TARMAC
A CRH COMPANY

Tarmac Cement National Laboratory

Yelsway Lane
Waterhouses
Staffordshire
ST10 3AZ

09/01/2025

Composition of Ground Granulated Blastfurnace Slag

Tudela EN 15167-1 GGBS
(0086-CPR-780512)

Based on the **October 2024** monthly composite sample: 3944

Property			Value	BS EN 15167-1 Limit
Magnesia	MgO	%	7.32	≤ 18.0%
Sulfate	SO_3	%	0.20	≤ 2.5%
Sulfide	$S2^-$	%	0.82	≤ 2.0%
Chloride	Cl^-	%	0.02	≤ 0.1%
Alkalis	Na_2Oeq	%	0.56	-
Alumina	Al_2O_3	%	11.78	≤ 14%*
Fineness	SSA	m^2/kg	539	≥ 275 m^2/kg
7 Day Activity Index – September Sample		%	66	>40%
28 Day Activity Index – September Sample		%	94	>65%
Declared Mean Alkali Content	Na_2Oeq	%	0.70	-
Declared Maximum Chloride Content	Cl^-	%	0.05	-

Upper limit in BS 8500 for use in '+SR' combinations

For and on behalf of Tarmac Cement:

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Conformity of Ground Granulated Blast Furnace Slag to BS 8500-2: Annex B
Tudela EN 15167-1 GGBS
(0086-CPR-780512)

Based on the composite samples for the month of: October 2024

Constituent	Source
EN 15167-1 GGBS	Tudela
EN 197-1 CEM II/A-LL	Aberthaw

The results of compressive strength testing (in accordance with BS EN 196-1) on a 50:50 blend of CEM II/A-LL with GGBS were:

7 Day Strength (MPa)	34.2
28 Day Strength (MPa)	55.2

Based on equivalent results obtained for the last **7** months, the permitted proportions of combinations conforming to the requirements of Annex B of BS 8500-2 are:

Strength Class of Combination	GGBS Content (%)	
	Min	Max
32,5L	48	80
42,5L	6	62
52,5L	6	32

BS 8500-2 Combination Designation	GGBS Content (%)	
	Min	Max
CIIS	6	35
CIIIA	36	65
CIIIB	66	80

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Tudela EN 15167-1 GGBS
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Based on the composite samples for the month of: October 2024

Constituent	Source
EN 15167-1 GGBS	Tudela
EN 197-1 CEM I	Aberthaw

The results of compressive strength testing (in accordance with BS EN 196-1) of a 50:50 blend of CEM I with GGBS were:

7 Day Strength (MPa)	32.0
28 Day Strength (MPa)	57.7

Based on equivalent results obtained for the last **12** months, the permitted proportions of combinations conforming to the requirements of Annex B of BS 8500-2 are:

Strength Class of Combination	GGBS Content (%)	
	Min	Max
32,5L	50	80
42,5L	6	67
52,5L	n/a	n/a

BS 8500-2 Combination Designation	GGBS Content (%)	
	Min	Max
CIIS	6	35
CIIIA	36	65
CIIIB	66	80

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Tudela EN 15167-1 GGBS
(0086-CPR-780512)

Based on the composite samples for the month of: October 2024

Constituent	Source
EN 15167-1 GGBS	Tudela
EN 197-1 CEM II A-L	Cauldon

The results of compressive strength testing (in accordance with BS EN 196-1) on a 50:50 blend of CEM II A-L with GGBS were:

7 Day Strength (MPa)	35.0
28 Day Strength (MPa)	59.0

Based on equivalent results obtained for the last **1** month, the permitted proportions of combinations conforming to the requirements of Annex B of BS 8500-2 are:

Strength Class of Combination	GGBS Content (%)	
	Min	Max
32,5L	70	80
42,5L	6	76
52,5L	6	56

BS 8500-2 Combination Designation	GGBS Content (%)	
	Min	Max
CIIS	6	35
CIIIA	36	65
CIIIB	66	80

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Based on the composite samples for the month of: October 2024

Constituent	Source
EN 15167-1 GGBS	Tudela
EN 197-1 CEM I	Cauldon

The results of compressive strength testing (in accordance with BS EN 196-1) of a 50:50 blend of CEM I with GGBS were:

7 Day Strength (MPa)	28.7
28 Day Strength (MPa)	49.9

Based on equivalent results obtained for the last **12** months, the permitted proportions of combinations conforming to the requirements of Annex B of BS 8500-2 are:

Strength Class of Combination	GGBS Content (%)	
	Min	Max
32,5L	53	80
42,5L	6	72
52,5L	6	38

