

Master Specification Part ST-SC-C7

Placement of Concrete

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ST-SC-C7 Placement of Concrete

1 General

- a) This Master Specification Part specifies the requirements for the placement, curing and stripping of concrete and the properties of the finished product, including:
 - i) the documentation requirements, as set out in section 2;
 - ii) the concrete placement requirements, as set out in section 3;
 - iii) the requirements for the finishing of unformed concrete surfaces, as set out in section 4;
 - iv) the curing requirements, as set out in section 5;
 - v) the maturity testing and temperature matched curing estimating the in-situ strength of concrete requirements, as set out in section 6;
 - vi) the cracking of concrete requirements, as set out in section 7;
 - vii) the surface finish requirements, as set out in section 8;
 - viii) the tolerance requirements, as set out in section 9; and
 - ix) the Hold Point and Witness Point requirements, as set out in section 10.
- b) The placement, curing and stripping of concrete and the properties of the finished product must comply with the Reference Documents, including:
 - i) AS 1379 Specification and supply of concrete;
 - ii) AS 1478.1 Chemical admixtures for concrete, mortar and grout, Part 1: Admixtures for concrete;
 - iii) AS 2758.1 Aggregates and rock for engineering purposes, Part 1: Concrete aggregates;
 - iv) AS 3600 Concrete structures;
 - v) AS 3610.1 Formwork for concrete, Part 1: Specifications;
 - vi) AS 3610.2 Formwork for concrete, Part 2: Design and construction
 - vii) AS 3799 Liquid membrane-forming curing compounds for concrete;
 - viii) AS 3972 General purpose and blended cements;
 - ix) AS 4586 Slip resistance classification of new pedestrian surface materials;
 - x) AS 5100.5 Bridge design, Part 5: Concrete;
 - xi) Department Road Structures Inspection Manual - Appendix D: Bridge Repair Manual (available from <https://dit.sa.gov.au/standards/manuals>);
 - xii) T41 Guide to Concrete Construction;
 - xiii) VicRoads Standard Section 687 Repair of Concrete Cracks (available from <http://webapps.vicroads.vic.gov.au/VRNE/csdspeci.nsf/>); and
 - xiv) VicRoads Standard Section 689 Cementitious Patch Repair of Concrete (available from <http://webapps.vicroads.vic.gov.au/VRNE/csdspeci.nsf/>).

2 Documentation

2.1 Construction Documentation

In addition to the requirements of PC-CN3 “Construction Management”, the Construction Documentation must include the following documents, procedures, and instructions:

- a) procedures describing the proposed method of placing, compacting, finishing, and curing the concrete, including:
 - i) the rate of placement;
 - ii) the number of personnel required and their responsibilities and required competencies;
 - iii) the plant and equipment to be used, including required standby equipment;
 - iv) the Contractor’s methodology for ensuring that the durability requirements set out in ST-SD-D1 “Design of Structures” are met during the concrete placement and curing period;
 - v) ambient, formwork and reinforcement temperature monitoring and control (where appropriate); and
 - vi) methods to control early age temperature (where appropriate);
- b) procedures for set out and level control for bridge deck pours (where applicable);
- c) procedures describing the measures that will be taken to protect freshly placed concrete and prevent evaporative moisture loss during finishing operations of concrete slabs;
- d) details of the materials and measures to ensure compliance with the specified curing requirements;
- e) if used, the type of curing compound and method of application, including methodology to ensure an application rate of not $<0.2 \text{ l/m}^2$ is achieved;
- f) procedures for precast component installation and connection (where applicable);
- g) for large and restrained concrete members, the Contractor’s methodology for ensuring that the requirements of section 3.1d) are met during the concrete placement and curing period;
- h) details of the precautionary measures to ensure concrete can be placed and finished without Defects, in accordance with section 3.6.2; and
- i) where curing compounds are applied to surfaces which are to be subsequently coated, the information required by section 5d)ii)G.

2.2 Quality Management Records

In addition to the requirements of PC-QA1 “Quality Management Requirements” or PC-QA2 “Quality Management Requirements for Major Projects” (as applicable) the Quality Management Records must include:

- a) where applicable, evidence of removal of curing compounds as set out in section 5d)ii)G; and
- b) records of all maturity testing, as required by section 6d)iii).

