SCHOOL OF FLOORING

ATLAS®

SCHOOL OF FLOORING

LESSON 1

Following the "School of Insulation" and the "School of Tiling" brochures we continue our lessons on the ATLAS technology. This time we are going to take a closer look at the flooring. This brochure includes both the information concerning theoretical issues, which helps to organise one's knowledge about the floors and appropriate selection of their individual layers, as well as the practical advices on the technology of the flooring works.

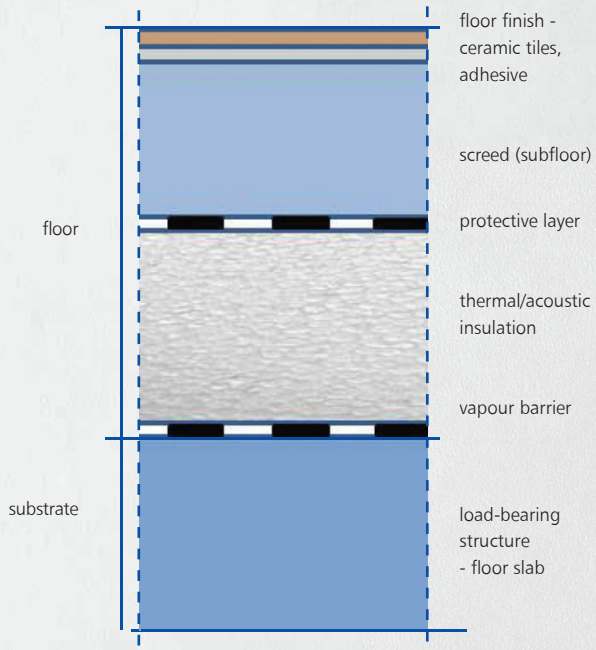
We start with a short revision of the basic information regarding floors in the buildings. Let's begin with defining the essential terms which will appear in the subsequent articles of this series.

◆ **The floor is a horizontal element of a building**, which forms the upper part of a ceiling, a foundation or the ground. It consists of several layers which fulfill various functions within the system. Floors provide resistance related to the transfer of operational loads, assure thermal, acoustic and damp-proof insulation up to the given requirements and standards, ensure decorative and functional properties.

◆ **The floor finish is one of the layers of the floor** on which one can walk, drive vehicles, set the furniture, etc. It is an outer, functional and decorative layer. The floor finish can be represented then by any **floor coverings**: ceramic tiles, wooden and wood-based materials (floor panels, wooden boards or parquet), carpets, PVC, epoxy materials, etc. The floor finish can also be made of the layer of concrete or cement mortar applied directly onto the ground. This solution is particularly used in the utility rooms.

◆ The floor finish is applied on the **screed (subfloor)** - a layer which is placed between the substrate (ceiling or foundation) and the floor finish. The main objective of a screed is to elevate the floor level in a room and to **provide an appropriate surface profile** (slope or horizontal) and evenness enabling the application of a floor finish.

Fig. 1 Multi-layer floor – structural arrangement



TYPES OF FLOORS

The most general division of floors is a division into **multi-layer floors** (Fig. 1) and **single-layer floors** (Fig. 2).

◆ **A single-layer floor** is a type of a floor which is formed of a single layer of material only, e.g. concrete or cement floor finish, applied directly onto the substrate. This layer provides the appropriate plane and forms the outer, functional finish.

◆ **A multi-layer floor** is a complex structure, in which the floor is composed of several, consecutively applied layers of different materials. The floor is executed on the structural substrate - it may be the **ceiling of the building** or alternatively the **ground**. The first floor layer levels the substrate unevenness and initially forms the floor level, alternatively the slight slope (e.g. in wet compartments). Usually this layer is made of concrete or ferroconcrete slab.

Fig. 2 Single-layer floor – structural arrangement

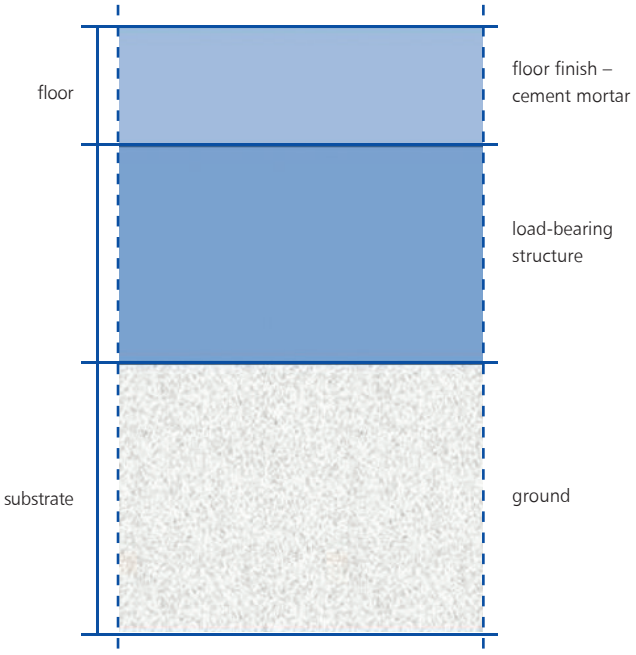
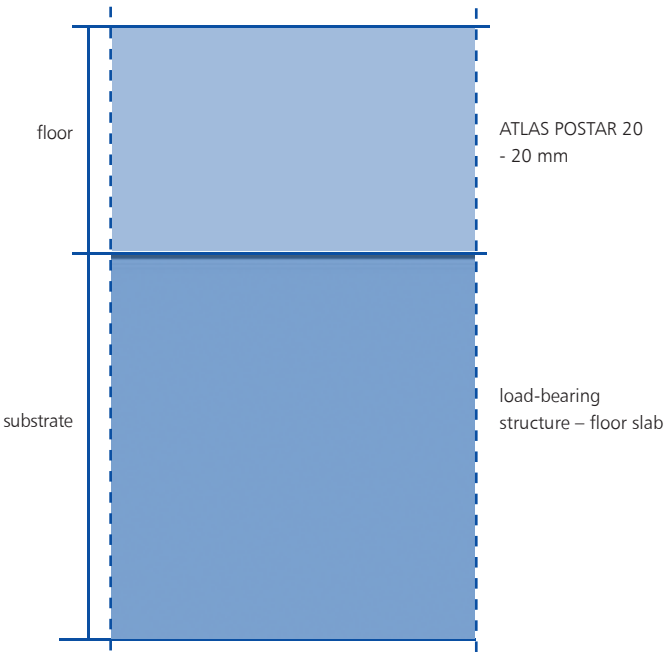


Fig. 3 Screed/ subfloor bonded to the substrate – structural arrangement



The next layer is the **damp proofing** (in case of floor installed on the ground) or the **vapour barrier** (in case of inter-storey slab floor) and a layer of the thermal/acoustic insulation applied subsequently. In order to protect the insulating layer against the absorption of technological water from the subsequent screed layer, **it is necessary to apply a protective layer** (e.g. made of the construction PE foil 0.2 mm). The previously mentioned **screed** is the next layer. It can be made of materials based on cement or anhydrite (in dry compartments). With the application of the screed one obtains the floor level close to the required one. As the screed also works as the substrate for the floor finish, it must be sufficiently even. If the required evenness is not reached, one must apply an additional thin layer – it's the smoothing layer.

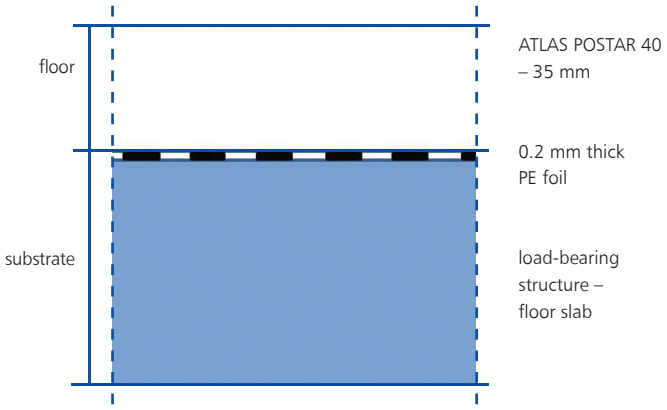
STRUCTURAL ARRANGEMENTS OF FLOORS

A second division of floors can be made in respect of their possible structural arrangement. We can distinguish bonded floors, floors on separation layer and floating floors.

