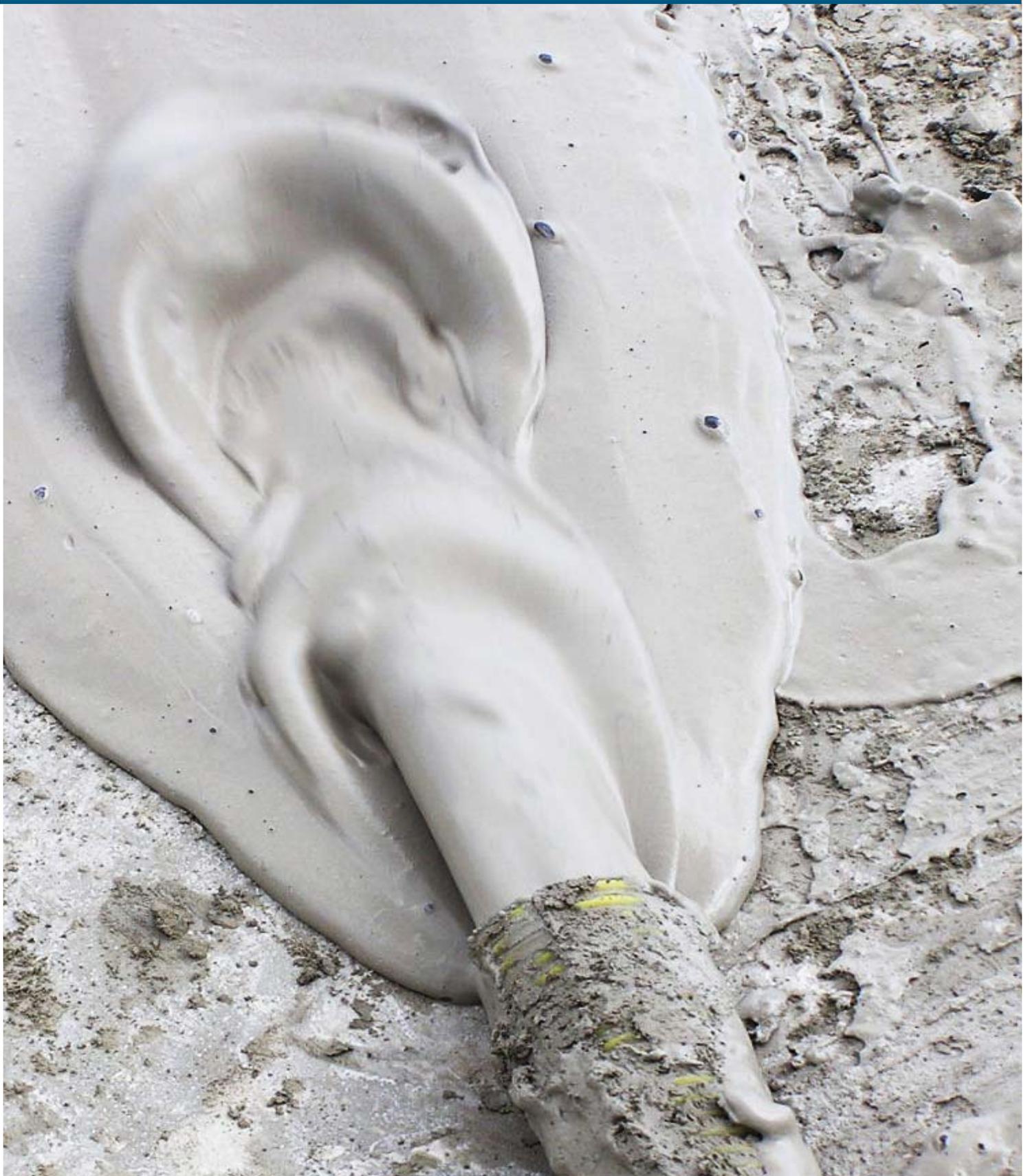




Cellular Concrete

**Insulating, Screeding material
Especially designed for deck
roofing applications**





AERCEL CATALOGUE INDEX

1. Brochure
2. Aercel a must for Roofing
3. Aercel machine and foaming agent
4. Aercel Properties and Advantages
5. Design details
6. Density vs Compressive Strength
7. Method statement
8. Specifications

Aercel



LIGHT Weight Concrete Machine



- Daily production of 80 CBM per minimum number of staff.
- Local availability of accessories.
- Smooth surface
- High Compressive strength

AERATOR

Gauging of foam density control
Constant pressure
Constant density

MIXER

Double feeding inlet
Visible foam entry
1 CBM Net Capacity

PUMP

Easy to move on the roof
Up to 30 meters high



AERCEL®

SP-20

Foaming Agent



- High concentration formulation
- 30% saving of liquid cost against old formulators.
- Bubble consistency to get uniform mix
- Only 1 liter of SP 20 is enough to achieve 1 CBM of L.W.C. for densities varying between 400 and 500 kg/m³
- Formulated for hot Weathers
- More than 20 Million SQM executed in the Middle East.



First, we would like to point out that we are the inventor and the producer of the Internationally recognized "Aercel" SP20 advanced formula. Also, we are one of the largest manufacturers of the lightweight concrete machines, with experience in this field of more than thirty years.

The foam concrete machines are specially designed and manufactured to meet the specific requirements of high quality cellular concrete. The machine is composed of mixer, aerator, pump, water reservoir all controlled by electric panel board.

The selected mix design depends on the desired average dry density.

Accordingly, the mixer will use enough quantity of "Aercel" SP20 foam and foaming water injected into the mixer up to its rim until white foaming layer appears on the mix surface. No dispenser at aerator output is required.

The final water/cement workable ratio should be set by site trial mixes, prior to commencement of work, and the marking of the water tank gauge will be used as guidance for all mixes.

