AGON C®

LIGHT WEIGHT CELLULAR CONCRETE and CEMENT

= TECHNICAL MANUAL =

INTRODUCTION

This technical manual is meant to give the main principles for the production of LIGHT WEIGHT CELLULAR CONCRETE AND CEMENT, to obtain a high quality product, which is definitely profitable compared to the majority of other similar products. Its unique and unalterable characteristics are: Lightness, Thermal Insulation, Thermal Inertia, Acoustics Insulation, Fire Resistance and easiness in laying.
Under the same weight conditions of other building materials, our product shows a satisfactory Mechanical Strength, always suitable for the recommended use.

PART ONE

1) With cement and aggregates, the required components to produce the AGON C® light weight cellular cement are:

The **AGON C® Foamy Agent**, the"**Foam Producer**", the **Mixer** and the **Mixture Transporting Pump.**

A) **AGON C® foamy compound**:

Physical specifications	=	Clear, amber-coloured liquid
Base	=	Synthetic
Specific gravity at 15°C	=	1.06 ± 0.02
H2O solubility	=	TOTAL
PH	=	7.0 - 8.0
Viscosity at 20°C	=	50 mm²/sec max;
Viscosity at 0°C	=	90 mm²/sec max;
No chloride salt		
Freezing point	=	- 6°C
Expansion ratio	=	20 times minimum;
AGON C® Storage	=	should be stored in its original sealed drums and in a cool place;

Storage life	= five years (in the original sealed drums);
Incompatibilities	= oils, grease and similar substances

AGON C® has been specifically developed for the preparation of light weight cellular cements (l.w.c.c.).
AGON C® easily mixes with water and is used in a 1% (1 L AGON C® : 100 L clean water) diluted solution; it does not spoil concrete hydration and does not affect the construction materials as well as the reinforced structures. It is flameproof and does not give off poisonous fumes. It also does not change the cements mineralogical reaction, which occurs during the setting and hardening time.

B) **"FOAM PRODUCER"**

The purpose of the foam producer is to produce foam in a constant and uniform way.
Non-continuous or continuous foam producers can be used:

The "NON-CONTINUOUS FOAM PRODUCER" is a 150 or 300 litres container with an air compressor to supply the air that is necessary to obtain the foam. When the mixture (agent + water) in the container is finished, the foam producer needs to be stopped and refilled. 2500 L of best quality foam can be obtained with roughly 1,5 L of AGON C® + 150 L of water.

The "CONTINUOUS FOAM PRODUCER" is a two calibrated pumps machine, with an air compressor: it is able to produce foam continuously.

These types of foam producers have a production of 300 or 600 lt/min. foam.

C) **"MIXER"**

The required type of cement-mixer to produce l.w.c.c. is the one normally used in the building industry.

The AGON C® light weight cellular cement production (cement + water + AGON C® foam) requires the use of a reversible cement-mixer, with horizontal rotation axis. This kind of mixer quickly gives a good blend of foam and cement slurry, giving a homogeneous product with the right density.
This simple and functional equipment increases the work rate and thereby reduces labour costs.

For the AGON C® light weight cellular concrete production (sand + cement + water + AGON C® foam) it is suitable to use the mixers normally used for concrete (also truck mixers) with the rotation axis as close as possible to a horizontal position.

D) **"PUMP"**

For transporting light weight cellular cement (made with cement, water and foam only), we suggest rotating volumetric pumps or peristaltic pumps, we do not advise using piston pumps.

Indicatively, are required only two men to produce and cast from 25 to 35 m³ of light-weight cellular cement in an 8 hours day.

Any type of pumps are suitable to transport light weight cellular concretes.
If you have to use a piston pump, make sure to use a long-piston one, to limit the breakage of the foam. The quantity of foam lost will depend on the pistons' pressure and it will have to be replaced to maintain the l.w.c.c. requested consistency.

2) Light weight cellular cement/concrete production

a) The various components of l.w.c.c. are put in the mixer in the following sequence:

water-cement-foam (for mixtures of cement only)
water-cement-sand-foam (for sand and cement mixtures)

b) Water-cement, (or water- cement- sand) have to be put slowly in while the cement-mixer is in motion and left to mix until a pasty slurry (or mortar) is obtained.
Once the slurry has become homogeneous the foam should be added, according to the quantity suggested by the Instruction Sheet **(tab. B)**. The mixing process should then continue until all the foam is completely mixed with the pasty slurry (or mortar).
At this stage the material is ready for casting.
If using a cement-mixer with paddles, which let the mixture pass through, it is important to cover the inside blades with wooden or steel boards; this to avoid the making of lumps.

c) The l.w.c.c. should not be kept in the mixer or transporting containers longer than necessary, to avoid air-bubbles collapsing as well as setting, before it is used.
Therefore, mixing, transporting and casting should be completed as quickly as possible, in order to guarantee successful results with AGON C® light weight cellular cements or concretes.

d) The material can be cured either naturally or, more quickly, by using a curing forced method. This subject will be fully dealt with in **PART TWO**.

e) We suggest to keep the manufactured product made with air cured light weight cellular concrete, after de-molding, for a period of 28 days, before using it.
We recommend treating the material as normal concrete, during setting & hardening time, which means to avoid a rapid evaporation of the remaining moisture to prevent concrete dehydration which, if allowed to occur, would cause strength lowering.
Instructions should be followed in order to exploit the best physical and mechanical properties of AGON C® l.w.c.c..

