The Guide to

LEVELLING FLOOR COMPOUNDS

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School OF FLOORING

LEVELLING FLOOR COMPOUNDS

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 exural 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.

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

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

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

Class	A22	A15	A12	A9	A6	A3	A1,5	C35	C40	C50	C60	C70	C80
Resistance [cm³/50 cm²]	22	15	12	9	6	3	1,5	35	40	50	60	70	80

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

Class	AR6	AR4	AR2	AR1	AR0,5	A3	A1,5	C35	C40	C50	C60	C70	C80
Maximum wear depth [μ]	600	400	200	100	50	3	1,5	35	40	50	60	70	80

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

Class	RWA300	RWA100	RWA20	RWA10	RWA1
Max. abrasion quantity [cm³]	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 under floor 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 three of them - ***SMS 15***, ***SMS 30*** and ***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.

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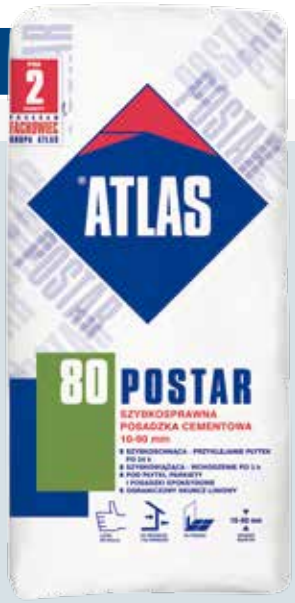
No shrinkage during binding – this allows to pour large areas without the need for additional intermediate expansion joints. For example, if one uses ATLAS SAM 150 screed, there is no need for expansion joints on the areas up to 50 m^2, providing that the diagonal of the compartment is not longer than 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 levelling 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 under floor 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.



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.

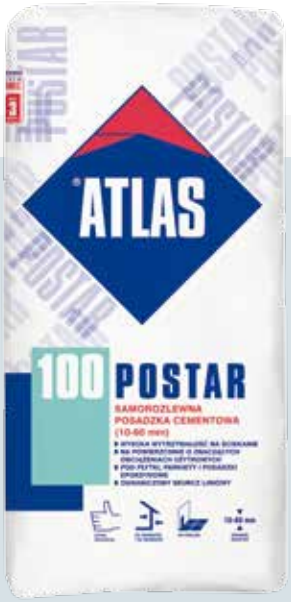
Main properties:

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

Main parameters:

- consumption: 20 kg/1 m^2/1 cm layer
- thickness: 10-80 mm
- high compressive strength: ≥ 40 N/mm^2

* 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.

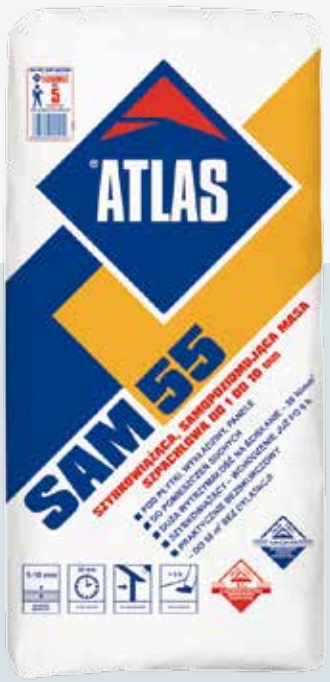
Main parameters:

- consumption: 20 kg/1 m^2/1 cm
- layer thickness: 10-80 mm
- high compressive strength: ≥ 50 N/mm^2

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 and ATLAS SWS. Three of them: SAM 150, SAM 200 and SWS (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.

CRITERIA FOR SELECTING 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:



ATLAS SAM 55

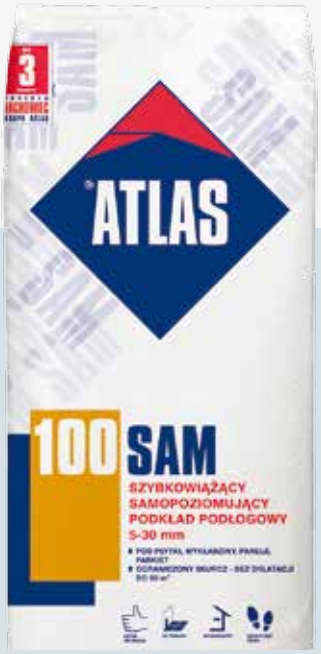
Forms a screed beneath the tiles, PVC and carpet floorings, floor panels in the compartments subject to medium loads – residential buildings, offices, kindergartens, schools.

