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Fire resistance classification No. LBO – 047 – KZ/25E

Classified product:

Wooden roofs with the Norgips roof casing with cladding made of gypsum plasterboards Norgips GKF type DF and Norgips GKFI type DFH2 and Norgips Acoustic Super type DFH2IRE

Sponsor:

Norgips Sp. z o.o.
ul. Krakowiaków 50
02-255 Warszawa

Prepared by:

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Copy No. 1
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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 1363-1:2012 Fire resistance tests – Part 1: General requirements.
1.4. Standard PN-EN 13501-2: 2023-09 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. Standard PN-EN 1991-1-3:2005 Eurocode I: Actions on structures – Part 1-3: General actions – Snow loads.
1.7. Report No. LP-926.4.2/05 Roof ZP 2xDF12.5 CD 60 W 20, cladded with 2 x 12.5 mm thick gypsum plasterboards Norgips GKF type DF. Fire resistance test. Building Research Institute (Instytut Techniki Budowlanej), Warsaw 2008.
1.8. Report No. LP-926.3.1/05 Suspended ceiling manufactured by Norgips, cladded with 2 x 12.5 mm thick gypsum plasterboards Norgips GKF type DF. Fire resistance test. Building Research Institute (Instytut Techniki Budowlanej), Warsaw 2006.
1.9. Report no. LBO-786/16 Suspended ceiling SP-2x12,5 GKF DF CD 60. Fire Testing Laboratory, GRYFITLAB Sp. z o.o., Łozienica 2016.
1.10. Technical documentation provided by Norgips Sp. z o.o.

2. Technical description of the roof casing made using the Norgips cladding system (12.5 mm thick gypsum plasterboards Norgips GKF type DF, Norgips GKFI type DFH2 and Norgips Acoustic Super type DFH2IR)

2.1 Roof casing ZP-2x12.5 GKF DF/CD 60 ES W, ZP-2x12.5 GKFI DFH2/CD 60 ES W, ZP-2x12.5 DFH2IRE/CD 60 ES W with cladding made of 2 x 12.5 mm thick gypsum plasterboards Norgips GKF type DF or Norgips GKFI type DFH2 or Norgips Acoustic Super type DFH2IRE, 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 **100 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 e.g. **Norgips CD 60** which were made of cold bent galvanized steel (the nominal thickness of the steel used: **0.55 mm** or **0.6 mm**). Profiles **CD 60** are fixed to wooden beams (e.g. rafters); the beams are placed maximally every **100 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 e.g. **Norgips ES 60/75, ES 60/125, ES 60/60 plus, ES 60/120 plus** or **flat** hangers e.g. **Norgips type L-180, L-270, L-350** 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** or **ES plus** by means of sheet steel screws e.g. **Norgips Ø 3.5 x 9.5 mm** or e.g. **Norgips Ø 3.5 x 11 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 **12.5 mm thick** boards **Norgips GKF type DF** or **12.5 mm thick** boards **Norgips GKFI type DFH2** or **12.5 mm thick** boards **Norgips Acoustic Super type DFH2IRE** is fixed perpendicularly to profiles **CD 60** 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 profiles **CD 60**. The second layer of **12.5 mm thick** boards **Norgips GKF type DF** or **12.5 mm thick** boards **Norgips GKFI type DFH2** or **12.5 mm thick** boards **Norgips Acoustic Super type DFH2IRE** is fixed perpendicularly to profiles **CD 60** using system sheet steel screws **Ø3.5 x 35 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 or A2 class of reaction to fire or with **mineral rock wool** of any thickness and the A1 or A2 class of reaction to fire. The self-weight load of mineral wool cannot be less than **0.1 kN/m^3**.

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 **12.5 mm thick** boards **Norgips GKF type DF** or **Norgips GKFI type DFH2** or **Norgips Acoustic Super type DFH2IRE** are covered with gypsum filler e.g. **Norgips Start**, **Norgips Super Filler** or **Norgips Start & Finish (Norgips Light Ready Mix)** 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 (Norgips Light Ready Mix)**, **Norgips Finish Mega (Norgips Easy Finish)** or gypsum finish **Norgips Finish**.

