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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

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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.

CONTENTS

		Page
SECTION 1. GENERAL REQUIREMENTS		
1.1	Scope	5
1.2	Application	5
1.3	Safety	5
1.4	Symbols and Definitions	5
1.5	Standards and Specifications	11
1.6	Interpretation	11
SECTION 2. MATERIALS AND COMPONENTS		
2.1	General	12
2.2	Qualification Categories of Materials and Components	12
2.3	Qualifying Procedures—General	12
2.4	Qualifying Requirements for New or Used Pipe Complying with a Standard or Specification not Nominated in the Code	13
2.5	Fracture Toughness	14
2.6	Valves, Fittings, and Accessories	16
2.7	External Protective Coating	17
2.8	Internal Protective Lining	17
2.9	Weight Coating	17
2.10	Galvanic Anodes	17
SECTION 3. DESIGN		
3.1	General Considerations	18
3.2	Design Pressure	18
3.3	Design Temperature	18
3.4	Stability of Pipeline	18
3.5	Allowable Hoop Stress	18
3.6	Stress Limits	20
3.7	Allowances	20
3.8	Design of Components	20
3.9	Design of Closures for Pipe Ends	24
3.10	Design of Flanges	24
3.11	Design of Reducers	24
3.12	Design of Other Pressure-containing Components	24
3.13	Selection and Limitation of Components	25
3.14	Used Components	27
3.15	Selection and Limitation of Joints	27
3.16	Pipeline Flexibility, Supports and Restraints	27
3.17	Road and Railway Reserves	31
3.18	Instrument, Control, and Sampling Piping	32
3.19	Control of Pipeline Pressure	32
3.20	Corrosion	33
3.21	Noise	33
3.22	Records	33
SECTION 4. WELDING		
4.1	General	34
4.2	Safety in Welding	34
4.3	Welding Equipment	34
4.4	Electrodes, Fluxes, Filler Rods, and Gas Mixtures	34
4.5	Prohibition of Welding	35
4.6	Definitions and Terms	35
4.7	General Provisions for Welding	35
4.8	Preheating	38
4.9	Postweld Heat Treatment	42
4.10	Qualification of Welding Procedures	43
4.11	Qualification Testing of Welded Joints	45
4.12	Welder Qualification	49
4.13	Inspection and Testing of Production Welds	55
4.14	Non-destructive Testing	55
4.15	Standards of Acceptability for Non-destructive Testing	56
4.16	Removal of Unacceptable Defects in Welds	61
4.17	Welding or Cutting on Steel Pipelines Containing Hydrocarbons	61
4.18	Attachment of Electrical Connections	62
SECTION 5. CONSTRUCTION AND INSTALLATION		
5.1	General	64
5.2	Inspection	64
5.3	Location	64
5.4	Survey	64
5.5	Handling, Transportation, Stringing and Storing	64
5.6	Repair of Fabricated Items and Pipes	64
5.7	Bends, Mitres and Elbows	65
5.8	Welding	65
5.9	Protective Coatings	65
5.10	Tie-In	65
5.11	Installation of Pipelines	65
5.12	Crossings	67
5.13	Valves	67
5.14	Scraper Traps	68
5.15	Manifolds	68
5.16	Liquid Strainers and Filters	68
5.17	Assembly of Components	68
5.18	Connections to Pipelines	68
5.19	Warnings and Markers	68
5.20	Corrosion Control	69
5.21	Safety Devices and Instruments	69
5.22	Fire Protection	69
5.23	Pump Stations	69
5.24	Electrical Installations	70
5.25	Hot Taps	70
SECTION 6. INSPECTION AND TESTING		
6.1	Inspection	72
6.2	Repair of Defects	72
6.3	Testing	73
6.4	Pressure Testing	73
6.5	Commissioning	74
6.6	Records	74
SECTION 7. OPERATION AND MAINTENANCE OF PIPELINES		
7.1	Operation and Maintenance Procedures Affecting the Safety of Pipelines	75
7.2	Pipeline Operation and Maintenance	76
7.3	Pipeline Repairs	77
7.4	Safe Working with Liquid Petroleum	78
7.5	Prevention of Accidental Ignition	78
7.6	Corrosion Control	78
7.7	Records	78
7.8	Abandoning a Pipeline	78
7.9	Corrosion	78

SECTION 8. CORROSION MITIGATION

8.1 General 80
8.2 Qualification of Personnel 80
8.3 Rate of Corrosion 80
8.4 Corrosion Mitigation Methods 81
8.5 Internal Corrosion Mitigation 81
8.6 External Corrosion Mitigation 81
8.7 Installation of Galvanic Anodes 83
8.8 Timing of Application of Corrosion Mitigation 83
8.9 Inspection for the Detection of Corsion 83
8.10 Corrosion Defects 84
8.11 Records 84

SECTION 9. CHANGES IN MAXIMUM ALLOWABLE OPERATING PRESSURE OF EXISTING PIPELINES

9.1 General 85
9.2 Increasing the Maximum Allowable Operating Pressure 85
9.3 Records 85

APPENDICES

A Nominated Standards and Specifications 86
B Reference Standards 89
C Identification and Addresses of Standards-issuing and Other Bodies Referred to in this Code 90
D Notes on Statutory Requirements 91
E Notes on Liquefied Petroleum Gas and Similar Liquefied Gases 92
F Fracture Toughness for Steel Pipelines 93
G Figures Relating to Weld Reinforcement 95
H Recommended Welding Sequence for Hot Tap Fittings 100
J Assessment of Corroded Pipelines 101
K Markers 109

INDEX 111
ANNEX 118

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))