

Tarmac Cement National Laboratory
Yelsway Lane
Waterhouses
Staffordshire
ST10 3AZ

03/12/2018

Composition of Ground Granulated Blastfurnace Slag

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

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

Property	Value	BS EN 15167-1 Limit
Magnesia (% MgO)	7.86	Max 18%
Sulfate (% SO ₃)	0.43	Max 2.5%
Sulfide (% S ²⁻)	0.87	Max 2.0%
Chloride (% Cl) %	0.018	Max 0.10%
Alkalis (% Na ₂ O eq)	0.56	-
Alumina (% Al ₂ O ₃)	11.26	Max 14%*
Fineness (m ² /kg)	453	-
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

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

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

Tarmac Cement National Laboratory
 Yelsway Lane
 Waterhouses
 Staffordshire
 ST10 3AZ

03/12/2018

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 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)	35.6
28 Day Strength (MPa)	56.6

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	66	80
42,5L	16	74
52,5L	6	45

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:

W.F. Price

Dr Bill Price

**National Commercial Technical Manager
 Tarmac Cement**

Tarmac Cement National Laboratory
Yelsway Lane
Waterhouses
Staffordshire
ST10 3AZ

03/12/2018

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 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)	32.0
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	60	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

For and on behalf of Tarmac Cement:

W.F. Price

Dr Bill Price

**National Commercial Technical Manager
Tarmac Cement**

Tarmac Cement National Laboratory
 Yelsway Lane
 Waterhouses
 Staffordshire
 ST10 3AZ

03/12/2018

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 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)	23.0
28 Day Strength (MPa)	55.4

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	60	80
42,5L	6	71
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:

W.F. Price

Dr Bill Price

**National Commercial Technical Manager
 Tarmac Cement**

Tarmac Cement National Laboratory
 Yelsway Lane
 Waterhouses
 Staffordshire
 ST10 3AZ

11/12/2018

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 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)	30.9
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	57	80
42,5L	6	68
52,5L	6	40

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:

W.F. Price

Dr Bill Price

**National Commercial Technical Manager
 Tarmac Cement**

Tarmac Cement National Laboratory
 Yelsway Lane
 Waterhouses
 Staffordshire
 ST10 3AZ

03/12/2018

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 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)	31.9
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	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

For and on behalf of Tarmac Cement:

W.F. Price

Dr Bill Price

**National Commercial Technical Manager
 Tarmac Cement**

Tarmac Cement National Laboratory
 Yelsway Lane
 Waterhouses
 Staffordshire
 ST10 3AZ

03/12/2018

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 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)	28.6
28 Day Strength (MPa)	55.7

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	55	80
42,5L	6	68
52,5L	6	32

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:

W.F. Price

Dr Bill Price

**National Commercial Technical Manager
 Tarmac Cement**

Tarmac Cement National Laboratory
 Yelsway Lane
 Waterhouses
 Staffordshire
 ST10 3AZ

03/12/2018

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

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

Based on the **September 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)	32.5
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 A of BS 8500-2 are:

Strength Class of Combination	GGBS Content (%)	
	Min	Max
32,5L	64	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

For and on behalf of Tarmac Cement:

W.F. Price

Dr Bill Price

**National Commercial Technical Manager
 Tarmac Cement**

Tarmac Cement National Laboratory
 Yelsway Lane
 Waterhouses
 Staffordshire
 ST10 3AZ

03/12/2018

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 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)	33.5
28 Day Strength (MPa)	56.0

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	66	80
42,5L	34	74
52,5L	6	47

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:

W.F. Price

Dr Bill Price

**National Commercial Technical Manager
 Tarmac Cement**

Tarmac Cement National Laboratory
 Yelsway Lane
 Waterhouses
 Staffordshire
 ST10 3AZ

03/12/2018

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 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)	29.4
28 Day Strength (MPa)	58.4

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	57	78
42,5L	6	66
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:

W.F. Price

Dr Bill Price

National Commercial