AS 2789.3—1985
UDC 621.43.018

Australian Standard®
2789.3—1985

INTERNAL COMBUSTION ENGINES—PERFORMANCE

Part 3—ENGINES FOR LAND, RAIL-TRACTION AND MARINE USE—TEST MEASUREMENTS

STANDARDS ASSOCIATION OF AUSTRALIA
Incorporated by Royal Charter

B

This Australian standard was prepared by Committee ME/20, Internal Combustion Engines. It was approved on behalf of the Council of the Standards Association of Australia on 6 February 1985 and published on 10 May 1985.

The following interests are represented on Committee ME/20:

Australian Assembly of Fire Authorities

Australian Chamber of Commerce

Building Owners and Managers Association of Australia Limited

Confederation of Australian Industry

Construction Equipment Importers and Manufacturers of Australia

Department of Agriculture, Vic.

Department of Defence

Electricity Supply Association of Australia

Federal Chamber of Automotive Industries

Federation of Automotive Products Manufacturers

Institution of Engineers Australia

Metal Trades Industry Association of Australia

National Farmers Federation

Society of Automotive Engineers Australasia

State Insurance Office, Vic.

Tractor and Machinery Association of Australia

University of Melbourne

Victoria Police

This standard was issued in draft form for comment as DR 84025.

AS 2789 Parts 0-10 supersedes AS1501 - 1976

AS 2789 Parts 1-6 were published in May 1985 and in the May 1985 TAS they were given as superseding AS 1501 - 1976 which was withdrawn.

AS 2789 Parts 0 and 7-10 were published in May 1986. Information received from the technical officer, Peter Moore, is that they do supersede in part AS 1501-1976 but no information to that effect was given in the May 1986 TAS.

AUSTRALIAN STANDARD

INTERNAL COMBUSTION ENGINES—PERFORMANCE

Part 3
ENGINES FOR LAND, RAIL-TRACTION AND MARINE USE—TEST MEASUREMENTS

AS 2789.3—1985

First published 1985

PUBLISHED BY THE STANDARDS ASSOCIATION OF AUSTRALIA
STANDARDS HOUSE, 80 ARTHUR ST, NORTH SYDNEY, N.S.W.

ISBN 0 7262 3718 3

PREFACE

This standard was prepared by the Association's Committee on Internal Combustion Engines. It supersedes (in part) AS 1501—1976, Method for Rating and Testing of Internal Combustion Engines. It is one of a series of six standards on the performance of internal combustion engines which are identical with and have been reproduced from International Standards ISO 3046/1, 3046/2, 3046/3, 3046/4, 3046/5 and 3046/6, drawn up by ISO/TC 70.

The standards in the series are as follows:

AS 2789.1 Internal Combustion Engines—Performance, Part 1—Engines for Land, Rail-traction and Marine Use—Standard Reference Conditions and Declarations of Power, Fuel Consumption and Lubricating Oil Consumption

AS 2789.2 Internal Combustion Engines—Performance, Part 2—Engines for Land, Rail-traction and Marine Use—Test Methods

AS 2789.3 Internal Combustion Engines—Performance, Part 3—Engines for Land, Rail-traction and Marine Use—Test Measurements

AS 2789.4 Internal Combustion Engines—Performance, Part 4—Engines for Land, Rail-traction and Marine Use—Speed Governing

AS 2789.5 Internal Combustion Engines—Performance, Part 5—Engines for Land, Rail-traction and Marine Use—Torsional Vibration

AS 2789.6 Internal Combustion Engines—Performance, Part 6—Engines for Land, Rail-traction and Marine Use—Overspeed Protection

The series of standards applies to internal combustion engines for land, rail-traction and marine use, excluding engines used to propel agricultural tractors, road construction and earthmoving machines, road vehicles, motor cycles and aircraft.

It is proposed that additional parts will be reproduced from ISO standards which cover further matters in relation to the performance of internal combustion engines. An application standard (AS 2789.0)* is also intended which will be read in conjunction with these standards to cover any variation which the committee considers warranted to meet Australian conditions.

For the purpose of this Australian standard, the text of the ISO standard used herein should be modified as follows:

(a) *Terminology.* The words 'Australian standard' should replace the words 'International Standard' wherever they appear.

