

K-Mac Eccentric Trailing Arms Bushings

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[Friction Effects](#)

Friction in automobile suspensions is bad - that is a fact.

The factory rubber bushings that come on our E30 M3's (and most other cars for that matter) may seem soft and spongy sometimes, but they actually allow the movement of the suspension to occur with very little friction at the pivots. That is because, if the bushings are working properly, nothing is rubbing against anything during movement of the suspension. Rather what occurs is that the rubber bushings "twist", with only a small resistive force which grows as the suspension deflects further.

The twisting of a rubber bushing is akin to storing energy in an anti-roll bar by twisting it. Except that the amount of energy is negligible in comparison to the overall movement of the suspension. But there is very little energy loss associated with the twisting of the rubber bushings since there is no friction. So these rubber bushings actually make ideal suspension pivots in that they allow the suspension to move very freely. (Note that the worst friction in the factory suspension is probably in the front struts, especially when they are laterally loaded. This drives the Super Touring car tuners nuts).

Now the problem with replacing factory rubber bushings with after-market poly-urethane ones is that you add a lot of friction to the pivot points. Poly bushings do not work at all like the rubber bushings that they replace. Poly bushings rely on things sliding against each other in order to let the suspension move. This goes for sway bar pivots as well. You can lube the poly bushings real good when you instal them, and this will work ok for a while. But once the lube wears off you introduce a lot of pivot point friction. Real race cars do not use poly bushings, or Delrin ones either for that matter. They use ball joints and spherical bearings since these operate with relatively little friction, and also allow minimal flex in the suspension alignment.

So installing poly-urethane eccentric bushings is a bit of a Catch-22. You gain adjustability, which is good. You reduce unwanted deflection in the rear trailing arm suspension which is also good. But you inevitably introduce unwanted friction in the rear trailing arm pivots, which is bad. If you can manage to incorporate zerk fittings into the trailing arm pivots then at least you can keep the poly bushings well lubricated. Other than that you just have to live with it. In many instances the advantages outweigh the disadvantages. I plan on installing them if that counts for anything 8^)

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