



CONFORMITY CERTIFICATE																																											
Ground Granulated Blastfurnace Slag Produced at		Scunthorpe		Works																																							
Sample Period		April 2019																																									
<b>Certificate of Conformity of GGBS to EN 15167-1:2006</b>			<b>Certificate of Conformity of Combinations of GGBS and CEM I Portland Cement to Annex A of BS 8500-2:2015</b>																																								
Spot samples of GGBS were taken and tested to determine conformity to the autocontrol requirements of EN 15167-1:2006 "Ground granulated blastfurnace slag for use in concrete, mortar and grout" following the methods given in that standard. The values reported are mean values for the monthly production period.			Portland Cement Source:																																								
Scunthorpe GGBS Only			N/A																																								
For combinations of GGBS supplied from the above works with the above CEM I Portland cement the permitted proportions conforming to the requirements given in annex A of BS 8500-2:2015 are:																																											
<table border="1"> <thead> <tr> <th>Results</th> <th>Product</th> <th>EN Limit</th> </tr> </thead> <tbody> <tr> <td>Fineness m<sup>2</sup>/kg</td> <td>511</td> <td>min. 275</td> </tr> <tr> <td>Magnesium Oxide MgO %</td> <td>8</td> <td>max. 18</td> </tr> <tr> <td>Sulfate SO<sub>3</sub> %</td> <td>0.3</td> <td>max. 2.5</td> </tr> <tr> <td>Sulfide S<sup>2-</sup> %</td> <td>0.8</td> <td>max. 2.0</td> </tr> <tr> <td>Chloride Content Cl<sup>-</sup> %</td> <td>0.03</td> <td>max. 0.10</td> </tr> <tr> <td>Moisture Content %</td> <td>0.0</td> <td>max. 1.0</td> </tr> <tr> <td>Corrected Loss on Ignition %</td> <td>1.0</td> <td>max. 3.0</td> </tr> <tr> <td>Aluminium Oxide Al<sub>2</sub>O<sub>3</sub> %</td> <td>12.5</td> <td>to 1 d.p.</td> </tr> </tbody> </table>			Results	Product	EN Limit	Fineness m <sup>2</sup> /kg	511	min. 275	Magnesium Oxide MgO %	8	max. 18	Sulfate SO <sub>3</sub> %	0.3	max. 2.5	Sulfide S <sup>2-</sup> %	0.8	max. 2.0	Chloride Content Cl <sup>-</sup> %	0.03	max. 0.10	Moisture Content %	0.0	max. 1.0	Corrected Loss on Ignition %	1.0	max. 3.0	Aluminium Oxide Al <sub>2</sub> O <sub>3</sub> %	12.5	to 1 d.p.	<table border="1"> <thead> <tr> <th>Strength Class</th> <th>Not Less Than**</th> <th>Not More Than**</th> </tr> </thead> <tbody> <tr> <td>52.5L</td> <td>N/A</td> <td>N/A</td> </tr> <tr> <td>42.5L</td> <td>N/A</td> <td>N/A</td> </tr> <tr> <td>32.5L</td> <td>N/A</td> <td>N/A</td> </tr> </tbody> </table>		Strength Class	Not Less Than**	Not More Than**	52.5L	N/A	N/A	42.5L	N/A	N/A	32.5L	N/A	N/A
Results	Product	EN Limit																																									
Fineness m <sup>2</sup> /kg	511	min. 275																																									
Magnesium Oxide MgO %	8	max. 18																																									
Sulfate SO <sub>3</sub> %	0.3	max. 2.5																																									
Sulfide S <sup>2-</sup> %	0.8	max. 2.0																																									
Chloride Content Cl <sup>-</sup> %	0.03	max. 0.10																																									
Moisture Content %	0.0	max. 1.0																																									
Corrected Loss on Ignition %	1.0	max. 3.0																																									
Aluminium Oxide Al <sub>2</sub> O <sub>3</sub> %	12.5	to 1 d.p.																																									
Strength Class	Not Less Than**	Not More Than**																																									
52.5L	N/A	N/A																																									
42.5L	N/A	N/A																																									
32.5L	N/A	N/A																																									
Note: If the value of Al <sub>2</sub> O <sub>3</sub> is ≥ 14.5% the '+SR' restriction will be exceeded if the C <sub>3</sub> A of the CEM I is >10%.			Conformity Evaluation Period (if less than 6 months)																																								