BS 8500-2 Combination Designation	GGBS Content (%)	
	Min	Max
CIIS	6	35
CIIIA	36	65
CIIIB	66	80

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Based on the composite samples for the month of: October 2024

Constituent	Source
EN 15167-1 GGBS	Tudela
EN 197-1 CEM I	Dunbar

The results of compressive strength testing (in accordance with BS EN 196-1) of a 50:50 blend of CEM I with GGBS were:

7 Day Strength (MPa)	26.8
28 Day Strength (MPa)	57.8

Based on equivalent results obtained for the last **12** months, the permitted proportions of combinations conforming to the requirements of Annex B of BS 8500-2 are:

Strength Class of Combination	GGBS Content (%)	
	Min	Max
32,5L	58	80
42,5L	35	56
52,5L	6	45

BS 8500-2 Combination Designation	GGBS Content (%)	
	Min	Max
CIIS	6	35
CIIIA	36	65
CIIIB	66	80

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Tudela EN 15167-1 GGBS
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Based on the composite samples for the month of: October 2024

Constituent	Source
EN 15167-1 GGBS	Tudela
EN 197-1 CEM II A-L	Hope

The results of compressive strength testing (in accordance with BS EN 196-1) on a 50:50 blend of CEM II A-L with GGBS were:

7 Day Strength (MPa)	36.1
28 Day Strength (MPa)	57.3

Based on equivalent results obtained for the last **1** month, the permitted proportions of combinations conforming to the requirements of Annex B of BS 8500-2 are:

Strength Class of Combination	GGBS Content (%)	
	Min	Max
32,5L	61	80
42,5L	6	69
52,5L	6	49

BS 8500-2 Combination Designation	GGBS Content (%)	
	Min	Max
CIIS	6	35
CIIIA	36	65
CIIIB	66	80

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Tudela EN 15167-1 GGBS
(0086-CPR-780512)

Based on the composite samples for the month of: October 2024

Constituent	Source
EN 15167-1 GGBS	Tudela
EN 197-1 CEM I	Hope

The results of compressive strength testing (in accordance with BS EN 196-1) of a 50:50 blend of CEM I with GGBS were:

7 Day Strength (MPa)	33.0
28 Day Strength (MPa)	59.4

Based on equivalent results obtained for the last **12** months, the permitted proportions of combinations conforming to the requirements of Annex B of BS 8500-2 are:

Strength Class of Combination	GGBS Content (%)	
	Min	Max
32,5L	55	80
42,5L	27	65
52,5L	6	44

BS 8500-2 Combination Designation	GGBS Content (%)	
	Min	Max
CIIS	6	35
CIIIA	36	65
CIIIB	66	80

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Based on the composite samples for the month of: October 2024

Constituent	Source
EN 15167-1 GGBS	Tudela
EN 197-1 CEM I	Lagerdorf

The results of compressive strength testing (in accordance with BS EN 196-1) on a 50:50 blend of CEM I with GGBS were:

7 Day Strength (MPa)	36.9
28 Day Strength (MPa)	60.6

Based on equivalent results obtained for the last **12** months, the permitted proportions of combinations conforming to the requirements of Annex B of BS 8500-2 are:

Strength Class of Combination	GGBS Content (%)	
	Min	Max
32,5L	61	80
42,5L	31	70
52,5L	6	49

BS 8500-2 Combination Designation	GGBS Content (%)	
	Min	Max
CIIS	6	35
CIIIA	36	65
CIIIB	66	80

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Based on the composite samples for the month of: October 2024

Constituent	Source
EN 15167-1 GGBS	Tudela
EN 197-1 CEM I	Lemona

The results of compressive strength testing (in accordance with BS EN 196-1) on a 50:50 blend of CEM I with GGBS were:

7 Day Strength (MPa)	32.6
28 Day Strength (MPa)	59.5

Based on equivalent results obtained for the last **9** months, the permitted proportions of combinations conforming to the requirements of Annex B of BS 8500-2 are:

Strength Class of Combination	GGBS Content (%)	
	Min	Max
32,5L	56	80
42,5L	24	67
52,5L	6	43

BS 8500-2 Combination Designation	GGBS Content (%)	
	Min	Max
CIIS	6	35
CIIIA	36	65
CIIIB	66	80

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Based on the composite samples for the month of: October 2024

Constituent	Source
EN 15167-1 GGBS	Tudela
EN 197-1 CEM I	Limerick

The results of compressive strength testing (in accordance with BS EN 196-1) of a 50:50 blend of CEM I with GGBS were:

7 Day Strength (MPa)	31.2
28 Day Strength (MPa)	58.2

Based on equivalent results obtained for the last **12** months, the permitted proportions of combinations conforming to the requirements of Annex B of BS 8500-2 are:

Strength Class of Combination	GGBS Content (%)	
	Min	Max
32,5L	53	78
42,5L	6	63
52,5L	6	20

BS 8500-2 Combination Designation	GGBS Content (%)	
	Min	Max
CIIS	6	35
CIIIA	36	65
CIIIB	66	80

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Based on the composite samples for the month of: October 2024

Constituent	Source
EN 15167-1 GGBS	Tudela
EN 197-1 CEM I	Mannock

The results of compressive strength testing (in accordance with BS EN 196-1) of a 50:50 blend of CEM I with GGBS were:

7 Day Strength (MPa)	36.2
28 Day Strength (MPa)	62.8

Based on equivalent results obtained for the last **12** months, the permitted proportions of combinations conforming to the requirements of Annex B of BS 8500-2 are:

Strength Class of Combination	GGBS Content (%)	
	Min	Max
32,5L	61	80
42,5L	6	71
52,5L	6	45

BS 8500-2 Combination Designation	GGBS Content (%)	
	Min	Max
CIIS	6	35
CIIIA	36	65
CIIIB	66	80

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Tudela EN 15167-1 GGBS
(0086-CPR-780512)

Based on the composite samples for the month of: October 2024

Constituent	Source
EN 15167-1 GGBS	Tudela
EN 197-1 CEM II/A-L	Platin

The results of compressive strength testing (in accordance with BS EN 196-1) on a 50:50 blend of CEM II/A-L with GGBS were:

7 Day Strength (MPa)	35.8
28 Day Strength (MPa)	56.0

Based on equivalent results obtained for the last **4** months, the permitted proportions of combinations conforming to the requirements of Annex B of BS 8500-2 are:

Strength Class of Combination	GGBS Content (%)	
	Min	Max
32,5L	58	80
42,5L	6	71
52,5L	6	36

BS 8500-2 Combination Designation	GGBS Content (%)	
	Min	Max
CIIS	6	35
CIIIA	36	65
CIIIB	66	80

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Constituent	Source
EN 15167-1 GGBS	Tudela
EN 197-1 CEM I	Platin

The results of compressive strength testing (in accordance with BS EN 196-1) of a 50:50 blend of CEM I with GGBS were:

7 Day Strength (MPa)	32.8
28 Day Strength (MPa)	57.3

Based on equivalent results obtained for the last **12** months, the permitted proportions of combinations conforming to the requirements of Annex B of BS 8500-2 are:

Strength Class of Combination	GGBS Content (%)	
	Min	Max
32,5L	54	80
42,5L	20	68
52,5L	6	41

BS 8500-2 Combination Designation	GGBS Content (%)	
	Min	Max
CIIS	6	35
CIIIA	36	65
CIIIB	66	80

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Constituent	Source
EN 15167-1 GGBS	Tudela
EN 197-1 CEM II A-LL	Tunstead

The results of compressive strength testing (in accordance with BS EN 196-1) on a 50:50 blend of CEM II A-LL with GGBS were:

7 Day Strength (MPa)	33.6
28 Day Strength (MPa)	57.1

Based on equivalent results obtained for the last **1** month, the permitted proportions of combinations conforming to the requirements of Annex B of BS 8500-2 are:

Strength Class of Combination	GGBS Content (%)	
	Min	Max
32,5L	65	80
42,5L	6	73
52,5L	6	49

BS 8500-2 Combination Designation	GGBS Content (%)	
	Min	Max
CIIS	6	35
CIIIA	36	65
CIIIB	66	80

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Based on the composite samples for the month of: October 2024

Constituent	Source
EN 15167-1 GGBS	Tudela
EN 197-1 CEM I	Tunstead

The results of compressive strength testing (in accordance with BS EN 196-1) of a 50:50 blend of CEM I with GGBS were:

7 Day Strength (MPa)	31.1
28 Day Strength (MPa)	60.5

Based on equivalent results obtained for the last **12** months, the permitted proportions of combinations conforming to the requirements of Annex B of BS 8500-2 are:

Strength Class of Combination	GGBS Content (%)	
	Min	Max
32,5L	58	80
42,5L	11	68
52,5L	6	43

BS 8500-2 Combination Designation	GGBS Content (%)	
	Min	Max
CIIS	6	35
CIIIA	36	65
CIIIB	66	80

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