# PART R09

# CONTROLLED LOW-STRENGTH MATERIAL (CLSM)

## CONTENTS



## 1. GENERAL

.1 This Part specifies the requirements for the supply and placement of Controlled Low Strength Material (CLSM).

.2 CLSM and its constituent materials must comply with and/or be tested in accordance with the following:

| | |
|---|---|
| AS 1012 | Methods of testing concrete |
| AS 1478 | Chemical admixtures for concrete |
| AS 2566.2 | Buried flexible pipelines Part 2: Installation; Appendix K: Controlled Low Strength Materials |
| AS 3582 | Supplementary cementations materials for use with portland and blended cement |
| AS 3972 | Portland and blended cements |

## 2. QUALITY REQUIREMENTS

.1 CLSM must be supplied from a manufacturing plant which has third party certification to AS 9001 from a JAS-ANZ accredited assessment body.

.2 The Contractor must be able to provide the CLSM mix design, including:

(a) the source, type and proportions of the constituent materials;

(b) aggregate gradings and saturated surface-dry densities;

(c) chemical admixtures details and manufacturer's recommended method of use;

(d) the nominated slump and where a super-plasticizer is used, the final slump; and

(e) documentary evidence that the mix will comply with the specified requirements of the Contract under consideration, from either previous production of the mix (the test results must not be more than 12 months old) or full details of a trial mix undertaken.

(f) evidence , either through trial mixes (in accordance with AS 1012.2) or production testing, that the CLSM will comply with the requirements of this Part.

## 3. MATERIALS

.1 Cement must comply with AS 3972.

.2 Admixtures must comply with AS 1478.1.

.3 Fly Ash must comply with AS 3582

.4 Aggregates must be free of reactive or expansive materials and be compatible with the CLSM flow characteristics.

.5 The maximum size of coarse aggregates used must not exceed the values as specified in Table 4.1.

## 4. PROPERTIES

.1 The CLSM must comply with the properties in Table 4.1 for the application specified.

| TABLE 4.1 – USE CRITERIA & PROPERTIES | | | | |
|---|---|---|---|---|
| **Application** | **Description** | **28 day Strength (MPa)** | **Slump (mm)** | **Maximum Size of Coarse Aggregate (mm)** |
| General Purpose Backfill | Early strength is not critical.<br>High degree of flowability.<br>Future excavation by hand. | < 0.5 | > 180 | 19 |
| Roadway Trench Backfill | High early bearing strength.<br>Normal flowability,<br>Future excavation by machine. | 1.5 – 2.0 | 150 - 200 | 19 |
| Pipe Embedment Backfill | Normal flowability.<br>Future excavation by machine. | 0.6 – 3 | 150 – 200 | 10 |
| Structural Backfill | Normal flowability.<br>Strength to be specified.<br>Not to be used for pipe backfill or where future excavation is likely. | 3.0 – 8.0 | 150 – 200 | 19 |

.2 CLSM must be homogeneous, free of lumps of unmixed material and without segregation.

## 5. PLACEMENT

.1 The method of placement must be such as to ensure no foreign materials enter the mix.

.2 Where CLSM is used as conduit and culvert backfill, the Contractor must establish a placement process to ensure conduits and culverts will not float, or otherwise become dislodged, during placement of CLSM. CLSM must be installed in accordance with AS 2566.2 Part 2: Appendix K.

.3 The Contractor must retain a copy of the delivery information specified in AS 1379: Clause 1.8. 3 “Identification Certificate”

## 6. TEST PROCEDURES

.1 The Contractor must use the following test procedures (refer http://www.dpti.sa.gov.au/contractor_documents) to verify conformance with the Specification:

| TEST | TEST PROCEDURE |
|---|---|
| Compressive strength of CLSM specimens | AS 1012.9 |
| Slump Test | AS 1012.3.1 |

## 7. VERIFICATION REQUIREMENTS AND RECORDS

.1 The Contractor must supply the following records:

| CLAUSE REF. | SUBJECT | RECORD TO BE PROVIDED |
|---|---|---|
| 5.3 | Delivery Information | Identification certificates in accordance with AS 1379: Clause 1.8. 3 “Identification Certificate” |