

A wide-angle photograph of a large industrial manufacturing facility. In the center, a worker in a blue shirt and jeans stands next to a large blue industrial machine. To the right, another worker is operating a yellow forklift. The background shows various other industrial equipment, including a yellow overhead crane with a red motor, workbenches, and storage racks. The floor is concrete with white safety lines. The overall scene depicts a busy, modern manufacturing environment.

Replacing brass
with sustainable
smooth-gliding plastics

Thermoplastics are a substitute for brass and make it easier to fit forklift truck attachments manufactured by KAUP GmbH & Co. KG

Thermoplastics and fibre-reinforced plastics are proving to be a viable alternative to conventional materials such as brass.

Together with KAUP GmbH & Co. KG (KAUP), a leading manufacturer of forklift truck attachments, Technoform launched a pilot test in November 2023. The objective was to use plastic profiles as a substitute for brass profiles in certain categories of forklift truck attachment.

The plastic profiles were to exhibit the same non-friction properties, load-bearing capacity and abrasion resistance as the metal profiles previously used.

“We had been looking for a substitute for brass profiles in the higher tonnages of certain attachment types for some time,” says Maik Krüger from KAUP’s central purchasing department.

“Technoform advised us on the choice of materials, and developed the profile.”

The test

The glass fibre-reinforced plastic profile used fulfilled the same function as the previous brass profile, and passed the three-month endurance test. The plastic profile underwent around 10,000 cycles with and without lubricant in the sliding test.

This test was carried out under a range of loads.

In the friction test, the thermoplastic material (PA66GF30) yielded the best results.

It also delivers further decisive benefits in daily use and service.

The benefit

The plastic profile results in less pressure being required for displacement of the moving parts on the KAUP forklift truck attachment. This substantially reduces the energy consumed," says Sebastian Groh, Design Engineer at KAUP.

He points out that the plastic profile also no longer needs to be lubricated during maintenance. "This significantly reduces the cost and time overhead for our customers," he says. "Furthermore, forklift truck attachments with a plastic profile can also be used in food applications, where lubrication-free systems are standard."



"Even though the cost aspect is main reason for using plastic rather than brass overall, the issue of sustainability is nevertheless becoming increasingly important."

Michel Lauterbach,
Technoform Product Engineer



The next step: working together towards greater sustainability

Thermoplastics constitute an environmentally responsible alternative to brass in the manufacturing process.

The production of thermoplastics generally has a lower environmental impact, as less energy is required for manufacture.

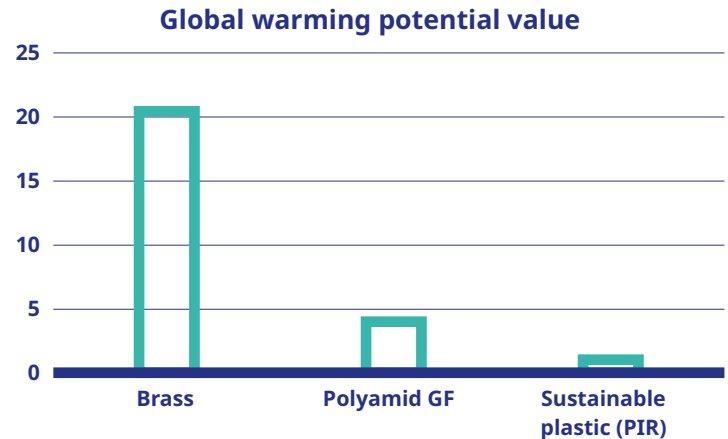
In addition, many types of thermoplastics are recyclable and have a lower GWP than brass.

“We recommend the use of recycled plastic as the next step, in order to optimise the global warming potential, or GWP. This is a value used to calculate a material's CO₂ footprint. The use of recycled plastic reduces the GWP by a factor of five,” says Michel Lauterbach.

A brass profile has a GWP value of 20.9 kg CO₂eq per metre of profile. By contrast, the GWP of thermoplastics is 4.3 CO₂eq per metre of profile. By contrast, the GWP of thermoplastics is 4.3 CO₂eq per metre of profile.

This is not accompanied by any loss of functionality or increases in cost.

“We see potential here to minimise our ecological footprint significantly, , and to implement the change to a new material cost-effectively and with no impact on functionality,” explains Sebastian Groh for KAUP.



