

Laterlite Expanded Clay



LIGHTWEIGHT, INSULATING, STRONG, NATURAL NON-COMBUSTIBLE AGGREGATE

FOR WEIGHT REDUCTION, INSULATION, BACKFILL, DRAINAGE, AND IN LIGHTWEIGHT CONCRETES AND MORTARS, GARDENING, AND AGRICULTURE

Laterlite Expanded Clay is a lightweight aggregate made by expanding special natural clays at high temperature (1200°C). It is supplied either as granules in a range of sizes or as a crushed version, with a peculiar set of characteristics.



CHARACTERISTICS

Lightweight, insulating, strong

Its porous internal structure means it is lightweight (from approx. 320 kg/m³), thermally insulating (from lambda [λ] 0.09 W/mK), and sound-absorbent. The ceramic "clinkered" outer shell surrounding the granules makes them very hard and resistant to compression (up to 12 N/mm).

Non-combustible and fire-resistant

This is a 100% mineral non-combustible product (Euroclass fire rating - A1) that is fire-resistant and safe, including in the presence of fire. It is commonly used in refractory applications.

Extremely stable and durable

It will not rot, cannot be attacked by parasites (fungus, rodents, insects, etc.), is resistant to acids, bases, solvents, and freeze-thaw cycles, is dimensionally stable and non-deformable, and retains its properties unaltered over time; for all practical purposes this material will last forever.

A natural material for sustainable construction

The natural raw materials used in Laterlite Expanded Clay, its manufacturing process that respects the environment, and the total absence of harmful emissions (even in the presence of fire), make it ideal for sustainable construction as certified by ANAB-ICEA, the Italian Accreditation Institute.

Versatility

Laterlite Expanded Clay is used extensively in construction, both loose on its own or mixed with binders (cement, lime, resins, etc.). It is widely used as a component of concretes (p. 24-25), in blocks and precast elements (p. 26-27), for agricultural and horticultural applications, and in geotechnical engineering and infrastructure works.

High drainage capacity

Because of its granular nature, which consists of a dense network of intergranular voids with high drainage capacity, it can be used to create lightweight drainage layers of high strength.

CE-marked

It is manufactured and tested in accordance with international reference standards, and is CE-marked to denote conformity to EN 13055-1, EN 14063-1, and EN 13055-2.



TYPES

GRANULAR

Laterlite Expanded Clay in granular form optimises the relationship between weight, lightness, and insulating ability. The characteristic spherical granules come in a wide range of sizes (denominations 0/2 – 2/3 – 3/8 – 8/20).

CRUSHED

Laterlite Expanded Clay can also be supplied in crushed form, in a range of sizes (denominations 0/2 FRT, 0/4 FRT and 2/4 FRT) suitable for use as a component in some lightweight concrete (e.g. for lightweight blocks and refractory products) and wherever there is a need for a lightweight fine material that has good insulation characteristics.

STRUCTURAL

We use a particular manufacturing process to obtain a special type of expanded clay that has a denser and porous internal nucleus and a thicker, more tenacious ceramic "clinkered" external shell of particularly high compressive strength. Structural Laterlite Expanded Clay is available in a range of sizes (denominations 0/5 – 5/15 – 5/15) for use as a component of lightweight structural concrete mixes (p. 24–25) and for all applications where particularly good mechanical performance is required.

DRY

All the standard versions of Laterlite Expanded Clay normally contain a varying percentage of humidity but on request, can be supplied dry (humidity approx. 1%). Expanded clay can also be manufactured as the Laterlite Plus variant, which is dry and hydrophobic (p. 10).



GRANULAR 0/2



GRANULAR 2/3



GRANULAR 3/8



GRANULAR 8/20



CRUSHED



STRUCTURAL

TECHNICAL CHARACTERISTICS

LATERLITE EXPANDED CLAY

	0/2	Granular			Crushed	
		2/3	3/8	8/20	FRT 0/2	FRT 2/4
Denomination *	0/2	2/3	3/8	8/20	FRT 0/2	FRT 2/4
Density in kg/m ³ (approx.) **	680	480	380	350	600	350
Resistance to granule fragmentation N/mm ² **	≥ 5,0	≥ 3,0	≥ 1,5	≥ 1,0	-	-
Certified thermal conductivity λ W/mK	0,12	0,10	0,09	0,09	0,10	0,08
Reaction to fire	Euroclass fire rating – A1 (non-combustible)					