Main properties:

- anhydrite-gypsum,
- resistant to concentrated load,
- no need of expansion joints for up to 50 m^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 levelling 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 50 m^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

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 ATLAS brochures and data sheets).

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.

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Installation hints

and important differences in comparison to the cement-based products.

SUBSTRATE PREPARATION

On the previous pages 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 bonded screeds or 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; 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 impair the bonding, 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 use the fast-binding material which is easy to mould, e.g. ATLAS ZW 330 levelling 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

Machine application of the self-levelling screed on an old concrete substrate

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 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. After- wards, 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 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 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 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-levelling of the mass.

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

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 deaerated 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.

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 deaeration 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 po- wer 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.

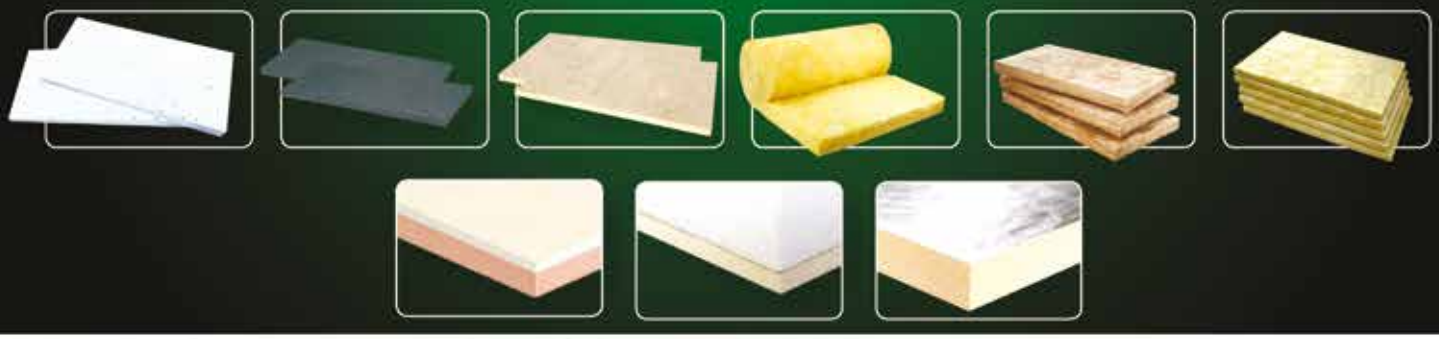
MAINTENANCE

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.

QUALITY THERMAL INSULATIONS

FOR FAÇADES & INTERNAL WALLS

Polystyrene (EPS) Panels | Polyurethane (PUR) Foam Panels
Mineral Wool Rolls & Slabs | Polyisocyanurate (PIR) Boards
Kingspan Insulated Plasterboards | Thermal Laminate Plasterboards



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Cement or Anhydrite? – this is the question.

One of the most frequent question asked by the contractors is where to apply cement screed and where the anhydrite one. Does this discourse lead us to a final settlement? No. Both cement and anhydrite screeds have their pros and cons. Let's take a closer look at them.

Cement and anhydrite – two strong representatives. Both binders bond with the process of hydration with water. Both are mineral. Nevertheless, the difference between them is significant. Cement unlike anhydrite is a binder "resistant" to water and negative temperature. Cement screeds can be used in wet areas (without any restrictions) and outdoors.

From the chemical point of view anhydrite is anhydrous calcium sulfate ($CaSO_4$) – a binder which is very similar to gypsum (formed by dihydrate calcium sulfate – $2H_2OCaSO_4$). Therefore, anhydrite screeds my not be applied outdoors and in wet areas (e.g. in a bathroom). Why? Due to the fact that the screed cannot be poured on a floor where the "water load" is significant.

Cement screed

There can be much to tell about the advantages of the cement screeds. Generally speaking, they are mortars of thick-plastic consistency. Usually we need to add approx. 1.75-3.75 litres of water per 25 kg bag. This makes them an ideal material for forming slopes on terraces and balconies. Furthermore, cement (combined with an appropriate aggregate) provides significantly higher compressive and flexural strength. Thus, cement screeds are strongly recommended in, e.g. industrial, farm and service facilities where higher strength and abrasion resistance are required. In ATLAS portfolio: ***Postar 10***, ***Postar 20***, ***Postar 40***, ***Postar 80***, ***Postar 100***

Anhydrite screed

Anhydrite screeds are always manufactured as self-levelling mortars of liquid consistency. One needs to add approx. 4.25-6.25 litres of water per 25 kg bag. Liquid consistency ensures easy manual and machine application. Moreover, it provides perfectly leveled and even screed surface. Therefore, anhydrite screeds are recommended beneath the top floor finishes: panels, PVC flooring and carpets. That is why anhydrite screeds are most often used in the living and office rooms.

Technically anhydrite screed is a non-shrink material. This is an important feature in view of performing the expansion joints. When executing cement screed, the areas divided with expansion joints must not exceed 36 m^2. On the other hand, in case of anhydrite screed, the adequate areas may have up to 50 m^2, whereas the diagonal of the room may be up to 10-12 m long. This is due to significantly lower shrinkage of the anhydrite compounds during the bonding process. In ATLAS portfolio: ***Sam 150, Sam 200, SWS (Sam 500).***

Use

Tables 1 and 2 show the advantage of particular screed depending on a feature. We show here conditions of screed use, the most important screeds parameters, as well as the locations in which it is particularly recommended to use one of the screed types. According to manufacturers' technical data sheets both anhydrite and cement based screeds can be used on floors with underfloor heating.

Based on the interpretation of the physical parameters one can draw a conclusion that anhydrite screed is slightly a better heat conductor and that it heats up quicker. It is also important to note that the liquid consistency of anhydrite screeds enables more accurate filling of the spaces between the heating system elements. Anhydrite screed easily "surrounds" the elements of the system. Furthermore, the air voids remaining in the bottom part of the thick-plastic cement screed work as a good insulator, so they limit the heat flow from the system to the substrate.

Surface finishes

The self-levelling surface finishes (both anhydrite and cement) are also screeds types, but they are specific. Their maximum thickness is 30 mm. Moreover, they can be applied only as bonded floors. In case of ATLAS self-levelling surface finishes, regardless of whether they are based on anhydrite or cement, they both can be used indoors only. This results from the recipes of these products. The chemical additives included in the formula provide excellent spreading and quick

setting time. However, they are unfortunately not resistant to outdoor conditions. It is therefore difficult to tell which type of surface finish is in the lead.

Of course all cement finishes may be used in bathrooms and wet rooms. The range of use of both finishes types is similar - they are used for smoothing the existing screeds in order to enable covering them with carpets or parquets. So, there can be only one verdict - a draw. The additional points may be given to the cement finishes due to the fact that they dry faster than the anhydrite ones. Thus, one may apply the finishing top layer sooner. In ATLAS portfolio: ***SMS 15, SMS 30, Sam 55, Sam 100, Aval KN 10***

Is it necessary to grind anhydrite finishes? Or is it only required when tarnish appears on the surface.

It all depends on whether there appears tarnish* on the finish/screed surface. Tarnish is a thin, cream-colour layer of low resistance. If there is tarnish on the surface, which is not that rare in case of anhydrite-based finishes, the surface must be grinded. Removal of the tarnish accelerates the process of drying. In addition, it accelerates the moisture release. Therefore, the finish reaches its optimum moisture content, so that the works may be continued.

If we use ATLAS Sam 200 screed type then the work may be continued the next day. After one day from the application the mass is hard enough and one can enter the floor surface. However, we still need to be careful – the mass tends to "smear". One solution to this problem is to remove blemish by shearing it with a steel float. However, if we let the entire surface dry, we can solve the problem by grinding the surface – preferably mechanically (tarnish generally bonds slower than the actual compound). There is no rule on the range of strength and work needed – some anhydrite-based products are grinded as easy as polymer finishes and some definitely harder.

** **Tarnish (ettringite)** – a layer which forms a coating in the form of crystalline white needles. However, it does not occur everywhere. It occurs in mortars based on anhydrite, e.g. ATLAS Sam 200 or Portland cement. It works as a bonding activator, the anhydrite slurry would not bond or harden without it. Ettringite is a result of certain chemical reactions. It may increase its volume from 30 up to even 800%, causing delamination, flaking and peeling of the top finish layers.*

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Table 1: Crucial features of anhydrite and cement screeds – comparison

	Wet rooms	Size of areas between expansion joints	Layer evenness and smoothness	Easy in application	Strength	Abrasion resistance
Advantage of anhydrite		X	X	X		
Advantage of cement	X				X	X

Table 2: Use of anhydrite and cement screeds – comparison

	Slope layer on balconies and terraces	Underfloor heating	Outdoor use
Advantage of anhydrite		X	
Advantage of cement	X		X