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**Fire resistance classification No. LBO – 798 – K/22E**

Classified product:

**Suspended ceilings Norgips  
faced with 2x15 mm + 2x12.5 mm thick gypsum plasterboards  
Norgips GKF type DF or Norgips GKFI type DFH2**

**Sponsor:**

Norgips Sp. z o.o.  
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**Prepared by:**

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1. **This classification has been prepared based on the following documents:**
  - 1.1. 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.
  - 1.2. Standard PN-EN 1364-2:2018-02 Fire resistance tests for non-loadbearing elements – Part 2: Ceilings.
  - 1.3. Standard PN-EN 1363-1:2020-07 Fire resistance tests – Part 1: General requirements.
  - 1.4. Test Report No. LBO-798/16 Suspended ceiling SP – 2x15 + 2x12.5 GKF DF CD 60. Fire Tests Laboratory, GRYFITLAB Spółka z o.o., Łozienica 2016.
  - 1.5. Drawings and technical documentation provided by the Sponsor.
2. **Technical description of suspended ceilings Norgips faced with 2x15 mm + 2x12.5 mm thick gypsum plasterboards Norgips GKF type DF or Norgips GKFI type DFH2**
  - 2.1 **Suspended ceilings SP – 2x15 + 2x12.5 GKF DF/CD60, SP – 2x15 + 2x12.5 GKFI DFH2/CD60, faced with 2x15 mm + 2x12.5 mm thick gypsum plasterboards Norgips GKF type DF or Norgips GKFI type DFH2, with two level grids**

The construction of the ceilings consists of a two level grid. The grid is made of profiles e.g. **Norgips CD 60**. The profiles are made of cold bent galvanized steel; the nominal thickness of the steel used is **0.55 mm** (tolerance +/- 0.06 mm) or **0.6 mm** (tolerance +/- 0.06 mm). The profiles of the main (top) layer are aligned at maximum every **100 cm**. The profiles of the loadbearing (bottom) layer are aligned at maximum every **40 cm**. The profiles of the main and loadbearing layer are connected with one another by means of e.g. **Norgips cross connectors** for profiles CD 60. The profiles of the main layer are suspended by means of system **rotating hangers with spring** e.g. **Norgips** or **rotating hangers with nonius** e.g. **Norgips** or by applying system hangers e.g. **Norgips ES 60** or **Norgips ES 60 plus** fixed to the construction of a floor or to the construction of a roof by means of mechanical connectors, such as steel dowels (minimum dimensions: **Ø 6 x 40 mm**), screws (minimum dimensions: **Ø 4 x 40 mm**), etc. Profiles **CD 60** of the main layer are fixed to hangers **ES 60** or **ES 60 plus** by means of 4 screws **Ø 3.9 x 11 mm** or **Ø 3.5 x 9.5 mm** with self-drilling ends. The hangers are placed maximally every **60 cm**.

Cold bent steel profiles e.g. **Norgips UD 30** are fixed to the walls on the perimeter of the ceiling by means of mechanical connectors, such as steel dowels (minimum dimensions: **Ø 6 x 40 mm**), screws (minimum dimensions: **Ø 4 x 40 mm**), etc. placed maximally every **60 cm**. It is recommended to apply 30 mm wide Norgips sealing tape between the perimeter steel profiles and the walls.

Gypsum plasterboards **Norgips GKF type DF** (thickness: **2 x 15 mm + 2 x 12.5 mm**) or **Norgips GKFI type DFH2** (thickness: **2 x 15 mm + 2 x 12.5 mm**) of the minimum surface density equal to at least **12.0 kg/m<sup>2</sup>** for 15 mm thick boards and at least **10.1 kg/m<sup>2</sup>** for 12.5 mm thick boards are fixed to the profiles of the loadbearing layer.

The first layer of the plasterboards is fixed by means of e.g. **Norgips** screws **Ø 3.5 x 25 mm**, placed at maximally **40 cm** centres. The second layer of the plasterboards is fixed by means of e.g. **Norgips** screws **Ø 3.5 x 45 mm**, placed at maximally **40 cm** centres. The third layer of the plasterboards is fixed by means of e.g. **Norgips** screws **Ø 3.5 x 55 mm**, placed at maximally **40 cm** centres. The fourth layer of the plasterboards is fixed by means of e.g. **Norgips** screws **Ø 4.2 x 70 mm**, placed at maximally **17 cm** centres.

The plasterboards are fixed in such a way as to ensure that their longer edges are perpendicular to the profiles of the loadbearing layer. The joints between shorter edges of boards always have to be placed within profiles **CD 60**. Adjacent shorter edges of boards in the first layer have to be shifted in relation to one another by minimally **40 cm**. Adjacent shorter edges of boards in the second layer have to be shifted in relation to one another by minimally **40 cm** and, at the same time, have to be shifted in relation to the respective shorter edges of the boards in the first layer by minimally **40 cm**. Adjacent shorter edges of boards in the third layer have to be shifted in relation to one another by minimally **40 cm** and, at the same time, have to be shifted in relation to the respective shorter edges of the boards in the second layer by minimally **40 cm**. Adjacent shorter edges of boards in the fourth layer have to be shifted in relation to one another by minimally **40 cm** and, at the same time, have to be shifted in relation to the respective shorter edges of the boards in the third layer by minimally **40 cm**. Longer edges of boards in the second layer of boards have to be shifted in relation to the respective longer edges of the boards in the first layer by minimally **40 cm**. Longer edges of boards in the third layer of boards have to be shifted in relation to the respective longer edges of the boards in the second layer by minimally **40 cm**. Longer edges of boards in the fourth layer of boards have to be shifted in relation to the respective longer edges of the boards in the third layer by minimally **40 cm**.

The screw heads as well as the joints between the **Norgips GKF** plasterboards **type DF** or the **Norgips GKFI** plasterboards **type DFH2** are filled with gypsum plaster jointing compound e.g. **Norgips Start, Norgips Super Filler, Norgips Start & Finish or Norgips Strong Filler**. The joints in the fourth layer of boards are additionally strengthened with e.g. Norgips self-adhesive reinforcing tape made of glass fibre or with e.g. Norgips reinforcing tape made of interlining. For final filling, it is recommended to apply ready to use e.g. **Norgips** jointing compounds e.g. **Norgips Extra Finish, Norgips Start & Finish, Norgips Finish or Norgips Strong Filler**. Details of the construction of the suspended ceilings are presented in **Figures 1 – 5**.

If the diagonal of the suspended ceiling is longer than 15 m or in places where there are constructional expansion joints of a building, one should provide expansion joints in the suspended ceiling (**Figure 14**).

## **2.2 Suspended ceilings SPJ – 2x15 + 2x12.5 GKF DF/CD60, SPJ – 2x15 + 2x12.5 GKFI DFH2/CD60, faced with 2x15 mm + 2x12.5 mm thick gypsum plasterboards Norgips GKF type DF or Norgips GKFI type DFH2, with one level grids**

The construction of the ceilings consists of a one level grid. The grid is made of profiles e.g. **Norgips CD 60**. The profiles are made of cold bent galvanized steel; the nominal thickness of the steel used is **0.55 mm** (tolerance +/- 0.06 mm) or **0.6 mm** (tolerance +/- 0.06 mm). Main profiles are aligned at maximum every **120 cm**. Lateral profiles are aligned at maximum every **40 cm**. The lateral profiles and the main profiles are connected with one another by means of e.g. **Norgips lateral single-sided connectors** for profiles CD 60. These connectors are slid into the lateral profiles and then screwed with them by means of 2 screws (**Ø 3.9 x 11 mm** or **Ø 3.5 x 9.5 mm**) with self-drilling ends. Then, the lateral profiles are slid into the main profiles in such a way that a fastener of the lateral single-sided connector is slid into a web of the main profile. Then, the lateral single-sided connector is screwed to the main profile by means of 2 screws (**Ø 3.9 x 11 mm** or **Ø 3.5 x 9.5 mm**) with self-drilling ends. The main profiles are suspended by means of system **rotating hangers with spring** e.g. **Norgips** or **rotating hangers with nonius** e.g. **Norgips** or by applying

system hangers e.g. **Norgips ES 60** or **Norgips ES 60 plus** fixed to the construction of a floor or to the construction of a roof by means of mechanical connectors, such as steel dowels (minimum dimensions:  $\varnothing 6 \times 40 \text{ mm}$ ), screws (minimum dimensions:  $\varnothing 4 \times 40 \text{ mm}$ ), etc. Main profiles **CD 60** are fixed to hangers **ES 60** or **ES 60 plus** by means of 4 screws  $\varnothing 3.9 \times 11 \text{ mm}$  or  $\varnothing 3.5 \times 9.5 \text{ mm}$  with self-drilling ends. The hangers are placed maximally every **50 cm**.

Cold bent steel profiles e.g. **Norgips UD 30** are fixed to the walls on the perimeter of the ceiling by means of mechanical connectors, such as steel dowels (minimum dimensions:  $\varnothing 6 \times 40 \text{ mm}$ ), screws (minimum dimensions:  $\varnothing 4 \times 40 \text{ mm}$ ), etc. placed maximally every **60 cm**. It is recommended to apply 30 mm wide Norgips sealing tape between the perimeter steel profiles and the walls.

