

Full-Torque®

Spark plug thread repair for Ford Triton cylinder heads

Step-by-step instructions:

- Identification
- Installation
- Verification



Specifically designed and tested for
4.6L, 5.4L, and 6.8L 2 and 4 valve heads, Model years 1991 through 2005
The only inserts approved by Ford Motor Company for the 5.4 and 6.8L 2 valve engines

Ford Technical Service Bulletin # TSB07-15-2

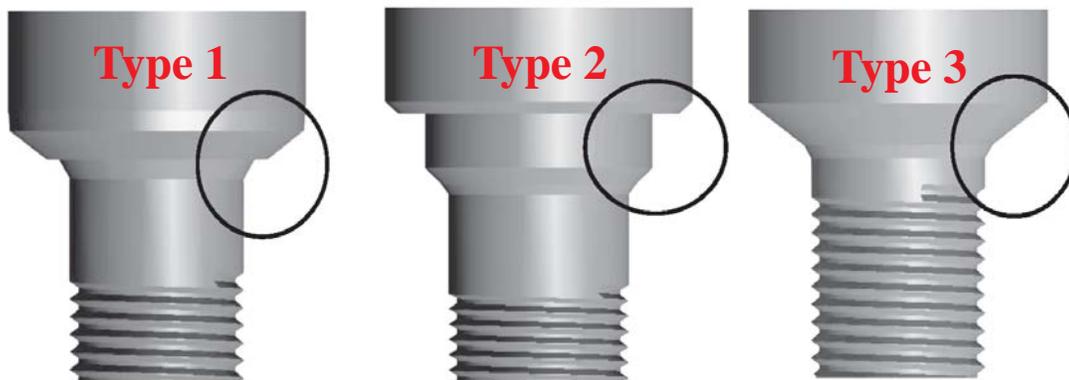
Spark Plug Thread Repair Instructions

Ford Triton 4.6L, 5.4L, and 6.8L



The Ford Triton Spark plug holes have been divided into three Types for model years 1993 through 2005. The drawings below will help you identify each Type.

Each individual cylinder head will have the same Type for all spark plug holes.



Gauge **FT5CG** will help you identify which Type the head is so you can make sure to use the correct installation tooling and can verify if the insert was installed to the same depth as original. Complete information on the use of this tool and installation of the inserts are contained in these instructions.



Full-Torque spark plug inserts for aluminum heads are made of aluminum and are hard anodized to improve the strength and integrity of the threads.

They are made of aluminum to insure they will transfer heat from the spark plug the same as original.

Ford Motor has completed substantial dyno testing of Full-Torque inserts to validate and approve their use in aluminum cylinder heads.

The chart to the right can be used as a guide only. Some heads manufactured between 1998 and 2003 may not conform to the chart.

Model Years	Engine Size	# of Valves
Type 1		
'93 to '00	4.6L	2V
'93 to '96	4.6L	4V
'94 to '00	5.4L	2V
'94 to '00	6.8L	2V
Type 2		
'96 to '05	4.6L	4V
'97 to '05	4.6L	2V
'98 to '05	5.4L	4V
Type 3		
'02 to '05	4.6L	2V
'00 to '05	5.4L	2V
'00 to '05	6.8L	2V

Cleaning and Identifying the Head Type

CAUTION: Ford Motor Company recommends removal of the cylinder head to avoid chip contamination in the engine.

CAUTION: If spark plug thread repair is being done in vehicle make sure the piston is 1/3 - 1/2 way down the bore on the down stroke. This will ensure the valves are closed to help reduce contamination and avoid any interference with the core drill.

Cleaning:

1. Remove spark plug from a good spark plug hole, chuck the FT5FTCB brush supplied in the kit into a slow speed drill, and clean the bottom of the hole. **Note: If procedure is being done in vehicle clean hole using a vacuum cleaner to remove debris.**

Caution: Do not use the brush to clean the hole after the repair insert has been installed.

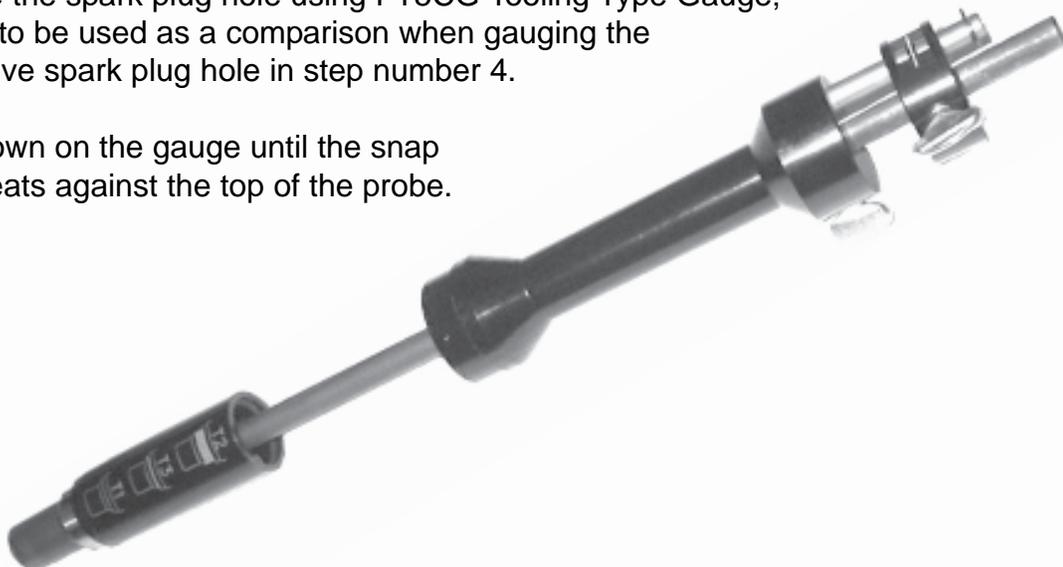


Identifying:

Perform Steps 2 through 4 to determine cylinder head Type:

2. Gauge the spark plug hole using FT5CG Tooling Type Gauge; this is to be used as a comparison when gauging the defective spark plug hole in step number 4.

Pull down on the gauge until the snap ring seats against the top of the probe.

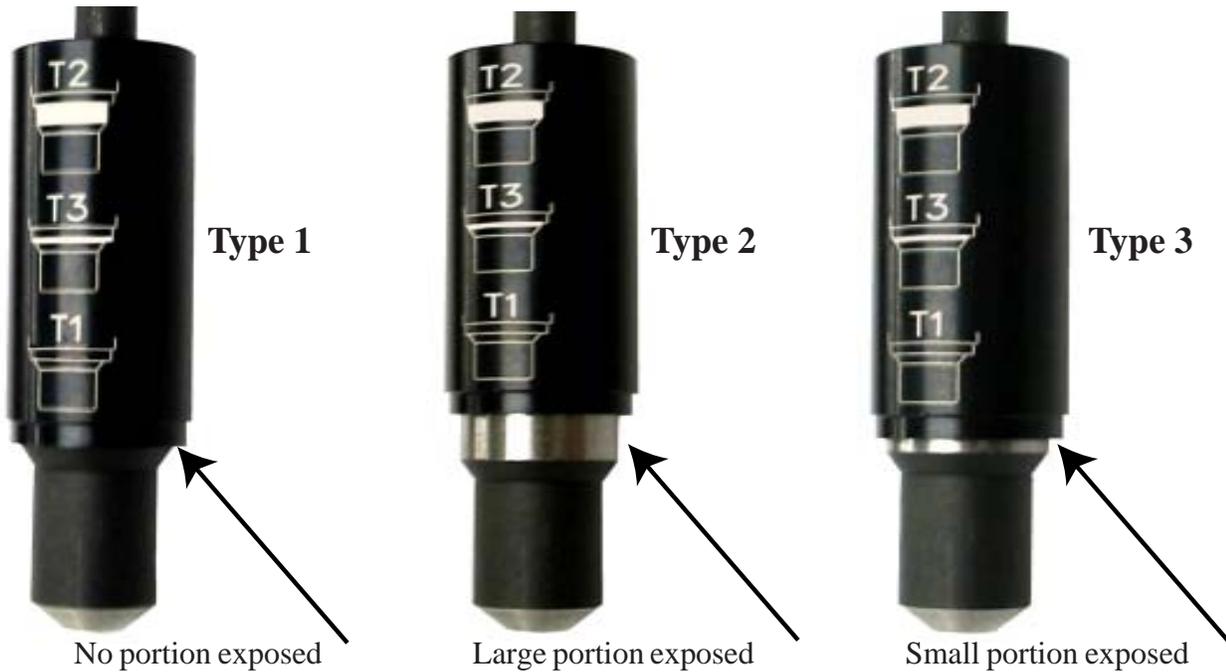


3. Push the gauge down into the spark plug well until it seats firmly at the bottom.

Make sure that the upper part of the tool is up high enough to allow the gauge to reach the bottom of the hole. Allow the upper alignment bushing to center the tool in the hole. Let the rod float in the upper alignment bushing without tightening the thumb screw.



4. Pull the gauge up out of the well and read the chart on the side of the gauge by comparing the portion of the gauge that is exposed when pushed into the the spark plug hole to determine if the head is Type 1, 2, or 3. **Note: the difference between Type 1 and Type 3 is small. Double check to make sure the reading repeats. If your gauge readings are in question remove another spark plug from a good hole and compare gauge readings.**



Type 1 (T1): Steps 5 through 7; 15 through 32
Type 2 (T2): Steps 5 through 12; 15 through 32
Type 3 (T3): Steps 5 through 7; 13 through 32

Gauging the height of the spark plug seat:

5. (T1, T2, T3) Chuck the brush extension into a slow speed drill and clean the bottom of the **bad** spark plug hole and blow out the hole with compressed air when finished. **Note: If procedure is being done in vehicle clean hole using a vacuum cleaner to remove debris.**

Caution: Do not use the brush to clean the hole after the repair insert has been installed.



6. (T1, T2, T3) Insert the FT5CG Height gauge tool into the bad spark plug hole until it seats against the bottom of the hole. Adjust the upper Height Verification part of the tool by loosening both thumb screws. Slide the lower part down into the upper part of the well until it stops and tighten the lower thumb screw firmly.



7. (T1, T2, T3) Adjust the upper gauge ring so that the line is lined up with the center line on the gauge pin and tighten the thumb screw firmly so that it doesn't come loose. Remove the assembly from the head and set it aside until after the thread insert has been installed.



Thread Repair Instructions:

CAUTION: STEP 8 MUST BE COMPLETED BEFORE USING THE COREDRILL. FAILURE TO DO SO WILL REMOVE THE PLUG SEAT ANGLE THAT THE COUNTERBORE CUTTER USES TO SET THE DEPTH FOR THE INSTALLATION TOOL.

8. (T2) Slide the FT514125CC4V #2 counterbore cutter into the well and use a 5/8" socket with a long extension to turn the cutter. Apply L750-2 cutting fluid. The cutter will cut a small amount of aluminum around the spark plug hole to allow the thread insert to be installed to the correct depth. The cutter cannot cut too deeply. Keep turning until it stops cutting. Repeat the process two times to make sure it stops cutting.

Note: If procedure is being done in vehicle pack the flutes with bearing grease as a lubricant and to capture most of the chips.

9. (T2) Use the long threaded handle to remove the #2 cutter. Screw the threaded end into the top of the cutter and pull it out of the well.

10. (T2) Install FT54164AB drill alignment bushing onto the FT4164CD to make sure the hole is drilled in alignment to the well.



11. **(T2 - 4 valve only)** Attach the FT4164CD-EXT to the end of the core drill. The 4 valve heads require longer tools to reach the bottom of the hole. These heads will use the longer drill tube and 1/16" drill bit that came with your kit to install the locking pin.



12. **(T2 - 4 valve only)** Chuck the extension into a drill and bore out the hole. Use plenty of cutting fluid while drilling. **Note: If procedure is being done in vehicle pack the flutes with bearing grease as a lubricant and to capture most of the chips.**



13. **(T3)** Slide the FFT514125CCT Type 3 counterbore cutter over the drive end of the core drill until it stops over the drill flutes. Align the set screw with the flat on the core drill shank and tighten.





14. (T3) Next slide the FT54164AB alignment bushing onto the core drill small end first.

15. (T1, T2, T3) After installing the FT54164AB drill alignment tool onto the FT4164CD, chuck the core drill into a drill. Use a drill of 500 to 800 RPM.



16. (T1, T2, T3) Apply supplied cutting fluid L750-2 to core drill and drill out the bad spark plug hole. If the FT514125CCt cutter is used (T3), drill down until both cutters stop cutting.

Note: If procedure is being done in vehicle pack the flutes with bearing grease as a lubricant and to capture most of the chips. Remove the core drill after several revolutions to remove the chip contaminated grease. Then repeat step 16 until the core drill has removed all the original threads. Caution should be taken to avoid contact with the piston as the drill completes the cut.



