

Method for concrete specification:

- Copy concrete designation class stated on the standard detail drawing into Table 1.
- Select an allowable mix A, B, or C from the standard detail drawing. Mix A is a higher early strength, higher embodied carbon mix. Mix B is a general mix with moderate early strength with medium embodied carbon. Mix C is a lower early strength, lower embodied carbon mix. Where multiple allowable options are given, the engineer is to select a mix.
- Copy the allowable cement combinations for the selected mix in Table 2 into Table 1.
- Specify the consistence either "To be selected by sub-contractor" or select a value. Delete from Table 1 as appropriate.
- The completed Table 1 is the concrete specification. Send to sub-contractor for procurement.

Table 1: Concrete specification.

Property	Value
Concrete designation	[Input from standard detail drawing]
Allowable cement combinations	[Select allowable mix A, B, or C from standard detail drawing and copy allowable cement combinations from Table 2]
Max. w/c ratio	As specified in BS 8500-2 Table 6.
Min. cement content	
Max. aggregate size	20mm
Chloride class	Cl 0,40 to BS 8500-1 Table A.8
Consistence	To be selected by sub-contractor or select S1, S2, S3, S4, S5
Required admixtures	Use of admixtures to achieve the required consistence class are permitted
Other requirements:	<ul style="list-style-type: none"> Concrete must conform to BS 8500-2. Cement constituents shall conform to BS EN 197-1. Methods for measuring chloride contents of constituent materials are given in BS 8500-2. All admixtures shall comply to the requirements of Cl.1702 of SHW.

Concrete Standard detail to BS 8500-1:2015+A2:2019 and BS 8500-2:2015+A2:2019

Table 2: Mix options cement combinations.

Allowable Cement Combinations (to be input to Table 1)		
Mix A	Mix B	Mix C
Higher early strength, higher carbon mix	General mix	Lower early strength, lower carbon mix
CEM I, CEM II/A-L, CEM II/A-S, CEM II/A-P, CEM II/A-Q, CEM II/A-V	CEM II/B-S, CEM II/B-P, CEM II/B-Q, CEM II/B-V	CEM III/A, CEM III/B, CEM IV/B

Caveat note:

This concrete Standard detail is designed to help Oxfordshire County Council (and its designers/contractors) meet its obligations to reduce embodied carbon across all its operations. However the designer for the specific scheme will need to take into account the specific application constraints and environmental conditions that the standard detail is being applied to, especially where there is a choice of mix options, in order to ensure that it meets the buildability and durability requirements for that project. These alternative mixes are compliant with current British Standards and embodied carbon value guidance at the time of issue (references contained within this drawing), but the designer should check that these references remain current prior to use.

There are alternative proprietary lower carbon concretes starting to become available that are outside of the Specification for Highway Works. However there are likely to be some restrictions in terms of their availability depending on quantity/site location. OCC encourage designers to consider these in consultation with the relevant OCC officer where they may provide substantial embodied carbon savings, but still meet the required performance required for that application. However at present a Departure from Standards will need to be submitted and approved by OCC for their use on OCC adopted highway assets.

Table 3: Embodied carbon of mix options.

Concrete Designation (Equivalent min. compressive strength class)	Equivalent ST mix (Assumed design strength equivalent to that of GEN mix)	Embodied carbon per m ³ concrete (kgCO ₂ e/m ³)[1] Average of all mix options, % reduction from ST mix.			
		ST mix	Mix A (Higher early strength)	Mix B (General mix)	Mix C (Lower carbon mix)
GEN0 (C6/8)	ST1	268	152 ↓43%	131 ↓51%	99 ↓63%
GEN1 (C8/10)	ST2	295	204 ↓31%	179 ↓39%	133 ↓55%
GEN2 (C12/15)	ST3	336	226 ↓33%	195 ↓42%	140 ↓58%
GEN3 (C16/20)	ST4	368	242 ↓34%	209 ↓43%	149 ↓60%
RC20/25	ST5	395	263 ↓33%	228 ↓42%	162 ↓59%

[1] Embodied carbon values include cement, cement replacements, transport of cement, water, aggregate, batching plant operations, and transport to site. Admixtures and steel reinforcement are excluded.
Source: C. Jones and G. Hammond, "Inventory of Carbon and Energy", V3.0 Nov 2019, Circular Ecology and University of Bath.

DRAWING TITLE:

Concrete For Ancillary Purposes Standard Specification

SCALE: NTS

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