LATERLITE DRY EXPANDED CLAY

	0/2	Granular			Crushed	
		2/3	3/8	8/20	FRT 0/2	FRT 2/4
Denomination *	0/2	2/3	3/8	8/20	FRT 0/2	FRT 2/4
Density in kg/m ³ (approx.) **	560	440	350	320	560	330
Resistance to granule fragmentation N/mm ² **	≥ 5,0	≥ 3,0	≥ 1,5	≥ 1,0	-	-
Certified thermal conductivity λ W/mK	0,12	0,10	0,09	0,09	0,10	0,08
Reaction to fire	Euroclass fire rating – A1 (non-combustible)					

STRUCTURAL

	0/5	Granular	
		5/15	0/15
Denomination *	0/5	5/15	0/15
Density in kg/m ³ (approx.) **	720	600	680
Resistance to granule fragmentation N/mm ² **	≥ 12,0	≥ 5,0	≥ 9,0
Certified thermal conductivity λ W/mK	0,12	0,12	0,13
Reaction to fire	Euroclass fire rating – A1 (non-combustible)		

Refer to the Technical Data Sheet and the Safety Information Sheet.

* "Denomination" means the commercial denomination of the product. It does not refer to the diameter in mm of the Laterlite Expanded Clay granules.

** the densities and strengths given are indicative averages based on annual production checks at each manufacturing unit and may deviate by ± 15% as permitted by European Standard EN 13055-1. On request, Laterlite Technical Support can provide Product Data Sheets that are produced by each manufacturing unit. These give the most detailed and up-to-date information.

For specific applications that use denominations 0/2, 2/3 of Laterlite Expanded Clay and denomination 0/4 of Laterlite Plus in components that are intended to remain visible, particular measures have to be taken (contact Laterlite Technical Support).

LIGHTWEIGHT AGGREGATES – LATERLITE EXPANDED CLAY



PRINCIPAL METHODS OF APPLICATION: GRANULAR PRODUCT

Support

The bearing layer must be solid, stable, free of cracks, discontinuities or loose parts, of high compressive strength, and free of dust or the remains of other materials. Any services previously laid on the bearing layer (electrics, water, drainage, etc.) must be adequately protected and distanced to prevent them from being damaged whilst the Laterlite granules are being laid. If the product is to be spread on the ground, a separating layer (such as a geotextile membrane) must first be laid.

APPLICATION METHODS

Loose application

In order to exploit to the full the insulating and lightness characteristics of granular Laterlite Expanded Clay, the material should be laid loose and simply levelled to the thickness desired (with slight falls if required). If the top surface is not to be walkable it can be left as is. If it is to be accessible or walkable or if a surface finish, such as an impermeable layer or paving, is to be applied, it must be covered with a layer of another material (various types of panel, a screed, a non-structural or structural floor slab, or plant growth soil), incorporating separation layers if required. N.B. the space to be filled with Laterlite Expanded Clay must be adequately contained at the sides, particularly if the layers are thick and if the material is to serve as backfill.

Surface bonding with cement slurry

The topmost granules of a layer of loose Laterlite Expanded Clay can be fixed with a cement slurry to make the surface easy to walk on for completing the job (by adding a top slab, a screed, etc.).

The cement slurry (a mixture of cement and water) should be spread over the surface of the loose Laterlite Expanded Clay after it has been levelled. By varying the proportions of water and cement (w/c), the slurry can be made more on less fluid and will penetrate to a greater or lesser depth into the layer of expanded clay. The suggested approximate w/c ratio is 0.8 (equivalent to 1 no. 25 kg bag of cement + 20 litres of water).

If the top surface is to be accessible/walkable, or if a top finish is to be applied (such as an impermeable layer or paving), an appropriate levelling or top screed will be required.

Binding with cement

Permeable concrete (open-pore structure)

Laterlite Expanded Clay binds easily with cement to give a lightweight insulating permeable concrete with better mechanical strength as compared to the loose product. These concrete mixes can be prepared using ordinary batchers or mixers.

Typical formulation per m³:

- 1 m³ (20 bags) of expanded clay in the desired grain size;
- 150 kg of type 32.5 cement;
- 80-90 litres of clean water (or less if the material is already wet).

Preparation in a concrete mixer:

Pre-humidify the granules by emptying 3 bags of expanded clay (150 litres) into the mixer along with 10 litres of water. Then add 1 bag of cement (25 kg) and 5 more litres of water. Mix for approx. 3 minutes.

