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# editorial

*These days, as summer approaches and the heat sets in, I would like to take this opportunity to greet you once again.*

*Dear reader, the core mission of this publication has always been to bring visibility to a material as fascinating as stainless steel, so that you can recognize its extraordinary performance in everyday applications.*

*Speaking of stainless steel means addressing endless applications and sectors; in fact, one might ask which sector is it not a part of? Let this issue serve to explore some of them. Throughout these pages, we examine spaces designed for leisure and gastronomy, such as the article dedicated to Plaza Mahou inside the Santiago Bernabéu Stadium— a venue that stands as a global architectural benchmark for stainless steel.*

*Remaining on the subject of architecture, we believe that the centennial of Gaudí's passing offers a perfect moment to revisit his genius and discover how stainless steel is quietly shaping the completion of the Sagrada Familia.*

*We have not forgotten the largest market for this material: industry. We will show you various examples where stainless steel improves process safety and efficiency, as well as new alloys for emerging manufacturing methods such as additive manufacturing.*

*Summer is a time to disconnect and travel, and our most enthusiastic readers will be eager to discover our next destination. We thought you might enjoy a combination of sun and beach, so on this occasion, we propose a tour around the city of Turia river (Valencia). We hope you enjoy it.*

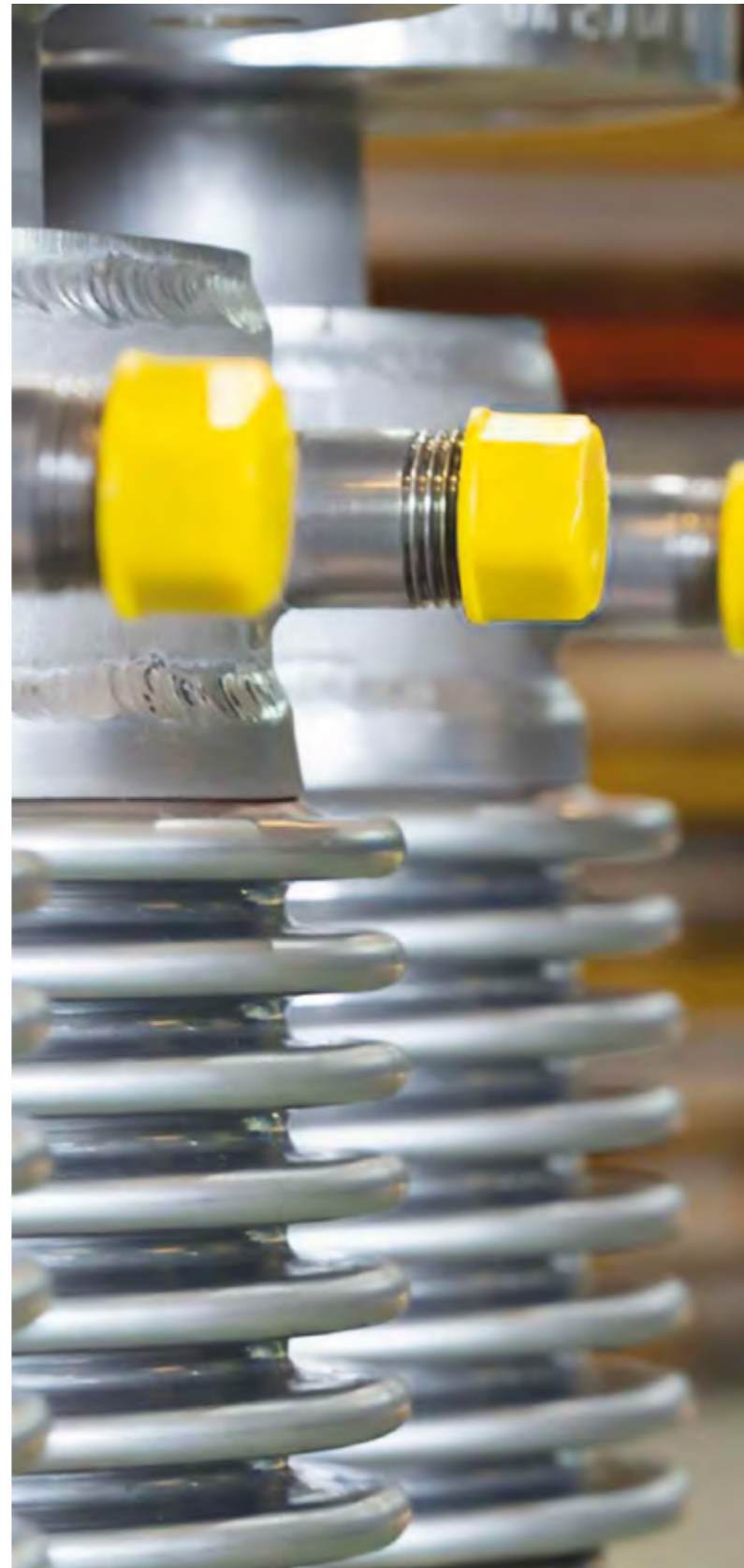
*I would like to conclude by thanking everyone who makes this project possible, from manufacturers to writers and layout designers. Without you, we would not achieve the growing visibility we are gaining for stainless steel.*

*Warmest regards to all, and have a great summer!*

Luis Peiró

Director of Cedinox

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# Plaza Mahou:

## Stainless Steel and Brewing Tradition



The new Plaza Mahou, located in the renovated Santiago Bernabéu Stadium, represents one of the most unique concepts within the stadium's new leisure and dining spaces. Conceived as a meeting point for hospitality, brewing culture, and innovation, it makes the Bernabéu the first stadium in Spain to incorporate its own brewery integrated into the premises and visually open to visitors.

The space brings the brewing process closer to the public in a contemporary environment intimately tied to Madrid's identity. Plaza Mahou combines design, technology, and tradition in a place where visitors do not merely consume the product, but coexist with part of its manufacturing process. The microbrewery is naturally woven into the layout of the premises, allowing the observation of different production and storage areas through glass surfaces that

connect the gastronomic experience with industrial activity.

Stainless steel takes on a central role from both a technical and decorative standpoint. Its presence is particularly symbolic within the Bernabéu, whose recently completed outer envelope is composed of stainless steel louvers. In this way, the material establishes continuity between the stadium's exterior architecture and the interior of Plaza Mahou, reinforcing the contemporary character of the complex.

In a context subjected to high daily traffic and intensive use, the choice of stainless steel also meets criteria for durability, mechanical resistance, and ease of maintenance. The material is present in bars, cladding, structural elements, and furniture pieces inspired by beer kegs, providing a clean and timeless industrial aesthetic.

Satin and polished finishes allow for interaction with light reflection and foster a greater sense of spaciousness and luminosity. This presence of stainless steel coexists with other elements deeply rooted in Madrid's local identity, such as ceramic murals, graphic references linked to beer, and decorative details in red tones that evoke the classic aesthetic of the capital's taverns.

Beyond its visual contribution, stainless steel is an essential material within the brewery installed on the premises. From the fermentation areas to the storage tanks and piping, stainless steel constitutes the standard solution in the food and brewing industry due to its hygienic properties and high resistance to corrosion.

The low surface porosity of the material facilitates cleaning and disinfection processes, minimizing residue accumulation and guaranteeing optimal conditions for food production. Furthermore, its neutrality allows the organoleptic properties of the beer to be

preserved intact, preventing alterations in aromas or flavors during the different stages of brewing and storage.

The relationship between the visitor and the microbrewery constitutes one of the most interesting aspects of the project. Through a large glass window, the public can observe part of the internal operations of the facility, including the master brewer's

work areas and the cold storage tanks. This integration of industrial activity within the dining area reinforces the immersive character of the premises and highlights the technical processes associated with beer production.

The gastronomic offering accompanies the general concept of the space with a contemporary reinterpretation

of the Madrid tavern, while the beer selection combines classic Mahou varieties with special references and beer brewed in situ at Plaza Mahou itself. All of this unfolds in an environment where stainless steel continues to play a significant role as a material capable of meeting the functional demands of daily hospitality service.

Founded in 1890, Mahou maintains a strong commitment to innovation and the modernization of its spaces without losing the link to its historical heritage. At Plaza Mahou, this vision translates into the incorporation of technical solutions and materials aligned with durability and sustainability criteria.

In this regard, stainless steel fits naturally within a strategy oriented toward the circular economy, thanks to its long service life and its ability to be recycled at the end of its life cycle without losing its properties. Its use in both industrial facilities and public service areas demonstrates the versatility of a material that combines technical performance, resistance, and a distinct architectural value.

Plaza Mahou demonstrates how engineering, hospitality, and design can coexist within one of Europe's most iconic stadiums. In this project, stainless steel acts not merely as a construction resource, but as an element capable

of connecting architecture, functionality, and user experience, where tradition and innovation naturally blend.



SOURCE:  
[www.mahou.es](http://www.mahou.es)  
Photos: cedinox©



# Hybrid Profiles that combine hot rolling and welding

The company Montanstahl, located in Switzerland and specializing in special stainless steel profiles, was contacted by a client to resolve a significant operational problem detected in automatic vehicle wash facilities. They were requested to provide an alternative solution to the one currently in use, capable of addressing the challenges raised.

During the automatic vehicle washing process in tunnels specifically equipped for this purpose, vehicles remain stationary while various cleaning devices move along rails during the cleaning operation.

The client of Montanstahl requested a reduced-section profile that would sit flush with the floor to minimize potential tripping hazards, given that the wash area is accessible to the public. This requirement necessitated tight tolerances in both the cutting and the shape of the profile.

At the same time, it was crucial to ensure adequate load-bearing capacity, good resistance to abrasion caused by the movement system's gears, and, finally,

excellent corrosion resistance in a humid environment containing cleaning agents and dirt. Any stoppage of the movement system due to wear or corrosion could lead to not only operational costs but also safety issues within the facility.

The client was seeking an alternative solution that would combine the properties of hot-

rolled carbon steel (S355J2) with adequate corrosion resistance.