Gypsum plasterboards **Norgips GKF type DF** (thickness:  $2 \times 15 \text{ mm} + 2 \times 12.5 \text{ mm}$ ) or **Norgips GKFI type DFH2** (thickness:  $2 \times 15 \text{ mm} + 2 \times 12.5 \text{ mm}$ ) of the minimum surface density equal to at least  $12.0 \text{ kg/m}^2$  for 15 mm thick boards and at least  $10.1 \text{ kg/m}^2$  for 12.5 mm thick boards are fixed to the main profiles and to the lateral profiles.

The first layer of the plasterboards is fixed by means of e.g. **Norgips** screws  $\varnothing 3.5 \times 25 \text{ mm}$ , placed at maximally **40 cm** centres. The second layer of the plasterboards is fixed by means of e.g. **Norgips** screws  $\varnothing 3.5 \times 45 \text{ mm}$ , placed at maximally **40 cm** centres. The third layer of the plasterboards is fixed by means of e.g. **Norgips** screws  $\varnothing 3.5 \times 55 \text{ mm}$ , placed at maximally **40 cm** centres. The fourth layer of the plasterboards is fixed by means of e.g. **Norgips** screws  $\varnothing 4.2 \times 70 \text{ mm}$ , placed at maximally **17 cm** centres.

The plasterboards are fixed in such a way as to ensure that their longer edges are perpendicular to the lateral profiles and are supported by the main profiles. The joints between shorter edges of boards always have to be placed within lateral profiles **CD 60**. Adjacent shorter edges of boards in the first layer have to be shifted in relation to one another by minimally **40 cm**. Adjacent shorter edges of boards in the second layer have to be shifted in relation to one another by minimally **40 cm** and, at the same time, have to be shifted in relation to the respective shorter edges of the boards in the first layer by minimally **40 cm**. Adjacent shorter edges of boards in the third layer have to be shifted in relation to one another by minimally **40 cm** and, at the same time, have to be shifted in relation to the respective shorter edges of the boards in the second layer by minimally **40 cm**. Adjacent shorter edges of boards in the fourth layer have to be shifted in relation to one another by minimally **40 cm** and, at the same time, have to be shifted in relation to the respective shorter edges of the boards in the third layer by minimally **40 cm**. Longer edges of boards in the second layer of boards have to be shifted in relation to the respective longer edges of the boards in the first layer by minimally **40 cm**. Longer edges of boards in the third layer of boards have to be shifted in relation to the respective longer edges of the boards in the second layer by minimally **40 cm**. Longer edges of boards in the fourth layer of boards have to be shifted in relation to the respective longer edges of the boards in the third layer by minimally **40 cm**.

The screw heads as well as the joints between the **Norgips GKF** plasterboards **type DF** or the **Norgips GKFI** plasterboards **type DFH2** are filled with gypsum plaster jointing compound e.g. **Norgips Start**, **Norgips Super Filler**, **Norgips Start & Finish** or **Norgips Strong Filler**. The joints in the fourth layer of boards are additionally strengthened with e.g. Norgips self-adhesive reinforcing tape made of glass fibre or with e.g. Norgips reinforcing tape made of interlining. For final filling, it is recommended to apply ready to use e.g. **Norgips** jointing compounds e.g. **Norgips Extra Finish**,

**Norgips Start & Finish, Norgips Finish or Norgips Strong Filler.** Details of the construction of the suspended ceilings are presented in **Figure 6 - 8**.

If the diagonal of the suspended ceiling is longer than 15 m or in places where there are constructional expansion joints of a building, one should provide expansion joints in the suspended ceiling.

### **2.3 Ceiling linings OSF – 2x15 + 2x12.5 GKF DF/CD60, OSF – 2x15 + 2x12.5 GKFI DFH2/CD60, faced with 2x15 mm + 2x12.5 mm thick gypsum plasterboards Norgips GKF type DF or Norgips GKFI type DFH2**

The construction of the ceiling linings consists of profiles e.g. **Norgips CD 60**. The profiles are made of cold bent galvanized steel; the nominal thickness of the steel used is **0.55 mm** (tolerance +/- 0.06 mm) or **0.6 mm** (tolerance +/- 0.06 mm); the profiles are aligned every **40 cm**.

The profiles used are suspended by applying system hangers e.g. **Norgips ES 60** or **Norgips ES 60 plus** fixed to the construction of a floor or to the construction of a roof by means of 2 mechanical connectors, such as steel dowels (minimum dimensions: **Ø 6 x 40 mm**), screws (minimum dimensions: **Ø 4 x 40 mm**), etc. Profiles **CD 60** are fixed to hangers **ES 60** or **ES 60 plus** by means of 4 screws **Ø 3.9 x 11 mm** or **Ø 3.5 x 9.5 mm** with self-drilling ends. The hangers are placed maximally every **60 cm**.

Cold bent steel profiles e.g. **Norgips UD 30** are fixed to the walls on the perimeter of the ceiling by means of mechanical connectors, such as steel dowels (minimum dimensions: **Ø 6 x 40 mm**), screws (minimum dimensions: **Ø 4 x 40 mm**), etc. placed maximally every **60 cm**. It is recommended to apply 30 mm wide Norgips sealing tape between the perimeter steel profiles and the walls.

Gypsum plasterboards **Norgips GKF type DF** (thickness: **2 x 15 mm + 2 x 12.5 mm**) or **Norgips GKFI type DFH2** (thickness: **2 x 15 mm + 2 x 12.5 mm**) of the minimum surface density equal to at least **12.0 kg/m<sup>2</sup>** for 15 mm thick boards and at least **10.1 kg/m<sup>2</sup>** for 12.5 mm thick boards are fixed to the **CD 60** profiles.

The first layer of the plasterboards is fixed by means of e.g. **Norgips** screws **Ø 3.5 x 25 mm**, placed at maximally **40 cm** centres. The second layer of the plasterboards is fixed by means of e.g. **Norgips** screws **Ø 3.5 x 45 mm**, placed at maximally **40 cm** centres. The third layer of the plasterboards is fixed by means of e.g. **Norgips** screws **Ø 3.5 x 55 mm**, placed at maximally **40 cm** centres. The fourth layer of the plasterboards is fixed by means of e.g. **Norgips** screws **Ø 4.2 x 70 mm**, placed at maximally **17 cm** centres.

The plasterboards are fixed in such a way as to ensure that their longer edges are perpendicular to the **CD 60** profiles. The joints between shorter edges of boards always have to be placed within profiles **CD 60**. Adjacent shorter edges of boards in the first layer have to be shifted in relation to one another by minimally **40 cm**. Adjacent shorter edges of boards in the second layer have to be shifted in relation to one another by minimally **40 cm** and, at the same time, have to be shifted in relation to the respective shorter edges of the boards in the first layer by minimally **40 cm**. Adjacent shorter edges of boards in the third layer have to be shifted in relation to one another by minimally **40 cm** and, at the same time, have to be shifted in relation to the respective shorter edges of the

boards in the second layer by minimally **40 cm**. Adjacent shorter edges of boards in the fourth layer have to be shifted in relation to one another by minimally **40 cm** and, at the same time, have to be shifted in relation to the respective shorter edges of the boards in the third layer by minimally **40 cm**. Longer edges of boards in the second layer of boards have to be shifted in relation to the respective longer edges of the boards in the first layer by minimally **40 cm**. Longer edges of boards in the third layer of boards have to be shifted in relation to the respective longer edges of the boards in the second layer by minimally **40 cm**. Longer edges of boards in the fourth layer have to be shifted in relation to the respective longer edges of the boards in the third layer by minimally **40 cm**.

The screw heads as well as the joints between the **Norgips GKF** plasterboards **type DF** or the **Norgips GKFI** plasterboards **type DFH2** are filled with gypsum plaster jointing compound e.g. **Norgips Start, Norgips Super Filler, Norgips Start & Finish or Norgips Strong Filler**. The joints in the fourth layer of boards are additionally strengthened with e.g. Norgips self-adhesive reinforcing tape made of glass fibre or with e.g. Norgips reinforcing tape made of interlining. For final filling, it is recommended to apply ready to use e.g. **Norgips** jointing compounds e.g. **Norgips Extra Finish, Norgips Start & Finish, Norgips Finish or Norgips Strong Filler**. Details of the construction of the ceiling linings are presented in **Figures 9 – 10**.

If the diagonal of the ceiling lining is longer than 15 m or in places where there are constructional expansion joints of a building, one should provide expansion joints in the ceiling lining.

#### **2.4 Ceiling linings OSF – 2x15 + 2x12.5 GKF DF/KAP, OSF – 2x15 + 2x12.5 GKFI DFH2/KAP, faced with 2x15 mm + 2x12.5 mm thick gypsum plasterboards Norgips GKF type DF or Norgips GKFI type DFH2**

The construction of the ceiling linings consists of e.g. **Norgips hat** profiles. The profiles are made of cold bent galvanized steel; the nominal thickness of the steel used is **0.55 mm** (tolerance +/- 0.06 mm) or **0.6 mm** (tolerance +/- 0.06 mm); the profiles are aligned every **40 cm**.