Constructional details of the roof casing made of **2 x 12.5 mm** thick gypsum plasterboards **Norgips GKF type DF** or **2 x 12.5 mm** thick gypsum plasterboards **Norgips GKFI type DFH2** or **2 x 12.5 mm** thick gypsum plasterboards **Norgips Acoustic Super type DFH2IRE** are presented in Figures 1 ÷ 4.

2.2 Roof casing ZP-2x12.5 GKF DF/KAPEL W, ZP-2x12.5 GKFI DFH2/KAPEL W, ZP-2x12.5 DFH2IRE/KAPEL W with cladding made of 2 x 12.5 mm thick gypsum plasterboards Norgips GKF type DF or Norgips GKFI type DFH2 or Norgips Acoustic Super type DHFH2IRE, 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 **100 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 e.g. **Norgips** which were made of cold bent galvanized steel (the nominal thickness of the steel used: **0.55 mm** or **0.6 mm**). **Hat** profiles are fixed directly to wooden beams (e.g. rafters); the beams are placed maximally every **100 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 **12.5 mm thick** boards **Norgips GKF type DF** or **12.5 mm thick** boards **Norgips GKFI type DFH2** or **12.5 mm thick** boards **Norgips Acoutic Super type DFH2IR** 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 **12.5 mm thick** boards **Norgips GKF type DF** or **12.5 mm thick** boards **Norgips GKFI type DFH2 or 12.5 mm thick** boards **Norgips Acoustic Super type DFH2IRE** is fixed perpendicularly to **hat** profiles using system sheet steel screws **Ø3.5 x 35 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 or A2 class of reaction to fire or with **mineral rock wool** of any thickness and the A1 or A2 class of reaction to fire. The self-weight load of mineral wool cannot be less than **0.1 kN/m^3**.

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 **12.5 mm thick** boards **Norgips GKF type DF** or **Norgips GKFI type DFH2** or **Norgips Acoustic Super type DFH2IRE** are covered with gypsum filler e.g. **Norgips Start**, **Norgips Super Filler** or **Norgips Start & Finish (Norgips Light Ready Mix)** 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 (Norgips Light Ready Mix), Norgips Finish Mega (Norgips Easy Finish)** or gypsum finish **Norgips Finish**.

Constructional details of the roof casing made of **2 x 12.5 mm** thick gypsum plasterboards **Norgips GKF type DF** or **2 x 12.5 mm** thick gypsum plasterboards **Norgips GKFI type DFH2** or **2 x 12.5 mm** thick gypsum plasterboards **Norgips Acoustic Super type DFH2IRE** are presented in **Figures 5 ÷ 6.**

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 12.5 mm gypsum plasterboards, with the roof pitch angle of 30 degrees, and a suspended ceiling in the Norgips system – a independent structure cladded with 2 x 12.5 mm gypsum plasterboards was carried out by the Fire Tests Laboratory of the Building Research Institute (Insytut Techniki Budowlanej) in Warsaw.
Test reports: LP-926.4.2/05 [1.7] and LP-926.3.1/05 [1.8].

The fire resistance test of a suspended ceiling SP-2x12,5 GKF DF CD 60 was carried out by the Fire Testing Laboratory GRYFITLAB in Łozienica.
Test report: LBO-786/16 [1.9].

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 13501-2:2023-09 [1.4] as belonging to fire resistance class **REI 30**.

5. Disclaimer

Roofs with Norgips cladding systems, described in sections 2.1 and 2.2, meet the requirements specified in § 219, paragraph 2 of the Regulation of the Minister of Infrastructure of April 12, 2002, regarding the technical requirements for buildings and their location (Journal of Laws No. 75, item 690, as amended). Attic partitions with a fire resistance classification of at least REI 30, in accordance with section 4, meet the requirement of separation from combustible structures and a combustible roof covering with a partition with a fire resistance class of EI 30.