◆ **Screed bonded to the substrate (bonded floor)** is an arrangement in which the layer of the fresh material is bonded to the existing substrate (ceiling, layer of concrete) on its entire surface. The minimum thickness of the bonded floor relates to the type of material in use, therefore it must always be considered during the materials selection. The exemplary solution of this type of arrangement is shown in Fig. 3, where the 20 mm thick layer of the fast-drying cement screed **ATLAS POSTAR 20** is used.

◆ **Floor on the separation layer** is executed on the interlayer which separates the fresh screed layer from the existing substrate on its entire surface. The separation layer can be made of **damp proofing** or, e.g. of the **PE polyethylene foil** of minimum thickness of 0.2 mm. This arrangement is often used in case of renovations, when the existing substrate is not strong enough for the new floor layer installation, too weak or permanently contaminated with, e.g. adhesive for PVC tiles, etc. Since the layer is not permanently bonded to the building structural elements, it must form a self-supporting slab which enables normal rooms operation. The recommended minimum thickness of the screed layer in this structural arrangement equals 35 mm. The exemplary solution of this type of arrangement is shown in Fig. 4, where the 35 mm thick layer of **ATLAS POSTAR 40** is executed on the separation layer made of the PE polyethylene foil.

Fig. 4 Screed on the separation layer – structural arrangement



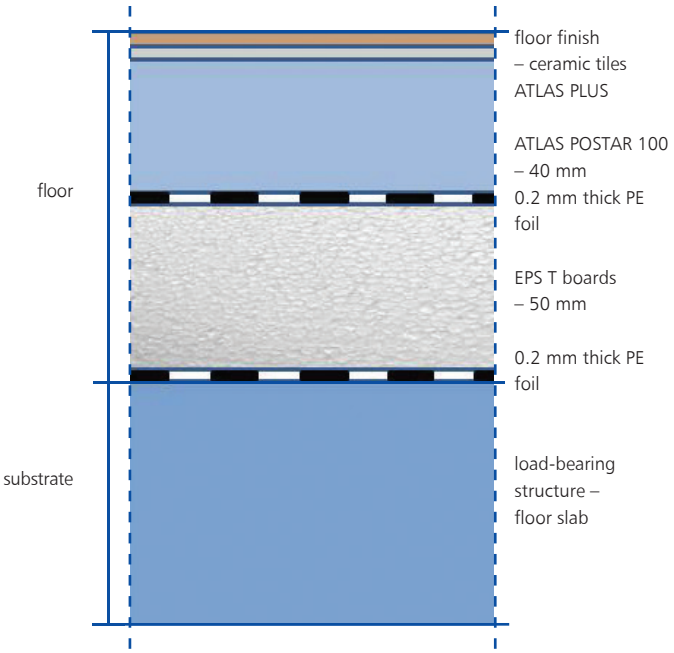
◆ **Floating screed** is executed on a layer of thermal insulation and/or acoustic insulation laid on the substrate. It is worth bearing in mind that in relation to the building partitions, such as ceilings and floors on the ground, one should apply, beside the construction requirements related to the safe operation, the requirements related to **the thermal insulation and the acoustic insulation** (it is particularly important in case of multi-family buildings). These requirements are listed in the respective documents issued by an appropriate body of any European Union country. In order to meet these requirements (Tab. 1), it is necessary to use the thermal insulation in the form of EPS boards, XPS boards or special hardened mineral wool panels. Only the **materials specially designed for floors** must be used for this purpose. One must not use, e.g. the façade polystyrene, because the layer of the floor thermal insulation must keep the required **compressibility**. The thickness of the insulation layer should result from the calculation and current regulations (Tab. 1). One applies the protective layer (0.2 mm thick polyethylene foil) on the laid thermal/acoustic insulation and then executes the screed layer. The layer of the floating screed works as a **pressure slab** and a **stiffening layer** beneath the floor finish. The minimum thickness of the floating screed is 40 mm. The exemplary solution of this type of arrangement is shown in Fig. 5. We recommend using a 40 mm thick layer of **ATLAS POSTAR 100** – a self-spreading cement floor.

Tab. 1 Requirements for the thermal insulation for all types of buildings (for Poland, check your local regulations)

Type of partition and temperature in a compartment	Overall heat transfer coefficient $U_{(max)}$		
	I 2014	I 2017	I 2021*
floor on the ground at $t_i > 16°C$ at $8° C < ti \leq 16°C$ at $t_i < 8°C$	 0.3 1.2 1.5	 0.3 1.2 1.5	 0.3 1.2 1.5
slab roofs and ceilings under unheated attics or over passages at $t_i > 16°C$ at $8°C < t_i \leq 16°C$ at $t_i < 8°C$	 0.2 0.3 0.7	 0.18 0.3 0.7	 0.15 0.3 0.7
ceilings above unheated compartments and encased underfloor zones at $t_i > 16°C$ at $8°C < t_i \leq 16°C$ at $t_i < 8°C$	 0.25 0.3 1.0	 0.25 0.3 1.0	 0.25 0.3 1.0
ceilings above heated underground compartments and inter-storey ceilings at $t_i > 16°C$ at $8°C < t_i \leq 16°C$ at $t_i < 8°C$	 1.0 no requirments 0.25	 1.0 no requirments 0.25	 1.0 no requirments 0.25
t_i – temperature of heated compartment			

*Public access buildings from I 2019

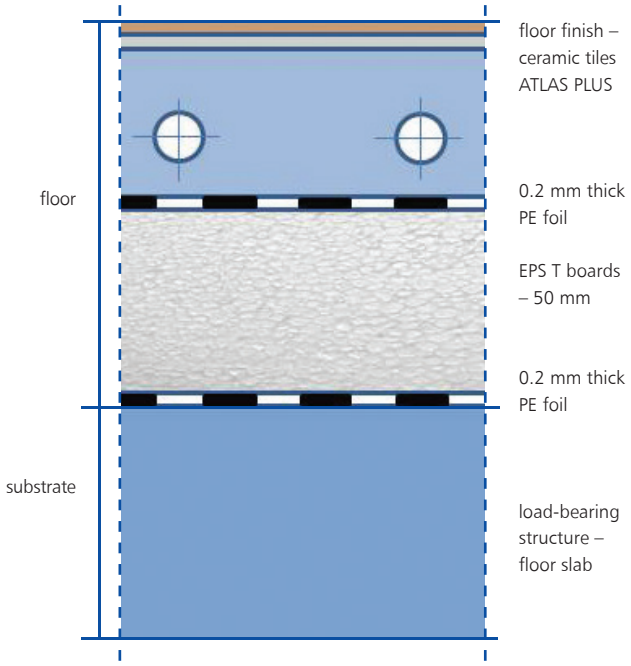
Fig. 5 Floating screed – structural arrangement



A special type of the floating floor arrangement is the one with **the underfloor heating**. It is a structural arrangement in which the elements of the heating system are installed in the screed layer. Heating can be provided with water or electricity. Therefore, the heating elements are **the heating pipes or the heating cables**, respectively. They can be placed in the floor layer either by the application on the thermal insulation layer or within the screed layer (with covering). In order to maximize the performance of the heating system, it is required to apply **the thermal insulation** which prevents heat loss to the outside. Figure 6 shows an exemplary arrangement of the floating screed with the water underfloor heating. Heating pipes are placed in the 60 mm thick layer of the self-leveling screed **ATLAS SAM 150**. The minimum 35 mm layer thickness above the heating elements is kept.

◆ **Floor on the ground**. In the modern construction, the buildings usually do not have basements. Therefore, the floor on the ground is at the same time the floor of the residential compartments. The appropriate arrangement of the layers is shown in Fig. 7. The hard core layer of **the compacted sand** is applied onto the ground. Its main objective is to level the surface and to enable the application of the consecutive layers of the same thickness within the entire floor surface. The next layer is **the filtrating layer** made of breakstone. Its task is **to break the capillary rising of the groundwater to the floor layers**. Then one applies the protective layer – made of the geotextile or the dimpled membrane. The hard core, the filtrating layer and the geotextile form **the foundation** onto which one executes the subsequent floor layers. The first of them is the concrete or ferroconcrete slab, which forms the load bearing layer.

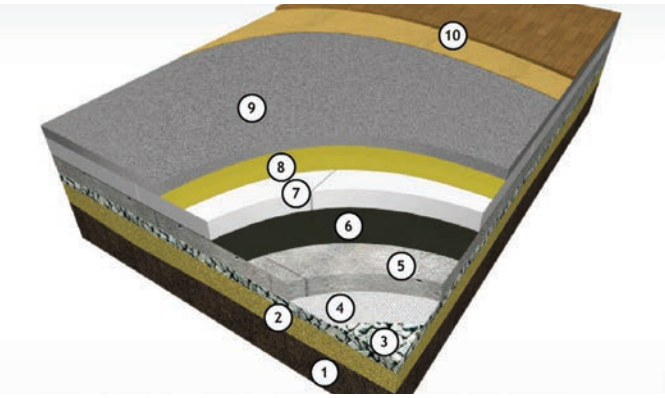
Fig. 6 Floating screed with the underfloor heating – structural arrangement



Next, the damp proofing is applied. It can be made of the **IZOHAN IZOBUD WM** asphalt-rubber mass which protects the compartment from the groundwater. Having completed the damp proofing, one can execute the thermal insulation layer – made of XPS, hard EPS boards or alternatively of special mineral wool panels and then proceed to the application of the floating floor, made of, e.g. **ATLAS POSTAR 80** (as described earlier).

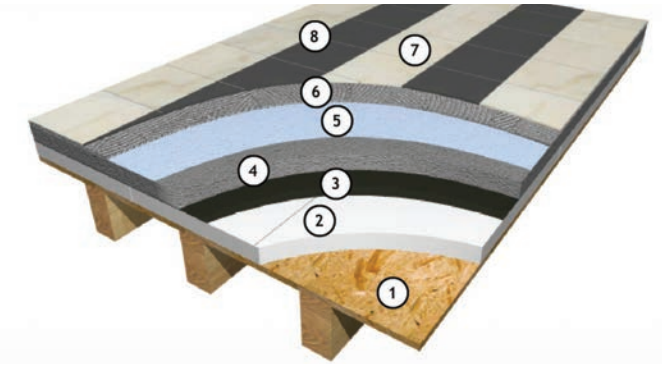
◆ **Floor on the wooden slab.** This solution is mainly used in the **renovated buildings**. The specificity of the construction of this floor type results from the structure working conditions and the type of the construction materials which are usually the wooden or the wood-based boards (e.g. OSB). Therefore, one does not execute the screed bonded to the substrate there. The appropriate arrangement of layers is shown in Fig. 8, where the floor with ceramic tiles top finish is executed in a wet compartment. The 40 mm layer of **ATLAS POSTAR 80** screed is applied onto the thermal/acoustic insulation protected with the 0.2 mm thick PE foil.

Fig. 7 Floor on the ground – appropriate arrangement of layers.



1. Genuine ground
2. Leveling base of sand
3. Filtrating layer of breakstone
4. Geotextile or dimpled membrane
5. Concrete or ferroconcrete slab
6. IZOHAN IZOBUD WL primer (diluted with water in 1:1 ratio) + IZOHAN IZOBUD WM damp proofing
7. Thermal or acoustic insulation
8. PE foil
9. ATLAS POSTAR 80 cement screed
10. Parquet applied onto the screed

Fig. 8 Floor on the wooden slab – appropriate arrangement of layers.



1. Wooden slab
2. Thermal or acoustic insulation
3. PE foil
4. ATLAS POSTAR 80 cement screed
5. ATLAS WODER E/ AVAL KL 51 under-tile damp proofing
6. ATLAS PLUS EXPRESS adhesive
7. Gres-porcelain and other ceramic large-size tiles
8. ATLAS ARTIS grout

SCHOOL OF FLOORING

LESSON 2

What are the types of screeds and standard requirements for them? What is the proper selection of the floor layers in rooms of various purposes?

Regardless the structural arrangement to be used, the screeds (subfloors) can be based on various construction materials. The standard identifies **five types of screeds** differing in the binder type*:

CT cement screeds,
CA calcium sulfate screeds,
MA magnesite screeds,
AS mastic asphalt screeds,
SR synthetic resin screeds.

The technical requirements for all types of screeds are listed in the European standard EN 13813:2002 "Screed material and floor screeds. Screed material. Properties and requirements ". This standard defines and details the levels or values for particular technical parameters. However, it is mainly the information for manufacturers of screeds, designers or construction supervisors. There is no practical guidance for execution of floors and screeds, or even recommendations on the properties of a screed used in a particular arrangement, e.g. under ceramic tiles or parquet.

SCREEDS PROPERTIES

In Europe, the most common are the first two types of screeds – **the cement (CT)** and **the calcium sulfate (CA)** ones. Therefore, we will focus on the technical characteristics of these two types of screeds only.
Due to the location and the type of loads the screeds are subject to, the most important are their mechanical properties, i.e. **the compressive strength** (Tab. 1) and **the flexural strength** (Tab. 2). If the screed forms at the same time the floor finish, its wear resistance becomes a very important property as well. The standard specifies three alternative methods for determining this technical feature – Böhme method, BCA method and the method for determining the resistance to rolling wheel (Tab. 3-5). Unfortunately, direct comparison of the wear resistance determined by different methods is not possible – perhaps the new edition of the standard, which is currently being amended, will sort out this issue.

* EN 13813:2002 "Screed Material And Floor Screeds - Definitions"

Tab. 1. Compressive strength classes (C) for screed materials.

Class	C5	C7	C12	C16	C20	C25	C30	C35	C40	C50	C60	C70	C80
Strength [N/mm²]	5	7	12	16	20	25	30	35	40	50	60	70	80

Tab. 2. Flexural strength classes (F) for screed materials.

Class	F1	F2	F3	F4	F5	F6	F7	F10	F15	F20	F30	F40	F50
Strength [N/mm²]	1	2	3	4	5	6	7	10	15	20	30	40	50

Tab. 3. Abrasion resistance Böhme classes (A).

Class	A22	A15	A12	A9	A6	A3	A1,5
Resistance [$cm^3/50\ cm^2$]	22	15	12	9	6	3	1,5

Tab. 4. Abrasion resistance BCA classes (AR).

Class	AR6	AR4	AR2	AR1	AR0,5	A3	A1,5
Maximum wear depth [μ]	600	400	200	100	50	3	1,5

Tab. 5. Abrasion resistance to rolling wheel classes (RWA)

Class	RWA300	RWA100	RWA20	RWA10	RWA1
Max. abrasion quantity [cm^3]	300	100	20	10	1

CEMENT SCREEDS (CT)

The most popular type of screeds and floor finishes are those based on cement.

Properties:

◆ They have **the widest range of use**: they can be applied indoors and outdoors (see the box) and with any structural arrangement – as bonded to the substrate, on the separation layer, on the layer of thermal/acoustic insulation or with the underfloor heating systems.

SCREEDS AND TECHNICAL APPROVALS

One important issue should be mentioned when the European standard EN 13813:2002 is considered – this standard refers to the screeds for indoor use only. Therefore, if a manufacturer wishes to introduce a product intended also for the outdoor use – on terraces, balconies, etc. – then, must acquire a technical approval which confirms the product suitability for the outdoor use.

◆ One may form screeds of various, even **very high strength**. This enables to use them beneath any type of finish (including parquet and epoxy coatings) and in areas of intensive operations – production, warehousing, etc.

◆ Screeds and cement finishes are manufactured **on the basis of Portland cement**, aggregate and additives improving the working parameters. The aggregate size and fraction depend on the designed layer thickness - the thicker the aggregate, the larger may be the screed thickness.

◆ According to the standard, the most important technical properties of the cement screeds are the compressive strength, the flexural strength and the abrasion resistance.

What one can find on the packaging: an exemplary labeling of the cement screeds in accordance to the EN 13813 standard:

◆ CT-C30-F6 (floor screed beneath the floor finish)

◆ CT-C30-F6-AR6 (floor screed which works as a floor finish at the same time). As you can see, the screed which can be a floor finish at the same time, has the wear resistance parameter listed. It is an essential screed feature, so it withstands the operational loads resulting from the use (foot traffic, forklifts traffic, etc.). This labeling can be found on each packaging and in the Declaration of Performance of the product.

