
SMS-001 | Concrete Sampling, Cube Preparation & Testing

Purpose

Concrete quality is judged not only by the strength achieved but also by the reliability of the process used to measure that strength.

SMS-001 establishes a practical approach to concrete sampling, cube preparation, identification, curing and compressive-strength testing so that the test result is representative, traceable and technically meaningful.

The Standard is intended as a practical quality-control reference for engineers, laboratory personnel, RMC teams and site quality teams.

1. Scope

This Standard covers the basic quality-control sequence from obtaining a representative sample of fresh concrete through preparation, curing and testing of concrete cubes.

The emphasis is on the practical controls that can influence the reliability of a concrete cube test result.

It should be used along with the applicable project specifications and relevant testing standards.

2. The Basic Principle

A cube test does not begin when the cube is placed in the compression-testing machine.

It begins when the concrete sample is taken.

The complete chain is:

Sampling → Cube Preparation → Identification → Curing → Testing → Recording

A weakness at any stage can affect the final result.

Therefore, a cube strength result should always be considered together with the process through which the specimen was produced and tested.

3. Sampling of Fresh Concrete

The sample should be representative of the concrete being evaluated.

Practical controls include:

- Identify the correct transit mixer or batch.
- Take the sample at the designated sampling location.
- Avoid selecting concrete merely because it is convenient to collect.
- Ensure that sufficient concrete is available for all required tests and specimens.
- Record relevant batch and delivery information.
- Carry out workability checks as required by the quality-control plan.

The purpose of sampling is simple:

The cube should represent the concrete that we intend to evaluate.

A perfectly prepared cube made from a non-representative sample can still produce a misleading result.

4. Cube Preparation

Before casting, check that the moulds are clean, properly assembled and suitable for use.

During cube preparation:

- Ensure the mould is correctly positioned.
- Apply suitable mould-release treatment.
- Fill and compact the concrete as required by the applicable testing procedure.
- Avoid both inadequate and excessive compaction.
- Finish the exposed surface properly.
- Mark the specimen immediately and clearly.

The objective is not merely to make a cube.

The objective is to make a representative test specimen.

5. Cube Identification and Traceability

Every specimen should be identifiable throughout its life cycle.

The identification system should allow the cube to be traced to the relevant project, location or pour, concrete grade, date of casting, transit mixer or batch, sample number and testing age.

Traceability becomes particularly important when a result is abnormal.

Without reliable identification, investigation of a low or unusually high result becomes unnecessarily difficult.

6. Curing

After casting, the specimens should be protected and subsequently cured in accordance with the applicable testing procedure.

Control should include:

- Protection immediately after casting
- Proper demoulding
- Correct identification after demoulding
- Appropriate curing conditions
- Required curing duration
- Careful handling during movement and transportation

Curing is not a formality.

The condition of the specimen before testing can directly influence the strength result obtained.

7. Compression Testing

Before testing, verify:

- Cube identification
- Concrete grade
- Age of specimen
- Physical condition of the specimen
- Testing-machine status
- Correct positioning of the specimen
- Applicable testing procedure

The test should then be conducted in accordance with the applicable standard procedure.

The result must be recorded against the correct specimen identification.

8. Recording of Results

A useful concrete test record should provide enough information to understand what was tested and when.

As applicable, record:

- Cube identification
- Concrete grade
- Date of casting
- Date of testing
- Age at testing
- Individual cube strengths
- Average strength
- Relevant observations
- Testing-machine identification
- Remarks

A strength value without proper identification and traceability has limited value for investigation.

9. When a Cube Result Appears Abnormal

An unusual result should not immediately be treated as proof that the concrete itself was abnormal.

Before drawing an engineering conclusion, review the complete testing chain:

- Was the sample representative?
- Was the correct concrete identified?
- Was the mould suitable?
- Was compaction appropriate?
- Was the cube correctly identified?
- Was curing satisfactory?
- Was the specimen handled properly?
- Was the testing equipment suitable?
- Was the testing procedure followed?
- Are other results showing a similar trend?

This approach helps separate a genuine concrete-performance issue from a possible sampling, specimen-preparation, curing or testing issue.

10. Practical Quality-Control Checklist

Before relying on a cube test result, confirm:

- ☐ Representative concrete sample obtained
- ☐ Correct grade and batch identified
- ☐ Mould condition checked
- ☐ Cube properly prepared and compacted
- ☐ Specimen clearly identified
- ☐ Correct curing followed
- ☐ Cube age verified
- ☐ Testing equipment verified
- ☐ Testing procedure followed
- ☐ Result correctly recorded

11. SM Practical Insight

A concrete cube test is not simply a machine reading.

It is the final output of a chain of activities beginning with sampling.

Therefore:

Good concrete + poor sampling or specimen control can produce a poor test result.

Similarly, an isolated unusual result should trigger investigation before conclusion.

The objective of quality control is not to obtain a number that looks good.

It is to obtain a number that can be trusted.

12. Closing Note

SMS-001 provides a practical framework for maintaining consistency and traceability in concrete sampling and cube testing.

Project specifications, contractual requirements and applicable national or international standards shall take precedence wherever they prescribe specific requirements.

This Standard is intended as a practical SMKH engineering reference, helping concrete professionals focus not only on the test result but also on the quality of the process that produced it.

Disclaimer

This document is provided by SM Knowledge Hub (SMKH) as a practical technical reference based on field experience and engineering understanding. It is intended to support professional judgement and does not replace applicable codes, statutory requirements, project specifications, contractual requirements or approved testing procedures.

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