

Australian/New Zealand Standard™

**Natural gas (NG) fuel systems for
vehicle engines**



AS/NZS 2739:2009

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee ME-046, Gas Fuel Systems for Vehicle Engines. It was approved on behalf of the Council of Standards Australia on 4 November 2008 and on behalf of the Council of Standards New Zealand on 25 February 2009. This Standard was published on 16 March 2009.

The following are represented on Committee ME-046:

Australian Automobile Association
Australian Industrial Truck Association
Department for Transport, Energy and Infrastructure, SA
Department of Mines and Energy, Qld
Energy Safety, WA
Engineers Australia
Federal Chamber of Automotive Industries
Gas Association of New Zealand
International Association for Natural Gas Vehicles
New Zealand Transport Agency
LPG Association of New Zealand
LPG Australia
Motor Trade Association, New Zealand
Motor Traders' Association of NSW
Motor Trades Association of Australia
Roads and Traffic Authority of NSW
Safework SA Department for Premier and Cabinet
Victorian Police
TAFE NSW

Keeping Standards up-to-date

Standards are living documents which reflect progress in science, technology and systems. To maintain their currency, all Standards are periodically reviewed, and new editions are published. Between editions, amendments may be issued. Standards may also be withdrawn. It is important that readers assure themselves they are using a current Standard, which should include any amendments which may have been published since the Standard was purchased.

Detailed information about joint Australian/New Zealand Standards can be found by visiting the Standards Web Shop at www.standards.com.au or Standards New Zealand web site at www.standards.co.nz and looking up the relevant Standard in the online catalogue.

Alternatively, both organizations publish an annual printed Catalogue with full details of all current Standards. For more frequent listings or notification of revisions, amendments and withdrawals, Standards Australia and Standards New Zealand offer a number of update options. For information about these services, users should contact their respective national Standards organization.

We also welcome suggestions for improvement in our Standards, and especially encourage readers to notify us immediately of any apparent inaccuracies or ambiguities. Please address your comments to the Chief Executive of either Standards Australia or Standards New Zealand at the address shown on the back cover.

This Standard was issued in draft form for comment as DR 07279.

Australian/New Zealand Standard™

**Natural gas (NG) fuel systems for
vehicle engines**

Originated in Australia as AS 2739—1984.
Originated in New Zealand as NZS 5422.2:1980.
Previous edition AS/NZS 2739:2003.
Fifth edition 2009.

COPYRIGHT

© Standards Australia/Standards New Zealand

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of the publisher.

Jointly published by Standards Australia, GPO Box 476, Sydney, NSW 2001 and Standards New Zealand, Private Bag 2439, Wellington 6020

ISBN 0 7337 9050 X

PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee ME-046, Gas Fuel Systems for Vehicle Engines, to supersede AS/NZS 2739:2003, *Natural Gas (CNG) fuel systems for vehicle engines*.

This edition introduces requirements for the installation of equipment used in fuelling engines with Liquefied Natural Gas (LNG). The term Compressed Natural Gas (CNG) has been removed from the title of this Standard so as to allow the introduction of LNG alongside CNG.

The document has been restructured to facilitate the introduction of LNG requirements alongside the requirements of CNG and a new section dealing exclusively with LNG.

The requirement for the maximum working operating pressure of 20 MPa for CNG containers has been removed to allow for the latest designs in container specifications. The Installation Compliance Plate requirement has been modified for consistency with AS/NZS 1425, *LP Gas fuel systems for vehicle engines*.

The 2003 edition had been expanded to include engine exhaust emission testing and acceptance of components complying with ISO 15500, Parts 1 to 20 and ECE R110. This Standard further incorporates changes to the requirements of exhaust emissions, which are simplified and include requirements for both CNG and LNG fuelled engines.

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

CONTENTS

	<i>Page</i>
SECTION 1 SCOPE AND GENERAL	
1.1 SCOPE	5
1.2 OBJECTIVE.....	5
1.3 REFERENCED DOCUMENTS	5
1.4 DEFINITIONS	5
1.5 NEW DESIGNS AND INNOVATIONS	5
1.6 VEHICLE MODIFICATIONS	8
1.7 IMPACT ON VEHICLE LOADING	9
1.8 ENGINE MANAGEMENT SYSTEM ALTERATIONS	9
1.9 APPROVED EQUIPMENT.....	10
1.10 PREVIOUSLY USED EQUIPMENT	10
1.11 WORKING AREA AND SAFE PRACTICES.....	10
SECTION 2 COMPONENTS	
2.1 GENERAL SUITABILITY	11
2.2 COMPONENT PARTS	11
2.3 MODIFICATION	11
SECTION 3 CNG CONTAINER AND FUEL SYSTEM COMPONENTS	
3.1 APPLICATION	12
3.2 CONTAINER	12
3.3 COMPONENTS FOR REMOVABLE CONTAINERS	13
3.4 CONTAINER VALVE.....	13
3.5 REFUELLING CONNECTION	13
3.6 REFUELLING NON-RETURN VALVE	14
3.7 LOCATION OF REFUELLING RECEPTACLE	14
3.8 REFUELLING INFORMATION PLATE	14
3.9 SERVICE ISOLATION VALVE.....	15
3.10 FUEL FILTER.....	15
3.11 AUTOMATIC FUEL SHUT-OFF DEVICE.....	15
3.12 FUEL FLOW REGULATION DEVICE.....	15
3.13 CONTENTS INDICATOR.....	16
3.14 CONTAINER COMPARTMENTS AND SUB-COMPARTMENTS	16
3.15 MOUNTING OF FUEL CONTAINER	18
3.16 CONTAINER LOCATION AND GROUND CLEARANCES	21
3.17 PROTECTION	23
3.18 HEAT SHIELDING	23
SECTION 4 LNG CONTAINER AND FUEL SYSTEM COMPONENTS	
4.1 APPLICATION	24
4.2 CONTAINER	24
4.3 DESIGN OF REFUELLING CONNECTION	25
4.4 CONTAINER SHUT-OFF VALVE	25
4.5 PRESSURE RELIEF DEVICES	26
4.6 MOUNTING OF CONTAINER(S)	26
4.7 CONTAINER LOCATION AND GROUND CLEARANCES	27
4.8 PROTECTION OF CONTAINER	28
4.9 CONTAINERS MOUNTED IN THE INTERIOR OF VEHICLES	29
4.10 VAPORIZERS.....	29