3 Concrete placement

3.1 General

- a) The Contractor must submit evidence verifying that the reinforcement has been placed within the specified cover and tolerances (refer ST-SC-S6 “Steel Reinforcement”), which will constitute a **Hold Point**. Concrete must not be placed until this Hold Point has been released.

- b) At least 24 hours' notice must be provided prior to placing concrete, which will constitute a **Witness Point**. Concrete must not be placed until the Contractor has progressed past the Witness Point.
- c) Concrete must be transported, handled, placed, compacted, finished, and cured in accordance with AS 3600 Concrete structures, using the recommended processes described in T41 Guide to Concrete Construction. Hand mixing of concrete is not permitted.
- d) For large and restrained concrete members (as defined in AS 5100.5 Bridge design, Part 5: Concrete), the Construction Documentation must include details of the methodology to ensure that, during the concrete placement and curing period:
 - i) the maximum differential temperature between core and surface concrete does not exceed 20°C; and
 - ii) the maximum concrete temperature anywhere within the concrete member does not exceed 75°C.

3.2 Stand-by mixing plant

The Contractor must ensure that alternative supplies of concrete from stand-by mixing plants can be made available immediately in the event of breakdown.

3.3 Traceability of concrete

All concrete batches (truckloads) used in the Works must be traceable from the batch plant to its location in the structure by a unique identification number.

3.4 Temperature at time of delivery

Concrete, when delivered at the acceptance point, must not have a temperature <5°C or >35°C (refer AS 1379 Specification and supply of concrete).

3.5 Construction joints

- a) All mandatory joints are shown on the Design Drawings. Any proposal for additional joints prior to construction will constitute a **Hold Point**.
- b) All construction joints, including those with keys or dowels, must:
 - i) be roughened to expose coarse aggregate to provide a bond between the new and old concrete. The Contractor must ensure that the reinforcement is not hit if mechanical roughening tools are used;
 - ii) have all curing compound removed from the surface; and
 - iii) be washed clean with water within 2 hours prior to placing fresh concrete against it.
- c) All excess water and loose material must be removed prior to placing the adjoining concrete for all construction joints.

3.6 Environmental conditions for placing concrete

3.6.1 Requirements for temperature and other adverse conditions

- a) Concrete must not be placed if between the time of placement and the time curing is to be applied, the air temperature at the Site (including the forecast temperature) is below 5°C or the shade temperature (including the forecast temperature) at the Site is over 35°C.
- b) Concreting in the open must not be carried out during adverse conditions, such as rain, wind, dust, or bushfires in the immediate vicinity of the Site.
- c) Steel formwork, reinforcing steel, and any other steel surfaces that will come in contact with the concrete must be cooled by shading, by providing covers or wetting down with water before the concrete is placed, to prevent flash setting of the concrete.

3.6.2 Additional requirements for elements with high area to volume ratios

- a) Concrete must not be placed in decks, approach slabs and similar elements with an area to volume ratio ≥ 5 , unless the rate of evaporation determined in accordance with Figure ST-SC-C7 11-1 is $< 1 \text{ kg/m}^2/\text{h}$.
- b) Concrete must not be placed when the rate of evaporation is between $0.5 \text{ kg/m}^2/\text{h}$ and $1 \text{ kg/m}^2/\text{h}$ unless precautionary measures are taken to ensure the concrete can be placed and finished without Defects.
- c) Details of the precautionary measures must be provided as part of the Construction Documentation.

3.7 Self-compacting concrete

Self-compacting concrete (SCC) must not be vibrated. The concrete must not be subjected to any physical disturbance after deposition other than leveling and smoothing the surface to meet the design finish.

4 Finishing of unformed concrete surfaces

4.1 General

The finish on unformed concrete surfaces are classified as follows:

- a) finish U1 - screeded finish;
- b) finish U2 - wood floated finish; and
- c) finish U3 - steel floated finish.

4.2 Finish U1 - screeded finish

- a) A screeded finish must be applied to bridge decks and other surfaces that will be later covered with a bituminous wearing surface or to walkways and other surfaces required to take pedestrian traffic.
- b) The surface must be screeded, wood floated and then roughened by broom when the concrete has set sufficiently, to produce:
 - i) for bridge decks or other surfaces that will be later covered with a bituminous wearing surface, a 0.5 mm deep surface texture; and
 - ii) for walkways required to achieve slip resistance, compliance with AS 4586 Slip resistance classification of new pedestrian surface materials.