PART TWO

1) LIGHT WEIGHT CELLULAR CONCRETE MANUFACTURING MATERIALS

a) Aggregates:

Aggregates used to produce light weight cellular concrete can be either calcareous or siliceous sands, river or press-crushed type. Aggregates of high siliceous content give the best results and it is very important that do not contain organic substances or dirt. It is important to study the granulometric curve of the aggregate being used, to obtain the best results when making a normal type concrete and also when manufacturing light weight cellular concretes.
The theoretical graph shows the aggregates' granulometric curves that are most suitable to produce various densities of l.w.c.c.. ***(tab.A)***

b) Foam:

The foam is a white, creamy, homogeneous fluid, containing micro- bubbles.
The foam must go through the foam producer continuously and its weight should be of 60-65 gr. per liter. The foam weight will be effective over a long period, provided the foam producer is well kept and regularly cleaned.

c) Cement:

The best cement to be used is the Portland R 425; however, all types can be used, also Pozzolana or slag cement.
The natural, cellular structure of l.w.c.c. requires new, fine cement to obtain a homogeneous product, which allows the forming of a cement stratum around the air bubbles, to ensure a perfect and even three-dimensional structure.
The above mentioned structure is not obtainable if the cement is old and has formed lumps by absorbing moisture.
The use of sub-standard cement would cause a strength decrease and would take a much longer setting time.
Since not all the types of cement give equal plasticity to the mortar, even having the same water/cement ratio, it is better to choose those types of cement that can bear the largest quantity of water.
The "Fly Ash", that we can find in several cements, can be tolerated in light-weight cements or concretes only if it is in small quantity and completely oil-free.
The presence of traces of oil in the "Fly Ash" occur when the coal from which is derived, has not been completely burnt.

d) Water/cement ratio:

The water and cement ratio depends on the advised density (***tab. B***)
After conducting preliminary tests, the above mentioned ratio can be reduced by lowering the quantity of water or increasing the quantity of cement. Once the quantity of l.w.c.c. components has been chosen, carry out a test and check the Humid Density of the l.w.c.c. produced, comparing with the one of the table attached (tab. B). By increasing or decreasing the foam quantity is possible to obtain the desired density of l.w.c.c..
If producing a cement mortar at a very low water/cement ratio, part of the foam will be destroyed by the mortar low plasticity; if this happens, it will be sufficient to replace the quantity of foam that was destroyed, in order to obtain the required final density.

e) Additives:

Only few additives are compatible with the AGON C® foamy agent, except the ones to assist the de-molding and to accelerate the setting. The additives' compatibility with the foaming agent should always be checked beforehand.

2) OBTAINABLE DENSITIES

The main advantage of l.w.c.c. produced with the AGON C® is the possibility to vary the density so to meet the insulation and strength requirements.
Following the list of the obtainable densities, showing the suggested sand cement quantities and the necessary AGON C® foam per cubic meter of mix, you can have the starting quantities to make the preliminary tests. All the quantities ***(tab.B)*** are approximate because they depend on the specific weight of local cements and sands.

3) CURING METHODS

a) Air curing:

This is the generally used method, therefore it needs little explanation. Problems may occur only with inclement weather and when the work is not being carried out in a heated or indoor area.
In the l.w.c.c. pre-fabrication, it may not be possible to make a daily cast during the winter time, while it is possible to do it in the summer time, except when temperatures are too high.

Therefore to keep constant the work throughout the wintertime it is necessary to use an accelerated curing method. The choice of the method depends on its productive poperties:

- Accelerated curing:

The use of a fast setting cement and accelerating additives can allow a daily cast of the product, within certain temperatures. The quantity of foaming agent varies according to the ambient temperature both during the working cycle than after the l.w.c.c. setting time. It is advisable to do preliminary tests, in order to determine the most suitable dosage of fast setting additive according to the ambient condition and the production requirements.
When using a fast setting additive, this must be put in the mixer with the water, before adding the cement.

- Steam curing:

Light weight cellular concrete can also be steam-cured to reduce the setting and hardening time.
Unlike normal concrete, l.w.c.c. comprises many air bubbles that increase in quantity as the product density decreases. The steam effect increases the mass inner temperature and expands the air inside the bubbles.
Thus, if the cement stratum around the air bubbles is not hard enough, the stratum will burst causing a drop of light weight cellular concrete surface; the material will rise and the surface may puff out and will crumble very easily for at least 1-2 cm.

To avoid these problems the following measures should be adopted:
The material has to rest for 5-7 hours after casting, before starting the steam curing. Care should be taken to make sure the material has completed the setting and has entered the hardening stage.
The steam temperature must be rigidly controlled throughout the cycle and shall never exceed 65°-70° C.

