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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. 95-NM-111-AD; Amendment 39-13544; AD 2004-06-18]

RIN 2120-AA64

Airworthiness Directives; Boeing Model 737-100, -200, -300, -400, and -500 Series Airplanes

AGENCY: Federal Aviation Administration, DOT.

ACTION: Final rule.

SUMMARY: This amendment supersedes an existing airworthiness directive (AD), applicable to certain Boeing Model 737-300 and -400 series airplanes, that currently requires either repetitive leak checks on the forward lavatory service system and repair, as necessary, or draining of the system and placarding the lavatory inoperative. This amendment also requires periodic changing of the seals of certain lavatory drain systems; replacing "donut valves" with other FAA-approved valves; revising certain leak test intervals; and revising the pressurization and fluid level requirements for testing. The actions specified by this AD are intended to prevent damage to engines, airframes, and property on the ground that is associated with the problems of "blue ice" that forms from leaking lavatory drain systems on transport category airplanes and subsequently dislodges from the airplane fuselage.

DATES: Effective April 29, 2004.

ADDRESSES: Information pertaining to this amendment may be examined at the Federal Aviation Administration (FAA), Transport Airplane Directorate, Rules Docket, 1601 Lind Avenue, SW., Renton, Washington.

FOR FURTHER INFORMATION CONTACT: Don Eiford, Aerospace Engineer, Cabin Safety and Environmental Systems Branch, ANM-150S, FAA, Seattle Aircraft Certification Office, 1601 Lind Avenue, SW., Renton, Washington; telephone (425) 917-6465; fax (425) 917-6590.

SUPPLEMENTARY INFORMATION: A proposal to amend part 39 of the Federal Aviation Regulations (14 CFR part 39) by superseding AD 89-11-03, amendment 39-6223 (54 FR 21933, May 22, 1989), which is applicable to certain Boeing Model 737-300 and -400 series airplanes, was published as a supplemental notice of proposed rulemaking (NPRM) in the Federal Register on November 26, 1997 (62 FR 62708). That action proposed to continue to require either repetitive leak checks on the forward lavatory service system and repair, as necessary, or draining of the system and

placarding the lavatory inoperative. In addition, that action proposed to add a requirement to perform leak checks of other lavatory drain systems; require the installation of a cap or vacuum break on the flush/fill line; and require either a periodic replacement of the seal for the cap and tank anti-siphon valve or periodic maintenance of the vacuum break in the flush/fill line. Further, that action proposed to require a periodic changing of the seals of certain lavatory drain systems; and replacing "donut valves" with other FAA-approved valves.

Comments Received

Interested persons have been afforded an opportunity to participate in the making of this amendment. Due consideration has been given to the comments received.

Comments That Resulted in a Change To the Final Rule

Requests To Extend Leak Test Interval

One commenter requests that paragraph (a)(4) of the supplemental NPRM be revised to extend the leak test intervals of certain service panel drain valves (also known as and referred to in the supplemental NPRM as waste drain valves) from 1,000 flight hours to 2,000 flight hours. The commenter also requests that Table 1 of paragraph (a) of the supplemental NPRM be updated to reflect the appropriate valves approved for the 1,000-flight hour interval. In addition, the commenter requests that paragraph (a)(5) of the supplemental NPRM be revised to extend the leak test intervals from 600 flight hours to 1,000 flight hours. The commenter advises that more than 7,000 Shaw valves have accumulated in excess of 50 million flight hours during the past 10 years. The commenter states that it is aware of less than five blue ice events that could have been attributed to a Shaw Aero service panel valve and suggests that this is ample evidence to support the extensions of the leak test intervals. The commenter further states that service experience clearly indicates that the main problems regarding blue ice occur after a period of two years of residue build-up on the sealing surfaces of the valve design. Therefore, the commenter concludes that the performance of the Shaw valves in real life maintenance environments will, if approved for an interval of 2,000 flight hours for the leak test, continue to operate with no blue ice events.

Another commenter requests that the improved Shaw valves specified in Table 1 of paragraph (a) of the supplemental NPRM be approved for the 2,000 flight hour interval that is specified in paragraph (b) of the supplemental NPRM. The commenter states that the improved valves specified in Table 1 of paragraph (a) of the supplemental NPRM, coupled with the incorporation of the maintenance program specified in paragraph (b) of the supplemental NPRM, justify increasing the leak test intervals.

The FAA agrees that the interval for the leak test of the waste drain valves specified in Table 1 of paragraph (a) of the supplemental NPRM should be extended. Since the issuance of the supplemental NPRM, requests for alternative methods of compliance (AMOCs) have been approved to extend the leak test interval to 4,000 flight hours for certain valves. We have determined that, if those valves are maintained properly, the valves are capable of leak-free operation. To simplify and clarify the requirements of this AD, we have consolidated the leak test intervals for certain valves specified in the supplemental NPRM for -4,500, -2,000, and -1,000 flight hour intervals into one group with a leak test interval of 4,500 flight hours. Therefore, we have revised this final rule to specify that the valves listed in Table 1 of this AD are approved for a leak test interval of 4,500 flight hours. For certain other valves, we have consolidated the leak test interval to 1,000 flight hours. Consequently, after the removal of "donut" type valves as required by this AD, there will be only two leak test intervals specified in the AD. To accommodate this change in the final rule, we have consolidated the requirements of paragraphs (a)(2), (a)(3), and (a)(4) of the supplemental NPRM into

paragraph (a)(2) of this AD. We consider that the requirement of this AD to repair any leaking valves before further flight to be an additional safety factor in this determination.

Request To Add a Panel Ball Valve With a 48-Month Seal Replacement Interval

Two commenters request that the interval for the leak test for Kaiser Electroprecision panel ball valve, part number (P/N) 2651-357, be extended to 2,000 flight hours. Both commenters request that the seal replacement interval be every 48 months. The commenters explain that ample testing with airlines has been accomplished to justify the 2,000 flight hour interval.

We agree with the commenters' request. Since the issuance of the supplemental NPRM, additional flight data has been submitted to the FAA justifying an extension of the leak check interval. Additionally, the valve manufacturer has recommended that the seal change interval be revised to every 48 months. We have revised paragraphs (a) and (d) of the final rule to reflect these changes.

Requests Regarding Use of Certain Leak Test Tools

Three commenters request that use of a vacuum leak test tool be approved for performing the requirements of paragraph (b)(3)(ii)(A) of the supplemental NPRM, just as it is specified in paragraph (a)(8)(ii)(A) of the supplemental NPRM. The commenters note that use of a vacuum leak test tool does not require the airplane to be pressurized, and is, therefore, valid for performing the requirements of both paragraphs.

We agree with the commenters' request. We have redesignated paragraph (b) of the supplemental NPRM to paragraph (d) of the final rule and revised it from, "Pressurize the airplane to 3 PSID * * *" to "Apply 3 PSID across the valve in the same direction as occurs in flight."

Another commenter requests the FAA to specify that it is unnecessary to completely cover the upstream end of the valve being tested with fluid when a vacuum leak test tool is used to test the inner seal of the service panel valves. The commenter notes that leakage will be detected by a loss of applied vacuum, not by fluid leaking past the inner seal.

We agree and have added new paragraphs (b) and (c) of this AD that specify procedures to perform vacuum leak tests.

Requests To Provide an Additional Option for Paragraph (d) of the Supplemental NPRM

Several commenters request that installation of an FAA-approved liquid level sensor and motorized shut-off valve (also known as and specified as an automatic shut-off valve in the supplemental NPRM) be accepted as another option for compliance with the requirements of paragraph (d) of the supplemental NPRM. That paragraph specifies installation of an FAA-approved lever/lock cap, vacuum break, or flush/fill ball valve for all lavatories. Additionally, the commenters request that this system also be provided in paragraphs (a)(8) and (b)(3) of the supplemental NPRM. One commenter points out that the automatic shut-off valve system is similar to other systems currently installed in another airplane model, and it has proven effective in preventing "blue ice" incidents.

We agree with the commenters' request and have revised those paragraphs of the final rule to add the automatic shut-off valve as an additional method of compliance. Also, we have redesignated paragraph (d) of the supplemental NPRM as paragraph (f) of the final rule, and paragraphs (a)(8) and (b)(3) of the supplemental NPRM as paragraphs (a)(5)(iv) and (d)(3)(iv) of the final rule.

