

ONE



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MAGAZINE



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Dear Colleagues, Partners and Friends!

This publication was not intended as a formal report on progress or a showcase of corporate achievements. Its purpose is to become a space where we can share with readers our thoughts on the transformation of the global powder coatings industry, which is currently experiencing systemic growth, becoming more technologically advanced, transparent, and structurally mature.

2025 marks a period of qualitative transition for 1Thirty Holding. Today, our production network includes Asiacolor plants in Kazakhstan and Qemtex in the UAE, but we see this as merely a starting point for something greater. Over the next five years, the group’s strategy calls for the launch of four new high-tech production sites in various parts of the world, which will help create a solid foundation for the company’s further development. This scaling up is not simply a mechanical expansion of production or an expansion into new markets. It is about creating a new logic of industrial growth based on advanced management models, the implementation of deep digitalization, artificial intelligence, and fundamentally new operating standards for the industry.

We are consistently building a robust industrial ecosystem based on the principles of responsibility, flexibility, and long-term sustainability. In modern industry, leadership is increasingly determined not by production volumes, but by the ability to combine innovation with systemic reliability and meaningful development.

Kazakhstan remains a strategic fulcrum and a primary platform for us. It was here that 1Thirty Holding’s core values and principles were formed, which are now being scaled internationally. As we

implement major government and infrastructure projects we continue to drive industry development and serve as a benchmark for quality. Our key objective is to transform the Kazakh platform into a unique intellectual and production hub, providing standards, expertise, R&D infrastructure, and operational support to all of the group’s international divisions.

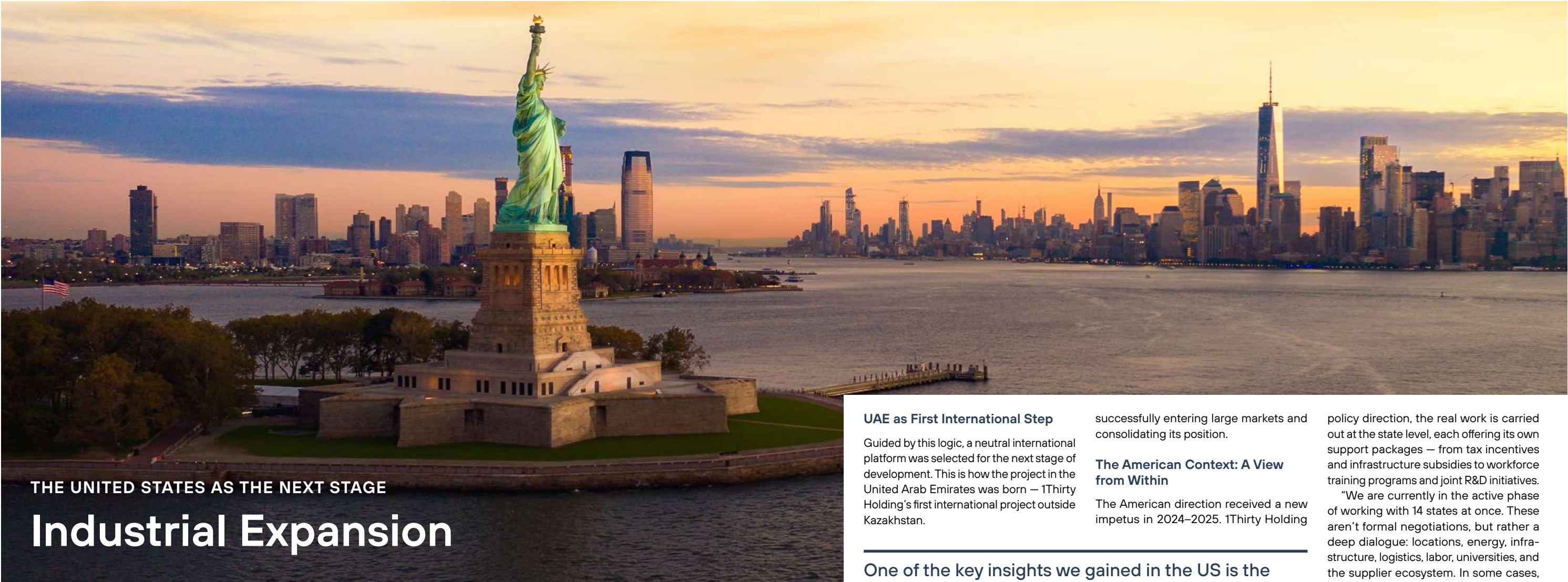
In the United Arab Emirates, we are rightfully proud of what we have achieved in a relatively short period of time. We are deeply grateful to this country for its trust and the opportunity to become part of a highly competitive market. Having established a reputation as a reliable partner in the region, we intend to continue contributing to the development of local industry and strengthening the country’s economy by introducing innovative surface protection technologies in a unique climate.

In this magazine, we have deliberately combined practical industrial experience with cutting-edge industry science. We are convinced that powder coating is more than just a protective layer, but a fundamental connection between form and substance, guaranteeing the durability and integrity of human-made creations.

Welcome to the world of 1Thirty – where innovation takes on new meaning!

Chairman of the Board of Directors of 1Thirty Holding
Glukhov Alexander





THE UNITED STATES AS THE NEXT STAGE

Industrial Expansion

For 1Thirty Holding, entering the U.S. market was not simply the launching point of a new project, but a logical continuation of a long-standing journey built amidst intense competition, market turbulence, and large-scale transformations. The decision to launch an R&D Center and production cluster in USA, with a total estimated investment of \$130 million, demonstrates the maturity of our industrial model and our readiness to integrate into one of the world’s most competitive and technologically advanced markets.

Today, the US powder coatings market is a global hub for the development of standards, engineering approaches, regulatory norms, and technological trends, which are then transmitted to other regions of the world. Being present in this market means not so much geographic expansion as participating in shaping the future of the industry and contributing to its development.

A Decision Made Long Before Implementation

1Thirty Holding’s interest in the American market didn’t arise spontaneously. Research into the possibility of entering the US began back in 2020. As part of the preparatory phase, Co-Founder Alexander Glukhov spent approximately one year in the US, studying the potential for localizing production, the industry structure of

demand, the regulatory architecture, and the economics of market entry, both at the federal level and within individual states. Following this period, a conscious strategic decision was made: despite the attractiveness of the American market, its entry barrier in terms of capital expenditures, regulatory complexity, and overall risks required preliminary adaptation of the management model and the accumulation of practical international experience.

UAE as First International Step

Guided by this logic, a neutral international platform was selected for the next stage of development. This is how the project in the United Arab Emirates was born — 1Thirty Holding’s first international project outside Kazakhstan.

successfully entering large markets and consolidating its position.

The American Context: A View from Within

The American direction received a new impetus in 2024–2025. 1Thirty Holding

policy direction, the real work is carried out at the state level, each offering its own support packages — from tax incentives and infrastructure subsidies to workforce training programs and joint R&D initiatives. “We are currently in the active phase of working with 14 states at once. These aren’t formal negotiations, but rather a deep dialogue: locations, energy, infrastructure, logistics, labor, universities, and the supplier ecosystem. In some cases, states themselves are taking the initiative and proposing conditions that would have been unimaginable just a few years ago,” he emphasizes.

One of the key insights we gained in the US is the depth and systematic nature of government support for industry.

The UAE became a new hub for professional growth for the group. It was the first experience of transferring the Kazakh model beyond its core market to an environment with different standards, business culture, quality requirements, and speed of decision-making. This stage instilled confidence and provided a clear understanding that 1Thirty Holding’s system (management, process, technology, and operational) was ready for further scaling and entry into more competitive markets. It was after this experience that the group returned to its American operations with a clear understanding of the working mechanisms for

co-founder Zhandos Temirgali has visited the United States on numerous business trips and as part of business delegations, participating in meetings with state representatives, economic and commercial agencies, and industrial partners. “One of the key insights we gained in the US is the depth and systemic nature of government support for industry. Competition for investors here is not even at the state level, but at the district level within each state, which undoubtedly pleases us as investors,” notes Zhandos Temirgali. The United States has a fundamentally different approach to industrial policy. While the federal government sets the



Signing with BCIU during “C5+1” Business forum



State Support as Part of the Industrial Strategy

One of the key factors influencing the decision to launch the project now was the transformation of the US approach to industrial localization. Programs supporting manufacturing, infrastructure, and technological sovereignty create a unique window of opportunity for high-tech companies.

“In the US today, there’s a very clear understanding: if you want to maintain an industrial base, you must create conditions in which production is economically viable. And we see that these conditions are indeed being created — through subsidies, tax mechanisms, support for job creation, exports, and R&D,” Temirgali notes.

For 1Thirty Holding, this means the opportunity to become part of an ecosystem where production, science and public policy work in sync.

KAZAKHSTAN LAUNCHES FIRST INDUSTRIAL PRODUCTION FACILITY IN THE US 1Thirty Holding Invests \$130M in Chemical Complex

Diplomatic Impulse and Strategic Decision

In July 2025, in a letter to Kazakhstan’s President Kassym-Jomart Tokayev, US President Donald Trump confirmed Washington’s readiness to provide institutional support to Kazakh companies whose projects are aimed at investing in the US economy and creating new jobs in the manufacturing sector.

This was a significant signal for 1Thirty Holding’s management. Having received

clear confirmation of a favorable investment climate, the company moved into the active phase of project development. In November 2025, during the Kazakh leader’s state visit to Washington for the C5+1 summit, key negotiations took place, cementing the initiative’s status as a flagship project for bilateral economic cooperation.

One of the central events of the business program was the meeting between Zhandos Temirgali and the Assistant Secretary of Commerce and Director

General of the United States and Foreign Commercial Service David L. Fogel, during which the American leadership was presented with a project to create a vertically integrated chemical complex with an estimated investment of \$130 million.

The American side enthusiastically welcomed the 1Thirty Holding project and expressed full readiness for its further support from federal agencies.

Meeting with the Assistant Secretary of Commerce, David L. Fogel



Vertical Integration as a Factor of Sustainability

The 1Thirty Holding project is seen as the first large-scale industrial presence of a Kazakh business in the United States. The industrial base will be developed in two stages, allowing the company to systematically expand its capabilities and market presence.

The initial phase will focus on launching powder coatings production and establishing a cutting-edge R&D center. The research unit will focus on developing next-generation technologies, including raw materials for powder coatings. This is critical to meeting demand in high-tech industries such as aerospace, automotive, and modern construction.

The second phase of the project involves launching production of our own raw materials — polyester resins. This full-process strategy, from the synthesis of base components to the finished product, minimizes dependence on third-party suppliers and guarantees consistent product characteristics. The total investment in the project will be approximately \$130 million, creating approximately 150 highly skilled jobs in engineering and automation of industrial processes.

Formation of a New Industrial Identity

Scaling a business in North America requires not only financial stability but also a well-thought-out infrastructure strategy. A commercial hub spanning several US states is scheduled to launch in 2026. This hub will serve as the operational foundation for market entry, providing logistical support and customer interaction even

before the production facility reaches full capacity.

This initiative goes far beyond commercial considerations. The company is creating not just a factory, but a center of excellence that combines technology and sustainable production principles. For Kazakhstan, this represents a qualitative shift in its global positioning: the country is no longer simply a recipient of investment but a technology partner, implementing innovations at the global level.

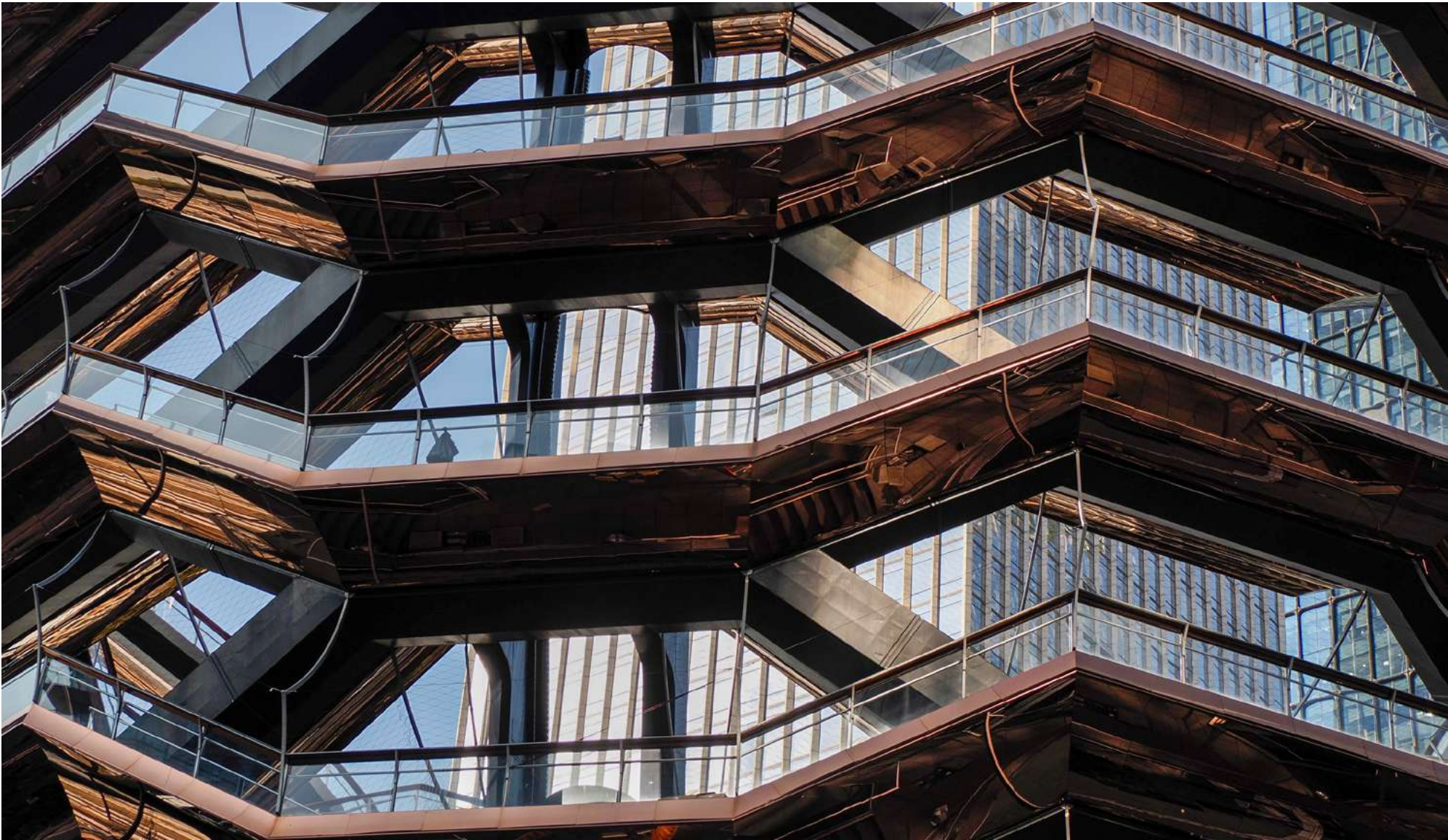
Successful implementation of the project in the US will allow 1Thirty Holding to significantly strengthen its position in global production chains. Based on industry expertise, vertical integration and in-house R&D are the most viable model in a highly competitive environment. The combination of political support, long-term vision, and a focus on environmentally friendly technologies makes this project a benchmark example of modern industrial expansion, building trust in Kazakh businesses on the international stage. ♦



Reception at the U.S. Mission to the Republic of Kazakhstan with D. Robinson

TIME FOR CHANGE

Transforming the Coatings Industry



From Increasing Volumes to Increasing Complexity

Looking back over the last 10-15 years of the coatings industry's development, it becomes clear: for a long time, the market grew primarily quantitatively. Construction volumes increased, production capacities expanded, and consumption in mechanical engineering, infrastructure, and architecture grew. In this logic, the key issues were capacity, price, and product availability.

However, by today, this model has ceased to work in its purest form. The

industry has entered a phase where growth no longer means simplification, but, on the contrary, is accompanied by increasing complexity of processes, requirements, and responsibilities. It is no longer enough for a coatings manufacturer to simply "know how to produce." They are expected to be able to manage a complex system: supply chain, energy, increased customer needs, regulatory changes, big data, and the product lifecycle.

Powder coatings are no longer a niche technology or an "eco-friendly alternative." **By 2025, they will be firmly established as the foundational platform of the modern coatings industry – provided they are backed by a mature operational and engineering logic.**

Why 2025: A Confluence of Several Factors

Tectonic Shifts

The year 2025 wasn't revolutionary in itself. It was the confluence of processes that had been building for years, but now began to act in unison.

First, attitudes toward global supply chains have changed. Companies that have survived the pandemic, logistical disruptions, and geopolitical restrictions are increasingly asking themselves: How resilient is my business in the event of an external shock? The answer is less and less about global optimization and more and more about regional reliability. This

means localization, shorter supply chains, and increased demands for consistent quality within a region.

Secondly, energy is no longer a "background concern." In Europe, prices are rising, in the US, there are massive investments in infrastructure, and in Asia, there is pressure on production costs. For any production, including coatings, the energy profile has become as important a parameter as the formulation or line throughput. And here, powder technologies, with the right process tuning, gain a structural advantage.

Third, regulatory connectivity across markets has increased. Even if the requirements formally differ, their underlying logic is similar: transparency, measurability, and accountability. This means that a company operating in multiple regions must be able to adapt without constantly restructuring the entire system.

Fourth, the green agenda is becoming a global trend and entering a practical phase. Increased demand for eco-friendly solutions is giving impetus to the powder coatings industry.

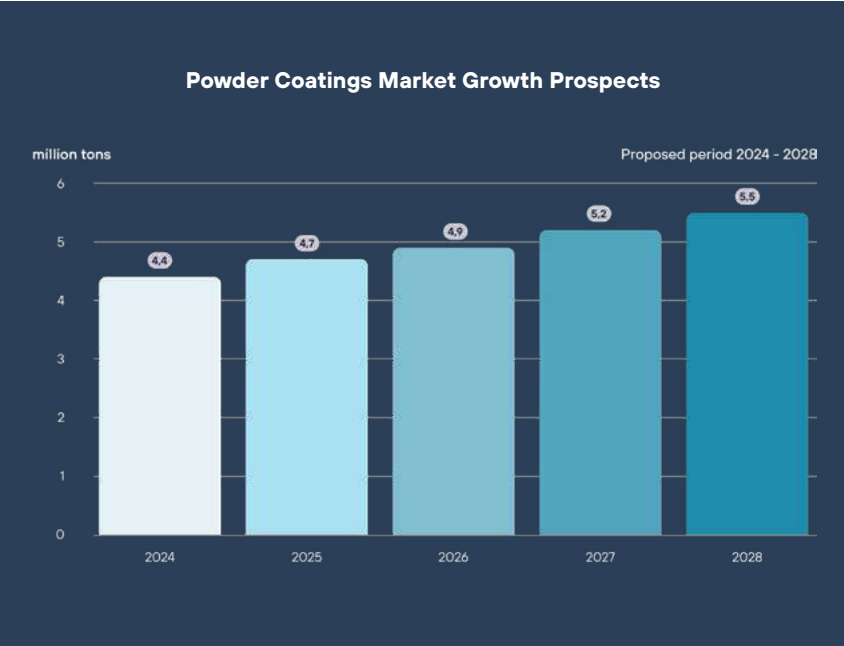
Regional Breakdown: One Market, Different Logics

North America: A Market of Opportunities

The US market in 2025 remains one of the most attractive and, at the same time, most demanding. There is no “average” customer here. There are either high demands and standards or fierce competition based on price and efficiency. It’s important to understand that the US is not a single market, but a collection of state markets, each with its own industrial policies, incentives, and priorities.

For powder coatings, this means steady growth in architecture, aluminum extrusion, industrial equipment, transportation, and energy. But this growth is accompanied by demands for reproducibility, traceability, and stability that go far beyond conventional specifications.

If you’re working or planning to work in the US, the question isn’t, “Is there demand?” Clearly, there is. The question is, “How capable is your system of withstanding constant monitoring, auditing, and scaling without losing quality?”



Europe: A Market of Maturity and Durability

The European market in 2025 will be less volume-oriented and more focused on sustainability and product lifecycles. Here, coatings are viewed not as consumables, but as part of a systemic solution for buildings, vehicles, and industrial facilities.

For powder coatings, this means increasing demands on durability, environmental impact, color stability, resistance to aggressive environments, and minimal maintenance. European customers increasingly consider not the price per kilogram, but the cost of ownership over a 15-25-year horizon.

If you work in Europe, you’ve likely already encountered this shift: questions about re-application, the choice of sustainable raw materials and components, and recycling are raised as often as questions about appearance.