A good complete cycle lasts 12 hours and it is divided this way:

- 6 hours of initial stage, in which the temperature is slowly increasing;
- 4 hours at a constant 65°/ 70°C temperature;
- 2 hours with a slowly decreasing temperature, to avoid a thermal shock.

During the following period of time keep the product covered with a cellophane sheet to avoid that a sudden dehydration may induce a decrease of mechanical resistance and the possibility of cracks.

4) PHISICAL-MECHANICAL PROPERTIES

a) Thermal conductivity- One of the basic properties of l.w.c.c. is its high thermal-insulating value, which remains unaltered over the years. In fact, it has become one of the most widely employed materials in the insulation field.
The thermal conductivity coefficient value λ**= 0,85** of light weight cellular cement with density 400 kg/m^3, is strictly connected to the material density, to the bubbles' quantity, size and their perfect distribution.
The thermal conductivity coefficient λ is defined by the formula: ***(tab. C)***

$$\lambda = \frac{\text{Kcal}}{\text{m} \cdot \text{h} \cdot \text{°C}}$$

where

λ	=	Thermal conductivity coefficient, in Kcal/mh°C;
Kcal	=	Quantity of heat transmitted in the time unit, (Kcal);
m	=	Surface 1 m²; Thickness 1 m.;
h	=	1 hour;
°C	=	1° C difference of temperature between two sides.

You may calculate the thermal transmission from the value obtained with the following formula.

The equation is: $K = \dfrac{1}{\frac{1}{\alpha 1} + \frac{1}{\alpha 2} + \sum \frac{S}{\lambda}} \left[\dfrac{Kcal}{m^2 \cdot h \cdot °C}\right]$

where:

K	=	Total thermal transmission coefficient, in Kcal/m² h°C
$\alpha 1 * \alpha 2$	=	Thermal transmission coefficient of the two opposite surfaces in kcal/m² h°C (convention and radiation of air)
S	=	Sample thickness in m.
λ	=	Thermal conductivity coefficient in Kcal/m h°C

$$K = \frac{1}{0{,}20 + \sum \frac{S}{\lambda}} \left[\frac{Kcal}{m^2 \cdot h \cdot °C}\right]$$

where the value $\frac{1}{\alpha 1} + \frac{1}{\alpha 2}$ is generally accepted to be in the order of 0,20. ***(tab.D)***

b) <u>Thermal capacity</u>

When studying or planning walls, floors or ceilings insulation it is important to consider the insulating material Thermal Capacity, (Q), too.
For a wall, floor or ceiling made with only one product, the thermal capacity is given by:

$$Q = d \cdot \gamma \cdot c \quad Kcal/m^2\ °C$$

where:

d	=	Thickness in m.
γ	=	Density in Kg/m³
c	=	Specific heat in K cal/Kg°C

On examination, the above equation shows that, besides giving optimum values of thermal insulation, the AGON C® light weight cellular cement /concrete has the relevant properties of a thermal accumulator. In other words, an AGON C® light weight cellular cement / concrete, when the ambient temperature drops, gives off some of the heat previously stored and absorbs it when the ambient temperature rises up.
For instance, in the winter time, when the internal temperature changes because of cool air circulation, the inside temperature of a house with good thermal capacity structures does not

change much. On the other hand, with some insulating materials walls, (as wood, expanded polystyrene,.....etc.), we have a good "K" value, but they do not act as good thermal accumulators.
This is the reason why, when planning insulation, it is better to consider both thermal insulation and thermal capacity.

5) TECHNICAL SPECIFICATION

a) Resistance to compression

In the l.w.c.c., under normal condition of humidity, mechanical resistance proportionally drops with the density decrease and it mainly depends on the quantity and quality of the cement, the sand type and their granulometric curve.
Compression strength in l.w.c.c. can be tested after 2 days, 7 days, 28 days or 180 days.
It is necessary to emphasize that the AGON C® light weight cellular concretes' mechanic strengths increase about 100% in the period of time between 28 days and 12 months.

The ratio between strength and density is characterized by the so called
"Specific-Strength Module" (M)

$$M = \frac{\delta c}{\gamma c} \quad 100$$

where :

M = Specific strength module
δc = Concrete strength (at 28 days in Kg/cm²)
γc = Air-dryed concrete density (at Kg/m³)

N.B.=
The effective data of compressive strength, elasticity modulus, etc., are strictly connected to local aggregates and cements: that's because all our tables must be considered as guidance only and have to be supported by many local tests. ***(tab. E)***

b) Modulus of elasticity

In the light weight cellular concrete, the strains due to compression or traction do not follow "HOOK's" rule.
The European Concrete Committee advices to apply the following formula for the Modulus of Elasticity: (E°)

$$E° = 5000 \cdot \sqrt{K \cdot Yvd} \quad \text{for short time deformation}$$

$$E° = 3000 \cdot \sqrt{K \cdot Yvd} \quad \text{for long time deformation}$$

where

E° = Modulus of elasticity in Kg/cm²
Yvd = Cellular concrete density in g/cm³
K = Compressive strength in Kg/cm²

c) Humidity content and absorbing capacity

Due to the absorption of the water and the humidity existing in the air light weight cellular concrete contains small quantities of moisture, just like normal concrete. Such quantity is entirely dependent on the ambient conditions (atmosphere humidity), type of aggregate and type of structure.
Therefore, with a good choice of aggregate and l.w.c.c. density, thanks to the structure of mainly closed cells, the humidity values will be very low ***(tab. F)***.
With regard to humidity condensation, caused on the surfaces by the ambient conditions, it should be pointed out that, contrary to what happens to normal concrete, on l.w.c.c. such phenomenon does not occur or if it occurs it will be in a totally irrelevant measure.

