

TECHNICAL SHEET 00.01.16-ENG

FAÇADE THERMAL INSULATION SYSTEM



JUBIZOL Strong

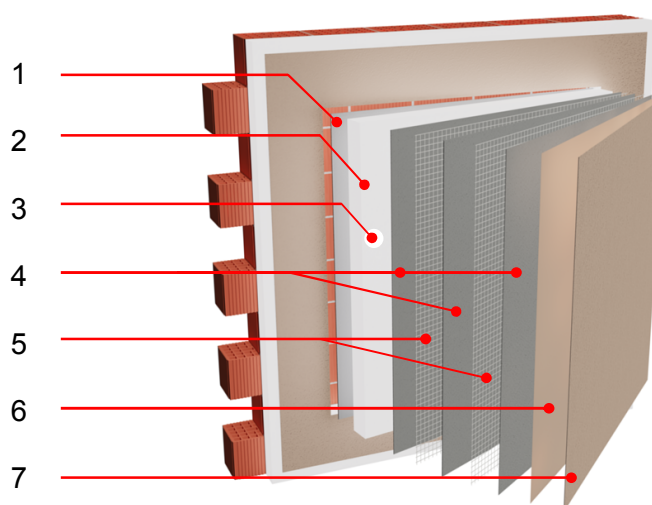
1. Description, Application

JUBIZOL Strong façade thermal insulation system is intended for thermal protection of new and thermal restoration of the existing up to 22 m high residential, commercial and other buildings with required improved resistance to damages caused by hail, vandalism, different animals as well as to damages caused by extreme thermal expansions and contractions. It is suitable for all types of massive surfaces. The system is suitable for demanding exploitation conditions.

2. Technical Data

Response to fire SIST EN 13501-1	B – s1, d0 ($d_{\max} \leq 300$ mm)
Water absorption W_{24} ETAG 04 (water absorption after 24 hours $< 0.5\text{kg/m}^2$)	It meets the requirements
Hygrothermal behaviour ETAG 04	Resistant to hygrothermal cycles
Freezing/thawing ETAG 04 (water absorption after 24 hours $< 0.5\text{kg/m}^2$)	Resistant to freezing / thawing
Resistance to blows ETAG 04	JUBIZOL Strong fix + UNIXIL G: class I JUBIZOL Strong fix + SNG and SNZ: class I

3. Components



No.	Structure	Product	Thickness	Consumption	Drying time (T=+20°C RH=65%)
1.	Adhesive	JUBIZOL Strong fix	0.5 – 1.5 cm	3.5 – 5.0 kg/m ²	2 – 3 days
2.	Thermal insulation lining	JUBIZOL EPS F W0 (white without switch)*	According to construction – physical calculation – JUBIZOL ENGINEERING	~ 1.05 m ² /m ²	/
3.	Anchors	Two-part plastic nail-in anchors ***	/	According to calculation - JUBIZOL ENGINEERING	/
4.	Undercoat	JUBIZOL Strong fix	~ 6.0 mm	~7.0 kg/m ²	6 days
5.	Reinforcement mesh	2 x JUBIZOL facade mesh at least 160 g/m ²	/	2.2 m ² /m ²	/
6.	Primer	UNIGRUND – (shade as close as possible to the render colour)	~0.1 mm	~150 g/m ²	1 day
7.	Finishing coat	UNIXIL G 1.5 mm**	~1.5 mm	~2.5 kg/m ²	/
		UNIXIL G 2.0 mm**	~2.0 mm	~3.1 kg/m ²	/
		SILICONE SMOOTH RENDER 1.5 mm	~1.5 mm	~2.4 kg/m ²	/
		SILICONE SMOOTH RENDER 2.0 mm	~2.0 mm	~3.0 kg/m ²	/
		SILICONE TROWELLED RENDER 2.0 mm	~2.0 mm	~2.8 kg/m ²	/

* (boards made of expanded polystyrene JUBIZOL EPS F-W0 (white without switch) of thickness 50 to 300 mm should satisfy at least the following requirements: EPS-EN 13163-L2-W2-T2-S2-P4-DS(N)2-DS(70,-)1- TR150-BS115-CS(10)70

** UNIXIL G 1.5 mm and UNIXIL G 2.0 mm can be ordered also in the in the COOL version (10 shades from the PAINTS AND RENDERERS colour chart, available upon previous order – tinting is possible only at JUB d.o.o., Dol pri Ljubljani). Tinting agents for those shades contain special - IR repellent pigments; for this reason, on sun exposed facade surfaces they get less warm than renders of the same colour shades for which standard tinting agents were used.