In the ATLAS portfolio: cement screeds called **ATLAS POSTAR** and **ATLAS SMS**. Four of them: **POSTAR 10**, **POSTAR 40**, **POSTAR 80** and **POSTAR 100** can be both a screed and a floor finish, whereas one of them – **POSTAR 20** may be used as a screed only.

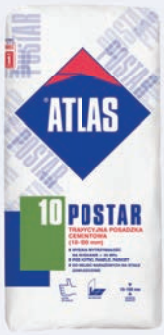
ANHYDRITE SCREEDS (CA)

Screeds based on calcium sulfate, also known as the anhydrite or the gypsum ones, give an alternative to the cement screeds.

Properties:

◆ They are manufactured on the basis of anhydrite or anhydrite dust, alpha gypsum and Portland cement, aggregate and additives improving the working parameters. Although there is also cement in the anhydrite screed, its main task is to activate the anhydrite binding.

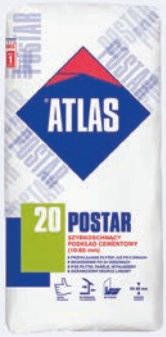
CEMENT PRODUCTS – ATLAS POSTAR 10, 20, 40, 80, 100



ATLAS POSTAR 10
It may be used as the floor finish or screed beneath the top finishes like: ceramic and stone tiles, epoxy floors and coatings, PVC and carpet floorings, parquet and floor panels.

Main properties:
- for places exposed to permanent damp,
- high cohesion,
- low linear shrinkage,
- for underfloor heating,
- bonded, on separation layer or floating.

Main parameters:
- consumption: 20 kg/1 m²/1 cm
- layer thickness: 10-100 mm
- compressive strength: ≥ 25 N/mm²



ATLAS POSTAR 20
Floor screed used beneath the ceramic and the stone tiles, PVC and carpet flooring*, floor panels – recommended for any type of the surface subject to medium and large loads.

Main properties:
- further works just after 5 days,
- foot traffic after 24 hours,
- limited linear shrinkage,
- for places exposed to permanent damp.

Main parameters:
- consumption: 20 kg/1 m²/1 cm
- layer thickness: 10-80 mm
- compressive strength: ≥ 20 N/mm²

**Before the application one should execute a smoothing layer with the use of ATLAS SMS 15 or ATLAS SMS 30.

ATLAS POSTAR 40
It forms floor finish layer of high wear resistance – recommended for residential buildings, warehouses, production halls, driveways, terraces, etc. It may be used as the floor finish or screed beneath the top finishes like: ceramic and stone tiles, epoxy floors and coatings, PVC and carpet floorings, parquet and floor panels.

Main properties:
- for places exposed to permanent damp,
- high cohesion,
- low linear shrinkage,
- for underfloor heating,
- bonded, on separation layer or floating.

Main parameters:
- consumption: 20 kg/1 m²/1 cm
- layer thickness: 10-80 mm
- compressive strength: ≥ 30 N/mm²
- high compressive strength: ≥ 30 N/mm²

ATLAS POSTAR 80
It is recommended for quick repairs. It may be used as the floor finish or screed beneath the top finishes like: ceramic and stone tiles, epoxy floors and coatings, PVC and carpet floorings*, parquet and floor panels.

Main properties:
- further works just after 24 hours,
- foot traffic after 3 hours,
- limited linear shrinkage,
- high cohesion,
- thick plasticity.

Main parameters:
- consumption: 20 kg/1 m²/1 cm
- layer thickness: 10-80 mm
- high compressive strength: ≥ 40 N/mm

*Before the application one should execute a smoothing layer with the use of ATLAS SMS 15 or ATLAS SMS 30.

ATLAS POSTAR 100
It forms the floor finish layer of high strength – it is used on loading ramps, driveways, underground garages, parking lots, terraces, balconies, warehouses, production halls, etc. It may be used as the floor finish or screed beneath the top finishes like: ceramic and stone tiles, epoxy floors and coatings, PVC and carpet floorings, parquet and floor panels.

Main properties:
- limited linear shrinkage,
- easy application,
- applied manually or mechanically.

Main parameters:
- consumption: 20 kg/1 m²/1 cm
- layer thickness: 10-80 mm
- high compressive strength: ≥ 50 N/mm²

◆ No shrinkage during binding – this allows to pour large areas without the need for additional intermediate expansion joints. For example, if one uses ATLAS SAM 150 screed, there is **no need for expansion joints on the areas up to 50 m²**, providing that the diagonal of the compartment is not longer than 10 meters. This simplifies the execution and is important for investor, as the lack of expansion joints eliminates the need for transferring them onto the top finish layer.

◆ Due to the low linear shrinkage of the binding anhydrite, the layer does not provide concavities or convexities. Therefore, no scratches and cracks occur during binding, which is often an issue in case of the cement mortars.

◆ The screeds based on calcium sulfate are designed for the machine application. The liquid consistency of the mass enables **easy spreading and leveling** the screed plane. This property, supported by the aggregate finer than in the cement screeds, provides more accurate tucking of the cables or the heating pipes. It virtually eliminates the possibility of leaving voids, which can reduce the efficiency of the heating system, around the cables – the substrate is more homogenous within its whole thickness.

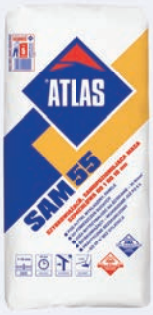
◆ Another advantage of the anhydrite screeds in regard to the execution of an underfloor heating is their **high thermal conductivity coefficient**, much higher than in case of the cement screeds. The anhydrite screed with the heating system heats up quicker and provides more efficient compartment heating.

◆ Restrictions for using the anhydrite products: one should remember that they can be used only indoors and only in dry rooms. Moreover, the anhydrite screed requires longer ageing before the execution of the floor finish. The moisture of the screed/ subfloor should not exceed 1.5%, whereas in case of the cement screeds further works can commence with the 3% humidity.

What is on the packaging: an exemplary labeling of the calcium sulfate screed in accordance to the EN 13813 standard: CA-C20-F5. This labeling can be found both on the product packaging and in the Declaration of Performance.

In ATLAS portfolio: anhydrite screeds called **ATLAS SAM**. Three of them: **SAM 150**, **SAM 200 (AVAL KN 20)** and **SAM 500** can be used in any possible structural floor arrangement. Two others: **SAM 55** and **SAM 100 (AVAL KN 10)** are used mainly to improve the quality and to level the existing screeds.

ANHYDRITE PRODUCTS – ATLAS SAM 55, 100, 150, 200, 500



ATLAS SAM 55
Forms a screed beneath the tiles, PVC and carpet floorings, floor panels in the compartments subject to medium loads – residential buildings, offices, kindergartens, schools.

Main properties:
- anhydrite-gypsum,
- resistant to concentrated load,
- no need of expansion joints for up to 50m^2,
- wide-spread and fast-setting,

bonded to the substrate.

Main parameters:
- consumption: 18 kg/1 m^2/10 mm
- layer thickness: 1-10 mm
- compressive strength: ≥ 30 N/mm^2

ATLAS SAM 100
It is recommended for leveling the screeds in dry compartments: rooms, antechambers, halls, living rooms, offices, corridors, waiting rooms etc. It forms a screed beneath the tiles, PVC and carpet floorings, floor panels.

Main properties:
- anhydrite-gypsum,
- resistant to concentrated load,
- no need of expansion joints for up to 50m^2,
- bonded to the substrate.

Main parameters:
- consumption: 20 kg/1 m^2/10 mm
- layer thickness: 5-30 mm
- compressive strength: ≥ 35 N/mm^2

ATLAS SAM 150
Product works perfectly as a layer for embedding the electric or the water underfloor heating. It can be used in dry compartments: rooms, antechambers, halls, living rooms, offices, corridors, waiting rooms etc. It forms a screed beneath the tiles, PVC and carpet floorings, floor panels.

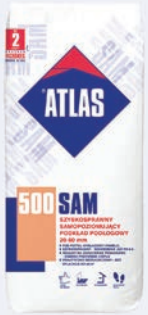
Main properties:
- anhydrite-gypsum,
- foot traffic already after 6 hours,
- no need of expansion joints for up to 50m^2,
- conducts heat well,
- self-leveling – facilitates application.

