Singapore Standard SS 544: Part 1: 2019

Concrete – Complementary Singapore Standard to SS EN 206 Part 1: Method of specifying and guidance for the specifier

AMENDMENT NO. 1

May 2021

1. Page 7, National Foreword

Add the following after NOTE:

The changes are predominantly concerned with the increased range of cementitious materials covered. These include: natural pozzolana, natural calcined pozzolana or high reactivity natural calcined pozzolana as an addition, Portland-pozzolana and pozzolanic cements, as well as a range of ternary cements which include up to 20% limestone fines. The recommendations for the use of natural, natural calcined and high reactivity natural calcined pozzolana, as part of cement or combination, are based on the assumption that their performance in concrete is similar to fly ash. The recommendations for ternary cements, which include up to 20% limestone fines, are for applications where their use is considered safe and durable. The option to use durability modelling or an equivalent durability procedure is clarified. Minor editorial changes are not tagged, such as the change of nomenclature from N/mm2 to MPa for stress.

2. Page 10, Introduction

Add the following after the last paragraph:

The Foreword to SS EN 206 sets out the context in which SS EN 206 operates in the context of European standards. As SS 544 is Singapore complementary standard to SS EN 206, the context in which SS 544 operates is the same when SS 544 is used within a suite of Singapore Standards.

3. Page 17, 4.2.3 Additional requirements

Replace item a) with the following:

a) any restriction on the permitted range of cement and combination types, or any relaxation to permit type IVB-P, IV-B-Q or IVB-V cements or combinations (see Note 1);

4. Page 18, 4.3.2 Basic requirements

Replace NOTE 3 with the following:

NOTE 3 The specifier may choose one or more groups using the broad designations given in Table A.6, select specific cement and combination types from SS 544-1:2019+A1:2021 Table 1 or choose other cement and combination types not listed in these tables. With designed concrete, it is not normally necessary to specify the cement strength class, but where this is needed, it may be specified. Where the specification for a designed concrete does not state the cement and combination types to be used, the producer is required to select from those listed in SS 544-1:2019+A1:2021 Table 1.

5. **Page 33, A.4.1 General**

Add the following new paragraph after "• the structural requirements (see structural design codes for guidance, e.g. SS EN 1992-1-1)":

For some conditions this guidance may be considered either too restrictive or too conservative, in which case the designer may use combinations of durability modelling and performance related parameters as given in EN 206:2013+A1:2016 5.3.3, to specify concrete. The performance related parameters may be derived from the durability model or established by comparison with a reference concrete as set out in PD CEN/TR 16563, Principles of the equivalent durability procedure.

6. Page 34, A.4.2 Concrete properties and limiting values to resist corrosion of reinforcement

Replace Paragraph 5 with the following:

The use of additional quantities of natural pozzolana, natural calcined pozzolana, high reactivity natural calcined pozzolana, fly-ash, ggbs, limestone fines or silica fume or combinations of these materials, forming ternary or quaternary cementitious blends, is not prohibited by the recommendations of Table A.4 and Table A.5. Where these additional materials are used they are not considered as part of the cement content and do not contribute to the w/c ratio unless they are shown to be demonstrably equivalent using the equivalent concrete performance concept (ECPC) as given in SS 544-1:2019+A1:2021.

The term pozzolana refers to either natural pozzolana or natural calcined pozzolana conforming to BS 8615-1 or high reactivity natural calcined pozzolana conforming to BS 8615-2.

7. Page 37, Table A.4 – Durability A) recommendations for reinforced or prestressed elements with an intended working life of at least 50 years (Nominal Cover B) mm, XC3/4)

Under the "Cement/combination types" column, replace with the following:

Cement/combination types
All in Table A.6 except IVB-P, IVB-Q, IVB-V
IVB-P, IVB-Q, IVB-V

8. Page 37, Table A.4 – Durability A) recommendations for reinforced or prestressed elements with an intended working life of at least 50 years (Nominal Cover mm, XD2)

Under the "Cement/combination types" column, replace with the following:

Cement/combination types
CEM I, IIA, IIB-M, IIB-S, CEM I-SR0, CEM I-SR3
IIB-P, IVB-Q, IIB-V, IIIA
IIIB, IVB-P, IVB-Q, IVB-V

9. Page 37, Table A.4 – Durability A) recommendations for reinforced or prestressed elements with an intended working life of at least 50 years (Nominal Cover B) mm, XD3)

