



Purchasing Parts: A Sure Thing Or Russian Roulette?

By Mike Weinberg
Contributing Editor

Being successful in the business of transmission repair isn't easy. Ever-increasing technical complexity, unending expansion in transmission designs, rising costs of units and parts and computer controls have revolutionized our industry. An ongoing problem for transmission rebuilders is the purchase and availability of quality parts. Logic tells us that the whole transmission is the sum of its parts; therefore, an inferior part can bring about a costly comeback. I have talked before

about proper teardown and re-building technique, so now we will explore what goes into a quality part. In order to clarify some of the terms used in this discussion, I will give you the following definitions:

Original Equipment Manufacturer (OEM) Parts – those parts manufactured by the original automaker, or by a manufacturer designated by the automaker to produce the parts. That same supplier may make these parts available to the after-

market (the transmission repair industry). These parts, when purchased by the transmission rebuilder, are the same as those that are installed by the factory originally. The term "OEM quality" also can mean parts made by a manufacturer that is a supplier to various automakers and has the capacity to make all its parts to OEM specifications.

Replacement Parts – those parts manufactured by a company that does NOT make them for the original manufacturer and has no official connection with the OEM.

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BRONCO - NP208F, BW1356F, RANGER-BW1350F, BW1354F, BW4405F
BRONCO II - BW1350F, BW1354F
AEROSTAR - RA29F
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• Durango RT - Converts Full Time AWD to Select Trac or Command Trac

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DAKOTA - NV2310, NV2330, NV2420, NV2440
RAM PICKUP - NV2410LD, NV2410HD, NV2710, NV2730
RAM QUAD CAB - NV2310HD, NV2410LD, NV2430, NV2440
RAMCHARGER - NP2080, NV2410





Up To Standards

So What Goes Into A Quality Part?

On OEM parts, the manufacturer is part of the design team for the particular unit involved. The transmission is designed for particular applications. Engine torque and horsepower, gear ratios, vehicle-packaging requirements, transmission weight, vehicle weight, 2- or 4-wheel drive, etc. are some of the parameters that will influence the design.

Next comes the engineering and building of prototypes. The design is refined further and tested. Materials and gear design will be changed to provide durability and quiet operation. One of the most critical issues to the automakers and their suppliers is durability. Virtually all contracts between the carmaker and its OEM suppliers make those suppliers liable for the cost of failure under warranty.

The Manufacturing Process

I am looking at a list of specifications and quality-control information on a T5 main-drive gear for a Ford application, provided

Input bearing journal-----	.0005 (5/10,000 inch)
Pilot bearing journal-----	.0006 (6/10,000 inch)
Pocket roller inside diameter-----	.0008 (8/10,000 inch)
Helical gear pitch diameter-----	.002, ± 1,000th
Spline outside diameter-----	.008, ± 1,000th
Clutch tooth diameter-----	.002, ± 1,000th
Tooth thickness-----	.002, ± 1,000th
Cone angle -----	5 minutes Tolerance*
Cone runout-----	.001
Micro Finish Cone-----	7 micron or less**
OD bearing journal-----	20 micron
pilot bearing journal-----	32 micron

*Minutes are parts of a degree, 360° = a circle

**Indicates a mirror finish good enough to shave in.

by the Powertrain Assemblies Division of Borg-Warner Corporation. In this relatively simple gear there are 281 dimensions in the finished product. Here are a few of the tolerances that the gear must meet:

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Jeep Transfer Cases



- 231J Command Trac
- 242J Select Trac
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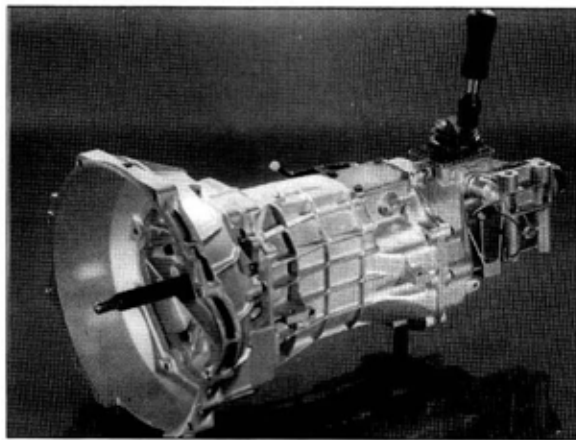
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Up To Standards

