

Supplier Deviation Disposition Request

Attachment No. N/A
 Spec C-SPP-F-00055
 Revision No. 4
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- NOTE
1. Completion instructions attached.
 2. Items 1-19 below to be completed by Supplier.
 3. *Items SRS entries only.
 4. Attach additional information whenever necessary.
 5. SRS must be notified within 5 days after detection of deviation.
 6. A copy of the completed SDDR form shall be included by the Supplier in the Quality Verification Data Package for each item to which this SDDR applies.

For Supplier Use		For SRS Use	
Supplier SDDR No. <u>TC-15-001</u>	Date Submitted <u>3-30-15</u>	SRS SDDR No. <u>13182</u>	Project No. <u>N/A</u> Date Received <u>6/5/15</u>
1. Supplier Name <u>Argos Ready Mix LLC</u>	Address <u>205 Lancy Walker Blvd. Ext. Augusta, GA 30901</u>	City/State/Zip <u>Augusta, GA 30901</u>	2. Supplier's Order No. <u>SRRA064184</u>
2.1 SRS Document <u>C-SPP-F-00055</u>	3. Supplier's Part No. <u>Slag Cement</u>	4. Supplier's Part Name <u>Slag Cement</u>	5. Deviation Detected (Date) <u>3-04-15</u> Method <u>Phone</u>
6. All Previous SDDRS (No./Date) <u>None</u>	7. SRS PO No./Change Notice No. <u>SRRA064184</u>	8. SRS Buyer <u>Abbey Evans</u>	9. SRS Part No. <u>N/A</u>
10. SRS Part Name <u>Slag Cement</u>	11. SRS SSR Notified (Date) <u>03-04-15</u> Method <u>Phone</u>	12. SRS Eng Notified (Date) <u>3-04-15</u> Method <u>Phone</u>	
13. Deviation Description (attach extra sheets, photographs, sketches, etc., as necessary and identify quantity and Serial Nos. as applicable). <u>Section 3.2.3.3 states the slag cement must meet ASTM C989, Grade 100. This slag is no longer available in the Southeast, WA.</u>			
14. Supplier's Proposed Disposition <input type="radio"/> Use As-Is <input type="radio"/> Repair <input checked="" type="radio"/> Modify SRS Requirement			
15. Cost Impact <u>TBD</u>		16. Schedule Impact <u>TBD</u>	
17. Proposed Disposition and Technical (plus cost/schedule if applicable) Justification (attach extra sheets, sketches, etc., as necessary). <u>Change specification to allow for the use of ASTM 989, Grade 120 Slag from Lehigh or other source from available in the SE, USA. Test Reports attached.</u>			
18. Associated Supplier Document Change(s) <u>Attached Last 12 months ASTM C989 Test Reports</u>			
19. Supplier's Authorized Representative (Print Name/Signature) <u>Carl Darlak</u>		Title <u>QA Manager</u>	Date <u>3-30-15</u>
*20. SRS Eng Action <input checked="" type="checkbox"/> Accepted * <input type="checkbox"/> Rejected * Per Block 22		Drawing Change: <input type="checkbox"/> SRS <input type="checkbox"/> Supplier <input checked="" type="checkbox"/> Specification/Requisition Change <input type="checkbox"/> Other Suppliers Affected <input type="checkbox"/> Follow-up <input type="checkbox"/> Baseline Change <input type="checkbox"/> Other Item Description <u>Slag Cement</u> End Use <u>SRR/Construction</u> Responsible Division <u>SRR/DS</u> Functional Class <u>GS</u>	
*21. USQ/TSQ Document No. <u>USQ-HTF-2015-00300</u>	For Prior Use USQ Application (Print Name/Signature) CTF1: <u>N/A</u> CTF2: <u>N/A</u>		
*22. SRS Disposition Statement Including Justification (attach extra sheets, sketches, etc., as necessary). <u>See pages 15-16 for Engineering disposition, including the grout mix requalification requirements for the acceptance of the proposed slag cement material, in Block 17 of this SDDR.</u>			
Incorporation Required <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Document No.(s) <u>C-SPP-F-00055, Rev.4</u>		SRS Action Required <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
*23. SRS Acceptance/Printed Name/Signature			
Amit Ganguly / <u>Amit Ganguly</u> 6/15/15		Bruce Dragon / <u>Bruce Dragon</u> 8/31/15	
CTF/Disposition Originator Carlos Chiappetto / <u>Carlos Chiappetto</u> 8-27-15		CQF Marcus Deason / <u>M. Deason</u> 9/14/15	
VER/CHK. Max Howard / <u>E. Howard</u> 9-14-15		PMMD <u>R. Voegtlin</u> 9/3/15	
MGR		Other	

DESIGN AUTHORITY
CLASSIC ENGINEERING

Material Certification Report



Brand Name: CAMCEM™
 Material: Slag Cement
 Type: ASTM C989

DATE: 01-Apr-2014

General Information

Supplier: Hanson Slag Cement DBA Civil and Marine, Inc
 Address: 575 Cargo Road
 Cape Canaveral, Florida 32920
 Telephone: (321) 302-2254

Source Location: Hanson Slag Cement
 575 Cargo Road
 Cape Canaveral, Florida 32920
 Contact: Dennis Thompson (321) 302-2254

The following information is based on average test data. The data is typical of GGBFS shipped by
 Hanson Slag Cement; individual shipments may vary

Test Data on ASTM "Standard" Requirements

Chemical (C989, Table 2)			Physical (C989, Table 1)		
Item	Limit	Result	Item	Limit	Result
			+45 µm (No. 325) Sieve (%)	20 max	0.51
			Blaine Fineness (m ² /kg)	-	534
Sulfide S (%)	2.5 max	1.1	Air Content (%)	12 max	4.0
Sulfate Ion - SO ₃ (%)	NA	3.2	Slag Activity Index (SAI %)		
			Average of Last 5 Samples:		
			Avg 7 Day Index	75 min	95
			Avg 28 Day Index	95 min	121
			Current Samples		
			7 Day Index	70 min	97
			28 Day Index	90 min	125

Test Data on Reference Cement

Chemical			Physical		
Item	Limit	Result	Item	Limit	Result
Total Alkalies as Na ₂ O (%)	0.60 - 0.90	0.64	Blaine Fineness (m ² /kg)	-	363
C ₃ S	-	65	Compressive Strength MPa (psi):		
C ₂ S	-	8	7 Day	-	4358
C ₃ A	-	7	28 Day	35 (5000) min	38.2 (5450)
C ₄ AF	-	8			

Optional Test Data

Chemical			Physical		
Item	Limit	Result	Item	Limit	Result
% Total Alkalies	-	0.38	Specific Gravity	-	2.89
% Cl (Chloride)	-	0.01	1 Day Accelerated (C-1073) psi	-	2267

Certification Statement

Hanson Slag Cement meets Section 929-1 and 929-5 of FDOT Specifications

Dennis S. Thompson (Laboratory Manager)

Material Certification Report**LEHIGH™**
HEIDELBERGCEMENT GroupBrand Name: CAMCEM™
Material: Slag Cement
Type: ASTM C989

DATE: 01-May-2014

General InformationSupplier: Lehigh Cement Company
Address: 575 Cargo Road
Cape Canaveral, Florida 32920Source Location: Lehigh Cement Company
575 Cargo Road
Cape Canaveral, Florida 32920
Contact: Dennis Thompson (321) 302-2254The following information is based on monthly average test data. The data is typical of GGBFS shipped by
Lehigh Cement Company, Cape Canaveral, FL Plant; individual shipments may vary.**Test Data on ASTM "Standard" Requirements**

