Cladding
Design and Installation Manual

Vers. 0/2020

LAPITEC

NOTE

The aim of this manual is to provide general instructions on the criteria for use of **Lapitec®** as a floor and wall covering, indoors and outdoors; applied using adhesives and cementitious grouts.

The information contained herein is the result of experience acquired by Lapitec SpA and the technical knowledge available at the time of publication. Users are therefore invited to refer to the most up-to-date version, which is always available for download at www.lapitec.com in the download area.

The assessment of fitness for use for a specific project and verification of compliance with the regulations in force in the country and context where the project will be developed, remain the responsibility of the authorised professional.

In regards to the above, Lapitec S.p.A. shall not be held liable for any damage that may result during the application of the information and suggestions contained in this technical manual, insofar as considered merely information and suggestions, which must always be verified beforehand by the user.

Moreover, Lapitec S.p.A. reserves the right to make technical changes of any type without any prior warning and without direct communication to any parties.

INDEX

1. LAPITEC® 7
   - 1.1/ CHARACTERISTICS 7
   - 1.2/ TECHNICAL DATA SHEET 8
2. DESIGN 11
   - 2.1/ INTRODUCTION 11
   - 2.2/ SELECTING THE SIZE AND THICKNESS 12
   - 2.3/ SAFETY OF USE 15
     - 2.3.1/ Safety systems: mesh and matting 17
   - 2.4/ CLEANABILITY 18
   - 2.5/ DESIGN CRITERIA 19
     - 2.5.1/ Gaps 19
     - 2.5.2/ Joints 20
     - 2.5.3/ Slopes 24
     - 2.5.4/ Edges, corners and skirting 25
   - 2.6/ GENERAL REQUIREMENTS OF SUBSTRATES 27
   - 2.7/ SPECIFIC REQUIREMENTS OF SUBSTRATES 29
     - 2.7.1/ Cement screeds 29
     - 2.7.2/ Lightweight screeds (anhydrite) 30
     - 2.7.3/ Heated screeds 30
     - 2.7.4/ Concrete poured in situ 31
     - 2.7.5/ Waterproofing 31
     - 2.7.6/ Dry substrates (backer boards) 32
     - 2.7.7/ Indoor drywalls 33
     - 2.7.8/ Indoor rendered walls 35
     - 2.7.9/ Outdoor rendered walls 36
     - 2.7.10/ Safety systems: anti-tip brackets 37
   - 2.8/ ADHESIVES 40
     - 2.8.1/ Selecting the adhesive 41
     - 2.8.2/ Partner manufacturers 44
   - 2.9/ GROUTS 49
     - 2.9.1/ Partner manufacturers 50
3. INSTALLATION 55
   - 3.1/ INSTALLATION STEPS 56
     - 3.1.1/ Measurements and checks 56
     - 3.1.2/ Storing the material 56
     - 3.1.3/ Checking essential requirements 57
     - 3.1.4/ Preparation and application of adhesives 57
     - 3.1.5/ Application of Lapitec® 59
     - 3.1.6/ Preparation and application of grouts 60
     - 3.1.7/ Cleaning 61

4. SPECIAL APPLICATIONS 63
4.1/ SWIMMING POOLS 63
4.2/ SHOWERS AND THERMAL AREAS 69
4.3/ TERRACES AND BALCONIES 73
4.4/ FIREPLACES AND STOVES 77
5. MANUAL PROCESSING 81
5.1/ INTRODUCTION 81
5.2/ SLAB RECOVERY 82
5.3/ MANUAL CUTTING 83
5.3.1/ Tools - blades for on-site cutting 84
5.4/ MANUAL DRILLING 85
5.4.1/ Tools - bits and hole saws for on-site drilling 86
5.5/ FINISHES 87
5.5.1/ Finish for top and edge - LUX 87
5.5.2/ Finish for top and edge - SATIN 87
5.6/ ASSEMBLY USING ADHESIVES 88
5.6.1/ Good practices for use of adhesives 88
5.6.2/ STRONGBOND Cartridge 89
5.6.3/ STRONGBOND A+B 89
5.6.4/ FROZENBOND A+B 89
5.6.5/ FIREBOND 90
5.6.6/ RAINBOW 90
5.7/ BIO-CARE 91
5.8/ REPAIR KIT 92
6. CLEANING, CARE AND MAINTENANCE 93
6.1/ ROUTINE CLEANING 93
6.2/ REGENERATIVE CLEANING 93
7. AFTER SALES 97
7.1/ LapitecLAB - Research centre 97
7.2/ LapitecACADEMY - Development centre 97
8. CREDITS 99

1. LAPITEC®

1.1/ CHARACTERISTICS

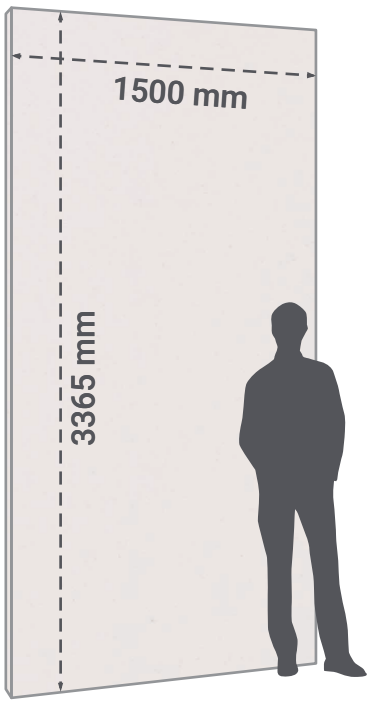
Lapitec® is a sintered stone, an innovative material produced in large slabs using an exclusively patented technology, which can be used for both indoor and outdoor applications.

Lapitec® sintered stone is resistant to wear, weather, UV exposure, heat, frost and absorption.

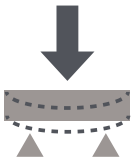
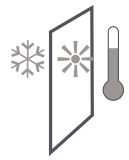
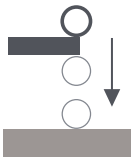
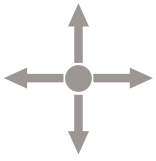
The different surface finishes of **Lapitec®** make it perfect for use on both floors and walls.

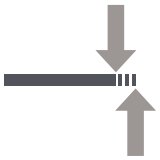
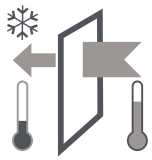
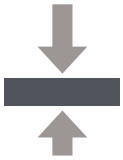
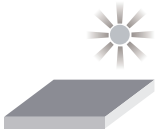
Lapitec® is compatible with a broad range of adhesives and binders, thus allowing it to be installed on various types of supports; it can be used without limits in different environments, including those that are particularly harsh (humidity, salinity, presence of aggressive pollutants...).

Standard dimensions



1.2/ TECHNICAL DATA SHEET

TECHNICAL SPECIFICATIONS		STANDARD	VALUE
	Standard dimensions	EN 14617-16	3365x1500 (12-20 mm) 3365x1460 (30 mm)
	Thicknesses	EN 14617-16	12 – 20 – 30 mm
	Density	EN 14617-1	2,4 kg/dm^3
	Water absorption	EN 14617-1	0.02%
	Flexural strength (R_{tf}) after 25 freeze-thaw cycles (R_{Mf}) after 20 thermal shock cycles (R_{sf})	EN 14617-2	55 N/mm^2 54.1 N/mm^2 54.3 N/mm^2
	Deep abrasion resistance	EN 14617-4	140 mm^3
	Frost resistance	EN 14617-5	Resistant
	Coefficient of thermal shock resistance (after 20 cycles)	EN 14617-6	0.9%
	Impact resistance	EN 14617-9	1.97 Joule (thickness 12 mm) 3.3 Joule (thickness 20 mm)
	Acid and alkali resistance	EN 14617-10	C4 - Resistant
	Coefficient of linear thermal expansion	EN 14617-11	5.8 x 10^{-6} °C^{-1}

TECHNICAL SPECIFICATIONS		STANDARD	VALUE
	Dimensional stability	EN 14617-12	A
	Fire reaction	EN 13501-1	A1
	Thermal conductivity	EN ISO 10456	1,3 W /m · °K
	Specific heat capacity	EN ISO 10456	840 J/kgK
	Aqueous vapour diffusion resistance	EN ISO 10456	no value (dry) ∞ (wet)
	Non-slip properties	DIN 51130	R10 (Vesuvio, Lithos, Dune) R13 (Fossil, Arena)
	Compressive strength	ASTM C170	439 N/mm^2 (dry) 483 N/mm^2 (wet)
	Colour resistance to light	DIN 51094	No variation
	Water absorption - capillary	EN 1925	0,006 g/m^{2}s0,5

Lapitec® is a fireproof material, classified A1. When exposed to fire it does not ignite, does not release fumes and does not spread flames.

Violent thermal fluctuations such as direct exposure to a flame may cause the material to break.

2. DESIGN

2.1/ INTRODUCTION

The wide range of surface finishes by **Lapitec®** make it perfect for floor and wall coverings, indoors and outdoors.

The design must state the composing materials and sizes and consider all measures able to guarantee durability over time and safe use.

The initial assessments when selecting the most appropriate solution, must consider the conditions in which **Lapitec®** will be used in terms of use, position, accessibility and purpose:

- floor and/or wall
- indoor and/or outdoor
- private/public
- residential, commercial or industrial

Subsequently, it is necessary to consider the operating conditions to which **Lapitec®** will be exposed:

- exposure to weather
- exposure to pollutants or chemical substances
- thermal fluctuations
- traffic and intensity (light foot traffic, vehicular...)
- presence of water or other fluids on the surface
- continuous immersion in water or other fluids
- routine maintenance cleaning requirements

The foregoing assessments will determine design choices in relation to the thickness, size, finish and installation criteria of **Lapitec®**, which must satisfy the performance requirements (e.g. slip resistance, mechanical strength...).

2.2/ SELECTING THE SIZE AND THICKNESS

Lapitec® can be used in all sizes obtainable from the standard size; the choice of a particular size will depend on the type of use.

In general, there are no restrictions on the maximum size that can be used, however when a large size is used (side > 600 mm) a series of measures must be adopted to ensure safe use and guarantee durability.

In regards to the thickness, the following summary tables show the minimum values that can be used in various locations. In case of doubt regarding the suitability of a certain thickness, please consult the Lapitec SpA technical department.

LAPITEC FLOOR COVERING

Substrate		Application				
		Indoor			Outdoor	
		Residential	Public/ commercial	Industrial	Res pub/ comm Light foot traffic	Pub comm ind Vehicular traffic
Cement screed	with heating	12 mm	12-20 mm	not envisaged	not envisaged	not envisaged
	without heating	12 mm	12-20 mm	20-30 mm	12-20 mm	20-30 mm
Sulphate-based screed (anhydrite)	with heating	12 mm	12-20 mm	not envisaged	not envisaged	not envisaged
	without heating	12 mm	12-20 mm	not envisaged	not envisaged	not envisaged
Concrete	cast in situ	12 mm	12-20 mm	20-30 mm	12-20 mm	20-30 mm
	prefabricated	12 mm	12-20 mm	20-30 mm	12-20 mm	20-30 mm
Sound insulation layers		12 mm	12-20 mm	not envisaged	not envisaged	not envisaged
Preformed panels		12 mm	12-20 mm	not envisaged	not envisaged	not envisaged
Waterproofing	membrane in sheets	12 mm	12-20 mm	20-30 mm	12-20 mm	20-30 mm
	non-cementitious liquid products	12 mm	12-20 mm	20-30 mm	12-20 mm	20-30 mm
	cementitious liquid products	12 mm	12-20 mm	20-30 mm	12-20 mm	20-30 mm
Existing substrates with organic adhesive residue (carpeting...)		12 mm	12-20 mm	20-30 mm	not envisaged	not envisaged
Tiles/mosaic/ existing stone		12 mm	12-20 mm	20-30 mm	12-20 mm	20-30 mm
Existing parquet		12 mm	12-20 mm	not envisaged	not envisaged	not envisaged
Existing hard flooring		12 mm	12-20 mm	20-30 mm	not envisaged	not envisaged
Existing resin flooring		12 mm	12-20 mm	20-30 mm	not envisaged	not envisaged
Existing metal flooring		12 mm	12-20 mm	20-30 mm	12-20 mm	20-30 mm

Important note for floors

The thicknesses shown above have been determined based on the assumption that the substrates are constructed in compliance with specific regulations, thus guaranteeing the required rigidity and mechanical strength (compressive and flexural strength). In case of screeds, the standard used as a reference is EN 13813.

By way of example, the compressive strength of a screed should be at least 15 N/mm^2 in residential spaces and at least 25 N/mm^2 in commercial spaces.

LAPITEC WALL COVERING-INDOOR INSTALLATION

Substrate		Application			
		Indoor			Outdoor
		Residential	Public/ commercial	Industrial	Res pub comm ind
Lime/cement render	with heating	12 mm	12 mm	12 mm	not envisaged
	without heating	12 mm	12 mm	12 mm	12 mm
Gypsum/anhydrite render	with heating	not envisaged	not envisaged	not envisaged	not envisaged
	without heating	not envisaged	not envisaged	not envisaged	not envisaged
Concrete	cast in situ	12 mm	12 mm	12 mm	12 mm
	prefabricated	12 mm	12 mm	12 mm	12 mm
Tiles/mosaic/ existing stone		12 mm	12 mm	12 mm	not envisaged
Waterproofing	membrane in sheets	on request	on request	on request	on request
	non-cementitious liquid products	on request	on request	on request	on request
	cementitious liquid products	on request	on request	on request	on request
Cement/fibre cement-based panels		12 mm	12 mm	12 mm	12 mm
Wood panels		12 mm	12 mm	12 mm	not envisaged
Plasterboard sheets		12 mm	12 mm	12 mm	not envisaged
Existing metal surfaces		12 mm	12 mm	12 mm	on request
Thermal insulating/ soundproof panels		12 mm	12 mm	12 mm	not envisaged

Important note for walls

In the case of wall applications, in addition to complying with all the requirements for the installation of smaller sizes, the designer and installer must ensure full compliance with the required parameters for rigidity, mechanical resistance and dimensional stability of the substrate, and that the adhesive used for installation is specifically designed for use with large sizes. More information provided in the following chapters.

2.3/ SAFETY OF USE

Health and hygiene - emission of hazardous substances

Lapitec® does not release any harmful substances, therefore it can be used in any location, including healthcare and food processing facilities.

Fire and sources of heat

Lapitec® is a fireproof material, classified A1. When exposed to fire it does not ignite, does not release fumes and does not spread flames. Violent thermal fluctuations such as direct exposure to a flame may cause the material to break.

Chemical substances

Lapitec® is resistant to the actions of acids and bases thanks to its very low porosity (0.02% as per EN 14617-1) and is classified C4 (EN 14617-10).

Selecting the finish - slip resistance value

Lapitec® is produced with different surface finishes that guarantee different levels of slip resistance, thus making it suitable for application in various locations.

Following are details of the classification of the various **Lapitec®** finishes according to the different regulations. For more information see the product and technical data sheets.

FINISH	DIN 51130	DIN 51097	UNI EN 14231 USRV**
Lux	N.C.	N.C. (3,9°)	-
Satin	N.C.	N.C. (11°)	38 dry; 22 wet
Vesuvio	R10	A+B+C (24°)	49 dry; 30 wet
Lithos	R10	A+B (19°)	42 wet
Dune	R10	A+B (20°)	37 wet
Arena*	R13	A+B+C (>24°)	66 wet
Fossil*	R13	A+B+C (>35°)	81 dry; 64 wet

*Considering the non-slip properties of surfaces with a slip rating R ≥ 12, these should only be applied in fields of use where high-pressure water cleaning is possible.

**Slip resistance value

DIN 51130

Slip rating with reference primarily to commercial and industrial environments.

Key

N.C.: not classified; applications with slopes <6°

R9: Entranceways and stairs with access from outside, shops, hospitals, schools, restaurants and canteens; applications with slopes between 6° and ≤10°

R10: Public bathrooms and showers, catering businesses, garages and basements; applications with slopes between 10° and ≤19°

R11: Catering businesses, work environments with a strong presence of water and mud, laboratories, laundries; applications with slopes between 19° and ≤27°

R12: Catering businesses (industrial kitchens); food industry (oils, grease, dairy products and their derivatives; industrial processing involving the use of slippery substances, car parks; applications with slopes between 27° and ≤35°

R13: Food industry with heavy presence of grease; applications with slopes ≥35°

DIN 51097

Specific test for environments with bare foot traffic.

Key

N.C.: Not classified; applications with slopes <12°

A: Change rooms, areas with bare foot access between 12° and ≤18°

B (A+B): Public showers, poolsides; applications with slopes between 18° and ≤24°

C (A+B+C): Immersed poolsides, submerged stairs, wash tanks, environments with stagnant water; applications with slopes ≥24°

UNI EN 14231

Determination of slip resistance by means of the pendulum tester.

Key

0–24 Potentially slippery. Suitable for commercial environments

24–34 Limited resistance. Suitable for bathrooms and warehouses

35–64 Adequate. Suitable for exteriors and interiors, commercial areas and walkways including stairs

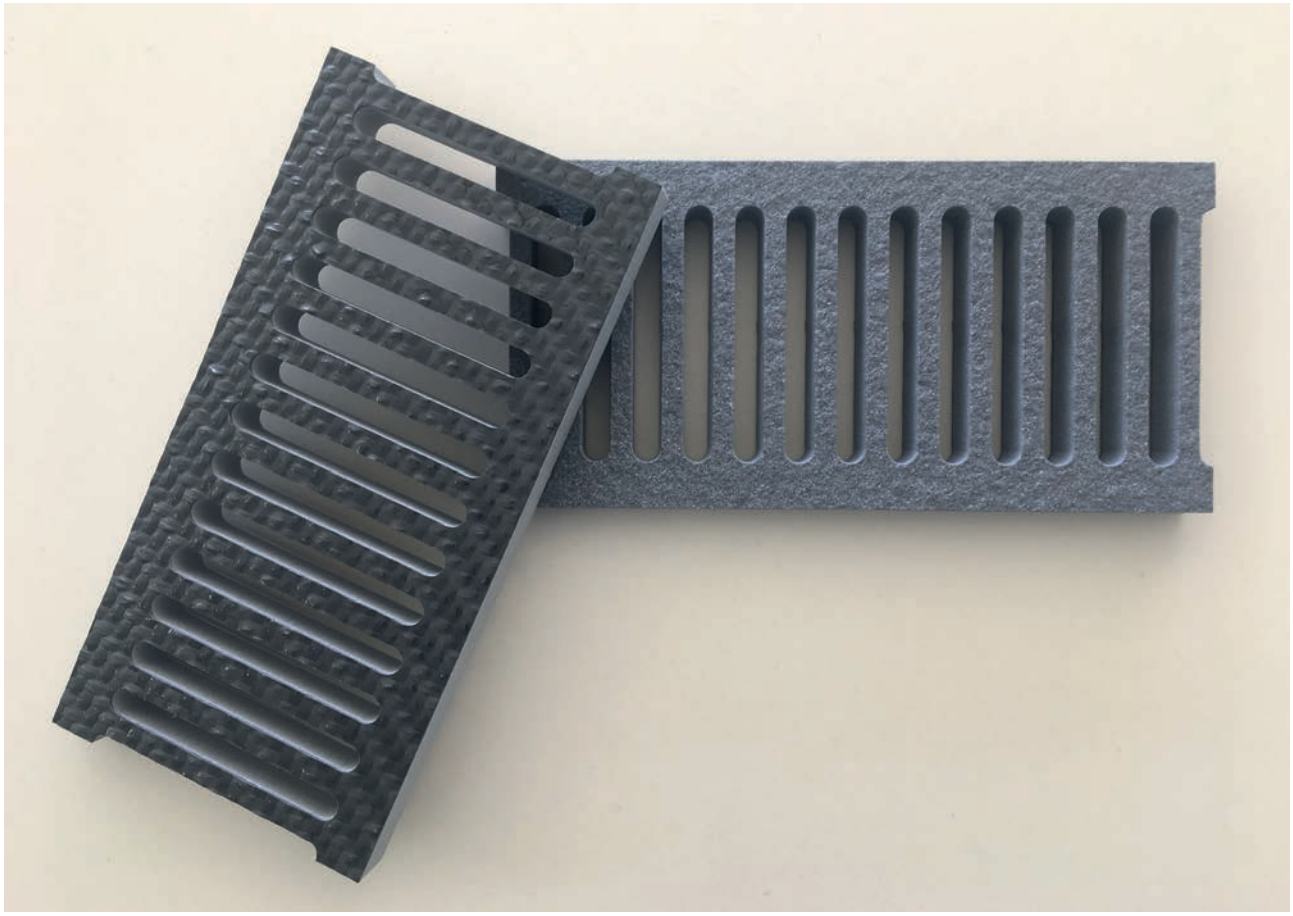
>65 Very resistant. Suitable for exteriors and slopes

2.3.1/ Safety systems: mesh and matting

The mechanical resistance and reaction to impact of **Lapitec®** can be modified through the use of reinforcement materials glued to the back side of the slabs.

