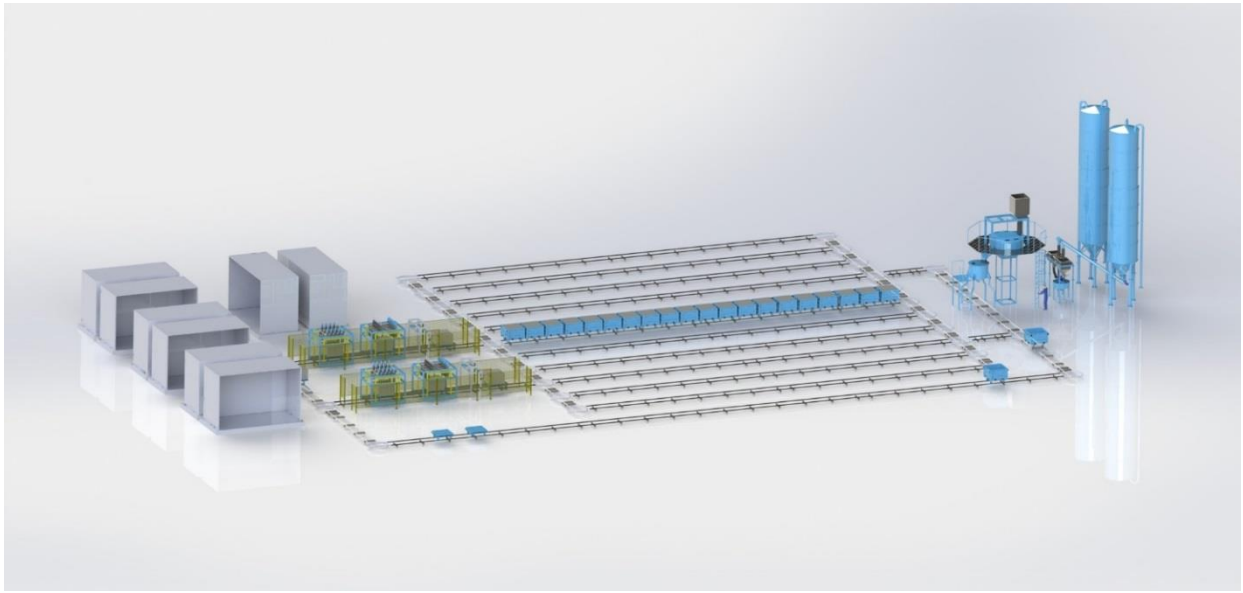
LithoPore®

Advanced and Innovative Aerated Concrete Technology
by Luca Industries International GmbH

LithoPore® Aerated Concrete (LPAC)



Company key data

- Employees: 60 worldwide
- Production capacity biochemical additives: 2500 mtons/year
- Group turn over 2017: 11 Mio EUR
- Customers: 250 in 40 countries
- Key markets: Europe, India, South East Asia, Middle East, USA
- Certifications: ISO 9001:2008 since 2005 through DQS

