

# Supplemental Type Certificate

*Number* SA4363NM

*This certificate, issued to* **Rohr, Inc.**  
**850 Lagoon Drive**  
**Chula Vista, CA 91910-2098**

*certifies that the change in the type design for the following product with the limitations and conditions therefor as specified hereon meets the airworthiness requirements of Part \* of the \* Regulations.*

\* See page 3 and 4 of this STC for the Certification Basis.

*Original Product—Type Certificate Number:* A3WE

*Make:* Boeing

*Model:* 727, 727-100, 727C, 727-100C, 727-200, and 727-200F

*Description of the Type Design Change:* Installation of Pratt and Whitney JT8D-217A, -217C, and -219 engines, related aircraft system changes in the pod engine positions, replacement of the center engine thrust reverser and related systems with an exhaust mixer, acoustically treated exhaust nozzle and fairing in accordance with FAA approved Rohr, Inc., Master Drawing Lists Document No. VA000001, Revision R, dated August 14, 1997, or later FAA approved revision, for Boeing Model 727-200 and 727-200F airplanes; and Rohr, Inc., Document No. VA000003, Revision J, dated August 13, 1997, or later FAA approved revision, for Model 727, 727-100, 727C, 727-100C airplanes.

*Limitations and Conditions:* Approval of this change in type design applies to the above model airplane only. This approval should not be extended to other aircraft of this model on which other previously approved modifications are incorporated unless it is determined by the installer, that the relationship between this change and any of these other previously approved modifications, including changes in type design, will introduce no adverse effects upon the airworthiness of that aircraft. A copy of this Certificate and the FAA approved Rohr, Inc., Master Drawing List Document, as defined above, must be maintained as part of the permanent records for the modified aircraft. If the holder agrees to permit another person to use this certificate to alter the product, the holder shall give the other person written evidence of that permission.

(See Continuation Sheet Pages 3, 4 and 5 for additional Limitations and Conditions)

*This certificate and the supporting data which is the basis for approval shall remain in effect until surrendered, suspended, revoked, or a termination date is otherwise established by the Administrator of the Federal Aviation Administration.*

*Date of application:* June 2, 1986

*Date reissued:* March 30, 1995; October 2, 1997

*Date of issuance:* October 13, 1988

*Date amended:* September 1, 1989; July 23, 1990



*By direction of the Administrator*

*Philip L. F.*

*For* (Signature)  
Acting Manager, Seattle  
Aircraft Certification Office

(Title)

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# Experimental Design

1. Introduction

2. Objectives

3. Methodology

4. Results and Discussion

The purpose of this experiment is to investigate the effect of temperature on the rate of reaction between hydrogen peroxide and potassium iodide. The reaction is catalyzed by the presence of a small amount of potassium iodide. The rate of reaction is measured by the volume of oxygen gas evolved over a period of time.

The reaction is carried out in a conical flask at different temperatures. The volume of oxygen gas evolved is measured by the displacement of water in a gas syringe. The rate of reaction is calculated from the volume of oxygen gas evolved per unit time.

The results show that the rate of reaction increases with increasing temperature. This is because the molecules have more kinetic energy and are therefore more likely to collide with sufficient energy to overcome the activation energy barrier.

The following table shows the results of the experiment. The rate of reaction is expressed as the volume of oxygen gas evolved per second.

Temperature (°C) | Volume of oxygen gas evolved (cm<sup>3</sup>) | Rate of reaction (cm<sup>3</sup>/s)

20 | 10 | 0.1

30 | 20 | 0.2

40 | 40 | 0.4

50 | 80 | 0.8

60 | 160 | 1.6

United States of America  
 Department of Transportation Federal Aviation Administration  
**Supplemental Type Certificate**  
 (Continuation Sheet)

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*Limitations and Conditions: (cont'd)*

The limitations and conditions of Type Certificate A3WE apply, except as outlined herein. For engine operating limitations, see Engine Type Certificate Data Sheet E2EA for the JT8D-7, -7A, -7B, JT8D-9, -9A, JT8D-15, -15A, JT8D-17, and -17A, and E9NE for the JT8D-217A, -217C, and -219, or the FAA approved AFM supplement.

I - Boeing 727, 727-100, 727C and 727-100C series as modified by this STC

Engines: Pod Locations - Two Pratt & Whitney JT8D-217A, -217C or -219  
 Center - Pratt & Whitney JT8D-7, -7A, -7B, JT8D-9, -9A, or JT8D-15, -15A

Engine Ratings:	<u>Pod Locations P&amp;W JT8D</u>	<u>-217A, -217C</u>	<u>-219</u>
	Takeoff (normal) static thrust, standard day, sea level conditions, (5 min.), pounds	20,000	21,000
	Maximum continuous static thrust, standard day, sea level conditions, pounds	18,000	18,900
	<u>Center P&amp;W JT8D</u>	<u>-7, -7A, -7B</u>	<u>-9, -9A, -15*, -15A*</u>
	Takeoff (normal) static thrust, standard day, sea level conditions, (5 min.), pounds	14,000	14,500
	Maximum continuous static thrust, standard day, sea level conditions, pounds	12,600	12,600

\* The JT8D-15/15A are limited to operation at the JT8D-9/9A engine thrust rating and operating limits, and optionally at the JT8D-9/9A thrust rating and the JT8D-15/15A gas generator operating limits (N1, N2 and EGT) provided cockpit instruments are marked accordingly.