6. Validity

The classification presented in item 4 is valid until 11.07.2030 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 and Norgips Acoustic Super type DFH2IRE

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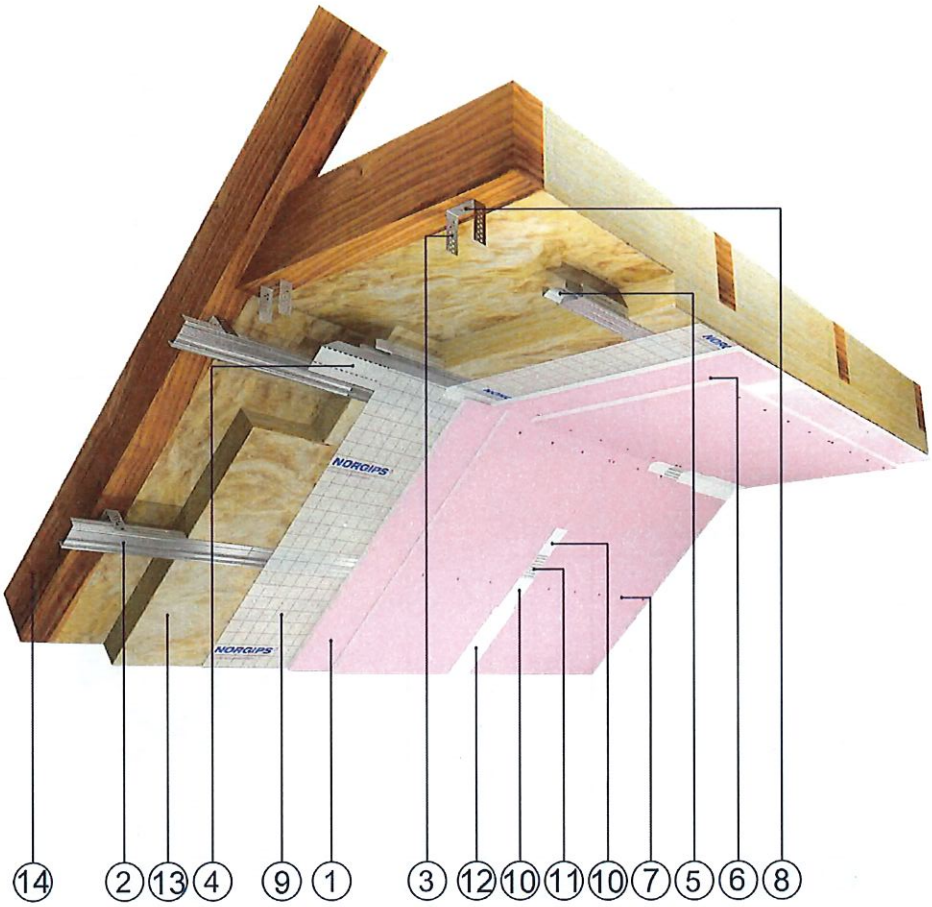
Prezes Zarządu
Andrzej Szarycki