Trial mixes must be done in full mixer volume capacity. Proportional mix not completely filling the mixer must never be tried. Samples must be left to dry 28 days before testing them for compressive strength or dry density. Oven drying is not allowed as it will completely destroy the cellular structure of sample.

Further to the above, we hereby confirm that:
Our trainings to our clients's personnel on the operation of the machine, density control, trouble shooting and maintenance procedures are free of charge, and our technical support is continuous.

Aercel





Edition: May 2009
Version: 9051

Division: 03
Section: # 3050

AC 300L

AERATOR FOR AERCEL

● THE PRODUCT

- **AC 300 L (125x180x[h]130 cm; 500 kg) Aerator Twin Tank:**

Aerates the foaming agent (in water solution) with compressed air to produce foam to specified standards.

Features:

- 1- Gauging of Foam Density Control. Innovation of Aercel not available by any other manufacturer.
- 2- All gauges and valves are one side of the machine, to allow one person to control all equipment.
- 3- Sieve in the inlet to avoid dirt getting in the tank
- 4- Gauged Liter/s of Foam in the Aerator allow you to transfer foam from the drum to the Aerator directly.





Edition: May 2009
Version: 9051

Division: 03
Section: # 3050

MIXER

MIXER

● THE PRODUCT

- **MIXER 1CBM (100x265x[h]205 cm; 750 kg):** The machine in which the actual mixing process takes place; water, cement, and foam (from the aerator) are introduced and blended into a homogeneous mix, volume is 1 cubic meter.

Features:

- 1- Double feeding inlet for the cement
- 2- Cement inlet is now pitched to facilitate labor work for loading the Cement.
- 3- Water gauging is simplified to have a steady volume per mix.
- 4- Foam entry to the mixer is visible while feeding cement.
- 5- Water flow into the mixer is now in three points that will help cleaning the mixer per mix.
- 6- Water valve is now clear from all directions.
- 7- Bigger volume of 1 cubic meter per mix that give 30% more production capacity.





Edition: May 2009
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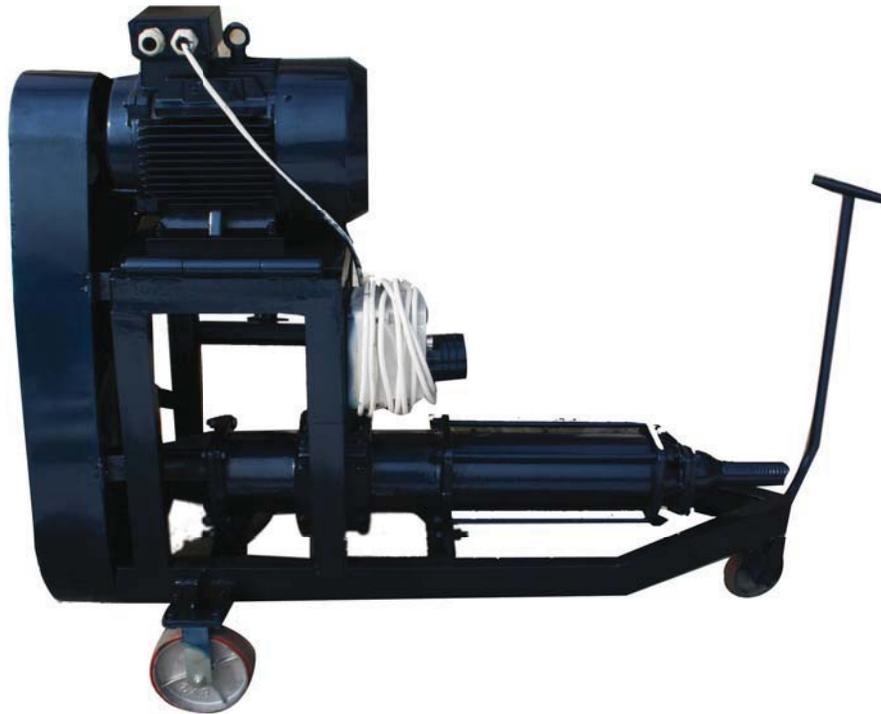
Division: 03
Section: # 3050

PXP 240

PUMP FOR AERCEL

● THE PRODUCT

- **PUMP 410 L (105x165x[h]135 cm; 350 kg):** Conveys the mix to the place of installation without damaging the cell structure.
Outlet is 63 mm, should use PVC or rubber hose. For high levels, rubber hose is recommended.





Edition: May 2009
Version: 9051

Division: 03
Section: # 3050

PXP 340

PUMP FOR AERCEL

● THE PRODUCT

- **PUMP 410 L (105x165x[h]135 cm; 350 kg):** Conveys the mix to the place of installation without damaging the cell structure.
Outlet is 63 mm, should use PVC or rubber hose. For high levels, rubber hose is recommended.



To produce Lightweight insulation concrete with variable densities.



Code	Description	Color	Unit of Sale	Quantity	Base Unit
AR223001	AC 300 L Aerator Twin Tank, (300 Litersx2)	Blue	Piece	1	Piece
AR283001	Central Panel Board	Blue	Piece	1	Piece
AR232150	Pump 410L for Light Weight Concrete	Blue	Piece	1	Piece
AR215115	Mixer 1CBM for Light Weight Concrete	Blue	Piece	1	Piece



EXPORT ORDERS: Product size and packaging may change slightly to accommodate export shipping requirements.
 WARRANTY: We warrant our materials to be of good quality and will replace materials found defective, providing however, that the buyer shall examine the materials when received and promptly notify use of any defect before the materials are used or incorporated into a structure of which they are intended. Unless otherwise agreed to in writing, this warranty shall extend only to comply with specifications of materials manufactured and published by PLYDEX Company and made available to the buyer at request. We cannot warrant nor in any way guarantee particular methods, use or applications and performance, nor can we warrant that the materials will be suitable for any intended use. This warranty is in lieu of all others expressed or implied and may not be extended representatives, written sale information or drawings, nor do our distributors or salesmen or any representatives of distributors or of this company have any authority to extend any guarantee beyond that outlined above or to waive the limitations of the seller's liability.



