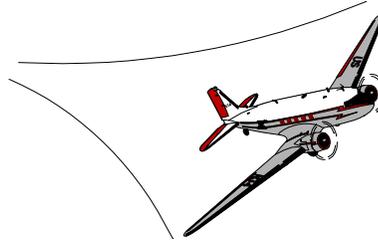


# SPECIAL AIRWORTHINESS INFORMATION BULLETIN

REGULATORY SUPPORT DIVISION  
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0460



U.S. Department  
of Transportation  
**Federal Aviation  
Administration**

No. ANE-99-26  
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*SAIB's are posted on the internet at <http://av-info.faa.gov>*

This is issued for informational purposes only and any recommendation for corrective action is not mandatory.

## **Introduction:**

The purpose of this Special Airworthiness Information Bulletin (SAIB) is to alert repair stations, mechanics holding Inspection Authorization (IA), Principal Maintenance Inspectors (PMI) in the FAA Flight Standards District Offices (FSDO), and the Suspected Unapproved Parts Program Office (AVR-20) of service difficulties and safety issues with overhauled or repaired AlliedSignal (previously Garrett or AiResearch) turbochargers installed on general aviation reciprocating engines. This bulletin is a follow-up to SAIB ANE-97-02 issued March 6, 1997.

## **Background:**

A letter from the National Transportation Safety Board (NTSB) Washington, DC dated November 14, 1996, and a memorandum from the FAA Fresno FSDO dated August 20, 1996, both expressed the following concerns:

1. In-flight failure of overhauled and repaired AlliedSignal turbochargers.
2. Lack of part marking to differentiate FAA approved aircraft engine turbocharger components from automotive turbocharger components.
3. FAA approved repairs on turbocharger components which are beyond the scope of the AlliedSignal "Overhaul Manual for Aircraft System Turbochargers" TP20-0128, dated August 15, 1985.

An FAA technical team was formed to review all the accidents and incidents in the FAA database related to the turbocharger system since 1974, to investigate major turbocharger repair facilities, to investigate FAA approved repairs beyond the AlliedSignal overhaul manual and to review AlliedSignal production drawings and processes.

## **Information:**

FAA Team Findings and Action:

1. The review of accident/incident data indicates that the principal causes of the turbocharger system failures have been related to maintenance and installation issues i.e., exhaust clamp, air inlet duct, oil lines, lack of lubrication, etc. However, potential for catastrophic failure exists from performing unapproved repairs or installing unapproved components in aircraft turbochargers i.e., turbocharger shaft failure, engine oil contamination, engine fire, loss of engine power, etc.
2. Since welding repairs may affect the integrity of the turbocharger shaft, the previously approved welding repair to the shaft seal groove was rescinded by the FAA on March 6, 1998.
3. Chrome plating or plasma coating of the turbine shaft at overhaul is not approved by AlliedSignal nor the FAA because the process, if not properly accomplished, may weaken the shaft below its structural integrity, and the coating/plating may flake away and contaminate the oil system. In addition, these repairs may extend the in-service time of the shaft beyond its intended structural integrity, and the in-service time of the turbine wheel beyond its creep growth limit.
4. Since AlliedSignal manufactures turbochargers and components for both the aviation and the automotive industries, there are physical similarities in design between the two lines of turbochargers and components. Also, in some instances, the same components are used for both applications. However, in most instances, there are differences in material, process and quality control applied during manufacturing of components for aircraft application versus automotive application.

The availability and lower cost of automotive turbocharger components have enhanced the potential of unapproved automotive components being installed in place of FAA approved aircraft components during turbocharger repair or overhaul. The components of most concern are: turbine wheel/shaft assemblies, bearings, center housings and

turbine housings. The criticality of installation of unapproved automotive parts is further enhanced by the difference in the type of operations between aircraft and automotive, i.e., higher turbine temperature and rpm for aircraft, high cycle for automotive, etc.

5. Major turbocharger components approved for aircraft and manufactured by AlliedSignal after December 1, 1997, are now permanently identified with a part number (i.e., xxxxxxAxxxx or xxxxxx-xxxxA). The part number location is depicted in the figure of this bulletin. For small components, the part number is identified on the packaging i.e., bag and tag, reference 14 CFR part 45.15.

6. It is the intent of the FAA that most turbocharger components, which are currently unmarked and installed in aircraft, will eventually be purged out of the system.

7. AlliedSignal Overhaul Manual TP20-0128 is being updated and revision should be available to the FAA approved repair stations early in the year 2000.

**Recommendations:**

1. Use only FAA approved repair, overhaul and service data when servicing or working on AlliedSignal aircraft turbochargers.

2. Use only FAA approved replacement components for aircraft turbochargers. These components are now permanently identified with an AlliedSignal part number and an "A" for aircraft (see figure for marking location and AlliedSignal Overhaul Manual TP20-0128 for FAA approved part listing).