Therefore, three challenges were posed:

1. Finding an alloy that showed sufficient corrosion resistance in an environment subjected to humidity, cleaning products, and dirt.

2. Identifying a suitable manufacturing technology to combine the selected material with the required geometry.

3. Achieving a maximum twist of 0.35 mm/m.

After analyzing the different alternatives, the technical department at Montanstahl decided on a completely innovative idea: based on their experience over the years and the results of the tests conducted, Montanstahl opted for a hybrid profile made entirely of AISI 304L.

The manufacturing process for this profile consists of two clearly differentiated stages that combine hot rolling and welding. In the first, the upper part of the profile is hot-rolled at Montanstahl's own facilities in Switzerland. The second consists of welding a standard flat bar of the same material to the profile manufactured in the first phase of the process.

After testing the initial prototype, it was possible to ensure a maximum twist interval between 0.329 and 0.3020 mm/m, which met the initially stated requirements.

Thanks to this interesting innovation and the flexibility of the plant's manufacturing processes, all the client's requirements were met, and both the carbon steel and stainless steel profiles were supplied for subsequent full-scale testing.

Following the in situ tests conducted, the client ultimately opted for the proposed stainless steel solution. It demonstrates the viability and suitability of these new hybrid profiles for this type of application and opens up a wide range of possibilities in environments requiring similar characteristics: high corrosion resistance, combined with adequate load-bearing capacity and abrasion resistance, often paired with a low profile and specific geometry. The development of these profiles aligns with the strategy of promoting new applications of stainless steel in high-demand projects.



Original carbon steel profile



Improved stainless steel profile



**MATERIAL :**  
[AISI 304L stainless steel](#)  
Manufactured and supplied: [Roldan, S.A.](#)

**SOURCE :**  
[www.montanstahl.com](http://www.montanstahl.com)  
Photo: montanstahl©

# When Flexibility is Essential for Industry

In industrial facilities, equipment is constantly subjected to temperature changes, vibrations, and mechanical stresses that can compromise its operation. To absorb these movements and guarantee the safety of the facilities, expansion compensators play an essential role. Although they often go unnoticed, these components are fundamental for protecting pipes, pumps, valves, and other equipment against stresses that could cause leaks, breakdowns, or unscheduled downtimes.

For over 35 years, CODINOR has been designing and manufacturing metal expansion compensators at its facilities in Zamudio (Biscay), offering solutions in diameters between 18 mm and 7,000 mm. Also known as metal expansion joints, these flexible elements are designed to absorb thermal movements, reduce vibrations, and correct misalignments. Their use makes it possible to balance the expansions and contractions caused by temperature variations, protect equipment against mechanical loads, and improve

the reliability of the facilities, especially in applications subjected to high pressures, elevated temperatures, or aggressive fluids.

Their design requires a detailed analysis of the service conditions, including temperature, pressure, fluid characteristics, and plant operating conditions. To this end, CODINOR employs proprietary calculation software developed in accordance with international standards, using advanced 2D and 3D design tools.

## Key Material

Material selection is one of the most important aspects in the performance of an expansion compensator. In this field, stainless steel has become the benchmark material thanks to its excellent combination of mechanical strength, corrosion resistance, and ability to withstand repeated deformations over long periods of service.

The bellows and sleeves are manufactured primarily from 300 austenitic stainless steels series, including grades AISI 304, 304L, 309, 310, 316, 316L, 316Ti, and 321. A 2B finish is usually employed, valued

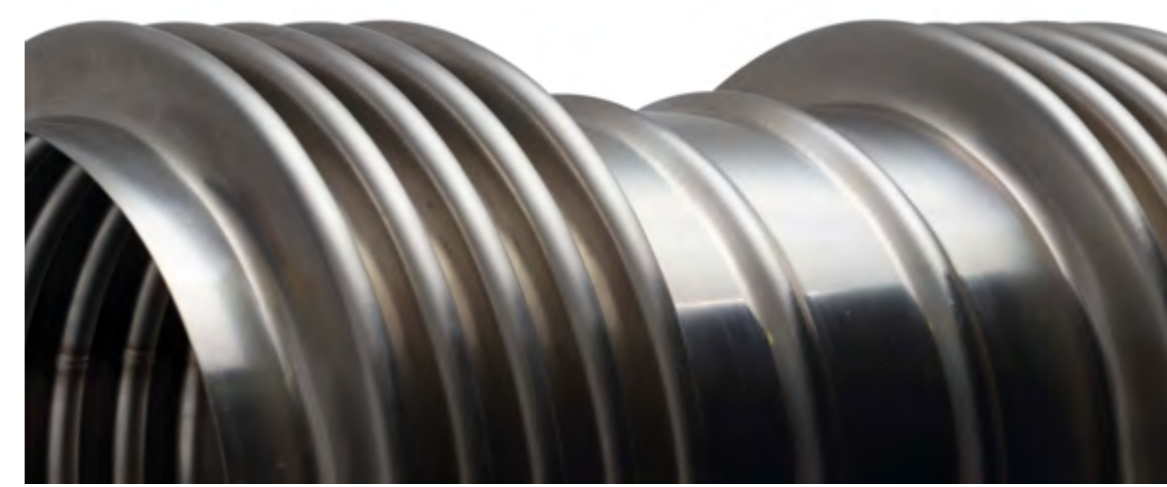


for its surface uniformity, dimensional stability, and good corrosion performance.

When service conditions are particularly demanding, higher-performance materials are used, such as duplex and super duplex stainless steels or special nickel alloys, which are capable of withstanding highly corrosive environments and extreme conditions of temperature and pressure. The versatility of these materials allows each compensator to be adapted to the specific requirements of the facility, optimizing its performance and durability.

## Quality Control

Compensators can be manufactured in circular or rectangular geometries and even adapted to special designs to respond to the needs of multiple sectors. Depending on the application and the required diameter, different forming technologies are employed. Mechanical expansion allows the manufacturing of long bellows by individually forming the convolutions. Hydraulic forming, or hydroforming, generates all the convolutions in a single



operation through hydrostatic pressure, guaranteeing high geometric precision. On the other hand, elastoforming uses an elastomer block as a flexible die to obtain complex geometries with great accuracy.

Welding constitutes one of the most critical stages of the manufacturing process. To guarantee joint quality, the bellows are welded using state-of-the-art automated GTAW (TIG)

technology equipment, even in thicknesses of just 0.20 mm. Furthermore, the products are subjected to rigorous non-destructive testing, including liquid penetrant, industrial radiography, ultrasonic inspections, and hydrostatic pressure tests, which verify the integrity and reliability of each component prior to its commissioning.

ISO 9001:2015 certification backs the company's

manufacturing and quality control processes. After consolidating its presence in the domestic market, CODINOR has expanded its international activity in Europe, South America, Africa, and Asia, demonstrating how the combination of technical knowledge, innovation, and stainless steel contributes to guaranteeing the safety and reliability of some of the most demanding industrial facilities in the world.

Urs ven hil ublius, stre ati, qui permill aristri patus, P. Are



**MATERIAL :**  
300 series austenitic stainless steel  
Supplied: [Metalinox](#)

**SOURCE :**  
[www.codinor.com](http://www.codinor.com)  
Photos: codinor©

# Additive manufacturing on the Rise



## HPA Division

**HAYNES**  
International  
The Home of HASTELLOY® and HAYNES® Alloys

VDM Metals

The additive manufacturing market continues to be very dynamic. The HPA Division of Acerinox intends to expand its footprint – by new investments, new powder products and developing new applications.

The additive manufacturing metal powder market is a rapidly expanding sector, valued between USD \$1.5 and \$2.5 billion, and projected to exceed USD \$4 billion by 2032–2035. Driven by robust aerospace, energy, healthcare, and automotive demand, amongst others, the industry is transitioning from prototyping to large-scale, high-efficiency production.

Additive manufacturing processes enable the rapid and cost-effective production of complex components directly from digital models. Among the greatest advantages are elimination of expensive tooling, tremendous design freedom, rapid production times for prototypes, and resource-efficient (mass) production on demand.

[Haynes International](#) and [VDM Metals](#), which represent the HPA Division of Acerinox, have established a solid foundation for future growth in the metal powder sector.

### New Production Facilities

In February, the groundbreaking ceremony for the expansion of the powder production at VDM Metals in Germany took place. A new hall will be constructed, which will be equipped with a new vacuum inert gas atomizer (VIGA 70) and house the necessary laboratory facilities. The VIGA 35 atomizer currently in use at VDM Metals will later move into the new hall, which furthermore has room for further additional atomizer units. With the construction of the new facility and the new larger plant, the site's total production capacity for high-alloy metal powder will increase strongly. The

new complex is scheduled to be completed and put into operation in 2027.

### Broad Portfolio

In the field of nickel and cobalt alloys, printed parts have become standard in the aerospace and gas turbine industries. Besides renowned nickel alloys such as Alloy 625, Alloy 718, HAYNES® 282® or Alloy 939, Haynes International and VDM Metals both focus on their proprietary alloy developments. This means every newly developed alloy is now also evaluated for its potential applications in the field of additive manufacturing.

As an example, HAYNES® 282®, is a gamma-strengthened nickel-based superalloy, which is commonly used in gas turbine applications. It is prized for its extreme creep resistance, thermal stability, and high-temperature strength. HAYNES® 233®, an alumina forming alloy, offers superior oxidation resistance and exceptional strength at temperatures to 1149°C or higher. For applications operating at low to intermediate temperatures, the alloy can be age-hardened

for even greater strength. The same applies for Haynes® 292®, which was recently launched in July 2025. VDM® Alloy 699 XA, developed for the use in metal dusting environments, is another perfect example, as well as VDM® Nickel 201, a pure Ni alloy used in a variety of industrial applications. This development is still evolving, to the point where the first materials designed specifically for additive manufacturing are now being developed.

### Safe Operations

Today, printed components perform just as reliably as machined parts made from traditional semi-finished products. Issues related to processing and material properties (such as fatigue and cracking behavior, high-temperature strength, etc.) have been resolved in recent years through collaborative efforts with research institutions and industry partners for various alloys.