Chemical (C989, Table 2)			Physical (C989, Table 1)		
Item	Limit	Result	Item	Limit	Result
			+45 µm (No. 325) Sieve (%)	20 max	0.41
			Blaine Fineness (m ² /kg)	-	532
Sulfide S (%)	2.5 max	1.1	Air Content (%)	12 max	4.0
Sulfate Ion - SO ₃ (%)	NA	3.4	Slag Activity Index (SAI %)		
			Average of Last 5 Samples		
			Avg 7 Day Index	75 min	98
			Avg 28 Day Index	95 min	127
			Current Samples		
			7 Day Index	70 min	99
			28 Day Index	90 min	131

Test Data on CCRL Reference Cement

Chemical			Physical		
Item	Limit	Result	Item	Limit	Result
Total Alkalies as Na ₂ O (%)	0.80 - 0.90	0.64	Blaine Fineness (m ² /kg)	-	363
C ₂ S	-	65	Compressive Strength MPa (psi)		
C ₃ S	-	8	7 Day	-	4358
C ₄ A	-	7	28 Day	35 (5000) min	38.2 (5450)
C ₆ AF	-	8			

Optional Test Data

Chemical			Physical		
Item	Limit	Result	Item	Limit	Result
% Total Alkalies	-	0.40	Specific Gravity	-	2.89
% Cl (Chloride)	-	0.01	1 Day Accelerated (C-1073) psi	-	2300

Certification Statement

Lehigh Cement Co. CAMCEM meets Section 929-1 and 929-5 of FDOT Specifications

Dennis S. Thompson (Laboratory Manager)

Material Certification Report

LEHIGH
HEIDELBERGCEMENT Group

Brand Name: CAMCEM™
Material: Slag Cement
Type: ASTM C989

DATE: 01-Jun-2014

General Information

Supplier: Lehigh Cement Company
Address: 575 Cargo Road
Cape Canaveral, Florida 32920

Source Location: Lehigh Cement Company
575 Cargo Road
Cape Canaveral, Florida 32920
Contact: Dennis Thompson (321) 302-2254

The following information is based on monthly average test data. The data is typical of GGBFS shipped by Lehigh Cement Company, Cape Canaveral, FL Plant. Individual shipments may vary.

Test Data on ASTM "Standard" Requirements

Chemical (C989, Table 2)			Physical (C989, Table 1)		
Item	Limit	Result	Item	Limit	Result
Sulfide S (%)	2.5 max	1.1	+45 µm (No. 325) Sieve (%)	20 max	0.94
Sulfate Ion - SO ₃ (%)	NA	3.4	Blaine Fineness (m ² /kg)	-	528
			Air Content (%)	12 max	4.1
			Slag Activity Index (SAI) %		
			Average of Last 5 Samples		
			Avg 7 Day Index	75 min	102
			Avg 28 Day Index	95 min	122
			Current Samples		
			7 Day Index	70 min	100
			28 Day Index	90 min	121

Test Data on CORL Reference Cement

Chemical			Physical		
Item	Limit	Result	Item	Limit	Result
Total Alkalies as Na ₂ O (%)	0.60 - 0.90	0.64	Blaine Fineness (m ² /kg)	-	363
C ₃ S	-	65	Compressive Strength MPa (psi):		
C ₂ S	-	8	7 Day	-	4358
C ₃ A	-	7	28 Day	35 (5000) min	38.2 (5450)
C ₄ AF	-	8			

Optional Test Data

Chemical			Physical		
Item	Limit	Result	Item	Limit	Result
% Total Alkalies	-	0.40	Specific Gravity	-	2.89
% Cl (Chloride)	-	0.01	1 Day Accelerated (C-1073) psi	-	2227

Certification Statement

Lehigh Cement Co. CAMCEM meets Section 929-1 and 929-5 of FDOT Specifications

Dennis S. Thompson (Laboratory Manager)

Material Certification Report

LEHIGH™
HEIDELBERGCEMENT Group

Brand Name: CAMCEM™
Material: Slag Cement
Type: ASTM C989

DATE: 01-Jul-2014

General Information

Supplier: Lehigh Cement Company
Address: 575 Cargo Road
Cape Canaveral, Florida 32920

Source Location: Lehigh Cement Company
575 Cargo Road
Cape Canaveral, Florida 32920
Contact: Dennis Thompson (321) 302-2254

The following information is based on monthly average test data. The data is typical of GGBFS shipped by Lehigh Cement Company, Cape Canaveral, FL Plant. Individual shipments may vary.