Informative presentation of colour shades available in the COOL version



*** Below is the list of two-part plastic nail-in anchors which can be used in the JUBIZOL Strong system

Manufacturer of anchors:	LESKOVEC:	EJOT:	HILTI:
Type of anchor	fixing anchor PP	ejotherm ST U	SX-FV
	plastic fixing PSK	ejotherm STR-U in STR U 2G	SD-FV 8
	fixing anchor PPV	SDM-T plus in SDF-K plus	D-FV
	/	ejotherm NTK-U, NT-U in NK-U	D-FV T
	/	ejotherm H1 Eco	XI-FV
Manufacturer of anchors:	FISHER:	RANIT:	WKRET-MET:
Type of anchor	TERMOZ 8 N	Isofix NDT8LZ, ND8LZ in ND8LZ K	LFN-8
	TERMOZ 8 U	Isofix NDS8Z, NDM8Z, NDS90Z in NDM90Z	LFM-8
	TERMOZ KS 8	isofix	LTX-10
	/	/	LMX-10

4. Application Steps for JUBIZOL Strong Thermal Insulation System

Works that must be completed on a building before insulation works on facade are started.

Technically correct application of the JUBIZOL Strong system is possible on a building only after facade walls are at least a month old, or if levelling renders were coarsely levelled with lime-cement mortar in the case of serious deviations from the vertical, then they have to be at least a month too.

Installation of the ETICS system begins only after all works on the roof of a building are finished including the covering and all roofing and roof-plumbing works (drip edge flashings and other roof drip edges, eaves gutter and rainwater downpipes), installation of all window and door frames on the facade of the building, installation of window sills made of natural or artificial stone (except in cases where window and door frames are installed on the outer edge of facade walls), assembly of all installations that are envisaged on the facade, junction and other boxes (electricity, telephone, door phone, cable TV, safety devices and security cameras), elements used for fastening wall lights, name-plates, flag holders, and similar. Inside a building, major wet masonry works (renders, cement screed, concrete floorings and similar) must be finished.

5. Preparation of Surface for Fixing Insulation Boards

Boards made of expanded polystyrene (EPS) are the most frequently used insulation lining in the ETICS system, as their application is fast and simple. Adequate thickness of thermal insulation lining is determined according to customer preferences and based on regulations on allowed losses through facade walls of buildings. Such regulations are not unified across the EU countries.

Insulation boards made of expanded polystyrene can be fixed with JUBIZOL Strong fix onto surface, which is solid enough, dry and clean. The surface should be level – when checking the levelness with a 3-metre long batten, a slit between the control batten and the wall surface should not exceed 10 mm. Larger uneven parts are levelled by plastering and not by a thicker application of the adhesive.

Primers are not applied on clean brick wall surfaces before insulation lining is fixed. However, as far as other types of construction surfaces are concerned, such coats are obligatory. Water-diluted AKRIL EMULSION (AKRIL EMULSION : water = 1 : 1) is used for suitably rough and normally absorbent surfaces. Primers are applied with a suitable brush, a long-bristle painting roller or they are sprayed. Fixing of insulation lining may begin approximately 2 to 3 hours after priming.



Plastered façade walls make a suitable surface for fixing insulation lining only if renders are well-adhered to the wall surface. Otherwise, they are removed completely or processed appropriately and mended. In normal conditions ($T = +20^{\circ}\text{C}$, relative air humidity = 65 %), the newly applied renders should dry or mature for at least 1 day for each mm of their thickness. It is obligatory to disinfect and clean surfaces infected with wall mould or algae prior to fixing. Concrete surfaces are cleaned with hot water or steam. Prior to fixing, all badly-adhered and non-adhered decorative coats and slurries are removed from the surface.