Multiple industry segments have invested heavily in the use of additive manufacturing over the past several years and have begun to transition more components to be produced via AM processes.

The Power Generation market led by industrial gas turbine (IGT) manufacturers and space exploration companies were the earliest adopters of AM and fastest to utilize AM processes for production components.

### Additive Manufacturing (AM) Processes

There are multiple AM processes that use powder and wire feedstock. The common processes used for Haynes and VDM alloys include Laser Powder Bed Fusion (LPBF), LP-DED (Laser Powder Directed Energy Deposition), WAAM (Wire Arc Additive Manufacturing) and LW-DED (Laser Wire Directed Energy Deposition). The complexity, size, surface finish and volume of the final component are some aspects that determine which AM process is most suitable for the application. Each AM process also results in a unique microstructure, which can be influenced by post printing heat treatments.

LPBF is the dominant additive manufacturing technique used to produce high-density, complex components from nickel- and cobalt-based alloys. A laser beam melts the

metal powder layer by layer in a powder bed, creating highly complex, dense components.

LP-DED uses a flowing powder feedstock, which is melted, by a laser power source. It has been adopted by space exploration companies and is used to produce larger components due to the faster deposition rate compared to LPBF.

WAAM is a wire-based AM process that is becoming increasingly popular. In this process, a welding robot continuously melts metal wire and applies it in layers to quickly produce large, complex, and dense components, oftentimes combined with subsequent CNC machining. Since both Haynes and VDM have decades of experience in the manufacture of welding wire, this development is promising.

LW-DED uses a continuously fed wire consumable melted by a laser power source. The deposition rate is slower than the WAAM process, however the surface finish achieved is much smoother. This result in near net shape as printed components that require much less post processing

steps compared to other AM processes.

Which alloys are best suited, which processes should be used, and which parameters need to be considered— all of these aspects are discussed directly with the customer to ensure that the results are successful.



# Stainless Steel Turns blue

In wellness and hospitality architecture, materials must not only meet technical and functional requirements but also integrate as part of the design and user experience. In this context, stainless steel has established itself as a high-value-added construction solution due to its durability, versatility, and performance in humid and marine environments.

An example of this application is the swimming pool developed for the Hawa Rooftop space at the Hotel Silken Saaj Maar. The project was executed by Klafs Spain & LATAM, specialists in the design and construction of wellness areas for luxury hotels and resorts.

Located on the seafront promenade of Puerto de la Cruz in Tenerife, the project incorporates a swimming pool

conceived not only as a leisure space but simultaneously serves as an architectural and visual anchor capable of elevating the entire guest experience.

The entire pool shell has been manufactured from stainless steel; furthermore, it features an L-shaped underwater window using a structural methacrylate piece.

The interior dimensions of the pool are 7.75 x 5.45 meters, with a water depth of 0.90 meters. One of the main areas incorporates a structural double height of 2.30 meters, visible from the indoor spa reception through the underwater window blended with the stainless steel structure.

In this type of facility, stainless steel not only fulfills a structural

load-bearing function, but additionally forms part of the architectural proposal, providing visual cleanliness, aesthetic continuity, and high-quality finish.

The choice of stainless steel responds to multiple technical and construction advantages, which are particularly relevant in facilities subjected to permanent moisture and aggressive environments, as occurs in coastal areas. Key advantages include high corrosion resistance, great durability even in marine environments, structural lightness through reduced thicknesses, speed of execution, and low maintenance.

Moreover, being a non-porous material, stainless steel hinders the accumulation

of dirt and microorganisms, facilitating cleaning tasks and reducing the consumption of chemical disinfectants.

Another relevant aspect is watertightness. By being constructed using welded joints on a single material, the shell functions as a completely watertight continuous monocoque, minimizing the risk of leaks or structural deterioration.

AISI 316 and AISI 316L stainless steels were used to manufacture the structure; these materials are widely employed in architectural

applications and highly corrosive environments due to their excellent resistance to moisture and chlorides. The use of AISI 316L further improves corrosion behavior in welded areas, a particularly important aspect in structures subjected to continuous contact with water and treatment products.

Due to the dimensions of the pool, it was necessary to perform partial pre-assemblies prior to transport to the site. Subsequently, at the final location, the placement of the main structure, the positioning

of the shell plates, and the final welding were carried out using the TIG process, which is particularly suitable for stainless steel due to the high-quality finish it provides and because it allows for clean, strong, and watertight joints.

In addition to its technical performance, stainless steel provides advantages from an environmental and operational standpoint. It is a 100% recyclable material with a very long service life, which reduces the need for frequent replacements or repairs. Likewise, the absence

of leaks and low maintenance contribute to decreasing the consumption of water and chemicals during the operation of the facility.

The experience of Klafs Spain & LATAM demonstrates how stainless steel has become a strategic material in the development of high-end wellness spaces, combining architecture, sustainability, and technical performance into a single construction solution.

Furthermore, this project embodies decades of sector

expertise, most notably reflected in the trajectory of Enrique Naya who has spent over 35 years driving the development and execution of advanced swimming pools systems, consistently contributing to the evolution of technical and architectural solutions of the field.



**MATERIAL :**  
 AISI 316/316L stainless steel  
 Supplied: [Inoxcenter](http://Inoxcenter)  
**SOURCE :**  
[www.klafs.es](http://www.klafs.es)  
 Photos: Klafs Spain & LATAM ©

*The hotel and its innovative swimming pool are the work of PhD architect Juan José Martínez Rodríguez (Las Palmas, 1979), a project brought to life thanks to the commitment of the Bhagvanji family, the building's owners and investors.*

# Technique

## Transition from natural gas to hydrogen in the annealing process.

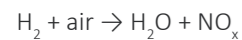
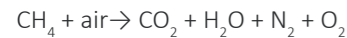
### Impact on the oxidation mechanisms of stainless steel. FORNAX PROJECT.

The FORNAX Project, a consortium led by Acerinox Europa together with Alfran, Tubacex, and Titania, studies the effect of substituting natural gas with green hydrogen in the annealing of stainless steel. The project is funded by NextGenerationEU funds through the IDAE (Institute for the Diversification and Saving of Energy).

To evaluate the impact of hydrogen combustion on the heat treatment of stainless steels, the tests were carried out in a laboratory-scale furnace, designed and built specifically for the project at the Titania facilities. This equipment integrates two independent burners (natural gas and hydrogen) that allow the flow rates to be regulated until the desired mixture is achieved.

When burning hydrogen, the combustion gases increase the water vapor in the heat treatment environment. This directly impacts the oxidation mechanism of the stainless steel and, consequently, the pickling stage.

When working with excess air, hydrogen combustion generates a super-oxidizing medium. The combustion reactions are as follows:



To verify this effect, five tests were carried out in the laboratory furnace with different fuel compositions. As detailed in Table 1, two scenarios with pure gases (natural gas and hydrogen in tests 1 and 5) and three with different NG/H2 mixture proportions (tests 2, 3, and 4) were evaluated.

Experiment	CH <sub>4</sub> : H <sub>2</sub>	Combustion atmosphere
1 (Ref.)	100: 0	CO <sub>2</sub> + H <sub>2</sub> O + N <sub>2</sub> + O <sub>2</sub>
2	75: 25	
3	50: 50	CO <sub>2</sub> + H <sub>2</sub> O(v) + N <sub>2</sub> + O <sub>2</sub> + NO <sub>x</sub>
4	25: 75	
5	0: 100	H <sub>2</sub> O (v) + NO <sub>x</sub>

The material used in the tests was ACX 240 austenitic stainless steel. The samples were treated at 1100 °C (with times adjusted to their thickness) and subjected to forced air cooling. After the process, significant differences in the scale were evident;

the sample exposed to 100% hydrogen suffered severe oxidation driven by the breakaway phenomenon. This

effect involves the sudden rupture of the protective layer and the total loss of the steel's passivity, which triggers destructive oxidation and rapid spalling of the surface.



Comparison between tests 1 (100% natural gas) and 5 (100% hydrogen)



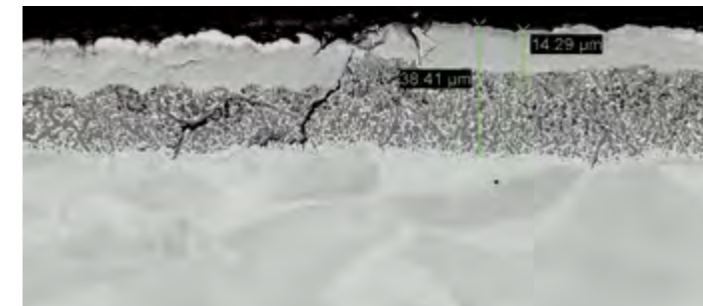
To compare the tests with pure fuels (test 1 with 100% natural gas and test 5 with 100% hydrogen), the detached scale was characterized using ICP spectrometry. As detailed in the attached table, the elemental analysis reveals that it is primarily composed of iron oxides, with minor proportions of manganese and chromium.

% wt	Experiment 1: 100 % GN	Experiment 5: 100 % H <sub>2</sub>
Al	0.07	0.14
Cr	0.57	0.31
Fe	67.40	73.50
Mn	1.82	1.43
Mo	0.04	0.05
Ni	0.43	0.36

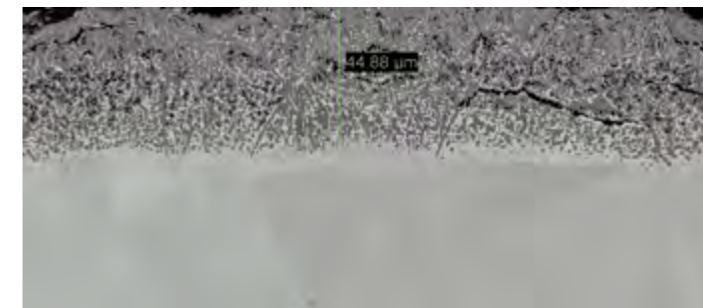
Through the X-ray diffraction (XRD) technique, it has been possible to determine that the dominant species in the detached scale in experiment 1 and 5 was (Fe,Cr,Mn)<sub>3</sub>O<sub>4</sub>, with the most probable oxide being MnFe<sub>2</sub>O<sub>4</sub>, since the available chromium would be in the hexagonal phase of Cr<sub>2</sub>O<sub>3</sub>.