Test Data on ASTM "Standard" Requirements

Chemical (C989, Table 2)			Physical (C989, Table 1)		
Item	Limit	Result	Item	Limit	Result
			+45 µm (No. 325) Sieve (%)	20 max	0.98
			Blaine Fineness (m2/kg)	-	527
Sulfide S (%)	2.5 max	1.1	Air Content (%)	12 max	4.0
Sulfate Ion - SO ₃ (%)	NA	3.4	Slag Activity Index (SAI %)		
			Average of Last 5 Samples		
			Avg 7 Day Index	75 min	100
			Avg 28 Day Index	85 min	124
			Current Samples		
			7 Day Index	70 min	103
			28 Day Index	90 min	122

Test Data on CORL Reference Cement

Chemical			Physical		
Item	Limit	Result	Item	Limit	Result
Total Alkalies as Na ₂ O (%)	0.60 - 0.90	0.64	Blaine Fineness (m2/kg)	-	363
C ₃ S	-	65	Compressive Strength MPa (psi):		
C ₂ S	-	8	7 Day	-	4358
C ₃ A	-	7	28 Day	35 (5000) min	38.2 (5450)
C ₄ AF	-	8			

Optional Test Data

Chemical			Physical		
Item	Limit	Result	Item	Limit	Result
% Total Alkalies	-	0.40	Specific Gravity	-	2.89
%Cl (Chloride)	-	0.01	1 Day Accelerated (C-1073) psi	-	2201

Certification Statement

Lehigh Cement Co. CAMCEM meets Section 929-1 and 929-5 of FDOT Specifications

Dennis S. Thompson (Laboratory Manager)

Material Certification Report

LEHIGH™
HEIDELBERGCEMENT Group

Brand Name: CAMCEM™
Material: Slag Cement
Type: ASTM C989

DATE: 01-Aug-2014

General Information

Supplier: Lehigh Cement Company
Address: 575 Cargo Road
Cape Canaveral, Florida 32920

Source Location: Lehigh Cement Company
575 Cargo Road
Cape Canaveral, Florida 32920
Contact: Dennis Thompson (321) 302-2254

The following information is based on monthly average test data. The data is typical of GGBFS shipped by Lehigh Cement Company Cape Canaveral, FL Plant. Individual shipments may vary.

Test Data on ASTM "Standard" Requirements

Chemical (C989, Table 2)			Physical (C989, Table 1)		
Item	Limit	Result	Item	Limit	Result
Sulfide S (%)	2.5 max	0.9	45 µm (No. 325) Sieve (%)	20 max	1.13
Sulfate Ion - SO ₃ (%)	NA	3.2	Blaine Fineness (m ² /kg)	-	529
			Air Content (%)	12 max	4.0
			Slag Activity Index (SAI %)		
			Average of Last 5 Samples:		
			Avg 7 Day Index	75 min	100
			Avg 28 Day Index	95 min	125
			Current Samples:		
			7 Day Index	70 min	99
			28 Day Index	90 min	124

Test Data on CORL Reference Cement

Chemical			Physical		
Item	Limit	Result	Item	Limit	Result
Total Alkalies as Na ₂ O (%)	0.60 - 0.90	0.64	Blaine Fineness (m ² /kg)	-	363
C ₃ S	-	85	Compressive Strength MPa (psi):		
C ₂ S	-	8	7 Day	-	4358
C ₃ A	-	7	28 Day	35 (5000) min	38.2 (5450)
C ₄ AF	-	8			

Optional Test Data

Chemical			Physical		
Item	Limit	Result	Item	Limit	Result
% Total Alkalies	-	0.40	Specific Gravity	-	2.89
% Cl (Chloride)	-	0.01	1 Day Accelerated (C-1073) psi	-	2330

Certification Statement

Lehigh Cement Co. CAMCEM meets Section 929-1 and 929-5 of FDOT Specifications

Dennis S. Thompson (Laboratory Manager)