4.3 Finish U2 - wood floated finish

A wood floated finish must be applied to all surfaces that are not required to have either a U1 or U3 finish.

4.4 Finish U3 - steel floated finish

A steel floated finish must be applied to prominently exposed surfaces such as tops of wing walls, parapets, end walls, kerbs, and similar elements. The steel floated finish must provide a smooth uniform surface, true to line and level and free of marks.

5 Curing

- a) Concrete in exposure classifications A, B1 and B2 must be continuously cured for 7 days when the concrete contains cement Types GP or SR complying with AS 3972 General purpose and blended cements without mineral additions to the concrete mix, except that decks, footways,

approach slabs and similar elements with an area to volume ratio ≥ 5 must be cured for 14 days.

- b) Concrete in exposure classifications C1 or C2 must be continuously cured for 14 days.
- c) Where cement Types GB, LH or SL are a component of the concrete, the curing times required by this section 5 must be increased by 48 hours.
- d) Curing of concrete must be by one of the following methods:
 - i) **water curing**, which must comply with the following:
 - A. all surfaces of the concrete must be kept moist for the specified periods of curing by continuous spraying, ponding, wet hessian, felt matting or sand blankets; and
 - B. wet curing materials used on vertical surfaces must be effectively wrapped during the whole curing period;
 - ii) **curing compounds**, which must comply with the following:
 - A. all curing compounds must comply with AS 3799 Liquid membrane-forming curing compounds for concrete;
 - B. curing compounds must not be applied to the upper surface of bridge decks unless approved otherwise. PVA based curing compounds are not permitted;
 - C. curing compounds must be pigmented sufficiently to allow visual inspection to ensure full application on the surface. The pigment must not be visible 14 days after application. Curing compounds must not have a deleterious effect on the concrete or stain the surface of the concrete;
 - D. the curing compound must be applied by a pressurised sprayer to give a uniform cover. The sprayer must incorporate a device for continuous agitation and mixing of the compound in its container during spraying. The curing compound must be applied using a fine spray at the rate stated on the certificate of compliance, or at a rate of 0.2 l/m^2 per coat, whichever is the greater. The application rate must be checked by calculating the amount of curing compound falling on felt mats, each approximately 0.25 m^2 in area, placed on the concrete surface;
 - E. 2 coats must be applied at the full rate. The time between the first and second coat must be in accordance with the manufacturer's recommendation, or on the basis of a trial application;
 - F. curing compounds must not be applied to construction joints unless the joint is to be roughened or sandblasted at a later date to ensure all curing compound has been removed from the surface;
 - G. curing compounds must not be applied to surfaces which are to be subsequently coated unless the Construction Documentation demonstrates they are compatible with the coating, waterproofing or surfacing system, or provision is made for removal of the compound from these surfaces prior to the application of the coating, waterproofing or surfacing system, and evidence of such removal provided as part of the Quality Management Records; and
 - H. curing membranes and curing compounds must be maintained intact for not less than the specified period of curing. Any damage to the curing membranes during the period of curing must be repaired immediately at the original rate of application;
 - iii) **polyethylene sheet**, which must comply with the following:
 - A. polyethylene sheet must be of sufficient strength to withstand wind and any imposed foot traffic or physical loading;
 - B. torn or punctured sheeting must not be used;

- C. laps must be 300 mm minimum and edges and laps must be sealed by tape or held down by boards or other means;
 - D. all edges and laps must be sealed against evaporative moisture losses for the duration of curing;
 - E. water must be sprayed under the sheeting at regular intervals to maintain moist conditions; and
 - F. polyethylene sheet must not be used on concrete decks or slabs unless used in conjunction with water curing;
- iv) **maintaining formwork**, which must comply with the following:
- A. the formwork must be sealed against evaporative moisture losses for the duration of curing; and
 - B. where formwork is removed prior to the completion of the curing period, curing must recommence within 30 minutes and continue until the total curing time is not less than the periods of curing specified in section 5a);
- v) **low pressure steam curing** for precast elements only (refer to ST-SC-S4 “Low Pressure Steam Curing of Precast Units”);
- vi) **heat accelerated curing** for precast elements only (refer to ST-SC-S5 “Heat Accelerated Curing”); and
- vii) for steam cured and hot water cured precast units, curing times are able to be reduced in accordance with ST-SC-S4 “Low Pressure Steam Curing of Precast Units” or ST-SC-S5 “Heat Accelerated Curing” as appropriate. In these cases, curing is considered complete at the end of the curing cycle.