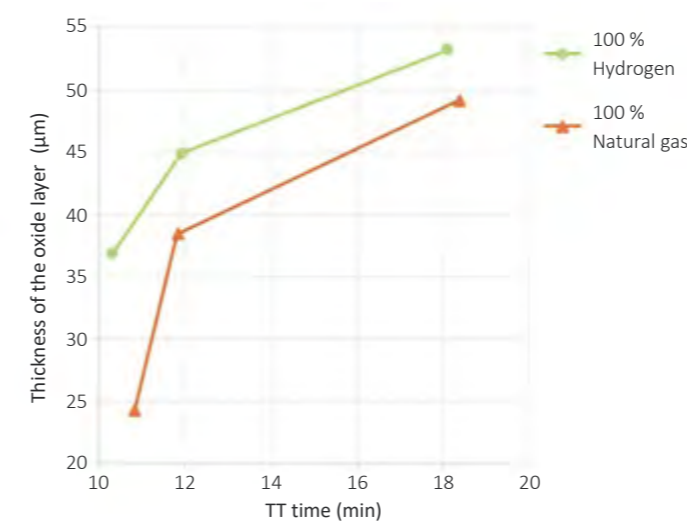
The study also included an analysis using scanning electron microscopy (SEM), specifically focused on the residual oxide layer that managed to remain adhered to the steel surface after the treatment. In the sample evaluated with 100% natural gas, this layer reached an average thickness of 38.41 microns and revealed the presence of two well-differentiated strata. The outer stratum is composed of iron-rich mixed oxides and exhibits nickel oxidation, a clear indication that the protection was beginning to weaken. Conversely, the inner stratum (formed by chromium and iron oxides) shows no nickel oxidation. In this deeper zone, chromium and iron completely dominate the reaction with oxygen, confirming their high passivity and resistance compared to the external stratum.



In the case of the sample treated with 100% hydrogen, the oxide layer is thicker, about 44.88 microns, and only presents one stratum of mixed iron and chromium oxides. This implies that the breakaway phenomenon was more advanced in this sample, to the point that the outermost iron-rich stratum, which was indeed observed in the 100% NG sample, has detached in this 100% hydrogen case.



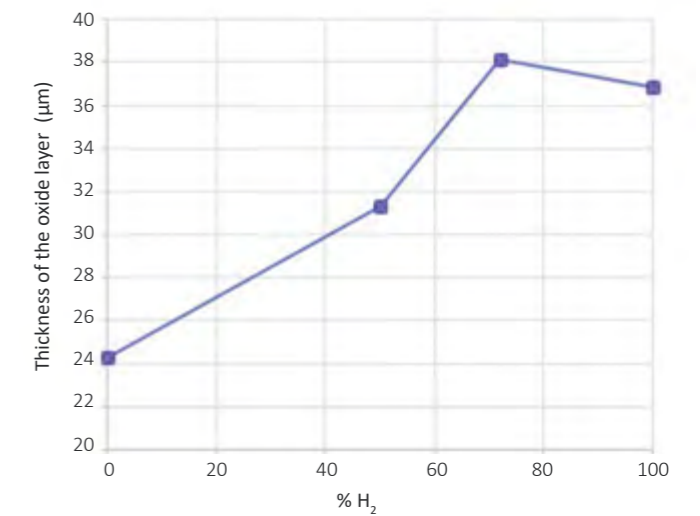
#### Conclusions



This graph shows the thickness of the oxide layer as a function of the heat treatment time, comparing the behavior of the stainless steel under a combustion atmosphere of 100% Natural Gas (orange line) versus one of 100% Hydrogen (green line).

Hydrogen drastically accelerates the oxidation kinetics. This empirically confirms that the water vapor generated by the combustion of hydrogen is much more aggressive and accelerates the oxidation reactions on the surface of the stainless steel in comparison with natural gas.

Between 10 and 12 minutes, the growth rate of the oxide layer is extremely fast for both fuels. After 12 minutes, the slopes of both curves smooth out. This occurs because the oxide layer itself begins to act as a protective physical barrier, making it more difficult for external oxygen to continue reaching the steel matrix with the same ease.



Here, the thickness of the oxide layer is analyzed as a function of the percentage of Hydrogen in the fuel mixture (from 0% —pure natural gas— to 100% —pure hydrogen—), under constant time and temperature conditions.

The increase in hydrogen does not linearly affect the oxidation kinetics of austenitic stainless steel. Gradually introducing hydrogen into the burners up to 50% moderately increases the thickness of the oxide layer. However, from 50% hydrogen onwards, the oxidation kinetics undergoes a sudden acceleration.

Looking to the future, regarding the partial replacement of natural gas: the knowledge generated by the project demonstrates that it is scientifically advisable to remain with mixtures below 50% hydrogen.

FORNAX provides the empirical evidence that, up to this 50%, stainless steel experiences predictable and acceptable oxide growth. In mixtures where the hydrogen is above this 50%, it implies entering the zone of catastrophic and uncontrolled oxidation.

# Designed for Wear Applications

In a high-performance motorcycle, every component is subjected to extreme conditions. At high speeds, the braking system becomes one of the most critical elements to ensure safety, precision, and control. Moreover, within that system, the brake disc plays a fundamental role.

During each braking event, the disc must withstand continuous friction, high temperatures, surface wear, and repeated mechanical stress, always maintaining dimensional stability and braking capacity. It is not merely about stopping a motorcycle, but doing so consistently and reliably thousands of times under

highly variable conditions: road, rain, mud, thermal changes, or sport riding.

The service life of a brake disc can vary depending on the riding style and operating conditions, but in medium and high-displacement motorcycles, it is typically in the range of tens of thousands of kilometers. To achieve this durability without compromising performance, the choice of material is decisive.

For this reason, martensitic stainless steels have established themselves as one of the most widely used materials in the manufacture of motorcycle brake discs. Their main advantage is the ability to combine:

- High wear resistance.
- High controlled hardness.
- Excellent friction stability.
- Optimal corrosion resistance.

In applications such as this, specialized manufacturers like NG Brakes use AISI 420 martensitic stainless steel, supplied by Acerinox, in different thicknesses depending on the requirements of each disc.

The hardness balance is crucial, an excessively hard disc can hinder the proper grip of the brake pad, reducing

braking efficiency. Conversely, insufficient hardness accelerates surface wear and reduces the component's service life. Therefore, the heat treatments applied during manufacturing seek to achieve a highly precise balance.

The industrial transformation process combines pioneering technology and rigorous geometry control:

- Initial cutting: the process begins with martensitic stainless steel sheet metal. When the outer design of the disc is perfectly circular, the parts are obtained by blanking. On the contrary, wave designs, which are common in sport motorcycles, require laser cutting processes to reproduce complex geometries with high precision.

- Flattening and heat treatment: the discs undergo flattening processes to ensure their dimensional stability before receiving the heat treatments that provide their final mechanical properties.

- Functional machining: beyond aesthetics, each geometry serves a specific function. The cross-drilled holes improve thermal dissipation and particle evacuation. In off-road and motocross applications, machined grooves are incorporated to facilitate the expulsion of mud and dirt.

- Grinding: after machining, the discs undergo grinding operations to ensure a

controlled surface roughness and a homogeneous contact with the pad.

constant research into materials, shapes, and performance, to offer

also for mopeds, ATVs, UTVs, and quads.

Today, their discs equip market-leading brands, and the company is present in over 40 countries, consolidating its position as one of the main manufacturers in the international aftermarket.

In addition to its extraordinary technical performance under extreme conditions of wear, temperature, and friction, stainless steel provides another crucial advantage for today's industry: it is a 100% recyclable material.

This capacity for recovery and reuse directly contributes to improving the sustainability of the automotive sector without compromising performance or durability at any time, positioning stainless steel as a strategic ally for the challenges of the future.



- Protection and finishing: certain areas receive cathaphoresis treatments (especially in perforations and areas less exposed to friction) to preserve the component against corrosion. Finally, laser marking is performed to guarantee individual traceability.

maximum safety. With a consolidated track record and a catalog of more than 2,400 references, they develop reliable solutions not only for road, racing, scooter, and motocross motorcycles, but

**MATERIAL :**  
[AISI 420 stainless steel](#)  
 Supplied: [Acerinox Gavà](#)

**SOURCE :**  
[www.ngbrakes.com](http://www.ngbrakes.com)  
 Photos: cedinox©



## The Guardian of the Sagrada Família

Dear colleague,

In this edition, we stray slightly from the usual topics of this section to reflect on a masterpiece of Modernisme, the Expiatory Temple of the Sagrada Família.

Before delving into this fascinating construction, allow us to refresh our understanding of what Modernista architecture is –which differs vastly from Modern architecture– and familiarize ourselves with the term. Modernisme emerged a few decades before the Modern Movement, and both are based on virtually opposing principles, deeply linked to the historical and social context in which each is framed.

Modernisme, known elsewhere as Art Nouveau, emerged at the end of the 19th century. Inspired by organic forms from nature, it utilizes color and curved lines, and emphasizes the craftsmanship of artisans working with ceramics, iron, glass, wood, and other disciplines. It is exuberance, craftwork, and fantasy.

In absolute contrast, the Modern Movement, which emerged in the first half of the 20th century, expresses itself in pure geometric

volumes, straight lines, and formal simplicity. This style suppresses any unnecessary ornamentation; materials such as concrete and steel are shown bare, with complete honesty, and the sole motivation of the design is functionality.

We will see how Gaudí elevates nature-inspired forms to their most sacred level, turning this Temple into the crowning work of Modernista architecture. He applied the lessons learned from various projects that he managed simultaneously during his early years, until he decided to dedicate himself exclusively to this work. Now that we know the pillars upon which this artistic movement rests, it will be much easier to identify them in this grandiose construction.