Edition: May 2009
Version: 9051

Division: 03
Section: # 3050

AERCEL SP20

CELLULAR CONCRETE ADMIXTURE
SYNTHETIC BASE FORMULA

BACKGROUND

For centuries waterproofing materials have been known to provide prolonged effectiveness only when applied over properly sloped surfaces; the key: to ensure prompt evacuation of rain waters.

Thus the necessity of a durable and lightweight element on which to lay the waterproofing membrane; a material which would make the execution of adequate drainage slopes easy, without overloading or complicating the structural components. Cementitious mortars became the logical choice, but their weight often resulted in excessive burden for the structure, so the idea somehow making these versatile materials lighter was introduced.

Beginning with the incorporation in the mortar mix of naturally lightweight aggregates (such as pumice: a porous rock of volcanic origin), the technology embracing mortar weight reduction has since evolved greatly, taking many forms. Many have, in time, been abandoned, either because of cost, predictability of results, long term performance, or job site practicality.

By 1960, among accepted methods of mortar weight reduction, it was possible to identify three main categories :

1 . LOW FINES CONCRETE

Aggregate grading is selected so as to leave voids between adjacent stones. This method could provide only very limited weight reduction, and therefore found only limited applications.

2 . LIGHTWEIGHT AGREGATE CONCRETES

Sand and gravel aggregates are substituted with natural or man-made aggregates of lower unit weight thereby lowering the overall weight of the concrete. This method offered greater weight reduction and very good mechanical strengths, eventually finding its ideal application in prefabrication of structural elements. As roof fill it proved to be unpractical due to high weight-to-strength ratio, excessive aggregate storage requirements, and undesirable water retention properties of some of the lightweight aggregates.



3 . CELLULAR CONCRETE

A particular family of chemicals produces foam through a physical process which does not require chemical interaction with constituents of the mortar matrix. The foam is added to cement matrix. Its bubbles are trapped inside the mortar mix, and the over-all weight is reduced. This method offered good weight reduction capacity and ease of production on the job site. It promised to be the most suitable for roofing applications, but performance in such areas as density control, compressive strength, and production capacity, still needs substantial improvements.

At this stage it was clear that the "foaming" method had good possibilities, and a number of entrepreneurs set out on the complex task of not only selecting the proper formulation for ("foaming agent"), but also to devise a complete system that would transform production of "foamed" lightweight concrete into a practical operation, capable of yielding

predictable and satisfying results.

The research became oriented towards three very intricately related items:

The foaming agent, the production plant, and the technology of foam concrete production and placing.

To be of any real interest to the industry, the system would have had to produce acceptable densities and compressive strengths within reasonable tolerances. Also, to be really practical the mix would have had to be conveyable by pumps.

The first substantial step towards evolution of cellular concrete was the discovery that preformed foams (chemical agents foamed separately then added to the mortar matrix) yielded better results.

In a successive step, basic requirements were set:



1 . The Foaming Agent would have to be:

A. Chemically inert with respect to the portland cement; so as not to interfere with the cement's hydration process (on short terms), nor react with the crystallized cement (on long terms);

B .Capable of generating air cells of uniform size so as to provide a "foamed" concrete of uniform structure, important to guarantee strength, conductivity, and other physical properties;

C .Easily mixed into cementous mixes;

D .Resistant to the rigorous stresses encountered during mixing, placing and surface finishing of the foamed concrete;

E .Chemically stable so as to withstand storage for substantial periods of time;

F .Safe to be handled by all personnel concerned.



PRODUCT PRESENTATION

AERCEL Cellular Concrete

is a lightweight, and insulating screeding material, especially designed for deck roofing applications, where it is necessary to provide effective slopes for proper drainage. Applied on the structural deck (below the waterproofing), **AERCEL** will form a strong, continuous, fireproof, lightweight screed with considerable thermal insulation properties.



AERCEL Cellular Concrete

- Is composed of Portland cement cells. The materials necessary for its manufacture are Portland cement, **AERCEL** Formula Foaming Agent, and water.
 - Is produced directly on the job site.
 - Fills all surface irregularities on metal or decks, is easily screeded to form effective drainage slopes, and provides a smooth, resistant surface.
 - Is ideal for both traditional and innovative waterproofing membrane systems.
 - Is the most practical solution to today's roof fill problems. Offering a very wide range of design possibilities,
 - Is unmatched in versatility, mechanical strengths, and fire resistance by another insulating material.
- AERCEL** can be applied on new roofing, reroofing, and remedial roofing, as roof fill, thermal insulation, and substrate for the waterproofing system.



PRODUCT PRESENTATION



BENEFIT & ADVANTAGES OF AERCEL



AERCEL's unmatched flexibility allows designers to adopt standard as well as original architectural solutions.

AERCEL Cellular Concrete offers exceptional versatility;

- It adapts perfectly to any roof deck geometry;
- Is fire proof: will not burn, spread flame, contribute to fuel, or emit toxic fumes:

AERCEL improves deck fire rating;

- Is strong: it has excellent compressive strength as an insulating material;
- Has a low water content: the mix design uses the same water content proportions as –concrete; there are no water retaining aggregates;
- Is similar to concrete: it behaves according to the same –general principles of durability and resistance to pests, molds, –animals, etc.;
- Has a low thermal expansion coefficient: generally it requires no expansion joints;
- Has excellent workability: it–is easily placed and screeded, requiring much less effort than concrete;
- Is nailable: it provides a nailable substrate for those waterproofing systems requiring mechanical fixing;
- Provides efficient thermal insulation: it forms a continuous insulating layer, without thermally inefficient joints;
- Is lightweight: only one fifth the weight of concrete;
- Adds a safety factor to your roof: it will not deteriorate or absorb water in case of failure of the waterproofing membrane;
- Is easily repaired: it can be patched easily with Portland cement mortar.
- Cctechique guarantees quality results: only licensed applicators install AERCEL Cellular Concrete.

