Australian Standard

SAA PACKAGING CODE

Part 18—USE OF DESICCANTS IN PACKAGING

This Australian standard was prepared by Committee PK/25, Packaging Code. It was approved on behalf of the Council of the Standards Association of Australia on 5 October 1983 and published on 2 December 1983.

The following interests are represented on Committee PK/25:

Agricultural and Veterinary Chemicals Association of Australia
Adhesives and Sealants Manufacturers Association
Ansett Airlines of Australia
Australian Institute of Packaging
Australian and New Zealand Pulp and Paper Industry Technical Association (Appita)
Bureau of Steel Manufacturers of Australia
Canmakers Institute of Australia
Confederation of Australian Industry
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Plastics Institute of Australia Incorporated
Printing and Allied Trades Employers Federation of Australia
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PREFACE

This standard has been prepared by the Association's Packaging Code Committee under the direction of the Packaging Standards Board.

The purpose of this standard is to provide information on the use of desiccants in packaging to reduce humidity inside the packages as dampness encourages corrosion and the growth of moulds and bacteria, even when liquid water is not present.

The SAA Packaging Code (AS 2400) has been divided into parts dealing with specific subjects, as follows:

Part	*Title*
1	Glossary of Packaging Terms*
2	Basic Principles of Packaging Practice
3	Mechanical Aids in Packaging
4	Protection Against Spoilage by Microorganisms, Insects, Mites and Rodents*
5	Metal Protection
6	Paper and Board, Wrappers and Containers
7	Timber Containers
8	Textile Bags, Sacks and Wrappings
9	Metal Containers
10	Cushioning Materials
11	Cordage
12	Adhesive Closing and Sealing Tapes
13	Tensional Strapping
14	Adhesives for Packaging
15	Glass Containers and Closures
16	Transparent Cellulose Films, Plastics Films, Metal Foils and Flexible Laminates
17	Plastics
18	Use of Desiccants in Packaging
19	Packaging for Airfreight*
20	Handling of Goods in Freight Containers*
21	Packaging of Dangerous Goods
22	Closures
23	Shrink and Stretch Wrapping

During the preparation of the SAA Packaging Code, account is being taken of material included in BS 1133, Packaging Code, and the assistance obtained from this source is acknowledged.

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* Published.

CONTENTS

STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard
SAA PACKAGING CODE

PART 18—USE OF DESICCANTS IN PACKAGING

1 SCOPE. This standard provides guidance on the use of desiccants in packaging.

2 REFERENCED DOCUMENTS. The following standards are referred to in this standard:

AS 2400 SAA Packaging Code
Part 1— Glossary of Packaging Terms
Part 16— Transparent Cellulose Films Plastics Films, Metal Foils and Flexible Laminates

3 DEFINITIONS. For the purpose of this standard, the definitions given in AS 2400, Part 1 and the following apply:

3.1 Period of protection—the time duration between sealing a package and its first opening.

3.2 Basic desiccant (*BD*)—a substance which will adsorb 27 percent (of its dry mass) of moisture when exposed to an atmosphere maintained at 50 percent relative humidity at a temperature of 25°C.

3.3 Water-vapour barrier—the layer or layers of the package that are intended to minimize the entry of water.

4 GENERAL. Steps can often be taken to reduce the deleterious effect of moisture on a packaged article by such means as the application of a temporary protective against corrosion to a metal surface or the proofing of packaging materials. However, such direct protection is not practicable for all articles, for example, for certain electrical components or scientific and optical instruments. A method of providing protection in such instances is by using a completely sealed moisture barrier as part of the package. There may, however, still be damp air inside the container and moisture may be given off by the cushioning or bracing material used to hold the articles in position; moreover, few materials used in making sealed packages are completely resistant to the penetration of water-vapour and a certain amount of moisture will reach the article through the walls of the package. Desiccants are, therefore, used to absorb moisture that may be in a package from any of these sources.

To decrease the damaging effect of moisture to packaging systems, certain factors have to be considered. These are as follows:

(a) *Materials.* Some materials, being hygroscopic; are capable of taking up water-vapour from the surrounding atmosphere. That will continue until an equilibrium is reached and this is dependent upon the conditions of temperature and relative humidity of the atmosphere. For many substances this is a reversible process so that if the moisture content is in excess of the equilibrium value water-vapour will be given off until equilibrium conditions are established.

(b) *Moisture in air.* Air naturally contains moisture in the form of vapour. The quantity of moisture present in a unit volume is known as the absolute humidity. At any particular temperature the air can hold only a limited amount of water-vapour; the higher its temperature the more water-vapour the air can hold. Air containing as much water-vapour as it can hold is said to be saturated. If saturated air is cooled, it will lose by condensation just enough of its moisture (as liquid water) to remain saturated at the lower temperature.

The maximum quantity of moisture which can be held as vapour by atmospheric air is determined by the temperature. Maxima for a whole range of temperatures have been accurately determined and are published in the form of hydrometric tables and charts.

(c) *Relative humidity.* Normally air is not saturated with water-vapour unless it is in close contact with liquid water. The actual amount of water-vapour present in air, i.e. the absolute humidity, expressed as a percentage of the amount the air contains when saturated at the same temperature is called the relative humidity (r.h.).

For example, supposing a cubic metre of air contains 5 g of water-vapour and the air if saturated at the same temperature would contain 20 g of moisture per cubic metre, then the air has a relative humidity of—

$$\frac{5}{20} \times 100 = 25 \text{ percent}$$

Saturated air has a relative humidity of 100 percent.

The relative humidity of the atmosphere is the dominating factor in determining whether the corrosion of metals, mould growth, rotting, etc, will take place. It is known, for example, that at ordinary temperatures corrosion of iron is extremely slow at relative humidities below 60 percent, but becomes rapid at higher humidities. Mould growth does not in general take place or is extremely slow unless the relative humidity is above 70 percent. Generally for engineering purposes a 50 percent relative humidity level has been found to be the critical level and provides a tolerance against a sudden fall in temperature, but for other products other critical levels may apply.

5 DESICCATED PACKAGES.

5.1 General. It has been stated in Clause 4 that the deterioration of many articles can be minimized by applying suitable treatment to the article itself either during or after manufacture. Sometimes such treatment is not practicable or desirable and it is still necessary to protect the contents; one method of doing this is to ensure that the relative humidity of the atmosphere in contact with the item never exceeds a safe limit.