Request To Specify Terminating Action

One commenter requests that the actions required by the supplemental NPRM and incorporation of an FAA-approved maintenance program be considered as terminating action for the requirements of the supplemental NPRM. The commenter states that the proposed actions, such as donut valve removal, seal replacement, and rinse system upgrade, will reduce the incidence of "blue ice" significantly, and in conjunction with the FAA-approved maintenance program, justify providing accomplishment of those actions as terminating action.

We agree with the commenter's request. A review of reports indicates that, since the issuance of several blue ice ADs, the number of reported events of blue ice has decreased markedly. We consider the decrease as an indication that the existing blue ice ADs are effective. Therefore, we have revised paragraph (d) of the final rule to allow terminating action by incorporation of the requirements of paragraphs (d), (f), and (g) of the AD into the operator's FAA-approved maintenance program.

Request To Extend Intervals for Seal Replacement

One commenter requests that paragraphs (a)(1) and (b)(1) of the supplemental NPRM be revised to provide that, for waste drain systems that incorporate more than one type of valve, the seal replacement interval of all affected valves in the system would be that of the valve with the longest seal replacement interval. For example, if an in-line drain valve were installed with a service panel valve, replacement of the service panel valve seal would coincide with replacement of the in-line drain valve seal. The commenter suggests that it be specified that the secondary valve would not be a means of continuing operations if the seal of the valve with the longest replacement interval were malfunctioning.

We partially agree with the commenter. We have revised paragraphs (a)(1) and (d)(1) of the AD to permit extension of the interval for replacement of the seals. However, we do not consider it necessary to specify that the secondary valve would not be a means of continuing operations if the seal of the valve with the longest replacement interval is malfunctioning, since the final rule requires any worn or damaged seal or any seal leakage to be repaired before further flight.

Request To Revise Paragraph (b) To Clarify Leak Test Interval

One commenter requests that certain language used in paragraph (a) of the supplemental NPRM be added to paragraph (b) of the supplemental NPRM. The language states, "If the waste drain system incorporates more than one type of valve, only one of the waste drain system leak test procedures (the one that applies to the equipment with the longest leak test interval) must be conducted at each service panel location."

We agree that clarification is needed and have revised the final rule accordingly. Paragraph (b) of the supplemental NPRM also has been redesignated as paragraph (d) of the final rule.

Request To Add Appropriate Leak Tests for Auxiliary Waste Tanks

One commenter states that the flush/fill line valve tests specified in paragraphs (a) and (b) of the supplemental NPRM cannot be accomplished as specified for airplanes that have auxiliary waste tanks installed. The commenter explains that auxiliary waste tanks cannot be half-filled because the bowl is installed only on the primary waste tank. Additionally, the primary waste tank cannot be tested by this procedure without filling the auxiliary tank, because the standpipe installation in the primary tank precludes filling the bowl half-full. Therefore, the commenter requests that an appropriate leak test be specified for those airplanes with auxiliary waste tanks installed. The commenter did not suggest any specific leak test.

We agree with the commenter's request. Since using a vacuum test does not require filling the tanks with fluid, we have determined that such use of a vacuum test in accordance with applicable airplane and component maintenance manuals will provide an acceptable method to comply with the leak test requirements for airplanes with auxiliary waste tanks installed. We have clarified paragraphs (a)(5) and (d)(3) of the final rule to specify that vacuum test equipment (rigs) may be used for those airplanes for the flush/fill line leak tests.

Request To Allow Certain Leak Test Extensions

One commenter states that, although paragraph (c) of the supplemental NPRM provides for revision of the leak test intervals required by paragraph (b) of the supplemental NPRM, no similar provision is made for operators who comply with the requirements of paragraph (a) of the supplemental NPRM. The commenter explains that it is implementing a maintenance program that complies with the requirements of paragraph (a) of the supplemental NPRM for certain airplanes in its fleet, and that it complies with the requirements of paragraph (b) of the supplemental NPRM for certain other airplanes in its fleet. The commenter requests that paragraph (c) of the supplemental NPRM be revised to permit extension of the leak test intervals for airplanes that are in compliance with either paragraph (a) or (b) of the supplemental NPRM.

We agree. The provision to extend the leak test intervals provided in paragraph (c) of the supplemental NPRM has been revised accordingly. Paragraph (c) of the supplemental NPRM has also been redesignated as paragraph (e) in the final rule.

Request To Clarify Use of "Dump Valve"

One commenter requests that the FAA revise the term "dump valve" as used in the supplemental NPRM to read "toilet tank dump valve." We agree with the commenter's request and have changed the final rule accordingly.

Request To Specify "FAA-Approved Vacuum Breaks"

One commenter requests that, rather than requiring the use of two particular vacuum breaks as specified in paragraph (a) of the supplemental NPRM, the FAA require the use of any FAA-approved vacuum breaks. We agree with the commenter's request and have changed the final rule accordingly.

Request To Revise a Part Number for the Vacuum Breaker Check Valve

One operator requests that reference to the P/N series for the Shaw vacuum breaker check valves by changed from "301-0009-01" to "309-0009." We agree with the commenter's request and have corrected the references to those P/Ns in the final ru;e accordingly.

Comments Received That Did Not Result in a Change to the Final Rule

Request To Approve Terminating Action

One commenter requests that a certain in-line drain valve be approved as a terminating action for the requirements of paragraph (b) of the supplemental NPRM. The commenter states that it is not aware of any reports of leakage on the particular valve.

We do not agree with the commenter's request. Since in-line drain valves may be damaged, fouled, and worn, we have determined that it is not appropriate to approve those valves as a terminating action for the requirements of paragraph (b) of the supplemental NPRM (redesignated as

paragraph (d) in the final rule). However, we have also provided for terminating action by allowing incorporation of the requirements of paragraphs (d), (f), and (g) of the final rule into the operator's FAA-approved maintenance program.

Request To Revise Replacement Intervals

One commenter states that the FAA should not extend replacement intervals for certain valve seals based on the success of certain other in-line ball valve seals. The commenter specifies that the two different types of valves are not similar, and therefore, extending the replacement intervals should not be approved on that basis.

We do not agree that certain valve seals should not have the replacement interval extended. We did not approve the extension of the replacement interval of the seals based on similarity with another type of valve. We based that approval on the manufacturer's recommended seal change interval and on the successful operating experience with an extended interval for the seal change. No change is necessary to the final rule in this regard.

Request To Require Both a Vacuum Break Check Valve and a Lever Lock Cap

Two commenters request that the FAA require both a vacuum break check valve and a lever lock cap on the lavatory fill/rinse line. One commenter states that a large portion of blue ice leakage propagates from the lavatory fill/rinse line and check valve designs are inherently vulnerable to this waste system environment. Also, a single vacuum breaker check valve provides no positive mechanical means of closure as required for all other critical leak path valves with the waste system.

We do not agree with the commenter's request. As we explained in the "Comments Received" section of the supplemental NPRM, we acknowledge that redundant systems generally provide a higher level of safety; however, in this case, the vacuum breaker provides redundancy to the check valve function. In the case of a check valve alone, the lever lock cap provides redundancy to the check valve. There are insufficient data to show which combination is more reliable. No change is necessary to the final rule in this regard.

Request To Revise Replacement Intervals of Certain Seals

Two commenters request that the seal replacement intervals specified in paragraphs (a)(1)(ii) and (b)(1)(ii) of the supplemental NPRM be revised from "Thereafter, repeat the replacement of the seals at intervals not to exceed 18 months or 6,000 flight hours, whichever occurs later" to read "Thereafter, repeat the replacement of the seals at intervals not to exceed 18 months." One commenter did not provide any justification for the requested change. The other commenter states that the seal in a ball-type or half-ball type valve (especially when used at the service panel) is subjected to significantly greater dynamic action than the seal in a flapper-type valve. The distance that the ball or half-ball drags across the seal subjects the seal to considerably more wear than that experienced by an o-ring seal in a flapper-type valve as it moves from a sealed to an unsealed position. Also, the plastic seals used in the ball or half-ball type valves are much less forgiving and less compressible than elastomer-type seals used in flapper-type valves and thus are more susceptible to being damaged by foreign objects and allowing leakage. The potential for ice, hardened debris, and black tar buildup on the ball at the service panel makes the seals much more susceptible to damage as the ball is dragged across the seals. The commenter concludes that the location of the service panel valve relative to the in-line valve makes damage more susceptible to the seals or mating surfaces as a result of service and maintenance processes.