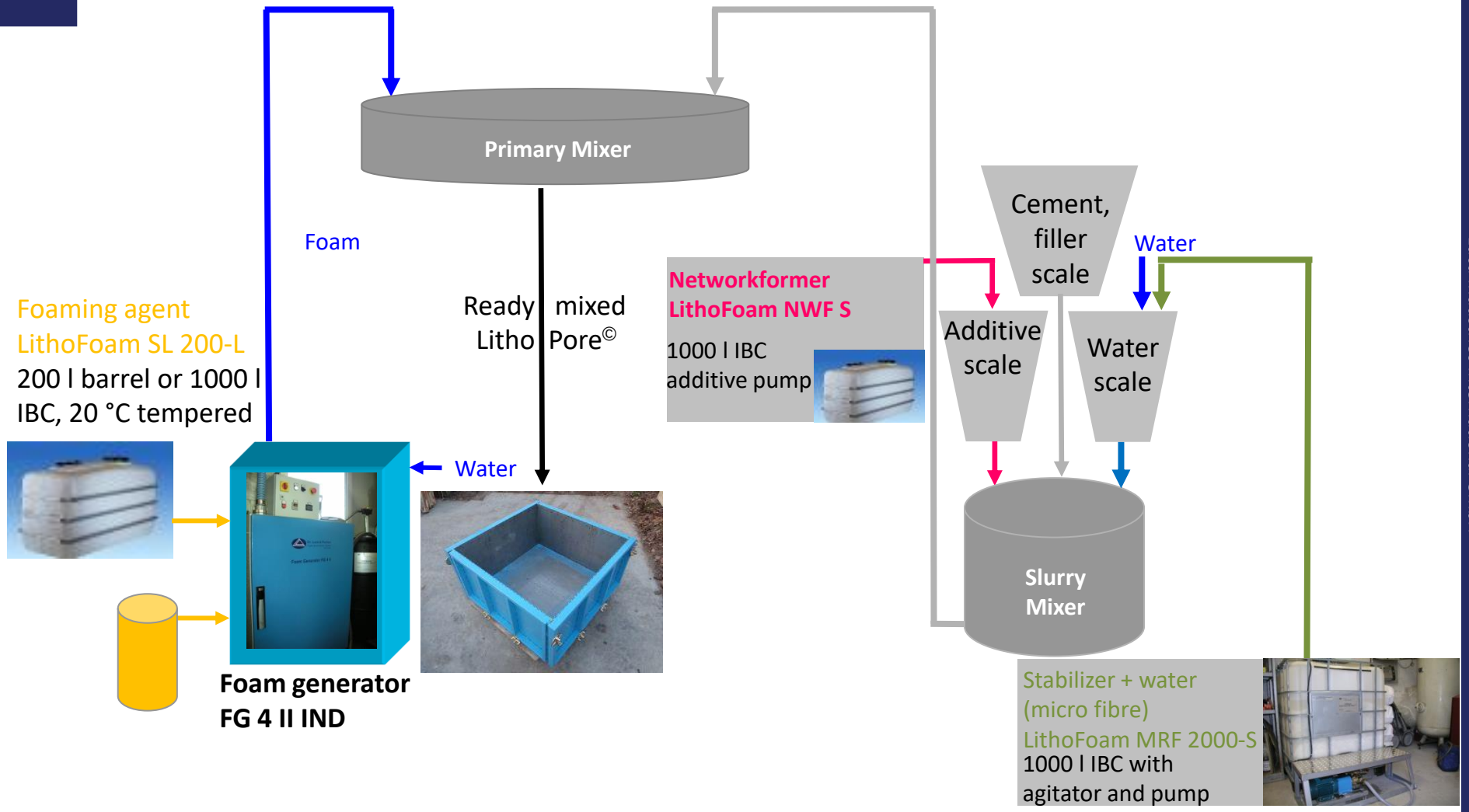
Registered brands

- **LithoPore®** (end product/aerated concrete)
- **LithoFoam®** (biochemical additives)

LithoPore© Aerated Concrete - Introduction

- **Raw materials**
  - Cement, filler (sand, fly ash, calcium carbonate, stone dust, etc.) water foaming compound and optional further chemicals
- **Production Methodology**
  - Specialized mixers, foaming equipment, and ordinary moulds.
  - Steam cured or water spray-cured under ambient conditions
- **Light Weight**
  - Foam creates millions of tiny voids, hence the name **aerated concrete**.
- **Environment**
  - Eco-friendly and cost effective

Production of LithoPore® aerated concrete



Chemical Additives

Foaming Agent
- LithoFoam® SL 200-L
- LithoFoam® SL 250-L

Networkformer
- LithoFoam® NWF S
- LithoFoam® NWF NT

Stabilizer
- LithoFoam® MRF 2000-S

Accelerators
- LithoFoam® CC

Hydropobicity (Reduction of water absorption)
- LithoFoam® SPO

Foaming Agent

LithoFoam® SL 200-L

MEP – *M*olecular *E*ngineered *P*rotein

- Worldwide Unique
- Artificial Protein
- Compound not only Foaming Agent
- No bad smell as for conventional protein based foaming agents

Networkformer

LithoFoam® NWF S

- Strength increasing agent
- Chemical reaction between NWF S with cement and foam
- Faster hardening
- LithoPore® density: ≥ 200 kg/m³

LithoFoam® NWF NT

- Fills gaps between cement particles
- Shrinkage reducing agent
- Reduces pore structure
- LithoPore® density: ≥ 75 kg/m³

Certifications

Contruction Material Approvals

- ICC ES Approval in the USA (test performed by Intertek, York, PA) for Blocks (ongoing), following ASTM standards
- DIBt Approval for insulation board (German Institute for Construction Material) following DIN EN standards

Environmental Certifications

- LithoPore® Aerated concrete is environmental friendly (Ecolabel for low emission)
- Testing for all volatile organic substances (VOCs) (negative result)
- Testing for Ammonia (negative result)

Application – Cast at site / frame work filling

Major countries: Africa, South East Asia
Dry density target: 1000-1600 kg/cbm
End product trade name: LithoPore®1000-1600






Application – Roof insulation

Major countries: India, Middle East
Dry density target: 400-800 kg/cbm
End product trade name: LithoPore®400-800

Application – Panel production (at site or precast)

Major countries: USA, Australia, Italy
Dry density target: 800-1400 kg/cbm
End product trade name: LithoPore®800-1400






Application – Lightweight floor screeds

Major countries: East and South Europe, Turkey
Dry density target: 400-800 kg/cbm
End product trade name: LithoPore®400-800

Application – Blocks

Major countries: India, South East Asia
Dry density target: 400-800 kg/cbm
End product trade name: LithoPore®400-800