Material Certification Report

LEHIGHTM
HEIDELBERGCEMENT Group

Brand Name: CAMCEMTM
Material: Slag Cement
Type: ASTM C989

DATE: 01-Sep-2014

General Information

Supplier: Lehigh Cement Company
Address: 575 Cargo Road
Cape Canaveral, Florida 32920

Source Location: Lehigh Cement Company
575 Cargo Road
Cape Canaveral, Florida 32920
Contact: Dennis Thompson (321) 302-2254

The following information is based on monthly average test data. The data is typical of GGBFS shipped by Lehigh Cement Company, Cape Canaveral, FL Plant. Individual shipments may vary.

Test Data on ASTM "Standard" Requirements

Chemical (C989, Table 2)			Physical (C989, Table 1)		
Item	Limit	Result	Item	Limit	Result
Sulfide S (%)	2.5 max	0.9	+45 μ m (No. 325) Sieve (%)	20 max	1.07
Sulfate Ion - SO ₃ (%)	NA	3.2	Blaine Fineness (m ² /kg)	-	526
			Air Content (%)	12 max	4.4
			Slag Activity Index (SAI) %		
			Average of Last 5 Samples		
			Avg 7 Day Index	75 min	98
			Avg 28 Day Index	95 min	122
			Current Samples		
			7 Day Index	70 min	99
			28 Day Index	90 min	121

Test Data on CGRL Reference Cement

Chemical			Physical		
Item	Limit	Result	Item	Limit	Result
Total Alkalies as Na ₂ O (%)	0.60 - 0.90	0.64	Blaine Fineness (m ² /kg)	-	363
C ₂ S	-	85	Compressive Strength MPa (psi)		
C ₂ S	-	8	7 Day	-	4358
C ₃ A	-	7	28 Day	35 (5000) min	38.2 (5450)
C ₄ AF	-	8			

Optional Test Data

Chemical			Physical		
Item	Limit	Result	Item	Limit	Result
% Total Alkalies	-	0.40	Specific Gravity	-	2.89
%Cl (Chloride)	-	0.01	1 Day Accelerated (C-1073) psi	-	2300

Certification Statement

Lehigh Cement Co. CAMCEM meets Section 929-1 and 929-5 of FDOT Specifications

Dennis S. Thompson (Laboratory Manager)

Material Certification Report

LEHIGH™
HEIDELBERGCEMENT Group

Brand Name: CAMCEM™
Material: Slag Cement
Type: ASTM C989 Grade 120

DATE: 01-Oct-2014

General Information

Supplier: Lehigh Cement Company
Address: 575 Cargo Road
Cape Canaveral, Florida 32920

Source Location: Lehigh Cement Company
575 Cargo Road
Cape Canaveral, Florida 32920
Contact: Dennis Thompson (321) 302-2254

The following information is based on monthly average test data. The data is typical of GC8FS shipped by Lehigh Cement Company, Cape Canaveral, FL Plant. Individual shipments may vary.

Test Data on ASTM "Standard" Requirements

Chemical (C989, Table 2)			Physical (C989, Table 1)		
Item	Limit	Result	Item	Limit	Result
Sulfide S (%)	2.5 max	0.8	+45 µm (No. 325) Sieve (%)	20 max	0.67
Sulfate Ion - SO ₃ (%)	NA	3.4	Blaine Fineness (m ² /kg)	-	522
			Air Content (%)	12 max	4.4
			Slag Activity Index (SAI) %		
			Average of Last 5 Samples		
			Avg 7 Day Index	75 min	100
			Avg 28 Day Index	95 min	122
			Current Samples		
			7 Day Index	70 min	99
			28 Day Index	90 min	119

Test Data on CCRL Reference Cement

Chemical			Physical		
Item	Limit	Result	Item	Limit	Result
Total Alkalies as Na ₂ O (%)	0.60 - 0.90	0.64	Blaine Fineness (m ² /kg)	-	363
C ₂ S	-	65	Compressive Strength MPa (psi)		
C ₃ S	-	8	7 Day	-	4358
C ₄ A	-	7	28 Day	35 (5000) min	38.2 (5450)
C ₃ AF	-	8			

