SACOUR
for industrial innovation

MICROCORE® Aerated Concrete

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About Us

SACOUR® For Industrial Innovation is a leading company in construction chemicals field that has achieved the aspirations of its partners to carry out added value for the construction industry through a research team of chemists and engineers over decades to provide products that achieve the highest specifications at the lowest cost to the end user by raising the added value by providing patented MICROCORE® Aerated Concrete (MAC) technology to achieve The highest values of efficiency and sustainability using the latest production science.

Mission: Revolutionizing construction industry with innovative, sustainable and cost-efficient elements that maintain preserving the environment.

Vision: We aspire to establish a legacy of sustainable construction that prioritizes practicality, durability, and affordability while safeguarding the well-being of our planet for generations to come.

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Scientific Contribution

Ain Shams University
Faculty of Engineering
Structural Department

Properties of Foamed Concrete Containing Glass Powder

A Thesis submitted in partial fulfillment of the requirements of the degree of
Master of Science in Civil Engineering
(Structural Engineering)

By

Name: Ahmed Saad Ismail

Bachelor of Science in Civil Engineering
(Structural Engineering)
Faculty of Engineering, Ain Shams University, 2022

Supervised by

Prof.El Sayed Abd El-Raoaf Nasr.
Professor of Properties and Testing of Materials
Structural Engineering Department
Ain Shams University

Dr. Mohamed koheil.
Associated Professor of Properties and Testing of Materials
Structural Engineering Department
Ain Shams University

Dr. Mahmoud Galal.
Assistant Professor of Properties and Testing of Materials
Structural Engineering Department
Ain Shams University

Cairo - (2022)

1

SACOUR® Central lab support all Projects and scientific theses aimed at developing building system and sustainability:

- Lead an industrial waste Recycling Project For Egyptian Government.
- Support scientific Institution by latest technologies for researches and thesis.
- Perform laboratory activity for master's thesis studying industrial waste recycling.
- Perform laboratory activity for Ph.D. Thesis studying applicability of MICROCRE® Structural Aerated Concrete".

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MicroCore ® Characteristics

Density	D200	D300	D400	D600	D800	D 1000	D 1200	D1400
Compressive Strength (Kg\cm3)	Up To 10	Up To 18	Up To 30	Up To 50	Up To 80	Up To 135	Up To 180	Up To 300
Thermal Conductivity (W/m*K)	0.06 to 0,065	0.08 to 0.085	0.09 to 0.1	0.16 to 0.19	0.2 to 0.23	0.3 to 0.33	0.36 to 0.4	0.44 to 0.47

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MICROCORE® Technology

MICROCORE® Aerated Concrete Advantage

Our Company had succeeded to innovate **MICROCORE® Aerated Concrete (MAC)** (Advanced Aerated Concrete) to manufacture a cementitious light weight elements (Cellular Concrete) with the highest physical properties as detailed below:

- Lowest Lightweight Concrete formulation Cost worldwide.
- Using waste material in production up to 65% of m3.
- Density ranges from 70 kg\m3 up to 1400 kg\m3.
- Highest Compressive strength had been achieved compared to alternative LWC.
- Highest flexure strength compared to alternatives LWC.
- Minimum water absorption.
- Pumpable Light Weight Concrete (Foamed Concrete) with neglectable loss.
- Sustainable production process by using MICROCORE Production Lines\Machines.
- Seismic (Earthquake) resistance.

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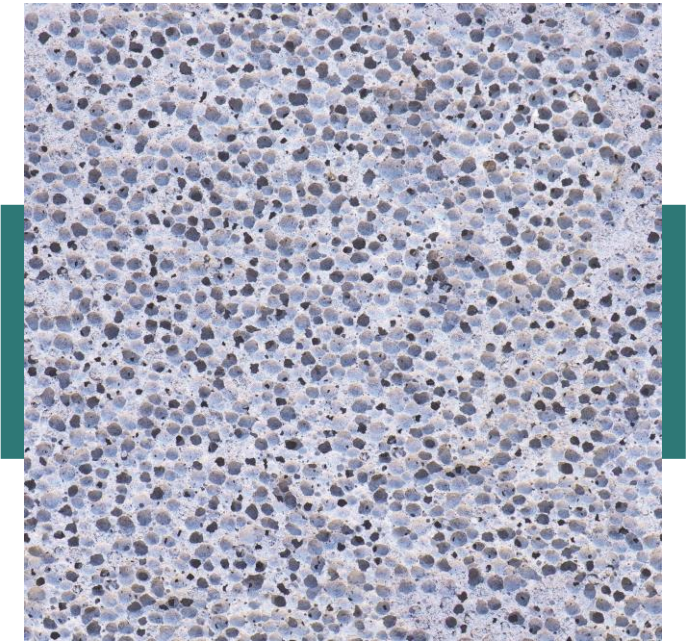
MicroCore ® Add Value