Although the overwhelming amount of ornamentation can mask the layout of the building, we are looking at a structure with a Latin cross floor plan. This spatial organization remains partially hidden from the exterior view due to the perimeter walls, which form a covered cloister acting as an acoustic barrier and connecting the sacristies with the side chapels of the

apse and, in the near future, with the main façade.

Its eighteen towers impart a distinct vertical character to its massing; as part of the profound symbolism surrounding this temple, they reflect the hierarchy and figures of the Christian faith. Twelve towers will be dedicated to the Apostles, and four dedicated to each of the Evangelists. These are followed in height by the Tower dedicated to the Virgin Mary, positioned over the apse. Finally, with absolute centrality, directly above the transept crossing and between the towers of the Evangelists, rises the Tower of Jesus, crowned by a four-armed cross, reaching a height of 172.5 meters.

This translates into a strict structural response inside the temple: Gaudí did not design identical pillars. Instead, he adapted the thickness, material, and the number of edges of each column in exact accordance with the structural loads they must resist, reserving the hardest stones –such as Iranian porphyry– for the crossing pillars that bear the greatest weight. This is yet another demonstration of his brilliant structural intuition.

Access to the temple is organized through three monumental façades: the Nativity and the Passion façades, already completed – on either side of the transept–



and the Glory façade, which will be the main entrance at the foot of the main nave and where construction efforts will be concentrated in the coming years.

Before entering the temple, let us focus our attention on the building of the old schools for the neighborhood children, where Gaudí exhibits his absolute virtuosity in

ruled geometry. This brick construction utilizes a succession of straight lines that, when shifted, generate conoids to form both the load-bearing walls and the sinuous roof. This solution optimizes structural resistance and material efficiency, proving the functional value of these warped surfaces. Beyond its humble scale, the schools

served as a testing laboratory: a full-scale mock-up where he tested the same geometric logic that he would later expand on a monumental scale. The efficient curves that support a modest brick roof here are the direct predecessors of the colossal ruled surfaces that today elevate the towers and vaults of the Basilica.



Maqueta:  
Sistema geométrico  
de la cubierta en forma de conoide



The inspiration from nature, so characteristic of the Modernista trend, captivates us as soon as we cross the entrance portico and step into the nave. We are welcomed by an authentic stone forest, a sacred space that eschews the rigidity of the straight line, where perforated vaults filter the light, immersing us in an atmosphere of peace identical to that of a natural forest. The colors of the stained-glass windows create a changing atmosphere: one side is tinged with cold tones, evoking sunrise, while the opposite side features warm tones, capturing the warmth of sunset.

There are many details that lead us to describe Gaudí as a genius, but his incredible capacity to understand geometry, structures, and material properties elevates his architecture to a superior level. Aware of this, and despite his trust in the professionals who would succeed him, he fought to achieve the general definition of the project, as well as the conception of entire areas to serve as models, that is to establish the "rules of the game". He geometricizes nature to simplify construction, reducing curved forms to a succession of straight lines through ruled surfaces. Other great masters –Le Corbusier, Eduardo Torroja, or Félix Candela– would follow him in the development of warped structures, but Gaudí was a



pioneer, applying it decisively in the Sagrada Família. Conoids, paraboloids, and hyperboloids are abundantly repeated throughout the Basilica.

Among the many challenges presented by the execution of a design of such scale and complexity, with scarce original documentation, we highlight that of guaranteeing its long-term durability. This is where stainless steel plays an intimate and subtle role: that of an invisible guardian. The temple is a hymn to the mass and texture of stone. However, in the heights, where the towers defy the wind and the passage of centuries, stainless steel becomes the perfect ally to Gaudí's idea of eternity. Used as a structural skeleton that ties together the pre-stressed stone modules, this material assumes a fascinating paradox: it provides maximum strength and durability without claiming visual prominence. It does not age, it does not corrode, and it does not stain the stone with rust, allowing the temple to maintain its organic purity on the outside while being supported on the inside by an incorruptible technology. It is 21st-century engineering silently serving 19th-century mysticism, ensuring that Gaudí's stone

forest remains standing, intact, for future generations. And this is only possible thanks to the work of the Construction Board of the Expiatory Temple of the Sagrada Família, which oversees its completion and maintenance with the utmost respect and devotion to the architect's work, executed today with impeccable technical mastery.

Beyond nostalgia for what could have been, his work poses a fascinating question. If, with brick, stone, and a geometric intuition ahead

of his time, Gaudí managed to defy gravity and place matter at the service of the transcendental, what frontiers would he have crossed today with new materials, additive manufacturing technologies, or artificial intelligence? We refrain from formulating hypotheses because we are certain he would have surpassed them all, but we have no doubt that he would have been deeply fond of duplex stainless steel –with its extraordinary mechanical properties and durability in the

**MATERIAL :**  
[Stainless steel rebar 1.4462- 2205](#)  
 Manufactured: [Roldan, S.A.](#)  
 Supplied: [Inoxcenter](#)

**SOURCE :**  
[www.sagradafamilia.org](http://www.sagradafamilia.org)  
 Photos: cedinox©

most extreme environments–. The Sagrada Família is not only his legacy on the verge of reaching its fulfillment, but a constant question of how far our creative audacity can go when technique and materials are placed at the service of the extraordinary.



# Next-Generation Dished Ends



Perfectly orchestrated production process

**Steel** Bombe Valley (SBV), a company founded in 2012, has established itself as an indisputable benchmark in the manufacture of tank heads, polishing, and laser cutting. Designed to meet the needs of sectors as demanding as boilermaking, transport, petrochemistry, pharmaceuticals, and food, the company's success lies in the high qualification of its technical team and a unique specialization in working with stainless steel, becoming a strategic ally synonymous with precision in the market.

Its trajectory reflects a constant and organic technological evolution. The company has progressively added key capabilities throughout its history, beginning with the incorporation of polishing for large diameters. Subsequently, they automated their processes with high-definition machinery, integrating plasma technology and BOLDRINI presses. This progress culminated in a qualitative leap by investing in a powerful 12 kW laser cutting table and moving to modern 5,000 m<sup>2</sup> facilities. Currently, the company continues to expand its infrastructure with an investment of an additional 1,000 m<sup>2</sup> in a new warehouse exclusively dedicated to optimizing its polishing division.

## A Perfectly Orchestrated Production Process

For SBV, excellence is not just the goal, but a fundamental part of a rigorous method. They deploy top-tier technological potential to transform raw materials into high-precision formed heads, structured into five key stages:

1. Pioneering cutting solutions: The process begins on their 8,000 x 2,500 mm, 12 kW laser table, a technology that guarantees millimeter precision in plate dimensioning.
2. High-resistance welding: Depending on technical requirements, they employ PAW (TIG Plasma) welding on benches up to 6 meters in length. For large thicknesses up to 30 mm, in any material grade, the company utilizes Submerged Arc systems, ensuring structurally perfect joints.
3. High-power pressing: The forming of the crown radius is executed using three automatic presses with up to 6 meters of span and 500 tons of force, capable of processing maximum thicknesses of up to 40 mm.
4. Versatile flanging: The perimeter profiling is entrusted to four state-of-the-art flanging machines, capable of processing diameters up to



80% of the energy used in the plant, drastically eliminating its carbon footprint. Backed by the trust placed in them by their clients, SBV continues to consolidate its hallmark of dedication, excellence, and care.

6 meters and thickness ranges from 2 mm to 32 mm.

5. Cold machining: The process culminates in an added value feature, edge finishing via cold milling cutters. This system is crucial, as it avoids introducing heat input to the most critical area of the head, ensuring that the end user receives an optimal part with intact material properties, ready to be welded to the shell.

## Material Versatility and Surface Finishes

Technical flexibility is one of the pillars defining the company's identity. At SBV, they work with an extensive range of highly demanding materials: from standard and special stainless steels such as 304L, 316L, 904L, 321, 310S, and 444, to duplex and super duplex steels (2205, 2304, 2507), and high-performance alloys such as Inconel and Hastelloy, in addition to aluminum, covering thicknesses from 2 mm to 32 mm.

Added to this versatility is an extraordinary surface treatment capability. Through its polishing division, SBV delivers satin finishes

in all their variants and high-definition polishing that achieves extremely demanding roughness values, such as mirror-shine finishes with Ra values below 0.1, 0.5, and 0.8. This rigorous control guarantees sanitary-grade surfaces with the lowest bacterial adhesion and the highest corrosion resistance on the market.

## Cutting-Edge Technology for a Sustainable Future

At SBV, industrial leadership goes hand in hand with social and environmental responsibility. This responsiveness became evident during the health crisis, a period in which the company collaborated closely with various clients in manufacturing the heads destined for COVID-19 vaccine production equipment. Currently, that same level of commitment is directed toward the energy transition, developing solutions for green hydrogen storage, as well as R&D projects alongside abrasives manufacturers for the continuous improvement and efficiency of their polishing processes.

All this engineering deployment is managed from a clean and eco-efficient operation. SBV's headquarters features a 170 kW photovoltaic installation that generates

**MATERIAL :**  
[Stainless steel](#)  
 Supplied: [Inoxcenter Pinto](#)

**SOURCE :**  
[www.steelbombe.com](http://www.steelbombe.com)  
 Photos: cedinox©





## Wave Barriers

The renovation of the McGurk Beach jetty at Playa del Rey, south of Los Angeles, has become a remarkable example of how stainless steel can extend the lifespan and reliability of coastal infrastructure exposed to highly corrosive marine conditions.

Originally built more than 40 years ago to protect swimmers and reduce coastal erosion, the concrete jetty incorporated carbon steel wave barriers that progressively deteriorated due to continuous exposure to seawater and saline environments. Severe corrosion compromised the structural integrity and functionality of the barriers, making replacement unavoidable.

As part of the renovation process, the city authorities evaluated several material alternatives capable of

resisting corrosion while maintaining the required mechanical strength. Materials such as aluminum and galvanized steel were assessed, but stainless steel ultimately proved to be the most suitable solution for long-term performance in aggressive marine environments.