2 . The Production Plant would have had to:

- A . Measure proper quantities of mix constituents, in a precise, and systematic manner;
- B . Homogenize the mix so as to guarantee continuity in the product performance;
- C . Convey (or pump) the foamed concrete, from the place of mixing, to the place of installation, without damaging the material;
- D . Produce foam concrete in the substantial quantities.

3 . The Technology regarding foam concrete production and placing was expected to guarantee uniformity of results regardless of ambient conditions, even if meant modification under particular circumstances, of the characteristics of either or both the foaming agent or/and the production plant. Encouraged by a pressing market demand, many of the firms involved in the early development attempts, proceeded to commercialize their first achievements, without having a legitimate record of real and diversified experiences.

Code	Description	Unit of Sale	Quantity	Base Unit
AR101231	AERCEL SP20 LWC Foaming agent	Drum	210	Kg

Properties of cured AERCEL Concrete appear in Table 1, while Tables 2, 3, 4, and 5 are dedicated to AERCEL's outstanding thermal insulation properties.

Table 1		Properties of cured AERCEL Cellular Concrete			
Test	ASTM method	Typical Test Results AerCel Type			
		A	B	C	D
Dry Density (lbs/cu.ft.) Metric-(kg/cu.m)	C-796	25 400	30 480	35 560	40 640
Wet Density (lbs/cu.ft.) Tric-(kg/cu.m)	C-796	35 560	40 640	45 720	50 800
Thermal Conductivity - "k" factor 75°F (B.T.U./hr sq.ft./°F/in) Metric-A(W/m°C)	C-518	0.55 0.09	0.70 0.10	0.80 0.11	0.90 0.13
Tensile Splitting Strength (P.S.I.) Metric-(kg/sq.cm)	C-796	17 1.2	25 1.8	36 2.6	51 3.7
Flammability -Flame Spread -Fluel Contributed -Smoke Developed	E-84	none none none	none none none	none none none	none none none
Thermal Expansion (in/in ×10.6)	C-157	5 .0005	6 .0006	7 .0007	8 .0008
Loss or air during pumping	C-796	less than 4.5% (by volume)			
Water Absorption		less than 20% (by volume)			
Working Temperature Range		up to 1800°F			
Drying Shrinkage		less than 0.08%			

Thickness of AERCEL over top of corrugations (inches)		2			3			4		
Depth of Corrugations (inches)		9/16	15/16	15/16	9/16	15/16	15/16	9/16	15/16	15/16
Volume of AERCEL (cu.ft./sq.ft.)		4.75	5.14	5.53	6.84	7.23	7.62	8.92	9.31	9.70
Heat	Winter (up)	0.21	0.20	0.19	0.16	0.15	0.14	0.12	0.12	0.12
Flow	Summer (down)	0.19	0.18	0.17	0.15	0.14	0.14	0.12	0.12	0.12

Dry density of **AERCEL Cellular Concrete** 22-28 lbs/cu.ft.
 "U" values in tab. 2 in Btu/ft²h°F

Thickness of AERCEL over top of corrugations (inches)		50			76			102		
Depth of Corrugations (inches)		14.3	23.8	33.3	14.3	23.8	33.3	14.3	23.8	33.3
Volume of AERCEL (cu.ft./sq.ft.)		0.05	0.06	0.06	0.08	0.08	0.09	0.10	0.11	0.11
Heat	Winter (up)	1.19	1.14	1.08	0.91	0.85	0.80	0.68	0.68	0.68
Flow	Summer (down)	1.08	1.02	0.97	0.85	0.80	0.80	0.68	0.62	0.62

Dry density of **AERCEL Cellular Concrete** 350-460kg/cu.m.
 k" values in tab. 3 in w/m²°C

Thickness of AERCEL over structural concrete (inches)			2	2.5	3.0	3.5	4.5	5.0
Volume of AERCEL (cu.ft./sq.ft.)			0.17	0.21	0.25	0.29	0.33	0.42
Weight of AERCEL (lbs./sq.ft.)			4.17	5.21	6.25	7.29	8.33	10.42
Thickness of Concrete 3"	Heat	Winter (up)	0.22	0.19	0.16	0.14	0.13	0.11
	Flow	Summer (down)	0.20	0.17	0.15	0.14	0.12	0.10
Thickness of Concrete 4"	Heat	Winter (up)	0.21	0.18	0.16	0.14	0.13	0.11
	Flow	Summer (down)	0.20	0.17	0.15	0.13	0.12	0.10
Thickness of Concrete 6"	Heat	Winter (up)	0.21	0.18	0.16	0.14	0.12	0.10
	Flow	Summer (down)	0.19	0.17	0.15	0.13	0.12	0.10

Density of **AERCEL Cellular Concrete** 22-28 lbs/cu.ft.
 "U" values in tab. 4 in Btu/ft²h°F

