

APPLICATION MANUAL

TEKTOTERM

Ready mix ultra-light thermal insulating plaster



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The realization of a manual is a complex operation that needs of several controls on the text, on the images and on the sketches that compose it. Experience suggests that it is impossible to publish a manual totally exempt from errors. We will be therefore thankful to the users of the present manual that, upon finding some mistakes, they would signal it to us. Therefore, all the indications provided in this manual are purely approximate and not binding for legal purposes. It should also be specified that our instructions are not irrespective of all due precautions and good practice during installation referable to the so-called "workmanlike" execution, which must always and under any circumstances be adopted in addition to following the detailed instructions given in our technical data sheets. The data listed herein has been gathered from laboratory tests and it hence follows that in practical applications on building sites the final characteristics of the products may be subjected to substantial variations depending on the meteorological conditions and the installation. The user must always check suitability of the product for its specific use, undertaking all liability implicit in and deriving from use of the product, as well as comply with all the methods and instructions for use generally referable to "workmanlike" execution. TEKTO HELLAS S.A. reserves the right to change the contents of this manual upon its final judgement. The spreading of this manual, through any media, supersedes and cancels the validity of any other manual sheet previously published.

It is absolutely forbidden to publish and distribute, totally or partially, this Manual without the previous TEKTO HELLAS S.A. expressed written consent.

1. PREAMBLE

Ready mix plaster of high thermal insulating ability.

- **Tektoterm** is a ready mix plaster for thermal insulation of buildings and total protection.
- **Tektoterm** is composed of binding agents, additives and expanded virgin polystyrene beads, EPS, with controlled particle size.
- **Tektoterm** is a plaster with very little water absorption and good vapor permeability. Thanks to those properties, Tektoterm is fully stable and does not decompose with the passage of time. Tektoterm ensures stable technical results during the passage of time.

2. THE SYSTEM

Among the various systems used to achieve thermal insulation in buildings, **TEKTOTERM** is surely of the highest quality, performance and versatility, as it creates a coating which improves the living comfort of the tenants, thanks to its excellent properties and the resulting cancelation of the thermal bridges (if used as an outer coat). **TEKTOTERM** has a competitive price and it is easy to be applied mechanically; without that, external factors may compromise the result.

3. GUARANTEE OF THE RESULT

By using **TEKTOTERM** to coat the exterior facades of a building, you can quickly feel the results in terms of insulation. In fact, 30 days after the application, you will already realize an important difference between the external and the internal side of the walls.

TEKTOTERM allows you to achieve significant energy savings both in the winter by saving money for heating bills (natural gas, oil, electricity) and in the summer for the air conditioning systems.

TEKTOTERM is a suitable thermal insulating product for the energy certification of buildings.

4. PRODUCTION

TEKTOTERM is produced with cutting-edge automatic machinery for ready mix products and it is continuously subjected to quality tests thus guaranteeing its high performances and the complete customer satisfaction. **TEKTOTERM** is being produced under the ISO 9001:2008 quality system. The product is available in 60 liter bags (2 square meter yield for 3 cm application thickness), and in pallets of 40 bags. **TEKTOTERM** can't be stored in a silo. Each **TEKTOTERM** bag must be fully used at once. It is not possible to use the content of the bag in two different applications.

5. WHERE TO APPLY TEKTOTERM

Tektoterm is suitable for the thermal insulation of buildings (outside or/& inside application) and in constructions and industrial buildings.

Tektoterm is suitable for new as well as existing buildings.

Tektoterm can be applied in every type of masonry: bricks, concrete, light partition walls, wooden and metal surfaces etc.

Tektoterm can be applied on surfaces which are covered with old plasters (no gypsum-based plasters), as long as the old plaster is fully adherent to the surface, it is in very good condition, it is completely free of paints or other coatings or contaminations and has been sufficiently sanded or has been sandblasted and the surface has been impregnated with an adhesion Latex promoter, type Edilstik (fresh on fresh application).

6. APPLICATION

6.1 Cleaning of the surface

The perfect cleaning of the application surface on which **TEKTOTERM** will be applied is very essential. In more detail, before proceeding with the application of **Tektoterm** a thorough and meticulous cleaning of the surface must be performed. The application surface must be free of dust, oil, grease, contaminations, brittle or/& non-cohesive materials, of old plasters who are not fully adherent to the surface and of great condition, of simple or water repelling paints and of every other sediments and coatings. The surface must be completely free of anything that might compromise the excellent and direct adhesion of **Tektoterm** to the application surface. It is the applicators responsibility to establish and ensure that the conditions of the substrate are met for the application of **Tektoterm**.