17. (T1, T2, T3) Clean any remaining grease and aluminum chips from spark plug hole using compressed air. **Note: If procedure is being done in vehicle clean hole with a vacuum cleaner.**



18. (T1, T2, T3) Install FT5RPLTAB-1 tap alignment bushing on to FT5RPLT tap. **Note: If procedure is being done in vehicle use bearing grease as a lubricant and to capture most of the chips.**



Caution: If you don't tap deeply enough the insert can't be installed to the right depth. You'll feel the tap cutting pressure reduce when the threads are all the way through.

19. (T1, T2, T3) Apply supplied cutting fluid L750-2 to FT5RPLT tap and tap spark plug hole. **Note: If in vehicle remove the tap after few revolutions to remove the chip contaminated grease. Then repeat step 19 until the tap has cut full threads through the hole. Make sure to stop in time to prevent the tap from falling into the cylinder.**



20. (T1, T2, T3) Clean aluminum chips from spark plug hole and cylinder.
Note: Use a vacuum cleaner if done in vehicle.



21. (T1, T2, T3) Insert the 6" long by 1/16" locking pin drill bit into the 5/16" depth setting hole on the top of the proper spark plug insert installation tool.



Type 1



Type 2



Type 3



22. (T1, T2, T3) Install the drill tube over the locking pin drill bit. Chuck the drill bit in the drill so the chuck is touching the top of the drill tube and the tube is touching the top of the installation tool. Set the drill, drill tube, and drill bit aside. Use a drill that is between 2000 and 2600 RPM.

Caution: Make sure your drill will hold the 1/16" drill bit tight without slipping.

23. (T1, T2, T3) Apply a small amount of anti-seize on the threads of spark plug insert installation tool. This will prevent the thread locker from getting between the installation tool and thread insert.



24. (T1, T2, T3) Screw the spark plug thread insert onto the installation tool.



25. (T1, T2, T3) Apply 5 drops of LHC623 supplied thread locker to the threads of the insert.



26. (T1, T2, T3) Set torque wrench to 37 Nm (27 lbs ft.) and install insert.

Note: Install insert in one continuous rotation so the supplied thread locker does not set up before reaching full torque.



27. (T1, T2, T3) Place the drill tube into the receiving hole on the side of the installation tool.



28. (T1, T2, T3) Insert the 1/16" drill bit into the tube.

Caution: Spin the drill at full speed to prevent breaking the drill bit (2000 to 2600 RPM). Use slow even pressure and lift the drill occasionally to clear the chips. Make sure to use a good drill chuck that will not allow the drill bit to slip. If the drill bit slips in the chuck the hole may not be drilled deep enough for the locking pin.



29. (T1, T2, T3) Drill down until the drill chuck touches the top of the drill tube,



30. (T1, T2, T3) Remove drill from the drill tube and blow the chips out of the tube with compressed air. Remove the tube and clean aluminum chips around the installation tool using compressed air.
Note: If procedure is being done in vehicle clean hole using a vacuum cleaner.



31. (T1, T2, T3) Place the drill tube back into the receiving hole on the side of the installation tool. Place 3 drops of supplied thread locker in the top of the drill tube. This is mandatory to prevent the locking pin from coming out.



CAUTION: AFTER INSTALLING THE LOCKING PIN REMOVE THE TUBE AND CLEAN ANY RESIDUAL THREAD LOCKER FROM THE DRILL BIT AND INSIDE THE TUBE WITH A GOOD CLEANING SOLVENT IMMEDIATELY TO PREVENT THEM FROM LOCKING TOGETHER.



32. (T1, T2, T3) Slide the locking pin into the top of the drill tube and tap the pin into the bottom of the hole using the drill bit still in the drill.

33. (T1, T2, T3) Remove the installation tool and clean all residual hardened thread locker and drill chips from all surfaces before using the tool again.



Verifying the height of the installed insert:

34. (T1, T2, T3) Insert FT5CG Height Verification Gauge and tooling type gauge to verify the spark plug insert is installed to the proper depth. Loosen the lower thumb screw and push downward on the end of the long rod and the lower portion of the height gauge and retighten the thumb screw.





35. (T1, T2, T3) Remove the height gauge and check the alignment of the marks to see if there is a change. The install tolerance is plus or minus .5 mm (.020"). The insert can be removed by inserting the install tool and torquing it the same as above. Use the same drill bit and drill out the locking pin. Apply heat to the insert to release the thread locker and use an easy-out to unscrew the insert. Re-tap the hole and follow the original installation process.

Caution: Install only full threaded spark plug in the repaired hole and torque the spark plug to 34 Nm (25 lb ft).

Full-Torque is a registered trademark of *LOCK-N-STITCH* Inc.

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Spark Plug Thread Repair Inserts