Optional Test Data

Chemical			Physical		
Item	Limit	Result	Item	Limit	Result
% Total Alkalies	-	0.40	Specific Gravity	-	2.89
%Cl (Chloride)	-	0.01	1 Day Accelerated (C-1073) psi	-	2424

Certification Statement

Lehigh Cement Co. CAMCEM meets Section 929-1 and 929-5 of FDOT Specifications

Dennis S. Thompson (Laboratory Manager)

Material Certification Report

LEHIGH™
HEIDELBERGCEMENT Group

Brand Name: CAMCEM™
Material: Slag Cement
Type: ASTM C989 Grade 120

DATE: 01-Nov-2014

General Information

Supplier: Lehigh Cement Company
Address: 575 Cargo Road
Cape Canaveral, Florida 32920

Source Location: Lehigh Cement Company
575 Cargo Road
Cape Canaveral, Florida 32920
Contact: Dennis Thompson (321) 302-2254

The following information is based on monthly average test data. The data is typical of GGBFS shipped by Lehigh Cement Company, Cape Canaveral, FL Plant. Individual shipments may vary.

Test Data on ASTM "Standard" Requirements

Chemical (C589, Table 2)			Physical (C989, Table 1)		
Item	Limit	Result	Item	Limit	Result
			+45 µm (No. 325) Sieve (%)	20 max	0.51
			Blaine Fineness (m2/kg)	-	527
Sulfide S (%)	2.5 max	0.8	Air Content (%)	12 max	4.4
Sulfate Ion - SO ₃ (%)	NA	3.4	Slag Activity Index (SAI %)		
			Average of Last 5 Samples:		
			Avg 7 Day Index	75 min	101
			Avg 28 Day Index	95 min	124
			Current Samples:		
			7 Day Index	70 min	102
			28 Day Index	90 min	125

Test Data on CORL Reference Cement

Chemical			Physical		
Item	Limit	Result	Item	Limit	Result
Total Alkalies as Na ₂ O (%)	0.60 - 0.90	0.64	Blaine Fineness (m2/kg)	-	363
C ₂ S	-	65	Compressive Strength MPa (psi):		
C ₃ S	-	8	7 Day	-	4358
C ₄ A	-	7	28 Day	35 (5000) min	38.2 (5450)
C ₄ AF	-	8			

Optional Test Data

Chemical			Physical		
Item	Limit	Result	Item	Limit	Result
% Total Alkalies	-	0.40	Specific Gravity	-	2.89
% Cl (Chloride)	-	0.01	1 Day Accelerated (C-1073) psi	-	2418

Certification Statement

Lehigh Cement Co. CAMCEM meets Section 929-1 and 929-5 of FDOT Specifications

Dennis S. Thompson (Laboratory Manager)

Material Certification Report**LEHIGH™**
HEIDELBERGCEMENT Group

Brand Name: CAMCEM™

Material: Slag Cement

DATE: 01-Dec-2014

Type: ASTM C989 Grade 120

General InformationSupplier: Lehigh Cement Company
Address: 575 Cargo Road
Cape Canaveral, Florida 32920Source Location: Lehigh Cement Company
575 Cargo Road
Cape Canaveral, Florida 32920
Contact: Dennis Thompson (321) 302-2254

The following information is based on monthly average test data. The data is typical of GGBFS shipped by Lehigh Cement Company, Cape Canaveral, FL Plant. Individual shipments may vary.

