

Tarmac Cement National Laboratory
Yelsway Lane
Waterhouses
Staffordshire
ST10 3AZ

25/02/2019

Composition of Ground Granulated Blastfurnace Slag

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

Based on the **December 2018** monthly composite sample:

Property	Value	BS EN 15167-1 Limit
Magnesia (% MgO)	7.62	Max 18%
Sulfate (% SO ₃)	0.21	Max 2.5%
Sulfide (% S ²⁻)	0.85	Max 2.0%
Chloride (% Cl ⁻) %	0.022	Max 0.10%
Alkalis (% Na ₂ O eq)	0.65	-
Alumina (% Al ₂ O ₃)	11.67	Max 14%*
Fineness (m ² /kg)	492	-
Declared Mean Alkali Content (% Na ₂ O) eq)	0.70	-

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

For and on behalf of Tarmac Cement:

W.F. Price

Dr Bill Price

**National Commercial Technical Manager
Tarmac Cement**

TARMAC.COM

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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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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 2018** 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)	34.3
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	65	80
42,5L	16	73
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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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 2018** 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)	33.7
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	62	80
42,5L	6	71
52,5L	--	--

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 2018** 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)	27.2
28 Day Strength (MPa)	59.5

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	72
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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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 2018** 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)	33.3
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 A of BS 8500-2 are:

Strength Class of Combination	GGBS Content (%)	
	Min	Max
32,5L	56	79
42,5L	6	67
52,5L	6	38

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 2018** monthly composite samples of:

Constituent	Source
EN 15167-1 GGBS	Tudela
EN 197-1 CEM I	Lemona CEM I 52,5R

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)	34.1
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	13	72
52,5L	6	33

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 2018** 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)	32.1
28 Day Strength (MPa)	53.0

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	55	80
42,5L	6	68
52,5L	6	30

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 Blastfurnace Slag to BS 8500-2: Annex A

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

Based on the **December 2018** 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)	31.7
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	63	80
42,5L	6	72
52,5L	--	--

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 2018** 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)	33.0
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	64	80
42,5L	32	73
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 **December 2018** 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)	32.1
28 Day Strength (MPa)	57.2

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	58	78
42,5L	6	66
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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