

## TyrolSport Brake Caliper Bushings Theory and Testing

In our track and street driving experience with VWs and other vehicles equipped with ATE brake calipers, we have noticed uneven brake pad wear. This wear would usually manifest itself with the inner pad wearing faster than the outer, or tapered wear along the surface of the pad. We never really understood what the root cause of this was until we analyzed the mounting system of the caliper itself. Upon doing this, we noticed rubber bushings are used to locate the caliper to the rotor. These rubber bushings allow the caliper to move under heavy braking, resulting in uneven brake pad pressure to the rotor. The typical fix for this problem would be to used a fixed caliper design(Porsche, Stoptech). We decided to come up with a high quality, simple and easy solution without necessitating a different caliper or braking system. Here are the TyrolSport 954 Bronze Brake Caliper Guide Sleeves:





These high quality pieces replace the rubber bushings in your calipers with 954 Bronze Alloy sleeves, stainless steel bushings and retaining clips.

For our product testing, we installed a set of the TyrolSport sleeves on a few different vehicles, from daily drivers, to our track-oriented GTI. We also corrosion tested the pieces for longevity. The testing procedure involved replacing the rubber bushings on one caliper, while leaving the other side stock. New pads of varying compounds(Mintex, Ferodo) were installed on the vehicles, and the testing began. Here are some pictures of the Ferodo pads in our test GTI, after 15k miles of street and track driving. The pads on the left used the TyrolSport sleeves, while the pads on the right rode on stock bushings:



To our surprise, the pads using our bushings wore MORE than the pads without. How could this be?





The TyrolSport sleeves allow the caliper to work more effectively and apply more braking force for a given pedal pressure. This can also be evidenced by the pictures of the brake pad faces below. The pads on the left were using the TyrolSport sleeves. Notice the additional pockmarks on the surface from braking heat:



This begs the question, “Will the TyrolSport brake sleeves wear my brakes sooner or prematurely?” The answer is an emphatic “NO”. Given the same driving style, your pads will continue to wear at the same rate. However, when it counts the most, you have MORE overall braking power. So you get to have your cake and eat it as well. We like mods like that.

For our corrosion testing, we submerged our pins and sleeves in a 7% hydrochloric acid solution for 24 hours. There was no appreciable wear:

