

Phase 1 – a Technical and Financial Design Phase for Successful AAC Projects

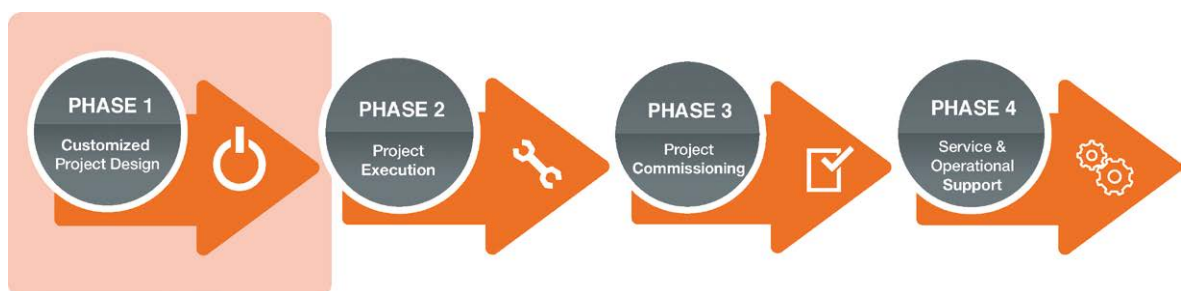
Most AAC factory projects with Aircrete start with a tailored technical and financial design project – Phase 1. Designed for both greenfield developments and factory upgrades, Phase 1 results in a complete package of technical and commercial insights. From raw materials testing to financial modeling and layout engineering, each deliverable is grounded in real data and Aircrete's decades of industry experience. This article explores the key components of Phase 1 and how it helps clients make smarter, investment-ready decisions from day one.

Introduction - Aircrete Phase 1

Aircrete Phase 1 – a tailored design phase of an AAC project – sets the technical and commercial foundation for future investments. Together with the client, Aircrete defines a specific scope of deliverables of the Phase 1 project that will be executed based on Aircrete's expertise and experience, complemented by local inputs from the client. Generally, there are two distinct types of Phase 1 projects: one for greenfield developments, where the goal is to build a new facility from the ground up (or build a new Aircrete factory in an existing building), and another for existing factories exploring upgrades. Each path requires different insights – and thus, different deliverables. For greenfield projects, Phase 1 typically includes a wider set of deliverables, including raw materials testing and recipe design in Aircrete's in-house laboratory, a full production cost breakdown,

competitiveness analysis, a tailored financial model, factory layout engineering, and infrastructure and location analysis. Whereas for upgrades, Phase 1 generally focusses more on layouts, new technical solution developments, preliminary BIM modelling and 3D scans. Aircrete Phase 1 is a modular product where clients may pick several relevant deliverables of Phase 1.

Together, these deliverables help answer the most important question: what kind of factory should one build or what scope and solution is required for the desired upgrade? Phase 1 equips clients with the data, strategy, and confidence to make more informed decisions and eliminate surprises during the project.



Aircrete project phases



Aircrete headquarters in Oldenzaal

Raw materials testing and recipe design

One of the most common and impactful elements of Phase 1 is raw materials testing and recipe design, as this is detrimental to the production feasibility and final product quality. The right raw materials are a key ingredient to running a successful operation. As part of this process, after in-house analysis of technical datasheets, clients send samples of their available raw materials to Aircrete's headquarters in Oldenzaal. There, the team of chemical engineers evaluates the results coming from a series of in-depth analyses to assess chemical and mineralogical composition and overall suitability for AAC production. Based on these results, Aircrete's technologists carry out multiple sample castings using the client's own materials. Each sample is tested for, amongst others, compressive strength and curing behavior. This allows Aircrete to iteratively refine and optimize the formula design, ultimately identifying the most efficient and cost-effective production recipe. All testing and sample development takes place in Aircrete's fully equipped laboratory. By working with real raw materials from the outset, uncertainties can be eliminated and provides clients with a clear understanding of how their materials perform in practice – laying a strong foundation for every engineering and commercial decision in the project.