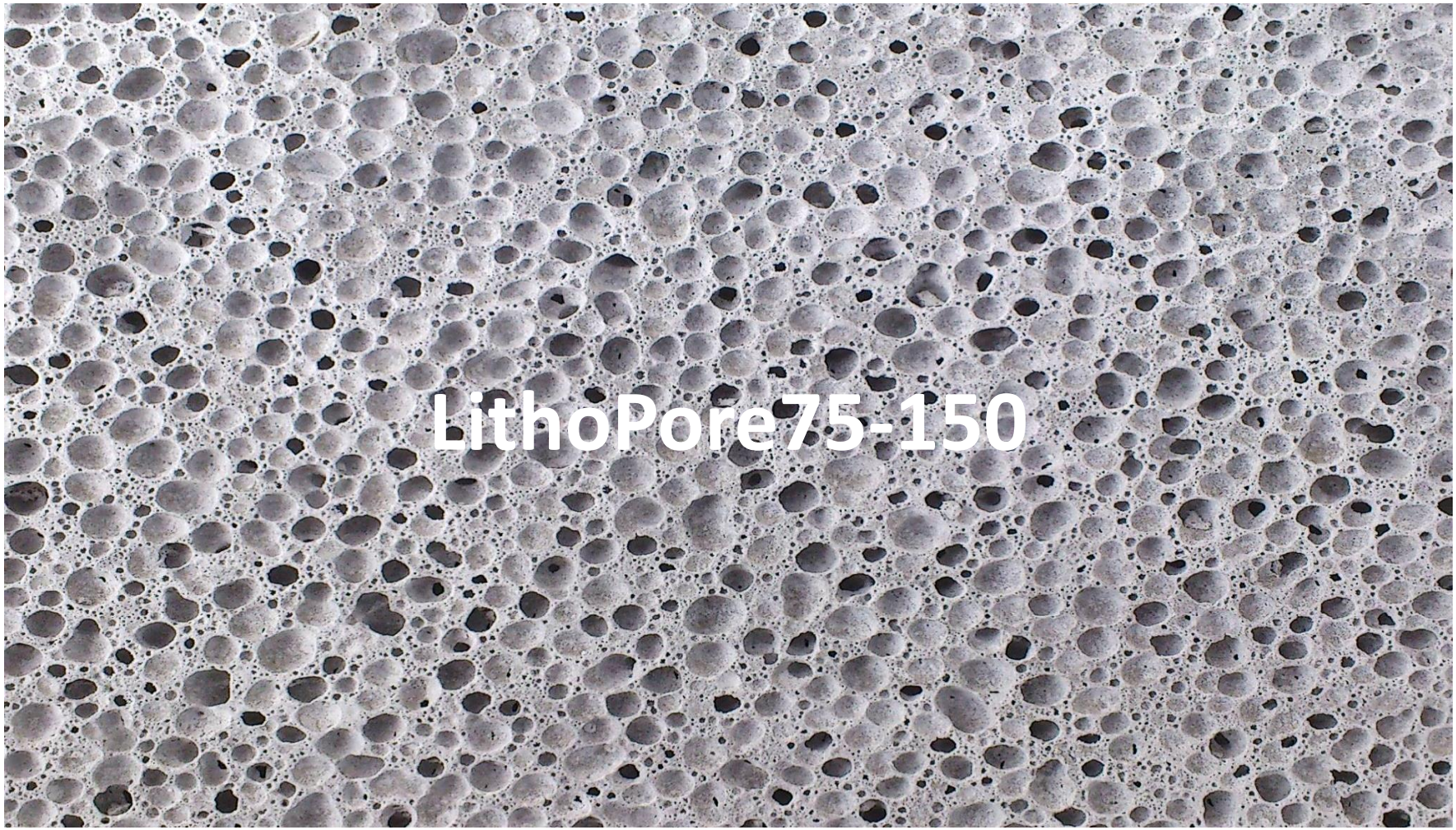



Heat insulating and compensation layer below floor screed

Major regions: Europe
Dry density target: 200-300 kg/cbm
End product trade name: LithoPore®200-300

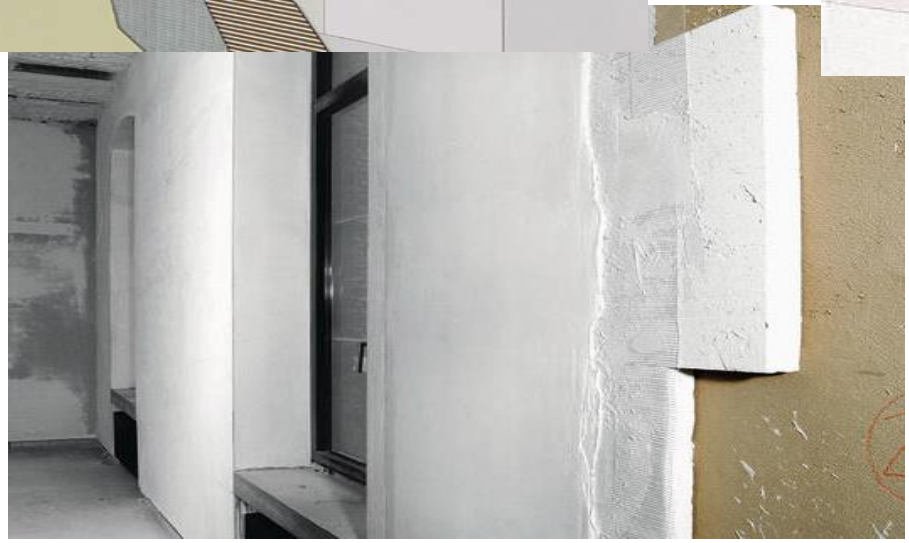
Innovations - Heat insulating compensation layer below floor screed

Innovations – pre cast insulating board



Innovations – pre cast insulating board
Applications

in collaboration with masa
Milestone to your success.