d) Contraction and Expansion:

Like all cement-base materials, light weight cellular concretes are subject to contraction phenomenon during the setting stage.
The amount depends on several variables such as: material density, type and quantity of cement per m^3, type of curing system, aggregates quality and granulometric curve.
Indicatively, the average density contraction values obtained after 28 days (the period of time within the most part of the hardening process occurs) has given the following figures:

Density:	1,200	1,400	1,700	kg / m^3
	0,21	0,18	0,17	‰

The expansion and the contraction of light weight cellular concrete/cements due to thermal changes is very limited. This property together with their thermal-insulating capacity and their incombustibility, allows the structure to be used as a fireproof wall as well as external cover for ovens.

e) Frost and Fire Resistance

-Light weight cellular concrete has given excellent results to frost and thaw cycles, thanks to its cellular structure, with close cells.
It is however advisable to protect the external unit surfaces, exposed to atmospheric conditions (rain, frost, snow, etc.), by coating or using a water repellent paint.

-Fire resistance is very high, because of the structure of the material, the nature of the components, the high insulating value and the low expansion coefficient.
It follows, the AGON C® light weight cellular cements and concrete's incombustibility also gives to the material very good fire-resistant properties.

f) Sound insulation

The l.w.c.c. have a high acoustic absorbing capacity and a reasonably good acoustic insulating quality. When light weight cellular concrete is used for partition walls, the acoustic and thermal insulation turns out to be much higher than the one obtained with traditional masonry walls.

Indicative values of acoustic insulation:

Densities	Kg / m³		1200	1400	1700
Thickness	15 cm.	dB	45	46	48
Thickness	25 cm.	dB	52	53	55

We should anyway consider that:

Light weight cellular concretes and cements have very good acoustic absorbing capacities and no special qualities as acoustic insulation.

PART THREE

Main applications referred to the densities:

Light Weight Cellular Cement and Concrete have several and always increasing applications in all types of construction work. Some of the most common applications are listed below:

- 300 - 600 Kg/m³ (light weight cellular cement)

Light weight and insulating cements for floors' foundation, for heat insulation and slope for flat roofs, rigid floors foundation ; tennis courts foundation ; interspace concrete filling; raceways insulation; thermo insulating blocks; steel structures fireproofing ; tunnels and pipelines compensating mass ; dumps' foundation and coverings ; land reclamation and consolidation ; underground cavities infill and all types of infill where an elevated thermal insulation is required.

---------- °°°°°° ----------

- 600 - 900 Kg/m³ (light weight cellular concrete)

Stables and pig-sties foundations; industrial foundations; partition and tampooning slabs; ceiling slabs; concrete + Light Weight Concrete mixed panels.

---------- °°°°°° ----------

- 900 - 1200 Kg/m³ sand-cement mixture (light weight cellular concrete)

Blocks for outside walls; slabs for partitions; concrete and light weight concrete mixed panels for covering; foundations for elastic floors.

---------- °°°°°° ----------

- 1200 - 1700 Kg/m³ sand-cement mixture (light weight cellular concrete)

Prefabricated panels for civil and industrial buildings plugging; walls casting; gardens ornaments.

SPECIFIC APPLICATIONS

It has been stated that the technical characteristic of the LWCC produced with AGON C® are:

- **perfect thermal insulation;**
- **excellent thermal inertia;**
- **good compression strength, compared to different consistencies;**
- **absolutely fire-resistant;**
- **time inalterability;**
- **shows less cracks compared to the other protein based foamy LWCC.**

We display some of the product specific applications:

a) Rigid pavement floor foundations (ceramic tiles, marble, paving, tiles, etc., laid down with mortar.)

A 400 Kg/m³ density cement-only mixture is generally used to obtain a thermal insulation and an acoustic absorption, to load the structure as little as possible. The floor foundation minimum advisable thickness is of 4 ÷ 5 cm.
Before casting, the l.w.c.c. foundation, the underneath concrete must be wet, avoiding the formation of large pools of water.
For a better sound-proof result, it is advised to detach the l.w.c.c. slab from the partition walls by lying strips of tarred paper board, of glass wool or of rubber panels along the wall perimeter and to lay sound insulating panels under the l.w.c.c..

b) Elastic pavement floor foundation (carpets, woods, rubber, linoleum, etc.)

