AS 3584.1:2021

Australian STANDARD®

STANDARDS Australia

Diesel engine systems for underground coal mines

Part 1: Fire protected — Heavy duty

AS 3584.1:2021

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Australasian Institute of Mining & Metallurgy
Australian Chamber of Commerce and Industry
Australian Industry Group
Chamber of Minerals and Energy of Western Australia
Construction and Mining Equipment Industry Group
Department of Mines, Industry Regulation and Safety, WA
Department of Regional NSW
Department of Resources, Qld
Engineers Australia
Minerals Council of Australia
Mining Electrical and Mining Mechanical Engineering Society
WorkSafe New Zealand

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Diesel engine systems for underground coal mines

Part 1: Fire protected — Heavy duty

Originated as AS/NZS 3584.1:2005.
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Preface

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee ME-018, Mining Equipment, to supersede AS/NZS 3584.1:2008.

After consultation with stakeholders in both countries, Standards Australia and Standards New Zealand decided to develop this document as an Australian Standard rather than an Australian/New Zealand Standard.

The objective of this document is to promote the safety of fire-protected diesel engine systems that are used underground in coal mines.

A list of all parts in this series can be found in the Standards Australia online catalogue.

This document introduces the requirements for a fire ignition hazard assessment and functional safety assessment to be performed on the fire-protected diesel engine system. Emissions requirements for fire-protected diesel engine systems have been removed from this document and are included in AS 3584.4.

The major changes in this document are as follows:

(a) Section 3 Design and construction of this document now includes all performance requirements.

(b) The test appendices now include all test requirements.

(c) Rated torque speed has been replaced with intermediate speed.

(d) References to product certification schemes have been removed.

The terms “normative” and “informative” have been used in this document to define the application of the appendix to which they apply. A “normative” appendix is an integral part of a document, whereas an “informative” appendix is only for information and guidance.

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Part 1: Fire protected — Heavy duty

Section 1 Scope and general

1.1 Scope

This document specifies safety requirements for fire-protected diesel engine systems (FpDES) that are designed for use in designated safe areas in underground coal mines. It applies to diesel engine systems with heavy duty applications.

NOTE Whether a particular application is heavy duty will need to be determined by the end user and the manufacturer, using risk management processes.

Safety requirements include the following:

(a) The control of surface temperature, to avert ignition of coal dust that could settle on a hot surface or fluid fires.

(b) Containment or elimination of flames and sparks that could initiate a fire.

FpDES are not explosion protected and are not designed to operate in flammable or explosive atmospheres.

This document nominates the means by which identified hazards may be managed. It is intended for designers, manufacturers, users, regulatory authorities, testing authorities and associated interests.

1.2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document.

NOTE Documents referenced for informative purposes are listed in the Bibliography.

AS 1019, *Internal combustion engines—Spark emission control devices*

AS 4024.1201, *Safety of machinery — Electrical equipment of machines, Part 1201: General requirements (IEC 60204-1:2016 (ED. 6.0) MOD)*

AS 4024.1501, *Safety of machinery, Part 1501: Design of safety related parts of control systems—General principles for design*

AS 4024.1502, *Safety of machinery, Part 1502: Design of safety related parts of control systems—Validation*

AS 4024.1503, *Safety of machinery, Part 1503: Safety-related parts of control systems—General principles for design*

AS 4024.1601, *Safety of machinery, Part 1601: Design of controls, interlocks and guarding—Guards—General requirements for the design and construction of fixed and movable guards*

AS 5062, *Fire protection for mobile and transportable equipment*

AS 61508.1, *Functional safety of electrical/electronic/programmable electronic safety-related systems, Part 1: General requirements*

AS 62061, *Safety of machinery — Functional safety of safety-related electrical, electronic and programmable electronic control systems (IEC 62061:2005+AMD1:2012+AMD2:2015 CSV (ED.1.2)/COR1:2015 MOD)*

AS/NZS 3584.3, *Diesel engine systems for underground coal mines, Part 3: Maintenance*

AS/NZS 4024.1604, *Safety of machinery, Part 1604: Design of controls, interlocks and guarding — Emergency stop — Principles for design (ISO 13850:2017 (ED.3.0), MOD)*

AS/NZS 4871.1, *Electrical equipment for mines and quarries, Part 1: General requirements*

AS/NZS 4871.5, *Electrical equipment for mines and quarries, Part 5: Battery powered electrical mobile machines*

AS/NZS 4871.6, *Electrical equipment for mines and quarries, Part 6: Diesel powered machinery and ancillary equipment*

AS/NZS 60079.29.1, *Explosive atmospheres, Part 29.1: Gas detectors—Performance requirements of detectors for flammable gases*

AS ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

ISO 1813, *Belt drives — V-ribbed belts, joined V-belts and V-belts including wide section belts and hexagonal belts — Electrical conductivity of antistatic belts: Characteristics and methods of test*

ISO 8178-1, *Reciprocating internal combustion engines — Exhaust emission measurement — Part 1: Test-bed measurement systems of gaseous and particulate emissions*

ISO 9563, *Belt drives — Electrical conductivity of antistatic endless synchronous belts — Characteristics and test method*

ISO 13849-1, *Safety of machinery — Safety related parts of control systems — Part 1: General principles for design*

ISO 13849-2, *Safety of machinery — Safety-related parts of control systems — Part 2: Validation*

ASTM D1298 12b, *Standard Test Method for Density, Relative Density, or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method*

1.3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

1.3.1
catalytic converter
equipment that modifies the constituents of an exhaust gas stream by means of a catalyst

1.3.2
designated safe area
place in which there is a minimum likelihood of an explosive atmosphere being present, which would require special precautions while a diesel engine is operated, serviced or maintained

Note 1 to entry: It cannot be assumed that areas of a mine that are not classified as being explosion risk zones are designated safe areas.

Note 2 to entry: Legislation, regulations or requirements by the relevant statutory authority may define a designated safe area in greater detail.

1.3.3
engine safety shutdown system
protection system that automatically causes an engine to stop in the event of an unsafe condition occurring

1.3.4
emergency safety shutdown system
system fitted to stop the diesel engine in the event of the failure of the other systems to stop the engine