Production cost analysis

A key deliverable of Phase 1 is a detailed production cost analysis – essential for any client aiming to understand the performance of their future factory. User-friendly input sheets developed by Aircrete help clients gather local market data for all necessary raw materials, additives, consumables, energy costs, etc. Aircrete supports the client in this data collection process as needed, helping them approach local suppliers or benchmark pricing where gaps exist. The input from the raw material testing provides valuable insight into the raw material usage, which is often the highest cost driver in production. Once the pricing data is in place, Aircrete calculates the expected production cost per cubic meter (or cubic feet in case of imperial measuring system) of client's future AAC, using the optimized recipe developed during raw material testing. This insight gives clients a transparent view of how much it will cost to manufacture their product considering actual parameters. For both greenfield investors and existing producers exploring new product lines, this deliverable offers critical clarity on profitability from the very beginning.

Aircrete laboratory

Drying ovens that remove moisture from AAC samples to determine dry density precisely



From left to right: display cabinet with past samples, counter with sieving equipment and mixers for lime and cement testing, hydraulic press for conducting compressive strength tests

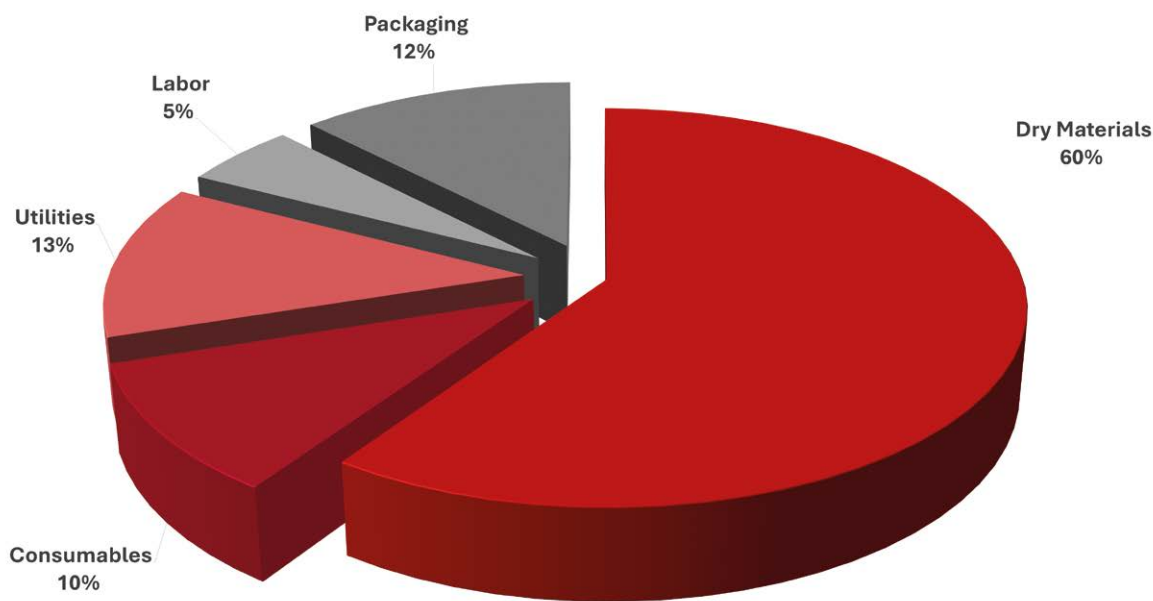


Autoclave room with the autoclave and its control cabinet on the left, and boiler system on the right



Inside view of the ball mill with ceramic balls (from 10 to 25 mm in diameter) ready for sand milling



