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Ford 9 Inch Identification and Detailing Guide
Part 1 Axle Housings

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This guide is split in to 4 separate sections and will go over the many different identification and detailing items related to the Ford 9 inch rear end and associated parts as they were installed in the 1965 to 1973 Mustangs and the 1967 to 1973 Mercury Cougars.

Part 1 Axle Housings
Part 2 Backing plates and drums
Part 3 Center section
Part 4 Axles

The 9 inch Ford rear axle was first introduced in 1957 and was used all the way until 1986 and is one of the most popular rear axle designs ever made, not just for Ford production cars, but also the aftermarket industry and racing of all different brands and makes and models. It was eventually phased out and replaced by the 8.8 inch rear end, not because of durability, but for weight/gas milage purposes. The rear axle assemblies have been manufactured by Ford at their 170 acre Sterling Axle Plant which is located in Sterling Heights Michigan and still operational today. They assembled complete bolt in ready rear axles that would then be shipped to the various assembly plants as complete units that were then installed in the cars.

Some of the key things that made the 9 inch rear end so popular and the choice for performance Fords being made during this time are the removable “third member”, strength due to a larger ring gear and pinion support bearing, and its massive aftermarket support which still exists today. We will go thru this and other details in this guide.

The Sterling Axle Plant

The Ford Sterling Axle plant is located in Sterling Heights which is a suburb of Detroit Michigan. Construction of the plant started in April 1955 on 171 acres, with machinery installation beginning in February 1956 and operations starting in September 1956...just in time for the introduction of the 9 inch Ford rear end in 1957.

The plant itself was responsible for manufacturing and shipping all axle assemblies to all the different Ford car and truck assembly lines. There was no second or third site for this type of operations. Because of this for the cars we are looking at here there was no such thing as a Dearborn built or San Jose built rear end assembly. All of them came from one source and as such the basic markings and identifications are the same.

1972—Courtesy of Ford Archives

1972—Courtesy of Ford Archives

Some facts on the plant size and operations during this time frame (1960's/1970's):

The plant and all its operations covered about 2,747,000 square feet.

The plant also produced other related components like driveshafts and suspension pieces (such as wheel spindles).

Wages and salaries paid out to employees are about $221 million annually.

During this era there were about 2,205 hourly workers.

The cost of total purchases of production materials including forgings, castings, bar and sheet steel are about $1,400,000 per day.

An average of 70 railroad freight cars and 300 highway trucks loaded with parts and supplies move in and out from the shipping and receiving docks each day.

About 175 tons of coal are used are used to generate nearly 2,500,000 pounds of steam per day.

During this time period, the Sterling Plant is recognized as having the largest gear cutting department in the world performed by row after row of automatic machines.

The plant recovered and recycled oil at the rate of 80,000 gallons per month.

1967—Courtesy of Ford Archives

Images from Inside the Plant

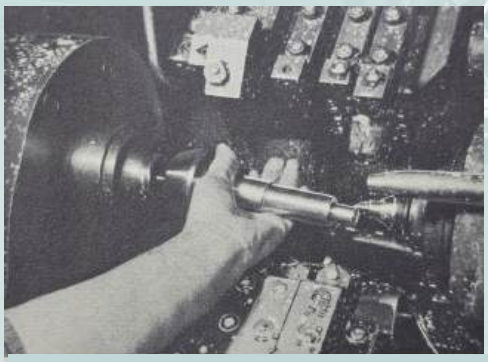
Hot ring gears are removed from furnaces and oil quenched in a press to prevent distortion.

The teeth of matched ring and pinion sets receive a final polish. Gear sets are revolved together in a lapping machine while teeth are sprayed with a fine abrasive compound.

1972—Courtesy of Ford Archives

Checking a pinion finisher

64 machines finish cut the teeth in the drive pinion to the size and shape required (32 machines generate the drive side of the teeth and 32 generate the reverse side).



Drive pinion blank being removed from the high speed turning lathe. Thirteen carbide tools turn forging to accurate dimensions at a cutting speed of nearly 1,300 surface feet per second removing three pounds of metal in 15 seconds.

Multi-station drilling and tapping machine which drills, chamfers and taps holes in back of ring gears.

How to tell the difference between an 8 inch and 9 inch rear end

The first step, is to identify and make sure you actually have a 9 inch rear end assembly. During these years the most commonly installed rear end assemblies (with a removable carrier) were the 8 inch Ford and the 9 inch Ford. Differences include that the 8 inch rear end has two dimples as shown below on each side of the center of the axle housing which look different when compared to the two dimples on the 9 inch. The 9 inch housing has a raised area (or hump) in the middle of the axle housing (starting in 1966) which the 8 inch does not. Another basic difference is the overall shape of the center section with it being flat vs rounded.

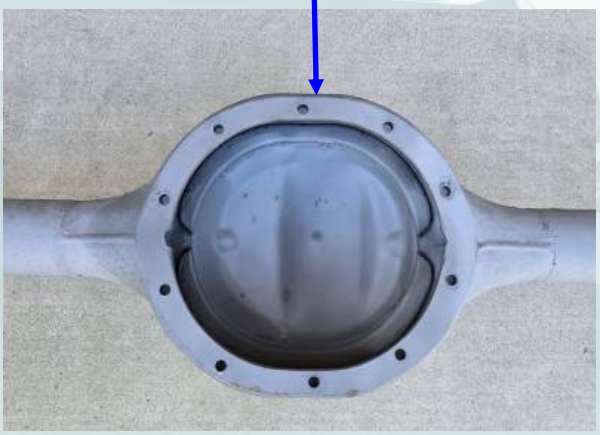
8 inch rear end housing

Dimples

9 inch rear end housing

Flat surface on top and bottom

Rounded surface on top and bottom



If its difficult to see the overall shape of the center section because you don't have full access under the car, there is another easy way to identify it. If you can't get a socket on the bottom two nuts that hold the center section to the axle housing... it's a 9 inch assembly. This is unlike the 8 inch rear end which all 10 carrier to axle housing nuts can easily be removed with a socket.

Axle Housing measurements

Since Ford made so many different 9 inch axle assemblies over the years the measurements on these pages will help to identify what will specifically fit in the stock original 1965 to 1973 Mustangs and 1967 to 1973 Mercury Cougars which we are focused on here. Other models may also fit for these applications—check your resources to confirm.

The measurements here are approximate and variances of as much as 1/8 to 1/4 can exist—the rear end axles were not manufactured to such a rigid standard so expect some minimal differences. However the general measurements listed here are accurate enough to identify different axle housings.

1965 and 1966

Housing flange to flange: 52.25 inches
Axle flange to axle flange: 57.25 inches
Spring perches (center to center): 43 inches

1967 to 1970

Housing flange to flange: 54.25 inches
Axle flange to axle flange: 59.25 inches
Spring perches (center to center): 43 inches

1971 to 1973

Housing flange to flange: 56.00 inches
Axle flange to axle flange: 61.25 inches
Spring perches (center to center): 43 inches

Axle housing versions 1965 to 1973

1965 to 1966 model year till about October 1, 1965

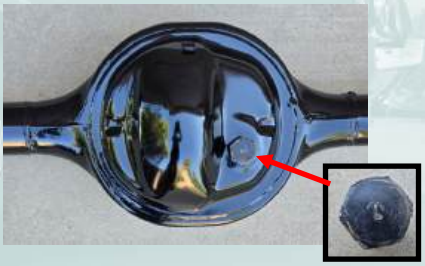
C5ZZ-4010-B

This is the first version during the Mustang years that was typically installed in 1965 K code Mustangs and Shelbys and continued in to the early model year of 1966. The main difference is in the center section being smooth and rounded versus the other comparable years here. The fill plug is a pipe plug with a recessed square drive where gear oil was added and checked. Also the axle tubes have a much more significant taper towards the ends.

From about October 1, 1965 till end of 1966 model year

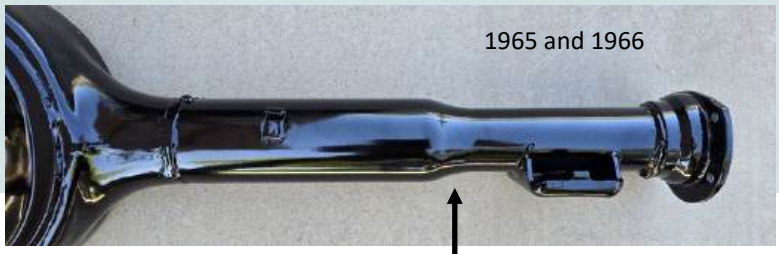
C5ZZ-4010-C

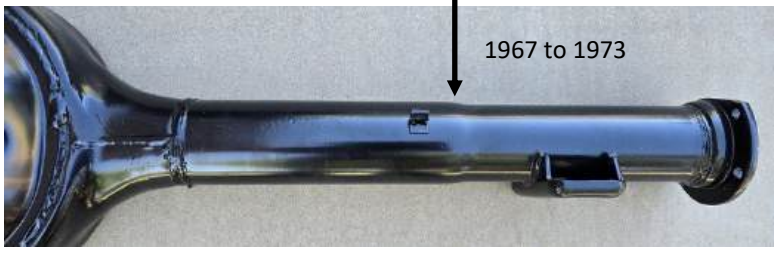
This is the second version that was installed in 1966 K code Mustangs and Shelbys. The center section no longer is smooth but now has a hump in the middle that continued thru the remaining years. The fill plug also changed and is now a large bolt style design typically with an L stamped on the end. The axle tubes have the same taper as the previous version.



Changes to axle housing tubes:

Starting with the C7ZZ-4010-F units (1967 model year) the axle tubes on the 9 inch axle housings no longer have a large taper on the ends—see photos for reference here. The 1967 to 1973 housings, although they still have a taper, no longer have such a pronounced taper making them also easier to identify.





Axle housing versions 1965 to 1973, cont.

1967 model year till about April 1, 1967

C7ZZ-4010-D

This next version of the axle housings in now about 2 inches wider as the Mustang body dimensions grew. The axle tubes no longer have the large tapered ends and now have a less visible taper. The fill plug still is on the back as shown .

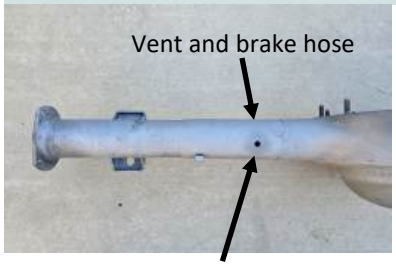
About April 1 1967 to end of model year 1970

C7ZZ-4010-F

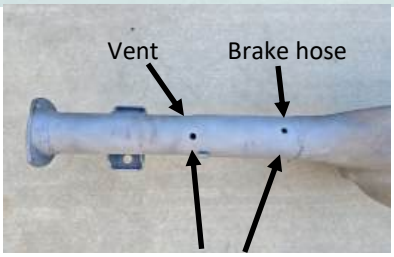
Same as the previous version, however the main difference now is the fill plug is no longer on the back of the housing. The fill plugs are all now part of the third member. Single hole for vent tube (non staggered shocks—see below).

***** Note: Staggered rear shock 4 speed cars (April 1 1968 to end of 1970 model year)**

Starting with the introduction of the 1968 Cobra Jet cars Ford modified axle housings to accommodate for the staggered shock set up that the 4 speed cars had. Because of potential interference with the vent tube and hose they relocated the vent and the brake line block on the housing to two locations (versus 1 as shown below). However there are documented cases where cars built without staggered shocks still had a housing with this variation installed from the factory.



Single hole version



Two hole version

Staggered shock installation

Axle housing versions 1965 to 1973, cont.

April 1968 to end of model year 1970

C8ZZ-4010-A replaced by DOZZ-4010-C

This is the staggered rear shock version that was designed to be used on 4 speed cars that had staggered shocks installed from the factory with the best examples being, Mach 1, Boss 302 and Boss429. Two holes for the vent and brake block.

1971, 1972 and 1973 model year

D1ZZ-4010-B

This final version of the 9 inch axle housing used during these years of Mustangs again grew wider as the cars did adding yet another 2 inches to the previous version. Other than the size differences the axle housing looks the same as previous version. All had two holes for vent and brake block.

Axle housing pads

Although not a replaceable item from Ford, the axle housing pads (for the leaf springs), were manufactured in two different versions—an early and late version. This helps to identify an axle housing that may have been modified.

1965 and 1966 version

1967 to 1973 version

Axle bearing sizes: Large vs small

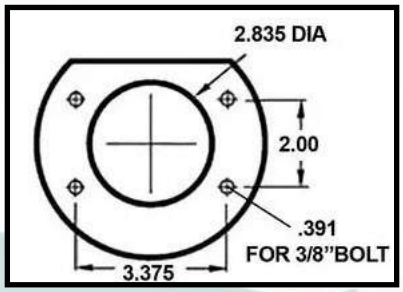
There are different size axle bearings that Ford used and commonly called large bearing or small bearing. For the years and applications we are we are focused on here, all Ford 9 inch axle housings used the same bearing size regardless. If it was a 9 inch in a Mustang or Cougar it used the same size. And related to this the 8 inch axle housings also used the same size bearing. All Mustangs from 1965 to 1973 that used an 8 inch or 9 inch rear end had the same bearing that has an outside diameter of 2.8346 inches and inside diameter of 1.378 inches (a good replacement is a Timken RW207CCRA).

Axle flanges, gaskets, and bearing retainers

These also changed during the years. Ford originally called for a gasket to be used on both sides between the backing plate and axle housing and the bearing retainer and backing plate. After 1968 when the flange style changed they only call for a gasket between the axle housing and the backing plate. The gaskets changed shape as did the axle housing flanges. See below

Axle flange 1965 to April 1968

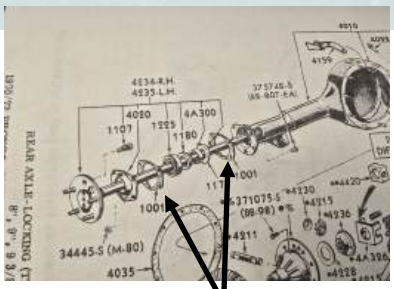
Axle flange April 1968 to end of 1973 model year



Gasket used between bearing retainer and backing plate A8AZ-1001-A used till 1968

Paper gasket used between backing plate and axle housing C1AZ-1001-A used 1965 to 1969

Metal gasket used between backing plate and axle housing D0OZ-1001-A used from 1970 to 1973



Ford drawing showing placement of two gaskets till 1968

C0AW-4020-B bearing retainers with matching gaskets 1965-1968

C8UZ-4020-A bearing retainers. These are used with no gasket. 1968 –1973

Axle housing vent

The rear axle housing had a vent that was used thru these years that is a C5ZZ-4022-B which is the short version that was used and measures about 1/2 inch on the threaded portion. The C5ZZ-4022-A version was a longer version with about twice as much threads used in other applications and should not be used in the 9 inch housing. These always were a pipe t thread so care should be taken if chasing threads not to strip them.

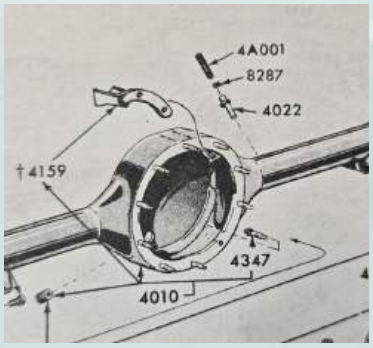
Left to right: NOS, original 1965 GT350, and the longer –A version

Toothed washer used in 1965 and 1966

Split lock washer used 1967 to 1973. Not unique serrated edge

Rear axle lubricator

1965 thru 1967 rear axle housings had what Ford called a "Rear Axle Differential Lubricator" plate that was inside the housing as shown below. This was a piece of stamped metal formed to help sling the gear oil on applications with locking axles. Part number B9A-4159-A. Its not clear if this was really needed and Ford stopped using it after 1967.