We do not agree with the commenters' request. The proposed replacement intervals for those seals specified in the supplemental NPRM were based on the manufacturer's recommended seal change interval and on successful operational experience with a longer seal change interval. We

consider that, if leakage does occur before the specified replacement interval, the requirement to repair any leaks or placard the lavatory inoperative before further flight will ensure that the valve does not continue to leak. No change is necessary to the final rule in this regard.

Request To Require the Same Proof for Approval

One commenter requests that other valve suppliers be required to complete the same or similar number of flight test hours as the PneuDraulics valve before extended leak test intervals are granted, and that credit for similarity be disallowed. The commenter states that the 25,000 flight hours and use of similarity to approve extended leak check intervals for valves as proposed in Notes 9 and 11 of the supplemental NPRM are inadequate. The commenter states that the FAA required it to complete 13 million flight hours over a 3-year period before an extension to 4,000 flight hours was considered. The commenter asserts that other applicants for extended leak test intervals should be required to have a similar service history, and that service history should be based upon in-flight experience with the exact design in the exact location of use. The commenter states that the FAA cannot act as a judge of equality in the marketplace, and that it must maintain its role of acting in the best interest of airline passenger safety. The commenter recommends that the FAA judge engineering data equally and fairly, and that all requests for approval of an extended leak test extension be determined by the same set of criteria.

We do not agree that "credit" for similarity should be disallowed. We have allowed use of similarity for partial credit in lieu of service experience, but a considerable amount of successful service history was required before an extended interval was approved. In granting such approvals, we primarily consider service history obtained by operators using a program to gather data similar to that outlined in paragraph (b) of the supplemental NPRM. For instance in the case of a certain valve, operators reported approximately 936,000 flight hours and one leak. In another case, operators reported approximately 848,000 flight hours and 2 leaks. In a third case, operators reported approximately 480,000 flight hours and no leaks, plus similarity to another valve manufactured by the same company. These data indicate that any of these valves can be effective in service. The requirement to repair any leak or placard the lavatory inoperative before further flight is intended to motivate operators to select and maintain the most reliable valves in order to avoid leaking. No change is necessary to the final rule in this regard.

Request To Reduce Time of the Leak Test

One commenter requests that the duration of the five-minute leak test be reduced to one minute for the leak tests that are performed with a vacuum leak check tool. The commenter states that any leak path will be readily detected within one minute when a three pounds per square inch differential pressure is generated. If the pressure gauge remains stationary, the inner seal is leak-tight.

We do not agree with the commenter's request. The commenter did not provide any data to substantiate that a one-minute leak test is as sensitive to low leakage rates as a five-minute leak test. No change is necessary to the final rule in this regard. However, under the provisions of paragraph (h) of the final rule, the FAA may approve requests for alternative method of compliance (AMOC) if data are submitted to substantiate that such an AMOC would provide an acceptable level of safety.

Request To Revise the Economic Impact Section

One commenter requests that the FAA add information to the Economic Impact section to advise operators that the leak check tool (the hand-held vacuum pump) provides a more economic method of performing the leak test. The commenter states that without the leak check tool, the engine or auxiliary power unit (APU) must be started and the leak test will take four work hours for each

lavatory drain valve. The commenter points out that, with the leak check tool, there is no need to power up the airplane and the leak test takes only five or 10 minutes to perform for each lavatory drain.

We do agree that it is necessary to add the additional information concerning the costs of performing a leak test with the leak check tool. As explained in the Economic Impact section of the supplemental NPRM and in this final rule, the costs discussed are estimates based on the fact that certain airplanes may be required to be leak tested as many as 15 times each year, while certain other valve configurations may be required to be leak tested as few as three times each year. Additionally, some airplanes that have various combinations of drain valves installed would require approximately two leak tests of one drain valve and three leak tests of the other drain valve each year. Because of the varied costs that may be incurred by different operators, we have provided estimated costs of the leak tests that range from between $1,170 and $5,850 per airplane per year. No change is necessary to the final rule in this regard.

Request To Limit Leak Test Extensions Specified in Paragraph (b)

The commenter states that, in the recent past, the FAA provided rationale for not granting an across-the-board leak check extension for a manufacturer when the FAA stated that, "it recognizes that varying aspects of each airlines operational environment and the human factors associated with maintenance procedures means that equal results for all airlines would not necessarily result." Therefore, the commenter states that the FAA encouraged operators who had proven and effective maintenance programs to individually obtain approval for increased leak check intervals. The commenter agrees with that approach and requests that any extensions of the leak test intervals specified in paragraph (b) of the supplemental NPRM be granted only on an airline-by-airline basis, rather than across-the-board leak check extensions for certain service panel valves.

We do not agree with the commenter's request. Since the time that we granted extension of leak test intervals on an operator-by-operator basis, sufficient data has been submitted to justify the conclusion that certain service panel valves, if properly maintained, can perform satisfactorily under different operating conditions and maintenance programs. Further, to ensure that leakage does not become a problem in conditions that may not be foreseen, the requirement to repair any leak or to placard the lavatory inoperative before further flight should ensure the operational safety of the fleet. No change to the final rule is necessary in this regard.

Conclusion

After careful review of the available data, including the comments noted above, the FAA has determined that air safety and the public interest require the adoption of the rule with the changes previously described. The FAA has determined that these changes will neither increase the economic burden on any operator nor increase the scope of the AD.

Changes to 14 CFR Part 39/Effect on the AD

On July 10, 2002, the FAA issued a new version of 14 CFR part 39 (67 FR 47997, July 22, 2002), which governs the FAA's airworthiness directives system. The regulation now includes material that relates to altered products, special flight permits, and alternative methods of compliance. However, for clarity and consistency in this final rule, we have retained the language of the supplemental NPRM regarding that material.

Change to Labor Rate Increase

After the supplemental NPRM was issued, we reviewed the figures we use to calculate the labor rate to do the required actions. To account for various inflationary costs in the airline industry, we find it appropriate to increase the labor rate used in these calculations from $60 per work hour to $65 per work hour. The economic impact information, below, has been revised to reflect this increase in the specified hourly labor rate.

Cost Impact

There are approximately 2,410 Model 737 series airplanes of the affected design in the worldwide fleet. The FAA estimates that 1,031 airplanes of U.S. registry and 110 U.S. operators will be affected by this AD.

The required waste drain system leak test and outer cap inspection will take approximately 6 work hours per airplane to accomplish, at an average labor rate of $65 per work hour. Based on these figures, the cost impact on U.S. operators of these requirements of this AD is estimated to be $402,090, or $390 per airplane, per test/inspection.

Certain airplanes (i.e., those that have "donut" type drain valves installed) may be required to be leak tested as many as 15 times each year. Certain other airplanes having other valve configurations will be required to be leak tested as few as 3 times each year. Some airplanes that have various combinations of drain valves installed will require approximately 2 leak tests of 1 drain valve and 3 leak tests of the other drain valve each year. Based on these figures, the annual (recurring) cost impact of the required repetitive leak tests on U.S. operators is estimated to be between $1,170 and $5,850, per airplane per year.

With regard to replacement of "donut" type drain valves, the cost of a new valve is approximately $1,200. However, the number of leak tests for an airplane that is flown an average of 3,000 flight hours a year is thereby reduced from 15 tests to 3 tests. The cost reduction because of the number of tests required is approximately equal to the cost of the replacement valve. Therefore, no additional cost is incurred because of this change.

We estimate that it will take approximately 1 work hour per airplane lavatory drain to accomplish a visual inspection of the service panel drain valve cap/door seal and seal mating surfaces, at an average labor cost of $65 per work hour. As with leak tests, certain airplanes will be required to be visually inspected as many as 15 times or as few as 3 times each year. Based on these figures, the annual (recurring) cost impact of the required repetitive visual inspections on U.S. operators is estimated to be between $195 and $975 per airplane, per year.

