Australian Standard™

Safety requirements for electrically heated Type 1 ovens in which flammable volatiles occur

Standards Australia

This Australian Standard was prepared by Committee EL-014, Electrical Equipment in Hazardous Areas. It was approved on behalf of the Council of Standards Australia on 21 May 2002 and published on 19 June 2002.

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PREFACE

This Standard was prepared by the Australian members of the Joint Standards Australia/Standards New Zealand Committee EL-014, Electrical Equipment in Hazardous Areas. After consultation with stakeholders in both countries, Standards Australia and Standards New Zealand decided to develop this Standard as an Australian, rather than an Australian/New Zealand Standard.

This Standard supersedes AS 1681—1974, *Electrically heated ovens in which flammable volatiles occur—Type 1 Ovens*.

This Standard is intended for the guidance of users and manufacturers of industrial ovens and regulatory authorities concerned with the safe usage, operation and installation of such ovens. It prescribes requirements for design, construction and ventilation of these ovens.

This Standard is similar to corresponding American Standard 86, *Ovens and furnaces*, issued by the National Fire Protection Association (NFPA), and acknowledgment is made of assistance received from that source.

Changes to the 1974 edition are essentially editorial and no technical alterations have occurred.

The term ‘informative’ has been used in this Standard to define the application of the appendices to which it applies. An ‘informative’ appendix is only for information and guidance.

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FOREWORD

The purpose of this Standard is to establish requirements for a type of electrically heated oven in which flammable atmospheres are evolved within the oven without risk of fire or explosion. Accordingly, safeguards are specified herein for the location, construction and operation of such ovens.

To prevent an ignition or explosion within an oven, the specification requires the introduction of a sufficient quantity of fresh air ventilation into the oven so as to dilute any possible flammable vapour or mixture to a safe concentration below the lower explosive limit. The method of calculating the amount of ventilation required is given in Section 4, and the following basic principles apply:

(a) There is a reliable and continuous supply of ventilating air while the oven is operating and flammable vapours are being given off.

(b) Failure of any ventilation equipment automatically shuts down the heating system.

(c) The oven is pre-ventilated before the heating system (which may originate ignition) can be started, in order to dissipate any accumulated vapour due to a work charge left in an unventilated oven, either accidentally following failure of safety ventilation, or following normal shutdown.

It is not intended to imply that the requirements of the specification will ensure compliance with the Standards of AS 2380 series—*Electrical equipment for explosive atmospheres—Explosion-protection techniques* and/or AS/NZS 60079 series—*Electrical apparatus for explosive gas atmospheres* and/or the AS 2381 series—*Electrical equipment for explosive atmospheres—Selection, installation and maintenance*. Careful consideration must, therefore, be given to the hazards peculiar to each individual project. This consideration of safety will include all supplementary equipment in the vicinity of the oven, such as spray booths or dip tanks; the mixing, handling or storage of flammable material; or auxiliary operations, such as impregnating, washing, surfacing, coating or combining by the use of adhesives. Where the atmosphere in which the oven is installed is likely to become hazardous, due to the processing of such materials, it must be rendered non-hazardous by means which are deemed to be adequate by the relevant regulatory authority (e.g. Ventilation in accordance with AS 1482—*Electrical equipment for explosive atmospheres—Protection by ventilation—Type of protection v*)

There must be constant supervision over all operating conditions that might otherwise become unsafe.

A procedure needs to be in place to ensure that electrical equipment and instrumentation are maintained in safe and operational conditions.

Partial protection might be, and in many cases is, much more dangerous than no protective equipment at all. Insufficient, ill-chosen, or improperly installed or maintained safety control equipment may cause operators to lapse into carelessness by supposing safety which is not actually present.

The requirements of this Standard are based, in part, on tests conducted by the Underwriters' Laboratories Inc., USA, to obtain data on the explosion limits of the solvents commonly used in connection with ovens. The actual figures vary considerably with different solvents, but properties of some common solvents are tabulated in Appendix A.

STANDARDS AUSTRALIA

Australian Standard

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SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard sets out the requirements for the design, construction and ventilation of electrically heated Type 1 ovens.

It also provides guidelines for the location and operation of such ovens.

Compliance with this Standard does not imply compliance with the Standards of the AS 2380 series and/or AS/NZS 60079 series and/or the AS 2381 series.

1.2 OBJECTIVE

The objective of this Standard is to enable designers, manufacturers, suppliers, employers and users of electrically heated Type 1 ovens to minimize the risks to health and safety of employees and others working with or otherwise near such type of ovens.

1.3 APPLICATION

The requirements of this Standard apply to electrically heated ovens in which the temperature does not exceed 540°C (Type 1 ovens).

NOTE: For ovens having heating systems based on gas or oil see AS 1375.

1.4 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS

1375 Industrial fuel-fired appliances (known as the SAA Industrial Fuel-fired Appliances Code)

1482 Electrical equipment for explosive atmospheres—Protection by ventilation—Type of protection v

2380 Electrical equipment for explosive atmospheres—Explosion-protection techniques

4024 Safeguarding of machinery

4024.1 Part 1: General principles

AS/NZS

2106 Methods for the determination of the flash point of flammable liquids (closed cup)

2381 Electrical equipment for explosive atmospheres—Selection, installation and maintenance

2381.1 Part 1: General requirements

3000 Electrical installations (known as the Australian/New Zealand Wiring Rules)

3100 Approval and test specification—General requirements for electrical equipment