

Tarmac Cement National Laboratory

Yelsway Lane
 Waterhouses
 Staffordshire
 ST10 3AZ

02/07/2024

Composition of Ground Granulated Blastfurnace Slag

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

Based on the **April 2024** monthly composite sample: 1416

Property			Value	BS EN 15167-1 Limit
Magnesia	MgO	%	7.54	≤ 18.0%
Sulfate	SO ₃	%	0.23	≤ 2.5%
Sulfide	S ²⁻	%	0.79	≤ 2.0%
Chloride	Cl ⁻	%	0.01	≤ 0.1%
Alkalis	Na ₂ O _{eq}	%	0.47	-
Alumina	Al ₂ O ₃	%	11.09	≤ 14%*
Fineness	SSA	m ² /kg	532	≥ 275 m ² /kg
7 Day Activity Index – March Sample		%	54	>40%
28 Day Activity Index – March Sample		%	84	>65%
Declared Mean Alkali Content	Na ₂ O _{eq}	%	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**

TARMAC.COM

Tarmac Trading Limited Registered in England and Wales. Company No. 453791
 Tarmac Cement and Lime Limited Registered in England and Wales. Company No. 66558
 Tarmac Services Limited Registered in England and Wales. Company No. 8197397
 Registered address for all companies: T3 Trinity Park, Bickenhill Lane, Birmingham, B37 7ES

T3 Trinity Park, Bickenhill Lane,
 Birmingham, B37 7ES
0345 812 6232 info-cement@tarmac.com

**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: April 2024

Constituent	Source
EN 15167-1 GGBS	Tudela
EN 197-1 PLC	Aberthaw

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)	26.4
28 Day Strength (MPa)	46.1

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	28	72
42,5L	6	46
52,5L	-	-

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

For and on behalf of Tarmac Cement:
Simon Chudley



National Commercial Technical Manager Tarmac Cement
TARMAC.COM

Tarmac Cement and Lime Limited Registered in England and Wales. Company No. 66558
 Registered address: T3 Trinity Park, Bickenhill Lane, Birmingham, B37 7ES

Tarmac Cement National Laboratory
Yelsway Lane
Waterhouses
Staffordshire
ST10 3AZ



**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: April 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)	24.9
28 Day Strength (MPa)	44.7

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	47	80
42,5L	6	64
52,5L	6	31

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

For and on behalf of Tarmac Cement:
Simon Chudley

National Commercial Technical Manager Tarmac Cement
TARMAC.COM

Tarmac Cement and Lime Limited Registered in England and Wales. Company No. 66558
Registered address: T3 Trinity Park, Bickenhill Lane, Birmingham, B37 7ES

Tarmac Cement National Laboratory
Yelsway Lane
Waterhouses
Staffordshire
ST10 3AZ



**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: April 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)	27.5
28 Day Strength (MPa)	51.1

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	54	80
42,5L	6	73
52,5L	6	38

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

For and on behalf of Tarmac Cement:
Simon Chudley

National Commercial Technical Manager Tarmac Cement
TARMAC.COM

Tarmac Cement and Lime Limited Registered in England and Wales. Company No. 66558
Registered address: T3 Trinity Park, Bickenhill Lane, Birmingham, B37 7ES

Tarmac Cement National Laboratory
 Yelsway Lane
 Waterhouses
 Staffordshire
 ST10 3AZ



**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: April 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)	19.8
28 Day Strength (MPa)	49.6

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	52	80
42,5L	32	53
52,5L	6	42

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

For and on behalf of Tarmac Cement:
Simon Chudley

National Commercial Technical Manager Tarmac Cement
TARMAC.COM

Tarmac Cement and Lime Limited Registered in England and Wales. Company No. 66558
 Registered address: T3 Trinity Park, Bickenhill Lane, Birmingham, B37 7ES



Tarmac Cement National Laboratory
Yelsway Lane
Waterhouses
Staffordshire
ST10 3AZ



**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: April 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)	27.4
28 Day Strength (MPa)	48.6

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	53	79
42,5L	15	63
52,5L	6	42

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

For and on behalf of Tarmac Cement:
Simon Chudley

National Commercial Technical Manager Tarmac Cement
TARMAC.COM

Tarmac Cement and Lime Limited Registered in England and Wales. Company No. 66558
Registered address: T3 Trinity Park, Bickenhill Lane, Birmingham, B37 7ES

**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: April 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)	29.4
28 Day Strength (MPa)	49.9

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	57	80
42,5L	18	67
52,5L	6	43

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

For and on behalf of Tarmac Cement:
Simon Chudley



National Commercial Technical Manager Tarmac Cement
TARMAC.COM

Tarmac Cement and Lime Limited Registered in England and Wales. Company No. 66558
 Registered address: T3 Trinity Park, Bickenhill Lane, Birmingham, B37 7ES

**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: April 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)	27.0
28 Day Strength (MPa)	48.5

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	49	80
42,5L	6	61
52,5L	6	35

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

For and on behalf of Tarmac Cement:
Simon Chudley



National Commercial Technical Manager Tarmac Cement
TARMAC.COM

Tarmac Cement and Lime Limited Registered in England and Wales. Company No. 66558
 Registered address: T3 Trinity Park, Bickenhill Lane, Birmingham, B37 7ES

Tarmac Cement National Laboratory
Yelsway Lane
Waterhouses
Staffordshire
ST10 3AZ



**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: April 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)	25.0
28 Day Strength (MPa)	48.2

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	52	77
42,5L	6	61
52,5L	6	6

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

For and on behalf of Tarmac Cement:
Simon Chudley

National Commercial Technical Manager Tarmac Cement
TARMAC.COM

Tarmac Cement and Lime Limited Registered in England and Wales. Company No. 66558
Registered address: T3 Trinity Park, Bickenhill Lane, Birmingham, B37 7ES

Tarmac Cement National Laboratory
Yelsway Lane
Waterhouses
Staffordshire
ST10 3AZ



**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: April 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)	28.0
28 Day Strength (MPa)	50.6

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	6	68
52,5L	6	36

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

For and on behalf of Tarmac Cement:
Simon Chudley

National Commercial Technical Manager Tarmac Cement
TARMAC.COM

Tarmac Cement and Lime Limited Registered in England and Wales. Company No. 66558
Registered address: T3 Trinity Park, Bickenhill Lane, Birmingham, B37 7ES

Tarmac Cement National Laboratory
Yelsway Lane
Waterhouses
Staffordshire
ST10 3AZ



**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: April 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)	25.1
28 Day Strength (MPa)	47.9

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	50	80
42,5L	6	65
52,5L	6	38

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

For and on behalf of Tarmac Cement:
Simon Chudley

National Commercial Technical Manager Tarmac Cement
TARMAC.COM

Tarmac Cement and Lime Limited Registered in England and Wales. Company No. 66558
Registered address: T3 Trinity Park, Bickenhill Lane, Birmingham, B37 7ES

Tarmac Cement National Laboratory
Yelsway Lane
Waterhouses
Staffordshire
ST10 3AZ



**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: April 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)	23.8
28 Day Strength (MPa)	51.1

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	6	65
52,5L	6	37

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

For and on behalf of Tarmac Cement:
Simon Chudley

National Commercial Technical Manager Tarmac Cement
TARMAC.COM

Tarmac Cement and Lime Limited Registered in England and Wales. Company No. 66558
Registered address: T3 Trinity Park, Bickenhill Lane, Birmingham, B37 7ES