No sand should be included in the mix. The dosages of cement should not be increased as this would increase the weight of the mix and reduce its insulating characteristics.

LIGHTWEIGHT AGGREGATES – LATERLITE EXPANDED CLAY

Due to the open-pore structure of a porous concrete of this type, it cannot take reinforcement. If the final surface is to be accessible or walkable or if a top finish is to be applied (such as an impermeable layer or paving) a screed will be required.

Other binders

other types of binder, such as hydraulic lime and resins, can also be used with Laterlite Expanded Clay. In some situations it may be necessary to use the hydrophobic version of Laterlite Plus (p. 10). For further information, consult Technical Support.

LAYING WATERPROOFING AND PAVING: LEVELLING/COVER SCREEDS

If paving or waterproofing is to be laid on top of loose Laterlite Expanded Clay whose surface has been consolidated with slurry or that has been bound with cement, a top screed is required to level the surface and distribute the loading. This screed can be made using one of the Latermix range of pre-mixed screeds, or a traditional sand/cement mix. It can vary in thickness from 3 cm if it is to take an impermeable membrane to 5 cm if a residential type of floor finish is to be applied.



CONSIGNMENT

BAGS

Granular Laterlite Expanded Clay is consigned in easy-to-handle 50-litre polythene bags (20 bags/m³), on non-returnable wooden pallets each holding the following quantities:

- 30 bags (1.5 m³) of the 0/2 denomination.
- 60 bags (3.0 m³) of the 2/3 denomination.
- 75 bags (3.75 m³) of the 3/8 and 8/20 denominations.

By request, the 3/8 and 8/20 denominations of Laterlite Expanded Clay can be consigned on pallets each holding 35, 50, or 65 bags.

BIG BAGS

By request, all types of Laterlite Expanded Clay can be consigned in big bags of capacity approx. 1 – 1.5 – 2 – 2.2 – 3 m³.

LOOSE

All types of Laterlite Expanded Clay can be consigned loose:

- in tipper trailer trucks (bulk cereal side or rear tipping type) of capacity up to 65 m³ depending on the denomination and type, or in "walking floor" trailer trucks of capacity up to 80 m³.
- in silo trailer trucks of capacity up to 60 m³ fitted with pumping gear of power sufficient to move the material for a distance of up to 30m vertically or 80m horizontally.
- in containers for sea transport
- by ship for large quantities of product in bulk.

By request, different denominations can be delivered in a mix of sizes.

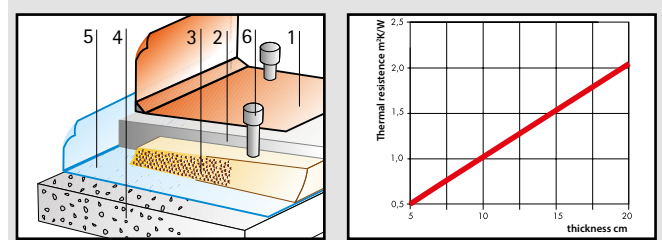


PRINCIPAL APPLICATIONS

Flat and sloping roofs

When used on a roof Laterlite Expanded Clay ensures that the necessary degree of insulation combined with high thermal inertia - the two indispensable requirements for comfortable winter and summer habitation - will be met. Because it is a lightweight material it can be laid to a considerable thickness without excessively loading the structure.

In its loose form, after it has been consolidated on its top surface, or has been bound with cement, it can be used as an insulation layer that can incorporate falls for rainwater run-off, or as ballast on top of a waterproof layer. If it is to take an impermeable membrane, a screed will be required (see p. 7). It can also be applied on roof pitches if it is consolidated with cement.



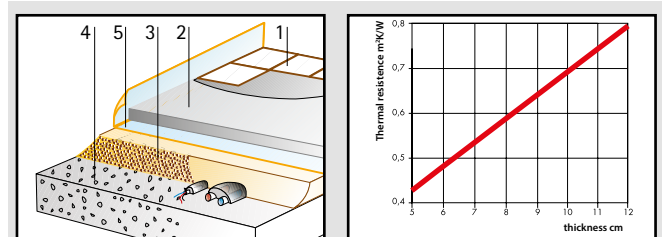
- 1 Impermeable membrane.
- 2 Sand/cement screed or Latermix lightweight levelling screed.
- 3 Weight reducing/insulation/ fall layer of Laterlite Expanded Clay.
- 5 Vapour barrier.
- 4 Slab.
- 6 Vent.