Main parameters:
- consumption: 20 kg/1 m^2/10 mm
- layer thickness: 15-60 mm,
- compressive strength: ≥ 20 N/mm^2

ATLAS SAM 200
It levels the substrates in dry compartments: rooms, antechambers, halls, living rooms, offices, corridors, waiting rooms etc. Product works perfectly as a layer for embedding the electric or the water underfloor heating. It forms a screed beneath the tiles, PVC and carpet floorings, floor panels.

Main properties:
- anhydrite-gypsum,
- no need of expansion joints for up to 50m^2,
- consistency can be regulated,
- conducts heat very well,
- self-leveling – facilitates application.

Main parameters:
- consumption: 20 kg/1 m^2/10 mm
- layer thickness: 25-60 mm
- compressive strength: ≥ 16 N/mm^2



ATLAS SAM 500
It levels the substrates in dry compartments: rooms, antechambers, halls, living rooms, offices, corridors, waiting rooms etc. Product works perfectly as a layer for embedding the electric or the water underfloor heating. It forms a screed beneath the tiles, PVC and carpet floorings, floor panels.

Main properties:
- anhydrite-gypsum,
- no need of expansion joints for up to 50m^2,
- fast-setting – foot traffic just after 6 hours
- conducts heat very well,
- self-leveling – facilitates application.

Main parameters:
- consumption: 18 kg/1 m^2/10 mm
- layer thickness: 20-60 mm
- compressive strength: ≥ 20 N/mm^2

CRITERIA FOR SELECTING THE FLOOR FINISHES AND SCREEDS

The screed and especially the floor top finish must be designed and installed with consideration of its location and the type of load resulting from operation. The choice of material, thickness and structural arrangement should be made taking into account the required strength parameters, thermal and acoustic issues and conditions under which the material will be used. The basic issues related to the choice of the materials can be classified into one of the following groups:

◆ **Place of application (indoors, outdoors). Type of room (dry, wet).**

The location of the floor finish or the screed is the basic criteria for the suitable material selection. Outdoors, one may use the cement materials only. This is due to the fact that products based on calcium sulfate are not resistant to moisture. Thus, they cannot be used neither outdoors nor in the wet compartments. Nevertheless, one should check whether a particular cement screed can be used outdoors.

◆ **Purpose of a room (residential, production, warehouse).**

Purpose of a room can determine the type and standard of the floor finish. The cement screed often forms the finishing layer in the utility and auxiliary rooms.

◆ **Structural arrangement (bonded, on the separation layer, floating, heating).**

The structural arrangement is an important issue, as depending on the adopted arrangement one must use the corresponding recommended layer thickness (you can find more information concerning this issue in the previous lesson of this brochure).

◆ **Type of the floor top finish (tiles, floor panels and boards, parquet, epoxy materials, etc.).**

The type of the floor finish – the functional layer of the floor – it is important, because it enables to determine the technical parameters for the substrate. For example, there are different parameters for the floor panels, parquet and epoxy materials.

◆ **Operational factors.**

Operational factors relate to the conditions under which the material will be used. In the utility rooms and the industrial buildings one should consider higher requirements in this regard – e.g. higher chemical resistance, wear (abrasion) resistance, etc.

These guidelines do not release from the obligation to comply with the existing specifications and design documentation for a particular project.

SCHOOL OF FLOORING

LESSON 3

In the third part of our brochure we are going to focus on the technology of installation of the cement screeds. This lesson lists the core principles on the substrate preparation and the brief instructions on the screeds manual or machine application.

SUBSTRATE PREPARATION

The method of the substrate preparation depends on the structural arrangement to be executed. At the beginning, here are some basic rules:

◆ One should pay great attention when preparing the substrate, especially in case of bonded floors.

◆ The substrate should be **dry and aged** – it is advisable to stabilize the cement substrates for 28 days and the concrete substrates for approx. 3 months.

◆ The moisture content of the substrate before application of the subsequent layers – **it should not exceed 3%**.

◆ The substrate must be **strong enough** – one should remember about the principle of applying a weaker layer onto a stronger one. In addition, it should be **sound enough** (this applies to wooden ceilings and OSB boards).

◆ One should also **clean the substrate from any layers which can deteriorate the adhesion** and from weak and loosening elements. How to check where to execute local fillings in the loosening spots? It is notified by thuds while tapping.

◆ In order **to fill** any individual substrate points, it is recommended to use the material which is easy to mould and quick binding, **e.g. ATLAS ZW330 leveling mortar**. Scratches or cracks in the substrate must be repaired depending on the situation.

◆ Proper **priming** is crucial. In case of absorbent substrates, it is recommended to use an emulsion which will reduce the absorption – **ATLAS UNI-GRUNT PLUS (AVAL KN 97)**. Optionally, one can use **ATLAS Uni-Grunt (AVAL KT 17**) diluted with water in 1:1 ratio (Photo 1)

Photo 1. Priming with the use of ATLAS Uni-Grunt (AVAL KT 17) emulsion

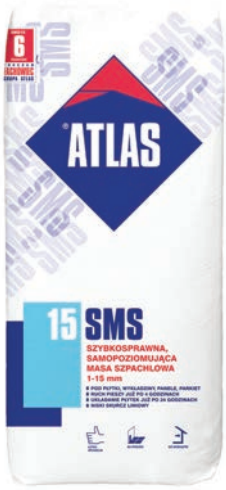
◆ In case of traditionally-applied mortars, for example **ATLAS POSTAR**, it is advisable to execute **a contact (bonding) layer** of the cement slurry. This can be done with the **ATLAS ADHER** mortar or with the mixture of the material to be used and **ATLAS ELASTIC EMULSION**. One should commence the application of the flooring layer before the contact layer dries – with the "wet on wet" method.

◆ In case of **the arrangement on the separation layer**, one can assume that the parameters and properties of the substrate are not of such great importance in view of adhesion, as both layers

Photo 2. The intermediate expansion joints determine the technological areas in the shape of a square or similar.

SMS 30

Manufactured in the form of a dry mix based on Portland cement, quartz fillers and modifying additives. For use beneath the tiles, carpet floorings, floor panels, parquet. Thickness 3-30 mm. Foot traffic after 4h.



SMS 15

Manufactured in the form of a dry mix based on cement. For use beneath the tiles, carpet floorings, floor panels, parquet. Thickness 1-15 mm. Foot traffic after 4h.

are separated over the entire surface. Then, as a separating layer one can use, e.g. **0.2 mm thick PE membrane**, spread without rucks on the substrate free of any projecting elements. The adjacent strips of the membrane should overlap with approx. 30 cm. Additionally, one can tape the joints with a waterproof tape. The membrane should be curled up onto the walls above the designed level of the executed layer.

◆ When executing **the floating screed**, i.e. on the layer of thermal or acoustic insulation, one should ensure that the boards are laid on the even substrate and they do not move when pressed. Before laying the boards on the substrate, one can apply **a base of dry sand** which, properly distributed and compacted, eliminates any local unevenness. The insulation boards are placed in one or two layers with the offset of the edges. Afterwards, one lays the protective layer onto them (analogously to the previous description).

◆ If we arrange the layers with **the water heating system**, then the heating installation should be properly distributed and securely mounted to the substrate. Prior to the execution of the screed the **tightness test** needs to be performed. Note that the heating pipes should be filled with water during works.

EXPANSION JOINTS

◆ The proper execution of the expansion joints is crucial when installing the cement floor finish or the screed. It results from the properties of the cement-based products which shrink during binding – this phenomenon may cause cracking or loosening off the substrate.

◆ First of all one should execute (repeat) the **structural expansion joints** - they must go through all the layers of the floor.

◆ One can also distinguish **the intermediate expansion joints** (anti-shrinking, zonal). Their task is to divide the surface into smaller technological areas (Photo 2). Their distribution should be designed in the way to determine the areas similar in shape to a square. If it is difficult to be done, one should plan the technological areas so as the ratio between the area sides is not larger than 2:1. The expansion joints should be also implemented at points where the shape of a room changes - at thresholds and along the joints between different construction materials.

◆ The third type of the expansion joints are **the perimeter expansion joints** (peripheral, insulating). Their task consists in the permanent separation of the layer from the vertical elements of the building – walls, columns, stairs, etc. It is recommended to use **ATLAS self-adhesive expansion joint profiles** or narrow, approx. 10 mm thick, polystyrene strips.