As such floor coverings are directly glued to the floor foundation, the most suitable density is of 1400 Kg/m³.
These types of pavement can be laid down on a light weight cellular cement 400 Kg/m³ slab, with a 4÷5 cm mortar slab on top, too.

c) Heat insulation and sloping of flat roofs

A 400 Kg/m³ cement-only mixture is the ideal density for such application and the standard sloping should be of 1÷1,5%.
The thickness at the end of the slope should not be less than 5 cm.
It is recommended to wet the floor before casting l.w.c.c, avoiding water pools, and in the summer time it is advised to keep the light weight cellular cement wet for 48 hours after casting, to avoid a fast dehydration.

d) Interspace filling

For this application the standard density is about 300 Kg/m³ of cement-only mixture. The interspace should be filled in following stages (30-50 cm at the time) every 12 hours or more.

e) Floor foundations for agricultural and industrial buildings

In this case, the most suitable density is given by 1200 Kg/m³ or a foundation of 400-500 Kg/m³ density, with at least a 10 cm concrete slab on top.
It is worth noting that this application has given interesting results in the construction of stables and pig-sties, where the pavement insulation provides an ideal thermal insulation for the animals.

f) Concrete blocks for masonry and small panels

Concerning these products, the density may vary from 800 to 1100 Kg/m³, depending on physical strength, thermal insulation and size of the blocks required for the application.
For the blocks casting, steel or wooden perimetral moulds should be used (the moulds for the pavement should be made of steel or concrete).
To demould or fasten the setting, only high quality products must be used.

g) All types of panels, including partitions.

The right density for this range goes from 1200 to 1700 Kg/m³.
The density for such applications should be chosen considering the required strength, thickness and dimensions of panels.
For mixed slabs (normal concretes + light weight cellular concrete), it is better to cast the light weight cellular concrete immediately after the concrete in order to allow simultaneous setting and perfect adhesion between the two different materials.

ADDENDUM

This brochure is intended to be a guide to the use of AGON C® foaming agent, describing some different ways to use it for the production of light weight cellular concretes and cements.
The values shown in this bulletin are typical laboratory averages and are meant to serve only as a guide. Such values have to be taken as general rules and there is no guarantee, especially if the product applications and methods occur out of our control.

MIBO SRL

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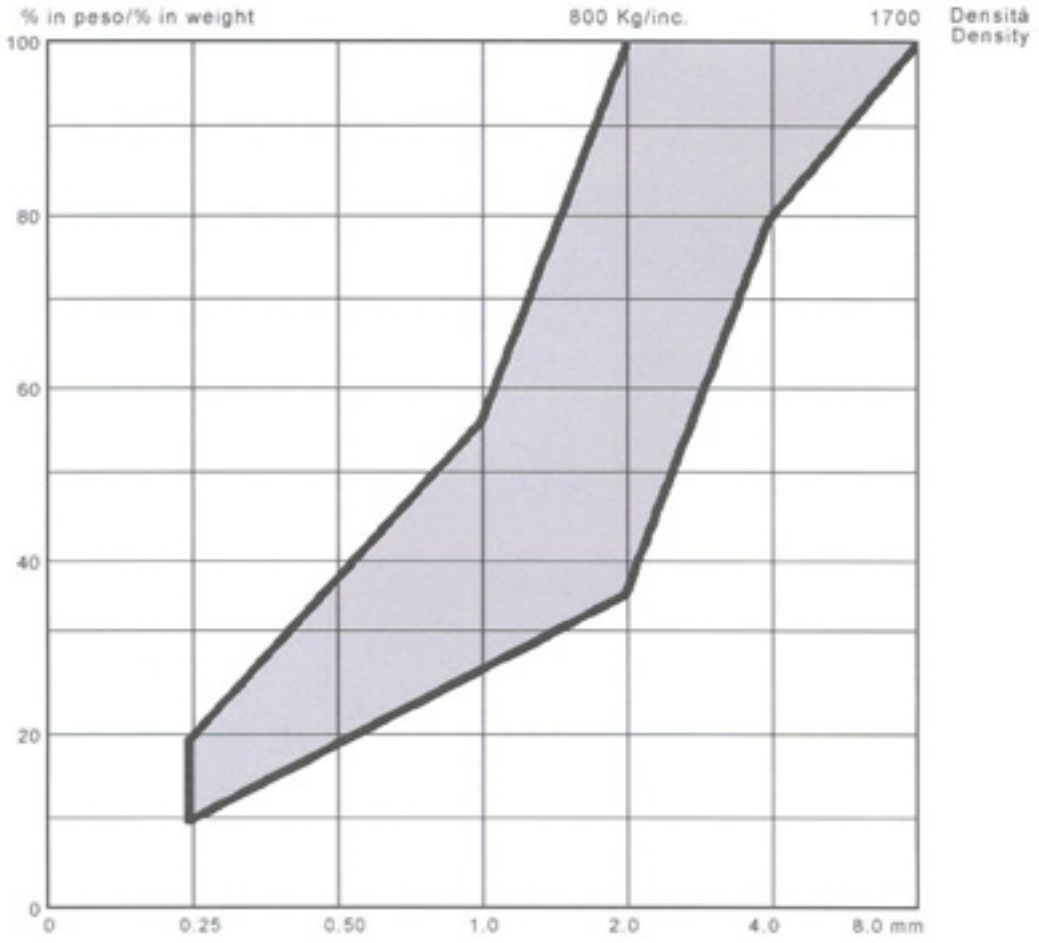
TABELLA "A"