The profiles are fixed to the construction of a floor or to the construction of a roof by means of 2 mechanical connectors, such as steel dowels (minimum dimensions: **Ø 6 x 40 mm**), screws (minimum dimensions: **Ø 4 x 40 mm**), etc. placed maximally every **100 cm**.

Gypsum plasterboards **Norgips GKF type DF** (thickness: **2 x 15 mm + 2 x 12.5 mm**) or **Norgips GKFI type DFH2** (thickness: **2 x 15 mm + 2 x 12.5 mm**) of the minimum surface density equal to at least 12.0 kg/m<sup>2</sup> for 15 mm thick boards or at least 10.1 kg/m<sup>2</sup> for 12.5 mm thick boards are fixed to the **hat** profiles.

The first layer of the plasterboards is fixed by means of e.g. **Norgips** screws **Ø 3.5 x 25 mm**, placed at maximally **40 cm** centres. The second layer of the plasterboards is fixed by means of e.g. **Norgips** screws **Ø 3.5 x 45 mm**, placed at maximally **40 cm** centres. The third layer of the plasterboards is fixed by means of e.g. **Norgips** screws **Ø 3.5 x 55 mm**, placed at maximally **40 cm** centres. The fourth layer of the plasterboards is fixed by means of e.g. **Norgips** screws **Ø 4.2 x 70 mm**, placed at maximally **17 cm** centres.

The plasterboards are fixed in such a way as to ensure that their longer edges are perpendicular to the **hat** profiles. The joints between shorter edges of boards always have to be placed within **hat** profiles. Adjacent shorter edges of boards in the first layer have to be shifted in relation to one another by minimally **40 cm**. Adjacent shorter edges of boards in the second layer have to be shifted

in relation to one another by minimally **40 cm** and, at the same time, have to be shifted in relation to the respective shorter edges of the boards in the first layer by minimally **40 cm**. Adjacent shorter edges of boards in the third layer have to be shifted in relation to one another by minimally **40 cm** and, at the same time, have to be shifted in relation to the respective shorter edges of the boards in the second layer by minimally **40 cm**. Adjacent shorter edges of boards in the fourth layer have to be shifted in relation to one another by minimally **40 cm** and, at the same time, have to be shifted in relation to the respective shorter edges of the boards in the third layer by minimally **40 cm**. Longer edges of boards in the second layer of boards have to be shifted in relation to the respective longer edges of the boards in the first layer by minimally **40 cm**. Longer edges of boards in the third layer of boards have to be shifted in relation to the respective longer edges of the boards in the second layer by minimally **40 cm**. Longer edges of boards in the fourth layer of boards have to be shifted in relation to the respective longer edges of the boards in the third layer by minimally **40 cm**.

The screw heads as well as the joints between the **Norgips GKF** plasterboards **type DF** or the **Norgips GKFI** plasterboards **type DFH2** are filled with gypsum plaster jointing compound e.g. **Norgips Start, Norgips Super Filler, Norgips Start & Finish or Norgips Strong Filler**. The joints in the fourth layer of boards are additionally strengthened with e.g. Norgips self-adhesive reinforcing tape made of glass fibre or with e.g. Norgips reinforcing tape made of interlining. For final filling, it is recommended to apply ready to use e.g. **Norgips** jointing compounds e.g. **Norgips Extra Finish, Norgips Start & Finish, Norgips Finish or Norgips Strong Filler**. Details of the construction of the ceiling linings are presented in **Figures 11 – 13**.

If the diagonal of the ceiling lining is longer than 15 m or in places where there are constructional expansion joints of a building, one should provide expansion joints in the ceiling lining.

### **3. Fire resistance tests**

Fire resistance tests of Norgips suspended ceiling made of 2x15 + 2x12.5 mm thick gypsum plasterboards were carried out in the Fire Tests Laboratory of Gryfitlab Spółka z.o.o., in Łozienica.

Test report: No. LBO-798/16 [1.4].

### **4. Fire resistance classification of suspended ceilings Norgips faced with 2x15 + 2x12.5 mm thick gypsum plasterboards Norgips GKF type DF or Norgips GKFI type DFH2**

Based on the analysis of test results indicated in item 3, suspended ceilings Norgips faced with 2x15 + 2x12.5 mm thick gypsum plasterboards Norgips GKF type DF or Norgips GKFI type DFH2, manufactured and installed in accordance with the technical description presented in item 2, are classified according to standard PN-EN 13501-2:2016-07 [1.1] as belonging to the following fire resistance class:

**EI 120 (a←b)**

### **5. Suspended ceilings Norgips faced with 2x15 + 2x12.5 mm thick gypsum plasterboards Norgips GKF type DF or Norgips GKFI type DFH2, used as fire separation**

Horizontal fire separation elements, in the form of a floor or a flat roof with suspended ceiling Norgips faced with 2x15 + 2x12.5 mm thick gypsum plasterboards Norgips GKF type DF or Norgips

GKFI type DFH2, manufactured and installed in accordance with the technical description specified in item 2 herein, which – taking into account the classification provided in item 4 herein – constitute independent fire separation when being exposed to fire from below, meet the respective REI fire resistance criteria according to standard PN-EN 13501-2:2016-07 [1.1], as follows:

- Systems: floor – suspended ceiling and floor – ceiling lining (the construction of a floor is designed according to the Polish Standards and Eurocodes)  
fire resistance class **REI 120 (a←b)**
- Systems: roof – suspended ceiling and roof – ceiling lining (the construction of a roof is designed according to the Polish Standards and Eurocodes)  
fire resistance class **REI 120 (a←b)**

## 6. Restriction

The classification presented in item 4 is valid for elements made of Norgips gypsum plasterboards, manufactured in accordance with standard PN-EN 520+A1:2012, and of the surface density not less than:

10.1 kg/m<sup>2</sup> – for 12.5 mm thick boards type DF and DFH2

12.0 kg/m<sup>2</sup> – for 15 mm thick boards type DF and DFH2

Classification No. LBO – 798 – K/22E replaces Classification No. LBO – 798 – K/19E.

Classification No. LBO – 798 – K/22E may only be used or reproduced in its entirety.

## 7. Validity

This classification is valid until 27.07.2027 on the condition that there are no changes in the construction or materials of the classified products.

Prezes Zarządu

*Andrzej Szarycki*

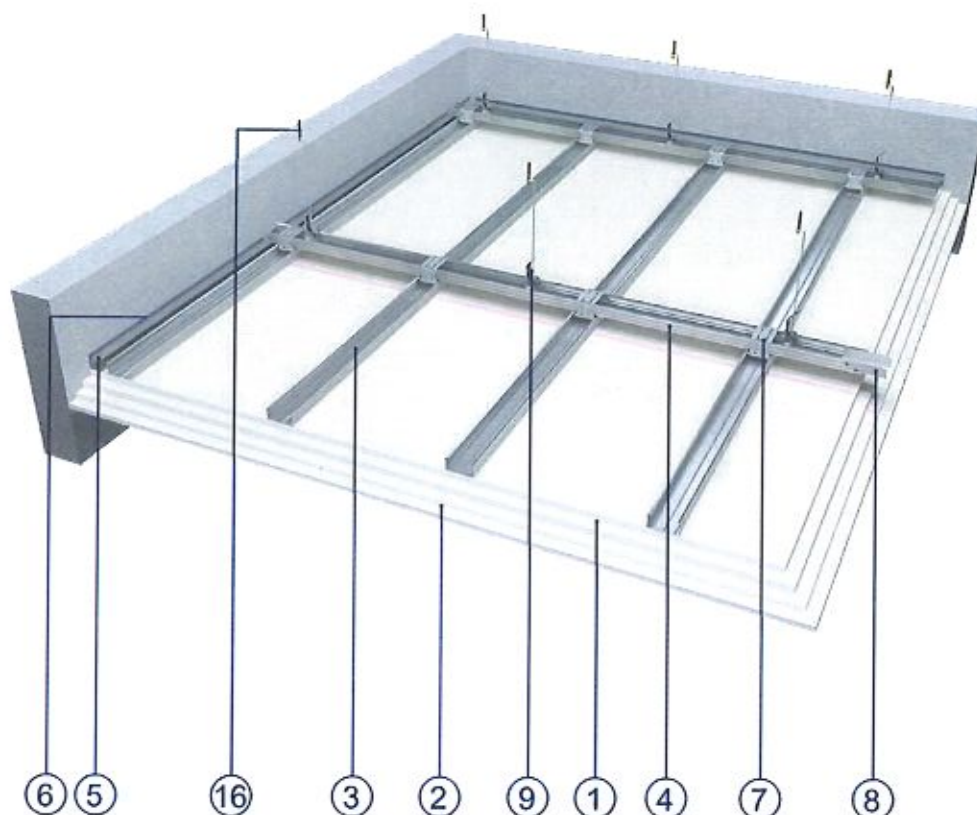
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72-100 GOLENIÓW

