

SPECIFYING Concrete

This Data Sheet provides guidance on the preparation of specifications for the supply of premixed concrete. It is general in nature and does not provide specification wording. Issues specific to a particular project should be discussed with the concrete supplier.

1 SCOPE

The guidance applies to the specification of concrete supplied for reinforced, prestressed and unreinforced concrete structures and associated works, and relates to normal-class and special-class concrete as defined in Australian Standard AS 1379 *Specification and supply of concrete*.



THIS DATA SHEET provides guidance on the preparation of specifications for the supply of premixed concrete.

2 RELEVANT STANDARDS

Concrete is generally specified in accordance with the provisions of Australian Standards AS 1379 *Specification and supply of concrete* and AS 3600 *Concrete structures*. The following Standards are also referred to in this guide:

- AS 1012 *Methods of testing concrete*
- AS 2758.1 *Aggregate and rock for engineering purposes Part 1 Concrete aggregate.*
- AS 3582.1 *Supplementary cementitious materials for use with portland cement Part 1 Fly ash.*
- AS 3582.2 *Supplementary cementitious materials for use with portland cement Part 2 Slag – ground granulated iron blast furnace.*
- AS 3582.3 *Supplementary cementitious materials for use with portland cement Part 3 Amorphous silica.*
- AS 3972 *Portland and blended cements.*
- AS/NZS/ISO 9000
Quality management and quality assurance *Standards*.

3 DEFINITIONS

CEMENT Portland or blended cement complying with AS 3972 alone or in combination with one or more supplementary cementitious materials (SCMs) complying with the relevant part of AS 3582.

CONCRETE A mixture of cement, aggregates and water with or without the addition of chemical admixtures or other materials and defined as follows:

- **Plastic concrete.** Concrete in the state between completion of mixing and initial set as defined in AS 1012.18 *Determination of setting time of fresh concrete mortar and grout by penetration resistance*.
- **Hardened concrete.** Concrete after initial set, as represented by test specimens that have been subjected to a specified process and duration of curing.
- **Normal-class concrete.** Concrete that is specified primarily by a standard compressive strength grade and is otherwise in accordance with the limits contained in Clause 1.5.3 of AS 1379.
- **Special-class concrete.** Concrete that is specified to have certain properties or characteristics different from, or additional to, those of normal-class concrete and is otherwise in accordance with the requirements of Clause 1.5.4 of AS 1379.

Note: Other terms used in this document are as defined in AS 1379.

4 CONCRETE PROPERTIES

4.1 Normal-class Concrete

Normal-class concrete that complies with AS 1379 has the following parameters (or properties):

- A mass per unit volume in the range 2100 to 2800 kg/m³ when determined in the saturated, surface-dry condition in accordance with AS 1012.12 *Determination of mass per unit volume of hardened concrete*.
- Acid-soluble chloride and sulfate contents within the limits given in Clause 2.7 of AS 1379 when determined in accordance with Clause 5.5.2 of AS 1379.
- A drying shrinkage strain after 56 days of drying not exceeding 1000×10^{-6} when determined in accordance with Clause 5.6 of AS 1379.
Note: This maximum value is consistent with the use for design purposes of a median basic shrinkage strain value of 850×10^{-6} .
- A mean compressive strength at 7 days, assessed in accordance with Clause 5.7 of AS 1379, of not less than the values shown in Table 1.2 of AS 1379.
- Cement complying with AS 3972 alone or in combination with one or more supplementary cementitious materials.
- No lightweight aggregate as defined in AS 2758.1.

The basic parameters that should be specified for normal-class concrete are set out in **Schedule A**.

4.2 Special-class Concrete

The parameters and attributes that should be specified for special-class concrete should be as set out in **Schedule B** with reference to Appendix B and Table B1 of AS 1379

Special-class concrete commonly has the same basic parameters as normal-class concrete with some additions and/or exceptions. Parameters or attributes that are different from, or additional to, those of normal-class concrete should be included in **Schedule B**. If the requirements of **Schedule B** for any concrete are inconsistent with those for normal-class concrete then the requirements of **Schedule B** take precedence for that concrete.

Where any parameter other than strength grade requires the specification of a special-class concrete, or the proportions of the mix are specified, the concrete should be identified by an appropriate code agreed to between the supplier and customer that identifies that particular mix.

5 CONCRETE SUPPLY

5.1 General

Normal-class and special-class concretes are produced using similar materials, ordering procedures, plant, production and delivery methods and quality control procedures. The basic parameters are listed in **Schedule A** for normal-class concrete and **Schedule B** for special-class concrete.

A more extensive list of parameters and guidance on the values to be specified is given in Table B1 of AS 1379.

If the requirements listed in **Schedule B** for any concrete are inconsistent with Clauses 5.2, 5.3 and 5.4 in AS 1379, then the requirements of **Schedule B** take precedence for that concrete.