The required installation of the flush/fill line cap will take approximately 1 work hour per cap to accomplish, at an average labor rate of $65 per work hour. The cost of required parts will be $275 per cap. There is an average of 2.5 caps per airplane. Based on these figures, the cost impact on U.S. operators of these requirements of this AD is estimated to be $875,500, or $850 per airplane.

The addition of the seal change requirement to paragraph (a) of this AD will require approximately 2 work hours to accomplish, at an average labor cost of $65 per hour. The cost of required parts will be $200 per each seal change. Based on these figures, the cost impact on U.S. operators of these requirements of this AD is estimated to be $340,230, or approximately $330 per airplane per year.

The number of required work hours, as indicated above, is presented as if the accomplishment of the actions required in this AD were to be conducted as "stand alone" actions. However, in actual practice, these actions could be accomplished coincidentally or in combination with normally scheduled airplane inspections and other maintenance program tasks. Therefore, the actual number of necessary "additional" work hours will be minimal in many instances. Additionally, any costs associated with special airplane scheduling should be minimal.

In addition to the costs discussed above, for those operators who elect to comply with paragraph (d) of this AD, we estimate that it will take approximately 40 work hours per operator to incorporate the lavatory drain system leak test procedures into the maintenance programs, at an average labor cost of $65 per work hour. Based on these figures, the cost impact of the maintenance revision requirement of this AD action on the 110 U.S. operators is estimated to be $286,000, or $2,600 per operator.

The cost impact figures discussed above are based on assumptions that no operator has yet accomplished any of the requirements of this AD action, and that no operator would accomplish those actions in the future if this AD were not adopted. The cost impact figures discussed in AD rulemaking actions represent only the time necessary to perform the specific actions actually required by the AD. These figures typically do not include incidental costs, such as the time required to gain access and close up, planning time, or time necessitated by other administrative actions.

We recognize that the obligation to maintain aircraft in an airworthy condition is vital, but sometimes expensive. Because ADs require specific actions to address specific unsafe conditions, they appear to impose costs that would not otherwise be borne by operators. However, because of the general obligation of operators to maintain aircraft in an airworthy condition, this appearance is deceptive. Attributing those costs solely to the issuance of this AD is unrealistic because, in the interest of maintaining safe aircraft, prudent operators would accomplish the required actions even if they were not required to do so by the AD.

A full cost-benefit analysis has not been accomplished for this AD. As a matter of law, in order to be airworthy, an aircraft must conform to its type design and be in a condition for safe operation. The type design is approved only after the FAA makes a determination that it complies with all applicable airworthiness requirements. In adopting and maintaining those requirements, the FAA has already made the determination that they establish a level of safety that is cost-beneficial. When the FAA, as in this AD, makes a finding of an unsafe condition, this means that the original cost-beneficial level of safety is no longer being achieved and that the required actions are necessary to restore that level of safety. Because this level of safety has already been determined to be cost-beneficial, a full cost-benefit analysis for this AD would be redundant and unnecessary.

Regulatory Impact

The regulations adopted herein will not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government. Therefore, in accordance with Executive Order 12612, it is determined that this final rule does not have sufficient federalism implications to warrant the preparation of a Federalism Assessment.

For the reasons discussed above, I certify that this action (1) is not a "significant regulatory action" under Executive Order 12866; (2) is not a "significant rule" under DOT Regulatory Policies and Procedures (44 FR 11034, February 26, 1979); and (3) will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act. A final evaluation has been prepared for this action and it is contained in the Rules Docket. A copy of it may be obtained from the Rules Docket at the location provided under the caption ADDRESSES.

List of Subjects in 14 CFR Part 39

Air transportation, Aircraft, Aviation safety, Safety.

Adoption of the Amendment

Accordingly, pursuant to the authority delegated to me by the Administrator, the Federal Aviation Administration amends part 39 of the Federal Aviation Regulations (14 CFR part 39) as follows:

PART 39–AIRWORTHINESS DIRECTIVES

1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

§ 39.13 [Amended]

2. Section 39.13 is amended by removing amendment 39-6223 (54 FR 21933, May 22, 1989), and by adding a new airworthiness directive (AD), amendment 39-13544, to read as follows:

AIRWORTHINESS DIRECTIVE

Aircraft Certification Service
Washington, DC

U.S. Department
of Transportation
Federal Aviation
Administration

We post ADs on the internet at "www.faa.gov"

The following Airworthiness Directive issued by the Federal Aviation Administration in accordance with the provisions of Title 14 of the Code of Federal Regulations (14 CFR) part 39, applies to an aircraft model of which our records indicate you may be the registered owner. Airworthiness Directives affect aviation safety and are regulations which require immediate attention. You are cautioned that no person may operate an aircraft to which an Airworthiness Directive applies, except in accordance with the requirements of the Airworthiness Directive (reference 14 CFR part 39, subpart 39.3).

2004-06-18 Boeing: Amendment 39-13544. Docket 95-NM-111-AD. Supersedes AD 89-11-03, Amendment 39-6223.

Applicability: All Model 737-100, -200, -300, -400 and -500 series airplanes, certificated in any category.

Note 1: This AD applies to each airplane 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 airplanes 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 (h) 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: Required as indicated, unless accomplished previously.

To prevent engine damage, airframe damage, and/or hazard to persons or property on the ground as a result of "blue ice" that has formed from leakage of the lavatory drain system or flush/fill systems and dislodged from the airplane, accomplish the following:

Replacing Valve Seals and Performing Leak Tests

(a) Except as provided by paragraph (d) of this AD, accomplish the applicable requirements of paragraphs (a)(1) through (a)(6) of this AD at the time specified in each paragraph. If the waste drain system incorporates more than one type of valve, only one of the waste drain system leak test procedures (the one that applies to the equipment with the longest leak test interval) must be conducted at each service panel location. Except as provided in paragraphs (b) and (c) of this AD, the waste drain system valve leak tests specified in this AD shall be performed in accordance with the following requirements: fluid shall completely cover the upstream end of the valve being tested; the direction of the 3 pounds per square inch differential pressure (PSID) shall be applied across the valve in the same direction as occurs in flight; the other waste drain system valves shall be open; and the minimum time to maintain the differential pressure shall be 5 minutes.

(1) Replace the valve seals in accordance with the applicable schedule specified in paragraph (a)(1)(i), (a)(1)(ii), or (a)(1)(iii) of this AD. If an in-line drain valve as specified in paragraph (a)(1)(i) of this AD is installed in the same lavatory drain line as the valves specified per paragraph (a)(1)(ii) or (a)(1)(iii) of this AD, seal replacement for the valves specified in paragraph (a)(1)(ii) or (a)(1)(iii) of this AD may be performed at the seal replacement interval for the in-line drain valve.

Note 2: The seals and o-rings in the service panel drain valve that are to be replaced in accordance with paragraph (a)(1) or (d)(1) of this AD are the seals and o-rings that seal against the valve door, lid, cap, or ball, which is opened to allow flow through the service panel drain valve or in-line drain valve. The seals and o-rings in the lavatory flush/fill line valve or cap that are to be replaced in accordance with paragraph (a)(5) or (d)(3) of this AD are the seals and o-rings that seal against a surface and prevent backflow from the lavatory waste tank through the flush/fill line.

(i) For each lavatory drain system that has an in-line drain valve installed, Kaiser Electroprecision part number (P/N) series 2651-278 or service panel ball valve, Kaiser Electroprecision P/N series 2651-357: Replace the seals within 5,000 flight hours after the effective date of this AD, or within 48 months after the last documented seal change, whichever occurs later. Thereafter, repeat the replacement of the seals at intervals not to exceed 48 months.

(ii) For each lavatory drain system that has a Pneudraulics P/N series 9527 valve: Replace the seals within 5,000 flight hours after the effective date of this AD, or within 18 months of the last documented seal change, whichever occurs later. Thereafter, repeat the replacement of the seals at intervals not to exceed 18 months or 6,000 flight hours, whichever occurs later.

(iii) For each lavatory drain system that has any other type of drain valve: Replace the seals within 5,000 flight hours after the effective date of this AD, or within 18 months after the last documented seal change, whichever occurs later. Thereafter, repeat the replacement of the seals at intervals not to exceed 18 months.

(2) For each lavatory drain system that has an in-line drain valve installed having Kaiser Electroprecision P/N series 2651-278, or service panel drain valve installed having Kaiser Electroprecision P/N series 2651-357, or Pneudraulics P/N series 9527, or Shaw Aero valve having a P/N or serial number (S/N) as listed in Table 1 of this AD: Within 4,500 flight hours after the effective date of this AD, or within 4,500 hours after the last documented leak test, whichever occurs later, accomplish the procedures specified in paragraphs (a)(2)(i) and (a)(2)(ii) of this AD. Thereafter, repeat the procedures at intervals not to exceed 18 months or 4,500 flight hours, whichever occurs later.

(i) Conduct a leak test of the toilet tank dump valve (in-tank valve that is spring loaded closed and operable by a T-handle at the service panel) and the in-line drain valve (Kaiser Electroprecision P/N series 2651-278) or service panel drain valve (Kaiser Electroprecision P/N series 2651-357, or Pneudraulics P/N series 9527, or Shaw Aero valve having a P/N or serial number (S/N) as listed in Table 1 of this AD). The toilet tank dump valve leak test must be performed by filling the toilet tank with a minimum of 10 gallons of water/rinsing fluid and, after a period of 5 minutes, testing for leakage. Take precautions to avoid overfilling the tank and spilling fluid into the airplane. Except as provided by paragraphs (b) and (c) of this AD, the in-line drain valve or service panel drain valve leak test must be performed with a minimum of 3 PSID applied across the valve in the same direction as occurs in flight.

(ii) If a service panel valve or cap is installed, perform a general visual inspection of the service panel drain valve outer cap/door seal and the inner seal (if the valve has an inner door with a second positive seal), and the seal mating surfaces for wear or damage that may allow leakage.

Note 3: For the purposes of this AD, a general visual inspection is defined as: "A visual examination of an interior or exterior area, installation, or assembly to detect obvious damage, failure, or irregularity. This level of inspection is made from within touching distance unless otherwise specified. A mirror may be necessary to enhance visual access to all exposed surfaces in the inspection area. This level of inspection is made under normally available lighting conditions such as daylight, hangar lighting, flashlight, or droplight and may require removal or opening of access panels or doors. Stands, ladders, or platforms may be required to gain proximity to the area being checked."

TABLE 1.—SHAW AERO VALVES APPROVED FOR 4,500 FLIGHT HOUR LEAK TEST INTERVAL

Shaw waste drain valve part number	Serial numbers of part number valve approved for 4,500 flight hour leak test interval
331 Series	All.
10101000B–A–1	0207–0212, 0219, 0226 and higher.
10101000B–A–1	0001–0206, 0213–0218, and 0220–0225 that are marked ‘‘SBB38–1–58,’’ and that incorporate the improvements outlined in Shaw Service Bulletin 10101000B–38–1, dated October 7, 1994.
10101000BA2	0130 and higher.
10101000BA2	0001–0129 that are marked ‘‘SBB38–1–58,’’ and that incorporate the improvements outlined in Shaw Service Bulletin 10101000B–38–1, dated October 7, 1994.
10101000C–A–1	0277 and higher.
10101000C–A–1	0001–0276 that are marked ‘‘SBC38–2–58,’’ and that incorporate the improvements outlined in Shaw Service Bulletin 10101000C–38–2, dated October 7, 1994.
10101000CN OR 10101000C–N	3649 and higher.
10101000CN OR 10101000C–N	0001–3648 that is marked ‘‘SBC38–2–58,’’ and that incorporate the improvements outlined in Shaw Service Bulletin 10101000C–38–2, dated October 7, 1994.

(3) For each lavatory drain system with a lavatory drain system valve that incorporates either "donut" plug, Kaiser Electroprecision P/N 4259-20 or 4259-31; Kaiser Roylyn/Kaiser Electroprecision cap/flange P/N 2651-194C, 2651-197C, 2651-216, 2651-219, 2651-235, 2651-256, 2651-258, 2651-259, 2651-260, 2651-275, 2651-282, 2651-286; or other FAA-approved equivalent parts; accomplish the requirements at the specified times of paragraphs (a)(3)(i), (a)(3)(ii), and (a)(3)(iii) of this AD. For the purposes of paragraph (a)(3) of this AD, "equivalent part" means either a "donut" plug that mates with the cap/flange having part numbers listed in this paragraph, or a cap/flange that mates with the "donut" plug having part numbers listed in this paragraph, such that the cap/flange and "donut" plug are used together as an assembled valve.

(i) Within 200 flight hours after the effective date of this AD, and thereafter at intervals not to exceed 200 flight hours, conduct leak tests of the toilet tank dump valve and the service panel drain valve. The leak test of the toilet tank dump valve must be performed by filling the toilet tank with a minimum of 10 gallons of water/rinsing fluid and testing for leakage after a period of 5 minutes. Take precautions to avoid overfilling the tank and spilling fluid on the airplane. Except as provided by paragraphs (b) and (c) of this AD, the service panel drain valve leak test must be performed with a minimum 3 PSID applied across the valve in the same direction as occurs in flight.

(ii) Perform a general visual inspection of the outer door/cap and seal mating surface for wear or damage that may cause leakage. This inspection shall be accomplished in conjunction with the leak tests of paragraph (a)(3)(i) of this AD.

(iii) Within 5,000 flight hours after the effective date of this AD, replace the donut valve (part numbers per paragraph (a)(3) of this AD) with another type of FAA-approved valve. Following installation of the replacement valve, perform the appropriate leak tests and seal replacements at the intervals specified for that replacement valve, as applicable.

(4) For each lavatory drain system not addressed in paragraph (a)(2) or (a)(3) of this AD: Within 1,000 flight hours or 6 months after the effective date of this AD, whichever occurs later, accomplish the actions specified in paragraphs (a)(4)(i) and (a)(4)(ii) of this AD. Thereafter, repeat those actions at intervals not to exceed 1,000 flight hours or 6 months, whichever occurs later.

(i) Conduct a leak test of the toilet tank dump valve and the service panel drain valve. The toilet tank dump valve leak test must be performed by filling the toilet tank with a minimum of 10 gallons of water/rinsing fluid and, after a period of 5 minutes, testing for leakage. Take precautions to avoid overfilling the tank and spilling fluid on the airplane. Except as provided by paragraphs (b) and (c) of this AD, the service panel drain valve leak test must be performed with a minimum of 3 PSID applied across the valve inner door/closure device.

(ii) Perform a general visual inspection of the outer cap/door and seal mating surface for wear or damage that may cause leakage.

(5) For flush/fill lines: Within 5,000 flight hours after the effective date of this AD, perform the requirements of paragraph (a)(5)(i), (a)(5)(ii), (a)(5)(iii), or (a)(5)(iv) of this AD, as applicable. Thereafter, repeat the requirements at intervals not to exceed 5,000 flight hours, or 48 months after the last documented seal change, whichever occurs later. For airplanes that contain auxiliary waste tanks, the leak tests may be performed per one of the leak test procedures in paragraph (b) or (c) of this AD, or by using the leak test procedures without filling the toilet tank bowl half-full of fluid per the applicable airplane or component maintenance manual.

Note 4: The seals/o-rings in the service panel drain valve that are to be replaced in accordance with paragraph (a)(1) or (d)(1) of this AD are the seals/o-rings that seal against the valve door/lid/cap/ball, which is opened to allow flow through the service panel drain valve or in-line drain valve. The seals/o-rings in the lavatory flush/fill line valve or cap that are to be replaced per paragraph (a)(5) or (d)(3) of this AD are the seals/o-rings that seal against a surface and prevent backflow from the lavatory waste tank through the flush/fill line.

(i) If a lever lock cap is installed on the flush/fill line of the subject lavatory, replace the seals on the toilet tank anti-siphon (check) valve and the flush/fill line cap with new seals. Perform a leak test of the toilet tank anti-siphon (check) valve with a minimum of 3 PSID across the valve in the same direction as occurs in flight, in accordance with paragraph (a)(5)(ii)(A) of this AD, as applicable.

Note 5: The leak test procedure described in Boeing 737 Maintenance Manual, 38-32-00/501, may be referred to as guidance for this test if the toilet tank is filled to the level specified in paragraph (a)(5)(ii)(A) of this AD.

(ii) If a vacuum breaker check valve, Monogram P/N series 3765-190, or Shaw Aero Devises P/N series 301-000, or other FAA-approved vacuum break check valve is installed on the subject lavatory, replace the seals/o-rings in the valve. Perform a leak test of the vacuum breaker check valve and verify proper operation of the vent line vacuum breaker in accordance with paragraphs (a)(5)(ii)(A) and (a)(5)(ii)(B) of this AD.

(A) Leak test the toilet tank anti-siphon valve or the vacuum breaker check valve by filling the toilet tank with water/rinsing fluid to a level such that the bowl is approximately half full (at least 2 inches above the flapper in the bowl.) Apply 3 PSID across the valve in the same direction as occurs in flight. The vent line vacuum breaker on vacuum breaker check valves must be pinched closed or plugged for this leak test. If there is a cap/valve at the flush/fill line port, the cap/valve must be removed/open during the test. Check for leakage at the flush/fill line port for a period of 5 minutes.

(B) Verify proper operation of the vent line vacuum breaker by filling the tank and testing at the fill line port for back drainage after disconnecting the fluid source from the flush/fill line port. If back drainage does not occur, replace the vent line vacuum breaker or repair the vacuum breaker check valve in accordance with the component maintenance manual to obtain proper back drainage. As an alternative to the above test technique, verify proper operation of the vent line vacuum breaker in accordance with the procedures of the applicable component maintenance manual.

(iii) If a flush/fill ball valve, Kaiser Electroprecision P/N series 0062-0009 is installed on the flush/fill line of the subject lavatory, replace the seals in the flush/fill ball valve and the toilet tank anti-siphon valve with new seals. Perform a leak test of the toilet tank anti-siphon valve with a minimum of 3 PSID across the valve in the same direction as occurs in flight, in accordance with paragraph (a)(5)(ii)(A) of this AD.

(iv) If an FAA-approved shut-off valve that uses a mechanical or electrical devise to prevent overfilling of the toilet tank is installed, replace the seals/o-rings in the shut-off valve. Perform the leak test of the shut-off valve per the applicable airplane or component maintenance manual, or per the procedures specified in paragraph (b) or (c) of this AD.

(6) As a result of the leak tests and inspections required by paragraph (a) of this AD, or if evidence of leakage is found at any other time, accomplish the requirements of paragraph (a)(6)(i), (a)(6)(ii), or (a)(6)(iii), as applicable.

(i) If a leak is discovered, prior to further flight, repair the leak. Prior to further flight after repair, perform the appropriate leak test, as applicable. Additionally, prior to returning the airplane to service, clean the surfaces adjacent to where the leakage occurred to clear them of any horizontal fluid residue streaks; such cleaning must be to the extent that any future appearance of a horizontal fluid residue streak will be taken to mean that the system is leaking again.

Note 6: For purposes of this AD, "leakage" is defined as any visible leakage, if observed during a leak test. At any other time (than during a leak test), "leakage" is defined as the presence of ice in the service panel, or horizontal fluid residue streaks/ice trails originating at the service panel. The fluid residue is usually, but not necessarily, blue in color.

(ii) If any worn or damaged seal is found, or if any damaged seal mating surface is found, prior to further flight, repair or replace it with a new seal, in accordance with the valve manufacturer's maintenance manual.

(iii) In lieu of performing the requirements of paragraph (a)(6)(i) or (a)(6)(ii) of this AD: Before further fight, drain the affected lavatory system and placard the lavatory inoperative until repairs can be accomplished.

One Alternative to Accomplishing Test Procedures

(b) As an alternative to the test procedures for service panel drain valves and in-line drain valves specified in paragraph (a) or (d) of this AD, and flush/fill line valves as specified in paragraph (a)(5) or (d)(3) of this AD, a vacuum leak test may be done in accordance with "Shaw Aero Devices Document ILS-193C (Operation Instructions for the Waste Drain Valve Inner Flapper and Lavatory Rinse/Fill Valve Leak Test Tool), Revision C, dated July 1999. The tests shall be conducted with a minimum of 3 PSI differential pressures across the valve seal being tested in the same direction as occurs in flight. The duration of the test shall be 5 minutes. The test may be conducted with fluid completely covering the seal to be tested and checked for fluid leakage, or by subjecting the seal to a vacuum without fluid present, and checking for loss of vacuum. Any movement of the vacuum gauge needle indicates loss of vacuum and constitutes failure of the test. Failure of the test also occurs if fluid is behind the valve being tested and any leakage of fluid past the valve occurs during the test. Operators should note that the test rig may not work for all valve types. Confirm compatibility of the test rig to the valve by verifying compatibility with the manufacturer(s) of the test rig and valve. Other leak test tools may be used for this test if approved per paragraph (h) of this AD.

Another Alternative to Accomplishing Test Procedures

(c) As an alternative to the test procedures for service panel drain valves and in-line drain valves specified in paragraph (a) or (d) of this AD, and flush/fill line valves as specified in paragraph (a)(6) or (d)(3) of this AD, a vacuum test may be done in accordance with "Operating Instructions for Lavatory Waste Drain Valve and Flush/Fill Valve Leak Test Tool," AAXICO Industries, Ltd., Document AI 18, Issue 4, dated January 2002. The test shall be conducted with a minimum of 3 PSI differential pressures across the valve seal being tested in the same direction as occurs in flight. The duration of the tests shall be 5 minutes. The test may be conducted with fluid completely covering the seal to be tested and checked for fluid leakage, or by subjecting the seal to a vacuum without fluid present, and checking for loss of vacuum. Any movement of the vacuum gauge needle indicates loss of vacuum and constitutes failure of the test. Failure of the test also occurs if fluid is behind the valve being tested and any leakage of fluid past the valve occurs during the test. Operators should note that the test rig might not work for all valve types. Confirm compatibility of the test rig to the valve by verifying compatibility with the manufacturer(s) of the test rig and valve. Other leak test tools may be used for this test if approved per paragraph (h) of this AD.

Revising the FAA-Approved Maintenance Program

(d) As an alternative to the requirements of paragraph (a) of this AD, operators may revise the FAA-approved maintenance program to include the requirements specified in paragraphs (d), (f), and (g) of this AD, which constitutes terminating action for the AD. However, until the FAA-approved maintenance program is revised, operators must accomplish the requirements of paragraph (a) of this AD. If the waste drain system incorporates more than one type of valve, only one of the waste drain system leak test procedures (the one that applies to the equipment with the longest leak test interval) must be conducted at each service panel location. The waste drain system valve leak tests specified in paragraphs (a) and (d) of this AD shall be performed in accordance with the following requirements: Fluid shall completely cover the upstream end of the valve being tested unless a vacuum test is being performed in accordance with paragraph (b) or (c) of this AD; the direction of the 3 PSID shall be applied across the valve in the same direction as occurs in flight; the other waste drain system valves shall be open; and the minimum time to maintain the differential pressure shall be 5 minutes. A differential pressure greater than 3 psi may be used if specified by procedures referenced in paragraph (b) or (c) of this AD.

(1) Replace the valve seals in accordance with the applicable schedule specified in paragraph (d)(1)(i), (d)(1)(ii), or (d)(1)(iii) of this AD. If an in-line drain valve as specified in paragraph (d)(1)(i) of this AD is installed in the same lavatory drain line as the valves specified in paragraph (d)(1)(ii) or paragraph (d)(1)(iii) of this AD, seal replacement for the valves specified in paragraphs (d)(1)(ii) and (d)(1)(iii) of this AD may be performed at the seal replacement interval for the in-line drain valve. (See Note 2 of this AD.)

(i) For each lavatory drain system that has an in-line drain valve installed, Kaiser Electroprecision P/N series 2651-278 or service panel ball valve installed, Kaiser Electroprecision P/N series 2651-357: Replace the seals within 5,000 flight hours after the effective date of this AD, or within 48 months of the last documented seal change, whichever occurs later. Thereafter, repeat the replacement of the seals at intervals not to exceed 48 months.

(ii) For each lavatory drain system that has a Pneudraulics P/N series 9527 valve: Replace the seals within 5,000 flight hours after the effective date of this AD, or within 18 months of the last documented seal change, whichever occurs later. Thereafter, repeat the replacement of the seals at intervals not to exceed 18 months or 6,000 flight hours, whichever occurs later.