Table 2

Table 2

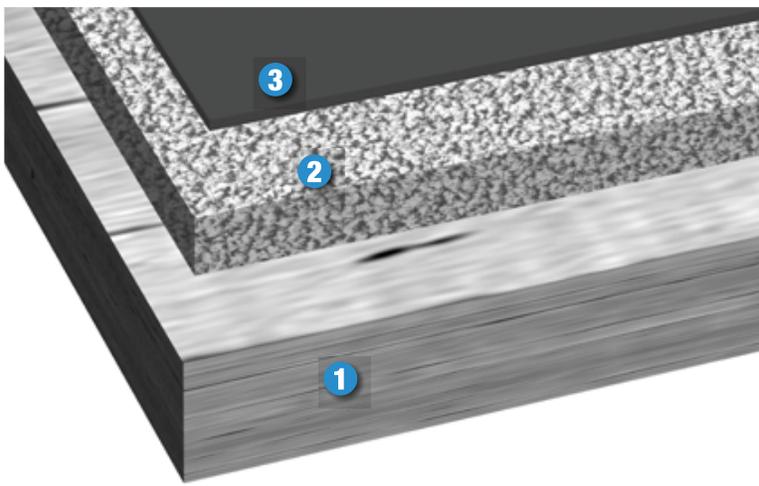
Table 5		(METRIC) "K" values for AERCEL Cellular Concrete over Structural Concrete Deck					
Thickness of AERCEL over structural concrete (inches)		50.8	63.5	76.2	88.9	102	127
Volume of AERCEL (cu.ft./sq.ft.)		0.05	0.06	0.08	0.09	0.10	0.13
Weight of AERCEL (lbs./sq.ft.)		20.3	25.4	30.5	35.5	40.6	50.8
Thickness of Concrete 72.2 mm	Heat Winter (up)	1.25	1.08	0.91	0.80	0.74	0.62
	Flow Summer (down)	0.14	0.97	0.85	0.80	0.74	0.62
Thickness of Concrete 102 mm	Heat Winter (up)	1.19	1.02	0.91	0.80	0.74	0.62
	Flow Summer (down)	1.14	0.97	0.85	0.74	0.68	0.57
Thickness of Concrete 152 mm	Heat Winter (up)	1.19	1.02	0.91	0.80	0.68	0.57
	Flow Summer (down)	1.08	0.97	0.85	0.74	0.68	0.57

Dry density of **AERCEL Cellular Concrete** 350-460kg/cu.m. "
k" values in tab. 3 in w/m²°C

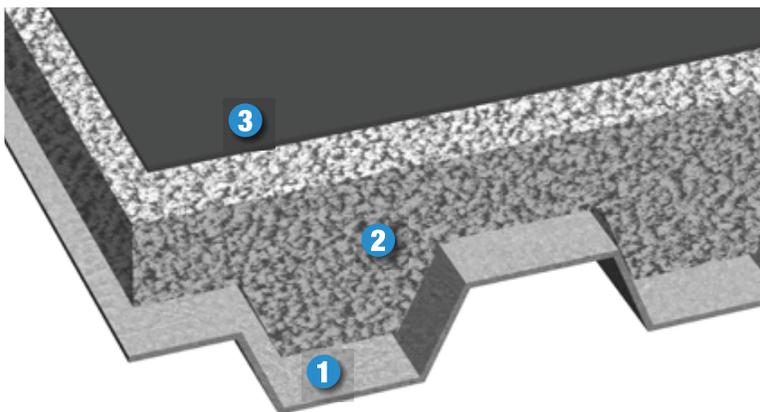
NOTE: Values in table above are approximate figures only; actual consumption of materials may vary in accordance with local factors such as type and water requirements of cement used, plant and procedures actually employed, etc. These values are calculated considering an application considering an application where the Aercel machine is at the same level of the pouring surface, i.e. neglecting the roof-mixer factor, also called pump factor.



- 1- Structural Concrete Slab**
- 2- AERCEL Cellular Concrete Screed**
- 3- Waterproofing Membrane(s)**



1.Sloped **AERCEL** screed over Structural Concrete Deck,
With Exposed Waterproofing.



2.Sloped **AERCEL** screed over Structural Steel Deck,
With Exposed Waterproofing.

(See SPECIFICATIONS
General Requirements).

The following are some typical design
details for **AERCEL Cellular Concrete**.

Not all possible designs are shown .

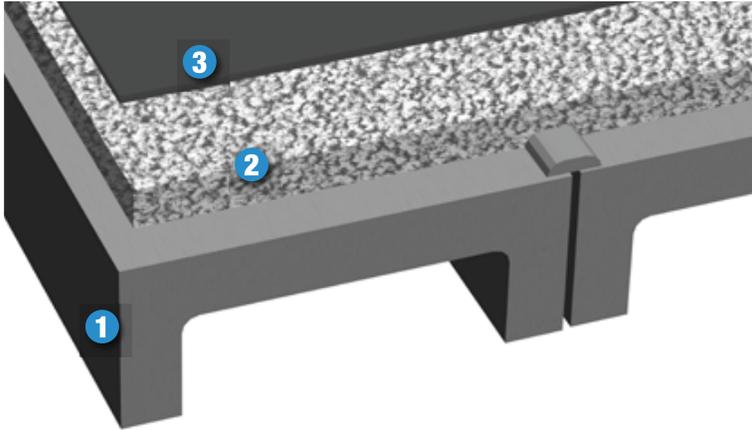
Other designs are possible.

See your local **AERCEL** representative
for special requirements.



