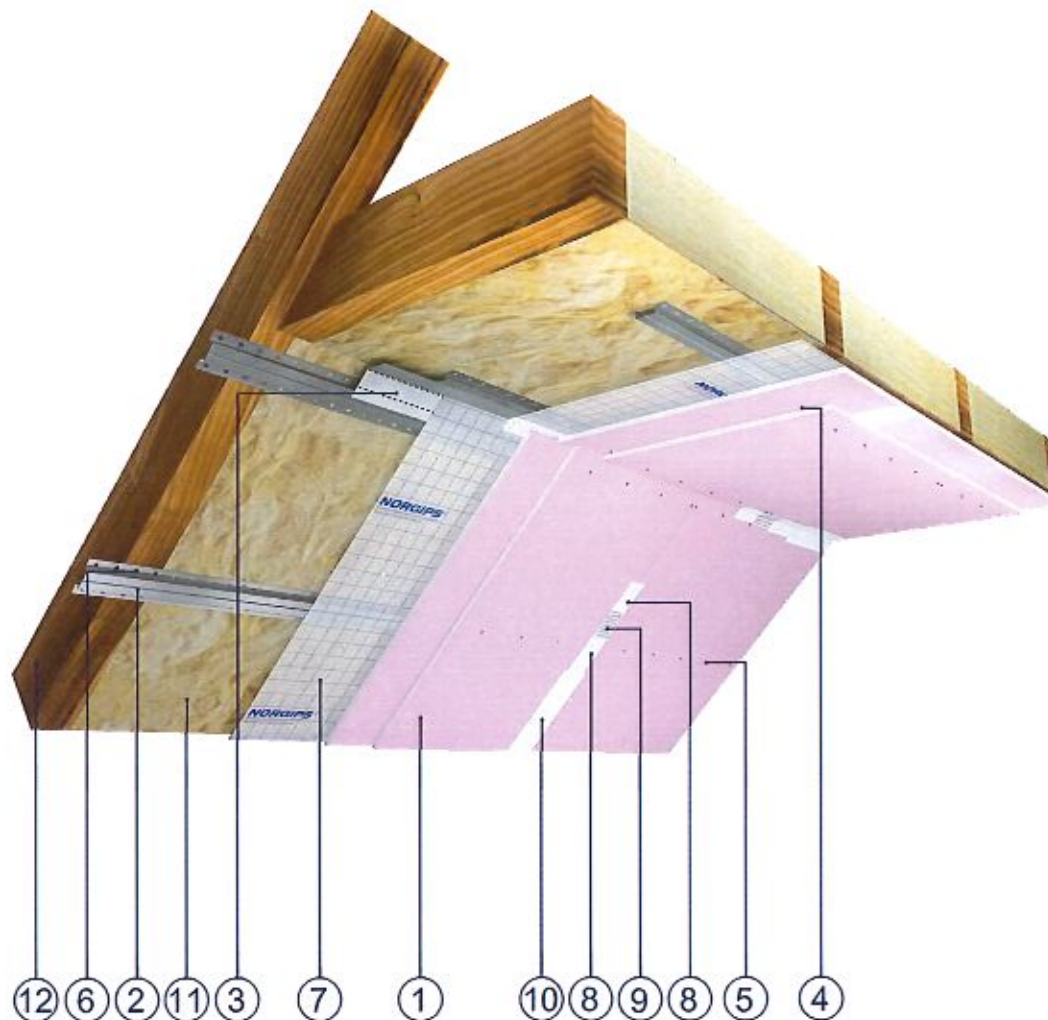
Figure 5 Section of the roof casing with the framework made of profiles CD 60 and flat hangers type L



LEGEND

1. Mineral glass wool or mineral rock wool
2. Flat hanger e.g. Norgips type L
3. Screws for wood e.g. Norgips 3.5 x 35 mm (2 pieces per hanger)
4. Profile e.g. Norgips CD 60 made of at least 0.55 mm thick sheet metal
5. Vapour insulation foil
6. First layer of gypsum plasterboards Norgips GKF type DF or Norgips GKFI type DFH2, thickness: 15 mm
7. Second layer of gypsum plasterboards Norgips GKF type DF or Norgips GKFI type DFH2, thickness: 15 mm
8. Sheet steel screws e.g. Norgips 3.5 x 25 mm placed every 40 cm
9. Sheet steel screws e.g. Norgips 3.5 x 45 mm placed every 17 cm
10. Gypsum filler e.g. Norgips Start or Norgips Super Filler
11. Reinforcing tape e.g. Norgips made of glass fibre or interlining