The most commonly used material is matting, due to its mechanical resistance, and mesh to hold the slab together in the case of impact. This process is available on request. For applications requiring use of this system, please contact the Lapitec SpA technical department for an assessment of your requirements.

Attention: if materials are delivered with reinforcement systems applied to the back of the slabs, it is important to inform the adhesive supplier; not all products guarantee full compatibility with these systems in terms of adhesion.



2.4/ CLEANABILITY

The choice of a certain type of finish implies a careful evaluation also of the ease-of-cleaning during use. The different finishes will facilitate or otherwise cleaning operations. Generally speaking, smoother surfaces are preferable in cases requiring regular cleaning and the impossibility to use equipment (e.g. pressure cleaners, industrial cleaners...). **Lapitec®** can be exposed to most substances found in common environments, however certain products are particularly harsh and their removal from the surface of the slabs requires very deep cleaning cycles.

In the worst case scenario, the only solution is mechanical removal by way of abrasion with the subsequent repair of the surface treatment (Bio-Care).

As a guide, and strictly in the case of floor applications, a table is provided for the choice of finish based on the cleaning index of the surface. This index is attributed based on the context and therefore the ease-of-cleaning in the environment where **Lapitec®** is applied.

FINISH	Indoor flooring Residential	Indoor flooring Public	Indoor flooring Industrial	Outdoor flooring Residential	Outdoor flooring Public	Outdoor flooring Industrial
Lux	A	A	A	A	A	A
Satin	A	A	A	A	A	A
Vesuvio	B	B	B	B	B	B
Fossil	NP	NP	NP	C	C	C
Arena	NP	NP	NP	C	C	C
Lithos	B	B	B	B	B	B
Dune	B	B	B	B	B	B

A: Easy cleanability

B: Normal cleanability

C: Cleanability using cleaning equipment

NP: Not applicable

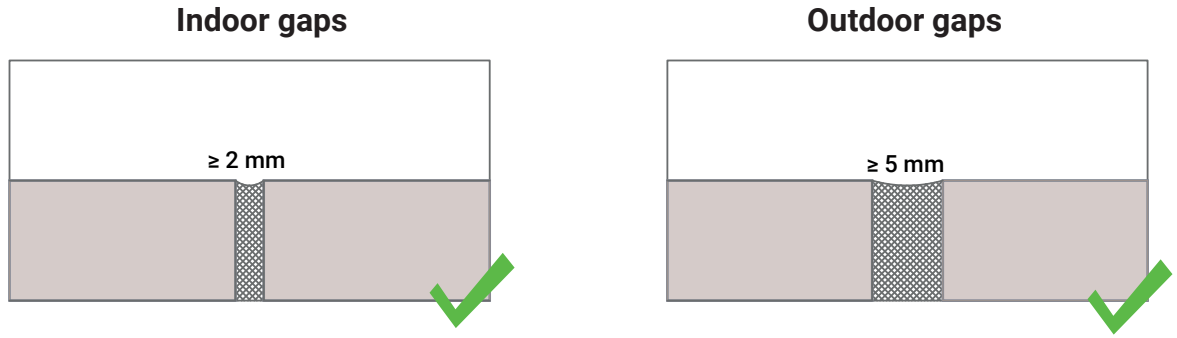
2.5/ DESIGN CRITERIA

Lapitec® can be designed with any composition layout (in-line gaps, staggered gaps, alternated gaps...). The design, in order to guarantee the durability and visual appeal of the covering must consider the layout of the gaps and joints (structural and control joints).

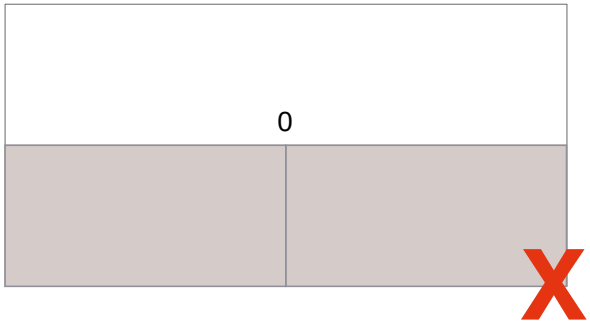
The substrates, regardless of their nature, are subject to deformation and flexure, which may be transferred to the surface covering and cause damage.

The slabs are calibrated and produced in compliance with design tolerances, however the alignment of slabs may highlight even the slightest dimensional difference and/or unevenness of the substrate. The designer must also bear in mind that the larger the size, the higher the risk of encountering the issues above.

2.5.1/ Gaps



Lapitec SpA recommends a minimum gap width of 2 mm (regardless of the type of substrate). “Gapless” installation is not allowed. For surfaces exposed to high thermal fluctuations (e.g. entrances connecting outdoor and indoor areas, near large windows...) the minimum recommended gap width is 3 mm. For outdoor installations, the minimum allowed gap width is 5 mm.

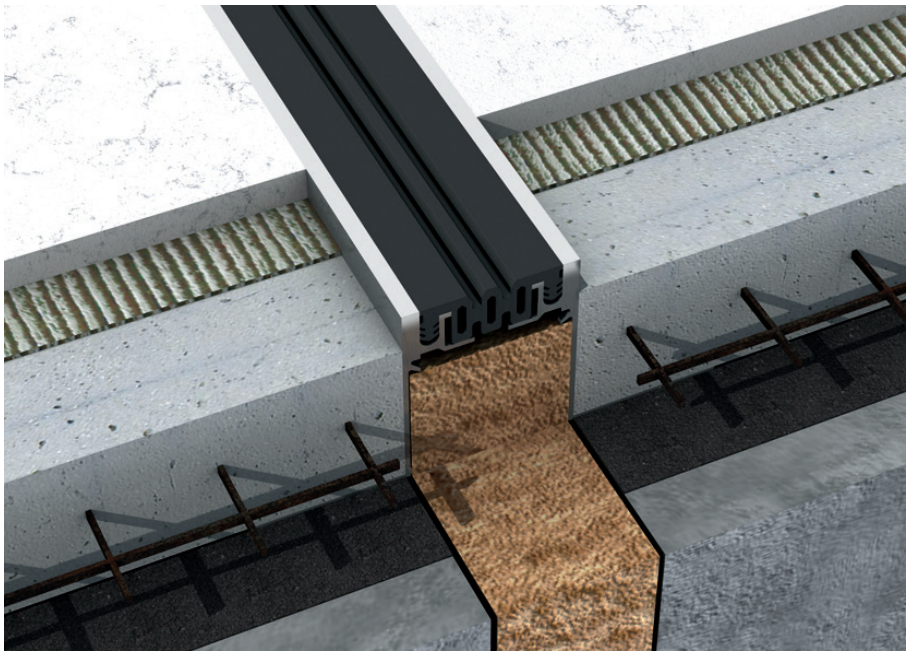


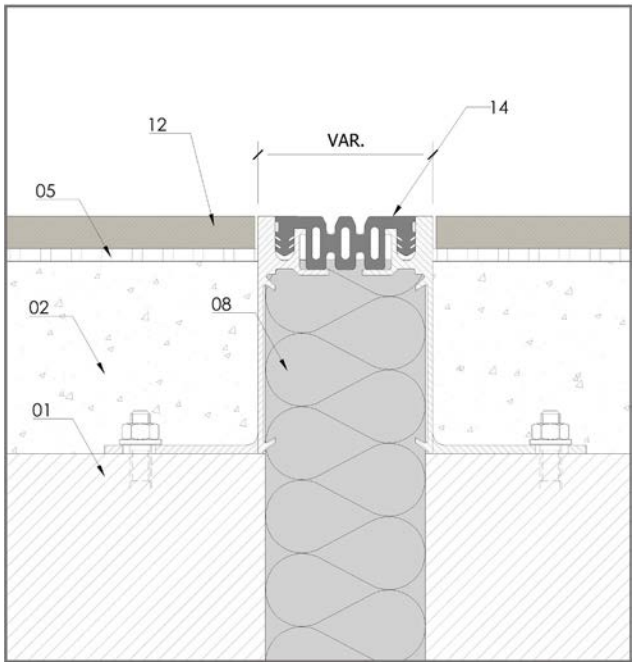
2.5.2/ Joints

Structural joints

Structural joints are constructive separation joints that subdivide buildings into segments, allowing independent expansions. Structural joints on **Lapitec®** coverings are made in correspondence with those of the structure, also making use of prefabricated elements. The dimensions will depend on those in the structure. The layout of the slabs is determined by taking into account the position of the joints so as to limit their number and facilitate their creation.

NOTE: installation on top of a structural joint is not allowed.





Key

01 Substrate
02 Screed
03 Levelling system
04 Membrane (e.g. waterproofing, vapour barrier...)
05 Adhesive
06 Reinforced slab
07 Cementitious grout
08 Insulating panel
09 Glass fibre mesh
10 Structure for plasterboard
11 Plasterboard sheets
12 Lapitec slab
13 Sheet metal closings
14 Joint

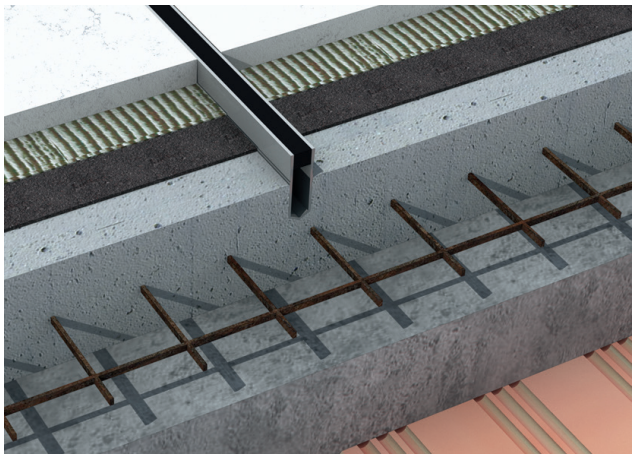
Control joints

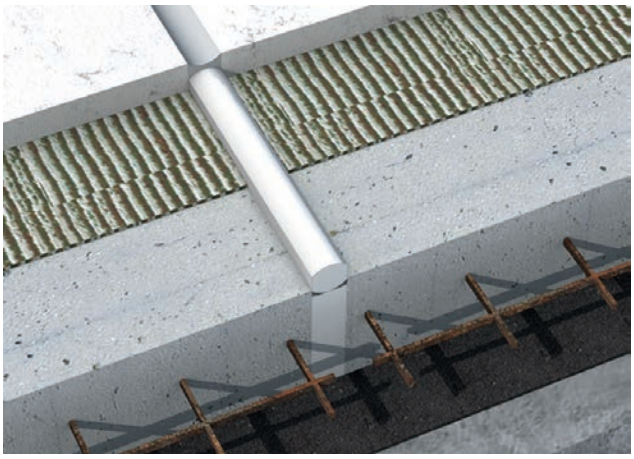
Control joints (on the surfaces and on part of the structure), are made by subdividing the surface of the covering in square or rectangular portions, the aim of which is to limit mechanical strain caused by the structural movements of the building or its components.

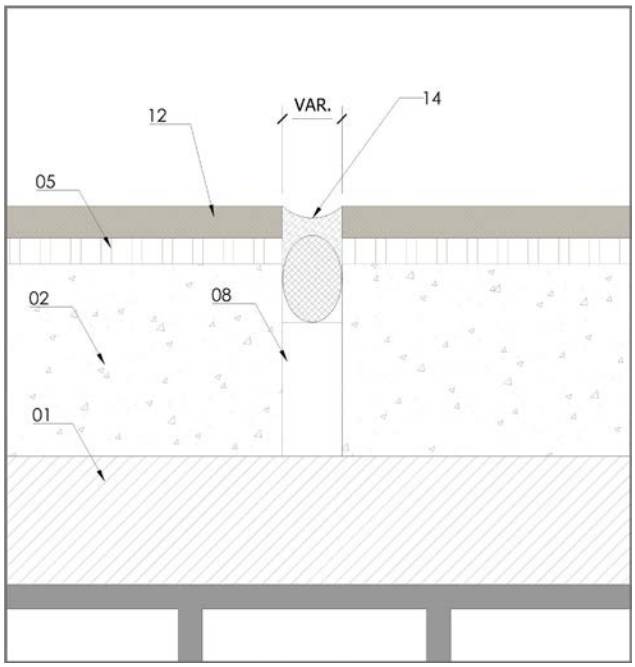
These portions have a maximum area of 25 m^2 in indoor spaces and 16 m^2 in outdoor spaces. If additional measures are adopted, such as the presence of desolidified screeds and the use of separating membranes, further to a specific design study, it may be possible to separate the surface into larger fractions.

The size of the joint will depend on the substrate and stresses (generally 5-10 mm). The areas will have sides with a maximum ratio of 1.5.

NOTE: installation on top of a control joint is not allowed.







Key

01 Substrate
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09 Glass fibre mesh
10 Structure for plasterboard
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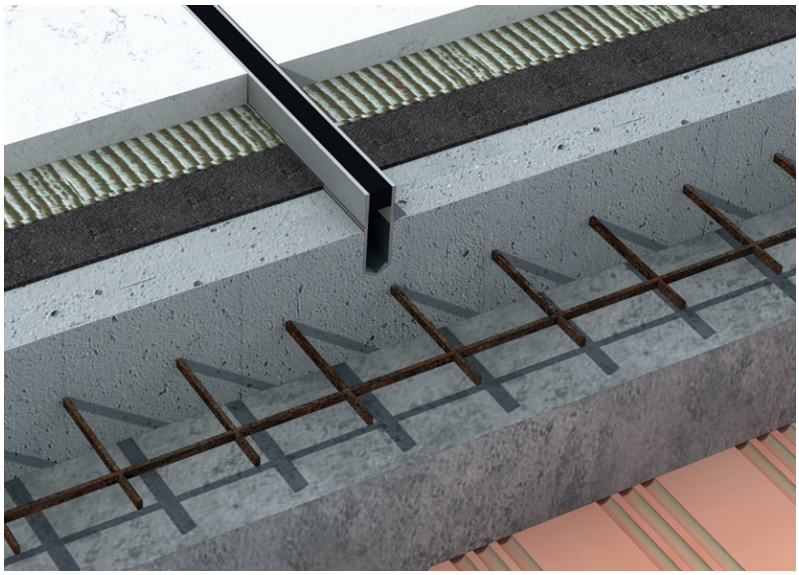
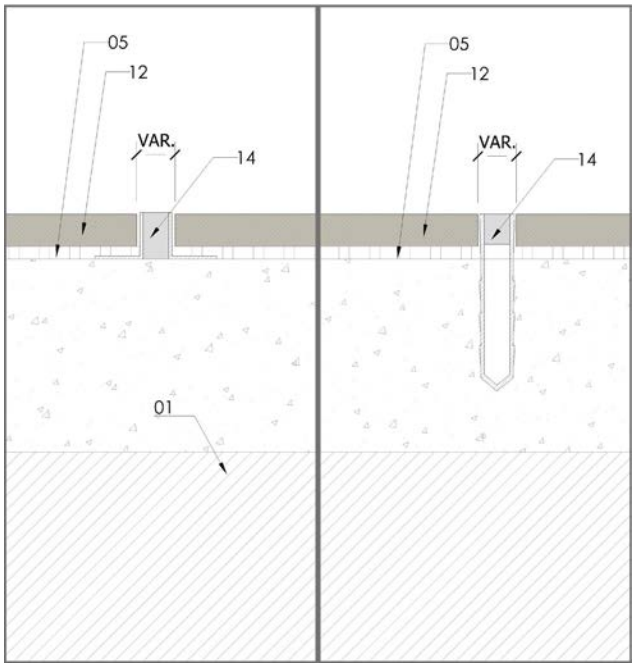
14 Joint

Expansion joints

Expansion joints have the same function as control joints but do not affect the structure. They will have the same positioning and smaller sizes: in general 3-5 mm.



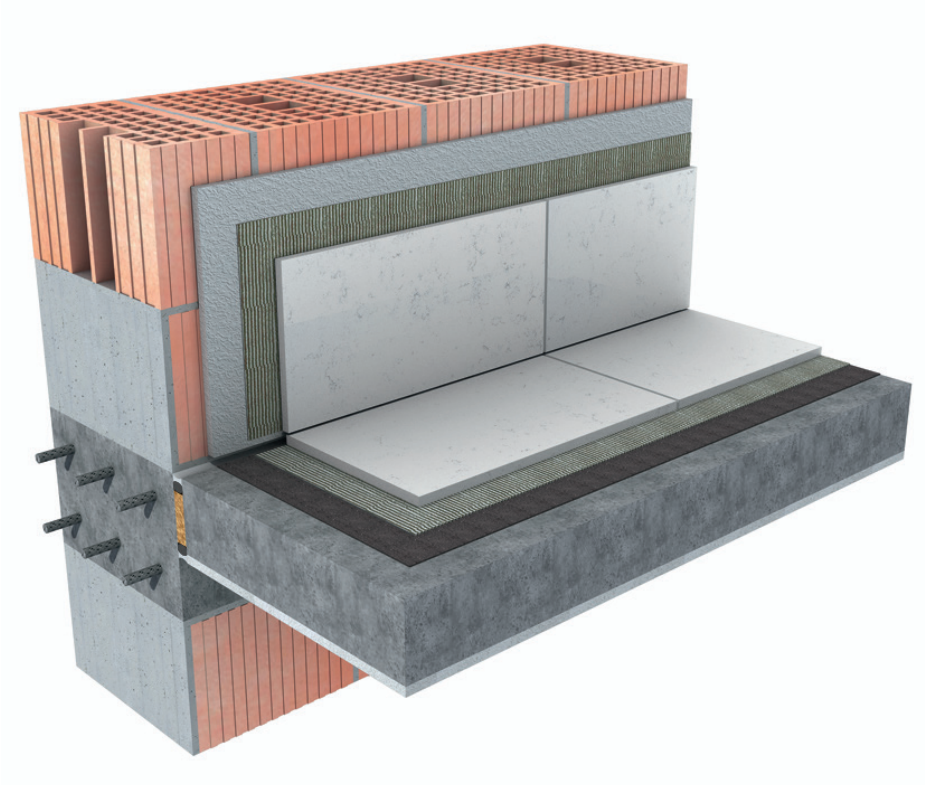


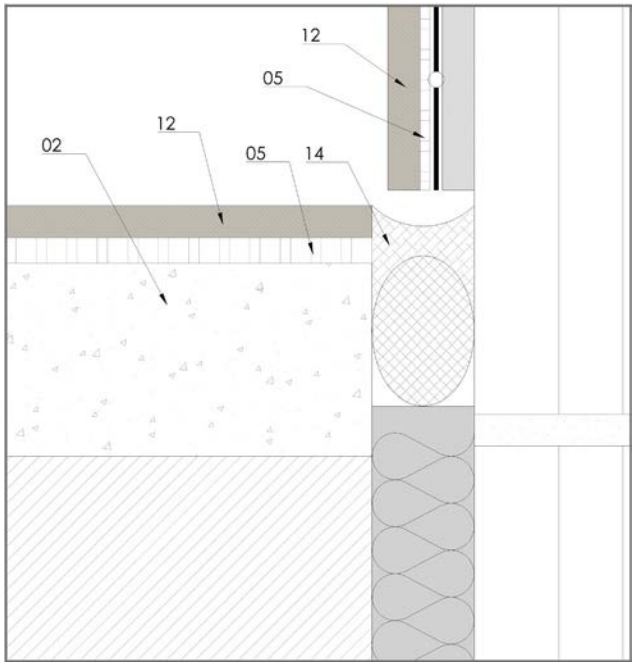
Key

01 Substrate
02 Screed
03 Levelling system
04 Membrane (e.g. waterproofing, vapour barrier...)
05 Adhesive
06 Reinforced slab
07 Cementitious grout
08 Insulating panel
09 Glass fibre mesh
10 Structure for plasterboard
11 Plasterboard sheets
12 Lapitec slab
13 Sheet metal closings
14 Joint

Perimeter joints

Perimeter joints are expansion joints that separate the screed from the covering and vertical components inside the screed, such as pillars and columns. They reduce the transmission of sounds and absorb the expansion phenomena of the floor structure. Perimeter joints are developed by leaving a minimum space of 5 mm from the edge of the covering (around columns, floor/wall or wall/ceiling corners, stair risers...).





