

# “Nugget”: In the fast lane with bicycle brakes

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**“The excellent customer service from the staff at Angst+Pfister is the clincher for a lasting business relationship,” says Marc Boriss, the proprietor of the Frank Industries company in Germany. This statement carries double weight because Mr. Boriss is speaking not just in his role as business proprietor, but also as the designer of the brake system for which Angst+Pfister supplies a crucial component. This brake system has sparked a sensation among users and experts. One can sense that Mr. Boriss’ creation is dear to his heart not just in conversation with him, but also in the name of the product itself – the Nugget. And the name says it all: the Nugget is truly as good as gold!**

Marc Boriss doesn’t fit the stereotype of a design engineer. He was once a racing cyclist and today is a passionate downhill rider, and he greets visitors to his website with the phrase “let’s rock.” As a practitioner, he knows how important it is to be able to absolutely rely on a vehicle’s brakes. Good brakes aren’t a synonym for safety for nothing. The Nugget is a brake system in a class of its own. And lo and behold, it’s a brake system for bicycles. All this ado about bicycle brakes? Hold on there a minute!

## Bicycle brakes are highly complex

Bicycle brakes are much more complex than automobile brakes, for example, partly because the pistons – the Nugget is a 4-piston brake system – must not rest against the brake discs, but instead must retract immediately after braking. If the piston retraction malfunctions, the pistons grind against the brake discs,

causing the brakes to squeal. In a car that is not necessarily a problem, but a cyclist, in contrast, might feel like he’s suffering from tinnitus.

Seals are the crucial element for perfect piston retraction. On the one hand, they must perform their main task: they must seal off and prevent brake fluid from leaking out. On the other hand, they must not impede the retractability of the pistons, which must have excel-

lent sliding ability. This is seemingly a contradiction. Even the best brake design hinges on the seals. “The combination of brake and seal is the most important element,” Mr. Boriss emphasizes.

## Love at first sight

To develop the brake, it was therefore necessary to find someone who could design this linchpin of brake systems. But who can you entrust your “baby” to when such a crucial component is at issue? Mr. Boriss came across Angst+Pfister on a tip – and it was like love at first sight. “A very friendly company,” says the design engineer about his first encounter with Angst+Pfister.

Right from the outset of the collaboration, the partnership between Angst+Pfister and Frank Industries was marked by mutual trust and respect. With enormous dedication, the developers at Angst+Pfister set about tackling this unusual assignment. A continual exchange of ideas between the partners during the experimental stage brought the team increasingly closer to the solution. Alternatives were devised, prototypes were tested onsite, and finally Angst+Pfister succeeded in constructing a seal whose design was so perfect that the ingenious Nugget idea could now be suitably carried out.

## Angst+Pfister brings additional safety into play

What else must the seal do? Due to the special design of the Nugget, its heat absorption capacity increases by around 50% compared to conventional brakes. If the brake, which is lightweight by the way despite the great heat absorption ability, is to function durably, i.e. if it is to be capable of absorbing a lot of braking energy over an extended period, the seals must be able to withstand temperatures up to 130°C.

The thermal load capacity of the sealing material originally used – a special EPDM compound – ranged in that area. To add a safety buffer to that, the material FKM is now being used on recommendation by Angst+Pfister. The deployment of this material, whose thermal load capacity hovers in the 150°C to 160°C range, marks an investment in additional safety.

## A concerted solution in the service of safety

The team-up of Frank Industries and Angst+Pfister is a stroke of luck – not just for both companies, but especially also for all those who enjoy the benefits of the Nugget. The close collaboration gave birth to a brake system with an exceptional degree of safety.

The fact that the Nugget – which is actually a bicycle brake, mind you – is now even being used in motorized racing is the result of a perfectly matched



The complete brake caliper in red is the Nugget version available in stores. The cross-sectioned brake caliper in gold shows the installation position of the sealing rings.



The Nugget



The Nugget is also used in motorized racing.

combination of design and seal. A bicycle brake used for Formula Student race cars or for 125cc Grand Prix motorcycles – the Nugget is indeed as good as gold.



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