



**INDIVIDUAL MACHINE COMPONENTS  
WITH CAST POLYAMIDE PA 12C LAURAMID®**



# LAURAMID® PA 12C - HUGELY LIGHTWEIGHT:

Casting without limits

## Maximum design options:

Individual components from Lauramid®

Lauramid® is a polyamide 12C which is cast as a low viscosity liquid into casting moulds. It is not extruded or injection moulded like more simple plastics.

With Lauramid® casting semi-finished products are produced:

- discs, cylinders, rods, pipes
- Lauramid® metal combinations:  
inseparable cast-in of diverse hubs

In particular, individual parts are also designed with Lauramid® casting. Thus, Lauramid® parts with innovative geometries are emerging:

- parts with inside free-form surfaces and final-cast exterior outlines
- different wall thicknesses can be cast directly

## Minimum „Total Cost of Ownership“:

Longer lifetime, lower service costs

In terms of mechanical and physical properties Lauramid® shows considerable benefits which especially come into play in demanding applications. Due to extended durability and lower service costs the total costs of lifetime of parts and systems made of this cast polyamide are reduced to a minimum.

- lubrication-free application
- best impact strength of all polyamides
- low weight for light weight constructions (1/7 as compared to metal)
- minimal absorption of humidity (0.9 weight %)
- chemical resistance (> 200 substances tested)
- wide temperature range (-40 to +120 °C)
- with this casting method complete production steps (postprocessing) or elaborate bondings can be omitted
- Lauramid® is highly superior to an extruded or injection moulded polyamide 12 with 30 % fibre glass in its creep behaviour



→ Lauramid® can be produced in different material qualities, as well as in a food-safe type and in black



→ Elements like steel hubs can be cast inseparably with Lauramid® during the production process



**NEU** HUGELY LIGHTWEIGHT  
COMPONENTS FROM  
CAST POLYAMIDE

# LAURAMID® PA 12C CASTING:

Hugely lightweight cast in one piece

## Example #1: Biogas Propeller cast in one piece

Innovative eyecatcher at the Handtmann Elteka Hannover Fair booth: An agitator propeller with a diameter of 2500 mm cast from Lauramid® which is employed in fermentation plants - a common development of the Handtmann Elteka engineers and the company Maier Energie & Umwelt (Maier Energy & Environment).

For production of energy in biogas plants renewables like for example agricultural products or dung and liquid manure are used. These ferment in a fermenter and produce biogas in this process. This is utilized for the generation of energy or is purified to natural gas quality. In order to keep this process running the substrate in the fermenter must constantly be kept in motion. This Job is assumed by one or more agitators.

The main interest for operators of biogas plants is an increase of efficiency by an extended lifetime of the agitators. The problem: The propeller from glass fiber reinforced epoxy which was formerly employed gets destroyed by the aggressive biomass. This leads to expensive downtimes of the site. The intelligent solution: Propellers made of the PA 12C Lauramid®. With a density of only 1.025 kg/m<sup>3</sup> Lauramid® is not only an extremely lightweight material and thus energy efficient but also chemical resistant. This predestines Lauramid® for the application in the biogas substrates.

Due to their know-how in the casting process Handtmann Elteka was able to develop a particular casting mould which enables net shape casting of this hugely lightweight propeller. Thus, an laborious reworking of this component can be omitted as well as a subsequent assembly of single parts and this results in additional stability.

A diameter of 2500 mm and cast net shape in one piece:  
The agitator propeller made of Lauramid®



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## LAURAMID® PA 12C CASTING: MORE CAPABLE PARTS

### Example 2: Real size robot arm

Special eye-catcher at Elteka's booth at Hannover Fair: A 3D light weight robot arm, which was built like an exploded view. This robot arm is employed in Fanuc painting robots. The breast-high model shows single arm pieces, connectors and joints made of the high-capacity polyamide Lauramid®. The visible metal spacers of this exhibit are for mere purposes of visualisation and are not attached to the original arm where all pieces are joined directly.

Due to this presentation, the hollow-wrist design of each Lauramid® part is visible also on the inside. This hollow-wrist design as well as the elaborate external free-form surfaces were formed directly while casting. Subsequent machining is not necessary with this production method.

The areas with the most load of both robot joints were additionally supported with aluminium inserts which were also cast into Lauramid® directly. In automated paint shops an important property of the employed robots is their resistance to magnetic induction, their extreme cleanliness as well as extremely fast robot movements. Due to its low empty weight the PA 12C Lauramid® of the German manufacturer Handtmann Elteka shows 20 % weight advantage as compared to standard plastics like POM or PA6 in this application. Furthermore, Lauramid® is lubrication free, chemically resistant to the employed varnishes and resolvers as well as capable of electrical isolation up to 100,000 V.



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## LAURAMID® PA 12C CASTING: MORE CAPABLE PARTS

### Example 3: Shaped roller for cutting of steel profiles

In the factories of a big German metal forming company steel pipes have to be tooled and are transported with high speed out of a saw. In this process these pipes are guided by rollers, when a very exact transport guidance is necessary to avoid incorrect positioning.

Guiding rollers made of PE and POM and bonded from two halves used to fail in this application due to high abrasion. The solution to this problem was delivered by the German specialist for technical plastics, Handtmann Elteka: A one-piece roller, made of the PA 12C Lauramid® with an external diameter of 290 mm and varying inner diameters was cast in net shape. The specific casting method grants this Lauramid® roller extreme abrasion capacity and high dimensional tolerance. Thus, material and complete production steps could be saved in the production process already.

In spite of sharp cutting sides of the cut steel pipes the Lauramid® shaped rollers only wear minimally. They show high guiding stability even with rotating profiles. Besides the accuracy in guiding another important factor in this process step is that the steel profiles don't get scratched while transported with the shaped rollers which the Lauramid® surface also enables. If necessary, a replacement of the shaped rollers can be executed easily and with little expenditure of time on site.





## LAURAMID® PA 12C CASTING: MORE CAPABLE PARTS

### Example 4: Propeller for the paper industry

Industrial paper production is a „heavy“ business: Huge mass has to be moved. Additionally, this mass is treated in a chemically demanding environment.

During one of the paper production steps an agitation propeller made of the cast polyamide Lauramid® with a diameter of 1,500 mm is employed for moving the fiber pulp. This propeller substitutes a formerly employed steel propeller. With a density of only 1.025 g/ml Lauramid® is extremely light - seven times lighter than steel. Due to the sophisticated casting method Lauramid® parts are furthermore insensitive to stress fractures. In addition, PA 12C Lauramid® is resistant to the chemicals used in paper production.

This complete propeller is cast in its net shape. An integrated stainless steel hub is cast inseparably. This casting-in, which is free of backlash, facilitates an optimal power flow in the paper production process. In the meantime, the positive experiences made with employing Lauramid® propellers for technical tasks are also taken advantage of for other application purposes and business fields, such as fermentation plants.

# HIGH-TECH PLASTICS

by Handtmann Elteka

## **Lauramid®:**

Wear-resistant, temperature-resistant and light construction polyamide (PA 12C). In-gate steel hubs possible, food safe modifications available.

## **Lauramid Hybrid®:**

With Lauramid® cast-in metal foam which enables very firm, yet extremely light components.

## **Lauramid Inject® 970:**

Lauramid® chips re-granulated in a special process, suitable for producing injection-moulded components. Different material properties are almost equivalent to Lauramid®.

## **Albert Handtmann Elteka GmbH & Co. KG**

is a subsidiary of German Handtmann Holding. The traditional company was founded more than 135 years ago and is internationally active in engineering and construction. Handtmann Elteka develops technical plastics. The materials Lauramid®, Lauramid Hybrid® and Lauramid Inject® 970 are employed in engineering as parts or complete systems in a large number of different fields.



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