

**DIRECT GAS-FIRED
CIRCULATING HEATERS FOR
AGRICULTURAL ANIMAL
CONFINEMENT BUILDINGS**



**INTERNATIONAL
APPROVAL SERVICES - U.S., INC.**
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PREFACE

This publication represents a basic standard for safe operation, substantial and durable construction, and acceptable performance of direct gas-fired circulating heaters for agricultural animal confinement buildings. It is the result of years of experience in the manufacture, testing, installation, maintenance, inspection and research on direct gas-fired circulating heaters for agricultural animal confinement buildings designed for the utilization of gas. There are risks of injury to persons inherent in some appliances that, if completely eliminated, would defeat the utility of the appliance. The provisions in this Standard are intended to reduce such risks while retaining the normal function of the appliance.

Nothing in this standard is to be considered in any way as indicating a measure of quality beyond compliance with the provisions it contains. It is designed to allow compliance of direct gas-fired circulating heaters for agricultural animal confinement buildings, the construction and performance of which may exceed the various provisions specified herein. In its preparation, full recognition has been given to possibilities of improvement through ingenuity of design. As progress takes place, revisions may become necessary. When they are believed desirable, recommendations should be forwarded to International Approval Services - U.S., Inc., 8501 East Pleasant Valley Road, Cleveland, Ohio 44131. A proposal form is provided in the back of this document.

Safe and satisfactory operation of direct gas-fired circulating heaters for agricultural animal confinement buildings depends to a great extent upon its proper installation, and it should be installed in accordance with the *National Fuel Gas Code, ANSI Z223.1*, manufacturers' installation instructions, and local municipal building codes.

Users of this American National Standard are advised that the devices/products/activities within its scope may be subject to regulation at the Federal state or local level. Users are strongly urged to investigate this possibility through appropriate channels. In the event of a conflict with this standard, the Federal, state or local regulation should be followed.

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EFFECTIVE DATE: An organization using this standard for product evaluation as a part of its certification program will normally establish the date by which all products certified by that organization should comply with this standard.

HISTORY OF THE DEVELOPMENT OF STANDARD FOR DIRECT GAS-FIRED CIRCULATING HEATERS FOR AGRICULTURAL ANIMAL CONFINEMENT BUILDINGS

(This History is informative and is not part of the standard.)

In 1988, International Approval Services-U.S. Inc. (formerly the American Gas Association laboratories), developed its A.G.A. Requirement 5-88 on agricultural heaters. This standard was used for design certification testing of gas-fired agricultural heaters by IAS U.S. Interest was indicated in 1990 to develop a nationally recognized standard, at which time IAS U.S. agreed to relinquish its standard to the Z83 Project. The Z83 Committee assigned the activity to its construction heater subcommittee.

As time progressed, there was a desire to expedite development of a national standard and it was believed that this could be accomplished more readily by returning the draft standard to IAS U.S. for development under its ANSI Canvass Method sponsorship. The Z83 Committee and its construction heater subcommittee agreed that IAS U.S. undertake development of the standard.

IAS U.S. proceeded to establish a new project activity. The American National Standards Institute (ANSI) was contacted in October 1994 to inform them that IAS U.S. was undertaking this project under its Canvass Method sponsorship. A Canvass List was formed of interested parties to exercise review and approval of the standard. The A.G.A. (IAS U.S.) Requirements Committee, an internal standards writing committee of IAS U.S., and a Technical Advisory Group (TAG) comprised of non-IAS interested parties, were appointed to serve as the technical advisors on this activity. The project was assigned the designation IAS U.S. LC 2.

IAS U.S. LC 2 provides coverage for newly-produced direct-fired circulating heaters primarily intended for use in agricultural animal confinement buildings.

At its December 1, 1994 meeting, the IAS U.S. Requirements Committee reviewed and modified proposed IAS U.S. LC 2, in light of recommendations developed previously by an advisory working group of the Z83 construction heater subcommittee.

By letter ballot dated December 22, 1994, individuals selected to serve on the Technical

Advisory Group (TAG) were forwarded a copy of proposed IAS U.S. LC 2 standard dated December 1994. They were asked to review the document for technical accuracy. The results of the ballot indicated the document required further review and development.

At its February 2, 1995 meeting, the IAS U.S. Requirements Committee modified the December 1994 draft of proposed IAS U.S. LC 2, in light of substantive comments received from the Technical Advisory Group (TAG). Subsequently, a second draft of proposed IAS U.S. LC 2 dated February 1995 was forwarded to the TAG for their review. Comment was received that the standard should be limited to heaters having a nominal gas supply pressure not exceeding 1/2 psig. This comment was based on a recommendation made by the GAMA Controls Division Standards Review Task Group at its February 1994 meeting.

After TAG approval and modification in light of the above comment, a third draft of IAS U.S. LC 2, dated March 1995, was prepared and distributed to the canvass list by letter ballot.

A June 15, 1995 meeting of the IAS Requirements Committee was held in response to requests submitted by two participants. Both individuals originally voted "Object" on the Canvass ballot dated February 28, 1995. In order to resolve the objections, both individuals agreed to change their vote to "Abstain" on the February 1995 ballot, provided a meeting of the IAS Requirements Committee was scheduled to address their comments prior to a public review submittal to the American National Standards Institute (ANSI).

A subsequent fourth draft of proposed IAS U.S. LC 2 dated June 1995 was distributed to the TAG by ballot. The TAG was requested to vote on whether the June 1995 draft of proposed IAS U.S. LC 2 was ready for distribution to the canvass list.

In view of the favorable vote by the TAG members, the June 1995 Draft of proposed IAS U.S. LC 2 was distributed to and approved by the canvass list by letter ballot and was approved by the American National Standards Institute (ANSI) on March 8, 1996.

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**AMERICAN NATIONAL STANDARD FOR
DIRECT GAS-FIRED CIRCULATING HEATERS FOR
AGRICULTURAL ANIMAL CONFINEMENT BUILDINGS**

**PART I
CONSTRUCTION**

1.1 SCOPE

1.1.1 This standard applies to newly-produced direct gas-fired circulating heaters (see Part IV, Definitions) of 400,000 Btu (117 228 W) or less, hereinafter referred to as heaters, constructed entirely of new, unused parts and materials and primarily intended for permanent installation in agricultural animal confinement buildings. All the products of combustion generated by the heater are released into the area being heated.

These requirements apply to heaters having a gas supply pressure rating not exceeding $1/2$ psi (3.45 kPa) at the gas inlet of the appliance.

1.1.2 This standard does not apply to heaters intended for use in green houses.

1.1.3 This standard applies to self-contained heaters with integral means for air circulation.

1.1.4 This standard does not cover heaters employing a flameless catalytic combustion process, heaters for use with liquid phase fuel gases or forced type heaters.

1.1.5 This standard applies to heaters having an air outlet temperature of 350°F (176.5°C) above room temperature or less (see 2.8.2).

1.1.6 Special construction provisions applicable to a heater for outdoor installation are outlined under 1.2.5, 1.3.5, 1.3.6, 1.5.1, 1.7.3, 1.9.3-2b and 1.22.4.

1.1.7 Heaters covered by this standard are intended for use with natural or liquefied petroleum gases.

The construction of heaters for use with the above-mentioned gases is covered under Part I.

The performance of heaters for use with the above-mentioned gases is covered under Part II.

1.1.8 Special construction provisions for heaters intended for installations subject to spray washdown are outlined under 1.2.7 and 1.21.1.

1.1.9 Exhibit A contains a list of standards specifically referenced in this standard, and sources from which these reference standards may be obtained.