Value Adding For Construction Industry:

- Reduce masonry weight by 60%.
- Reduce Construction Dead-Load to minimum.
- Reduce Construction Skeleton Cost by 15 to 30%.
- Reduce Foundation Loads.
- Energy Saving Up to 40%.
- Reduce Structural element cross-section area to minimum.
- Minimize Reinforcement Steel Bars.
- Excellent bonding strength to Cementous mortar.
- Improve Soundproof.

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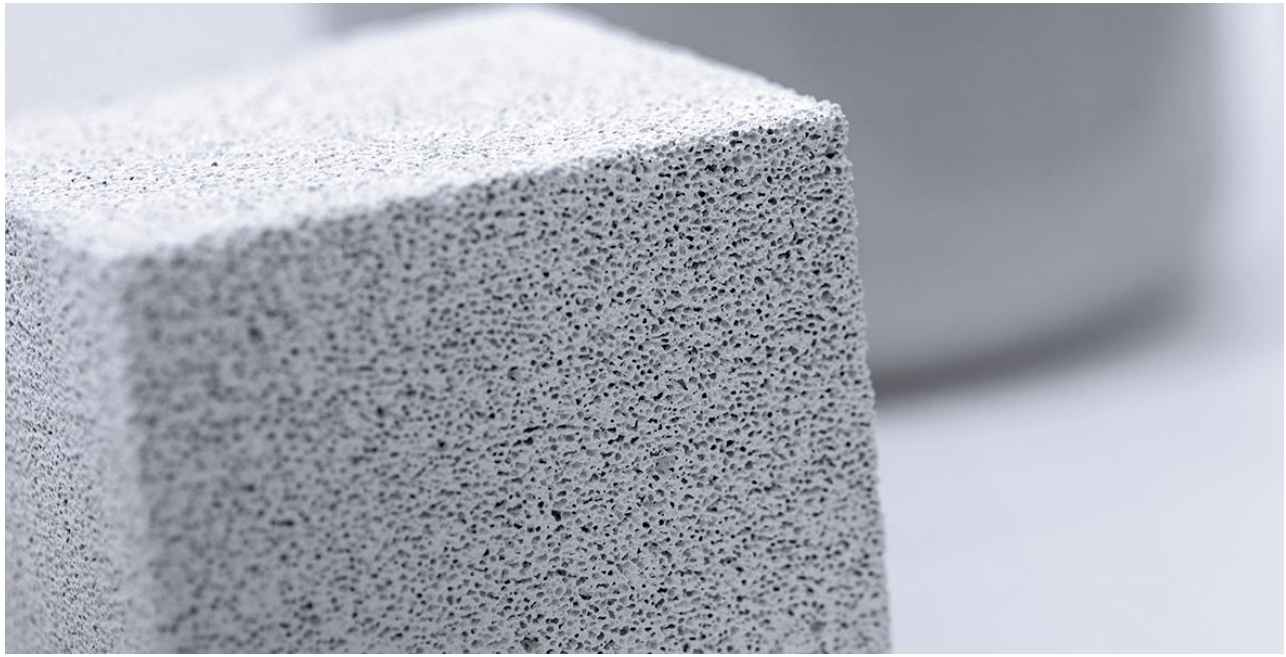
MICROCORE® Application

MICROCORE® Aerated Concrete Applications:



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MICROCORE® Application

MicroCore® Aerated Concrete Applications:

1. **Light Weight Block.**
2. Insulation Boards.
3. Roof Insulation .
4. Sub-Flooring Insulating Screed.
5. Slob Screed.
6. Precast Panels.
7. Decorative Element.
8. Cast-Instu Panels.
9. Modular System

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MicroCore ® Technology Vs. AAC