Classification No. LBO – 047 – KZ/25E

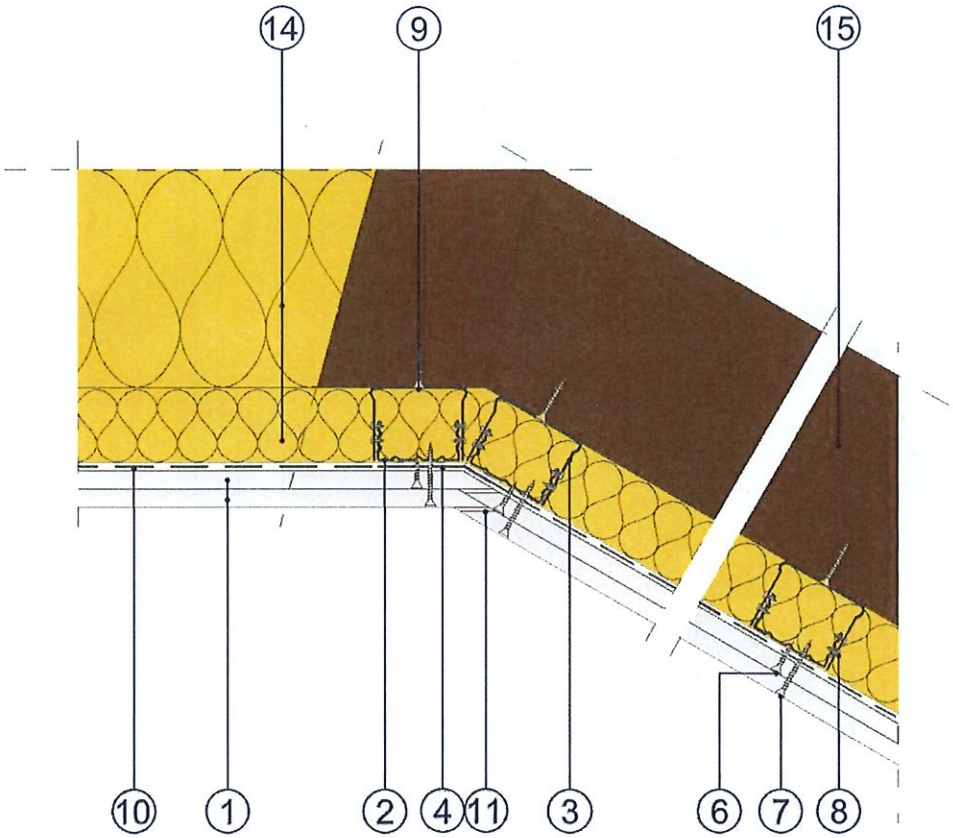
Annex 1

Drawings presenting wooden roofs
with the Norgips roof casing and
cladding made of gypsum plasterboards
Norgips GKF type DF and
Norgips GKFI type DFH2 and
Norgips Acoustic Super type DFH2IRE