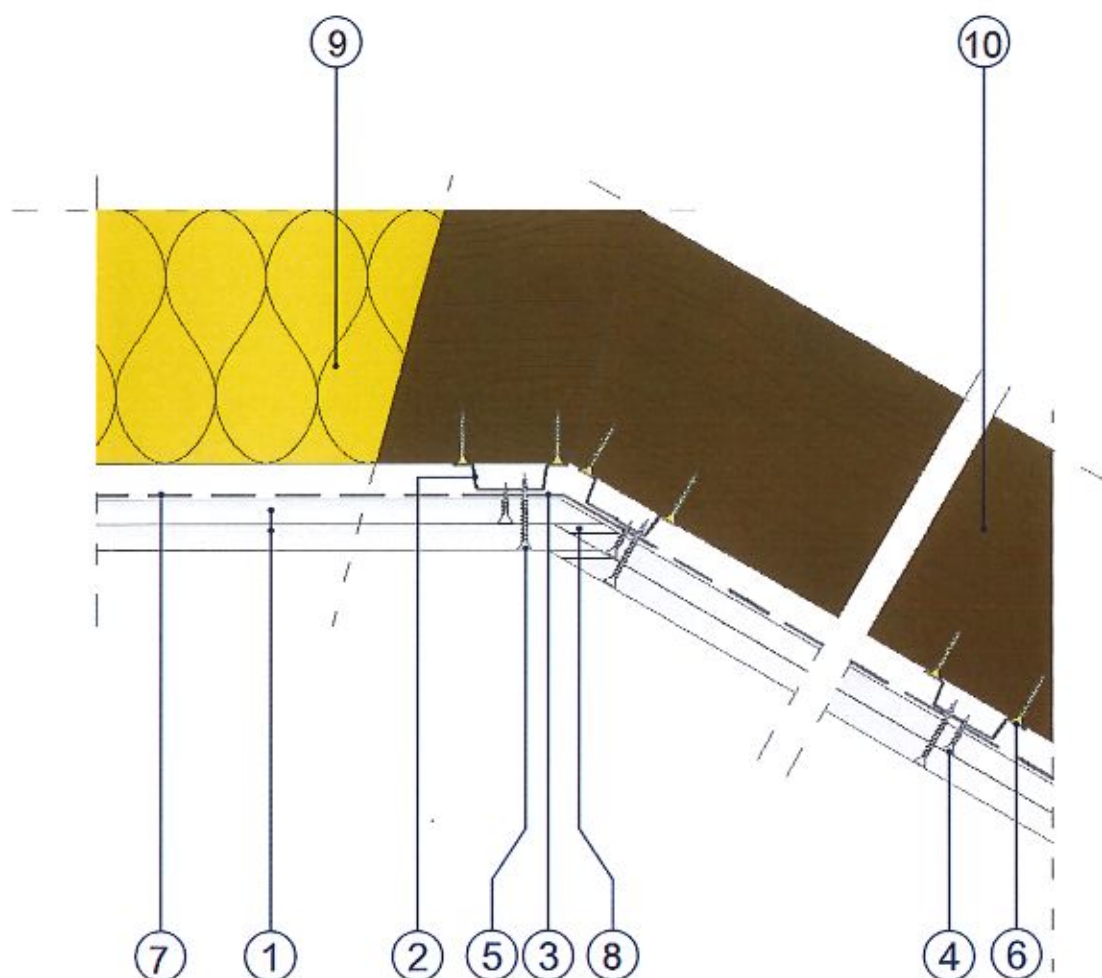
Figure 6 Section of the roof casing with the framework made of profiles CD 60 and flat hangers type L



LEGEND

1. Gypsum plasterboards Norgips GKF type DF or Norgips GKFI type DFH2, thickness: 2 x 15 mm
2. Hat profiles e.g. Norgips made of at least 0.55 mm thick sheet metal, placed maximally every 40 cm (the distance measured between the axes of the adjacent profiles)
3. Universal profile Norgips Flex (recommended)
4. Sheet steel screws e.g. Norgips 3.5 x 25 mm placed every 40 cm
5. Sheet steel screws e.g. Norgips 3.5 x 45 mm placed every 17 cm
6. Screws for wood e.g. Norgips 3.5 x 35 mm
7. Vapour insulation foil
8. Gypsum filler e.g. Norgips Start or Norgips Super Filler
9. Reinforcing tape Norgips made of glass fibre or interlining
10. Gypsum finish e.g. Norgips Finish or ready mix jointing compound e.g. Norgips Start & Finish or Norgips Extra Finish
11. Mineral glass wool or mineral rock wool
12. Roof rafters