Granulometric Curve of Aggregates
Curva Granulometrica degli Inerti

CARATTERISTICHE DELL'AGON C®

Aspetto:Liquido limpido ed omogeneo;
Peso Specifico: 1,06 ± 0,02;
Acidità: PH 7,0 - 8;
Solubilità in acqua a 20°C: Totale,
Incompatibilità: Olii, grassi, sostanze similari;
Conservazione: in luogo fresco e nel fusto sigillato, fino a 5 anni;
Punto di congelamento: -6 °C:
COD: 29,000 mg/lt.-4% soluzione
Biodegradabilità:a termini di legge;

CHARACTERISTICS OF AGON C®

Appearance: Clear, homogeneous liquid;
Specific gravity: 1.06 ± 0,02;
Acidity: PH from 7.0 - 8;
Solubility in water at 20 °C: Total;
Uncompatibility: Oils, fats and similar substances;
Preservation: up to 5 years, if stored in cool place and sealed drum;
Freezing point - 6 °C;
COD: 29,000 mg/lt. with 4% solution
Biodegrading: according to law;

RACCOMANDAZIONI

In caso di ripetuti contatti con la pelle, si possono verificare irritazioni.
In caso di contatto con gli occhi, lavare con acqua.
In caso di ingestione accidentale, richiedere immediatamente l'intervento del medico.

RECOMMENDATIONS

Slight irritations may occur, if the product comes repeatedly in touch with the skin.
If the product gets into the eyes, wash thoroughly with water.
In case of accidental swallowing, immediately call a doctor.

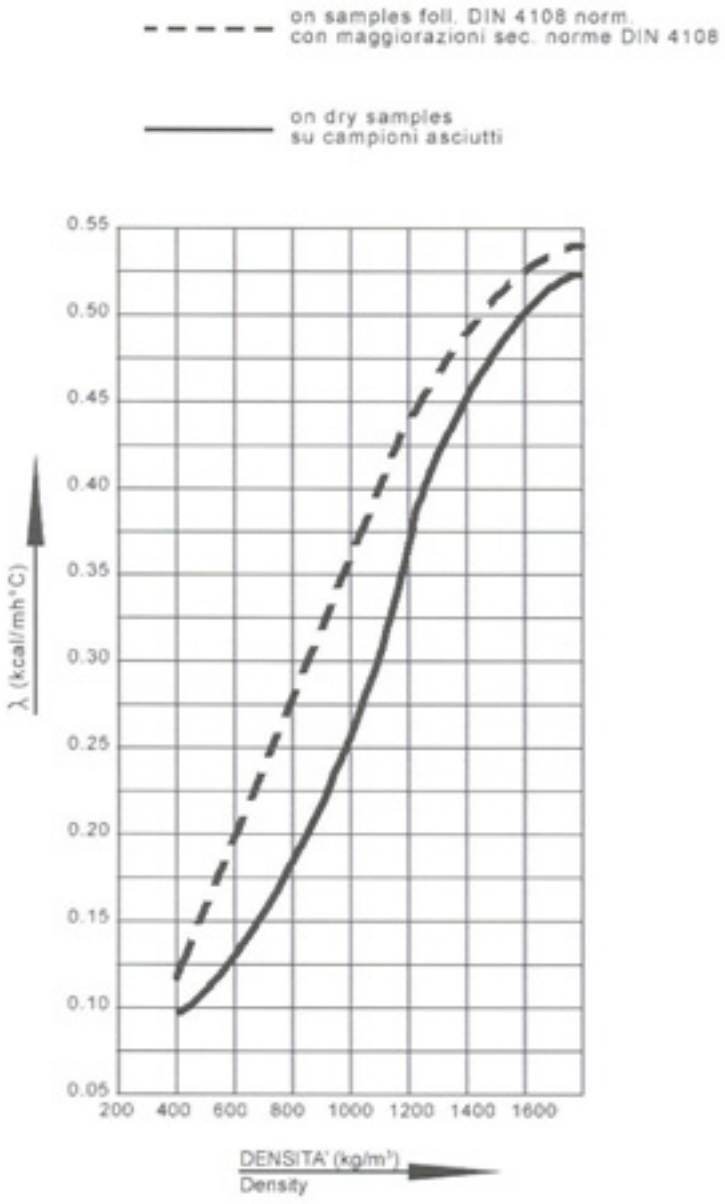
Densità Density	Carichi di rottura a compressione Compressive strengths				Coefficiente di conduttività Termica λ =K cal/mh °C Thermal Conductivity Coefficient λ =K cal/mh °C
Kl/m³	Solo cemento Cement only		Con inerti With aggregates		
	7 gg	28 gg	7 gg	28 gg	
	kg/cm²		kg/cm²		
300	2	4	Le resistenze meccaniche vanno determinate con prove una volta scelti inerti, curve granulometriche, cementi e dosaggi Mechanical strengths should be defined with tests when it has been selected the quality and grading of aggregates, cements and dosages		0,065
350	3	7			0,070
400	4	10			0,085
450	6	15			0,090
500	10	23			0,095
550	13	30			0,100
600	18	40			0,115
700					0,130
800					0,150
900					0,175
1000					0,205
1100					0,230
1200					0,270
1300					0,305
1400					0,345
1500					0,390
1600					0,435
1700					0,500