<i>Alkalis as Na<sub>2</sub>O equ. (acid soluble)</i>			month(s)																																								
<table border="1"> <tbody> <tr> <td>Guaranteed Alkali limit %</td> <td>≤ 1.0</td> </tr> <tr> <td>Certified Average Alkali ( Last 25 ) %</td> <td>0.67</td> </tr> <tr> <td>Declared Mean : Mean last 25 + ( SD last 25 x 1.64 ) %</td> <td>0.76</td> </tr> </tbody> </table>			Guaranteed Alkali limit %	≤ 1.0	Certified Average Alkali ( Last 25 ) %	0.67	Declared Mean : Mean last 25 + ( SD last 25 x 1.64 ) %	0.76	Combination Designation (Table 1 BS 8500-2:2015)																																		
Guaranteed Alkali limit %	≤ 1.0																																										
Certified Average Alkali ( Last 25 ) %	0.67																																										
Declared Mean : Mean last 25 + ( SD last 25 x 1.64 ) %	0.76																																										
COMBINATION OF 50% LABORATORY STOCK CEM I PORTLAND CEMENT AND 50% GGBS			<table border="1"> <tbody> <tr> <td>CIIA-S</td> <td>6</td> <td>20</td> </tr> <tr> <td>CIIB-S</td> <td>21</td> <td>35</td> </tr> <tr> <td>CIIIA</td> <td>36</td> <td>65</td> </tr> <tr> <td>CIIBB</td> <td>66</td> <td>80</td> </tr> </tbody> </table>		CIIA-S	6	20	CIIB-S	21	35	CIIIA	36	65	CIIBB	66	80																											
CIIA-S	6	20																																									
CIIB-S	21	35																																									
CIIIA	36	65																																									
CIIBB	66	80																																									
<table border="1"> <tbody> <tr> <td>Initial Setting Time min.</td> <td>235</td> <td>not &gt; than 2 x PC</td> </tr> <tr> <td rowspan="2">Activity Index %</td> <td>7 days</td> <td>61</td> </tr> <tr> <td>28 days</td> <td>82</td> </tr> </tbody> </table>			Initial Setting Time min.	235	not > than 2 x PC	Activity Index %	7 days	61	28 days	82	Results of tests in accordance with BS EN 196-1 for 50% GGBS in combination with 50% CEM I Portland cement shown above																																
Initial Setting Time min.	235	not > than 2 x PC																																									
Activity Index %	7 days	61																																									
	28 days	82																																									
LABORATORY STOCK CEM I PORTLAND CEMENT ONLY			<table border="1"> <thead> <tr> <th>Age</th> <th>7 Days</th> <th>28 Days</th> </tr> </thead> <tbody> <tr> <td>Compressive Strength N/mm<sup>2</sup></td> <td>N/A</td> <td>N/A</td> </tr> </tbody> </table>		Age	7 Days	28 Days	Compressive Strength N/mm <sup>2</sup>	N/A	N/A																																	
Age	7 Days	28 Days																																									
Compressive Strength N/mm <sup>2</sup>	N/A	N/A																																									
<i>The stock CEM I Portland cement used in these tests was supplied by Hanson Ribblesdale works and the following results were obtained from that sample</i>			<i>The samples of LKAB Minerals GGBS and the CEM I Portland cement were bulk average monthly samples for the works specified</i>																																								
<table border="1"> <tbody> <tr> <td>Initial Setting Time min</td> <td>180</td> </tr> <tr> <td rowspan="2">Compressive Strength N/mm<sup>2</sup></td> <td>7 days</td> <td>49.7</td> </tr> <tr> <td>28 days</td> <td>62.4</td> </tr> </tbody> </table>			Initial Setting Time min	180	Compressive Strength N/mm <sup>2</sup>	7 days	49.7	28 days	62.4	<div style="text-align: center;"> </div>																																	
Initial Setting Time min	180																																										
Compressive Strength N/mm <sup>2</sup>	7 days	49.7																																									
	28 days	62.4																																									
The GGBS contained no additional materials other than those permitted. The above results and other tests demonstrate the conformity of the material sold during the month to the requirements of EN 15167-1:2006			<b>1333-CPR-00194</b>																																								

Signed:

L Bontoft - Technical Manager GGBS