6 Maturity testing and temperature matched curing estimating the in-situ strength of concrete

- a) Maturity testing and temperature matched curing must not be used to determine the early age in-situ strength development of concrete over a required time period for the purpose of facilitating early formwork removal, lifting precast units out of moulds or early application of loading, unless otherwise approved by the Principal in accordance with section 6b).
- b) Based on the specific application, a proposed maturity testing or temperature matched curing method of assessing early in-situ strength may be submitted for review by the Principal, which will constitute a **Hold Point**.
- c) The proposed method of maturity testing or temperature matched curing required by section 6b) must include:
 - i) a documented detailed methodology and documented evidence of previous performance including accuracy in determining the in-situ strength development of concrete;
 - ii) the type of equipment to be used to monitor the in-situ temperatures, or the control temperatures for temperature matched curing for the specific concrete mix and prevailing curing conditions:
 - A. for maturity testing, to develop a maturity curve (correlation between compressive strength and maturity); and
 - B. for temperature matched curing, to monitor the heat development in the in-situ concrete which heats the water in the temperature matched curing system and matches the temperature of the in-situ concrete with the temperature of the cylinders in the temperature matched curing system to facilitate strength development;

- iii) the method of recording the time / temperature relationship including the type of data loggers;
 - iv) the period of monitoring; and
 - v) the proposed number and location of temperature sensors to be used which must include as a minimum the interior and near surface of the concrete member.
- d) To ensure the ongoing validity of the maturity testing or temperature matched curing method, once the Hold Point has been released in section 6b):
- i) the maturity curve must be updated on a 3 monthly basis or earlier as a minimum to allow for any changes in materials, concrete mix proportioning, performance of mixing equipment, and construction conditions;
 - ii) the maturity curve must be verified at the commencement of maturity testing and subsequently on a 3 monthly basis as follows:
 - A. compare the early age strengths of test cylinders sampled and tested, with the maturity curve; and
 - B. monitor the maturity of an additional early age strength test cylinder per sample, sampled in accordance with ST-SC-S7 "Supply of Concrete", during construction and compare the strength with the maturity curve; and
 - iii) the Contractor must maintain records of all maturity testing to demonstrate compliance with the specified requirements of this section 6, which must be included as part of the Quality Management Records. The Contractor must ensure that the records are available for review by the Principal at any time.

7 Cracking of concrete

- a) At all times after placement of the concrete, the width of any crack measured at the concrete surface must not exceed:
 - i) 0.10 mm for pre-cast pre-stressed concrete; and
 - ii) the relevant value specified in Table ST-SC-C7 7-1 for all other concrete.
- b) In the event that cracks exceed the values specified in section 7a)i) or 7a)ii), this will constitute a Non-Conformance and the Contractor must:
 - i) issue a Non-Conformance Notice in accordance with PC-QA1 "Quality Management Requirements" or PC-QA2 "Quality Management Requirements for Major Projects" (as applicable);
 - ii) undertake an assessment of the cracked concrete structure (prepared by the Designer and, where necessary, a technical specialist with a minimum of 5 years' practical experience in the diagnostic assessment and investigation of concrete structures) to evaluate the influence of cracks on the load bearing capacity, serviceability and durability;
 - iii) establish the causes of the cracks, crack width, the moisture condition of the crack and whether a crack is active or inactive;
 - iv) prepare a crack repair procedure or plan, which must set out how the Contractor proposes to repair the cracks in accordance with:
 - A. Department Road Structures Inspection Manual - Appendix D: Bridge Repair Manual, SR05 Epoxy Pressure Injection of Cracks or SR06 Sealing Leaks in Cracked Concrete with Waterproof Slurry; or
 - B. to a standard not less than that specified in:
 - I. VicRoads Standard Section 687 Repair of Concrete Cracks; or

- II. VicRoads Standard Section 689 Cementitious Patch Repair of Concrete (as appropriate); and
 - v) submit the information or results of assessment required by section 7b)ii) to 7b)iv) as part of the Non-Conformance Report.
- c) Repair of the crack must not occur until the associated Hold Point set out in PC-QA1 “Quality Management Requirements” or PC-QA2 “Quality Management Requirements for Major Projects” (as applicable) has been released.

