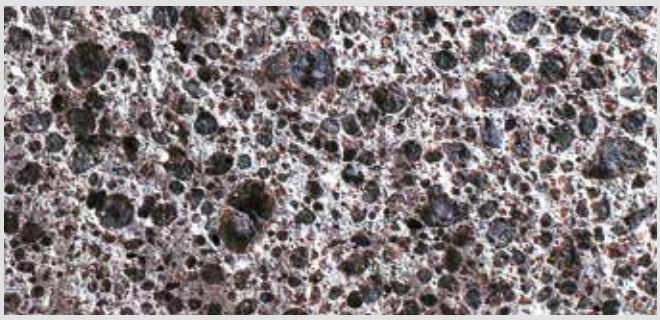
CONCRETE BATCHING AND PRECASTING PLANTS

LIGHTWEIGHT STRUCTURAL CONCRETES MIXED WITH LATERLITE EXPANDED CLAY IN CONCRETE BATCHING PLANTS OR PRECASTING FACTORIES



Thanks to its mechanical strength and lightness, the different versions of Laterlite Expanded Clay make it the ideal aggregate for formulating lightweight structural concrete mixes. By completely or partly replacing traditional aggregates with Laterlite Expanded Clay, in fact, the properties of the concrete can be varied to give a wide range of densities and strengths.
These can be used both for in situ casting and for making precast elements in dedicated manufacturing plants. The different mix designs are generally configured to meet the final design requirements, using whatever aggregates are locally available.

PRINCIPAL CHARACTERISTICS

CE-marked mineral aggregate

Laterlite Expanded Clay is a lightweight aggregate that is suitable for use as a component of lightweight structural concrete because:

- As a 100% mineral product it is stable, durable, and will not rot
- It is manufactured and tested in accordance with international reference standards and is therefore CE-marked to denote conformity to EN 13055-1 (Lightweight aggregates for concrete, mortar and grout)

Weight reduction

Laterlite Expanded Clay/Laterlite Structural can be used in lightweight structural concretes of density between 1,400 kg/m^3 and 2,000 kg/m^3, saving up to 1,000 kg (1 tonne) of dead load per m^3 as compared to traditional concretes (2,400-2,500 kg/m^3). On average, structures can be reduced in weight by 25% to 40%.

Good mechanical performance

Laterlite Expanded Clay/Laterlite Structural can be used in lightweight structural concretes of high compressive strength from 15 to 60 MPa (150 – 600 kg/cm^2). i.e. for all the same purposes as traditional concretes.
The tensile strength, flexural strength, pullout strength, and dimensional stability (shrinkage and creep) of these concretes are comparable to those of traditional concretes in the same class.

Structural calculation and statutory verification

Lightweight concretes based on Laterlite Expanded Clay can be formulated and designed to comply with international reference standards (EN 206, Eurocode 2, etc.)

Good insulating characteristics

The lambda (λ -thermal conductivity) of lightweight structural concretes based on Laterlite Expanded Clay/Laterlite Structural is up to 4,5 times lower than that of an ordinary concrete, reducing thermal bridging through external facades and increasing the energy efficiency of buildings.

Easy to pour

Most lightweight structural concretes based on Laterlite Expanded Clay are pumpable (particularly those of density greater than 1650 kg/m^3), This simplifies the site pouring process which is similar to that of an ordinary concrete. (Consult Technical Support).

Better behaviour in the presence of fire

The insulating and refractory properties of Laterlite Expanded Clay used in lightweight structural concretes give a better performance than that of ordinary concretes in the same class.

More efficient transportation and simplified handling

Thanks to the lower density of the concrete, particularly in precast components of large size.

APPLICATIONS

In structures where the self-weight is greater than the loads carried

In large-span bridges, precast Y-shaped roof beams, large precast panels, floor slabs with wide spans etc., the use of lightweight structural concrete enables structures of reduced cross-section to be created that require smaller amounts of concrete and reinforcement whilst also giving aesthetic and economic advantages.

Reconstruction work in general

The use of lightweight structural concrete for reconstructing floor slabs, for adding floors to existing buildings, and all other types of strengthening works to structural concrete (columns, loadbearing walls, edge beams, floor slabs, staircases, balconies etc.) helps to avoid overloading the existing structure and foundations.

New construction and reconstruction work in seismic zones.

The extent of seismic action is proportional to the mass of the structural elements affected; the use of lightweight structural concrete reduces the seismic stresses acting on them by reducing the inertial masses of the structure.

Structures bearing on soils of low bearing capacity

The complexity and cost of foundations can be minimised by reducing their structural weight. This enables the same loads to be supported, enabling larger buildings to be constructed.

