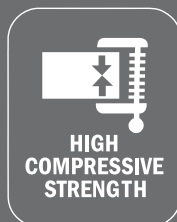




TOKYO SUPERLIGHT

Sri Lanka's First Cellular Lightweight Concrete Technology



Dear Valued Customer,

Greetings from the TOKYO SUPERHOUSE, Tokyo Cement Group's Innovations and Learning Center. And congratulations choosing TOKYO SUPERLIGHT Cellular Lightweight Concrete (CLC) blocks for your construction project !

Cellular Lightweight Concrete (**CLC**) not only has the smallest carbon footprint of any locally available building materials, but the best fire rating, the highest thermal insulation and therefore the greatest energy efficiency for your finished building. At a third of the weight and twice the compressive strength of conventional cement:sand blocks you can reduce your structural design requirements, and save cost.

Although **CLC** is relatively new to the Sri Lankan market, it has been a tried and trusted construction material in most of the developed world for decades.

To make it easier to adapt to, we would like to offer the services of our technical support team that can visit your site at a scheduled date to demonstrate the methodology to your workforce, so that they can implement it in the best possible way.

As most Sri Lankan developers, contractors, masons will be using **CLC** for the first time, we've compiled list of recommended practices from New Zealand, British and Indian construction codes so that you might get the best possible results. The following are some factors that must be considered when costing and building **CLC** walls. Please note that the material and therefore the methodology for **CLC** will differ from conventional block walls:

CLC blocks should be laid with a 5mm layer of **TOKYO SUPERSET: BLOCK BOND** (or alternative block glue) instead of the traditional 15-20mm layer of cement/sand mortar. This block bond was specifically designed for **CLC** and **AAC** blocks, as it has a higher adhesion strength, polymers to allow for material expansion and a fiber induced bonding material for better workability. Further, traditional cement sand mortar requires a surface to be porous to effectively adhere, however, a **CLC** block's smooth surface does not have the same surface properties as conventional cement/sand blocks to allow it to do so.

CLC walls must be plastered on the inside and outside using an alkaline-resistant, fiber mesh . This will help prevent the formation of hairline cracks that appear on walls over time due to the stresses of material expansion and contraction with changing climates.

At any point that a **CLC** wall meets a dissimilar material, i.e. column, beam, lintel or floor we recommend overlapping fibre mesh across the two surfaces in order to prevent aesthetic separation at these points.

We recommend plastering of all **CLC** walls with a 5-7mm layer of **TOKYO SUPERCAS: PLASTER MASTER** as its particle size, the addition of polymers and water retentive chemicals have been used to optimize bonding and coverage with the surface of **TOKYO SUPERLIGHT** blocks.

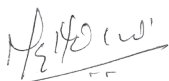
At any point at which the **CLC** wall meets a concrete beam, column, or lintel, the international codes insist on using either polyurethane spray foam or a 15mm polyurethane foam sheets. This is because (a) concrete beams may sag, (b) structural movements are not uncommon over time and (c) concrete will expand and contract at a different rate to **CLC** so the polyurethane foam will absorb these movements and prevent unnecessary stress on the walls.

Not all customers strictly adhere to this methodology, but deviation from this recommended methodology will be met with varying results. Yet, it is our responsibility to recommend the best practice, so that you might determine how you wish to proceed.

As the material manufacture, we do not take responsibility for workmanship error which is why we strongly recommend that you follow the detailed instructions outlined in the attached methodology statement for best results.

Assuring you of our fullest support throughout the process.

Best Regards,



Dr. M.G.M.U Ismail, Director - R&D

WHAT IS TOKYO SUPERLIGHT?

TOKYO SUPERLIGHT blocks use Cellular lightweight concrete (CLC) technology. Instead of coarse aggregates found in traditional cement blocks, the CLC blocks are comprised of millions of micro air bubbles that result in a lighter weight whilst increasing the structural integrity of the material, giving it a higher compressive strength than conventional blocks.

It is produced by homogenously blending Ordinary Portland Cement (OPC), manufactured sand, fibre, an IP-protected foaming compound, amongst other additives, using advanced mixing technology, whilst maintaining stringent quality control procedures.

TOKYO SUPERLIGHT blocks are a far more sustainable building materials as their superior thermal insulating properties require less energy consumption for air-conditioning and are manufactured through a carbon-neutral process (void of wood ovens or autoclaves used in traditional brick making). In addition to climate benefits, CLC is the best acoustic insulator, is graded with the highest fire rating and allows for the least water absorption compared to similar wall solution.

WHY USE TOKYO SUPERLIGHT?

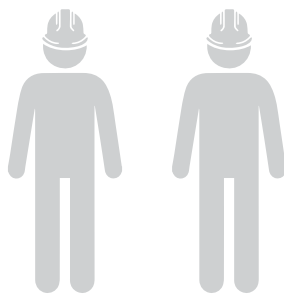


1/3 THE WEIGHT **2x** THE STRENGTH
OF A TRADITIONAL CEMENT BLOCK

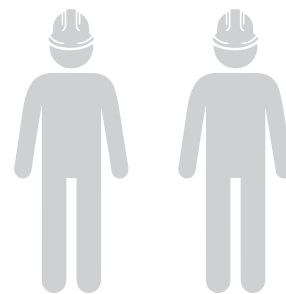


BUILD FASTER

TRADITIONAL
8 - 12 m² / day



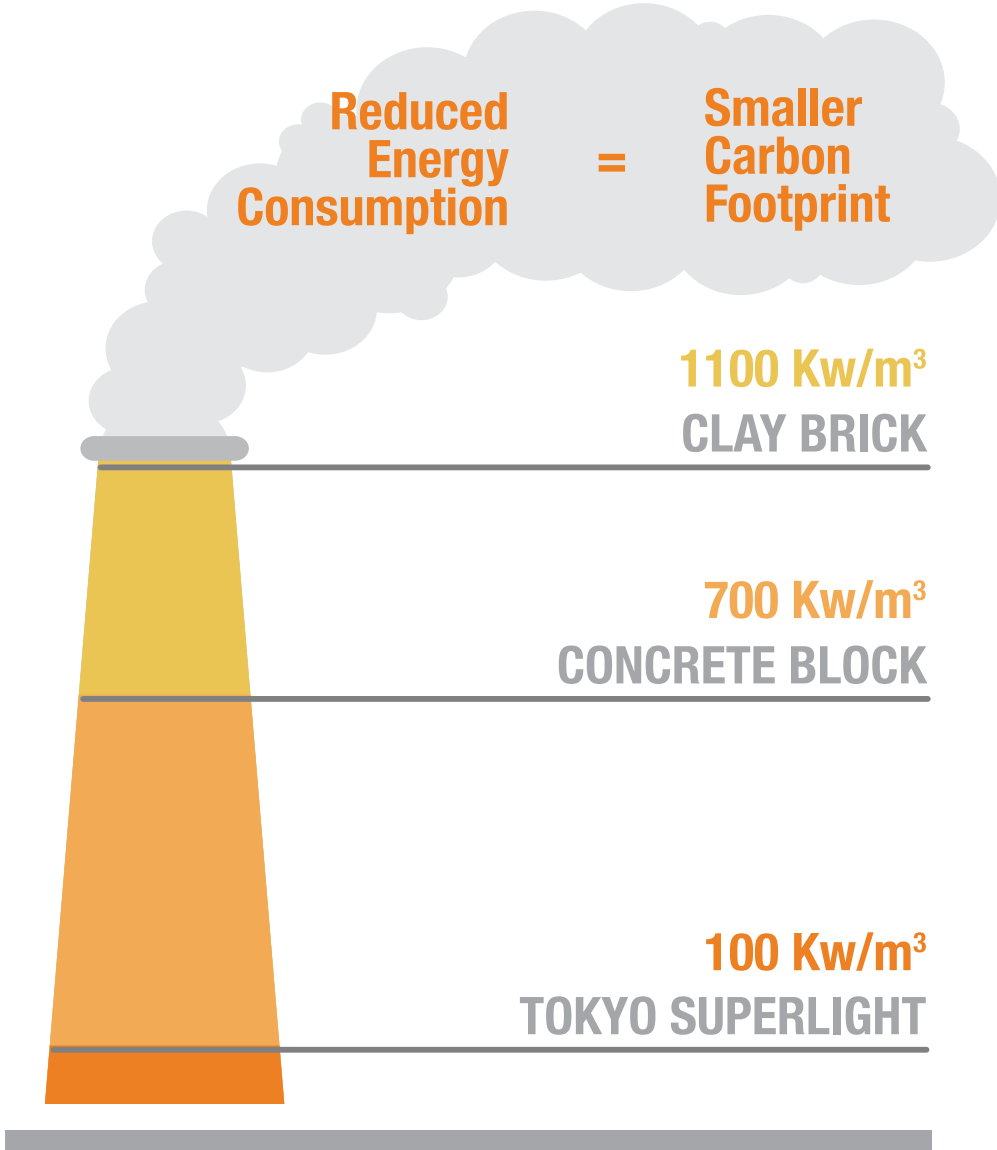
CLC
20 - 25 m² / day



2-5x
FASTER

TOKYO SUPERLIGHT requires less materials due to finishings and block size (in plaster and mortar) and takes considerably less time to build a wall due to the larger size. Therefore, fewer billable worker hours to complete the job.