Approximate consumption of the primer for fairly absorbent finely rough plastered wall surfaces:	
AKRIL EMULSION	90 – 100 g/m ²

6. Fixing EPS Insulation Boards

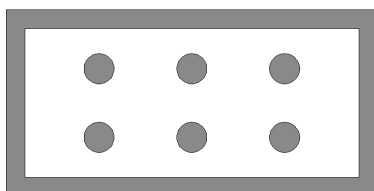
Support to the first row of insulation boards is usually the edge of the foundation on the bottom concrete slab of the building. If there is no such support on the wall surface or if insulation lining is fixed only onto a part of the wall, the lower row of boards is laid onto a special metal JUBIZOL trim that is fixed onto the surface in the horizontal position.

Width of the trim corresponds to the thickness of insulation lining. The base trim protects the lower edge of the insulation system against damages and enables the fixing of the lower row of insulation boards in a horizontal position as ideally as possible as well the formation of a suitable drip edge.

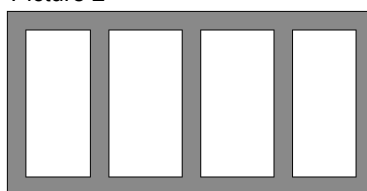
In exceptional cases, a subsidiary wooden batten can offer temporary support to the first row of insulation boards. The batten is mounted at the height of the bottom edge of facade lining and is removed prior to the application of the base coat. In this case, the lower edge of insulation lining is protected with a strip of JUBIZOL glass fibre mesh in width of 30 to 50 cm. It is fixed onto the wall surface above the batten and the remaining part is rolled up around the lower edge of the first row of insulation boards after the batten is removed. Then it is imprinted into the coat of adhesive mortar that has been applied beforehand. The lower edge of insulation lining is protected with adhesive mortar. At the end, the JUBIZOL drip profile is fixed onto the batten.

Adhesive compound is applied on one side – the back side of boards – with a stainless painting trowel or a plastering trowel in continuous bands at the edge of boards and additionally on 4 to 6 spots or in two stripes in the middle (in the case of fixing of insulation lining onto ideally level surfaces, the compound may be applied with a notched stainless steel smoothing trowel – width and depth of notches 8 to 10 mm – evenly across the entire surface of boards). If the compound is applied by a machine, it can be applied diagonally as shown on Picture 3 below. The quantity of the applied adhesive should be such so as to spread across at least 40 % of the surface of boards when they are pressed onto the surface.

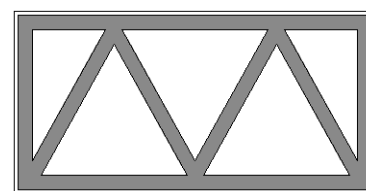
Picture 1



Picture 2

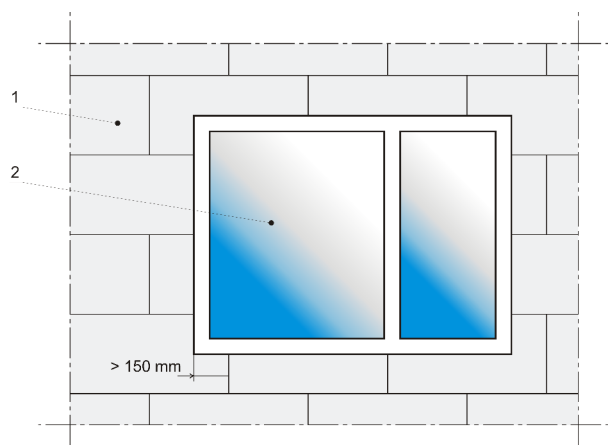
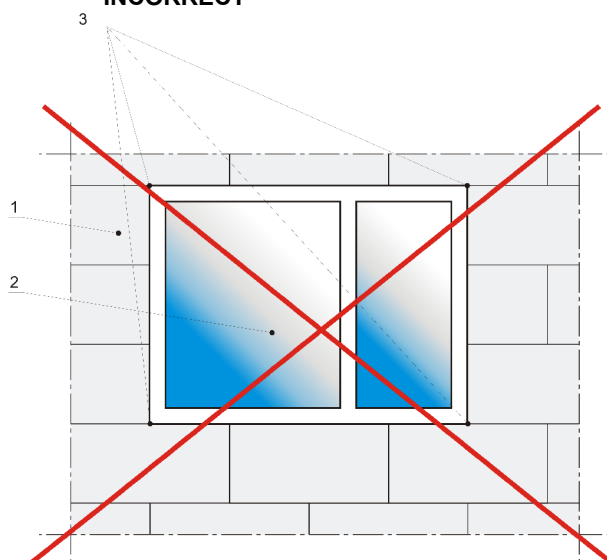