Key

01 Substrate
02 Screed
03 Levelling system
04 Membrane (e.g. waterproofing, vapour barrier...)
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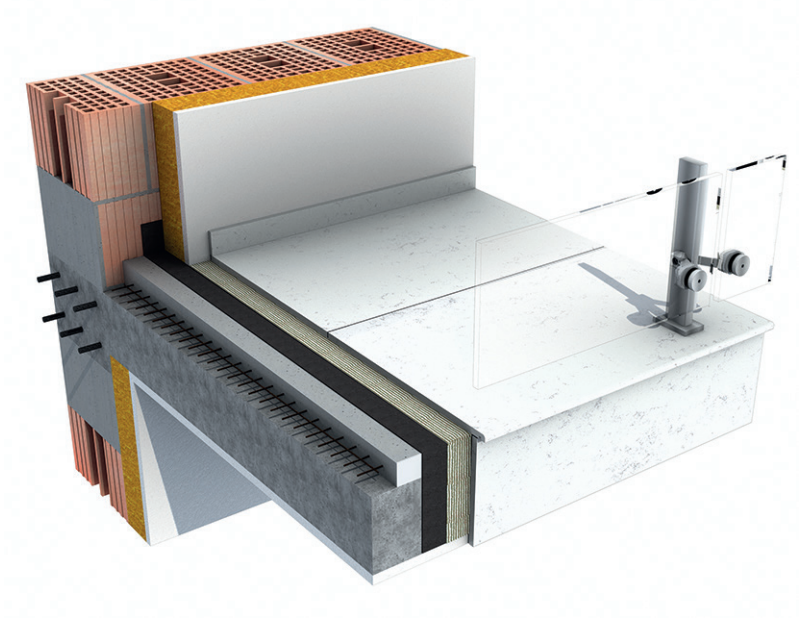
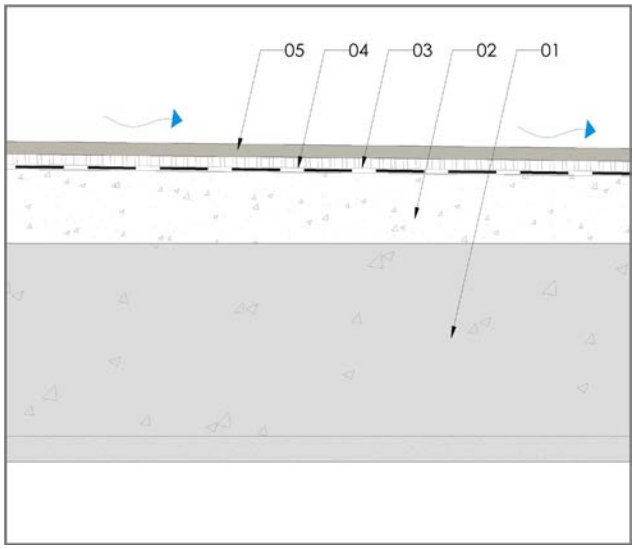
06 Reinforced slab
07 Cementitious grout
08 Insulating panel
09 Glass fibre mesh
10 Structure for plasterboard
11 Plasterboard sheets
12 Lapitec slab
13 Sheet metal closings
14 Joint

2.5.3/ Slopes

Areas exposed to liquids (water or liquid processing residue) must include drainage and discharge elements, preventing fluid retention on **Lapitec®**. To guarantee a normal run-off, the substrates of coverings must have a suitable slope (1.0-1.5% indoors, and 2% outdoors).

In regards to the development of drains, Lapitec Spa invites you to refer to the instructions provided by the producers of said elements. Should the adoption of certain elements (traps, grilles, vents, ...) require works on the surface of the material (drilling, recessed areas, ...) it is recommended to check feasibility with Lapitec SpA.





Key

01 Substrate
02 Screed
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04 Membrane (e.g. waterproofing, vapour barrier...)
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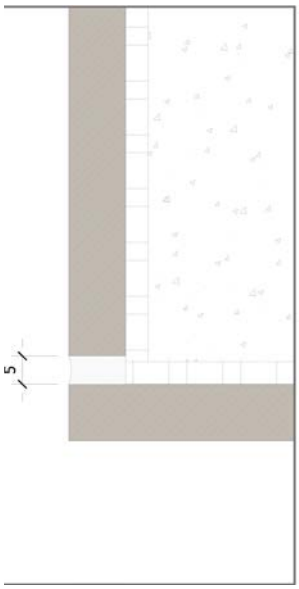
08 Insulating panel
09 Glass fibre mesh
10 Structure for plasterboard
11 Plasterboard sheets
12 Lapitec slab
13 Sheet metal closings
14 Joint

2.5.4/ Edges, corners and skirting

Edges and corners can be developed by simply aligning two **Lapitec®** slabs or else through machining processes that allow highly prestigious aesthetic results (mitres, half and full bullnose, ...).

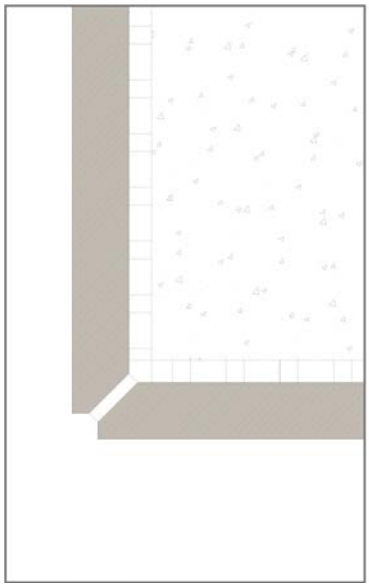
The top and lower edge of the cut side should be sanded slightly. This will prevent inconvenient chipping during the process.

The choice of aesthetic solution will be selected by the designer but must always involve careful consideration of the stress to which the **Lapitec®** slab will be subjected.



Key

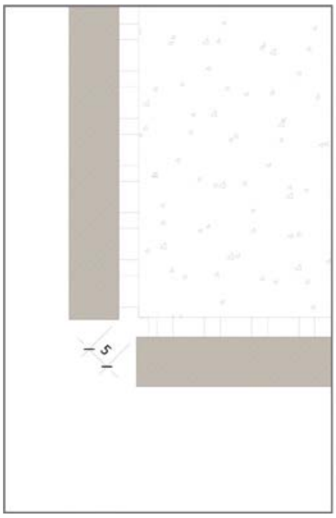
01 Lapitec slab
02 Adhesive
03 Substrate



Key

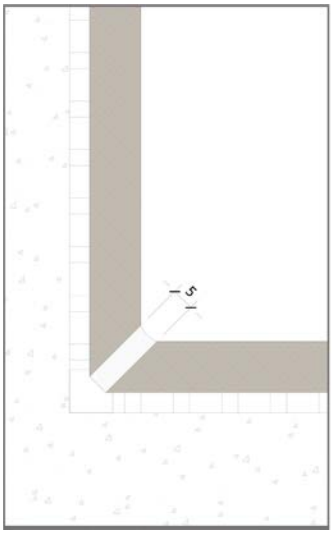
01 Lapitec slab
02 Adhesive
03 Substrate

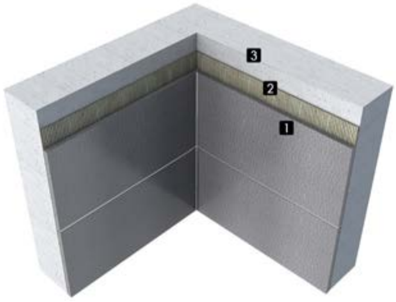
The space between the wall and floor covering can be finished with a skirting made in **Lapitec®**. These elements can be produced on request in our facilities. The design must also consider a minimum height of 5 cm and a distance from the floor covering of at least 2 mm. This gap must be filled with a suitable grout.



Key

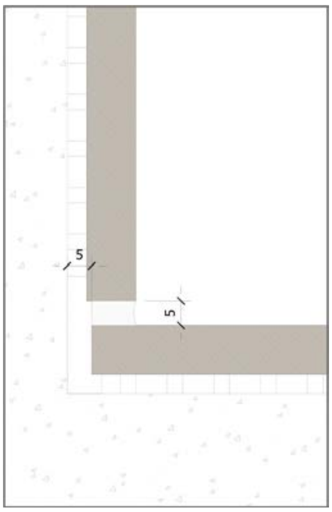
01 Lapitec slab
02 Adhesive
03 Substrate

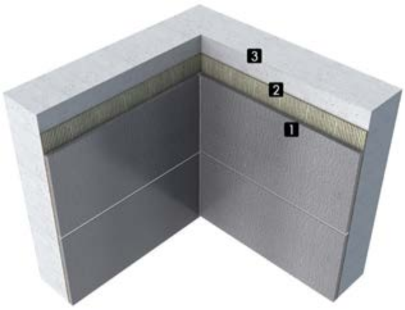




Key

01 Lapitec slab
02 Adhesive
03 Substrate





Key

01 Lapitec slab
02 Adhesive
03 Substrate

2.6/ GENERAL REQUIREMENTS OF SUBSTRATES

The designer and installer, regardless of the space in which **Lapitec®** will be installed, must ensure that certain characteristics of the substrate are respected; should any of the listed requirements not be satisfied, it will not be possible to proceed with installation.

Note: substrates will be developed in compliance with the requirements of specific and local regulations.

Compactness

The compactness and uniformity of the substrate must guarantee the absence of detachment phenomena over time due to a loss of cohesion of the substrate itself.

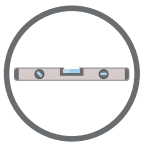
It is recommended to manually check these qualities by tapping various parts of the surface and making light incisions.

The surface must not produce dull sounds indicating the presence of voids or decohesion deep in the substrate.

The surface must not produce dust or flake around the incisions.

Finally, the surface must be free of gaps, cracks, swelling and holes.

Any defects may compromise the performance of the adhesive over time and cause the detachment of **Lapitec®** from the substrate.



Coplanarity

The coplanarity of the surface of the substrate must be checked.

Dimensional consistency (surface) test as per UNI 11493:2013

- Adhesive thickness ≥ 5 mm with a tolerance of about 2 mm over a 2-metre span
- Adhesive thickness ≤ 5 mm with maximum sag tolerance 1.5 mm with 2-metre screed board

Attention: surfaces that do not comply with the above tolerances must be finished with levelling layers (floors) or smoothing layers (walls). Failure to satisfy this criterion shall negatively impact the life of the Lapitec® covering.

Curing

The substrate on which **Lapitec®** will be installed must have reached the correct level of curing. Before installation, check that the substrate is no longer subject to shrinkage due to curing and that it does not seep water/solvents as its components dry (bedding, screed, self-levelling system, render...). Compliance with the required curing times will prevent cracking phenomena, which may damage the covering.

This principle is particularly important in the case of cementitious substrates. In general, concrete substrates take up to six months to achieve dimensional stability, while renders or cement screeds about 28 days. These values are intended as a guideline only, as they will be affected by the specific environmental conditions.

Cleaning the surface

Before laying the covering, the substrate must be cleaned; any dust, oil, grease and dirt must be removed using manual tools or detergents. The performance characteristics of the adhesives may be seriously compromised if used on an unclean surface. In the case of substrates with existing coverings (e.g. tiled surfaces), after checking adhesion to the substrate, the surfaces of the coverings must be suitably cleaned.

2.7/ SPECIFIC REQUIREMENTS OF SUBSTRATES

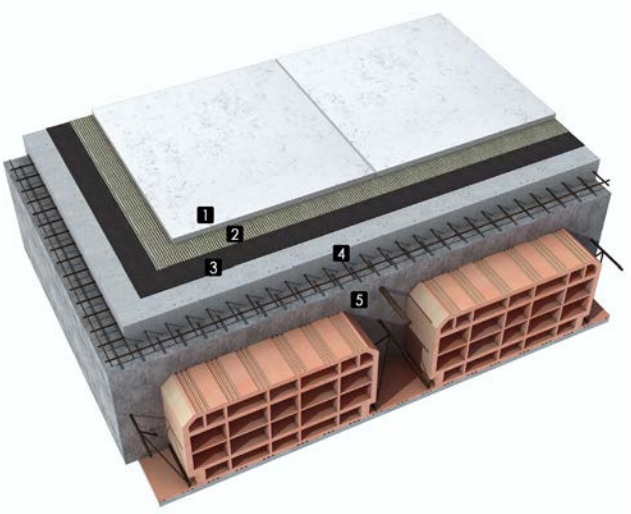
2.7.1/ Cement screeds

In the case of screeds, the substrate must guarantee mechanical strength in compliance with current regulations for its various applications. This check is to be carried out by the designer or authorised professional. Installation can occur no earlier than 3 weeks after the screed has been laid. The substrates must be dry on the surface.

The level of humidity must be measured using a carbide hygrometer.

The maximum allowed percentage is: 3% for screeds in class CT (cement-based), both indoors and outdoors.

In the case of outdoor substrates, these should be protected against rain before installation.



01 Lapitec slab
02 Adhesive
03 Waterproofing membrane
04 Top screed
05 Substrate: slab in concrete and masonry

In the case of complex substrates, it is recommended to develop a waterproofing, insulation and compensation system through the application of membranes that also assist the distribution of weight. Any cracks or deformations in the screed, which may be manifested at a later stage, will be compensated thanks to this membrane and will not be transmitted to the covering slabs.

2.7.2/ Lightweight screeds (anhydrite)

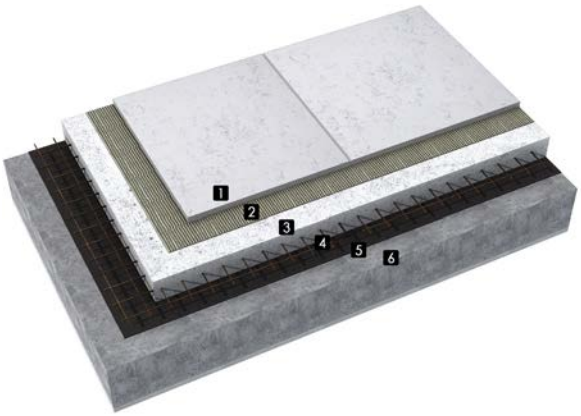
In the case of lightweight screeds always refer to the instructions of the system producer; before laying Lapitec, the surfaces must be sanded, free of dust and perfectly dry.

The level of humidity must be measured using a carbide hygrometer.

The maximum allowed percentage is: 0.5% for screeds in class CA.

It is not possible to lay cementitious self-levelling systems on lightweight screeds.

Anhydrite screeds are very sensitive to humidity. Lapitec recommends protecting them suitably (tarpaulin, membranes, ...) until the covering is installed.



01 Lapitec slab
02 Adhesive
03 Top lightweight screed
04 Arc-welded mesh
05 Waterproofing membrane
06 Substrate: slab in reinforced concrete

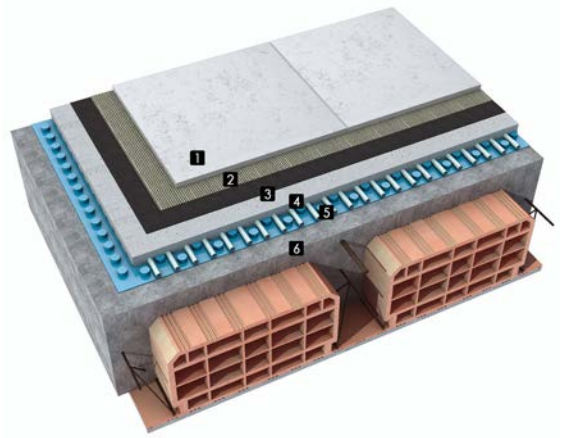
2.7.3/ Heated screeds

The reduced thermal inertia and consequent dimensional stability of Lapitec slabs means they can also be installed on heated screeds.

In these cases, before proceeding, be sure to have waited at least 14 days from the laying of the screed and to have checked the system as per the provisions of EN 1264-4 (test conducted by bringing the system to a temperature between 20° and 25° for at least 3 days and then to its maximum operating temperature for at least 5 days, before leaving it to cool to ambient temperature).

The covering can be grouted 8 days after installing **Lapitec®** and used after a minimum of 6 days from grouting. The level of humidity must be measured using a carbide hygrometer.

The maximum allowed percentage is: 0.3% for screeds with a heated substrate.

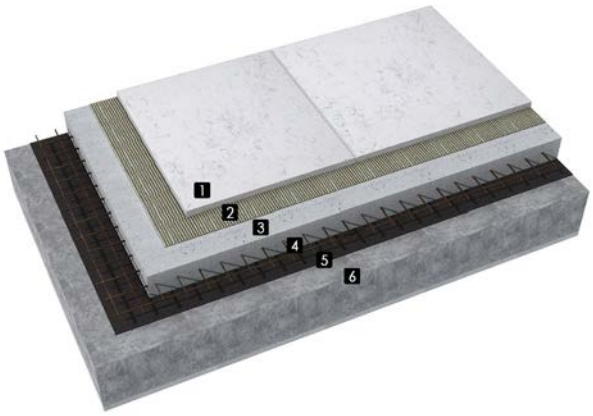


01 Lapitec slab
02 Adhesive
03 Waterproofing membrane
04 Top screed
05 Floor heating system
06 Substrate: slab in concrete and masonry

2.7.4/ Concrete poured in situ

On concrete substrates, install the covering only after the required drying times based on the thickness and composition of the substrate itself. The substrate must not be treated with substances that may negatively impact the adhesion of the fixing products (mould treatments, resins, vapour barriers ...).

The concrete is subject to deformation due to shrinkage, which may continue for a long period of time. Lapitec recommends using a membrane to prevent and/or reduce the tensions that would be generated between the concrete and overlying covering, thus allowing the floor to be laid as soon as the concrete is set to light foot traffic.



01 Lapitec slab
02 Adhesive
03 Top screed
04 Arc-welded mesh
05 Waterproofing membrane
06 Substrate: slab in reinforced concrete

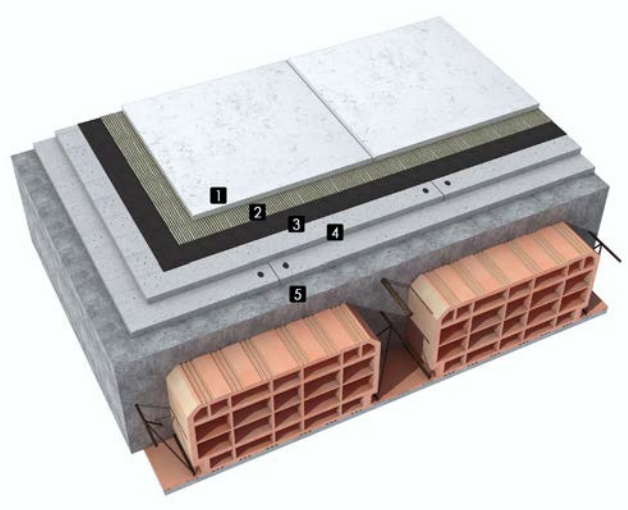
2.7.5/ Waterproofing

In the case of substrates including a cement-based waterproofing agent, Lapitec slabs can be installed in accordance with the instructions of the manufacturer of the adhesive used. For all other cases, always consult the manufacturers of the adhesives regarding the possibility to proceed.