(iii) For each lavatory drain system that has any other type of drain valve: Replace the seals within 5,000 flight hours after the effective date of this AD, or within 18 months of the last documented seal change, whichever occurs later. Thereafter, repeat the replacement of the seals at intervals not to exceed 18 months.

(2) Conduct periodic leak tests of the lavatory drain systems in accordance with the applicable schedule specified in paragraph (d)(2)(i), (d)(2)(ii), or (d)(2)(iii) of this AD. Only one of the waste drain system leak test procedures (the one that applies to the equipment with the longest leak test interval) must be conducted at each service panel location.

(i) For each lavatory drain system that has an in-line drain valve installed having Kaiser Electroprecision P/N series 2651-278; service panel drain valve installed having Kaiser Electroprecision P/N series 2651-357; Pneudraulics part number series 9527; or Shaw Aero P/N/S/N as listed in Table 1 of this AD: Within 5,000 flight hours after the effective date of this AD, or within 5,000 hours of the last documented leak test, whichever occurs later, accomplish the procedures specified in paragraphs (d)(2)(i)(A) and (d)(2)(i)(B) of this AD. Thereafter repeat the procedures at intervals not to exceed 18 months or 5,000 flight hours, whichever occurs later.

(A) Conduct a leak test of the toilet tank dump valve (in-tank valve that is spring loaded closed and operable by a T-handle at the service panel) and the in-line drain valve (Kaiser Electroprecision P/N series 2651-278) or the service panel drain valve (Kaiser Electroprecision P/N series 2651-357, Pneudraulics part number series 9527, or Shaw Aero Part Number/Serial Number as listed in Table 1 of this AD). The leak test of the toilet tank dump valve must be performed by filling the toilet tank with a minimum of 10 gallons of water/rinsing fluid and testing for leakage after a period of 5 minutes. Take precautions to avoid overfilling the tank and spilling fluid on the airplane. Except as provided by paragraphs (b) and (c) of this AD, the in-line drain valve or service panel drain valve leak test must be performed with a minimum of 3 PSID applied across the valve in the same direction as occurs in flight.

(B) If a service panel valve or cap is installed, perform a general visual inspection of the service panel drain valve outer cap/door seal and the inner seal (if the valve has an inner door with a second positive seal), and the seal mating surfaces, for wear or damage that may allow leakage.

(ii) For each lavatory drain system with a lavatory drain system valve that incorporates either "donut" plugs Kaiser Electroprecision P/N 4259-20 or 4259-31; Kaiser Roylyn/Kaiser Electroprecision cap/flange part number 2651-194C, 2651-197C, 2651-216, 2651-219, 2651-235, 2651-256, 2651-258, 2651-259, 2651-260, 2651-275, 2651-282, 2651-286; or other FAA-approved equivalent part; accomplish the requirements at the times specified in paragraphs (d)(2)(ii)(A), (d)(2)(ii)(B), and (d)(2)(ii)(C) of this AD. For the purposes of this paragraph, (d)(2)(ii), "FAA-approved equivalent part" means either a "donut" plug that mates with the cap/flange having P/Ns listed in this paragraph, or a cap/flange that mates with the "donut" plug having P/Ns listed in this paragraph, such that the cap/flange and "donut" plug are used together as an assembled valve.

(A) Within 200 flight hours after the effective date of this AD, or within 200 flight hours after the last documented leak test, whichever occurs later, conduct leak tests of the toilet tank dump valve and the service panel drain valve. Thereafter, repeat the tests at intervals not to exceed 200 flight hours. The toilet tank dump valve leak test must be performed by filling the toilet tank with a minimum of 10 gallons of water/rinsing fluid and, after a period of 5 minutes, testing for leakage. Take precautions to avoid overfilling the tank and spilling fluid on the airplane. Except as provided in paragraphs (b) and (c) of this AD, the service panel drain valve leak test must be performed with a minimum of 3 PSI differential applied across the valve in the same direction as occurs in flight.

(B) Perform a visual inspection of the outer door/cap and seal mating surface for wear or damage that may cause leakage. Perform this inspection in conjunction with the leak tests specified in paragraph (d)(2)(ii)(A).

(C) Within 5,000 flight hours after the effective date of this AD, replace the donut valve with another type of FAA-approved valve. Following replacement of the valve, perform the subsequent leak tests and seal replacements at the intervals specified for the new valve.

(iii) For each lavatory drain system that incorporates any other type of approved valves: Within 1,000 flight hours after the effective date of this AD, or within 1,000 flight hours of the last documented leak test, whichever occurs later, accomplish the requirements of paragraphs (d)(2)(iii)(A) and (d)(2)(iii)(B) of this AD. Thereafter, repeat the requirements at intervals not to exceed 1,000 flight hours.

(A) Conduct leak tests of the toilet tank dump valve and the service panel drain valve. The toilet tank dump valve leak test must be performed by filling the toilet tank with a minimum of 10 gallons of water/rinsing fluid and, after a period of 5 minutes, testing for leakage. Take precautions to avoid overfilling the tank and spilling fluid on the airplane. The service panel drain valve leak test must be performed with a minimum of 3 PSID applied across the valve in the same direction as occurs in flight. If the service panel drain valve has an inner door with a second positive seal, only the inner door must be tested.

(B) Perform a general visual inspection of the outer cap/door and seal mating surface for wear or damage that may cause leakage.

(3) For flush/fill lines: Within 5,000 flight hours after the effective date of this AD, perform the requirements of paragraph (d)(3)(i), (d)(3)(ii), (d)(3)(iii), or (d)(3)(iv), as applicable. Thereafter, repeat the requirements at intervals not to exceed 5,000 flight hours, or 48 months after the last documented seal change, whichever occurs later. For airplanes that contain auxiliary waste tanks, the leak tests may be performed per one of the leak test procedures in paragraph (b) or (c) of this AD, or by performing the leak test procedures without filling the toilet tank bowl half-full of fluid per the applicable airplane or component maintenance manual.

(i) If a lever lock cap is installed on the flush/fill line of the subject lavatory, replace the seals on the toilet tank anti-siphon (check) valve and the flush/fill line cap. Perform a leak test of the toilet tank anti-siphon (check) valve with a minimum of 3 PSID across the valve in the same direction as occurs in flight, as specified in paragraph (d)(3)(ii)(A) of this AD.

(ii) If a vacuum breaker check valve having Monogram P/N series 3765-190; Shaw Aero Devices P/N series 301-0009-01; or other FAA-approved vacuum breaker check valve is installed on the subject lavatory; replace the seals/o-rings in the valve. Prior to further flight, leak test the vacuum breaker check valve, and test for proper operation of the vent line vacuum breaker as specified in paragraphs (d)(3)(ii)(A) and (d)(3)(ii)(B) of this AD.

(A) Leak test the toilet tank anti-siphon valve or the vacuum breaker check valve by filling the toilet tank with water/rinsing fluid to a level such that the bowl is approximately half full (at least 2 inches above the flapper in the bowl). Except as provided in paragraphs (b) and (c) of this AD, apply 3 PSID across the valve in the same direction as occurs in flight. The vent line vacuum breaker on vacuum breaker check valves must be pinched closed or plugged for this leak test. If there is a cap/valve at the flush/fill line port, the cap/valve must be removed/opened during the test. Test for leakage at the flush/fill line port for a period of 5 minutes.

Note 7: The leak test procedure in the appropriate section of Boeing 737 Maintenance Manual 38-32-00 may be used as guidance for this test if the toilet tank is filled approximately half full (at least 2 inches above the flapper in the bowl).

(B) Verify proper operation of the vent line vacuum breaker by filling the tank and testing at the fill line port for back drainage after disconnecting the fluid source from the flush/fill line port. If back drainage does not occur, replace the vent line vacuum breaker or repair the vacuum breaker check valve in accordance with the component maintenance manual as required to obtain proper back drainage.

(iii) If a flush/fill ball valve, Kaiser Electroprecision P/N series 0062-009 is installed on the flush/fill line of the subject lavatory, replace the seals in the flush/fill ball valve and the toilet tank anti-siphon valve. Perform a leak test of the toilet tank anti-siphon valve in accordance with paragraph (d)(3)(ii)(A) of this AD.