6.2 Pre-work

Before proceeding with the application of **Tektoterm** you must first perform some verification works of the preparation and of the surface and of the conditions of use that facilitate and improve the application.

a. Wetting of the surface

<ul style="list-style-type: none"> - Hollow bricks - Cement bricks 	Wet the surface with water from the night before the application of Tektoterm
<ul style="list-style-type: none"> - Solid bricks - Stone - Concrete 	Wet the surface with water without leaving standing water, before applying Tektoterm
<ul style="list-style-type: none"> - Lightweight concrete - Gas concrete - Concrete based on fly ash 	Apply an adhesion layer based on a mortar of sand, cement and EDILSTIK additive or a mortar with special performance specifications as an adhesion layer.
<ul style="list-style-type: none"> - Surfaces made of gypsum 	<p>A very careful and thorough cleaning of the surface is required. The application surface must be free from dust, oil, grease, contaminations, brittle and/or non cohesive material, from old plasters that are not completely healthy and perfectly attached to the substrate, from simple or water-repellent paints and from any other debris or coatings. The surface must be completely free from anything that may compromise the excellent and direct adhesion of Tektoterm to the application surface.</p> <p>The entire surface must be impregnated with EDILSTIK and the application must take place "fresh on fresh": apply Tektoterm on the wet surface.</p>

B. Net

In case the application takes place on wooden or metal beams, exposed wooden panels, cork, polystyrene, polyurethane panels, not perfectly clean concrete elements or bituminous sheaths, before proceeding with the application you must first apply mortar with netting. The netting must have minimum dimensions of 10 x 10, 2 mm thickness and maximum dimensions 25 x 25, 3 mm thickness which must be anchored on the adjacent wall. The netting must be completely encapsulated by a special first layer mortar of high strength based on cement.

6.3 Preparing the corners and the intermediate strips
A. With wooden boards:

Create plumb lines over the whole thickness by using wooden boards on the corners of the building and the doors and windows. Also create the intermediate strips by using

Tektoterm exclusively. If there are any intermediate strips or corners made with materials different from **Tektoterm**, you must remove them carefully.

Position the boards taking into consideration the plumb lines and the thickness required by the costumer.

Hang the string from one corner to the other so that the intermediate strips can be made during the application of the first coat of **Tektoterm**.

The intermediate strips, made of **Tektoterm**, must be less than 2 m apart.

N.B.: on the strips that are made this way cracking may appear, which will be covered when the second coat of Tektoterm is applied, without the risk of peeling, flacking or cracking.

With this procedure, once **Tektoterm** cures (see Paragraph 8 – smoothing), steel staff angles with a maximum thickness of 5 mm must be fitted (staff angle for plasterboard or PVC with netting) on every corner of the building, including doors, windows and string closures.

B. With steel staff angles

Make plumb lines over the whole thickness of the application area, on the corners and the intermediate strips. For the creation of the intermediate strips use only **Tektoterm**. If there are any intermediate strips or corners made of materials different than **Tektoterm**, those must be removed entirely and with caution. Perfectly square each wall of the building that will be coated with **Tektoterm** by using a string. Position the staff angles in the corners and spot-fix them by means of thermal insulating mortar (picture 1) or with screw anchors (picture 2). Afterwards, apply the intermediate strips (beveled type) with the same procedure with a distance not more than 2 m from each other. After applying the second coat of **Tektoterm** remove the strips and the cement. Fill the empty spaces with **Tektoterm**.



- Picture 1-



-Picture 2-

For application thicknesses bigger than 6cm it is easier to use the wooden boards' method. For application thicknesses up to 6 cm the steel staff angles fixed with thermal insulating mortar or with screw anchors is easier.

6.4 Application stages

Because of the designated application thickness, more layers than 2 -which are the minimum Tektoterm layers required for an application- may be needed.

- For application thicknesses 2-4 cm	2 layers, of which:	1 st layer 1 cm 2 nd layer finishing
- For application thicknesses 4-6 cm	3 layers, of which:	1 st layer 1 cm 2 nd layer 2 cm 3 rd layer finishing
- For application thicknesses 6-8 cm	3 layers, of which:	1 st layer 2 cm 2 nd layer 3 cm 3 rd layer finishing

With **Tektoterm** it is possible to have application thicknesses bigger than 8 cm, by applying additional layers of 2 cm each.