Under the "Cement/combination types" column, replace with the following:

Cement/combination types	
CEM I, IIA, IIB-M, IIB-S, CEM I-SR0, CEM I-SR3	
IIB-P, IIB-Q, IIB-V, IIIA	
IIIB, IVB-P, IVB-Q, IVB-V	

10. Page 38, Table A.4 – Durability A) recommendations for reinforced or prestressed elements with an intended working life of at least 50 years (Nominal CoverB) mm, XS1)

Under the "Cement/combination types" column, replace with the following:

Cement/combination types
CEM I, IIA, IIB-M, IIB-S
IIB-P, IIB-Q, IIB-V, IIIA
IIB-P or Q ≥25% pozzolana, IIB-V≥25% fly ash, IIIA ≥46% ggbs
IVB-P, IVB-Q, IVB-V, IIIB

11. Page 38, Table A.4 – Durability A) recommendations for reinforced or prestressed elements with an intended working life of at least 50 years (Nominal Cover B) mm, XS2)

Under the "Cement/combination types" column, replace with the following:

Cement/combination types
CEM I, IIA, IIB-M, IIB-S
IIB-P, IIB-Q, IIB-V, IIIA
IIB-P OR Q ≥25 % pozzolana, IIB-V≥25% fly ash, IIIA ≥46%ggbs
IVB-P, IVB-Q, IVB-V, IIIB

12. Page 39, Table A.4 – Durability A) recommendations for reinforced or prestressed elements with an intended working life of at least 50 years (Nominal Cover B) mm, XS3)

Under the "Cement/combination types" column, replace with the following:

Cement/combination types
CEM I, IIA, IIB-M, IIB-S
IIB-P, IIB-Q, IIB-V, IIIA
IIB-P or Q ≥25 % pozzolana, IIB-V ≥25 % fly ash, IIIA≥46% ggbs
IVB-P, IVB-Q, IVB-V, IIIB

13. Page 39, Table A.4 – Durability A) recommendations for reinforced or prestressed elements with an intended working life of at least 50 years (footnote)

Replace D) and H) with the following:

^{D)} Also applies to heavy weight concrete. For lightweight concrete, the maximum w/c ration and minimum cement or combination content applies, but the compressive strength class needs to be changed to a lightweight compressive strength class (see A.4.2, Note, BS EN 206:2013 +A1:2016, Table 13 and SS 544-2:2019+A2:2021, Table 12) on the basis of equal cylinder strength if designing to SS EN 1992-1-1 and SS EN 1992-1-2.

H) For IVB-P, IVB-Q and IVB-V increase the strength class to C28/35

14. Page 40, Table A.5 – Durability A) recommendations for reinforced or prestressed elements with an intended working life of at least 100 years (Nominal Cover B) mm, XC3/4)

Under the "Cement/combination types" column, replace with the following:

Cement/combination types
All in <u>Table A.6</u> except IVB-P, IVB-Q, IVB-V
IVB-P, IVB-Q, IVB-V

15. Page 40, Table A.5 – Durability A) recommendations for reinforced or prestressed elements with an intended working life of at least 100 years (Nominal CoverB) mm, XD2)

Under the "Cement/combination types" column, replace with the following:

Cement/combination types
CEM I, IIA, IIB-M, IIB-S, CEM I-SR0, CEM I-SR3
IIB-P, IIB-V, IIIA
IIIB, IVB-P, IVB-Q, IVB-V

16. Page 40, Table A.5 – Durability A) recommendations for reinforced or prestressed elements with an intended working life of at least 100 years (Nominal Cover B) mm, XD3)

Under the "Cement/combination types" column, replace with the following:

Cement/combination types
CEM I, IIA, IIB-M, IIB-S, CEM I-SR0, CEM I-SR3
IIB-P, IIB-Q, IIB-V, IIIA
IIIB, IVB-P, IVB-Q, IVB-V

17. Page 41, Table A.5 – Durability A) recommendations for reinforced or prestressed elements with an intended working life of at least 100 years (Nominal Cover B) mm, XS1)

Cement/combination types
CEM I, IIA, IIB-M, IIB-S
IIB-P, IIB-Q, IIB-V, IIIA
IIB-P or Q≥25% pozzolana, IIB V ≥25% fly ash, IIIA ≥46% ggbs
IIIB
IVB-P, IVB-Q, IVB-V