Innovations – pre cast insulating board
Technical properties

- Non-inflammable
- Totally inorganic construction material based on cement
- Similar insulating properties as mineral/rock wool
- excellent steam diffusion
- fully recycable

in collaboration with masa
Milestone to your success.

Innovations – pre cast insulating board
Technical properties

Standard product type

	LithoPore75	LithoPore150
Dry density DIN EN 1602 [2] $\rho_{105\,°C}$	75-85 kg/m³	140-155 kg/m³
Moisture absorption DIN EN ISO 12571 [3] $\Delta_{m,\,23/80}$	≤ 19 M.-%	≤ 19 M.-%
Thermal conductivity DIN EN 12667 [13] $\lambda_{10,\,tr}$	≤ 0,0398 W/m*K	≤ 0,0518 W/m*K
Thermal conductivity DIN EN 12667 [13] λ	0,046 W/m*K	0,060 W/m*K
Compressive Strength DIN EN 826 [4] $\sigma_{10\%}$	≥ 40 kPa	≥ 220 kPa
Tensile strength perpendicular to faces DIN EN 1607 [5] σ_{mt}	≥ 10 kPa	≥ 20 kPa
Bending strength DIN EN 12089 Methode B [6] σ_b	≥ 10 kPa	≥ 60 kPa
Behaviour under point load at 1mm DIN EN 12430 [8] ε_{Fp}	NPD	≥ 1400 N
Water absorption DIN EN 1609 [9] $W_{p,\,24h}$	≤ 3,5 kg/m²	≤ 4,5 kg/m²
Fire behaviour DIN EN 13501	Class A1	Class A1
Steam diffusion DIN EN ISO 12572 [10] μ	≤ 3,0	≤ 4,0
Dimensions stability DIN EN 1604 [11]	≤ 0,1 %	≤ 0,1 %

Hydrophobic product type

	LithoPore75H	LithoPore150H
All values as for standard product, however:		
Water absoprtion DIN EN 1609 [9] $W_{p,\,10s}$	≤ 0,7 kg/m²	≤ 0,7 kg/m²
$W_{p,\,24h}$	≤ 0,9 kg/m²	≤ 0,9 kg/m²

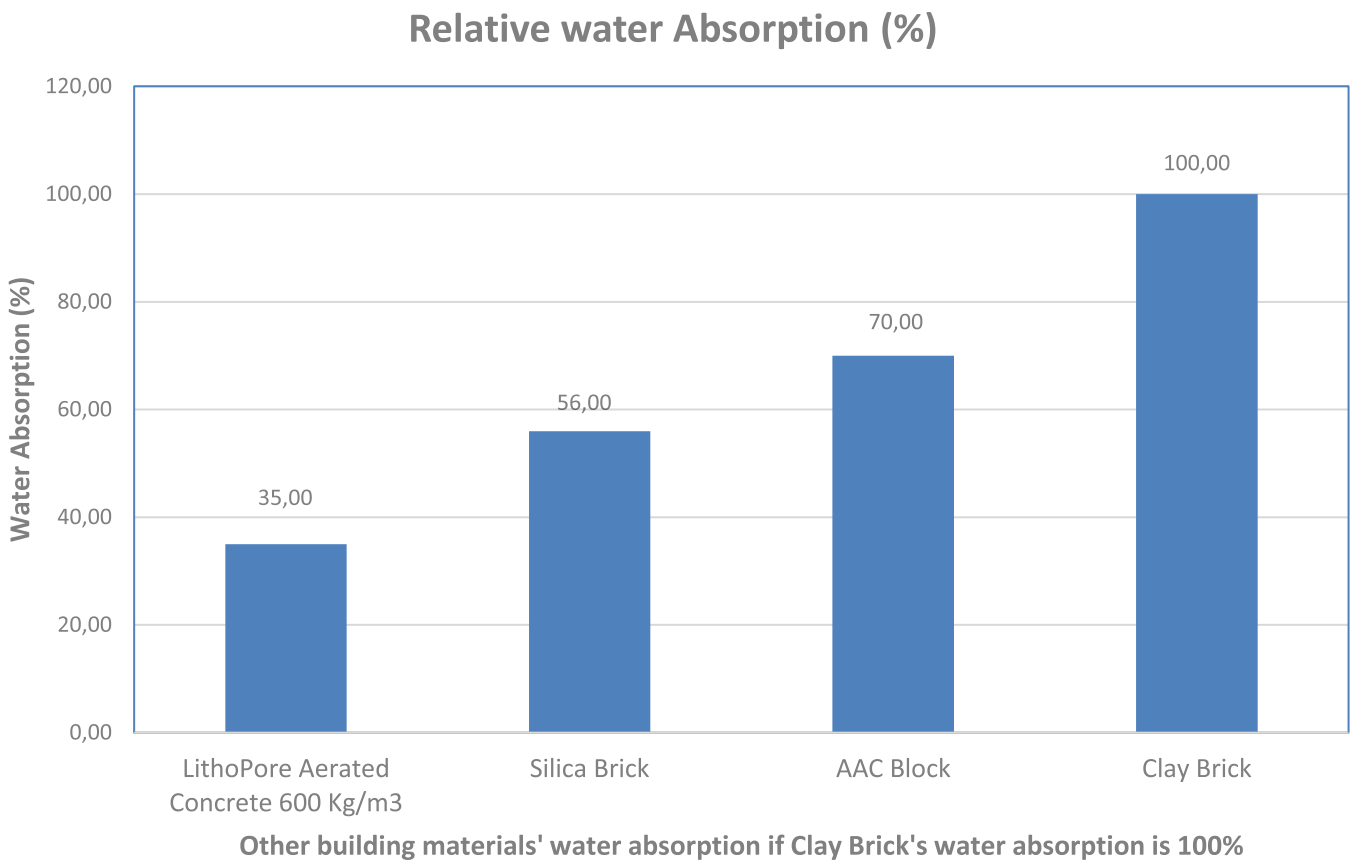
RECOMMENDATION for Applications and technical data