Table ST-SC-C7 7-1 Acceptable crack widths for all other concrete (excluding pre-cast pre-stressed concrete)

Exposure classification	Maximum acceptable crack widths (mm)
A	0.20
B1	0.20
B2	0.15
C1,C2,U	0.10

8 Surface finish

8.1 Class

The class of finish (as defined in AS 3610.1 Formwork for concrete, Part 1: Specifications) on formed concrete surfaces must comply with the following:

- a) totally concealed areas such as footings and foundation beams must be Class 4;
- b) all other surfaces concealed from view such as back faces of abutment walls, retaining walls and wing walls must be Class 3;
- c) visible surfaces such as front faces of abutment walls, retaining walls and wing walls, and both faces of piers and underside of deck slabs must be Class 2. Tie rods must be installed in a regular pattern; and
- d) visible surfaces such as kerbs, end walls and deck slab edges must be Class 2. No tie rods will be permitted for these surfaces.

8.2 Test panels

Despite the requirement set out in AS 3610.1 Formwork for concrete, Part 1: Specifications and AS 3610.2 Formwork for concrete, Part 2: Design and construction, for Class 2 finishes, no test panels are required.

8.3 Acceptable surface Defects and deviations

In addition to the requirements of AS 3610.1 Formwork for concrete, Part 1: Specifications and AS 3610.2 Formwork for concrete, Part 2: Design and construction, all fins and irregular projections must be removed and broken arises and edges repaired. All blowholes of greater depth than 10% of the specified cover, and any instances of honeycombing, must be treated as a Non-Conformance in accordance with PC-QA1 “Quality Management Requirements” or PC-QA2 “Quality Management Requirements for Major Projects” (as applicable).

9 Tolerances

- a) The deviation between the specified position and the finished concrete work must not exceed the lesser of the tolerances specified in this section 9 and those specified in AS 3610 Formwork for concrete, Part 1: Specifications and AS 3610.2 Formwork for concrete, Part 2: Design and construction.

- b) The soffits of arches, box girders, beams and deck edges must be continuous curves or straight lines, free from all visible irregularities.
- c) Cast in-situ slip-formed concrete kerbs and barriers and cast in-situ off-structure concrete barriers must comply with the tolerance requirements for precast concrete units as stated in Table ST-SC-C7 9-4. In addition, the vertical and horizontal alignment between adjacent segments must not exceed 5 mm.
- d) Unless specified otherwise, the tolerances in this section 9 are specified in mm.

Table ST-SC-C7 9-1 General tolerances

Item	Tolerance (mm)
Placing of reinforcement	5
Placing of post-tensioning sheeting	5
Spacing of reinforcement	15 or 10% of nominated spacing (whichever is greater)
Concrete cover	-0 to +5

Table ST-SC-C7 9-2 Cast in-situ concrete

ID	Item	Sub-item	Tolerance (mm)
1	Footings	Plan dimensions:	
		- Formed footings and pile caps	-15 to +15
		- Unformed footings	0 to +150
		Thickness:	
		- <300 mm	-5 to +25+
		- >300 mm	-10 to +50
		Top of footing or pile cap reduced level	-25 to +25
		Departure from the plan position in any direction	50
2	Cylinders	Variation from the vertical	25 mm in 3 m
		Departure from the plan position in any direction	75
3	Columns, piers, pier and abutment crossheads, slabs, walls, beams and similar parts (excluding deck slab and end posts)	Variation in cross section <3 m	-5 to +15
		Variation in cross section >3 m	-10 to +25
4	End posts	Variation of cross section	-5 to +5
5	Deck	Thickness of deck slabs (excluding allowance for correction of camber or hog)	0 to +10
		Deck surface reduced level	-10 to +10
6	Deck joints	Width of slot	-3 to +3
7	Columns, piers, walls, handrail posts and arises	Variation from vertical or specified batter of unexposed concrete	10 mm in 2.5 m (1/250)
		Variation from vertical or specified batter of exposed concrete	5 mm in 2.5 m (1/500)
8	Railings, kerbs and arises	Variation from grades indicated on drawings	2.5 mm in 2.5 m (1/1000)
9	Reduced level of tops of pier and abutment crossheads and piers	With pedestals	-10 to +10
		Without pedestals	-5 to +5
		Difference in level across width of cross head	5
10	Bearing pedestals	Reduced level	-2 to +2
		Variation from grade across the width of individual pedestals must not exceed	1 in 200
		Deviation from flat surface	+1 to -1
11	Departure from plan position at any level	Columns, piers, walls, pier and abutment crossheads, beams, slabs, kerbs, railing and other similar parts	25
		Relative displacement of adjoining components must not exceed	10
12	Departure from alignment	Rows of columns, faces of piers or walls	10
		Handrails, faces of hand rail posts, kerbs	5
13	Maximum allowance for irregularities in exposed concrete surfaces	Sections <1 m in dimension when measured with a straightedge across the dimension of the section	2.5
		Sections > 1 m in dimension when measured with a straightedge across the dimension of the section, except that when section are >2.5 m in dimension, a 2.5 m straightedge must be used	5
14	Irregularities in railings	-	2.5 mm in 2.5 m
15	Slab surface finish	-	5 mm in 2.5 m