THE ECO-FRIENDLY CHOICE



ENERGY SAVING

Unlike alternative materials that use furnaces and autoclaves, **TOKYO SUPERLIGHT** is designed to use the least amount of energy during production, making it the greenest material with structural properties.

DO MORE, WITH LESS!

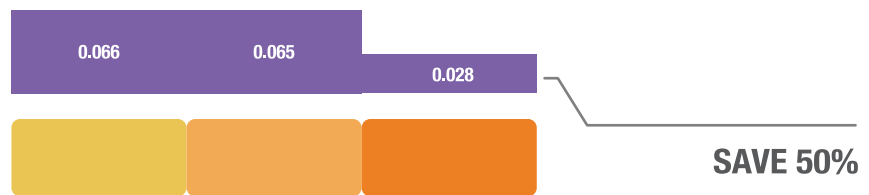
PLASTER THICKNESS (m³ / m²)

The considerably smoother surface and larger block size of **TOKYO SUPERLIGHT** mean cost saving of over 75% when casting plaster.

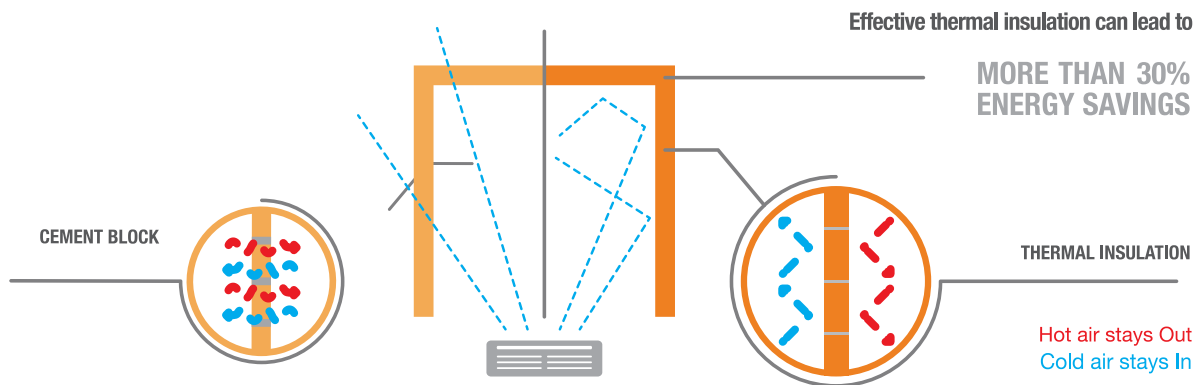


MORTAR THICKNESS (m³ / m²)

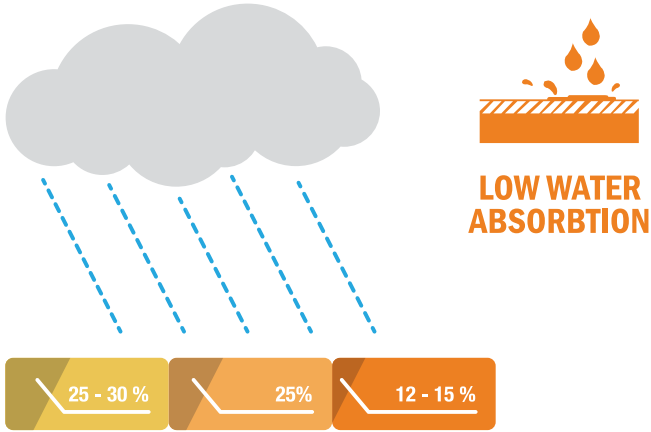
The considerably smoother surface and larger block size of **TOKYO SUPERLIGHT** mean cost saving of over 50% when laying mortar.



THERMAL INSULATION SAVES ENERGY

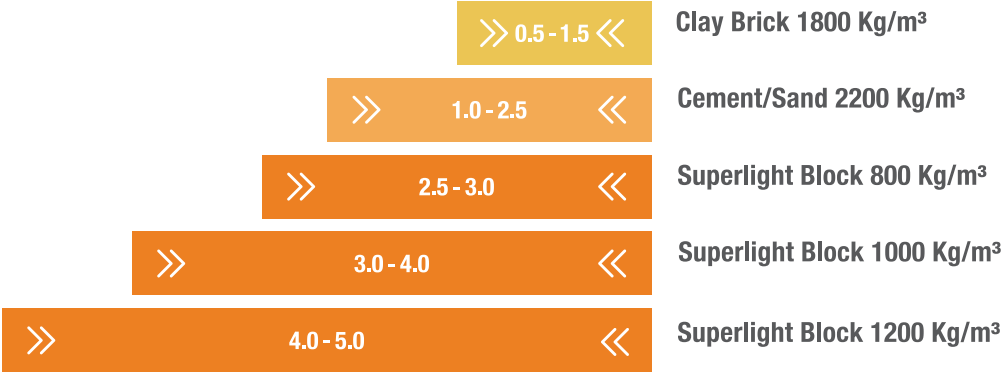


LOWEST WATER ABSORPTION



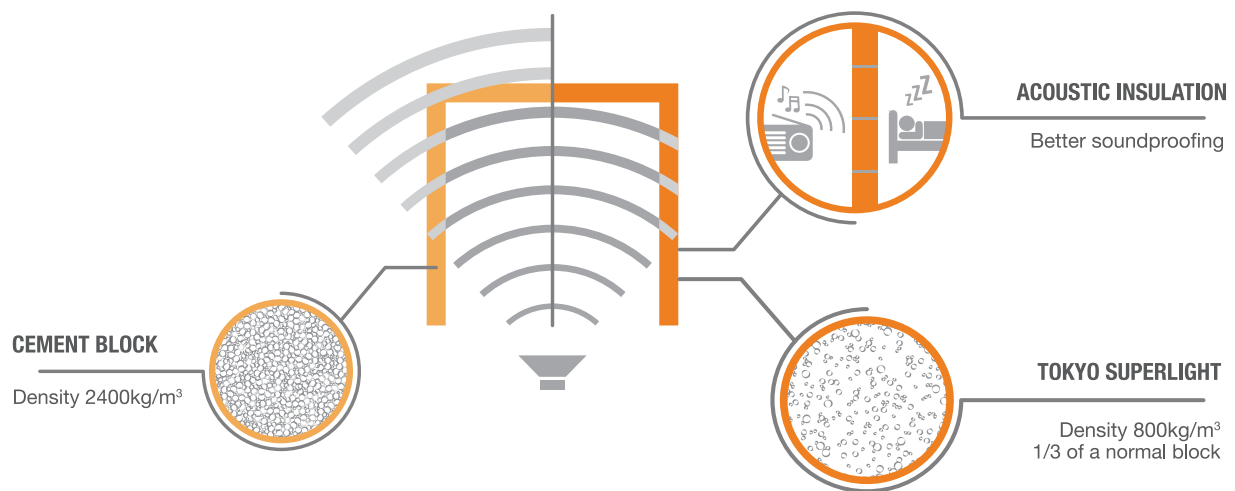
Porous materials retain water, which can raise structural weight by 30% requiring more plastering to prevent it.

