

Tarmac Cement National Laboratory

Yelsway Lane
 Waterhouses
 Staffordshire
 ST10 3AZ

19.11.2019

Composition of Ground Granulated Blastfurnace Slag

**Tudela EN 15167-1 GGBS
 (0099/CPR/B34/0001)**

Based on the **September 2019** monthly composite sample:

Property			Value	BS EN 15167-1 Limit
Magnesia	MgO	%	7.72	≤ 18.0%
Sulfate	SO ₃	%	0.59	≤ 2.5%
Sulfide	S ²⁻	%	0.68	≤ 2.0%
Chloride	Cl ⁻	%	0.01	≤ 0.1%
Alkalis	Na ₂ O _{eq}	%	0.65	-
Alumina	Al ₂ O ₃	%	11.31	≤ 14%*
Fineness	SSA	m ² /kg	466	≥ 275 m ² /kg
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:

S. Chudley

Simon Chudley

**National Commercial Technical Manager
 Tarmac Cement**

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 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: **Portland House Bickenhill Lane Solihull Birmingham B37 7BQ**

Portland House Bickenhill Lane
 Solihull Birmingham B37 7BQ
0800 1 218 218 enquiries@tarmac.com

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01.12.2019

Conformity of Ground Granulated Blast Furnace Slag to BS 8500-2: Annex A

**Tudela EN 15167-1 GGBS
 (0099/CPR/B34/0001)**

Based on the **September 2019** monthly composite samples of:

Constituent	Source
EN 15167-1 GGBS	Tudela
EN 197-1 CEM I	Aberthaw CEM I 52,5N

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)	36.1
28 Day Strength (MPa)	58.0

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

Strength Class of Combination	GGBS Content (%)	
	Min	Max
32,5L	71	80
42,5L	34	75
52,5L	6	55

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

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**Tudela EN 15167-1 GGBS
 (0099/CPR/B34/0001)**

Based on the **September 2019** monthly composite samples of:

Constituent	Source
EN 15167-1 GGBS	Tudela
EN 197-1 CEM I	Cauldon CEM I 52,5N

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)	28.1
28 Day Strength (MPa)	52.6

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

Strength Class of Combination	GGBS Content (%)	
	Min	Max
32,5L	65	80
42,5L	6	74
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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Conformity of Ground Granulated Blast Furnace Slag to BS 8500-2: Annex A

**Tudela EN 15167-1 GGBS
 (0099/CPR/B34/0001)**

Based on the **September 2019** monthly composite samples of:

Constituent	Source
EN 15167-1 GGBS	Tudela
EN 197-1 CEM I	Dunbar CEM I 52,5N

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)	25.0
28 Day Strength (MPa)	56.2

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

Strength Class of Combination	GGBS Content (%)	
	Min	Max
32,5L	67	80
42,5L	34	74
52,5L	6	50

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

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**Tudela EN 15167-1 GGBS
 (0099/CPR/B34/0001)**

Based on the **September 2019** monthly composite samples of:

Constituent	Source
EN 15167-1 GGBS	Tudela
EN 197-1 CEM I	Hope CEM I 52,5N

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)	30.9
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 A of BS 8500-2 are:

Strength Class of Combination	GGBS Content (%)	
	Min	Max
32,5L	61	80
42,5L	27	70
52,5L	6	47

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

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**Tudela EN 15167-1 GGBS
 (0099/CPR/B34/0001)**

Based on the **September 2019** monthly composite samples of:

Constituent	Source
EN 15167-1 GGBS	Tudela
EN 197-1 CEM I	Limerick CEM I 52,5N

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)	32.8
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 A of BS 8500-2 are:

Strength Class of Combination	GGBS Content (%)	
	Min	Max
32,5L	58	80
42,5L	6	70
52,5L	6	39

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

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**Tudela EN 15167-1 GGBS
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Based on the **September 2019** monthly composite samples of:

Constituent	Source
EN 15167-1 GGBS	Tudela
EN 197-1 CEM I	Platin CEM I 52,5N

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)	32.7
28 Day Strength (MPa)	55.2

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

Strength Class of Combination	GGBS Content (%)	
	Min	Max
32,5L	67	80
42,5L	6	74
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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**Tudela EN 15167-1 GGBS
 (0099/CPR/B34/0001)**

Based on the **September 2019** monthly composite samples of:

Constituent	Source
EN 15167-1 GGBS	Tudela
EN 197-1 CEM I	Quinn CEM I 52,5N

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)	35.8
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 A of BS 8500-2 are:

Strength Class of Combination	GGBS Content (%)	
	Min	Max
32,5L	69	80
42,5L	40	75
52,5L	6	50

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 **September 2019** monthly composite samples of:

Constituent	Source
EN 15167-1 GGBS	Tudela
EN 197-1 CEM I	Tunstead CEM I 52,5N

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)	30.7
28 Day Strength (MPa)	56.3

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

Strength Class of Combination	GGBS Content (%)	
	Min	Max
32,5L	60	79
42,5L	6	68
52,5L	6	50

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

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