01 Lapitec slab
02 Adhesive
03 Waterproofing membrane
04 Substrate: slab in reinforced concrete

2.7.6/ Dry substrates (backer boards)

In the case of substrates made of fibre-reinforced backer boards (fibre-cement panels, gypsum fibreboards...), always refer to the instructions of the system manufacturer; before installing Lapitec, the surfaces must be perfectly coplanar (maximum allowed tolerance near board joints 0.8 mm), free of dust, perfectly dry and properly fixed to the substrate.

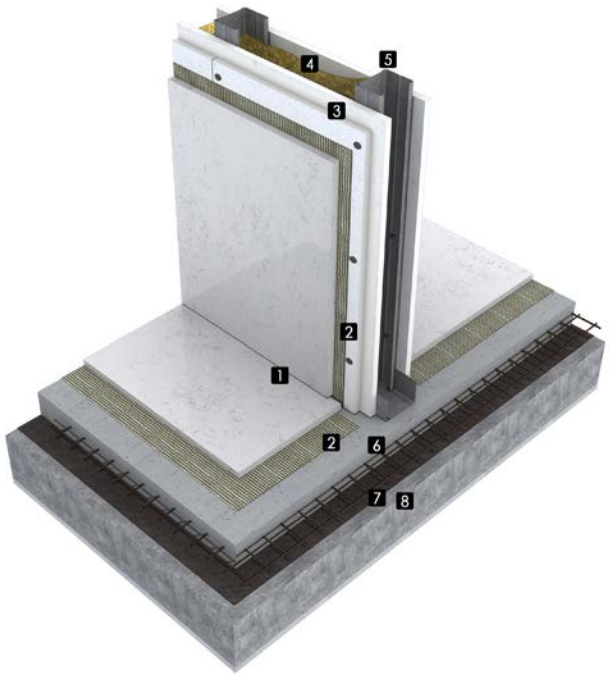


01 Lapitec slab
02 Adhesive
03 Waterproofing membrane
04 Reinforced slab
05 Substrate: slab in concrete and masonry

2.7.7/ Indoor drywalls

In the case of drywall substrates (large slabs), always refer to the instructions of the system manufacturer. Surfaces must be properly fixed to the substrate, assembled in accordance with best practices and satisfy the requirements listed below.

Plasterboard walls

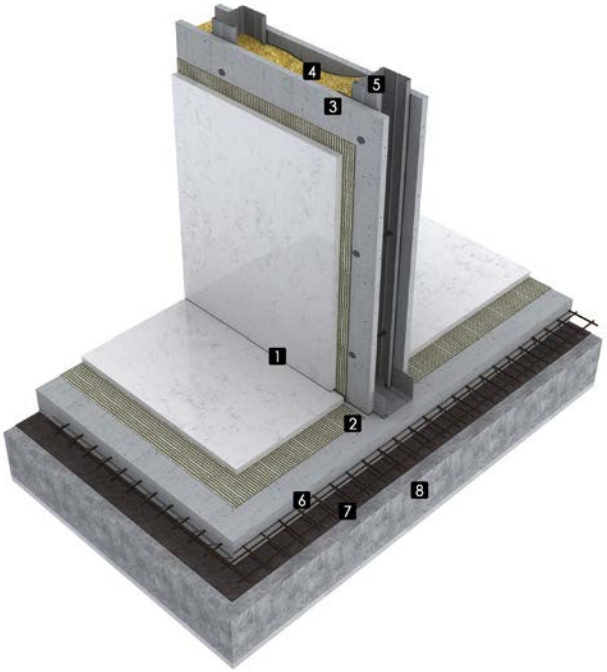


01 Lapitec slab
02 Adhesive
03 Plasterboard sheet
04 Insulating layer
05 Structure for drywalls
06 Top pour
07 Waterproofing membrane
08 Substrate

Single board systems are not allowed and the system must be able to support a covering weighing up to 40 kg/m^2.

If using boards without rebated edges, they must be aligned in a perfectly coplanar manner (maximum allowed board-to-board tolerance 0.8 mm).

Gypsum fibreboard/fibre-cement panel walls



01 Lapitec slab
02 Adhesive
03 Reinforced slab
04 Insulating layer
05 Structure for drywalls
06 Top pour
07 Waterproofing membrane
08 Substrate

Single board systems are allowed but they must guarantee a sufficient mechanical pull-off strength and shear resistance.

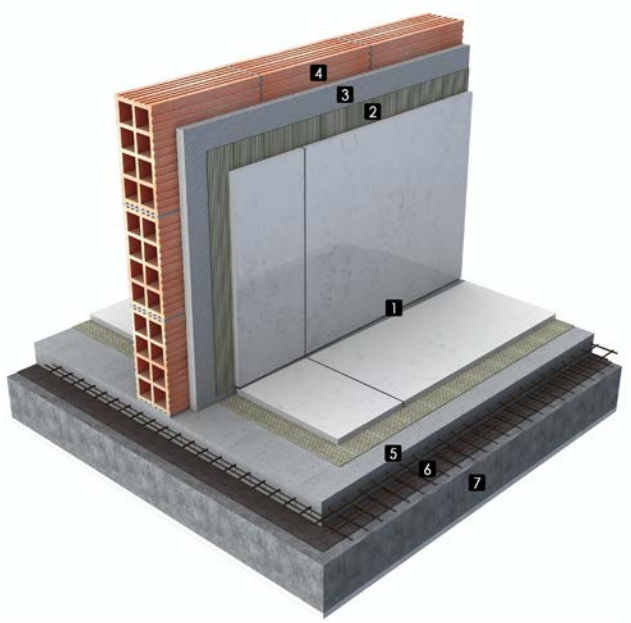
The substrate must guarantee a pull-off resistance > 1 N/mm^2.

Check with the manufacturer regarding the need or otherwise for a surface finish (smoothing). This finish must in turn guarantee a pull-off resistance of at least 1 N/mm^2.

Adjacent boards without rebated edges must be perfectly coplanar (maximum allowed board-to-board tolerance 0.8 mm).

2.7.8/ Indoor rendered walls

Lapitec® can only be installed on cement renders with an adhesive strength higher than 0.7 N/mm^2.
In general, it is recommended to apply a glass fibre mesh to increase the hold of the vertical substrate.



01 Lapitec slab
02 Adhesive
03 Cement render
04 Traditional masonry
05 Top pour
06 Waterproofing membrane
07 Substrate

2.7.9/ Outdoor rendered walls

Lapitec® can be installed on façades (heights greater than 2.5 m) only if the following conditions are satisfied:

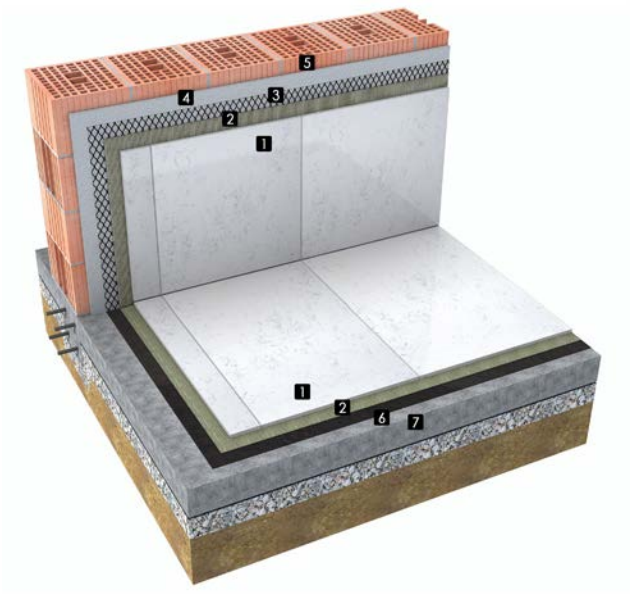
- the substrate must guarantee a pull-off resistance > 1 N/mm2. If the substrate is in turn bonded to another layer, the underlying layer must guarantee the same level of adhesion;
- the substrate must guarantee resistance to parallel stress ≥ 1.2 N/mm2 (UNI 10827);
- if the substrate does not satisfy the minimum requirements, reinforcement systems (mesh) can be used;
- the material cannot be installed directly on top of non-rendered substrates (construction blocks, hollow bricks);
- in the case of large slabs (one side >60 cm), the back-buttering technique must be adopted as well as mechanical safety systems (see chapter 2.3.1);

In the case of slabs exposed to high stress generated by thermal-hygrometric variations, consult the Lapitec SpA technical department for a joint feasibility study.

The feasibility study must also involve the manufacturer of the adhesives.

Disclaimer

Installation on any type of insulation (thermal cladding) is not allowed under any circumstances.



01 Lapitec slabs
02 Adhesive
03 Glass fibre mesh
04 Render
05 Vertical support (e.g. masonry in lethal...)
06 Sheath (e.g. Waterproof, steamed...)
07 Support (e.g. brick concrete floor...)

2.7.10/ Safety systems: anti-tip brackets

For the installation of wall coverings with adhesives, in materials similar to **Lapitec®** in terms of weight and size, Italian standards (UNI11493) prescribe the use of anti-tip brackets and a substrate pull-off resistance of at least 1 N/mm^2. These brackets do not prevent damage due to poor installations, but rather reduce the risk of accidental detachment, while also indicating pending detachments.

In this manual, Lapitec SpA has included a description of the operating principle of these brackets, thanks also to information provided by Raimondi SpA, a specialised company that owns the rights to the system reported below. Regardless of the safety system adopted, it must have the same characteristics as the proposed system. Although regulatory bodies are leaning towards making use of such safety systems mandatory, as at today their use is at the discretion of the designer. Lapitec SpA strongly recommends their use for sizes larger than 600x600 mm, for coverings installed at heights more than 2.5 m off the ground and in cases where slabs are laid in areas with vehicular or foot traffic.

NOTE: for thicknesses greater than 12 mm, the request shall be assessed by our technicians.

USE OF BRACKETS

Installation steps

- Cut the upper edge of the rear side of the slab to create one or more diagonal slots, each about 8 mm deep. The cuts can be made using a power tool, or in our facilities on request.
- After removing any traces of oil and grease, fit the brackets into the incisions, checking that they are fully inserted.
- Spread the adhesive on the wall, taking care not to interfere with the areas where the brackets will fitted.
- Spread the adhesive on the back of the slab also (back-buttering technique).
- Position the slab in position, then drill the substrate in correspondence with the holes in the bracket (6-8 mm drill bit).
- After removing any dust, fix the bracket using suitable fasteners (expansion dowels, screws...).

Installation must occur from the bottom up.

Indicative consumption for horizontally installed slabs

	Maximum weight RAI FIX 8 mm	Brackets for slab
0 < x < 600 mm	60 kg	1
600 mm < x < 2.000 mm	120 kg	2
2.000 mm < x < 3.000 mm	180 kg	3

NOTE: vertical installation (vertical side>horizontal side) is only allowed with slabs with long side <1500 mm.

RAI-FIX by Raimondi SpA

Retaining bracket in stainless steel for slabs with minimum thickness 8 mm.

Subject to tensile strength testing with 120 kg result and including 10 holes with diameter 8mm and one hole with diameter 9mm for insertion of dowels.

RAI-CUT by Raimondi SpA

Routing unit for diagonal cuts on the rear face of slabs. Effective thickness for use: ≥6 mm and ≤30 mm.

Dry cutting with diamond blade, diameter 125 mm.

Structure in stainless steel with port for connection of suction hose (diameter 38 mm) and semi-universal drive coupling for angle grinder. Also available with 900 W angle grinder on request.

Technical data sheets available on the website: www.raimondispa.com

2.8/ ADHESIVES

SELECTING THE ADHESIVE

Lapitec® is installed using a broad range of products designed to guarantee the performance of the material in its intended uses. Lapitec SpA continually works with several of the industry's leading companies, jointly identifying the most suitable systems for the various applications.

The choice of adhesives always depends on the substrate, the intended use (stresses) and time frames for use.

In the attached tables Lapitec SpA provides an indication of the most suitable adhesive taking into account the different sizes of the slabs, the type of substrate and intended use.

The selected product can be one of those reported in this manual, otherwise making sure that any other product has identical characteristics to those expressed herein.

Always contact the manufacturer of the adhesives and obtain the most up-to-date documentation, following the provided instructions.

The harmonised standard EN 12004 defines the classification of adhesives for ceramics and stone materials and identifies the uses, making a distinction based on their chemical nature between:

C: Cementitious adhesive

D: Dispersion adhesive

R: Reaction resin adhesive

The adhesives identified for use with **Lapitec®** are cementitious and reactive.

Cementitious adhesive

A powder mixture of hydraulic binding agents, aggregates and organic additives to be mixed with water (single component) or liquids with polymer additives (two-component)

C1: Normal cementitious adhesive

C2: Improved cementitious adhesive (mechanical characteristics doubled with respect to C1)

F: Fast-setting cementitious adhesive

T: Adhesive with reduced vertical slip

Suitable for wall applications

E: Adhesive with extended open time

Installation allowed for a number of minutes after spreading (30 minutes)

S1: Deformable adhesive EN 12004-2:2017

S2: Highly deformable adhesive EN 12004-2:2017

Reaction resin adhesive

Mixture of synthetic resins, mineral fillers and organic additives

R1: Normal reaction resin adhesive

R2: Improved reaction resin adhesive (resists against immersion and thermal shock)

Excellent ability to compensate for deformations on the substrate without detachment phenomena

2.8.1/ Selecting the adhesive

LAPITEC FLOOR COVERING | INDOOR INSTALLATION

Substrate		Residential			Public commercial Light foot traffic			Public commercial industrial Vehicular traffic		
		≤90cm	≤120cm	>120cm	≤90cm	≤120cm	>120cm	≤90cm	≤120cm	>120cm
Cement screed	with heating	C2	C2S1/S2	C2S1/S2	C2	C2S1/S2	C2S1/S2	/	/	/
	without heating	C2	C2S1	C2S1	C2	C2S1	C2S1	C2	C2S1/S2	C2S1/S2
Sulphate-based screed (anhydrite)	with heating	C2	C2S1/S2	C2S1/S2	C2	C2S1/S2	C2S1/S2	/	/	/
	without heating	C2	C2S1	C2S1	C2	C2S1	C2S1	/	/	/
Concrete	cast in situ	C2	/	/	C2	C2S1	C2S1	C2	C2S1	C2S1
	prefabricated	C2S1/ S2	/	/	C2S1/S2	/	/	C2S1/S2	/	/
Sound insulation layers		on request	on request	on request	on request	on request	on request	not envisaged	not envisaged	not envisaged
Preformed panels		on request	on request	on request	C2	C2S1/S2	C2S1/S2	not envisaged	not envisaged	not envisaged
Waterproofing	membrane in sheets	on request	on request	on request	on request	on request	on request	on request	on request	on request
	non-cementitious liquid products	on request	on request	on request	on request	on request	on request	on request	on request	on request
	cementitious liquid products	C2	C2S1	C2S1	C2	C2S1	C2S1	C2	C2S1	C2S1
Existing substrates with organic adhesive residue (carpeting...)		C2	C2S1/S2	C2S1/S2	C2	C2S1/S2	C2S1/S2	C2	C2S1/S2	C2S1/S2
Tiles/mosaic/ existing stone		C2	C2S1	C2S1	C2	C2S1	C2S1	C2	C2S1	C2S1
Existing parquet		on request	on request	on request	on request	on request	on request	/	/	/
Existing hard flooring		on request	on request	on request	on request	on request	on request	on request	on request	on request
Existing resin flooring		on request	on request	on request	on request	on request	on request	on request	on request	on request
Existing metal flooring		R1-R2	/	/	R1-R2	/	/	R1-R2	/	/

LAPITEC FLOOR COVERING | OUTDOOR INSTALLATION

Substrate		Residential - public - commercial - industrial		
		≤90cm	≤120cm	>120cm
Cement screed	with heating	/	/	/
	without heating	C2 F	C2S1/S2 F	C2S1/S2 F
Sulphate-based screed (anhydrite)	with heating	/	/	/
	without heating	/	/	/
Concrete	cast in situ	C2	C2S1/S2 F	C2S1/S2 F
	prefabricated	C2S1/S2 F	/	/
Sound insulation layers		/	/	/
Preformed panels		/	/	/
Waterproofing	membrane in sheets	on request	on request	on request
	non-cementitious liquid products	on request	on request	on request
	cementitious liquid products	C2 F	C2S1 F	C2S1 F
Existing substrates with organic adhesive residue (carpeting...)		/	/	/
Tiles/mosaic/existing stone		C2 F	C2S1 F	C2S1 F
Existing parquet		/	/	/
Existing hard flooring		/	/	/
Existing resin flooring		/	/	/
Existing metal flooring		R1-R2	/	/

LAPITEC WALL COVERING | INDOOR INSTALLATION

Substrate		Residential			Public commercial			Industrial		
		≤90cm	≤120cm	>120cm	≤90cm	≤120cm	>120cm	≤90cm	≤120cm	>120cm
Lime/cement render	with heating	C2	C2S1/S2	C2S1/S2	C2	C2S1/S2	C2S1/S2	C2	C2S1/S2	C2S1/S2
	without heating	C1	C2S1	C2S1	C2	C2S1	C2S1	C2	C2S1	C2S1
Gypsum/anhydrite render	with heating	/	/	/	/	/	/	/	/	/
	without heating	/	/	/	/	/	/	/	/	/
Concrete	cast in situ	C2	C2S1	C2S1	C2	C2S1	C2S1	C2	C2S1	C2S1
	prefabricated	C2	C2S1	C2S1	C2	C2S1	C2S1	C2	C2S1	C2S1
Tiles/mosaic/ existing stone		C2	C2S1	C2S1	C2	C2S1	C2S1	C2	C2S1	C2S1
Waterproofing	membrane in sheets	on request	on request	on request	on request	on request	on request	on request	on request	on request
	non-cementitious liquid products	on request	on request	on request	on request	on request	on request	on request	on request	on request
	cementitious liquid products	C2	C2S1	C2S1	C2	C2S1	C2S1	C2	C2S1	C2S1
Cement/fibre cement-based panels		C1	C2S1/S2	C2S1/S2	C2	C2S1/S2	C2S1/S2	C2	C2S1/S2	C2S1/S2
Wood panels		C2	/	/	C2	/	/	C2	/	/
Plasterboard sheets		C2	/	/	C2	/	/	C2	/	/
Existing metal surfaces		R1	/	/	R1	/	/	R1	/	/
Thermal insulating/ soundproof panels		C2	C2S1/S2	/	C2	C2S1/S2	/	C2	C2S1/S2	/

Note: see pertinent standards applicable in the country of installation.

LAPITEC WALL COVERING | OUTDOOR INSTALLATION

Substrate		Residential - public - commercial - industrial		
		≤90cm	≤120cm	>120cm
Lime/cement render	with heating	/	/	/
	without heating	C2S1/S2 F	C2S1/S2 F	C2S1/S2 F
Gypsum/anhydrite render	with heating	/	/	/
	without heating	/	/	/
Concrete	cast in situ	C2S1/S2 F	C2S1/S2 F	C2S1/S2 F
	prefabricated	C2S1/S2 F	C2S1/S2 F	C2S1/S2 F
Tiles/mosaic/existing stone		R1	R2	/
Waterproofing	membrane in sheets	on request	on request	on request
	non-cementitious liquid products	on request	on request	on request
	cementitious liquid products	C2 F	C2S1 F	C2S1 F
Cement/fibre cement-based panels		C2S1/S2 F	not envisaged	/
Wood panels		/	/	/
Plasterboard sheets		/	/	/
Existing metal surfaces		R2	R2	/
Thermal insulating/soundproof panels		/	/	/

2.8.2/ Partner manufacturers

All manufacturers included in this manual have tested **Lapitec®** to assess the possibility of using it with their adhesives and finishing the Lapitec surface with their grouts, assessing its fitness for use in various contexts. All tests were conducted in compliance with the applicable standards in force. The tests results can be supplied on request.

Lapitec SpA has contacted several manufacturers to guarantee its clients the broadest selection in terms of fitness for use, market availability and reliability over time. The products shown here are all guaranteed by their respective manufacturers. The choice of a brand and product is the responsibility of the user. In order to ensure correct use and a successful result, it is essential to read the most up-to-date technical data sheets for each of the products mentioned herein.