COMPRESSIVE STRENGTH (N/mm²)



TOKYO SUPERLIGHT can be designed to your engineering requirement , from a lower density of 600kg/m³ for partition walls that have greater acoustic and thermal insulation making them perfect for high-rise apartments or hotel rooms to enhance privacy and prevent energy wastage or they can be manufactured to a higher density of 1000 -1200kg/m³ that have a higher compressive strength making them ideal for load-bearing, external walls.

AIR POCKETS = EFFECTIVE SOUND INSULATION



THE SAFEST CHOICE



EARTHQUAKE RESISTANCE

Can be designed for earthquake resistant structures.



FIRE RESISTANCE

Greater fire resistance rating than the alternatives.

MATERIALS

Dimensions in mm (L x H x W)	Interlock available?
500 x 200 x 100	✓
500 x 200 x 150	✓
500 x 200 x 200	

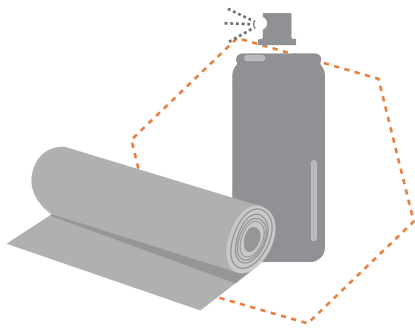


TOKYO SUPERLIGHT

Cellular lightweight concrete block, that maintains a bulk density of 800kg/m³ ($\pm 100\text{kg/m}^3$) and a compressive strength of $> 2.5\text{N/mm}^2$.

This density can be tailored to meet your requirements. **TOKYO SUPERLIGHT** is available in the following sizes.

500mm (Length) x 200mm (Height) x 100mm (Width) 150mm, 200mm



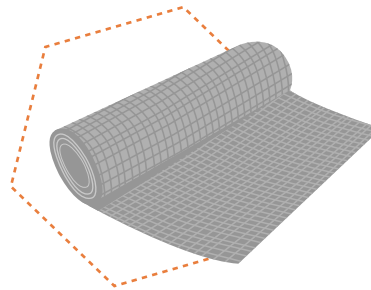
15mm POLYURETHANE FOAM SHEETS OR POLYURETHANE SPRAY CAN

15 mm thickness polyurethane foam sheets or polyurethane foam (Open cell spray foam, CFC and HCFC free, high expansion capacity with good adhesion to masonry and moisture absorption $< 1\%$)



TOKYO SUPERSET BLOCK BOND

TOKYO SUPERSET BLOCK BOND is a ready to mix masonry mortar specially developed for building walls with **CLC and AAC blocks**. This superglue-like mixture can achieve a consistency that spreads like butter, allowing for the use of less material, whilst guaranteeing a stronger bond.



FIBRE GLASS MESH

Alkaline resistant fibreglass mesh fabric, with a mesh size of 4x4mm and a GSM of 160.

MATERIALS



TOKYO SUPERCASST EXTERNAL WALL PLASTER

A 2-for-1 weatherproofing plaster that not only protects your walls from the elements - preventing blemishes and mould - but acts as a waterproofing layer on your outer surface of the structure.



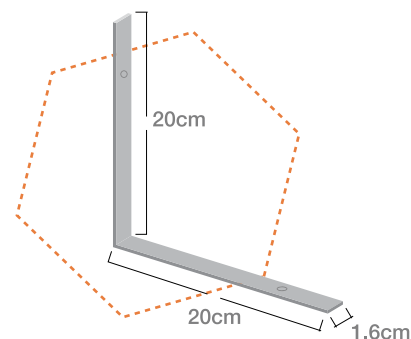
TOKYO SUPERCASST INTERNAL WALL PLASTER

A quality-controlled mixture for a perfectly bonding cement wall plaster every time. This means that your plaster can be mixed and applied in minutes and yet guarantee consistent texture. Add pigments to get that colour you want!



SKIMCOAT

A good quality polymer-added skim coat for finishing coat of internal walls.



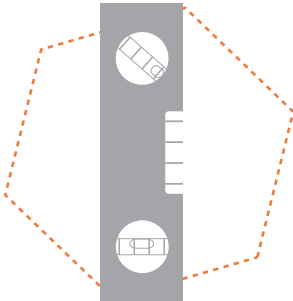
HOLDFAST

L shaped metal strip with a minimum thickness of **3mm** and a width of **12mm** which is used to fix the wall to the column

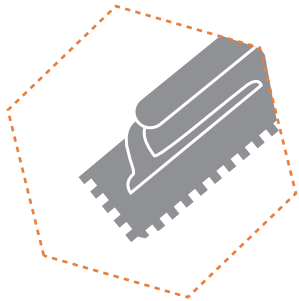
TOOLS



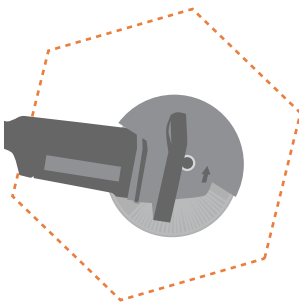
RUBBER HAMMER



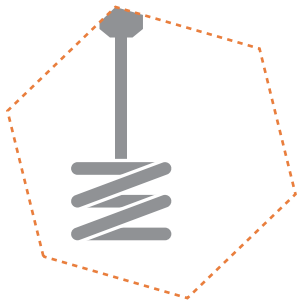
SPIRIT LEVEL



NOTCHED TROWEL



WALL CHASER



HAND MIXER



BUCKET

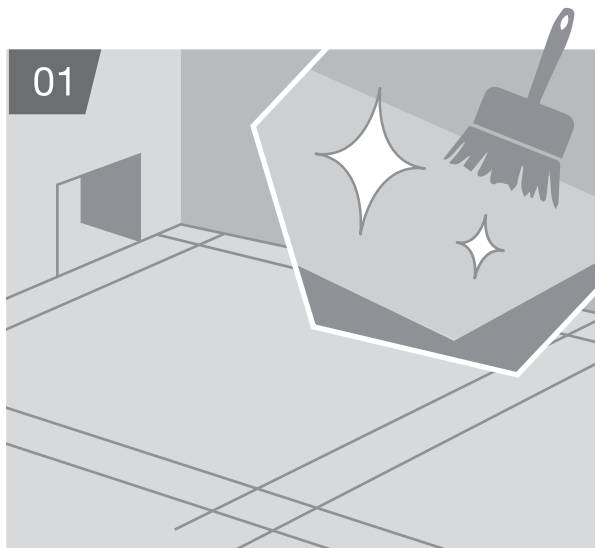


FLOAT



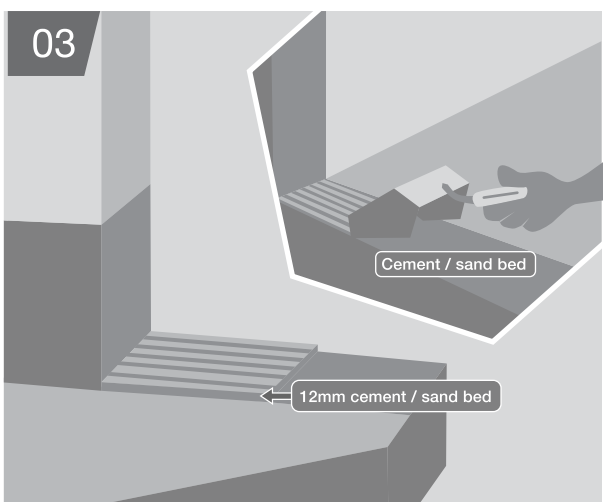
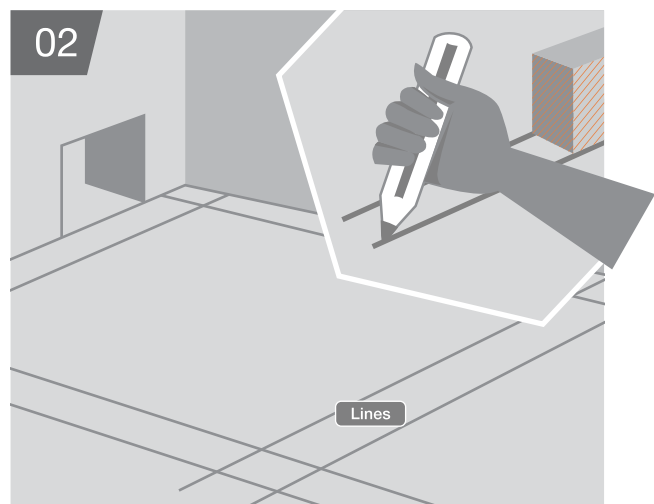
MASON'S TROWEL

