



# ICBO Evaluation Service, Inc.

A subsidiary corporation of the International Conference of Building Officials

5360 WORKMAN MILL ROAD

• WHITTIER, CALIFORNIA 90601-2299

• (562) 699-0543  
FAX (562) 695-4694

## ACCEPTANCE CRITERIA FOR FORCED COMBUSTION-AIR SYSTEMS

AC153

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### PREFACE

Evaluation reports issued by ICBO Evaluation Service, Inc. (ICBO ES), are based upon performance features of the *Uniform Building Code*<sup>™</sup>, *ICBO Uniform Mechanical Code*<sup>™</sup> and related codes. Section 104.2.8 of the *Uniform Building Code* is the primary charging section upon which evaluation reports are issued. Section 104.2.8 reads as follows:

The provisions of this code are not intended to prevent the use of any material, alternate design or method of construction not specifically prescribed by this code, provided any alternate has been approved and its use authorized by the building official.

The building official may approve any such alternate, provided the building official finds that the proposed design is satisfactory and complies with the provisions of this code and that the material, method or work offered is, for the purpose intended, at least the equivalent of that prescribed in this code in suitability, strength, effectiveness, fire resistance, durability, safety and sanitation.

The building official shall require that sufficient evidence or proof be submitted to substantiate any claims that may be made regarding its use. The details of any action granting approval of an alternate shall be recorded and entered in the files of the code enforcement agency.

The attached acceptance criteria has been issued to provide all interested parties with guidelines on implementing performance features of the codes. The criteria was developed and adopted following public hearings conducted by the Evaluation Committee and is effective on the date shown above. All reports issued or reissued on or after the effective date must comply with this criteria, while reports issued prior to this date may be in compliance with this criteria or with the previous edition. If the criteria is an updated version from a previous edition, solid vertical lines (■) in the outer margin within the criteria indicate a technical change or addition from the previous edition. Deletion indicators (◆) are provided in the outer margins where a paragraph or item has been deleted if the deletion resulted from a technical change. This criteria may be further revised as the need dictates.

ICBO ES may consider alternate criteria, provided the proponent submits valid data demonstrating that the alternate criteria are at least equivalent to the attached criteria and otherwise meet the applicable performance requirements of the codes. Notwithstanding that a material, type or method of construction, or equipment, meets the attached acceptance criteria, or that it can be demonstrated that valid alternate criteria are equivalent and otherwise meet the applicable performance requirements of the codes, if the material, product, system or equipment is such that either unusual care in its installation or use must be exercised for satisfactory performance, or malfunctioning is apt to cause unreasonable property damage or personal injury or sickness relative to the benefits to be achieved by the use thereof, ICBO ES retains the right to refuse to issue or renew an evaluation report.

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# ACCEPTANCE CRITERIA FOR FORCED COMBUSTION–AIR SYSTEMS

## 1.0 INTRODUCTION

**1.1 Purpose:** The purpose of this acceptance criteria is to establish requirements for recognition, in ICBO Evaluation Service, Inc. (ICBO ES), evaluation reports, of forced-air systems that supply combustion air to spaces that contain fuel-burning appliances, under the 1997 ICBO *Uniform Mechanical Code*<sup>™</sup> (UMC), the 1998 *International Mechanical Code*<sup>®</sup> (IMC) and the 1998 *International One and Two Family Dwelling Code*<sup>™</sup> (IOTFDC).

**1.2 Scope:** The acceptance criteria is limited to systems supplying combustion air from the exterior to spaces that contain fuel-burning appliances.

### 1.3 Reference Documents:

- 1997 ICBO UMC.
- 1998 IMC.
- 1998 IOTFDC.
- UL 507, Electric Fans, 8<sup>th</sup> Edition, dated October 26, 1994, with revisions through December 3, 1998.
- CAN/CSA-B140.0-M87, General Requirements for Oil Burning Equipment.
- ANSI/AMCA 210-85 (ANSI/ASHRAE 51-1985), Laboratory Methods of Testing Fans for Rating.

