

50 YEARS LAURAMID®. 50 YEARS KNOW-HOW IN PA 12 CASTING



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Know-How in
PA 12 Casting.



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50 YEARS HIGH-PERFORMANCE NYLON

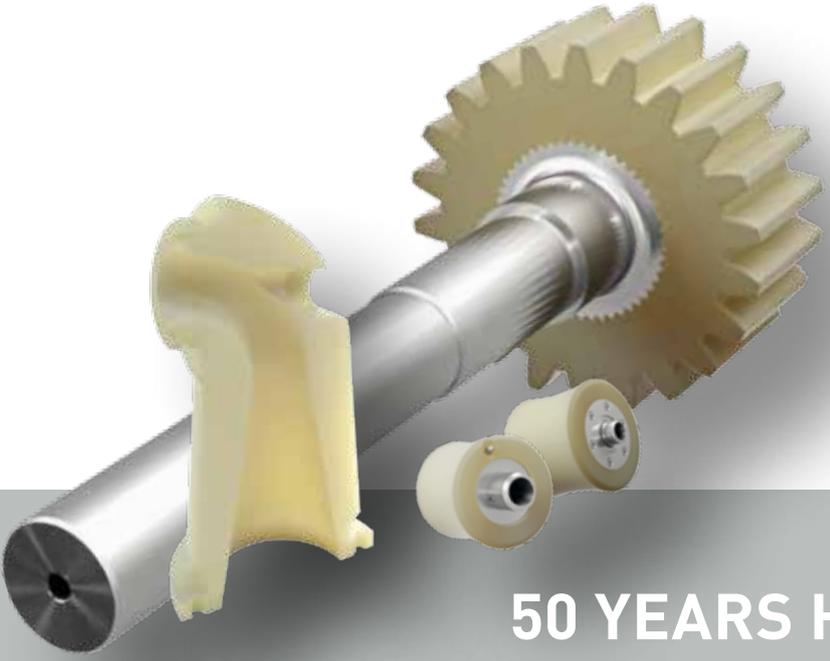
for demanding engineering components

We cast plastic. For 50 years.

The Albert Handtmann Elteka GmbH & Co. KG is a subsidiary of the Handtmann Group. Handtmann, a company with a long tradition, was founded more than 140 years ago and is active worldwide in plant construction and mechanical engineering. For four generations, the current Handtmann Group has been supported by the entrepreneurial spirit of the Handtmann family from Biberach, Germany. The resulting identity has become an important basis of our self-image. Handtmann pursues its corporate goals with passion and energy. For more than a century, it has been more long-term and continuous growth than rapid, short-term success that counts.

The Handtmann Group employs 3,600 people worldwide and generated sales of € 880 million in 2017. The course is set for further increases. The high investments associated with this are made possible by a very consistent policy of retention on the part of the company owners.

Handtmann Elteka is also headquartered in Biberach, Wuerttemberg. A new production and administration building with almost doubled production capacity was occupied at the beginning of 2014. The complete engineering, production and quality control of all systems, components and semi-finished products is carried out there. Handtmann Elteka employs 90 people and has a worldwide sales and service network.



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50 YEARS HIGH-TECH NYLON

based on polyamide

The most important material development from Handtmann Elteka turns 50 this year. The cast nylon Lauramid® is a PA 12, which, unlike simple injection-molded plastics, is produced in a pressureless casting process. In the casting tool, Lauramid® polymerizes and crystallizes to a high-molecular, dimensionally stable material. Another advantage of this manufacturing process is that steel reinforcements can be cast in inseparably. This is how Lauramid® metal composite parts are produced, for example for gears in drive technology. Lauramid® is also available as a food-safe version.

The composite Lauramid Hybrid® consists of a metal foam that is completely or partially pressurelessly cast over with the engineering plastic Lauramid®. Lauramid® penetrates the pores of the metal foam part during casting and thus produces a mechanically insoluble bond. No other connecting elements are required. This is an advantage when special rigidity and weight savings are required.

Lauramid Inject® 970 is a regranulated material based on Lauramid®. Lauramid Inject® 970 is especially suitable for injection molding. Its material properties achieve up to 80 % of the performance of PA 12C Lauramid®. Lauramid Inject® 970 comes into play when a conventional PA 6 material does not meet the requirements of the application.

HICOMPELT® is the latest material innovation of Handtmann Elteka and one of the highest-volume lightweight materials on the composite market (up to 65 % fibre volume).

HICOMPELT® is a composite of caprolactam or laurilactam with carbon or glass fibres or a carbon/glass fibre mixture. Components are pressed from this composite in thermoplastic resin transfer moulding (T-RTM) close to the final contour. With the T-RTM, Handtmann Elteka offers another production process that opens up completely new possibilities for individual components. With very short cycle times of +/- 3 minutes, high batch sizes of up to 100,000 units per year can be produced with just one mold. Structural components made of HICOMPELT® are used in automotive and aircraft construction, among others.



