



## 0314 Concrete – In Situ

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# 00 Design principles

## 0.01 Main considerations

It is a requirement to undertake the [00 PLANNING AND DESIGN/0001R - DESIGN REFERENCE](#) and [GLOSSARY OF TERMS](#) information into all aspects of design, detailing and delivery when developing the content here within. Clear demonstration of adherence to these requirements is part of the services and will be called upon at key points in the project and during at the discretion of the Department of Education (DoE).

## Specification

### 01 General

As per current NATSPEC except as follows:

#### 1.1 Documents

Prepare drawings for all concrete works, showing layout plans, sections and working details. Show clearly on the drawings all slab thicknesses, beams, sizes, reinforcement, concrete quality and cover, etc.

#### 1.2 Durability

The design is to comply with a minimum 50-year lifetime durability or higher as required by current AS. All external structural concrete elements and those elements which are adjacent to the cavity of external walls (eg. supporting beams) shall have a minimum exposure classification of B1 or higher as required by the design.

### Shrinkage Sensitive Structures

**GUIDE NOTE:** Add subclause “Shrinkage Sensitive Structures” to NATSPEC Building Template/Worksection

The drying shrinkage limits for the concrete in any part of the works shall, where required, be as specified for that part and shall be measured by submitting samples to drying shrinkage tests as specified. The measure of drying shrinkage shall be the percentage change in dimension of the sample after a period of 8 weeks, in accordance with AS 1012.13 Methods of testing concrete - Determination of the drying shrinkage of concrete.

Unless otherwise specified the maximum permissible drying shrinkage shall be as follows:

**Table 01: Shrinkage Tolerances**

F'c (MPa)	Shrinkage (microstrain)
10, 15, 20	600
25, 32 ,40, 45, 50	700

## 1.3 Submissions

GUIDE NOTE: Re-number subclause 1.6 “Submissions” as 1.7 in NATSPEC Building Template/Worksection and add the text below:

### Testing authority

Submit names of the testing authority and personnel engaged in sampling, preparing and handling test specimens to the Principal’s Authorised Person / Principal’s Representative for approval. The testing authority must be NATA registered

### Curing compounds

GUIDE NOTE: Add to existing curing compounds subclause in NATSPEC Building Template

Do not use ineffective or inappropriate curing compounds. Do not use wax-based or chlorinated rubber-based curing compounds on surfaces forming substrates to toppings such as concrete toppings and cement-based render. Apply as a continuous coating without visible breaks or pinholes, at the rate recommended by the manufacturer.

### Coarse aggregate

To AS 2758.1 Sampling and Testing to AS 1141& AS1012

If so directed by the Principal’s Authorised Person / Principal’s Representative, and under his supervision, take in accordance with AS 1141 a 50 kg sample of each aggregate type, individually or in combination proposed for use in the concrete mix, and submit to the approved NATA registered independent testing authority three weeks prior to commencement of concrete supply. Accompany the samples with a written request stating the particular tests required by the Principal’s Authorised Person / Principal’s Representative. In the case of individual aggregate samples, state the mix proportions

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proposed. The cost of such handling and testing of the aggregate shall be treated as a variation to the Contract.

## **Specimen store**

GUIDE NOTE: Add "Specimen Store" subclause to NATSPEC Building Template for remote sites at which samples cannot be immediately transported to the testing laboratory

Construct the store prior to pouring of any concrete on site.

Purpose: For making and storing of test specimens

Structure: Provide a level waterproof rigid floor and weatherproof walls and roof

Store shall be a minimum 2500mm x 1800mm x 2400mm high internally. Provide the structure with a lockable door capable of giving complete protection to the test specimens.

Storage Conditions: To AS 1012, Part 8, Clause 1.7 for Standard Temperature Zone.

## **1.4 Specimen Demoulding and Transport**

GUIDE NOTE: Add subclause "Specimen Demoulding and Transport" to NATSPEC Building Template/Worksection

### **Standard**

To AS 1012, Part 8, clauses 1.8.1 and 1.9 except as follows:

The specimen shall remain in its metal mould for 24 hours, without movement, before de-moulding

Sydney Metropolitan Area: Preference shall be given to sub-clause (a) or (b) in clause 1.8.2 of AS 1012.

Site De-moulding: When carried out, remove each specimen from its mould in the presence of the Principal's Authorised Person / Principal's Representative, who will indelibly mark the side of each specimen for identification.

NATA Laboratory Handling: If cylinders have been cast by the approved independent testing authority, the authority will be permitted to de-mould and transport the concrete

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specimens to its laboratories, in the same manner as that in which the authority would normally process specimens.

Under these circumstances, specimens for 28-day testing shall be delivered to the testing laboratory no later than 14 days prior to the due date, and specimens for 7 day testing no later than 3 days prior to the due date.

Country Areas: Where direct transport can be affected within reasonable time such as in the Newcastle and Port Kembla areas, the provisions covering the Sydney Metropolitan Area shall apply.

Remote Country Areas: The requirements of AS 1012, Clause 1.8.2 paragraph (c) or (d) may be modified such that should lime saturated water storage not be available, storage in damp sand in a purpose-made tray is permitted, provided the sand is kept continuously damp and temperature requirements are maintained.

## 02 Product

As per current NATSPEC except as follows:

### 2.1 Materials

Use materials complying with AS based on the Whole of Life approach to materials selection. Do not use breccia or dolerite in concrete mixes.

Fly ash is a manufacturing bi-product that can be used as a cement replacement but should limited to a maximum of 20% by weight of cement content.

GUIDE NOTE: Add the following text to existing subclause in NATSPEC Building Template

#### General

Use materials complying with Australian Standards. Do not use breccia or dolerite in concrete mixes and limit fly ash content to 20% by weight of cementitious content.

#### Aggregate

Coarse aggregate Types:

Washed crushed river gravel, fine-grained basalt, or other materials approved by the Principal's Authorised Person / Principal's Representative. State the source of the

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aggregate on delivery dockets. Obtain approval before changing the source of the aggregate.

Metallurgical furnace slag aggregate: To AS 2758.1 Clause 16, except that non-ferrous slags must not be used.

## **Cement**

Cement type: Portland cement to AS 3972

## **2.2 Concrete**

GUIDE NOTE: Add the following text to existing subclause in NATSPEC Building Template

### **Coloured concrete**

Refer to [02 SITE URBAN AND OPEN SPACES/0274 CONCRETE PAVEMENT](#)

Standard: To AS 3600, AS3610.1

## **2.3 Testing**

GUIDE NOTE: Add text below “Project Assessment Strength Grade Sampling Table” in NATSPEC Building Template/Worksection

Additional to the above, hardened concrete represented by any one sample with a test strength less than 0.8 times the required characteristic strength shall be liable to rejection.

Rejected concrete shall be removed from the site.

## **03 Execution**

As per current NATSPEC except as follows:

### **3.3 Cores, Fixings and Embedded Items**

#### **Penetrations**

Termite barrier:

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GUIDE NOTE: Refer to [01 GENERAL/0184 TERMITE MANAGEMENT](#)

Chemical Barriers: Must not be used (Mandatory)

### 3.7 Joints

#### **Construction joints**

Termite barrier:

GUIDE NOTE: Refer to [01 GENERAL/0184 TERMITE MANAGEMENT](#)

Chemical Barriers: Must not be used (Mandatory)

#### **Expansion joints**

Termite barrier:

GUIDE NOTE: Refer to [01 GENERAL/0184 TERMITE MANAGEMENT](#)

Chemical barriers: Must not be used (Mandatory)

## 04 Selections

As per current NATSPEC.