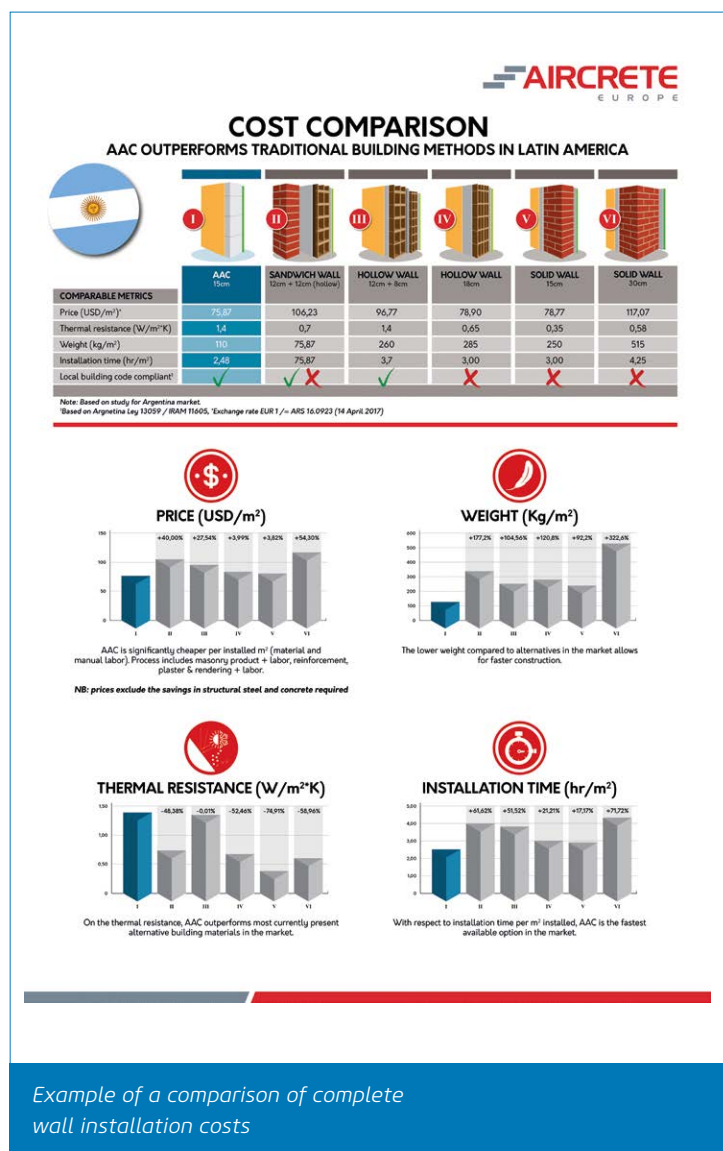


Example of an AAC production cost breakdown

Competitiveness and market analysis

Another important deliverable of Phase 1 is the competitiveness analysis – it evaluates how the client's future AAC products stack up against existing alternative solutions in their target region. Aircrete can support analyzing the overall market of the relevant building materials to assess the potential for AAC and determine the starting capacity of the envisaged Aircrete factory. Furthermore, together with the client, Aircrete collects market information on common competing materials – such as traditional clay bricks or hollow-core cement blocks – including the full installed cost per square meter of wall, not just the material price. Aircrete calculates the installed cost per square meter for the client's own product, factoring in the already calculated production cost, additional materials use and labor. This allows for a direct, apples-to-apples comparison with other wall systems. Furthermore, the Aircrete building application specialists also ensure that the standards and requirements of the client's local market are fulfilled when using AAC as an alternative.

Based on these insights, the envisaged sales price of the client's AAC products can be strategically adjusted to allow for healthy financial margins while at the same time ensure market competitiveness. In addition, this analysis helps shape the client's product portfolio. Depending on which wall solutions offer the best cost-to-performance ratio, Aircrete and the client determine whether the market would be better served by blocks or panels – and what dimensions and formats would be most commercially viable. By integrating technical parameters with real-world pricing and usage data, the competitiveness analysis helps position the client's future AAC products exactly where the market needs it.