## **8. Figures**

**Suspended ceilings Norgips**

**faced with 2x15 + 2x12.5 mm thick gypsum plasterboards**

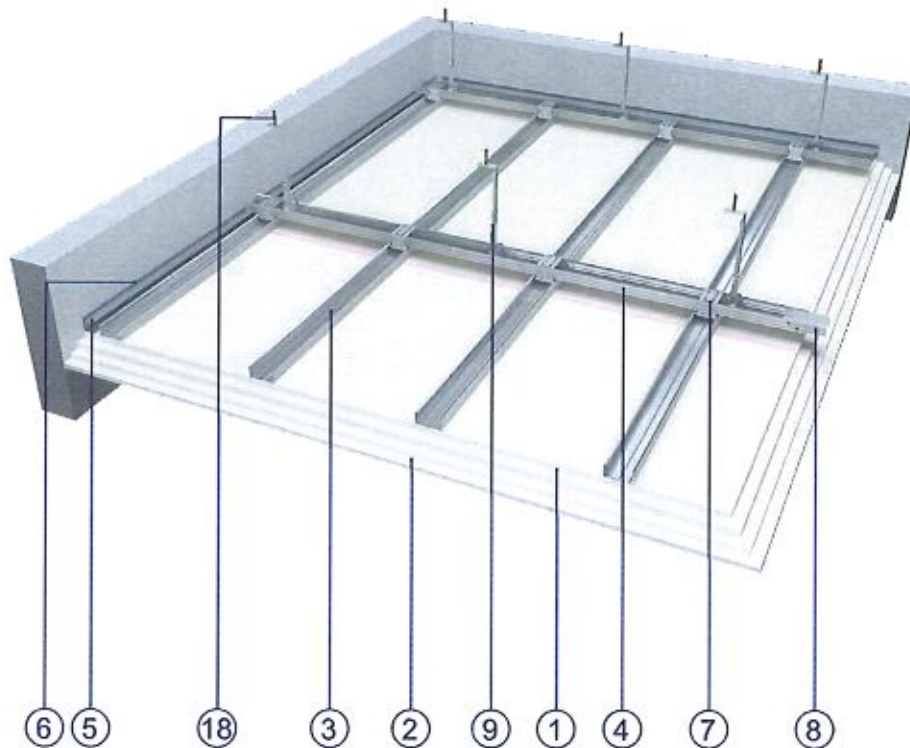
**Norgips GKF type DF or Norgips GKFI type DFH2**



### Ceiling elements

1. Covering made of boards Norgips GKF type DF or Norgips GKFI type DFH2 (thickness: 2x15 mm)
2. Covering made of boards Norgips GKF type DF or Norgips GKFI type DFH2 (thickness: 2x12.5 mm)
3. Profile e.g. Norgips CD 60 of the loadbearing layer, minimum thickness: 0.55 mm placed max. every 40 cm
4. Profile e.g. Norgips CD 60 of the main layer, minimum thickness: 0.55 mm placed max. every 100 cm
5. Profile e.g. Norgips UD 30
6. Sealing tape e.g. Norgips
7. Cross connector e.g. Norgips for profiles CD 60
8. Lengthwise connectors e.g. Norgips
9. Hanger e.g. Norgips rotating hanger with spring placed max. every 85 cm
16. Mechanical connectors, such as steel dowels (min. dimensions  $\text{Ø}6 \times 40 \text{ mm}$ )

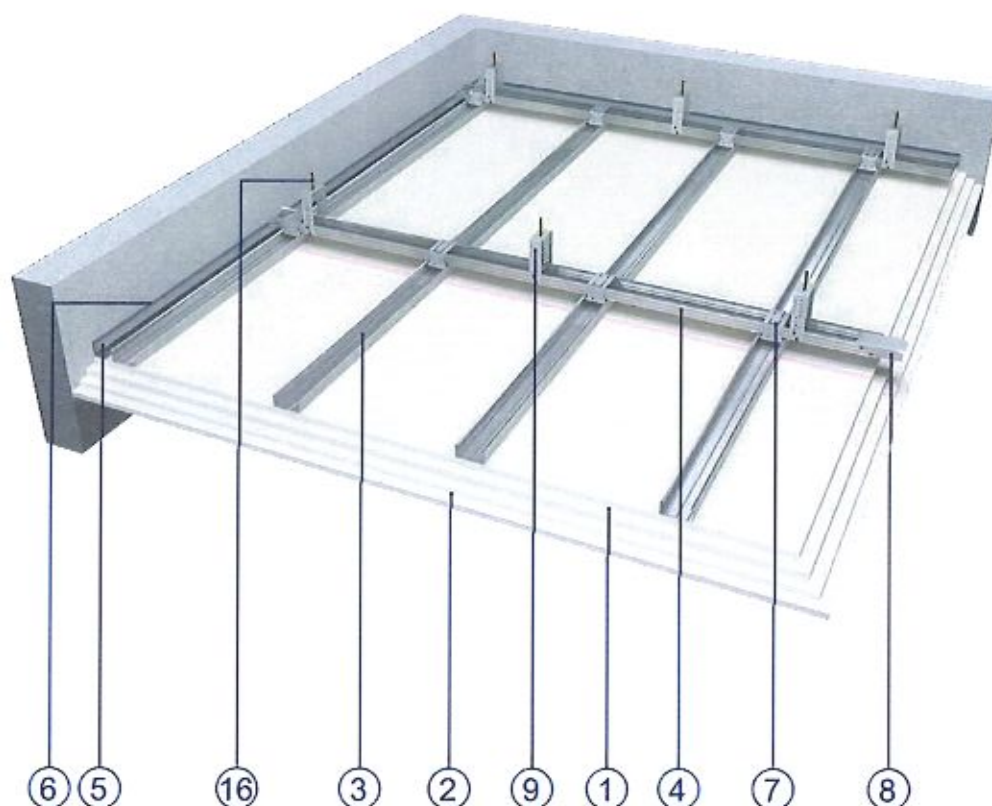
**Figure 1** View of the suspended ceiling – two level cross construction on rotating hangers with spring



### Ceiling elements

1. Covering made of boards Norgips GKF type DF or Norgips GKFI type DFH2 (thickness: 2x15 mm)
2. Covering made of boards Norgips GKF type DF or Norgips GKFI type DFH2 (thickness: 2x12.5 mm)
3. Profile e.g. Norgips CD 60 of the loadbearing layer, minimum thickness: 0.55 mm placed max. every 40 cm
4. Profile e.g. Norgips CD 60 of the main layer, minimum thickness: 0.55 mm placed max. every 100 cm
5. Profile e.g. Norgips UD 30
6. Sealing tape e.g. Norgips
7. Cross connector e.g. Norgips for profiles CD 60
8. Lengthwise connectors e.g. Norgips
9. Hanger e.g. Norgips rotating hanger with nonius placed max. every 85 cm
18. Mechanical connectors, such as steel dowels (min. dimensions  $\text{Ø}6 \times 40 \text{ mm}$ )

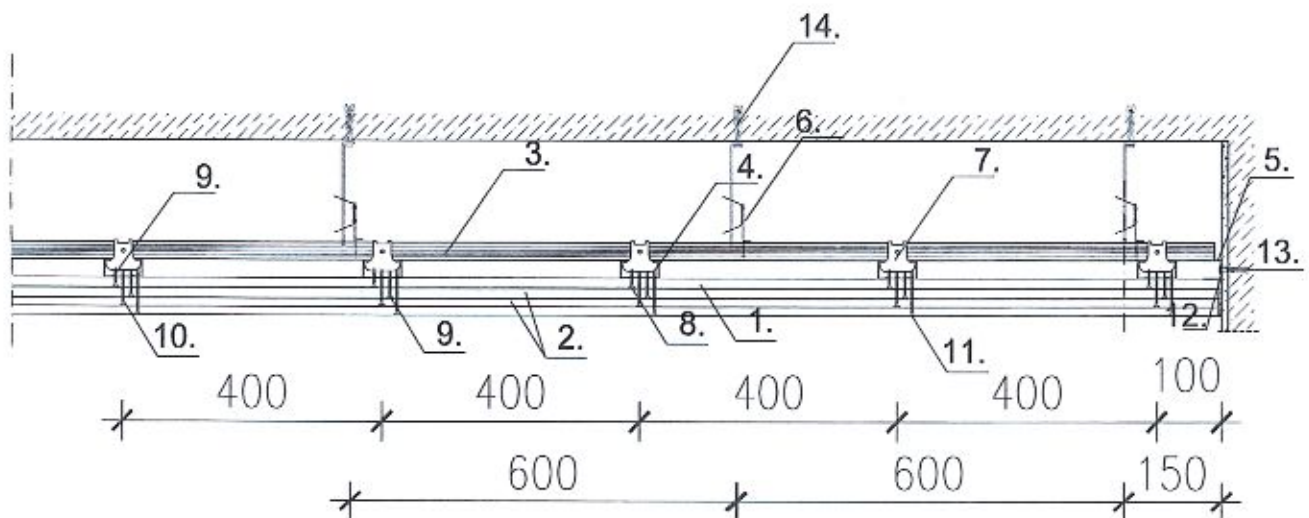
**Figure 2 View of the suspended ceiling – two level cross construction on rotating hangers with nonius**