North American Stainless (NAS) supplied its T316L stainless steel grade for the project, selected for its excellent combination of corrosion resistance, durability and structural reliability. The material was used in a variety of structural profiles manufactured by Stainless Structurals, including wide flange beams, angles, channels, and square and rectangular tubing.

The use of NAS T316L offers significant long-term advantages compared to conventional carbon steel solutions. In addition to reducing maintenance requirements and associated costs, the stainless steel

barriers provide enhanced durability and improved operational reliability for coastal protection systems exposed to seawater.

The successful implementation of the project has received positive feedback from both local authorities and the public, highlighting the value of stainless steel in infrastructure applications where durability, safety and lifecycle cost reduction are critical.

Beyond this specific project, the initiative demonstrates the growing potential for stainless steel in marine and coastal infrastructure

renovation worldwide. The experience gained through the McGurk Beach jetty renovation can be replicated in other coastal regions where corrosion remains one of the main challenges for public infrastructure maintenance.



## Anco

Manufacturing PTY Ltd is a benchmark in the innovation for the fire-fighting and agricultural manufacturing industries. Their products include fire-fighting skid units/bakkie sakkies, specialised firefighting trucks, compressed air foam systems (CAFS), fire-fighting pumps and equipment and mechanised silviculture equipment. Previously they used mild steel and/or aluminum, however, these materials proved insufficient for the severe, high-stress conditions and corrosive environments that these trucks must endure over their lifecycle.

The pivot to 3CR12 was strategic. The manufacturing process required material that guaranteed long-term durability and corrosion resistance while being cost

effective. The use of pure stainless steel is limited due to significant cost implications and was necessary to address this material performance challenge and achieve lifecycle cost efficiency.

Due to its robustness and lower maintenance requirements in harsh territories, 3CR12 ensures better long-term value and reliability. The material is specifically engineered to withstand the mechanical and environmental rigors typical of these operations while matching the mechanical properties of mild steel, which ensures disruption to existing manufacturing processes.

ANCO followed these actions to overcome this challenge and capture the market:

- Strategic pivot to 3CR12 for equipment and truck bodies.
- The development of

modular sub-sections, reducing lead times and allowing for versatile solutions across vehicle platforms and applications.

• Painting processes to the highest industry standards to ensure best possible corrosion protection.

3CR12 offers superior durability in corrosive environments compared to other steels, significantly extending the vehicle's operational lifespan. Fire-truck durability cycles improved remarkably with some of the first 3CR12 units now entering 4 to 5 annual seasons without the need for re-work on painted surfaces.

By standardizing the modular design and utilizing 3CR12, the company successfully optimized production and product durability for both

local (80%) and international (20%) markets. The goal of reaching maximum output was achieved and delivered within the 2025 calendar year.

The use of 3CR12 has been extended to include a wider range of products and is being offered to all end-users as a material option when selecting fire truck specifications.

Vehicle longevity directly impacts the end-user total cost of ownership. By adding more value without significant cost differences, the brand reputation has been strengthened significantly. This, in turn, boosted confidence across other industry sectors triggering a positive domino effect that benefits ANCO as a business, as a contributor to the local economy and ultimately, to its people.

Photo: Faith & Frames



# VALENCIA

## The Light of the Mediterranean



Veles e Vents Building

This new edition of Stainless and the City will take us to explore La Terreta (Valencia) from a whole new perspective—home to lovers of noise, fire, and gunpowder.

We begin with sea views at one of the city's most international hotspots.

### Veles e Vents Building – The America's Cup Balcony

Veles e Vents, referencing the poem by Valencian poet Ausiàs March, is the cornerstone piece that anchored the port's remodelling carried out in 2007 for the 32nd America's Cup. British architect David Chipperfield, along with the Spanish studio B720 headed by Fermín Vázquez, found a way to reconnect the city of Valencia with its seafront

and inner dock, which had historically been cut off by industrial activity.

Four overlapping platforms make up its overall volume. Solar gain is controlled by offsetting each platform relative to the one below it, resulting in spacious terraces and shaded zones. The only supports are the four concrete vertical communication cores, allowing for the creation of massive structural cantilevers. The white concrete slabs seem to float over the water like the decks of an ocean liner. In this privileged setting, stainless steel reveals itself as a fine, barely perceptible perimeter line—until we get closer, and it guides us along its splendid terraces—.

Now that the scent of the sea has left us wanting more, we just have to head down to the seafront. Right where the Cabañal and Malvarrosa beaches meet, we stumble upon our next landmark.

### Nau de l'Aigua Fountain

A fountain where the metal takes on the silhouette of a sailboat, and it is the flowing water itself that allows us to visualize the hull and the sail. A beautiful tribute to local fishermen.

With our feet on the sand, we walk across Malvarrosa beach to approach a nationally renowned university, particularly outstanding in technical and scientific fields.

### Universitat Politècnica de València (UPV)

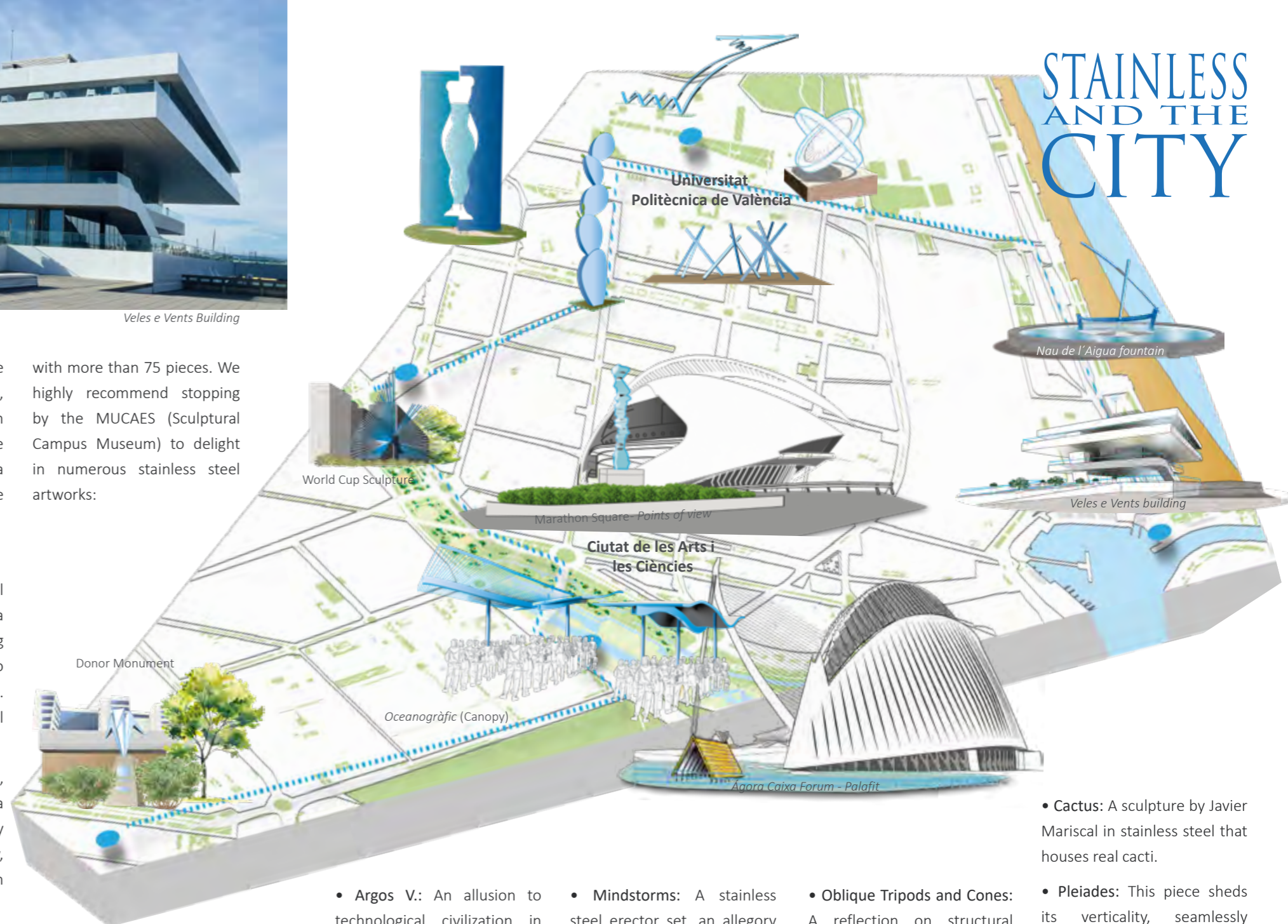
We will enter through the northern zone of the campus and come across the UPV Stadium, which features a glass canopy with stainless steel profiles and tie rods designed by FR Estudio. The Vera Campus, the main headquarters, is a complex organized around the Àgora, which serves as the heart of university life. The central axis of this urban plan consists of green areas that host an open-air sculpture museum

with more than 75 pieces. We highly recommend stopping by the MUCAES (Sculptural Campus Museum) to delight in numerous stainless steel artworks:

• **Horologium:** An equatorial sundial built from stainless steel, glass, and stone, by Rafael Amorós.

• **The Origin of Life:** Where Xavier Bertomeu expresses the concept of creation and life cycles. Energy flows through the circular forms of stainless steel.

• **Me in Your Place, Me in Front of You, Me Your Half:** A double sculpture by Amparo Carbonell. The silhouette of a woman is cut out of a polished stainless steel rectangle.



• **Argos V.:** An allusion to technological civilization in weathering steel and stainless steel by Gabino Amadeo.

• **Mindstorms:** A stainless steel erector set, an allegory by Joan Llavería celebrating technical research and creative ingenuity.

• **Oblique Tripods and Cones:** A reflection on structural limits through groupings of stainless steel sections, by Ángeles Marco.

