

Pull Starter Plunger Seals

Or...

The Constant Drip Drip Drip from the Pull Starter Plunger Seal/Continental Engines

I have my plane for 10 years and I always have to wipe the oil from the starter plunger. No parts diagrams to work with, Cessna doesn't return my calls, what to do? I find out the starter is a Delco-Remy part so I need to find a manual (I understand that El Reno in Oklahoma has one). Or, I can get on the Association Tech Forum. Here, I learn that Niagara Airparts <http://www.Niagaraairparts.com> does overhaul work on our starters/clutches and has a little ditty on their website https://niagaraairparts.com/wp-content/uploads/2017/03/HandPull_april_30_2003.pdf on just this issue.

Apparently, the original oil seals were leather washers, hard to find but still available (Cumberland Aero/Kentucky 1-800-524-5319, talk to Gary Boss). New/old stock leather washers may need to be soaked in motor oil to get them pliable and serviceable again. From what I gather most folks drop in a Chicago Rawhide CR9859 or a National Seal 6324-S. I'm told this is what Niagara does. Well, Nationals are hard to find here but CR's are all over the place. The local bearings shop tells me that Chicago Rawhide (now SKF) <https://www.skf.com/group/products/seals/industrial-seals/cr-seals/index.html> was originally big on leather washers/seals. Makes sense. Time has apparently changed that to metal/neoprene-like seals (elastomeric devices, as they call them). As a side note, I just changed out my tach cable housing seal and it has a "CR" number on it. Figures...

Out come the old National seals (may as well do the motor armature seal also). Inspect the Oilite bearings (that bronze looking thing with the diamond shaped holes to hold lubricant). New seals won't help you if the Oilites are shot. I don't know how to replace those but I'm lucky today-the shafts seem to fit somewhat tight in them. If the shafts fit sloppy in the Oilites then that's an article for another time. In goes a CR9859, and a new CR7512 for the armature seal, seals pointing in towards the oil source. But wait, why does that new plunger seal stick up like that? Why is there a faint ring around my starter clutch spur gear? Shouldn't the seal be flush with the starter plate adapter? Well, had I read a little more on the Niagara website I'd learned that this area needs to be machined down so the new seal fits flush with the starter plate adapter. Why? Clearance, Clarence; you want to make sure the starter clutch pinion gear and clutch assembly gets out of the way from the crankcase gear inside the engine. Courtesy of the Niagara PDF file...

"3.3 inspect the bushing in the starter housing. Inspect the starter housing and determine if the housing is machined for an oil seal. If the housing is machined for a seal, ensure that the correct seal is installed (the seal should not protrude above the machined surface of the housing). If the housing is not machined for a seal, a leather packing is required."

Inside near that coppery looking thing on the gear shaft is a spring that shoves the whole works back OUT of the accessory case, against the pinion gear pilot shaft, away from the crankcase gear. You know, that grinding sound you get on a bad day? Oh. So out comes the CR9859 and a little machine work occurs courtesy of a machinist A&P friend (sorry, don't know what he did here but he said it was easy), lower the whole thing about .060 more give or take to make things flush. No problems machining the Oilite bearing. In goes another new CR9859 and voilá! Life is good again. New starter plate gasket, reconnect everything (Niagara ditty has great instructions), and there is one less leak to deal with in the engine compartment. As far as bookwork, a mention of the starter mount no longer being a standard part (it's an old Delco-Remy part, remember?) and the seals used for any future replacements. (Oh, removing old seals is a bear, don't bugger up the plate-it's aluminum and soft. Pressing new seals in is easy!).



Old 'National' seal. Why is it raised?



Ring around the spur gear, hmmm



New CR seal, still not right



Ah, recessed correctly!