No.	Parameters	Lightweight concrete				
		MicroCore® Aerated Concrete (MAC)			Aerated Autoclaved (AAC)	
1	Production process and set- up	Can be produced at both centralized plant as well as project site using exclusive mixer and foaming generator			Produced only in well-established plant equipped with steam boiler and high pressure auto-claves	
2	Production Phases	1- mixing cement + Stone Powder + chemical (automatic process) 2- Cutting by requested dimensions (automatic Process)			1- Grinding Silica Sand. 2- Mixing cement+ Quick lime + Gypsum + Grinded Silica +Aluminum Powder 3- foaming Process 4- Auto Calving	
3	Recycle materials usage	40 - 50 % As LPAC formed by mixing Cement "binder" with fine Filler " any fine materials even sand"			Zero As the AAC formed by chemical reaction between the mentioned raw materials.	
4	Covered area required for plant	Approx. 7,000 m^2			Approx. 15,000 m^2.	
5	Energy required for producing blocks (Approx.)	**375 kWh**			**700kWh** and approx.**350 lit./hr.** of Diesel	
6	Dry Density Kg/m3	100-400	500-1000	1200-1400	400-800	
7	Compressive Strength Kg/cm2	1 - 25	25 - 100	100 - 300	Grade I 25 - 30	Grade II 35 - 40
8	Usage	Thermal Insulation, Boards, Infilled Panels.	Partitions, External walls, Low-rise load- bearing walls	Load-bearing Blocks, Panels.	Non-load bearing blocks	Reinforced panels
9	Water Absorption	5 – 15% of its weight			30 – 40% of its weight	

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MicroCore ® Technology Vs. AAC

No.	Parameters	Lightweight concrete	
		MicroCore® Aerated Concrete (MAC)	Aerated Autoclaved (AAC)
10	Plastering / Stucco	Due to low water absorption, water from plaster or stucco would be absorbed less by the blocks and so reduced cracks in the plastering or stucco. Also, due to uniform sizes and straight edges, **only thin cement plastering is enough or just stucco is sufficient**, which saves in plastering cost.	Due to high water absorption, water from plaster or stucco would be absorbed more by the blocks and so cracks appear in the plastering or stucco. **Need water proofing** for the external walls to avoid water seepage
11	Bed mortar	Normal cement mortar is sufficient for gluing the blocks. **No need** of special glue	**Need** special glue to bind the blocks
12	Sound Insulation	Superior (37 to 42 db. sound reduction)	Superior (37 to 42 db. sound reduction)
13	Eco Friendliness	Pollution free	Pollutant
14	Cost Savings	Due to normal cement mortar, cost of bed mortar is lesser than special glue. At least 20% Mortar and Labor Savings for construction of block work apart from Mortar and Labor Savings in Plastering compared to Brick work due to bigger size and lightweight	Additional cost of bed mortar, additional risk of cracks in plastering or stucco and its cost of repair. Additional cost for waterproofing the external walls.
15	Energy Savings in buildings using LPAC or AAC blocks	Due to high thermal insulation properties, it keeps the warmness and cold for long time inside the building. It will not pass the external heat or cold into the building and at the same it will not allow easily the heat or cold to outside of the building. This saves at least 10 to 30% of power consumption for heating or air conditioning system in the building. That is the reason why it is recommended for Green Building Certification.	Due to high thermal insulation properties, it keeps the warmness and cold for long time inside the building. It will not pass the external heat or cold into the building and at the same it will not allow easily the heat or cold to outside of the building. This saves at least 10 to 30% of power consumption for heating or air conditioning system in the building. That is the reason why it is recommended for Green Building Certification.
16	Fire Rating	It is Fire, Pest, Frost and **Moisture** resistant. It's fire resistance can last up to 4 hours, which is the highest in the industry.	It is Fire and Frost resistant. It's fire resistance can last up to 4 hours, which is the highest in the industry.

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Scientific Paper “Green Building”

المؤتمر الأول لفرع الرابطة الدولية لمحاكاة أداء المباني في مصر – نحو بيئة مشيدة خضراء ومستدامة – القاهرة 23، 24 يونيو 2013
مجال الورقة البحثية: العمارة الخضراء

محاكاة أداء المباني باستخدام الطوب الخفيف في البناء

أ.د. محمد عبد الباقي إبراهيم [1] ، م. داليا محمد سيف الدين [2]

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2- اشتانية بمركز الدراسات التخطيطية و المعمارية، القاهرة، مصر

عنوان المراسلة: مركز الدراسات التخطيطية و المعمارية

الملخص:

مع التطور الذي يشهده العالم في مجال البناء والتشييد للمشروعات المختلفة نجد أهمية البحث عن خامات بناء متوافقة مع البيئة وترقى بمستوى جودة الحياة لشاغلي تلك المنشآت مع مراعاة الجوانب الاقتصادية و سهولة التشغيل والصيانة مستقبلاً.

يهدف البحث إلى تقييم خامات البناء المستخدمة في بناء الحوائط في المباني في مصر لاختيار الأنسب و المتوافق مع الظروف البيئية و الاقتصادية للمجتمع المحلي و بما يحافظ على مستوى أكثر جودة للمستخدمين مع إثبات ذلك حسابياً و هندسياً على مشروعات محلية بالقاهرة.

يستعرض البحث بالتحليل المقارن مواد البناء المختلفة والمتاحة في مصر في بناء الحوائط من الطوب أو البلوكات وصولاً إلى تحديد الإيجابيات والسلبيات من المنظور الاقتصادي (التكلفة) والبيئة، ثم اختيار برج إداري و آخر فندقي و عمل الدراسات الحسابية للتكلفة و العزل الحراري والصوت وغيرها من معايير مقارنة بين استخدام الطوب الأسمنتي والحد مواد البناء المتاحة في السوق المصري بخصائص أفضل و هو الطوب الخفيف مع تحديد قيمة الوفر في التكلفة و الترشيد في أحمال الطاقة الكهربائية المستهلكة.

تشمل البحث على التحليل الإنشائي للمباني في حالتي استخدام الطوب الأسمنتي أو الطوب الخفيف والمقارنة لأحمال والاجهادات على العناصر الإنشائية في الحالتين. كما تطرق إلى تصميم العناصر الإنشائية (الأعمدة والكمرات والبلاطات و الأساسات) في الحالتين و مميزات الطوب الخفيف من وفر في الكميات و في الأحمال الحرارية المكتسبة باستخدام الطوب الخفيف وفي الطاقة على المدى القريب أو البعيد باستخدام الطوب الخفيف.

الكلمات المفتاحية: الطوب الخفيف- العناصر الإنشائية- ترشيد الطاقة- التكلفة الاقتصادية

1- المقدمة:

- تعتمد فكرة البحث على توضيح مزايا استخدام البلوكات من الطوب الخفيف المصنع من الرمل الأسمنت والجير والماء مقارنة بالطوب الطفلي العادي و ذلك لما تلاحظ لها من وجود خواص مميزة أهمها :
  - **الوزن الخفيف** للطوبة كأحمال الميتة بالمبنى بما ينعكس بالإيجاب على تقليل الاجهادات على العناصر الخرسانية للمبنى مما سيؤدى إلى وفر في الخرسانة و حديد التسليح للهيكل الخرساني
  - **معامل العزل الحراري** عالي لتقليل استهلاك الطاقة المستخدمة في التكييف أو التدفئة
  - **سهولة وسرعة في البناء و التنفيذ** ومسهل التقطيع بأدوات النجارة العادية الأمر الذي يحد من إهدار خامات البناء
  - **امتصاص الرطوبة** الزائدة والتخلص منها في قترات جفاف الهواء
  - **مقاوم للاضغاط**
  - **مقاوم للحريق** يتحمل إلى ثلاث ساعات ونصف
  - **العزل الصوتي الجيد**
- و قد تم إعداد الدراسات التحليلية و المالية على الوفر في تكاليف الهيكل الخرساني و الأساسات ومونة اللصق و استهلاك الكهرباء نتيجة استخدام الطوب الرملي الخفيف بدلاً من الطوب الطفلي على العديد من المباني (الحوائط الحاملة) والمنشآت الخرسانية و أثبتت التطبيقات الهندسية ودراسات الحصر الوفر بنسب تتراوح من 5% إلى 20% في تكلفة الهيكل الخرساني إلى جانب الوفر في استهلاك الطاقة سواء كان وفر ابتدائي أو وفر ممتد على المدى البعيد.

2- الدراسة الإنشائية:

- تم عمل التحليل الإنشائي للعناصر الإنشائية المختلفة (الأعمدة و الأساسات والأسقف) لبرجين أحدهما إداري و الأخر فندقي (شكل رقم (1)) وهي أبراج فالكون تاورز في المعادي، القاهرة وذلك للحالتين استخدام الطوب الخفيف أو الطوب الطفلي لحساب مدى الوفر في الأحمال و الكميات و بالتالي الوفر في التكلفة الكلية نتيجة استخدام الطوب الخفيف.

Construction Performance been Studied using Light Weight Block

- ✓ Skeleton Cost Saving = 12 %
- ✓ Energy Cost Saving = 27 %

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Green Industry

Waste Recycling Technology

Marble Sludge----- > MicroCore® Block

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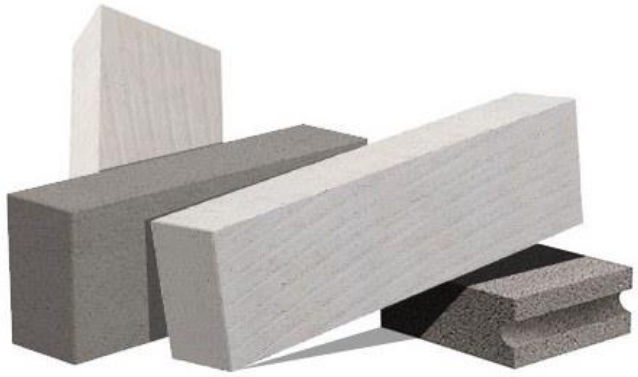
MicroCore® Block \ Panel

MicroCore® Block \ Panel

Technical Data



- Marble Waste Content = 200 to 300 kg per each m3
- Chemical Consumption :
  - UltraCore® T 500 → 1.5 to 2 kg per each m3.
  - ULTRACORE® C4T → Up to 1.5% of cement weight per each m3.
- Thermal Conductivity = 0.16 to 0.19 W/m*K
- Compressive Strength = 30 to 50 kg\cm2.
- Bonding Strength = 1.03 KN
- Absorption < 12%

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Partnership Policy

Aspects

- Analyzing Available cement types in Local market.
- Analyzing Available Raw material to be used as a fine filler.
- Formulating a targeted Product meet the values of local market specifications.
- Propose the suitable Production line.
- Create a theoretical feasibility study.

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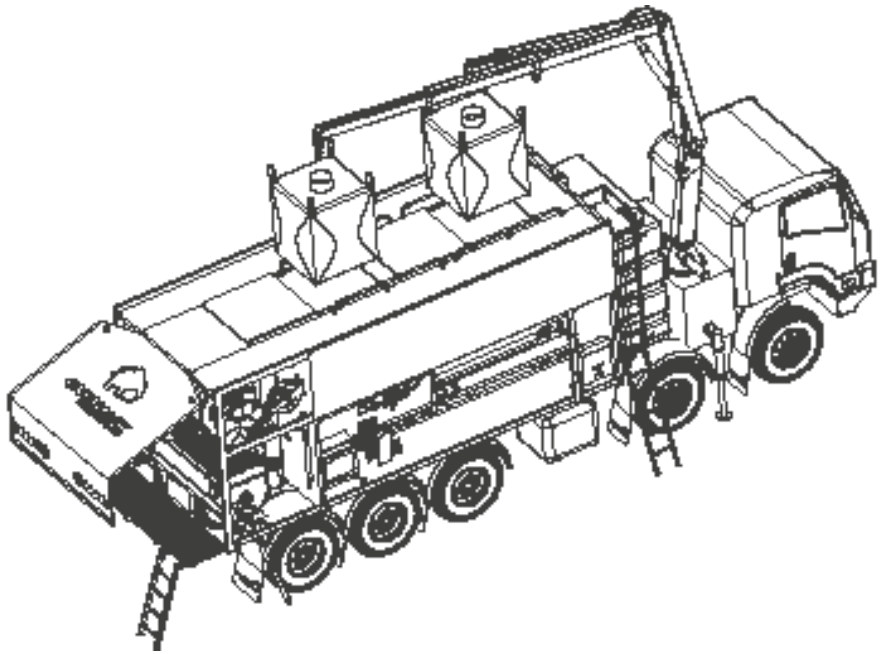
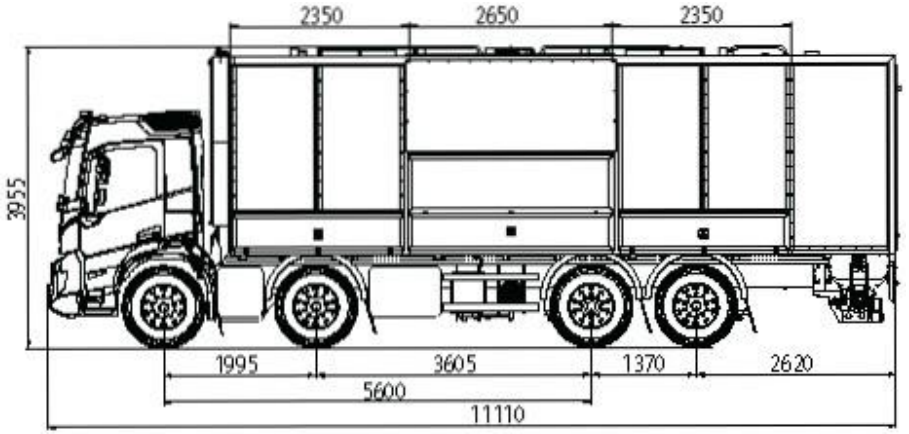
MICROCORE® Trans-Plant



- **For Continuous In-Situ Application**
- **Productivity Up to 25 m^3\Hour**



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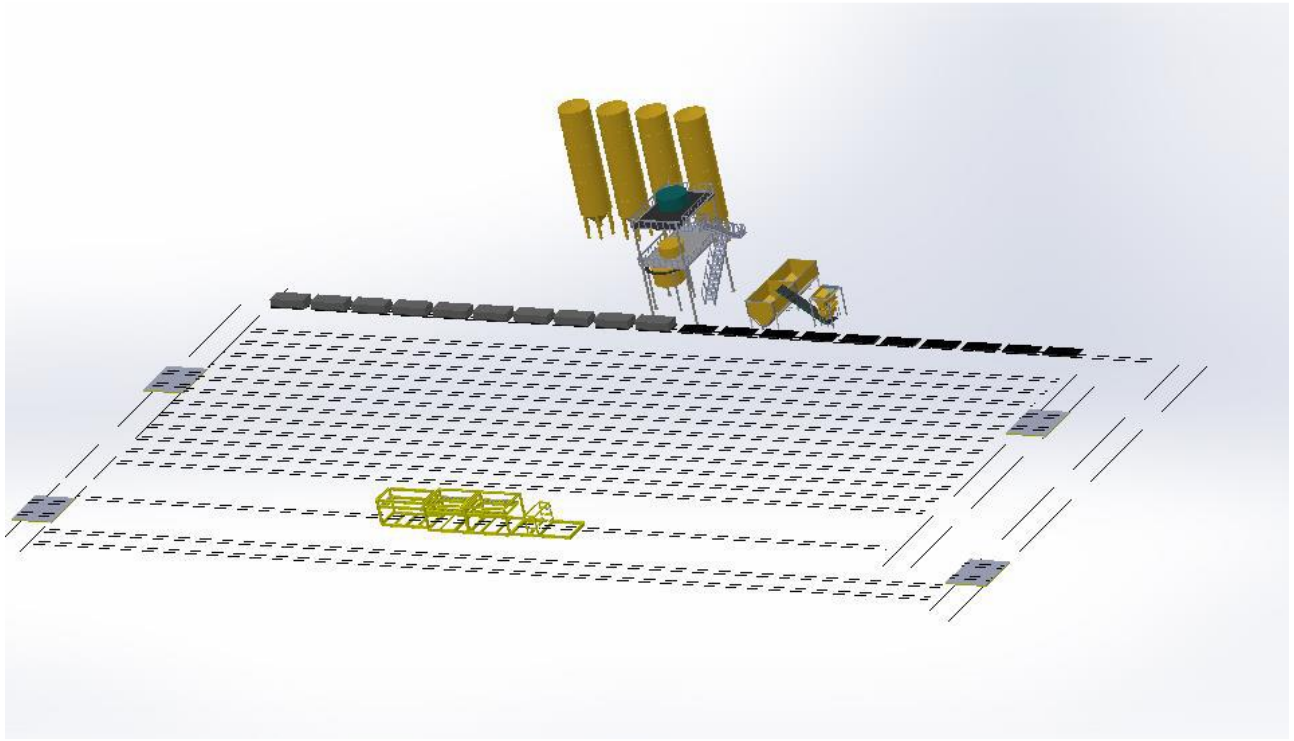
MicroCore® Plant



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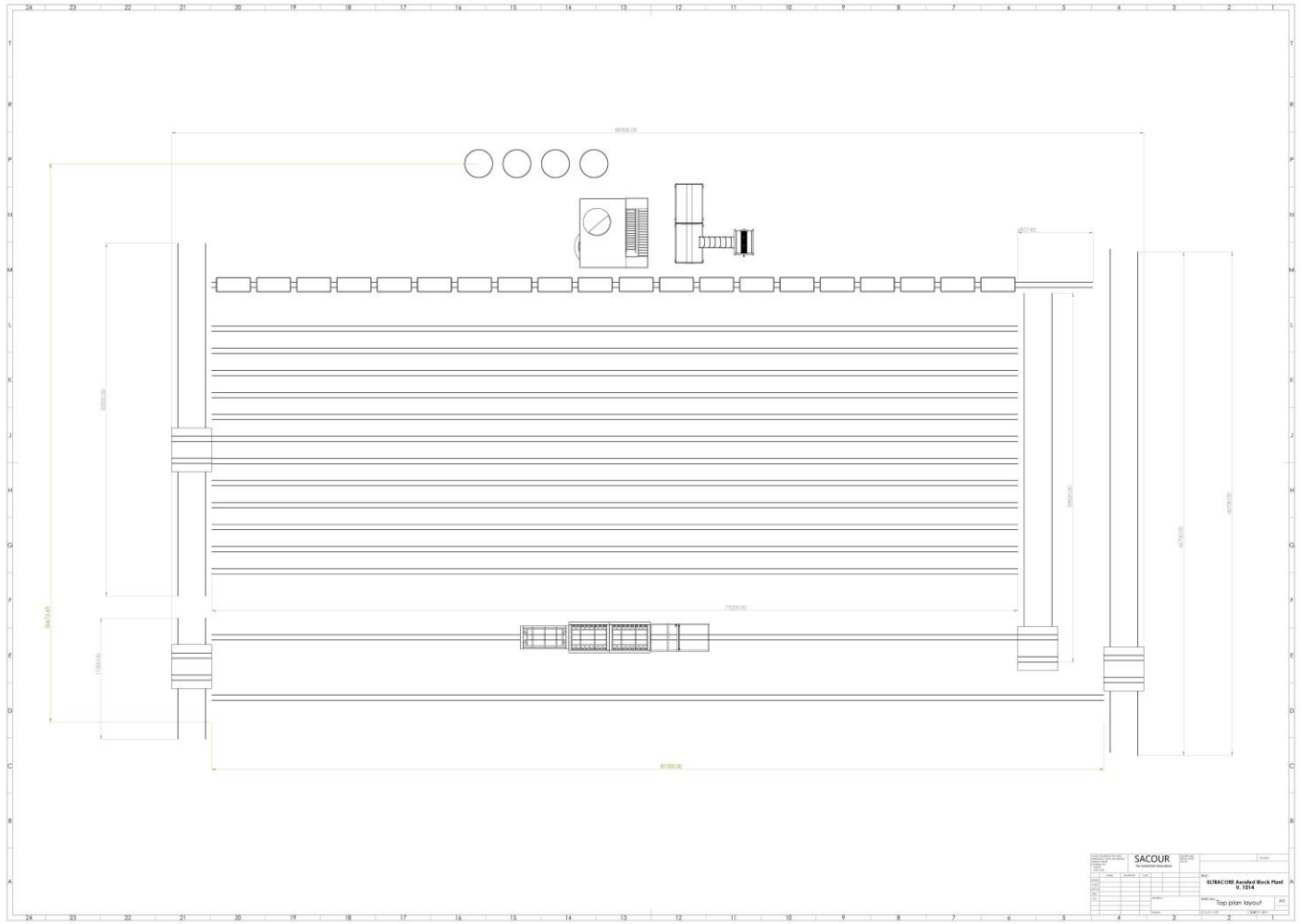
MicroCore® Plant 20 - Layout



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MicroCore® Plant Component

Hopper for Recycled Material \ Fine Sand:

Filler hopper for storage a processed marble sludge of capacity 8 m3 including feeding belt conveyor.