(iv) If an FAA-approved shut-off valve that uses a mechanical or electrical device to prevent overfilling the toilet tank is installed, replace the seals/o-rings in the shut-off valve. Perform a leak test of the shut-off valve per the applicable airplane or component maintenance manual, or per the procedures specified in paragraph (b) or (c) of this AD.

(4) Provide procedures for accomplishing visual inspections to detect leakage, to be conducted by maintenance personnel at intervals not to exceed 4 calendar days or 45 flight hours, which ever occurs later.

(5) Provide procedures for reporting leakage. These procedures shall provide that any "horizontal blue streak" findings must be reported to maintenance and that, prior to further flight, the leaking system shall either be repaired, or be drained and placarded inoperative.

(6) Provide training programs for maintenance and servicing personnel that include information on "blue ice awareness" and the hazards of "blue ice."

(7) If a leak is discovered during a leak test required by paragraph (d) of this AD; or if evidence of leakage is found at any other time; or if repair/replacement of a valve (or valve parts) is required as a result of a visual inspection required in accordance with this AD; prior to further flight, accomplish the requirements of paragraph (d)(7)(i), (d)(7)(ii), or (d)(7)(iii) of this AD, as applicable.

Note 8: For purposes of this AD, "leakage" is defined as any visible leakage, if observed during a leak test. At any other time (than during a leak test), "leakage" is defined as the presence of ice in the service panel, or horizontal fluid residue streaks/ice trails originating at the service panel. The fluid residue is usually, but not necessarily, blue in color.

(i) Repair the leak and, prior to further flight after repair, perform a leak test. Additionally, prior to returning the airplane to service, clean the surfaces adjacent to where the leakage occurred to clear them of any horizontal fluid residue streaks; such cleaning must be to the extent that any future appearance of a horizontal fluid residue streak will be taken to mean that the system is leaking again.

(ii) Repair or replace the valve or valve parts.

(iii) In lieu of either paragraph (d)(7)(i) or (d)(7)(ii), drain the affected lavatory system and placard the lavatory inoperative until repairs can be accomplished.

Requesting Extension of Leak Test Intervals

(e) Requests for extensions of the leak test intervals required by paragraph (a) or (d) of this AD must be approved by the Manager, Seattle Aircraft Certification (ACO), FAA. Requests for such revisions must be submitted to the Manager of the Seattle ACO through the FAA Principal Maintenance Inspector (PMI), and must include the following information:

(1) The operator's name;

(2) A statement verifying that all known cases/indications of leakage or failed leak tests are included in the submitted material;

(3) The type of valve (make, model, manufacturer, vendor part number, and serial number);

(4) The period of time covered by the data;

(5) The current FAA leak test interval;

(6) Whether or not seals have been replaced between the seal replacement intervals required by this AD;

(7) Whether or not a service panel drain valve is installed downstream of an in-line drain valve, Kaiser Electroprecision P/N series 2651-278: Data on a service panel valve installed downstream of an in-line drain valve will not be considered as an indicator of the reliability of the service panel drain valve because the in-line valve prevents potential leakage from reaching the service panel drain valve.

(8) Whether or not leakage has been detected between leak test intervals required by this AD, and the reason for leakage (i.e., worn seals, foreign materials on sealing surface, scratched or damaged sealing surface on valve, etc.); and

(9) Whether or not any cleaning, repairs, or seal changes were performed on the valve prior to conducting the leak test. (If such activities have been accomplished prior to conducting the periodic leak test, that leak test shall be recorded as a "failure" for purposes of the data required for this

request submission. The exception to this is the normally-scheduled seal change in accordance with paragraph (a)(1) and (d)(1) of this AD. Performing this scheduled seal change prior to a leak test will not cause that leak test to be recorded as a failure. Debris removal of major blockages done as part of normal maintenance for previous flights is also allowable and will not cause a leak test to be recorded as a failure. Minor debris removal that is not commonly removed during the normal ground maintenance test should not be removed prior to the leak test).

Note 9: Requests for approval of revised leak test intervals may be submitted in any format, provided the data give the same level of assurance specified in paragraph (e) of this AD. Results of an Environmental Quality Analysis (EQA) examination and leak test on a randomly selected high-flight-hour valve, with seals that have not been replaced during a period of use at least as long as the desired interval, may be considered a valuable supplement to the service history data, reducing the amount of service data that would otherwise be required.

Note 10: For the purposes of expediting resolution of requests for revisions to the leak test intervals, the FAA suggests that the requester summarize the raw data; group the data gathered from different airplanes (of the same model) and drain systems with the same kind of valve; and provide a recommendation from pertinent industry group(s) and/or the manufacturer specifying an appropriate revised leak test interval.

Note 11: In cases where changes are made to a valve design approved for an extended leak test interval such that a new valve dash number or P/N is established for the valve, the FAA may not require extensive service history data to approve the new valve to the same leak test interval as the previous valve design. The FAA will consider similarity of design, the nature of the design changes, the nature and amount of testing, and like factors to determine the appropriate data requirements and leak test interval for a new or revised valve based upon an existing design.

Certain Installations

(f) For all airplanes: Unless already accomplished, within 5,000 flight hours after the effective date of this AD, perform the actions specified in paragraph (f)(1), (f)(2), (f)(3), or (f)(4) of this AD:

(1) Install an FAA-approved lever/lock cap on the flush/fill lines for all lavatories; or

(2) Install a vacuum break check valve having Monogram P/N series 3765-190, Shaw Aero Devises P/N series 301-0009, or other FAA-approved vacuum break check valve in the flush/fill lines for all lavatories; or

(3) Install a flush/fill ball valve Kaiser Electroprecision P/N series 0062-0009 on the flush/fill lines for all lavatories; or

(4) Install an FAA-approved shut-off valve that uses a mechanical or electrical device on the flush/fill lines for all lavatories to prevent overfilling the toilet tank.

For Airplanes Acquired After the Effective Date of This AD

(g) For any affected airplane acquired after the effective date of this AD: Before any operator places into service any airplane subject to the requirements of this AD, a schedule for the accomplishment of the leak tests required by this AD shall be established in accordance with either paragraph (g)(1) or (g)(2) of this AD, as applicable. After each leak test has been performed once, each subsequent leak test must be performed in accordance with the new operator's schedule, in accordance with either paragraph (a) or (d) of this AD as applicable.

(1) For airplanes previously maintained in accordance with this AD, the first leak test to be performed by the new operator must be accomplished in accordance with the previous operator's schedule or with the new operator's schedule, whichever would result in the earlier accomplishment date for that leak test.

(2) For airplanes that have not been previously maintained in accordance with this AD, the first leak test to be performed by the new operator must be accomplished prior to further flight, or in accordance with a schedule approved by the FAA PMI, but within a period not to exceed 200 flight hours.

Alternative Method of Compliance

(h) Alternative method(s) of compliance with this AD:

(1) 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, Seattle ACO, FAA. Operators shall submit their requests through an appropriate FAA PMI, who may add comments and then send it to the Manager, Seattle ACO.

(2) All previously issued alternative methods of compliance approved for AD 89-11-03 (54 FR 21933, May 22, 1989) are hereby terminated as of the effective date of this AD and are no longer in effect.

Note 12: Information concerning the existence of approved alternative methods of compliance with this AD, if any, may be obtained from the Seattle ACO.

Note 13: For any valve that is not eligible for the extended leak test intervals of this AD: To be eligible for the extended leak test intervals specified in paragraph (a) or (d) of this AD, the service history data of the valve must be submitted to the Manager, Seattle ACO, with a request for an alternative method of compliance. The request should include an analysis of known failure modes for the valve, if it is an existing design, and known failure modes of similar valves, with an explanation of how design features will preclude these failure modes, results of qualification tests, and approximately 25,000 flight hours or 25,000 flight cycles of service history data which include a winter season, collected in accordance with the requirements of paragraph (e) of this AD, or a similar program. One of the factors that the FAA will consider in approving alternative valve designs is whether the valve meets Boeing Specification S417T105 or 10-62213. However, meeting the Boeing specification is not a prerequisite for approval of alternative valve designs.

Special Flight Permits

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

Effective Date of This AD

(j) This amendment becomes effective on April 29, 2004.

Issued in Renton, Washington, on March 19, 2004.
Kevin M. Mullin,
Acting Manager, Transport Airplane Directorate, Aircraft Certification Service.
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