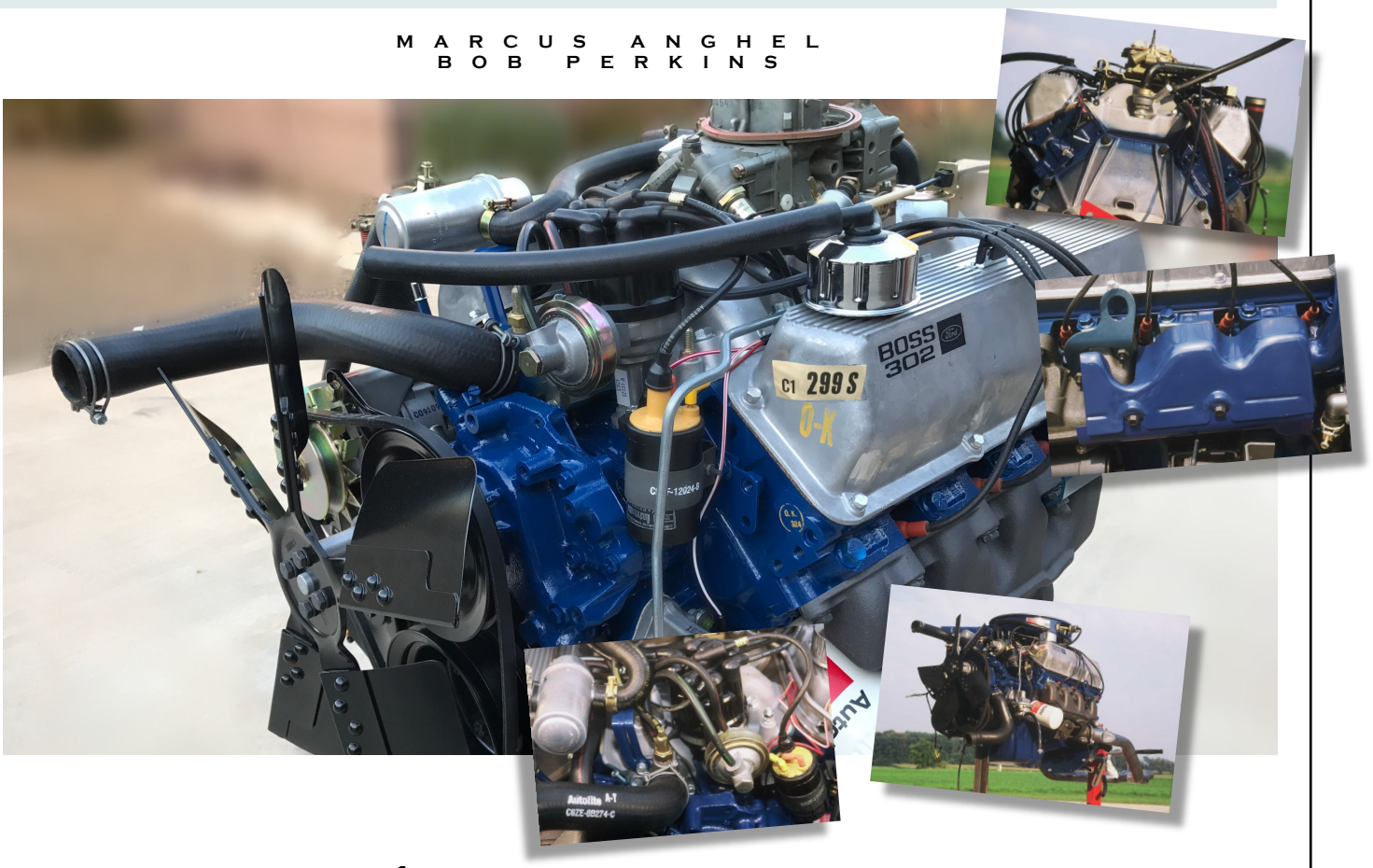
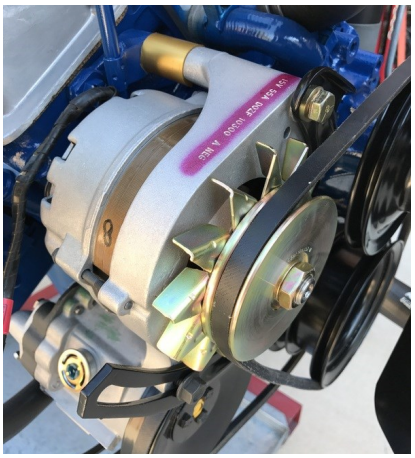
How To: Boss 302 Engine Detailing

M A R C U S A N G H E L
B O B P E R K I N S





1 The 1970 Boss 302 alternator is rated at 55 amps, as indicated by the red dye on the top of the housing. The dye was actually applied to the housing before the engineering numbers were stamped on (D0ZF-10300-A) so you will not see the numbers with paint in them. Notice the Boss 302 actually uses an oversize 289 high performance alternator pulley marked C5AF-10A352-H which is 4 inches in diameter. The alternator spacer is normally a gold anodized aluminum piece. The pulley and fan are a zinc dichromate finish.

A NUTS AND BOLTS GUIDE TO THAT FAVORITE ENGINE...16 YEARS LATER

In September of 2000 Bob Perkins and Jerry Heasley put together what is considered by most to be the best Boss 302 engine detailing guide that has ever been done. That guide has been used by many restorers over the years to detail a Boss 302 motor...except for one thing...that original article was printed in black and white. Going back with the help of Jerry and Bob we were able to find some of those original color photos, but more importantly, provide an updated detailing guide that shows some additional items and features to look for when putting one of these motors together. A lot more information has been uncovered since then, looking at original unrestored cars that we will share here. The motor shown here is a 1970 Boss 302 motor with differences noted for a 1969 Boss 302.

2 1969 and 1970 Boss 302 motors both use the same Ford cast iron exhaust manifolds. The driver's side (pictured on top) is marked with the engineering numbers of C9ZE-9431-A and the passenger's side (pictured on the bottom) is marked with the engineering numbers of C9ZE-9428-A. When installed there is no exhaust manifold gasket used. On original manifolds you may see some blue overspray from when the motor was painted.

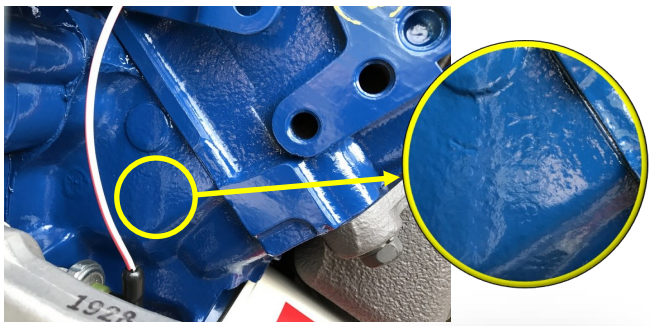
3 The original assembly line intake manifolds are aluminum with some slight blue overspray on the front and backside from when the motor was painted. Two engineering number versions exist which are a C9ZE9424-E or a C9FE9424-E. The underside of the intake has a casting that says BUDDY BAR. Date codes (when present) are on the front next to the engineering number.

4 The Boss 302 valve cover decals used in 1969 did not have the engineering number on them in the lower right. This continued to be used in to early 1970 production after which the engineering number was added on the decal.

5 1970 fan spacer is identified by the length (2.25 inches) and engineering number stamped on the nose (DOAE-A). The 1969 spacer is different and marked with C8ZE-D on the nose and an effective length of 2.50 inches. The correct finish is a natural aluminum. **Note:** Some very early April 1969 Boss 302's used a fan clutch marked C9AE-D.

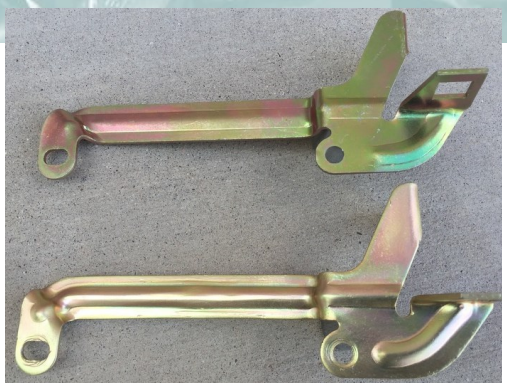
6 All 1969 Boss 302's had the chrome valve covers installed that are stamped with Power by Ford. Some early 1970 Boss 302's also had chrome valve covers installed which are slightly different. The two versions are shown here with the 1970 version shown on the left. All other 1970 Boss 302's received the finned aluminum valve covers which were also the only replacements ever sold by Ford.

7 Shown here is the unique bolts used on the aluminum valve covers. The original is on the left side in both pictures, compared to a reproduction on the right. Note on the original, the unique manufacturers stamp on the head of the bolt and the small cut mark on the side and the markings on the lock washer.



8 There is two areas on the motor that will give date codes and casting information. The first is the casting number which is on the bottom of the motor on the passenger side next to where the starter mounts. In general, for 1969 we have C8FE-6015-B and D0ZE-6015-A casting numbers. For 1970 we have D0ZE-6015-A, DOZE-6015-B and DOZE-6015-C casting numbers being used. Next to the casting number you will always find the casting date. In addition on many motors on the front side you can still see stamped an assembly date as shown here, or next to the distributor area. This is the date the motor was assembled which always is after the casting date. In this motor here we have a casting date of September 15 1969 and then an assembly date of October 13 1969.

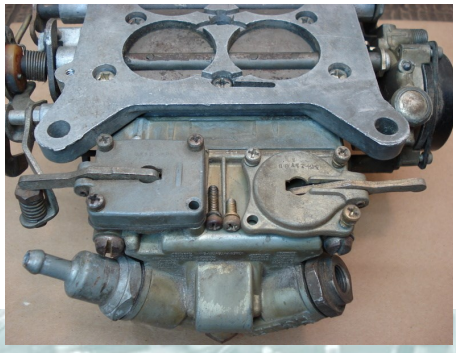
9 Some of the earliest built April 1969 Boss 302's used a C9WE-A fan that was matched to a fan clutch (C9AE-D). After that, both the 1969 and the 1970 Boss 302 motors used the same cooling fan marked with a C8SE-B until about December of 1969. Then after that a DOZE-B fan was used. The date code is a month and year format as shown here stamped on each fan blade. Example here is H69, August 1969.



11 The engine mount heat shield was never serviced by Ford and is only used on the drivers side of the Boss 302 motors. It is a bare piece of stamped steel with an asbestos strip that is stapled to it in place. Shown above uninstalled and installed for reference.

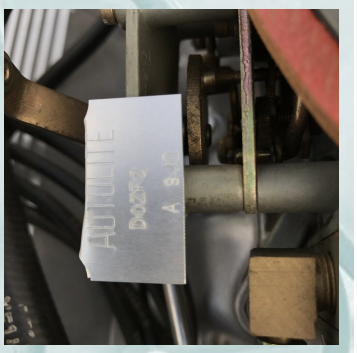
10 Shown above is an original and reproduction throttle bracket for comparison. Notice the original (on the bottom) and the deep stamping marks compared to the reproduction above. Zinc dichromate is the correct finish for the bracket.

12 The carburetor used on a Boss 302 is a 780 CFM Holly. In 1969 it was a C9ZF-9510-J and in 1970 was a D0ZF-9510-Z. The date code shown here above is 935 which decodes as 1969, 3rd month, 5th week.



13 The original accelerator pumps had a square body as shown above and the later replacements had the round style thinner body. This is visible on the front of the carb when mounted on the intake manifold.

14 All carbs should have an aluminum Autolite ID tag with a date code. Limiter caps would have been originally installed from the factory. Note the thin special undersized carb hold down nuts used to mount the carb to the intake manifold.

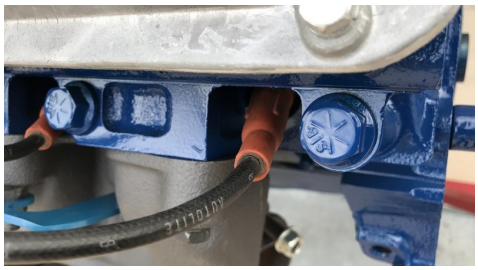


15 The temperature sender used on a 1970 Boss 302 would have a red insulator as shown and be stamped Autolite 260 with the date code. A 1969 Boss 302 has a green insulator and is stamped Autolite 258 with the date code. The format for the date would be month/year. Later versions were stamped Motorcraft.

16 All Boss 302's came with a Carter X fuel pump. Note that in the photo the original assembly line style fuel pump gasket that is just visible against the engine block mounting surface. 1928 is ink stamped on the top surface and the date code is stamped on the underside as is the ID code 4910S.

17 The ported vaccum switch that is mounted in the thermostat housing was a C8AE-A version for 1969 and a D0AE-A for 1970. The change over date was approximately Aug/Sept 1969. Date codes are a month year format with the middle character representing the manufacturing plant—H for Hanover IL and K for Kalamazoo MI .

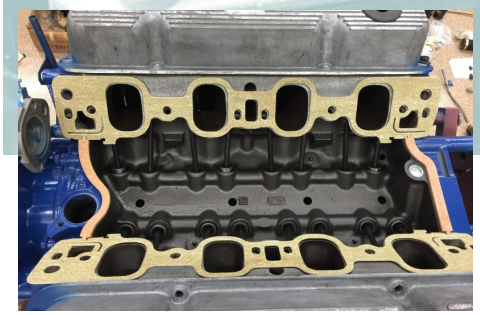
18 The anti-backfire valve that was part of the thermactor system manufactured by Carter and came in two colors. 1969 Boss302's used a blue anodized version which was also installed on some very early 70 models that had chrome valve covers. The date code and engineering number is stamped on the body but not always visible from the top as shown in the photo.



19 The head bolts used on a Boss 302 were a flanged style head bolt. Typically these are seen in three different versions as shown. Today these are very difficult to locate as they do not make a reproduction of these and the Ford service replacements were not the same.

20 The Boss 302 has a dual point distributor with a C9ZF 12127 cast in the back of the housing. This would be dated as well as in this example here the 9J8 is Sept 8 1969. Typically a paper tag was placed over front as shown here.

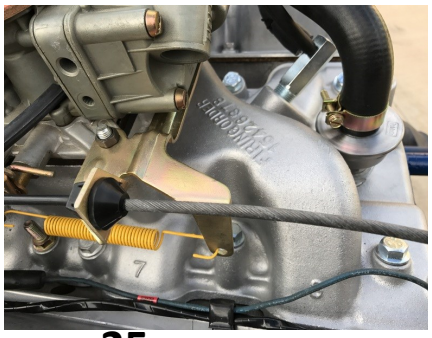
21 Original aluminum Boss 302 valve cover brackets for the spark plug wires had screws rather than rivets to hold them in place. Later service replacement valve covers had the rivet style.



22 Shown here is the original intake manifold gaskets (marked C9ZE-9439-B) on the gaskets. Note that the top of the cylinder heads by the valve covers do not get any blue paint and should be bare. As an added detailing item you can see the original intake manifold gaskets once the motor is assembled.

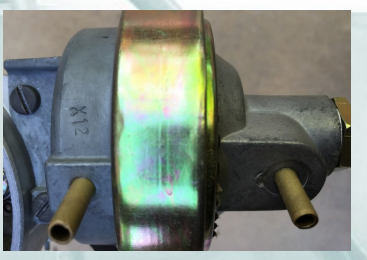
23 Smog clamps are generally two tower clamps and two #10 Wittek style clamps. The tower clamps are typically used on the hose that connects the smog pump to the anti-backfire valve. Orientation of the clamps can vary but were positioned for ease of installation.

24 Original throttle cables do not have a plastic covering on them like the later Ford service replacements shown here above for comparison.

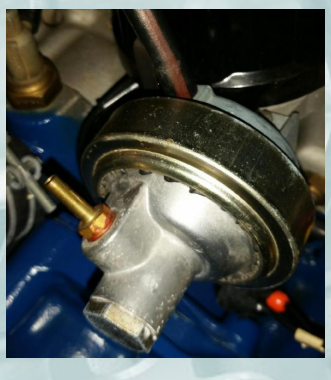


25 1970 Smog pump shown here installed with a flat black back cover, relief valve with a zinc dichromate crimped top and blue calibration insert. 1969 smog pumps were installed on top of the alternator. Smog pumps were made by Saginaw, a GM division. Note the texture of the original smog hose as opposed to the smooth texture reproductions.