Picture 3



Boards are fixed closely together so that the adhesive does not dribble into joints. Throughout fixing, straightness of the outer surface of the lining is checked with a suitably long lath. Boards on adjacent rows are indented in accordance with brick connection rules with the indent of vertical joints being at least 15 cm. Brick connection rules are also complied with as far as corners are concerned, where boards of one wall surface should stretch over the outer surface of the lining of the neighbouring wall surface by at least a few centimetres and perform the so called crossing in the corner. Excess part of boards is cut off in corners in a straight line, but only 2 to 3 days after fixing. Any clearances and crevices are filled with pieces of EPS insulation of suitable size that can also be wedge-shaped if necessary or with polyurethane foam.



CORRECT**INCORRECT**

1- INSULATION LINING

2 - WINDOW

3 - CONTACTS OF INSULATION BOARDS IN CORNERS OF INSULATION OPENINGS ARE NOT ALLOWED

Works are performed only in suitable weather or microclimate conditions: the temperature of the air and the wall surface should be between +5°C and +35°C and the relative air humidity should not exceed 80 %. Façade surfaces are protected from sun, wind and rainfall by protective scaffold nettings; however, do not conduct any work in rain, fog or strong wind (≥ 30 km/h) despite such protection.

NOTE:

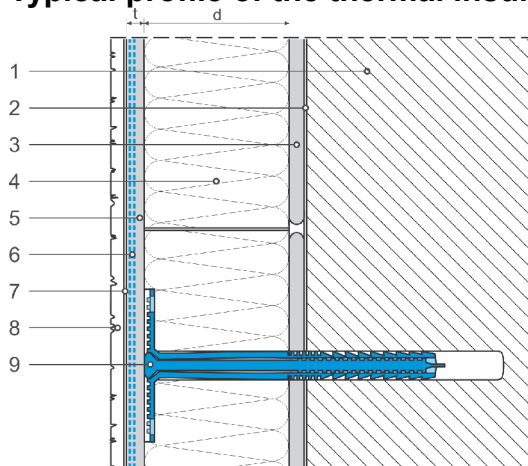
The treatment of plinths and parts of buildings built in the ground is dealt with in the special systemic technical sheet.

7. Preparation of Insulation Lining Surface for Application of Base Coat

Any uneven parts of the insulation lining are sanded (sandpaper no. 16) two to three days after the fixing of insulation boards. If deep anchors are used for fixing thermal insulation system, sanding is performed after anchoring.

8. Additional Attachment of Insulation Boards

Additional attachment of insulation boards is carried out when the adhesive dries completely. Number of anchors is calculated by using the JUBIZOL ENGINEERING program, which is available on the web site www.jub.eu.

Typical profile of the thermal insulation system

- 1 Facade wall
- 2 Primer (where necessary)
- 3 JUBIZOL Strong fix
- 4 EPS insulation lining (JUBIZOL EPS F-W0 – white without switch)
- 5 JUBIZOL Strong fix
- 6 2 x JUBIZOL facade mesh at least 160 g/m²
- 7 UNIGRUND
- 8 UNIXIL G 1.5 mm, 2.0 mm or SILICONE SMOOTH RENDER 1.5 mm, 2.0 mm or SILICONE TROWELLED RENDER 2.0 mm
- 9 Two-part plastic nail-in anchors



You will find the following on the web site www.jub.eu: details of the contact of façade with floors, details of façade with window and door frames, details regarding fastening of name plates, details about façade dilatation, etc.

