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Australian Standard 2018–1981

SAA LIQUID PETROLEUM PIPELINE CODE

STANDARDS ASSOCIATION OF AUSTRALIA
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THE FOLLOWING SCIENTIFIC, INDUSTRIAL AND GOVERNMENTAL ORGANIZATIONS and departments were officially represented on the committee entrusted with the preparation of this standard:

Australasian Corrosion Association
Australasian Institute of Mining and Metallurgy
Australian Gas Association
Australian Institute of Energy
Australian Institute for Non-destructive Testing
Australian Institute of Petroleum
Australian Liquefied Petroleum Gas Association
Australian Petroleum Exploration Association
Australian Pipelines Industry Association
Australian Welding Institute
Australian Welding Research Association
Bureau of Steel Manufacturers of Australia
Department of Industrial Relations, N.S.W.
Department of Minerals and Energy, Victoria
Department of Mines and Energy, S.A.
Department of Mines, Queensland
Department of Mines, W.A.
Energy Authority of New South Wales
Institution of Engineers, Australia
Institute of Petroleum, U.K.
Metal Trades Industry Association of Australia
National Association of Australian State Road Authorities
New South Wales Institute of Technology
Pipeline Authority
Pipelines Authority of South Australia
Railways of Australia Committee
Snowy Mountains Engineering Corporation

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AUSTRALIAN STANDARD

LIQUID PETROLEUM PIPELINES

known as the

SAA LIQUID PETROLEUM PIPELINE CODE

AS 2018—1981

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PREFACE

This edition of this standard was prepared by the Association's Committee on Gas and Liquid Petroleum Piping Systems.

This edition includes a major revision of Section 8—Corrosion Mitigation, and also includes the changes made in Amendment No 1 which, in the main, incorporated requirements for determining a safe operating pressure for a corroded pipeline. The items which have been technically revised in this edition are listed in the 'Annex' following the Index.

The purpose of this standard is to establish requirements for safe design, construction, inspection, testing, operation, and maintenance of liquid petroleum pipelines constructed from steel pipe. Such requirements are necessary for the protection of the general public, the Operating Authority personnel, and the environment as well as to provide reasonable protection for the pipeline against accidental damage resulting from activities other than those of the Operating Authority.

The standard sets out requirements for good engineering practice based on known experience and on appropriate existing Australian and overseas standards. Close attention has been given to AS 1697, SAA Gas Pipeline Code; AS 1978, SAA Code for Field Pressure Testing of Pipelines; ANSI B31.4, Liquid Petroleum Transportation Piping Systems; API 1104, Standard for Welding Pipelines and Related Facilities; and USA Minimum Federal Safety Standards for Liquid Pipelines (Part 195, Title 49, Code of Federal Regulations) and other standards. Acknowledgement is made of the assistance obtained from these sources.

Although safety is the basic consideration of this standard, other requirements will also control the specifications for any pipeline and these must be considered. The standard is not a design handbook and, although certain sections contain specific requirements, does not replace the need for appropriate experience and competent engineering judgement. Fundamental engineering principles should be followed. Provided that there is no specific prohibition, materials and procedures not included in this standard may be qualified for use as described in the applicable sections.

Environmental conditions are of importance in the design of pipelines and are to be considered fully in the design stage. The extent of the investigations necessary in a particular location will depend on the amount and reliability of the environmental information already available.

Attention is drawn to the requirements of both Commonwealth and State legislation, and to guides and codes issued by Statutory Authorities and local government bodies which may affect pipelines; this standard should be regarded as complementary to such requirements where these are applicable. Notes on Statutory Requirements are included as Appendix D.

This standard does not deal with, and is not intended to supplant, any matter of personnel safety with respect to work practices or such matters as the safe use of equipment and machinery in construction which may be required by law or which are current industrial practice.

This standard makes reference to a wide range of materials and components listed in standards originating from Australia, Great Britain, and the United States of America. Many of these standards require the reporting of results of tests. Such reporting should be in the form of approved test certificates. Listings of relevant standards are given in Appendices A and B.