TABELLA "B"

Campi di prevalente impiego *Main applications*	Densità *Density*	Quantità indicative per m³ di CCL. *Approximate quantities for a m³ of L.W.C.C.*						Consumi indicativi di AGON C® per m3 *Approximate quantity of AGON C® for m3*		Densità Umida *Wet Density*		Consumi indicativi di schiuma *Approximate quantity Foam*	
		s - c 4 : 1	s - c 3 : 1	s - c 2 : 1	s - c 1 : 1	Cemento *Cement*	Acqua *Water*	Con inerti *With aggregates*	Solo Cemento *Cement Only*				
	Kg/m3	Kg.	Kg.	Kg.	Kg.	Kg.	Kg.	kg.	kg.	kg/m3 about		it./m3	it./m3
Strutture autoportanti o di modesta portata *Self-bearing structures or of modest capacity load structures*	1700	1300 350	1220 410				150	0,12		1815	1795	175	190
	1600	1235 310	1135 390				150	0,14		1715	1695	220	230
	1500	1160 290	1070 375				140	0,17		1610	1590	260	280
	1400	1080 270	950 375				140	0,19		1510	1490	305	320
	1300	1010 255	870 350				130	0,22		1420	1380	350	365
	1200	925 235	800 350				130	0,24		1320	1305	395	405
Riempimenti e manufatti leggeri *For filling or light structures*	1100		785 265	690 350			125	0,27		1205	1195	450	460
	1000		720 240	580 350			125	0,30		1120	1110	485	500
	900			560 280	410 410		120	0,34		995	975	545	570
	800			500 250	365 365		110	0,37		900	880	600	615
	700				320 320		100	0,40		780	-----	660	----
Sottofondi termoisolanti, fonoassorbenti. Con formazione o meno dipendenze fino al 4% *Thermo phono insulated foundations with or without formation of gradients up to 4%*	600					495	150		0,41		700		690
	500					415	150		0,43		610		715
	450					375	145		0,44		565		730
	400					330	140		0,45		520		750
	350					290	135		0,46		470		770
	300					250	130		0,47		430		790

s = sabbia/sand
c = cemento/cement

TABELLA "C"

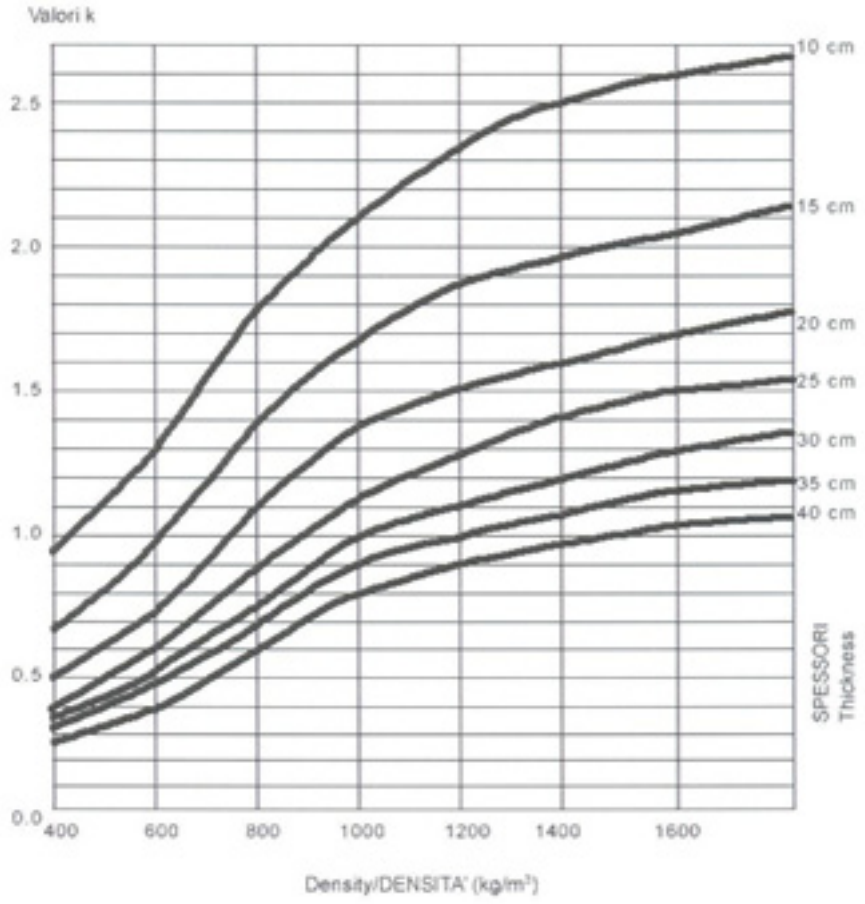


Thermal Conductivity Chart
Diagramma Conduttività Termica

TABELLA "D"