www.lithopore.com

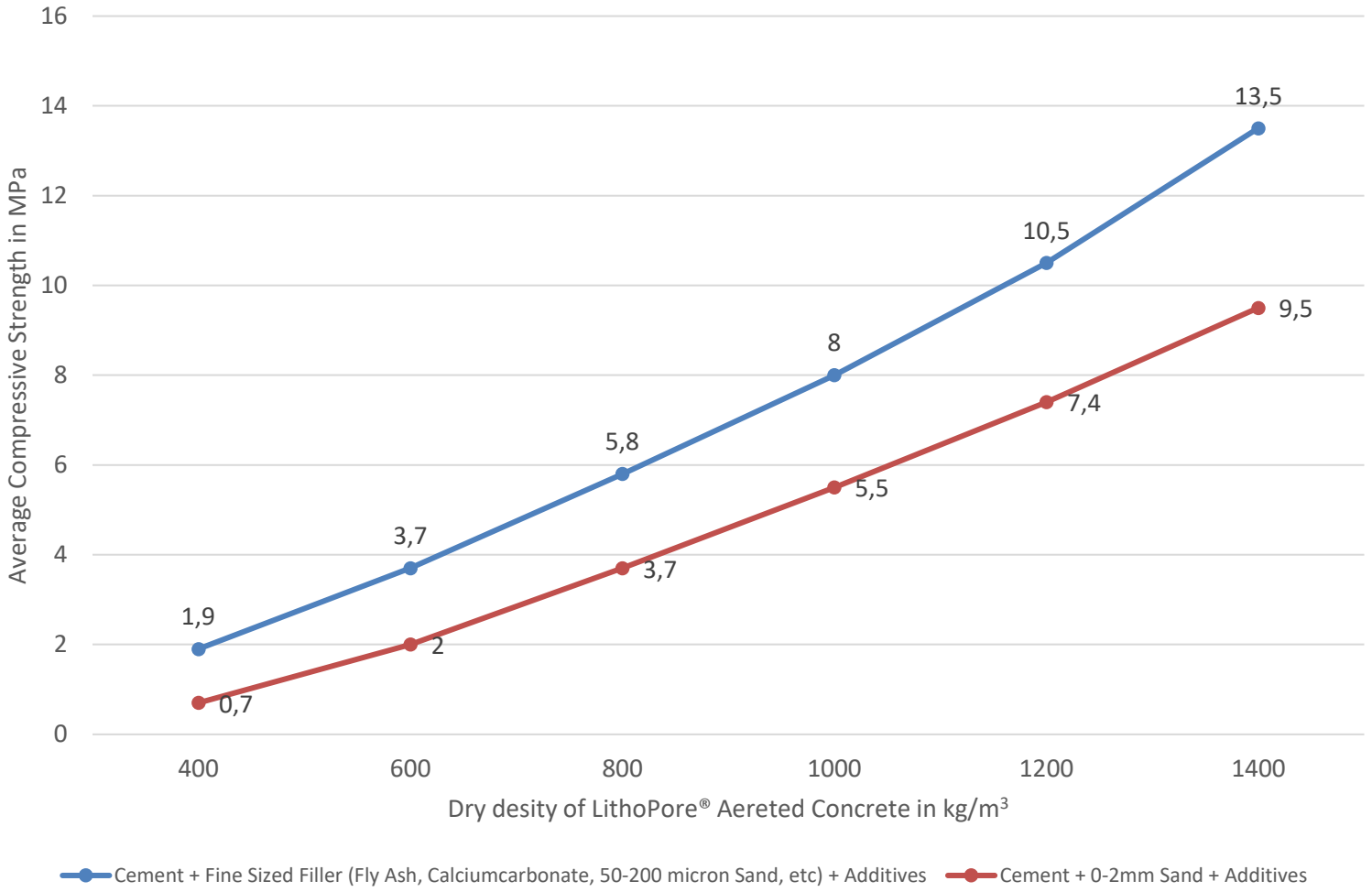
Characteristics of LithoPore© aerated concrete

- **Can be produced in a range of densities** (75 – 1600 Kg/m^3)
  - The lower density range of 75-600 kg/m^3 for insulation over roofs, prefabricated insulation panels or as in-fill material
  - The mid-range density of 600-1000 kg/m^3 for making non-load-bearing cladding panels or pre-cast blocks for non-structural filler wall masonry
  - The higher density range of 1,200-1,600 kg/m^3 for structural elements, either as reinforced components or block-work for load bearing masonry wall.
- **Closed cellular structure**
  - Consists out of very small sized unconnected individual air bubbles, uniformly spaced
  - Due to absence of coarse aggregate (gravel), aerated concrete flows by itself into the moulds, shuttering and any cavities, thereby avoiding the necessity of compaction or vibration.
- **Production method**
  - Prefabricated or at site
- **Lower water absorption**
  - Due to the closed cellular structure, the water absorption of LithoPore® Aerated Concrete is in the range of 1% to 25% only, depending on density thus an don used chemicals, lower than Aerated Autoclaved Concrete (AAC) blocks or used clay bricks