Table ST-SC-C7 9-3 Pre-tensioned concrete

ID	Item	Sub-item	Tolerance (mm)
1	Cross section	Dimensions: - <2 m	-3 to +3
		- >2 m	-6 to +6
2	Strand and reinforcement	Out of square - >2 m	0.5 in 250, or desirable 3, maximum 5
		Placing of reinforcement	5
		Placing of prestressing strand	2
3	Squareness of ends	Concrete cover	0 to +5
			Deviation from a plane perpendicular to the longitudinal axis of a member, or from the specified end plane
		Dimension <500 mm Dimension >500 mm	3 6 mm/m (10 mm maximum)
4	Length	Diagonal length for precast unit	5
		Overall length or length centre to centre of bearings (for beams and slabs)	0.06% × specified length (max 20)
		Centre to centre spacing of holes for transverse rods or both	5
5	Profile in a vertical plane (hog) -		The deviation in hog of any unit from the mean hog of all units must not vary by >0.07% of the length of the units. The absolute value for hog for any unit must not be <0. Hog measurements must be made at transfer of prestress.
6	Profile in a horizontal pane (bow) -		The deviation of a unit from the required profile must not exceed 0.06% of the length of the unit or a maximum of 15 mm.
7	Twist -		The angular rotation of any cross section relative to an end cross section must not exceed 1 in 200.
8	Sole plates -		The plane of the sole plate or bearing surface must not vary from that shown on the Design Drawings by more than 1 in 200 in any direction.
9	Deviation - the distance of any point from a flat plane held against that surface		3 mm in 2 m

Table ST-SC-C7 9-4 Precast concrete units

ID	Item	Sub-item	Tolerance (mm)
1	General	Placing of reinforcement	5
		Placing of sheathings for post-tensioned segmental components	5
		Concrete cover	0 to +5
2	Cross section	Dimension	
		- <2 m	0 to +3
		- >2 m	0 to +6
		Out of square	Maximum 5
3	Squareness of ends	Dimension <500 mm	3
		Dimension >500 mm	6 mm/m (10 mm maximum)
			Deviation from a plane perpendicular to the longitudinal axis of a member, or from the specified end plane
			For parapet units and new jersey barriers, the deviation from a plane perpendicular to the longitudinal axis must not exceed 3 mm.
4	Length	Diagonal length for precast unit	5
		Overall length or length centre to centre of bearings (for beams and slabs)	0.06% × specified length (max 20)
		Centre to centre spacing of holes for transverse rods or bolts	5
		Overall length for parapets and new jersey barriers	3
5	Profile in a vertical plane (camber)	-	The deviation of a unit from the design camber, after allowance has been made for the deflection due to the mass of the member, must not exceed 0.10% of the length of the unit with a maximum of 6 mm. Measurement of camber must be made at the mid-point of the member which must be supported at the bearing positions
6	Profile in a horizontal plane (bow)	-	The deviation of a unit from the required profile must not exceed 6 mm or 0.10% of the length of the unit, whichever is the greater. Bow in precast parapet units and new jersey barriers must not exceed 3 mm.

10 Hold Points and Witness Points

- a) Table ST-SC-C7 10-1 details the review period or notification period, and type (documentation or construction quality) for each Hold Point referred to in this Master Specification Part.
- b) Table ST-SC-C7 10-2 details the review period or notification period, and type (documentation or construction quality) for each Witness Point referred to in this Master Specification Part.

