

Australian/New Zealand Standard™

Safety of machinery

**Part 3610: Conveyors—General
requirements**



AS/NZS 4024.3610:2015

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee SF-041, Safety of Machinery. It was approved on behalf of the Council of Standards Australia on 10 August 2015 and on behalf of the Council of Standards New Zealand on 2 July 2015.

This Standard was published on 21 August 2015.

The following are represented on Committee SF-041:

Australian Chamber of Commerce and Industry
Australian Industry Group
Australian Manufacturing Workers Union
Department of Trade and Investment, Regional Infrastructure and Services, NSW
Engineers Australia
Human Factors and Ergonomics Society of Australia
Institute of Instrumentation, Control and Automation Australia
National Safety Council of Australia
New Zealand Electrical Institute
Safety Institute of Australia
Winery Engineering Association
WorkCover New South Wales
Worksafe New Zealand
WorkSafe Victoria

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 Standards may also be withdrawn.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 Australia Web Site at www.standards.org.au or Standards New Zealand web site at www.standards.co.nz and looking up the relevant Standard in the on-line catalogue.

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 AS/NZS 4024.3610.

Australian/New Zealand Standard™

Safety of machinery

Part 3610: Conveyors—General requirements

Originated in Australia as part of AS C215—1971.
Previous edition part of AS 1755—2000.
Jointly revised in part and redesignated as AS/NZS 4024.3610:2015.

COPYRIGHT

© Standards Australia Limited/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, unless otherwise permitted under the Copyright Act 1968 (Australia) or the Copyright Act 1994 (New Zealand).

PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee SF-041, Safety of Machinery, to supersede (in part) AS 1755—2000, *Conveyors—Safety requirements*.

The objective of this Standard is to apply the principles articulated in the AS 4024.1 series of Standards to conveyors and to protect workers and other persons against harm to their health, safety and welfare through the elimination or minimization of lifecycle risks associated with conveyor systems.

This Standard comprises the safety measures to be implemented for the lifecycle of conveyors and conveyor systems, both above ground and underground and the necessary risk controls against hazards experienced by operators of such plant.

The revision of this Standard covers the general safety requirements for large and small conveyors and conveyor systems. Technical and editorial revisions have been incorporated in line with available ISO documentation for mechanical handling equipment.

Major changes include—

- (a) the inclusion of risk management concepts;
- (b) the inclusion of hazards relating to conveyors;
- (c) contemporizing guarding requirements and providing clarity;
- (d) alignment with the AS 4024 series of Standards;
- (e) lifecycle management of conveyors; and
- (f) contemporizing of electrical requirements and conveyor control/protection.

The terms ‘normative’ and ‘informative’ have been used in this Standard to define the application of the appendix to which they apply. A ‘normative’ appendix is an integral part of a Standard whereas an ‘informative’ appendix is provided for information and guidance.

CONTENTS

| | <i>Page</i> |
|--|-------------|
| FOREWORD..... | 5 |
| SECTION 1 SCOPE AND GENERAL | |
| 1.1 SCOPE..... | 6 |
| 1.2 OBJECTIVE | 6 |
| 1.3 APPLICATION | 6 |
| 1.4 REFERENCED DOCUMENTS..... | 6 |
| 1.5 DEFINITIONS..... | 6 |
| 1.6 RISK MANAGEMENT | 12 |
| SECTION 2 REQUIREMENTS FOR DESIGN | |
| 2.1 GENERAL..... | 15 |
| 2.2 DESIGN RISK ASSESSMENT | 16 |
| 2.3 ENVIRONMENTAL CONTROL | 19 |
| 2.4 DESIGN FOR OPERABILITY AND MAINTAINABILITY | 20 |
| 2.5 SYSTEMS TO STOP AND HOLD A CONVEYOR | 23 |
| 2.6 ENERGY AND ISOLATION | 24 |
| 2.7 STRUCTURAL REQUIREMENTS | 27 |
| 2.8 ELECTRICAL REQUIREMENTS | 27 |
| 2.9 ILLUMINATION | 27 |
| 2.10 CONVEYOR CONTROL | 27 |
| 2.11 EXPLOSION AND FIRE PROTECTION | 36 |
| 2.12 MARKINGS, SIGNS AND IDENTIFICATION | 38 |
| 2.13 SAFEGUARDS | 39 |
| SECTION 3 REQUIREMENTS FOR SPECIFIC LOCATIONS | |
| 3.1 TUNNELS, GALLERIES, PITS, CONFINED SPACES AND HAZARDOUS AREAS | 55 |
| 3.2 UNDERGROUND COAL MINES | 55 |
| SECTION 4 INSTALLATION, COMMISSIONING AND DISMANTLING | |
| 4.1 GENERAL..... | 57 |
| 4.2 COMMISSIONING PLAN | 57 |
| 4.3 COMMISSIONING CRITERIA | 58 |
| 4.4 COMMISSIONING RECORDS | 58 |
| SECTION 5 OPERATION | |
| 5.1 GENERAL..... | 59 |
| 5.2 STANDARD OPERATING GUIDELINES..... | 60 |
| 5.3 TRAINING | 61 |
| SECTION 6 MAINTENANCE | |
| 6.1 GENERAL..... | 62 |
| 6.2 MAINTENANCE MANAGEMENT | 62 |
| 6.3 MAINTENANCE PROCEDURES | 63 |
| 6.4 PLANT SAFETY FILE | 64 |
| 6.5 MAINTENANCE DOCUMENTATION | 64 |

