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Australian Standard®

Reeling, trailing and feeder cables used for mining—Repair and testing

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Reeling, trailing and feeder cables used for mining—Repair and testing

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Specifies requirements for the repair and testing of cables used in underground coal mines, metalliferous mines, open-cut mines, quarries and dredges.
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STANDARDS AUSTRALIA

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Australian Electrical and Electronic Manufacturers Association

Civil Aviation Authority (Commonwealth)

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Department of Defence

Department of Mineral Resources, New South Wales

Electrical Contractors Association of Australia

Electrical Regulatory Authorities

Electricity Supply Association of Australia

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PREFACE

This Standard was prepared by Standards Australia's Committee on Electric Wires and Cables to supersede AS 1747—1980, *Repair and testing of trailing cables and feeder cables used for mining*. It provides standard procedures for the repair of trailing cables and feeder cables used in underground coal mines and other mining applications, and establishes requirements for the repair of cables, that will ensure the repaired cable is returned to a condition as near as possible to the original design.

This Standard is in metric units, but the methods given herein will also be applicable for the repair of imperial dimensioned cables.

CONTENTS

Page

FOREWORD

Preparation of the first edition of this Standard (AS 1747—1975) was prompted by a need to formalize the practice of repairing trailing cables and feeder cables for use in underground coal mines so that some uniformity of practice could be established. As avoidance of premature failure of repaired cables is of paramount importance this Standard contains a definite bias towards existing repair practices used in underground coal mines.

It was the intention of the Committee, that practices that are essential only for underground coal mines should not be imposed upon other sections of the mining industry where they are not warranted. Some requirements of the Standard may be unnecessarily stringent for other than underground coal mining applications.

Where on-site or temporary repairs are undertaken, it is realized that it will not be practicable to carry out all the requirements of the Standard, e.g. testing.

The Standard specifies the use of ferrules, which are subsequently soldered, for joining bunches that may be parts of conductors, conductors as a whole, pliable armouring, and collective metallic or composite screens. Ferrules are also specified as one of two methods for the joining of individual metallic or composite screens. Except in the case of pliable armour, (see Clause 3.13), the Standard does not permit dry crimp joints in any cable but approaches may be made to regulatory authorities for specific recognition of other techniques.

Vulcanizing by the use of a heated pressure moulding machine is the only method acceptable in an underground coal mining operation. Alternative methods are no doubt satisfactory in surface applications, but it is considered that the bonding obtained between original material and repair material by vulcanizing is far superior to that obtained by any other method available at this time. Nevertheless, Clause 3.15 indicates that alternative methods may be employed for surface applications subject to the approval of the relevant Regulatory Authority.

Testing procedures contained in the Standard are those procedures which are considered essential for ensuring that repairs made to cables are of the highest possible quality. It is recognized, however, that some of the tests may be inappropriate in surface applications. The test methods and equipment specified in this Standard are in line with the present state of the art, but it is not in any way intended that development in these fields should be impeded by the need to comply with the existing provisions of this Standard. As new developments occur Standards Australia should be notified so that the matter can be put before the Committee with the view to modifying the Standard to keep pace with technology.

STANDARDS AUSTRALIA

Australian Standard

Reeling, trailing and feeder cables used for mining—Repair and testing

SECTION 1. SCOPE, REFERENCE DOCUMENTS AND DEFINITIONS

1.1 SCOPE. This Standard sets out requirements for the repair and testing of cables used in underground coal mines. The requirements of this Standard may apply also to the repair of cables used elsewhere, e.g. metalliferous mines, open cut mines, quarries and dredges.

The Standard establishes sound practice for the repair and testing of—

(a) reeling and trailing cables used for underground coal mines, metalliferous mines, open-cut mines, quarries and dredges; and

(b) feeder cables used for underground coal mines and having insulation and sheath of elastomer.

Except for pliable armour, the Standard limits repairs to the use of soldered connections only.

The Standard also details the repair of plugs fitted to the cables and to the test equipment used for testing cable.

NOTE: The Standard applies particularly to reeling and trailing cables complying with AS 1802, AS 2802 and the former AS C81; and to feeder cables complying with AS 1972 and the former AS C412, but is not restricted in application to such cables.

Where type or code numbers are referred to in the Standard for trailing cables, the numbers are as specified in AS 1802, AS 2802 and the former AS C81.

1.2 REFERENCED DOCUMENTS. The following documents are referred to in this Standard:

AS
1299 Electrical equipment for coal mines—Flameproof restrained plugs and receptacles
1300 Electrical equipment for coal mines—Bolted flameproof cable coupling devices
1593 Electrical equipment for explosive atmospheres—Increased safety apparatus—Type of protection e
1660 Methods of test for electric cables, cords and conductors
1802 Reeling and trailing electric cables for underground coal mining purposes
1972 Cables for use below ground in coal mines (other than the trailing cables)
2290 Electrical equipment for coal mines—Maintenance and overhaul
2508 Safe storage and handling information cards for hazardous material
2802 Reeling and trailing electric cables for mining and general use (other than underground coal mining)—Elastomeric flexible cables for working voltages 1.1/1.1 kV up to and including 33/33 kV.
C81 Superseded by AS 1802
C412 Superseded by AS 1972

BS
219 Specification for soft solders
2719 Methods of use and calibration of pocket type rubber hardness meters

1.3 DEFINITIONS. For the purpose of this Standard, the following definitions apply:

1.3.1 Reeling and trailing cable—a cable having multiple stranded conductors, insulation incorporating conductor and insulation screens where appropriate, filling, reinforcement where appropriate, and protective covering(s), and specially designed to provide a flexible electrical connection between portable or mobile equipment and a point of supply.

1.3.2 Feeder cable—a cable intended primarily for use between a transportable substation and associated equipment, e.g. gate-end box or distribution centre, where the cable is required to be moved frequently.

1.3.3 Individually screened cable—a cable in which the insulation of each power core is separately enclosed in a conducting layer.

1.3.4 Collectively screened cable—a cable in which the insulation of all conductors is collectively enclosed in a conductive layer.

1.3.5 Conductor screen—a non-metallic semiconductive layer over a power conductor.

1.3.6 Insulation screen—a non-metallic semiconductive layer over insulation of a power core.

1.3.7 Composite screen—a screen comprising copper wires or stranded or bunched copper wires applied in one direction and interwoven in the opposite direction with polyethylene terephthalate, or equivalent, yarn.

1.3.8 Power core—a power conductor with insulation and, when appropriate, the semiconductive conductor and insulation screen, but not including any other protective covering.

1.3.9 Earth conductor—a conductor, metallic or composite earth screen included in the cable for the purpose of providing earth continuity.

1.3.10 Pilot core—a conductor with insulation or covering which is installed either in the centre of a cradle separator (central pilot core) or in the outer interstices between the power cores (interstitial pilot core), or is otherwise laid up in the cable for use in conjunction with a pilot protection system.

1.3.11 Covered conductor—a pilot or earth conductor having elastomeric insulation of a specified radial thickness which differs from that required by the voltage rating of the cable, or an interstitial earth conductor with its semiconductive covering.