50 YEARS HANDTMANN ELTEKA

50 years passion for PA 12 C

PA 12C Lauramid® and the casting know-how of Handtmann Elteka look back on a success story in 2018, the end of which is far from being written. Since day one, Handtmann Elteka has been working on tailor-made Lauramid® solutions that are both technologically and economically convincing.

1968 Handtmann, the metal processing specialist, begins developing an innovative plastic with the aim of countering possible market competition from plastics with its own product. And it should not be just any plastic: The desired material should beat conventional, already known plastics qualitatively by far. With the development of PA 12 C Lauramid®, Handtmann subsidiary Elteka, newly founded especially for plastics development, has achieved this masterpiece.

The research and development team of Handtmann Elteka recognises the potential of PA 12 and develops a special processing method for this material. Just three years after work began, Handtmann submitted the result of his work to the German Patent Office: a pressureless casting process in which the basic material PA 12 melts into a high-tech material by adding a catalyst and an activator, whose properties are unrivalled on the plastics market. Lauramid® was born, because the newly developed material fulfilled the high requirements of Handtmann Elteka in every respect - and continues to do so today.

Lauramid® has outstanding mechanical, chemical, physical and thermal features: It shows the lowest water absorption and strength change of all nylons, the highest dimensional stability and wear resistance and the best long-term behaviour. In addition, it leaves all other nylons behind when it comes to chemical resistance. This convincing package of properties in combination with the casting and application know-how of Handtmann Elteka enable an almost unlimited number of component solutions, both then and now - especially for demanding applications.

From large resistors and small endurance runners

As early as 1976, Handtmann Elteka demonstrated its expertise and the potential of its Lauramid® for the first time with the casting of strip cam switches for the power position of the traction motor resistors for Deutsche Bahn. It is only due to technical progress in the form of the introduction of electronic engine control in the locomotives that this component is not going into series production.

50 YEARS HANDTMANN ELTEKA

— 1968: Go-ahead for plastics research

— 1971: Patent of Lauramid®

— 1976: Construction of the first glass plant for the production of plastic components in series production / Order from DB for the casting of strip cam switches

— 1977: Casting of light dirt cleaners for paper manufacturer Alfa Laval, Sweden / Proof that lactam casting can replace stainless steel or ceramics

— 1981: Development of a spur gear calculation for Lauramid® gears by the Research Center for Gears, TU Munich

— 1982: Two large orders for the Elteka: casting of paper propellers for Voith, Heidenheim, and 3 m long wire cylinders for paper machine manufacturer Escher Wyss, Ravensburg

— 1986: Production of PA 12C rollers for use in VW T4 car sliding doors

— 1990: modification of Lauramid® for use as support rollers, coupling rollers and track rollers in Doppelmayr cable cars

— 1999: Development and certification of the food safe Lauramid® FS



50 YEARS PIONEERING WORK in nylon casting

Nevertheless, with the PA 12C casting the Handtmann Elteka experts are doing pioneering work with such a complicated geometry as the strip cam switches.

And the next order is not long in coming: just one year later Handtmann Elteka presents the outstanding possibilities in Lauramid® casting with the casting of light dirt cleaners for the Swedish paper machine manufacturer Alfa Laval. Orders followed from Voith, Heidenheim, for which Handtmann Elteka cast deckle propellers from 1982-2003, and from paper machine manufacturer Escher Wyss from Ravensburg. Handtmann Elteka is realising the casting of a 3 m long sieve cylinder for the latter for the first time and is proving that gigantic components can also be realised in Lauramid® casting.

Mass with class

Only a few years later, Handtmann Elteka manages a real coup: The automotive supplier Bode GmbH from Kassel discovers the high-tech material Lauramid® and is immediately enthusiastic about the unbeatable capabilities of the plastic in use as rollers in motor vehicle sliding doors. The smoothness and smooth running of the PA 12C Lauramid® rollers also convinces the main customer of Bode: Volkswagen relies on Lauramid® sliding door rollers in its T4. A friendship that continues to this day: Since 2002, VW has been using high-performance Lauramid® rollers in all side doors of its cars. The confidence of the motorist from Wolfsburg also calls other car manufacturers onto the plan: in 2015, the share of the automotive sector in the total sales of Handtmann Elteka was 42 %. Approximately 10 million PA 12C rollers leave the Elteka halls every year. The castors can be found worldwide in models from Mercedes, Ford and Fiat, among others.

No standstill

The formula for the PA 12C Lauramid® has been continuously modified and refined over the last five decades by chemists, engineers and application engineers at Handtmann Elteka. Depending on the requirements, different material characteristics and properties can be achieved. For example, the cast nylon has been modified for use as support, coupling and track rollers in cable cars made by the Austrian company Doppelmayr so that it has enormous impact resistance even at very low temperatures. Lauramid® has proven its reliability in this responsible job since 1993.