Table ST-SC-C7 10-1 Hold Points

Section reference	Hold Point	Documentation or construction quality	Review period or notification period
3.1a)	Evidence verifying the placement of reinforcement	Documentation	5 Business Days review
3.5a)	Proposal for additional construction joints prior to construction	Documentation	5 Business Days review
6b)	Proposed maturity testing or temperature matched curing method of assessing early in-situ strength	Documentation	5 Business Days review

Table ST-SC-C7 10-2 Witness Points

Section reference	Witness Point	Documentation or construction quality	Review period or notification period
3.1b)	Notification prior to placing concrete	Construction quality	24 hours notification

11 Appendix 1: Evaporation rate from freshly placed concrete

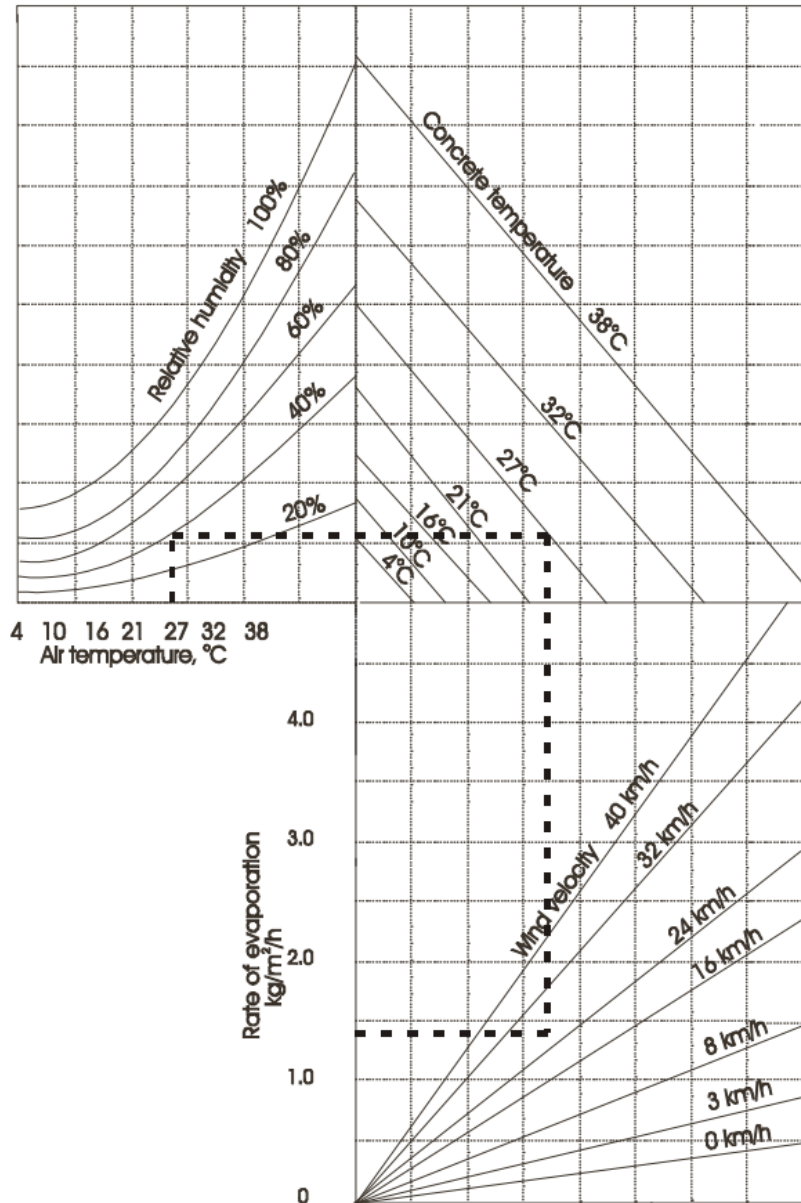
Figure ST-SC-C7 11-1 Evaporation rate from freshly placed concrete

TO USE THIS CHART:

1. Enter with air temperature.
Move up to relative humidity.
2. Move right to concrete temperature.
3. Move down to wind velocity.
4. Move left read approximate rate of evaporation

Example:

- * with air temperature at 27°C
 - * with relative humidity at 40%
 - * with concrete temp. at 27°C
 - * with a wind velocity of 26 km/h
- rate of evaporation would be 1.4 kg/m²/h



The graph shows the effect of air temperature, humidity, concrete temperature and wind velocity together on the rate of evaporation of water from freshly placed and unprotected concrete.

Ref: American Concrete Institute, "Manual of Concrete Practice"