18. Page 41, Table A.5 – Durability A) recommendations for reinforced or prestressed elements with an intended working life of at least 100 years (Nominal Cover B) mm, XS2)

Under the "Cement/combination types" column, replace with the following:

Cement/combination types
CEM I, IIA, IIB-M, IIB-S
IIB-P, IVB-Q, IIB-V, IIIA
IIB-P or Q≥25% pozzolana, IIB V≥25% fly ash, IIIA ≥46% ggbs
IVB-P, IVB-Q, IVB-V, IIIB

19. Page 41, Table A.5 – Durability A) recommendations for reinforced or prestressed elements with an intended working life of at least 100 years (Nominal Cover B) mm, XS3)

Under the "Cement/combination types" column, replace with the following:

Cement/combination types
CEM I, IIA, IIB-M, IIB-S
IIB-P, IVB-Q, IIB-V, IIIA
IIB-P or Q≥25% pozzolana, IIB V ≥25% fly ash, IIIA≥46% ggbs
IVB-P, IVB-Q, IVB-V, IIIB

20. Page 42, Table A.5 – Durability A) recommendations for reinforced or prestressed elements with an intended working life of at least 100 years (footnote)

Replace footnote D) with the following:

21. Page 43, Table A.6 Cement and combination types A)

Replace Table A.6 with the following:

Table A.6 Cement and combination types A)

Broad designation ^{B)}	Composition	Comprises cement and combination types (see SS 544-2:2019 +A1:2021)
CEM I	Portland cement	CEM I
CEM I-SR 0	Sulfate-resisting Portland cement	CEM 1-SR 0

D) Also applies to heavyweight concrete. For lightweight concrete the maximum w/c ratio and minimum cement or combination content applies, but the compressive strength class needs to be changed to a lightweight compressive strength class (see A.4.2, Note, BS EN 206:2013+A1:2016, Table 13 and SS 544-2:2019+A1:2021, Table 12) on the basis of equal cylinder strength if designing to SS EN 1992-1-1 and SS EN 1992-1-2.

Broad designation ^{B)}	Composition	Comprises cement and combination types	
		(see SS 544-2:2019 +A1:2021)	
CEM I-SR 3		CEM 1-SR 3	
IIA	Portland cement with either: 6% to 20% pozzolana, 6% to 20% fly ash, 6% to 20% ground granulated blastfurnace slag, 6% to 20% limestone, or 6% to 10% silica fume o. Portland cement with either:	CEM II/A-L or LL, CIIA-L or LL, CEM II/A-S, CIIA-S, CEM II/A-P or Q, CIIA-P or Q, CEM II/A-V, CIIA-V, CEM II/A-D, CEM II/A-M, CIIA-M	
	Fortiario Cernent with either.		
	6% to 20% limestone and pozzolana, or 6% to 20% limestone and ground granulated blastfurnace slag, or 6% to 20% limestone and fly ash		
IIB-S	Portland cement with 21% to 35% ground granulated blastfurnace slag	CEM II/B-S, CIIB-S	
IIB-P or Q	Portland cement with 21% to 35% pozzolana	CEM II/B-P or Q, CIIB-P or Q	
IIB-V	Portland cement with 21% to 35% fly ash	CEM II/B-V, CIIB-V	
IIB-M	Portland composite cement, comprised not less than 65% Portland cement clinker with either: 21% to 35% pozzolana and limestone ^{D)} , 21% to 35% fly ash and limestone ^{D)} , or 21% to 35% ground granulated blastfurnace slag and limestone ^{D)} . Portland limestone cement with up to either 29% pozzolana, 29% fly ash, or 29% ground granulated blastfurnace slag with not less than 65% Portland cement clinker in the combination.	CEM II/B-M(P or Q-L or LL), CIIB-M(P or Q-L or LL)	
		CEM II/B-M (V-L or LL), CIIB-M (V-L or LL)	
		CEM II/B-M (S-L or LL), CIIB-M (S-L or LL)	
		CEM II/B-M(L or LL-P or Q), CIIB-M(L or LL-P or Q)	
		CEM II/B-M(L or LL-V), CIIB-M(L or LL-V)	
		CEM II/B-M(L or LL-S), CIIB-M(L or LL-S)	
IIB-P+SR	Portland cement with 25% to 35% pozzolana	CEM II/B-P+SR, CIIB-P+SR	
IIB-Q+SR		CEM II/B-Q+SR, CIIB-Q+SR	
IIB-V+SR	Portland cement with 25% to 35% fly ash	CEM II/B-V+SR, CIIB-V+SR	