GCC and the Middle East: Extreme Climate as a Technology Driver

The UAE and GCC markets in 2025 are increasingly perceived not just as fast-growing, but also as technologically transformative. The region’s climate

— high temperatures, increased UV exposure, sand, and salty air — makes any compromises in coatings obvious within the first few years of use.

Here, powder coatings undergo accelerated “reality testing.” Superdurable and hyperdurable systems, fade resistance, and retention of mechanical properties are not marketing terms, but basic approval conditions for projects.

For the industry as a whole, the GCC is becoming a testing ground for solutions that are then applied in other regions with increased climatic stress.

Asia and Emerging Markets: Balancing Price and Quality

Growth in Asia remains robust, but even here, a shift toward stability and control is noticeable in 2025. Clients are increasingly unwilling to tolerate variations in quality and increasingly value consistency and predictability.

For powder coatings, this means competition not only on price but also on process efficiency: material consumption, line speed, and defect rate. And here again, those who can manage the system, not just the product, win.

Technologies Within Technologies: What’s Really Changing



Energy, Hardening and Flexibility

Low-temperature, energy-efficient curing systems are no longer experimental in 2025. They are becoming a response to real-world constraints: energy costs, substrate diversity, and the need for rapid changeovers.

If you manage a production line, you already understand that line flexibility is becoming just as important as its maximum productivity. Powder technologies offer ample room for maneuver here — with proper engineering setup.

From Versatility to Precision

Another important shift is the move away from one-size-fits-all products. The market increasingly demands customized solutions optimized for specific conditions:

climate, substrate type and preparation methods, service life, and mechanical loads.

This complicates the portfolio, but simultaneously increases the value of the manufacturer’s expertise. Today, the winners are not those with the widest product range, but those who are able to solve the client’s problems.

Durability as an Economic Category

Coating durability is increasingly viewed not as a technical bonus, but as an economic factor. The longer a coating lasts without intervention, the lower the overall cost for the customer — and the greater their loyalty.

This shift is particularly noticeable in infrastructure, architecture, and industry,

where downtime or rework costs many times more than the material itself.

New Management Standards

By 2025, it’s clear that manual settings and operator experience can no longer be the only quality management tools. The coatings industry is gradually shifting to a data-driven approach.

This is not about the digitalization trend, but about practical tools:

- ♦ monitoring of process parameters,
- ♦ analysis of deviations,
- ♦ defect prediction,
- ♦ energy
- ♦ and line loading management.

For a production manager, this means one thing: stability is achieved not through rigidity, but through precision.

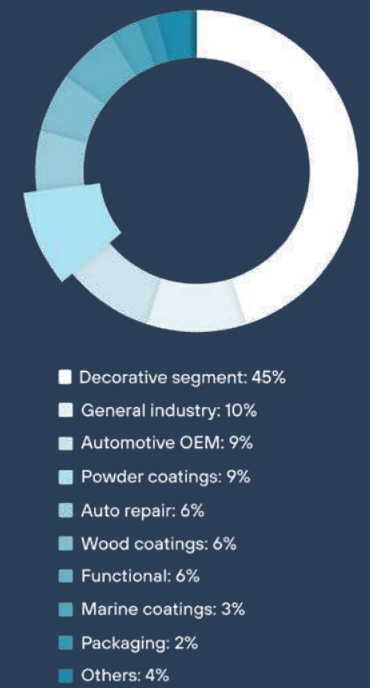
What Does This Mean for the Industry as a Whole?

The main change of 2025 isn’t technology per se, but a shift in thinking. The coatings industry can no longer develop linearly, adding capacity and products without considering the context.

Today, it’s a multidimensional system where product, market, energy, data, and management are interconnected. Powder coatings have found themselves at the center of this system because they fit better than other technologies into the new architecture of industrial development.

But this in itself does not guarantee success. It will belong to those who can transform the technology into a system.

Global Paint and Varnish Market: \$176 Billion (2024)



The year 2025 marks a new reality: the coatings industry has entered a period of maturity. And in this era, the winners are not the biggest and brightest, but the most systematic and adaptable. ♦



Powder Coatings

FROM THEORY TO PRACTICE

History of Asiacolor in Kazakhstan

When we talk about powder coatings today as a mature and well-understood technology, it's easy to forget that just twenty years ago, it was a virtually unknown field in the Kazakh market. In the early 2000s, the language, concepts, and culture of powder coatings application were virtually nonexistent in the professional community. And looking back, it becomes clear: we weren't starting a business — we were laying the foundation of a new market.



Larissa Semenchuk
General Director
of Asiacolor

● 2003

Without a Map or Instructions

Our journey began in 2003 with Verirs, which at the time was the first and only supplier of powder coatings in Almaty. It was a time when the market not only didn't understand what powder coating was, it didn't even see its practical value.

We were just getting to know this technology ourselves. We were studying application equipment, mastering new terminology, understanding the physics of the processes, the behavior of materials, and how it differs from traditional liquid paint systems. Essentially, we were learning alongside the market — and often faster than it was ready to accept.

The main goal of those years was education. We approached companies that had been working with traditional paints and varnishes for decades and tried to explain why they should abandon the familiar and seemingly straightforward in favor of a technology that seemed complex, expensive, and incomprehensible.

We were often told: "Why do we need this? We're already working."

And we didn't know then that years later these very conversations would become the foundation of an entire industry.



● 2003 — 2014

A Decade of Growth with the Country

From 2003 to 2014, we developed the powder coatings market practically from scratch. During this time, the company grew to more than five branches across Kazakhstan, covering key regions of the country.

It's important to understand the context of that time: construction and industry in Kazakhstan were just beginning to gain momentum. New factories, types of production, façade solutions, the first major architectural projects — all of this was taking shape before our eyes.

We were growing our client base almost every week. It was an amazing, exciting time for us. We weren't just selling

a product — we were delving into the processes with our clients, understanding their technologies, and working together to figure out how powder coating could solve specific problems: increasing durability, simplifying production, improving appearance, and reducing costs.

The company became a driver of new technologies and products. And the deeper we delved into our clients' actual production processes, the clearer it became: the retail model wasn't enough. The market needed more than just a supplier — it needed a center of excellence.

● 2014



Asiacolor Brand

In 2014, we reached a key decision: creating our first powder coatings brand in Kazakhstan, Asiacolor.

It was a deliberate and risky move. We stopped being just a trading company and took responsibility for the product.

By this point, we had already accumulated unique expertise: we understood market needs, climate characteristics, common mistakes, and real-world

operating conditions. New products under the Asiacolor brand were initially developed not from a catalog, but rather to meet specific customer needs and the specific conditions of Kazakhstan.

This decision was made by the entire team. We understood we were entering a completely new level of responsibility — and we were ready for it.



● 2017— 2019

The Toughest Challenge Was Building Our Own Production

In 2017, we began design work to establish the first powder coatings plant in Kazakhstan.

And here it is important to be honest: although we were a recognized center of excellence in the country in commercial and technical aspects, we had no practical experience whatsoever in the production of powder coatings.

This was a real challenge. We spent over two years studying production and R&D. Our technologists visited over 15 countries, studying global practices. We

literally lived in powder coating factories — observing processes, analyzing formulas, asking questions, and comparing approaches.

It was a time of deep immersion, when theory ceased to work without practice, and every mistake became a lesson.

We launched the plant at the end of 2019. And almost immediately, the world entered 2020 and the COVID-19 pandemic.

● 2020

Strength Test

We had no idea what awaited us. Our plans envisioned phased development, the introduction of new products, the arrival of foreign specialists, training, and the exchange of experience. All of this collapsed in just a few weeks.

Borders closed. Logistics ceased to function. International channels of communication were severed.

There is only one thing left to do — rely on yourself.

And it was here that it became clear that our team had truly matured into

experts. In 2020, despite restricted travel and remote work, we developed over 500 products. We completed certifications in real-time, implemented products remotely at customer sites, and maintained production without external assistance.

We entered the market at the highest level of difficulty and survived.

This time will always be remembered with a special feeling: as a test of maturity, which we passed with dignity.



Maturity and New Horizons

Today, everything is different. We are developing systematically and deliberately. Our strategy is not quantity, but complexity.

Projects that require expertise, knowledge, and engineering thinking. Indicators like adhesion, flexibility, and standardized tests are already a basis, not a source of pride.

From Competence to Influence

We look forward with a clear understanding of the challenges facing not only our company but the industry as a whole. Over the years, the market has become significantly more complex and demanding, requiring manufacturers to adopt a systematic approach rather than quick fixes. In the coming years, our strategy is built around several interconnected areas, each reinforcing the others and creating a sustainable long-term development model.

Expanding our product portfolio today means a conscious shift away from universal solutions toward highly specialized systems designed to operate in complex and often extreme operating conditions.

A key element of this strategy was the deep integration of R&D into the company's operating model.

We develop products that require in-depth engineering and a precise understanding of the application environment — whether it's a harsh climate, increased mechanical loads, complex architectural requirements, or the need to maintain a stable appearance over many years. This approach allows us to create coatings that not only meet current standards but also set new benchmarks for quality and reliability in the market.

Why Experience Is More Important Than Expansion

"On the surface, you could say we're growing, expanding, and entering new markets. But there's a different logic behind this: we're growing because we're developing competencies that are in demand by the market and industry," concluded Larisa Semenchuk.

A key element of this strategy has been the deep integration of R&D into the company's operating model. For us, the laboratory is not an isolated department or an auxiliary function, but rather part of a unified production system. We consistently implement digital methods for modeling coating properties, enabling us to predict their performance under real-world operating conditions from the early stages of development. Accelerated durability testing programs allow us to validate new solutions in a short timeframe without compromising the reliability and reproducibility of results. By complementing this with data analytics, we are creating a system in which operating experience, laboratory observations, and production parameters are combined into a single knowledge base. This enables us to more accurately predict coating performance throughout the product's lifecycle and make more informed technological decisions.

Our international presence is also developing as part of a larger plan, rather than as a collection of individual projects. Our experience in the United Arab Emirates and active development of the US market are elements of our strategy for creating an international network of competencies. Each site in this system not only serves as a production facility but also as a source of knowledge: products are tested in various climates, an understanding of local requirements is developed, and quality standards are established that can then be adapted and transferred between regions. This model allows us to maintain a consistent level of quality while scaling and serve markets of varying maturity.

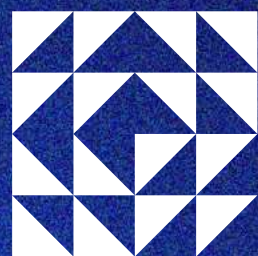
Asiacolor's development strategy is not a race for volume. It is a deep, consistent creation of technological maturity. ♦

Asiacolor occupies a special place in this architecture. We see the Kazakhstan site not simply as a production asset, but as an industrial hub for Central Asia — a center that accumulates best practices, establishes quality standards, invests in training and development, and serves as a knowledge platform for the entire indus-



try. This role is especially important in a situation where the market demands not only a product but also expertise, systems thinking, and the ability to tackle complex problems.

It is this approach — a combination of engineering depth, operational discipline, and international experience — that we see as the foundation for future growth. For us, development doesn't mean expansion for the sake of scale, but rather deepening our competencies, which enable the industry to move forward more consciously and sustainably.



Qemtex
POWDER COATINGS



qemtex.com



Asiacolor
Powder Coatings



asiacolor.kz

When the Market Becomes a School and the Team Becomes the Greatest Asset

Qemtex greenfield project and its brand are more a story of professional courage and the ability to build complex systems in highly competitive markets with their own established orders and rules of the game.



Chingiz Ibragimov
General Director
of Qemtex



Qemtex: Kazakhstan’s Industrial Breakthrough in the Global Market

For our team, this ambitious project was not just another business development milestone, but an important precedent: Qemtex is the first and only major industrial project in the UAE entirely created and implemented by Kazakh nationals. Our management team entered the region with a clear vision of creating a modern

industrial base, testing and developing our own capabilities and potential, and attracting highly qualified talent to implement future large-scale initiatives. Frankly, for me personally, this project was a huge challenge, as at the time we understood the risks and the scale of the obstacles we would face throughout the project’s

lifecycle. Looking back today, I sometimes even envy the new members of our team — they have yet to embark on this journey of development, a journey that is simultaneously challenging and incredibly interesting and unique.

Pioneers in Umm Al Quwain

Umm Al Quwain Free Trade Zone (UAQ), a jurisdiction with high growth potential and an emerging industrial ecosystem. We became one of the zone's first industrial residents, choosing a location relatively remote from the UAE's traditional urban and industrial centers. This choice was driven not by short-term convenience, but by strategic considerations and long-term investment logic.

Entering the zone at an early stage of development allowed us to secure competitive location terms, ensure control over key production parameters, and lay the foundation for future scaling. At the same time, we recognized the increased operational and infrastructure risks associated with the lack of established logistics routes, suppliers, and a service environment.

The decision required us to adopt a structured and disciplined approach to management. We essentially built the entire logistics and supply chain system from scratch, including selecting and diversifying partners, creating backup routes, and implementing operational control mechanisms. Essentially, we invested in



infrastructure and processes where existing templates and proven models were lacking.

We studied UAE construction, legal, financial, and labor legislation from scratch, immersing ourselves in regulations and procedures that were fundamentally different from those we were accustomed to in Kazakhstan. It was an intense, sometimes painful, but extremely valuable experience. It's important to note that the UAE welcomed us not as temporary players, but as partners. The administration and the free zone authorities literally lived

with us throughout the entire construction phase. This wasn't just formal support, but genuine engagement. We felt they were as passionate about the project as we were.

Thus, the chosen strategy became not only an operational decision but also an investment foundation: we created a scalable platform with a transparent risk structure, a clear management model, and the potential for sustainable growth in subsequent industrial and infrastructure projects.

Climate and Technology Exam



One of the key challenges was the local climate. In the UAE, weather is a severe technical factor, directly affecting equipment operation and the stability of production processes. Extreme temperatures required adapting technologies and revising

engineering solutions already at the plant design stage. All key elements — from ventilation and climate control systems to coating curing modes and sensitive equipment settings — were calibrated to the GCC region's conditions. This made

it possible to transform climate risks into manageable parameters and ensure consistent product quality.

This stage was a test of engineering maturity, confirming our ability to build reliable production solutions in complex and atypical conditions. I still remember the construction period vividly. It was the middle of summer. Temperatures were over 50°C. There was no air conditioning yet on the construction site. It was a desert. Everything around you was completely new: the country, the rules, the people, the approaches, the speed of decision-making. In such conditions, you simply have no right to lose focus. You need maximum concentration, complete immersion in the processes, and an understanding of the level of responsibility that rests on you and your team.

Miracle in the Desert



Many international partners, clients, and visitors to our plant call Qemtex "The Miracle in the Desert." This status

is justified by our pace: we received the design and estimate documentation (DED) in just two months, and the construction

itself was completed in a record six months. This speed was made possible by our well-established communication system and coordination with all stakeholders, as well as our rapid adaptation to local regulatory policies and UAE regulations, which differ significantly from those we are accustomed to. We demonstrated that a systematic approach allows us to reduce timelines without sacrificing quality. Thus, in just eleven months, we reached our design capacity and operational targets. The project's pace was phenomenal and was only possible thanks to the synergy between the team, regulators, and the environment.

From a New Name to Market Leadership

Entering the GCC market presented a strategic challenge. The powder coatings segment was already established by leading international players, and at the outset, Qemtex was perceived as a new entrant with limited recognition.

Our entry strategy was based on three key principles: rapid operational launch, ensuring high product quality, and confirming compliance with international standards. This enabled us to quickly transform this challenge into a competitive advantage, establishing ourselves as a significant player in the segment.

Today, Qemtex is not only present on the market but is also actively developing exports, demonstrating steady sales growth and expanding its customer base beyond the region. In less than a year, the company has received key international certifications, such as Qualicoat Class 1 and 2, Qualideco, QualiSteelCoat and ISO, which has become a good sign for our major partners and investors.



Synergy of Cultures and Management Code

Qemtex's success would not have been possible without its unique team. Today, we employ people from more than 15 countries — people with diverse mentalities, professional backgrounds, and cultural identities. Our goal wasn't simply to unite them under one roof, but to

implement our corporate culture and management approaches. We created an environment in which colleagues from different parts of the world were able to adapt to our performance standards, turning cultural diversity into a powerful intellectual asset.

Ceremony bookmarks foundation with General manager of UAQ FTZ D. Johnson

The Foundation of Our Values and Principles

At the heart of everything we do are our core corporate values, which shape the company’s strategy and determine our approach to business development. These values don’t just influence the corporate culture; they define the company’s strategic direction: sustainable growth, technological leadership, high levels of customer satisfaction, and professional development for employees. Together, they create a solid foundation for long-term investment appeal and confident scaling in regional and international markets.



Sustainable Development

For Qemtex, sustainable development is not merely a trend, but a long-term responsibility to society and future generations. We create products that protect materials, extend their service life, and minimize their environmental impact. In every project, we strive to find a balance between efficiency, quality, and environmental safety, turning environmental responsibility into a strategic advantage for the company.

Customer Focus

For Qemtex, customer focus means deeply understanding each partner’s needs and building long-term, trusting relationships. We provide a full support cycle — from consultations and implementation to service support throughout every stage of the product lifecycle. This approach increases customer satisfaction, strengthens loyalty, and creates a sustainable platform for business growth.

Innovations

Our R&D center is a source of continuous technological progress. We develop new formulas and solutions, adapting our products to the unique needs of our customers. Through continuous investment in research and development, we don’t just produce coatings — we create the technologies of tomorrow, laying the foundation for new industry standards and expanding opportunities for scaling businesses in international mar-kets.

Human Capital

Our people remain the driving force behind all our processes. We believe that investing in human capital is the most reliable and long-term investment in the future. Qemtex creates conditions for the development of professionals, engaging them in projects that shape the appearance of cities, infrastructure, and entire countries. We encourage initiative, the sharing of experience, and continuous improvement of competencies, transforming the team into a source of sustainable competitive advantage.

Pride in What Has Been Created and a Look to the Future

Today, I look back with pride on what we’ve achieved. Qemtex has become a symbol of how Kazakh expertise and determination can be transformed into a successful international industrial project. We’ve proven to ourselves and the market that we’re capable of building complex systems, managing multicultural teams, and setting quality standards in the face of fierce global competition. Our journey in the UAE is just the beginning. We’ve created a sustainable system that’s ready for further expansion. I’m confident that Qemtex has many more achievements ahead, and we’ll continue to strengthen our position as a global leader, building on our principles, our people, and our commitment to excellence in every detail.



Plans

Today, the project has reached a new stage. In 2026, we will begin the second phase of construction and expansion, which will include production, the R&D center, and warehouse infrastructure. For us, this isn’t just about increasing volumes. It’s about the next level of responsibility — maintaining our culture, control, and quality while scaling. Qemtex has become a school of maturity for us. It is a project that taught us how to work at high speed, amid high expectations, and without complacency. And it’s this experience that today gives us the confidence that we’re ready for the next steps — wherever they may be located. ♦



Team 1Thirty



Yuri Semenchuk
Technical Director,
Asiacolor

Our journey in the powder coatings industry began in 2003 — at a time when Kazakhstan hadn't yet developed a fully formed industry. There were isolated workshops, early experiments, many questions, and an almost complete lack of ready-made answers. We learned alongside the market, often ahead of it, sometimes making mistakes, going back and starting over. Back then, we weren't charting career paths — we were laying the foundations of a profession.

Over the years, my journey has evolved from a technologist immersed in the application and behavior of materials to a role where responsibility extends beyond a single section to the entire production and quality system. And the higher the level of decision-making, the clearer one simple truth becomes: a coating cannot be considered in isolation from the product and the environment in which it will operate. It is always part of a complex system where metal, geometry, application modes, climate, and human factors are

interconnected. Ignoring even one element renders even the most ideal laboratory parameters meaningless.

Working in Kazakhstan became a key engineering school for me. Our climate leaves no room for complacency. Here, it quickly becomes apparent where decisions were superficial and where they were truly thoughtful and sustainable. This experience shaped my approach to management: stability is not a fluke, but the result of discipline, consistency, and accountability for the process.

Today, I understand that long-term success is determined not by individual technological breakthroughs, but by the ability to structure processes so that they operate with equal reliability one year, five years, and ten years from now. This is precisely what I see as the essence of mature production — and the benchmark toward which we consistently lead the entire group.

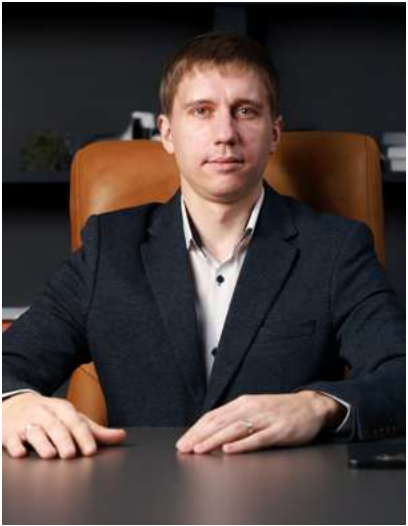
Alexander Selyutsky Head of Production, Asiacolor

I started in production as a line operator. I worked with my hands, witnessing every operation, every error, every failure. This experience cannot be replaced by any management course.