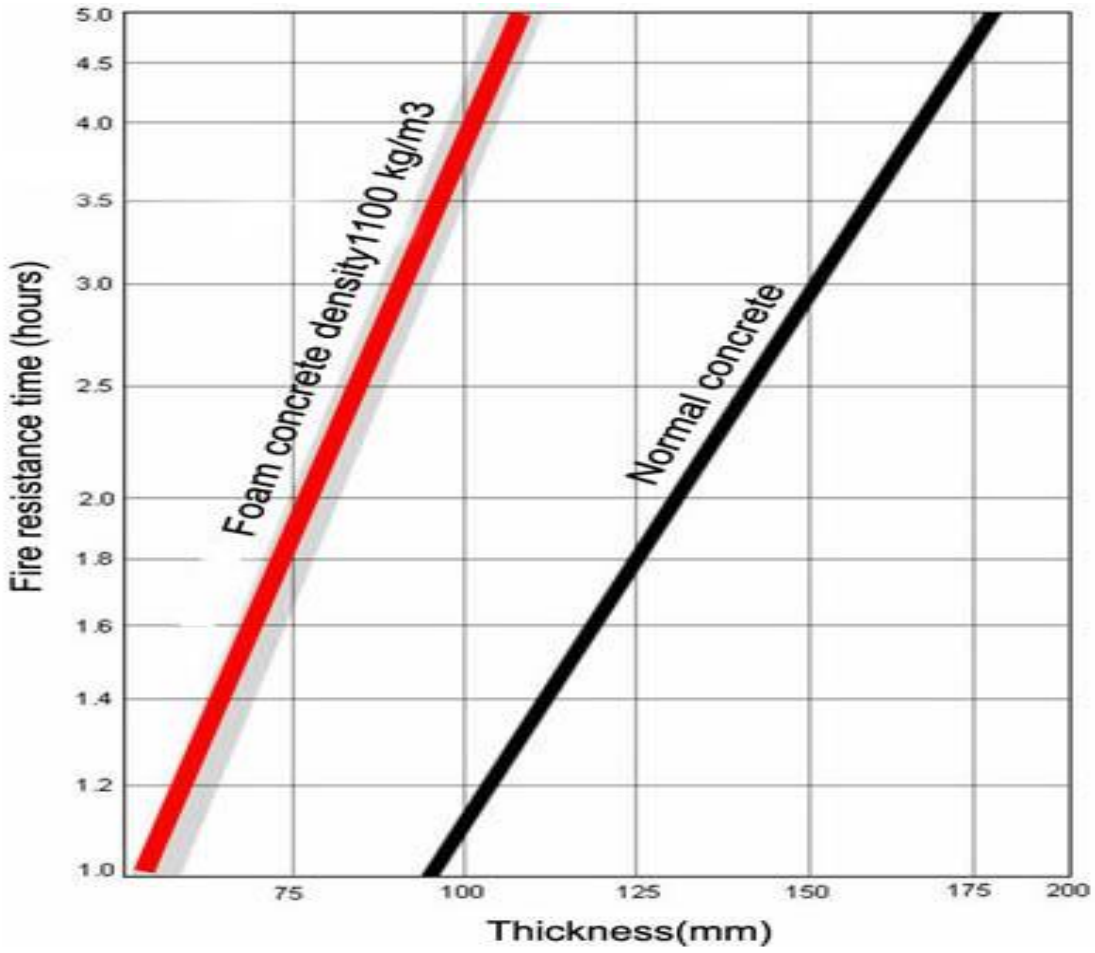
Characteristics of LithoPore© aerated concrete III
Water absorption



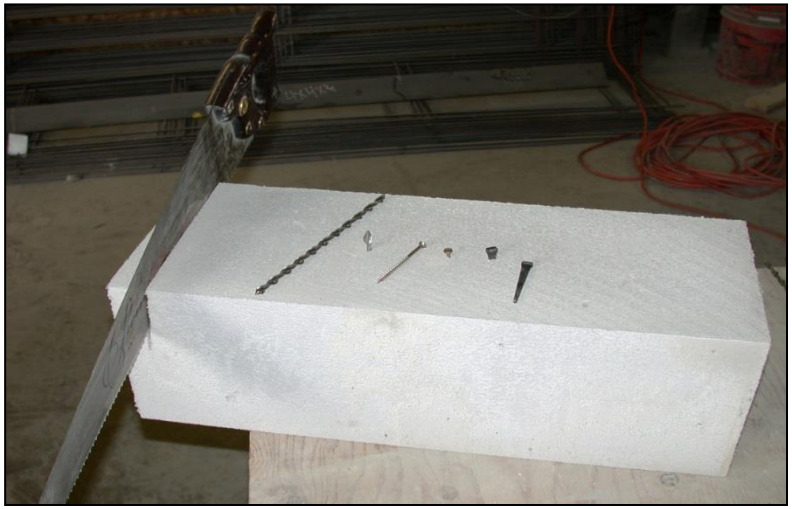
Characteristics of LithoPore© aerated concrete IV
Compressive Strength (average values)