26 The carb spacer is installed with the elbow towards the front of the motor. This early NOS piece is brown and later service pieces were black.



27 The original distributor advance is marked with an X12 on top. 1969 versions had a screw in vacuum nipple on the front and 70 version (shown above) had a pressed in vacuum nipple.



28 The ignition coil used on the Boss 302 motors was an Autolite yellow top coil. Original coils typically have a mold number cast between the two terminals on the top of the coil as shown.

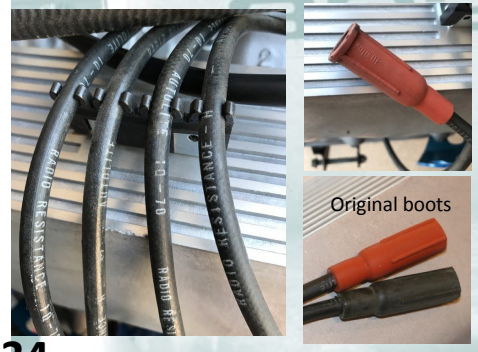
29 Original Ford valve cover gaskets are different. 1969 had a black rubberized coating over the cork and 1970 did not. You can also see a saw tooth cut out in at least one of the areas of the gaskets.

30 The original dipstick and tubes for a 1969 and 1970 Boss 302 are totally different. The 1969 version is shown on the left and marked C9ZE-6750-A and a 1970 version marked DOZE-6750-C shown on the right (this 1970 version replaced the original DOZE-6750-A version).

31 Notice the engine hook is a slightly lighter shade of blue than the motor. That is because they were painted at an outside shop. There is a slight amount of blue overspray from the motor on the very top edge of the engine lift hook. There is a special thin nut used to hold on the engine lift hooks as shown in phosphate finish.

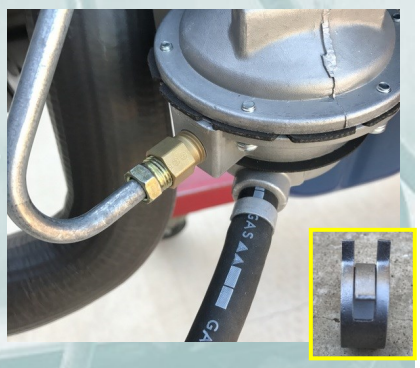
32 The flex –tube that connects the exhaust manifold heat shield to the air cleaner snorkel is stamped with the engineering number C9ZF-9B632-D. It has an orange stripe near the top where a Wittek #34 clamp would be used.

33 The most common vaccum T that was used on the Boss 302 motor is shown here and is a "5 way" T. However, this was not the only version used as some may have a 4 way or a combination of 2 way vacuum T's used.



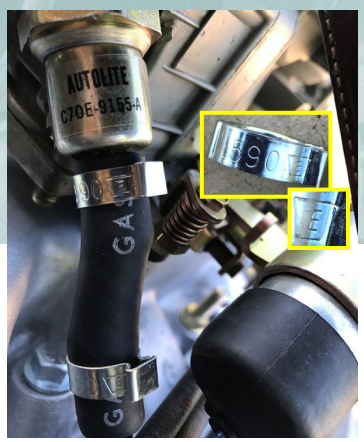
34 Spark plug wires were Autolite with either orange or black boots as shown. Note the original boots shown here with no ring on the ends as compared to the style seen with the ring used on other applications. The wires are date coded 1Q-70 which is first quarter of 1970.

35 The 1969 Boss 302 used the chrome C8AZ-6766-B breather cap. In 1970 the cap was used on Dearborn built cars while Metuchen also used the black breather cap C8AZ-6766-A.



36 The upper radiator hose is ink stamped with the engineering number C9ZE-8B274-C and the lower is ink stamped with DOZE-8B273-B. Note the band style clamps are stapled in place and the "alligator" texture on original hoses.

37 The rubber engine mount can be natural or painted black with a redish brown paint park on it. Note the proper routing of the starter cable at the engine mount underneath.