Broad designation ^{B)}	Composition	Comprises cement and combination types (see SS 544-2:2019 +A1:2021)
IIIA ^{E)}	Portland cement with 36% to 65% ground granulated blastfurnace slag	CEM III/A, CIIIA
IIIA+SR	Portland cement with 36% to 65% ground granulated blastfurnace slag with additional requirements that enhance sulfate resistance	CEM III/A+SRF), CIIIA+SR F)
IIIB ^{G)}	Portland cement with 66% to 80% ground granulated blastfurnace slag	CEM III/B, CIIIB
IIIB+SR	Portland cement with 66% to 80% ground granulated blastfurnace slag with additional requirements that enhance sulfate resistance	CEM III/B+SR ^{F)} , CIIIB+SR ^{F)}
IVB-P H)	Portland cement with 36% to 55% pozzolana	CEM IV/B-P, CIVB-P
IVB-Q H)		CEM IV/B-Q, CIVB-Q
IVB-V ^{I)}	Portland cement with 36% to 55% fly ash	CEM IV/B-V, CIVB-V

^{A)} There are a number of cements and combinations not listed in this table that may be specified for certain specialist applications. See BRE Special Digest 1 [1] for the sulfate-resisting characteristics of other cements and combinations. See IP 17/05 [8] for the use of high ggbs content cements and combinations in secant piling applications.

22. Page 46, Table A.9 – Limiting values for composition and properties of concrete to resist freezing and thawing (Exposure class, XF3)

Under the "Cement/ combination types" column, replace with the following:

Cement/ combination types	Alternative designated concrete
All in Table A.6 excluding cement and combinations IVB-V, IVB-P or IVB-Q	PAV1 and RC40/50XF

^{B)} The use of these broad designations is sufficient for most applications. Where a more limited range of cement or combinations types is required, select from the notations given in SS 544-2:2019+A1:2021, Table 1.

 $^{^{\}text{C}}$) When IIA or IIA-D is specified, CEM I and silica fume may be combined in the concrete mixer using the k-value concept; see BS EN 206:2013+A1:2016, 5.2.5.2.3.

D) Maximum limestone content 20%.

E) Where IIIA is specified, IIIA+SR may be used.

 $^{^{\}rm F)}$ "+SR" indicates additional restrictions on the chemical composition of cement or ggbs related to sulfate resistance. See SS 544:2019+A1:2021, Table 1, footnote G.

G) Where IIIB is specified, IIIB+SR may be used.

H) IVA cements and combinations with pozzolana should be classified as II-P or II-Q.

¹⁾ IVA cements and combinations with a siliceous fly ash should be classified as II-V.

23. Page 46, Table A.9 – Limiting values for composition and properties of concrete to resist freezing and thawing (Exposure class, XF4)

Under the "Cement/ combination types" column, replace with the following:

Cement/ combination types	Alternative designated concrete
All ^{C)} in Table A.6 excluding cement and combinations IVB-V, IVB-P or IVB-Q	PAV1 ^{D)} and RC40/50XF

24. Page 49, Table A.12 – Limiting values for composition and properties for concrete where a DC-class is specified

Under the "Cement/combination types" column, replace with the following:

DC-class	Max. w/c ratio	Cement and combination types	Grouping used in BRE SD1: 2005 [1]
DC-1 ^{A)}	-	All in Table A.6	A to G
	0.55	IIB-P+SR, IIB-Q+SR, IIB-V+SR, IIIA+SR, IIIB+SR, IVB-P, IVB-Q, IVB-V	D, E, F
DC-2	0.50	CEM I, CEM I-SR 0, CEM I-SR 3, IIA-D, IIA-P, IIA-Q, IIA-S, IIA-V, IIB-P, IIB-Q, IIB-S, IIB-V, IIIA, IIIB	A, G
	0.45	IIA-L or LL ≥42.5, IIA-M, IIB-M	В
	0.40	IIA-L or LL 32.5, IIA-M, IIB-M	С
DC-2z	0.55	All in Table A.6	A to G
	0.50	IIIB+SR	F
DC-3	0.45	IVB-P, IVB-Q, IVB-V	E
	0.40	IIB-P+SR, IIB-Q+SR, IIB-V+SR, IIA+SR, CEM I-SR 0, CEM I-SR 3	D, G
DC-3z	0.50	All in Table A.6	A to G
	0.45	IIIB+SR	F
DC-4	0.40	IVB-P, IVB-Q, IVB-V	E
	0.35	IIB-P+SR, IVB-Q,	D, G
		IIB V+SR, IIIA+SR, CEM I-SR 0, CEM I-SR 3	
DC-4z	0.45	All in Table A.6	A to G
DC-4m	0.45	IIIB+SR	F

