

Give your 928's steering that 'new car' feel!

In the quest for near perfect 50/50 weight distribution, replacing your original rack bushes goes a long way to restoring that tight, new car, feel to the steering. Aftermarket bushes not only save cash compared with Porsche parts, but won't deteriorate over time. The newer technology material used is simply better suited to the application than the original rubber parts. Adrian Langford talks us through it.

The rack bushes to be replaced are rubber components with a hollow steel core, through which the ZF steering rack is bolted to the crossmember. They isolate the steering column from the worst bumps and thumps experienced by the road wheels, but their location is Piccadilly Circus for oil leaks! Any engine oil seeping from the sump gasket gathers here. The sump is directly above, and the gasket is old school cork, prone to harden and shrink with age.

Oil leaks from elsewhere can be blown back to find a cosy home in the crossmember, together with any old or existing leaks of hydraulic oil for the power steering. The result is that the bushes can be soaked in a greasy bath of oil that turns the rubber to mush. That's why latex

condoms carry a warning not to use them with Vaseline or baby oil, or so I'm told! The resultant softening – we're talking bushes again, not condoms – allows the rack to move from side to side instead of remaining firmly in place, giving a vague and sloppy feel at the steering wheel. Even if your car is bone dry underneath, the original rubber rack bushes will have deteriorated through age, so you will see a big improvement moving from old to new bushes.

Fitting new bushes of the original design will restore that factory feel, but they are still vulnerable to attack from oil and grease. Newer synthetic materials like Delrin are self-lubricating and chemically resistant to oil, so are literally fit once and forget. They are also harder than rubber. Not as hard as the aluminium bushes favoured by track day fans, but hard enough to give a superbly direct feel to the steering.

You're going to be dropping the steering rack to replace the bushes so need as much room as possible under the car. Unless you have access to a lift, the first task is to get the car as high as you safely can on axle stands, and remove the undertrays.



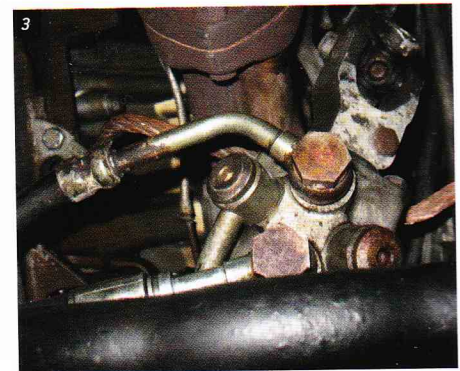
Start removing the rack plate

A reinforcement plate protects the steering rack. It's held on by four 10mm nuts in the centre, and four 17mm nuts at the corners threaded onto the bolts through the bushes. Not visible in this photo are two 17mm bolts attaching the side arms of the plate to the crossmember. 928s older than S4 models have only one side arm attached by a single 17mm bolt, but this is the only model-specific note in this procedure which otherwise applies to all models and all years.



Counterhold bolts above crossmember

Porsche made things a little difficult here. The 10mm nuts just spin off, since they thread onto T-headed bolts that sit captive in the channel at the edge of the crossmember. The 17mm M10 bolts that go through the bushes are conventional hex bolts with heads sitting above the crossmember. If you try to undo the 17mm nuts without counterholding, the bolts will just spin uselessly. However they are too close to the edge of the crossmember for access with a spanner, and there is very little headroom above to allow a socket to fit! I found there was just enough space for a 3/8" 17mm socket on a short handle. If none of your sockets or ratchets fit then you can just wedge a 5mm Allen key or screwdriver blade against the flats of the bolt head. Hold it so that the bolt head is jammed against the crossmember when you undo the nut, using a 17mm socket and ratchet from below. The 17mm bolts holding the side arms into the crossmember are easy to access.



Disconnect power steering lines at rack

There's nothing to stop you pulling the rack down and free of the crossmember at this point, but there's so little slack in the power steering lines that the job is easier if you disconnect them using a 22mm socket. The anti-roll bar blocks access to one of the banjo bolts, so just remove the 17mm bolts holding the anti-roll bar bushes to the frame, and loosen the 19mm bolt where the bar attaches to the suspension drop link. Now you can swing the bar down and out of the way and disconnect the rack banjo bolts. Look out for two copper crush washers per banjo bolt, but note they need to be replaced with new washers when it comes to reconnecting the lines. Don't forget to have a bowl ready to catch the power steering fluid! You'll replace it with new fluid when everything is buttoned up. The steering lines also attach to the left hand side of the engine bay under a plastic clamp, secured by a 10mm plastic bolt. Removing this clamp makes it easy to push the lines well out of the way when you're working on the rack bushes.



