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– Państwowy Instytut Badawczy**

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**Installation of partition wall systems 712[06].S1.02**

**Student's Handbook**



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# 1. INTRODUCTION

You will find this handbook useful while acquiring knowledge about installation of partition walls used in Technology of Interior Drywall Systems. The Handbook includes:

1. Prerequisite skills, i.e. a list of indispensable skills and knowledge which you should possess before training within this modular unit.
2. Learning objectives of the modular unit.
3. Reference material (Chapter 4) which will enable you self-preparation for performing the tasks and successful test completion. In order to broaden your knowledge use the literature indicated and other sources of information. It includes also:
  - revision questions checking the knowledge indispensable for task completion,
  - tasks including instructions, the way of task completion and workplace resources,
  - progress checks checking the level of knowledge following the task completion.

While doing a progress check you should use “yes” or “no” to answer a question, which indicates that you have acquired the reference material or not. Successful task completion is a proof that you have acquired the skills specified in a given modular unit. If you find the subject or tasks difficult to understand, ask the teacher or instructor to explain or, alternatively, check if you perform a given activity properly.

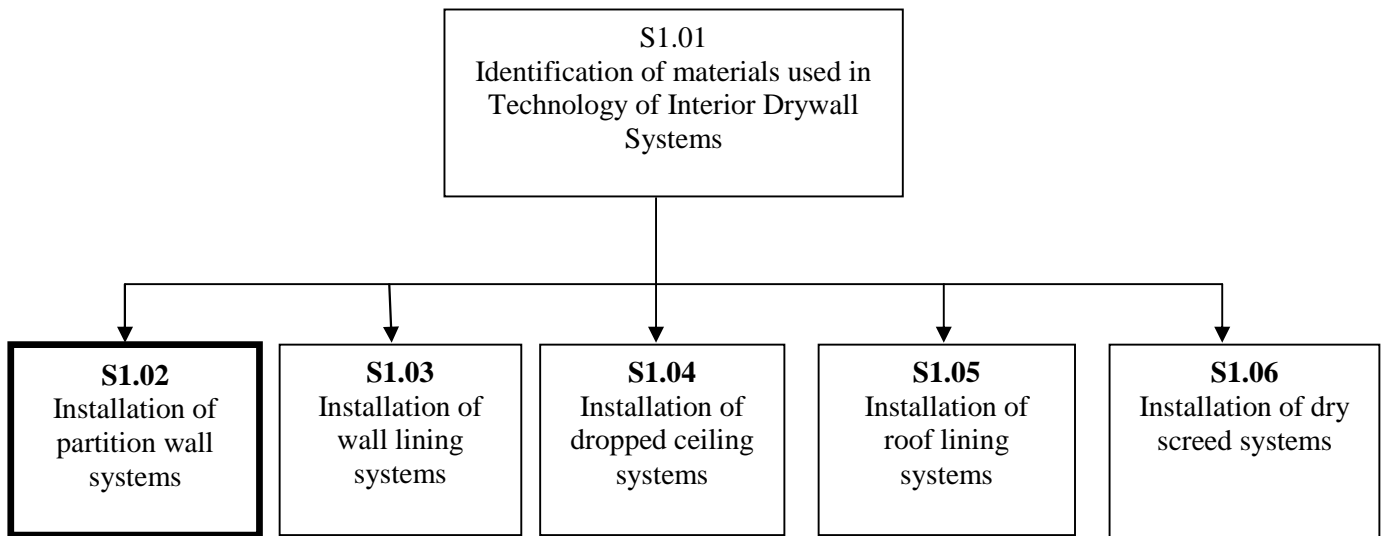
4. A set of revision questions checking your acquisition of the knowledge and skills covered by the entire unit. After getting familiarized with the reference material, try to take a test covering the whole unit.

The modular unit “Installation of partition wall systems”, the contents of which you will get familiarized with now is a part of a module “Technology of Interior Drywall Systems”.

## **Safety and hygiene at work**

During your stay in the workshop you must observe rules, regulations, safety and fire procedures related to the type of work performed. You will get familiarized with these regulations in the course of your training.

## Diagram of modular units



## **2. PREREQUISITE SKILLS**

Before starting the modular unit program “Installation of partition wall systems”, you should be able to:

- use technical building terminology,
- read and construe technical building drawings,
- use technical building documentation,
- organize the workplace in line with rules of ergonomics and safety,
- ensure the proper transportation of building materials,
- use different sources of information,
- identify materials used in Technology of Interior Drywall Systems,
- prepare mortar,
- select materials and equipment for construction works,
- take basic measurements in construction works,
- assemble scaffolding for construction works.

### **3. LEARNING OBJECTIVES**

Upon completion of the modular unit programme, you should be able to:

- prepare the workplace for the installation of partition walls,
- prepare the place where the materials for the installation of partition walls can be stored,
- ensure a proper transportation of all the necessary materials used in the installation of partition walls,
- establish the position of partition walls,
- prepare and cut to size boards for partition wall installation,
- select and assemble the steel profiles for the installation of partition walls,
- fix the boards to the wall profiles,
- fit insulation between boards,
- fix door frames,
- install walls with cavities in which service lines such as plumbing lines and sewage pipes can be concealed,
- fix shelves, walls and board frames to boards,
- complete the finishing works such as mudding, joint filling, finishing external angles, board cleaning,
- make an inventory of the materials needed for wall installation,
- assess the quality of the work done,
- respect the occupational health and safety rules as well as environmental law requirements.

## **4. REFERENCE MATERIAL**

### **4.1. Partition wall systems and their selection criteria**

#### **4.1.1. Reference material**

The interior drywall system is a set of products which have been selected and recommended by a plasterboard manufacturer and is to be installed according to the guidelines specified by the system supplier. The products included in the system embrace: the steel profiles, plasterboards (drywalls), sealing tapes, mudding compounds, fixing components and accessories. An interior drywall system allows users to erect light partition walls – flat- and arc-shaped.

Appropriate and failure-free performance of construction components executed in the drywall system – e.g. partition walls – depends, to a large extent, on the correct specification of requirements. They are described in the technical documentation. The most crucial parameters are rigidity and strength which in the case of partition walls usually mean maximum height permitted. In this respect requirements depend, to a large extent, on the final use of the rooms in which they are to be applied and the maximum number of people who will be allowed to stay in the room at the same time. Another important parameter in the case of partition walls in the technology of drywall systems is their acoustic resistance, which determines the comfort of the rooms. Protection against noise is included in building standards and specifies requirements which any wall must meet, depending on the type of the room. On the other hand, fire-resistance is a parameter which specifies the time during which a wall is a fire-barrier. Legal regulations specify fire-resistance parameters for majority of buildings and they are enforced in the course of technical acceptance of construction works.

Depending on the type of structure, single or double, and the number of plasterboard layers, the partition wall systems are labelled in different ways. There are also differences in labelling and some applied solutions resulting from a variety of commercial offers by domestic manufacturers of drywall systems, which have been omitted here.

Basically, we can distinguish three major systems of partition walls:

- a single structure with one layer of plasterboard lining,
- a single structure with many layers of plasterboard lining,
- a double structure with many plasterboard layers.

The choice of an appropriate partition wall system, e.g. the choice of steel profiles to be used, plasterboard types for layers and the material filling the wall interior (type of mineral wool, its volumetric density, thickness) have a crucial impact on attaining the pre-determined technical parameters by the wall. It refers to thermal insulation, fire resistance and rigidity. In other words, selection of the partition wall system is a crucial element of an interior arrangement, not only in the aesthetic aspect. The walls executed in the drywall system are characterized by low mass. During the design process their load on the building's structure (e.g. ceilings) is practically not taken into account. As a rule the wall mass in standard version amounts to ca. 25kg/m<sup>2</sup> at the wall thickness of 12.5 cm. For the sake of comparison, the mass of a masonry partition wall of identical thickness, depending on the material used, amounts to: ca. 165 kg/m<sup>2</sup> for brick; ca. 65 kg/m<sup>2</sup> – for cellular concrete and ca. 125 kg/m<sup>2</sup> – for gypsum blocks. High acoustic insulation of the system is obtained by using mineral wool as both insulation material and the wall structure element. Walls accomplished in this



technology are characterized by a definitely higher acoustic insulation RA1 than the wall of the same thickness made of other materials. Thanks to the unique chemical structure of their gypsum core, plasterboards are an inflammable material allowing the user to build partition walls which do not spread fire (NRO). Using impregnated plasterboards of enhanced resistance to moisture (type H2), we do not encounter any constraints concerning the use of drywall systems to build interiors in which increased humidity occurs temporarily (up to 10 hours at humidity below 85%).

The drywall system solutions offer possibilities which other solutions do not, namely: fast and easy wall assembly. It happens so owing to a comprehensive approach, adjustable elements of the system and elimination of labor-consuming wet processes. What is more, installation of all necessary service lines in the walls is easy as we do not have to bore the wall or attach wall slats which do not look nice. Another favourable characteristic is a possibility of using the rooms almost instantly, without a necessity of waiting for attaining by them appropriate strength and humidity. An extra bonus is flexibility of room arrangements resulting from an easy dismantling procedure.

**Single structure with one layer of plasterboard lining**

Walls on single structures with one plasterboard layer can be erected on each supporting floor structure. When a need arises, they can be easily dismantled. A quick and dry assembly is less time consuming than traditional building of a masonry wall.

Profiles are selected subject to the room height.

Table 1. Wall heights and profile thicknesses

| Wall height | Structure width | Wall thickness |
|-------------|-----------------|----------------|
| 3 m         | CW (C) 50       | 75 mm          |
|             | UW (U) 50       |                |
| 4 m         | CW (C) 75       | 100 mm         |
|             | UW (U) 75       |                |
| 5 m         | CW (C) 100      | 125 mm         |
|             | UW (U) 100      |                |

Because of the fact that maximum lengths of commercially available profiles are 4 m, in some cases it is necessary to join profiles on their length, e.g. by overlap joining. The length of an overlap for the CW (C) 100 profile is 1.0 m, for CW (C) 75 profile – 0.75 m, and for CW (C) 50 profile – 0.50 m. In the walls higher than 300 cm you must not use profiles which are joined on their length

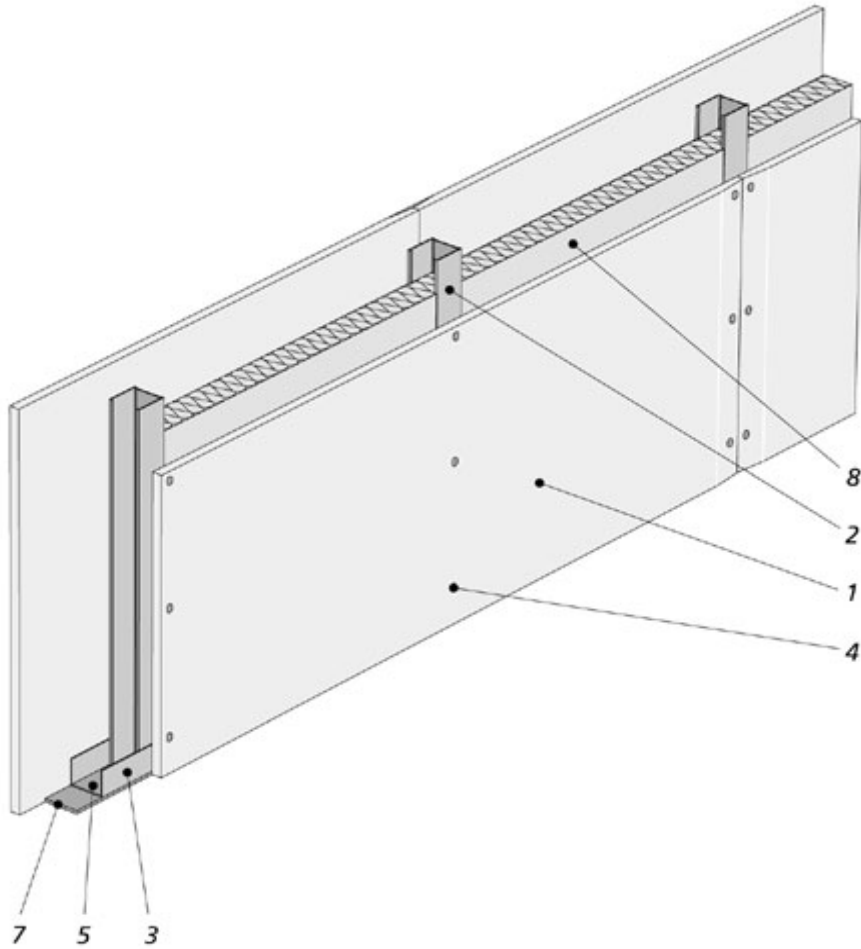


Fig. 1. Single structure with two-sided one-layer plasterboard lining

1. Plasterboards, thickness 12.5 mm, 2. Profile CW(C)50, every 60 cm, 3. Horizontal profile UW(U) 50, 4. Steel metal screws  $\Phi$  25 installed every 25 cm, 5. Expansion bolts or dowels; max every 100 cm, 6. System-included structural joint filler, finishing joint compound, 7. Sealing tape, 50 mm wide, 8. Mineral (rock or glass) wool

### Single structure with two-layer plasterboard lining

Walls on single structures with two-layer plasterboard linings are characterized by very good parameters of sound insulation, fire resistance and mechanical strength. These walls are widely used for different types of buildings and can be as high as 6.5 m.

Table 2. Maximum wall heights

| Profile type | Max. wall height |
|--------------|------------------|
| CW (C) 50    | 400 cm           |
| CW (C) 75    | 500 cm           |
| CW (C) 100   | 650 cm           |

Walls with two-layer plasterboard linings plasterboard layers should be used everywhere where a wall is exposed to the load of a great number of people. Two plasterboard layer layers

increase a wall's rigidity. This, in turn, allows us to build higher walls which may even reach the height of 10m; in such a case we use profiles "100" and two layers of plasterboards.

The walls on a double structure are characterized by the highest parameters of acoustic insulation and therefore they can be used as partition walls between apartments and in hotels. The idea behind such a structure is to erect two independent structures.

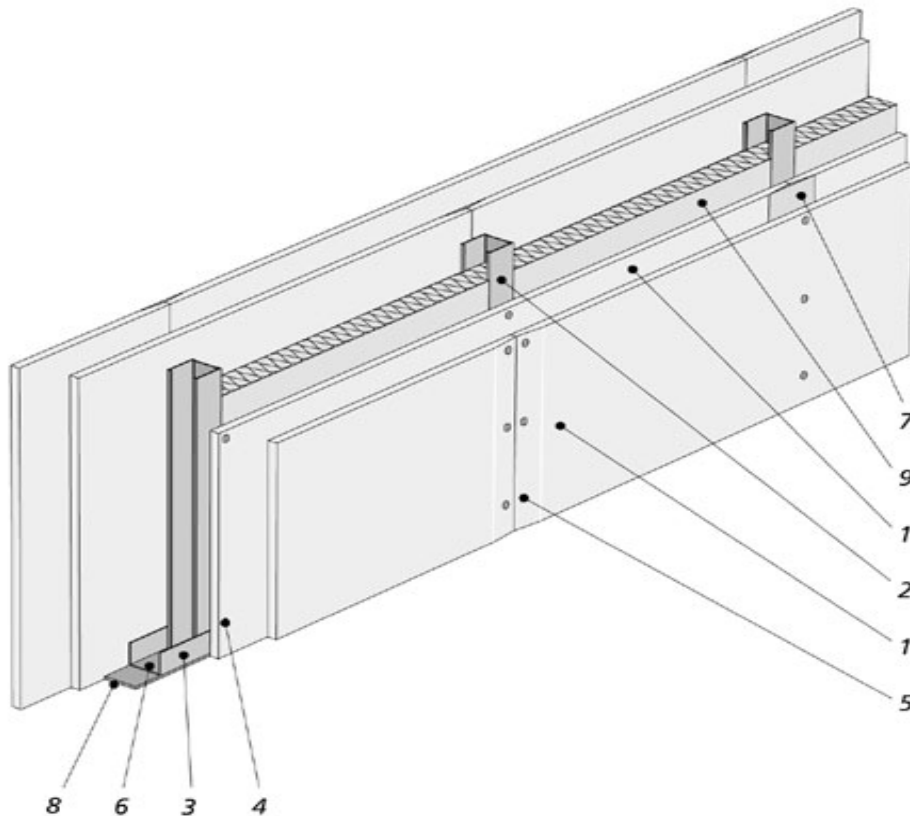


Fig.2. Single structure with two-sided two-layer plasterboard linings

1. Plasterboards, thickness 12.5 mm, 2. Profile CW(C)50, every 60 cm, 3. Horizontal profile UW(U) 50, 4. Steel metal screws  $\Phi$  25 installed in the first layer at intervals of 25 cm, 5. Steel metal screws  $\Phi$  25 every 25 cm. 6. Expansion bolts or dowels; max every 100 cm, 7. System-included structural joint filler, joint tape and finishing joint compound, 8. Sealing tape, 50 mm wide, 9. Mineral (rock or glass) wool

The first solution within this system are the walls on a double structure with profiles separated by a sealing tape. Such a method of constructing a wall ensures the highest parameters of acoustic insulation. In this way the walls between apartments are erected.

A characteristic feature of this solution in standard version are two adjacent profiles being 5 mm apart from each other and additionally separated by a layer of an acoustic insulation tape

stuck to the shelf of a CW profile. There are also such walls in which the distance between the two adjacent profiles is bigger, but adjacent profiles always work separately (they are not connected with each other). In such walls two plasterboards are used to improve rigidity and acoustic insulation. Filling them with mineral wool, at least on one side of the skeleton, is a standard solution.

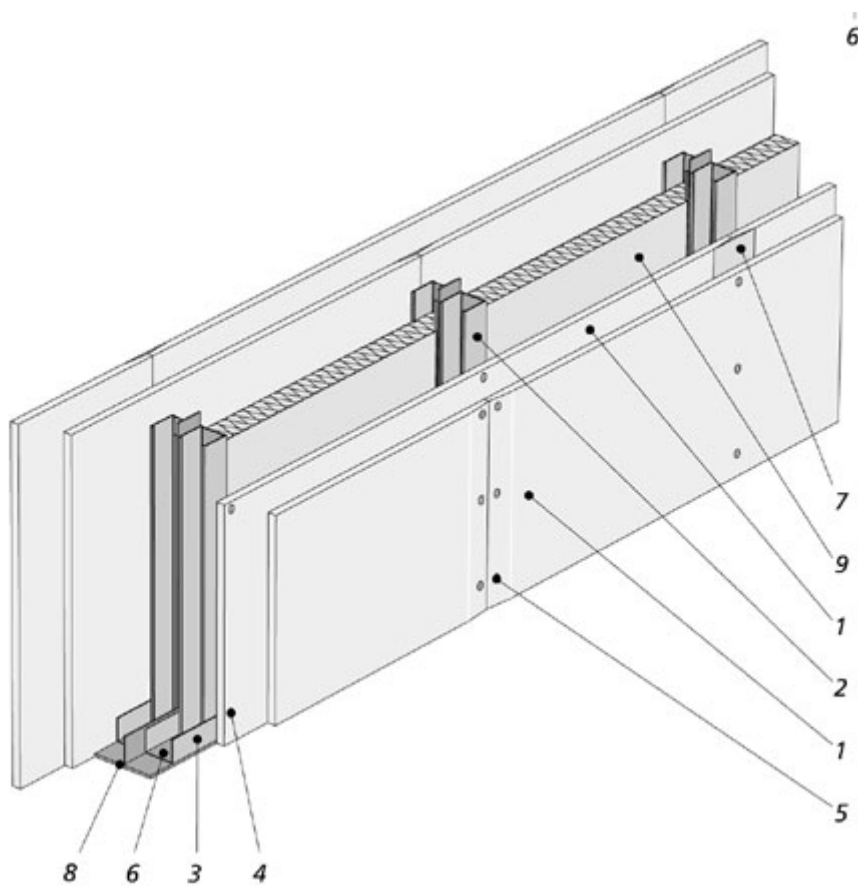


Fig.3. Double structure with two-sided two-layer plasterboard lining

1. Plasterboards, thickness 12.5 mm, 2. Profile CW(C)50, every 60 cm, 3. Horizontal profile UW(U) 50, 4. Steel metal screws  $\Phi$  25 installed every 75 cm in the first layer of plasterboard lining, 5. Steel metal screws  $\Phi$  25 at 25 cm intervals, 6. Expansion bolts or dowels; max every 100 cm, 7. System-included joint filler, joint tape and finishing joint compound, 8. Sealing tape, 50 mm wide, 9. Mineral (rock or glass) wool

The third solution is a wall with cavities. If it is necessary to install water and sewerage pipes in the walls, special walls with cavities are made to this purpose. The structure of such a wall consists of two rows of profiles installed away from each other to enable service lines to run between them. In order to make the structure more rigid, adjacent vertical elements are connected with each other by means of plasterboards being 300 mm in height which are fixed at 1/3 and 2/3 of the height of the vertical elements. In one row of the structure mineral wool is fitted, and two layers of plasterboards are applied. Such walls separate sanitary rooms, e.g. a bathroom from other rooms.

## **Fire barriers**

Chemical and physical properties of gypsum which makes a gypsum core in a plasterboard are taken advantage of in systems of passive fire protection. Gypsum-based building materials in the form of plasterboards are classified as the safest, inflammable products representing the Euroclass A2.

