

**AS/NZS 2211.2:2006**  
IEC 60825-2 Ed 3.0 (2005)

AS/NZS 2211.2:2006

**Australian/New Zealand Standard™**

**Safety of laser products**

**Part 2: Safety of optical fibre  
communication systems (OFCS)**



## **AS/NZS 2211.2:2006**

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee SF-019, Personal Protection Against Laser Radiation. It was approved on behalf of the Council of Standards Australia on 19 January 2006 and on behalf of the Council of Standards New Zealand on 3 February 2006.  
This Standard was published on 17 February 2006.

---

The following are represented on Committee SF-019:

Australasian Faculty of Occupational Medicine  
Australian Chamber of Commerce and Industry  
Australian Defence Force Academy  
Australian Dental Association  
Australian Radiation Laboratory  
Department of Defence (Australia)  
National Radiation Laboratory New Zealand  
Optus Communications  
Queensland Health  
Queensland University of Technology  
Royal Australian College of Ophthalmologists  
Telecom New Zealand  
Telstra Corporation  
WorkCover New South Wales

---

### **Keeping Standards up-to-date**

Standards are living documents which reflect progress in science, technology and systems. To maintain their currency, all Standards are periodically reviewed, and new editions are published. Between editions, amendments may be issued. Standards may also be withdrawn. It is important that readers assure themselves they are using a current Standard, which should include any amendments which may have been published since the Standard was purchased.

Detailed information about joint Australian/New Zealand Standards can be found by visiting the Standards Web Shop at [www.standards.com.au](http://www.standards.com.au) or Standards New Zealand web site at [www.standards.co.nz](http://www.standards.co.nz) and looking up the relevant Standard in the on-line catalogue.

Alternatively, both organizations publish an annual printed Catalogue with full details of all current Standards. For more frequent listings or notification of revisions, amendments and withdrawals, Standards Australia and Standards New Zealand offer a number of update options. For information about these services, users should contact their respective national Standards organization.

We also welcome suggestions for improvement in our Standards, and especially encourage readers to notify us immediately of any apparent inaccuracies or ambiguities. Please address your comments to the Chief Executive of either Standards Australia or Standards New Zealand at the address shown on the back cover.

---

*This Standard was issued in draft form for comment as DR 05537.*

---

AS/NZS 2211.2:2006

Australian/New Zealand Standard™

## **Safety of laser products**

### **Part 2: Safety of optical fibre communication systems (OFCS)**

Originated as AS/NZS 2211.2:1997.  
Second edition 2006.

#### **COPYRIGHT**

© Standards Australia/Standards New Zealand

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of the publisher.

Jointly published by Standards Australia, GPO Box 476, Sydney, NSW 2001 and Standards New Zealand, Private Bag 2439, Wellington 6020

ISBN 0 7337 7266 8

## PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee SF-019, Personal Protection Against Laser Radiation to supersede AS/NZS 2211.2:1997, *Laser safety, Part 2: Safety of optical fibre communication systems*.

The Standard is identical with and has been reproduced from IEC 60825-2: Ed.3.0 2005, *Safety of laser products, Part 2: Safety of optical fibre communication systems* (OFCS).

The objective of this Standard is to provide requirements and specific guidance for the safe operation and maintenance of optical fibre communication systems (OFCS). In these systems optical power may be accessible outside the confinements of transmitting equipments or at greater distance from the optical systems.

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

As this Standard is reproduced from an International Standard, the following applies:

- (a) Its number appears on the cover and title page while the International Standard number appears only on the cover.
- (b) In the source text, ‘this Part 2 of IEC 60825’ should read ‘this Australian/New Zealand Standard’.
- (c) A full point should be substituted for a comma when referring to a decimal marker.

References to International Standards should be replaced by references Australian Standards, as follows:

<i>Reference to International Standard</i>		<i>Australian/New Zealand Standard</i>	
IEC		AS/NZS	
60825	Safety of laser products	2211	Safety of laser products
60825-1	Part 1: Equipment classification, requirements and user’s guide	2211.1	Part 1: Equipment classification, requirements and user’s guide (IEC 60825-1:2001, MOD)

## CONTENTS

	<i>Page</i>
1 Scope and object.....	1
2 Normative references .....	2
3 Terms and definitions .....	2
4 Requirements .....	5
4.1 General .....	5
4.2 Protective housing of OFCS .....	6
4.3 Fibre cables .....	6
4.4 Cable connectors .....	6
4.5 Automatic power reduction (APR) and restart pulses .....	7
4.6 Labelling or marking .....	8
4.7 Organizational requirements.....	9
4.8 Assessment of hazard level.....	11
4.9 Hazard level requirements by location type .....	12
Annex A (informative) Rationale.....	13
Annex B (informative) Summary of requirements at locations in OFCS.....	14
Annex C (informative) Methods of hazard/safety analysis .....	15
Annex D (informative) Application notes for the safe use of OFCS .....	16
Annex E (informative) Guidance for service and maintenance.....	42
Annex F (informative) Clarification of the meaning of “hazard level” .....	45
Bibliography.....	47
Figure D.1 – PON (passive optical network)-based system .....	26
Figure D.2 – Simple laser drive circuit.....	28
Figure D.3 – Risk graph example from IEC 61508-5 Clause D.5 .....	32
Figure D.4 – Graph of FIT rate and mean time to repair .....	35
Table D.1 – OFCS power limits for 11 µm single mode (SM) fibres and 0,18 numerical aperture multimode (MM) fibres (core diameter < 150 µm) .....	18
Table D.2 – Relation between the number of fibres in a ribbon fibre and the maximum permitted power (example) .....	25
Table D.3 – Identification of components and failure modes (example) .....	29
Table D.4 – Beta values (example) .....	29
Table D.5 – Determination of failure rates (example) .....	30
Table D.6 – Consequence classification from IEC 61508-5 Table D.1 .....	32
Table D.7 – Frequency classification from IEC 61508-5 Table D.1 .....	33
Table D.8 – Possibility of avoiding hazard classification from IEC 61508-5 Table D.1 .....	33
Table D.9 – Classification of the probability of the unwanted occurrence from IEC 61508-5 Table D.1 .....	33

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

- 
- Looking for additional Standards? Visit Intertek Inform Infostore
  - Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation
-