### Ceiling elements

1. Covering made of boards Norgips GKF type DF or Norgips GKFI type DFH2 (thickness: 2x15 mm)
2. Covering made of boards Norgips GKF type DF or Norgips GKFI type DFH2 (thickness: 2x12.5 mm)
3. Profile e.g. Norgips CD 60 of the loadbearing layer, minimum thickness: 0.55 mm placed max. every 40 cm
4. Profile e.g. Norgips CD 60 of the main layer, minimum thickness: 0.55 mm placed max. every 100 cm
5. Profile e.g. Norgips UD 30
6. Sealing tape e.g. Norgips
7. Cross connector e.g. Norgips for profiles CD 60
8. Lengthwise connectors e.g. Norgips
9. Hanger e.g. Norgips hanger ES 60 or hanger ES 60 plus placed max. every 85 cm
16. Mechanical connectors, such as steel dowels (min. dimensions  $\text{Ø}6 \times 40 \text{ mm}$ )

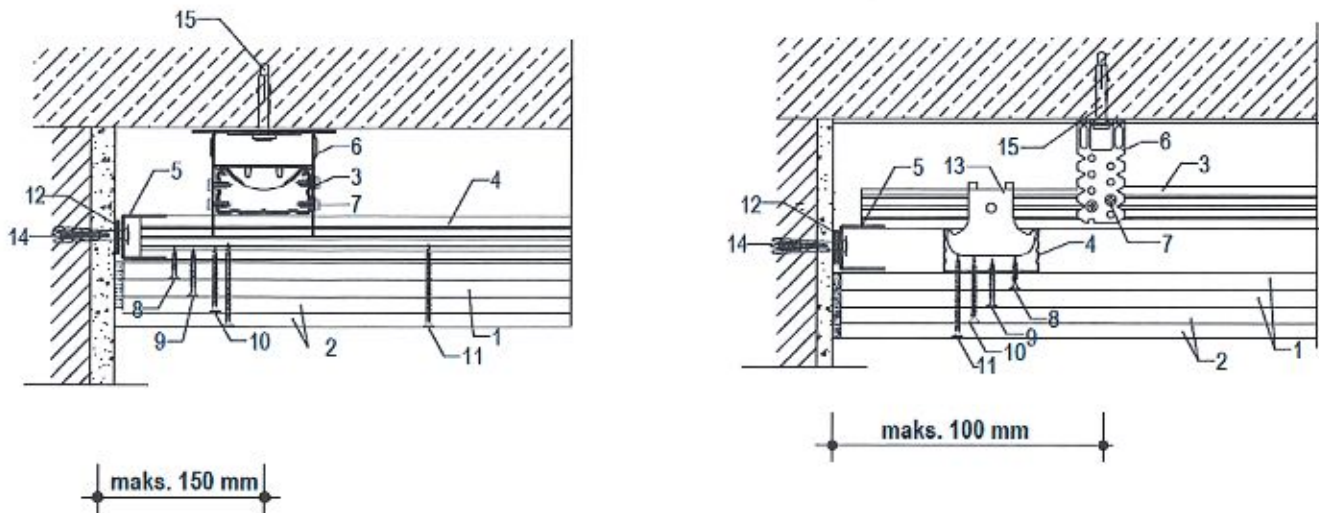
**Figure 3 View of the suspended ceiling – two level cross construction on hangers ES 60 or ES 60 plus**



### Ceiling elements

1. Two layers of boards Norgips GKF type DF or Norgips GKFI type DFH2, thickness: 15 mm
2. Two layers of boards Norgips GKF type DF or Norgips GKFI type DFH2, thickness: 12.5 mm
3. Profile e.g. Norgips CD 60 of the main layer, minimum thickness: 0.55 mm
4. Profile e.g. Norgips CD 60 of the loadbearing layer, minimum thickness: 0.55 mm
5. Profile e.g. Norgips UD 30, minimum thickness: 0.55 mm
6. Hanger e.g. Norgips: rotating hanger with spring or rotating hanger with nonius or hanger ES 60 or hanger ES 60 plus placed max. every 85 cm
7. Cross connector e.g. Norgips for profiles CD 60
8. Screws e.g. Norgips  $\text{Ø}3.5 \times 25$  mm placed every 40 cm
9. Screws e.g. Norgips  $\text{Ø}3.5 \times 45$  mm placed every 40 cm
10. Screws e.g. Norgips  $\text{Ø}3.5 \times 55$  mm placed every 40 cm
11. Screws e.g. Norgips  $\text{Ø}4.2 \times 70$  mm placed every 17 cm
12. Sealing tape e.g. Norgips, width: 30 mm
13. Mechanical connector, e.g. wall plug, dowel (min. dimensions  $\text{Ø}6 \times 40$  mm)
14. Mechanical connector, e.g. screw, steel dowel (min. dimensions  $\text{Ø}6 \times 40$  mm)

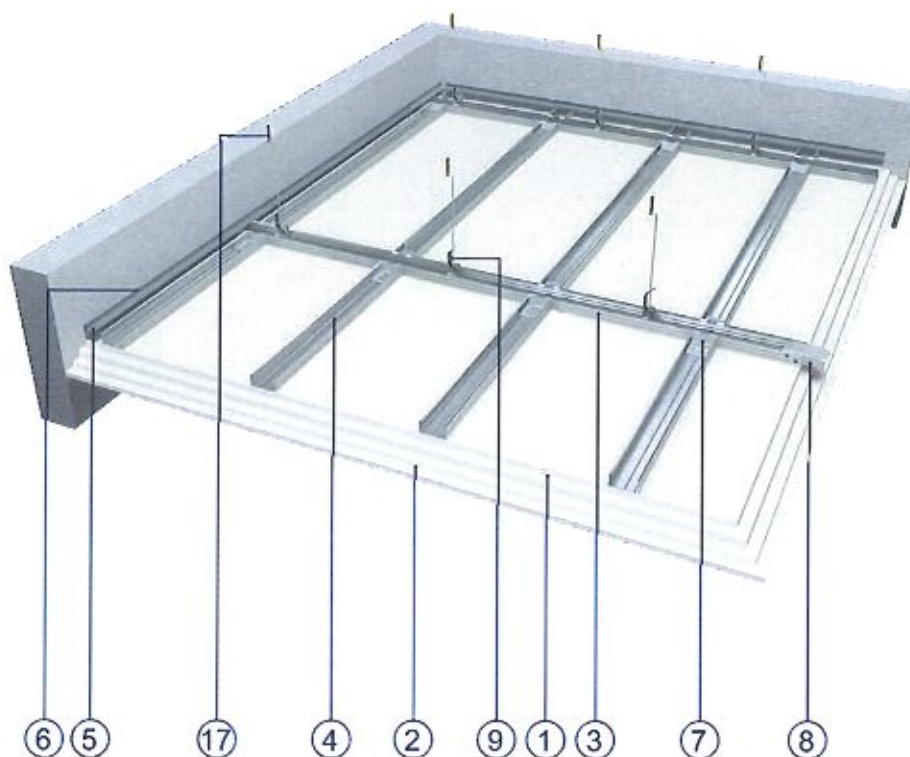
**Figure 4** Suspended ceiling of the two level cross construction – section perpendicular to the profiles of the main layer



### Ceiling elements

1. Two layers of boards Norgips GKF type DF or Norgips GKF I type DFH2, thickness: 15 mm
2. Two layers of boards Norgips GKF type DF or Norgips GKF I type DFH2, thickness: 12.5 mm
3. Profile e.g. Norgips CD 60 of the main layer, minimum thickness: 0.55 mm
4. Profile e.g. Norgips CD 60 of the loadbearing layer, minimum thickness: 0.55 mm
5. Profile e.g. Norgips UD 30, minimum thickness: 0.55 mm
6. Hanger e.g. Norgips: hanger ES 60 or hanger ES 60 plus placed max. every 85 cm
7. Screws e.g. Norgips Ø3.9 x 11 mm or Norgips Ø3.5 x 9.5 mm with self-drilling ends (4 pieces per hanger ES or hanger ES plus)
8. Screws e.g. Norgips Ø3.5 x 25 mm placed every 40 cm
9. Screws e.g. Norgips Ø3.5 x 45 mm placed every 40 cm
10. Screws e.g. Norgips Ø3.5 x 55 mm placed every 40 cm
11. Screws e.g. Norgips Ø4.2 x 70 mm placed every 17 cm
12. Sealing tape e.g. Norgips, width: 30 mm
13. Cross connector e.g. Norgips for profiles CD 60
14. Mechanical connector, e.g. wall plug, dowel (min. dimensions Ø6 x 40 mm)
15. Mechanical connector, e.g. screw, steel dowel (min. dimensions Ø6 x 40 mm)