When you've been on the line yourself, you perceive decisions differently. You understand where a process truly works and where it's held together by the efforts of

specific individuals. This is precisely what helps me today build production so that it's sustainable, not heroic.

I'm convinced that good production is where problems are immediately apparent, not in reports a month later. And the sooner you spot them, the more confident the entire team will be.



Perihan Karaalioglu Head of R&D, Qemtex



Innovation in the powder coatings industry today requires more than just technical expertise — it requires vision, speed, and the ability to translate science into sustainable, long-term value. Over fourteen years of working in a highly competitive industrial environment, including Turkey, I have learned that sustainable innovation is built on discipline, adaptability, and a deep understanding of real-world applications. These principles guide our work in the UAE today.

At Qemtex, this approach is at the core of our R&D management. Working in a rapidly changing market only confirms a simple truth: there are no universal or set solutions. Products must be developed taking into account harsh climate conditions, new applications, and increasingly complex customer expectations. Therefore, R&D becomes the core of strategic decisions, not the final stage of the process.

The laboratory must function as an open and dynamic system where science, field data, and professional judgment

converge. True innovation is born when developments are initially aligned with production capabilities and long-term operational requirements, rather than being limited to short-term specifications.

As head of R&D, my focus is on building teams and systems that think one step ahead of the market. We innovate not for the sake of novelty, but to create reliable and scalable solutions that earn trust over time. At this level, powder coatings development goes beyond chemistry — it becomes responsible for the progress and future of the human-made environment.

Looking ahead, Qemtex's future lies in shaping the next generation of powder coatings, where intelligent design, technology leadership, and strong teams set new benchmarks for efficiency, reliability, and innovation in global markets.



Askar Jumabaev
Head of Business Development,
1Thirty Holding

It's been over a year since I joined our team, and it's been perhaps the most intense and productive period of my professional career. We maintain a high level of dynamism at the company, which I would call a "rhythm of conscious speed." This isn't just a desire to do everything quickly, but an ability to make informed decisions in the shortest possible time. Every step we take is preceded by in-depth analysis, allowing us to maintain a leading pace without sacrificing quality or precision.

Today, our ambitions extend beyond local markets. The system we successfully implemented first in Kazakhstan and then in the UAE has proven its effectiveness and is ready for global scaling. It is founded on three key pillars: responsibility, flexibility, and long-term sustainability. We have created a universal mechanism that seamlessly integrates into various business cultures while maintaining its inherent logic and reliability.

The modern business world dictates new rules: today, it's not the largest and most unwieldy corporations that succeed,

but the boldest, most systematic, and most adaptive. Our ability to quickly transform challenges into opportunities is what sets us apart from our competitors. We're not afraid of complexity because we believe in the power of a systems approach that transforms the chaos of the global marketplace into a clear roadmap for development.

At the same time, we understand that people are behind any system. For us, human capital is our highest value and our most important asset. We don't just hire employees; we bring together talented individuals, creating an environment where everyone's potential is unlocked through ambitious challenges. Investing in the professional growth and well-being of our team is the most reliable investment in our shared future.

I look forward with great interest, determination, and inspiration. I'm confident that our ability to combine prudence with decisiveness will help us not just integrate into the global marketplace, but become a force that shapes it.

Hend Sayed
Head of Production, Qemtex

While working as a production manager at Qemtex, I came to the conclusion that equipment standardization is only the basis for efficiency, while human capital always remains the key factor for success.

In the UAE, I work with a multinational team and focus on harmonizing processes to integrate diverse approaches and perspectives into a unified production rhythm. By implementing clear role standards and increasing accountability, we've improved

operational efficiency and ensured sustainable growth.

I believe that operational excellence is built on a precise rhythm: when it's disrupted, problems become apparent immediately; when it's synchronized, high performance is achieved.

This approach allowed Qemtex to scale up production quickly while maintaining safety, efficiency, and quality.



Varun Ambre
Head of Quality Control Department,
Qemtex

I've always believed that quality control isn't the final stage, but the core of an organization. It's where raw material quality, manufacturing precision, R&D innovation, and customer expectations come together.

Quality can't be "added" at the end of a process — it must be built and developed from the very beginning. A strong quality system discreetly prevents problems, while a weak one often reveals its shortcomings only when the cost of correction becomes too high.

In the Quality Control Department, our vision is to make quality a company-wide

philosophy, transforming control into confidence. Every test, every parameter, and every standard are part of a larger goal: trust in what we deliver.

My role goes beyond meeting requirements. It's about creating an environment where excellence becomes a natural state, where quality is born from teamwork, transparency, and consistency.

True organizational maturity lies in the ability to grow without compromising standards. This is the essence of our QC vision and the foundation of our success.



Yulia Utenova
Head of Sales, Asiacolor

I've been in sales for over seventeen years, and almost my entire professional life has been spent in the coatings industry. I remember the days when we'd start a conversation by explaining what powder coatings were. Today, the conversations are completely different — about systems, service life, standards, and risks.

Sales in our industry are always about trust. Clients rarely make decisions right away. They observe, compare, come back, and test things out. And if you let them

down once, you might not get a second chance.

I love seeing clients grow. I love seeing small companies become serious players and start asking more complex questions. It's moments like these that make you realize you're not just selling a product — you're participating in the development of a market. And that's perhaps the most valuable part of my job. ♦



H₂O as a Critical Factor in the Adhesion and Durability of Protective Coatings

The role of water balance in surface electrochemistry and the physics of polymer interfaces

Abstract

In modern protective coating technologies, water is traditionally viewed as an auxiliary process agent, acting as a solvent, rinsing medium, or coolant. However, data from experimental corrosion science, surface electrochemistry, and the physical chemistry of polymers indicate that water

is an active chemical component directly determining the adhesive strength of a coating, resistance to subfilm corrosion, and the durability of protective systems as a whole. This article provides a review of current scientific understanding of the role

of water in metal pretreatment processes, analyzes the mechanisms of osmotic blistering, filiform and pitting corrosion, and substantiates the need for precise control of the ionic composition of process water as a key parameter for coating stability under long-term operating conditions.

1. Introduction: Rethinking the Role of Water in Coatings Technology

In the history of paint and powder coatings, the aqueous surface preparation stage was long perceived as technically neutral and secondary to the chemistry of conversion layers or the formulation of polymer systems. This approach was justified given the relatively short product life cycles and limited durability requirements. Modern operational realities have fundamentally changed this paradigm. Architectural façade systems,

transportation infrastructure, energy, and industrial equipment are designed for decades of operation in aggressive climatic and industrial environments. Under these conditions, even minor defects introduced early in the process chain become cumulative and lead to premature failure of protective systems. A combination of laboratory and field studies shows that the vast majority of adhesive failures and cases of underfilm

corrosion occurs not during the coating application or curing stage, but rather during the aqueous surface preparation process. Thus, water is no longer a passive participant in the process and should be considered a fully-fledged chemical factor influencing the thermodynamics and kinetics of interfacial interactions.

2. Physicochemical Nature of Process Water

2.1. Water as a Multicomponent Electrolyte System

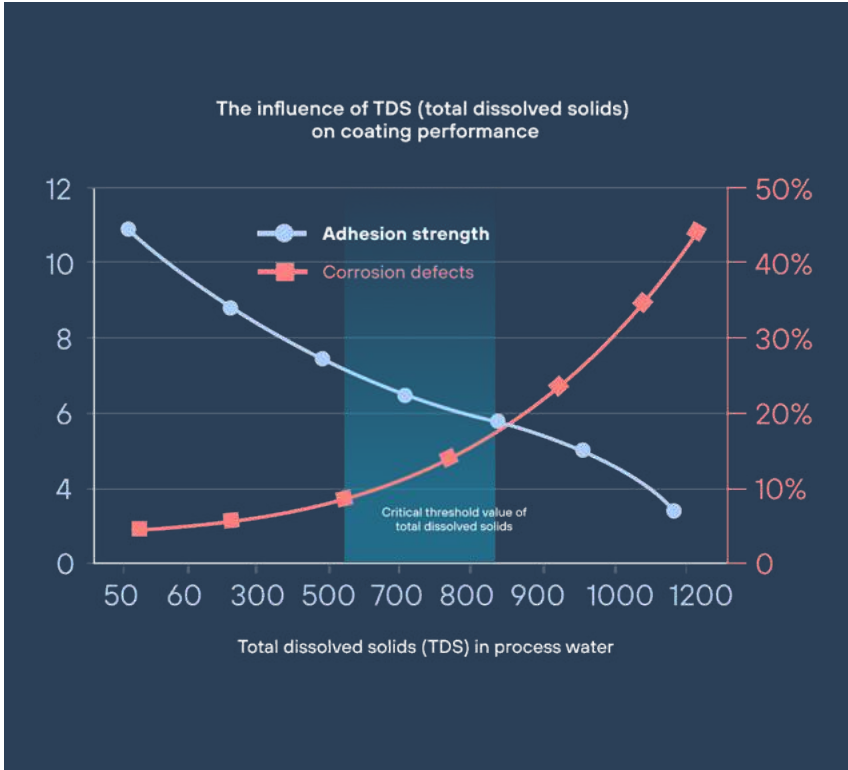
From a physical chemistry perspective, any natural or industrial water is a complex multicomponent system comprising dissolved inorganic salts, organic compounds, gases, and biological components. Even water that meets drinking water quality standards contains ions capable of actively participating in electrochemical processes on the metal surface. Calcium and magnesium cations, typical for hard water, can form poorly soluble compounds and affect the morphology of conversion layers. Chloride and sulfate anions, being highly mobile, significantly increase the corrosive activity of the environment. Dissolved oxygen and carbon dioxide participate in the formation of localized galvanic couples, and organic impurities can be adsorbed on the metal surface, altering its surface energy.

2.2. Total Dissolved Minerals as an Integral Risk Indicator

Total Dissolved Minerals (TDS) is widely used as an integral characteristic of water quality. In the context of coating technologies, it is particularly important because it is directly related to the likelihood of salt deposits on the metal surface.

When water evaporates during the drying process, dissolved substances are not removed, but rather concentrate and crystallize on the surface or in the micropores of the conversion layer. These salt residues, often invisible to visual inspection, form a latent defect that only

becomes apparent during the product's operational phase. Experimental data show that when a certain TDS threshold is exceeded, the likelihood of osmotic and corrosion defects increases nonlinearly, indicating the critical nature of this parameter.



3. Polymer Coating as a Functional Membrane

3.1. Diffusion Properties of Polymer Films

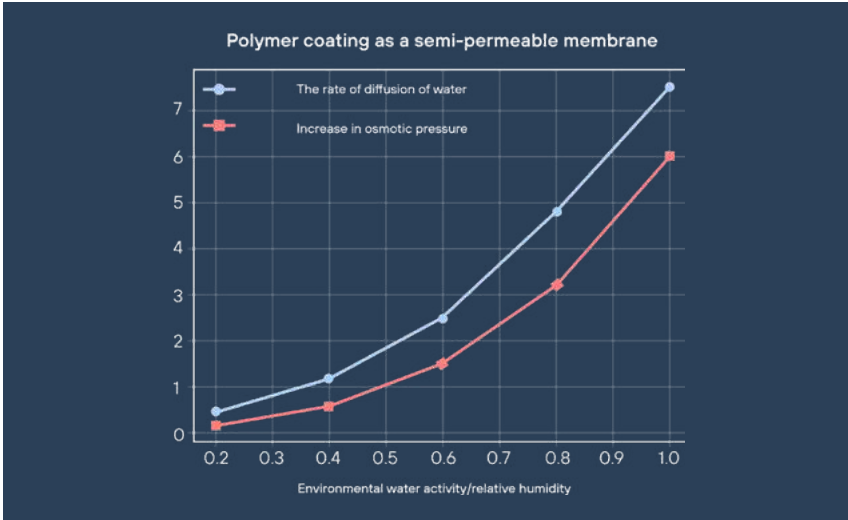
Modern protective coatings are cross-linked polymer systems with a developed microstructure. Despite their high density and mechanical strength, such coatings are not completely hermetic. From

a membrane physics perspective, they are classified as semipermeable media, capable of transmitting water molecules, oxygen, and low-molecular-weight ions. The diffusion rate is determined by a number of factors, including the chemical nature of the polymer, the degree of

cross-linking, the presence of microdefects, and operating conditions. Even in the absence of visible damage, the coating gradually interacts with the environment, making the condition of the metal-coating interface critically important.

3.2. Osmotic Pressure as a Mechanism of Adhesion Failure

If soluble salts are present under the coating, an osmotic system is formed in which the polymer film acts as a membrane. The concentration difference between the subfilm zone and the external environment leads to a directed transport of water into the system. The resulting osmotic pressure can reach significant values, sufficient to rupture adhesive bonds at the molecular level. This results in the formation of blisters, microcracks, and localized delamination zones, which become foci for further corrosion degradation.



4. Underfilm Corrosion: Nature and Manifestations

4.1. Pitting Corrosion and the Role of Ionic Contamination

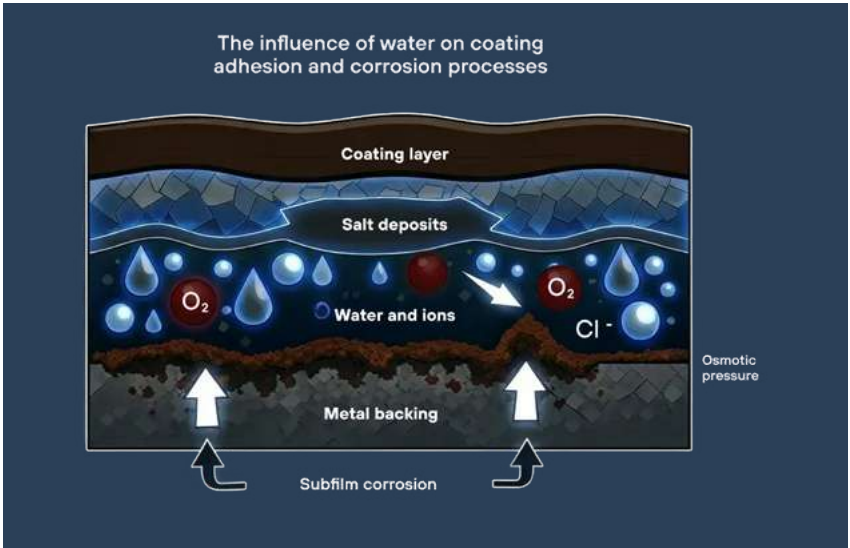
Pitting corrosion is one of the most dangerous forms of metal degradation under protective coatings, as it develops locally and often goes unnoticed until a critical stage. Chloride anions play a key role in this process, destroying passive oxide films and initiating localized anodic sites. Even low chloride concentrations present in residual moisture can significantly reduce the corrosion resistance of the system, especially under conditions of high humidity and temperature.

4.2. Filiform Corrosion as an Indicator of Water Defects

Filiform corrosion is typical for aluminum and galvanized substrates and is closely related to the presence of residual moisture and soluble salts on the surface. Its development almost always indicates a

problem with the water treatment system, since, even with an identical coating formulation, it is the water quality that

determines the rate and intensity of this process.



5. The Effect of Water on Conversion Layer Formation

Modern conversion technologies, including chromate-free systems, are highly sensitive to the ionic composition of water. The presence of calcium, magnesium, and organic impurities can disrupt the uniformity of conversion layer deposition,

reduce its density, and impair adhesion properties. Furthermore, instability in the water balance leads to variability in surface parameters, making accelerated corrosion test results difficult to reproduce.



6. Precision Water Treatment as an Element of Engineering Culture

A modern scientific and engineering approach views water treatment not as an auxiliary operation, but as an independent technological process requiring precise control. Multi-stage purification systems, including reverse osmosis and

deionization, significantly reduce the concentration of dissolved ions and organic impurities. Control of electrical conductivity, residual chlorides, total organic carbon, and microbiological background ensures stable

interfacial properties and reproducible test results, which is especially important for mass industrial production.



7. Coating Durability and Economic Outlook

From a product lifecycle perspective, the costs of advanced water treatment are incomparably lower than those associated with repairs, complaints, and premature

replacement of structures. Corrosion defects that arise after several years of operation almost always originate in the early stages of production, when their

prevention was technically and economically most effective

8. Conclusion

An analysis of modern scientific data allows us to draw a clear conclusion: water in protective coating technologies is an active chemical and electrochemical factor that determines the fate of the entire "metal-conversion layer-polymer coating" system. Considering water solely as a rinsing medium is methodologically outdated and does not meet the durability and reliability requirements of modern protective solutions. Dissolved salts, organic impurities, and ionic imbalances create hidden defects on the metal surface that are not apparent

during production but become catalysts for osmotic processes, subfilm corrosion, and adhesive failure during operation. Polymer coatings, possessing the properties of semipermeable membranes, inevitably interact with moisture, making the quality of the subfilm environment critically important. Precision control of the water balance should be considered an integral part of the engineering culture of protective coating production. It not only enhances corrosion resistance and adhesion, but also ensures process reproducibility,

predictability of test results, and long-term quality stability. In the face of increasingly complex climates, increasing demands on structural durability, and increasingly stringent regulations, water chemistry management is becoming a key tool for ensuring the longevity of protective coatings. Thus, water treatment is moving from the category of auxiliary operations to a strategic factor determining the reliability of 21st-century engineering systems. ♦



Molecular Engineering of Low-Bake Powder Coatings

Curing Below 140°C as a Strategic Shift in the Protective Systems Industry

In the history of powder coatings, there have been technological milestones that have changed not only the formulation of the material but also the very logic of its application. The transition from solution-based to powder-based systems was a turning point, defining the environmental and economic direction of the industry for decades to come. Today, the industry is facing a similarly large-scale shift associated with the advent of powder coatings capable of fully curing at temperatures below 140°C. This is not a matter of localized improvements in energy efficiency, but a fundamental redefinition of the applicability of powder coating technology in modern industrial conditions.

The importance of low-temperature powder coatings is determined by several macro-trends simultaneously exerting pressure on manufacturers and end consumers. Rising energy costs, stricter environmental regulations, the development of multi-material structures, and the increasing complexity of production chains are making the traditional 180–200°C temperature profile increasingly unsuitable. More and more products include temperature-sensitive components, whether polymer seals, electronics, composite components, or pre-lubricated assemblies. Under these conditions, high curing temperatures cease to be simply a process parameter

and become a limiting factor for design and engineering solutions.

This is why powder coatings with curing temperatures below 140°C are now viewed not as a niche solution, but as a key to expanding the very philosophy of powder coating. They open the possibility of integrating coatings into earlier assembly stages, reduce the energy and carbon footprint of production, and make powder coating technology compatible with products that were previously automatically excluded from this segment. In this context, low-bake systems become the link between polymer chemistry, production energy, and industrial design. In

recent years, research and development at 1Thirty Holding's R&D centers have focused on precisely this area—the creation of powder coatings capable of forming a fully functional protective and decorative film at temperatures previously considered unattainable for thermoset systems. The key principle here is the absence of compromise: lower temperatures should not be accompanied by a loss of adhesion, mechanical strength, chemical resistance, or durability under real-world operating conditions.

From a fundamental chemistry perspective, the main challenge of low-bake coatings lies in controlling the polymerization kinetics. Classic powder systems were designed based on the need to overcome the energy barrier associated with the limited mobility of macromolecules in the solid phase. Until temperatures reach approximately 170–180°C, polymer chains remain in a state where the probability of effective interaction between functional groups is low. Attempts to simply "lower the temperature" without changing the molecular architecture lead to incomplete crosslinking and degradation of properties, which has led to skepticism about low-temperature solutions for many years.

Modern low-bake systems operating below 140°C are based on a fundamentally different logic. They are designed from the ground up to provide increased reactivity of the polymer matrix. This is achieved through precise tuning of the resin molecular weight, the distribution of functional groups, and the glass transition temperature, which is shifted to a range that ensures sufficient segmental mobility already at 120–130°C. As a result, the melting process and the onset of the chemical reaction virtually coincide in time, radically shortening the induction phase of polymerization.