NOTE: Certain Lapitec® finishes (Arena, Fossil, Vesuvio and Dune) may present traces of engobe on the rear of the slab. Before installation in environments subject to particular stresses, check for the presence of any residue and remove it by sanding the material lightly.

MAPEI ADHESIVES RANGE

KERAFLEX MAXI S1 ZERO — C2TES1

(Available in the Italian, European, Asian and US markets).

High-performance, deformable cementitious adhesive with no vertical slip, extended open time.

Suitable for large slabs.

ELASTORAPID — C2FTES2

(Available in the Italian, European, Asian and US markets).

Two-component, high-performance, highly deformable adhesive with extended open time, fast-setting and with no vertical slip.

ULTRALITE S1 — C2TES1

(Available in the Italian, European and US markets).

Single component, high-performance, lightweight, deformable cementitious adhesive with no vertical slip and extended open time.

ULTRALITE S1 QUICK — C2FTS1

(Available in the Italian, European and US markets).

Single component, high-performance, lightweight, deformable cementitious adhesive, fast-setting with no vertical slip.

ULTRALITE S2 — C2ES2

(Available in the Italian, European and US markets).

Single component, high-performance, lightweight, highly deformable cementitious adhesive with extended open time.

ULTRALITE S2 QUICK — C2FES2

(Available in the Italian, European and US markets).

Single component, high-performance, lightweight, highly deformable cementitious adhesive, fast-setting with extended open time.

ULTRABOND ECO PU 2K — R2T

(Available in the Italian and European markets).

Two-component, high-performance polyurethane adhesive with no vertical slip.

KERAPOXY ADHESIVE — R2T

(Available in the Italian and European markets).

Two-component epoxy adhesive with no vertical slip.

Technical data sheets available on the website www.mapei.com

LATICRETE ADHESIVES RANGE

LATICRETE® 254 PLATINUM — C2TES1

(Available in the Italian, European, Asian and US markets).

Single component, high-resistance, deformable cementitious adhesive with extended open time and no vertical slip.

255 MULTI MAXTM — C2TES1

(Available in the Italian, European, Asian and US markets).

High-performance, deformable cementitious adhesive with no vertical slip, extended open time.

Suitable for large slabs.

LATAPOXY® 310 — R2T

(Available in the Italian, European, Asian and US markets).

Two-component epoxy adhesive, suitable for spot fixing on vertical surfaces.

Technical data sheets available on the website www.laticrete.com

PCI-BASF ADHESIVES RANGE

PCI FLEXMÖRTEL S1 — C2TES1

(Available in the Italian and European markets).

Single component, high-resistance, deformable cementitious adhesive with extended open time and no vertical slip.

PCI FLEXMÖRTEL S2 — C2TES2

(Available in the Italian and European markets).

Two-component, high-performance, highly deformable adhesive with extended open time and no vertical slip.

Technical data sheets available on the website www.pci-augsburg.eu

SIKA ADHESIVES RANGE

BUILDING TRUST

SIKACERAM® 255 StarFlex LD — C2TES1

(Available in the Italian, European, Asian and US markets).
High-performance, deformable cementitious adhesive with no vertical slip, extended open time.

SIKACERAM® 270 MultiFlow IT — C2FTES1

(Available in the Italian, European, Asian and US markets).
High-performance, lightweight cementitious adhesive, fast hardening with no vertical slip.

Technical data sheets available on the website www.sika.com

ARDEX ADHESIVES RANGE

ARDEX S 28 NEW MICROTEC **C2FTES1**

(Available in the Italian, European, Asian and US markets).

Single component, high-performance, deformable cementitious adhesive, fast-setting with extended open time and no vertical slip.

ARDEX S 28 NEW MICROTEC+ARDEX E90 **C2FTES2**

(Available in the Italian, European, Asian and US markets).

Single component, high-performance, highly deformable cementitious adhesive with synthetic resin additives (E90), fast-setting with extended open time and no vertical slip.

ARDEX X 78 MICROTEC **C2ES1**

(Available in the Italian, European, Asian and US markets).

High-performance, deformable cementitious adhesive with extended open time.

ARDEX X 78 MICROTEC+ARDEX E90 **C2ES2**

(Available in the Italian, European, Asian and US markets).

Single component, high-performance, highly deformable cementitious adhesive with synthetic resin additives (E90) with extended open time.

ARDEX X 78 S MICROTEC **C2FES1**

(Available in the Italian, European, Asian and US markets).

Single component, high-performance, deformable cementitious adhesive, fast-setting with extended open time.

ARDEX X 77 MICROTEC **C2FTES1**

(Available in the Italian, European, Asian and US markets).

Single component, high-performance, deformable cementitious adhesive, fast-setting with extended open time and no vertical slip.

ARDEX X 77 S MICROTEC **C2FTES1**

(Available in the Italian, European, Asian and US markets).

Single component, high-performance, deformable cementitious adhesive, fast-setting with extended open time and no vertical slip.

ARDEX X 90 OUTDOOR MICROTEC3 **C2FTES1**

(Available in the Italian, European, Asian and US markets).

Single component, high-performance, deformable cementitious adhesive, fast-setting with extended open time and no vertical slip.

Technical data sheets available on the website www.ardex.it

2.9/ GROUTS

The grouts used with **Lapitec®** are cementitious and reactive.

The choice of grouts must always be made in accordance with the width of the gaps and specific application (stresses).

The aesthetic choice (colour) of grout depends on the design; in any case, if the selected grout involves the use of contrasting colours with respect to the slab, it is recommended to carefully assess the final result before proceeding. Some grouts are in fact extremely tough, and although they can be removed from the surface of Lapitec slabs, they leave unsightly stains on certain finishes. In the case of contrasting colours, such stains would remain visible, thus compromising the final aesthetic result.

Standard EN 13888 defines the classification of grouts.

Definition according to chemical nature and performance:

CG1: Cementitious grout

CG2: Improved cementitious grout (supplementary characteristics Ar and W)

RG: Reaction resin grout

A: High abrasion resistance

W: Reduced water absorption

The selected product must be one of those reported in this manual, otherwise making sure that any other product has identical characteristics to those expressed herein.

2.9.1/ Partner manufacturers

MAPEI GROUTS RANGE

ULTRACOLOR PLUS **CG2WA**

(Available in the Italian, European, Asian and US markets).
High-performance cementitious grout, polymer-modified for gaps from 2 to 20 mm.

KERACOLOR GG **CG2WA**

(Available in the Italian, European, Asian and US markets).
High-performance cementitious grout, polymer-modified for gaps from 4 to 15 mm.

KERAPOXY **RG**

(Available in the Italian, European, Asian and US markets).
Two-component, acid-resistant epoxy grout for gaps at least 3 mm wide.

KERAPOXY CQ **RG**

(Available in the Italian, European, Asian and US markets).
Two-component, acid-resistant epoxy grout for gaps from 3 to 10 mm.

KERAPOXY DESIGN **RG**

(Available in the Italian, European, Asian and US markets).
Two-component, acid-resistant, decorative, translucent epoxy grout for gaps from 3 to 10 mm.

Technical data sheets available on the website www.mapei.com

LATICRETE GROUTS RANGE

LATICRETE® SpectraLOCK® PRO Premium **RG**

(Available in the Italian, European, Asian and US markets).
High-thixotropy epoxy grout for gaps from 1.5 to 12 mm.

LATICRETE® PermaColorTM **CG2WA**

(Available in the Italian, European, Asian and US markets).
High-performance cementitious grout for gaps from 1.5 to 15 mm.

Technical data sheets available on the website www.laticrete.com

PCI-BASF GROUTS RANGE

PCI NANOFUG® Premium **CG2WA**

(Available in the Italian and European markets).
High-performance cementitious grout for gaps from 1 to 15 mm.

Technical data sheets available on the website www.pci-augsburg.eu

SIKA GROUTS RANGE

BUILDING TRUST

SIKACERAM® CleanGrout **CG2 WA**

(Available in the Italian, European, Asian and US markets).
Cementitious grout for gaps from 1 to 8 mm.

SIKACERAM® LargeGrout **CG2 WA**

(Available in the Italian, European, Asian and US markets).
Cementitious grout for gaps from 4 to 20 mm.

SIKACERAM® EpoxyGrout **RG**

(Available in the Italian, European, Asian and US markets).
Two-component epoxy grout for gaps from 2 to 20 mm.

Technical data sheets available on the website www.sika.com

ARDEX GROUTS RANGE

ARDEX G9S Flex 2-15 **CG2WA**

(Available in the Italian, European, Asian and US markets).
High-performance cementitious grout for gaps from 1 to 15 mm.

ARDEX RG 12 1-6 **RG**

(Available in the Italian, European, Asian and US markets).
Two-component, acid-resistant, decorative, translucent epoxy grout for gaps from 1 to 6 mm.

Technical data sheets available on the website www.ardex.it

The following table shows the colour correspondence between the Lapitec range and several other products.

LAPITEC RANGE	LATICRETE	ARDEX	MAPEI	SIKA
Arabescato Canova		SILBERGRAU	MOON WHITE 103	LIGHT GREY 29
Arabescato Corallo		SANDBEIGE	JASMINE 130	BEIGE 08
Arabescato Donatello		SANDBEIGE JASMINE	JASMINE 130	BEIGE 08
Arabescato Michelangelo		SILBERGRAU	MOON WHITE 103	LIGHT GREY 29
Arabescato Perla		SANDBEIGE JASMINE	JASMINE 130	JASMINE 06 BEIGE 08
Artico	44 BRIGHT WHITE	SILBERGRAU	MOON WHITE 103	LIGHT GREY 29
Avana	24 NATURAL GREY	SANDGRAU ZEMENTGRAU	KERAPOXY 113	AGATA 120
Avorio	39 MUSHROOM	SANDBEIGE	VANILLA 131 KERAPOXY 130	BEIGE 08
Bianco Assoluto	18 SAUTERNE 44 BRIGHT WHITE	BRILLANTWEISS	WHITE 100	WHITE 00
Bianco Crema	03 SILK	SANDBEIGE	JASMINE 130	BEIGE 08
Bianco Polare	18 SAUTERNE	JASMIN	JASMINE 130	JASMINE 06
Ebano	60 DUSTY GREY	GRAUBRAUN	ANTHRACITE 114 KERAPOXY 114	ANTHRACITE 04
Grigio Cemento	78 STERLING SILVER	BASALT STEINGRAU	CEMENT GREY 113	MOONSTONE 121
Grigio Piombo	42 PLATINUM	BASALT	TORNADO 174	ANTHRACITE 04
Moca	35 MOCHA	GRAUBRAUN	MUD 136 KERAPOXY 731	DARK BROWN 12
Nero Antracite	45 RAVEN	DUNKELBRAUN	ANTHRACITE 114 KERAPOXY 114	ANTHRACITE 04
Nero Assoluto	22 MIDNIGHT BLACK	ANTHRAZIT	BLACK 120	TOTAL BLACK 30 NIGHT 123

ATTENTION: before proceeding with installation, check that the grout colour corresponds to the aesthetic expectations of the designer and/or client by testing it on a smaller portion of the covering. The products may have very distinct shades.

3. INSTALLATION

An essential requirement for the installation of **Lapitec®** is the availability of a specialised workforce having suitable equipment.

Correct installation must occur in compliance with each required step of the process; failure to carry out all the necessary checks may compromise the final result. A number of instructions are provided for informative purposes, which refer to all the checks and techniques to be adopted when installing a **Lapitec®** covering.

3.1/ INSTALLATION STEPS

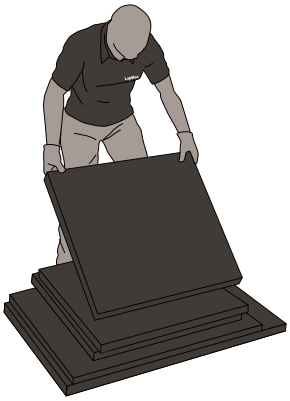
3.1.1/ Measurements and checks

Before proceeding with installation, it is important to check the correspondence of the design with the installation space.

The installer must check the layout of the slabs, highlighting any differences with respect to the design and/or interferences in the development of the covering.

At the same time, the installer must prepare an operating plan that covers the various installation steps. When installing large sizes, pay special attention when handling the slabs (avoid and/or remove any obstacles that may interfere during installation), as the installation time must be compatible with the pot life of the binders.

3.1.2/ Storing the material



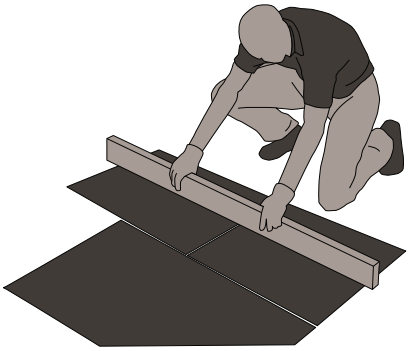
After defining a work plan, the installer must identify a suitable place in which to receive the slabs on the job site, complying with all the provisions set out for the unloading and storage of **Lapitec®**.

Once the material has been received on the job site, Lapitec SpA recommends proceeding with a visual inspection of all slabs, making a note of any defects and nonconformities.

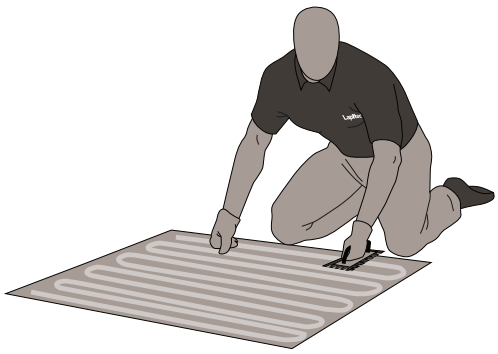
Important note: Any defects not immediately reported, and which cannot be attributed with any certainty to a defect in the material itself, shall not be acknowledged.

3.1.3/ Checking essential requirements

Immediately before installing the covering, the installer must check that all mandatory requirements have been satisfied. In particular those concerning the condition of the substrate and those concerning the ambient conditions for use of the adhesives (temperature and relative humidity). The latter must consider not only the period before installation, but also the period thereafter necessary for the products to set/ cure. In the case of outdoor installations, or in circumstances where it is difficult to determine stable conditions, suitable protective systems must be adopted (e.g. tarpaulins, air conditioners...). Should the installation requirements not be satisfied, it will not be possible to proceed until they have been met.



3.1.4/ Preparation and application of adhesives



Adhesives must always be prepared in accordance with the methods and dosages prescribed in the technical data sheets issued by the respective manufacturers. If in doubt concerning the correct use of an adhesive, Lapitec SpA recommends contacting the manufacturer directly.

Buttering criteria (full contact)

The adhesive buttering criterion depends on the application of the **Lapitec®** covering and the instructions provided by the manufacturer of the adhesive. Buttering must always guarantee the effectively required contact area. The maximum allowed thickness values for the adhesives must be respected. Use of a thickness greater than the prescribed limit may compromise the hold of the adhesive. Buttering on the rear face of the slab must be linear and the direction of buttering must be parallel to the short end of the slab in order to facilitate the release of air during positioning and prevent the formation of voids; the same direction must be used on the floor and covering (back-buttering). The adhesive must be applied using a notched trowel compliant with the specifications provided by the various manufacturers. It is recommended to use a 3mm notched trowel on the rear face of the slab and a 10mm notched trowel on the application surface; the sum of the two thicknesses with the slab installed should be less than 5/6mm. The application time of an adhesive (or "pot life" and open time) must be respected.

CONTACT SURFACES

Interior walls: at least 75% of the total surface area of the slab to be installed.
85% for large slabs (>3600 cm^2) or with one side longer than 600 mm.

Interior floors: at least 85% of the total surface area of the slab to be installed.
95% for large slabs (>3600 cm^2) or with one side longer than 600 mm.

Exterior walls: at least 90% of the total surface area of the slab to be installed.
100% for large slabs (>3600 cm^2) or with one side longer than 600 mm.

Exterior floors: 100% of the total surface area of the slab to be installed (full contact).

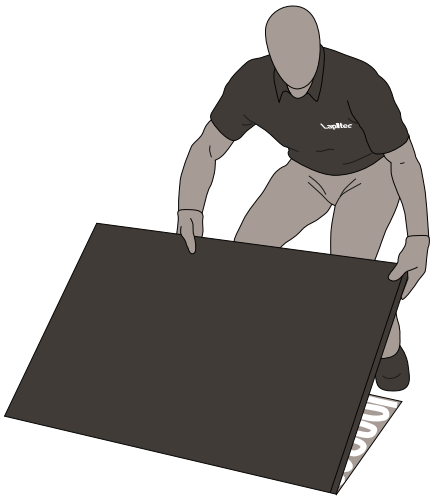
3.1.5/ Application of Lapitec®

The covering must be installed taking care to guarantee the required contact surface area of the various applications.

If spacers are used for the gaps, these must be positioned at the same time as the slabs are positioned and removed before grouting.

For the installation of large and/or heavy slabs, the use of a limited number of spacers or levelling/smoothing layers is allowed, without these reducing the contact area prescribed for the different environments.

Once laid, **Lapitec®** slabs must be lightly tapped with a rubber mallet across the entire surface in order to promote adhesion to the substrate and facilitate the release of any air bubbles.

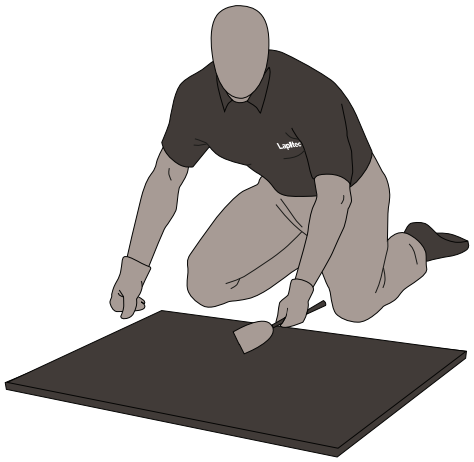


The evaporation of the process water and/or solvents contained in the adhesives must not be obstructed by laying tarpaulins or any other type of protection above the covering; the vapours may react with the plastic or paper, thus compromising the final result.

In the case of unfavourable weather conditions (excessive heat or cold), it is recommended to consult the manufacturers in order to identify the best solution.

Avoid any type of knock or impact, which may damage the slab. Once the **Lapitec®** covering has been installed, it must not be subjected to any stress until the adhesive has completely set. The “ready for use” time declared by the manufacturer of the adhesives must always be respected.

3.1.6/ Preparation and application of grouts



Grouts must always be prepared in accordance with the methods and dosages prescribed in the technical data sheets issued by the respective manufacturers.

The grouts can only be used once the adhesives used for installation have set and the grouting time declared by the manufacturers has elapsed.

The use of a grout must consider the width and depth of the gap and the stresses to which the covering will be subjected.

To apply the grouts, it is recommended to use rubber or plastic trowels in order to ensure complete and compact filling without any risk of damaging the surface.

The evaporation of the process water and/or solvents contained in the grouts must not be obstructed by laying tarpaulins or any other type of protection above the covering; the vapours may react with the plastic or paper, thus compromising the final result.

In the case of unfavourable weather conditions (excessive heat or cold), it is recommended to consult the manufacturers in order to identify the best solution.

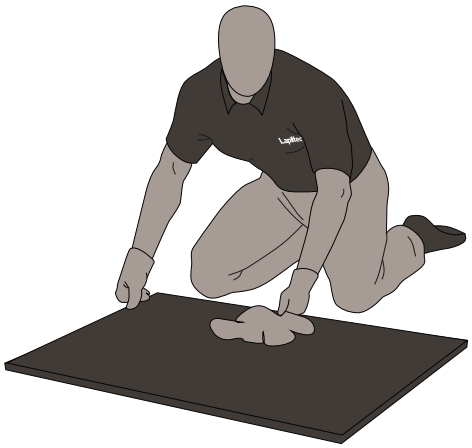
When tough reaction resin grouts (class RG) are used, take care to avoid dirtying the **Lapitec®** surface, using protective elements if necessary.

3.1.7/ Cleaning

After installing the covering and applying the grout, the **Lapitec®** surfaces need to be cleaned and protected.

All installation material residue must be removed, taking care not to damage the covering.