25. Page 50, Table A.13 – Limiting values of composition for unreinforced concrete in contact with seawater (exposure class XAS)

Under the "Cement/combination types" column, replace with the following:

Max. w/c ratio	Cement and combination types ^{A)}	Indicative compressive strength class ^{B)}
0.55	CEM I, CEM I-SR 0, CEM I-SR 3, IIIA, IIB-M, IIB-S	(C28/35)
0.55	IIB-P, IIB-Q, IIB-V, IIB-P+SR, IIB-Q+SR, IIB-V+SR, IIIA, IIIA+SR	(C25/30)
0.55	IIIB, IIIB+SR, IVB-P, IVB-Q, IVB-V	(C20/25)

26. Page 52, Table A.15 – Summary of requirements for designated concretes A)

Concrete designation	Min. cement or combination content (kg/m²) for 20 mm max. aggregate size	Cement and combination types
GEN0	120	CEM I, IIA, IIB-M, IIB-S, IIB-P, IIB-Q, IIB-V, IIIA, IVB-P, IVB-Q, IVB-V
GEN1	180	CEM I, IIA, IIB-M, IIB-S, IIB-P, IIB-Q, IIB-V, IIIA, IVB-P, IVB-Q, IVB-V
GEN2	200	CEM I, IIA, IIB-M, IIB-S, IIB-P, IIB-Q, IIB-V, IIIA, IVB-P, IVB-Q, IVB-V
GEN3	220	CEM I, IIA, IIB-M, IIB-S, IIB-P, IIB-Q, IIB-V, IIIA, IVB-P, IVB-Q, IVB-V
RC20/25	240	CEM I, IIA, IIB-M, IIB-S, IIB-P, IIB-Q, IIB-V, IIIA, IVB-P, IVB-Q, IVB-V
RC25/30	260	CEM I, IIA, IIB-M, IIB-S, IIB-P, IIB-Q, IIB-V, IIIA, IVB-P $^{\rm B)}$, IVB-Q $^{\rm B)}$, IVB-VB
RC28/35	280	CEM I, IIA, IIB-M, IIB-S, IIB-P, IIB-Q, IIB-V, IIIA, IVB-P $^{\rm B)}$, IVB-Q $^{\rm B)}$, IVB-V $^{\rm B)}$
RC30/37	300	CEM I, IIA, IIB-M, IIB-S, IIB-P, IIB-Q, IIB-V, IIIA, IVB-P $^{\rm B)}$, IVB-Q $^{\rm B)}$, IVB-V $^{\rm B)}$
RC32/40	300	CEM I, IIA, IIB-M, IIB-S, IIB-P, IIB-Q, IIB-V, IIIA, IVB-P $^{\rm B)}$, IVB-Q $^{\rm B)}$, IVB-V $^{\rm B)}$
RC35/45	320	CEM I, IIA, IIB-M, IIB-S, IIB-P, IIB-Q, IIB-V, IIIA, IVB-P $^{\rm B)}$, IVB-Q $^{\rm B)}$, IVB-V $^{\rm B)}$
RC40/50	340	CEM I, IIA, IIB-M, IIB-S, IIB-P, IIB-Q, IIB-V, IIIA, IVB-P $^{\rm B)}$, IVB-Q $^{\rm B)}$, IVB-V $^{\rm B)}$
RC40/50XF	340	CEM I, IIA, IIB-M, IIB-S, IIB-P, IIB-Q, IIB-V, IIIA C)
PAV1	300	CEM I, IIA, IIB-M, IIB-S, IIB-P, IIB-Q, IIB-V, IIIA C)
PAV2	340	CEM I, IIA, IIB-M, IIB-S, IIB-P, IIB-Q, IIB-V, IIIA $^{\rm C)}$
FND2	320	IIB-P+SR, IIB-Q+SR, IIB-V+SR, IIIA+SR, IIIB+SR, IVB-V
FINDZ	340	CEM I, CEM I-SR 0, CEM I-SR 3, II-S, II-P, II-Q, II-V, IIIA, IIIB