APPLICATION



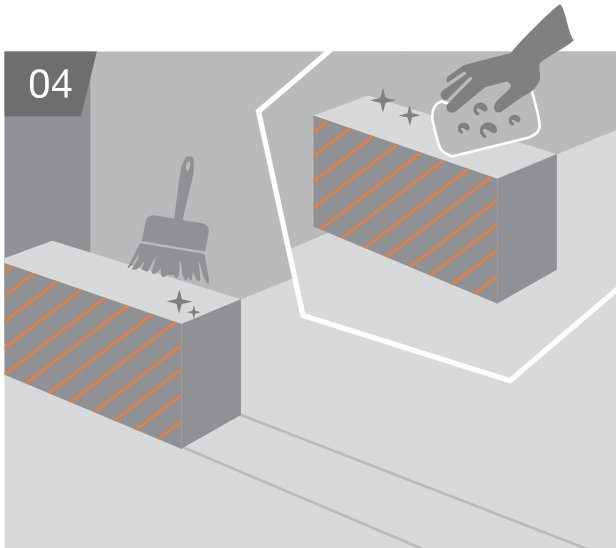
Clean the levelled concrete surface with a wire brush to remove all the dust and loose particles. Wash the area where the first course is to be laid.

Mark lines along the horizontal and vertical surfaces where the block wall is to be constructed.



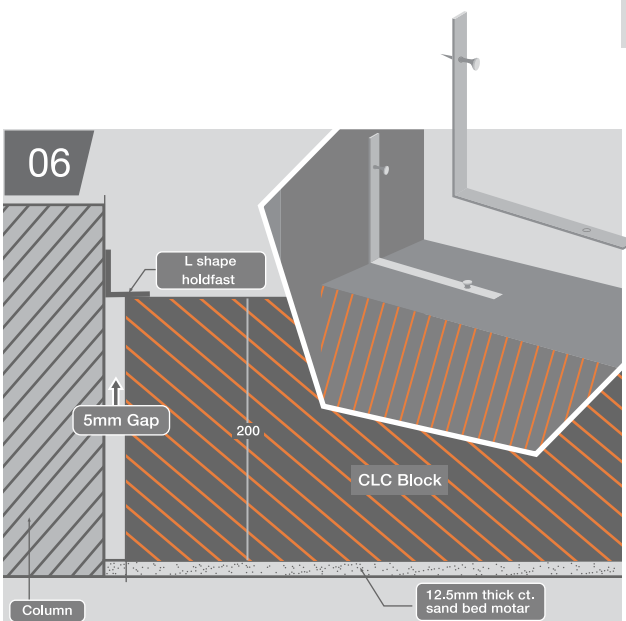
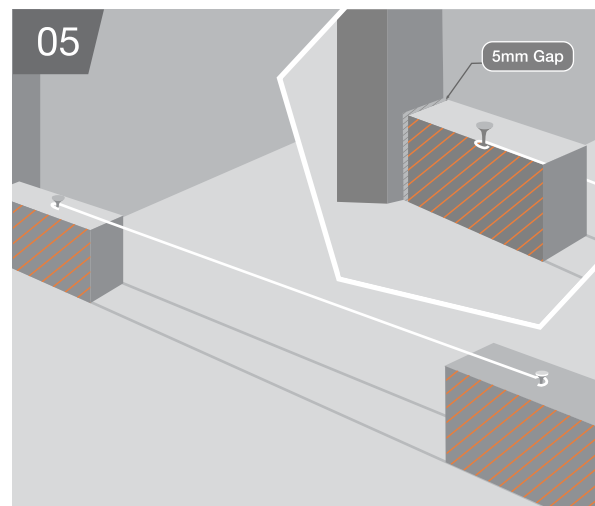
Lay a **12mm** thick layer of cement/sand (1:2) mortar bed on a clean and levelled surface.

APPLICATION



Clean blocks with a brush and wet sponge before use to remove dust and loose particles.

Leave a **5mm** gap between the columns and the block wall. Use strings to align the level.



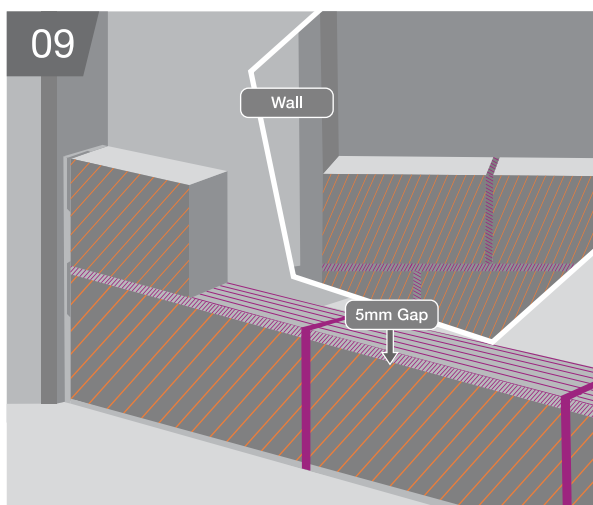
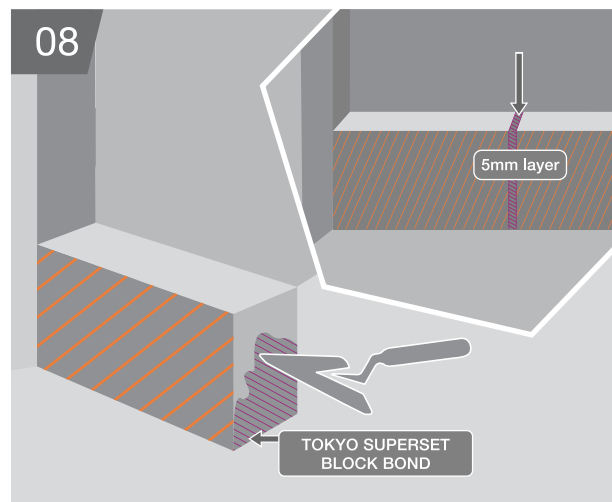
Lay the 1st course of **CLC blocks** starting with a **5mm** gap from the column. Fix the block to the column with the holdfast.

APPLICATION



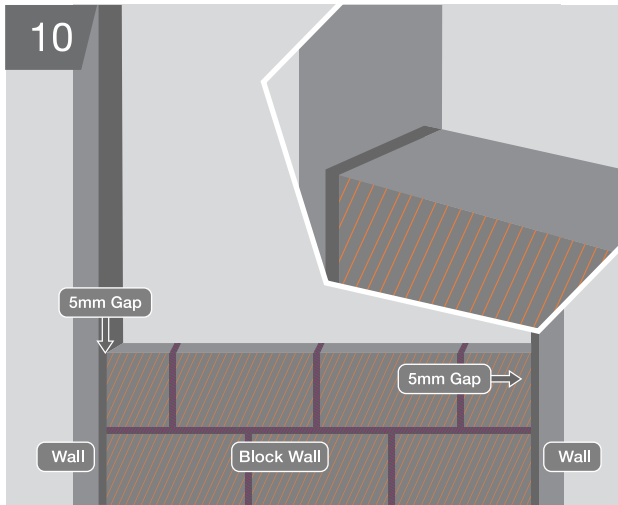
Prepare the **TOKYO SUPERSET BLOCK BOND** mix (for mixing instructions see page 22).

Apply a **5mm** layer of **TOKYO SUPERSET BLOCK BOND** to the vertical surface of the block and push it against the adjacent block.