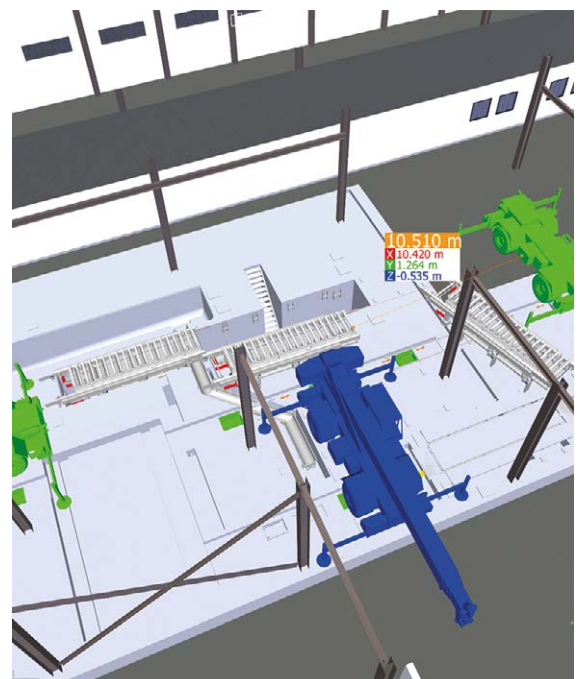


Layout engineering in progress

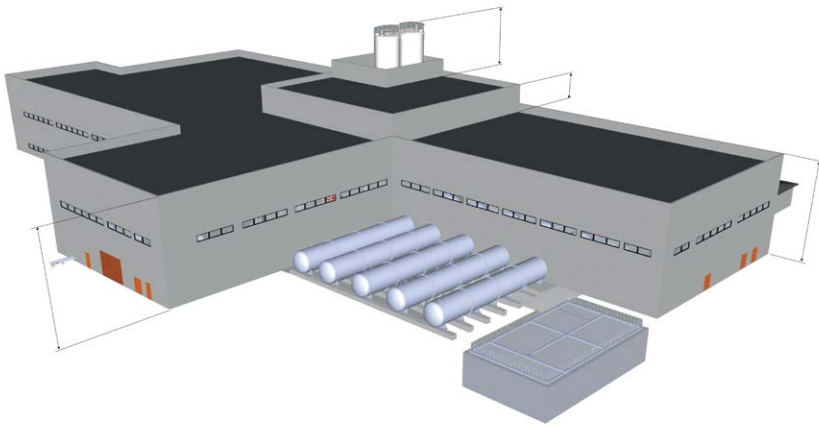
Factory layout engineering

Plant layout engineering in Phase 1 is a critical step that translates product and capacity targets defined through market and competitiveness analysis into a technically sound production concept. Aircrete begins by selecting the most suitable equipment configuration to support the required output and product portfolio. The Aircrete engineering team evaluates different machinery options and automation levels, balancing performance with investment efficiency to ensure the best possible return on investment. And at the same time, undoubtedly, focusing on future-proofing the project: layouts are designed with scalability and product diversification in mind, allowing the plant to expand as market needs evolve. Site planning is also an essential element of this phase. Whether working with an existing land plot or evaluating a new location, Aircrete engineers factor in site logistics such as vehicle movement, raw material inflow, stockyard access, and finished goods handling.

For upgrade projects, Aircrete complements project planning with 3D scanning of the existing plant to ensure seamless integration with new equipment via building information modelling¹. The result is a



BIM modelling of installation sequence in existing plants



Building render as a part of the infrastructure package

preliminary plant layout tailored not only to current business goals but also to long-term operational flexibility – giving clients a clearer view of the property requirements and how to make the most of their available space.