Use suitable detergents for cleaning. Surfaces must be cleaned in respect of the drying times of the adhesives and grouts used and no later than the times specified to remove said substances from the surfaces. If using tough grouts, delayed cleaning of the surfaces may compromise the aesthetic result of **Lapitec®**. If deep cleaning is required, Lapitec SpA recommends following the instructions provided in the dedicated chapter. Surfaces must be cleaned using manual and/or mechanical equipment.



NOTE: Before proceeding, perform a cleaning test on a limited area of the covering.

After installing the coverings, if additional works must be carried out near or above the surfaces (electrical connections, plumbing works, painting and decorating...) it is recommended to protect the surfaces with tarpaulins and/or elements that prevent accidental impact and any type of soiling.

In the case of outdoor surfaces, the tarpaulins used must be weatherproof and must not deteriorate, thus becoming “stuck” to the covering.

4. SPECIAL APPLICATIONS

4.1/ SWIMMING POOLS

Lapitec® slabs are suitable as a pool covering material. Its high resistance to outdoor weather conditions and non-slip properties of the various finishes, makes **Lapitec®** perfect as a covering for indoor and outdoor pools, as well as for details such as edges, poolsides and steps. **Lapitec®** can be used in both fresh and salt water. The Arena and Fossil finishes are those with the highest non-slip coefficient (R13 according to the DIN 51130 standard), and are therefore the most suitable for pool edges, steps and poolside areas.

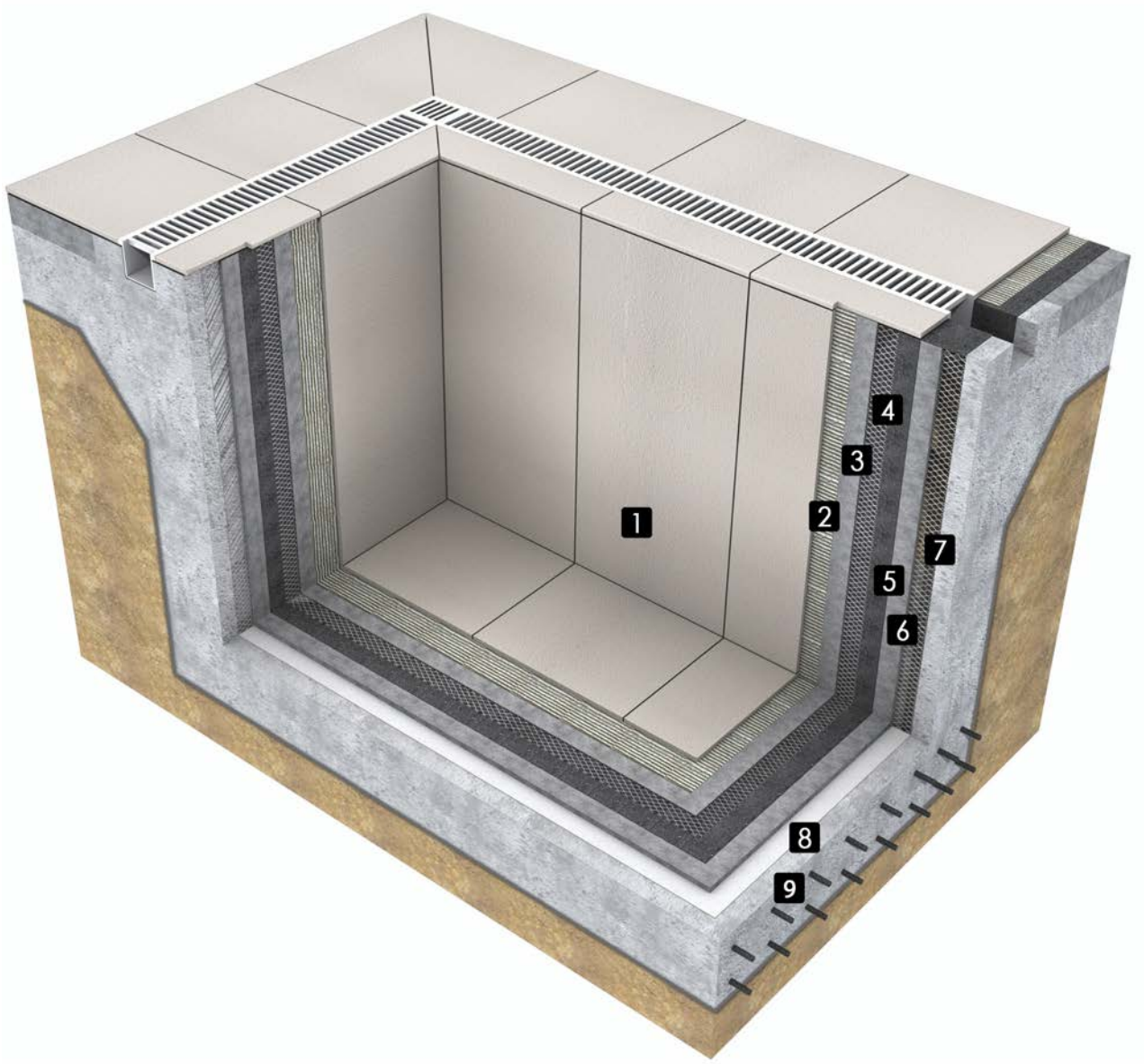
When designing and developing water-based structures such as swimming pools, several essential factors must be considered to ensure a successful result.

PREPARATION OF SUBSTRATES

In order to apply the covering, the inner horizontal and vertical substrates must first be levelled. All surfaces must be thoroughly cleaned using a pressure washer in order to remove any surface bleeding and residue of release agents. Potential cracks must be filled using specific products. Correct levelling of the pool floor will guarantee a mechanically resistant and compact substrate, suitable for the installation of the waterproofing system and subsequently the covering. Recommended products for the management of cracks include Eporip by Mapei, and for waterproofing, Mapelastic and Mapenet 150, respectively an elastic two-component cementitious grout and glass fibre mesh resistant to alkali, to form a waterproof layer. Before installing the waterproof membrane, it is recommended to use rubber tape in the most critical points such as the drains and pool floor/wall connections. After installing the waterproof membrane, its seal must be checked.

Also in the case of repair works, just like new constructions, the following checks must be carried out: preliminary inspection of substrates, preparation of surfaces, sealing of lighting elements and water recirculating and filtration elements, levelling and waterproofing of pools.

A typical pool constructive section is provided as an example, showing the different layers of the substrate.



Key

01 Lapitec covering
02 Adhesive
03 Waterproofing membrane
04 Glass fibre mesh
05 Waterproofing membrane
06 Screed and cement render
07 Render mesh
08 Bonding slurry
09 Substrate

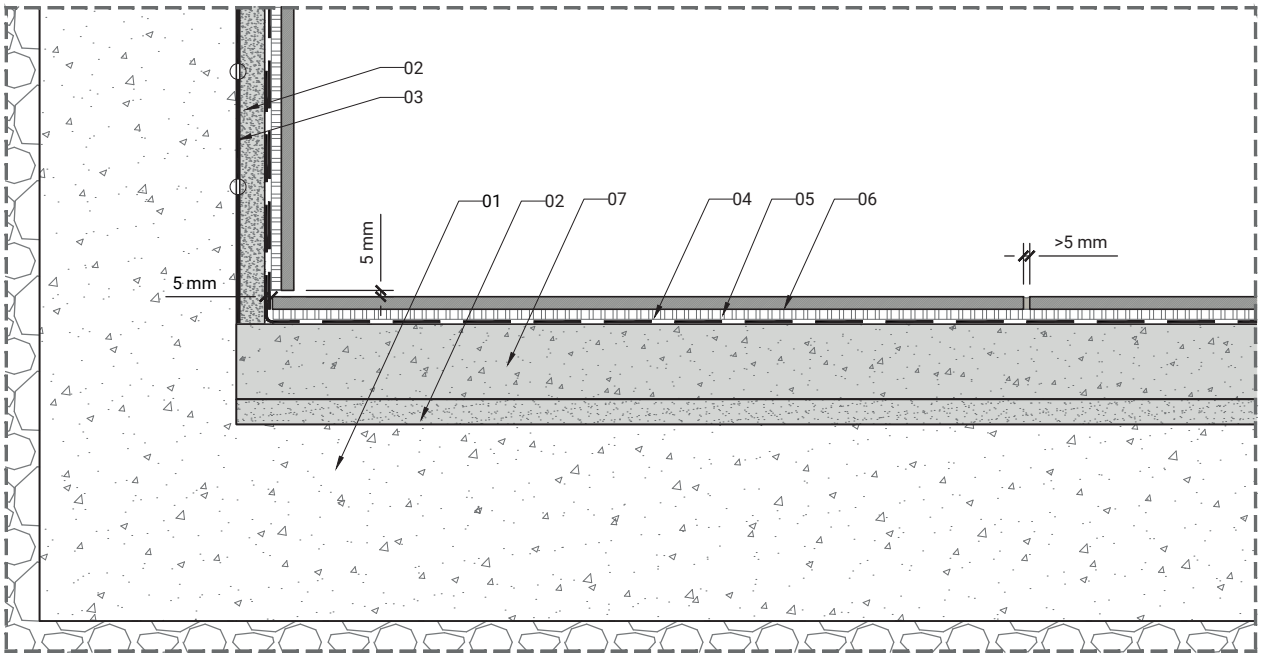
INSTALLATION OF LAPITEC

Before installing the covering, it is important to check the water tightness of the waterproofed pool. Once the proper execution of the waterproofing membrane has been checked, the coverings can be installed.

The choice of products for the installation of pool coverings must consider several factors, including: weather conditions at the time of installation; the time before use of the pool; the chemical and mechanical stresses that will be exerted during use.

Among the available adhesives, Lapitec recommends two-component fast-setting types, either cementitious or epoxy. Possible cementitious adhesives include: Mapei Elastorapid (C2 FTE S2) and Keraquick Maxi S1, Laticrete 254 Platinum with high resistance, SikaCeram 255 Starflex LD and PCI Flexmortel S1 and S2. Among the epoxy adhesives, Mapei Kerapoxy Adhesiv, which is more resistant to acids and cleaning and is also compatible with salt water and/or non-cementitious substrates. Lapitec SpA recommends contacting the manufacturer of the adhesives for an additional assessment of the product most compatible with the specific requirements of the project.

The installation must guarantee an adhesion surface equal to 100% of the total surface area of the slab to be installed (full contact). Buttering on the rear face of the slab must be linear and the direction of buttering must be parallel to the short end of the slab in order to facilitate the release of air during positioning and prevent the formation of voids; the same direction must be used on the floor and covering (back-buttering).



Key

01 Substrate
02 Cementitious grout
03 Glass fibre mesh
04 Waterproofing membrane
05 Adhesive
06 Lapitec covering

GAP GROUTING AND JOINT FILLING

The installation of the covering must factor in the suitable sizing of the gaps, as set out by standard UNI 11493 (gapless installation is not allowed). The gap must be 5-6 mm, to be checked in each instance by the designer and construction management.

The choice of product for grouting will depend on various factors: the nature of the water in the pool; the available time before use; the type and frequency of planned sanitation. It is recommended to respect the adhesive times before applying the grout.

Epoxy grouts classified RG, thanks to their high chemical and mechanical resistance properties, generally ensure improved durability with respect to cementitious grouts and are preferable in cases where frequent water sanitation cycles are planned. In the case of pools containing thermal or brackish water and applications requiring high resistance to chemical substances, cementitious products should not be used.

Lapitec SpA indicates several compatible epoxy grouts such as Mapei Kerapoxy, Ardex WA and RG12, similarly recommended for more aggressive environments, such as salt water. Other cementitious grouts such as Mapei Ultracolor Plus are suitable, but present greater degradation with respect to epoxy grouts.

Grouting must be carried out exclusively using syringes and instruments recommended by the manufacturer companies. It is recommended to spread the grout along the gaps using a trowel to encourage the filling of the gaps themselves, paying particular attention to the details such as the steps. Correct filling will prevent the infiltration of water under the slabs. During installation, proceed by grouting small square areas, cleaning with a sponge and water and making sure to rinse the sponge often. Lapitec recommends paying special attention to light colours and when selecting a grout colour to match the slab colour. The final cleaning operation can be considered concluded once all residue has been removed from the tiles. Any cementitious grout residue can be removed using an acidic detergent at the end of the works.

To conclude a correct installation system, elastic fillers must be applied on the expansion joints, corners, edges, changes in slope and wall/floor connections.

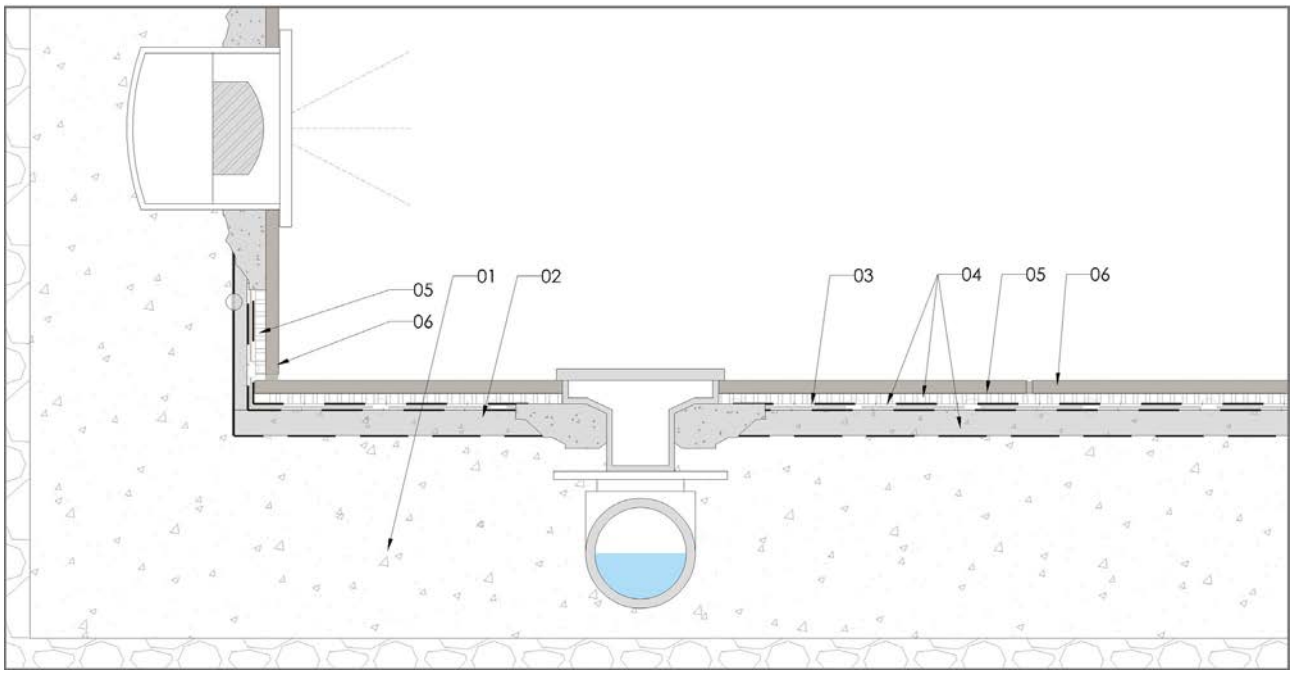
Lapitec SpA recommends acetic silicones as the most resistant in wet environments such as pools. Mapesil AC by Mapei is a suitable product, to be applied with a specific primer. Pay attention not to leave any stains on the slabs when applying the silicones.

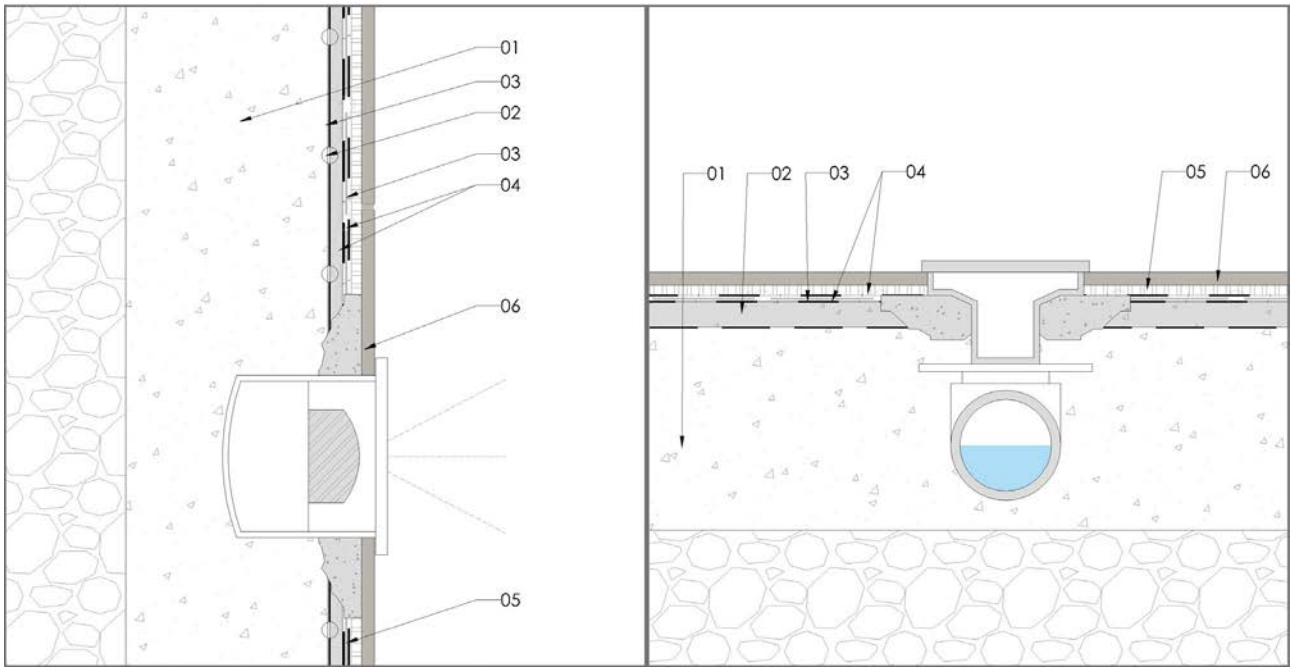
Once the grout has been applied, wait for the relative drying time to pass in accordance with the respective manufacturer's instructions before filling the pool.

MAINTENANCE

It is important to keep pool use interruptions (empty pool) to a minimum in order to avoid excessive strain during complete pool emptying (unexpected interruption of water pressure in components, loss of temperature and constant humidity of structure). When necessary, filling and emptying must be carried out slowly at a speed of approximately 5 cm of height/hour.

See the general indications of the specific chapter for information on routine and special maintenance.





Key

01 Substrate
02 Cementitious grout
03 Glass fibre mesh
04 Waterproofing membrane
05 Adhesive
06 Lapitec covering

4.2/ SHOWERS AND THERMAL AREAS

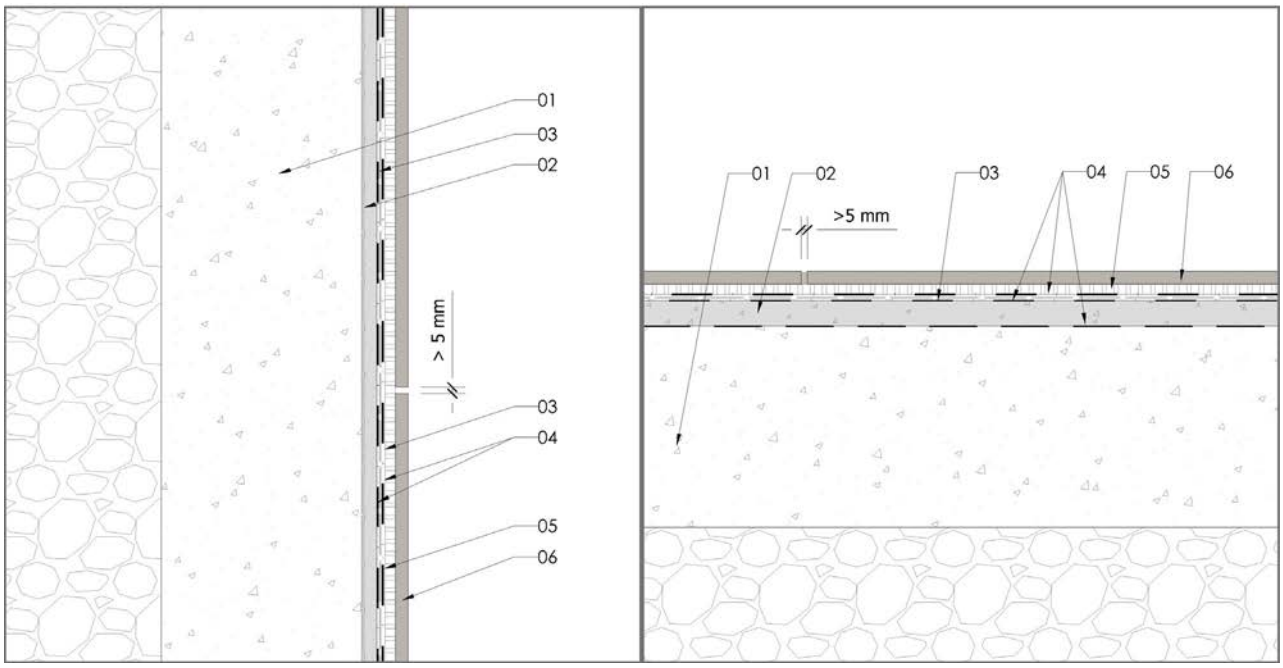
Lapitec® slabs are suitable as a covering material in showers and thermal areas. The friction coefficient of the Arena and Fossil finishes, those with the highest non-slip coefficient (R13 in accordance with the DIN 51130 standard), are most suited for the covering of stairs and poolside areas, especially outdoors. For indoor use, finishes with R10 Vesuvio, Lithos and Dune are recommended, which are easier to clean.