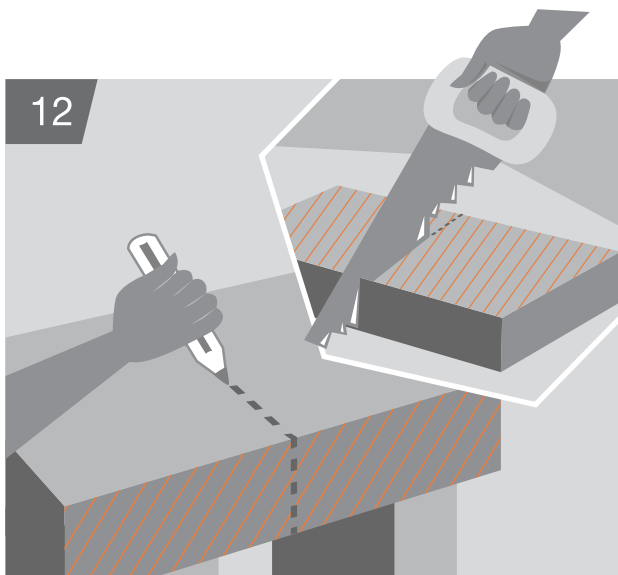
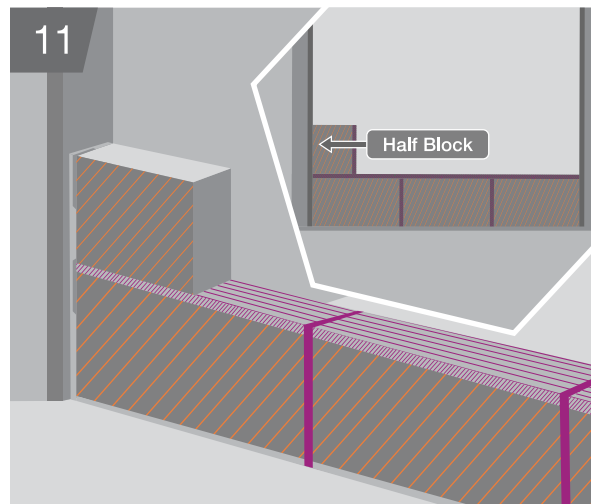
Once you've completed the first course apply a **5mm** thick layer of **TOKYO SUPERSET BLOCK BOND** with a notched trowel across the length of the first layer, and begin laying of the second course on top.

APPLICATION



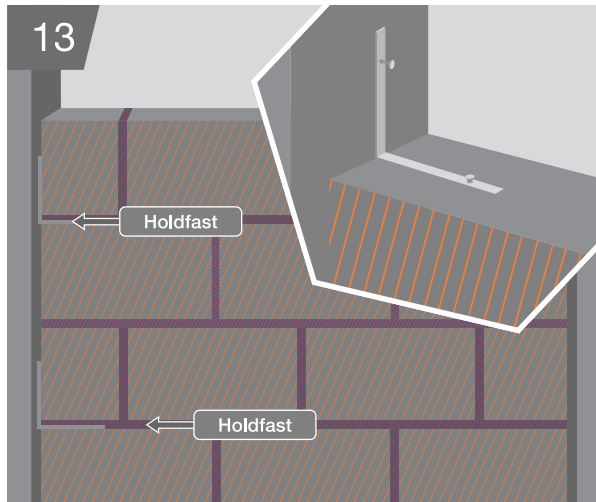
Keep a **5mm** gap on both ends of the block wall.

Start laying the second course **5mm** away from the column with a half block. This will allow for the staggering of vertical joints which increases the strength of the wall.



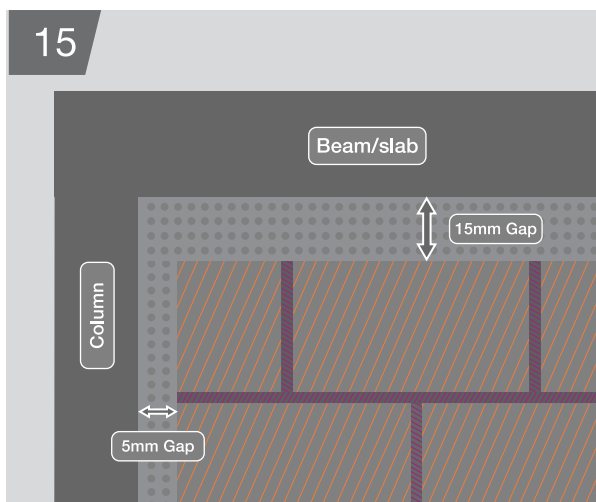
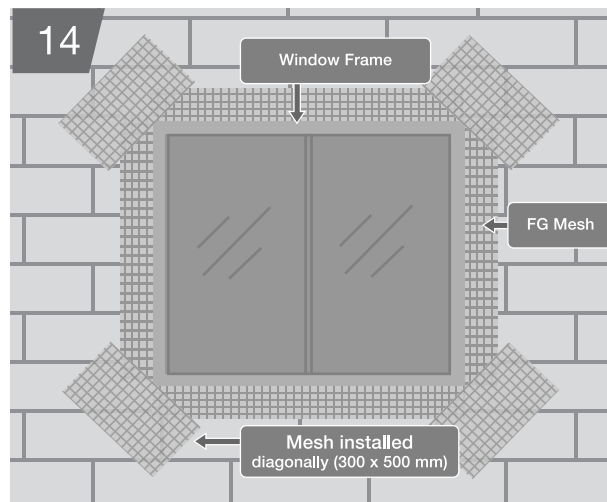
When half or a fraction of a block is required, use a hand saw or an electrical saw to cut it.

APPLICATION



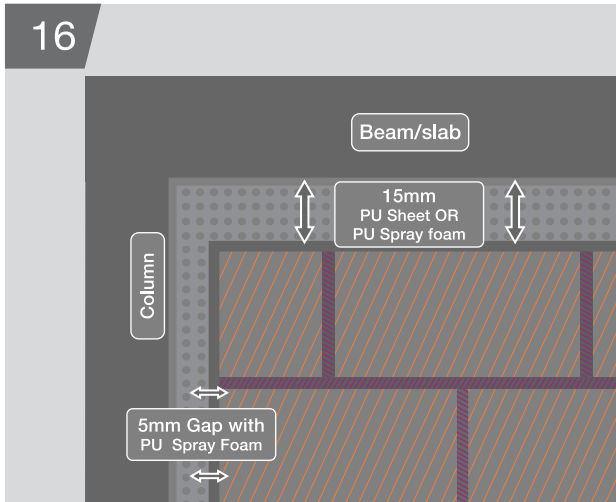
Fix L-shaped holdfast at every alternative course (**400mm**) on both ends to the columns.

WINDOWS/DOORS/OPENINGS - After installing the profiles apply the fibre glass mesh strips of 300x500mm diagonally at every corner of doors and windows with **TOKYO SUPERSET BLOCK BOND** to avoid cracking. Repeat this on both sides of the wall.



Leave a **15mm** gap between the top of the fully built wall and the beam/slab.

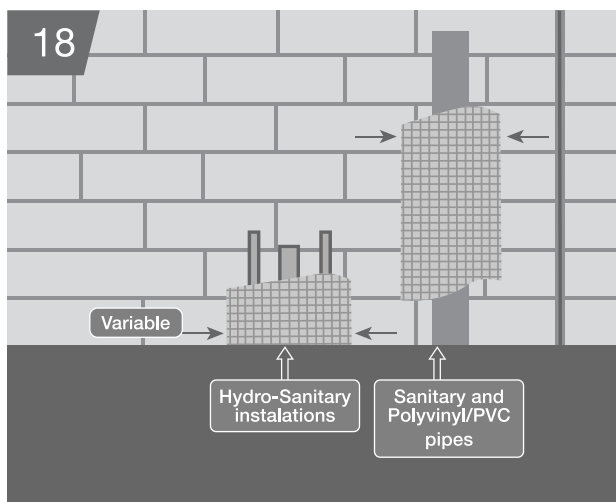
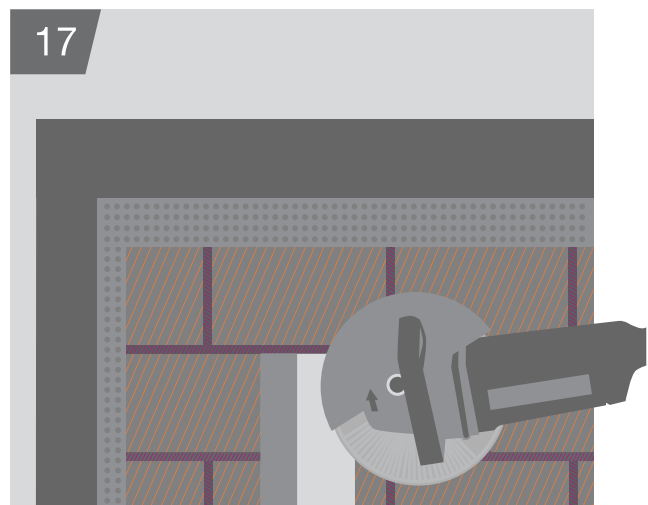
APPLICATION



Fill the horizontal and vertical gaps along the beams, slabs and columns with either **PU** Sheet or **PU** spray foam.

