



**BS6349:1-4-2013 Maritime works- Part 1-4
comparison with BS 8500-1:2015**

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Specifying Concrete for Marine Applications.

Review of BS 6346-1-4:2013 with the recently published BS 8500- 1:2015

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British Standards for specifying concrete for marine and maritime applications

BS6349 first published in 1984
1st revision in 2000
Latest revision in 2013

BS8500 first published in 2002
1st revision in 2006
Latest revision in 2015

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BSI Standards Publication

Maritime works –

Part 1-4: General – Code of practice
for materials

BS 8500-1:2015



BSI Standards Publication

Concrete – Complementary British Standard to BS EN 206

Part 1: Method of specifying and
guidance for the specifier

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BS 8500 is broadly in line with BS 6349, however there are some detailed differences for the mix design for similar durability conditions.

The differences are not significant and durability properties of the concrete using either code are not compromised, however it is felt that both documents should align to avoid confusion.

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Tables 1, 2 and 3 of BS6349-1-4 could now be aligned with the Tables A4 and A5 of BS8500-1.

Cement types as found in BS EN 197-1:2011 are used with modification but grouping of cement types does vary between codes.

Assessing exposure designations of XS1, XS2 and XS3 show slight differences in cement content and w/c ratios in some instances.

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50 years Fully Submerged Condition - XS2

BS6349-1-4 Table 2

	30 + Δc	35 + Δc	40 + Δc	45 + Δc	50 + Δc	55 + Δc	60 + Δc	65 + Δc	70 + Δc	75 + Δc	80 + Δc	
—	C40/50 0.35 360	C35/45 0.45 360	C32/40 0.50 360	C28/35 0.55 360	C25/30 0.55 340	C25/30 0.55 340	C20/25 0.55 340	C20/25 0.55 340	C20/25 0.55 340	C20/25 0.55 340	C20/25 0.55 340	IIIA with 46% to 65% ggbs IIIB IIB-V+SR (25% to 35% fly ash) [Ⓔ] IVB-V
—	—	C35/45 0.40 360	C32/40 0.45 360	C28/35 0.50 3 60	C25/30 0.55 340	C25/30 0.55 340	C20/25 0.55 340	C20/25 0.55 340	C20/25 0.55 340	C20/25 0.55 340	C20/25 0.55 340	IIIA with 35% to 45% ggbs IIB-V with 21% to 24% fly ash [Ⓔ]
—	—	—	—	—	—	C40/50 0.35 360	C35/45 0.40 360	C32/40 0.40 3 60	C32/40 0.45 3 60	C28/35 0.50 360	C28/35 0.50 360	CEM I CEM II/A-L(LL), II/A, II/B-S

BS8500-1 Table A4

	30 + Δc	35 + Δc	40 + Δc	45 + Δc	50 + Δc	55 + Δc	60 + Δc	65 + Δc	70 + Δc	75 + Δc	80 + Δc	
—	—	—	—	—	—	—	C45/55^F 0.35 [Ⓔ] 380	C40/50 ^F 0.40 380	C40/50 ^F 0.40 380	C35/45 ^F 0.45 360	C32/40 ^F 0.50 340	CEM I, IIA, IIB-S
—	—	C35/45 ^F 0.40 380	C32/40 ^F 0.45 360	C28/35 0.50 340	C25/30 0.55 320	C25/30 0.55 320	C25/30 0.55 320	C25/30 0.55 320	C25/30 0.55 320	C25/30 0.55 320	C25/30 0.55 320	IIB-V, IIIA
—	C40/50 ^F 0.35 [Ⓔ] 380	C32/40^F 0.45 [Ⓔ] 360	C28/35 0.50 340	C25/30 0.55 320	C25/30 0.55 320	C25/30 0.55 320	C25/30 0.55 320	C25/30 0.55 320	C25/30 0.55 320	C25/30 0.55 320	C25/30 0.55 320	IIB-V ≥25% fly ash, IIIA ≥46% ggbs
—	C35/45 ^F 0.35 [Ⓔ] 380	C28/35 0.45 360	C25/30 0.50 340	C20/25 0.55 320	C20/25 0.55 320	C20/25 0.55 320	C20/25 0.55 320	C20/25 0.55 320	C20/25 0.55 320	C20/25 0.55 320	C20/25 0.55 320	IV-B, IIIB

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100 years Durability Splash Zone Area XS3

BS6349-1-4 Table 3

30 + Δc	35 + Δc	40 + Δc	45 + Δc	50 + Δc	55 + Δc	60 + Δc	65 + Δc	70 + Δc	75 + Δc	80 + Δc	
—	—	—	—	—	—	C40/50 0.35 380	C35/45 0.40 360	C32/40 0.45 360	C28/35 0.55 360	C25/30 0.55 340	IIIA with 46% to 65% ggbs IIIB IIB-V+SR (25% to 35% fly ash) ^{g)} IVB-V
—	—	—	—	—	—	—	C40/50 0.35 380	C35/45 0.40 360	C32/40 0.45 360	C28/35 0.50 360	IIIA with 35% to 55% ggbs IIB-V with 21% to 24% fly ash ^{g)}

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BS8500-1 Table A5

30 + Δc	35 + Δc	40 + Δc	45 + Δc	50 + Δc	55 + Δc	60 + Δc	65 + Δc	70 + Δc	75 + Δc	80 + Δc	
—	—	—	—	—	—	—	—	—	—	—	CEM I, IIA, IIB-S
—	—	—	—	—	—	C40/50 ^{F)} 0.35 ^{H)} 380	C40/50 ^{F)} 0.35 ^{G)} 380	C35/45 ^{F)} 0.40 380	C32/40 ^{F)} 0.45 360	C28/35 0.50 340	IIB-V, IIIA
—	—	—	—	—	—	C40/50 ^{F)} 0.35 ^{G)} 380	C35/45 ^{F)} 0.40 380	C32/40 ^{F)} 0.45 360	C25/30 0.55 320	C25/30 0.55 320	IIB V ≥25% fly ash, IIIA ≥46% ggbs
—	—	—	—	—	—	C35/45 ^{F)} 0.35 ^{G)} 380	C32/40 ^{F)} 0.40 380	C28/35 0.45 360	C20/25 0.55 320	C20/25 0.55 320	IVB-V, IIIB

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Points to note.

PC cement mixes are less durable than any of the blended cements i.e. Those incorporating fly ash or ggbs. Best results are those with >25% fly ash or >46% ggbs

SRPC no longer specified as cements with low C3A content perform poorly in sea water

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One further amendment to BS 6349-1-4 will be to remove Table 6

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BS 6349-1-4:2013

BRITISH STANDARD

For tests on hardened concrete (e.g. BS 1881-124), the limits of chloride ion content (prior to exposure to seawater) should not exceed those given in Table 6.

Table 6 Total chloride ion content of hardened concrete

Concrete type	Limit of 95% of results	No results more than
Prestressed and heat-cured in contact with concrete	0.10%	0.15%
Containing steel reinforcement or other embedded metal	0.20%	0.25%
Plain (unreinforced) concrete	0.50%	0.65%

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Thank You

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