**Certification**

**Basis:** For unmodified systems and structures, and the engine mounts, the certification basis is as shown on Type Certificate Data Sheet A3WE. For new or extensively modified systems and structures, the following additional rules apply:

Federal Aviation Regulation Part 25 - Airworthiness Standards: Transport Category Airplanes, effective 2-1-65, as amended by amendments 25-1 through 25-69, effective 10-30-89 except for amendment 25-63, Section 25.25, Weight Limits. All other FAR Part 25 amendments and related sections not listed are not applicable to the design change.

Federal Aviation Regulation Part 36 - Noise Standards: Aircraft Type and Airworthiness Certification, effective 12-1-69, as amended by amendments 36-1 through 36-17, effective 8-14-89.

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 (Continuation Sheet)

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*Limitations and Conditions: (cont'd)*

II - Boeing 727-200 and 727-200F series as modified by this STC

Engines: Pod Locations - Two Pratt & Whitney JT8D-217A, -217C or -219  
 Center - Pratt & Whitney JT8D-9, -9A, JT8D-15, -15A or JT8D-17, -17A

Engine Ratings:	<u>Pod Locations P&amp;W JT8D</u>	<u>-217A, -217C</u>	<u>-219</u>	
	Takeoff (normal) static thrust, standard day, sea level conditions, (5 min.), pounds	20,000	21,000	
	Maximum continuous static thrust, standard day, sea level conditions, pounds	18,000	18,900	
	<u>Center P&amp;W JT8D</u>	<u>-9, -9A</u>	<u>-15, -15A</u>	<u>-17, -17A</u>
	Takeoff (normal) static thrust, standard day, sea level conditions, (5 min.), pounds	14,500	15,500	16,000
	Maximum continuous static thrust, standard day, sea level conditions, pounds	12,600	13,750	15,200

Certification Basis:

For unmodified systems and structures, and the engine mounts, the certification basis is as shown on Type Certificate Data Sheet A3WE. For new or extensively modified systems and structures, the following additional rules apply:

- Amdt. 25-54, Sections 25.571, 25.1529, and Appendix H
- Amdt. 25-59, Sections 25.901(c), 25.934, 25.1305(c)(6), and 25.1305(c)(7)
- Amdt. 25-59, Section 25.903 in lieu of CAR 4b.401
- Amdt. 25-59, Section 25.933 in lieu of CAR 4b.407
- Amdt. 25-59, Section 25.939 in lieu of Propulsion Special Condition 1
- Amdt. 25-59, Section 25.943 in lieu of Propulsion Special Condition 7
- Amdt. 25-59, Section 25.955 in lieu of Propulsion Special Condition 3 and CAR 4b.413
- Amdt. 25-57, Section 25.961 in lieu of CAR 4b.417
- Amdt. 25-59, Section 25.997 in lieu of CAR 4b.435
- Part 36 of the Federal Aviation Regulations through Amdt. 36-15
- Special Federal Aviation Regulation 27

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Department of Health and Human Services  
Centers for Disease Control and Prevention  
(Institutional Review Board)

IRB # 10-001

Protocol Title: [Faint Title]

Principal Investigator: [Faint Name]

Site: [Faint Location]

IRB # 10-001

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Department of Transportation Federal Aviation Administration  
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*Limitations and Conditions: (cont'd)*

III - Data Applicable to All Models

- Note 1: The airplane must be operated in accordance with the FAA approved Airplane Flight Manual Supplement VA-CR120-X (applicable to Model 727-200 and 200F), or VA-CR220-X (applicable to Model 727, 727-100, 727C and 727-100C). Each FAA approved AFM supplement lists the applicable appendices and airplane serial numbers. All placards required in either the AFM supplement, the operating rules, or the certification basis must be installed in the airplane.
- Note 2: A current FAA approved Weight and Balance Manual Supplement VA-CR279-X (applicable to Model 727-200 and 200F), or VA-CR303-X (applicable to Model 727, 727-100, 727C and 727-100C), to the applicable Boeing Weight and Balance Manual, including a list of equipment included in the certificated empty weight and loading instructions, must be in each aircraft, except in the case of operators having an approved weight control system. The applicable Boeing Weight and Balance Manuals are D6-21100 for the Model 727, 727-100, 727C and 727-100C, D6-21200 for the Model 727-200, and D6-212300 for the Model 727-200F.
- Note 3: Required structural inspections for all models of the 727 modified in accordance with this STC are contained in VALSAN Report VA-CR257. Information essential to the proper maintenance of aircraft modified in accordance with this STC is contained in the VALSAN B727100RE and B727-200RE Maintenance Manual Supplements to the Boeing 727 maintenance manual. VALSAN B727RE Structural Repair Manual supplement to Boeing Report D6-4062 is FAA approved and is applicable to all Model 727 airplanes modified in accordance with this STC.
- Note 4: The designation for airplanes modified in accordance with this STC is B727RE, B727-100RE, B727-200RE. These model designations do not alter or replace the original Boeing 727, 727-100, 727C, 727-100C, 727-200, or 727-200F series model designation.
- Note 5: Pratt & Whitney fan and exhaust mixer systems, Duct Assembly P/N 805976-01, must be installed on each center engine in accordance with the applicable installation instructions.
- Note 6: Hamilton Standard Fuel Control Model JFC60-6-12 (Pratt & Whitney P/N 802730) is required for the JT8D-217C and -219 engines.

**Applicability of the Change in Status Under FAR Part 36**

It has been determined that the Boeing airplane model and engine combinations listed in Rohr Master Drawing Lists, Document No. VA000001 and No. VA000003, comply with Stage 3 noise limits.

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