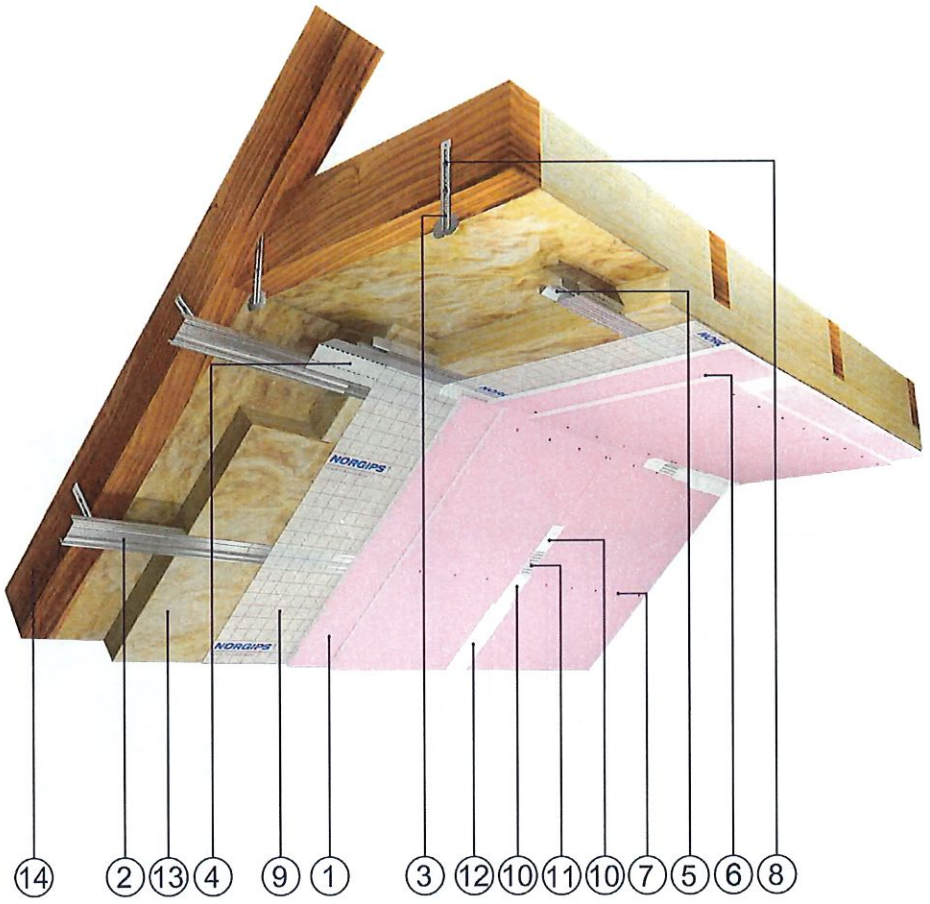
1. Gypsum plasterboards Norgips GKF type DF or Norgips GKFI type DFH2 or Norgips Acoustic Super type DFH2IRE, thickness: 2 x 12.5 mm
2. Profiles e.g. Norgips CD 60 placed every 40 cm (the distance measured between the axes of the adjacent profiles)
3. Hangers e.g. Norgips type ES or ES plus
4. Universal profile Norgips Flex (recommended)
5. Lengthwise connectors e.g. Norgips
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 35 mm placed every 17 cm
8. Screws for wood e.g. Norgips 3.5 x 35 mm
9. Vapour insulation foil (if required)
10. Gypsum filler e.g. Norgips Start, Norgips Super Filler, Norgips Start & Finish (Norgips Light Ready Mix)
11. Reinforcing tape e.g. Norgips made of glass fibre
12. Ready mix jointing compound e.g. Norgips Extra Finish, Norgips Start & Finish (Norgips Light Ready Mix), Norgips Finish Mega (Norgips Easy Finish) or gypsum finish Norgips Finish
13. Mineral glass wool or mineral rock wool
14. Roof rafters

