

Waukesha* gas engines

CFR*

SUBJECT: Breather System Construction

MODELS AFFECTED: All CFR Engine Models

TOPIC: Crankcase
SAFETY ALERT

IDENT NO: 4-1304

DATE: August 2014

SUPERSEDES: New

SAFETY ALERT: Failure to comply with this safety alert could result in personal injury or even in some cases death. All field sites should be inspected and, if necessary, corrected as soon as feasible.

The purpose of this bulletin is to emphasize the importance and safety of the proper design and installation of the crankcase breather and exhaust system as currently called out in the Operation & Maintenance manual for each respective CFR engine model. Failure to follow these guidelines could result in leakage of carbon monoxide (CO) containing exhaust gas and crankcase vapor. GE's Waukesha gas engines takes exhaust and breather leaks very seriously and requires all CFR models to be reviewed for proper installation of all exhaust and breather systems. In addition, all CFR labs should be fitted with a high-quality CO monitor near each engine for continuous monitoring. Follow the CO monitor manufacturer's recommendations for installation.

PROPER BREATHER SYSTEM CONSTRUCTION

Reference *Figure 1* as an example of proper breather construction.

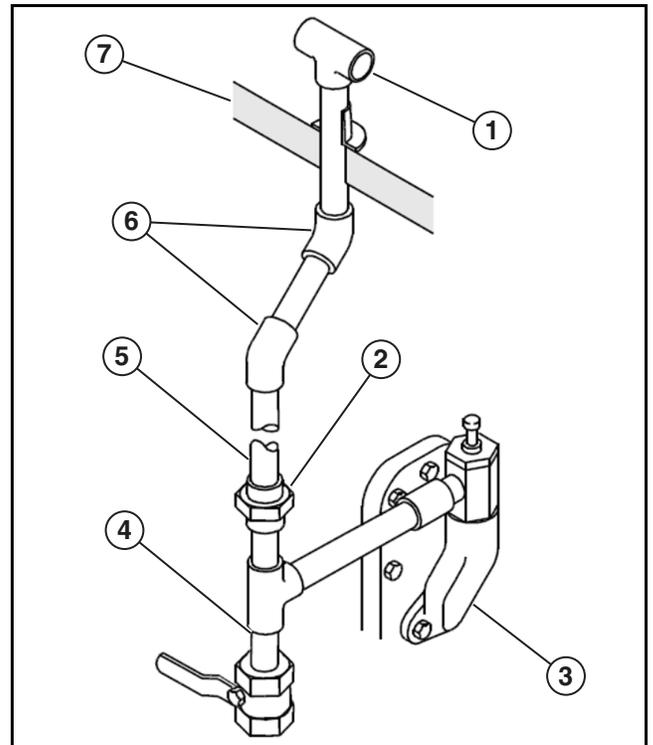


Figure 1: Crankcase Breather System

- 1 - Tee Weather Cap
- 2 - Union
- 3 - Crankcase Breather Valve on Side Door
- 4 - Trap
- 5 - 1 in. Breather Pipe
- 6 - Use 45° Elbows for Any Direction Changes
- 7 - Roof

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All CFR engines are to be inspected for proper breather construction. Breather systems that do not meet these requirements are to be updated as soon as feasible. Breather systems shall include:

- The breather system should be piped using 3/4 to 1 in. I.D steel piping (preferably 1 in.). The use of polyvinyl chloride (PVC) piping should be completely avoided as PVC potentially when melted will put harmful toxins in the air.
- The breather should be piped with no 90° elbows, with exception of a pipe tee mounted from the breather housing body as seen as item #4 in *Figure 1*. Any additional 90° elbows added to this system will create restrictions in the flow of exhaust gases.
- If directional changes are needed, 45° elbows can be used but should be minimized to no more than 3.
- There should be no more than 30 ft (9 m) of piping from the centerline of the breather outlet to the centerline of discharge to atmosphere.
- All pipe couplings should be made with a suitable pipe paste to make sure good seals are made.
- Drain valves used for draining condensate from the breather system should be of the gas-tight quality or ones used for control of natural gas.

All breather systems must be piped separately of the exhaust system and should not be combined. Failure to comply can cause exhaust gases to feed back into the room.

UNACCEPTABLE BREATHER CONSTRUCTION

The following examples of incorrectly installed breathers represent common errors seen in the field that must be corrected.

EXAMPLE A

This example (*see Figure 2*) has three features that are not acceptable:

- Flexible tube
- Barb fitting
- Termination into the exhaust system

All these conditions would need to be corrected.

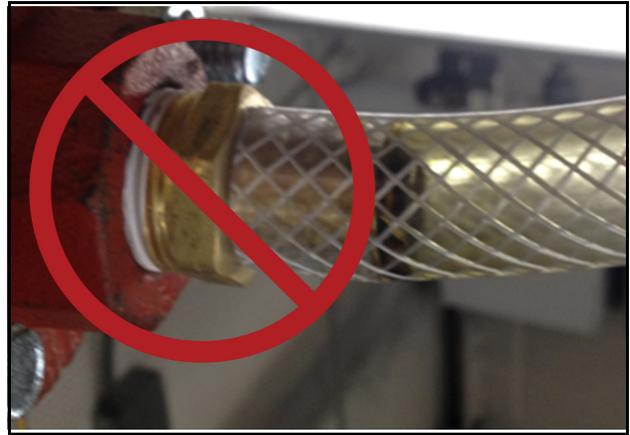


Figure 2

EXAMPLE B

This example (*see Figure 3*) shows the incorrect use of plastic tubing and a barb fitting. Neither is suitable for the breather or exhaust system.