Infrastructure and location analysis

The infrastructure and location analysis in Phase 1 ensures that the client's factory is not only well-designed, but strategically placed for long-term success. Aircrete's experts conduct a thorough assessment of client's proposed site(s), beginning with on-site visits to evaluate the location, access to utilities and infrastructure, proximity to key suppliers and raw material sources, etc. This helps to determine the most efficient and cost-effective location and supply chain flow. Beyond logistics, local infrastructure is analyzed in detail: land pricing, road and utility access, electricity and water availability, financial incentives from (local) governments and municipalities and compliance with local regulations. Based on this research, Aircrete delivers a tailored infrastructure and building guidance that includes foundation planning, access roads, building information and all necessary utility connections and requirements. Aircrete engages in discussion with local contractors, selected by the client to clarify items and support the contractors in their work to determine the costs for the building and infrastructure. Client visits to other existing Aircrete factories will be arranged, offering firsthand insight into how Aircrete implements infrastructure strategies in the real world. This combination of technical evaluation and real-world reference provides the clarity and confidence to choose the right location and prepare it for a factory that performs from the ground up. In addition, Aircrete provides technical drawings and information of items that can be sourced locally, so that the client will be able to obtain pricing from local fabricators. Aircrete can also provide a technical audit of such suppliers to ensure that they are able to meet the required quality standards.

HR planning

Human resources planning is a key component of Phase 1, bridging the gap between production strat-

egy and operational readiness. Once the level of automation for the future AAC plant is defined, Aircrete prepares a detailed HR plan tailored to the specific production concept. This plan outlines the number of personnel required across all functional areas – production, maintenance, quality control, and administration – along with the skill sets, experience levels, and general qualifications required for each role. The plan will be prepared taken into account the potential existing business infrastructure of the client, so it is possible that some personnel functions will not be needed from the onset, as they can be filled in from the client's own network. This allows the client to assess local labor market conditions, identify potential recruitment sources, and estimate realistic costs. These insights feed directly into the broader financial model, ensuring that labor-related expenses are accurately reflected in the plant's long-term business plan. By incorporating HR planning early in the process, Aircrete enables clients to plan for hiring, training, and organizational structure – ultimately supporting a more efficient transition from project execution to plant operation.

Financial model

Many deliverables outlined earlier serve as foundational components of the Aircrete financial model. The financial model is one of the most decisive commercial deliverables of Phase 1, offering a clear projection of the factory's financial and operational performance, including operational production details, financial statements, multiple-year forecasts, detailed revenue and cost breakdowns and valuation returns. Based on Aircrete's unique strategic involvement as an investor in multiple factories around the world, Aircrete has gained deep insights into the very details of AAC production and have built a proprietary operational and financial model based on this. Building on the production cost analysis, market competitiveness assessment, local variables adjustments and HR analysis, Aircrete prepares a detailed, customized operational and financial model for the proposed factory solution. This model includes projected income statements and balance sheets over a decade horizon, reflecting realistic revenue and expense forecasts. Key financial indicators – such as return on investment and payback period – are calcu-

Product margin and operating costs analyses as a part of financial model deliverable

Reinforced Panels - Margin Analysis

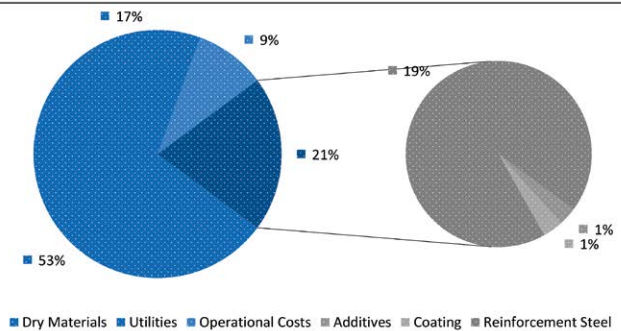


The estimated margin per m³ for Reinforced Panels = USD 150 (50.0%)



Additional Materials represent 20% of operational costs

Steel represents 93% of additional materials costs and 19% of total costs



Reinforced Panels - Operating Costs



Consumption (in tones)	Base	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Sand		5,009	7,513	8,014	9,517	9,517	9,517
Cement		2,254	3,381	3,607	4,283	4,283	4,283
Lime		834	1,251	1,334	1,584	1,584	1,584
Gypsum		251	376	401	476	476	476
Aluminum Powder		8	11	12	14	14	14
Reinforcement Steel		262	392	418	497	497	497

