



CONFORMITY CERTIFICATE					
Ground Granulated Blastfurnace Slag Produced at			Aboño		Works
Sample Period			December 2019		
Certificate of Conformity of GGBS to EN 15167-1:2006			Certificate of Conformity of Combinations of GGBS and CEM I Portland Cement to Annex A of BS 8500-2:2015		
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:		
Aboño GGBS Only			Cauldon		
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:					
Results	Product	EN Limit	Strength Class	Not Less Than**	Not More Than**
Fineness m ² /kg	480	min. 275	52.5L	6	33
Magnesium Oxide MgO %	8	max. 18	42.5L	6	73
Sulfate SO ₃ %	0.1	max. 2.5	32.5L	55	80
Sulfide S ²⁻ %	0.7	max. 2.0	Conformity Evaluation Period (if less than 6 months)	N/A	month(s)
Chloride Content Cl ⁻ %	0.03	max. 0.10	Combination Designation (Table 1 BS 8500-2:2015)		
Moisture Content %	0.0	max. 1.0	CIIA-S	6	20
Corrected Loss on Ignition %	1.4	max. 3.0	CIIB-S	21	35
Aluminium Oxide Al ₂ O ₃ %	11.6	to 1 d.p.	CIIIA	36	65
Note: If the value of Al ₂ O ₃ is ≥ 14.5% the '+SR' restriction will be exceeded if the C ₃ A of the CEM I is >10%.			CIIB	66	80
Alkalis as Na ₂ O equ. (acid soluble)			** % GGBS		
Guaranteed Alkali limit %	≤ 1.0		Results of tests in accordance with BS EN 196-1 for 50% GGBS in combination with 50% CEM I Portland cement shown above		
Certified Average Alkali (Last 25) %	0.58		Age	7 Days	28 Days
Declared Mean : Mean last 25 + (SD last 25 x 1.64) %	0.58		Compressive Strength N/mm ²	29.0	51.6
COMBINATION OF 50% LABORATORY STOCK CEM I PORTLAND CEMENT AND 50% GGBS			The samples of LKAB Minerals GGBS and the CEM I Portland cement were bulk average monthly samples for the works specified		
Initial Setting Time min	215	not > than 2 x PC			
Activity Index %	7 days: 65	min. 45			
	28 days: 94	min. 70			
LABORATORY STOCK CEM I PORTLAND CEMENT ONLY					
The stock CEM I Portland cement used in these tests was supplied by CEMENTOS TUDELA VEGUIN, S.A and the following results were obtained from that sample					
Initial Setting Time min	180				
Compressive Strength N/mm ²	7 days: 49.4				
	28 days: 57.9				
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.					
LKAB Minerals Ltd are acting as a dispatching centre in the distribution of the above GGBS and further details and certification are available on request			0099/CPR/B34/0001		

Signed: