

Service Bulletin

Number: #02-07
 Date: 10/11/2001
 Subject: SEA RAY EXHAUST INSTALLATION/VERIFICATION & SALT WATER INTRUSION PROCEDURES FOR 310DA, 340DA, 370DA, 380DA, 400DA, 410DA, (1999 TO 2001 MODEL YEAR WITH COLLECTOR STYLE EXHAUST SYSTEMS)
 Recall/ Bulletin
 Service Bulletin:

INFOGRAM

Copy and distribute to all appropriate locations and personnel

October 11, 2001

S E R V I C E

#02-07

TO: ALL SEA RAY DEALER PRINCIPALS, PARTS MANAGERS, SERVICE MANAGERS, WARRANTY MANAGERS

SUBJECT: SEA RAY® EXHAUST INSTALLATION/VERIFICATION & SALT WATER INTRUSION PROCEDURES FOR 310DA, 340DA, 370DA, 380DA, 400DA, 410DA (1999 TO 2001 MODEL YEAR WITH COLLECTOR STYLE EXHAUST SYSTEMS)

Over the past several months, we have received numerous reports of Water Ingestion issues in salt-water applications occurring with V-Drive models equipped with MerCruiser® power packages. The field failures are not specifically linked to either small block or big block packages; consequently, the information contained in this communication is generic from the standpoint that it addresses both packages. Where necessary, specific call-outs have been added where significant differences exist between packages. Sea Ray® recognizes the critical importance of correct exhaust system set-up; therefore with the occurrence of failures in the field, your understanding of our exhaust systems is critical.

First, we need to provide you with a brief history and definitions concerning water ingestion. As a result of extensive investigation and testing with Mercury Marine, Sea Ray® has changed the exhaust configuration on V-Drive and Inboard product to a water lift style system over the past two model years. Our goal in doing this is to eliminate the possibility, however small, that water could potentially travel the length of the exhaust system and damage the engine valve train, which in turn could lead to outright engine failure. Of course, there are many contributors to water ingestion other than a boat's exhaust system. Our goal was to remove the boat's exhaust system from the list of potential contributors to a failure scenario. Boat owner usage patterns, engine exhaust manifold gasket failures or surface irregularities, engine valve train failures, condensation, and reversion can also either contribute to, or be a precipitating factor in a failure scenario. Each of these items will be discussed in more detail below.

We realize that there are many vessels in the field with the **Horizontal Collector Style Exhaust**. This exhaust set-up has proven its robustness and efficiency over the years, however the possibility has always existed that exhaust components could be rearranged during servicing of engines or items in the bilge. As I am sure you are aware, there is a lot of equipment in the bilges of our product. Moving around in the bilge can be quite difficult when servicing certain items; therefore, it may be necessary for you to disassemble systems in order to access others. Please allow this information to serve as a guide when reassembling or assessing the correctness of one of our model's exhaust systems. Please refer to MerCruiser's service bulletins #2001-10 and #2001-13 for more information about diagnosing and repairing engine water ingestion damage. Some of the potential causes for water ingestion include but are not limited to the following:

Condensation

Water is a normal by product of the combustion of fossil fuels. Condensation in the engine manifolds produces freshwater, which cannot cause problems alone. However, if an excessive amount of condensation is occurring and another factor causes saltwater to combine with it, valve train damage and other serious engine problems can result.

Reversion

Reversion is a phenomenon where water is driven backwards by exhaust pulses. Factors that can cause reversion include but are not limited to the following: 1) engine misfiring; 2) insufficient exhaust system backpressure; 3) valve train damage caused by over-propping; 4) boat exhaust system pipe length, pipe down-angles and sharp bends can cause tuning effects which lead to reversion; 5) insufficient exhaust elbow height; 6) quick deceleration



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or throttle chops can create a negative pressure in the boat's exhaust system, which may allow the salt fog to be pulled back into the engine; 7) incorrectly positioned exhaust resonators.

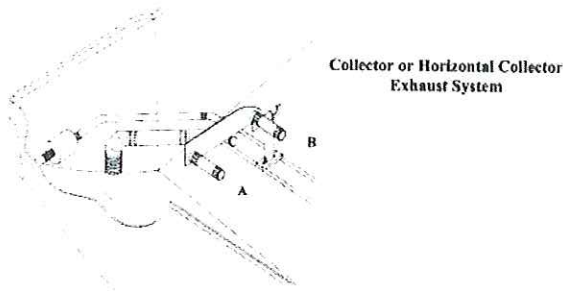
Water Leaks

Water leaks can come from a number of different areas. Some of the common factors that can cause water to leak into an engine via the exhaust system include the following: 1) leaks at the exhaust elbow to manifold assembly, which may be caused by bad castings, leaky gaskets or improper assembly; 2) corrosion of exhaust system components. These factors can aggravate situations where excessive condensation water is already present inside of the exhaust manifold. **Note:** External salt trails on manifolds are not always an indicator of internal leaks, however, they are an indicator that the gasket has been breached, and could potentially be leaking internally as well.

Extended Time Between Consumer Uses

Simply as the title implies, long periods of time between uses allow any saltwater that may have leaked or reverted into the exhaust manifold to corrode the valves, potentially causing them to stick open. This contributor to water ingestion can be minimized by engine fogging, when actual usage is infrequent. **Note: Additionally, as a normal part of the winterization process, all engines used in a marine environment should be completely fogged according to MerCruiser service bulletin #2001-15.**

Exhaust System Illustration:



1A	310DA			340DA			370DA			380DA			400DA			410DA		
	Angle Minimums In Degrees			Angle Minimums In Degrees			Angle Minimums In Degrees			Angle Minimums In Degrees			Angle Minimums In Degrees			Angle Minimums In Degrees		
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
6.7L	7	7	0	7	7	0												
300Mag	7	7	0	7	7	0												
300Mag Horizon	7	7	0	7	7	0	NOT AVAILABLE											
MX 6.2L	7	7	0	7	7	0												
7.4L				7	7	0	7	7	0	7	7	0	7	7	0	7	7	0
454 Horizon				7	7	0	7	7	0	7	7	0	7	7	0	7	7	0

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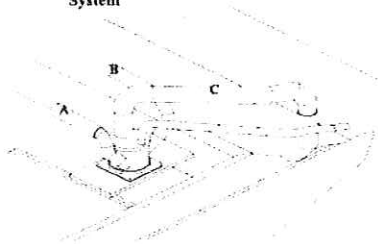
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The system depicted above is representative of the type of system installed in Sea Ray® models for several model years. This system is often referenced as a *Collector or Horizontal Collector System*. Angles are extremely critical to this system. Note: All angles must be measured with a calibrated *Inclinometer* with the boat at static rest in the water.



Note: If you perform work in the bilge, or disassemble any of the exhaust components referenced above, it is your responsibility to ensure the angles are reestablished per the matrix 1A above. Failure to do so could result in an ingestion failure. If you need assistance, please contact either the Knoxville Customer Service Department at (800) 648-8535 or the Merritt Island Customer Service Department at (800) 648-2821.

Water Lift Exhaust
System



1B	310DA			340DA			380DA			400DA			410DA		
	Angle Minimums In Degrees			Angle Minimums In Degrees			Angle Minimums In Degrees			Angle Minimums In Degrees			Angle Minimums In Degrees		
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
300Mag	7	7	7	7	7	7									
300Mag Horizon	7	7	7	7	7	7	NOT AVAILABLE								
MX 6.2L	7	7	7	7	7	7									
454 Horizon				7	7	7	7	7	7	7	7	7	7	7	7
8.1L				14	14	7	14	14	7	14	14	7	14	14	7

The system depicted above is a *Water Lift Style System*. This system is now utilized in all of Sea Ray's gasoline v-drive and inboard models. This system is also a system governed by angles. Note: All angles must be measured with a calibrated *Inclinometer* with the boat at static rest in the water.

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Note: If you perform work in the bilge, or disassemble any of the exhaust components referenced above, it is your responsibility to ensure the angles are reestablished per the matrix 1B above. Failure to do so could result in an ingestion failure. Again, please call either Merritt Island or Knoxville Customer Service if you need assistance.

Should water ingestion occur, the following process applies:

1. Contact MerCruiser OEM Customer Service @ 405-743-6555. A special phone access option has been set up for Sea Ray dealers who have a water ingestion issue. You will not be prompted for this access option. During the first announcement, please identify yourself as a dealer. The next announcement will offer you seven options to identify why you have called. Please press "8" at anytime during this announcement and your call will be directed to a specially designated MerCruiser service team.
2. MerCruiser® will assist Sea Ray dealers in diagnosis and proper repair procedures. MerCruiser® will contact Sea Ray® if a retrofit exhaust kit is needed for the vessel in question.
3. MerCruiser® and Sea Ray® will handle dealer compensation separately. All engine related claims will be submitted to MerCruiser® for reimbursement and all boat exhaust system claims will be submitted to Sea Ray®.

Note: In order to qualify for this program, the boat has to be a 1999 model year boat (models noted in this infogram) or newer with a collector style exhaust. The boat must be registered for less than 36 months from the time the dealer requests an exhaust system replacement.

Please distribute this information to others in your organization responsible for ensuring the integrity of items in the bilge of our models. Together, we can make tremendous strides in ensuring the complete satisfaction of our mutual customers. If you have any questions regarding any of this information, please call one of our Customer Service Departments for clarification.

Thank you for representing Sea Ray®.

Regards,

Nancy Luster
VP Customer/Dealer Service

HIN:

Part Number: