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SAA AUTOMOTIVE CNG CODE

STANDARDS ASSOCIATION OF AUSTRALIA
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The following interests are represented on Committee ME/46:

Australia Post

Australian Automobile Association

Australian Automobile Chamber of Commerce

Australian Liquefied Petroleum Gas Association

Australian Road Transport Federation

Australian Taxi Industry Association

Boiler and Pressure Vessel Manufacturers Association of Australia

Confederation of Australian Industry

Country Fire Authority

Department of Industrial Relations N.S.W.

Department of Labour, S.A.

Department of Mines and Energy, N.T.

Department of Mines, Qld

Department of Resources and Energy

Department of Territories and Local Government

Department of Transport

Federal Chamber of Automotive Industries

Institution of Engineers Australia

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Licensed Autogas Installers Society (N.S.W.)

Metal Trades Industry Association of Australia

Metropolitan Fire Brigades Board Melbourne

Ministry of Employment and Training, Vic.

Road Traffic Authority, Vic.

Road Traffic Board, S.A.

Society of Automotive Engineers—Australasia

State Energy Commission, W.A.

Victoria Police

This standard was issued in draft form for comment as DR 83207.

AUSTRALIAN STANDARD

COMPRESSED NATURAL GAS FUEL SYSTEMS FOR VEHICLE ENGINES

known as the SAA AUTOMOTIVE CNG CODE

First published.....1984

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PREFACE

This standard was prepared by the Association's Committee on Gas Fuel Systems for Vehicle Engines. It was derived from a draft prepared by the Society of Automotive Engineers.

For the specialized requirements for CNG this standard draws on NZS 5422, The Use of LPG and CNG Fuel Systems in Internal Combustion Engines, Part 2—CNG Fuel, and the Department of California Highway Patrol, Compressed and Liquefied Fuel System Regulations. Otherwise it aligns as closely as possible with AS 1425—1982, SAA Automotive LP Gas Code.

A question that is still open is whether to increase the maximum filling pressure nominated in this standard. The pressure has a marked influence on the economics of CNG vehicle operation, but an increase cannot be effected without adequate consideration for public safety, container technology, compressor capability and costs, and other matters that might affect cost/benefit decisions. In the absence of a comprehensive fund of knowledge about CNG, the committee has been unable to determine whether 16.5 MPa as chosen is the real optimum, or whether some higher pressure might be advantageous.

The substantial differences between CNG and LPG fuels as used in vehicles have led to significant departures from the sealed compartment and subcompartment philosophy of AS 1425.

In an LPG system these enclosures have a dual function. They are intended to prevent any vapour leakage to an enclosed area of the vehicle, and they provide substantial mechanical protection for the fittings and valves which would otherwise be exposed to possible damage.

In the normally installed position, the single end-mounted CNG cylinder valve is not nearly as exposed to mechanical damage as the valves and fittings of the LPG containers. Further, an LPG-type compartment or subcompartment would isolate the fusible plug protective device from the temperatures to which the rest of the cylinder may be exposed, an unacceptable possibility.

Other factors were that the total stored energy in the CNG cylinder is considerably less than for a similarly sized LPG container, and the CNG will disperse much more rapidly than LPG when discharged. The risk is therefore much lower.

These considerations were the basis for a distinctive CNG philosophy for sealed compartment, i.e. the standard should permit the use of a pliable material for the vapour sealing and the venting of the cylinder valve and fittings. Mechanical protection of the valves, fittings, and the vapour/seal would then be provided by a separate guard.

The terms of reference of the committee were limited to consideration of the vehicle itself, but a number of matters arose which relate to the filling station rather than to the vehicle. The following are noted for the advice of any organizations or committees which may in the future need to prepare regulations or standards for filling stations:

(a) An excess-flow device is not included in the vehicle system. However, a bursting disc failure, piping failure, fill hose failure or disconnection would result in a large leakage. This is particularly a problem where a trickle fill system is employed as the vehicle may be unattended at the time. The committee agrees therefore than an excess-flow prevention system should be incorporated in the filling station.

(b) While overpressure protection is provided at the fill point in the vehicle system, the committee considers that a protection system to prevent overpressurizing of vehicle systems should be incorporated in the filling station.

(c) A facility to release the pressure in the filling hose before disconnecting is desirable.

(d) This standard cannot compel the posting of filling instructions, necessary for safe vehicle operation. Therefore, the posting of the instructions described in Appendix A should be a requirement of any filling station regulations or standards.

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COMPRESSED NATURAL GAS FUEL SYSTEMS FOR VEHICLE ENGINES

SECTION 1. SCOPE AND GENERAL

1.1 SCOPE. This standard sets out requirements for compressed natural gas (CNG) 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 testing, commissioning, and periodic inspection. The standard may be applied to stationary engines where it is relevant.

1.2 NEW DESIGNS AND INNOVATIONS. Any novel materials, designs, method of assembly, procedures, etc, which do not comply with a specific requirement of this standard, or are not mentioned in it, but which give equivalent results to those specified, are not necessarily prohibited. SAA Committee ME/46 can act in an advisory capacity concerning equivalent suitability, but the specific approval remains the prerogative of the Authority.

1.3 INTERPRETATIONS. Questions concerning the meaning, application or effect of any part of this standard, may be referred to SAA Committee ME/46, for explanation. The authority of this committee is limited to matters of interpretation and it will not adjudicate in disputes.

1.4 REFERENCED DOCUMENTS. A list with titles of the standards referred to in this standard is given in the Annex.

1.5 DEFINITIONS. For the purpose of this standard, the following definitions apply:

1.5.1 Approved, approval—approved by or approval of the Authority.

1.5.2 Authority—the Authority having statutory powers to control any aspect of the design, manufacture and installation of equipment described in this standard in the State or Territory in which the vehicle is registered.

1.5.3 Authorized person—a person authorized by the relevant authority to install and maintain automotive CNG system.

1.5.4 Compressed natural gas (CNG)—a compressed gaseous fuel composed predominantly of methane (CH_4).

1.5.5 Container—a gas cylinder or pressure vessel which functions as an engine fuel tank.

1.5.6 Container compartment—a structure of rigid or pliable material which encloses the whole of the container and its fittings, whose purpose is to collect any gas leakage which might occur, so that it can be discharged to open air*.

1.5.7 Container subcompartment—a structure of rigid or pliable material attached to the container, which encloses the container fittings, and whose purpose is to collect any gas leakage which might occur, so that it can be discharged to open air*.

1.5.8 Design pressure—the maximum pressure to which a vessel or component will be subjected, and the basis for determining the thickness or dimensions of the component under consideration.

1.5.9 Maximum filling pressure—the maximum pressure to which it is permitted to fill a container with CNG measured when the container and its contents are at equilibrium temperature of 15°C.

1.5.10 Removable container—a container which is removed from the vehicle when refuelling is necessary, usually in exchange for a full container.

*The primary function of a compartment or subcompartment is leakage collection and discharge, not physical protection. This is a separate need, which may equally well be provided by some other means.