Building the walls which are to be fire barriers consists in using selected materials and respecting several rules. First of all, all wall structures must be made of the materials specified by the system supplier and be fire-rated. The perimeter edges of the wall structure must fire-proof, i.e. after plasterboards have been attached, all edge joints must be filled with the system-included gypsum filler. The joints in all plasterboard layers must be filled with system-included “mud” and the joints of the external plasterboard layer must be strengthened with a glass fibre tape. Special care must be given to the routes of service lines through the wall. Their fire resistance cannot be lower than that of the wall. All holes in the plasterboard layer surface (junction boxes, etc.) must be properly protected against fire. If the wall interior must be filled with mineral wool, the use of rock wool having the apparent density of  $> 35\text{kg/m}^3$  is recommended. In the case of walls higher than 3 m, supports for wool should be used made of horizontal sections of UW profiles. They should prevent the wool from sliding down. If the assembly of a fire door is needed, the structure fixing it to the wall must be analyzed for each single case separately and the weight of the door must be taken into account.

## **Sound barriers**

The use of light plasterboard structures filled with panels or mats of mineral (rock or glass wool) easily meets all the requirements regarding acoustic insulation levels specified by the appropriate Polish Standard.

Basically, the rules of erecting walls of enhanced acoustic insulation are not very different from the rules of erecting other walls in the technology of interior drywall systems. Selection of an appropriate structural solution of a partition wall, i.e. the type, thickness, number of plasterboard layers and parameters of the mineral wool which is to fill the wall interior, have a major influence on attaining by this partition wall the specified technical parameters concerning its acoustic insulation, fire resistance, load capacity and rigidity. Precise information referring to particular solutions can be found in “Aprobata Techniczna” (Technical Approval) published by Instytut Techniki Budowlanej (Institute of Building Technology).

### **4.1.2. Revision questions**

Answering these questions you can check if you are prepared for the tasks and their completion.

- 1) What protective functions can a wall erected in technology of drywall systems fulfil?
- 2) What is the main idea behind the system-based solutions in technology of drywall systems?
- 3) What are the basic differences between a wall erected in wet technology and a wall erected in the drywall system technology?
- 4) Which profiles must absolutely be covered by the insulation tape during the assembly of a steel profile structure?
- 5) Which steel profiles are used for the assembly of a standard partition wall in the drywall system technology?

- 6) What is the difference between a wall with cavities and a standard wall in the drywall system technology?
- 7) Why is mineral wool used for the partition wall insulation?
- 8) What are the three types of walls erected in the drywall system technology?

### 4.1.3. Tasks

#### Task 1

Identify construction components in the partition wall presented by the teacher.

The way to do the task:

To do this task you should:

- 1) get familiar with the partition wall structure (reference material from Chapter 4.1.1),
- 2) organize the workplace for task completion,
- 3) write the names of the construction components in the places indicated,
- 4) present the completed task.

Workplace resources:

- reference material from Chapter 6 of Student's Handbook,
- drawing instruments,
- drawings of the partition wall structure.

#### Task 2

Draw a projection and a cross-section of a wall of single structure and with two-sided one-layer plasterboard lining.

The way to do the task:

To do this task you should::

- 1) get familiar with the partition wall structure (reference material from Chapter 4.1.1),
- 2) organize the workplace for task completion,
- 3) draw the wall's cross-section,
- 4) present the completed task,
- 5) assess correctness and aesthetics of the task completed.

Workplace resources:

- a drawing paper pad, size A4,
- drawing instruments,
- reference material from Chapter 6 of Student's Handbook.

#### Task 3

Classify presented by the teacher partition walls executed in the technology of drywall systems by their application.

The way to do the task:

To do this task you should::

- 1) get familiar with the types of partition wall structures (reference material from Chapter 4.1.1),

- 2) organize the workplace for task completion,
- 3) identify the applications of particular types of partition walls depicted in the drawings by writing them down under the drawings,
- 4) present the completed task.

Workplace resources:

- 
- - a drawing paper pad, size A4,
- reference material from Chapter 6 of Student’s Handbook,
- paper clips,
- pictures or drawings of partition walls.

#### 4.1.4. Progress check

|  | <b>Yes</b> | <b>No</b> |
|--|------------|-----------|
| <b>Are you able to:</b>  |            |           |
| 1) identify types of plasterboard partition walls?   | ..         | ..        |
| 2) identify basic construction components of partition walls?                                    | ..         | ..        |
| 3) identify types of steel profiles used to erect a wall structure?                              | ..         | ..        |
| 4) identify types of plasterboards from the point of view of the desired properties of the wall? | ..         | ..        |
| 5) identify the insulation material used in drywall systems?                                     | ..         | ..        |

## **4.2. Steps in the installation of partition wall systems**

### **4.2.1. Reference material**

#### **General requirements for conducting construction works**

Starting works with the use of plasterboards is possible only when all “wet” works (including base floors) have been finished and all window frames have been installed. At the same time it is required that the temperature in the rooms cannot fall below 10° C. If works are carried out in winter, heating should already be working in the building. The requirement of keeping a minimum temperature refers also to the hours when workers are not on the construction site. Temporary warming up (e.g. for 8 hours) of the rooms by means of building site heaters is unacceptable, neither is a temperature drop at night hours. This requirement results from the necessity to maintain relative air humidity below 70%. What is more, it must be borne in mind that plasterboards must be stored in closed rooms or under a roof.

#### **Determining the position of a partition wall**

Plasterboard partition walls are made by attaching paper-based plasterboards on one side or two sides of the structure built of system-included steel profiles. After the plasterboards have been attached properly to the skeleton, an integrated structure is formed in which two basically different components, i.e. plasterboards and steel profiles, cooperate with each other.

The partition wall structure should be performed of thin-walled, system-included steel profiles. The wall skeleton consists of horizontal components labelled by the symbol UW (U) fixed to the floor and the ceiling and vertical components labelled by the symbol CW(C) which are inserted into horizontal components. Regardless of the type of the material which the grid is made of, the very plasterboard installed vertically determines spacing between vertical components which cannot be more than half of the board’s width. It must be selected in such a way that board joints are located on these vertical components. Hence the spacing between vertical elements in a straight line wall can be: 60, 40 or 30 cm.

When a wall is erected, the very first activity is to establish its positioning. Following the technical documentation, one must draw a line on the floor showing the position of the wall. Basically, it is enough to use one line to show the position of the wall, yet, it should be the line next to which a UW profile will be fixed. It requires a simple calculation from the drywall system assembler. Usually, the technical documentation provides either dimensions to the wall axis or to its edge, whereas the line drawn on the floor is to indicate the edge of the UW profile. Initially, the assembler should draw the lines on both sides of the profile. Only when he gets some experience it will be enough to use a pre-determined sign marked next to the line indicating on which side of the line the profile is going to be situated.

After establishing the position of the wall on the floor, a similar line indicating the wall’s position should be drawn on the ceiling too. This activity can be performed more quickly and easily if a bricklayer’s laser is used. Using this instrument one can transfer not only the levels and determine right angles on a horizontal plane, but first and foremost determine the position of vertical planes.

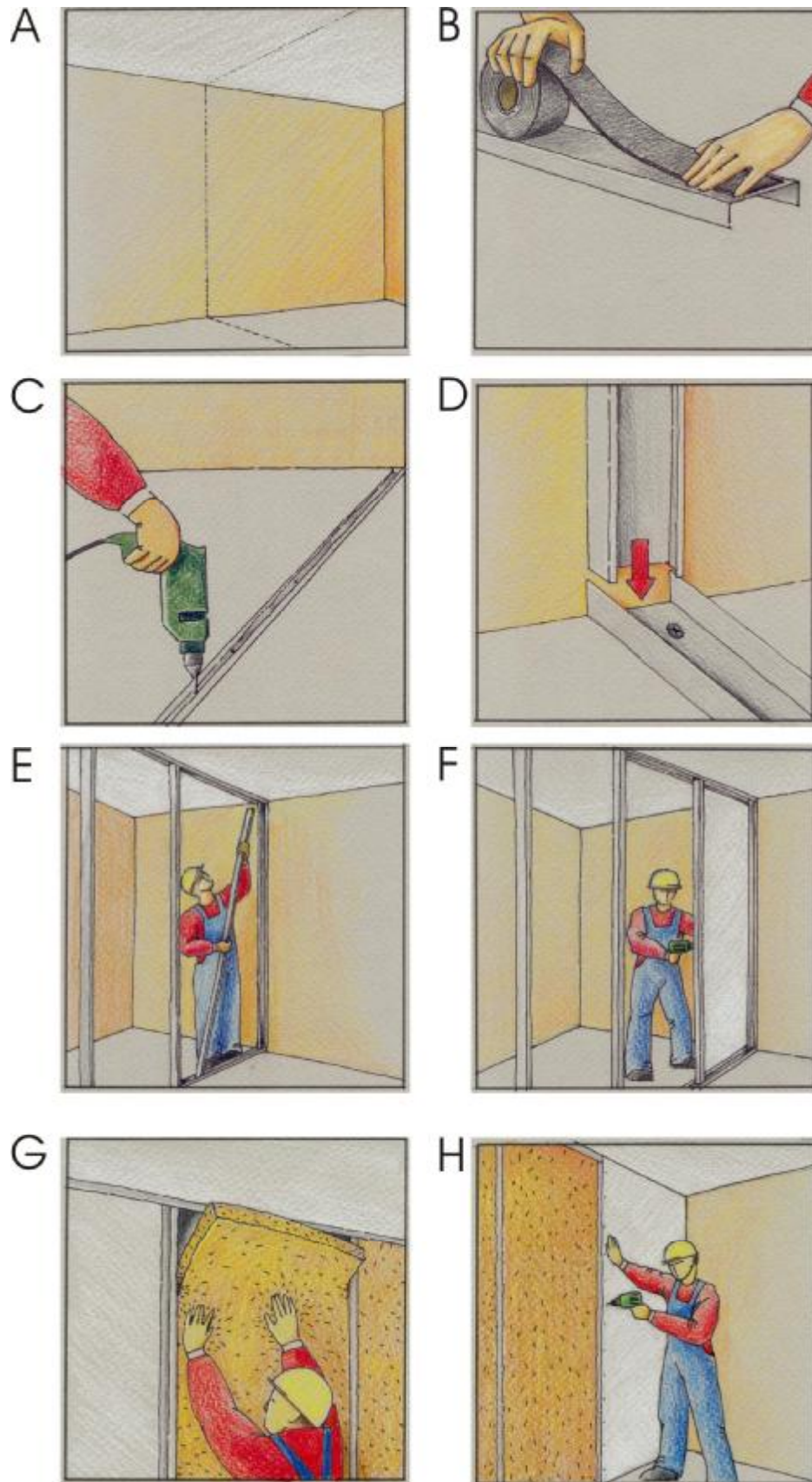
#### **Structure assembly**

After the position of the wall has been established, the next step is fixing horizontal elements and the perimeter vertical element to the substrate. In order to ensure the acoustic insulation of the wall as it was specified in the technical documentation, perimeter profiles, both horizontal and vertical ones (attached to the ceiling, floor and side walls) must be covered with the system-included insulation tape made of a flexible polyurethane foam. These



perimeter profiles (especially the ones attached to the floor and the ceiling) are fixed to the substrate with special quick assembly expansion bolts. For these bolts special holes must be drilled in the floor. They should be 6 or sometimes even 8 mm in diameter. It is permitted to fix profiles to the base floor layer provided that its thickness and strength are sufficient. Drilling is accomplished through the fixed profile. The maximum distance between bolts is 100 cm.