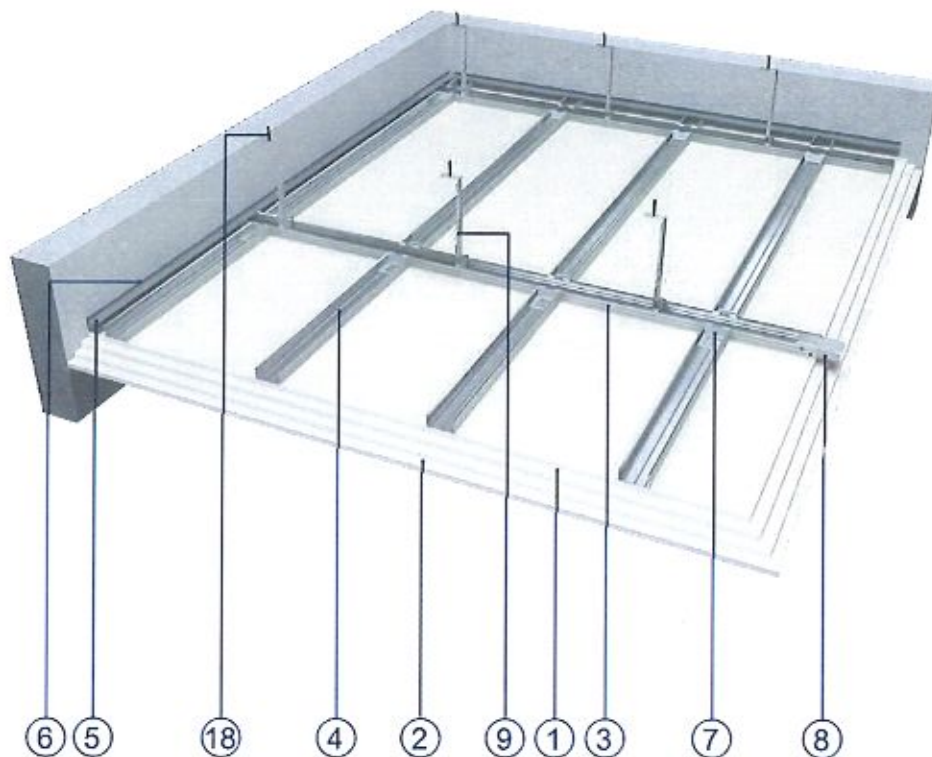
**Figure 5** Suspended ceiling of the two level cross construction – section perpendicular and section parallel to the profiles of the main layer



### Ceiling elements

1. Covering made of boards Norgips GKF type DF or Norgips GKFI type DFH2 (thickness: 2x15 mm)
2. Covering made of boards Norgips GKF type DF or Norgips GKFI type DFH2 thickness: 2x12.5 mm)
3. Profile e.g. Norgips CD 60 of the main layer, minimum thickness: 0.55 mm placed max. every 100 cm
4. Profile e.g. Norgips CD 60 of the loadbearing layer, minimum thickness: 0.55 mm placed max. every 40 cm
5. Profile e.g. Norgips UD 30
6. Sealing tape e.g. Norgips
7. Lateral single-sided connectors e.g. Norgips for profiles CD 60 connected to profiles CD 60 with screws e.g. Norgips Ø3.9 x 11 mm or e.g. Norgips Ø3.5 x 9.5 mm with self-drilling ends (4 pieces per one connection)
8. Lengthwise connectors e.g. Norgips
9. Hanger e.g. Norgips: rotating hanger with spring placed max. every 70 cm
17. Mechanical connectors, such as steel dowels (min. dimensions Ø6 x 40 mm)

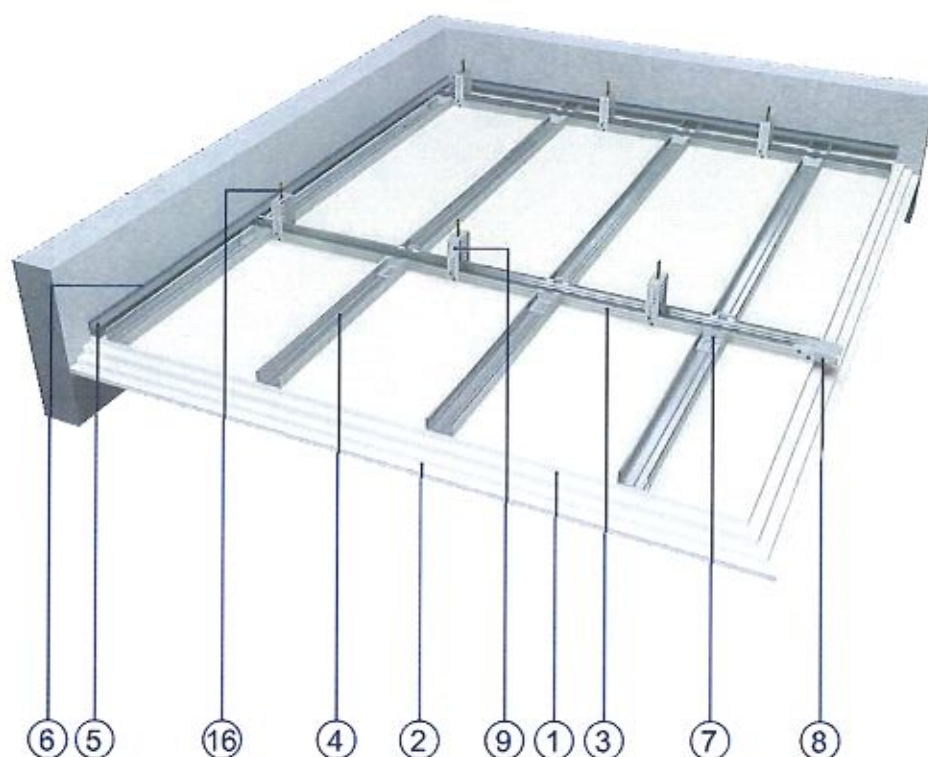
**Figure 6** View of the suspended ceiling – one level cross construction on rotating hangers with spring



### Ceiling elements

1. Covering made of boards Norgips GKF type DF or Norgips GKFI type DFH2 (thickness: 2x15 mm)
2. Covering made of boards Norgips GKF type DF or Norgips GKFI type DFH2 thickness: 2x12.5 mm)
3. Profile e.g. Norgips CD 60 of the main layer, minimum thickness: 0.55 mm placed max. every 100 cm
4. Profile e.g. Norgips CD 60 of the loadbearing layer, minimum thickness: 0.55 mm placed max. every 40 cm
5. Profile e.g. Norgips UD 30
6. Sealing tape e.g. Norgips
7. Lateral single-sided connectors e.g. Norgips for profiles CD 60 connected to profiles CD 60 with screws e.g. Norgips  $\text{Ø}3.9 \times 11 \text{ mm}$  or e.g. Norgips  $\text{Ø}3.5 \times 9.5 \text{ mm}$  with self-drilling ends (4 pieces per one connection)
8. Lengthwise connectors e.g. Norgips
9. Hanger e.g. Norgips: rotating hanger with nonius placed max. every 70 cm
18. Mechanical connectors, such as steel dowels (min. dimensions  $\text{Ø}6 \times 40 \text{ mm}$ )

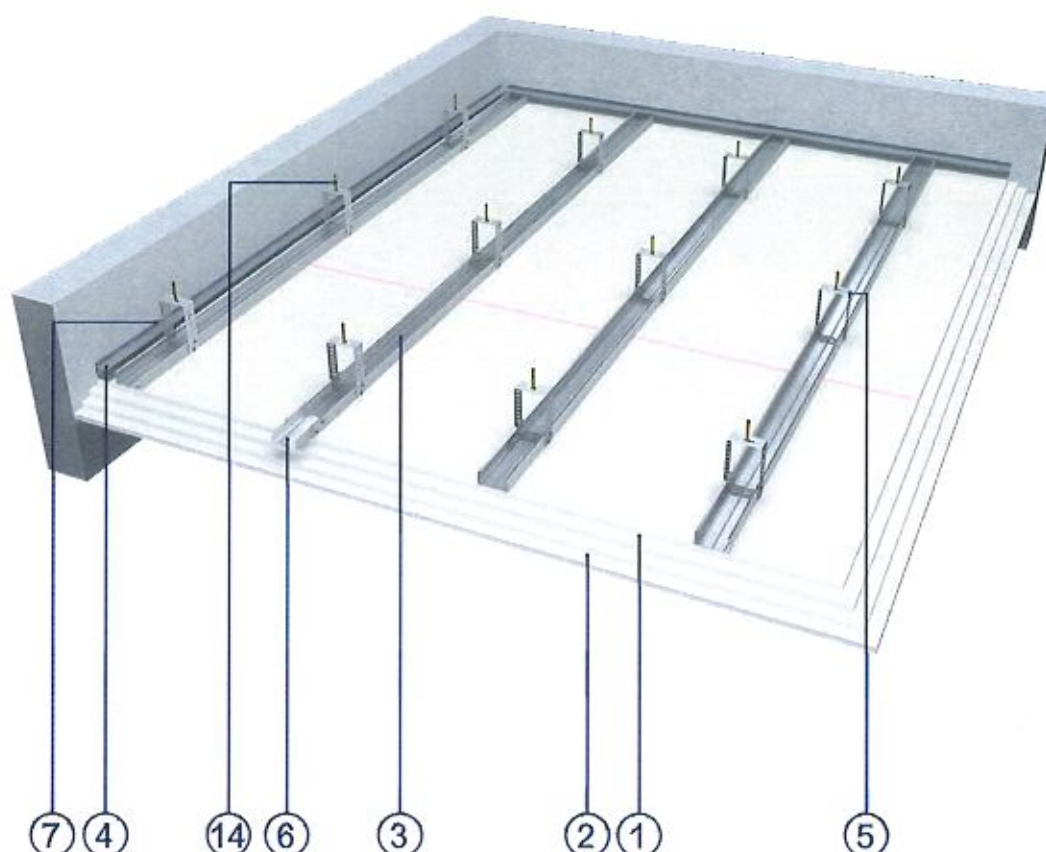
**Figure 7 View of the suspended ceiling – one level cross construction on rotating hangers with nonius**