9. Reinforcement of Corner and Reveal Edges, Installation of Dilatation Profiles, Additional Diagonal Reinforcement of Corners of Facade Openings, Double Reinforcement.

Prior to the installation of the base coat on the EPS insulation lining, but no sooner than 2 to 3 days after fixing insulation boards, all additional reinforcements and reinforcements of corner and reveal edges of the building are performed and all the necessary dilatation profiles are installed. Profiles with the mesh are imprinted into a coat of adhesive mortar in thickness of approximately 2 mm that has been applied beforehand using a notched smoothing trowel. When applying adhesive mortar, at least 5 cm more of it has to be applied than the size of the glass fibre mesh on individual profiles.

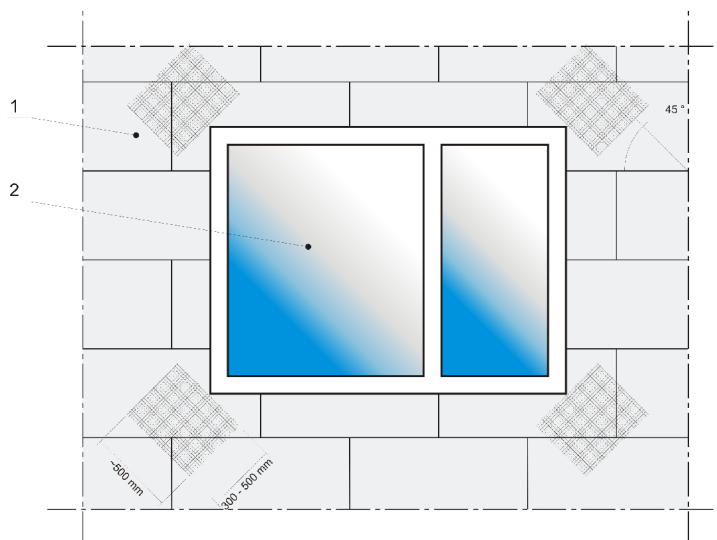
Corner and reveal edges as well as corners are reinforced with corner fittings made of perforated and alkaline protected aluminium steel or hard plastics. They are fixed onto stripes of vinyl-covered glass fibre mesh in width of at least 20 cm. Corner fittings are fixed onto insulation lining with a coat of adhesive mortar that is applied beforehand with a notched smoothing trowel in a stripe in width of approximately 10 cm and in thickness of approximately 2 mm onto one and the other side of a corner edge that is being reinforced. While doing this, corner fittings and the mesh are imprinted well into the adhesive mortar.

In places where the EPS insulation lining is interrupted due to construction dilatation joints and in contacts with existing objects, special dilatation profiles are installed.

The most quality manner of separating the base and the finishing coat from window and door frames is by a special dilatation profile (JUBIZOL REVEAL PROFILE) made of hard plastics that is installed before insulation boards are fixed. Protective silicone paper is removed from the self-sealing band on the side surface of the profile which is then fixed onto the cleaned window or door frame. Adhesive tape on the outer surface of that branch of the profile that is detached after the installation of the finishing coat serves to attach the protective foil that is used to protect window or door frames as well as glazed surfaces against contamination and damages. The mesh of the reveal profile is imprinted into a thin coat of the adhesive mortar that is applied in adequate thickness onto the insulation lining at the window or door frame. The mesh can also be left free until the lower coat of the base coat is installed and is then imprinted into it, but before the main reinforcement mesh is imprinted

If the base coat has not been separated from window or door frames with special dilatation profiles – in the contact of frames with the render, - joints in width of approximately 2 to 3 mm are formed. After the finishing coat has been installed, joints are filled with a suitable permanently elastic mastic, e.g. JUBOFLEX MS. Joints are made in the form of letter V using a painting trowel while the render is still fresh. The contact of the base coat with stone shelves and other facade elements made of natural or artificial stone, wood, plastic and other materials is made in the same manner.