DETERMINATION OF THE FLOOR LEVEL

At the stage of the material selection we should choose the mortar which enables the floor execution within the designed range of thickness. Prior to the works commencement, one sets the floor level both on the application areas and on the walls. When using the traditional mortars, this can be done by laying guides (metal tubes or wooden slats) of appropriate thickness. The guides are placed on the patches of a mortar and leveled. When applying the self-leveling or the self-spreading mortars it is recommended to use **the height benchmarks**. Why? Thanks to the adjustable pin the benchmarks enable to determine the layer of the designed thickness. They are placed in the application area and then, with the use of a long level (2 m), adjusted one by one referring to the level marked on the wall. **A laser level and a rule** are also very useful while determining the floor level.

Photo 3. The mortar should be poured in even layers; one should commence the application from the wall which is the furthest from the entrance.

MANUAL APPLICATION OF THE CEMENT SCREEDS

TRADITIONAL SCREEDS

This group of products includes all of the mortars from the **ATLAS POSTAR** line. They are applied in a conventional manner. The most important issue during their preparation for use is to keep the **mixing ratio** as indicated on the packaging.

STEP 1. The mortar for the manual application is prepared with the use of a low-speed mixer with a paddle for mortars, a concrete mixer or a flow mixer. The obtained mix has thick-plastic consistency.

STEP 2. It is applied between the guides and initially compacted, keeping small excess above the guides. The excess should be removed with a long patch or an even lath by slicing carried out along the guides. The slicing should be done with zigzag moves until the designed plane is reached. The guides should be removed soon after the mortar application and the resulting spaces filled with the mortar.

STEP 3. When executing the floor top finish, e.g. when using **ATLAS POSTAR 40**, the surface should be floated smoothly. However, if we apply the subfloor beneath other facing, e.g. when using **ATLAS POSTAR 20**, the surface should be floated rough.

SELF-LEVELING MORTARS

The self-leveling cement screeds **ATLAS SMS 15** and **ATLAS SMS 30** can be applied manually only in small compartments. This recommendation results from the technological issue concerning the appropriate screed application – the consecutive strips of the poured mass must be joined before the bonding process starts, i.e. within 30-40 minutes.

Photo 4. Unifying and de-aerating the mortar with a mesh roller.

STEP 1. **Prepare the mortar** by mixing the dry mix with the indicated volume of water using a low-speed mixer with a paddle for mortars. It is recommended to perform a test in order to control the obtained consistency. The test consists in pouring the mortar from a 1-liter-jug onto an even, non-absorbent surface (e.g. covered with a foil). The formed "patch" should have a diameter of approx. 45-50 cm (check the manufacturer's recommendations).

Photo 5. ATLAS SMS 15 and ATLAS SMS 30 self-leveling mortars can be mechanically applied on large surfaces.

STEP 2. **Pour the mortar** in even layers, in strips approx. 0.5 m wide, starting from the wall furthest from the entrance. The consecutive mortar strips must be applied as soon as possible in order to ensure their proper joining (Photo 3)

STEP 3. **Unify and de-aerate** the mortar with a spiked roller straight after application (in case of the layer thickness up to 30 mm) or a mesh roller (in case of the layer thickness below 30 mm) (Photo 4). A vibrating slat can also be useful for this operation. It is important to perform the de-aeration in both orthogonal directions. One should use a brush with long hard bristle when de-aerating the mortar applied onto the substrate with underfloor heating system and lead it with vibratory motion along and across the applied layer.

MACHINE APPLICATION OF THE CEMENT SCREEDS

Cement screeds can be applied with a mixing-pumping unit, e.g. a plastering unit, with properly adapted equipment. Such mortar is exemplified by **ATLAS POSTAR 100**, which enables quick and efficient execution of the screed or the floor top finish on large surfaces.

STEP 1. In order to prepare the mortar, pour the dry mix from the bag into the intake hopper, from which it gets into the mixing chamber. There, the mortar is mixed with water and then goes to the spiral pump producing pressure necessary to transfer the mortar from the machine to the application point. The appropriate unit adjustment, especially in the terms of the volume of dosed water is crucial, as it results in the proper mortar consistency.

STEP 2. One performs the test which consists in pouring the mortar (see above). The diameter of the poured "patch" should be slightly larger (50-55 cm) in view of the manner of preparation and application of the mortar.

STEP 3. Commence the work from the corner placed furthest from the room entrance. The mortar is poured from a hose, with strips applied along the walls. The adjacent strips must be applied relatively quickly in order to enable correct mortar joining.

STEP 4. De-aeration of the executed layer.

OPTIMUM CONDITIONS

The optimum temperature during work is between 5° C and 25° C. The surface should be protected against drying too fast, direct sunlight and draughts. In order to achieve the designed mechanical properties and to reduce the shrinkage, one should mist the surface with water for a few days or cover the freshly applied layer with a foil. In practice, the drying time depends on the layer thickness and the thermal and moisture conditions in the compartment.

MAINTENANCE

Prior to the tiling or the parquet fixing, it is advisable to check the substrate moisture content. The measurements should be performed in several points. It is assumed that the maximum residual moisture content for the cement floor screeds equals 3%. Cement mortars dry approx. 7 days per 1 cm of the thickness. So, if we apply the layer 4 cm thick, the tiles can be fixed not sooner than after approx. 4 weeks. In order to avoid such situations, it is advisable to use fast-setting and fast-drying mortars which release technological moisture much faster and enable earlier commencement of the facing works, e.g. **ATLAS POSTAR 80** and **ATLAS POSTAR 20**.

SCHOOL OF FLOORING

LESSON 4

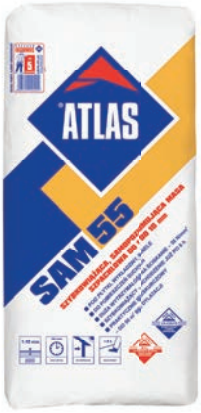
In the previous lesson we focused on the technology of application of the cement screeds. In this one we are going to focus on the anhydrite-based materials. We are going to give some installation hints and highlight important differences in comparison to the cement-based products.

Photo 1. Machine application of the self-leveling screed on an old concrete substrate

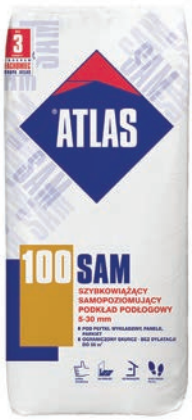
SUBSTRATE PREPARATION

In the previous lesson we emphasized that the method of the substrate preparation depends on the structural system to be executed. As a reminder here are some helpful principles:

- preparation of the substrate should be done **carefully** in case of executing the bonded screeds or the bonded floor top finishes;
- it's the best when the substrate is dry and aged; the stabilization period for cement screeds lasts **approx. 28 days** since the application, whereas the ageing period for concrete screeds is **approx. 3 months** since the application;
- the moisture content of the substrate before the application of the successive floor layers **should not exceed 3%;**
- capillary rising damp is unacceptable; the floor on the ground must be protected with damp proofing course or water vapour barriers;
- substrate must be **strong enough** – keep in mind the principle of applying the weaker layer onto the stronger one;
- the substrate must be **sufficiently stable** – especially when we apply a layer on a wooden ceiling or OSB boards;
- **clean any coatings which may weaken the adhesion**, e.g. dust, lime, oil, grease, bitumen, paints, weak and loosening elements. Having cleaned the substrate, one can perform local fillings in the points where the substrate is loosened and thuds when tapped. To fill the cavities in the most convenient way, one should

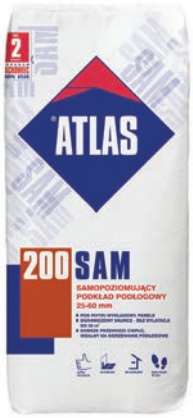


ATLAS SAM 55
Self-leveling surface finish
Layer thickness: 1-10 mm
Beneath the tiles,
floor panels,
carpet floorings