### Ceiling elements

1. Covering made of boards Norgips GKF type DF or Norgips GKF type DFH2 (thickness: 2x15 mm)
2. Covering made of boards Norgips GKF type DF or Norgips GKF type DFH2 thickness: 2x12.5 mm)
3. Profile e.g. Norgips CD 60 of the main layer, minimum thickness: 0.55 mm placed max. every 100 cm
4. Profile e.g. Norgips CD 60 of the loadbearing layer, minimum thickness: 0.55 mm placed max. every 40 cm
5. Profile e.g. Norgips UD 30
6. Sealing tape e.g. Norgips
7. Lateral single-sided connectors e.g. Norgips for profiles CD 60 connected to profiles CD 60 with screws e.g. Norgips Ø3.9 x 11 mm or e.g. Norgips Ø3.5 x 9.5 mm with self-drilling ends (4 pieces per one connection)
8. Lengthwise connectors e.g. Norgips
9. Hanger e.g. Norgips: hanger ES 60 or hanger ES 60 plus placed max. every 70 cm
16. Mechanical connectors, such as steel dowels (min. dimensions Ø6 x 40 mm)

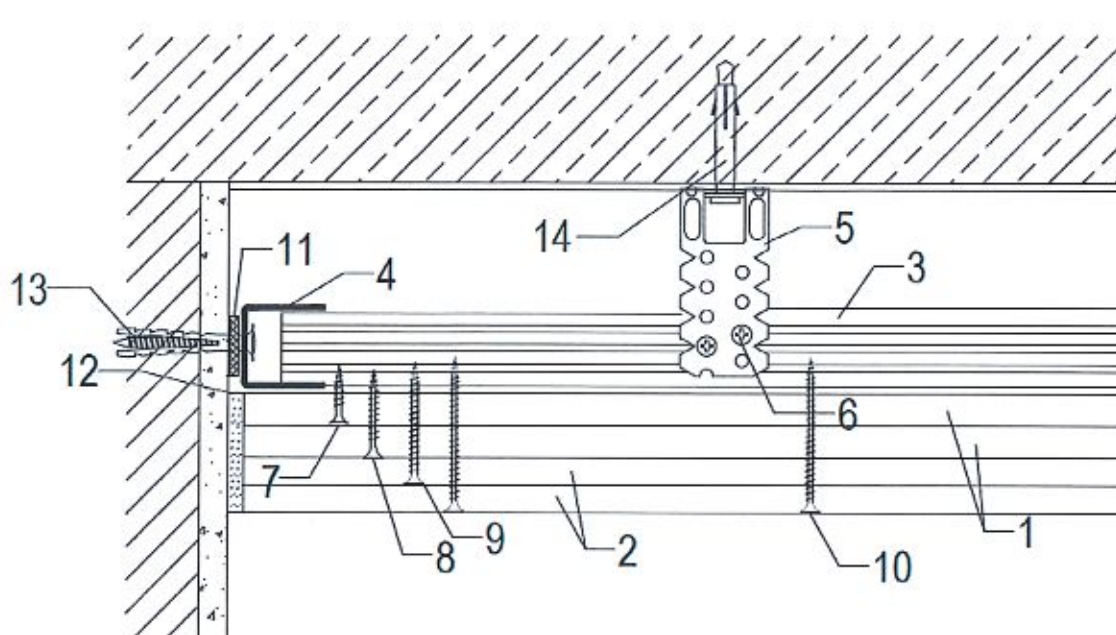
**Figure 8 View of the suspended ceiling – one level cross construction on hangers ES 60 or ES 60 plus**



### Ceiling elements

1. Covering made of boards Norgips GKF type DF or Norgips GKFI type DFH2 (thickness: 2x15 mm)
2. Covering made of boards Norgips GKF type DF or Norgips GKFI type DFH2 (thickness: 2x12.5 mm)
3. Profile e.g. Norgips CD 60 minimum thickness: 0.55 mm placed max. every 40 cm
4. Profile e.g. Norgips UD 30
5. Hanger e.g. Norgips: ES 60 or hanger ES 60 plus placed max. every 85 cm
6. Lengthwise connectors e.g. Norgips
7. Sealing tape e.g. Norgips
14. Mechanical connectors, such as steel dowels (min. dimensions  $\varnothing 6 \times 40$  mm)

**Figure 9** View of the ceiling lining suspended on hangers ES 60 or Norgips ES 60 plus



### Ceiling elements

1. Two layers of boards Norgips GKF type DF or Norgips GKFI type DFH2, thickness: 15 mm
2. Two layers of boards Norgips GKF type DF or Norgips GKFI type DFH2, thickness: 12.5 mm
3. Profile e.g. Norgips CD 60, minimum thickness: 0.55 mm placed max. every 40 cm
4. Profile e.g. Norgips UD 30, minimum thickness: 0.55 mm
5. Hanger e.g. Norgips: hanger ES 60 or hanger ES 60 plus placed max. every 85 cm
6. Screws e.g. Norgips  $\text{Ø}3.9 \times 11$  mm or e.g. Norgips  $\text{Ø}3.5 \times 9.5$  mm with self-drilling ends (4 pieces per hanger ES or hanger ES plus)
7. Screws e.g. Norgips  $\text{Ø}3.5 \times 25$  mm placed every 40 cm
8. Screws e.g. Norgips  $\text{Ø}3.5 \times 35$  mm placed every 40 cm
9. Screws e.g. Norgips  $\text{Ø}3.5 \times 55$  mm placed every 40 cm
10. Screws e.g. Norgips  $\text{Ø}4.2 \times 70$  mm placed every 17 cm
11. Sealing tape e.g. Norgips, width: 30 mm
12. Mechanical connector, e.g. wall plug, dowel (min. dimensions  $\text{Ø}6 \times 40$  mm)
13. Mechanical connector, e.g. screw, steel dowel (min. dimensions  $\text{Ø}6 \times 40$  mm)

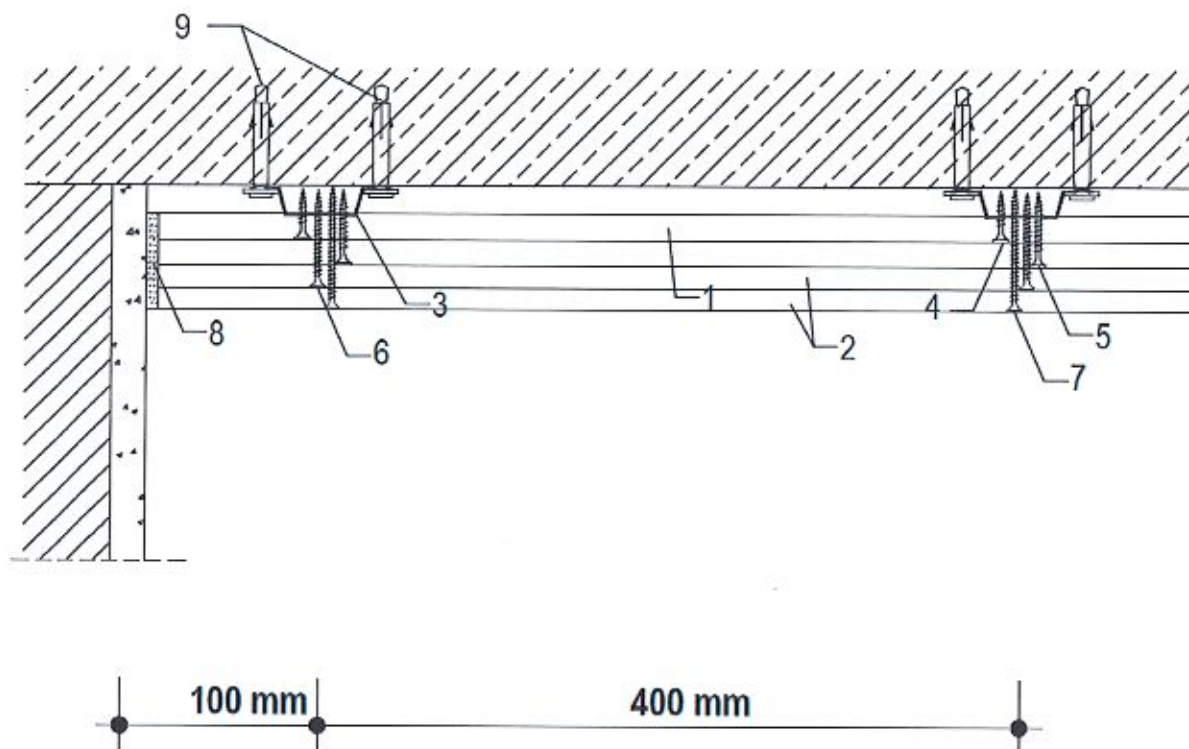
**Figure 10** Ceiling lining suspended on hangers Norgips ES 60 or Norgips ES 60 plus – section parallel to profiles CD 60