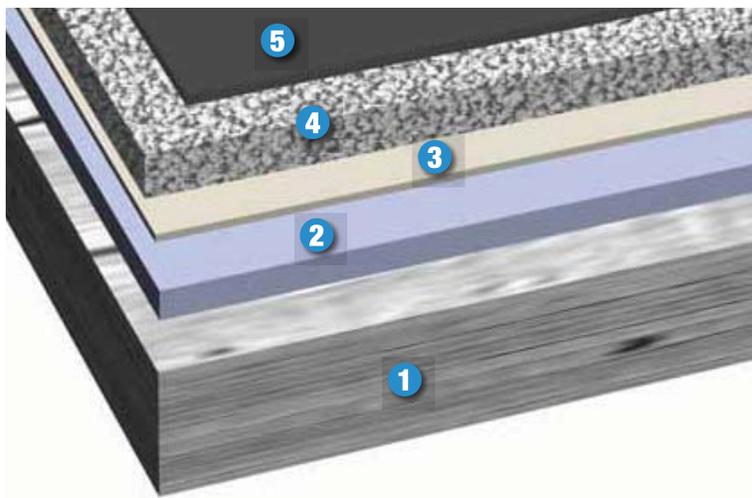
AERCEL[®]

Design Detail



- 1- Prefabricated Concrete Slab
- 2- AERCEL Cellular Concrete Screed
- 3- Waterproofing Membrane

3. Sloped **AERCEL** screed over Prefabricated Concrete Slabs, With Exposed Waterproofing Membrane.



- 1- Structural Concrete Deck
- 2- Insulation Board
- 3- PE Film
- 4- AERCEL
- 5- Membrane

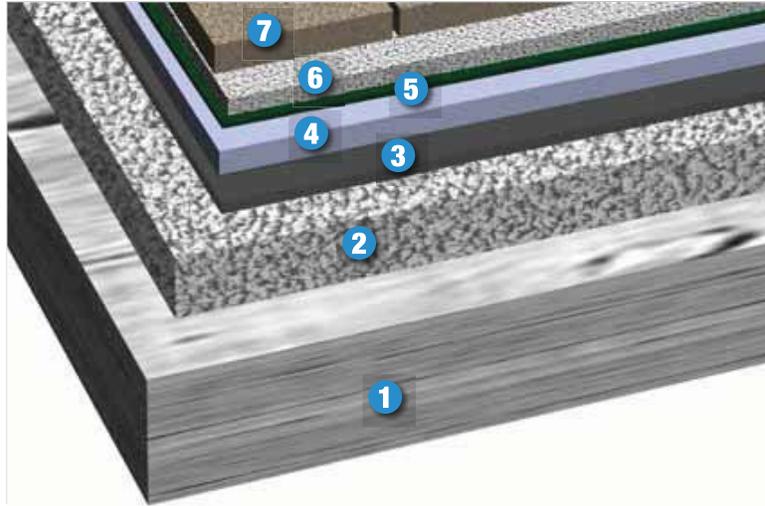
4. Sloped **AERCEL** screed over Structural Concrete Deck, With additional insulation Board and Exposed Waterproofing Membrane.

Design Detail
Design Detail



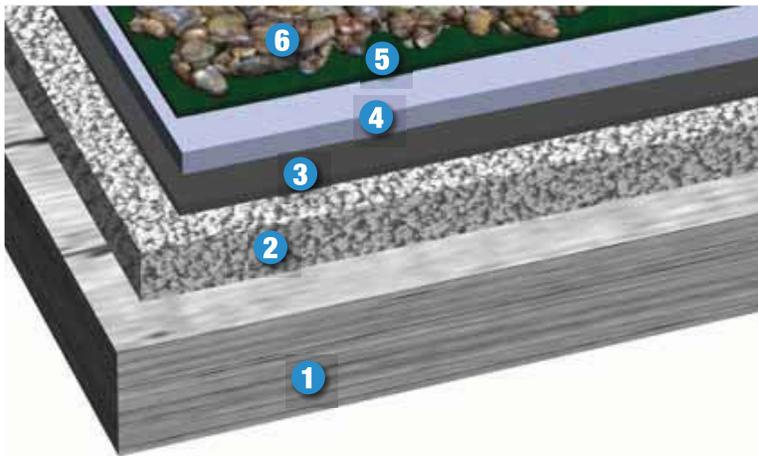
AERCEL[®]

Design Detail



- 1- Structural Steel Deck
- 2- AERCEL Cellular Concrete Screed
- 3- Waterproofing Membrane
- 4- Insulation Board
- 5- Non-Woven Fabric Filter Membrane
- 6- Cement Mortar
- 7- Concrete Paving Tiles

5. Sloped **AERCEL** screed over Structural Concrete Deck, With inverted Roofing and concrete paving Tiles Laid in Mortar



- 1- Structural Steel Deck
- 2- AERCEL Cellular Concrete Screed
- 3- Waterproofing Membrane
- 4- Insulation Board
- 5- Non-Woven Fabric Filter Membrane
- 6- Gravel

6. Sloped **AERCEL** screed over Structural Concrete Deck, With Inverted Roofing and Gravel

TABLE

ASTM C495



Density kg/m ³	Compressive strength Kg/cm ²
300	7.50
350	9.00
400	10.00
450	12.50
500	15.00
550	17.50
600	20.00
650	22.50
700	25.00
750	27.50
800	30.00
850	33.55
900	37.61
950	41.67
1000	45.75
1050	49.80
1100	53.86
1150	57.92
1200	62.5

Fire Behaviour

AERCEL LIGHTWEIGHT CELLULAR CONCRETE FIRE BEHAVIOUR	
TEST	INDEX
FLAMMABILITY	0
FLAME SPREAD	0
SMOKE PRODUCTION	0

CCTechnique.- Tero Highway, Shoueifet, Lebanon. Tel:(+961)(1) 738725, Fax:(+961) (1) 738731
CR # 67322

***Note: all tests have been carried at CCTechnique Lab with local cement and water and at room temperature. Variation in results could occur as compressive strength depends directly on cement quality and water/cement ratio.**



Advanced Construction Technology Services

TEST REPORT



Tested at : "ACTS Central Laboratory, Beirut,
Sanayeh area, George Assy st.
P.O.Box: 14/5918-Code:1105-2080
Tel: 01-737400; Fax: 01-737222"

Client : "ACC"

COMPRESSIVE STRENGTH OF LIGHTWEIGHT INSULATING CONCRETE (ASTM C495)

Contractor : ACC
Consultant : Mr. Rafic Khoury
Project : Platinum Towers
Sample Type : Light-Weight Concrete Cylinder