Rear axle to differential studs

The rear axle studs are a dark phosphate finish and a 3/8-24 thread. These studs are designed to be used with lock nuts that are a clear cadmium finish up to 1969 and then they had a red dye color on top of the of the cadmium finish from 1969 to 1973. The copper washers are used to help seal the threads from the gear oil seeping thru the threads.

Axle housing gasket

The original axle housing gaskets were a Ford part number B7A-4025-A. These gaskets actually had a different shape then all the replacements that are available today. All gaskets today are much wider and hang over the axle housing much more and are easy to spot when installed.

Original style on top of current available shows differences

Original style on axle housing. Note lower right area.

Current reproduction sold today. Note lower right area.

Machined surface on axle housing

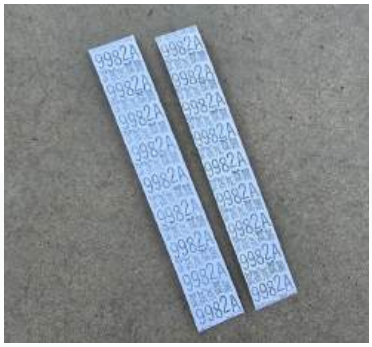
The rear end housing will have the mating surface where the carrier bolts as a bare metal. This was machined after the housings was painted so it would be bare with no paint. On a restored and detailed assembly you can see the bare surface as example below shows.

Axle vent hose

The original rear axle vent hoses typically would have a ribbed pattern on them as shown in the photo below and not be smooth. They also would have a paint dab on the hose to indicate where the clamp to the body would be that could be white or yellow. The hose would be secured to the vent with a crimped clamp.

Paper axle tags

Each axle housing would have a code that the Sterling plant would assign based on the internal gear ratio, ring gear diameter, engine/transmission pairing, and also if it's an open or locking axle. This would match the metal ID tag, and was also written on the axle housing. This helped identify the housing for installation on the assembly line. These paper tags were used from 1965 to 1973 and would generally be under or near the driver side U bolt since it was applied before the housing was installed in the car. Paper tags also came in different colors over the years in green, red, white/tan and blue. Generally the first digit of the paper axle tag would indicate the model year starting in about 1967. 0= 1970, 9 = 1969.



Axle bracket—brake line

There is two different types of axle brackets for the brake line that was used from 1968 to 1973. The basic bracket shown below (version 1) was used on axle housings with one hole for vent and brake from 1968 thru 1970 model year. The second type of bracket (version 2) was used on cars with staggered shocks (or two hole axle housings) from 1968 thru 1970 and all rear 9 inch end housings from 1971 to 1973. Both versions would have a phosphate and oil finish. Although these brackets are shown in the assembly manuals with engineering numbers they were never serviced and sold by Ford on any individual basis.

For the staggered shock version this bracket was held in place typically with a Rockford bolt that had a split washer. Just like the axle vents the mounting holes here are also pipe threads so care should be taken not to strip the threads when cleaning or rebuilding.

Typical installation showing the bracket in place holding the brake line.

Paint process and markings

When the axle housings were manufactured there was a variety of markings on them—some more common than others with variation thru the years. The Sterling Axle Plant had to mark the housings so that when they arrived at an assembly plant they knew what was inside. Some markings are to identify the housings and some part of the machining process and some as a completed assembly. Its recommended to carefully clean and document the housing before stripping the paint to see if any marks are there. Otherwise the best source is to look at a survivor car built during the same time frame or photos of a well documented restoration.

The axle housings would be painted a semi gloss black. In the past a PPG DP90LF would have been the black primer to use and then sprayed with a PPG DDL9423 however if these are not available a semi gloss like SEM Hot Rod black would be similar. The trick is not too glossy and not too flat.

The axle housings were painted standing up and would have runs in them. They were never perfectly painted. They would be clamped on one end so there would be less paint or even possibly some bare areas on one end.

Original unrestored housing showing paint runs

Close up showing paint runs

NOS axle housing showing marking on bottom

Unrestored axle housing showing paint on bottom

Yellow paint dab typical 68-70 staggered shock housings

A N G H E L
R E S T O R A T I O N S

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