Australian Standard®

Underground mining—Shaft equipment

Part 3: Drum winding gripper systems

This Australian Standard was prepared by Committee ME/18, Mining Equipment. It was approved on behalf of the Council of Standards Australia on 11 May 1990 and published on 17 September 1990.

The following interests are represented on Committee ME/18:

Australian Coal Association
Australian Mining Industry Council
Broken Hill Mining Managers Association
Bureau of Steel Manufacturers of Australia
Chamber of Mines of Western Australia (Incorporated)
Confederation of Australian Industry
Department of Industry and Economic Planning, Victoria
Department of Minerals and Energy, New South Wales
Department of Mines and Energy, Tasmania
Department of Mines, Western Australia
Department of Resource Industries, Qld
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New South Wales Coal Association
Queensland Chamber of Mines
Queensland Coal Association
Queensland Coal Board
South Australian Chamber of Mines (Incorporated)
The Australian Chamber of Mining and Metallurgy
University of New South Wales

Additional interests participating in preparation of Standard:

Department of Mineral Resources, New South Wales
Mining Companies
Mining Equipment Manufacturers and Suppliers
Mining Consultants

This Standard was issued in draft form for comment as DR 89169.

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Part 3: Drum winding gripper systems

First published as AS 3785.3—1990.

PUBLISHED BY STANDARDS AUSTRALIA
(STANDARDS ASSOCIATION OF AUSTRALIA)
1 THE CRESCENT, HOMEBUSH, NSW 2140

ISBN 0 7262 6356 7

PREFACE

This Standard was prepared by the Standards Australia Committee on Mining Equipment.

It is one of a series of Standards on shaft equipment for underground mines. The other Standards in the series are as follows:

(a) Underground mining—Shaft equipment, Part 1: Drum winding overwind safety catch system.

(b) Underground mining—Shaft equipment, Part 2: Friction winding arresting systems.

(c) Underground mining—Shaft equipment, Part 4: Conveyances.

(d) Underground mining—Shaft equipment, Part 5: Headframes.

(e) Underground mining—Shaft equipment, Part 6: Guides and rubbing ropes for conveyances.

(f) Underground mining—Shaft equipment, Part 7: Sheaves.

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FOREWORD

Gripper systems are used in vertical hoisting installations which incorporate a drum winder and timber guides.

A gripper system is designed to engage on the guides and support the conveyance when either—

(a) the conveyance is unintentionally impeded while descending; or

(b) the hoist rope of suspension equipment fails while the conveyance is ascending.

In either case the grippers will engage with the guides at relatively low speeds.

The design and testing of the gripper system may be subject to the approval of the relevant statutory authority.

STANDARDS AUSTRALIA

Australian Standard
Underground mining—Shaft equipment

Part 3—Drum winding gripper systems

1 SCOPE This Standard specifies requirements for gripper systems fitted to conveyances used in vertical mine shafts which have timber conveyance guides and drum winders.

This Standard does not apply to vertical shaft friction winding installations.

NOTE: Guidelines on information to be provided by the purchaser and supplier are given in Appendices A and B.

2 REFERENCED DOCUMENTS The following document is referred to in this Standard:

AS
3785 Underground mining—Shaft equipment
3785.6 Part 6: Guides and rubbing ropes for conveyances*

3 DEFINITIONS For the purpose of this Standard, the definitions below apply.

3.1 Shall—indicates that a statement is mandatory.

3.2 Should—indicates a recommendation.

3.3 Approved and approval—approved or by approval of the Statutory Authority.

3.4 Statutory authority—an authority having statutory powers to approve mine hoisting installations in the State or Territory within the Commonwealth of Australia.

3.5 Conveyance—any car, carriage, cage, skip, kibble or stage in which persons, minerals, or materials are wound through a shaft or any counterweight.

3.6 Dead load—the load due to the weight of the conveyance and suspension equipment.

3.7 Safe working load—the maximum static load permitted to be carried by the conveyance suspension equipment.

3.8 Guides—structural timber members arranged and secured in a shaft to limit lateral movement of the conveyance.

3.9 Gripper system—a mechanism which is mounted on a conveyance and which is designed to engage with the timber guides in response to a loss of hoist rope tension.

4 MATERIALS The materials selected for the manufacture of the gripper system components shall have appropriate impact properties at the lowest expected temperatures of the operating environment. Consideration should also be given to environmental conditions existing in the shaft.

NOTE: For the specifications of the timber guides, see AS 3785.6.

5 DESIGN

5.1 Design criteria. The gripper system shall be designed to—

(a) remain in the disengaged position under normal hoisting conditions and emergency stops; and

(b) effectively grip the guides and support the conveyance following an abnormal hoisting event which causes the hoist rope to slacken.

5.2 Loads. The gripper system shall fulfil the design criteria for the following extremes of loading:

(a) Dead load.

(b) Safe working load.

5.3 Guide tolerances. The gripper system shall be designed to operate within the wear limits appropriate for the timber guides.

NOTE: For the specification of the timber guides see AS 3785.6.

5.4 Stability. The gripper systems shall be positioned to ensure stability of the conveyance during its operation.

5.5 Energy-absorbing device. Energy absorption devices may be required to be provided within the gripper system to ensure that impact loads fall within the design criteria for the extremes of loading (see Clause 5.2).

* In course of preparation.