

Tarmac Cement National Laboratory

Yelsway Lane  
 Waterhouses  
 Staffordshire  
 ST10 3AZ

04.02.2020

**Composition of Ground Granulated Blastfurnace Slag**

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

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

Property			Value	BS EN 15167-1 Limit
Magnesia	MgO	%	7.79	≤ 18.0%
Sulfate	SO <sub>3</sub>	%	0.21	≤ 2.5%
Sulfide	S <sup>2-</sup>	%	0.72	≤ 2.0%
Chloride	Cl <sup>-</sup>	%	0.026	≤ 0.1%
Alkalis	Na <sub>2</sub> O <sub>eq</sub>	%	0.64	-
Alumina	Al <sub>2</sub> O <sub>3</sub>	%	11.39	≤ 14%*
Fineness	SSA	m <sup>2</sup> /kg	508	≥ 275 m <sup>2</sup> /kg
Declared Mean Alkali Content	Na <sub>2</sub> O <sub>eq</sub>	%	0.70	-
Declared Maximum Chloride Content	Cl <sup>-</sup>	%	0.05	-

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

For and on behalf of Tarmac Cement:

*S. Chudley*

**Simon Chudley**

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03.03.2020

**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 **December 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)	35.8
28 Day Strength (MPa)	57.0

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	70	80
42,5L	34	77
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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**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 **December 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)	34.6
28 Day Strength (MPa)	55.0

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	67	80
42,5L	6	75
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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**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 **December 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)	26.5
28 Day Strength (MPa)	54.9

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	66	80
42,5L	33	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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**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 **December 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)	34.2
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 A of BS 8500-2 are:

Strength Class of Combination	GGBS Content (%)	
	Min	Max
32,5L	63	80
42,5L	28	72
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 **December 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)	31.6
28 Day Strength (MPa)	55.3

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	61	80
42,5L	6	71
52,5L	6	41

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 **December 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)	33.7
28 Day Strength (MPa)	53.4

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	75
52,5L	6	41

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 **December 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)	36.8
28 Day Strength (MPa)	59.3

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	70	80
42,5L	39	77
52,5L	6	54

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 **December 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)	31.5
28 Day Strength (MPa)	54.7

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	61	80
42,5L	10	69
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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