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STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard for LIQUID PETROLEUM PIPELINES

SECTION 1. GENERAL REQUIREMENTS

1.1 SCOPE. This standard specifies minimum requirements for materials, design, construction, installation, inspection, testing, operation, and maintenance of liquid petroleum pipelines used for the transport of hydrocarbon fluids such as crude oils, natural gasoline, natural gas liquids, liquefied petroleum products, where—

(a) the pipelines are manufactured from steel and qualify for use in terms of the relevant Sections of the Standard;

(b) the temperature of the pipe transporting the liquid does not exceed 120°C and is not less than −30°C at any point in the pipeline.

1.2 APPLICATION. This standard is applicable to pipelines between production facilities, tank farms, processing plants, pump stations, terminals and all other delivery points (see Fig. 1.1). It is also applicable within the shore approach of a liquid petroleum submarine pipeline.

The standard contains provisions for the use of anchors, clamps, supports, and other means to prevent the overstressing of components.

The standard is not applicable to—

(a) auxiliary piping such as that required for water, air, steam, gas, lubricating oil and fuel;

(b) pressure vessels, heat exchangers, pumps, meters, and other similar equipment or piping and piping connections integral with them;

(c) casing, tubing or pipe used in petroleum wells, gathering systems at well heads, tankage and other production facilities;

(d) piping associated with hydrocarbon processing, handling or storage in refineries or terminals;

(e) piping associated with marine loading and unloading stations;

(f) piping associated with the handling and storage of liquefied petroleum gas covered by AS 1596;

(g) the design and fabrication of proprietary items of equipment;

(h) instrumentation, telemetering and remote control equipment.

It is not intended that the standard be applied retroactively to existing pipelines insofar as design, construction, installation and testing at the time of construction are concerned. However, provisions of the standard are applicable to operation and maintenance of existing installations and to the increasing of established operating pressures.

1.3 SAFETY. The requirements and recommendations of this standard are considered to be adequate to ensure the safety of the general public and all persons engaged in pipeline construction and operation under conditions usually encountered to the extent that safety is affected by—

(a) basic design;

(b) quality of materials and workmanship;

(c) testing requirements;

(d) maintenance and operation.

The standard has provision for extra protection of a pipeline where necessary to avoid damage or over-stressing of the pipeline at road, railway or river crossings, bridges, self-supported spans; or due to heavy traffic, vibration, subsidence, flooding or other conditions which may be unique to the area in which the pipeline is constructed.

Existing industrial safety regulations pertaining to work areas, safety devices, and safe working practices are not supplanted by this standard.

The standard also allows for the development and implementation of emergency operating and maintenance procedures. Particular attention is drawn to pipelines transporting petroleum liquids which vaporize at atmospheric pressure and form vapours denser than air, which, when mixed with air, may be flammable (see Appendix F).

1.4 SYMBOLS AND DEFINITIONS.

1.4.1 Symbols. For the purpose of this standard, unless otherwise defined, the symbols used shall have the following meanings:

A_1 = reinforcement area required as a result of excessive wall thickness of header, in square millimetres (see Fig. G3.8.5(A), Clause 3.8.7.4, and Fig. G3.8.7(C) and (D))

A_2 = reinforcement area required as a result of excessive wall thickness of branch, in square millimetres (see Fig. G3.8.5(A), Clause 3.8.7.4, and Fig. G3.8.7(C) and (D))

A_3 = summation of area at the added reinforcement, including welded areas which lie within the area of reinforcement, in square millimetres (see Fig. G3.8.5(A); alternatively, area with reinforcement zone required as a result of excessive thickness in extruded outlet lip, in square millimetres (see Clause 3.8.7.4 and Fig. G3.8.7(C) and (D))

A_R = required cross-sectional area of reinforcement at a branch connection or extruded outlet, in square millimetres (see Clause 3.8.5.3, Fig. G3.8.5(A), Clause 3.8.7.3, and Fig. G3.8.7(C) and (D))