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MicroCore® Plant Component

MicroCore® waste Processing Plant:

A Special plant for processing recycled material to be prepared and feed to the MicroCore® Complex Mixing system.

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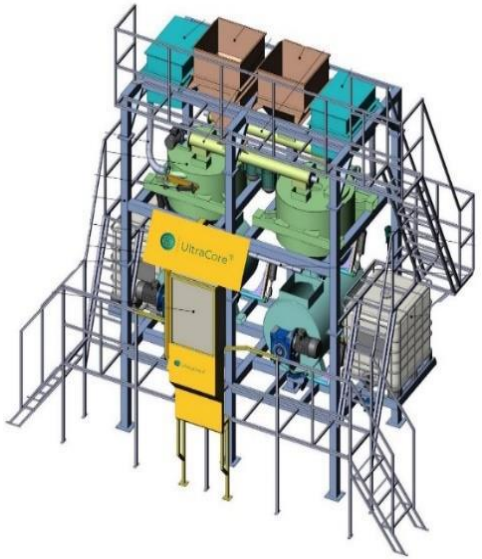
MicroCore® Plant Component

MicroCore® Complex Mixing Plant:



A special mixing Complex for production of UltraCore Aerated Block containing:

- Cement \ filler Weighing Hopper.
- Water dosing system.
- Additive's dosing system.
- Control Panel
- Full set of Load Cell
- MicroCore® Activating Mixer.
- MicroCore® Aeration Mixer.
- MicroCore® Casting Mixer.
- MicroCore® Generator 40V.

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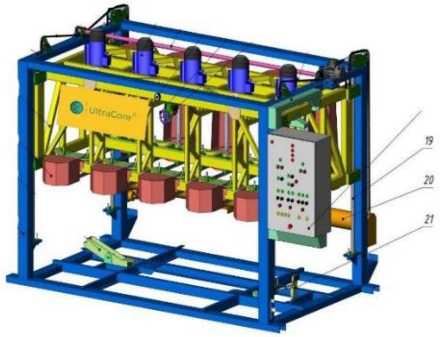
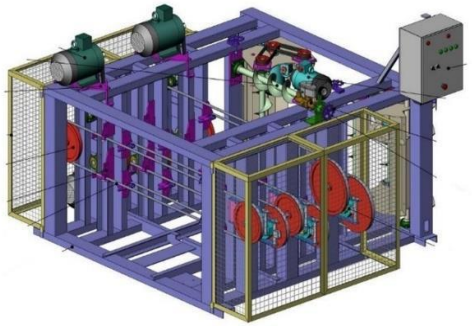
MicroCore® Plant Component

MicroCore® Cutting Complex

Blade system cutting towers for three axes containing:

- Vertical Cutting Tower.
- Longitudinal Cutting Tower
- Top Cut Cleaning System.
- Removing System for the cutting waste.





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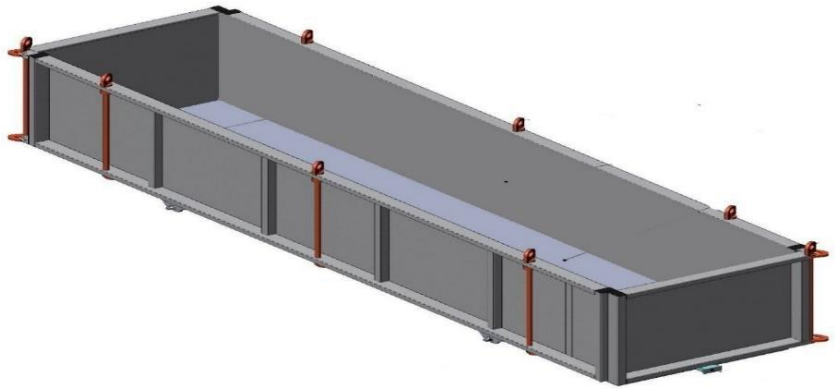
MicroCore® Plant Component

UltraCore® Molding System.

Sealed steel for casting MicroCore® Aerated Concrete to be formed and shaped.



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MicroCore® Plant Component

UltraCore® Packing machine (Optional)

An innovative packing Complex containing:

- Palletizing robot.
- Pallet wrapping machine.
- Automated Conveyor for pallet feeding.
- Pallet Strapping Unite.

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Thank you

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www.sacour.com