PREPARATION OF SUBSTRATES

For the preparation of Lapitec substrates see the same instructions as those for pools (previous chapter). In the case of thermal areas, in certain cases the substrate, in addition to being waterproofed, may need to guarantee a vapour seal so as to prevent the risk of transferring moisture to adjacent environments (especially in the case of vertical substrates).

Lapitec SpA recommends the project, in terms of sizes, time frames and methods of execution, be followed by a qualified technician.

Following are the typical constructive sections.



Key

01 Substrate
02 Cementitious grout
03 Glass fibre mesh
04 Waterproofing membrane
05 Adhesive
06 Lapitec covering

INSTALLATION OF LAPITEC

Before installing the covering, it must be checked that the waterproofing membrane has been properly laid.

The choice of products for the installation of coverings in wet environments shall depend on several factors, including: the size and type of material being installed; weather conditions at the time of installation; the time before use of the areas; the chemical and mechanical stresses that will be exerted during use.

Adhesives and grouts for the application must be suited to the environment and used in accordance with the instructions provided in the technical data sheets of the respective manufacturers. It is important to scrupulously follow the installation and maintenance recommendations of the manufacturer, with particular attention to epoxy grouts requiring specific procedures of use.

For thermal areas, it is strongly recommended to use acid-resistant epoxy adhesives able to resist against the conditions of use and cleaning.

Lapitec SpA indicates suitable fast-setting adhesives that speed up the grouting and use times of the structure. These include Mapei Kerapoxy Adhesiv and Kerapoxy CQ, Laticrete 255 Multimax, PCI Flexmortel S1 and S2. In any case, the authorised technician is responsible for the selection based on the project specifications.

Finally, we remind you that the adhesion surfaces must be equal to 100% of the total surface area of the slab to be installed (full contact).

GAP GROUTING AND JOINT FILLING

The installation of the covering must factor in the suitable sizing of the gaps, as set out by standard UNI 11493 (gapless installation is not allowed). The gaps have multiple functions, among which to reduce the rigidity of the covering, thus making it more resistant to deformations. Moreover, they must be created in relation to the size of the slab being installed and the severity of the thermal fluctuations in the area. Indicatively speaking, gaps should be 5-6 mm, to be checked in each instance by the designer and construction management. In the presence of environments subject to high thermal fluctuations, the minimum guaranteed gap between slabs must be 5 mm.

Epoxy grouts in class RG generally guarantee improved durability with respect to cementitious grouts and are preferred in cases where frequent sanitation cycles are planned, and for applications requiring high resistance to chemical substances that are potentially aggressive for cementitious products. The same considerations applicable to acid-resistant epoxy adhesives also apply to grouts. Lapitec SpA therefore indicates the two-component epoxy types, Kerapoxy and Kerapoxy CQ by Mapei, available in a range of colours.

Grouting must be carried out exclusively using syringes and instruments recommended by the manufacturer companies. First and foremost, the grout should be spread along the gaps, possibly using a trowel to encourage the filling of the gaps themselves. During this step special attention must be afforded to details such as steps: it is important to ensure proper filling in order to prevent the infiltration of water under the slabs. Then proceed by grouting small square areas, cleaning with a sponge and water and making sure to rinse the sponge often. The final cleaning operation can be considered concluded once all residue has been removed from the tiles. Any cementitious grout residue can be removed using an acidic detergent at the end of the works.

To conclude a correct installation system, elastic fillers must be applied on the expansion joints, corners, edges, changes in slope and wall/floor connections.

In regards to specific products for joints, Lapitec SpA recommends acetic silicones as the most resistant in thermal and wet environments. Mapesil AC by Mapei is one of the most suitable products, to be applied with a specific primer. Pay attention not to leave any stains on the slabs when applying the silicones.

MAINTENANCE

See the general indications of the following chapter for information on maintenance. A first and very thorough clean must be carried out as soon as the works are finished as the grouts harden very quickly, in as little as a few minutes. This must occur in accordance with the cleaning methods indicated by the manufacturer of the grout used.

4.3/ TERRACES AND BALCONIES

Lapitec® slabs, thanks to their large size, allow the design of all details of terraces and balconies, choosing from thicknesses of 12 and 20 mm. Lapitec SpA recommends selecting the covering finish in consideration of its non-slip classification and specific indications regarding the cleaning and maintenance of surfaces.

When designing terraces and balconies, it is recommended to follow a few essential guidelines in order to guarantee correct design and execution, both in terms of the substrate and Lapitec covering.

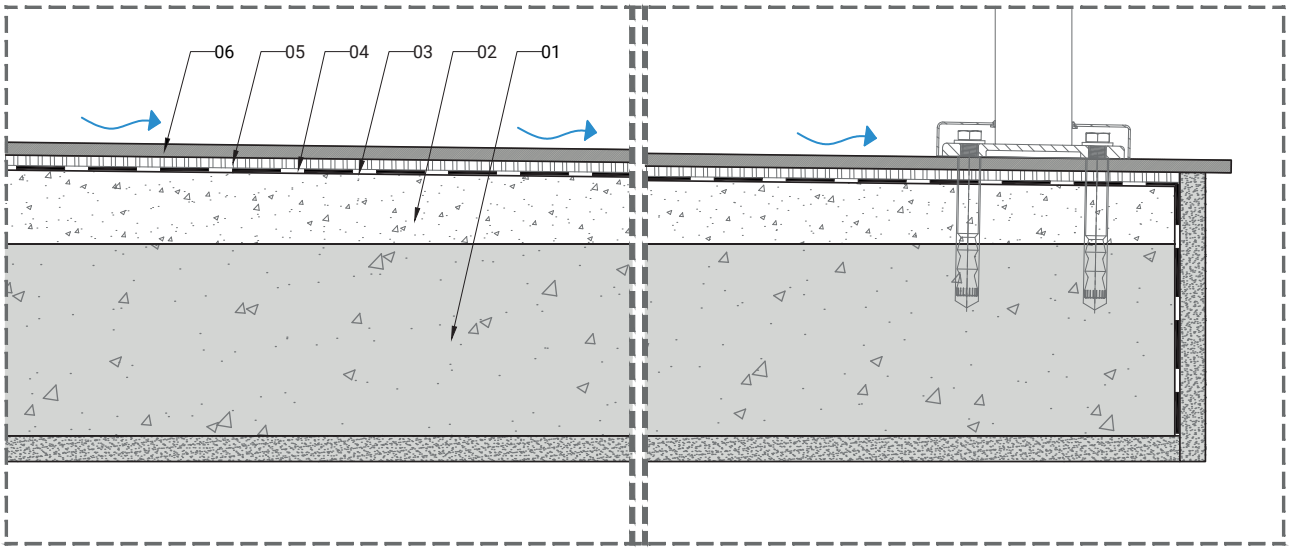
PREPARATION OF SUBSTRATES

Cement conglomerate is considered the structural substrate of terraces and balconies. The design must always carefully consider all deformations of the substrates insofar as these concern not only the structure, but also the superstructure and therefore the screeds and coverings on which structural and expansion joints must be created. In order to prevent water retention, the substrate must guarantee a minimum slope of 1-1.5% and be designed with suitable run-off and drainage systems. In the case of waterproofing, under the screed, it is advisable to prescribe a drainage layer on top of the waterproof layer, with a suitable run-off system in order to prevent the risk of water infiltrating the slab and being intercepted by the waterproof layer but without any way out/run-off.

The dynamic and physical stresses to which terrace and balcony structures are subjected mean the waterproofing layer must not only guarantee waterproofing, but also increase the durability of the structure, supporting its deformations. In certain points such as railing attachments, drains, gutters, vertical/horizontal connections and joints, Lapitec recommends applying bands of rubber tape to guarantee the continuity of waterproofing. If the external render has already been applied, it will need to be removed up to a height of about 10 cm from the extrados of the future flooring in order to guarantee the waterproofing turn-up directly on the masonry and not on the render.

The waterproofing products indicated by Lapitec include Mapelastic and Mapenet 150 by Mapei, respectively an elastic two-component cementitious grout and glass fibre mesh resistant to alkali, which form a waterproofing layer of 3mm.

A typical pool constructive section is provided as an example, showing the different layers of the substrate.



Key

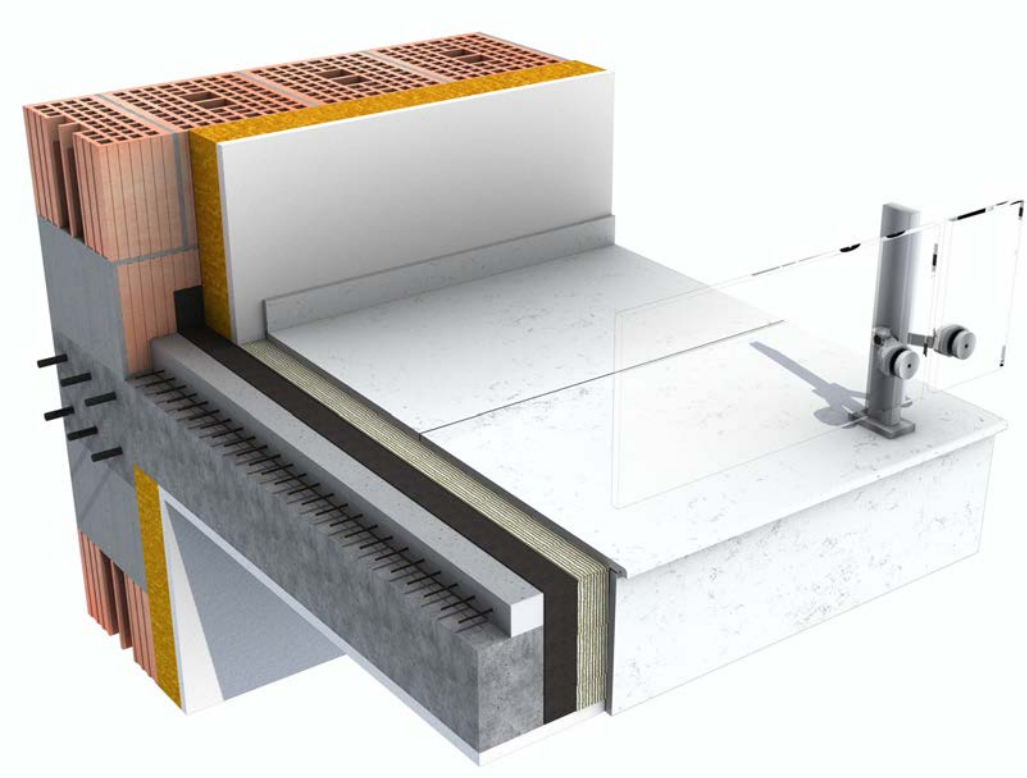
01 Substrate
02 Cementitious grout
03 Levelling system
04 Waterproofing membrane
05 Adhesive
06 Lapitec covering

INSTALLATION OF LAPITEC

The flooring of a terrace or balcony with direct exposure to the sun is subject to night-time/seasonal thermal fluctuations by a few dozen degrees, which may determine the development of stressful states due to the difference in the thermal expansion coefficients of the covering with respect to the substrate. In these conditions it is important to adopt an installation technique that includes expansion gaps and joints. The floor must respect the existing joints in the substrate (structural joints), and if these are not present or create very large areas, expansion joints must be developed every 9-12 m². In the case of surfaces with an elongated rectangular plan, such as balconies, joints must be created every 4-5 m² at most.

The skirting, fixed to the vertical substrate with an adhesive, must maintain a distance from the horizontal surface of at least 2mm. Pay special attention during application in the water collection and run-off points: here, the alignment of the slabs and drainage element must provide adequate insulation, thus preventing the water from reaching the substrate and building up under the covering. Even the run-off fronts and edges of the outer tiles, which are exposed to the risk of retaining water in contact with the edge of the covering, must be developed in such a way as to prevent the infiltration of water, using a drip to protect the edges of the slabs.

Lapitec recommends paying special attention to elements such as railing posts during the design and working stages. The covering must never come into contact with these elements, the distances (2-5 mm) will ensure the elements are able to move freely without stressing the Lapitec covering. A section of a typical post is shown as an example.



The choice of adhesive is of essential importance: in the aforementioned exposure conditions and on an elastic and deformable substrate such as the waterproofing system used, it is necessary to use an adhesive system in class C2, that is, with improved adhesion, or class R2, that is reactive with improved adhesion, and F, fast-setting, according to that set out by the standard EN 12004. Deformability must be selected based on the size of the tiles and layout of the terrace. The adhesive must be applied using the back-buttering technique and with adhesion surfaces equal to 100% (full contact) to prevent the formation of voids under the covering, thus reducing the build-up of rainwater under the slabs to a minimum.

In general, for large slabs we recommend two-component fast-setting adhesives as being the most suitable, whether cementitious such as Mapei Elastorapid and Ultralite S1 and S2, or epoxy such as Kerapoxy and polyurethane such as Ultrabond eco Pu2K. From Ardex we recommend X78S, a cementitious adhesive with improved adhesion. These adhesives, insofar as fast-setting, speed up the grouting and use times of the structure. In any case, the choice shall be made by the authorised technician depending on the specific requirements of project.

GROUTING THE GAPS

Upon the completion of works, the gaps must be grouted and the joints must be filled, taking care to follow the technical instructions provided by the manufacturer in order to ensure the correct execution and future maintenance of the covering.

The most suitable grouts indicated by Lapitec SpA include Kerapoxy and Kerapoxy CQ by Mapei, both two-component and epoxy grouts available in a range of colours, and Keracolor FF mixed with Fuglastic, a cementitious grout.

Lapitec SpA recommends leaving a minimum gap of 5 mm in outdoor installations, to be checked in each instance by the designer and construction management.

To conclude a correct installation system, it is advisable to use elastic fillers on the expansion joints, corners, edges, changes in slope and wall/floor connections.

In regards to specific products for joints, Lapitec SpA recommends acetic silicones as the most resistant. Mapesil AC by Mapei is a suitable product, to be applied with a specific primer. Pay attention not to leave any stains on the slabs when applying the silicones.

MAINTENANCE

Routine maintenance using suitable tools (e.g. detergents, monobrushes, pressure washers etc.), must be carried out systematically, ensuring no dust deposits or any type of residue is left on the floor for long periods, which would make subsequent cleaning more difficult.

See the general indications of the dedicated paragraph for information on special maintenance. A first and very thorough clean must be carried out as soon as the works are finished as the grouts harden very quickly, in as little as a few minutes. This must occur in accordance with the cleaning methods indicated by the manufacturer of the grout used.

4.4/ FIREPLACES AND STOVES

Lapitec®, thanks to its physical-mechanical properties, can be installed near sources of heat such as fireplaces or stoves, taking care to follow the instructions provided in this paragraph.

Disclaimer

Lapitec® sintered stone is classified A1 according to the standard EN 13501-1. When exposed to fire it does not ignite, does not release fumes and does not spread flames. In any case, direct contact with sources of heat such as flues, open flames and other causes of sudden changes in temperature may cause violent contractions and subsequent breakages.

PREPARATION OF SUBSTRATES

Consult qualified designers for all considerations regarding the structure of the fireplace/stove.

In order to apply a covering, the flue must be suitably insulated and a suitable separation structure must be created between the flue and the covering itself.

The insulation is also essential in ensuring the good performance of the adhesives, which can withstand certain temperatures (see the technical data sheets of the individual adhesives).

The insulation is also essential in ensuring the good performance of the adhesives, which can withstand certain temperatures (see the technical data sheets of the individual adhesives).

INSTALLATION OF LAPITEC

Lapitec® slabs must always be installed without being laid on different types of materials and taking care to avoid any thermal shock due to direct exposure to flames.

The adhesion system must take into account the nature of the slab and of the substrate. The system indicated by Lapitec SpA for applications in fireplaces and stoves is 310 Stone Adhesive by Laticrete. Additional adhesives are indicated in the chapter 2.8 ADESIVI. The designer and installer must ensure that the adhesive used is compatible with the maximum temperatures that can be reached by the substrate, otherwise a mechanical fixing system must be employed.

The adhesion surface must always be properly insulated from the source of heat (refractory bricks, mineral wool layers, heat reflective membranes...).

Pay special attention to edges and corners. The recommendation also applies to any joints between elements.

GROUTING THE GAPS

In the case of fireplaces and stoves, the same recommendations apply as for vertical applications, in addition to the need to carefully select products suitable for exposure to heat. Lapitec SpA recommends checking each specific instance with the designer and construction management.

MAINTENANCE

Routine maintenance using suitable tools must be carried out systematically, ensuring no dust deposits or any type of residue is left behind for long periods, which would make subsequent cleaning more difficult.

See the general indications of the dedicated paragraph for information on special maintenance. A first and very thorough clean must be carried out as soon as the works are finished as the grouts harden very quickly, in as little as a few minutes. This must occur in accordance with the cleaning methods indicated by the manufacturer of the grout used.

5. MANUAL PROCESSING

5.1/ INTRODUCTION

Lapitec® is a sintered stone supplied to the worksite ready for installation (cut, drilled and processed).

A good design and accurate site survey will allow all processes to be carried out at the company premises, avoiding the need for inconvenient and critical adjustments in the worksite.

Should processing be necessary in the worksite, it is recommended to strictly follow all instructions provided in this manual, using the tools supplied and/or recommended by Lapitec SpA.

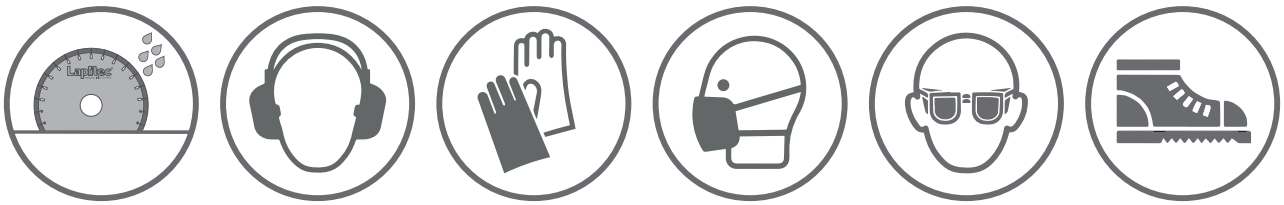
If it becomes necessary to perform any type of process, it is good practice to carry out preliminary tests for both cutting and drilling in order to acquire familiarity and avoid unfortunate inconveniences.

On request, the company can provide manufacturing scraps to use for this scope.

To perform manual processes, it is recommended to abide by health and safety legislation in force.

Each worker must have the PPE (Personal Protective Equipment) specific to the required processes.

Following are our recommendations.

