# Unobtainium Supply Co

## When it's NLA, who do you call?

# Quad shift seal installation tips

**Rev. B**
**Effective: 31-DEC-2015**

**Quad shift seal installation tips**

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**TIP#1: BREAK SHAFT GLAZE:**
Seals work by the surface tension of a film of oil. When polished the shaft doesn't hold enough oil to either seal properly, or to lubricate the seal. Once the shift shaft is removed, break the glaze where the seal has polished the shift shaft by rubbing with 1500 to 3000 grit sandpaper (ScotchBrite™ even grey is too coarse). You just want a very smooth satin appearing finish. The satin finish lets a fine film of oil adhere to the shaft, even when it slides under the seal.

**TIP#2: SEAL REMOVAL & INSTALLATION:**
1. DO NOT REMOVE THE SWAGED WASHER that forms the outer side of the seal's groove.
2. Use a hook type tool to remove the old seal.
3. Lubricate the new seal with engine oil or assembly lube, fold the seal into a C shape, work it into the groove starting with one end of the C.

**REPLACING 105558 O-ring SEALS:**
The 105558Q quad seal/O-ring pairs that replace the older 105558 o-ring style seal install easily, just slip the quad seal into the groove & push it against the back of the groove. Then insert the O-ring beside the seal next to the swaged in metal ring that forms the grooves outside edge. The O-ring fits into the circular groove in the side side of the quad seal formed by the inner & outer lobes on that side. *Once this is done you probably don't need to read further.*

WHY THE O-RING?: On most transmissions the groove is significantly wider than the o-ring (or quad ring) seal. This lets the shaft drag the seal side to side in the groove. This axial drag wears the outside of the seal as the bottom of the groove is not as smooth as the shaft.

The small o-ring fills the gap between the quad ring & the swaged in washer to keep the quad ring from sliding.

IF O-RING WON'T FIT: Apparently the slot width varies significantly from car to car depending on how deep the retaining washer is staked in. Several people have reported that the quad ring was a tight fit in the slots and they could not insert the small O-ring. In this case, discard the small o-ring.

> NOTE: By design, the quad seal is compressed inward onto the shaft by the groove. If you just slip the quad seal onto the shaft it will be loose.

**REPLACING 115372 SQUARE SEALS:**
The Unobtainium Supply 115372-Q quad seals that replace the newer 115372 square cross-section seals fit very snugly when compressed between the shaft & seal mounting hole. I've recently replaced the shift seals on 3 different 308s: A GTSi, and a couple of

GTS QVs. I've found that pressing the shaft thru the seal can be a lot of effort. The following tips will greatly reduce the effort:

## TIP: PRE-EXPAND THE SEAL BEFORE INSERTING THE SHAFT:

Use a socket (or something similar) that's the same OD as, or up to about 1mm slightly smaller OD than the shift shaft to pre-enlarge the seal for the shaft. I use a Craftsman 14mm 3/8" drive socket, but your socket size may vary. Lubricate the seal & socket with transmission oil, assembly lube, or something similarly slippery. Insert the seal into it's groove. Stick the socket into the shaft hole from the side opposite the side the shaft will be entering & work the socket thru the seal. Keep the socket inside the seal until the shift shaft is inserted. When the shaft is inserted it will more readily slip into the seal, pressing the socket out as it goes thru the seal.

## TIP: 328 & very late QV SHIFT SHAFT TAPER:

For some reason Ferrari started machining a shorter taper on the end of the shift shaft when the 328 was introduced (the shift shaft p/n did not change). Late QVs sharing transmission parts with the 328 may also have this problem. This short taper makes it very hard to insert the shaft into the seal. Fix is to lengthen the taper to about 3mm [1/8"], with the taper's end being about the seal's ID or slightly smaller. The taper is not critical, so lengthening can be done by filing, grinding, or turning in a lathe.

## TIP#3: VERIFY SHIFT SHAFT'S END HAS ENOUGH TAPER:

In a few cases, mostly 328s, it's been extremely difficult to insert the shift shaft's end thru the quad seal. Here's what's been found:

Shift shaft insertion becomes very difficult when there is insufficient taper for the shaft's end to enter the inserted Quad seal & compress it as the shaft slides thru it.

When  the shaft has insufficient end taper, the shaft's end will try pull the seal's entry lobe along with it as it is being inserted, thus distorting the seal instead of compressing it. While the shift shaft part number is the same for all 308s, Mondials, & 328s, the amount of taper machined on the shift shaft's end varies significantly from part to part.. Some shafts, mostly in 328s & very late QVs have almost no taper. Instead, the end is just rounded off a bit.

 The solution is to add more taper to the shaft's end. Ideally the shaft would have about 3mm to 3.5mm, tapering down to the quad seal's ID or slightly smaller. Adding taper will have no adverse effect on the shift shaft.

Tapering the end can easily be done, either with a lathe once the shaft has been removed, or by careful hand filing or grinding. I recommend wrapping the shaft first with 2 layers of masking tape to protect against the lathe chuck, a file or other tool accidentally damaging it.

## SNUG IS OK:
The shaft will feel very snug, but over 6-8 months, and as it's used it takes a bit of a set & the drag is reduced.

The owners of 3 cars have said they liked the 'improved feel' of their shifter.

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I also got this tip from another customer:
Quote:

> **I was having a lot of trouble pre-expanding the seals in a cold garage, could not get either a 14mm or 16mm socket to pre-expand the seal until I heated things up.**

This makes sense as the Viton used in these seals will get quite firm when the temperature is 50 F or 60 F. It softens up quite a bit if you can warm the seal, shaft, & sump case up to 70 F or higher. The warmer the better.

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Hope these help,
Verell