

# 170 Technical

## Oil Seals for the Delco-Remy Starter

by Steve Grimsley #3204 TX



Photo #1 - Fresno Delco Remy starter overhaul kit.

The original Delco-Remy starter for the Continental C-145 engine has a pinion gear that extends to engage the crankshaft gear. Since the starter pinion operates across the accessory case cover the correct oil seals are required to prevent leaks that will cover the backside of the engine and the firewall. The starter motor shaft and gear is also

inside the accessory case and a seal is needed there to keep oil out of the starter motor. Oil leaks were not a problem with my starter after I first overhauled it, 25 years ago, using a kit I purchased from Fresno Airparts. This kit included two oil seals, three brass Clevite bushings, and four graphite brushes. Fresno doesn't list a starter overhaul kit in their Trade-A-Plane ad anymore. Believing the overhaul kits were not available, and being occupied with another major overhaul, I took the starter to an auto accessory rebuild shop. The shop needed extra time to do the work because they had trouble finding an oil seal for the pinion that would fit. When I got it back I attached the rebuilt starter on the new engine and started flying.

Unfortunately, from the first flight, oil consistently leaked from the accessory case to the firewall and down to the belly of the airplane. The total oil loss was significant, about a quart every four hours, but not enough to ground the airplane. Tracking oil leaks back to the source can be a tedious exercise because everything gets wet with all of the air flowing through the cowling. I ended up redoing the seals and gaskets on the right mag, the tack drive housing, and the alternator. The alternator work improved the situation but it wasn't a complete correction. The starter, and particularly the area around the pinion, was by elimination, the last remaining source for the oil. It was always dripping wet after flight and was the source of the oil splashing on the magnetos. I tried to find the correct seals

Photo #2 - Seals found through various auto parts houses



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Photo #3 - The landing area in the case the new seal.

but without parts numbers or dimensions I wasn't successful. I phoned Fresno Airparts to see if they had any useful information and was surprised to find out they still had the Delco-Remy starter overhaul kit in stock. For \$38.50 plus a few dollars freight I received the same old kit as before. This included (first photo upper left going clockwise) three brass bushings, a motor shaft seal, pinion gear seal, and the four graphite brushes. Best of all I had parts and parts numbers to match for finding the seals for individual purchase.

The most important seal is the National 6324S that presses easily into the starter housing using a 1 1/8 inch socket as a drift. This seal goes around the pinion shaft where it slides forward to engage the starter clutch and gear with the crankshaft gear. I was able to special order these through Auto Zone auto parts company. The starter motor shaft seal is stamped with NS470027. I wasn't able to find this exact seal but NAPA measured it and came up with one that has the same critical dimensions. The number is 7513 with the same outside and inside diameters. This seal is thinner than the NS470027 but it should work. This seal can be tapped into position using a 1 inch socket. The second photo shows these seals with their parts box and numbers.

Installation of the lower pinion seal is very easy, and directly accessible, with the starter off of the engine. Just punch out the old seal and drift in the new one. The third photo shows the landing area in the case for the lower seal with the new seal below. The brass bushing that is pressed into the case behind the oil seal can also be seen. On photo four the new lower seal is in place. The upper seal that seats behind the starter motor gear is visible on this photo as well. To gain access to this area, for replacement of the upper seal, will require pulling the starter motor off of the starter mount casting. This upper seal isn't exposed to the oil splashing around the inside of the accessory case as much as the lower seal. Also, being higher on the engine, leaks from a worn out seal here usually are not as bad in terms of volume. However, leaks



Photo #4 - New lower seal is in place.

around the upper seal will put crankcase oil inside the starter motor which could cause poor electrical contact.

The new seals on my starter haven't completely eliminated oil getting on my accessories but it has reduced the problem to just minor oil wetting of the surfaces. For an old C-145 engine this is about as good as you can make it. If you just need the seals without the full starter overhaul kit this job will cost less than 15 dollars.

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