Handtmann Elteka once again shows with its brand new material HICOMPELT® that the focus is always on the future. The lightweight composite based on caprolactam and laurilactam opens up a wealth of new possibilities in the lightweight construction market. Handtmann Elteka: 50 years of plastics know-how and no standstill. www.handtmann.de/en/plastics

since 2003: Lauramid® rollers also used in Volkswagen city transporters

2003: Cessation of propeller production for Voith, but further supply of spare parts

2005: Mercedes Benz relies on PA 12C castors in the sliding doors of the Sprinter and the V-Class family limousine

2010: Fire in Handtmann Elteka's production halls > Decision to extend the new building

2012: Ground-breaking ceremony for the construction of a new plastics factory in Biberach-Aspach

2014: Move into the new production facilities

2016: Development and market launch of the lightweight composite HICOMPELT®

2018: Handtmann Elteka celebrates: 50 years of Lauramid®, 50 years of know-how in PA 12 casting

Features of PA 12C Lauramid®:

- lubricant-free applicable
- suitable for lightweight construction, 1/7 of steel
- low rolling resistance, excellent sliding behaviour
- high thermal resistance (-50 °C to +120 °C)
- good chemical and UV resistance
- optimal sizes and thus cost reduction possible



50 YEARS PA 12 CASTING

50 years solutions for demanding applications

Lauramid® is a pressureless cast nylon PA 12C. Due to its unique combination of chemical, physical and mechanical properties, it meets a wide variety of application requirements for innovative components in a variety of applications. Handtmann Elteka is exhibiting typical components made of Lauramid® at the Hannover Messe 2018, because components made of PA 12C Lauramid® have been the ideal solution in countless applications for 50 years. They convince not only technologically, but also economically due to their long and maintenance-free running times and production in near-net-shape casting. The latter saves material, time-consuming post-processing and costs. Thanks to the profound know-how of Handtmann Elteka, components can be cast in almost any shape in both small dimensions and large volumes. Some examples of the wealth of solutions that are possible with Lauramid® in PA 12 castings:

Exhibit 1: Lauramid® sprocket wheel

The Lauramid® sprocket is manufactured in a highly dynamic packaging machine in cycle operation. High freedom from maintenance and reliable operation are top priorities here. The direct encapsulation of the stainless steel hub creates a non-detachable plastic-steel connection. On the other hand, the outstanding tribology of the cast components optimizes the sliding properties and the noise and damping profile even in lubricant-free applications.



Exhibits 2 + 3: Lauramid® heavy duty roller and gear wheel

With this heavy-duty roller and the gear wheel, the stainless steel hubs are cast directly and inseparably and do not require any further fastening or finishing. The two Lauramid® components are used in the food industry. In this sensitive environment, the PA 12C material scores particularly highly due to its lubricant-free application.



Advantages of PA 12C Lauramid® casting:

- near-net-shape casting possible
- almost any geometry castable
- creative overall design
- economical solution due to long service life and freedom from maintenance
- cost savings through elimination of time-consuming reworking and material savings
- direct, inseparable casting of steel reinforcements

Exhibit 4: Lauramid® cone

The near-net-shape cast Lauramid® cone is used in the paper industry. Components used in industrial papermaking must be highly resistant to chemicals and at the same time resistant to abrasion. Another prerequisite for use in this application is low water absorption due to the enormous amount of water in the production process. Lauramid® fulfils all these properties. The complicated component geometry is impressive proof of the application and casting know-how of Handtmann Elteka.



Exhibit 5: Lauramid® control disc with cast-in steel hub

This Lauramid® disc is used to control vacuum and compressed air in a manufacturing process. The requirements for the component were high rigidity and high flatness (max. 0.02 mm over the entire surface) in order to achieve an optimum sealing effect and low leakage. The production was carried out as near-net-shape individual casting followed by precision production. The control disc has a diameter of 320 mm and a thickness of 20 mm.



Exhibit 6: Lauramid® rollers

Real endurance runners are the rollers made of Lauramid®, as they are used in different types of sliding doors. In this application, the PA 12C rollers impress with their dimensional stability, low weight, extremely low flattening and low rolling resistance. These features guarantee tilt-free operation over the entire service life of the vehicle.



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COMPOSIT HICOMPELT®

The high-performing thermoplastic composit material
with PA 12C Lauramid®

The brandnew HICOMPELT® composit is available with different structural materials, like

- carbon fiber
- glass fiber
- carbon/glass fiber

Benefits

- Integration of metal hardware
- On-demand melting concept
- Fast turnarounds
- Exceptional strength-to-weight ratios
- Custom-made parts and components
- Elevated mechanical properties
- Robust reparability
- Ease of recycling

HICOMPELT® application examples

- Structural parts for mechanical engineering
- Automotive
- Aerospace
- Doors
- Frames
- Rooftops
- Seats
- Brackets



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High-tech plastics for machine and lightweight construction

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