Complex architectural projects

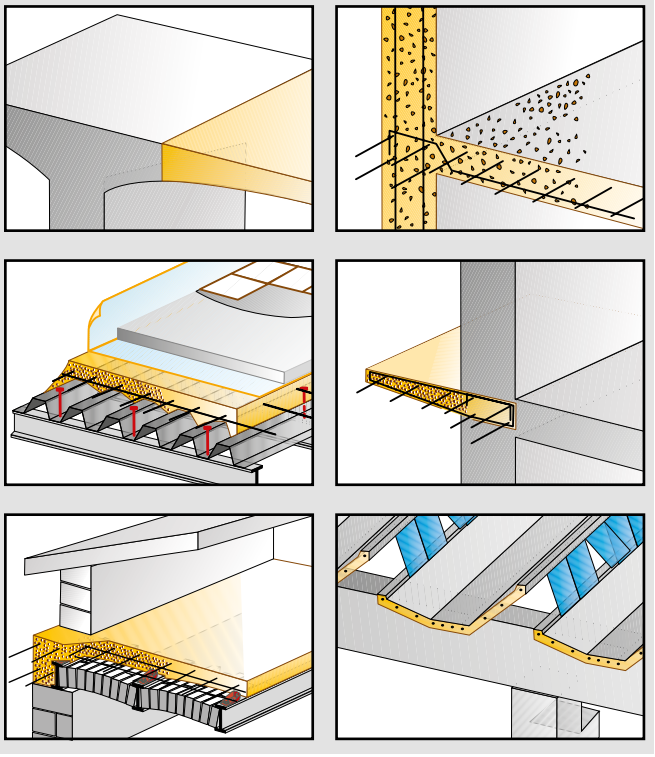
When the weight of concrete elements is reduced, greater design freedom, leaner structures, and fewer structural constraints become possible.

Reduced thermal bridging in the building envelope

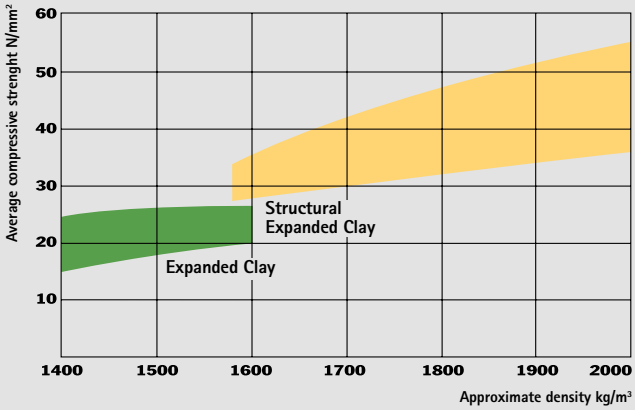
Thermal bridging caused by structural elements that pass through the external envelope (facades, roofs, foundations, etc.) is reduced by up to 4 or five times, reducing heat loss and the risk of building pathologies, and making it easier to comply with more restrictive regulations and certification protocols.

Precast structures and elements

Precast lightweight structural concrete elements are easier to manoeuvre, more economical to transport, have a leaner cross-section, give better insulation, and have better fire resistance than precast elements made with ordinary concrete.



LATERLITE EXPANDED CLAY CONCRETE DIAGRAM



METHOD OF USE

MIX PREPARATION

Laterlite Expanded Clay structural concretes are mixed in batching or precasting plants. For traditional pouring (using a chute or a bucket) the process is the same as for traditional concrete. Pumped pouring requires the correct mix design to be defined (contact Laterlite Technical Support). The following processes can be used:

- SCC Technology (self-compacting concrete)
- Pre-hydrating the expanded clay.

For specific information and for the mix design of lightweight structural concretes, contact Laterlite Technical Support.

NON-STRUCTURAL LIGHTWEIGHT INSULATING CONCRETES

Concrete batching plants can also be used to mix very lightweight non-structural concretes for use as lightweight backfill and in levelling layers. For more information contact Technical Support.

TECHNICAL CHARACTERISTICS

Examples of structural concretes with expanded clay

Density kg/m³ (approx.) (UNI EN 206-1)	1500	1600
Expanded clay type	Expanded Clay Laterlite	Structural Expanded Clay
Density (fresh)	1.650 kg/m³	1.750 kg/m³
Thermal conductivity λ	0,47 W/mK	0,42 W/mK
Compressive strength (car.) 28 days	15 N/mm² (150 kg/cm²)	25 N/mm² (250 kg/cm²)
Compressive strength (ave.) 28 days	20 N/mm² (200 kg/cm²)	30 N/mm² (300 kg/cm²)²
Modulus of elasticity (certified)	approx. 10.000 N/mm²	approx. 15.000 N/mm²

For further information contact Laterlite technical support