### Ceiling elements

1. Covering made of boards Norgips GKF type DF or Norgips GKFI type DFH2 (thickness: 2x15 mm)
2. Covering made of boards Norgips GKF type DF or Norgips GKFI type DFH2 (thickness: 2x12.5 mm)
3. Hat profile e.g. Norgips, minimum thickness: 0.55 mm placed max. every 40 cm
9. Mechanical connector, e.g. screw, steel dowel (min. dimensions  $\text{Ø}6 \times 40 \text{ mm}$ )

**Figure 11** View of the ceiling lining suspended on hat profiles

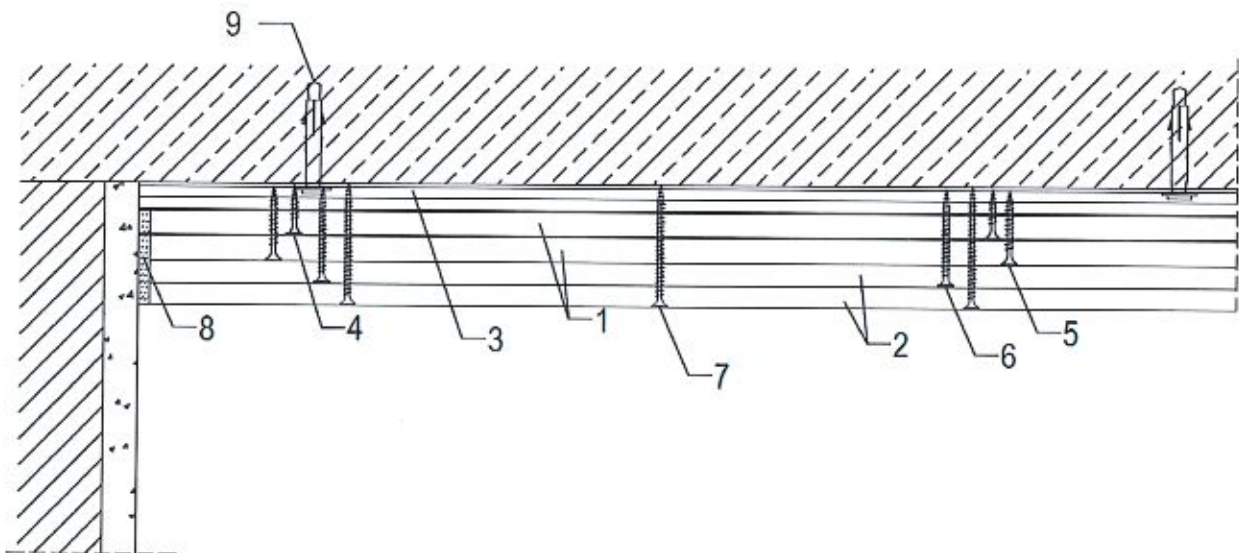


### Ceiling elements

1. Two layers of boards Norgips GKF type DF or Norgips GKFI type DFH2, thickness: 15 mm
2. Two layers of boards Norgips GKF type DF or Norgips GKFI type DFH2, thickness: 12.5 mm
3. Hat profile e.g. Norgips, minimum thickness: 0.55 mm placed max. every 40 cm
4. Screws e.g. Norgips  $\text{Ø}3.5 \times 25$  mm placed every 40 cm
5. Screws e.g. Norgips  $\text{Ø}3.5 \times 35$  mm placed every 40 cm
6. Screws e.g. Norgips  $\text{Ø}3.5 \times 55$  mm placed every 40 cm
7. Screws e.g. Norgips  $\text{Ø}4.2 \times 70$  mm placed every 17 cm
8. Gypsum plaster jointing compound e.g. Norgips Start, Norgips Super Filler, Norgips Start & Finish or Norgips Strong Filler
9. Mechanical connector, e.g. screw, steel dowel (min. dimensions  $\text{Ø}6 \times 40$  mm)

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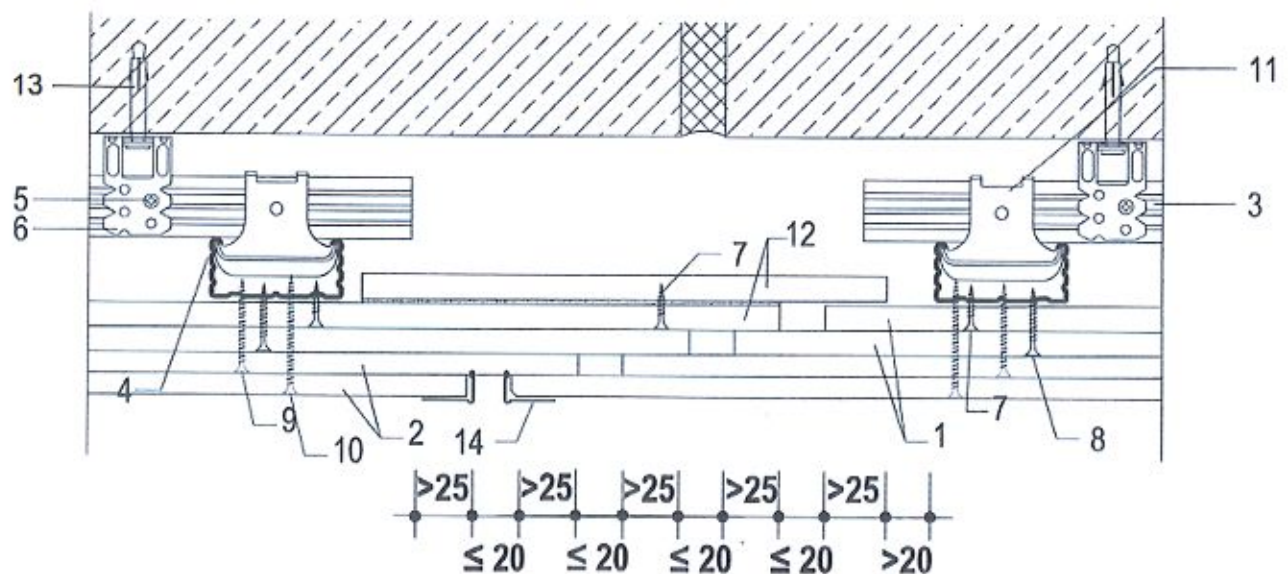
**Figure 12 Ceiling lining suspended on hat profiles – section perpendicular to the profiles**



### Ceiling elements

1. Two layer of boards Norgips GKF type DF or Norgips GKFI type DFH2, thickness: 15 mm
2. Two layers of boards Norgips GKF type DF or Norgips GKFI type DFH2, thickness: 12.5 mm
3. Hat profile e.g. Norgips, minimum thickness: 0.55 mm
4. Screws e.g. Norgips  $\varnothing$  3.5 x 25 mm placed every 40 cm
5. Screws e.g. Norgips  $\varnothing$  3.5 x 45 mm placed every 40 cm
6. Screws e.g. Norgips  $\varnothing$  3.5 x 55 mm placed every 40 cm
7. Screws e.g. Norgips  $\varnothing$  3.5 x 55 mm placed every 17 cm
8. Gypsum plaster jointing compound e.g. Norgips Start, Norgips Super Filler, Norgips Start & Finish or Norgips Strong Filler
9. Mechanical connector, e.g. screw, steel dowel

Figure 13 Ceiling lining suspended on hat profiles – section parallel to the profiles



### Ceiling elements

1. Two layer of boards Norgips GKF type DF or Norgips GKFI type DFH2, thickness: 15 mm
2. Two layers of boards Norgips GKF type DF or Norgips GKFI type DFH2, thickness: 12.5 mm
3. Profile e.g. Norgips CD 60 of the main layer, minimum thickness: 0.55 mm
4. Profile e.g. Norgips CD 60 of the loadbearing layer, minimum thickness: 0.55 mm
5. Hanger e.g. Norgips: hanger ES 60 or hanger ES 60 plus or rotating hanger with spring or rotating hanger with nonius
6. Screws e.g. Norgips  $\varnothing 3.9 \times 11$  mm or e.g. Norgips  $\varnothing 3.5 \times 9.5$  mm with self-drilling ends (4 pieces per hanger ES or hanger ES plus)
7. Screws e.g. Norgips  $\varnothing 3.5 \times 25$  mm placed every 40 cm
8. Screws e.g. Norgips  $\varnothing 3.5 \times 45$  mm placed every 40 cm
9. Screws e.g. Norgips  $\varnothing 3.5 \times 55$  mm placed every 40 cm
10. Screws e.g. Norgips  $\varnothing 4.2 \times 70$  mm placed every 17 cm
11. Cross connector e.g. Norgips for profiles CD 60
12. Boards Norgips GKF type DF or Norgips GKFI type DFH2, thickness: 15 mm stuck together gypsum plaster jointing compound e.g. Norgips Start, Norgips Super Filler, Norgips Start & Finish or Norgips Strong Filler
13. Mechanical connector, e.g. screw, steel dowel
14. Protection corner

Figure 14 Suspended ceiling – expansion joints