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



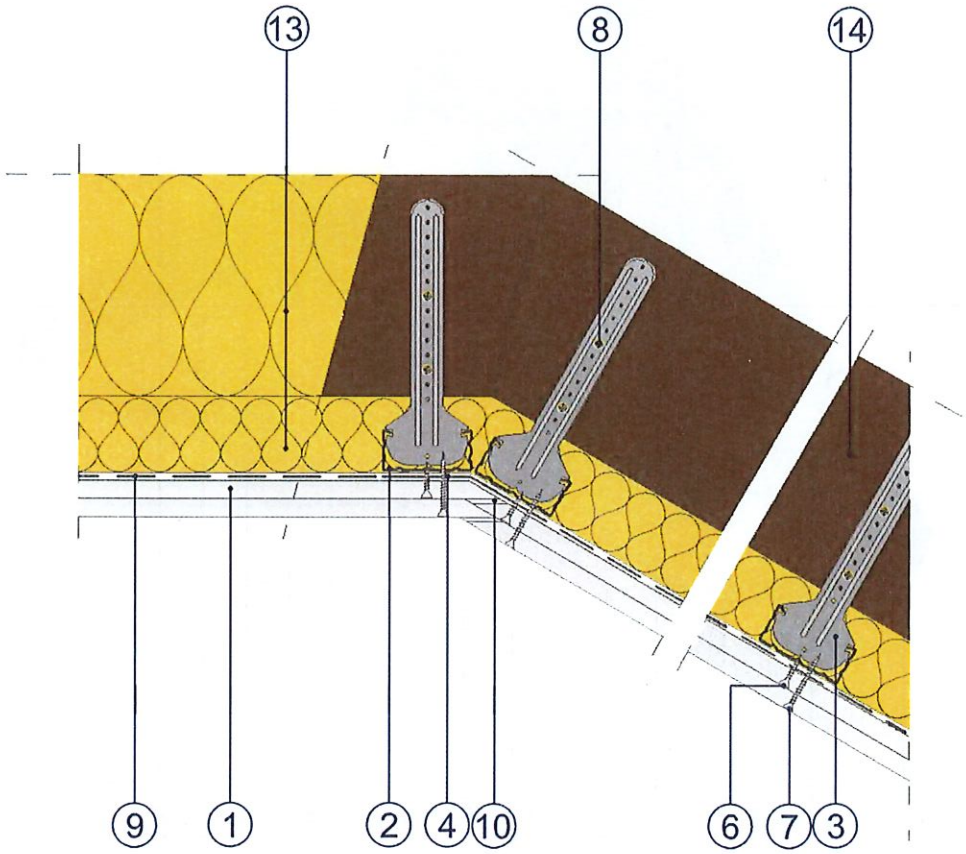
1. Gypsum plasterboards Norgips GKF type DF or Norgips GKFI type DFH2 or Norgips Acoustic Super type DFH2IRE, thickness: 2 x 12.5 mm
2. Profiles e.g. Norgips CD 60 placed every 40 cm (the distance measured between the axes of the adjacent profiles)
3. Hangers Norgips type ES or ES plus
4. Universal profile 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 35 mm placed every 17 cm
8. Sheet steel screws e.g. Norgips 3.5 x 9.5 mm with self-drilling endings
9. Screws for wood e.g. Norgips 3.5 x 35 mm
10. Vapour insulation foil (if required)
11. Gypsum filler e.g. Norgips Start, Norgips Super Filler, Norgips Start & Finish (Norgips Light Ready Mix)
14. Mineral glass wool or mineral rock wool
15. Roof rafters