All corners and reveal edges are protected with reinforcing JUBIZOL corner fittings. It is obligatory to additionally diagonally reinforce corners of all facade openings (windows, doors) and also of those where various installation and other boxes are installed. Additional reinforcement includes pieces of JUBIZOL glass fibre mesh in size of 30 - 50 cm x 50 cm that are imprinted into a coat of adhesive mortar in thickness of approximately 2 mm that has been applied beforehand using a notched smoothing trowel. When applying adhesive mortar, at least 5 cm more of it has to be applied than the size of the glass fibre mesh. The mesh is rotated so that its threads form an angle of 45 ° with the horizontal or the vertical. The same additional reinforcement must also be performed at corners of all construction elements that "stick out" from facade surfaces or that "penetrate" through the facade. These works are also performed 2 to 3 days after fixing or before the base coat is applied.



- 1- INSULATION LINING
2 - WINDOW

IMPORTANT! There should nowhere be more than three meshes in one place at switches. This includes meshes of reveal edges, drip profiles, corner meshes and switches of the main reinforcement mesh.

Consumption of materials

Product	Consumption:
JUBIZOL reveal profile	ca. 1m/m1 of window or door frame
JUBIZOL mesh for additional diagonal reinforcement of façade openings	ca. 1 m ² / façade opening
JUBIZOL corner fitting	ca. 1m/m1 corner or reveal edge

10. Application of Adhesive Mortar into ETICS System Base Coat

Mortar compound is applied onto the insulation lining manually or by a machine in three coats. Thickness of the lower and middle coat on the lining made of expanded polystyrene is 2.5 mm and of the upper coat 1 mm (total thickness of the base coat is thus 6 mm). Immediately after the base coat has been applied, JUBIZOL vinyl-covered glass fibre mesh (160 g) is imprinted into the first and second layer, while each additional layer of adhesive mortar is applied only when the preceding layer hardens (in normal conditions this occurs after two to three days) and "levelled" as much as possible. After the surface has dried for a day for each millimetre of its thickness, the upper coat of the base coat in thickness of ~1 mm is applied. Then the façade surface is levelled and smoothed as much as possible. The final processing of façade may begin after 1 to 2 days.

Works are performed only in suitable weather or microclimate conditions: the temperature of the air and the wall surface should be between +5°C and +35°C and the relative air humidity should not exceed 80 %. Façade surfaces are protected from sun, wind and rainfall by protective scaffold nettings; however, do not conduct any work in rain, fog or strong wind (≥ 30 km/h) despite such protection.

11. Description and Applicability of Decorative Renders

Decorative renders provide the façade with aesthetic effect and also protect it against atmospheric influences.



Construction and physical characteristics of Jub's renders are in line with characteristics of base coats; decorative renders are of the right strength and adhesion as well as adequate water vapour permeability and good water repellence ($w < 0.5 \text{ kg/m}^2\text{h}^{0.5}$).

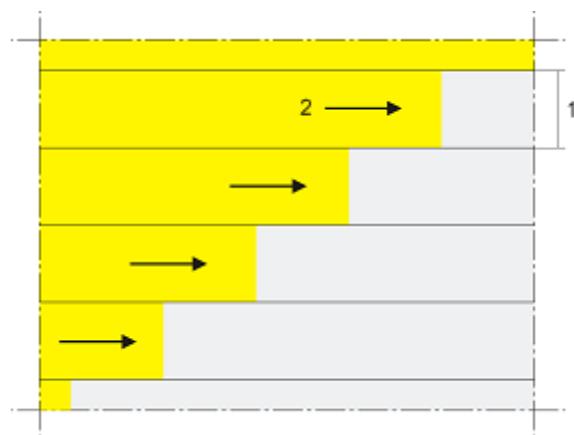
It is very important to select the correct shade. One has to be aware that the temperature difference on a facade between the winter and the summer period exceeds 50°C , and it is even higher in the case of darker shades. Suitable renders have the brightness of $y > 25$ (the only exception are 10 shades of UNIXIL G 1.5 mm and 10 shades of UNIXIL G 2.0 mm in the COOL version, for which during application in ETICS systems there are no limitations regarding their brightness (Y)). Information on the brightness of decorative renders is stated on the back of the PAINTS AND RENDERS colour chart.

