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Australian Standard 2478—1981

EQUIPMENT FOR THERMAL PROCESSING OF LOW-ACID FOODS IN HERMETICALLY SEALED CONTAINERS

ESSENTIAL DESIGN FEATURES AND PERFORMANCE REQUIREMENTS

STANDARDS ASSOCIATION OF AUSTRALIA
Incorporated by Royal Charter

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THE FOLLOWING SCIENTIFIC, INDUSTRIAL AND GOVERNMENTAL ORGANIZATIONS and departments were officially represented on the committee entrusted with the preparation of this standard:

Australian Institute of Food Science and Technology

Confederation of Australian Industry

Council of Australian Food Technology Associations Incorporated

CSIRO, Division of Food Research

Department of Primary Industry

Departments of Health

Hawkesbury Agricultural College

National Health and Medical Research Council

University of New South Wales

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AUSTRALIAN STANDARD

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PREFACE

This standard was prepared by the Association's Committee on Thermal Processing Equipment for Canned Foods at the request of Food Standards Committee of the National Health and Medical Research Council.

The aim of the standard is to ensure that the equipment is designed so that, when operated correctly, all containers being processed will receive the scheduled heat treatment. The standard deals with the important aspects of the design and performance of equipment used for processing low-acid foods as these foods must be processed under strictly controlled conditions to ensure that they are commercially sterile.

It is recognized that some existing installations may not comply with all of the requirements of this standard. In such cases it is recommended that the installation be inspected, and tested if necessary, by a competent authority to establish efficacy in thermal processing and the means of control.

Aspects relating to safety of construction, materials, fabrication, inspection, testing and certification have not been covered. Operating procedures have also not been described since they vary according to the individual design of equipment and the processing requirements dependent on the nature of the food and size and type of container. It should be emphasized therefore that the equipment covered by this standard should only be operated under the supervision of properly trained and authorized personnel. Where considered appropriate, advisory notes have been included in the text to emphasize essential aspects of the operation and maintenance of equipment.

In the preparation of this standard, account was taken of current Australian practice together with the recommendations of the United States Food and Drug Administration, the National Food Processors Association of the United States and codes being developed by the Codex Alimentarius Commission.

This standard makes reference to the following standards:

AS 1349 Bourdon Tube Pressure and Vacuum Gauges

AS 1779 Recommendations for Line Scales for Recording Instrument Charts

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STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard for EQUIPMENT FOR THERMAL PROCESSING OF LOW-ACID FOODS IN HERMETICALLY SEALED CONTAINERS—ESSENTIAL DESIGN FEATURES AND PERFORMANCE REQUIREMENTS

SECTION 1. SCOPE AND GENERAL

1.1 SCOPE. This standard sets out requirements for the design of equipment used for the thermal processing of low-acid foods in hermetically sealed rigid, flexible or semi-rigid containers and for the indicating and control instruments to be fitted to and used with such equipment.

1.2 PURPOSE. The standard is intended to ensure that processing equipment, when operated correctly by adequately trained personnel, will deliver the heating medium of known composition and temperature uniformly to all containers in the batch so that each container will receive the heat treatment which is designed to make the product commercially sterile.

1.3 APPLICATION. This standard applies to the following types of thermal processing systems:

(a) *Batch retorts heated with saturated steam* (see Section 2)—the containers are processed in saturated steam under pressure in discontinuous (batch type) vertical or horizontal retorts. The containers may or may not be mechanically agitated during heating and cooling.

(b) *Batch retorts heated with water under pressure* (see Section 3)—the containers are processed under water in batch retorts using steam to heat the water while a superimposed air pressure is maintained in the retort above the water surface. The water is circulated among the containers during heating and cooling.

(c) *Continuous retorts (except hydrostatic retorts)* (see Section 4)—the containers are processed in saturated steam under pressure in retorts fitted with mechanical inlet and outlet ports which allow continuous throughput of containers.

(d) *Hydrostatic retorts* (see Section 5)—the containers are processed in steam under pressure. The pressure of the steam is maintained in the processing chamber by means of hydrostatic water legs which also act as inlets and outlets to the steam dome allowing continuous throughput of containers.

(e) *Retorts heated with steam/air mixture* (see Section 6)— the containers are processed in a mixture of steam and air under pressure. The heating medium is agitated by a fan to give uniform mixing and distribution.

(f) *Flame sterilizers* (see Section 7)—the containers are preheated to a uniform temperature and are then processed continuously by passing over gas flames which heat the cans directly to the required process temperature followed by a holding period. The cans rotate during heating and cooling and in some flame sterilizers special devices are used to mechanically agitate the cans.

1.4 DEFINITIONS. For the purpose of this standard, the following definitions apply:

Bleeders (bleeds)—small valve-controlled orifices through which steam and other gases escape during the entire process. Their purpose is to remove air which accumulates in the retort during the process and to promote circulation of the heating medium especially in the proximity of indicator/controller probes.

Commercially sterile—the term used to describe foods that are free of microorganisms which are capable of growing under the conditions the product is likely to encounter during storage and distribution.

Hermetically sealed—the term used to describe containers which are closed so that the contents are protected against the entry of microorganisms and other materials.

Low-acid foods—foods with a pH of 4.6 or higher.

Retort—a pressure vessel in which containers of food are processed under pressure in a heating medium which may be steam, a steam/air mixture, or water.

Thermal process (heat sterilization process)—the process in which a container of food is exposed to a defined heating medium at a specified temperature for a specified time so that the food is made commercially sterile.

NOTE: After processing, the containers should be cooled as rapidly as possible through the range of 60°C to 40°C to prevent growth of thermophilic microorganisms.

Vent—a large valve-controlled opening in the retort installed in such a way as to allow thorough removal of air from the retort before timing of the process is started.

Venting—the operation whereby the heating medium is used to purge the closed retort thoroughly of air before the thermal process is started.