As a base layer for a floor finish

Because of the low specific weight of Laterlite Expanded Clay it can be laid to considerable thicknesses, and can incorporate services (electrical, water), whilst keeping the structural loading low.

The porous nature of the expanded clay granules gives excellent thermal insulation and improves acoustic insulation.

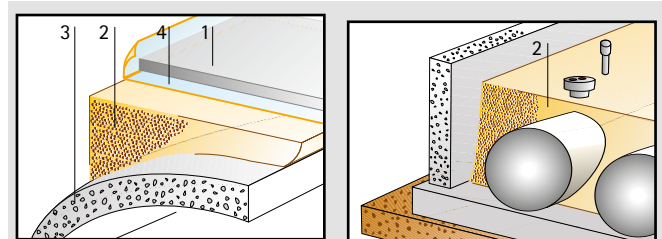
For laying the floor finish, a lightweight insulating top screed is required, either using one of the mixes in the Latermix range or a traditional sand/cement mix.



- 1 Floor finish.
- 2 Latermix or sand/cement screed.
- 3 Lightweight insulating substrate of Laterlite Expanded Clay.
- 5 If required, elastic layer for impact sound installation and/or as a vapour barrier.
- 4 Slab.

Lightweight insulating backfill, including for refractory purposes

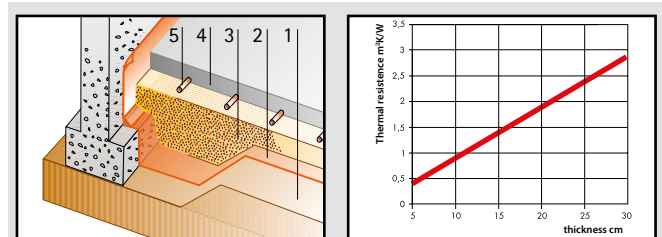
New construction often requires a backfill material that is stable, durable, lightweight, and non-combustible. It is even more frequently required for structural purposes in the refurbishment of old buildings, for instance as a lightweight fill on top of old structural vaults and different types of floors and decks, etc. Laterlite Expanded Clay is extremely well-suited to these applications. It can also be used as backfill in proximity to structural elements that are combustible (such as timber stairs and suspended floors, in relation to which see also Laterlite Plus p. 10-11). Laterlite Expanded Clay is also extensively used as an insulation material in civil and industrial construction as fire protection, for making safe active or redundant cisterns and storage tanks, for laying underground pipelines, and as insulation at high temperatures, including of refractory type.



- 1 Latermix or sand/cement screed.
- 2 Lightweight Laterlite Expanded Clay backfill/Insulation.
- 4 If required, elastic layer for impact sound installation and/or as a vapour barrier.
- 3 Structure.

Insulation for foundations and earth retaining walls

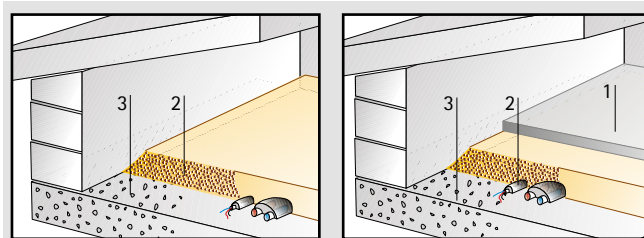
The underground parts of buildings must be adequately insulated to reduce heat loss into the ground. Laterlite Expanded Clay can be used for this purpose in civil, industrial, and zootechnical buildings, and as a hardcore layer with effective insulating characteristics below most floors, including industrial floors, refrigerated cold stores, or floors that incorporate heating pipework. For these types of application the recommended product is Laterlite Plus Hydrophobic Expanded Clay (p. 10-11), which is also very effective against rising damp or as insulation and drainage behind vertical earth-retaining structures.



- 1 Ground.
- 2 Impermeable separating layer
- 3 Laterlite Expanded Clay or Laterlite Plus insulation
- 4 Floor slab, industrial floor, or screed.
- 5 Underfloor heating if required.