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



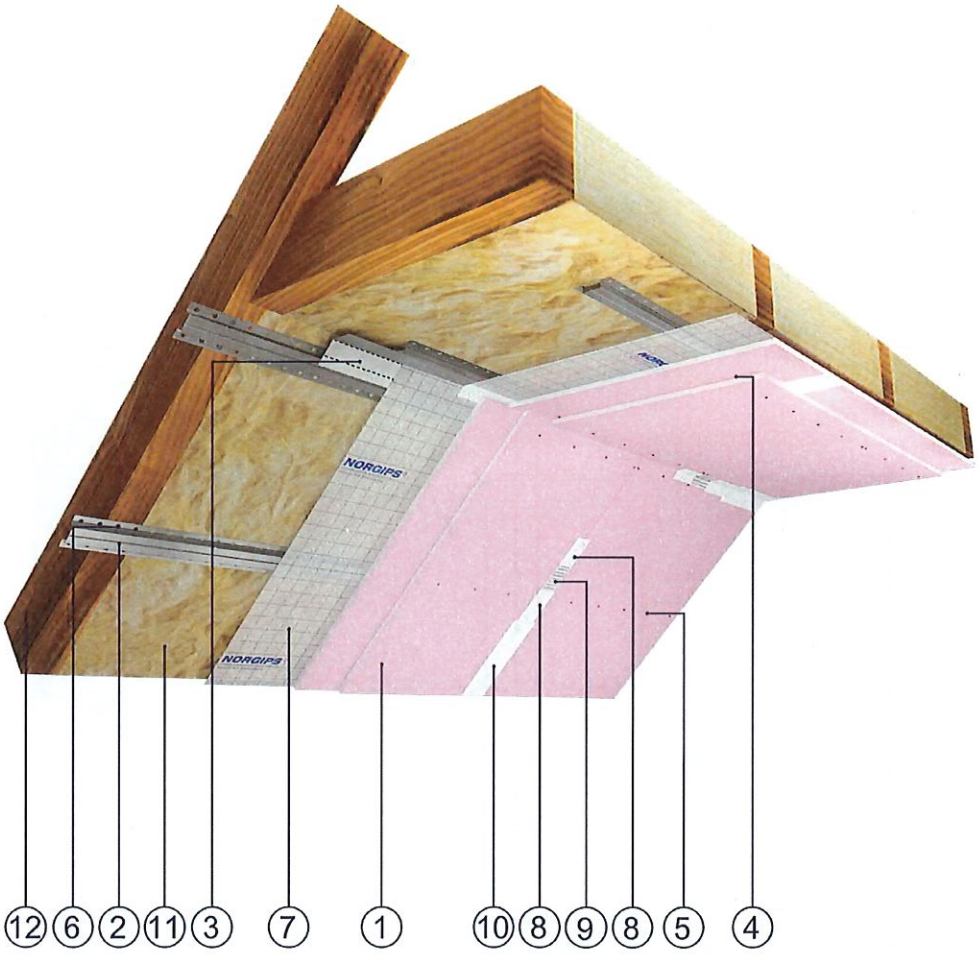
1. Gypsum plasterboards Norgips GKF type DF or Norgips GKFI type DFH2 or Norgips Acoustic Super type DFH2IRE, thickness: 2 x 12.5 mm
2. Profiles e.g. Norgips CD 60 placed every 40 cm (the distance measured between the axes of the adjacent profiles)
3. Flat hangers e.g. Norgips type L
4. Universal profile 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 35 mm placed every 17 cm
8. Screws for wood e.g. Norgips 3.5 x 35 mm
9. Vapour insulation foil (if required)
10. Gypsum filler e.g. Norgips Start, Norgips Super Filler, Norgips Start & Finish (Norgips Light Ready Mix)
11. Reinforcing tape Norgips made of glass fibre
12. Ready mix jointing compound e.g. Norgips Extra Finish, Norgips Start & Finish (Norgips Light Ready Mix), Norgips Finish Mega (Norgips Easy Finish) or gypsum finish Norgips Finish
13. Mineral glass wool or mineral rock wool
14. Roof rafters

Figure 3 View of the roof casing with the framework made of profiles CD 60 and flat hangers type L



