

Tarmac Cement National Laboratory

Yelsway Lane
 Waterhouses
 Staffordshire
 ST10 3AZ

25/03/2025

Composition of Ground Granulated Blastfurnace Slag

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

Based on the **December 2024** monthly composite sample: 0112

Property			Value	BS EN 15167-1 Limit
Magnesia	MgO	%	7.48	≤ 18.0%
Sulfate	SO ₃	%	0.20	≤ 2.5%
Sulfide	S ²⁻	%	0.82	≤ 2.0%
Chloride	Cl ⁻	%	0.01	≤ 0.1%
Alkalis	Na ₂ Oeq	%	0.55	-
Alumina	Al ₂ O ₃	%	11.75	≤ 14%*
Fineness	SSA	m ² /kg	529	≥ 275 m ² /kg
7 Day Activity Index – November Sample		%	70	>40%
28 Day Activity Index – November Sample		%	93	>65%
Declared Mean Alkali Content	Na ₂ Oeq	%	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:



Simon Chudley

**National Commercial Technical Manager
 Tarmac Cement**

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 Tarmac Cement Limited Registered in England and Wales. Company No. 66558
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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: December 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)	29.5
28 Day Strength (MPa)	52.7

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	52	80
42,5L	7	67
52,5L	6	36

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

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

Constituent	Source
EN 15167-1 GGBS	Tudela
EN 197-1 CEM II/A-LL	Aberthaw (limestone content 10-14%)

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)	31.0
28 Day Strength (MPa)	51.0

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	49	80
42,5L	6	63
52,5L	6	32

BS 8500-2 Combination Designation	GGBS Content (%)	
	Min	Max
CIIIA	36	65
CIIBB	66	80
CIIA-M	6	14
CIIB-M	6	29
CIIC-M	16	44
CVI	31	59

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Based on the composite samples for the month of: December 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)	31.4
28 Day Strength (MPa)	55.9

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	66
52,5L	6	13

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

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Based on the composite samples for the month of: December 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)	27.6
28 Day Strength (MPa)	55.8

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	56	80
42,5L	6	54
52,5L	6	43

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

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Based on the composite samples for the month of: December 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)	31.6
28 Day Strength (MPa)	55.6

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	56	80
42,5L	29	65
52,5L	6	45

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

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

Constituent	Source
EN 15167-1 GGBS	Tudela
EN 197-1 CEM II/A-L	Hope (limestone content 12.5-16.5%)

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)	35.7
28 Day Strength (MPa)	54.4

Based on equivalent results obtained for the last 3 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	59	80
42,5L	6	67
52,5L	6	45

BS 8500-2 Combination Designation	GGBS Content (%)	
	Min	Max
CIIIA	36	65
CIIBB	66	80
CIIA-M	6	14
CIIB-M	6	29
CIIC-M	16	44
CVI	31	59

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Based on the composite samples for the month of: December 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)	35.3
28 Day Strength (MPa)	57.1

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
CIIB	66	80

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Based on the composite samples for the month of: December 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)	31.8
28 Day Strength (MPa)	54.8

Based on equivalent results obtained for the last **11** 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	57	80
42,5L	26	68
52,5L	6	44

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

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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)	31.5
28 Day Strength (MPa)	54.3

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	55	80
42,5L	6	65
52,5L	6	35

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

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Based on the composite samples for the month of: December 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)	35.4
28 Day Strength (MPa)	58.7

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	63	80
42,5L	6	73
52,5L	6	48

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

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

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)	30.3
28 Day Strength (MPa)	54.0

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	6	66
52,5L	6	40

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

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

Constituent	Source
EN 15167-1 GGBS	Tudela
EN 197-1 CEM II/A-L	Platin (limestone content 12-16%)

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)	33.0
28 Day Strength (MPa)	52.3

Based on equivalent results obtained for the last 6 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	6	70
52,5L	6	34

BS 8500-2 Combination Designation	GGBS Content (%)	
	Min	Max
CIIIA	36	65
CIIB	66	80
CIIA-M	6	14
CIIB-M	6	29
CIIC-M	16	44
CVI	31	59

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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)	28.7
28 Day Strength (MPa)	56.5

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	59	80
42,5L	31	66
52,5L	6	47

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

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