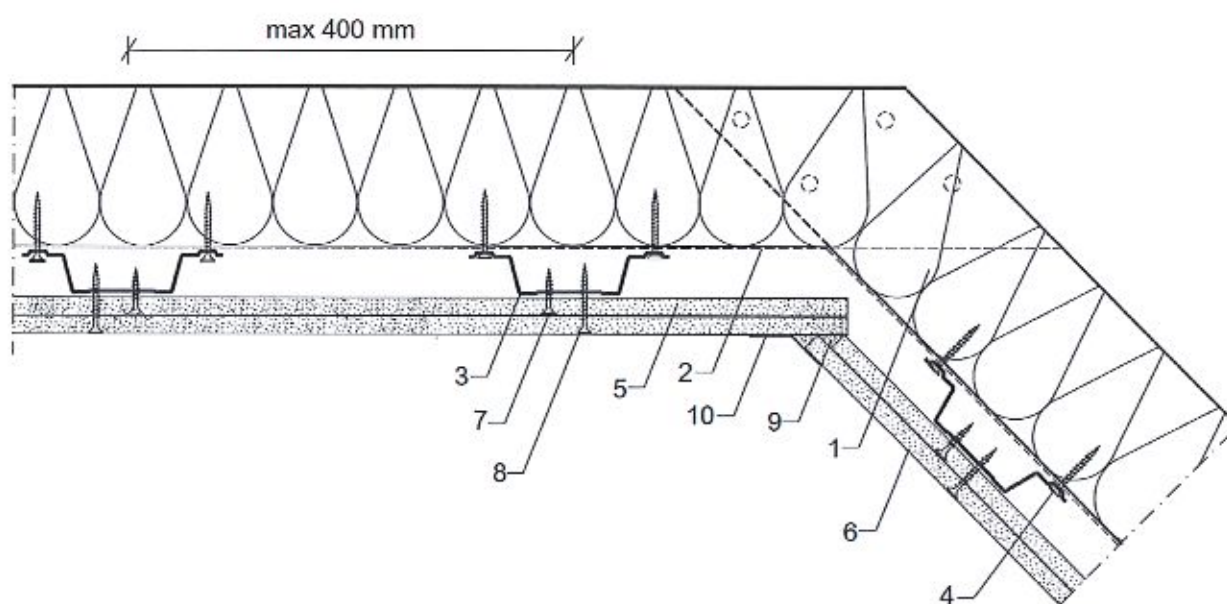
Figure 7 View of the roof casing with the framework made of hat profiles



LEGEND

1. Gypsum plasterboards Norgips GKF type DF or Norgips GKFI type DFH2, thickness: 2 x 15 mm
2. Hat profiles e.g. Norgips made of at least 0.55 mm thick sheet metal, placed maximally every 40 cm (the distance measured between the axes of the adjacent profiles)
3. Universal profile Norgips Flex (recommended)
4. Sheet steel screws e.g. Norgips 3.5 x 25 mm placed every 40 cm
5. Sheet steel screws e.g. Norgips 3.5 x 45 mm placed every 17 cm
6. Screws for wood e.g. Norgips 3.5 x 35 mm
7. Vapour insulation foil
8. Gypsum filler e.g. Norgips Start or Norgips Super Filler
9. Mineral glass wool or mineral rock wool
10. Roof rafters

Figure 8 Section of the roof casing with the framework made of hat profiles



LEGEND

1. Mineral glass wool or mineral rock wool
2. Vapour insulation foil
3. Hat profile e.g. Norgips made of at least 0.55 mm thick sheet metal
4. Screws for wood e.g. Norgips 3.5 x 35 mm placed maximally every 100 cm
5. First layer of gypsum plasterboards Norgips GKF type DF or Norgips GKFI type DFH2, thickness: 15 mm
6. Second layer of gypsum plasterboards Norgips GKF type DF or Norgips GKFI type DFH2, thickness: 15 mm
7. Sheet steel screws e.g. Norgips 3.5 x 25 mm placed every 40 cm
8. Sheet steel screws e.g. Norgips 3.5 x 45 mm placed every 17 cm
9. Gypsum filler e.g. Norgips Start or Norgips Super Filler
10. Reinforcing tape Norgips made of glass fibre or interlining

Figure 9 Section of the roof casing with the framework made of hat profiles