Concrete designation	Min. cement or combination content (kg/m²) for 20 mm max. aggregate size	Cement and combination types
	360	IIA-L or LL, IIB-M, class 42.5
	380	IIA-L or LL, IIB-M class 32.5
FND2Z	320	All in Table A.6
	340	IIIB+SR
FND3	360	IVB-P, IVB-Q, IVB-V
11120	380	IIB-P+SR, IIB-V+SR, IIIA+SR, CEM I-SR 0, CEM I-SR 3
FND3Z	340	All in Table A.6
	360	IIIB+SR
FND4	380	IVB-P, IVB-Q, IVB-V
TND4	380	IIB-P+SR, IIB-Q+SR, IIIB-V+SR, IIIA+SR, CEM I-SR 0, CEM I-SR 3
FND4Z	360	All in Table A.6
FND4M	360	IIIB+SR
A) See SS concrete	•	use 6 for the full set of requirements for designated

27. Page 53, Table A.16 – Summary of requirements for designated cement-bound concrete

Under the "Cement/combination types" column, replace with the following:

Concrete	Cement and combination type	
designation		
CB6/8	CEM I, IIA, IIB-M, IIB-S, IIB-P, IIB-Q, IIB-V, IIIA, IVB-P, IVB-Q, IVB-V	
CB8/10	CEM I, IIA, IIB-M, IIB-S, IIB-P, IIB-Q, IIB-V, IIIA, IVB-P, IVB-Q, IVB-V	
CB12/15	CEM I, IIA, IIB-M, IIB-S, IIB-P, IIB-Q, IIB-V, IIIA, IVB-P, IVB-Q, IVB-V	
CB16/20	CEM I, IIA, IIB-M, IIB-S, IIB-P, IIB-Q, IIB-V, IIIA, IVB-P, IVB-Q, IVB-V	
CB20/25	CEM I, IIA, IIB-M, IIB-S, IIB-P, IIB-Q, IIB-V, IIIA, IVB-P, IVB-Q, IVB-V	
CB25/30	CEM I, IIA, IIB-M, IIB-S, IIB-P, IIB-Q, IIB-V, IIIA, IVB-P, IVB-Q,IVB-V	
CB28/35	CEM I, IIA, IIB-M, IIB-S, IIB-P, IIB-Q, IIB-V, IIIA, IVB-P, IVB-Q, IVB-V	
CB30/37	CEM I, IIA, IIB-M, IIB-S, IIB-P, IIB-Q, IIB-V, IIIA, IVB-P, IVB-Q, IVB-V	
CB32/40	CEM I, IIA, IIB-M, IIB-S, IIB-P, IIB-Q, IIB-V, IIIA, IVB-P, IVB-Q, IVB-V	
CB35/45	CEM I, IIA, IIB-M, IIB-S, IIB-P, IIB-Q, IIB-V, IIIA, IVB-P, IVB-Q, IVB-V	
CB40/50	CEM I, IIA, IIB-M, IIB-S, IIB-P, IIB-Q, IIB-V, IIIA, IVB-P, IVB-Q, IVB-V	

- A) The characteristic compressive strength at 28 days of cylinders or cubes made in accordance with BS EN 13286-51 and tested in accordance with BS EN 12390-3.
- Aggregate grading for cement-bound concrete as given SS 544-1:2019+A1:2021, Table 8

28. Page 53, Table A.17 – Standardised prescribed concretes and indicative strengths

Replace "N/mm2" with "MPa".

29. Page 54, Table A.18 - Consistence suitable for different uses of in-situ concrete

Add the following after Table A.18:

Consistence should be specified by using one of the classes in BS EN 206:2013+A1:2016, Table 3, Table 5 or Table 6. Where there are particular compaction, viscosity, passing ability or segregation resistance requirements then one of the classes in BS EN 206:2013+A1:2016, Table 4, Table 7, Table 8, Table 9, Table 10 or Table 11 should be specified. In special cases, a target value instead of a consistence class might be appropriate. It is normally the responsibility of the user of the fresh concrete to make the selection of consistence and inform the specifier of the requirements. The specifier should add this requirement to the specification.

30. Page 69, Bibliography

Add the following standard:

PD CEN/TR 16563, Principles of the equivalent durability procedure