Characteristics of LithoPore© aerated concrete V
Fire Resistance



Characteristics of LithoPore© aerated concrete VI



Durability

- Sound insulation
- Thermal insulation
- Fire resistant

Workability

- Drilling
- Cutting and installing
- Nailing
- Sawing

Overall technical data at a glance

	LithoPore® 200	LithoPore® 400	LithoPore® 600	LithoPore® 1000	LithoPore® 1400
Dry Density in kg/cbm and (lb/cu.ft)	200 (12.5)	400 (25.0)	600 (37.5)	1000 (62.5)	1400 (87.5)
Compressive strength in mPa and (PSI)	0.25-0.45 (37-66)	1.5-2.5 (220-368)	2.5-4.0 (368-588)	5.0-7.0 (735-1029)	8.0-11.0 (1176-1617)
Thermal conductivity W/(m*K)	0.06-0.065	0.10-0.11	0.17-0.19	0.30-0.33	0.44-0.47
U-Value W/(m^2*K) 100 mm / 4´´ thick material	0.60-0.65	1.00-1.10	1.70-1.90	3.00-3.30	4.40-4.70
R-Value per inch	2.22-2.40	1.31-1.44	0.76-0.85	0.44-0.48	0.31-0.33

Ready Mixed Concrete Systems (RMC)

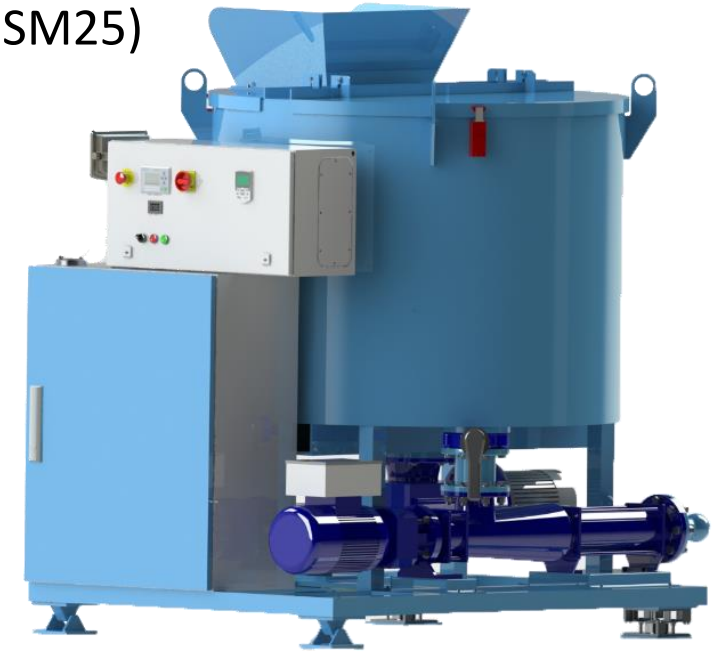
LithoPore® Foam Generator FG4 II IND

- Stand-Alone Machine e.g. for RMC Concrete Plants
- High output
- Remote controlled
- Can be embedded into existing RMCS plants

Small sized machinery

LithoPore® Station

- All-in-One Machine
- Including LithoPore® Foam Generator FG4 II IND
- Unique mixing arm design to mix slurry and Foam
- Suitable for start-up projects, small plants (SM25)
- Precise weighing scale included

