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Australian Standard 2430, Part 1—1981

CLASSIFICATION OF HAZARDOUS AREAS Part 1—EXPLOSIVE GAS ATMOSPHERES



STANDARDS ASSOCIATION OF AUSTRALIA
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Australian Electrical and Electronics Manufacturers Association
Australian Gas Association
Australian Institute of Petroleum Limited
Australian Liquefied Petroleum Gas Association
Confederation of Australian Industry
Department of Industrial Relations, N.S.W.
Department of Minerals and Energy, Victoria
Department of Mineral Resources, N.S.W.
Department of Industry and Commerce
Department of Transport
Grain Elevators Board of New South Wales
Insurance Council of Australia
Royal Australian Chemical Institute

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AUSTRALIAN STANDARD

**CLASSIFICATION OF
HAZARDOUS AREAS**

**Part 1
EXPLOSIVE GAS
ATMOSPHERES**

AS 2430, Part 1-1981

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PREFACE

This standard was prepared by the Association's Committee on Classification of Hazardous Locations for the guidance of industry and relevant statutory authorities concerned with the classification of hazardous areas. It is Part 1 of a series dealing with specific hazardous atmospheres.

This standard deals with the classification of hazardous areas according to the probability of the existence of an explosive mixture of gas, vapour or mist with air in the atmosphere.

The content of this standard is solely concerned with the classification of hazardous areas and not with the types of equipment or ignition sources which can be used in such areas. Such types of equipment are covered in standards published by the specific technology group, i.e. electrical, mechanical, gas, chemical.

This standard may require reference to the following Australian standards:

- AS 1021 Protection by Purging of Electrical Equipment for Explosive Gas Atmospheres
- AS 1425 The Use of LP Gas in Internal Combustion Engines
- AS 1482 Protection by Ventilation of Electrical Equipment for Explosive Atmospheres
- AS 1697 SAA Gas Pipeline Code
- AS 1825 Pressurized Enclosure of Electrical Equipment for Explosive Atmospheres
- AS 1896 Methods of Test for Ignition Temperature of Gases and Vapours
- AS 1940 SAA Flammable and Combustible Liquids Code
- AS 2030 SAA Gas Cylinders Code
- AS 2106 Methods for the Determination of the Flashpoint of Flammable Liquids (Closed Cup)

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STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard
for
CLASSIFICATION OF HAZARDOUS AREAS

PART 1 — EXPLOSIVE GAS ATMOSPHERES

FOREWORD

Many gases, vapours and dusts which are generated, processed, handled and stored in industry are combustible. When ignited they may burn rapidly and with considerable explosive force if mixed with air in the appropriate proportions.

Areas where gases and vapours, dusts, flyings and fibres occur in dangerous quantities are classified as hazardous. This standard deals with the zonal classification of hazardous areas where explosive gas atmospheres are present. For classification of hazardous dust atmospheres, refer to AS 2430, Part 2.

The word 'zone' is internationally accepted as indicating the probability of the presence of a flammable, combustible or explodable material, and the extent, dimension, shape of hazardous area and volume in which the hazardous material can be expected.

This standard covers the following zones:

ZONE 0: In which an explosive gas atmosphere is present continuously, or is expected to be present for long periods, or for short periods which occur with high frequency.

ZONE 1: In which an explosive gas atmosphere can be expected to occur periodically or occasionally during normal operation.

ZONE 2: In which an explosive gas atmosphere is not expected to occur in normal operation and if it occurs is likely to be present only infrequently and for short duration.

NOTE: Zones 3, 4 and 5 are covered in Part 2.

Area classification is a method of analysing the environment where explosive atmospheres may occur, to allow the proper selection of apparatus to be installed in or used in that environment. Such environments are those where a risk of fire or explosion can occur only if an explosive gas atmosphere and a source of ignition can coexist. The aim of the classification procedure is to ensure the satisfactory presence of apparatus in these environments.

Where it is necessary to use apparatus in an environment in which there may be an explosive atmosphere and it is not possible to —

- (a) eliminate the likelihood of an explosive atmosphere occurring around the source of ignition; or
- (b) eliminate the source of ignition;

then measures should aim at reducing the likelihood of occurrence of either or both of the above factors so that the likelihood of coincidence is so small as to be acceptable.

In most practical situations where flammable materials and apparatus are used it is difficult to ensure that an explosive atmosphere will never occur. It may also be difficult to ensure that apparatus will never give rise to a source of ignition. Reliance is therefore placed on the use of apparatus which has an extremely low likelihood of creating a source of ignition in situations where an explosive atmosphere has a high likelihood of occurring. Conversely, where the likelihood of an explosive atmosphere's occurring is reduced, apparatus which has an increased likelihood of becoming a source of ignition may be used. To apply this approach the first step is to assess the likelihood of an explosive atmosphere's occurring in accordance with the definitions of the zones of hazard.

The area classification should be carried out by those who have full knowledge both of the processes, systems and equipment concerned and of safety and personnel. The agreement reached on the area classification should be formally recorded.

The properties (which are relevant to area classification) of all process materials should be listed and should include flashpoint, boiling point, melting point, ignition temperature, ignition energy, vapour pressure, vapour density and flammability limits.

The initial step is to decide if a process item contains flammable material and if a release can occur. The procedure outlined herein should be applied to each item of equipment. The type and extent of the zonal areas can then be established.