AS 2200—2006
(Incorporating Amendment No. 1)
Reconfirmed 2017

Australian Standard®

Design charts for water supply and sewerage

This Australian Standard® was prepared by Committee PL-045, Plastics Pipe Systems Test and Calculation Methods. It was approved on behalf of the Council of Standards Australia on 13 October 2005.
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The following are represented on Committee PL-045:

- Australian Chamber of Commerce and Industry
- Australian Nuclear Science and Technology Organisation
- CSIRO Manufacturing and Infrastructure Technology
- Certification Interests (Australia)
- Energy Networks Association
- Engineers Australia
- Master Plumbers, Gasfitters and Drainlayers New Zealand
- New Zealand Water and Waste Association
- Plastics Industry Pipe Association of Australia
- Plastics New Zealand
- Water Services Association of Australia

This Standard was issued in draft form for comment as DR 00340.

Standards Australia wishes to acknowledge the participation of the expert individuals that contributed to the development of this Standard through their representation on the Committee and through the public comment period.

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STANDARDS AUSTRALIA

RECONFIRMATION

OF
AS 2200—2006
Design charts for water supply and sewerage

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Technical Committee PL-021 has reviewed the content of this publication and in accordance with Standards Australia procedures for reconfirmation, it has been determined that the publication is still valid and does not require change.

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Approved for reconfirmation in accordance with Standards Australia procedures for reconfirmation on 27 April 2017.

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Energy Networks Australia
Engineers Australia
Local Government New Zealand
New Zealand Employers and Manufacturers Association (Central)
Plastics Industry Pipe Association of Australia
Plastics New Zealand
Water New Zealand
Water Services Association of Australia

NOTES

Australian Standard®

Design charts for water supply and sewerage

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PREFACE

This Standard was prepared by the Australian members of the Joint Standards Australia/Standards New Zealand Committee, PL-045, Plastics pipe systems test and calculation methods to supersede AS 2200—1978.

This Standard incorporates Amendment No. 1 (April 2009). The changes required by the Amendment are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure or part thereof affected.

After consultation with Stakeholders in both countries, Standards Australia and Standards New Zealand decided to develop this Standard as an Australian, rather than an Australian/New Zealand Standard.

The objective of this Standard is to provide designers of pipelines for the conveyance of water and sewerage, with a set of charts and mathematical formulae for the determination of flow characteristics.

The terms 'normative' and 'informative' have been used in this Standard to define the application of the appendix to which they apply. A 'normative' appendix is an integral part of a Standard, whereas an 'informative' appendix is only for information and guidance.

Statements expressed in mandatory terms in notes to tables and figures are deemed to be requirements of this Standard. Other notes are for information and guidance only.

CONTENTS

Page

FOREWORD

The pipe-flow charts in this Standard are based on the Manning formula and the Colebrook-White formula. These two formulae were chosen as they represent those most commonly used for pipeline design in Australia. Designers will need to make their own choice as to which formula they wish to adopt.

It must be realized that the charts and formulae on which they are based may have limitations on the range of velocities, diameters and roughness coefficients to be used. They may be inaccurate particularly where the parameters used are outside the conditions upon which the formulas were originally based. A guide to roughness coefficients for various pipe materials is given in Table 2.

The Colebrook-White formula is regarded by many hydraulic design experts throughout the world as the most accurate basis for hydraulic design. It has had ample experimentation confirmation over wide conditions of flow.

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1 SCOPE

This document provides design charts for the flow of liquid through pipes and fittings based upon surface roughness, diameter, velocity and hydraulic gradient. The resistance coefficients of fittings are also included.

The use of computer spreadsheets and programmable calculators has allowed the determination of pipe flow and head loss to be made without the use of charts. Where the unknown factor is the hydraulic gradient, this can be determined either by successive approximation using the Colebrook-White formula or by use of Moody's approximation to the Colebrook-White transition formula.

Therefore the charts provided in this document are for approximate evaluations only. For critical calculations the mathematical formulae must be used.

2 DERIVATION OF CHARTS

2.1 Formulae

The design charts are based on the following formulae:

(a) Manning:

$$V = \frac{1}{n} R^{0.67} S^{0.5}$$

or

$$V = \frac{0.3950}{n} D^{0.67} S^{0.5}$$

(b) Colebrook-White:

$$V = -(32gRS)^{0.5} \log\left(\frac{k}{14.8R} + \frac{1.255v}{R(32gRS)^{0.5}}\right)$$

or

$$V = -2(2gDS)^{0.5} \log\left(\frac{k}{3.7D} + \frac{2.51v}{D(2gDS)^{0.5}}\right)$$

where

n	=	Manning roughness coefficient
k	=	Colebrook-White roughness coefficient, in metres
V	=	velocity, in metres per second
R	=	hydraulic radius, in metres, (= D/4 for circular pipes)
D	=	circular cross-section pipe, inside diameter, in metres
S	=	slope, in metres per metre