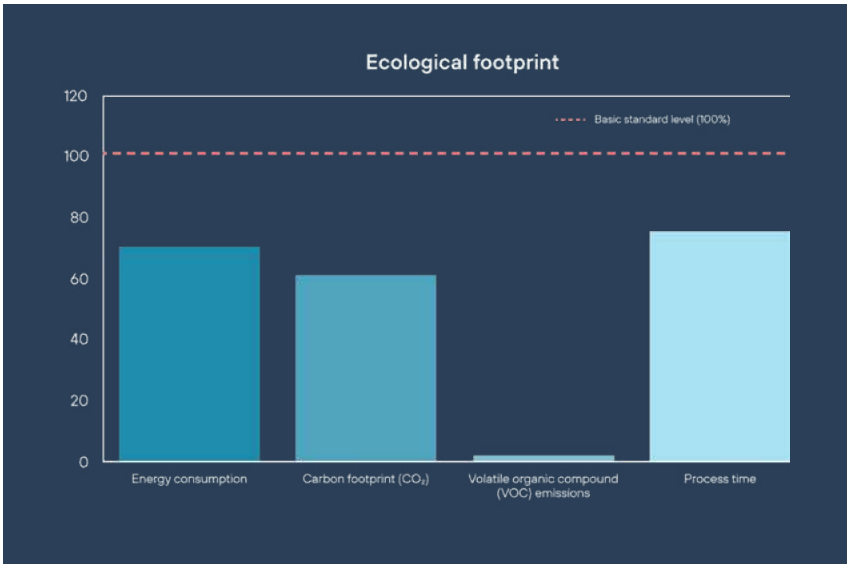
Hardeners and catalytic components are particularly important in such systems.

Their purpose is not simply to accelerate the reaction, but to create a controlled reaction window in which crosslinking occurs intensively without the risk of localized overheating or uneven structure. From a physical chemistry perspective, this allows for a scenario in which the final crosslink density is comparable to traditional coatings, despite the significantly lower process temperature. Thus, temperature ceases to be a determining factor in quality, giving way to precision molecular engineering.

The industrial effect of such coatings becomes particularly evident when analyzing the thermal balance of paint lines. In real-world conditions, the majority of energy is spent not on polymerizing the coating itself, but on heating the massive metal parts and maintaining the oven temperature. Reducing the polymerization temperature by 50–60°C leads to a disproportionately greater reduction in energy consumption due to the reduced thermal inertia of the system. In addition to direct savings, this reduces line ramp-up time and increases its flexibility when changing product mixes.

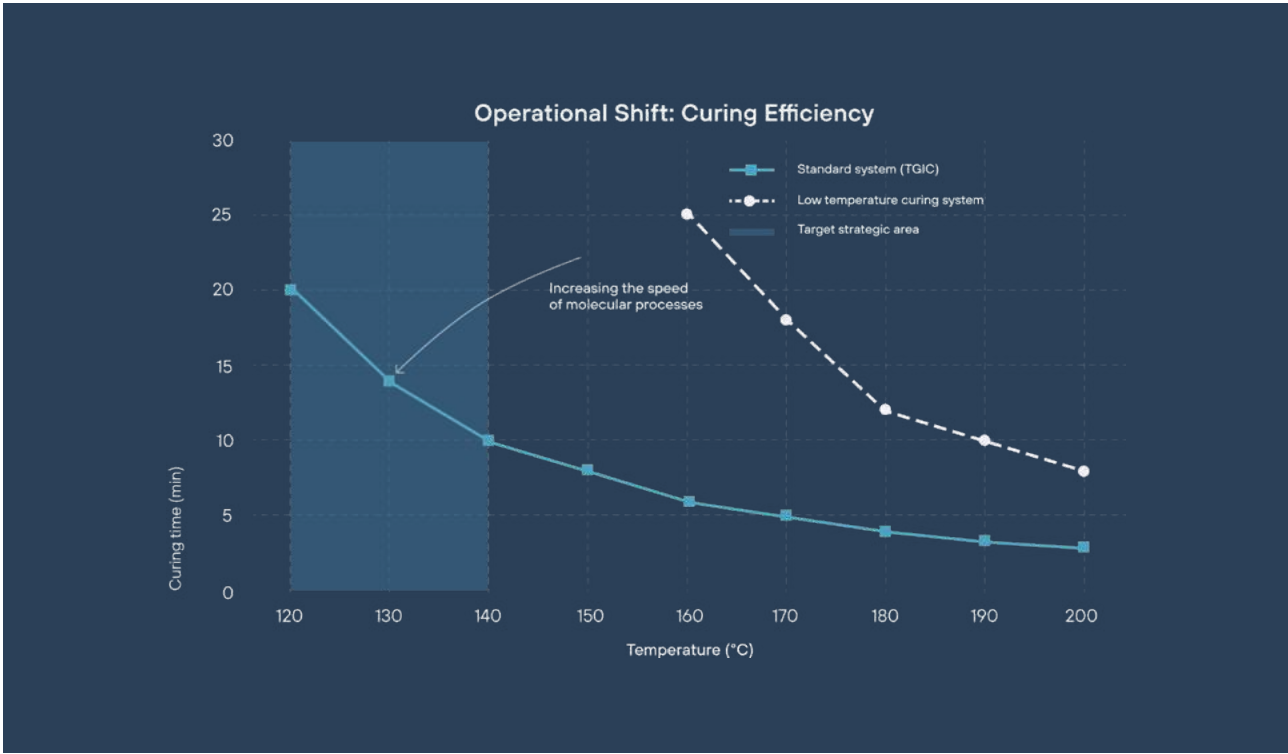
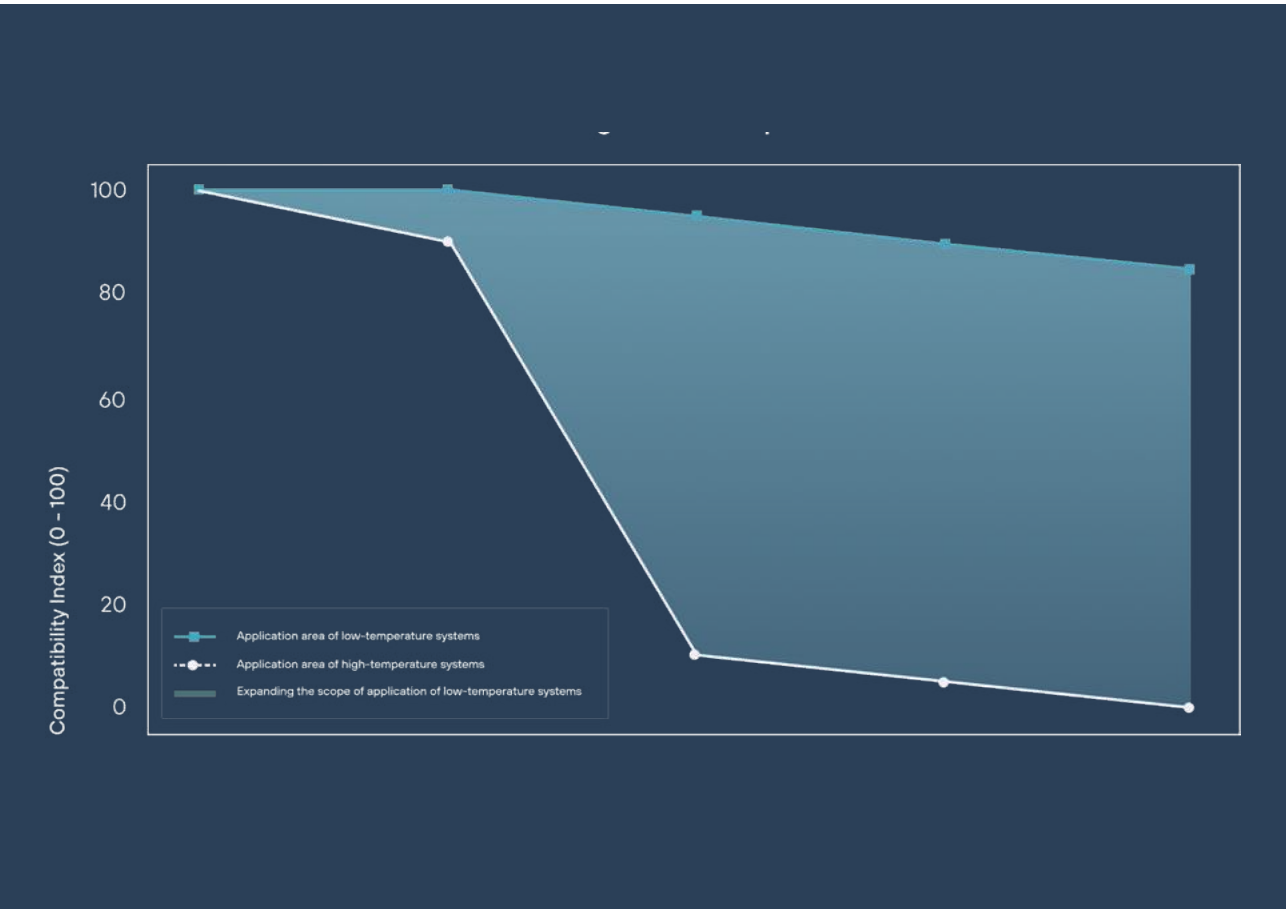
Low-temperature powder coatings below 140°C also significantly change the approach to product design. The ability to coat assemblies without dismantling heat-sensitive components opens up new architectural and engineering solutions. This is especially relevant for the electrical industry, transport engineering, and architectural systems, where the requirements for integrating various materials are constantly increasing. In these segments, low-bake coatings are becoming not just an alternative, but a determining factor in product competitiveness.

From an aesthetic perspective, a gentler temperature profile has a positive effect on



coating surface formation. Reduced thermal stress reduces the risk of microdefects associated with uneven melting and rapid cooling. The surface develops more uniformly, which is especially important when using transparent or translucent topcoats. Combined with modern powder coating chemistry, this allows for visual characteristics previously associated primarily with high-quality liquid systems.

It is important to emphasize that the durability of such coatings is determined not by the curing temperature, but by the quality of the formed polymer network. Modern testing shows that properly designed low-bake systems exhibit high resistance to corrosion, UV radiation, and chemical attack, confirming the fundamental principle: the decisive factor is the effectiveness of molecular interactions, not the absolute temperature.



In a broader market context, the emergence of powder coatings with curing temperatures below 140°C marks the beginning of a structural shift in the industry.

As the share of renewable energy grows and carbon regulations become more stringent, manufacturers will increasingly evaluate coatings not only by technical performance but also by their energy and climate profile. Low-bake systems offer a clear advantage in this regard, allowing for a reduction in carbon footprint without abandoning powder coating technology.

Over the next 5-10 years, we can expect a shift in industry standards, with the temperature range of 180–200°C no longer dominant. It will remain in place for certain segments, but will no longer define the market “norm.” Instead, a multi-layer coatings ecosystem will emerge, where the temperature profile will become a design parameter equal to color, texture, or gloss level. Equipment, chemical, and end-use manufacturers will increasingly integrate their developments, focusing on the compatibility of materials and processes.

In the longer term, low-bake powder coatings could become a catalyst for the transition to hybrid production lines combining powder coating with sensitive electronics, composites, and functional surfaces. This will lead to the expansion of powder coating technology into segments where it was previously virtually unused, and will establish a new standard for industrial coating based on precision molecular engineering, energy efficiency, and environmental responsibility.

Thus, polymerization below 140°C ceases to be simply a technical achievement and becomes a marker for the next stage in the evolution of powder coatings. This stage is determined not only by the chemistry of the materials, but also by a shift in the very logic of industrial production, where temperature is transformed from a limiting factor into a manageable tool for the industry’s strategic development. ♦

Thermal Optimization of Powder Coatings

Gas Catalytic Infrared Heating and the New Physics of Polymerization

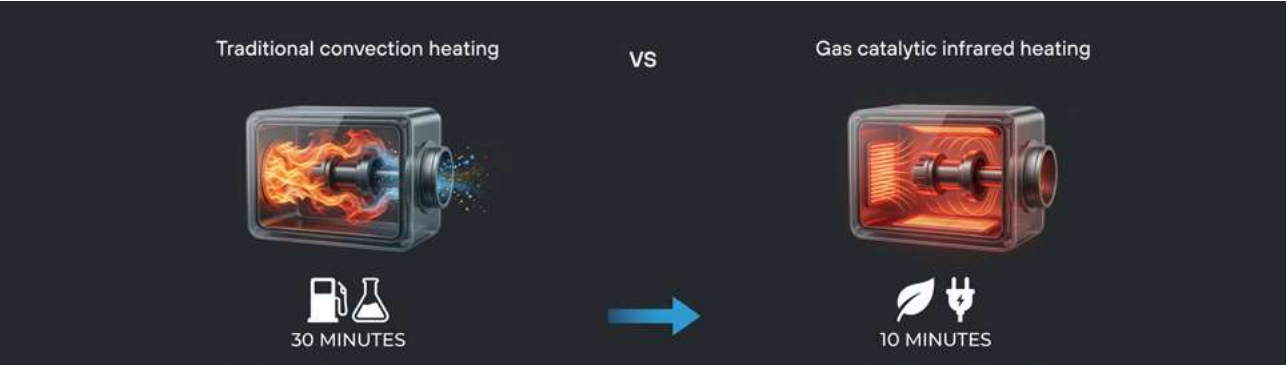
For most of the history of powder coatings, the thermal curing stage was perceived as an immutable given, determined by the design of the convection oven and the heat transfer capabilities of the heated air. This paradigm was logical in an era of relative energy stability and moderate demands for environmental efficiency. However, in recent years, the thermal sub-system of coating lines has come under

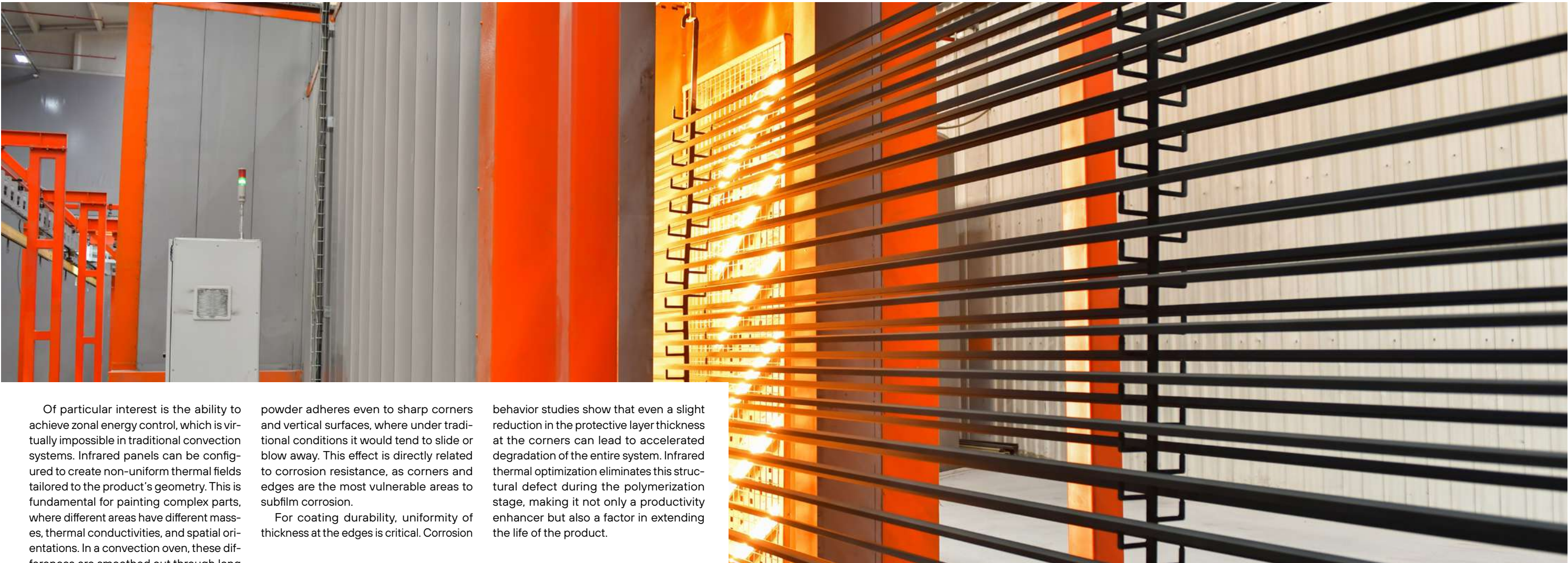
pressure from several factors: sharply rising energy costs, stricter CO₂ and nitrogen oxide emission standards, and increasingly complex requirements for the visual and functional quality of coatings. Under these conditions, it has become clear that further evolution of powder coating technology is impossible without reconsidering the physics of heating and polymerization itself. As part of this shift,

gas-catalytic infrared heating is attracting increasing attention. This technology not only improves energy efficiency but also changes the fundamental mechanism of energy transfer during polymer film formation. Unlike convection systems, where heat is a byproduct of air heating, infrared radiation provides direct energy transfer to the metal surface and the organic matrix of the powder coating.

This fundamental shift in energy delivery underlies the observed acceleration of polymerization and improved finish quality. Physically, infrared heating is a form of radiant heat transfer, in which the energy of long-wavelength electromagnetic waves is absorbed by the molecular bonds of organic materials. Spectroscopy studies show that functional groups characteristic of polyester, epoxy, and acrylic powders exhibit pronounced absorption bands in the infrared region of the spectrum. This means that the energy of the infrared radiation is converted into thermal motion directly within the polymer matrix, bypassing the heating of the surrounding gaseous medium. As a result, heating becomes not only faster, but also more targeted. The contrast with convection ovens is crucial here. In a traditional system, air is heated, which then transfers heat to the part's surface through convection and conduction. This process inevitably results in significant heat loss, high inertia, and an uneven temperature profile, especially when coating complex geometries. Metal with high heat capacity and thermal conductivity requires a long time to reach the set temperature, and coating temperature control is achieved indirectly through air temperature control, which reduces the precision of process control. Infrared heating eliminates this intermediate step. Energy is delivered directly to the zone where it is needed to activate the chemical polymerization reactions. This mechanism underlies the empirically proven "3:1 rule," widely discussed in the engineering community: processes that require approximately 30 minutes in a convection oven are completed in 10 minutes under the influence of IR radiation. It's important to emphasize that this isn't about forced overheating, but rather about more efficient energy use, where

the reaction rate is determined not by air temperature, but by the energy density absorbed in the polymer system. From a chemical kinetics perspective, the acceleration of the process is due to the fact that infrared radiation increases the local mobility of polymer chains and functional groups precisely at the moment and location of the reaction initiation. This reduces the induction phase of polymerization and ensures more synchronous melting and crosslinking processes. As a result, the formation of a three-dimensional polymer network occurs faster and more uniformly, which positively impacts the mechanical and barrier properties of the coating. Equally significant is the impact of infrared heating on the cleanliness and visual quality of the finish. In convection ovens, maintaining the correct temperature requires intensive air circulation, which creates turbulent air flows. These flows inevitably stir up dust particles, fibers, and microcontaminants, which settle on the uncured coating surface. For standard industrial applications, this effect may be acceptable; however, in the high-gloss and clear coatings segment, it becomes a critical factor in defects. Infrared ovens, on the other hand, operate with minimal or no air circulation. Radiant energy does not require a transport medium, meaning there are no turbulent flows that could transport contaminants. This creates conditions close to a laminar or quasi-static air environment, which is essential for the formation of Class A coatings with a high DOI and a mirror-like surface. Experience confirms that, with identical formulations and surface preparation, IR polymerization exhibits a significantly lower incidence of inclusions and optical defects.





Of particular interest is the ability to achieve zonal energy control, which is virtually impossible in traditional convection systems. Infrared panels can be configured to create non-uniform thermal fields tailored to the product's geometry. This is fundamental for painting complex parts, where different areas have different masses, thermal conductivities, and spatial orientations. In a convection oven, these differences are smoothed out through long heating times, but this inevitably leads to energy overuse and overheating of less massive areas.

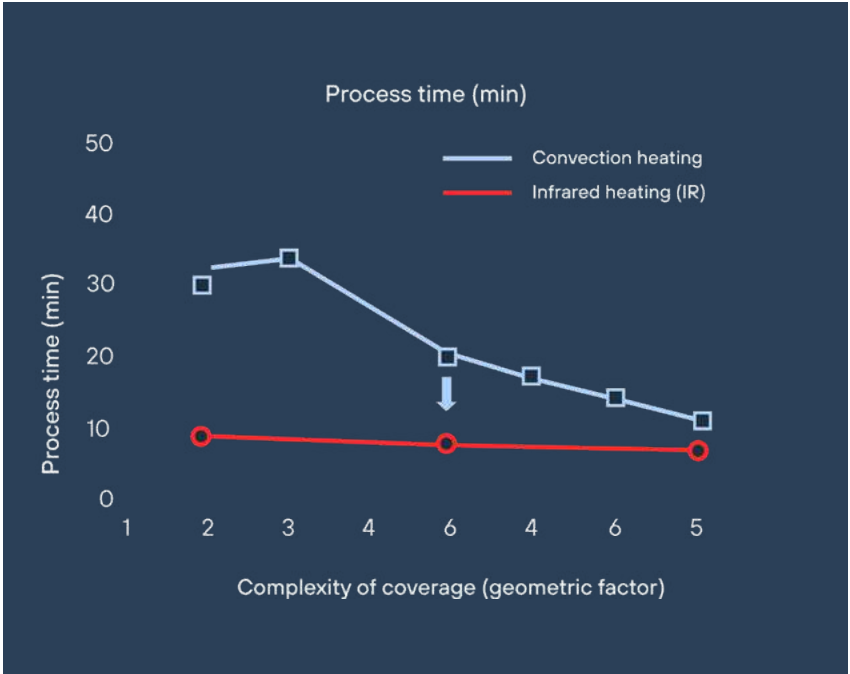
An infrared system offers a fundamentally different approach. Radiation density can be increased in areas of sharp edges, stiffeners, and hard-to-reach areas where coating thickness is traditionally insufficient. This compensates for the Faraday effect and ensures uniform powder melting across the entire surface of the part. A key role here is played by the IR preheating stage, often referred to as gelation, which occurs at the entrance to the main furnace.

