Singapore Standards Council

TR 12 : 2003
(ICS 43.060.40; 75.060)

TECHNICAL REFERENCE

Compressed natural gas (CNG) vehicle refueling stations

Published by
Enterprise Singapore

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ISBN 9971-67-962-0

First published, 2003

NOTE

1. *Singapore Standards (SSs) and Technical References (TRs) are reviewed periodically to keep abreast of technical changes, technological developments and industry practices. The changes are documented through the issue of either amendments or revisions.*

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3. *Compliance with a SS or TR does not exempt users from any legal obligations*

Contents

Foreword

This Technical Reference was prepared by the Working Group on Compressed Natural Gas (CNG) Vehicles appointed by the Technical Committee on Engineering Support under the direction of the General Engineering and Safety Standards Committee. It is now endorsed under the national standardisation programme, which is coordinated by the Enterprise Singapore and guided by an industry-led Singapore Standards Council.

This Technical Reference is not to be regarded as a Singapore Standard. It is made available for provisional application over a period of two years, but does not have the status of a Singapore Standard. The aim is to use the experience gained to modify the Technical Reference so that it can be adopted as a Singapore Standard. Users of the Technical Reference are invited to comment on its technical content, ease of use and any ambiguities or anomalies. These comments can be submitted using the feedback form provided at the end of the Technical Reference and will be taken into account in the review of the publication. At the end of the two years, the Technical Reference will be reviewed by the CNG WG to discuss the comments received and to determine its suitability as a Singapore Standard. Submission for approval by the Standards Council as a Singapore Standard will be carried out only upon agreement after review.

This Technical Reference has been compiled from a number of established national and international standards, taking into account the latest technology developments, as well as operating, industrial and regulatory conditions specific to Singapore. To promote international harmonisation, ease of application, and availability and affordability of products, the terminology and requirements have been aligned where possible with the latest relevant ISO standards or the applicable equivalent national standards.

Whilst it is inevitable that there will be discrepancies among different international and national standards, industry experience indicates they have by and large provided a satisfactory history of safety and performance. Thus this Technical Reference also allows the use of components, systems and assembly methods which vary from those specified in it, but which comply with accepted alternative national and international standards.

In addition, components need not be directly approved in Singapore. Acceptance of foreign approvals, at the discretion of Singapore's natural gas vehicle industry and regulatory authorities, will improve the availability of safe and affordable components from a wide range of supply sources.

It is intended that work on CNG refuelling stations and their associated equipment is performed only by qualified CNG gas fitters. The training of such personnel may be conducted at accredited vocational training institutions. The registration/certification of qualified personnel may be conducted by a suitable regulatory authority or industry body.

This Technical Reference is not to be regarded as being either a design specification or an instruction manual for untrained persons. The requirements are intended to be used in conjunction with, but not take precedence over, any statutory regulations which may apply.

While great care and extensive research has gone into the preparation of this Technical Reference, the Committee cannot accept responsibility for any inadequacies. Furthermore, compliance with this Technical Reference does not in any way remove the responsibility from persons involved in work associated with a refuelling station for ensuring at all times that the facility is in a safe condition.

The terms "normative" and "informative" have been used in this Technical Reference to indicate the status of an annex. A "normative" annex constitutes a provision for mandatory compliance, while an "informative" annex is only for information and guidance.

Attention is drawn to the possibility that some of the elements of this Technical Reference may be the subject of patent rights. Enterprise Singapore shall not be held responsible for identifying any or all of such patent rights.

Technical reference for ompressed natural gas (CNG) vehicle refuelling stations

1 Scope and general

1.1 Scope

This Technical Reference applies to the design, construction and operation of a compressed natural gas refuelling station operating on pipeline quality gas.

Classification of hazardous areas shall be in accordance with AS/NZS 2430.3 as applied to natural gas compression, storage and handling.

Where other standards are referred to in this Technical Reference, the reference shall be taken to include all current amendments.

Subject to the approval of the relevant regulatory authorities, non-public fleet refuelling stations and special purpose refuelling stations may employ designs, layouts and components that are different from those specified in this Technical Reference.

1.2 Objective

The objective of this Technical Reference is to provide designers, manufacturers, installers and regulatory authorities with technical requirements for compressed natural gas vehicle refuelling stations so as to provide functional, safe installations.

1.3 Normative references

The following referenced documents are indispensable for the application of this standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ANSI/AGA NGV 1	Compressed natural gas vehicle (NGV) fueling connection devices
ANSI/IAS NGV 2	Basic requirements for compressed natural gas vehicle (NGV) fuel containers
ASTM A 53	Specification for pipe, steel, black and hot-dipped, zinc-coated welded and seamless
ASTM A 269	Specification for seamless and welded austenitic stainless steel tubing for general service
NFPA 68	Guide for venting of deflagrations
SAE J1453	Fitting – O-ring face seal
AS/NZS 2430.3	Classification of hazardous areas. Part 3 – Specific occupancies
AS 2832	Guide for the cathodic protection of metals. Part 1 – Pipes, cables and ducts
BS 806	Specification for the design and construction of ferrous piping installations for and in connection with land boilers
BS EN 837	Pressure gauges
	Part 1 : Bourdon tube pressure gauges. Dimensions, metrology, requirements and testing

	Part 2 : Selection and installation recommendations for pressure gauges
BS 2050	Specification for electrical resistance of conducting and antistatic products made from flexible polymeric material
CSA B51 Part 2	Boilers, pressure vessels, and pressure piping code. Part 2 : High pressure cylinders for the on-board storage of natural gas as a fuel for automotive vehicles
ISO 834	Fire resistance tests – Elements of building construction. Parts 1 to 11
ISO 11439	Gas cylinders – High pressure cylinders for the on-board storage of natural gas as a fuel for automotive vehicles
ISO 15403	Natural gas – Designation of the quality of natural gas for use as a compressed fuel for vehicles
ISO 15500-17	Road vehicles – Compressed natural gas (CNG) fuel system components. Part 17 : Flexible fuel line
CP 5	Code of practice for electrical installations
CP 13	Code of practice for mechanical ventilation and air-conditioning in buildings
CP 29	Code of practice for fire hydrant systems and hose reels
SS 217	Specification for industrial safety signs
SS 232-1	Specification for portable fire extinguishers – Description, duration of operation, Class A and B fire tests
TR 10	Compressed natural gas (CNG) vehicle workshop and personnel requirements
TR 11	Compressed natural gas (CNG) vehicle component and installation