

EMERGENCY AIRWORTHINESS DIRECTIVE



Aircraft Certification Service
Washington, DC

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

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DATE: April 13, 2001
2001-08-52

Send to all U.S. owners and operators of Pratt and Whitney (PW) model PW4050, PW4052, PW4056, PW4060, PW4060A, PW4060C, PW4062, PW4152, PW4156, PW4156A, PW4158, PW4160, PW4460, PW4462, and PW4650 turbofan engines. These engines are installed on, but not limited to, certain models of Boeing 747, Boeing 767, Airbus Industrie A300, Airbus Industrie A310, and McDonnell Douglas MD-11 series airplanes.

This emergency Airworthiness Directive (AD) is prompted by a report of a dual-engine surge event during take-off on an Airbus Industrie A300 airplane. The investigation to date of this incident has confirmed that these surges occurred at rotation and during early climb. Review of the PW4000 fleet's takeoff surge history has indicated that certain subpopulations of engines are associated with a higher occurrence rate of takeoff surges than other engines. Although the investigation is continuing, the FAA has determined that reducing aircraft exposure to no more than one of these engines installed will have a significant and immediate reduction in the worldwide risk of another dual-engine takeoff surge event. In addition, the FAA has determined that the unscheduled removal and overhaul of these engines will reduce the overall rate of single-engine surges, as well. This AD will also prevent the creation of additional surge-prone engine configurations at subsequent engine shop visits. Further regulatory action may be necessary based on the results of this investigation.

This condition, if not corrected, could result in multiple-engine power losses due to high pressure compressor (HPC) surge at a critical phase of flight such as takeoff or climb.

Since an unsafe condition has been identified that is likely to exist or develop on other engines of this same type design, this AD requires:

- Limiting the number of PW4000 engines, listed by serial number (SN) in this AD, with potentially reduced stability on each airplane to no more than one engine within 10 cycles after receipt of this AD. AND
- Removal of certain PW4000 engines, listed by SN in this AD, before exceeding cyclic limits that are determined by airplane model, or within 100 cycles-in-service (CIS) after the receipt of this AD whichever occurs later. AND
- Removal of certain PW4000 engines, listed by SN in this AD, within 100 cycles after the receipt of this AD, that have an HPC with CSO of 1,500 cycles or more than the high pressure turbine (HPT) CSO. AND
- Requires a minimum rebuild standard for engines that are returned to service.

This rule is issued under 49 U.S.C. Section 44701 (formerly section 601 of the Federal Aviation Act of 1958) pursuant to the authority delegated to me by the Administrator, and is effective immediately upon receipt of this emergency AD.

2001-08-52 Pratt and Whitney: Docket No. 2001-NE-09-AD

Applicability

This emergency Airworthiness Directive (AD) is applicable to Pratt and Whitney (PW) model PW4050, PW4052, PW4056, PW4060, PW4060A, PW4060C, PW4062, PW4152, PW4156, PW4156A, PW4158, PW4160, PW4460, PW4462 and PW4650 turbofan engines. These engines are installed on, but not limited to, certain models of Boeing 747, Boeing 767, Airbus Industrie A300, Airbus Industrie A310, and McDonnell Douglas MD-11 series airplanes.

Note 1: This AD applies to each engine identified in the preceding applicability provision, regardless of whether it has been modified, altered, or repaired in the area subject to the requirements of this AD. For engines that have been modified, altered, or repaired so that the performance of the requirements of this AD is affected, the owner/operator must request approval for an alternative method of compliance in accordance with paragraph (j) of this AD. The request should include an assessment of the effect of the modification, alteration, or repair on the unsafe condition addressed by this AD; and, if the unsafe condition has not been eliminated, the request should include specific proposed actions to address it.

Compliance

Compliance with this AD is required as indicated, unless already done.

To prevent multiple-engine power losses due to high pressure compressor (HPC) surge at a critical phase of flight such as takeoff or climb, do the following:

(a) Within 10 cycles in service (CIS) after the receipt of this AD, limit the number of engines listed by SN in the following Table 1 of this AD, to no more than one per airplane:

Table 1. Suspected High Surge Rate Engines

717675, 723845, 723934, 723936, 723962, 723966, 723967, 723969, 724012, 724013, 724016, 724030, 724040, 724041, 724045, 724057, 724073, 724115, 724137, 724153, 724175, 724195, 724196, 724198, 724200, 724351, 724383, 724501, 724612, 724615, 724616, 724625, 724629, 724689, 724690, 724808, 724827, 724829, 724830, 724833, 724837, 724838, 724848, 724855, 724857, 724858, 727316, 727317, 727365, 717710CN
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(b) Engines that are removed in accordance with paragraph (a) of this AD may be installed on an airplane if ALL of the following conditions are met:

- (1) That airplane does not have any engines with a SN that is listed in Table 1 or Table 2 of this AD. AND
- (2) The installed engines meet the requirements of paragraphs (d) and (e) of this AD. AND
- (3) The airplane does not have any engines that incorporate the HPC Cutback Stator configuration, which have been incorporated as specified by the following PW service bulletins (SB's) or earlier revisions: PW4ENG 72-706, Revision 3, dated July 17, 2000; PW4ENG 72-711, dated June 13, 2000; or PW4ENG 72-704, dated July 17, 2000.