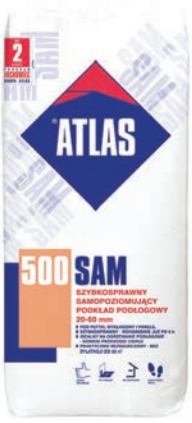


ATLAS SAM 100
Self-leveling surface finish
Layer thickness: 5-30 mm
Beneath the tiles, parquet,
floor panels,
carpet floorings

ATLAS SAM 150
Fast-setting, self-leveling screed
Layer thickness: 15-60 mm
Beneath the tiles,
floor panels,
carpet floorings



ATLAS SAM 200
Fast-setting, self-leveling screed
Layer thickness: 25-60 mm
Beneath the tiles,
floor panels,
carpet floorings



ATLAS SAM 500
Fast-setting, self-leveling screed
Layer thickness: 20-60 mm
Beneath the tiles,
floor panels,
carpet floorings

use the fast-binding material which is easy to mould, e.g. **ATLAS ZW 330** leveling mortar. Any existing scratches or cracks must be repaired according to their type and size;

◆ it's crucial to **prime the substrate** properly. For the absorbent substrates we recommend to use **ATLAS UNI-GRUNT PLUS** (**AVAL KN 97**) priming emulsion which limits the substrate absorption. It is a primer designed for floors (horizontal surfaces) only, as due to a micromolecular structure and low viscosity it assures appropriate penetration into the substrate. Optionally, one may also use **ATLAS UNI-GRUNT (AVAL KT 17**) diluted with water in 1:1 ratio as the first priming layer. Priming is very important and has two tasks: it limits the possibility of holes formation resulting from air bubbles on the screed surface and it separates the anhydrite layer from the cement substrate;

◆ in the case of the arrangement on **the separation layer**, one applies the 0.2 mm thick PE foil onto the entire substrate. The foil should be spread without folds onto even substrate devoid of protruding or sharp elements. The adjacent strips of foil should be arranged with the overlaps approx. 5 cm wide. Additionally, one can tape the joints with a waterproof tape. The foil should be curled up onto the walls above the designed level of the executed layer.

◆ when executing **the floating screed**, i.e. on the layer of thermal or acoustic insulation, one should ensure that the boards are laid on the even substrate and they do not move when pressed. To assure this, before placing the boards on the substrate, one can apply a base of dry sand which, properly distributed and compacted, eliminates any local unevenness The insulation boards are placed in one or two layers with the offset of the edges. Afterwards, one lays the protective layer, e.g. the 0.2 mm thick PE foil, onto them (analogously to the previous description).

◆ If we arrange the layers with **the water heating system**, then the heating installation should be properly distributed and securely mounted to the substrate. Prior to the execution of the screed the tightness test needs to be performed. Note that the heating pipes should be filled with water during works.

EXPANSION JOINTS

Similarly to the cement-based materials, it is obligatory to execute **the structural expansion joints** which must always go through all the layers of the floor.

One must also apply **the perimeter expansion joints** (peripheral, insulating), regardless of the shape and size of the compartment which they are to be installed in. Their task is to separate the layer permanently from the vertical building elements – walls, columns, stairs, etc. The perimeter expansion joints prevent also against spreading the impact noises and vibrations resulting from the use of other rooms or floors. It is recommended to use the convenient ATLAS self-adhesive expansion joint profiles or, optionally, narrow polystyrene strips approx. 10 mm thick. The anhydrite-based screeds differ from the cement-based ones, where the installation of **the intermediate expansion joints** (antishrinking, zonal) and dividing the floor into smaller technological areas is crucial.

Materials of this type are practically contractionless within binding process. Thus, one can carry out larger areas in a single action without the need for additional expansion joints within the application area. In case of anhydrite screeds, the expansion joints do not have to be installed on the surfaces smaller than 50 m^2, in the compartments where the diagonal is shorter than 10 meters. Similarly to the cement screeds, the technological areas should have a shape similar to a square. Alternatively, the ratio of the sides should not be greater than 2:1. This shape provides the best maintenance conditions for the screed. However, the intermediate expansion

Photo 2. Machine application of the fast-setting anhydrite-based screeds is a perfect solution for large surfaces (over 15m²)

joints should be used in places where the shape of the compartment changes, e.g. in rooms of irregular shape, at the room thresholds, at the joints between different building materials.

DETERMINATION OF THE FLOOR LEVEL

At the stage of the material selection we should choose the mortar which enables the floor execution within the designed range of thickness. Prior to the works commencement, one sets the floor level both on the application areas and on the walls. We recommend to use the benchmarks to do that. Thanks to the adjustable pin the benchmarks enable to determine the layer of the designed thickness. They are placed in the application area and then, with the use of a long level (2 m), adjusted one by one in order to set the floor plane.

GROUND RULES FOR EXECUTING THE ANHYDRITE SCREEDS

Anhydrite-based floor screeds can be applied both manually and mechanically. Note that the application differs from the one concerning the cement materials which was described previously. Consistency of the mix is always semi-liquid and it enables the self-leveling of the mass.

I. MANUAL APPLICATION

The manual application of the screeds is recommended in small compartments (10-15 m^2), where the team can execute a layer of certain thickness in a single operation (providing appropriate work organization). In larger rooms, it is required to use the separated technological areas of size mentioned above.

A. The mortar is prepared with the use of a low-speed mixer with a paddle. The dry mix must be mixed with the amount of water listed by the manufacturer.

B. It is recommended to perform a test in order to control the obtained consistency. The test consists in pouring the mortar from a 1-liter-jug onto an even, non-absorbent surface (e.g. covered with a foil) and then measuring the patch obtained. Its diameter should be approx. 45-50 cm. The mortar must be poured in 0.5 m wide strips, starting from the wall furthest from the entrance.

C. The subsequent strips should be applied as soon as possible so that they can join appropriately. Immediately after the application, the mortar should be unified and de-aerated with a spike roller (layer thickness of up to 30 mm) or a mesh roller (layer thickness larger than 30 mm). It is important to de-aerate the screed in two perpendicular directions. In case of floors with the heating system, one should perform the de-aeration process using a brush with long hard bristle, led with a vibratory motion along and across the applied layer.

II. MACHINE APPLICATION

The anhydrite screeds can be applied with a mixing-pumping unit, e.g. a plastering unit with properly adapted equipment (analogously to the cement screeds).

A. In order to prepare the mortar, pour the dry mix from the bag into the intake hopper, from which it gets into the mixing chamber. There, the mortar is mixed with water and then goes to the spiral pump producing pressure necessary to transfer the mortar.

B. The mortar is transferred under-pressure with a hose of a diameter of 35 mm. The appropriate unit adjustment, especially in the terms of the volume of dosed water, is crucial, as it results in the proper mortar consistency. In order to verify the obtained consistency, it is recommended to perform a test similar to the one described above. The diameter of the poured "patch" should be slightly larger (50-55 cm) in view of the manner of preparation and application of the mortar.

C. Commence the work from the corner placed furthest from the room entrance. The mortar is poured from a hose, with strips applied along the walls. The adjacent strips must be applied relatively quickly in order to enable correct mortar joining. Similarly to the manual application, the de-aeration process of the freshly applied layer must be performed following the instructions given above. During the work one must ensure appropriate municipal water pressure and proper voltage of the three-phase electric power protected on each phase.

OPTIMUM CONDITIONS

In case of anhydrite-based screed its is required to provide temperature in the range between +5°C and +25°C. The freshly applied screed should be protected from drying too fast, direct sunlight, low air humidity and draughts. The layer drying time depends on its thickness and on the thermal and moisture conditions. The optimum conditions are as follows: temperature of approx. 20°C and relative humidity of 55-60%. If there appears a yellowish or white surface tarnish, it must be removed mechanically, e.g. by grinding, and the whole surface dusted. The removal of the tarnish accelerates the layer drying.

MAINTENANCE

Prior to the further works it is advisable to let the screed dry properly. It is assumed that the layer dries approx. 7 days per 1 cm of the thickness. Nevertheless, it is recommended to check the substrate moisture content again prior to tiling or parquet fixing. The moisture content of the executed layer can be measured with the **carbide method** (CM), which provides the most precise results, or with an electric meter check. Note that in both cases the measurements are carried out in several points. It is assumed that the maximum residual moisture content for the anhydrite screeds should not exceed 1.5%. In case of using any impermeable finishing materials, e.g. PVC or wooden floorings, one should always follow the manufacturer's instructions in this regard.