During gelation, the powder almost instantly transitions from a solid to a viscous-plastic state, forming a continuous film and becoming securely fixed to the surface. This occurs even before air movement or mechanical vibrations can affect the material's distribution. As a result, the

powder adheres even to sharp corners and vertical surfaces, where under traditional conditions it would tend to slide or blow away. This effect is directly related to corrosion resistance, as corners and edges are the most vulnerable areas to subfilm corrosion.

For coating durability, uniformity of thickness at the edges is critical. Corrosion

behavior studies show that even a slight reduction in the protective layer thickness at the corners can lead to accelerated degradation of the entire system. Infrared thermal optimization eliminates this structural defect during the polymerization stage, making it not only a productivity enhancer but also a factor in extending the life of the product.



The environmental aspect of gas catalytic IR heating also deserves special attention. Catalytic panels ensure virtually complete gas combustion at a low flame temperature, significantly reducing nitrogen oxide and carbon monoxide emissions. Combined with reduced polymerization time, this leads to lower specific CO₂ emissions per unit of output. In an environment of increasingly stringent environmental regulations and the growing importance of ESG indicators, this factor is becoming an important argument in favor of switching to infrared technologies. 1Thirty Holding's R&D practice views infrared heating not as a replacement for pure convection, but as an element of a hybrid thermal architecture.

The combination of IR preheating zones with optimized convection mod-

ules allows for a balance between process speed, uniformity, and controllability. This approach is particularly effective when working with modern low-bake and low-cure powder coating systems, where temperature profile accuracy is critical.

It's important to note that implementing infrared technology requires a rethinking of the entire paint line design logic. Not only the heat source changes, but also the process control strategy, temperature control methods, and quality approaches. However, this is precisely its key advantage: it allows for a shift beyond the inertial convection paradigm and toward a more precise, adaptive, and energy-efficient polymerization model.

In a broader context, gas catalytic infrared heating can be seen as part of the coatings industry's overall transition to physically based, targeted methods of material manipulation. Instead of heating the

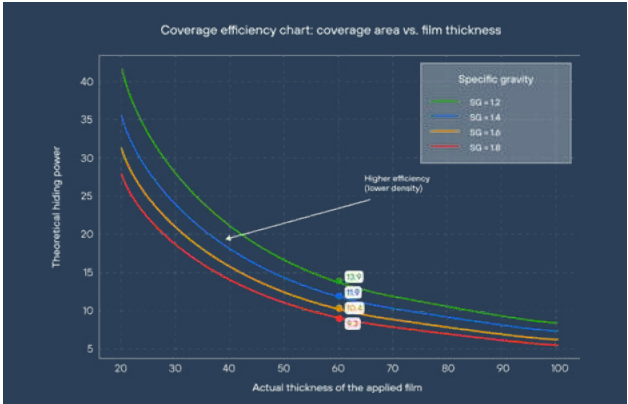
entire medium, the industry is moving toward energy management at the surface and molecular bond level. This approach not only improves efficiency but also opens up opportunities for further integration of powder coatings with low-temperature systems, sensitive substrates, and complex multi-material structures.

Thus, thermal optimization using gas catalytic infrared heating is no longer a proprietary engineering solution but is becoming an essential element of the new physics of polymerization. It changes the understanding of process speed, quality, and sustainability, forming the foundation for the next stage of powder coating evolution, in which energy, chemistry, and product geometry are combined into a single, controllable system. ♦

THE HIDDEN MATHEMATICS OF POWDER COATINGS

Specific Gravity, Applied Cost, and the Economics of a Square Meter

A common illusion persists among professional powder coating manufacturers and consumers that the price per kilogram is the primary economic benchmark when choosing a material. This logic seems intuitive and easily comparable, yet it remains one



of the most common and costly mistakes in the industry. Powder coatings are not sold by the kilogram at the point of use; they are applied to the surface of a product, measured in square meters, and it is within this framework that the actual cost, quality, and profitability of the finished product are determined. The modern analytical approach in the coatings industry increasingly utilizes the concept of Applied Cost—the actual cost per coated square meter for a given thickness and performance requirements. In this model, the price per kilogram of raw materials becomes just one variable, and far from the most decisive. Central to calculations is the specific gravity (SG) of a powder, a parameter that has long been overshadowed by more obvious characteristics such as color, gloss, or chemical resistance.

In the analytical models used at 1Thirty Holding, specific gravity is considered a key variable directly affecting powder efficiency. This approach allows us to shift the discussion from the level of intuitive comparisons to the level of precise calculations, where every gram of material has a measurable return. In this coordinate system, powder ceases to be an abstract product in a bag and becomes a tool for managing the cost of the finished product.

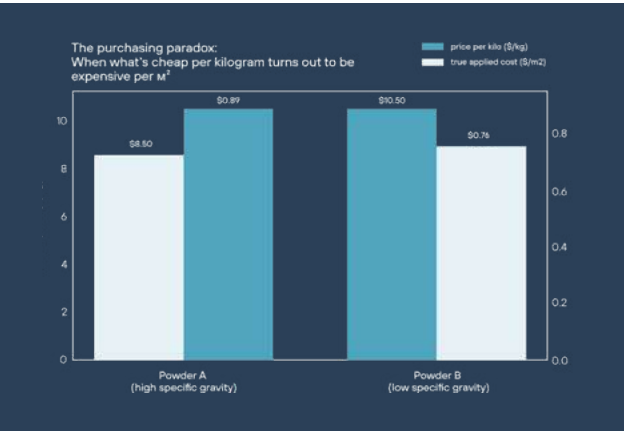
Scientifically, SG is the ratio of a material’s density to the density of water and reflects the mass per unit volume of powder. For powder coatings, this parameter is determined by a combination of factors: the chemical nature of the polymer matrix, the type and amount of fillers, pigments, and functional additives, as well as the microstructure of the particles. SG determines the volume of material contained in one kilogram of powder and, consequently, the area that can be coated with a given layer thickness.

In practical applications, this parameter is far more significant than is commonly believed. For the same coating thickness, say, 25 micrometers, a powder with a specific gravity of 1.2 occupies significantly more volume than a material with an SG of 1.75. This means that the same kilogram of “lightweight” powder can produce a 30-35% greater coverage area than a denser equivalent. This difference, which may seem abstract in laboratory calculations, translates into tens of tons of material and millions of dollars in the company’s annual budget in mass production.

Paradoxically, it is precisely this fundamental physical difference that is often ignored in procurement practices. Powder with a higher SG often appears more attractive due to its lower price per kilogram, creating the illusion of savings. However, when converted to actual coverage area, these savings disappear, and in some cases, turn into direct losses. The applied cost in this scenario is higher, despite the “cheap” raw materials, since more material mass is required to achieve the required thickness and protective properties.

From a scientific and technological perspective, reducing the specific gravity of a powder coating is a much more complex task than it might initially appear. It’s not a matter of simply reducing the amount of filler or “diluting” the formulation. On the contrary, reducing the specific gravity while maintaining hiding power, mechanical strength, and protective properties requires the use of high-tech polymers, optimized pigments, and carefully selected functional additives. Each change in composition affects not only the density but also the melt rheology, the electrostatic properties of the powder, and the nature of film formation. Particle microstructure plays a key role in this process. Modern research shows that particle size distribution and shape directly affect the powder packing density both in the bag and on the part surface. “Airier” structures with optimized morphology allow for a reduction in effective density without sacrificing hiding power, further enhancing the cost-effectiveness of the coating. These effects cannot be achieved without a thorough understanding of the physics of powder systems and a close connection between laboratory research and industrial practice. It’s important to note that the concept of low specific gravity is not universal and requires contextual application.

There are product categories where high specific gravity is not a disadvantage, but a functional necessity. A prime example is zinc-rich primers designed for active sacrificial protection of steel. In such systems, the high density is due to the metallic zinc content, which performs an electrochemical protective function. In this case, attempting to reduce the specific gravity would lead



to a direct loss of protective properties, meaning any savings in material weight would be illusory and potentially dangerous. That’s why a correct Applied Cost calculation must always take into account the coating’s intended purpose, the required layer thickness, and the expected operating conditions. While there are no universal figures, there is a universal approach: assessing cost not by weight, but by the material’s performance on the surface. This approach avoids the confusion that occurs when raw material savings are achieved at the expense of reduced product life or increased complaints.

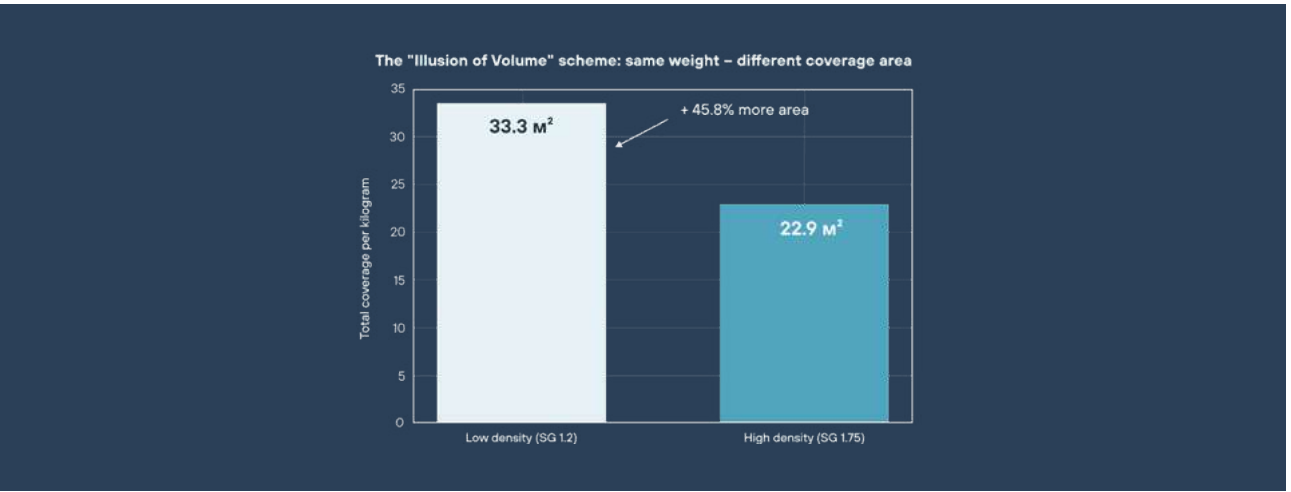
In high-volume production, the effect of optimizing specific gravity becomes strategically important. A 10-15% material savings on a single product may seem insignificant, but with an annual production volume of hundreds of thousands or millions of square meters, it translates into significant reductions in purchasing, logistics costs, and inventory. Furthermore, reducing overall powder consumption reduces the load on recovery and filtration systems, further enhancing production efficiency and environmental friendliness.

From a sustainability perspective, the specific weight of powder coatings is becoming a hidden but important ESG parameter. Less material used means a smaller carbon footprint associated with production, transportation, and disposal. In a context where regulators and large customers increasingly demand transparency and verifiability of environmental performance, ESG optimization is evolving from a purely economic tool into an element of a company’s strategic positioning.

The educational aspect deserves special attention. The transition from a “price per kilogram” mindset to an “Applied Cost” mindset requires a change in thinking not only among engineers, but also among purchasers, CFOs, and production managers. Experience shows that after implementing correct calculation models and training personnel, powder coating selection decisions become more informed and predictable. This reduces internal conflicts between departments and enables the development of long-term partnerships with suppliers based on transparent economics rather than short-term price fluctuations. Within the broader industry context, the growing attention to specific gravity and Applied Cost reflects the maturation of the powder coatings market. As fundamental technological issues are resolved, the focus is shifting to optimization, detail, and hidden efficiency reserves. This is where new competitive advantages are formed that cannot be replicated simply by lowering prices or expanding product ranges.

In the coming years, specific gravity can be expected to become one of the standard parameters by which powder coatings will be classified and compared, along with gloss, corrosion resistance, and weather resistance. This will lead to the emergence of more transparent and comparable performance metrics, as well as the development of software and digital tools for calculating Applied Cost in real time.

Thus, the hidden mathematics of powder coatings is no longer a highly specialized topic and is entering the realm of strategic production management. Specific gravity, a seemingly simple physical parameter, becomes key to understanding the true economics of coatings, where each kilogram of material is assessed not by price, but by the area, protection, and value it provides. This approach transforms powder coating from a cost item into a tool for increasing profits and business sustainability. ♦





INDUSTRY 5.0

Digital Powder, Artificial Intelligence, and the Digital Twin of the Paint Line

The transition to Industry 5.0 in the protective coatings sector doesn't begin with robotics or automation in their classic sense. It begins with the rejection of assumptions. For decades, paint line management was based on empirical rules, operator experience, and average parameters considered acceptable for most products.

This model worked under conditions of relative stability, but it scales poorly, is difficult to reproduce, and leaves virtually no room for system optimization. In an environment where demands for quality, traceability, and efficiency are simultaneously increasing, intuitive control is no longer competitive.

It is precisely this gap between the complexity of the real process and a simplified control model that gives rise to the concept of Digital Powder — a digital approach to powder coatings, in which every stage of the painting process is viewed as

a measurable, modelable, and manageable process. This approach is based on the idea of a digital twin, a virtual replica of a physical paint line that exists in parallel with the actual production process and is continuously updated with data streams.

The digital model does not describe an "average" part or a "typical" process; it reflects a specific product passing through the line at a given moment, taking into account its geometry, position, environmental conditions, and the history of previous operations.

The digital control process begins long before the powder is applied. Upon entering the paint booth, the product undergoes high-speed scanning using laser and ultrasonic sensors. These systems determine the part's dimensions, shape, orientation, and position on the suspension within a fraction of a second. The resulting data is immediately converted into a 3D virtual model, synchronized with the physical object. Thus, even before the first spray pulse, the system "knows" what exactly what it will be coating.

1Thirty Holding's R&D strategy views the digital twin not as an abstract IT tool, but as a new engineering reality in which physics, chemistry, and mathematics are integrated into a single decision-making system.

This virtual model becomes the basis for zonal control of the spraying process. Unlike traditional lines, where guns operate according to a fixed timing or trajectory, the digital system activates spraying only when the metal surface is within the effective spray zone. This eliminates spraying into the voids between hangers, onto transport system elements, or into areas where there is no product. This approach not only reduces powder loss but also fundamentally changes the approach to equipment lifespan.

Practical data shows that eliminating "idle" spraying allows for a reduction in material consumption of 10-15% without any compromise in coating thickness or uniformity. At the same time, wear on pumps, hoses, filters, and electrostatic components is reduced, as they operate only when truly needed. Thus, the digital

twin manages not only the quality of the coating but also the lifespan of the equipment, something rarely considered in traditional efficiency models. However, the key value of artificial intelligence lies not so much in controlling the guns' activation and deactivation, as in its ability to analyze and adjust process parameters in real time. Powder coating is a complex electrophysical system in which the efficiency of material transfer directly depends on air temperature and humidity, the condition of the part's surface, electrostatic parameters, and the dynamics of the powder cloud. Even minor fluctuations in these factors can lead to changes in the coating structure and the appearance of defects.



The transition to Industry 5.0 in powder coatings is not a technological fad or a demonstration of digital capabilities. It is a logical stage in the industry's evolution, in which artificial intelligence and digital twins are becoming tools for improving precision, sustainability, and trust

AI systems within Digital Powder continuously analyze the workshop's microclimate, monitoring temperature, relative humidity, and their dynamics. These parameters directly affect the electrostatic properties of the powder cloud, the particle charge rate, and the nature of their deposition on the surface. Based on this data, algorithms automatically adjust the voltage and current at each spray gun, adapting the process to current conditions rather than average settings.

Of particular importance is preventing back ionization, one of the most complex and difficult-to-control defects in powder coating. This effect occurs when excessive electrostatic loading occurs, when the accumulated charge on the surface of the part begins to repel newly deposited powder particles. Visually, this manifests

as an "orange peel" appearance, uneven texture, and deterioration in the optical properties of the coating. In traditional systems, mitigating this phenomenon comes down to reducing the voltage or adjusting the coating formula, often through trial and error. In the digital model, AI detects the preconditions for back ionization at an early stage by analyzing charge distribution, deposition rate, and environmental parameters. Corrections occur instantly and locally, without interrupting the line or operator intervention. This allows for process stabilization even in the rapidly changing microclimate typical of large production facilities. A fundamental element of the Industry 5.0 concept is the transition from monitoring individual operations to managing the entire data life-cycle. Every part passing through the line

receives a digital "passport" recording all key process parameters: spray conditions, curing profile, actual powder consumption per square meter, oven parameters, and timestamps for each stage. This data is automatically stored in the 1Thirty Cloud ecosystem, creating a continuous production history.

This level of traceability changes the very understanding of quality. It's not about random inspection or statistical tolerances, but rather about the ability to reconstruct the complete picture of the paint finish of any specific part, regardless of whether it was produced yesterday or several years ago. For customers, this means a fundamentally new level of transparency and trust, and for manufacturers, a powerful tool for process analysis and improvement.

From a scientific perspective, a digital twin opens the possibility of moving from reactive to predictive control. Accumulated data sets make it possible to identify hidden correlations between process parameters and final coating properties that are impossible to detect using traditional approaches. Machine learning algorithms use this information to predict system behavior and optimize settings before deviations occur.

In this context, artificial intelligence ceases to be an auxiliary tool and becomes a full-fledged participant in the engineering process. It does not replace humans, but relieves them of the need to make decisions under conditions of multidimensional uncertainty. Operators and engineers move from manual control to strategic oversight, focusing on technology development rather than symptomatic remediation.

It is important to note that the Industry 5.0 concept in this case goes beyond automation for efficiency. It implies the humanization of technology, where digital systems take over routine and high-frequency tasks, reducing the cognitive load on personnel and the likelihood of errors. This is especially relevant in the face of a shortage of qualified personnel and the increasing complexity of production processes.

In a broader industrial context, Digital Powder and the digital twin of the paint line are establishing a new standard of industrial thinking. Production is no longer a "black box" where results are assessed post-factum. Instead, it is becoming a transparent, measurable, and manageable system, where every parameter is digitally reflected and can be optimized. In the coming years, it's expected that such systems will become not just a competitive advantage, but a mandatory element of

industrial standards. Customers will increasingly demand not only coating compliance but also demonstrable process verification. Digital product data sheets, traceability of parameters, and predictability of results will become part of contract requirements, especially in infrastructure, energy, and architectural projects.

Therefore, the transition to Industry 5.0 in powder coatings is not a technological fad or a demonstration of digital capabilities. It is a logical stage in the industry's evolution, in which artificial intelligence and digital twins are becoming tools for improving precision, sustainability, and trust. In this new paradigm, quality ceases to be the result of fortunate circumstances and becomes a controllable, reproducible, and documentable characteristic of an industrial process. This is precisely what defines the industrial standard of the new era. ♦



QUALITY AS A NATIONAL PRIORITY

New Industrial Doctrine

We are entering 2026 at a time when Kazakhstan’s industrial landscape is undergoing a profound structural transformation. In this article, we analyze how the government’s updated policy and the President’s policy messages are shaping new conditions for the entire industry, and the role that technological expertise plays in building this future.

A Course on Responsibility: A Signal from Akorda

President Kassym-Jomart Tokayev’s policy speeches for the 2024–2025 period laid the foundation for a new paradigm in the country’s construction and industrial sectors. The head of state clearly outlined a path toward radically increasing responsibility for the quality of materials used and

compliance with technical regulations. In today’s reality, lowering safety standards in architectural and infrastructure projects is officially characterized as a “crime” against the public interest. This message became the starting point for a large-scale review of the

technical regulation system. The state is shifting from a model of formal control to a model of real durability: today, it is strategically important that every tenge invested goes toward creating facilities capable of serving for decades without losing their operational characteristics.

The Transition to Digital Transparency

The current state of Kazakhstan’s construction and metalworking industries is characterized by adaptation to new traceability tools. The government initiative to implement end-to-end digital control systems at all stages — from production to installation — aims to create a transparent environment for all market participants. This step changes the very structure of interactions within the industry. Now,

the origin and technical characteristics of every industrial component, including protective coatings, must be confirmed in a single digital database. This transparency allows the market to naturally filter out solutions that do not meet modern environmental requirements and international technical standards. The industry is shifting from price competition to competition based on verified product life cycles.

In a broader context, it can be stated that Kazakhstan’s industrial policy is increasingly focused on technological modernization and improvment of quality discipline



Prospects and Opportunities

Given the ongoing changes in Kazakhstan’s industrial and technological policies, local full-cycle production, as represented by the Asiacolor plant, can be seen as a practical element in implementing the goals of import substitution, improving energy efficiency, and transitioning to stricter quality standards in key industries. In this case, the production site not only produces finished products but also serves as an engineering competence center capable of adapting materials and technological solutions to national operating conditions, climate conditions, and local regulatory requirements.

By investing in coatings with a lower curing temperature threshold, 1Thirty Holding is contributing to a systemic reduction in energy costs in the industrial sector. From an applied perspective, such technologies reduce gas and electricity

consumption during the polymerization stage, as well as lowering the thermal load on equipment. For industries with a high proportion of thermal processes, this effect can be quantified through reduced operating costs and increased stability of production cycles, making such developments not just lip service but measurable in terms of economic impact.

Climate remains a key constraint on the use of protective coatings in Kazakhstan. Significant seasonal temperature fluctuations, freeze-thaw cycles, and high solar insolation in certain regions place increased demands on the stability of polymer systems. In this context, the focus of R&D departments on developing materials resistant to critical temperature ranges and long-term atmospheric loads is a fundamental requirement for the engineering reliability of façade systems,

infrastructure facilities, and metal structures. Climate adaptation in this case is not viewed as an additional benefit, but rather as the minimum required level of compliance with operating conditions.

International expertise and knowledge transfer deserve special attention. The company’s experience in the European, US, and Middle Eastern markets means that it operates within developed product certification and coating classification systems that set clear requirements for product architecture, layer thickness, adhesion, corrosion resistance, UV radiation, and weathering. These systems are based on mandatory laboratory and climatic testing, regular production audits, and confirmation of serial production stability. They also classify products by application and expected service life under specific conditions.

Experience working within these standards demonstrates that they create a transparent and comparable quality model in which materials are assessed not by stated characteristics, but by proven op-

developments — the presence of a local manufacturer operating to internationally comparable standards reduces logistical and technological risks. This is especially important in the context of increasingly

only the origin of the product but also its compliance with a certain level of technological and operational reliability.

As a result, the combined effect of localizing production, implementing energy-efficient technologies, climate adaptation, and translating international standards manifests itself not only in short-term savings or import substitution, but also in the formation of a more mature industrial environment. Such an environment is characterized by transparent quality criteria, predictable results, and reduced systemic risks at all stages — from design to operation. This is precisely where the potential for the long-term impact of such initiatives on the development of the industry as a whole lies. ♦

A mature industry begins where global quality standards become the natural code of local production

erational reliability. A company’s experience in completing similar procedures and complying with these requirements in international markets creates the opportunity for their implementation and adaptation at the local level. Applying similar principles in Kazakhstan can improve quality predictability, simplify material selection for designers and customers, and narrow the gap between domestic and export requirements. In the long term, this will contribute to the development of a common technical language among manufacturers, developers, and regulators, where quality is determined by objective and reproducible criteria.

From a market validation perspective, it’s important to note that the use of management and production practices that comply with international requirements reduces technological risks and improves the comparability of locally produced solutions with products used in developed markets. However, the key factor remains not formal compliance with standards, but the ability to consistently reproduce the stated characteristics in serial production, which is directly related to process discipline and the level of engineering control.

In a broader context, it can be noted that Kazakhstan’s industrial policy is increasingly focused on technological innovation and improving quality discipline. For 1Thirty Holding, this creates the conditions for scaling up its accumulated engineering and production experience within local projects. This is not about replacing government functions, but rather about practical participation in the implementation of strategic objectives through the supply of technologies, materials, and expertise adapted to national conditions.

With major investment projects scheduled for implementation through 2026 — including petrochemical complexes, infrastructure, and new residential

complex supply chains and growing demands for quality traceability. In this context, local, full-cycle production can be seen as an element in the formation of a sustainable industrial network, where the “Made in Kazakhstan” label reflects not



COURSE TOWARDS INDUSTRIALIZATION

Formation of a New Industrial Framework



At the beginning of 2026, Kazakhstan's industrial agenda is increasingly perceived as an applied dimension of modernization, not as a "separate industry," but as a mechanism through which reforms translate into new capacity, jobs, and sustainable output. In this spirit, President Kassym-Jomart Tokayev, in an interview with the Turkistan newspaper, described 2025 as a milestone confirming the irreversibility of reforms and the country's entry "into a new stage of modernization."

Macroeconomic statistics show that growth is increasingly driven by sectors of the "real economy." According to the Bureau of National Statistics, Kazakhstan's GDP increased by 6.5% in 2025, with industry, transport, construction, and trade contributing the most. Within industry, it is particularly significant that growth is occurring not only in production but also in processing: the industrial production index for 2025 was 7.4%, while

the manufacturing sector grew by 6.4%. Growth in processing was supported, in particular, by increased output in the food industry (+8.1%), oil refining (+5.9%), chemicals (+9.8%), and mechanical engineering (+12.9%). Against this backdrop, industrialization takes on a "second-tier" economic significance: its importance lies not in the number of applications, but in the fact that it expands domestic added value

and triggers a multiplier effect in logistics, infrastructure, and employment. This correlation is well illustrated by data on the 2025 growth structure: transportation and warehousing increased by 20.4%, construction by 15.9%, and trade by 8.9%. In practical terms, this means that industrial investment is increasingly "pulling" associated markets — from freight transportation to residential construction and social infrastructure.

Industrial Cycle 2024–2026: From Project Launch to Design Capacity

The government's industrialization plan for 2025 is ambitious. According to government reports, 33 new industrial enterprises were launched in various regions of the country in 2025. According to official estimates, these projects created over 10,000 jobs and attracted over 841 billion tenge (approximately \$1.6 billion) in investment. A "2026 economic model" is also being developed, with a clear emphasis on manufacturing. In reviewing forecasts for 2026, the government indicated that the manufacturing industry, construction, transportation and warehousing, trade, and food and beverage production should

contribute primarily to future growth. The manufacturing industry's physical volume index is expected to grow by 6% by the end of 2025, with the target for 2026 set at 6.2%. Importantly, this forecast is tied to specific industrial growth drivers. In mechanical engineering, the target for 2026 is set at +13.4%, while the increase in passenger car production is estimated at +17% — directly linked to the launch of new capacity at a number of enterprises. Separately, in the chemical industry, the expected growth is linked to the launch of new capacity for sulfuric acid, sodium cyanide,

hydrogen peroxide, and liquid glass. In construction materials production, according to government data, the share of domestic producers in the domestic market has reached 70%, and this base is seen as a foundation for further growth. For business audiences, the key question is which specific projects are changing the structure of production and creating sustainable demand for cooperation. In the current industrial cycle, three indicative initiatives in the manufacturing industry stand out.

Astana Motors Manufacturing Kazakhstan

This is one of the largest new sites in mechanical engineering, creating impact not only through final product assembly but also through the development of supplies of materials, components, and services. The government's 2026 forecast links the growth in passenger car production to the capacity added at such facilities.



KIA Kazakhstan

The economic role of this project is similar in logic: automobile production acts as an anchor for the local value chain — from metalworking and industrial chemistry to logistics and industrial services. In official government documents, the growth forecast for mechanical engineering and automobile production in 2026 also relies on the introduction of new production capacity in the sector.



Silk Road Electronics

According to the regional administration, the plant has officially launched production of Samsung-branded televisions and washing machines. This year, 17 washing machine models and 21 television models are planned for production. Production of Crystal UHD 4K, FHD, and HD televisions has also begun, with plans to launch QLED televisions in the near future. The project, implemented with state and regional participation and supported by the Industrial Development Fund, underscores its importance as a key element in the localization of high-tech production in the manufacturing sector.



Digitalization of Construction as an Infrastructure for Industrial Growth

It's especially noteworthy that the industrial agenda is complemented by "speed infrastructure" — digital changes in the construction industry that directly impact the timeframe and cost of commissioning new production facilities. According to the government, a plan for digitalization of the construction industry has been approved, which includes, among other things, the implementation of BIM design, automation of processes and government services, and the creation of digital facility passports.

For investors and industrialists, this means a transition to a more predictable project implementation environment: reduced transaction costs, shorter approval times, and increased manageability of the facility's life cycle — from design to operation.

Overall, the current picture resembles a unified industrial cycle: growth in 2025 (6.5% of GDP) is supported by accelerated manufacturing and mechanical engineering. The government has recorded the launch of 33 new industrial enterprises and is simultaneously formulating a forecast for 2026, where the key drivers are manufacturing, construction, transport and warehouse logistics, and trade. At the case level, this is reflected in the launch of anchor projects in mechanical engineering and the localization of high-tech household appliance production, as well as in the institutional "superstructure" — the digitalization of construction. As a result, industrialization is becoming not an accompanying trend, but one of the most practical pillars of economic modernization, as outlined by President Kassym-Jomart Tokayev. ♦



MAKE IT IN THE EMIRATES

THE UAE'S INDUSTRIAL BREAKTHROUGH

Operation 300 Billion

For decades, the UAE was perceived as a global trade and logistics hub, where capital, people, and goods move faster than anywhere else in the region. However, in the 2020s, the country has been steadily restructuring its economic model: industry is being transformed from a “supporting” sector into a systemically important driver of sustainable growth, exports, and technological independence. The conceptual framework for this transformation is the Operation 300 Billion program, a government industrial strategy aimed at a qualitative leap in manufacturing and processing.

Operation 300 billion is based on a measurable goal: to increase the contribution of industry to the economy by 2031, doubling the target from approximately AED 133 billion, while simultaneously increasing competitiveness through the implementation of “Fourth Industrial Revolution” technologies and restructuring the regulatory environment.

The most important feature of the UAE’s approach is its focus not on declarative slogans, but on the “project-based assembly” of industrial growth: through large production clusters, off-take, localization of supply chains, and long-term financing.

Make It in the Emirates

Make platform became the practical “driver” of the Operation 300 billion agenda. It is an annual industrial event where the government, national companies, banks, and the private sector synchronize their project and contract portfolios. In 2025, the platform recorded a significant industrial acceleration: over 122,000 participants, more than 187 agreements and memorandums, as well as new off-take opportunities worth AED 7.8 billion and the announcement of new industrial projects worth AED 11 billion.

This isn’t just a matter of isolated “showcase factories.” The forum itself is

structured by industrial sector, from chemicals and metals to mechanical engineering and defense. In 2025, the exhibition and project agenda covered 12 industry sectors, including chemicals, metallurgy and metalworking, mechanical engineering, electrical equipment and electronics, construction, shipbuilding and the marine industry, as well as aerospace, automotive, and defense. This represents the industry’s “assembly loop”: projects, technologies, local supply chains, and financing all come together in one place.



TA’ZIZ

The most illustrative example of Emirati-style industrialization is the development of the chemical and processing cluster in Al Ruwais Industrial City around the TA’ZIZ platform. The logic is simple: oil and gas remain the resource base, but added value and export potential are created in processing—chemicals, plastics, and materials.

In 2024, TA’ZIZ announced the award of contracts worth over \$2 billion for key infrastructure. Production is scheduled to begin in 2027, with a target volume of 4.7 million tons per year by 2028. Notably,

the launch phase will include products, some of which have not previously been produced in the UAE, directly supporting import substitution and the development of manufacturing industries. The list of launch chemicals includes caustic soda, ethylene dichloride (EDC), vinyl chloride monomer (VCM), polyvinyl chloride (PVC), low-carbon ammonia, and methanol.

A separate indicator of the cluster’s maturity is its logistics and export infrastructure: TA’ZIZ and ADNOC Logistics & Services have announced the creation of a specialized chemical port in Ruwais based

on a long-term agreement to ensure the efficient export of chemical products.

At the same time, “transition fuels” and low-carbon chemistry are developing. For example, in 2024, Reuters reported on the Al Ruwais ammonia plant project (a partnership between Mitsui and TA’ZIZ/ADNOC, among others), scheduled to begin operations in 2027 with a capacity of 1 million tons per year, integrating CO₂ solutions for the transition to “clean ammonia.” For the UAE, this is more than just an energy project — it’s an export-oriented industrial chain with industrial expertise.



ADNOC

The second pillar of the industrial push is not only capacity construction but also ensuring capacity utilization through domestic demand from major customers. ADNOC has strengthened industrial localization through its In-Country Value (ICV) program and publicly set the ambitious target: localizing up to AED 90 billion in products in its procurement basket by 2030, while simultaneously expanding the economic impact of ICV.

In 2025, ADNOC also announced that its supply chain partners had committed to investing AED 3 billion in the establishment of production facilities in the UAE to meet ADNOC’s current and future procurement needs and in line with Make it in The Emirates. Together with TA’ZIZ, this creates a closed-loop system: large processing projects plus local manufacturers of equipment, materials, and services, which gain a long-term domestic market.

Make platform itself play a similar role. it in The Emirates: an increase in coverage to 4,800 locally produced (or localized) items, an increase in industrial procurement through ICV and a link to offtake contracts — this is essentially a “conveyor belt” for converting purchasing demand into new factories and lines.

Leonardo and EDGE



Leonardo-EDGE joint venture in the UAE in 2026 is announced for the development and production of defense systems with a focus on industrialization, training, and workforce development.

At the same time, EDGE is demonstrating the industrial “inside” of this policy: the group announced the implementation of over 65 digital transformation projects, affecting 24 production sites, and

the improvement of production parameters through automation and Industry 4.0. Taken together, this means not only product assembly but also the transfer of engineering, production, and quality expertise in-country.

The logic is similar in civil aviation: Reuters reported on an agreement between Emirates and Safran to establish a factory in Dubai for the production and assembly of aircraft seats, with the project targeting completion in Q4 2027 and a planned capacity of up to 1,000 business-class seats per year at launch. This is an example of “smart localization”: it’s not necessary to build the entire aircraft, but it is critical to localize high-tech modules, service, MRO capabilities, and the supply chain.

Emirates Development Bank

Finally, an industrial breakthrough is impossible without long-term financing. The Operation 300 Billion architecture integrates the financial framework into the strategy: the Emirates Development Bank (EDB) is positioned as one of the program’s key financial drivers, with a targeted expansion of its support portfolio to AED 30 billion and a focus on priority sectors. In 2024, the EDB announced AED 5 billion in financing for 2024 to accelerate

production, including lending with commercial banks.

In 2025, as part of the Make program it in the The UAE Ministry of Industry and Advanced Technology has provided industrialists with access to a 40 billion dirham (approximately \$1.5 billion) credit line for five years. The agreement with national banks is aimed at supporting local production and promoting the Made in the UAE brand.



Industrialization as a Managed Portfolio

The UAE’s Operation 300 Billion is an industrial policy assembled as a portfolio of specific projects and contracts. TA’ZIZ chemicals in Ruwais, with its clear products and timeline, localized demand through ADNOC and supplier investments, complex defense and aviation production with the launch of new-generation

factories, plus the financial framework of the EDB and the banking system — all this transforms industrialization from an abstract strategy into an industrial practice.

While the UAE’s competitive advantage previously lay in the speed of trade and capital flows, the country is now adding a second layer — the speed of production

deployment. This approach transforms the Operation 300 Billion strategy from an abstract indicator into a working model for industrial breakthrough. Its effectiveness is confirmed by concrete metrics: the number of new capacities, the depth of supply chain localization, and the expansion of export portfolios. ♦

DUBAI AS A STRATEGIC MOVE

Why BI Group Chose the Middle East Market

Last year, the construction holding BI Group expanded its geographic presence and entered the United Arab Emirates market, launching two projects in Dubai. This move is a logical continuation of the company’s long-standing growth strategy. In this article, we discuss why the developer decided to enter one of the world’s most competitive markets and what goals it has set for the region.



Ruslan Yembergenov
Director of BI Group Dubai

According to Ruslan Yembergenov, Director of BI Group Dubai, entering Dubai is a considered strategic decision reflecting the maturity of the business and the Kazakh company’s readiness to compete on a global stage. Dubai’s real estate market is one of the largest in the world, reaching approximately \$100 billion annually. Companies from India, Europe, the Middle East, and Asia operate here, and this concentration of international players makes Dubai a global showcase for development standards.

For BI Group, entering this market was a logical step in its development. Over the past 30 years, the company has become the largest developer in Central Asia, having established its own product philosophy and sustainable business models.

“We didn’t come to Dubai to learn from scratch, but to test ourselves in a world-class environment, on equal terms with global players. For us, this is a conscious step that allows us to assess the maturity of our processes, team, and product in a competitive international environment,” noted Ruslan Yembergenov.

BI Group traditionally views development as creation of a complete living environment. This concept places housing, work, education, services, and public spaces within walking distance, allowing people to save time and spend it with their families. This approach underlies its Big Ville projects and is planned for adaptation in Dubai, taking into account the local context and the expectations of an international audience.

At the same time, the Dubai operation is seen as a growth hub for the entire group. Operating in one of the world’s most demanding markets allows BI Group to accumulate new technologies, product solutions, and approaches to service and quality management. This experience will be further integrated into the company’s projects in Kazakhstan and Uzbekistan, enhancing customer experience and value.

“An important part of our mission is to bring the best practices of the UAE to our home markets, which will improve people’s lives,” emphasized the director of BI Group Dubai.

Quality standards deserve special attention. The UAE’s climate, with its high humidity, salty sea air, and aggressive ultraviolet radiation, places strict demands on construction materials and technologies. In this context, BI Group builds partnerships with Tier 1 manufacturers and suppliers, implementing uniform, high standards across all countries where it operates — from foundations to final façade coatings. This ensures the durability of buildings and the preservation of their aesthetic and performance characteristics for decades to come.

Today, the first flagship projects under the BI Group brand have already been launched in Dubai, with financing provided through an investment fund. In partnership with leading regional developers, the company is building a portfolio that will serve as the foundation for further expansion in the Gulf region. The long-term vision, through 2030, includes expanding the geography of projects in the UAE and entering neighboring markets in the MENA region.

Finally, it’s also a matter of the country’s reputation. The company makes no secret of the importance to Kazakhstanis visiting international standards and being a reliable partner in the global market. While pursuing our strategic goals, we are ex-



Dubai, seeing BI Group’s completed projects and feeling a sense of pride.

“This is a restrained, unpretentious ambition — to prove that a Kazakh developer is capable of operating to the highest

porting the reliability and innovation that originated in Kazakhstan and is now recognized beyond its borders,” concluded Ruslan Yembergenov. ♦



Sayasat Nurbek
Minister of Science and Higher Education of the Republic of Kazakhstan

INTELLECTUAL FOUNDATION

Transformation of Science and Higher Education in Kazakhstan

Over the past year, science and higher education in the Republic of Kazakhstan have entered a phase of profound systemic transformation. Instead of targeted measures, the ministry has shifted toward a comprehensive transformation, prioritizing the quality of personnel training, academic freedom at universities, and the integration of research into the real economy. In an interview with the Minister of Science and Higher Education of the Republic of Kazakhstan, we explore how new educational standards, digital platforms, and international partnerships are shaping the country’s future.

Education for the Real Economy

How does the Ministry ensure that personnel training meets the needs of the labour market?

— We have completed the development of Regional Needs Maps as part of the “Mamandygym – Bolashagym” project, covering 27 economic sectors. Using the Atlas of New Professions, 1,758 educational programs have been updated, and 797 new professions have been identified, such as reverse engineers and digital twin engineers.

The industrial PhD model, focused on applied enterprise needs, is actively developing. Nine universities are training

doctoral students in partnership with major companies, with 210 grants allocated over two years. Dual training programs are also continuing, with over 4,600 companies participating. A key indicator of quality is that at some universities, the rate of internship placements reaches 40–50%.



Internationalization and Global Competition

What progress has been made in integrating Kazakhstan’s education into the global arena?

— Today, the country has established partnerships with 40 leading universities worldwide, and 33 branches of foreign universities have been opened.

In September 2025, representative offices of universities such as Cardiff and Coventry (UK), Woosong (South Korea), Anhalt (Germany), and MGIMO (Russia) have opened. We not only welcome partners but are also opening branches abroad: a branch of Al-Farabi KazNU in Omsk and L.N. Gumilyov Eurasian National University in Osh.