N.B.: During the change of each pallet of thermal insulating mortar Tektoterm, conduct a check in the amount of mixing water, because the characteristics of the binders may be altered depending on the supplier.

6.5 Application method**Wet wall (climatic period with temperatures between +15°C and +30°C)**

Wet the application surface according to the instructions of paragraph 6.2 «pre-work» and afterwards spray the thermal insulating mortar on the surface by keeping the nozzle of the machine at a distance of about 20cm from the wall.

The first layer must uniformly cover the wall in such a way as to ensure the perfect adhesion of **Tektoterm** on the surface and to provide a stable base for the subsequent layer.

During the application of the first layer of **Tektoterm** you must create the intermediate strips at a distance not larger than 2 m between them (see paragraph 6.3a) and fill the voids and the anchoring positions during the preparation works (see paragraph 6.3b)

Wait for at least 4 hours before applying the second layer, which will be a final layer in case 6.4a, or an intermediate layer in cases 6.4b and 6.4c.

B. Dry wall (climatic period with temperatures between +5°C and +15°C)

During the winter period, and on very cold periods, the wetting of the application surface is not recommended because of the risk of frost and thus the application method is different.

Spray the material from a distance of about 20 cm from the wall with the first layer being thicker. This is necessary to ensure a better adhesion and to allow the second layer to be applied in less thickness and to be better supported. Therefore, the thickness of the final layer will be less and will have less water that need to be evaporated. In this way, you reduce the risk of night frost (which creates salt booming and detachments).

The recommended application thickness for Tektoterm (for total thickness up to 4 cm) is 2.0-2.5cm for the first layer with the creation of the intermediate strips. Afterwards, allow **Tektoterm** to cure for at least 8 hours and then follow with a second layer of 1.0-1.5cm thickness for the filling of the strips and the smoothing of the surface.

In cases where the second layer is going to be applied some days after the application of the first layer, wash the surface of the first layer with water at least 24 hours before applying the second layer. This is done in order to remove dust that has settled on the surface and so that the surface will be dry before the application of the second layer.

6.6 Application

The first layer of **Tektoterm** must be left rough or possible flattened by means of a trowel. The finishing layer is applied gradually as to obtain a perfectly flat surface with the use of a float or an "h-rule" which in any case has to have a contact surface with a thin layer of **Tektoterm** no more than 3mm.

Any imperfection in the flatness of the surface must be corrected while the material is still fresh with the use of **Tektoterm** and a trowel.

6.7 Scrapping

Scrape the surface with a scraper, a trowel or a spatula as to remove any leftover imperfection on the surface of **Tektoterm** after the application of the final layer. Scrapping is performed in order to eliminate the polystyrene beads that are not completely covered with the binder. In reality, those beads may appear on the surface during the smoothing phase (maximum diameter of beads 5 mm) causing imperfection in the appearance of the final layer.

The scraping must be performed:

- a) Hot period: 24-48 hours after the application of the final layer
- b) Cold period: 72-96 hours after the application of the final layer

6.8 Smoothing plaster

This chapter is about the final protection layer of **Tektoterm**. The most ideal products for this are the breathable smoothing-finishing plasters. Other cement-based plasters may be used, bearing the fact that they must comply with the technical specifications of the products mentioned above. For internal places you may also use gypsum-based plasters. In any case, non-breathable products are not recommended.

The thickness of the smoothing-finishing plaster must be between 4 and 5 mm. The thickness is defined by the requirement not to increase the surface load on **Tektoterm** with excessive weight, with the risk of detachment of the finishing plaster from the surface.

Tektoterm may remain exposed to the environment without the application of a smoothing-finishing plaster, nevertheless the application of smoothing-finishing plaster as a mechanical protection layer and as a substrate for the aesthetic finishing of the surface according to the clients requirements is recommended.

To further improve the mechanical strength of the surface or in cases of application between non-homogenous materials, it is strongly recommended that you use fiberglass for plasters (at least 140 gr/m²) encapsulated inside the smoothing plaster.



The final smoothing plaster must be applied only after **Tektoterm** has fully cured.

a) Hot period: after at least 6 days

b) Cold period: after at least 10 days

The curing time is necessary as to allow the evaporation of 90% of the excess water inside the **Tektoterm** mixture and to ensure a better adhesion between the different layers of **Tektoterm**.

If the smoothing plaster is applied before the specified curing time, the concentration of water in **Tektoterm**, in conjunction with the pressure that is applied during the manual application of the flattening of the smoothing plaster, may cause web-like cracking on the final finishing layer and may cause detachments from the substrate of **Tektoterm**.

