

# IMPROVING COOLANT FLOW

This article discusses two potential issues that may hurt the coolant flow in your Thunderbird's engine temperature control system. The first issue is the gasket installed between the water pump spacer and the timing chain cover.

Figure 1 shows the alignment of the inner surface of an OEM (Original Equipment Manufacturer) water pump spacer and the timing chain cover's water pump well. These two components define the chamber in which the water pump impeller operates. The impeller accelerates the coolant in a clockwise flow, and centrifugal force keeps the fastest moving coolant to the outer circumference of the chamber. The green arrow shows the desired coolant flow back into the volute opening.

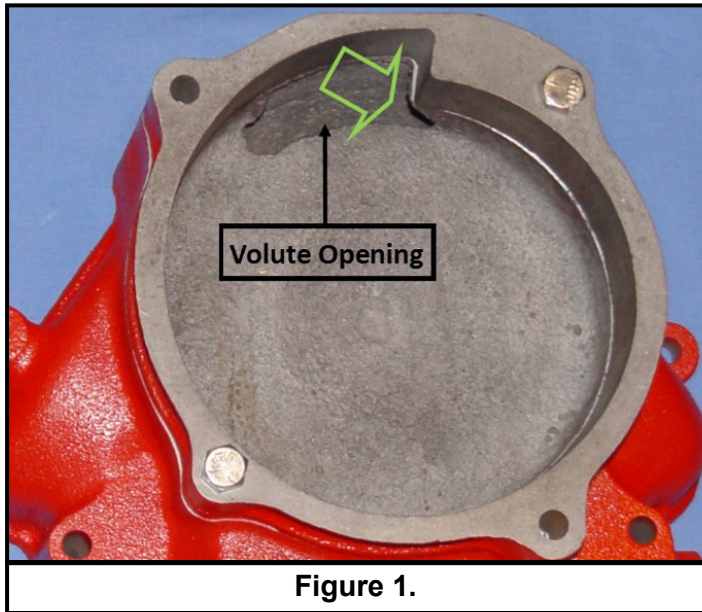


Figure 2 again shows the alignment of the spacer and timing chain cover, but with a standard Y-Block water pump gasket installed between them. The gasket is light blue and a portion of it is visible. Unfortunately, this visible part of the gasket presents an obstacle to the desired coolant flow. And this obstruction is at the most critical point in the coolant flow into the volute opening and ultimately to the engine's water jacket. The good news is this is easily corrected with a trim knife. This obstruction occurs when a standard Y-Block water pump gasket is used between either the OEM or an aftermarket spacer and the timing chain cover. If you are going to use one of these gaskets, it should be trimmed to align with the interior surface of the spacer.

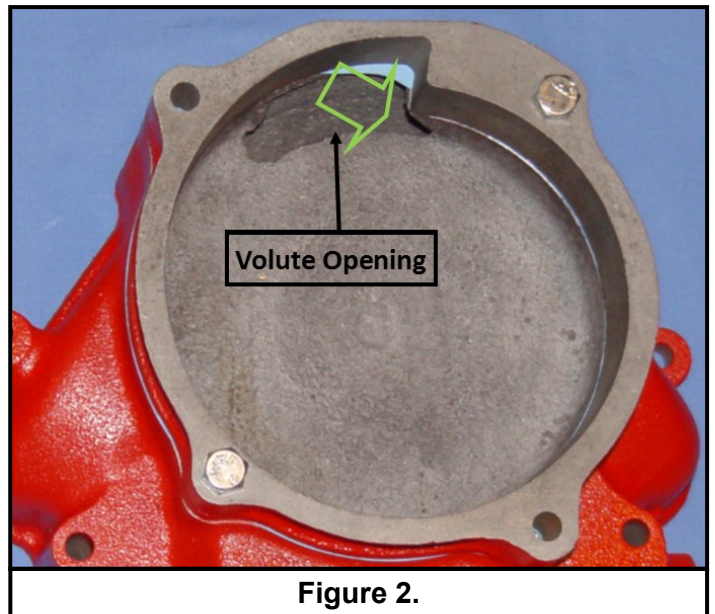
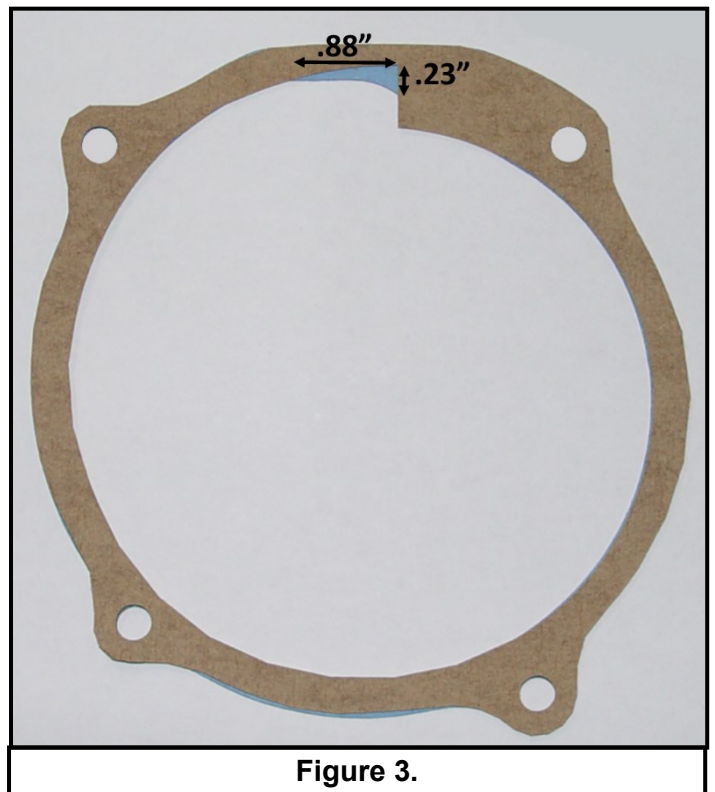


Figure 3 shows a gasket properly cut for the spacer to timing chain cover mating. It is positioned on top of a standard Y-Block water pump gasket to illustrate the location, size, and shape of the obstruction. As you can see, the is gasket obstruction is just



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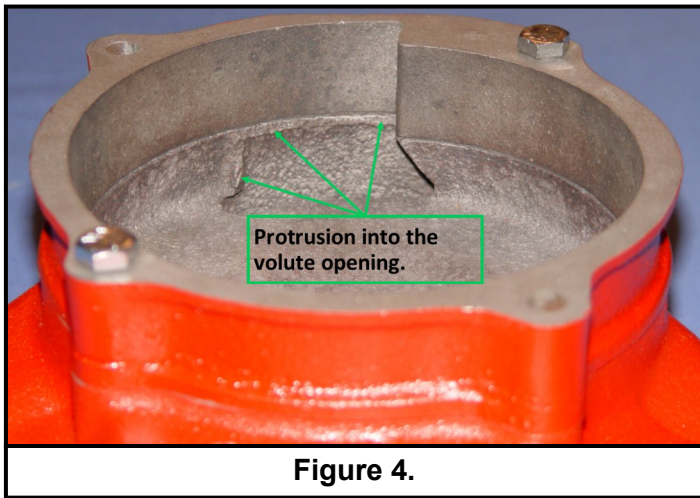
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under a quarter of an inch wide and tapers off to zero over a span of just over three-quarters of an inch.

And the location of this obstruction is significant. It blocks the corner of the chamber offset where the highest velocity coolant has just perpendicularly impacted the offset portion of the interior surface of the spacer. While the gasket currently installed between your spacer and timing chain cover is probably presenting an obstruction, I will leave the decision to remove the water pump to install a proper gasket or not to the reader. I would suggest that any time the water pump is removed, it should be reinstalled with a proper gasket.

The second potential issue is not as likely to exist in your Y-Block and results from a “bad” break at the Cleveland Foundry. Upon close inspection of the volute opening in the timing chain cover, it appears in the manufacturing process, part of the casting was broken away to make the volute opening. And unfortunately, not all breaks remove the same amount of the casting.

Figure 4 shows a timing chain cover with an example of a casting protrusion into the volute opening. Because of the location of the volute opening when the timing chain cover is installed, a casting protrusion is not something you would observe unless you were specifically looking for it.

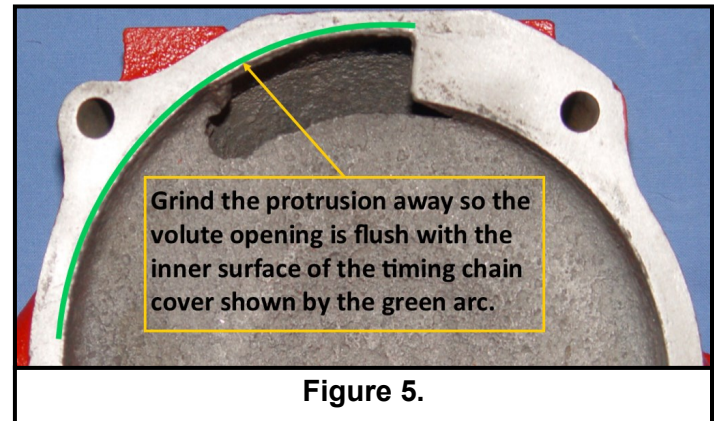


**Figure 4.**

I had removed and reinstalled my water pump and various spacers several times during flow testing and never saw the protrusion. After I became aware of this potential problem, I removed the water pump just to check. I found a protrusion close in size to the one pictured in figure 4. I used an angle drill with a 1½ inch sanding drum with number 80 abrasive to remove the biggest part of the protrusion, then stepped down to 1 inch, ¾ inch, and finally a ½ inch drum to get as close to the offset as possible. Cast iron is relatively soft, so check your progress fre-

quently during grinding. Finally, the water jacket will need to be thoroughly flushed to remove all grinding debris.

Figure 5 shows the inner surface of the timing chain cover with which the volute opening should be flush.



**Figure 5.**

Because this issue has only recently come to light, most of us have no idea if the timing chain cover on our car got a good break or bad break when it was manufactured 60 plus years ago. I suggest you make a note to check it the next time the water pump is removed.

There is no better time to check for and remove any protrusion that exists than when the timing chain cover is uninstalled. So don't miss this when you are rebuilding your engine.

One final point on this issue is that it applies to all Y-Blocks, regardless of whether an OEM spacer, an aftermarket spacer, or no spacer is installed. Let's share this information with all Y-Block owners.

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