3. At turbocharger overhaul or when a turbocharger is taken apart for repair, all serviceable components should be examined on an individual basis. If their configuration or origin is questionable or if unauthorized repairs are found, the components should be replaced with FAA approved components per AlliedSignal Overhaul Manual TP20-0128 part list and with a permanent part number marking (see figure for component markings and locations).

Examples of unauthorized repairs:

- welding of housings, flanges, shaft, turbine wheel
- plasma coating of wear surfaces such as seal groove
- chrome plating of turbine shaft

4. Carefully review and inspect the paperwork that accompanies any replacement parts to verify that the parts are FAA approved parts, produced under an approved FAA quality system, and that the paperwork includes the appropriate airworthiness tags/certificates for AlliedSignal aircraft turbocharger installation.

5. Repair stations should maintain only aircraft approved parts in their aircraft turbocharger overhaul facility area.

6. Report any suspected unapproved parts to the local Flight Standards District Office (FSDO) or Manufacturing Inspection District Office (MIDO).

**For Further Information Contact:**

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**TURBOCHARGER COMPONENT PART NUMBER LOCATION**  
(XXXXXXXXXXXX or XXXXX-XXXXA)

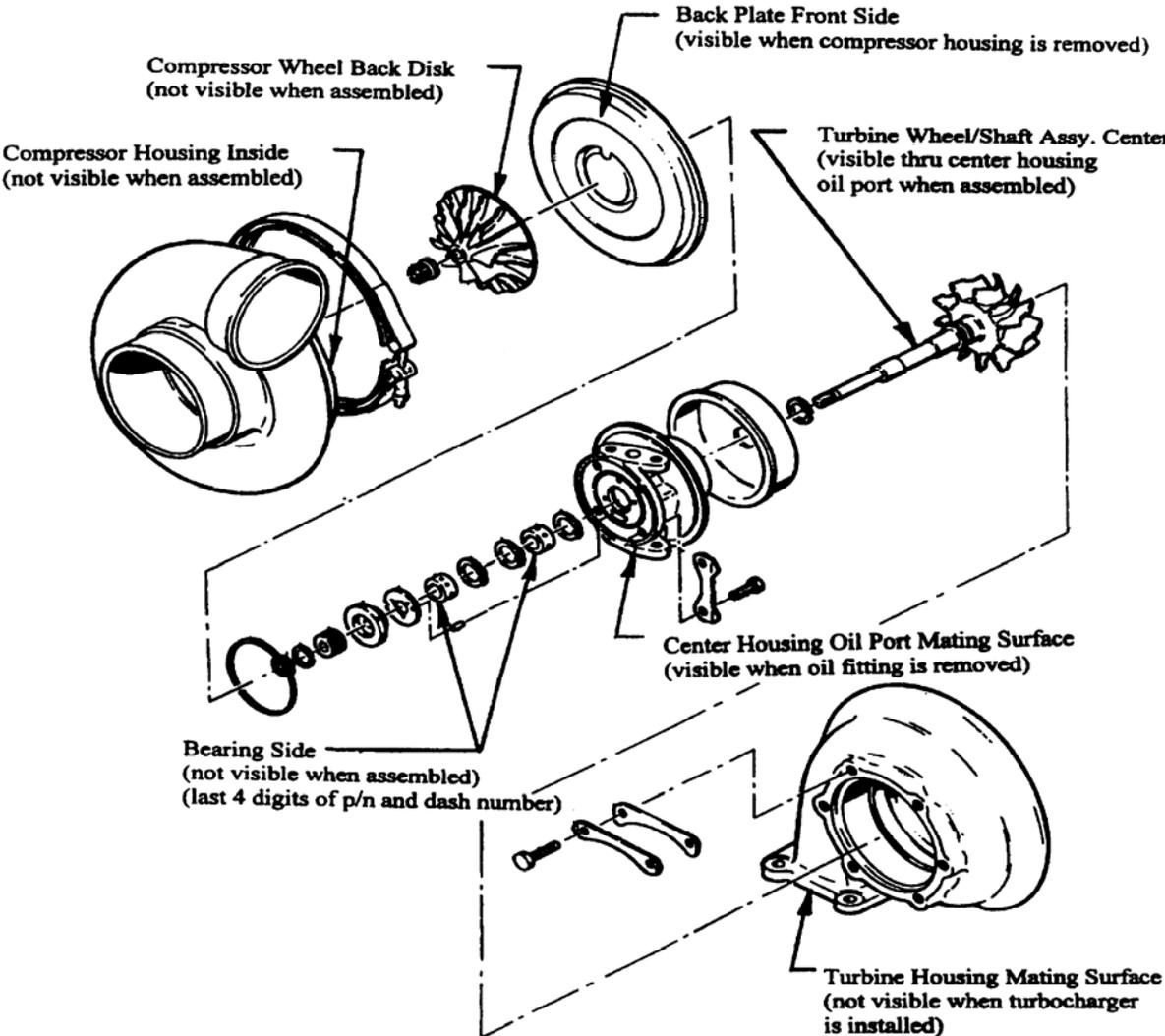


Figure 1. ANE-99-26