6.9 Finishing products

The final finishing layer can be performed with the following material:

- Dry ready-mix plaster
- Colored lime based plasters
- Colored plasters
- Silicate plasters which are applied with a trowel
- Colors which are applied with a brush or a roll, keeping in mind that the colors must have good breathability.

The putty finish is applied only in case of distemper (applied with a roller or a brush). With other types of paints for which a roughcast surface is required, putty is not applied.

6.10 Heavy coverings with a maximum load of 50 Kg/m²

For any type of covering, such as ceramic tiles, stone, marble, or any other material, this may be directly applied on **Tektoterm** if the following precautions are met:

1. Maximum height of covering 3 meters. **For heights bigger than 3 meters contact our technical department.**
2. Maximum dimensions of covering tiles: 300mm x 300mm x thickness 8mm (create expansion joints every 16m²). For dimensions and thicknesses bigger than 300mm x 300mm x thickness 8mm, besides the use of appropriate glue use also appropriate mechanical fixings (hooks, metallic structures etc).
3. Apply the layer of the glue directly on **Tektoterm** without flattening the surface according to chapter 8.

7. APPLICATION WITH PLASTER MACHINE

For the application of **Tektoterm** you can use plaster machines for premixed plasters (type PFT G4-G5 and similar) with a solid loading screw in order to guarantee that **Tektoterm** is fed in to the mixing chamber without the risk of the polystyrene aggregates breaking off of the cement during the loading phase of the dry mix.

The plaster machines should be equipped with accessories that are been supplied by the manufacturers for the use of thermal insulating plasters. In more detail, the following accessories are indispensable:

- α) **Helical mixes** for thermal insulating plasters with a solid screw – (picture 5)
- β) **Stator for thermal insulating plasters** of minimum productivity 30lt – (picture 6)
- γ) **Rotor** type D8/1.5 super – (picture 7)
- δ) **Cap/nozzle** 14 mm in diameter – (picture 8)

It is essential that you follow some basic rules to achieve a linear and a more even spraying of the plaster and subsequently reduce the margin of error during the application of **Tektoterm** by the applicator:

1. To achieve full efficiency of the machine and to avoid the interrupted operation you must ensure the following:
 - α) Regularly check that the water filters are clean
 - β) Clean the mixing chamber each night
 - γ) Clean the tubes and the mixing chamber after each break that lasts more than 30 minutes.
 - δ) Apply the spherical cap on the nozzle. The cap, during the spraying, must be closed when the air is closed.

- ε) Apply turbo or mini-turbo with the appropriate rotor with the appropriate pitch. Such device prevents the formation of air-voids in the carry-material tubes and the resultant irregularity of the spraying.
- στ) Regulate the flow meter of the mixing water on values between 150 -250 lt/hr, to achieve the optimal consistency of the product. At the start of the spraying the flow must be set at 350lt/hr and afterwards you should regulate on the previously mentioned values.
2. Use the cover-wheel of the material loading hopper to: prevent the polystyrene to enter the mixing chamber alone when the Tektoterm bags are being emptied in the hopper.
3. It is recommended to use the riser as to allow more **Tektoterm** to be fed in the hopper and to reduce the risk of emptying the machine completely and the subsequent spraying of non-homogenous and non-cohesive mortar.
4. The air tube must be inserted in the spray nozzle with the end piece 1cm away from the cap as to prevent the formation of plug flow caused by the EPS beads being broken away from the binders.
5. Always keep an empty container next to the spray nozzle to collect the material that flows from the cap after the air supply is stopped. This material can't be applied directly on the wall as in the case of cement-based premixed plasters: after collecting the material, you can apply it as a second layer.
6. After each recess, do not leave the nozzle inside the container with the tubes filled with air. This provision is recommended as to prevent mixed material from entering the air tube.
7. The use of tubes of different section (diameters) may cause problems in the flow and the consistency of the material. It is recommended the tubes to be even (if this is possible). The tubes in every joint must have the same inner diameter.



-Picture 5-



-Picture 6-



-Picture 7-



-Picture 8-



-Picture 9-

8. FALSE PROBLEMS & PROBLEMS

With over thirty years of experience in the production and the application of thermal insulating plasters, we can claim that **Tektoterm**, when used according to the producer's technical specifications and for the appropriate uses, does not present any imperfection or problems.

During the years, **TEKTO** came across with the most unusual situations and the most unusual problems, thus gaining an in-depth knowledge about the product as well as the certainty that the quality and the professionalism of the application are main issues in the success of each application.

a) False problems

- **Cracking of the first layer of Tektoterm**

This happens mainly in winter on walls that are not wet. During the summer periods this can happen on first layers of increased thickness or when the wall hasn't been wetted with water as a precaution.

In both cases the problem will disappear during the application of the next layers and won't have an effect on the good final result of the application.

- **Cracking of the intermediate strips**

This happens when the strips are made during the application of the first layer of **Tektoterm** and is caused by the rapid loss of the mixing water.

In that case as well the problem will disappear during the application of the next layers and won't have an effect on the good final result of the application.

b) Problems

Problems may arise on different irregular circumstances:

- When the first layer (the one that ensures the good adhesion of **Tektoterm** on the surface) is not left to cure on the surface for at least 4 hours before the application of the second layers, that results in the detachment of **Tektoterm** from the surface.
- When you use too much water in the mix (in case of spraying with a plaster machine, the water supply must be fully effective and regulated at about 200lt/hr), that results in the rapid detachment of **Tektoterm** from the surface.

- When you use too little water, which results in the direct detachment of **Tektoterm** from the substrate. When you use the nozzle of a machine plug flow may arise which prevents the spraying of the material.
- The excessive work on the final layer of **Tektoterm** (excessive flattening-concentration of the surface) results in the following detachment problems between the different layers of **Tektoterm**.
- Cracking occurs in the strips caused by cement keys that have not been removed, by strips made from mortars different than **Tektoterm** or metal parts that have been left in the strips.
- Excessive material consumption: the material that has fallen to the ground during the application of the different application stages (which in any cases should not happen if the material is properly used) must not be used.

On the contrary you should:

- Keep the application area clean
- Collect the material that gradually falls to the ground
- Place the collected material (within 30 minutes after spraying) in a clean and empty container and if the material appears non-cohesive, add a little bit of cement and water to create an homogenous and cohesive mixture.
- Apply the product with a trowel on surfaces that already have a first layer of **Tektoterm**.
- If the finishing plaster has a thickness larger than 5mm, there is the risk of detachment and serious crackings on the finishing plaster and on **Tektoterm**.
- Excessive work on the surface of the finishing plaster may lead to rapid dehydration with subsequent loss of adhesion and the appearance of cracking.
- If there are areas where **Tektoterm** is extremely friable and with little binders, αυτό this may be caused by the plastering machine which may be almost empty or by a plastering machine that is not completely suitable. It is really important that the plastering machine is capable of transporting **Tektoterm** to the mixing chamber without breaking the material up. It is also important, that the machine is always filled with material and not to get completely emptied before adding the next bag of **Tektoterm**.
- To prevent the appearance of friable and flimsy areas, you must ensure that you keep a clean and empty container next to the nozzle of the machine during the start of every stage of application, to check the material until it reaches the optimal quantity of water and the required cohesion. The collected material in the container is not suitable for application, as it must be enriched with cement until it reaches the appropriate cohesion and it must be applied only as a second layer. For this reason it is recommended to start the application in a container, holding the nozzle close and collect the material for check. Important: the collected material in that manner is not suitable for application. It must be enriched with cement until it reaches the

appropriate consistency and be applied mechanically, only this layer, on top of the first layer.

9. CHECKING THE EXECUTED APPLICATION THICKNESS

With the use of TEKTOTERM, when applied at the proper thickness, we can achieve almost any U-value

This manual gives some information on how to check the application and, in particular, suggests a simple method to measure the actual thickness of the plaster after its application.

Test zones or spots of the fully dried and applied plaster are selected, then are measured the thickness with a special probe (-pictures 13, 14, 15-), which, penetrating into the plaster, shows on a graded scale the measured coating thickness corresponding to the effectuated reading. If this special tool is not available, a common shop gage (gauge) will be also useful.

Important: all the instructions contained in this manual are approximate and not binding in a general sense. It should also be specified that our instructions are not irrespective of all due precautions and good practice during installation referable to so-called "workmanlike" execution, which must always and under any circumstances be adopted in addition to following the detailed instructions given in our technical data sheets. Our Engineering Department is at the disposal of the customer to provide any specific detailed clarification he may require.

FOR ANY DOUBT OR INFORMATION FOR THE UTILIZATION AND APPLICATION OF PROTHERM LIGHT PLASTER, WE RECOMMEND CONTACTING TEKTO HELLAS' TECHNICAL DEPARTMENT.