Renders are installed and processed in accordance with the prescribed instructions (see suitable technical sheets) that also include all technical and other important data.

12. Application of the Finishing Coat

Presentation of delays of contractors on a facade:

The application begins on the top floor while "step shift" is performed on the lower ones.



1 - FLOOR

2 - DIRECTION OF APPLICATION

In the case of **smooth renders**, mortar compound is applied manually – using a stainless steel smoothing trowel – or by spraying – in thickness slightly above the diameter of the thickest sand grain. When applying the render by spraying, instructions of the producer of the mechanical equipment should be followed. Immediately after the application, the surface is smoothed with a solid plastic smoothing trowel. Smoothing should be performed by circular strokes until an evenly grained structure is achieved. Grains in the applied mortar coat should move as little as possible during smoothing. Pushing of the mortar compound in the form of a wave in front of the trowel is not admitted. In most cases, the creation of such a wave can be attributed to over-thickness of the application or to the substrate not being prepared well or it being uneven. At the end – a few minutes after smoothing - mortar lumps sticking out of the render surface are pushed into the surface by smoothing the surface slightly using a clean stainless steel smoothing trowel.

In the case of **trowelled renders**, mortar compound is applied manually – using a stainless steel smoothing trowel – or by spraying – in thickness equivalent to the diameter of the thickest sand grain. When applying the render by spraying, instructions of the producer of the mechanical equipment should be followed. A few minutes after the application (the optimum time is set in relation to the absorption of the surface and microclimate conditions), the surface is trowelled by “rolling” the structural grains with a solid plastic finishing trowel across the wall surface so that they evenly furrow the application. The application is trowelled horizontally, vertically or circularly. At the end – a few minutes after trowelling – the protruding lumps are pushed into the surface by smoothing the surface slightly using a clean stainless steel smoothing trowel.

In the case of **trowelled and smoothed renders** the application should be performed as quickly as possible – without any interruptions from one corner of the wall to the other. When applying the render onto wall surfaces higher than one floor, it must be applied simultaneously to all floors: in such cases, the application always begins on the top floor, while a

phase-delayed “step shift” is performed on lower floors. Larger wall surfaces should be divided into smaller sections by using adequately wide decorative grooves, mortar trims and other decorations, frames or in any other way. Thus potential problems caused by continuous application of the render as well as the non-aesthetic appearance caused by a potentially uneven surface are avoided. Joints of surfaces in inner or outer corners can be done more easily by the performance of finely smoothed stripes which are a few cm wide and which also give a pleasant decorative appearance to processed surfaces. Decorative smoothed stripes, grooves, mortar trims, frames and similar are made prior to the application of the decorative render. Protect them with suitable wall paints, while paying attention not to apply coatings in an uncontrolled manner over their edges onto surfaces prepared for the application of the render.

In the case of **all finishing coats**, the application is possible only in suitable weather or microclimatic conditions: air and wall surface temperature should be between +5 °C and +35 °C. In no case should relative air humidity exceed 80 %. Protect façade surfaces from sun, wind and rainfall using protective scaffold nettings; however, do not conduct any work in rain, fog or strong wind (≥ 30 km/h) despite such protection.

In normal conditions ($T = +20$ °C, relative air humidity = 65 %), resistance of freshly processed surfaces to damage caused by drainage water (washing away of the application) is achieved within 24 hours at the latest.

13. Maintenance and Restoration of Painted Surfaces

Cleaning of facade surfaces

The non-adhering dust and other non-adhering filth can be swept, hoovered or washed away with water. Adhering dust and more obstinate stains can be removed by light rubbing using a soft brush soaked into a solution of usual universal household preparations and washed away by clean water.