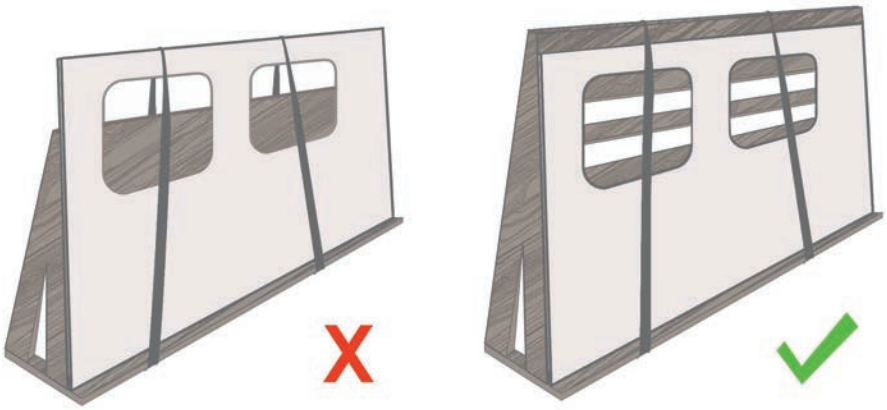


5.2/ SLAB RECOVERY

The slabs are packaged either on A-frames and/or in crates. Individually, they must be transported with care and stacked on their side, regardless of their size, making sure to insert materials between the different pieces, and between the slabs and the support, to prevent any potential breakages (e.g. wooden shims). The slabs must be suitably supported so as to avoid any flexion and must be housed in spaces that are not subject to any accidental impact (passageways or manoeuvring areas).

If they must be deposited outdoors, they must always be protected against the rain by a sheet, thus preventing any stagnation on the slabs. If the slabs are wet during packaging, the packaging must be completely removed and the slabs must be arranged in such a way as to perfectly dry.

During any manual processing, the slabs must be properly supported. The support must be sufficiently rigid, perfectly flat and in good condition. A wooden support is preferable to a metal one in order to prevent scratches due to rubbing on the Lapitec surfaces.



5.3/ MANUAL CUTTING

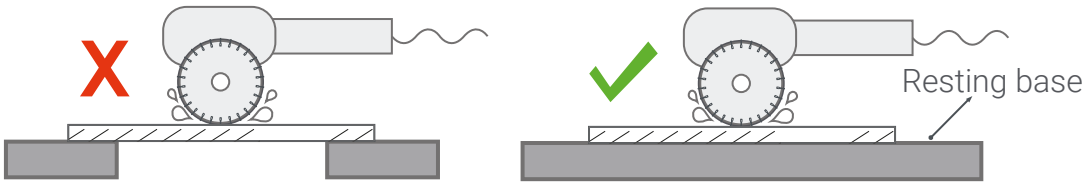
The instructions provided in this paragraph refer to manual cutting only; for benchtop processes (saw, waterjet or CNC), refer to the specific chapters.

In order to proceed, it is necessary to use the cutting tools supplied and recommended by Lapitec SpA, or alternatively, tools whose full compatibility with the indicated type has been checked, always with plenty of running water for cooling and to reduce dust. Lapitec SpA does not recommend dry cutting.

Processing must always start from the finished surface and proceed toward the unfinished one.

Once cutting is complete, it is recommended to lightly sand (with a sandpaper pad, 60/120 grit) the top and lower edge of the newly cut side. This technique will prevent inconvenient chipping and prevent the risk of cuts (the hardness of **Lapitec®** leaves the edges quite sharp).

Supplier	Tool	Grinder rotation
Lapitec®	Saw blade for manual cutting	13.000

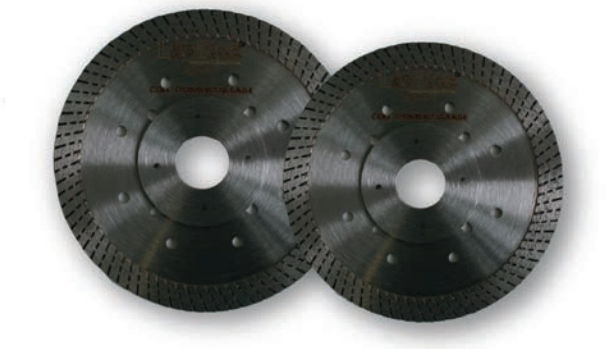


5.3.1/ Tools - blades for on-site cutting

To process the material on-site, Lapitec SpA supplies and suggests specific tools, all tested and guaranteed. The approved tools are available at Lapitec SpA, which declares their suitability for use.

Continuous rim diamond blades for manual tools (angle grinders, flex...)
Ø 115 mm attachment Ø 22 (*) RPM from 11,000 to 13,000
Ø 125 mm attachment Ø 22 (*) RPM from 11,000 to 13,000
Ø 230 mm attachment Ø 22 (*) RPM from 9,000 to 11,000
(*) adaptor also available for Ø 20

Lapitec® saw blade for manual cutting
Diameters 115-125-150-230 mm



The sequences are subject to possible variations due to the continuous effort to improve processing products. It is recommended to contact the supplier or the LapitecACADEMY service for all clarifications.

5.4/ MANUAL DRILLING

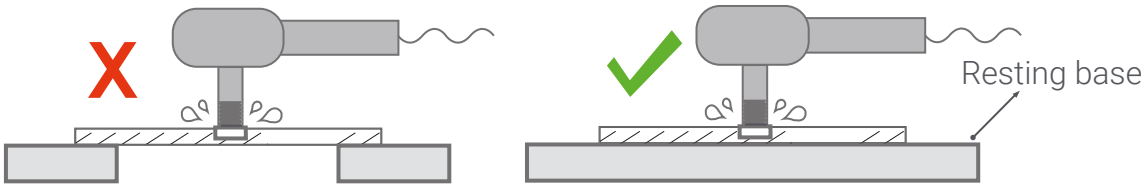
If cut-outs need to be made (for piping, wiring, air vents...) Lapitec can be drilled using the tools listed below and the indicated methods.

The part to be drilled must be suitably supported, as in the case of cutting; during drilling operations, all types of percussions must be avoided so as to prevent breakages.

To proceed with drilling, water must be used for cooling and to reduce dust. Lapitec SpA does not recommend dry cutting.

Processing must always start from the finished surface and proceed toward the unfinished one.

Attention: drilling must always start from the finished surface and proceed toward the unfinished one.



5.4.1/ Tools - bits and hole saws for on-site drilling

To process the material on-site, Lapitec SpA supplies and suggests specific tools, all tested and guaranteed. The approved tools are available at Lapitec SpA, which declares their suitability for use.

Diamond hole saw for drilling with manual tools (drills...)

Holes Ø 06 mm attachment HEX RPM 1,800 - 2,000 (for drill)
Holes Ø 08 mm attachment HEX RPM 1,800 - 2,000 (for drill)
Holes Ø 10 mm attachment HEX RPM 1,800 - 2,000 (for drill)
Holes Ø 12 mm attachment HEX RPM 1,800 - 2,000 (for drill)
Holes Ø 14 mm attachment HEX RPM 1,800 - 2,000 (for drill)
Holes Ø 06 mm attachment M14 RPM 1,800 - 2,000 (for flex)
Holes Ø 08 mm attachment M14 RPM 1,800 - 2,000 (for flex)
Holes Ø 10 mm attachment M14 RPM 1,800 - 2,000 (for flex)
Holes Ø 12 mm attachment M14 RPM 1,800 - 2,000 (for flex)
Holes Ø 14 mm attachment M14 RPM 1,800 - 2,000 (for flex)
Holes Ø 15 mm attachment M14 RPM 3,000-11,000 (for flex)
Holes Ø 20 mm attachment M14 RPM 3,000-11,000 (for flex)
Holes Ø 25 mm attachment M14 RPM 3,000-11,000 (for flex)
Holes Ø 30 mm attachment M14 RPM 3,000-11,000 (for flex)
Holes Ø 32 mm attachment M14 RPM 3,000-11,000 (for flex)
Holes Ø 35 mm attachment M14 RPM 3,000-11,000 (for flex)
Holes Ø 40 mm attachment M14 RPM 3,000-11,000 (for flex)
Holes Ø 50 mm attachment M14 RPM 3,000-11,000 (for flex)

Factory core drill bits
Ø 35 mm M14 1,500-2,500

5.5/ FINISHES

5.5.1/ Finish for top and edge - LUX

Supplier	Tool	Sequence adopted
Sanwa - Kenma (Alpha Tools)	Dia Ceramica - Ex Ceramica Series	150R - 300R - 500R - 1000R - 2000R - 3000R
Weha	Es Wet Use - Ex Series - Hybrid Flash	1 - 2 - 3 - 4 - 5 - 6 - 7 50 - 100 - 200 - 400 - 800 - 1500 - 3000 H1 - H2 - H3
Italdiamant	Ds Series	50 - 100 - 200 - 400 - 800 - 1500 - 3000

5.5.2/ Finish for top and edge - SATIN

Supplier	Tool	Sequence adopted
Sanwa - Kenma (Alpha Tools)	Dia Ceramica - TF Ceramica Series	150R - 300R - 500R*
Weha	Es Series - Hybrid Flash	50ES - 100ES - 200ES - 400ES - 800ES* H1 - H2
Italdiamant	Ds Series	50 - 100 - 200 - 400 - 800*

*Optional

See the technical manual of the tool manufacturer to determine the best working parameters.

5.6/ ASSEMBLY USING ADHESIVES

This paragraph deals with processes for bonding **Lapitec®** slabs to each other, in order to develop elements such as edges, steps and suspended corners.

Lapitec SpA has performed bonding tests on numerous products, not only for their technical performance, but also for the compatibility of their tone with the colours of **Lapitec®** slabs.

A number of Tenax branded products are proposed below, custom made for **Lapitec®** slabs and our colour range, inclusive of their technical specifications.

5.6.1/ Good practices for use of adhesives

Before applying the adhesive, check that the surface to be glued is clean, properly dried and free of any type of treatment. If it is necessary to glue on a treated surface, it must be sanded with coarse sandpaper (60-80) so as to remove the treatments and create a rough surface that guarantees certain and long-lasting adhesion.

For greater certainty on overhanging (45°) bondings, it is good practice to place a square or "L" profile measuring approximately 30 x 30 mm on the non-visible rear side of the material, along the entire gluing length of the lintel.

When it is not possible to use **Lapitec®** to support the finished piece, choose a material with the same expansion coefficient as **Lapitec®** (e.g. Granite).

Disclaimer

When selecting the adhesive, the intended function and use of the workpiece must be considered in order to identify the most suitable product.

5.6.2/ STRONGBOND Cartridge

Adhesive paste to glue **Lapitec®** suitable for both indoor and outdoor applications, also with persistent exposure to UV rays.

The Strongbond cartridge is characterised by its excellent adhesion in very short times (1 hour, 1 hour and 15 minutes), allowing the cutting and polishing of glued pieces.

5.6.3/ STRONGBOND A+B

New generation two-component adhesive with zero yellowing in the sun for **Lapitec®** bonding, suitable for indoor and outdoor applications and in the case of persistent exposure to UV rays. Paste product without solvents and with medium reactivity. Good hardness. The adhesive hardens even at 0°C. The appearance of the hardened film is still shiny and dry even in conditions with a poor humidity rate and temperature. Its use is suggested for white materials where it must be guaranteed that the resin will not yellow in the sun. Thanks to its properties, it does not leave streaks and its colour does not alter.

5.6.4/ FROZENBOND A+B

Extra-strong two-component epoxy adhesive in a very soft, spreadable thixotropic paste for vertical application, ideal for indoor and outdoor use, particularly suited to colder climates. Recommended for outdoor use. Characterised by high adhesion strength on multi-materials and weatherproof properties. Can be applied even on damp surfaces. Also suitable to bond different types of materials: **Lapitec®**-stone, **Lapitec®**-glass, **Lapitec®**-cement, **Lapitec®**-composite honeycomb panels, **Lapitec®**-wooden or laminate panels.

5.6.5/ FIREBOND

Adhesive paste to bond **Lapitec®**, suitable for indoor applications, offering particularly high resistance to heat and fast processing. Very fast, soft, with excellent workability. The Firebond product is characterised by excellent adhesion in very short times, 60-90 minutes, thus allowing the rapid processing of bonded pieces even at low temperature.

5.6.6/ RAINBOW

The systems described above can all be coloured with universal Rainbow pigments in a range of colours aligned with **Lapitec®** colours. The coloured paste features a soft, coloured and consistent appearance and mixes very well with all pastes, thus allowing easy colouration.

5.7/ BIO-CARE

Bio-Care is a technology that offers Lapitec antibacterial and self-cleaning properties during the production process. The functions of Bio-Care can be reactivated at any time by applying the Bio-Care kit. This treatment must be applied on the visible parts each time the material is processed (drilling, surface processing and cutting) in order to maintain the qualities attributable to **Lapitec®**.

How to apply

Make sure the surface is clean, dry and free of dust. Spread the Bio-Care One product evenly using a solvent-resistant cloth. When the product assumes a more viscous consistency (due to the evaporation of most of the solvent after about 2 minutes), remove the excess Bio-Care One with a clean cloth, taking care to remove any stains or shadows.

Attention: any shadows or stains left on the surface will become permanent once the treatment has completely hardened.

Treatment	Quantity gr/m²	Workpiece can be handled after
Bio-Care One	5-6	40 minutes

The surface can be handled 40 minutes after application; the treatment will have completely set and tests can be carried out after 7 days. The treatment can be manually applied on smaller surfaces. On slabs, the treatment must be applied using dedicated machinery. Given the minimal amount of product, it is recommended to apply **Lapitec®** Bio-Care One on several workpieces to be treated in a sequence.

Warning: do not turn upside down, store in a cool, dry place far from sources of heat.

5.8/ REPAIR KIT

The repair kit is composed of a 395nm UV torch, a coloured **Lapitec®** filler, 2 trowels, 1 diamond sheet 400 grit (usable on all finishes except Lux).

Instructions for use

Using the supplied trowel, thoroughly mix the filler until all the internal components are completely blended, then apply it in small quantities (drops) on the parts to be repaired.

Turn on the UV lamp and hold it over the repair to activate the solidification process (approx. 15-20 seconds). Manually check the compactness of the filler. Repeat the procedure until all chips have been filled.

Then protect the non-repaired section of the **Lapitec®** top with some masking tape to prevent the sandpaper from damaging the surface. Use the supplied diamond sandpaper to sand off any excess filler.

Then apply Bio-Care only on the repaired part to prolong the aesthetic effect of the repair over time.

Disclaimer

Failure to properly mix the filler may cause a difference in colour with respect to the **Lapitec®**.

The characteristics of the UV Lamp must be the same as those indicated by Lapitec, otherwise the filler may not completely react. For the Lux finish, use polishing paper for granite with grit up to 3000.

Poor chamfering on the edge of the workpiece may be the cause of chipping. For more information see the **Lapitec®** Technical Manual.

Duration of filler: 3 months in closed jar.

Hazard identification

Classification of substance or mixture: the product is classified as hazardous pursuant to the provisions set out in Regulation (EC) 1272/2008 (CLP) (and subsequent amendments), the product therefore requires a safety data sheet compliant with the provisions of Regulation (EC) 1907/2006 and subsequent amendments. Any additional information regarding risks to health and safety and/or the environment are reported in sect. 11 and 12 of this data sheet.

Watch the video tutorial

6. CLEANING, CARE AND MAINTENANCE

6.1/ ROUTINE CLEANING

Daily care forms the basis of correct maintenance of **Lapitec®** claddings. The material features excellent stain resistance, however prolonged or recurring use, especially in public places, may result in the deposit of particularly hard to remove grime. A good strategy to facilitate the removal of stains is not to wait for them to dry.

For routine care, **Lapitec®** coverings can be cleaned with a microfibre cloth and hot water, to which neutral detergents can be added (e.g. Vetril, Glassex or FilaBrio). These detergents must always be used in accordance with the indications of their manufacturers, especially in relation to their dilution ratios.

On **Lapitec®** surfaces it is not necessary to use scourer sponges, waxes, fatty soaps, impregnating agents and/or other protective treatments; rather, these products will leave an oily/shiny film on the surface that will compromise the final appearance of **Lapitec®**.

6.2/ REGENERATIVE CLEANING

In case of particularly stubborn stains or if routine cleaning is ineffective, more targeted cleaning will be required. Stains must be removed using products specific to the type of stain, taking care not to compromise the integrity of the surface.

Lapitec SpA has collaborated with Fila Industria Chemica SpA, a company specialised in surface cleaning, in order to identify the most suitable and efficient products for the proper cleaning of **Lapitec®** coverings.

Below is a table identifying the types of stains that may occur on the finishes and the products recommended by Fila Solution for their removal. Technical data sheets available on the website www.filasolution.com. The choice of detergent must be made based on the products reported in this table, or otherwise making sure that any other product has identical characteristics to those expressed herein.

Before proceeding, Lapitec SpA recommends contacting the provider of the cleaning products to obtain the most up-to-date documentation, always following the provided instructions.

After cleaning, the surfaces must be washed with plenty of warm water in order to remove all traces of the detergent used and dried with a cloth.

In the case of special needs, Lapitec SpA customer care can be contacted by writing to

customercare@lapitec.com

Type of dirt	Type of detergent
Oil and grease	FILA PS/87 - FILAFASEZERO
Beer	FILA PS/87 - FILAFASEZERO
Chewing Gum	FILA PS/87 - FILAFASEZERO
Vinyl glue	FILA PS/87 - FILAFASEZERO
Tyre marks and rubber shoe marks	FILA PS/87 - FILAFASEZERO
Silicone	FILA ZERO SIL
Ink	FILA PS/87 - FILA SR/95
Nicotine	FILA PS/87 - FILA SR/95
Urine and vomit	FILA PS/87 - FILA SR/95
Marker pen	FILA PS/87 - FILA SR/95
Hair dye	FILA PS/87 - FILA SR/95
Coffee	FILA PS/87 - FILA SR/95
Wine	FILA PS/87 - FILA SR/95
Blood	FILA PS/87 - FILA SR/95
Coca Cola	FILA PS/87 - FILA SR/95
Suction cup marks	A PS/87 - FILA CR10
Rust	FILA NO RUST
Metal/aluminium marks	FILA PHZERO
Cement-Potassium Nitrate (after laying)	FILA DETERDEK
Limescale	FILA DETERDEK
Pencil	FILA DETERDEK
Engobe	FILA DETERDEK
Epoxy grout (after laying)	FILA CR10
Enamel pain/wall paint	FILA NOPAINT STAR
Graffiti	FILA NOPAINT STAR
Dirty gap	FUGANET
Bitumen	FILASOLV
Candle wax	FILASOLV
Routine maintenance	FILACLEANER
Restoring wax finish	FILA SOLV - FILA ZERO SIL

Notes

Stains such as ink, paint, wax, oil/grease can also be removed using solvents such as a nitro thinner or turpentine. Before applying the product on the entire surface of the finish, it is recommended to test its efficacy on a small portion first.

Do not use hydrochloric acid or caustic soda concentrates and products containing hydrofluoric acid and its derivatives.

Warnings

If the material is not cleaned after installation, or in the case of poor cleaning, Lapitec SpA denies all liability in regards to the efficacy of cleaning and maintenance operations.

7. AFTER SALES

7.1/ LapitecLAB - Research centre

LapitecLAB is the Research and Development division dedicated to the study and experimentation of **Lapitec®** accessories and applications. The constant drive for innovation and the continuous development of new solutions allows us to meet the market's most specific needs.

Every single experience acquired working on international projects, in a range of different uses, is utilised to perfect the products and accessories sold by Lapitec S.p.A. Through a direct exchange with its customers, LapitecLAB continuously studies new solutions to offer an increasingly complete and efficient service for a diverse range of needs.

7.2/ LapitecACADEMY - Development centre

LapitecACADEMY is the division responsible for training and supporting professionals that work with **Lapitec®** through in-house company training courses and direct assistance. Thanks to the Academy Community service, all news and technical developments are rapidly diffused to the entire network of collaborators.

By attending the training course held by LapitecACADEMY, professionals can obtain an Approved Fabricator certificate and learn a series of helpful tips and **Lapitec®** machining techniques.

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8. CREDITS

We thank the following architects and architectural firms for the photographic references:
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