After the perimeter profiles have been fixed, CW (C) profiles are positioned. Profiles CW (C) are produced in lengths which are close to the most commonly encountered room heights. Nevertheless, usually they need shortening. It is done with the use of a pair of shears for steel sheets. It is a rule that a CW (C) profile should be by ca. 10 mm shorter than the room height.



*Fig. 4 Steps in the installation of a plasterboard partition wall a) establishing the position of the wall, b) sticking a sealing tape to perimeter profiles, c) fixing perimeter profiles, d) assembly of UW (U) profiles e) assembly of CW profiles, f) panelling, g) mineral wool fitting, h) panelling.*

In rooms of large stretches and under the ceiling vulnerable to deflections, where serious deflections of the ceiling can be expected, special sliding solutions must be applied eliminating the impact of the deflecting ceiling's load on the wall. The vertical elements are inserted between the UW profile channels but are not fixed to them. The CW profile of the vertical element is shifted into an appropriate place only after the plasterboard has been applied at the moment of its fixing to the elements of the structure skeleton. As a rule the drywall system manufacturers do not recommend a permanent connection (by screws) between CW profiles and perimeter UW profiles.

**Assembly of door-frame profiles**

In plasterboard walls, door frames are usually assembled at the stage of making the structure. Any door frames, wooden or steel ones, can be used for walls of every system. In the place where the door frame is assembled, the wall skeleton is disturbed when it comes to the rhythm of vertical element positioning. Vertical elements of the door frame are made of special, system-included UA profiles. They are made of a steel sheet, 1.8 mm thick. They require some kind of fixing in both the ceiling and the floor. There are special angle planes for this purpose and they are fixed to the ends of the UA profile by M8 screws and further fixed to the floor and the ceiling by the expansion bolts. Directly above the door frame, a section of the UW profile connecting vertical elements of the door frame must be inserted. Together they form a kind of a doorhead. This, in turn, enables insertion of short sections of the CW profile which are placed in such a way as to be consistent with intervals between the remaining vertical elements above the doorway.

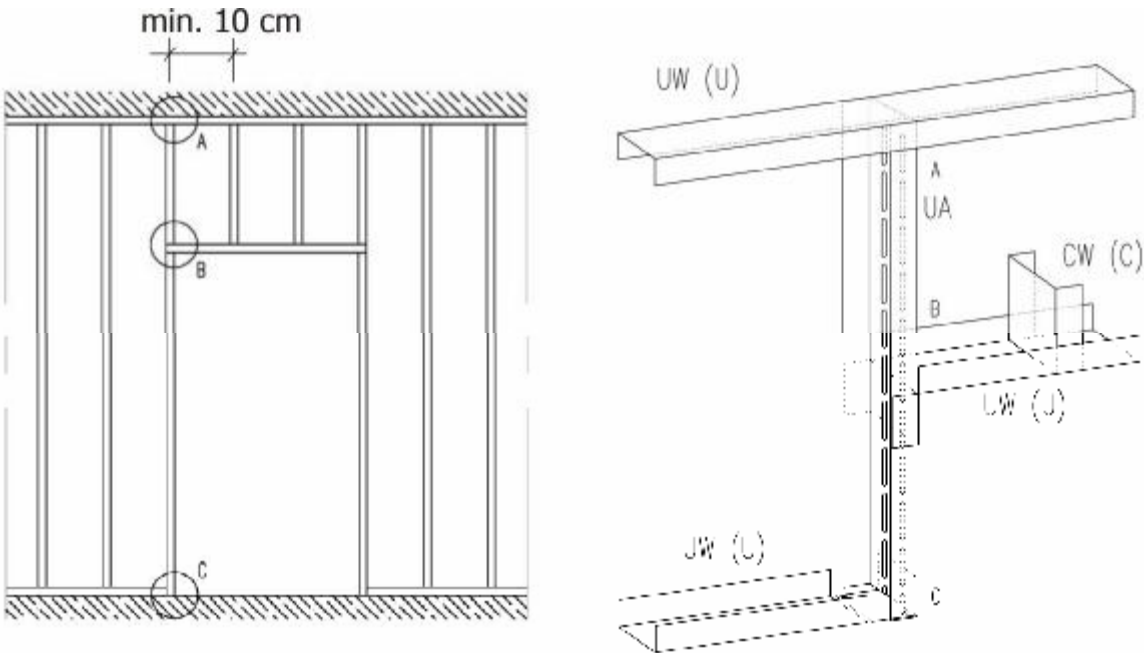
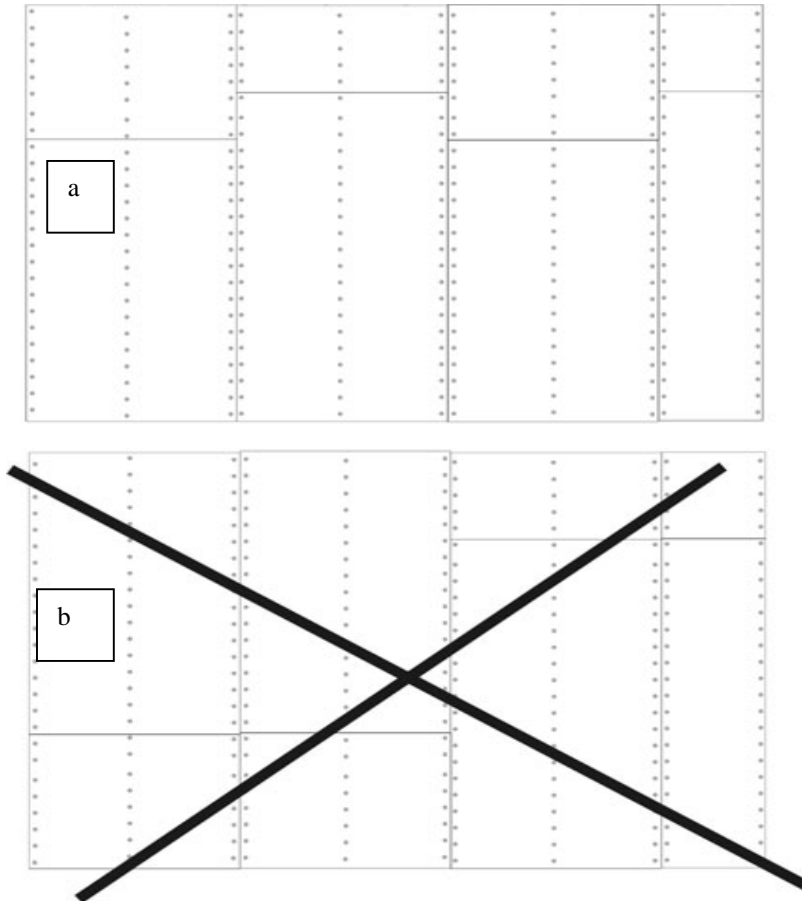


Fig. 5 Assembly of door-frame profiles

**Panelling**

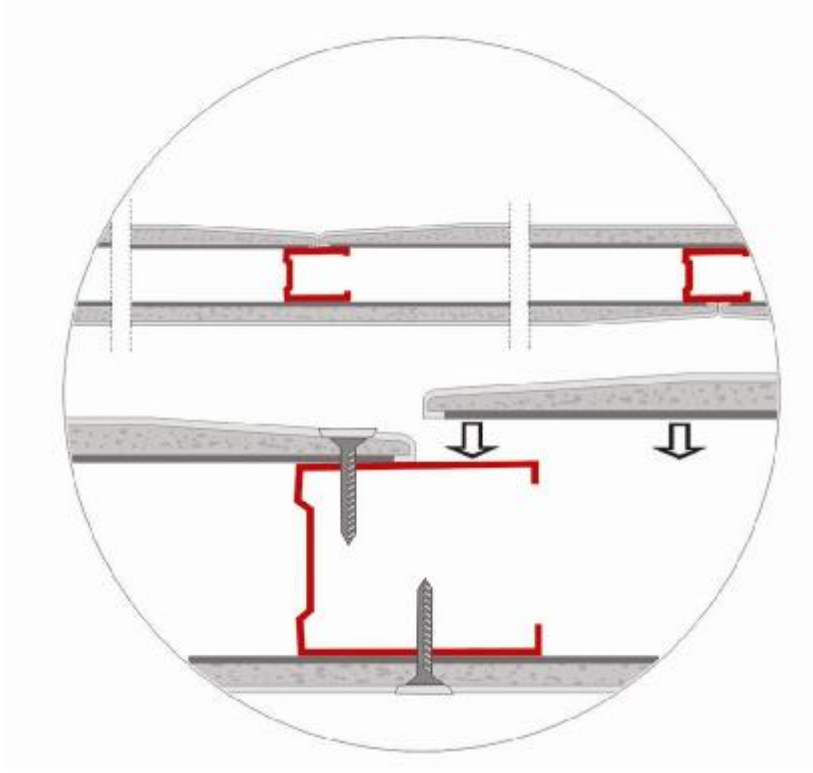
While installing plasterboards as wall linings, most often we put them with their length in vertical position so that they can stretch from the floor to the ceiling. In high rooms (above 3 m) and everywhere where the access ways make it impossible to bring the boards of a desired length, it is necessary to join the boards lengthwise. It is not allowed to join all boards at the same height (in one horizontal line). The contact lines of two adjacent boards should be

shifted in relation to one another by at least 40 cm. At the same time it is strongly recommended that the section of a board assembled next to the floor or the ceiling should not be smaller than 40 cm. It is not a fault to assemble the boards on the wall with their length in the horizontal direction, but it is justified only when the height of the room is a multiple of the plasterboard's width. Such an arrangement is not very common.



*Fig. 6 Plasterboard's shift during an assembly on the wall: a-correct ,b- incorrect.*

Before you start attaching plasterboards to the walls, the plasterboard size must be adjusted (naturally only when the commercially available plasterboard lengths do not match the room heights). Cutting the boards to size along the straight line is performed by one-sided nicking of the plasterboard (on the front side) with an assembler's knife and then breaking the gypsum core and cutting the cardboard layer on the back side of the board. If it necessary to cut the board along two perpendicular sections, first one section must be cut with a special saw and the other section cut off with a knife. The holes in the plasterboard are made with a crown saw installed on a drill or with a keyhole saw.



*Fig.7 Plasterboard assembly technique*

Plasterboards are fixed to the structure profiles by means of system-included steel metal screws. The shape of the screw heads allows the assembler to press them into the board which is being fixed to such an extent that they will not stick out above its surface. At the same time they do not cause any damage to the cardboard surface of the plasterboard. Depending on the thickness of the steel sheet from which profiles are made, two types of screws are used. The sharply ended screws can be used for the steel sheet whose max. thickness is 0.75 mm; the self-drilling screws must be used for thicker steel sheets. To drive screws one must use electric screwdrivers constructed specially for this purpose. You start the installation of plasterboards in the room corner. After the plasterboard has been applied to them, vertical steel profiles should be positioned in such a way as to be parallel to the vertical edge of the plasterboard. This edge must be in the centre of the CW channel. When a single plasterboard is applied to a steel grid, the 3.5 x 25 mm screws must be used (when two layers are applied – the screws must be 3.5 x 35 mm). The screws used for multilayers should be by 10 mm longer than the sum of layer thicknesses. Screws must be positioned at intervals of max. 25 cm. In multi-layers, in bottom layers the intervals should be of 75 cm.