SERVICE LINES

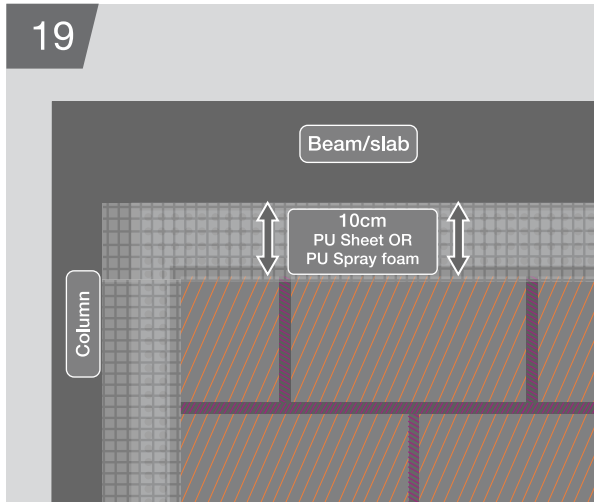
When installing piping and conduits for plumbing, electrical and ventilation you can easily cut into the **TOKYO SUPERLIGHT CLC** walls with a wall chaser or groove cutter or angle grinder.



SERVICE LINES

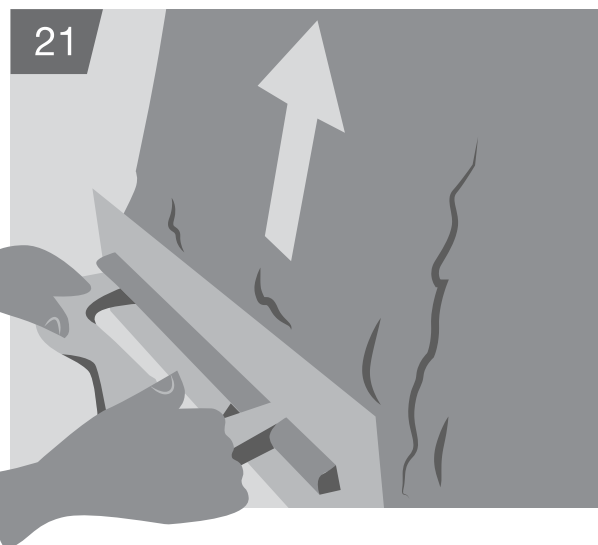
After installing the pipes or conduits, fill the grooves with **TOKYO SUPERSET BLOCK BOND** and cover with a Fibre Glass mesh layer.

APPLICATION



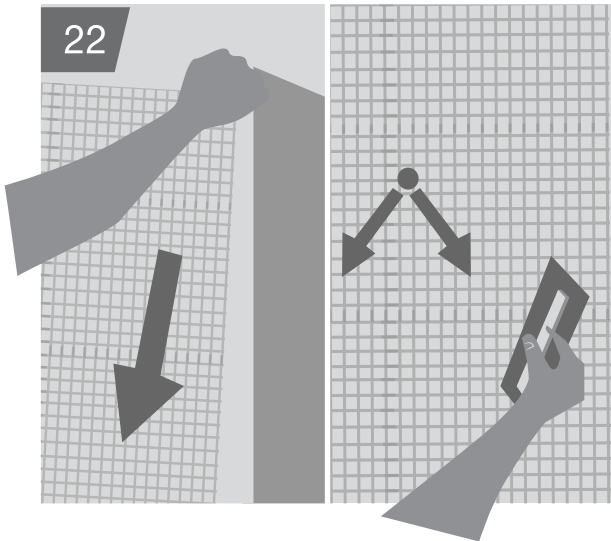
Apply fibre mesh that overlaps by **100mm** over the columns and beams to ensure continuity of reinforcement.

For best results, here's our guide on how to finish the walls (see page **23** for mixing instructions on **TOKYO SUPERCAS**)



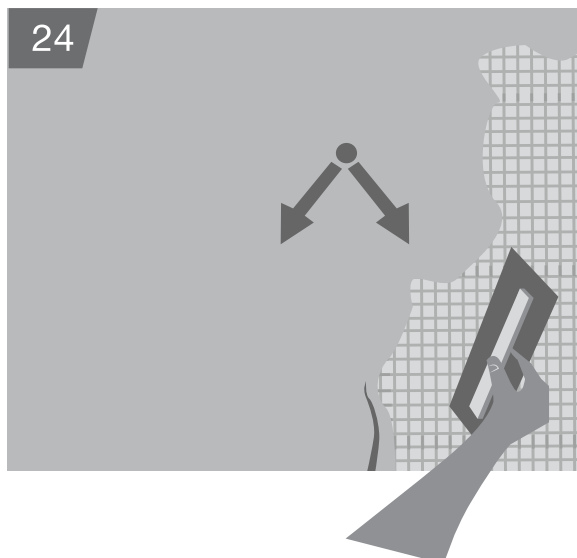
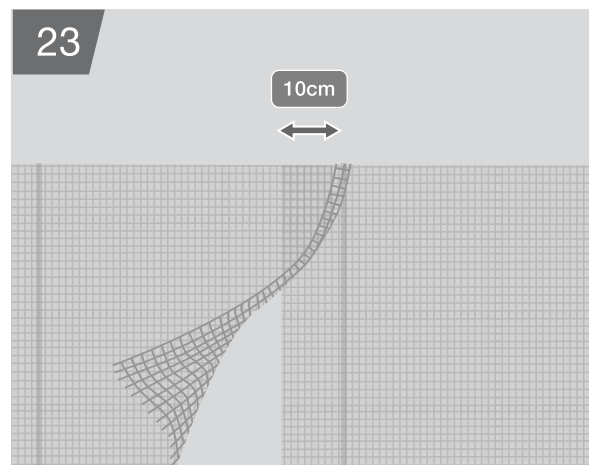
Apply a thin **3-5mm** base coat of **TOKYO SUPERCAS PLASTER MASTER** over the entire surface.