In every step of the production, there are multiple checks for dimension, finish, metal chemical composition, metallurgy, comparing them with the design layout and specification. In producing this one gear, the part will undergo 46 quality-control audits, and at least seven required layout checks. You and I take it out of the box, slap it into a unit and take it for granted. We have yet to consider what goes into achieving proper hardness, shot-peening to strengthen and compress the metal and achieving the proper "lead" (angle of spiral of the gear tooth expressed in inches).



The Borg-Warner T-56, big brother to the T-5.

Exhaustive test cycles are run on finished products. Borg-Warner uses vehicle testing and controlled machine-test cycles to evaluate durability and longevity. A transmission will be subjected to hundreds of thousands of shift cycles, drag starts, thousands of hours of extended operation in heat and cold on a continuous basis to make sure that the parts will survive in their intended environment.

Replacement Parts

When a non-OEM manufacturer makes a replacement part, it rarely has access to original prints and design criteria. It therefore has to reverse-engineer the part. That is, to buy a selection of the

same part, try to obtain a high and low side to the tolerances, measure angles, attempt to analyze the chemical composition of the metal and produce a copy. Many factories can produce a part that is acceptable and will provide enough durability to be safe to use. It is up to that supplier to provide proper data so that the product can be tested to meet the specs consistently. At the very least, gears should be tested in actual use before being offered for sale to the rebuilding industry.

At this point, you may wonder why there are replacement parts on the market at all. One good reason is that many OEM manufacturers will stop making service parts for units after they no longer are in current vehicle production. This leaves many units on the road without parts for repair. A gear supplier will have parts made to fill the need in the repair industry.

Another reason starts with the transmission shop. A percentage of the shops doing business operate strictly on price. They either cannot sell repair work profitably, or they don't know their cost of doing business and give their work away. These shops will put constant pressure on their suppliers to sell a cheaper product because they cannot afford OEM-quality parts at the prices they charge their customers for repair. Consequently, there are cheaper "will fit" parts on the market.

The third reason is greed. Someone will seize an opportunity to make a quick buck. Bearings, seals and synchro rings most commonly fall into this category.

How do you protect your wallet and your reputation in the community when buying parts?

1. Buy from reputable suppliers who will stand behind the product and won't sell any part they would not use themselves.

2. Demand OEM quality whenever possible. Brand names mean something. The few dollars you save when buying Eastern bloc bearings, seals or synchro rings may cost you a bundle in expensive gear-train repairs, should they fail in use.

3. Country of origin - It is FEDERAL LAW that all parts not made in this country have the country of origin plainly marked on the boxes.

4. Get the right price for your work. The cheapest thing you can put in a unit is quality parts. Know your cost of doing business and charge the customer a fair price that allows you to use good parts and make a fair profit.

5. If the price seems too good to be true, it usually is. You only get what you pay for. If you doubt me, I have a nearly new bridge I'd like to sell ...

6. Liability - Every reputable manufacturer and supplier will be there to help you if there is a problem with product liability. That \$6 you saved with those bearings from Communist China won't seem so good if the transmission locks up and turns the schoolbus over on the interstate. Don't be the last guy on the chain when push comes to shove, or plan to spend lots of time with lawyers.

Next time you take a quality part out of the box, take a minute to admire it. The marvel of engineering and manufacturing skill that went into its creation, and the hard work of lots of people who brought it into your hands often are taken for granted. Put quality first and watch your profits increase and your comebacks decline. You'll sleep better at night, too. ■