Roof voids

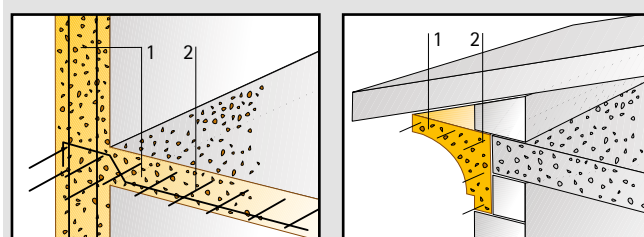
Laterlite Expanded Clay can be used in roof voids as a durable insulating layer of high compressive strength that is impenetrable to rodents or birds. Its very good thermal inertia makes it particularly effective as insulation that reduces summer overheating. If the roof void is not walkable the product can be laid loose (or in bags placed directly on the floor). If the roof void is to be accessible, the surface can be slurried or covered with wood-cement slabs; if it is to be walkable the product can be mixed with cement and topped with a screed.



- 1 Screed (if required) in Latermix or sand/cement.
- 2 Laterlite Expanded Clay insulation.
- 3 Floor slab.

Lightweight structural cast concrete

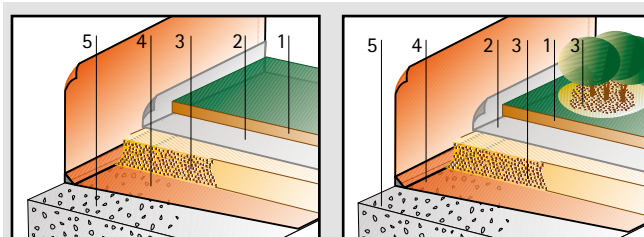
Laterlite Expanded Clay and Laterlite Structural are special high-strength aggregates that can be used as a component of lightweight structural concretes for the construction of collaborating floors, strengthening existing floors, and for in-situ or precast structures, giving significant weight savings as well as a number of other significant benefits (p. 24 – 25).



- 1 Lightweight structural concrete with Laterlite Expanded Clay.
- 2 Reinforcement.

Landscaping and roof gardens

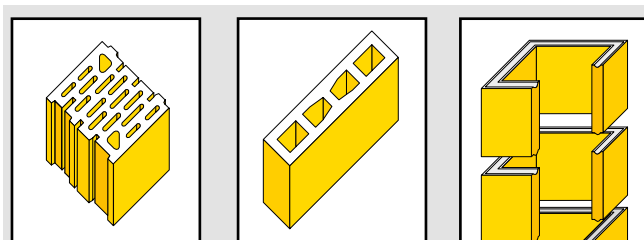
Laterlite Expanded Clay is widely used as a lightweight drainage layer in landscaped areas (green roofs, roof gardens, ponds, planters), or as a component of the growing or mulching layer for all types of garden. Laterlite Agri Expanded Clay (p. 12-13), the special aggregate with neutral pH, is a suitable product for these applications and for hydroculture.



- 1 Growing soil.
- 2 Filtering layer.
- 3 Laterlite Expanded Clay drainage or mulching layer.
- 4 Impermeable layer.
- 5 Structure.

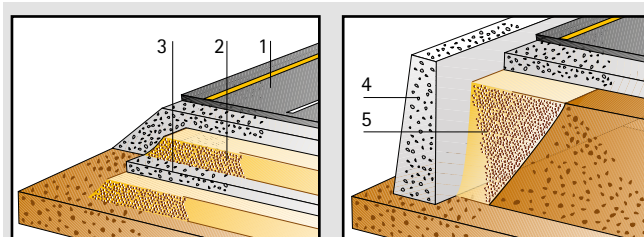
Blocks and small precast elements, including refractory products

The lightness, insulating, and fire resistance characteristics of Laterlite Expanded Clay make it the most important base material for fabricating a wide range of precast elements and components including refractory and sound absorbing products. such as blocks for construction, precast panels, chimneys and flues, fireplaces, and barbecues (p. 26-27).



Geotechnical engineering and road construction

The lightness and strength characteristics (its high angle of internal friction) of Laterlite Expanded Clay enable it to be used as a lightweight gravel for constructing embanked roads, reducing the weight of foundations, backfilling behind gravity retaining walls and reinforced retaining walls, stabilising slopes, backfilling tunnels and underground cavities, drainage, and in all geotechnical engineering applications (a specific manual is available for these types of application). Laterlite Expanded Clay and Laterlite Strutturale Expanded Clay can also be used as components of bituminous mixes for high-adhesion sound-absorbing asphalts.



- 1 Roadbed.
- 2 Laterlite Expanded Clay embankment.
- 3 Quarry mix ballast layer.
- 4 Retaining wall.
- 5 Laterlite Expanded Clay drainage backfill.