APPLICATION



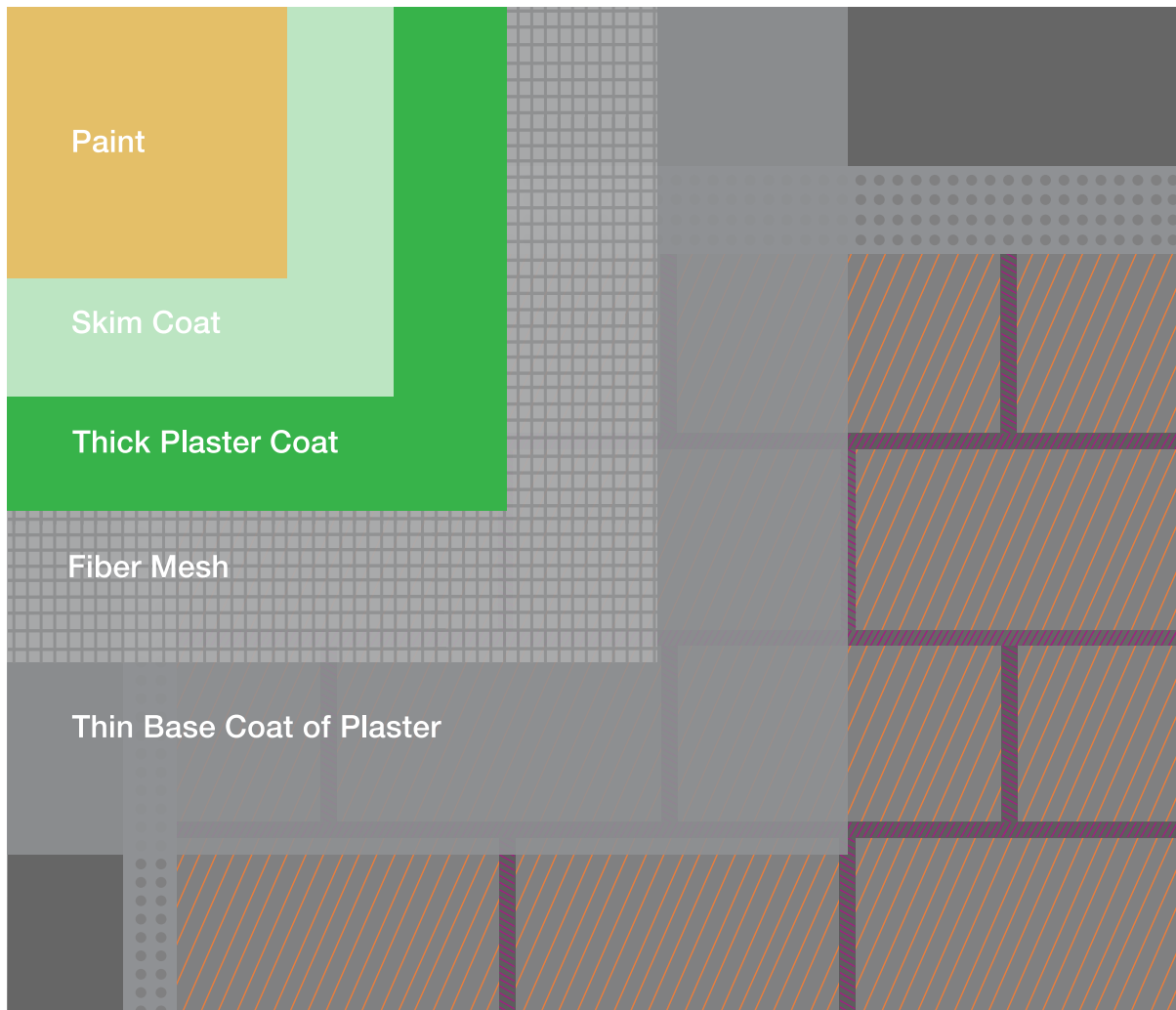
Apply the fibre mesh from top to bottom of the wall by pressing it into the first layer of **TOKYO SUPERCAS**T PLASTER MASTER base coat. Push down from the centre to the sides.

Overlap between two mesh strips should be a minimum of **10cm** to ensure continuity of reinforcement.



Apply a **5-10mm** thick coat of **TOKYO SUPERCAS**T PLASTER MASTER on top of the mesh and level to smoothen.

APPLICATION



And you're done!

For a smoother finish and a nicer paint job we recommend a Polymer based skim coat layer on top of the plaster for internal walls.

TECHNICAL SPECIFICATIONS



TOKYO SUPERSET BLOCK BOND

PHYSICAL PROPERTIES

TOKYO SUPERSET BLOCK BOND is a blended of Ordinary Portland Cement, Filler and Polymers to control the adhesion and strength.

CHARACTERISTICS	RESULTS
SETTING TIME (Hrs)	< 5
COMPRESSIVE STRENGTH (N/mm ²) 3 DAYS 28 DAYS	2.0 5.0
FLEXURAL STRENGTH (N/mm ²) 3 DAYS 28 DAYS	2.0 4.5
ADHESION STRENGTH (N/mm ²) 1 DAYS 28 DAYS	0.30 0.50



TOKYO SUPERLIGHT

PHYSICAL PROPERTIES

TOKYO SUPERLIGHT cellular light weight concrete blocks are made of cement, fly ash, quarry dust, foaming compound and other proprietary components and air cured for over 28 days.

CHARACTERISTICS	RESULTS
OVEN DRY DENSITY (kg/m ³)	800 ± 100
DRYING SHRINKAGE 28 DAYS %	< 0.07
MOISTURE MOVEMENT 28 DAYS %	< 0.05
WATER ABSORPTION (% BY WEIGHT)	< 12
COMPRESSIVE STRENGTH (N/mm ²) (28 DAYS%)	> 3.0
THERMAL PROPERTIES (UNDER DRY CONDITION)	
THERMAL CONDUCTIVITY (w/m/k)	0.2335
THERMAL DIFFUSIVITY (m ² /h)	0.0005834
SPECIFIC HEAT (KJ/kg/k)	1.479
FIRE RATING AT 1000 °C	> 4 hrs



TOKYO SUPERSET BLOCK BOND



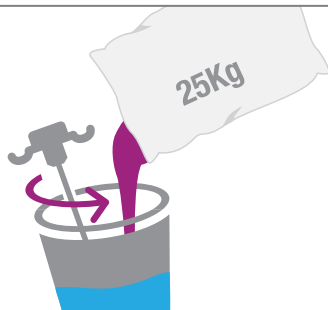
MIXING

01



1 Pour **4.5 litres** of clean water into a bucket.

02



2 Empty entire **25kg** bag of **TOKYO SUPERSET BLOCK BOND** gradually in to the same bucket while mixing using a stirrer (rpm <500)

03



3 Mix thoroughly for **3 mins** into a smooth, workable paste.

04



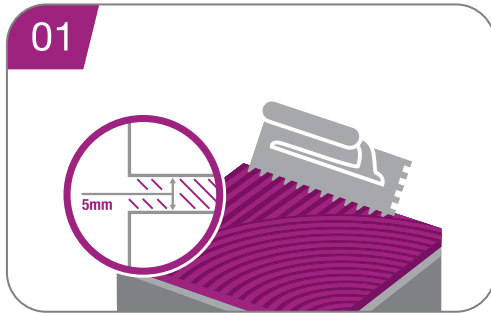
4 Allow the mixture to soak for **2 mins**.

05

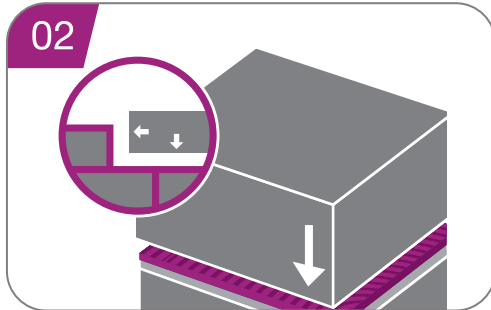


5 Then mix it again for **2 mins** and apply.
if required, add in small amounts up to 0.5 litre of water whilst mixing till you get a smooth, spreadable paste.

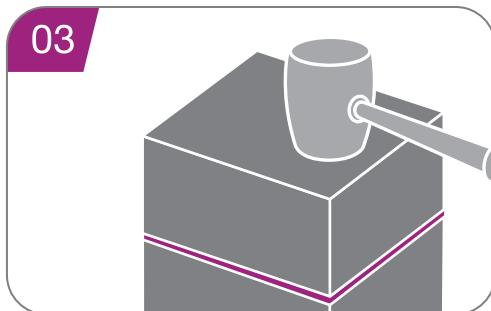
APPLICATION



- 1 Apply a 5mm layer of TOKYO SUPERSET BLOCK BOND on clean & dry block



- 2 surface with notched trowel. Place a surface-clean block on applied block bond layer.

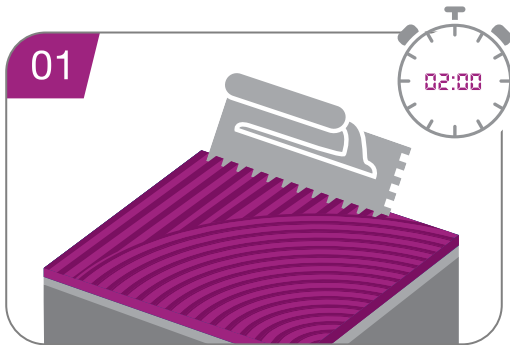


- 3 Use a rubber mallet to fix in place.