Figure 3

EXAMPLE C

This example (*see Figure 4*) shows the incorrect use of PVC piping and 90° elbows.



Figure 4

PROPER EXHAUST CONSTRUCTION

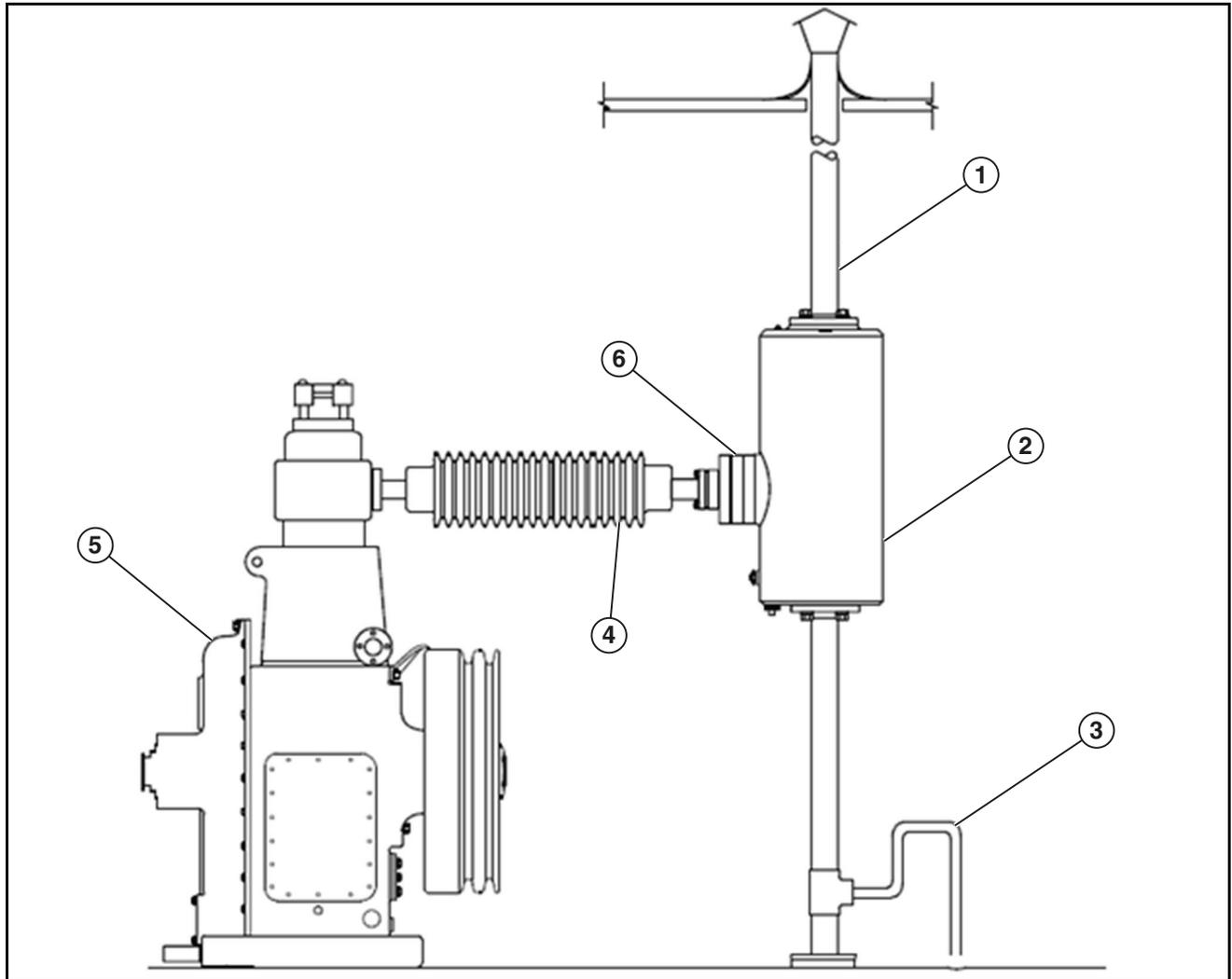


Figure 5: Proper Installation of the CFR Exhaust

- | | |
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| <ul style="list-style-type: none"> 1 - 2 in. Pipe Stack 2 - Surge Tank 3 - Cooling Water Drain Trap | <ul style="list-style-type: none"> 4 - Flex Exhaust Manifold 5 - CFR Engine 6 - Spray Ring Assembly |
|--|--|

- All exhaust systems should be made as outlined in the installation manual.
- All exhaust systems should be made with the Waukesha surge tank. Waukesha will not be responsible for the performance and/or safety issues that arise from aftermarket exhaust systems or incorrectly installed exhaust systems.
- The exhaust system should be piped using 2 in. minimum I.D steel piping. The use of PVC piping should be completely avoided as PVC potentially when melted will put harmful toxins in the air.
- The breather shall be piped with no 90° elbows as this creates restrictions in the flow of exhaust gases.
- If directional changes are needed, 45° elbows can be used but should be minimized to no more than 3.
- There should be no more than 30 ft (9 m) of piping from the centerline of the breather outlet to the centerline of discharge to atmosphere as this can create resonance.
- All pipe couplings should be made with a suitable pipe paste to make sure good seals are made.
- Drain valves used for draining condensate from the breather system should be of the gas-tight quality or ones used for control of natural gas.
- The trap shall be completely closed with no visible openings as pictured in *Figure 5*.