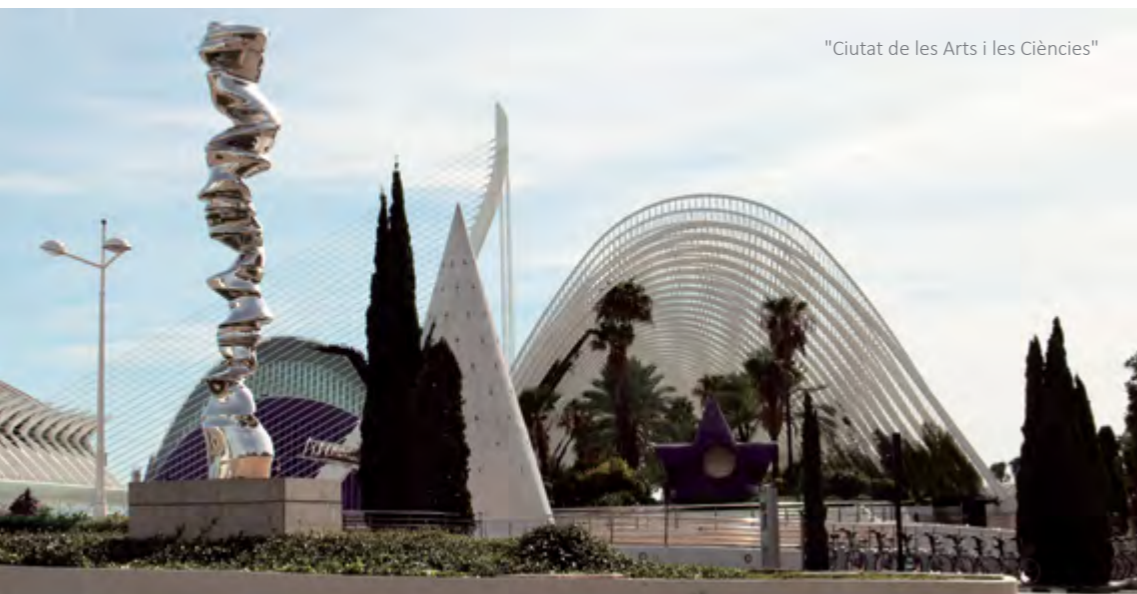
• **Pleiades:** This piece sheds its verticality, seamlessly integrating the stainless steel directly into the concrete of the access pavement.



Nau de l'Aigua Fountain

Universitat Politècnica de València, (UPV)





"Ciutat de les Arts i les Ciències"



We now set course to a spot in the city regularly visited by fans of Valencia F.C.: Mestalla. It is the oldest First Division stadium in Spain, taking its name from the ancient irrigation canal that fans historically had to cross to get to the stadium.

**1982 World Cup Sculpture**

Here we find the first of several works in the city by the prolific Valencian sculptor Andreu Alfaro. It is a tribute to sportsmanship and dynamism, which Alfaro achieves using fan-shaped stainless steel tubes. These tubes generate a sense of movement and torsion that beautifully evokes the fast-paced flow of the game.

To head to our next destination, we will walk through the Turia Garden –a green scar running through the city along the old riverbed of the Turia River, which was diverted following the tragic floods of 1957–. Therefore, crossing the Monteolivete Bridge, we arrive at a world-famous location: Valencia's City of Arts and Sciences.

**Ciutat de les Arts i les Ciències**

An architectural complex dedicated to cultural and scientific outreach, blending knowledge and entertainment.

The Valencian architect Santiago Calatrava was commissioned for most of this intervention, though we

can also enjoy the work of the award-winning Félix Candela.

The City of Arts and Sciences is a architectonic complex made up of six structures with distinct programmatic needs: Palau de les Arts, l'Hemisfèric, l'Umbracle, Museu de les Ciències, Àgora CaixaForum, and l'Oceanogràfic. Architecture becomes a tool to harmonize an environment designed to stimulate visitors' minds, linking science, nature, art, and technology together.

**Marathon Square – Points of View**

As soon as we cross the bridge, the stainless steel of the imposing sculpture Points of View by British artist Tony

Cragg comes out to greet us, alluding to the multiple perspectives of reality. Standing over 5 meters tall and weighing 3.8 metric tons, it flanks the Palau de les Arts, the first icon we approach. The lentil-shaped building catches our eye with its expressive cantilevered roof and its dome clad in trencadís –a mosaic technique that joins irregular ceramic pieces with mortar–. It is designed for hosting major spectacles, opera, theater, and music, featuring four auditoriums for this purpose.

We continue the tour following the stainless steel handrail that guides us through the central section of the site. We leave l'Hemisfèric

behind and walk alongside the Museu de les Ciències. We highly recommend seeking a quick respite from the Mediterranean sun under the Umbracle while enjoying the native vegetation.

**Àgora CaixaForum – Palafit**

We thus arrive at the Àgora building, a name that is no coincidence. Just like in ancient Greece, the space becomes a massive covered public square open to cultural, artistic, social, and philosophical debate. This unique architecture is placed at the service of CaixaForum to fulfill its purpose of boosting the spread of knowledge, culture, and science as drivers of social improvement.

Suspended over the turquoise waters guarding it, the imposing Palafit sculpture, created by artist Anna Talens, pays a beautiful tribute to the roots of the Valencian agricultural landscape and the Albufera lagoon. It finds its best ally in colored stainless steel; thanks to the material's reflective properties, the sculpture comes to life with the morning and afternoon light, even taking on a magnetic dark tone at nightfall.

**Oceanogràfic**

A few meters away, in Europe's largest marine park, we bow to the architecture of the genius Félix Candela and his

concrete thin-shell structures. Stainless steel escorts us at the entrance through wave-shaped canopies that offer shade from the sun. However, it is in the iconic underwater restaurant where Candela masterfully brings to life the ultra-thin roofs shaped as hyperbolic paraboloids. In doing so, he pushes the structural theories of his mentor, Eduardo Torroja, to their ultimate expression – who decades earlier proved that the strength of concrete roofs depended on the audacity of their shape rather than the thickness of their materials–.

We finish today's tour in front of one last sculpture, which in this case takes us all the way to La Fe Hospital.

**Donor Monument**

It is a beautiful tribute to the altruism of organ donors by the sculptor Juan Pedro Valero, who had been a transplant recipient himself a few years earlier. It consists of three stainless steel pieces set upon an uncarved stone monolith standing 2 meters high, representing the open arms of a donor.



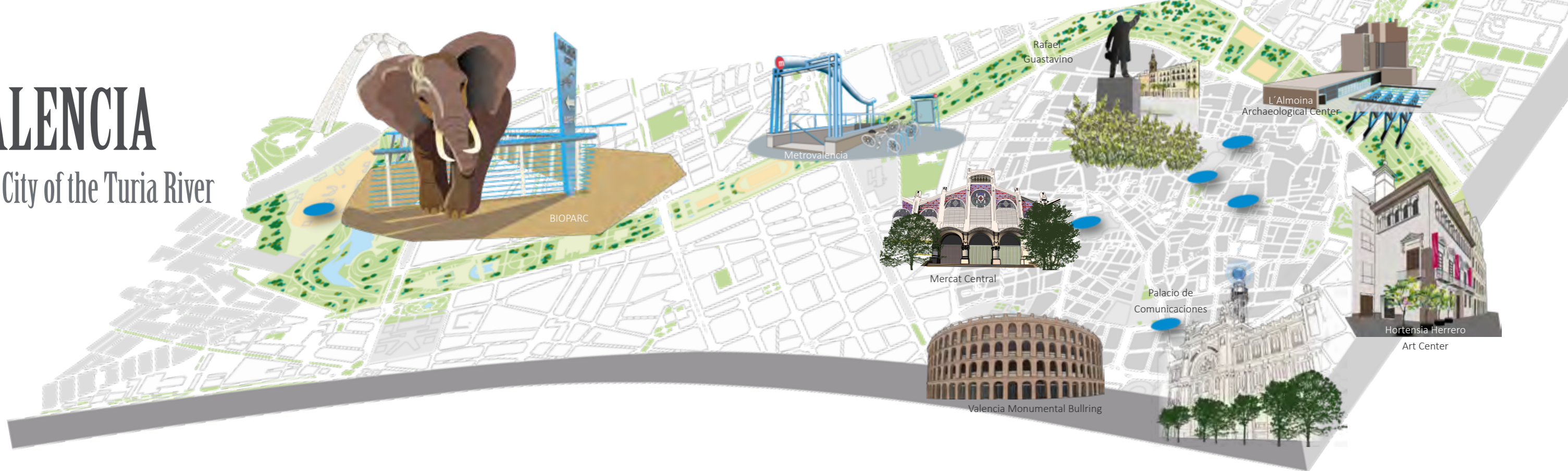
Donor Monument



1982 World Cup Sculpture

# VALENCIA

## The City of the Turia River



After saying goodbye to the seafront, we head west into the city, making our way up the course of the Turia River. We will dedicate the morning of this second tour to a type of venue we have not yet had the opportunity to visit in previous editions of *Stainless and the City*: the Valencia Zoo.

### Bioparc

The park is designed under the concept of zoo-immersion, standing out for making the visual barriers between visitors and animals disappear. However, to achieve this illusion of untamed nature, a high level of architecture and hidden engineering is required. Access is gained by a footbridge resolved through an elegant metallic structure by Grahen Ingenieros in collaboration with Rain Forest Diseño. It is an arch bridge typology, where the deck

itself is used as a lower tiered element. Here, stainless steel takes center stage in a handrail system that ensures visitor safety—one of the few we will see along the route, as

the park's philosophy is based on using natural barriers like terrain elevation changes, rocks, or lakes to separate the animals—.

As we pass through the Savannah, Madagascar, or the equatorial forest, we can spot stainless steel signage along the designated paths.

The window frames in the areas closest to wild animals, which are enclosed with glass panels, are also made of this material. Yet, stainless steel is not only where it can be seen;

it is also found in stainless steel drinking troughs hidden within logs or inside artificial termite mounds that perfectly replicate the mud mounds of chimpanzees. A complex, automated stainless steel mechanism dispenses food hygienically, stimulating the primates' natural behavior.

The rest of the day will be spent breathing the primitive atmosphere of the Ciutat Vella, heading towards the Nou d'Octubre metro station. It is worth mentioning that very close to this location, we find another of the numerous Andreu Alfaro's artworks for the city of Valencia, located in this case, within the courtyard of the General Hospital.

