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FAA Clamps Down on V-Band Failures

To educate the maintenance community about powerplant and component failures — the third ranking cause of fatal general aviation accidents — *FAA Safety Briefing* is addressing maintenance safety enhancements recommended by the General Aviation Joint Steering Committee (GAJSC). This issue's topic will focus on V-band coupling/clamp failures.

V-band engine exhaust coupling/clamp failures have been identified as a causal factor in a significant number of incidents and fatal accidents in both fixed-wing aircraft and rotorcraft. Despite best efforts by the FAA, the National Transportation Safety Board, and industry to raise awareness of this safety concern, V-band coupling/clamp failures, and the resulting accidents and incidents that occur, continue to be a repetitive problem in turbocharged, reciprocating engine-powered aircraft. Here's why.

V-Band couplings and clamps are widely used on reciprocating turbocharged engines as a means of coupling and retaining the exhaust tailpipe to the turbocharger exhaust outlet.

V-Band couplings and clamps are routinely exposed to extremely high exhaust temperatures and heat cycles, which can lead to cracks and failures in the V-band coupling/clamps. Consequently, hot exhaust gases can escape from the exhaust system, leading to smoke in the cockpit, in-flight fires, and fatal accidents.

A V-band coupling/clamp failure resulted in the tragic loss of all aboard a Beech A36TC in Tupelo, Mississippi in 2016. Shortly after takeoff, the pilot advised the control tower that there was smoke in the cockpit. A witness reported seeing something fall from the aircraft as it took off, with smoke and flames coming from the bottom just before it crashed. Accident investigators found that the exhaust tailpipe was separated at the exhaust flange of the turbocharger due to a fractured and separated, spot-welded V-band coupling, consistent with the existence of a preexisting crack.

Due to the continued occurrence of accidents and incidents resulting from V-band coupling/clamp failures, a V-band Working Group was created, comprised of aviation industry manufacturers, type/user groups, and government entities, to examine the turbocharger to tailpipe interface and develop safety recommendations.

"This diverse working group was able to take an objective look at the available safety data and develop a set of recommendations tailored to specific V-band types," says Bob Busto, Manager of the FAA's Central Manufacturing Inspection Office and Team Lead on the V-band Working Group. "Each team member brought specific strengths to the table and the result is a great example of the safety enhancements that can be achieved when industry, the NTSB, and the FAA work collaboratively to address GA safety issues."

Recommended Actions*

*If there exists an airworthiness directive against the product which establishes a life-limit and/or repetitive inspection interval, that mandate takes precedence over the information herein, unless approved by an Alternative Method of Compliance (AMOC) to the specific Airworthiness Directive (AD). Also check the airworthiness limitations.

REQUIREMENT	SPOT-WELD V-BAND COUPLING	RIVETTED V-BAND COUPLING	SINGLE-PIECE CLAMP
Visual Inspection	Annually	Annually	Annually
Life-Limit	500 hours total time in-service with no life extensions	2000 hours total time in-service with no life extensions	2000 hours total time in-service with no life extensions

Refer to the BPG for photographs, diagrams, and definitions of the above types of couplings/clamps that may be found on your aircraft. Always refer to the design approval holder's Type Certificate (TC), Supplemental Type Certificate (STC) or Parts Manufacturer Approval (PMA) Instructions for Continued Airworthiness (ICA) for specific installation and torque requirements for the V-band couplings/clamps.

The working group's recommendations are highlighted in Special Airworthiness Information Bulletin (SAIB) CE-18-07 and the Best Practices Guide for Maintaining Exhaust System Turbocharger to Tailpipe V-band Couplings/Clamps. The recommendations include the actions summarized in the preceding table, and discuss inspection requirements and replacement time, or life-limits, for V-band coupling/clamps which can be applied across product lines to multiple make/models and type of aircraft (including small rotorcraft).

Although the working group has officially concluded, their important recommendations are being evaluated by the FAA for further action.

Check out the newly released ***Best Practices Guide for Maintaining Exhaust System Turbocharger to Tailpipe V-band Couplings/Clamps (BPG)*** at bit.ly/2KWynrO. It's a helpful guide to V-band coupling removal, installation, inspection, and continued care of turbocharged reciprocating engine powered aircraft products. This guide contains the lessons learned and best practices accumulated over years of in-service experience.

We highly recommend that you make this guide an important part of your V-band maintenance practices!

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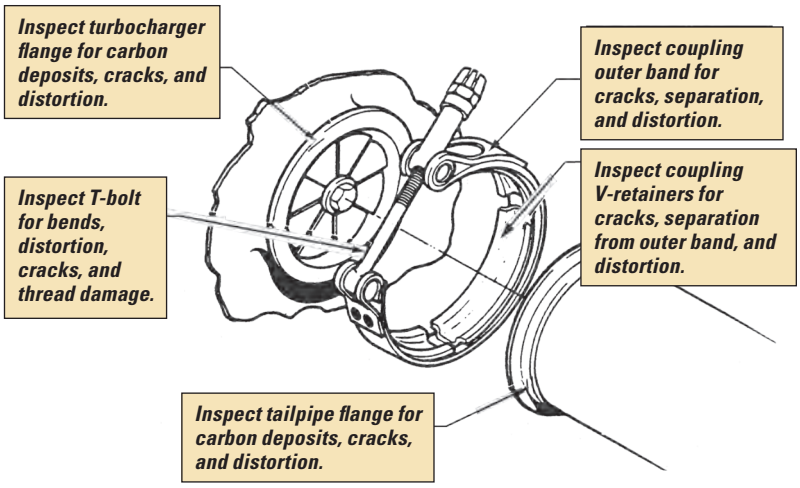
Learn More

View the FAA's Special Airworthiness Information Bulletin (SAIB) CE-18-07
bit.ly/2zLJv5W



Typical Turbocharger to Tailpipe Interface Area

Spot-welded, 3-segment Coupling — The red arrow shows where the coupling is deformed at a spot-weld where the crack originated. The crack had not yet grown across the outer band and the coupling had not separated. Found on inspection for another issue.