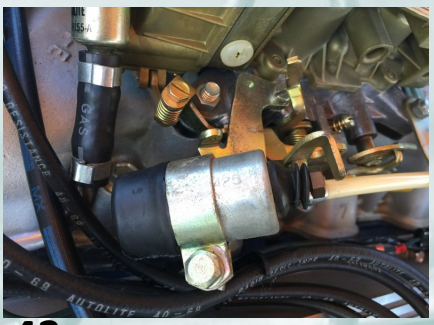
38 The flexible rubber fuel lines shown above with the correct original style fuel line clamps—spring clamps with square tabs at the fuel pump, and crimp style at the carb marked with .590 and an "E" for the manufacturer. Earlier fuel lines were marked with a C.

39 The oil sender set up is different for cars with and without a tachometer. For cars with a tach the oil sender is threaded directly in to the engine block as shown on the top left. For a non-tach car because the oil sender is so large a special bracket and tube was used to mount the sending unit next to the coil.

40 Original Autolite FL-1 oil filters used in 1969 and 1970 would typically have a single crimp on the top of the oil filter, although some early 1969 cars could have a dual crimp style. All of them have date codes and this one here on the left de-codes as February 4, 1970. Original factory oil filters where blue and also had date codes stamped on them.

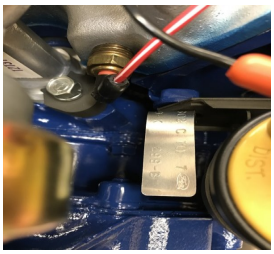
41 The PCV valve used in 1969 and until February 5 1970 was marked with the engineering number C70Z-6A66-A (EV-42), and shown above on the left. After that a D0OZ-6A666-A marked unit (EV-51) was used shown on the right.

42 The cover on the rear of the motor is painted blue except where the starter mounts. This area was left bare to ensure a good ground.



43 1969 and 1970 Boss 302's used a special electric carb solenoid. The purpose of this mechanical solenoid was to prevent "dieseling" when the motor was shut off. The 1969 solenoid had an additional short 6 inch jumper wire to connect between the solenoid and the wire harness. 1970 did not use this jumper wire. Both years use the same blue harness wire pictured which is marked with a C9AB-9D857-A number and about 17 inches long.

44 The timing pointer used on a 1969 and 1970 Boss 302 motor are totally different. In 1969 (shown on the right) a common 302 pointer was used and mounted on the drivers side of the motor. In 1970 a special pointer was used and mounted on the passenger side of the motor.



45 The engine tag was used to match the build sheet in to the car. This contains information such as the engine code (299-B), displacement (302), engine plant (Cleveland), and build date (October 1969). In 1970 the tag is typically mounted by the coil and in 1969 on the other side of the motor next to the smog pump bracket.

46 The engine OK stamp is typically seen in 1969 on the cast iron smog pump bracket, and in 1970 on the actual cylinder head as shown here. This is different than the OK valve cover stamp.

47 Original 1969 and 1970 belts on the motor from the factory could have ink stamped engineering numbers or embossed engineering numbers. Date codes would always be embossed on both version belts. Date codes were in a quarter/year format.

48 Ford Corporate Blue Paint information:

PPG Delstar Ditzler DAR-TCP 13358 (H) enamel

DXR 80 Delthane Ultra Urethane Hardener

Ditzler DX 265 Flattening Base (25% to 30%)

DTR-601 Reducer (HVLP gun x 2)

49 Boss 302 motors (and Boss 429 motors) had unique freeze plugs installed in the block that were actually a screw in type of freeze plug. This was used on all these Boss motors and another easy way to identify a real Boss 302 motor. All other Ford motors during this time had the normal press in style freeze plugs.

50 1969 and 1970 Boss302 oil pans are different as well. Shown above on the top left is the 1969 version. This was used till about September or October of 1969. The 1970 version shown above right has two recessed areas added for clearance issues. Side profile of the oil pans shows the ribbing that the reproductions today do not have.

51 The original air cleaner to carb gasket, was a C5ZZ-9654-B and was .18" thick. It was covered on one side with a red dry glue and was intended to be installed as shown facing up. This was done to prevent it from falling off during removal. Once the motor was heated up this gasket would stick to the bottom of the air cleaner.

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