### **A wall with cavities**

While installing wiring and water piping in partition walls, one must bear in mind that only very thin lines whose diameter is less than half of the profile's width can run inside the profiles. If the lines installed have a larger diameter (e.g. sewerage pipes) then a special structure must be applied – a wall with cavities.

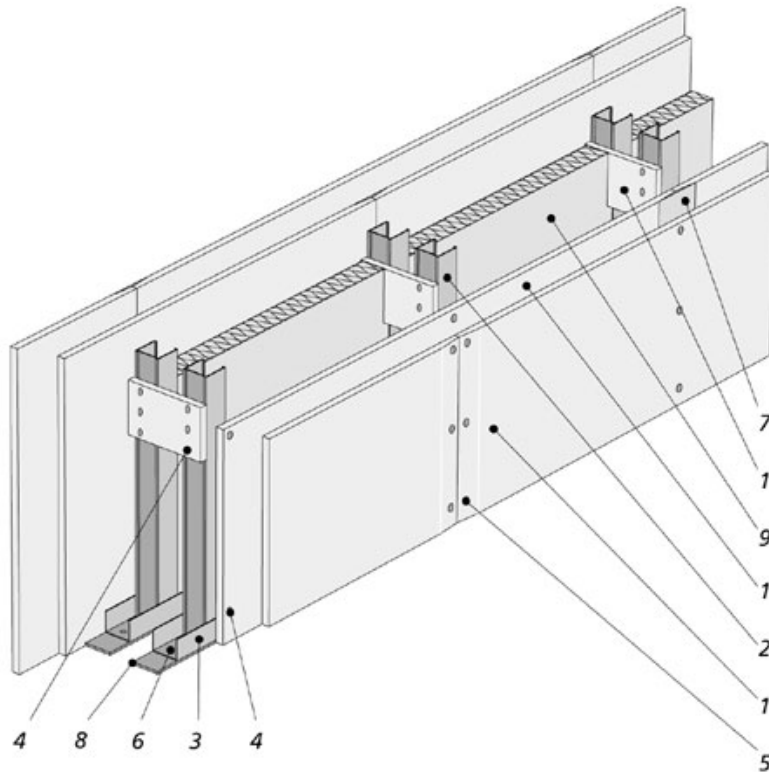


Fig. 8 Wall with cavities:

1. Panelling of H2 plasterboards, 2. Vertical profile CW (C) 3. Horizontal profile UW(U) , 4. Lacing of H2 plasterboards, 5. Screws of  $\Phi$  25 at intervals of 75 cm in the first layer and screws of  $\Phi$  25 at intervals of 25 cm. 6. Expansion bolts or dowels; 7. System-included joint compound, joint tape and finishing "mud" compound, 8. Sealing tape, 50 mm wide, 9. Mineral (rock or glass) wool filling

Usually CW(C) 50 profiles are used to assemble such a wall. Owing to them the wall thickness is reduced. In order to ensure appropriate stability, on both sides vertical profiles are connected laterally by means of plasterboard strips, 30 cm long, placed at intervals of 1/3 of the wall height. Basically a two-layer panelling is applied. Only the walls which do not have to transfer loads from sanitary facilities and which will not be finished with ceramic tiles can have a single-layer panelling. In such a case the maximum wall height will be lower than in the case of (C)50 or CW (C) 75 profiles. On the side of the rooms where air humidity is higher, the plasterboards of increased moisture resistance (H2) must be used in both layers.

When sanitary facilities are assembled, special assembly frames must be used. Their role is to take loads over. The frames are assembled to the profiles which create the wall structure. Following their panelling on one side (the side of the fittings), one can start the assembly of sanitary facilities. Fixing the pipes to the frames with the help of grips and clasps with rubber washers reduces the transfer of sounds to the fittings. The cold water pipes must be insulated to avoid moisture condensation. Application of the mineral wool insulation is recommended also for the whole internal surface, on both sides of the wall with cavities.

### **Insulation assembly**

In the case of the assembly of the wall with two-sided panelling, after the first side of the wall has been panelled, and electric wiring or sanitary piping have been installed, mineral or glass wool is placed between vertical profiles. The rigid wool in boards usually does not require fixing. The wool in the form of a mat is secured in place by means of special hangers or long screws driven into profiles. The use of light structures made of plasterboards as partition walls

filled with mineral (glass or rock) wool panels or mats ensures all parameters of sound insulation specified in the appropriate Polish Standard.

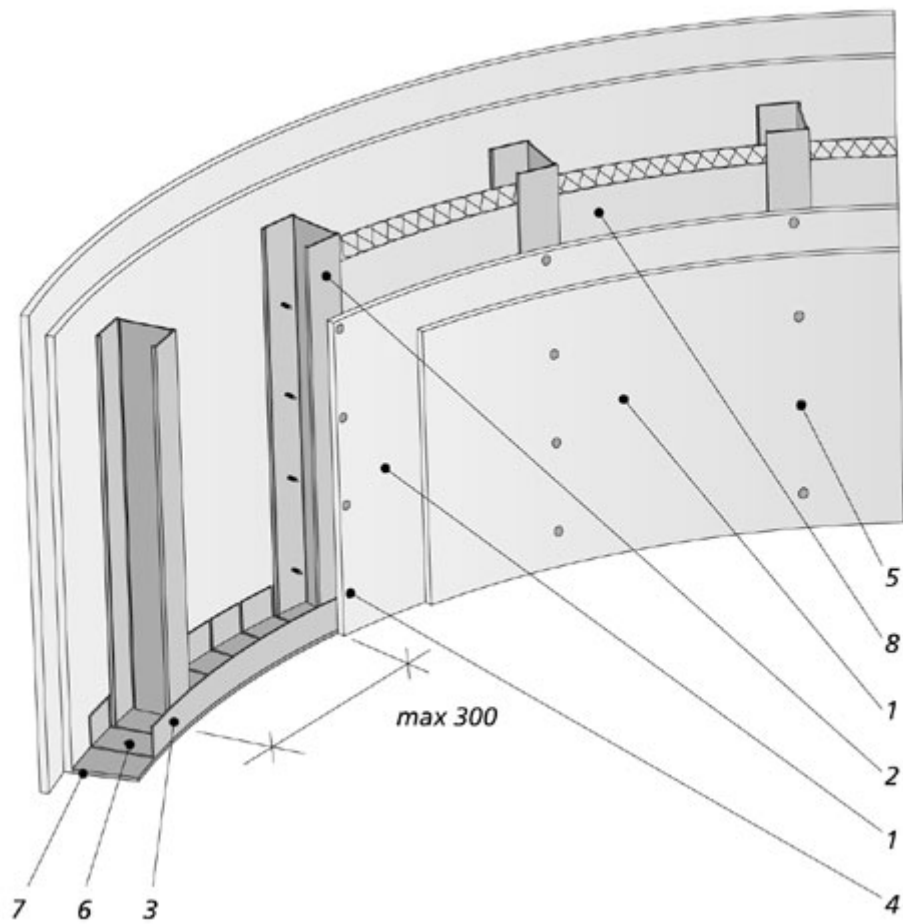
### **Multi-layer panelling**

In the case of two-layer and multi-layer panelling, the first layer of plasterboards (resting directly on the structure) and then the internal one are fixed by tacking only with the use of screws applied at intervals of 75 cm. However, the spacing of screws on the last – external – layer is like in the case of a single-layer, with one reservation, namely: that the screws must be selected in such a way as to be by 10 mm longer than the joint thickness of plasterboards when steel profiles are used.

Vertical joints of plasterboard layers on one side of the wall should be shifted in relation to one another by the distance equal to the interval between vertical elements, i.e. by 60 cm. In the case when on one side of the wall covering with an entire plasterboard was initiated, then – to achieve such a shift – on the other side one must start halfway of a plasterboard's width. This requirement applies also to two-layer panelling and joint shift in every layer. While fixing plasterboards to a steel structure, it is important to remember that plasterboards cannot rest directly on the floor – they must be lifted. The distance between the floor and the plasterboard edge must be ca. 10 mm. In order to position plasterboards in such a way on the floor surface during the assembly, the most convenient solution is to use plasterboard wedges.

### **Curved-line arc-shaped walls**

The structure of an arc-shaped wall is almost identical with that of the flat-shaped wall. Erecting arc-shaped walls starts with establishing their positioning on the floor and on the ceiling. In order to transfer the guidelines from the floor to the ceiling, the use of earlier prepared templates can turn out very useful. At the moment of the arc-shaped wall is designed it must be borne in mind that vertical joint covering both sides of the wall will not be on the same vertical profile CW. Also the fact that the wall structure will most often constitute the template for plasterboard bending enforces significant density of vertical profiles. Spacing of the vertical elements depends mainly on the radius of the wall's arch. The minimum radius of the wall curve in the case of the concave wall is 60 cm, whereas in the case of the convex wall – 100 cm.



*Fig. 9 Curved-line wall*

*1. Plasterboards fit for bending. 2. Vertical profile CW (C)100, at intervals max. 30 cm, 3. Horizontal profile UW (U) (slightly cut), 4. Screws 3.5 x 25 mm, 5. Screws 3.5 x 35 mm, 6. Expansion bolts or dowels; at intervals of max. 100 cm, 7. Sealing tape, 8. Mineral (rock or glass) wool*

Fast and perfect execution of an arc-shaped wall does not cause any problems if special plasterboards, 6.5 mm thick and reinforced with glass fibre, are used. One must use a two-sided lining in the horizontal arrangement.

The biggest problem encountered when curved-line walls are executed, is bending the UW (U) profile in conformity with technical documentation and fixing it to the floor and the ceiling. To this purpose a specially nicked profile for wall arcs is used. Nicks have been made in the profile in the factory. With the use of a pair of shears for steel sheets, one shelf (on the external part of the arc) is nicked every 5 cm (or every 10 or 15 cm when the radius of the curved line is bigger). Owing to this, the profile can be bent in the horizontal plane.

To stabilize the curvature created, the nicked UW (U) profile must be fixed to the substrate with fast assembly bolts located in the factory-made holes at max intervals of 50 cm when the radius is small. In the case of these walls in both layers smaller intervals are applied (not exceeding 20 cm).



## 4.2.2. Revision questions

Answering these questions you can check if you are prepared for the tasks and their completion.

1. What are the steps in the partition wall installation in the drywall system technology?
2. Why must some profiles be covered with an acoustic tape?
3. What types of steel profiles are used for the door frame assembly?
4. How much shorter should a CW (C) profile be than the room height?
5. What is the major rule of connecting CW (C) profiles with UW (U) profiles?
6. What is the maximum arch of a concave wall?

## 4.2.3. Tasks

### Task 1

On the basis of technical documentation of a room, determine the position of a partition wall. Mark this position on all four structural walls.

The way to do this task

To do this task you should:

- 1) get familiar with the room in which the task is to be performed,
- 2) get familiar with technical documentation of the room,
- 3) organize the workplace for task performance,
- 4) take necessary measurements in the room,
- 5) establish the position of a partition wall on the walls, the ceiling and the floor (in this sequence),
- 6) present the completed task,
- 7) assess correctness and aesthetics of the task completed.

Workplace resources:

- technical documentation of the room,
- measuring tools (bricklayer's laser),
- drawing instruments,
- reference material from Chapter 6 of Student's Handbook.

### Task 2

On the earlier determined position of the partition wall, fix horizontal and vertical profiles enabling further execution of the partition wall.

The way to do this task

To do this task you should:

- 1) get familiar with the earlier determined position of the partition wall (Task 1),
- 2) organize the workplace for task performance,
- 3) select materials for fixing profiles,
- 4) select appropriate profiles and other materials,
- 5) present the completed task,

6) assess correctness and aesthetics of the task completed.

Workplace resources:

- profiles needed for making a plasterboard wall,
- tools and equipment needed for fixing profiles,
- reference material from Chapter 6 of Student's Handbook.

### **Task 3**

Determine the position of door frames according to the technical documentation and fix profiles for their attachment. Present the task completed.

The way to do this task

To do this task you should:

- 1) get familiar with the room in which the door frame is to be installed,
- 2) get familiar with technical documentation of the room,
- 3) organize the workplace for task performance,
- 4) determine the position of the door frame,
- 5) fix the door frame profiles,
- 6) present the completed task,
- 7) assess correctness and aesthetics of the task completed.

Workplace resources:

- technical documentation specifying the door frame positioning,
- profiles for fixing door frames,
- tools for fixing profiles,
- reference material from Chapter 6 of Student's Handbook.

### **Task 4**

Assemble a fragment of a partition wall with cavities for water and sewerage line installation. Present the completed task.

The way to do this task

To do this task you should:

- 1) get familiar with the room in which the task is to be performed,
- 2) get familiar with technical documentation of the wall with cavities,
- 3) organize the workplace for task performance,
- 4) determine the position of the wall with cavities,
- 5) select materials for the execution of the wall with cavities,
- 6) fix profiles,
- 7) fix plasterboards,
- 8) present the completed task,
- 9) assess correctness and aesthetics of the task completed.

Workplace resources:

- plasterboards,
- steel profiles,
- tools and equipment for the assembly,
- reference material from Chapter 6 of Student's Handbook.

## Task 5

Make a fragment of a curved-line wall with a two-sided plasterboard lining.  
Present the completed task.

The way to do this task

To do this task you should:

- 1) get familiar with the room in which the task is to be performed,
- 2) get familiar with technical documentation of the room,
- 3) get familiar with technical documentation of a curved-line partition wall,
- 4) organize the workplace for task performance,
- 5) take necessary measurements in the room,
- 6) establish the position of the partition wall,
- 7) fix profiles,
- 8) fix one layer of plasterboards,
- 9) present the completed task,
- 10) assess correctness and aesthetics of the task completed.

Workplace resources:

- technical documentation,
- steel profiles,
- plasterboards,
- tools and equipment for the assembly,
- reference material from Chapter 6 of Student's Handbook.

### 4.2.4. Progress check

|  | Yes | No |
|--|-----|----|
| <b>Are you able to:</b>  |     |    |
| 1) identify basic steps in the partition wall assembly?  | ..  | .. |
| 2) identify types of profiles used for making doorways?  | ..  | .. |
| 3) identify the intervals between screws fixing plasterboards in walls with one-layer lining?  | ..  | .. |
| 4) identify intervals between screws fixing plasterboards in each layer of a two-layer lining? | ..  | .. |
| 5) select the type of plasterboards to be used in rooms of higher humidity?                    | ..  | .. |
| 6) describe the way of bending a plasterboard for the arc-shaped wall assembly?                | ..  | .. |
| 7) identify the rules of plasterboard assembly?  | ..  | .. |

## 4.3. Joint filling and finishing works

### 4.3.1. Reference material

After the plasterboards have been fixed to the walls, all plasterboard edges and heads of the screws used for fixing are clearly visible. To get a uniform surface the joints and screw heads must be masked and all possible defects should be concealed as well as other damage in plasterboard edges. To this purpose a system-included joint compound is used.

The purpose of joint-filling is not only to conceal plasterboard joints but first of all to make all plasterboard sheets into one continuous whole. A characteristic quality of a significant majority of the joint compounds used is the fact that their resistance to compression is several times higher than their tensile strength. To allow the joint to transfer even the slightest tensile forces, it must be provided with a tape made of a fibrous material.

Joint filling is one of the most important stages in wall lining installation. An appropriate selection of filling materials and appropriate execution assure a faultless performance of interior drywall systems.

The surface for joint filling must be cleaned of gypsum dust. Depending on the type of the joint compound or gypsum mud used we distinguish joint filling with and without a joint tape. In both cases, when we apply joint compound for the first time, it is spread laterally to the contact line of plasterboards, and pressed as deeply as possible to fill the whole joint tightly. Next, applying a uniform movement, preferably a single stroke, we spread and smooth out a joint compound along the whole joint.

For joint filling on tapered edges in commercially available plasterboards, we use a tape. We distinguish three types of tapes:

- paper tapes,
- self-adhering mesh tapes of glass fiber,
- glass fiber (felt) tapes.

In the case of tapered-edge plasterboards (NS, PRO, KS and KPOS), all types of joint tapes can be applied to their vertical junctions. In the case of the NS and PRO type edges, a self-adhering (mesh) tape should be applied to the edges of joined plasterboards directly onto their cardboard; in the case of edges of the NS, PRO, KS and KPOS types –a self adhering tape should be embedded in an earlier applied construction joint compound ("on wet gypsum"). "Felt" or paper tapes should be applied to the "wet gypsum" joints.

Vertical joints (on edges lowered in the factory) between plasterboards of half-round tapered edges (KPOS) can be "mudded" without the use of a tape in a situation when a special joint compound is prepared specially to this purpose.

Mudding horizontal joints between plasterboards, i.e. of the so-called "cut" edges should be accomplished with the use of tapes of the "felt" or paper type applied on "wet gypsum".

Mudding of vertical and horizontal joints between plasterboards with the use of a tape embedded in the earlier applied joint compound (to "wet gypsum") requires the second stage of mudding with joint compound the aim of which is to "cover" the tape.

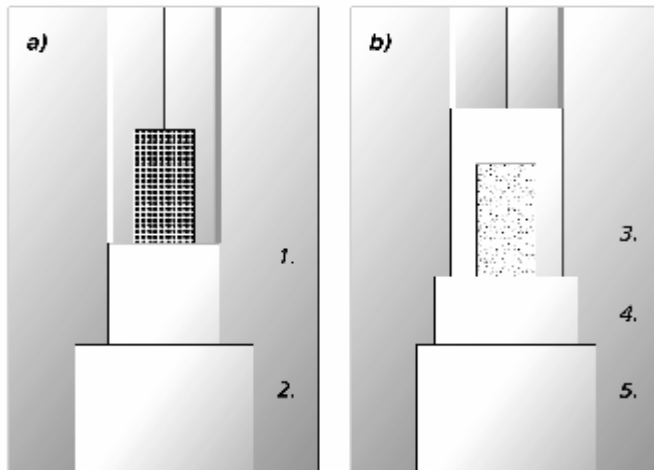


Fig. 10. Stages of plasterboard joint filling

a) applying a tape to the plasterboard edge and filling the joint with joint compound (1) when the first layer has dried up – applying the second, thinner layer of the finishing compound more widely (2).

b) when a fibre or paper tape is applied, the joint filling process consists of 3 stages: joint filling with joint compound and pressing a tape into it (3), after it has set – applying a wider coat of the same compound (4) and after it has dried up – applying the finishing mud (5)

Four quality levels of mudding are used to describe and classify the quality of drywall finishing in Technology of Drywall Systems. The Polish standards in this field are conformable with the European classification of Quality Levels and are described with the use of four different standards of mudding.

### Levels of gypsum board finish (Quality Level 1 (Q1))

Quality Level 1 for mudding refers to wall surfaces made of plasterboards towards which no aesthetic requirements are formulated (e.g. a substrate for ceramic tiles). It is enough to apply basic mudding which consists of filling the plasterboard joints and covering the visible fixing and finishing elements with joint compound. At this quality level the mudding process includes application of a joint tape of glass fiber (self-adhering mesh) to the plasterboard edges of the NS and PRO type and – depending on the system supplier's recommendations – covering it with one or two layers of joint compound.

Joint filling in the case of plasterboards having the KS type of edges should look a bit different. In this case, when a paper or felt tape or a fiber glass mesh tape is applied, the first step should be applying the system-included joint compound to an edge joint and then the tape should be applied. It must be borne in mind that after the first layer of joint compound with a tape applied to it has dried up, the joint should be mudded again with the use of one layer of the system-included joint compound.

If the joint compound has been applied to the edges of KPOS type, then - like in the case of KS edges – when we use a paper tape, or a felt tape, or a mesh tape of glass fiber, the first thing which must be checked is the use of the system-included joint compound into which the tape is embedded. After the first layer of the joint compound with a tape applied to it has dried up, the joint should be mudded again with one layer of the system-included, joint compound.

It is worth remembering that the application of joint compound without the use of any tapes is also possible in the case of KPOS edge plasterboards. Special, system-included joint compound is employed for joint filling without the use of a joint tape. Subject to a system

supplier's recommendations, two or three layers of joint compound should be applied to such plasterboard joints.

When the walls are covered with many layers of plasterboards, joint compound is applied to all subsequent layers, and the joints in the external surface must be additionally taped for joint filling. On the other hand, applying joint compound to screw heads in internal layers is not needed.

At this quality level of mudding, the occurrence of occasional ridges resulting from the joint compound shrinkage or tool marks are permitted. Additional application of finishing joint compound is not practised. Plasterboards finished in line with the Quality Level 1 recommendations are suitable as a substrate for wall linings (ceramic tiles, panels, etc.) and in temporary or technical rooms.

### **Levels of gypsum board finish (Quality Level 2 (Q2))**

The aim of finishing works performed by an assembler of drywall systems at this level is to even up and smooth out the joint surface so that it will make one uniform surface with a plasterboard. This applies also to fixing elements, internal and external angles and other joints. Mudding at the Quality Level 2 includes basic Q1 mudding and repeat mudding with the system-included "mud": structural – when it is required, and finishing mud until a joint and a plasterboard surface make a smooth, seamless whole. No ridges or tool marks are permitted. If it is necessary, the mudded surfaces should be sanded. The surface which has been treated in such a way is well-prepared for, e.g. wallpaper, structural paints and decorative plaster. After Q2 mudding we cannot exclude that an ultimately finished surface (e.g. painted one) will reveal a visible transition between the surface of drywall cardboard and a surface coated with a mud layer (e.g. on a joint).

### **Levels of gypsum board finish (Quality Level 3 (Q3))**

Gypsum board finish at Q3 Level includes Q2 level mudding as well as mudding the entire surface of the drywall element (joints and cardboard) with the system-included "mud" compounds and skim coats the aim of which is to smooth out the surface and close the micropores, making the texture and absorbability of these surfaces uniform. In this case the thickness of the coat applied is negligible and usually it does not exceed 1 mm. Attaining such an effect is possible only on condition we use steel trowels whose working surfaces are polished and edges - perfectly straight. Possible irregularities of surface, after the coat applied has set, should be sanded delicately with the use of a sanding mesh or sandpaper (grain 200).

### **Levels of gypsum board finish (Quality Level 4 (Q4))**

To meet the highest aesthetic standards of mudded drywall system surfaces, it is necessary to apply a thin coat of gypsum plaster (type: alabaster stuccowork gypsum) to the whole surface. Q4 Level mudding includes manual or mechanical application of a thin plaster layer or a special skim coat to the whole surface of the drywall system element (layer thickness: up to 3 mm). Besides, it is frequently needed to polish the whole layer applied.

Gypsum board finish of Quality Level 4 is always a result of the class of the interior and the method of its ultimate finish. A wall surface which has been treated like this can be painted with matt paints or wallpapered with thick wallpaper.

## **Preparation of cut edges**

In the case of plasterboards whose edges have been cut, joint filling is more difficult. The “sharply cut” edges, not covered with cardboard, must be joint filled in several stages. To joint fill such edges, the following activities should be performed:

- the plasterboard edge must be bevelled at an angle of  $22.5^\circ$ , to the depth of 50-75% of the board thickness; to this end we must use an assembler’s knife, a rasp or a special chamfer plane,
- the visible gypsum core should be wetted with water,
- a triangle which has been formed between the bevelled edges should be filled with the system-included mud; at the same time a paper tape should be applied in such a way as to prevent its excessive jutting out over the surfaces of joined plasterboards,
- when the first coat has set, another coat of the system-included mud intended for finish mudding should be applied. The width of this coat spreading is ca. 60 cm (30 cm on each side of the joint axis),
- after the previous coat has set and dried up, in order to achieve maximum surface smoothness, sandpaper can be used for additional smoothing of the joint.

## **Finishing the angles**

A paper tape is used for taping joints in internal angles. It is embossed lengthwise, which enables its easy bending. The mudding process is similar to that used for cut edges. Prior to mudding, the paper tape must be wetted. The stresses and shifts in the places where plasterboards meet may be bigger than on the joints of flat surfaces.

The external angle mudding is accomplished with the use of perforated aluminium angles. The angle should be fixed to joint compound dabs, not fastened with e.g. staples.

Steps in the protective (aluminium) angle assembly:

- clean the plasterboard’s cut edges of dust (priming is not needed),
- apply “mud” dabs to the angle at intervals of less than 10 cm,
- press and position (level) the angle on the corner of the walls (stick it),
- wipe off the mud excess and add as much mud as it is needed to cover the whole angle, on both sides,
- if required, press a fibre glass tape into the fresh “mud”,
- after the mud has dried up, fill in the places where it shrank and apply the mud more widely,
- any beads in the angle should be smoothed out with finish compound spread to the width of 30-40 cm.

## **Mudding the places of fixing**

Before you start mudding, check whether screws do not stick out of plasterboards. A correctly installed screw should be ca. 0.5 mm – 1 mm below the plasterboard surface. The cardboard next to its head must not be broken. Screws are covered with mud in two cycles: at the first mudding of joints and then at final mudding with a finishing mixture. Screw mudding is performed together with joint mudding.

## **Evaluation of the final effect of works in technology of drywall systems**

Like in the case of majority of construction works, the final effect of using drywall systems depends on each and every stage of their installation. When we talk about the final effect we mean completion of all works connected with drywall system installation, from the moment of the wall positioning until final mudding preceding painting, wallpapering or any other method of finishing the surface.

A number of activities undertaken by the drywall system assembler belong to the so-called “disappearing works”. Therefore, at the moment of the works acceptance some difficulties can occur when it comes to assessing their quality. For this reason the drywall system assembler should realize that whereas careless positioning of a wall or a ceiling will be clearly visible and easy to prove at the moment of the works acceptance, a careless execution of a steel profile structure or fitting the mineral wool insulation will become visible later after the building has been used for some time.

The following “disappearing works” are usually specified when we speak about the installation of drywall system elements:

- making a steel profile structure,
- mineral wool fitting,
- installation of plasterboards and the use of a joint tape,
- joint filling and mudding.

The final effect of the works performed is equally important. A drywall assembler – while performing works - should be aware that during the acceptance procedure of the works he did among the aspects assessed there will be dimensional tolerances for the positioning of planes and edges. Particular attention will be given to:

- deviations of surfaces from the plane, in other words – is the wall surface “corrugated”,
- deviation of the plane edges from the straight line, in other words – are there any deviations vertically and horizontally in the places where two planes intersect, e.g. in internal angles, and external wall angles,
- deviations of surfaces and edges from the vertical direction,
- deviations of surfaces and edges from the horizontal direction,
- deviations of intersecting planes from the angle specified in the documentation.





Fig. 11 Checking the surface and edge deviation from the vertical direction



Fig 12. Checking deviation of intersecting planes from the angle specified in the documentation.

You can find a detailed description of possible dimensional deviations in a book entitled "Warunki techniczne odbioru i wykonania systemów suchej zabudowy z płyt gipsowo-kartonowych" (Technical standards for acceptance of drywall system installation and execution works - group work, Polskie Stowarzyszenie Gipsu, Warszawa 2010)

### **Finishing works**

To the finished ceiling surface, a coat of primer is applied. Primer helps to eliminate the differences between absorbability of a plasterboard and mud compound. Before further treatment is started, the primer must be dry. Before tiles are applied, places which are directly exposed to water (e.g. in the bathroom) must be insulated with the so-called "liquid foil", which is a special preparation reducing water absorption of gypsum contained in the plasterboard core.

Commonly available dispersion paints are used for painting such ceilings. The paints which contain lime and water glass (liquid glass) should not be used. All commonly available wallpaper types and wallpaper adhesives can be used to wallpaper the ceiling plasterboards. Impregnated plasterboards of the H2 type are recommended for kitchens and bathrooms. Before tiles are applied, plasterboards must be covered with a coat of primer. Plasterboards prepared for tiles are not mudded with the finishing mud.

### **4.3.2. Revision questions**

Answering the questions you can check if you are ready for the tasks planned and task completion.

1. What activities are described as "disappearing works"?
2. Identify the basic stages in plasterboard joint filling?
3. What is Gypsum Board Finish Quality Level 1?
4. What are the characteristics of the basic standard mudding at Quality Level 1?
5. Identify possible errors that can be made during the light partition wall assembly in the drywall system technology?
6. What finishing works can be performed on walls made in the technology of drywall systems?

### **4.3.3. Tasks**

#### **Task 1**

Fill a joint in a fragment of a plasterboard partition wall which ends at the floor.

The way to do this task

To do this task you should:

- 1) get familiar with the wall in which a joint is to be filled,
- 2) select the quality level of joint filling,
- 3) organize the workplace for task performance,
- 4) select the materials and equipment for aligning the wall so that it is plumb,
- 5) fill a joint of the indicated partition wall fragment,
- 6) present the completed task,
- 7) assess correctness and aesthetics of the task completed.

Workplace resources:

- fragment of a partition wall made of plasterboards,
- materials for joint filling,
- tools for joint filling,
- reference material from Chapter 6 of Student's Handbook.

### **Task 2**

Finish a fragment of an angle in the plasterboard partition wall.

The way to do this task

To do this task you should:

- 1) get familiar with the wall in which the angle is to be finished,
- 2) select the finishing technique depending on the type of the angle (external/internal),
- 3) select the quality level of joint filling,
- 4) organize the workplace for task performance,
- 5) select the materials and equipment for aligning the wall so that it is plumb,
- 6) finish the indicated angle of the partition wall,
- 7) present the completed task,
- 8) assess correctness and aesthetics of the task completed.

Workplace resources:

- fragment of a partition wall made of plasterboards,
- materials for joint filling,
- tools for joint filling,
- materials for finishing the angle,
- reference material from Chapter 6 of Student's Handbook.

### **Task 3**

Check dimensional tolerances for the plasterboard partition wall.

The way to do this task

To do this task you should:

- 1) get familiar with the wall for which you have to check dimensional tolerances,
- 2) check if the wall has been completed and finished,
- 3) select the measuring instruments needed,
- 4) take wall measurements needed and check dimensional tolerances of its execution,
- 5) present the completed task,
- 6) assess correctness and aesthetics of the task completed.

Workplace resources:

- fragment of a partition wall made of plasterboards,
- measuring instruments,
- reference material from Chapter 6 of Student's Handbook.

#### 4.3.4. Progress check

|  | Yes | No |
|--|-----|----|
| <b>Are you able to:</b>                              |     |    |
| 1) identify the features of gypsum board finish QL1? | ..  | .. |
| 2) identify quality levels of mudding ?              | ..  | .. |
| 3) identify the steps in the assembly of angles?     | ..  | .. |
| 4) identify types of tapes?                          | ..  | .. |

## 5. TEST OF ACHIEVEMENTS

### INSTRUCTIONS FOR STUDENTS

1. Read the instructions carefully.
2. Sign the answer sheet with your name and surname.
3. Get acquainted with test tasks.
4. The test consists of 20 tasks of two difficulty levels. It includes tasks of the following types: open, gap-fill, multiple-choice and True/False.
5. Give your answers on the enclosed answer sheet only. Put a cross (X) in the appropriate column or write the correct answer. If you make a mistake, put a circle around the incorrect answer and then put a cross (X) next to the correct answer.
6. The test consists of 2 parts containing tasks of different difficulty levels: tasks 1, 2, 4, 5, 6, 7, 8, 9, 11, 13, 14, 16, 17, 19 – represent the basic level, whereas tasks: 3, 10, 12, 15, 18, 20 – represent the above-basic level.
7. Work on your own because only then you will get satisfaction of completing the task.
8. When you find answering a question difficult, leave it for a later time and return to it when you have time.
9. You have 90 minutes to complete the test.

Good luck !