SCHOOL OF FLOORING

LESSON 5

In the last lesson we are going to present the information on the principles of the flooring works acceptance and the examples of common mistakes and failures regarding the floor layers.

USE OF IMPROPER PRODUCT

Choosing an improper product is not always a contractor's fault. Sometimes, the mistake may result from the construction design, the contract technical specification or from the investor's independent decision. It still happens that the anhydrite products are used in areas where they should not be applied, e.g. in bathrooms and toilets. The type of the screed and its technical specifications should match the type of the floor top finish and designed loads. Depending on the finishing layer, the substrate is subjected to different requirements – there are different requirements for floor panels, ceramic tiles, parquet or epoxy materials. The use of a particular product depends on the manufacturer's guidelines. The manufacturer provides a respective range of use in the Declaration of Performance and on the product packaging. In case of the floor top finishes, it is also important that the applied material has the wear resistance appropriate to its range of use.
The product shelf life is significant as well. An expired material may cause deterioration of the floor strength parametres or even its loosening. As a result the layer must be hacked off and replaced with a new one – thus the investor bears additional costs of labor and materials.

IMPROPER SUBSTRATE PREPARATION

It is one of the most common reasons of damages of the executed floor finishes or screeds. The detailed requirements for substrates have been listed in two previous lessons. The problem concerns mainly the floors bonded to the substrate, i.e. in which the layer of a new material is in contact with the existing substrate over its entire surface (ceiling, concrete layer). One should always follow the principle of applying the weaker material onto the stronger one.

Photo 1. Tarnish on the surface of a floor screed

Otherwise, the shear forces will lead to delamination within the substrate or total loosening of the new layer. Therefore, it is forbidden to use mortars of high mechanical resistance on old and too weak substrates.
Proper cleaning of the substrate is an important issue as well. One should clean away dust, dirt, residues of paints, adhesives or PVC tiles. Note that priming is not the ultimate solution for all of the floor layers defects.

Photo 2. Tarnish on the surface of a floor screed

INAPPROPRIATE LAYER THICKNESS

Too thin or too thick layer of the floor top finish or the screed implies lower mechanical parameters than assumed – mainly it concerns the adhesion to the substrate and appropriate mechanical resistance. For instance, the fine-aggregate surface finishes will do well within the range they are designed for – namely in thin layers. The mortars designed for use with thicker layers contain completely different aggregate composition and therefore can be applied in much thicker layer. In case of cement-based mortars, too thick layer may cause an excessive contraction of the binding material and consequently the possibility of cracks and loosening off the substrate. In such cases one can often observe that layer is lifted in the room corners. This happens in particular in case of screeds in the arrangement with a separating layer. One should also remember that the thickness of the installed floor layer results not only from the manufacturer's recommendations, but also from the structural arrangement to be executed. Generally, layers bonded to the substrate may be of any thickness (according to the manufacturer's guidelines). However, when executing screeds on a separating layer or in the floating arrangement, one must keep in mind the minimum permissible layer thickness. It is the essential factor when selecting materials for a particular project.

Photo 3. Cracks and loosening of the screed layer of too small thickness

LACK OR IMPROPER EXECUTION OF THE EXPANSION JOINTS

Proper arrangement and execution of the expansion joints is particularly important in case of cement mortars which shrink during binding due to the water evaporation and the chemical reactions. These lead to additional tension in the material structure. The tension may result in the surface cracking. If the structural expansion joints are not transferred into all floor layers, one may observe cracks in the points where the structural joints should be localized. These cracks are implied by the structural loads of a building during its operation.

Photo 4. Loosening off the substrate

EXECUTION ERRORS

Nowadays, while executing the floor top finishes and the screeds, both during renovation and construction of the new facilities, one mainly uses the ready and factory-made mixes based on cement or calcium sulfate.

Photo 5. Shrinkage cracks of the screed. No peripheral expansion joints along the walls

Photo 6. Cracks of the substrate

Photo 7. Appearance of surface executed with mortar containing too much water; anhydrite screed is not homogenous in colour – it is a result of the chemical additives elution

Photo 8. Addition of insufficient amount of water results in difficulties in smoothing the surface finish

Less often (basically only in case of new constructions), one uses individually prepared mixes of particular components. The factory-made dry mixes must only be mixed with the amount of water recommended by the manufacturer. However, mistakes can happen also here. The amount of water is always given in relation to the amount of binder, thus one must apply to these guidelines. Appropriate amount of water determines both the working parameters of the prepared mortar and the mechanical parameters of the executed layer. Insufficient amount of water causes difficulties in regard to proper application of a layer. Moreover, in case of self-leveling mortars one does not obtain the desired effect. Excessive amount of water results in larger shrinkage of the cement mortars and may lead to cracks. It can also cause the sedimentation of the mortar aggregate. As a result thicker and heavier aggregate drops to the bottom while finer fillers and chemical additives are virtually eluted and appear on the surface of the executed layer. The mortar with the excess of water never achieves its designed strength parameters and is mechanically weaker. It can also cause problems while fixing the floor top finish layer in the arrangement with an adhesive e.g. with tiles or parquet.

ACCEPTANCE OF SCREEDS AND FLOOR TOP FINISHES

Information on the principles of acceptance of screeds and floor finishes is often listed in the local technical guidelines and regulations. One must also take into account the guidelines included in the design, the technical specification and in the agreement with the investor. The contractor and the investor (or one's representative) should be present at the time of the acceptance. In view of different possible arrangements of floors (bonded floor, on separation layer, floating) it is advisable to execute the intermediate acceptances despite the final one. The intermediate acceptances enable to inspect the work stages and results invisible after full application of the floor and have significant impact on the correctness of the floor execution. During the intermediate acceptances one is able to confirm the correctness of the substrate preparation, the type and the method of application of the thermal insulation or the separation layer.

1. FINAL ACCEPTANCE OF THE FLOOR SCREEDS SHOULD INCLUDE:

- the visual examination of the appearance of the executed screed in respect of cleanness, damp, presence of unevenness, cavities or cracks, and the required roughness;
- the verification of the substrate evenness (in increments of 1 mm) – performed with a 2 m long control batten laid on the surface in random places and directions. In Poland the determined clearance should not exceed 3 mm, check local regulations in this respect for your country.
- the verification of slopes (if they are required), with a 2 m long batten and a level; the measurement must be performed in increments of 1 mm, the slope must be consistent, aberration from the designed level of the surface compartment should be less than -/+5 mm (for Poland, check local regulations in this respect for your country);
- the examination of the special areas – expansion joints, plinths etc.

2. FINAL ACCEPTANCE OF THE FLOOR FINISHES SHOULD INCLUDE:

- the visual examination of the appearance of the executed surface – floor finish should be evenly effaced or smoothed, of homogenous colour over the entire surface, with no cracks or scratches;
- the visual examination of works at the areas of expansion joints, plinths, thresholds;
- the verification of the surface evenness – performed with a 2 m long control batten. The batten is laid on the executed surface in different places and directions; the clearance between the lower batten edge and the surface should not exceed 3 mm (test is performed in increments of 1 mm; according to Polish regulations, check local regulations in this respect for your country). When checking the surface evenness one should also use a level;

- the examination of the floor finish adhesion to the substrate (it concerns the bonded floors only) – by gentle tapping with a wooden hammer. Characteristic thuds indicate possible delamination and imperfect adhesion between the applied layer and the load-bearing substrate. Loosened layer must not be accepted;
- the verification of the executed layer thickness (optionally, on investor's request) by cutting out square holes of 10 cm long sides in 3 randomly selected locations (at least one location per every 100 m^2 of the checked area) and measuring their thickness. The measurement result should be given in increments of 1 mm. Then one should confirm that the layer is executed in accordance to the design and the manufacturer's guidelines.

Note! In case of screeds with the heating systems the commencement of flooring works follows the acceptance of the heating system installation. One should pay attention to the passages of pipes or heating cables (they should be placed in special ducts), the system distribution. The pipes should be filled with water and their water tightness confirmed. ■

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FAST-SETTING SELF-LEVELING

FOOT TRAFFIC JUST AFTER 4H

UNDER TILES, CARPETS AND PARQUET

1-15 mm LAYER THICKNESS

3-30 mm LAYER THICKNESS

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