Remove rubber inner part of bush

This is the fun part! I used a small blowtorch to set fire to the rubber of the rack bushes. The rubber burns merrily away, and the bush centre will drop out or can be pushed out easily once the rubber has burnt off. You are using heat around the rack, so be careful to keep the heat directed at the rack eye and not the main rack tube where the seals could be damaged. Do try to dodge the flaming, molten rubber and red-hot steel core when it drops out! If this technique sounds too risky, then another approach is to use a hole saw of a slightly smaller diameter than the bush, to chew up the rubber till it separates from the steel outer. A slower but equally effective method is to drill holes around the rubber till you can push it out.



What's left of the bush cores

These are the cores of the four bushes after their ordeal by fire. Note how much of the rubber has been burnt away, leaving just the steel core through which they are bolted to the rack.



Attack remains of the bushes in the rack

The rubber core is bonded to a thin metal outer shell and that's all that remains in the rack. The end of the shell is peened over to hold it firmly to the rack, so to remove these shells you need to distort this lip inwards so it can pass through the rack. If you have an air chisel it will take seconds, but I took a few minutes using a cold chisel and hammer on each shell. You just have to lift the metal ring away from the rack, and distort it till you can drift the metal shell out of the rack with a punch.



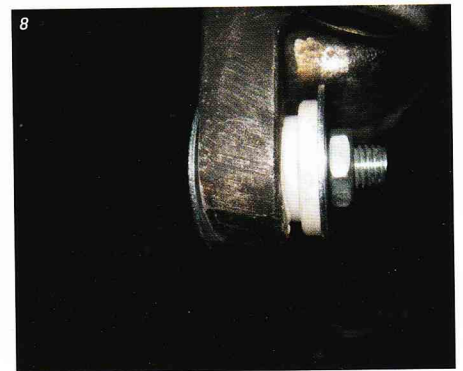
Old bushes are now out

Here are the shells of the old bushes. They put up a good fight against the chisel, but there was only going to be one winner. Repeat the removal process for each of the old bushes. The four rack eyes are now clear and ready for the new bushes to be installed.



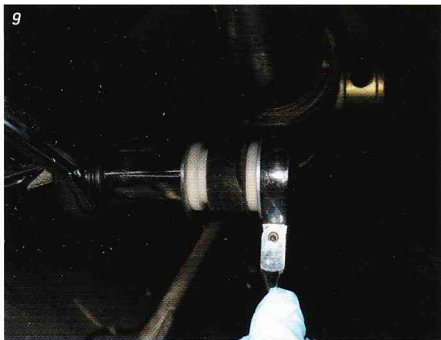
The new Delrin bushes

Whereas the old bushes are a single piece passing through the rack, the new Delrin bushes press into each side of the rack, so they are supplied in a kit of eight identical bushes. I don't know of any UK supplier, so mine came from g28 International in the USA. Their Delrin Steering Rack Bushing Kit was around £37, with VAT to pay on import, but any of the big g28 parts suppliers in the USA like Roger Tyson's g28s-R-U's or g28 Specialists will stock them. If you went with the Porsche bushes it would cost you three times as much, and you would miss out on the advantages of Delrin.



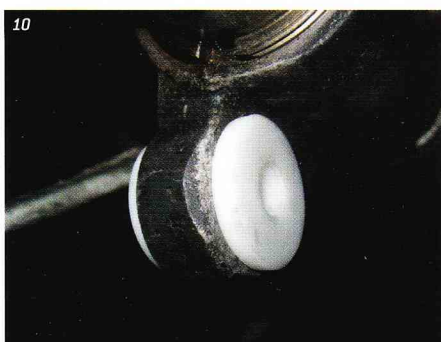
Press new bush into one side of the rack

The Delrin bushes are an interference fit into the rack. The eyes do vary slightly in size from rack to rack, so you may find you can push them in by hand, or just tap them in with a mallet. My rack made it a tighter fit but this is a worst case scenario. I made up a simple press using an M10 bolt with 17mm head, and a couple of matching M10 repair washers big enough to cover the rack eye. Using a ratchet, 17mm socket and a spanner to counterhold you can easily pull the bush into place till. The photo shows the bush before it's been pressed in.



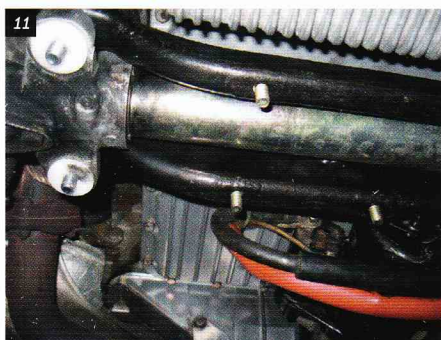
Repeat on the other side of the rack eye

The photo shows a bush fully inserted in one side, and the same improvised press being used to push in the bush on the other side.



