AS 2212—1979

Australian Standard®

ELASTOMERIC HOSE AND HOSE ASSEMBLIES FOR TRANSFERRING ANHYDROUS AMMONIA

The following scientific, industrial and governmental organizations and departments were officially represented on the committee entrusted with the preparation of this standard:

Australian Institute of Petroleum

Confederation of Australian Industry

Government Stores Department, N.S.W.

Institution of The Rubber Industry

Metropolitan Water Sewerage and Drainage Board, Sydney

Railways of Australia Committee

Society of Automotive Engineers—Australasia

State Electricity Commission of Victoria

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PREFACE

This standard was prepared by the Association's Committee on Rubber Hose as a metrication and revision of AS K194—1972, Rubber Hose for Use with Anhydrous Ammonia, which it accordingly supersedes. It was prepared under the guidance of the Advisory Committee on Standards for the Rubber Industry.

The revision was prompted by the need to harmonize the requirements of this standard with those of AS 2022, SAA Anhydrous Ammonia Code, in relation to the hoses used for conveying the product. Pertinent requirements of AS 1596, SAA LP Gas Code, and of AS 1869, Rubber Hose and Hose Assemblies for Liquefied Petroleum Gases (LP Gas), were also taken into account.

Provision is made for two types of hose according to the maximum internal working pressures, viz—

(a) Type 1 having a maximum internal working pressure of 1 MPa for applications where the hose is downstream of a pressure regulator and open-ended; and

(b) Type 2 having a maximum internal working pressure of 2.4 MPa for applications where the hose is subject to container pressure.

The provision of related requirements in this standard together with a marking requirement for the maximum working pressure obviates the necessity for similar provisions in AS 2022.

During the preparation of the revision, cognizance was also taken of requirements included in the following overseas documents:

ANSI K61.1	Safety Requirements for the Storage and Handling of Anhydrous Ammonia
RMA-TFI IP-14	Specification for Anhydrous Ammonia Hose
ISO/DP 5771.2	Rubber Hose for Transferring Anhydrous Ammonia

This standard sets out requirements for the materials, construction, dimensions and tolerances on inside diameter, and methods of test for this type of hose. Appendix A contains recommendations for the handling, storage and inspection of the hose during use. The methods of test include tensile strength and elongation properties of cover and lining, adhesion properties between cover, reinforcement and lining, hydrostatic pressure testing, resistance to ammonia ageing, low temperature testing, and resistance to ozone.

This standard requires reference to the following Australian standards:

AS 1180	Methods of Test for Hose Made from Elastomeric Materials .1 —Dimensions .2 —Tensile Strength and Elongation .3 —Accelerated Ageing .4A —Ply Adhesion—Dead Weight Method .4B —Ply Adhesion—Autographic Method .5A —Hydrostatic Pressure—Burst Test .5B —Hydrostatic Pressure—Proof Test .5D —Hydrostatic Pressure—Leak Test .7F —Resistance of Lining and Cover to Ozone .11 —Hose and Fitting Compatibility
AS 1199	Sampling Procedures and Tables for Inspection by Attributes
AS 1257	Bore Sizes, Test Pressures and Tolerances on Lengths of Elastomeric Hose
AS 1399	Guide to AS 1199, Sampling Procedures and Tables for Inspection by Attributes
AS 2022	SAA Anhydrous Ammonia Code
AS CK 15	Code of Recommended Practice for the Storage of Vulcanized Elastomers

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Australian Standard
for
ELASTOMERIC HOSE AND HOSE ASSEMBLIES FOR TRANSFERRING ANHYDROUS AMMONIA

SECTION 1. SCOPE AND GENERAL REQUIREMENTS

1.1 SCOPE. This standard specifies requirements for elastomeric hose and hose assemblies used for conveying anhydrous ammonia in liquid or gaseous form. It provides for hose up to and including 50 mm internal diameter.

NOTES:

1. Advice to hose users on periodical inspection and testing, and on handling and storage of hose and fittings is given in Appendix A.
2. Appendix B provides guidance on the use of this standard in conjunction with statistical sampling and inspection schemes.

1.2 APPLICATION. The hose and hose assemblies are intended for use with anhydrous ammonia liquid or vapour in the ambient temperature range of –40°C to + 65°C and up to working pressures of 2.4 MPa.

1.3 CLASSIFICATION. Hose and hose assemblies shall be classified according to maximum internal working pressure as follows:

(a) Type 1—maximum internal working pressure of 1 MPa.

(b) Type 2—maximum internal working pressure of 2.4 MPa.

1.4 MATERIALS AND CONSTRUCTION.

1.4.1 Hose Construction. The hose shall consist of a lining, a reinforcement, and an outer cover, bonded together in a uniform manner. The material requirements for these parts shall be as follows:

(a) *Lining.* The lining shall be—

(i) uniform in quality and thickness;

(ii) non-porous;

(iii) free from air holes, joins and other deleterious defects; and

(iv) resistant to anhydrous ammonia.

(b) *Reinforcement.* The reinforcement shall consist of one or more layers of woven or cord textile fabric, yarn or wire, thoroughly bonded together and resistant to ammonia. The reinforcement may be applied by braiding, wrapping or spiral winding.

In constructions utilizing a ply or plies of wire reinforcement, the composition of the wire shall be a suitable corrosion-resistant stainless steel.

(c) *Outer cover.* The outer cover shall be resistant to abrasion, weather and ammonia, and shall be uniform, concentric and free from deleterious defects. During manufacture a gas-tight cover shall be pricked to permit the release of any permeating gas in service.

1.4.2 Hose Assemblies. Couplings used on hose assemblies shall be designed and constructed so that an assembly will have sufficient strength to reach the minimum burst pressure set out in Section 2 without showing any sign of failure or leakage. Fittings shall be resistant to the action of anhydrous and aqueous ammonia. In particular, no copper or copper-based alloys shall be used where they might come into contact with ammonia.

Care shall be taken to ensure that fittings are properly installed so as not to damage the reinforcement or other vital parts of the hose.

1.4.3 Dimensions and Tolerances.

(a) *Internal diameter of hose.* When measured in accordance with AS 1180.1, the internal diameters of hose shall conform to the appropriate value given in Table 1.1.

TABLE 1.1

INTERNAL DIAMETERS AND THEIR TOLERANCES

millimetres

Internal diameter	Tolerance
6.3	±0.75
8	±0.75
10	±0.75
12.5	±0.75
20	±0.75
25	±1.25
31.5	±1.25
40	±1.50
50	±1.50
63	±1.50
80	±2.00

NOTE: Outside diameters and their tolerances are intentionally omitted from this table to permit flexibility with various end fittings and to allow for new developments in both hose and couplings.

(b) *Bore.* When examined visually, the bore shall be concentric with the outer cover, and shall be free from raised spots and lumps such that a steel ball having a diameter equal to the minimum allowable internal diameter less one half of the minus tolerance can easily pass through the hose while subjected to a pressure of 70 kPa.

(c) *Length.* Unless otherwise specified, the hose shall be supplied in nominal lengths of not less than 10 m. The tolerances on cut lengths of hose shall be as specified in AS 1257.

NOTE: Lengths from which samples are cut are considered as a full length.