Tarmac Cement National Laboratory

Yelsway Lane
Waterhouses
Staffordshire
ST10 3AZ

30.06.2020

Composition of Ground Granulated Blastfurnace Slag

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

Based on the **April 2020** monthly composite sample:

Property			Value	BS EN 15167-1 Limit
Magnesia	MgO	%	7.50	≤ 18.0%
Sulfate	SO_3	%	0.15	≤ 2.5%
Sulfide	$S2^-$	%	0.76	≤ 2.0%
Chloride	Cl^-	%	0.02	≤ 0.1%
Alkalis	Na_2Oeq	%	0.59	-
Alumina	Al_2O_3	%	10.47	≤ 14%*
Fineness	SSA	m^2/kg	495	≥ 275 m^2/kg
7 Day Activity Index – March Sample		%	57	>40%
28 Day Activity Index – March Sample		%	82	>65%
Declared Mean Alkali Content	Na_2Oeq	%	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:

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20.07.2020

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 **April 2020** 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)	32.5
28 Day Strength (MPa)	53.6

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	68	80
42,5L	28	76
52,5L	6	51

BS 8500-2 Combination Designation	GGBS Content (%)	
	Min	Max
CIIS	6	35
CIIIA	36	65
CIIIB	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 **April 2020** 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)	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	65	80
42,5L	6	74
52,5L	6	43

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

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

Based on the **April 2020** 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)	25.3
28 Day Strength (MPa)	53.9

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	62	80
42,5L	6	73
52,5L	6	46

BS 8500-2 Combination Designation	GGBS Content (%)	
	Min	Max
CIIS	6	35
CIIIA	36	65
CIIIB	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 **April 2020** 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)	32.6
28 Day Strength (Mpa)	54.6

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	62	80
42,5L	25	71
52,5L	6	48

BS 8500-2 Combination Designation	GGBS Content (%)	
	Min	Max
CIIS	6	35
CIIIA	36	65
CIIIB	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 **April 2020** 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)	28.1
28 Day Strength (Mpa)	50.9

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	80
42,5L	6	69
52,5L	6	32

BS 8500-2 Combination Designation	GGBS Content (%)	
	Min	Max
CIIS	6	35
CIIIA	36	65
CIIIB	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 **April 2020** 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)	31.2
28 Day Strength (MPa)	51.9

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	65	80
42,5L	6	74
52,5L	6	38

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

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

Based on the **April 2020** 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)	35.6
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	71	80
42,5L	41	77
52,5L	6	56

BS 8500-2 Combination Designation	GGBS Content (%)	
	Min	Max
CIIS	6	35
CIIIA	36	65
CIIIB	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 **April 2020** 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)	30.2
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	59	80
42,5L	6	68
52,5L	6	47

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

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