AS 3584.4:2021

Australian STANDARD®

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Diesel engine systems for underground coal mines

Part 4: Emissions

AS 3584.4:2021

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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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Preface

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee ME-018, Mining Equipment.

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 separate emissions performance and testing requirements as applied to both fire protected and explosion protected engines used in underground coal mines. This document draws together a number of International and Australian references to achieve a contemporary standard relevant for underground coal workplaces.

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

Modern diesel engines are achieving lower exhaust emissions through advanced electronics and after-treatment systems that are not readily compatible with fire protection and explosion protection methods and standards.

This document provides test procedures that specify the acceptable levels of exhaust emissions produced by specialized diesel engines with fire and explosion protection capability that operate in underground coal mines. These test levels are designed to strike a balance between the twin requirements of these engines to operate safely in a hazardous environment and to minimize harmful exhaust emissions.

In the preparation of this document, reference was made to the use of steady-state and transient test cycles for non-road diesel engine emissions measurements as specified in the ISO 8178 series and the UNECE Regulation No. 96 Revision 3, *Uniform provisions concerning the approval of compression ignition (C.I.) engines to be installed in agricultural and forestry tractors and in non-road mobile machinery with regard to the emissions of pollutants by the engine*. Regression line tolerances associated with transient testing have been adjusted from the UNR096r3:2014 to accommodate ExDES engine systems and current testing facilities available in Australia.

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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1 Scope and general

1.1 Scope

This document specifies the test equipment, test cycles, performance and reporting requirements for type testing of exhaust emissions for diesel engine systems (DES) to be used in underground coal mines.

This document applies to—

(a) fire-protected DES as defined in AS 3584.1; and

(b) explosion-protected DES as defined in AS 3584.2.

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 3584.1, *Diesel engine systems for underground coal mines, Part 1: Fire protected — Heavy duty*

AS 3584.2, *Diesel engine systems for underground coal mines, Part 2: Explosion protected*

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

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

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

ISO 8178-4, *Reciprocating internal combustion engines — Exhaust emission measurement — Part 4: Steady-state and transient test cycles for different engine applications*

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

NIOSH 5040, *Diesel Particulate Matter*

SN 277206, *Internal combustion engines—Exhaust gas after-treatment—Particle filter systems—Testing method*

Regulation No U.N.E.C.E. 96, Revision 3, *Uniform provisions concerning the approval of compression ignition (C.I.) engines to be installed in agricultural and forestry tractors and in non-road mobile machinery with regard to the emissions of pollutants by the engine, Addendum 95 Agreement Concerning the adoption of uniform technical prescriptions for wheeled vehicles, equipment and parts which can be fitted and/or be used on wheeled vehicles and the conditions for reciprocal recognition of approvals granted on the basis of these prescriptions* [online]. Geneva, Switzerland: [Viewed 18 January 2021]. Available from https://www.unece.org/fileadmin/DAM/trans/main/wp29/wp29regs/2015/R096r3e.pdf

SAFE WORK AUSTRALIA. *Workplace exposure standards for airborne contaminants* [online]. Canberra, Australia: [viewed 18 January 2021]. Available from https://www.safeworkaustralia.gov.au/system/files/documents/1912/workplace-exposure-standards-airborne-contaminants.pdf