Our position in international rankings is strengthening. Forty-four Kazakh universities have already entered the QS Asia 2026 ranking, up from 35 in 2025. Five universities represent Kazakhstan in

the Times Higher Education 2026 ranking, with Nazarbayev University entering the top 500. Another achievement was winning an international Coursera award. Students in the country have earned approximately 350,000 Coursera certificates, dozens of courses have been translated into Kazakh, and universities have integrated online learning into their academic programs.

Science: From Research to Production

How is the science funding system being restructured today, and what role does the Science Foundation play in supporting innovative projects?

— The funding system has implemented a range of innovations aimed at transparency and focusing research on tangible results. With the adoption of the Law “On

Decentralization has been an important step: local executive bodies are now empowered to coordinate research and development activities and provide grant funding for applied research from local budgets. Regional science councils have already been established within all regional executive bodies to interact with scientists and industry.



Science and Technology Policy”, grant funding instruments have been significantly expanded, including support for research and development work and international scientific projects.

A special place in this ecosystem is occupied by the Science Foundation, whose status has been expanded to that of the National Agency for Technology

Commercialization. The Foundation now not only allocates grants but also provides acceleration, technology brokerage, and venture financing services. The results of this work are already measurable: the Foundation’s portfolio includes 412 projects, and the cumulative contribution of all commercialization competitions has amounted to 126 billion tenge. This includes sales of science-intensive products worth 53.7 billion tenge and private co-financing totaling 24 billion tenge. Thus, we ensure a seamless chain — from a scientific idea to the market launch of the finished product.

Can you provide specific examples of the commercialization of Kazakh scientific developments?

— Science has begun to generate real income. Satbayev University’s Institute of Metallurgy and Beneficiation has developed a selenium refining technology. In January 2025, over 100 tons of products worth more than \$2.5 million were exported to China. Another example is the production of vanadium electrolytes for “perpetual” batteries, which are already exported to Austria and Russia, with sales volumes exceeding 280.8 million tenge.

Projects are also being implemented to produce vaccines against brucellosis and an AI system for diagnosing breast cancer.



Talent and Human Resources

What is being done to ensure that young scientists remain in science and feel supported by the state?

— We have significantly increased the number of competitions for young scientists: 12 grant competitions were held, including the “Zhas” program 1,735 projects were supported. One of the most pressing issues — housing — was resolved. In

2024–2025, 577 young scientists received keys to apartments.

We also increased bonuses for academic degrees to 50 MCI and ensured that leading scientists receive salaries within the basic funding. As a result, the number of young researchers in the country has grown to 12,738.

Projects are also being implemented to produce vaccines against brucellosis and an AI system for diagnosing breast cancer.



Innovation, AI, and the Digital Ecosystem

What role do the AI-Sana program and new IT solutions play in this process?

— AI-Sana includes the integration of educational, research, and applied approaches, allowing universities to move from a traditional educational model to a research-based format.

The AI-Sana program is being implemented in stages, with each stage aimed at consistently developing students’ competencies — from basic knowledge of artificial intelligence to the professional development of startups and their market scaling.

The preparatory phase of the innovative program was launched in February 2025. This phase will involve 724,000 students across the country, who will gain foundational knowledge in AI.

As part of the program, Huawei localized and translated two courses on basic AI skills into Kazakh. Students earned 256,019 unique certificates. The training is provided through 47 ICT Academies, established at universities across the country to provide comprehensive training in the latest ICT technologies.

In collaboration with Astana Hub, the “AI Fundamentals: ChatGPT” course was launched in March 2025, with 103,113 students certified. Registration for undergraduate, graduate, and doctoral students is ongoing.

Courses from the Coursera educational platform, including AI-related courses, are also available. Experts have selected two AI courses: “Generative AI for Everyone” and “Prompt Engineering for ChatGPT.” Coursera has allocated 36,890 licenses to 95 universities across the country as part of the program. A total of 64,134 certificates have been awarded for these courses.

In addition, universities will be able to teach students independently developed

courses, issuing an electronic certificate of the established format.

Twenty-seven “anchor” universities in each region of the country have been selected and approved for further implementation of the program. The universities were selected based on criteria related to the necessary infrastructure for program implementation, including the availability of AI-related educational programs, international partners, computing power, and other factors.

Thus, the AI-Sana program is aimed at creating a favorable ecosystem for the development of artificial intelligence in the country.

How has the legislative framework regulating the financial sustainability of universities and the development of science changed?

— We’ve laid a solid legal foundation. On July 1, 2024, the Law on Science and Technology Policy was adopted, introducing the international Technology Readiness Level (TRL). Furthermore, businesses received an incentive: 150% of research costs are tax-deductible, provided entrepreneurs co-finance the project at 30%.

On June 30, 2025, the Law “On Endowment Funds” was adopted. This is a historic moment for the financial independence of universities. Today, there are 22 endowment funds operating in the country, 15 of which are in the education sector. One example is the private endowment fund of Alageum Electric, with a capital of 2 billion tenge.

What are the Ministry’s strategic objectives for the near future?

Our priority remains the development of a sustainable academic community. This entails further diversification of funding sources for universities and the development of a regional research ecosystem through the creation of centers of excellence and advanced engineering schools. We are transitioning from a purely academic model to an applied one, where science and higher education become drivers of technological modernization for the entire Kazakh economy. ♦



Professor Zhumabay Bakenov
General Director, Institute
of New Materials
and Energy Technologies

Academician of the National Academy of Sciences of the Republic of Kazakhstan under the President of the Republic of Kazakhstan, Honored Figure in Science and Technology of the Republic of Kazakhstan, Professor at the School of Engineering and Digital Sciences at Nazarbayev University

CORROSION AS A SYSTEMIC PROBLEM

Why Metal Protection Is More Than Just a Coating

Dear readers, colleagues, and industry professionals,

I thank the editors of this journal for inviting me to share my professional perspective on a pressing technical topic at the intersection of science and industrial practice. Such dialogue between industry and academia is especially important today, when technological development is directly linked to the quality of engineering education and the applicability of scientific knowledge in real-world production settings.

In this article, I briefly examine corrosion as an engineering challenge that requires not only the selection of materials or coatings but also an understanding of the physical and chemical mechanisms underlying metal degradation processes. The observations presented are based on a combination of research and practical experience and are aimed at practical applications.

I hope that the considerations presented will be useful to industry specialists and will contribute to professional discussions on metal protection issues and the development of modern technological solutions.



Corrosion remains one of the most underestimated, yet most costly, problems facing modern industry. International organizations estimate that direct and indirect losses from corrosion reach 3–4% of the GDP of developed countries. In the oil and gas, chemical, energy, and construction industries, corrosion not only reduces the service life of equipment but also directly impacts safety, environmental risks, and business sustainability.

As a specialist in chemical engineering and electrochemistry, I would like to share my views on why corrosion protection should be considered today as a comprehensive engineering strategy rather than a secondary process step, and the role that modern paints and coatings play in this regard.

Corrosion Is Not “Rust,” But an Electrochemical Process.

In the public consciousness, corrosion is often associated exclusively with rust. Scientifically, however, corrosion is a spontaneous electrochemical process in which a metal seeks to return to a more stable thermodynamic state.

Simply put, most metals used in industry exist “in defiance of nature.” Iron, aluminum, and zinc were extracted from ores with the expenditure of energy, and corrosion is a way of “repaying” the environment.

The conditions in the oil and gas industry are particularly aggressive:

- ♦ high mineralization of water,
- ♦ the presence of CO₂ and H₂S,
- ♦ temperature and pressure changes,
- ♦ microbiological activity,
- ♦ mechanical damage to surfaces.

Under such conditions, corrosion accelerates and its mechanisms become more complex: localized corrosion, pitting, crevice corrosion, and stress corrosion cracking.

Why Materials Alone Are Not Enough

Engineers often ask, “Why not simply use a more corrosion-resistant metal?”

The answer is simple: economics and technological limitations.

Stainless steels, titanium alloys and nickel-based materials do have high resistance, but:

- ♦ they are much more expensive,
- ♦ more difficult to process and weld,
- ♦ not always available for large-sized structures.

Therefore, in practice, carbon steel is almost always used, and the problem of corrosion protection is solved with the help of:

- ♦ coatings,
- ♦ inhibitors,
- ♦ electrochemical protection,
- ♦ competent engineering design.

And this is where coatings play a key role.



A Coating Is an Engineered System, Not Just a Layer of Paint.

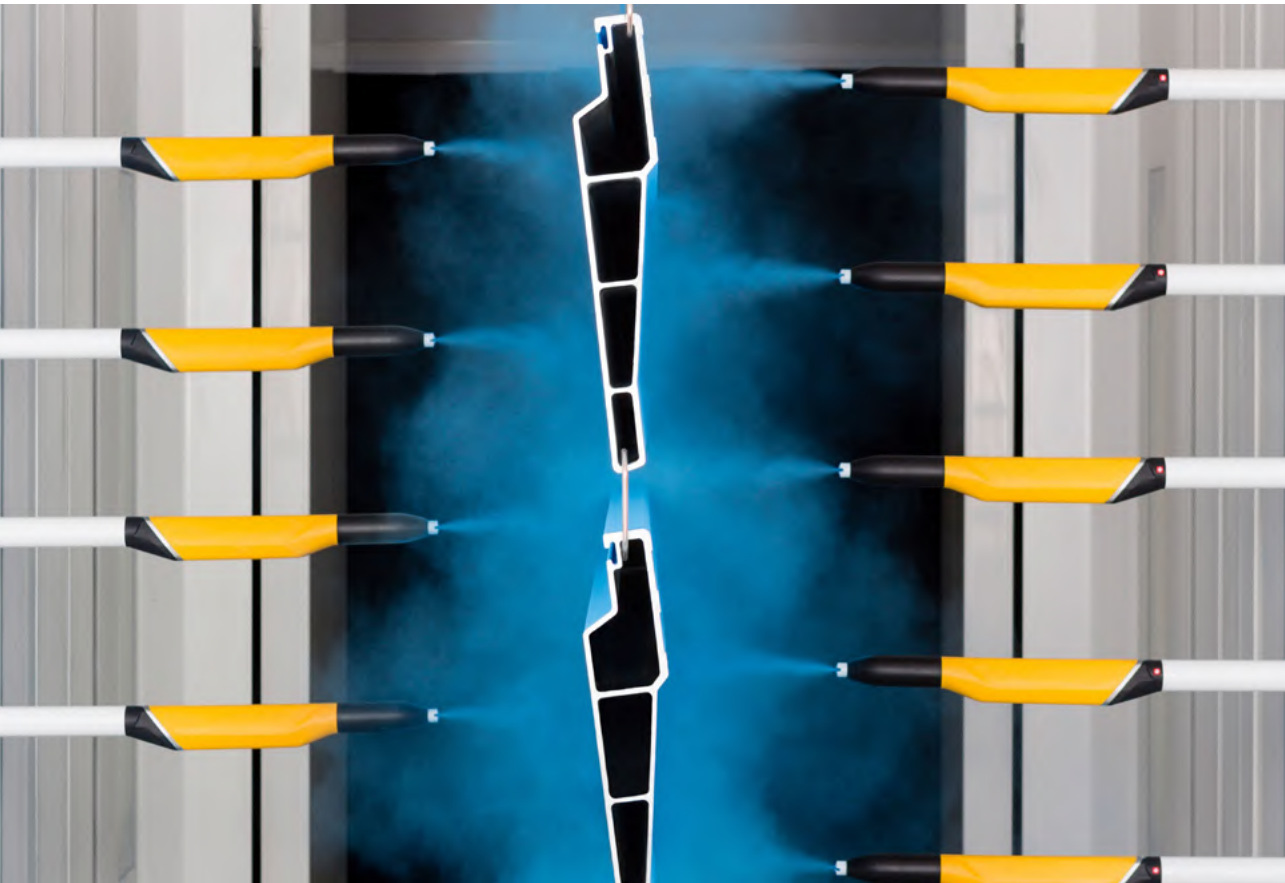
Modern anticorrosion coatings are no longer just “paint.” They are multilayer, functional systems, each component performing a specific task:

- ♦ barrier protection,
- ♦ electrochemical protection,
- ♦ adhesion to the substrate,
- ♦ decorative function,
- ♦ protection from UV radiation, chemicals, and abrasive wear.

From an electrochemical point of view, a good coating:

1. Minimizes access of electrolyte to the metal surface;
2. Slows down the transfer of ions and electrons;
3. Stabilizes surface potential;
4. Prevents local defects where intense corrosion can begin.

It’s important to understand that a coating defect isn’t just a point of damage, but a potential anode or cathode, where corrosion can occur tens of times faster than on an exposed surface. Therefore, improper design or a compromised coating’s homogeneity and integrity can lead to accelerated electrochemical corrosion.



Features of Operation in Kazakhstan

The Central Asian region has its own specifics:

- ♦ sharp daily and seasonal temperature changes,
- ♦ high solar radiation,
- ♦ dust, sand, and salt aerosols,
- ♦ a continental climate.

Under such conditions the coating must be:

- ♦ resistant to UV degradation,
- ♦ elastic under temperature-induced deformations,
- ♦ chemically resistant,
- ♦ technologically advanced in application and repair.

Companies operating in the region, such as Asiacolor, play a vital role in adapting global coating technologies to local operating conditions, which is often more important than blindly copying foreign solutions.

Common Mistakes in Corrosion Protection

Over the years of teaching the “Corrosion Protection in the Oil and Gas Industry” course and working on industrial projects, we regularly encounter the same mistakes:

1. **Underestimating surface preparation**
Up to 70% of coating failures are not related to the composition of the material, but to poor cleaning and preparation of the metal surface.
2. **Incorrect choice of coating system**
There are no universal solutions — what works on a tank may not work on a pipeline.

3. **Lack of control during the application process**
Layer thickness, drying conditions, humidity — all of this is critical.
4. **Ignoring the life cycle**
A coating is an investment and should be evaluated by its lifespan rather than its initial price.

The Future of Anti-Corrosion Coatings

Current trends in corrosion protection include:

- ♦ smart coatings capable of self-healing;
- ♦ systems with inhibitors released in case of damage;
- ♦ environmentally friendly compositions with reduced solvent content;
- ♦ digital monitoring of coating conditions.

However, even the most advanced technologies cannot replace an engineering approach and professional expertise.

Conclusion

Corrosion is not an enemy that can be defeated once and for all. It’s a natural process that must be managed properly. The key lies in a combination of science, practical experience, and high-quality materials.

Companies working in the coatings and metal protection sector are becoming more than just product suppliers — they are partners in ensuring the reliability and safety of industrial infrastructure. This approach is precisely what drives the sustainable development of many industries today. ♦

DIRECTOR OF EMIRATES EXTRUSION

About the New Era of Aluminum Production

The UAE is a country that doesn't just build, but sets the standards for the future. In this environment, industry, design, and emotion are no longer separate concepts. Today, we speak with the head of Emirates Extrusion Factory, an enterprise of Dubai Investments PJSC, about how the company transforms industrial aluminum profiles into high-tech products where every micron of the surface matters.



Sreekumar Brahmanandan
Director, Emirates Extrusion

Emirates Extrusion Factory has been a key player in the UAE's aluminum extrusion industry for many years. How would you describe the company's position today?

— We have a 30-year history in the UAE and are proud to have participated in many landmark projects. Emirates Extrusion has evolved into a fully integrated aluminum profile manufacturer serving the architectural, industrial, and infrastructure sectors. Our current position is determined by our reliability, scale, and ability to supply complex, high-precision profiles that meet international standards. We focus on long-term partnerships, which are increasingly important in a demanding global market. Despite market turmoil, we continue to maintain high customer retention rates.

What market trends are currently shaping the aluminum extrusion industry in the UAE and the Middle East?

— We are seeing growing demand for high-precision architectural and façade systems, particularly energy-efficient profiles. Clients are placing greater emphasis on sustainability, while developers value lifecycle performance indicators and compliance with the UAE's carbon reduction targets. Production capacity is expanding in the region, including at competitors with larger production lines. Areas that have been strengthened through systematic planning and operational optimization include supply chain resilience, uninterrupted raw material supply, and working capital stability

Emirates Extrusion Factory has made a number of advances in technology and manufacturing process efficiency. Could you highlight the most significant ones?

- Our investments are focused on the following aspects:
 - Firstly, the modernisation of presses and the optimisation of die performance, which increases the metal recovery rate and reduces production losses.
 - Secondly, our extensive surface treatment capabilities — powder coating, anodising, wood grain finishes — allow us to serve a variety of sectors, including construction, industrial design and transportation.
 - Third, digital transformation supported by centralised ERP-based operations and improved process monitoring.
 - Fourth, strengthening pricing processes, customer delivery metrics, and quality benchmarking based on recent customer feedback and the Chairman's comments.
- Together, these improvements provide greater stability, reduced variability, and shorter lead times for our customers.

Surface treatment, including powder coating, is a critical step in aluminum production. How do you assess its role in the overall value chain?

— Surface treatment is critical, but it is most effective when properly integrated into the extrusion and pretreatment processes. Powder coating promotes corrosion resistance, color stability, and durability, especially in harsh environments like the Middle East. However, achieving maximum efficiency requires proper profile design and process control.

How does collaboration with companies like Qemt看 support your product strategy and technological development?

— Collaboration with specialized manufacturers like Qemt看 plays a vital role in improving the overall performance of aluminum systems. Close collaboration allows us to align pretreatment processes and coating technologies early on. This results in more consistent quality, improved performance under challenging conditions, and faster adaptation to new

architectural and industrial requirements. Strategic partnerships also facilitate joint testing, knowledge sharing, and long-term innovation, which are essential for maintaining competitiveness in both regional and global markets.

The UAE's climate creates unique conditions. How does Emirates Extrusion ensure long-term reliability of its products?

— Working in the UAE means operating in extreme temperatures, intense UV radia-



tion, and coastal conditions. We address these challenges through strict quality protocols, meticulous material selection, and compliance with international certification schemes. Long-term testing and collaboration with technology partners are integral to this process.

What are Emirates Extrusion's strategic priorities in the UAE market in the next few years?

— Our priority is strengthening our presence in high-margin segments such as premium architecture, infrastructure, and specialized industrial applications. This includes expanding our capabilities, improving our quality control systems, and supporting our customers not only with

products but also with technical expertise. As part of our growth strategy, we plan to enter the automotive and solar frame construction markets in the near future.

How is Emirates Extrusion's role evolving in the global market?

— We currently operate in the Middle East and Africa, and we see growing opportunities beyond these regions, particularly in markets that value quality, reliability, and compliance with international standards. Our goal is to position Emirates Extrusion

as a reliable global supplier capable of delivering consistent and high-performance aluminum solutions and expand into European and Asian markets.

Finally, what message would you like to convey to architects, developers and industry partners?

— Successful projects are built on collaboration and long-term planning. Aluminum systems must be designed and manufactured with performance characteristics throughout their entire lifecycle in mind. At Emirates Extrusion, we strive to be a partner who contributes by providing expertise, reliability, and value at every stage of the project. ♦



CREATING EMOTIONS THROUGH METAL

Interview with the Founder of YLA Benoit Rondard



Benoit Rondard
Founder of YLA

Dubai is often associated with speed and scale. How did this city influence the birth of your brand?

— YLA was born precisely within this context. In Dubai, manufacturing, design, and ambition naturally coexist. Coming from an industrial background, I found it natural to develop a brand here that does not separate production from emotion. YLA focuses exclusively on metal furniture for interiors, where refined minimalism meets highly controlled industrial processes. My goal has always been to create objects that appear calm and restrained, yet are complex in execution and designed to last, both structurally and emotionally.

Metal is often perceived as a cold and purely functional material. How do you challenge this perception?

— I have never seen metal as a limitation. For me, it is a material with immense expressive potential. The challenge is to move it beyond pure function and allow it to feel conscious and human. Through proportion, finish, and restraint, metal can convey balance, stability, and quiet confidence. In a world often driven by excess, I believe strength lies in precision, control, and durability.

What role do technical details, such as proportions and finishes, play in your projects?

— Technical details are never neutral. Proportions, tolerances, and surfaces are emotional decisions as much as technical ones. Structure defines how an object stands, but surface defines how it is perceived. Finishes are where industrial precision meets intention: how metal reflects light, absorbs colour, or responds to touch directly shapes the way an object is experienced.

You mentioned using powder coating. Why is this so important for minimalist design?

— Powder coating is not a technical requirement for us, it is a deliberate design choice. It allows us to work with precise,

controlled colours and textures inspired by nature. In minimalist design, nothing can be hidden, so consistency becomes essential. When forms are reduced, execution must be flawless. In that sense, consistency is not a detail, it is the design itself.

How important is the reliability of materials and partnerships with companies like Qemtex?