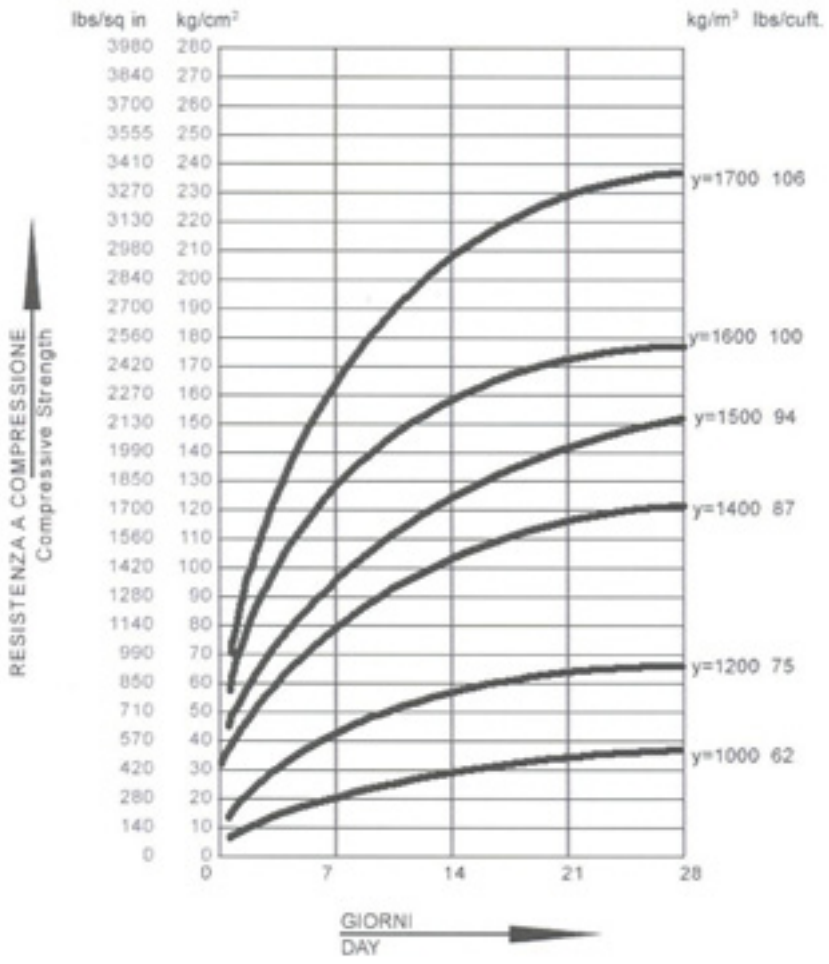
Coefficiente di trasmissione k in Kcal/m2 h°C
per pareti esterne in calcestruzzo cellulare leggero.

Indicative value of k of eventual walls made with
light-weight cellular concretes.



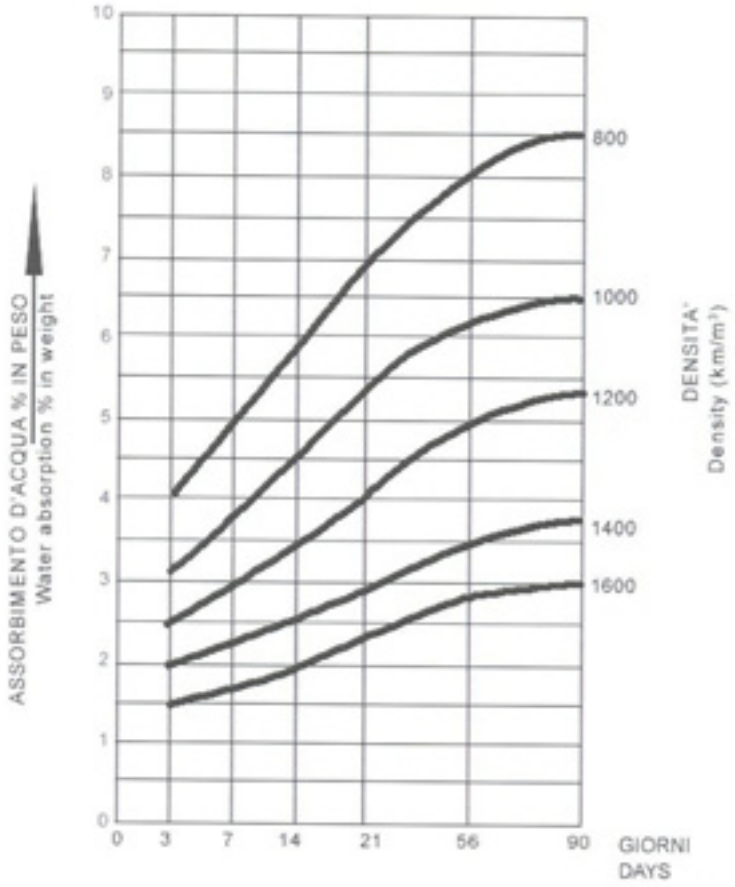
Trasmission Conductivity Chart
Diagramma Trasmissione Termica

TABELLA "E"



Compressive Strength
Resistenza alla Compressione

TABELLA "F"



Water Absorption
Assorbimento d'Acqua