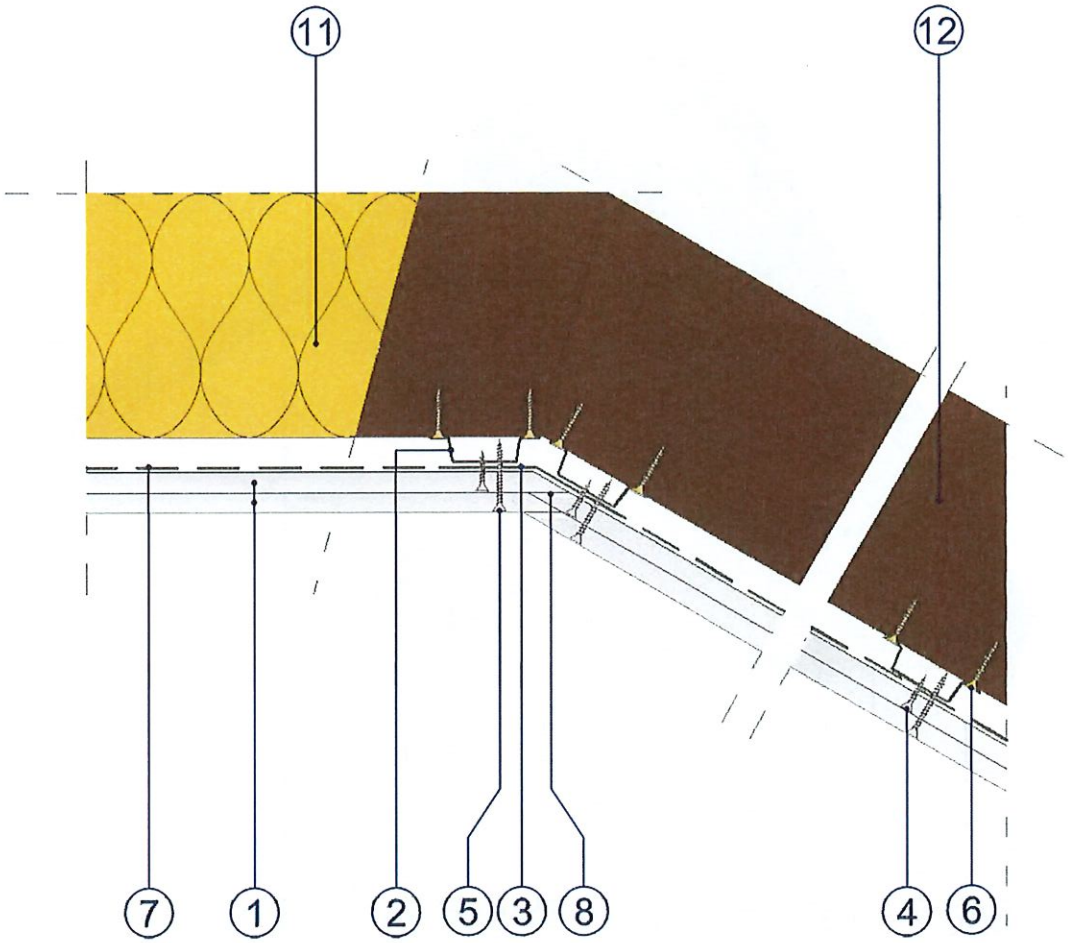
1. Gypsum plasterboards Norgips GKF type DF or Norgips GKFI type DFH2 or Norgips Acoustic Super type DFH2IRE, thickness: 2 x 12.5 mm
2. Profiles e.g. Norgips CD 60 placed every 40 cm (the distance measured between the axes of the adjacent profiles)
3. Flat hangers e.g. Norgips type L
4. Universal profile 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 35 mm placed every 17 cm
8. Screws for wood e.g. Norgips 3.5 x 35 mm
9. Vapour insulation foil (if required)
10. Gypsum filler e.g. Norgips Start, Norgips Super Filler, Norgips Start & Finish (Norgips Light Ready Mix)
13. Mineral glass wool or mineral rock wool
14. Roof rafters

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



1. Gypsum plasterboards Norgips GKF type DF or Norgips GKFI type DFH2 or Norgips Acoustic Super type DFH2IRE, thickness: 2 x 12.5 mm
2. Hat profiles e.g. Norgips placed 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 35 mm placed every 17 cm
6. Screws for wood e.g. Norgips 3.5 x 35 mm
7. Vapour insulation foil (if required)
8. Gypsum filler e.g. Norgips Start, Norgips Super Filler, Norgips Start & Finish (Norgips Light Ready Mix)
9. Reinforcing tape e.g. Norgips made of glass fibre
10. Ready mix jointing compound e.g. Norgips Extra Finish, Norgips Start & Finish (Norgips Light Ready Mix), Norgips Finish Mega (Norgips Easy Finish) or gypsum finish Norgips Finish
11. Mineral glass wool or mineral rock wool
12. Roof rafters

Figure 5 View of the roof casing with the framework made of hat profiles



1. Gypsum plasterboards Norgips GKF type DF or Norgips GKFI type DFH2 or Norgips Acoustic Super type DFH2IRE, thickness: 2 x 12.5 mm
2. Hat profiles e.g. Norgips placed 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 35 mm placed every 17 cm
6. Screws for wood e.g. Norgips 3.5 x 35 mm
7. Vapour insulation foil (if required)

13. Gypsum filler e.g. Norgips Start, Norgips Super Filler or Norgips Start & Finish (Norgips Light Ready Mix)
11. Mineral glass wool or mineral rock wool
12. Roof rafters

Figure 6 Horizontal section of the roof casing with the framework made of hat profiles