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SAA PACKAGING CODE
Part 19—PACKAGING FOR AIRFREIGHT

PUBLISHED BY THE STANDARDS ASSOCIATION OF AUSTRALIA
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The following interests were represented on the committee responsible for the preparation of this standard:

Agricultural and Veterinary Chemicals Association of Australia

Adhesives and Sealants Manufacturers Association

Ansett Airlines of Australia

Australian Institute of Packaging

Bureau of Steel Manufacturers of Australia

Canmakers Institute of Australia

Confederation of Australian Industry

Department of Defence

Department of Primary Industry

Department of Productivity

Glass Packaging Institute of Australia

Packaging Council of Australia

Plastics Institute of Australia Incorporated

Printed and Allied Trades Employers Federation of Australia

Railways of Australia Committee

Technical Association of the Australian and New Zealand Pulp and Paper Industry (Appita)

Victorian Sawmillers Association

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PREFACE

This standard was prepared by the Association's Packaging Code Committee under the direction of the Packaging Standards Board. The layout is based on BS 1133, Packaging Code.

The purpose of this standard is to provide information on packaging for air-freight and is primarily concerned with conditions applicable to the carriage of air-freight within Australia. However, the majority of statements also apply to international airfreight.

Reference may be necessary to AS 2400, Part 1—Glossary of Packaging Terms.

The SAA Packaging Code 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 Package Handling
4	Protection against Spoilage of Packages and their Contents by Microorganisms, Insects, Mites and Rodents*
5	Metal Protection
6	Paper and Board, Wrappers and Containers
7	Wooden 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
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

*Published.

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STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard
SAA PACKAGING CODE

PART 19—PACKAGING FOR AIRFREIGHT

1 SCOPE. This standard provides general guidance and information on packaging for airfreight (livestock excluded).

The packaging and carriage of hazardous or dangerous (restricted) goods is specifically governed by the IATA restricted articles regulations. A precis of these regulations is given in Appendix A.

2 GENERAL CONSIDERATIONS. The packaging requirements for airfreight are generally less severe than for surface modes of transport. However, special considerations should be given to shipment of articles which may be affected by variations of pressure and/or temperature.

Heavy or dense articles may require special consideration as regards restraint against air turbulence or landing load factors. In such instances the carrier should be informed well in advance of the intended date of shipment in order that the appropriate shoring (load-spreading) and restraint system can be devised.

All shipments should be checked to determine if they fall within the category of hazardous or dangerous (restricted) goods (see Appendix A).

3 MECHANICAL LOADS.

3.1 Flight Loads. The in-flight load factors to which the goods are subjected are a combination of atmospheric turbulence, aircraft manoeuvre and aircraft landing load factors. To some extent the magnitude of these load factors is dependent on the aircraft type. However, the normal standard of commercial packaging is usually adequate to withstand the load factors encountered.

Load factors may, however, prove significant with delicate instrumentation which may require special packaging for support, or with heavy or dense articles which may require individual restraint.

As a general guide the effective mass of an article can be increased as a result of aircraft movement.

According to the air navigation orders (ANO 103.11) published by the Commonwealth Department of Transport, Clause 2, the maximum factors to be considered are listed in Clause 2.1 therein as follows:

> Cargo restraint equipment shall be suitable to restrain cargo distributed in the most critical manner, under the maximum load factors for flight, ground or emergency landing conditions to which the aircraft is certificated. Alternatively, if the maximum load factors to which the aircraft is certificated are unavailable, the following ultimate load factors (acting separately) shall be observed in the case of aircraft with a V_{NE} or V_{MO} not greater than 250 knots IAS:
>
> (1) for cargo carried in or aft of any crew or passenger compartment—
>
> (a) 9.0 g* forward (crash case only);
>
> (b) 1.5 g aft;
>
> (c) 3.0 g upward or sideward; and
>
> (d) 7.0 g downward.
>
> (2) for cargo carried below or ahead of all crew and passenger compartments—
>
> (a) 3.0 g forward or upward;
>
> (b) 1.5 g aft or sideward; and
>
> (c) 7.0 g downward.
>
> NOTES:
>
> 1. V_{NE} —never exceed speed
> V_{MO} —maximum operational speed
> IAS —indicated air speed
> 2. *The g-factor is the ratio of the package acceleration to the acceleration due to earth's gravity. It may also, for the purpose of designing a restraint system, be taken as—
>
> $$\frac{\text{Total restraint force required}}{\text{mass of item}}$$

3.2 Vibration. The extent to which goods require protection should be assessed in relation to their nature, the type of aircraft used and all other transport and handling appliances which may be employed on the journey.

In flight the vibration frequencies normally experienced are in the range 5 Hz to 500 Hz.

Instruments and electronic equipment liable to vibration damage may pose special problems arising from the design of both the equipment and the package, as well as the vibration of the aircraft. Such problems can only be solved by collaboration between the designer of the product and the designer of the package.

3.3 Compression (Stacking). Packages may be stacked to a maximum height of 3 m. In assessing the compressive stresses set up, an average density 800 kg/m^3 should be considered or, for large consignments, the density of the consignment. Packages should be designed so that the floor loading imposed by them does not exceed 14 kPa.

3.4 Drop Impact. The drop height which packages should withstand is dependent on their mass. Typical drop heights for unpalletized items are given in Table 1.

Palletized packages should be capable of sustaining a drop of 150 mm without damage.

NOTES:

1. Packages of mass up to about 25 kg may be dropped on any face or edge. Above this mass drops are more likely to be on edges.
2. For conveyance on feeder airlines the package should withstand being toppled from the smallest face onto any other face.