Maintenance or restoration painting

Maintenance or restoration painting should be performed on surfaces that cannot be cleaned of filth and stains by following the method described above. Restoration painting is required every 15 years in order to maintain water repellency and other functional characteristics of the system. However, if infection with wall algae and/or mould occurs on the facade, the restoration painting is performed sooner. It is usually carried out in the following manner:

First, facade surfaces are washed with a jet of water – it is best if it is hot – to remove as much of the adhered filth as possible – dust particles, soot, and similar. Facade surfaces infected with wall mould and algae are then disinfected with diluted ALGICID (ALGICID : water = 1 : 5), which is rubbed well into the surface in one or two coats.

Then a primer should be applied. In the case of hair-cracked facade surfaces, REVITALPRIMER is recommended, while water-diluted SILICONEPRIMER (SILICONEPRIMER: water = 1 : 1) or water-diluted JUKOLPRIMER (JUKOLPRIMER : water = 1 : 1) are recommended in all other cases. Water-diluted AKRIL EMULSION (AKRIL EMULSION : water = 1 : 1) is also recommended for facade surfaces that are not very and often exposed to precipitation.

A two-coat application of micro-reinforced facade paint REVITALCOLOR AG or micro-reinforced facade paint REVITALCOLOR SILIKON follows on preceding application of adequate primer. The paint is applied only when the primer is entirely dry, in normal conditions this occurs after 6 hours.

Restoration of damages and more demanding renovation works

In the following cases, immediate restoration intervention is needed in order to eliminate the following: when façade surfaces are damaged due to soaking or desalting; if finishing coat is cracked; if undercoat or finishing coat peels off; if we notice that façade surfaces are mechanically damaged and that damages extend to undercoat or even into thermal insulation lining; if sealants are damaged in joints of façade thermal insulation system with joinery and carpentry frames, installation boxes, borders. For instructions regarding restoration, contact JUB's technical information service.

14. Construction Physics

Water vapour permeability of the system:	on EPS: $s_d < 2$ m
Capillary water absorption of the system:	$w < 0.5$ kg/m ² /24h



The universal thermal insulation system JUBIZOL Strong is conceived so that it enables correct flow of water vapour through the construction. The system fully meets the criteria of the European technical guidelines for ETICS - ETAG 004 (March 2000).

Instructions for calculation of construction physical parameters of the façade system and the data about the components built into it required for calculation can be found on the web site www.jub.eu.


16. Safety at Work

Apart from general instructions and regulations for construction or plastering and painting works, individual technical sheets and packaging should be considered for the preparation of products.

17. Quality Control

The product's quality characteristics are determined by the internal manufacturing specifications as well as by the Slovene, European and other standards. JUB ensures the achieving of the declared or set quality level by the ISO 9001 system for total quality management and control, which has been implemented at JUB for many years and which comprises daily quality checks in our own laboratories, occasionally at the ZAG Construction Institute in Ljubljana and other independent expert institutions in Slovenia and abroad. During the manufacturing process, JUB strictly complies with the Slovene and European standards for the protection of the environment and for ensuring security and health at work, which has been confirmed by the ISO 14001 and OHSAS 18001 certificates.

The adequacy of materials fitted into the JUBIZOL Strong ETICS system has been approved by the European Technical Approvals (ETA) – in accordance with the ETAG 004/2000 guidelines, the testing was performed at the ZAG Construction Institute in Ljubljana and at Magistratsabteilung 39 in Vienna.

JUBIZOL EPS FACADE
 1404
JUB d.o.o. 1262 Dol pri Ljubljani 28 SLOVENIA 10 1404-CPD-1606
ETA 09/0393 ETAG 004

18. Other Information

Technical instructions contained in this brochure are provided on the basis of JUB's experience and are given as a guideline to achieve the optimum results. JUB cannot accept any responsibility for damage caused by incorrect selection of a product, incorrect use or unprofessional work.

This technical sheet supplements and replaces all preceding editions. JUB reserves the right to change and supplement data in the future.

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The product is made by the holder of ISO 9001:2008, ISO 14001:2004 and OHSAS 18001:2007 certificates