### Metrovalencia

We descend into the underground through stainless steel frames that, like sentinels, guard the entrances to the Metrovalencia network.

Inside, stainless steel ceases to be a sculptural element and becomes the undisputed king of high-traffic architecture, conceived to withstand massive daily wear and tear without losing its pristine appearance.

Maintaining the same essence—the massive sinusoidal line, also in stainless steel, topped with the Metrovalencia logo—we encounter two types of access: the open-air entrance and the second covered by a structural glass envelope.

This transparent canopy, also supported by a lightweight tubular stainless steel substructure, features a clean design that amplifies the influx of natural light.

Upon returning to the surface at Xàtiva, we run into the monumental presence of the Valencia Bullring.

Bioparc



Valencia General Hospital. Sculpture by Andreu Alfaro





Metrovalencia



### Valencia Monumental Bullring

This small Colosseum was designed in the mid-19th century by the Valencian architect Sebastián Monleón. He used exposed brick as the main protagonist, achieving a texture and volume that became a landmark of Valencian urban landscape. However, behind that neoclassical skin that evokes the past, the bullring hides an avant-garde construction: an internal structure of cast-iron pillars, a technical daring for the time that freed up space

and supported grandstands with unprecedented lightness. In 2009, stainless steel was introduced to the bullring, as part of the refurbishment proposal by Peñín Arquitectos. Its exemplary design and special attention to surface finish surprise us, despite being a common application of stainless steel as a material for restrooms due to its hygienic qualities.

We set course for the monumental heart of Valencia, stopping right in the Plaza del Ayuntamiento just in front of the Palacio de Comunicaciones building.

### Palacio de las Comunicaciones

An eclectic work of architecture inaugurated in 1923, designed by the architect Miguel Ángel Navarro. Rising above its monumental classical façade is the 30-meter-high metallic telecommunications tower. It was built during the refurbishment carried out at the beginning of this century, after the loss of the original tower.

The armillary sphere gleaming at the top of the metallic tower –recently restored– represents an ancient model of the cosmos that placed the Earth at the center,

surrounded by rings tracing celestial orbits and meridians. Beyond its obvious beauty as the crowning piece of the tower, its original function was purely symbolic: to showcase the centrality of universal communications thereby proclaiming Valencia as a modern city.

We move just a few minutes away toward the San Francesc neighborhood to step into one of Valencia's newest cultural gems: Hortensia Herrero Art Center. A superb exercise in restoring the old Valeriola Palace, led by studio ERRE Arquitectura. In the spectacular courtyard of the palace, a breathtaking intervention awaits us: "Tempesta", by the famous Catalan artist Jaume Plensa.

### Tempesta by Jaume Plensa - CAHH

A three-dimensional sculptural curtain that defies gravity. The piece is composed of letters from multiple world alphabets (Cyrillic, Hebrew, Arabic, Latin...) masterfully intertwined in polished stainless steel. The overhead light of the Valencian sky glides over the metal surface, casting a delicate play of shadows and reflections onto

the ancient stone walls of the palace. Stainless steel allows Plensa to create a mesh with an almost textile-like lightness, a skin that envelops the spectator and celebrates cultural diversity and thought.

We walk toward the Plaza de la Almoina, the starting point where Romans founded Valentia in 138 BC.

### L'Almoina Archaeological Center

The museum project, designed by the architect José María Herrera García, is a milestone of contemporary architecture that solves a complex program: protecting the underground Roman, Visigothic, and Islamic ruins without disrupting the fabric of the square above. The

proposed solution consists of a large, glass roof flooded by a thin layer of water. Stainless steel accompanies us from the very first moment, guiding us into the building through the window profiles, while also taking on the structural load within the hidden trusses just beneath the sheet of water. From the outside, the water over the glass reflects the silhouette of the Cathedral; from the underground interior, visitors gaze at the sunlight filtered through the water, framed by the flawless grid.

We approach the end of our journey, making a stop at the city's gastronomic temple, the Mercat Central of Valencia.

### Mercat Central

This is an outstanding work of Valencian Modernisme, it was designed by architects Francesc Guàrdia i Vial and Alexandre Soler i March at the beginning of the 20th century.

The building is a festival of stone, polychrome tiles, brick, and a colossal iron structure that supports the domes. However, as we get closer to the market's daily life, we discover how stainless steel has masterfully conquered the design of the commercial stalls in contemporary functional upgrades. As in so many other historic markets, stainless steel replaced the old counters for strict reasons of hygiene, resistance to salt water, and ease of disinfection.

We soon realize that this is a land steeped in art and a passion for sculpture. Perhaps the grand tradition linked to its most famous festivities, the Fallas, has instilled in Valencians a sensitivity toward sculpture that has shaped our entire journey through the city. We thus conclude in front of a sculpture that pays tribute to a Valencian who played a



decisive role in the history of international architecture: we are talking about The Architect of New York.

### Rafael Guastavino

The Valencian architect and builder who revolutionized New York architecture at the end of the 19th century by exporting the traditional Mediterranean system of the tile vault. Guastavino patented the Tile Arch System in the United States, a technique that utilized layers of flat bricks laid with fast-setting plaster mortar. This constructive solution allowed for the creation of monumental curved ceilings that were incredibly lightweight and, above all, entirely fireproof –a major concern in New York at the time following devastating urban fires–. He thus founded Guastavino Fireproof Construction Company in 1889. Today, his distinct geometric stamp of intertwined exposed brick supports and embellishes countless iconic buildings in The Big Apple, including the majestic vaults of Grand Central Terminal.

With this sculpture, Valencia restores an iconic figure who had been hidden from the public eye for years. While a bronze figure pays homage to the architect, it is stainless steel, which takes center stage and becomes the symbolic tool used to trace a perfect curve in the air, visually materializing the tile vault that led him to global success.



Palacio de las Comunicaciones



Hortensia Herrero Art Center



Mercat Central

# Brief

## Jeremias relies on EcoACX® to develop the first line of low-emission chimneys



**MATERIAL :**  
[EcoACX® stainless steel](#)  
Manufactured: [Acerinox Europa](#)  
Supplied: [Inoxcenter Pinto](#)

**SOURCE :**  
[www.ecoacx.acerinox.com](http://www.ecoacx.acerinox.com)  
Photos: jeremias©

In the construction sector, sustainability is not a trend but a strategic necessity. In response to this new scenario, Jeremias and Acerinox have developed Blueline, the first line of chimneys and flue gas evacuation ducts manufactured with premium, low-emission stainless steel.

Behind this innovation is EcoACX®, Acerinox's sustainable stainless steel, which reduces the environmental impact of the material without altering its technical properties, strength, or durability.

Jeremias responds to an increasingly pressing market need: reducing Scope 3 emissions, those associated with a company's value chain, from raw material procurement to transport, product use, and end-of-life management. Although they are not generated directly during the company's activity, they represent one of the greatest challenges to achieving global decarbonization targets.

In building construction, where every component influences the total environmental footprint, the choice of lower-impact materials is a decisive factor. For this reason, Jeremias has integrated EcoACX® into

Blueline, maintaining the same technical performance and safety levels that characterize its flue gas evacuation systems, while aligning them with new environmental standards.

Blueline includes solutions for gas boilers, generator sets, and fire-resistant ducts, targeted at industrial, hotel, commercial, and residential projects. One of the first projects is the Gran Hotel Luna de Cádiz, where Jeremias España has installed Blueline for commercial kitchens. This type of solution helps facilitate the attainment of international certifications such as LEED and BREEAM.

With Blueline, Jeremias and Acerinox demonstrate that innovation in stainless steel plays a key role in the transformation of the sector, driving solutions that respond to the demands for efficiency, durability, and sustainability that shape the construction of the future.

# Sculptor

In the very centre of Ljubljana, a water sculpture has been realised nine years after winning a public design competition. Conceived as both a spatial and symbolic contribution to the city's public realm, it introduces a distinct micro-ambient within the dense urban fabric – a small urban “platform” whose continuous, rounded form establishes a separate, almost intimate space amid the city's bustle. Shaped as a continuous spatial loop, the sculpture frames and directs views while generating a sequence of ever-changing visual experiences. For passers-by, it presents a dynamic silhouette that reveals itself differently from every vantage point.



Photos: Ana Skobe

The sculpture is not an object to be merely walked around. It is conceived as a spatial experience that invites passers-by to become part of it. Rather than separating the observer from the artwork, it

incorporates them through movement, touch, sitting and inhabiting the space within its lines. It creates a place that is not only seen, but also experienced.

## A small urban "platform"

On a symbolic level, the sculpture speaks of movement, flow, circulation, fluidity and connection. It is a tribute to drinking water and a metaphor for the eternal cycles of nature. It represents the dynamic balance of the world and natural processes based on constant flow, transformation and the interconnectedness of all forms of life. The movement of water within the sculpture becomes a metaphor for this interweaving – an uninterrupted flow linking the visible and the invisible, the material and the immaterial, the individual and the whole.

Authors, Architects: [M.KOCBEK architects](#), Mojca Kocbek Dipl.Arch, M.Arch. & [P PLUS architects](#), Primož Boršič m.i.a.



Photos: Ana Skobe

# Water sculpture LJ

The water sculpture transcends a purely aesthetic or functional role, establishing itself as a space for contemplation, respect for nature and a reminder of the responsibility we bear as part of its cycle.

The choice of material – stainless steel – is deliberate: its reflective surface incorporates the surroundings and passers-by, continuously transforming the sculpture. At different times of day and under varying weather conditions, its appearance shifts and at moments almost dematerialises – under clear skies it reads differently than beneath clouds; in the western sun it glows in yellow-orange tones, while in the rain it once again takes on a new expression.

The new water sculpture has become a distinctive spatial landmark for both residents and visitors to the city. Just as it was originally conceived as a spatial intervention that does not enclose or divide, but softly connects space and people, it now truly functions and lives in this way.



Photo: Ana Skobe

Authors, Architects:

M.KOCBEK architects, Mojca Kocbek Dipl.Arch, M.Arch. & P PLUS architects, Primož Boršič m.i.a.



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