Autopsy A Westerbeke / Universal Marine Heat Exchanger

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01-JAN-2009

Westerbeke 3" Heat Exchanger

This is a typical 3" raw water heat exchanger as found on many Westerbeke an Universal diesel engines.

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Guest 06-Jan-2014 16:26

Don't know if you meantioned it but the end caps can be overtightened....should only be tightened to about 6 lbs of pressure or just enough to not leak. Just discovered your site great work. Regards, Bob Fleege Pensacola Fl.

click on thumbnails for full image

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Close Up of End Cap

The end caps on these HX's are prone to leaking if the gaskets are not replaced on a fairly regular basis. These end caps provide access to the heat exchangers copper tubes.

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Removal of End Cap

The end cap assembly consists of a brass end cap, a stainless bolt, an o-ring and a rubber gasket. The o-ring and gasket go together as shown.

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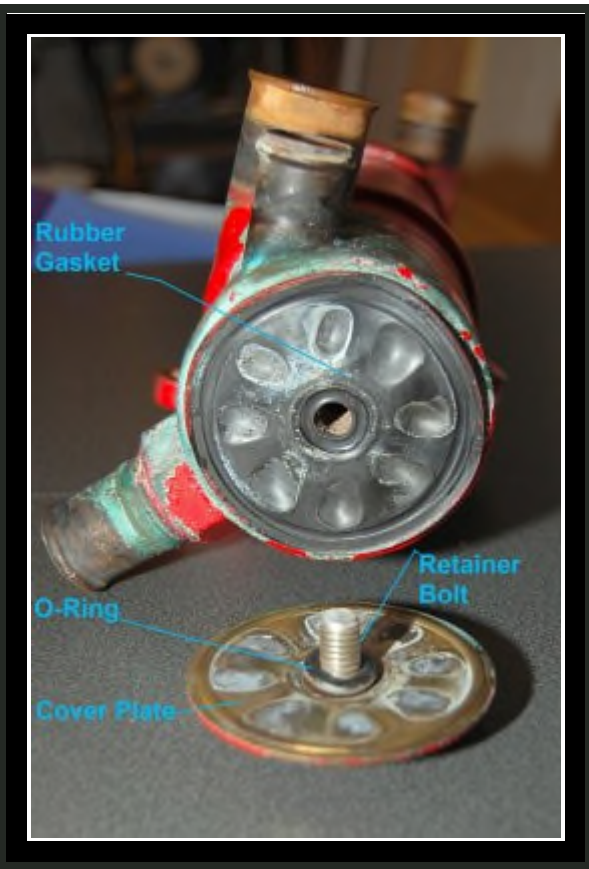
How A HX Works

If you follow the arrows you can see that this HX is broken into quarters and is a four pass HX. Raw water enters & then



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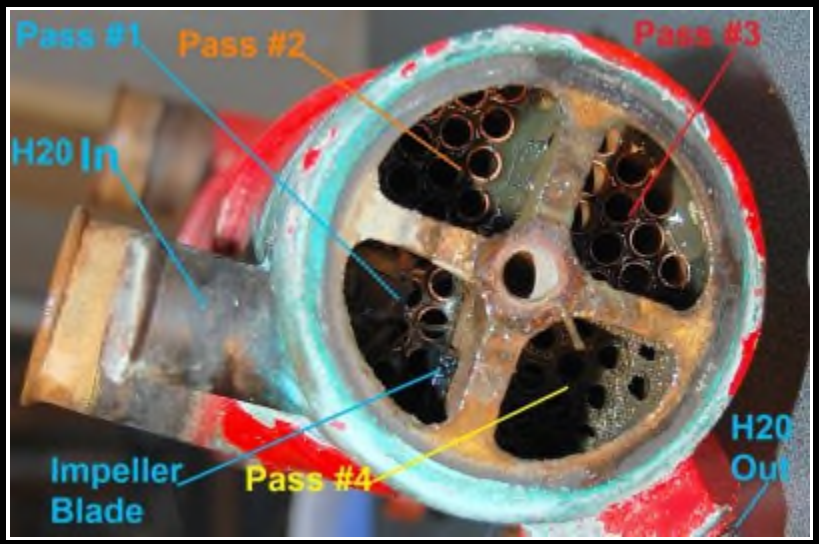
flows to the opposite end, returns to the inlet end, turns and heads back to the opposite end and finally turns back towards the inlet end and finally gets ejected into the wet exhaust system.



If you click on the picture to blow it up you'll notice a chunk of an impeller blade that took up residence in the heat exchanger.

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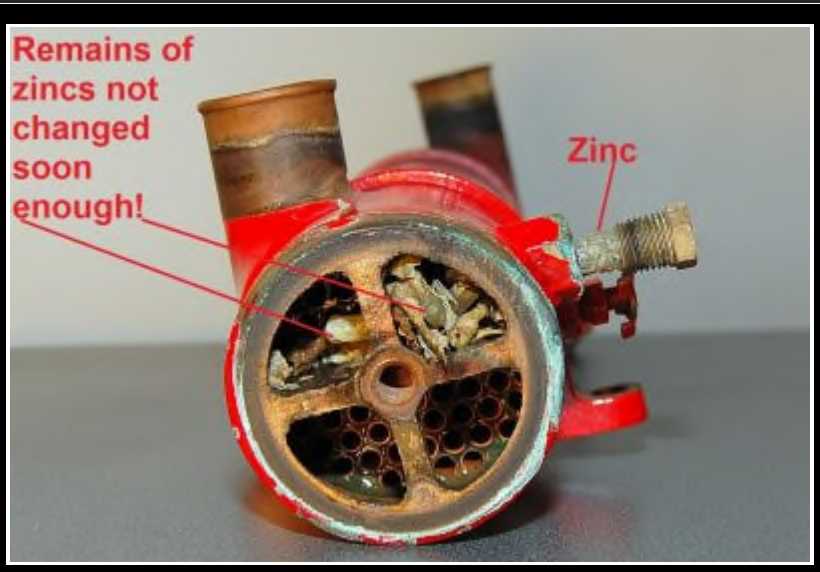
The Zinc End



This is about as good an example I can come up with as to why you need to change your HX zinc regularly. Each engine will be different in regards to zinc erosion so test it at three, four, six weeks etc. to see which works best for you.

This is WHY these heat exchangers have end caps..

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Zinc Pieces

All this crap came out of the zinc end of the HX and was impeding raw water flow. This type of crud can lead to an engine overheat. Of course this overheat will only happen when running a dangerous inlet in 8 foot following seas at 2:00 a.m., because Murphy is always waiting. Don't let Murphy get you, head him off at the pass and change your HX zincs regularly. The zinc pictured was just eight weeks old and probably should have been replaced at about six weeks as it was already shedding.

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HX End Cap Before

Most often the end caps are reusable but they do need to get cleaned up or the gaskets may leak.

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Brass HX End Cap Showing Dezincification

A little burgundy Scotch-Brite will do a great job of cleaning an end cap. Always examine them for signs of dezincification. Dezincification is the process of the zinc being leeched out of the brass. This process leaves the remaining metal rather brittle and more prone to failure. If you see much more "pink" coppery color than this end cap is exhibiting it would be a good idea to replace the end it.

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The HX - REady For Fresh Paint

This HX was pressure tested, cleaned inside and out and readied for a new coat of paint. A good auto radiator shop can

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pressure test it and then clean it all for about $30.00 to $50.00 depending upon your geography. I have a local guy that will do this for $30.00. Not really worth my time to even consider doing it myself.

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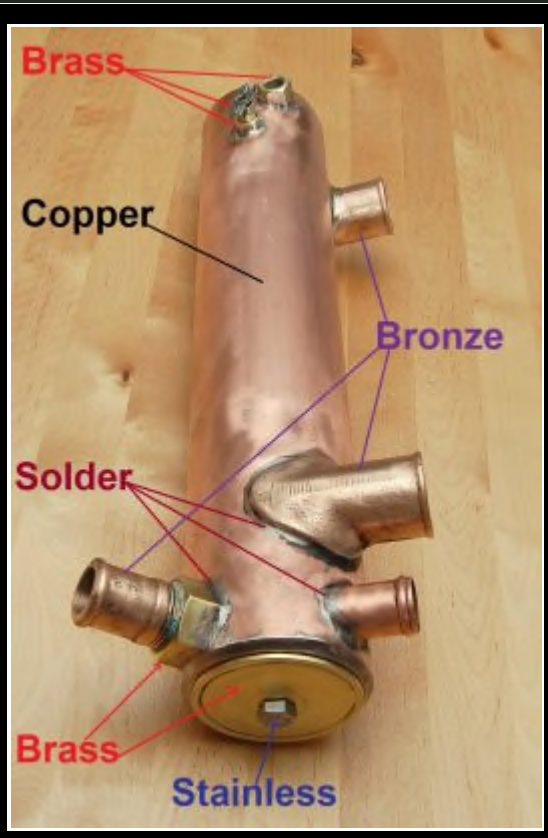
Dissimilar Metals

So why do I need a zinc again.....????

That's right these heat exchangers can have as many as FIVE different metals. Can you say galvanic corrosion stew...! The

zinc is there with good reason..



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All Clean & Boiled Out

This is what the tubes look like after being "boiled out"...

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Dex-Cool Sludge (AKA Death-Cool)

This engine was suffering from Dex-Cool sludge and required a flushing with Rydlyme. If you don't know what Dex-Cool is feel free to google "Dex-Cool Class Action Suit" and you get plenty of hits..

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