(c) After the receipt of this AD, do not install an engine with a SN that is listed in the following Table 2 of this AD on an airplane that has an engine with a SN that is listed in Table 1 of this AD:

Table 2. Engines Restricted from Installation with Suspected High Surge Rate Engines

717508, 723859, 723863, 723938, 723963, 724022, 724024, 724050, 724054, 724080, 724099, 724119, 724173, 724179, 724184, 724191, 724205, 724385, 724386, 724479, 724509, 724566, 724644, 724847, 724861, 724864, 724870, 724882, 724883, 724893, 727395, 727421, 727426, 727462, 727478, 727496, 727500, 727502, 727506, 727521, 727535, 727536, 727537, 727540, 727543, 727617, 727619, 727747, 733701

(d) Remove engines listed by SN in Table 1 of this AD within 100 cycles-in-service (CIS) after the receipt of this AD, or before exceeding the cyclic limits listed in the following Table 3 of this AD, whichever occurs later:

Table 3. High Pressure Compressor Cycle Limits by Airplane

Airplane	High Pressure Compressor (HPC) Cycles
(1) Boeing 767 and 747.	2,500 cycles-since-overhaul (CSO).
(2) McDonnell Douglas MD-11.	2,500 CSO.
(3) Airbus A300 and A310.	2,000 CSO.

(e) Within 100 CIS after the receipt of this AD, remove engines listed by SN in Table 1 of this AD that have an HPC with CSO of 1,500 cycles or more than the CSO of the high pressure turbine (HPT).

(f) For engines inducted into the shop after the receipt of this AD, do not install modules such that the HPC CSO is greater than 1,500 cycles more than the HPT CSO.

(g) When engines listed by SN in Table 1 of this AD meet the requirements of paragraph (h) of this AD, they are no longer restricted by the installation limitations of paragraphs (b) and (c) of this AD.

(h) On engines inducted into the shop after the receipt of this AD, do EITHER of the following:

(1) Incorporate the following PW SB's, or earlier revisions, during HPC refurbishment: PW4ENG 72-484, Revision 3, dated July 1, 1997; PW4ENG 72-486, Revision 2, dated April 28, 1998; PW4ENG 72-575, Revision 2, dated July 29, 1998; PW4ENG 72-514, Revision 3, dated August 10, 1999 –; OR

(2) Convert the engine to the Phase III configuration by incorporating the following PW SB's or earlier revisions: PW4ENG 72-490, Revision 1, dated August 2, 1994; PW4ENG 72-504, Revision 1, dated May 9, 1995; or PW4ENG 72-572, dated June 16, 1995.

Definitions

(i) For the purposes of this AD, the following definitions apply:

(1) An HPC overhaul is defined as restoration of the HPC stages 5 through 15 blade tip clearances to the limits specified in the applicable fits and clearances section of the engine manual.

(2) An HPT overhaul is defined as restoration of the HPT module stage 1 and 2 blade tip clearances to the limits specified in the applicable fits and clearances section of the engine manual.

Alternative Methods of Compliance

(j) An alternative method of compliance or adjustment of the compliance time that provides an acceptable level of safety may be used if approved by the Manager, Engine Certification Office (ECO).

Operators shall submit their requests through an appropriate FAA Maintenance Inspector, who may add comments and then send it to the Manager, ECO.

Note 2: Information concerning the existence of approved alternative methods of compliance with this airworthiness directive, if any, may be obtained from the ECO.

Special Flight Permits

(k) Special flight permits may be issued in accordance with §§ 21.197 and 21.199 of the Federal Aviation Regulations (14 CFR 21.197 and 21.199) to operate the aircraft to a location where the requirements of this AD can be accomplished.

(l) Emergency AD 2001-08-52, issued April 13, 2001, becomes effective upon receipt.

FOR FURTHER INFORMATION CONTACT: Peter White, Aerospace Engineer, Engine Certification Office, FAA, Engine and Propeller Directorate, 12 New England Executive Park, Burlington, MA 01803-5299; telephone (781) 238-7128; fax (781) 238-7199.

Issued in Burlington, Massachusetts on April 13, 2001.

Francis A. Favara, Acting Manager, Engine and Propeller Directorate, Aircraft Certification Service.