APPENDICES

| | | |
|---|--|----|
| A | REFERENCED DOCUMENTS..... | 66 |
| B | STORED ENERGY SYSTEMS..... | 68 |
| C | ERGONOMIC DATA..... | 71 |
| D | TUNNELS, GALLERIES, PITS, CONFINED SPACES AND HAZARDOUS AREAS | 78 |
| E | CONVEYOR TYPES | 79 |

FOREWORD

The publishing of the AS 4024.1—2006 series of Standards for Safety of Machinery, based on international Standards published by the International Standards Organization for Standardization (ISO), paved the way for the continued alignment of Australian Standards with international Standards. It also began the development of a set of Standards that would be internally consistent, therefore removing various anomalies and inconsistencies that had previously developed over time between individual Standards.

The resulting suite of Standards consists of a three-tiered structure for the AS 4024 series:

- (a) Part 1: Series of foundation Standards for all machinery.
- (b) Part 2: Series of supportive technical Standards.
- (c) Part 3: Series of application Standards.

This publication is an application Standard.

Conveyors represent wide-ranging and varied applications from simple conveyors carrying light loads, e.g. as found in the retailing and pharmaceutical industries to large conveyors carrying tonnes of material as seen, in mining and extractive industries and heavy industrial applications.

Conveyors present wide variation in design and operating environments so they demand equally wide-ranging safety strategies. The safety requirements for some conveyors can be addressed by applying the principles set out in the AS 4024.1 series without the need for further guidance.

However, potential uncertainty, interpretation and ambiguity can result in a lower standard of safety than would be the case if application guidance of the principles set out in AS 4024.1 were not provided. Specific application guidance on applying AS 4024.1 to conveyors is addressed in this Standard. This revision will address these issues and result in uniformity across the suite of machinery Standards.

During its work, the committee reviewed a number of International Standards to see if there were any that related specifically to the types of conveyors covered under AS 1755. This did not prove to be the case, and the committee decided to set out the safety requirements for conveyors in a number of new parts of the AS 4024.3 series, drawing on the existing Standard (AS 1755), the AS 4024.1 series and the expertise of personnel representing those industries using conveyor systems.

STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

Australian/New Zealand Standard
Safety of machinery

Part 3610: Conveyors—General requirements

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard sets out the minimum lifecycle safety requirements for conveyor systems. This Standard is intended to be used in conjunction with other conveyor Standards in the AS 4024 series (i.e. AS/NZS 4024.3611, AS/NZS 4024.3612 and AS/NZS 4024.3614) by all persons that design/modify, manufacture, supply, install, commission, operate, maintain or dismantle conveyor systems.

The conveyor Standards are not intended to apply to platform elevators, moving stairways or conveyors specifically designed for the conveyance of people. They do not apply to materials hoists, conveying material by fluids (e.g. slurries). This Standard does not cover disposal.

NOTES:

- 1 The conveyor Standards (AS/NZS 4024.3610, AS/NZS 4024.3611, AS/NZS 4024.3612 and AS/NZS 4024.3614) apply the principles set out in the AS 4024.1 series of Standards to conveyor systems.
- 2 Alternative risk controls based on risk assessment may be used, provided that the risk reduction achieved by the alternatives is at least equivalent to that provided by the requirements given in this Standard.
- 3 The committee intends to add a Standard to this series that will address screw conveyors.

1.2 OBJECTIVE

The objective of the conveyor Standards (AS/NZS 4024.3610, AS/NZS 4024.3611, AS/NZS 4024.3612 and AS/NZS 4024.3614) is to protect workers and other persons against harm to their health, safety and welfare through the elimination or minimization of lifecycle risks associated with conveyor systems.

1.3 APPLICATION

This Standard provides general requirements that apply to all conveyors as defined in this Standard. These requirements shall be applied in conjunction with the relevant particular requirements of AS/NZS 4024.3611, AS/NZS 4024.3612 and AS/NZS 4024.3614.

1.4 REFERENCED DOCUMENTS

A list of the documents referred to in this Standard is given in Appendix A.

1.5 DEFINITIONS

For the purpose of this Standard the definitions below apply.