

Australian Standard™

Explosives—Storage, transport and use

**Part 3: Pyrotechnics—Shopgoods
fireworks—Design, performance and
testing**

This Australian Standard was prepared by Committee CE/5, Explosives. It was approved on behalf of the Council of Standards Australia on 5 November 1999 and published on 5 December 1999.

The following interests are represented on Committee CE/5:

ADI

Australian Institute of Explosives

Australian Institute of Mining and Metallurgy

Australian Chamber of Commerce and Industry

AUSTROADS

Chamber of Minerals and Energy of Western Australia

Crushed Stone Association of Australia

Department of Administrative and Information Services, S.A.

Department of Defence (Australia)

Department of Mineral Resources, N.S.W.

Department of Minerals and Energy, W.A.

Department of Mines and Energy, Qld

Department of Natural Resources and Environment, Vic.

Institute of Quarrying Australia

Minerals Council of Australia

Royal Australian Chemical Institute

Victorian WorkCover Authority

WorkCover New South Wales

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Additional interests participating in the preparation of this Standard:

Pyrotechnic interests

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Australian Standard™

Explosives— Storage, transport and use

Part 3: Pyrotechnics— Shopgoods fireworks— Design, performance and testing

Published as AS 2187.3—1999.

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Published by Standards Australia International Ltd
PO Box 1055, Strathfield, NSW 2135, Australia

ISBN 0 7337 3072 8

PREFACE

This Standard was prepared by the Standards Australia Committee CE/5, Explosives and Pyrotechnics, in response to the need, articulated by users and regulators of shopgoods fireworks, that requirements for secure and safe working conditions be specified.

This Standard is one of a series dealing with explosives and pyrotechnics. To date the series consists of the following:

AS

- 2187 Explosives—Storage, transport and use
- 2187.0 Part 0: Terminology
- 2187.1 Part 1: Storage
- 2187.2 Part 2: Use of explosives
- 2187.3 Part 3: Pyrotechnics—Shopgoods fireworks—Design, performance and testing (this Standard)
- 2187.4 Part 4: Pyrotechnics—Outdoor displays

Proposed additional parts are as follows:

Pyrotechnics—Indoor theatrical and film sets

Pyrotechnics—Marine distress signals

The objective of this Standard is to provide users of shopgoods fireworks and regulatory authorities with acceptable requirements and assessment criteria to ensure that the public are supplied with fireworks that are safe to use in the environment in which they are intended to be used.

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

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FOREWORD

Shopgoods fireworks are fireworks articles suitable for use in a small area, such as a suburban house yard, by persons with no training in the safe use of fireworks, for example, children under parental supervision.

This Standard aims to provide criteria for shopgoods fireworks that are sold to the general public, as well as to provide guidance on the testing of such fireworks. It is based largely on BS 7114, *Fireworks*, with some contributions from the American Fireworks Standards Laboratory (AFSL) Standards. The document is intended to be performance based. It includes common criteria that are applicable to all shopgoods fireworks.

Shopgoods fireworks have been traditionally defined in Australia as those fireworks with a pyrotechnic composition that does not exceed a mass of 40 g. The pyrotechnic composition limits advocated in this Standard are based on qualitative risk assessment, relying on the experience of regulatory authorities, experienced fireworks vendors and users.

The rationale for changing the traditional Australian limit of 40 g is as follows.

- (a) A firework (such as a fountain) with a single casing, having a pyrotechnic content of 40 g, may present a greater hazard than a multi-tube firework with a total pyrotechnic content of similar mass. It, therefore, follows that the quantity of pyrotechnic that may explode would be much less than that of the fountain.
- (b) Compared to the equivalent number of single-tube items, multi-tube fireworks greatly reduce the number of times a person has to set up a firework, ignite its fuse and retreat to a safe distance. Only relatively small quantities of pyrotechnic material are required in each tube of a multi-tube shopgoods firework to provide satisfactory performance. Accordingly, a limit of 20 g of pyrotechnic composition per tube of a multi-tube firework is imposed, with a total pyrotechnic content of all tubes not to exceed 100 g mass.
- (c) A maximum of 100 g total pyrotechnic mass is imposed to prevent the possibility of fireworks having total pyrotechnic mass in excess of 100 g being made available to the general public. Fireworks of this nature are suitable only for controlled displays in large areas of clear ground such as showgrounds.

A mass limit is imposed to prevent debris being projected more than 3 m, and is based on experience; fireworks projecting debris having a mass not exceeding 20 g have been used for many years without any reported injuries related to such debris falling to the ground. In light of this experience, the 1 g limit imposed by BS 7114.2 is neither reasonable nor necessary.

STANDARDS AUSTRALIA

Australian Standard
Explosives—Storage, transport and use

Part 3: Pyrotechnics—Shopgoods fireworks—Design, performance and testing

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard sets out requirements for the design, performance, and testing of shopgoods fireworks as defined in AS 2187.0.

NOTE: For types and descriptions of shopgoods fireworks, see Appendix A.

The Standard does not apply to—

- (a) indoor theatrical and film sets fireworks;
- (b) distress signals;
- (c) model rocket motors;
- (d) display fireworks; or
- (e) storage, transport or use of fireworks.

NOTES:

- 1 Other standards may cover the above.
- 2 Regulatory authorities controlling the sale and use of shopgoods fireworks may have regulations or may impose conditions that differ from the requirements of this Standard.

1.2 REFERENCED DOCUMENTS

The following document is referred to in this Standard:

AS	
2187	Explosives—Storage, transport and use
2187.0	Part 0: Terminology

1.3 DEFINITIONS

For the purpose of this Standard the definitions given in AS 2187.0 apply.

1.4 GENERAL REQUIREMENTS

1.4.1 General design

Sufficient information shall be provided to enable the safe ignition and observation of the fireworks. The fireworks shall function in a safe and predictable manner. To accomplish this, consideration shall be given to—

- (a) ignition method and fuse burning time;
- (b) pyrotechnic content and composition;
- (c) construction type and integrity;