Materials Prices (USD/m ³)	Base	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Dry Materials							
Sand	17	18	18	19	19	20	20
Cement	30	32	32	33	34	34	35
Lime	30	32	33	33	34	35	35
Gypsum	1	1	1	1	2	2	2
Aluminum Powder	3	3	3	3	3	3	3
Additional Materials							
Additives	1	1	1	1	1	1	1
Coating	1	1	1	1	1	1	1
Reinforcement Steel	28	30	31	32	32	33	33
Utilities							
Fuel	7	7	7	8	8	8	8
Mould & Frame Oil	0	0	0	0	0	0	0
Water	1	1	1	1	1	1	1
Electricity	17	19	15	15	15	16	16
Operational Costs							
Grinding Media	1	1	1	1	1	1	1
Packaging	1	1	1	1	1	1	1
Cutting Wires	0	0	0	0	0	0	0
Maintenance	1	1	1	1	1	1	1
Labour	12	12	13	12	10	11	11

Estimated Prices (USD/m ³)	Base	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Complete Cost	150	160	159	162	163	166	169
Dry Materials	80	86	88	89	91	93	95
Utilities	25	27	23	24	24	25	25
Additional Materials	30	32	33	34	34	35	36
Operational Costs	14	15	15	15	13	13	14
Net Sales Price	300	307	313	325	338	345	352
Margin	150	146	153	164	175	179	183

lated and presented in a clear, visual format designed for decision-makers. Whether one is planning to secure financing², pitch investors, or simply validate their business case internally, this model becomes a central reference document. It not only shows how the business will perform, but also highlights the most influential drivers of profitability. With a strong technical foundation behind every input, this deliverable helps to remove uncertainty from capital planning and gives clients the confidence to move forward, knowing the numbers are backed by thorough engineering and market analysis.

Conclusion

Aircrete Phase 1 is a structured, insight-rich starting point for any AAC factory project – whether greenfield or an upgrade. Its deliverables are not only informative files, but also effective actionable items that begin client's AAC factory project journey. For

future AAC producers, these insights are critical to defining the right factory concept, product portfolio, and market positioning from the outset. For existing manufacturers, Phase 1 helps with technical and financial feasibility of the envisaged factory upgrade. Although Phase 1 is a paid product, its cost is fully deductible from the eventual greenfield or upgrade project supply contract with Aircrete. Therefore, Phase 1 is an investment in detailed early engineering that not only sharpens decision-making but also ensures faster and smoother implementation of the project. With this approach, Aircrete helps clients move seamlessly from feasibility to execution – managing the investment risk and accelerating the successful path to production.



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¹ For more details see "BIM integrated in AAC project management services" in the 3rd issue of AAC Worldwide in 2022

² For more details see "Attractive export finance for a green investment opportunity" in the 4th issue of AAC Worldwide in 2020



Zhejiang Yizhou Machinery Technology CO.,LTD

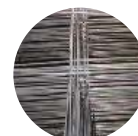
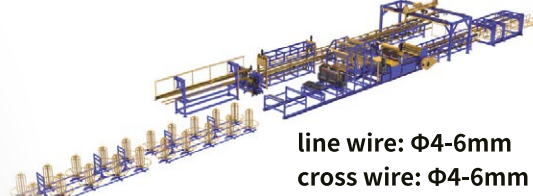
► GWC-CL-500 Fully Automatic AAC Slab Mesh Cage Welding Line Mesh Welding Line ◀



You can choose the following diameters

$\Phi 4-6\text{mm}$
 $\Phi 5-9\text{mm}$
 $\Phi 6-12\text{mm}$

► GWC-D-S500-WL Fully Automatic AAC Slab Mesh Cage Welding Line ◀



► GWC-D-2×500 Fully Automatic Twins AAC Slab Mesh Welding Line ◀



► GWC-C-500 Fully Automatic AAC Slab Mesh Welding Line ◀



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