### A SET of TEST TASKS

1. Identify the most important parameters of a partition wall:
  - a) .....
  - b) .....
  - c) .....
  - d) .....
2. Identify the basic elements of the partition wall structure in drywall systems:
  - a) .....
  - b) .....
  - c) .....
  - d) .....
3. Identify the mass of a plasterboard-made partition wall in its standard version (12.5 cm thick):
  - a)  $25 \text{ kg/m}^2$ ,
  - b)  $65 \text{ kg/m}^2$
  - c)  $125 \text{ kg/m}^2$ ,
  - d)  $165 \text{ kg/m}^2$ ,

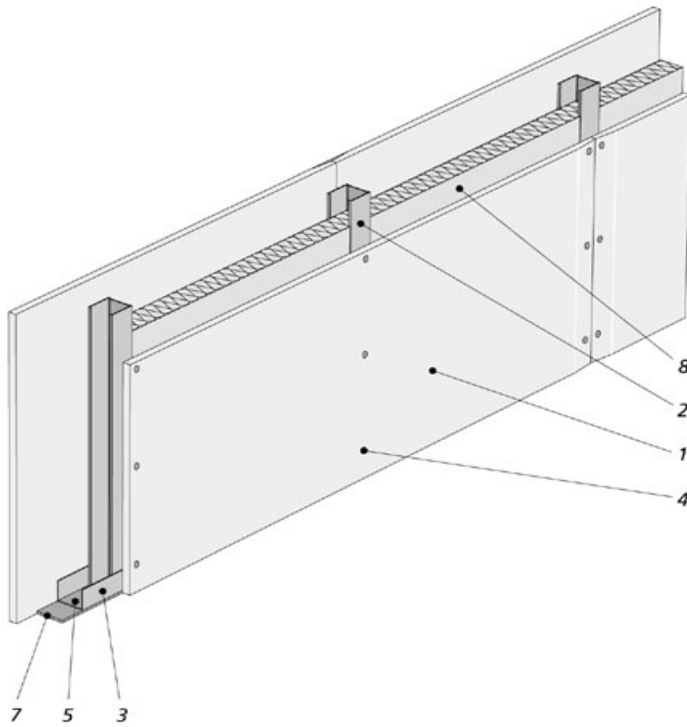
4. Identify major partition wall systems.

- a) .....
- b) .....
- c) .....
- d) .....

5. What material is used for acoustic insulation in partition walls?

- a) foamed polystyrene,
- b) mineral wool,
- c) insulation foam,
- d) different.

6. Identify particular structural elements (indicated by numbers) of a partition wall.

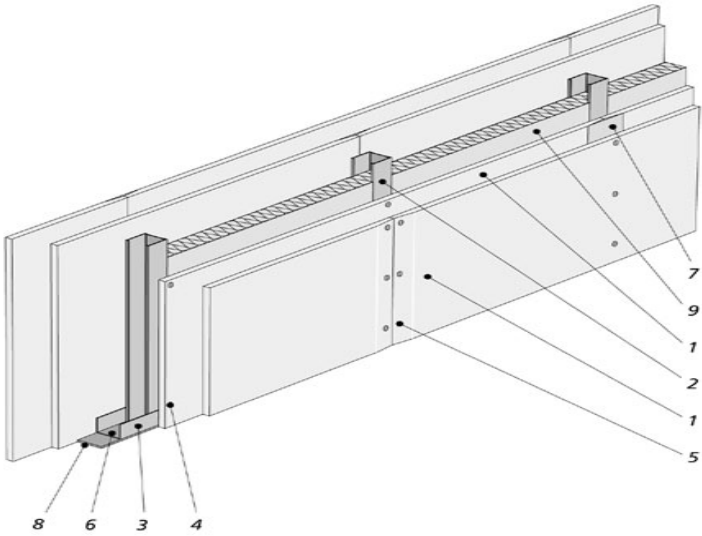


- a) 1 - .....
- b) 3- .....
- c) 7- .....
- d) 8- .....

7. The partition wall system depicted in point 6 is used:

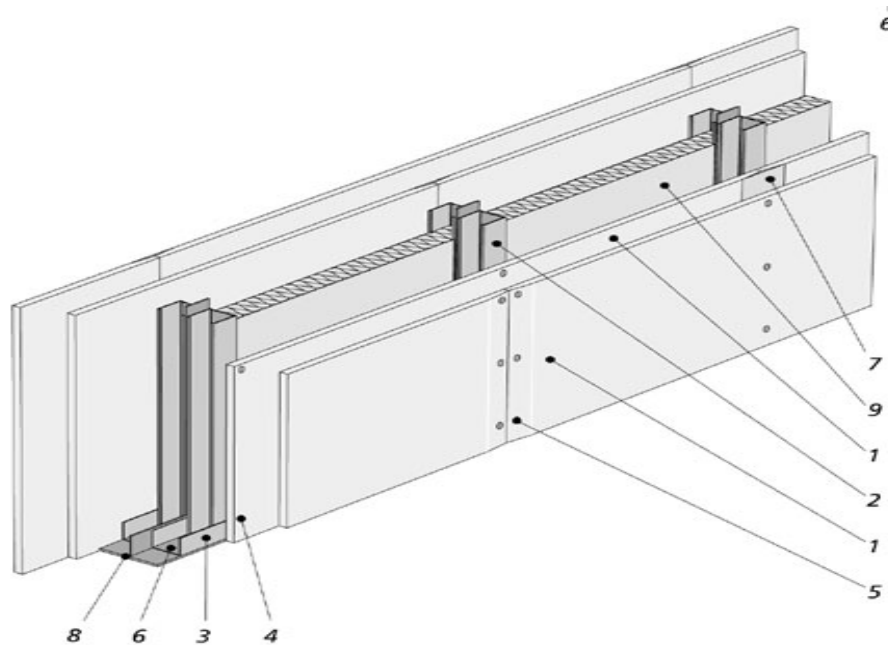
- a) within a single flat,
- b) between rooms in office buildings,
- c) between flats,
- d) between rooms and the corridor in office buildings.

8. The partition wall system depicted in the picture below is:



- a) a double structure with a two-sided two-layer plasterboard lining,
  - b) a wall with cavities for service lines,
  - c) a single structure with a two-sided two-layer plasterboard lining,
  - d) an ordinary partition wall made of plasterboards.
9. The height of the wall of a single structure and with a two-sided two-layer plasterboard lining is:
- a) 4.5 m,
  - b) 5.0 m,
  - c) 6.5 m,
  - d) 7.0 m.
10. The maximum height of a wall of a double structure with a two-sided two-layer plasterboard lining is:
- a) 5.0-7.0 m,
  - b) 6.5 -10.0 m,
  - c) 7.5 – 11.0 m,
  - d) 9.0 m.

11. The elements characteristic for the below presented wall of double structure with a two-sided two-layer plasterboard lining include:



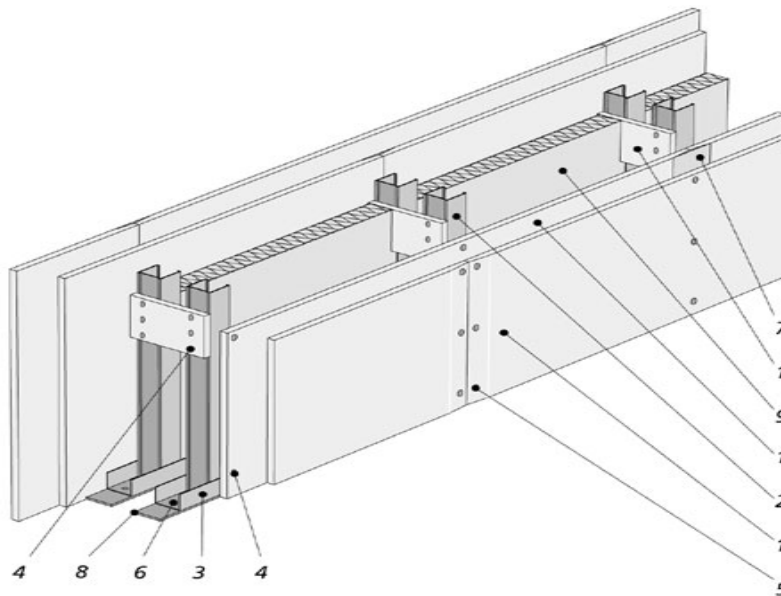
- a) 8 – insulation tape,
- b) 9- mineral wool,
- c) 2- the second vertical steel profile,
- d) 7-the system included “mud”

12. Walls of double structure with a two-sided and two-layer plasterboard lining are used:

- a) within one flat,
- b) between rooms in office buildings,
- c) between flats,
- d) in office buildings between rooms and the corridor.



13. Identify particular elements (indicated by numbers) of a partition wall with cavities:



- a) 4- .....
- b) 8- .....
- c) 2- .....
- d) 7- .....

14. Identify the basic steps in the partition wall assembly:

- a) .....
- b) .....
- c) .....
- d) .....
- e) .....

15. Identify basic criteria which allow one to start the assembly of a plasterboard-made partition wall:

- a) .....
- b) .....
- c) .....

16. While determining the position of the wall on the basis of technical documentation, the line indicating its position must be marked on:

- a) the wall axis,
- b) the wall's external line,
- c) profile's external edge,
- d) both external lines of the wall.

17. Profile fixing is accomplished in the following way:
- first vertical profiles, then horizontal ones,
  - horizontal perimeter, vertical perimeter, remaining ones,
  - always on one side,
  - external always first.
18. Draw the profile structure in skylight windows of the illumination width of 1150 mm.
19. The sequence of activities while cutting plasterboards to size is as follows:
- cutting the cardboard on the other side of the board, breaking the gypsum core, one-sided nicking of the board (on the front side) with the assembler's knife,
  - one-sided nicking of the board (on the front side) with the assembler's knife, breaking the gypsum core, cutting the cardboard on the other side,
  - the sequence is optional,
  - one-time cutting with a saw.
20. Identify basic dimensional tolerances for the positioning of the completed planes and edges which will be assessed during the construction works acceptance:
- .....,
  - .....,
  - .....,
  - .....,
  - .....

# ANSWER SHEET

Name and surname .....

## Installation of partition wall systems

Mark the correct answer, write in a missing phrase or an answer.

| Question number | Answers |   |   |   |   | Points scored |
|-----------------|---------|---|---|---|---|---------------|
| 1               | a       | b | c | d |   |               |
| 2               | a       | b | c | d |   |               |
| 3               | a       | b | c | d |   |               |
| 4               | a       | b | c | d |   |               |
| 5               | a       | b | c | d |   |               |
| 6               | a       | b | c | d |   |               |
| 7               | a       | b | c | d |   |               |
| 8               | a       | b | c | d |   |               |
| 9               | a       | b | c | d |   |               |
| 10              | a       | b | c | d |   |               |
| 11              | a       | b | c | d |   |               |
| 12              | a       | b | c | d |   |               |
| 13              | a       | b | c | d |   |               |
| 14              | a       | b | c | d | e |               |
| 15              | a       | b | c | d | e |               |
| 16              | a       | b | c | d |   |               |
| 17              | a       | b | c | d |   |               |

|              |          |          |          |          |          |  |
|--------------|----------|----------|----------|----------|----------|--|
| <b>18</b>    |          |          |          |          |          |  |
| <b>19</b>    | <b>a</b> | <b>b</b> | <b>c</b> | <b>d</b> |          |  |
| <b>20</b>    | <b>a</b> | <b>b</b> | <b>c</b> | <b>d</b> | <b>e</b> |  |
| <b>Total</b> |          |          |          |          |          |  |

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*Bibliography should be updated as new publications appear on the market.*