## 2.0 BASIC INFORMATION AND REPORTS OF TESTS

**2.1 Product Description:** Description of the appliance, of its components and of the manufacturing process must be submitted.

**2.2 Installation Instructions:** Installation instructions must be submitted.

**2.3 Packaging and Identification:** Description of the method of packaging and identification of the system components must be submitted. The components must be labeled with the evaluation report number.

### 2.4 Testing Laboratories, Reports of Tests and Product Sampling:

**2.4.1** Testing laboratories must comply with the ICBO ES Acceptance Criteria for Laboratory Accreditation (AC89).

**2.4.2** Test reports must comply with the ICBO ES Acceptance Criteria for Test Reports and Product Sampling (AC85). All reports of tests must be prepared by an ICBO ES accredited independent testing laboratory.

**2.4.3** Test specimens must be sampled in accordance with the product sampling requirements of AC85.

## 3.0 REQUIRED DATA AND TEST REQUIREMENTS

**3.1 Required Data:** Data must be submitted to address the requirements noted in Sections 3.1.1 through 3.1.3.

**3.1.1** Sizing charts for the fan, at various typical static pressures, must be established in accordance with Section 3.2.2 of this criteria. Sample calculations must be submitted, when applicable. The combustion-air fan must provide combustion and dilution air at a minimum rate of 1 cfm per 2,400 Btu/h (0.00067 m<sup>3</sup>/s · kW) of the combined input rating of all the fuel-burning appliances served. Motors must

be sized to operate in a negative pressure environment of 0.02 inch of water column.

**3.1.2** Materials exposed to the exterior must be corrosion resistant in accordance with the code.

**3.1.3** Combustion-air ducts must:

- Be of galvanized steel complying with Chapter 6 of the IMC or UMC, or Chapter 19 of the IOTFDC, or be of equivalent corrosion-resistant material approved for this application.
- Terminate in an unobstructed space allowing free movement of combustion air to the appliances.
- Serve a single appliance enclosure.
- Not be screened where terminating in an attic space.

**3.2 Required Testing:** Reports of the following tests must be submitted:

**3.2.1 Electric Fans:** Tests must be conducted to demonstrate compliance with UL 507.

**3.2.2 Fan Performance Curves:** Fan performance curves must be determined in accordance with ANSI/AMCA 210.

**3.2.3 Maximum Operating Temperature:** Tests must be conducted to demonstrate that the system, while operating under conditions of normal installation, will de-activate at a maximum temperature of 160°F (71°C). The laboratory must investigate all possible modes of system de-activation.

**3.2.4 Interlock:** Tests must be conducted to demonstrate that, in the event of motor failure or of complete inlet or outlet blockage, the interlock will shut off the burners in all appliances served in the space. The test report must indicate the specifications for the burners of all appliances served in the space to which the test is applicable. The laboratory must investigate all possible modes of system de-activation.

**3.2.5 Strength Tests:** Tests must be conducted in accordance with Section 19.4.2.6, Flue Gas Vent Terminal Assembly Strength, of CSA B140.0. The test sample must meet the conditions of acceptance of CSA B 140.0, with the exception that, following the load and impact tests, the combustion air fan must continue to supply the rated airflow.

**3.2.6 Rain Tests:** Tests must be conducted in accordance with Section 19.4.1.6, Rain Test, of CSA B 140.0. The test sample must comply with the conditions of acceptance of CSA B1 40.0. The velocity of the airflow at the inlet must be reported.

## 4.0 QUALITY CONTROL

The fans must be produced under a quality control program with inspections by a quality control agency accredited by ICBO ES. A quality control manual, jointly developed by the applicant and the agency, complying with the ICBO ES Acceptance Criteria for Quality Control Manuals (AC10), must be submitted. The manual must indicate that the quality control agency is conducting inspections for the purpose of verification of on-going compliance with this criteria and with the published evaluation report on the product.