Delrin bushes installed

This is one rack eye after the pair of bushes has been installed on each side. This part of the job goes very fast, but you need to repeat it for the four eyes of the rack 'till the rack is ready to reinstall.



Reinstall the rack

You're now just reversing the disassembly work. You need to push the new bushings onto the 17mm bolts hanging down from the crossmember. It's a tight fit so you may have to gently tap it home, but it means it will happily sit there while you attach the rack reinforcement plate. Secure the plate with the four 10mm locknuts torqued to 12Nm, the four 17mm locknuts on the new bushes torqued to 46Nm, and the 17mm bolts at the end of each sidearm torqued to 46Nm. You'll have to counterhold again above the crossmember for the four 17mm bolts that go through the new bushes.

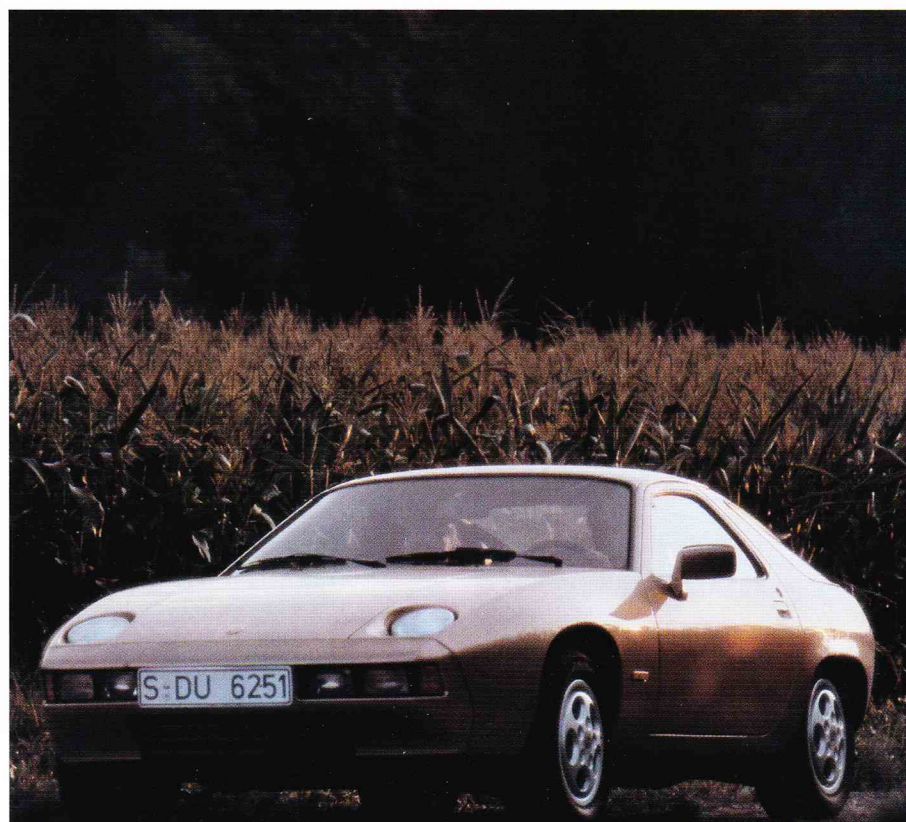
Final steps

If you disconnected the power steering lines from the rack, then the banjo bolts need to be reattached at 30Nm using new copper crush washers on the fitting at the end of each line. You need four standard metric copper washers internal diameter 14mm, external 18mm or Porsche part 90012304220. Also attach the plastic clamp holding the lines to the left side of the engine bay. Now you can swing the anti-roll bar back into its normal position, insert and torque the 17mm bolts at the frame rails to 46Nm, and the drop link bolts to 85Nm. Remember they were just loosened, not removed earlier.

Don't forget that the power steering system is empty, so you need to fill the reservoir before starting the engine or risk damaging the pump. The 928's power steering uses auto transmission fluid, not power steering fluid, so any generic Dexron II or Dexron III spec ATF is fine.

Fill the power steering reservoir, and briefly start the engine so it's all sucked down into the pump. Fill the reservoir again and restart the engine. The level should be checked with engine idling, so just top up until you are at the dipstick mark. With the wheels still in the air bleeding the system is just a matter of turning the wheel slowly a few times to each end of the rack. With all the air expelled you shouldn't see any foam in the reservoir.

After lowering the car back to the ground the job's done, and you're ready to test drive the new bushes. There's no need for any realignment, as you haven't touched the track rods, so the toe will return to its original settings. Assuming other steering components – especially the track rods and track rod ends – are in good shape you will notice a smoother, more direct and more precise feel at the wheel. If you want to complement the new bushes with new track rods, we can cover that in another article!



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