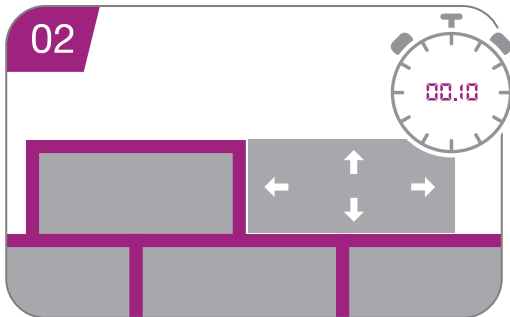


- 4 Use a spirit-level to check alignment.

OTHER NOTES



- 1** Use TOKYO SUPERSET BLOCK BOND within 2 hrs of mixing



- 2** Correction time for re-alignment is up to 10 mins to ensure perfection.



- 3** TOKYO SUPERSET BLOCK BOND is self-curing and does not require water-curing at post application.

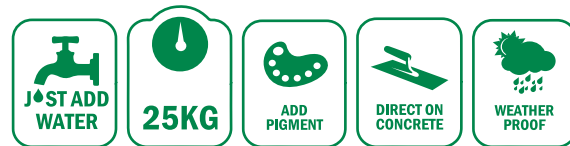


TOKYO SUPERCAS PLASTER MASTER

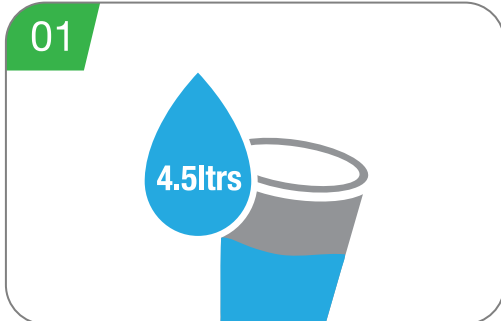
INTERNAL



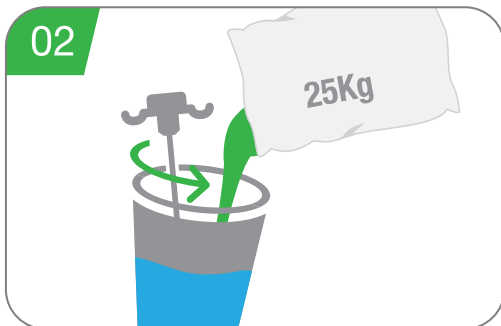
EXTERNAL



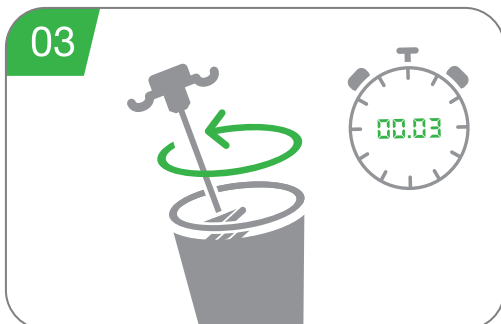
MIXING



1 Pour 4.5 litres of clean water in to a bucket.



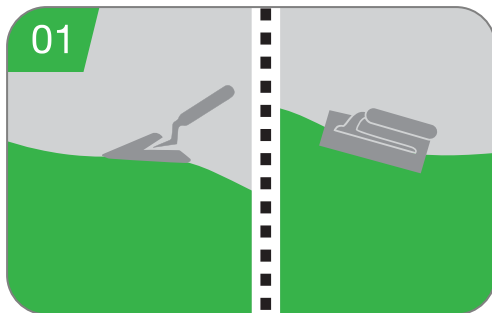
2 Empty entire 25kg bag of TOKYO SUPERCAST gradually in to the same bucket while mixing using a stirrer (rpm <500)



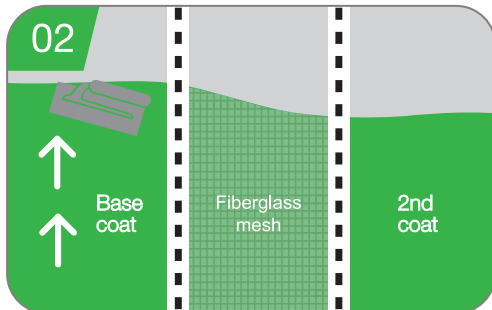
3 Mix thoroughly for 3 minutes into a thick consistency.
if required, add in small amounts up to 0.5 litre of water whilst mixing till you get required workability.



APPLICATION



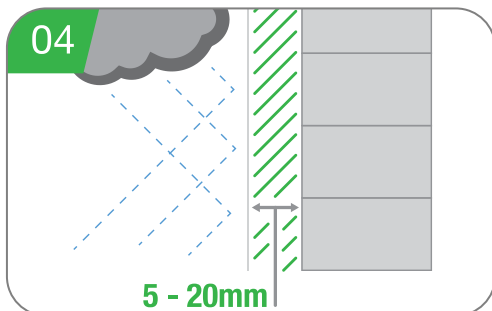
- 1 Apply plaster on to a **dry surface** with **mason's trowel** or **Japanese float** as a **base coat** with a thickness of **3-5mm**.



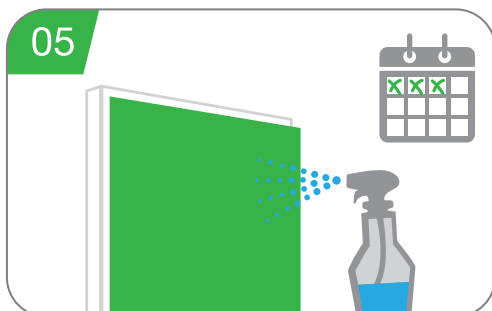
- 2 Apply the fiberglass mesh on base coat and finish the 2nd coat with a thickness of **5-10mm** and Push the float/trowel in an **upward motion** to spread the plaster.



- 3 Use the Straight edge to **level** the plaster to create an **even surface**.



- 4 For best results try to maintain a coating thickness within **5mm-20mm**.



- 5 After **24 hrs**, Saturate the plaster with water for **3 days**.

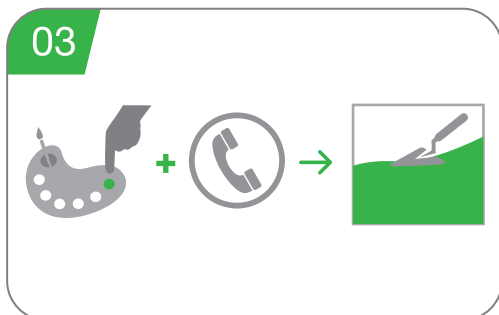
OTHER NOTES



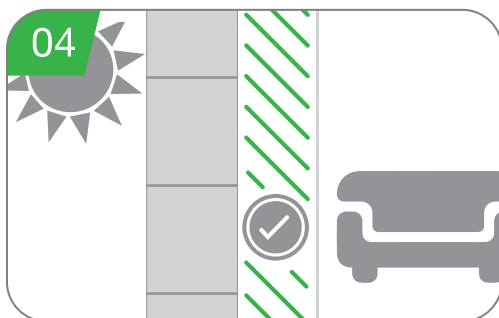
1 Use TOKYO SUPERCAST within 2hrs of mixing.



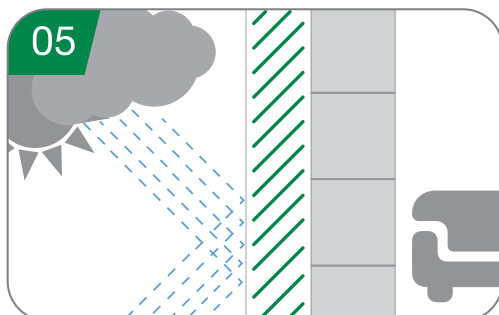
2 Not necessary to wet wall surface before plastering.



3 For coloured plasters, please contact sales for customised premixed design.



4 Specially recommended for internal wall plaster.



5 Specially recommended for external wall plaster.

NOTES

NOTES



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