(b) *Decimal comma.* The decimal point should replace the decimal comma wherever it appears.

(c) *Cross-references.* The reference to International Standards should be replaced by references to Australian standards as follows:

Reference to International Standard	*Appropriate Australian Standard*
ISO 3046/1—Reciprocating internal combustion engines—Performance—Part 1: Standard reference conditions and declarations of power, fuel consumption and lubricating oil consumption	AS 2789.1—Internal Combustion Engines—Performance, Part 1—Engines for Land, Rail-traction and Marine Use—Standard Reference Conditions and Declarations of Power, Fuel Consumption and Lubricating Oil Consumption
ISO 3046/2—Reciprocating internal combustion engines—Performance—Part 2: Test methods	AS 2789.2—Internal Combustion Engines—Performance, Part 2—Engines for Land, Rail-traction and Marine Use—Test Methods
ISO 3046/4—Reciprocating internal combustion engines—Performance—Part 4: Speed governing	AS 2789.4—Internal Combustion Engines—Performance, Part 4— Engines for Land, Rail-traction and Marine Use—Speed Governing

* In course of preparation.

Contents

(BLANK)

Internal combustion engines—Performance Part 3—Engines for land, rail-traction and marine use—Test measurements

1 SCOPE

This International Standard summarizes the common techniques of measurement of the main parameters of reciprocating internal combustion engines to ensure the required precision in measurements. Where necessary, individual requirements may be given for particular engine applications.

2 FIELD OF APPLICATION

This International Standard applies to reciprocating internal combustion engines for land, rail-traction and marine use, excluding engines used to propel road construction and earth-moving machines, agricultural and industrial types of tractors, automobiles and trucks and aero-engines.

3 REFERENCES

ISO 3046/I, *Reciprocating internal combustion engines : Performance – Part I : Standard reference conditions and declarations of power, fuel consumption and lubricating oil consumption.*

ISO 3046/II, *Reciprocating internal combustion engines : Performance – Part II : Test methods.*

ISO 3046/IV, *Reciprocating internal combustion engines : Performance – Part IV : Speed governing.*

4 MEASUREMENT CONDITIONS AND DEFINITIONS OF DEGREE OF ACCURACY

4.1 Operating conditions

4.1.1 Before a set of measurements is commenced, the engine shall have operated at the particular conditions of load and speed for a sufficient length of time to ensure that the operating temperatures have reached stable conditions as laid down by the manufacturer.

4.1.2 During the period in which a set of measurements is being made, the load, speed and all fluid temperatures and pressures shall be maintained constant within the limits of accuracy of measurement given in clause 5, column 6 of this International Standard.

4.2 Methods of measurement

4.2.1 Methods of measurement are selected by the manufacturer and, if necessary, may be subject to contractual agreement between the manufacturer, customer and/or inspecting authority.

4.2.2 The location of points of measurement is selected by the manufacturer.

4.3 Accuracy of measurement

4.3.1 The accuracy of measurement indicated in column 6 of clause 5 of this International Standard applies only to the power declared in the contract, and not only includes the accuracy of the instrument being used but also involves the correctness of its location, the conditions under which it is being used, and the interpretation of the results obtained.

Where the total accuracy involves measurements of a number of quantities, each with its own accuracy, or where an individual measurement is dependent on several parameters, each with its own accuracy, the overall accuracy is taken as the square root of the sum of the squares of the separate accuracies, each multiplied by an appropriate factor equal to the exponent of its parameter in the formulae.

4.3.2 The accuracy quoted is that considered adequate for most acceptance test purposes. Manufacturers may adopt greater accuracy of measurement :

a) for type tests;
b) for special contractual or legislative requirements.

Where measurements are used in subsequent calculations, accuracies other than those specified for the measured parameters may be chosen to achieve the specified accuracy of the final calculated parameters.

4.3.3 The degree of accuracy assumes that the instruments selected are operating within their range of maximum accuracy.

4.3.4 All measuring instruments and apparatus used during tests shall be checked and calibrated over the range of the expected readings.

4.3.5 Hydraulic brakes, electric dynamometers or other similar appliances for measurement of torque should be statically calibrated by suspending weights on a lever arm of constant length or by other suitable methods.

Electric dynamometers shall be calibrated for both "brake" and "motoring" positions.