GWP value, brass: 20.9 kg CO₂eq/1 m slide profile

GWP value, polyamid GF: 4.3 kg CO₂eq/1 m slide profile

GWP value, plastic (PIR): 1.1 kg CO₂eq/1 m slide profile

Source: BAFA/information sheet, CO₂ factors, 2022

Benefits:

1. Cost efficiency

One of the main benefits of using thermoplastics instead of brass is cost efficiency.

2. Lower weight

Thermoplastics are inherently lighter than brass. The lower overall weight contributes to fuel efficiency and increased performance. Transport costs are also reduced.

3. Versatility and design flexibility

Thermoplastics offer unparalleled versatility and design flexibility.

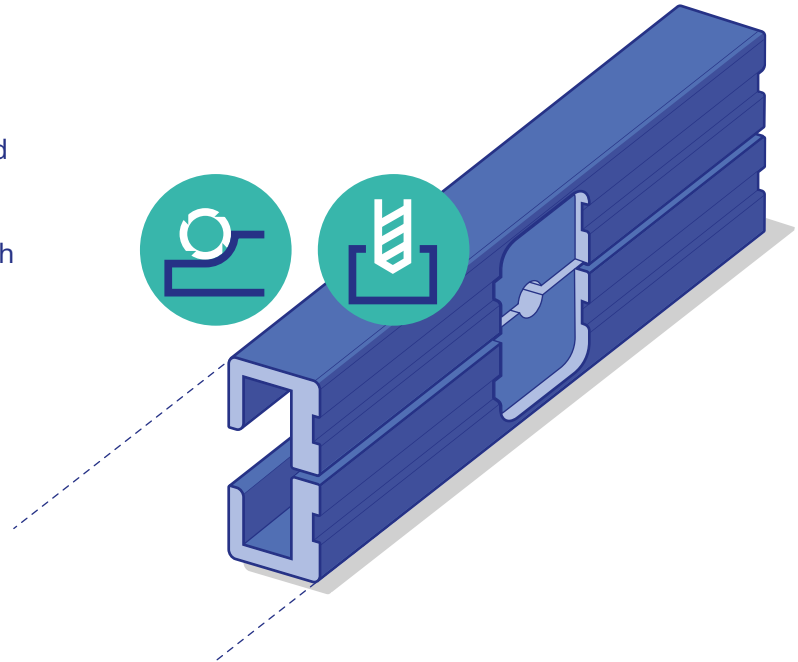
This flexibility enables complex components with improved functionality to be manufactured.

4. Corrosion resistance

In contrast to brass, thermoplastics have excellent corrosion resistance properties.

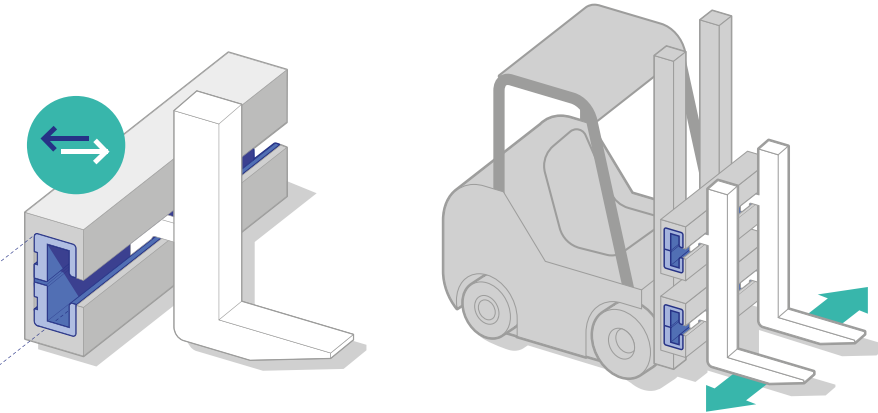
5. Post-processing

The plastic profiles can be post-processed by Technoform on request.



Conclusion

Using fibre-reinforced thermoplastics as a substitute for brass in manufacturing delivers a range of benefits. These include cost efficiency, low weight, design flexibility, corrosion resistance, superior insulating properties and a lower environmental impact.



With advances in technology and materials science, thermoplastics' versatility and adaptability make them a compelling choice for a wide range of applications. They pave the way for a more efficient and sustainable future in the manufacture of forklift truck attachments.

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