SECTION 5 CNG AND LNG FUEL SERVICE LINES AND MATERIALS	
5.1	APPLICATION 30
5.2	MATERIALS 30
5.3	RIGID PIPING 30
5.4	FLEXIBLE PIPING 31
5.5	JOINTS AND CONNECTIONS 31
5.6	PIPING INSTALLATION AND PROTECTION 31
5.7	PIPING OR FITTINGS IN ENCLOSED SPACES 32
5.8	CNG TRAILERS AND SEMITRAILERS 32
5.9	FUEL HOSE FOR PRESSURE NOT EXCEEDING 100 kPa 32
5.10	NG GAS FUEL PIPING FOR PRESSURE NOT EXCEEDING 450 kPa 33
5.11	CNG BREAKAWAY COUPLINGS 33
SECTION 6 FUEL CONTROL EQUIPMENT	
6.1	APPLICATION 34
6.2	FUEL METERING SYSTEM 34
6.3	FUEL SELECTOR 34
6.4	PETROL OR DIESEL SYSTEM MODIFICATIONS 35
6.5	ELECTRICAL WIRING 35
6.6	ENGINE MANAGEMENT SYSTEM 35
SECTION 7 INSPECTION, TESTING AND COMMISSIONING	
7.1	APPLICATION 36
7.2	USED EQUIPMENT 36
7.3	MODIFICATIONS AND REPAIRS 36
7.4	PRECAUTIONS 36
7.5	INSPECTION 37
7.6	LEAK DETECTION 37
7.7	CONTAINERS 37
7.8	INSTALLATION TEST 38
7.9	PERIODIC INSPECTION 39
7.10	NON-RETURN VALVE TEST 41
SECTION 8 CERTIFICATION COMPLIANCE PLATE, MARKINGS AND LABELS	
8.1	APPLICATION 42
8.2	CERTIFICATION 42
8.3	COMPLIANCE PLATE 42
8.4	LABELS AND MARKINGS 42
8.5	OPERATING INSTRUCTIONS 43
APPENDICES	
A	LIST OF REFERENCED DOCUMENTS 44
B	REGULATING AGENCY INFORMATION 48
C	NEW ZEALAND CNG REFUELLING CONNECTION AND DUST PLUG 50
D	LEAK DETECTION METHODS 51
E	PROCEDURES FOR DEMONSTRATING COMPLIANCE WITH EXHAUST EMISSION STANDARDS (Australia only) 53

STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

Australian/New Zealand Standard
Natural gas (NG) fuel systems for vehicle engines

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard specifies requirements for natural gas (NG) fuel systems for engines mounted on motor vehicles, either for the propulsion of the vehicles or for driving some auxiliary function, e.g. a mixer or a pump. It provides requirements for the design and construction of component parts, and for their installation in vehicles, and for tests, commissioning, and periodic inspection. It applies to all vehicle types, e.g. rigid chassis, articulated chassis and semitrailers.

This Standard does not cover the areas where major structural modifications are to be carried out to the vehicle. Prior to commencement of such work guidance should be sought from the vehicle manufacturer or a professional engineer who is experienced in the automotive disciplines.

This Standard does not apply to NG usage such as the gas supply system for appliances in caravans, mobile homes, forklifts, floor sweepers, polishers, tow tractors, elevating work platforms and industrial engines (refer to AS 4983) or for the propulsion of marine craft (refer to AS 4732).

1.2 OBJECTIVE

The objective of this Standard is to provide designers, manufacturers, installers and regulatory authorities with technical requirements for natural gas fuel systems for vehicle engines so as to provide functional, safe installations.

1.3 REFERENCED DOCUMENTS

A list of the Standards referenced in this Standard is given in Appendix A.

1.4 DEFINITIONS

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

1.4.1 Approved, approval

Approved by or approval of the regulatory authority.

1.4.2 Authority

The authority having statutory powers to control any aspect of the design, manufacture, installation and use of equipment described in this Standard in the country, state or territory in which the vehicle is registered.

1.4.3 Authorized person

In Australia—a person who has completed an authorized training course and is licensed/registered by the relevant statutory authority to install or service natural gas equipment in automotive vehicles.