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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 25

[Docket No. FAA-2019-0632; Special Conditions No. 25-762-SC]

**Special Conditions: The Boeing Company Model 747-8 Series Airplane;
Certification of Cooktops**

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final special conditions.

SUMMARY: These special conditions are issued for The Boeing Company (Boeing) Model 747-8 series airplane. This airplane, as modified by Boeing, will have a novel or unusual design feature when compared to the state of technology envisioned in the airworthiness standards for transport category airplanes. This design feature is associated with the installation of advanced technology induction coil cooktops in the main deck galleys on a Boeing Model 747-8 series airplane. The applicable airworthiness regulations do not contain adequate or appropriate safety standards for this design feature. These special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

DATES: Effective [INSERT DATE 30 DAYS AFTER PUBLICATION IN THE FEDERAL REGISTER].

FOR FURTHER INFORMATION CONTACT: Alan Sinclair, FAA, Airframe/Cabin Safety Branch, AIR-675, Transport Standards Branch, Policy and Innovation Division, Aircraft Certification Service, Federal Aviation Administration, 2200 South 216th Street,

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SUPPLEMENTARY INFORMATION:

Background

On July 2, 2018, Boeing applied for a supplemental type certificate for the modification of the Boeing Model 747-8 series airplane. The Boeing Model 747-8 currently approved under Type Certificate No. A20WE, is an extended range passenger version of the Boeing Model 747-400 series airplane with four General Electric engines having changes to increase its strength and fuel capacity.

The modification incorporates the installation of an electrically heated surface, called a cooktop. Cooktops introduce high heat, smoke, and the possibility of fire into the passenger cabin environment. These potential hazards to the airplane and its occupants must be satisfactorily addressed. Since existing airworthiness regulations do not contain safety standards addressing cooktops, special conditions are needed.

Type Certification Basis

Under the provisions of title 14, Code of Federal Regulations (14 CFR) 21.101, Boeing must show that the Model 747-8 series airplane, as changed, continues to meet the applicable provisions of the regulations listed in Type Certificate No. A20WE or the applicable regulations in effect on the date of application for the change, except for earlier amendments as agreed upon by the FAA.

If the Administrator finds that the applicable airworthiness regulations (e.g., 14 CFR part 25) do not contain adequate or appropriate safety standards for the

Boeing Model 747-8 airplane because of a novel or unusual design feature, special conditions are prescribed under the provisions of § 21.16.

Special conditions are initially applicable to the model for which they are issued. Should the applicant apply for a supplemental type certificate to modify any other model included on the same type certificate to incorporate the same novel or unusual design feature, these special conditions would also apply to the other model under § 21.101.

In addition to the applicable airworthiness regulations and special conditions, the Boeing Model 747-8 airplane must comply with the fuel vent and exhaust emission requirements of 14 CFR part 34 and the noise certification requirements of 14 CFR part 36.

The FAA issues special conditions, as defined in 14 CFR 11.19, in accordance with § 11.38, and they become part of the type certification basis under § 21.101.

Novel or Unusual Design Features

The modification of the Boeing Model 747-8 series airplane will incorporate a novel or unusual design feature, which is the installation of cooktops in the passenger cabin. Cooktops introduce high heat, smoke, and the possibility of fire into the passenger cabin environment. The current airworthiness standards of part 25 do not contain adequate or appropriate safety standards to protect the airplane and its occupants from these potential hazards.

Discussion

Currently, ovens are the prevailing means of heating food on airplanes. Ovens are characterized by an enclosure that contains both the heat source and the food being heated. The hazards represented by ovens are thus inherently limited, and are well

understood through years of service experience. Cooktops, on the other hand, are characterized by exposed heat sources and the presence of relatively unrestrained hot cookware and heated food, which may represent unprecedented hazards to both occupants and the airplane. Cooktops could have serious passenger and airplane safety implications if appropriate requirements are not established for their installation and use. These special conditions apply to cooktops with electrically powered burners. The use of an open flame cooktop (for example, natural gas) is beyond the scope of these special conditions and would require separate rulemaking action. The requirements identified in these special conditions are in addition to those considerations identified in Advisory Circular (AC) 20-168, *Certification Guidance for Installation of Non-Essential, Non-Required Aircraft Cabin Systems & Equipment (CS&E)*, dated July 22, 2010, and those in AC 25-17A, *Transport Airplane Cabin Interiors Crashworthiness Handbook*, Change 1, dated May 24, 2016. The intent of these special conditions is to provide a level of safety that is consistent with that on similar airplanes without cooktops.

The special conditions contain the additional safety standards that the Administrator considers necessary to establish a level of safety equivalent to that established by the existing airworthiness standards.

Discussion of Comments

The FAA issued Notice of Proposed Special Conditions No. 25-19-08-SC for the Boeing Model 747-8 series airplane, which was published in the *Federal Register* on August 20, 2019 (84 FR 43037). The FAA received responses from one commenter.

Boeing requested a revision of the text included in the Summary section of the preamble. The language the FAA used in the preamble of the notice special conditions

referred only to the replacement of an existing cooktop only. Boeing stated their proposed modification installs a complete system including cooktops, smoke detection, ventilation, and warnings. We concur with the request to revise the language and have done so in the preamble of these final special conditions.

Applicability

As discussed above, these special conditions are applicable to the Boeing 747-8 series airplane as modified by Boeing. Should Boeing apply at a later date for a supplemental type certificate to modify any other model included on Type Certificate No. A20WE to incorporate the same novel or unusual design feature, these special conditions would apply to that model as well.

Conclusion

This action affects only a certain novel or unusual design feature on the Boeing Model 747-8 series airplane. It is not a rule of general applicability and affects only the applicant who applied to the FAA for approval of these features on the airplane.

List of Subjects in 14 CFR Part 25

Aircraft, Aviation safety, Reporting and recordkeeping requirements.

Authority Citation

The authority citation for these special conditions is as follows:

Authority: 49 U.S.C. 106(f), 106(g), 40113, 44701, 44702, 44704.

The Special Conditions

Accordingly, pursuant to the authority delegated to me by the Administrator, the following special conditions are issued as part of the type certification basis for the Boeing Model 747-8 series airplane, as modified by The Boeing Company:

Cooktop Installations With Electrically-Powered Burner

1. Means, such as conspicuous burner-on indicators, physical barriers, or handholds, must be installed to minimize the potential for inadvertent personnel contact with hot surfaces of both the cooktop and cookware. Conditions of turbulence must be considered.
2. Sufficient design means must be included to restrain cookware while in place on the cooktop, as well as representative contents, e.g., soup, sauces, etc., from the effects of flight loads and turbulence. Restraints must be provided to preclude hazardous movement of cookware and contents. These restraints must accommodate any cookware that is identified for use with the cooktop. Restraints must be designed to be easily utilized and effective in service. The cookware restraint system should also be designed so that it will not be easily disabled, thus rendering it unusable. Placarding must be installed which prohibits the use of cookware that can not be accommodated by the restraint system.
3. Placarding must be installed which prohibits the use of cooktops (i.e., power on any burner) during taxi, takeoff, and landing.
4. One of the following options must be provided to address the possibility of a fire occurring on or in the immediate vicinity of the cooktop:
 - a. Placarding must be installed that prohibits any burner from being powered when the cooktop is unattended (Note: That this would prohibit a single person from cooking on the cooktop and intermittently serving food to passengers while any burner is powered). A fire detector must be installed in the vicinity of the cooktop, which provides an audible warning in the

passenger cabin, and a fire extinguisher of appropriate size and extinguishing agent must be installed in the immediate vicinity of the cooktop. Access to the extinguisher must not be blocked by a fire on or around the cooktop.

- b. An automatic, thermally activated fire suppression system must be installed to extinguish a fire at the cooktop and immediately adjacent surfaces. The agent used in the system must be an approved total flooding agent suitable for use in an occupied area. The fire suppression system must have a manual override. The automatic activation of the fire suppression system must also automatically shut off power to the cooktop.

- 5. The surfaces of the galley surrounding the cooktop, which could be exposed to a fire on the cooktop surface or in cookware on the cooktop must be constructed of materials that comply with the flammability requirements of Part III of Appendix F of part 25. This requirement is in addition to the flammability requirements typically required of the materials in these galley surfaces. During the selection of these materials, consideration must also be given to ensure that the flammability characteristics of the materials will not be adversely affected by the use of cleaning agents and utensils used to remove cooking stains.
- 6. The cooktop must be ventilated with a system independent of the airplane cabin and cargo ventilation system. Procedures and time intervals must be established to inspect and clean or replace the ventilation system to prevent a fire hazard from the accumulation of flammable oils and be included in the instructions for continued airworthiness. [Note: The applicant may find additional useful information in Society of Automotive Engineers, Aerospace Recommended

Practice 85, Rev. E, entitled “*Air Conditioning Systems for Subsonic Airplanes,*” dated August 1, 1991.]

7. Means must be provided to contain spilled foods or fluids in a manner that will prevent the creation of a slipping hazard to occupants and will not lead to the loss of structural strength due to corrosion.
8. Cooktop installations must provide adequate space for the user to immediately escape a hazardous cooktop condition.
9. A means to shut off power to the cooktop must be provided at the galley containing the cooktop and in the cockpit. If additional switches are introduced in the cockpit, revisions to smoke or fire emergency procedures of the AFM will be required.
10. If the cooktop is required to have a lid to enclose the cooktop, there must be a means to automatically shut off power to the cooktop when the lid is enclosed.

Issued in Des Moines, Washington, on January 23, 2020.

James E. Wilborn,
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Aircraft Certification Service.
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