Work Order No. : 19091
Sample Received on : 23.02.08
Sample Tested on : 17.03.08
Sampled by : ACTS

Sampling details **Date of Sampling :** 18.02.08
Location of sampling : 6th Floor

Cylinder Ref.	1-A	1-B	1-C	Cylinder Ref.	1-D	1-E
Age (days)	28	28	28	Age (days)	28	28
Diameter (mm)	153.2	152.8	152.4	Diameter (mm)	151.6	152.3
Length (mm)	294	298	294	Length (mm)	297	292
Load (kN)	22.3	24.4	21.1	Weight (g)	2490.2	2410.6
Area (mm ²)	18433.5	18337.3	18241.5	Area (mm ²)	18050.4	18217.5
Strength (MPa)	1.21	1.33	1.16	Volume (mm ³)	5360982	5319517
Strength (kg/cm ²)	12.3	13.6	11.8	Density (kg/m ³)	464.5	453.2

Fresh Density (kg/m³)	517
---	------------

Tested by: Nour Eddine El Safadi
Senior Technician

Nour Eddine El Safadi



Reviewed by: Rabih Boukaidbey
Head of Material Testing Division

Rabih Boukaidbey

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**Method Statement
Aercel Light Weight
Concrete**

*Typical for Density: 450 kg/CBM

Index

1. Light Weight Concrete in General
2. Mix Design
3. Site Preparation
4. Mixing & Pouring Procedure
5. Curing
6. Preparation for Roofing Membrane
7. Testing of Density and Compressive Strength

* For method statment of different densities please address your request to:
aercel@cctechnique.com



AERCEL®

Light Weight Concrete in General

1. Light Weight Concrete In General

LWC (Light Weight Concrete) is a concrete mix of light density that is generated by injecting homogeneous air bubbles into the mix of concrete.

In the case of low density of 450kg per CBM, the AERCEL SP20 LWC is made out of Cement, Water and creating air bubbles through the injection of AERCEL Foaming Agent into the mix.

The mixing of the AERCEL SP20 light weight concrete is done by a Gauged system mainly composed of: Mixer, Aerator, Pump and Gauged water reservoir, all controlled by one Electrical Panel Board.

Pouring and finishing of AERCEL SP20 is controlled at site by steel guidelines that get high precision control of the roof levels.

Site trials are recommended due to the fact that the main factor is the type of locally available Cement used.

2. Mix design :

For a project that requires an average Dry Density of 450 kg per cubic meter.

Based on AERCEL mixer of 1 CBM net Volume.

Usually water/Cement Ratio = 0.50

Initial Mix Design shall be:

6 Bags of cement per mix of 1CBM
110 liters of water***
40 - 50 liters foam water with AERCEL*** from the Aerator

Important note :

AERCEL system is based on a mixer that has fixed drum of 1 Cubic Meter Net. Accordingly the mixer will use enough AERCEL SP20 Foam generated by the Aerator up to its rim. Water/ Cement content at site might be changed to achieve a workable mix at the roof. Such water content is depending on the quality of cement. The final Water / Cement workable ratio should be set once by site trials. Marking the gauge of water Tank will be used as guidance for all mixes.

Based on above Initial Mix Design the yield of Dry Density is calculated as follows:

Dry density formulation is the density after keeping the lightweight concrete 28 days at room temperature in a chamber, and three days out of the chamber.

But at the scene time, site trials might require different ratios depending on the working temperature

Light Weight Concrete

Aercele



Light Weight Concrete

3. Site Preparation

Preparation at site before pouring AERCEL light weight concrete , to include :

- a. Completion for all other trades including but not limited to : Civil Work namely Clean Concrete Slab , plaster to parapet walls, fixing of Drains, Mortar around all outlets...All according to approved shop drawings.
- b. Approved Roof Plan with clear indication of levels.
- c. As Built Roof Plan with clear indication of any variation in concrete slab levels, or change of items on roof.
- d. Water, Cement and Electric outlet at the point of mixing.
- e. Other trades exposed to possible splash of Light Weight Concrete to cover their equipment to avoid any possible dirt from pouring AERCEL.

Preparation of Guidelines:

- a. Steel Guidelines made of U Channel (4 x 8 cm) and having different length to be fixed on the roof following the level of the Approved Roof Plan and consistent with As Build Drawing.
- b. Where it is inaccessible to put Steel Channels, Lines to be marked at the Parapet Wall.

4. Mixing & Pouring Procedure :

Once site preparations are completed, pouring shall proceed in two stages:

Stage 1: Base Layer:

Mix design as described above.

First dampen the surface of the roof area where AERCEL Light Weight Concrete is expected to be poured. Make sure that the surface of the roof is only damp without any excess water on the surface.

Mixing Procedure is done by filling the Water Reservoir to the level of Marked Guideline, then empty the water into the Mixer, add the Cement. Separately and at the same time while filling the cement, inject the AERCEL foam from the Aerator and keep the mix under a pressure of 5.5 Bar. (Bar Gauge is fixed on the Aerator)

The top surface of the First layer should be around 4 cm below the top of the level of the Guidelines. This is easily controlled because the Steel Guidelines are 4 cm thick. Rough surface is acceptable for Base Layer as long as the surface is 4 cm below the Top Layer Surface.

Leave the first layer for 24 hours then follow with the second layer.

Stage 2: Top Layer:

Follow the mixing procedure as per Stage 1.

Surface of the Top Layer should be to the level of the top of the Guidelines. To insure Good surface finish, Aluminum Rod to be used that is to be moved on top of the Guidelines. Note that whenever it is possible to allow for alternative bay pouring. This will allow pouring two days later of the Top Layer and using the Hard Surface of the adjacent Top Layer as Guidelines



Light Weight Concrete

Any left over pockets due to removal of the Guidelines, or caused by third parties to be fixed using normal mortar and using AD LATEX or approved equal .Should the consultants decide that there is large pocket in Light Weight Concrete, in such case cutting the area, preparing the surface and pouring AERCEL Light Weight Concrete is to be followed.

Care should be taken that Top Layer work should not proceed without making sure that the first layer is clean and damp. This is especially important in case the Top layer is done after a long period of pouring the Base Layer.

5. Curing:

Like any other Cement based mix, AERCEL Light Weight Concrete has to be cured after pouring for a period of 7 days. Curing to be carried out by spraying water once a day, preferable early in the morning. Should the temperature exceed 34 Deg C, it is preferable to cover the surface with Polyethylene to reduce the Hydration of Water. In this case curing to be done twice per day.

6. Preparation to Proceed with Roofing Membrane :

Roof membrane shall proceed after making sure that the AERCEL LWC is completed and all the concrete mortar are done especially the skirting work incorporating the use of SBR AD Latex or equivalent.

AERCEL LWC shall be left 3 (three) days after the last day before the application of the primer for the application of Roofing Membrane.

7. Testing :

a. **Testing for Density** : The main testing of the AERCEL can be carried out at site and while the pouring is taking place (See Para 2) . When the mix is completed indicated by the mixer being full to the rim, carry the RWD (Roof Wet Density Test).

b. **Testing for compressive strength:** AERCEL is acting as a layer to generate a screed to falls between the Roof Slab , and the Tiles, or Gravel on top. No structural behavior is expected from AERCEL except to carry compressive strength of the live load and dead load on top. With dry density test of 28 days, it is expected to get around 10 kg per sqcm *** all depending on the quality of Cement and Water / Cement ratio ***. Even if the Compressive Strength goes down to 3 kg / sqcm, this yield 3 x 100 cm x 100 cm = 30,000 Kg per sqm which is much beyond any Live Load Demand. Walking over the Top Layer, in two days after pouring, would insure a sound and loadable results.

c. **Inspection** : The final inspection and handing over the AERCEL should be carried out after curing . Inspection to include

1. Wet density approval (recorded during pouring).
2. Rigidity of the surface to take traffic.
3. Closing all pockets.
4. If roof design is indicating slope a spot check on higher and lower points to be done



Light Weight Concrete Specifications

A. Scope

Extent of work: The extent of light weight insulating concrete work is shown on drawings and includes the provision of lightweight concrete fill.

B. Performance and Standards

Comply with the requirements of the following codes and standards:

ASTM American Society for testing and materials:

C150 Specification for Portland Cement.

C172 Sampling Fresh Concrete.

C260 Specification for Air-Entraining Admixtures for Concrete.

C495 Test for Compressive Strength of Lightweight Insulating Concrete.

C. Related Items

Cast-In-Situ Concrete 03300

D. Quality Assurance

Material Evaluation Tests: perform material evaluation tests, for quality control and the design of concrete mixes.

Materials and installed work may require testing and retesting at any time during the progress of the work.

Allow free access to material stockpiles and facilities at all times. Tests, including the retesting of rejected materials and installed work, are to be carried out at the Contractor's expense.

E. Submittals

1. **General:** In addition to submittals listed below and prior to purchase, provide Catalog cuts and manufacturer's data for all items to be purchased, for review by the Engineer.

a) Samples of materials as specified, including names, sources and descriptions as required.

2. **Reports:** Submit written report to the engineer for review for each material sampled and tested, prior to the start of work. Provide the project identification name and number, date of report, name of Contractor, source of concrete aggregates, material manufactured materials, values specified in the referenced specification for each material is accepted for intended use.

F. Product Handling

Deliver materials in manufacturer's original undamaged packages and store off the ground and in covered sheds to protect them from damage and deterioration. Do not use the cement which shows indications of moisture damage, caking, or other signs of deterioration.

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G. Job Conditions

do not place lightweight insulating concrete during sandstorms or rain or when ambient temperature is above 32°C or below freezing. Do not place lightweight insulating concrete except in compliance with requirements of cold weather and hot weather concreting.

H. Materials

- | | | |
|------------------------------|---|--------------|
| 1. Portland cement | : | ASTM C260 |
| 2. Water | : | Clean, fresh |
| 3. Air Entraining Admixtures | : | ASTM C260 |

I. Design Mix

- Design Lightweight insulating concrete mix to produce the following physical properties:
 - Oven dry density 425 – 475 kg/m³, when tested in accordance with ASTM C 495
 - Compressive strength: minimum 0.97 MPA, when tested in accordance with ASTM C 495.
- Use only the minimum amount of water necessary to produce a workable mix.

J. Workmanship

1. Inspection

Contractor shall examine the areas and conditions under which lightweight insulation concrete is to be placed, and correct all unsatisfactory conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Engineer.

2. Installation

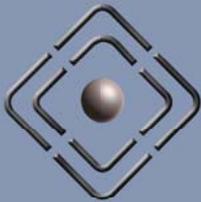
- Place lightweight insulating concrete using equipment and procedures to avoid segregation of the mix and the loss of air content. Deposit and screed in a continuous operation until an entire panel or section of the roof area is completed. Do not vibrate or work the mix except for screeding or floating. Place lightweight insulating concrete to the depths and slopes as indicated on the drawings.
- Design curing operations immediately after placement in accordance with weather and job conditions.

K. Field Quality Control

- The Contractor is to take samples and conduct tests to evaluate lightweight Insulating concrete.
 - Take samples in accordance with ASTM C 172, except as modified by ASTM C495.
 - Determine compressive strength and oven dry density in accordance with ASTM C495. Make at least 6 molds during each placement.
- Report test results to the Engineer immediately after completion of each test.

L. Defective Work

Refinish or remove and replace lightweight insulating concrete with objectionable Thermal or other cracks or when physical properties do not meet specified requirements.



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