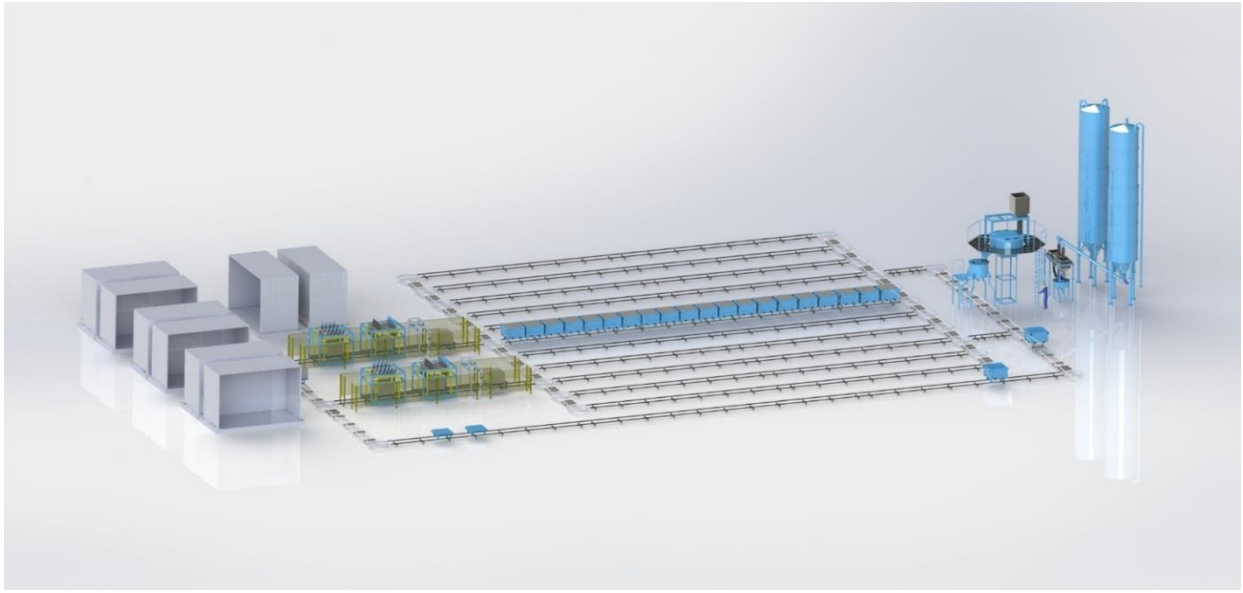


Plants (stationary) up to 400 m³

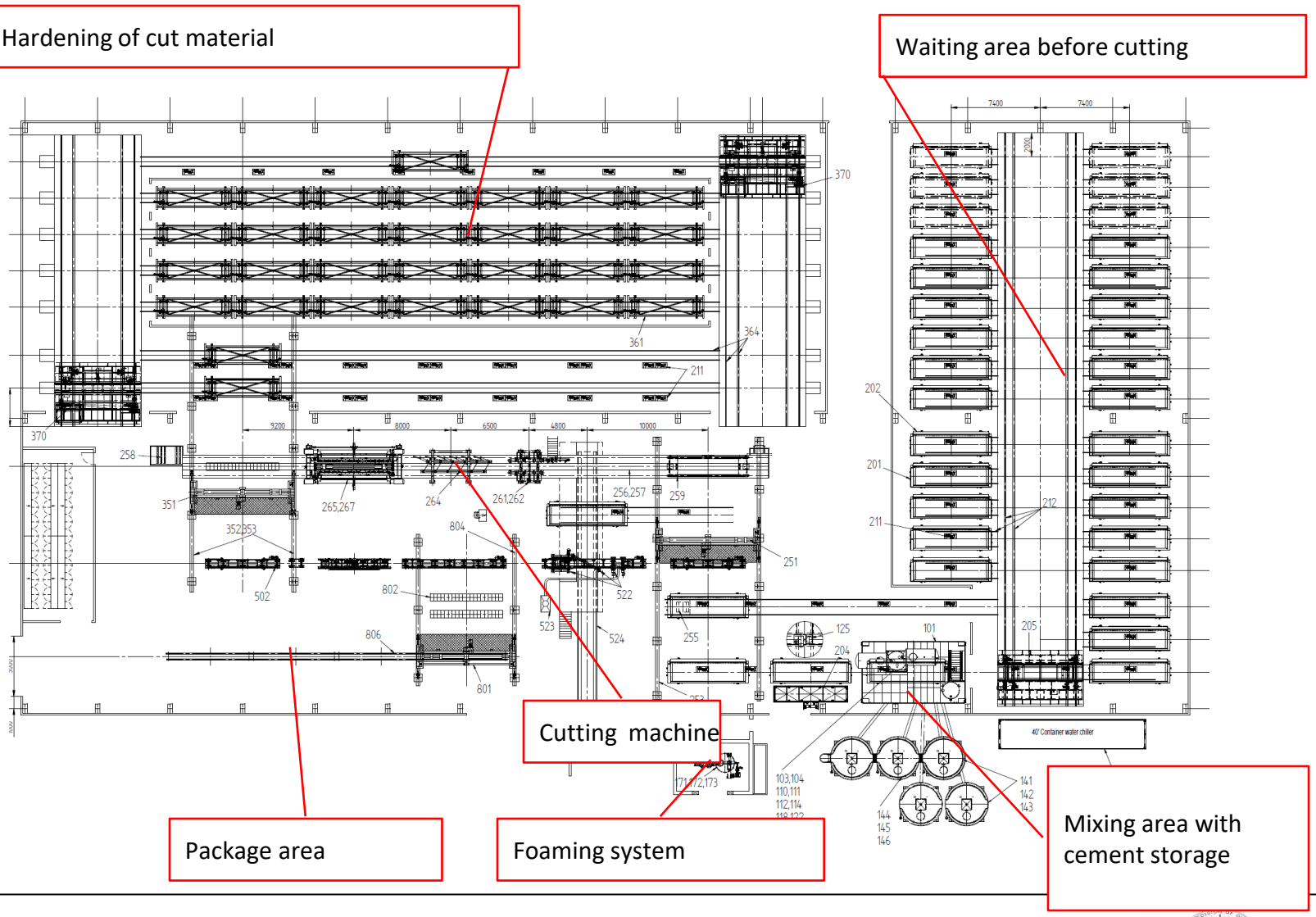
Fully Automatic Mixing Tower and Cutting Machine.

Only mould handling is by hand.

- Up to 400m³ per day/shift
- All inclusive – from raw-material storage to package
- Upgradeable 100-200-400m³



Plants (stationary) up to 1500 m³



Mobile Plants

- Up to 20 m³ capacity per hour
- Density range between 150 and 1400 kg/m³
- Reference: Antopus Concrete in Sweden

Thank you for your attention...

Time for your questions…