5.2 Ordering of Premixed Concrete

Methods of ordering premixed concrete and the basis of supply are set out in Clauses 1.6 and 1.7 of AS 1379. Also, see [Ordering Premixed Concrete](#).

5.3 Constituent Materials

All materials used in the supply of concrete are to conform to the requirements of Section 2 of AS 1379. If any materials having properties outside the limits of AS 1379 or other criteria or limitations are required, these should be specified by the customer in consultation with the supplier and the concrete designated as 'S' special class concrete.

5.4 Production and Delivery

Concrete is produced and delivered using plant and equipment conforming with Section 3 of AS 1379, and with production and delivery practices conforming with Section 4 of AS 1379.

SCHEDULE A Basic parameters for specification of normal-class concrete

Parameter	Unit	Concrete identification
Standard strength grade designation ¹	–	N...
The slump at the point of acceptance ²	mm	
The maximum nominal size of aggregate ³	mm	
The intended method of placement ⁴	–	
Is project assessment of the concrete required to be carried out by the supplier? ⁵	yes/no	
If required, a level of air entrainment ⁶	%	

¹ Selected from the following table:

Normal-class Concrete Designation	Standard grade	Design characteristic compressive strength after 28 days of curing (f'c) MPa
N20	20	20
N25	25	25
N32	32	32
N40	40	40
N50	50	50

² Selected as one of 20, 30, 40, 50, 60, 70, 80, 90, 100, 110 or 120 mm. The slump specified should be fit for purpose and should be consistent with the method of placement and other site factors such as formwork and reinforcement. For residential slabs and footings, in the absence of any specification by the customer, a slump of 100 mm will be supplied.

³ Selected as one of 10, 14 or 20 mm. Unless otherwise specified, the default value is taken as 20 mm.

⁴ Placement method should generally be nominated by the concreting subcontractor, eg chute, pump.

⁵ Normal-class concrete is subject to production assessment and may be subject to project assessment to ensure that the customer's project is tested. If unspecified, it will be assumed that project assessment is not required.

⁶ Up to a maximum of 5.0%. Generally only required in freeze-thaw conditions.

SCHEDULE B Basic and other parameters for specification of special-class concrete

(Where space in the table below is insufficient, additional sheets should be attached and referenced and will form part of this schedule.)

Parameter ^{1,2}	Unit	Concrete identification ^{3,4}
Basic parameters		
Strength grade designation	–	S...
The slump at the point of acceptance	mm	
The maximum nominal size of aggregate	mm	
The intended method of placement	–	
Is project assessment required to be carried out by the supplier? ⁵	yes/no	
Other parameters^{2,6}		

¹ Appendix B of AS1379 *Specification and supply of concrete* provides a guide to completing the parameters and their relevant values in Schedule B.

² **Other parameters.** If quality parameters other than those stated in Clauses 5.2 to 5.7 of AS1379 *Specification and supply of concrete* are specified, the method of production control and the criteria for compliance must also be specified.

³ It is recommended to select from standard strength grades of S20, S25, S32, S40, S50, S65, S80 and S100.

⁴ Where concrete is specified as special-class and a strength grade is applicable, the strength grade is designated by the prefix:

S, for compressive strength grades;

SF, for flexural strength grades; or

ST, for indirect-tensile strength grades.

Where concrete is special-class and any property other than strength grade is specified as the principal criterion, or the proportions of the mix are specified, it is designated by an appropriate alphanumeric code, agreed between the supplier and the customer, to indicate the criterion.

⁵ Special-class concrete should be subject to project assessment.

⁶ Certain concrete exposure classifications may require special provisions for aggregate durability, see AS 2758.1 *Aggregate & Rock for Engineering Purposes - Concrete Aggregates*.

5.5 Sampling, Testing and Compliance Assessment

All concrete specified by strength grade equal to or greater than 20 MPa is to be sampled, tested and assessed for compliance in accordance with Sections 5 and 6 of AS 1379.

Normal-class concrete should be assessed for compliance in accordance with Section 6 of AS 1379 for plant production assessment. The basis of supply of special-class concrete, and assessment of any performance requirements, should be agreed between the customer and the supplier.

Production assessment is an assessment procedure carried out by the supplier for concrete defined by strength grade and produced by a specific supplying plant. A customer's specific project may not be tested.

Project assessment is an assessment procedure specified by the customer for concrete defined by strength grade and supplied to a specific job or project. Unless specified, it will be assumed that project assessment is not required. Project assessment ensures that the customer's specific project will be tested.

Sampling and testing concrete is to be carried out by a NATA-accredited laboratory.

5.6 Quality Assurance

The premixed concrete supplier is to maintain a Quality System complying with the relevant Standard of the AS/NZS/ISO 9000 series.

→ Further information on good concreting practices can be downloaded from the Cement Concrete and Aggregates Australia website at www.concrete.net.au.

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