— A high level of design control is only possible when materials and processes are reliable. Partners like Qemtex are fundamental because they provide powder coating solutions that are consistent, durable, and technically dependable. When materials behave predictably over time, it gives me the freedom to focus on design rather than correction. Dubai's industrial

ecosystem plays a key role here, offering access to advanced expertise that allows industry and design to evolve together.

What does contemporary production mean to you in terms of cultural values?

— For me, manufacturing is first and foremost a question of values. Durability is not just a technical feature; it is a form of responsibility. Precision is a sign of respect, both toward the material and toward the people who will live with the object. Today, industry should not be defined only by speed or volume, but by the ability to create things that remain relevant, useful, and meaningful over time. Producing better matters more than producing more. ♦



QUALITY MARK

Why Certifications Are Important for the Future of the Industry

In today's industrial ecosystem, where supply chains cross national and continental borders, the issue of trust between customer and manufacturer is becoming a critical economic factor. For the protective and decorative coatings industry, "quality" has long ceased to simply mean the absence of visible surface defects. Today, it is a complex technological and management discipline, supported by international standards. Amid growing demands for building durability and environmental responsibility, the combination of ISO general management standards and specialized industry schemes, such as QUALICOAT, is becoming a "passport" for access to major international projects.

What Is a Quality Mark in Industry?

In the industrial sense, "quality" is not a one-time success, but the consistent reproducibility of specified characteristics. According to the basic ISO definitions, quality is the degree to which the set of inherent characteristics of an object meets the specified requirements. The key difference between a "certificate on the wall" and a truly functioning system is traceability.

A quality seal confirms that a company can document the production process of each product: from the batch of chemical raw materials to final laboratory testing. Certification verifies the existence of a risk management system that minimizes the likelihood of defective products to the lowest technologically feasible level.



ISO: A Common Language for Quality Management

The International Organization for Standardization (ISO) creates the foundation upon which any industrial production is built. ISO 9001 (Quality Management Systems) is the most recognized management tool globally. While it doesn't dictate the technical parameters of powder coatings, it does oblige companies to structure their processes to ensure that customer requirements are consistently met.

The ISO system's model of international trust is based on a hierarchical chain of accreditation:

1. Standard Establishes rules (ISO 9001, ISO 14001, etc.)
2. Certification body Conducts an audit of the enterprise
3. Accreditation Inspection of the certification body itself (e.g. UKAS, DAkkS, ANAB).
4. International recognition National accreditation bodies are members of the IAF (International Accreditation Forum). Signing of the IAF MLA means that a certificate issued in one country is recognized as equivalent in another.

It is important to understand that a certificate without an accreditation mark often carries no international weight and may be the result of a formal audit without proper verification of the auditor's competencies.

Qualicoat: A Two-Way Material-Process System

Unlike many other industry schemes, QUALICOAT is not just a regulation for paint manufacturers. It is a comprehensive system that guarantees the quality of the final product through mandatory certification of two key components: the material (powder/paint) manufacturer and the applica-tor.

Certification of Material Production

The QUALICOAT system eliminates the possibility of subjective by the manufacturer quality assessment. Approved status is awarded only based on the results of a multi-stage testing cycle in independent laboratories. The product undergoes a rigorous audit to ensure compliance with technical specifications, covering elemental composition analysis, adhesion properties, resistance to mechanical deformation, and stability of decorative properties under aggressive environmental conditions.

Only after successfully passing all stages is the powder assigned an approval number. The list of approved materials is publicly available and continuously updated.

Licensing of the Application Process

The second stage is the actual coating process. Obtaining a QUALICOAT license means that an applicator is obligated to use only approved materials (powders and surface preparation chemicals) and strictly adhere to the process regulations. The control mechanisms here are unique in the industry:

- ◆ **Unannounced Inspections:** Inspectors visit the plant unannounced at least twice a year.
- ◆ **Equipment control:** Checking the condition of chemical preparation baths (analysis of concentrations, temperature, quality of demineralized water) and polymerization ovens (monitoring of temperature curves).
- ◆ **In-house laboratory:** The applicator is required to have its own laboratory and maintain records for each production batch.

Synergy Effect

While ISO provides the overall discipline of an organisation, QUALICOAT provides the technical guarantee that the certified powder has been applied to a properly prepared surface under the correct temperature conditions.

QUALICOAT Standards

Industry certification is segmented by purpose, which helps minimize specific risks.

QUALICOAT: Architectural Aluminum

Here, the division of materials (powders) into classes is of key importance:

- ♦ **Class 1:** Basic protection. Ideal for moderate climates and private residential buildings.
- ♦ **Class 2:** High durability. ~3 times longer lasting than Class 1, ideal for areas with intense UV radiation.
- ♦ **Class 3:** Maximum service life (30+ years). For high-rise buildings and facilities with increased durability requirements.

Selecting a class is a responsibility. Using Class 1 in coastal zones is not a matter of a poor standard, but a design error.

QUALIDECO: Decorative Effects

A system for licensing materials and processes for decorative wood- or stone-effect finishes. This system monitors not only the durability but also the visual stability of the pattern, ensuring that the building's façade does not "fade" due to the differences in pigment stability in the decorative layer.

QUALISTEELCOAT: Steel Protection

A standard for the corrosion protection of steel structures. It regulates coating systems according to corrosion activity categories. The focus here is on surface preparation (sandblasting) and the thickness of the multilayer coating system.



International Comparability of Standards

There are two main systems competing in the global market: the European (QUALICOAT) and the American (AAMA, part of FGIA). Conceptual difference:

- ♦ **AAMA:** These are performance-based standards. They describe the expected performance results. The manufacturer is responsible for choosing the technology.
- ♦ **QUALICOAT:** This is a process-based standard for both materials and application processes. It regulates the use of approved materials, the control of equipment and process parameters, and the testing procedures to ensure consistent coating quality.

Why Certification Shapes the Future of the Industry

- 1. Durability and ESG:** Extending the lifespan of a façade with Class 2/3 powders dramatically reduces the building's carbon footprint. Fewer repainting cycles means lower resource consumption and CO₂ emissions.
- 2. Supply chain protection:** In the event of an on-site complaint, having certificates from both the powder manufacturer and the applicator allows for quick identification of the cause of the defect.
- 3. Digital transparency:** Leading powder coating manufacturers integrate their quality control systems with QUALICOAT requirements, providing digital traceability of every coating batch from the factory to the building façade.

Conclusion

Today, certification is not a burden, but a strategic asset. In a world where the cost of a mistake on a major construction project can run into millions of dollars, ISO and QUALICOAT international standards serve as the universal language of quality and safety. For powder manufacturers, it's a confirmation of the high quality of their materials. For applicators, it's a guarantee of process discipline. For customers, it's a reliable way to ensure that a beautiful

façade is backed by proven technology that can withstand the passage of time. Investing in quality is reputation insurance. In the protective coatings industry, the cost of a mistake and resulting reputational damage is always greater than the investment required to implement an effective quality control system. ♦

SYNERGY OF INNOVATION

The Technological Landscape of the Central Asia Coatings Show Through the Lens of Asiacolor and Qemtex

The Epicenter of Industry Transformation

The annual Central Asia Coatings Show once again confirmed its status as the leading indicator of the development of the coatings industry in the region. This year, the venue transformed itself into more than just a traditional exhibition space; it became a vibrant epicenter for technology and strategic dialogue between manufacturers and consumers of the latest solutions. Against the backdrop of rapid urbanization and industrial growth in Central Asia, the event focused on key contemporary challenges: the durability of materials, the environmental safety of production cycles, and the aesthetics performance. For leading market players such as Asiacolor and Qemtex, participation in the forum was not just a promotional step but also an opportunity to announce a new quality paradigm in the powder coatings segment, aimed at the most demanding architectural and industrial projects.



Technological Standard: A New Era of Powder Systems

The presence of Asiacolor and Qemtex at the exhibition marked the regional market's transition to a stage of mature technological solutions. The companies demonstrated the deep integration of research and development (R&D) into production processes, a critical factor for international competitiveness today. The focus was on innovative powder systems developed specifically for the architectural sector and the aluminum extrusion segment. The solutions presented underscore the brands' commitment to adhering to strict international standards, while ensuring exceptional product adaptability to the region's specific climatic conditions—from extreme insolation to significant temperature fluctuations. Visitors to the booths were able to see that behind the visual appeal of the coatings lies complex polymer chemistry designed to protect structures for decades, which is especially relevant for modern translucent façades and industrial buildings.

A Scientific Approach to Architectural Aesthetics

The central event of the business program and the intellectual core of the companies' participation was the expert presentation by Perihan Karaalioglu, Head of Research and Development at Qemtex. Her presentation generated keen interest from the professional community, bringing together architects, technologists, and industrial managers. The presentation focused on the evolution of architectural powder coatings and the current requirements for their physical and chemical properties in changing urban landscapes. Perihan detailed aspects of ensuring durability and color stability, emphasizing the need to implement advanced testing protocols. Her in-depth expertise in coating resistance to aggressive environments and functional aesthetics allowed the audience to take a fresh look at the capabilities of powder coating technologies, transforming coatings from a purely protective layer into an active element of architectural design.



Strategic Dialogue and Partnership Synergy

The atmosphere on the sidelines of the exhibition facilitated intense networking and the transition from theoretical discussions to practical collaboration. The Asiacolor and Qemtex stands hosted a series of productive meetings with key players in the aluminum systems market and representatives of the major industrial sectors. Direct dialogue with current partners allowed for the synchronization of plans for future periods, while discussions with potential customers opened new horizons

for the brands' expansion. The exhibition once again proved that personal contact remains a fundamental factor in building trust between partners.

A Vector for Sustainable Development in the Region

Summing up the results of their participation in the Central Asia Coatings Show, it can be confidently stated that the coatings industry in Central Asia is entering a phase of qualitative transformation. For 1Thirty Holding, represented by the Asiacolor and Qemtex brands, the exhibition was

a triumph of engineering excellence and effective positioning. A strategic focus on innovation, supported by high-level expertise and commitment to open dialogue with industry, sets a new direction for the entire materials market. In a context where demands on infrastructure projects and environmentally friendly production are growing year after year, technological transparency and adherence to global standards will be the tools that ensure sustainable leadership and make a significant contribution to shaping the modern and sustainable image of the region's cities and industries. ♦



CATALYZING INDUSTRIAL INNOVATION

The Strategic Synergy of 1Thirty Holding and Nazarbayev University



The Emergence of a Regional Knowledge Economy

In the rapidly evolving industrial landscape, the transition from a resource-based economy to one driven by technological sovereignty requires more than just capital investment; it demands a fundamental realignment between industry and academia. The recently announced strategic partnership between 1Thirty Holding and Nazarbayev University (NU) represents a landmark shift in this direction. This collaboration is not merely corporate sponsorship but a calculated integration of industrial scale and scientific rigor. As the region seeks to localize high-tech manufacturing, the convergence of 1Thirty Holding's market leadership in coatings and NU's premier research infrastructure creates a powerful catalyst for regional innovation. This partnership serves as a blueprint for the "Triple Helix" model of innovation, where the synergy between the private sector and academic institutions drives economic complexity and industrial resilience.

Establishing a Nucleus for Coating Science

At the heart of this alliance is the ambitious plan to establish the region's first dedicated R&D center for advanced coating technologies. In an industry where performance is measured at the molecular level, the necessity for sophisticated

laboratory environments cannot be overstated. By situating a significant portion of its research activities on the campus of Nazarbayev University, 1Thirty Holding is effectively bridging the gap between theoretical chemistry and industrial application.



This center is envisioned as a regional hub that will focus on the fundamental physics of polymers and the development of next-generation industrial finishes. The objective is clear: to move beyond the adaptation of foreign technologies and toward the creation of proprietary solutions that address the specific environmental and structural challenges of the Central Asian market. This long-term investment in scientific infrastructure marks a maturation of the local industry, signaling a move toward high-value-added production.

Shared Vision

The signing of the Memorandum of Understanding (MoU) was far more than a ceremonial gesture; it served as the formal beginning of a shared intellectual journey. The document outlines a comprehensive agenda centered on joint research initiatives, particularly in the field of coatings and high-performance industrial applications. This framework facilitates a sophisticated exchange of knowledge: 1Thirty Holding brings to the table its deep industrial R&D expertise and complex data, which are then augmented by the university's capacity for fundamental scientific inquiry and specialized laboratory analysis. By focusing on sustainable formulations and enhanced durability, the partnership aims to redefine the standards of the coatings industry. This collaborative approach ensures that the technological evolution of 1Thirty Holding remains grounded in rigorous scientific validation, while providing the university with a practical outlet for its intellectual output.

Nurturing Local Intellectual Capital

Beyond patents and formulations, the most significant impact of this collaboration lies in the development of human capital. Historically, the regional coatings industry has relied heavily on imported expertise for specialized roles. The 1Thirty-NU partnership aims to disrupt this trend by cultivating a new generation of Kazakhstan-grown scientists and engineers specifically trained for the nuances of the coatings sector. This ecosystem creates a seamless transition from the classroom to the laboratory and eventually to the production line. For the university, it provides students with a clear pathway to high-impact careers; for 1Thirty Holding, it

secures a pipeline of talent that is already acclimated to the company's R&D culture. This win-win model is essential for creating a sustainable industrial base that can compete on a global stage without total dependence on external intellectual resources.

The Pedagogical Bridge

The practical dimension of this knowledge exchange was recently exemplified by a masterclass delivered to Nazarbayev University students by Perihan Karaalioğlu, Head of Research and Development at Qemtex. Moving beyond the standard curricula, the lecture delved into the complex intersection of the chemistry and physics of powder coatings. What made this session unique was the inclusion of proprietary industry insights — data and operational nuances that are notoriously absent from open-source academic literature. By presenting the realities of research and development in a commercial



social responsibility. It is a strategic move that acknowledges that the future of the coatings industry is inextricably linked to the quality of scientific research and the caliber of local talent. By integrating production expertise with academic



manufacturing context, Perihan provided students with a rare glimpse into the "tacit knowledge" of the industry. The high level of engagement and the technical depth of the ensuing discussions highlighted a significant appetite among the next generation of researchers for applied industrial science.

Defining the Future

The collaboration between 1Thirty Holding and Nazarbayev University transcends the traditional boundaries of corporate

excellence, this initiative is setting a new precedent for how industrial players should engage with educational institutions in Kazakhstan. As the regional R&D center begins its operations and the first cohort of specialists emerges, this partnership will likely become the definitive model for industrial-academic cooperation. In the final analysis, such initiatives do more than just improve products; they build the foundational infrastructure of a modern, innovation-led economy. ♦

POP QUIZ

Test Your Powder Coating Expertise

The protective and decorative coatings industry is a balance of chemistry, physics, and strict international standards. For our readers, we've prepared a quiz divided into three levels of complexity: from basic concepts to the nuances of professional certification. Find out where you stand!



1thirty.com

Level: Basics

1. What physical phenomenon keeps powder coatings on the product in the spray chamber until it is baked?

- a. Magnetic attraction of the metal.
- b. Electrostatic charging of the powder particles.
- c. Use of a special adhesive backing.

2. Which of the following properties is the main environmental advantage of powder coatings over liquid enamels?

- a. High water content.
- b. Almost completely free of volatile organic compounds (VOCs).
- c. Can be applied without electricity.

Level: Pro

3. In modern automated lines, powder that doesn't settle on the part (overspray) isn't wasted. What happens to it?

- a. It is collected by a recovery system and returned to the painting cycle.
- b. It is used as a filler in construction mixtures.
- c. It undergoes instant thermal destruction in filters.

4. The process by which the powder coating forms a continuous protective film in the oven is called polymerization. What is critical to the proper completion of this process?

- a. Rapid cooling of the part immediately after exiting the oven.
- b. Maintaining the part at the required temperature for a specified period of time (the "temperature window").
- c. Maximum humidity inside the oven.

Level: Expert

5. When painting complex-shaped items or applying a second coat, back-ionization often occurs. What technical solution is most effective for combating this defect without sacrificing performance?

- a. Increasing the current (μA) to maximum values to "break through" the layer.
- b. Using the current limiting mode (μA) while maintaining a stable voltage and adjusting the powder feed.
- c. Increasing the distance from the gun to the part to 500 mm or more.

6. When switching to modern chrome-free aluminum preparation systems, which parameter of the final rinse water before drying is the most critical according to QUALICOAT specifications?

- a. Water temperature (not below 60°C).
- b. Electrical conductivity (not more than 30 $\mu S/cm$).
- c. Water color on the cobalt-platinum scale.

How to participate

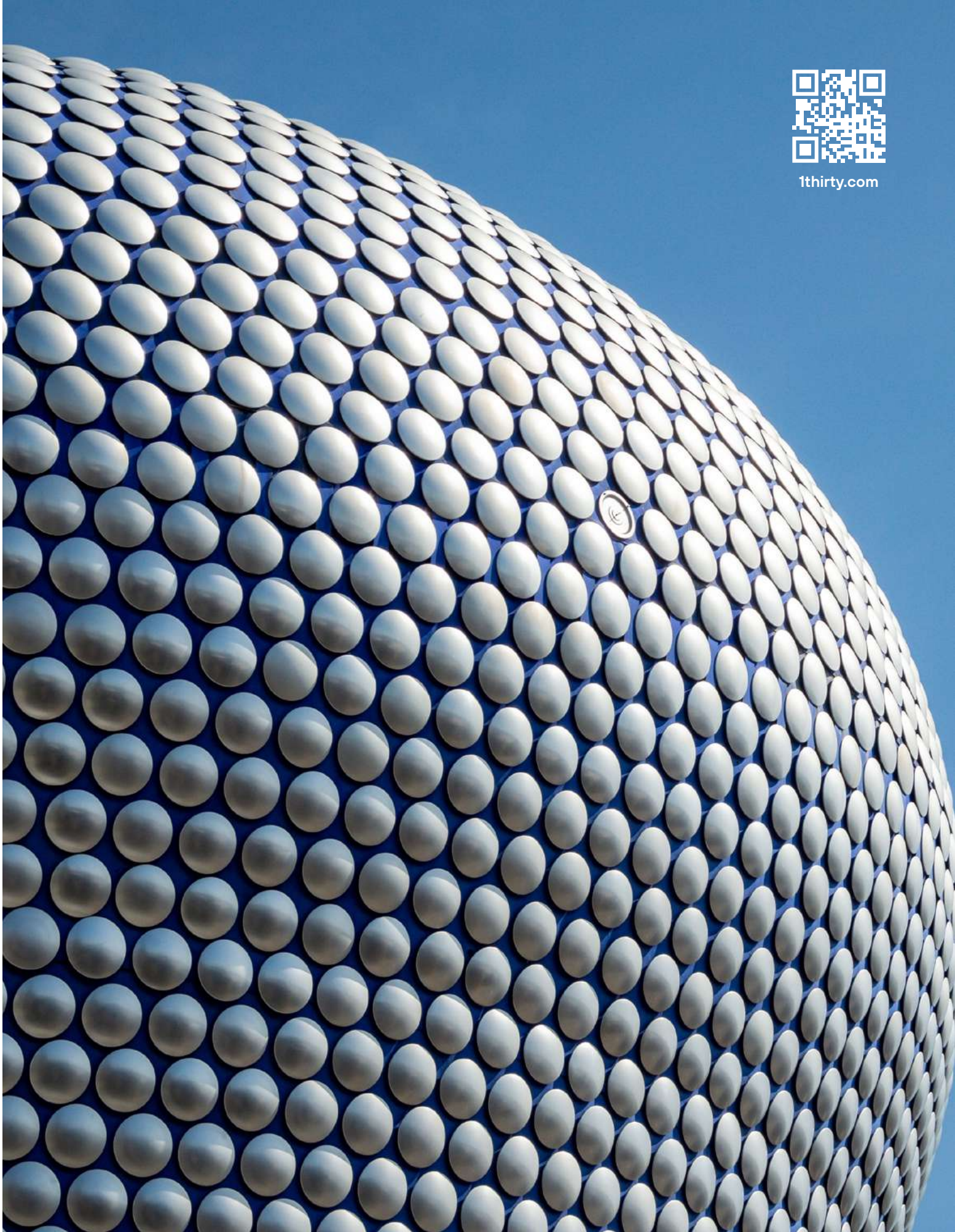
We invite industry professionals to share their knowledge and receive commemorative gifts from the editorial team.

1. Please send your answers (question numbers and selected options) to email: info@1thirty.com.

2. In the subject line of the email please indicate: **«Pop Quiz: Coating Expert».**
3. Please include your name, position, and the company you represent in your letter.
4. The deadline for receiving responses is **June 1, 2026**.

We will select the winners from among the participants who answer all test questions correctly.

Reward: A set of branded souvenirs from the company and a mention in the next issue of our magazine.



TO BE CONTINUED