Test Data on ASTM "Standard" Requirements

Chemical (C989, Table 2)			Physical (C989, Table 1)		
Item	Limit	Result	Item	Limit	Result
Sulfide S (%)	2.5 max	0.8	+45 µm (No. 325) Sieve (%)	20 max	0.60
Sulfate Ion - SO ₃ (%)	NA	3.4	Blaine Fineness (m ² /kg)	-	528
			Air Content (%)	12 max	4.2
			Slag Activity Index (SAI) %		
			Average of Last 5 Samples:		
			Avg 7 Day Index	75 min	101
			Avg 28 Day Index	95 min	123
			Current Samples		
			7 Day Index	70 min	100
			28 Day Index	90 min	125

Test Data on CORL Reference Cement

Chemical			Physical		
Item	Limit	Result	Item	Limit	Result
Total Alkalies as Na ₂ O (%)	0.60 - 0.90	0.64	Blaine Fineness (m ² /kg)	-	363
C ₃ S	-	65	Compressive Strength MPa (psi):		
C ₂ S	-	8	7 Day	-	4358
C ₃ A	-	7	28 Day	35 (5000) min	38.2 (5450)
C ₄ AF	-	6			

Optional Test Data

Chemical			Physical		
Item	Limit	Result	Item	Limit	Result
% Total Alkalies	-	0.40	Specific Gravity	-	2.89
% Cl (Chloride)	-	0.01	1 Day Accelerated (C-1073) psi	-	2313

Certification Statement

Lehigh Cement Co. CAMCEM meets Section 929-1 and 929-5 of FDOT Specifications

Dennis S. Thompson (Laboratory Manager)

Material Certification Report**LEHIGH™**
HEIDELBERGCEMENT GroupBrand Name: Lehigh Slag Cement
Material: Slag Cement
Type: ASTM C989 Grade 120

DATE: 01-Jan-2015

General InformationSupplier: Lehigh Cement Company
Address: 575 Cargo Road
Cape Canaveral, Florida 32920Manuf. Location: Lehigh Cement Company
575 Cargo Road
Cape Canaveral, Florida 32920The following information is based on monthly average test data. The data is typical of GGBFS shipped by
Lehigh Cement Company Cape Canaveral, FL Plant. Individual shipments may vary.**Test Data on ASTM "Standard" Requirements**

Chemical (C989, Table 2)			Physical (C989, Table 1)		
Item	Limit	Result	Item	Limit	Result
Sulfide S (%)	2.5 max	0.8	+45 µm (No. 325) Sieve (%)	20 max	0.50
Sulfate Ion - SO ₃ (%)	NA	3.4	Blaine Fineness (m ² /kg)	-	535
			Air Content (%)	12 max	4.3
			Slag Activity Index (SAI %)		
			Average of Last 5 Samples:		
			Avg 7 Day Index	95 min	102
			Avg 28 Day Index	115 min	124
			Current Samples:		
			7 Day Index	90 min	102
			28 Day Index	110 min	126

Test Data on CORL Reference Cement

Chemical			Physical		
Item	Limit	Result	Item	Limit	Result
Total Alkalies as Na ₂ O (%)	0.60 - 0.90	0.84	Blaine Fineness (m ² /kg)	-	363
C ₂ S	-	65	Compressive Strength MPa (psi):		
C ₂ S	-	8	7 Day	-	4358
C ₃ A	-	7	28 Day	35 (5000) min	38.2 (5450)
C ₄ AF	-	8			

Optional Test Data

Chemical			Physical		
Item	Limit	Result	Item	Limit	Result
% Total Alkalies	-	0.40	Specific Gravity	-	2.89
% Cl (Chloride)	-	0.01	1 Day Accelerated (C-1073) psi	-	2433

Certification Statement

Lehigh Slag Cement meets Section 929-1 and 929-5 of FDOT Specifications

Dennis S. Thompson (Laboratory Manager)

Material Certification Report

LEHIGH™
HEIDELBERGCEMENT Group

Brand Name: Lehigh Slag Cement
Material: GGBFS
Type: ASTM C989 Grade 120

DATE: 01-Feb-2015

General Information

Supplier: Lehigh Cement Company
Address: 575 Cargo Road
Cape Canaveral, Florida 32920

Manuf. Location: Lehigh Cement Company
575 Cargo Road
Cape Canaveral, Florida 32920

The following information is based on monthly average test data. The data is typical of GGBFS shipped by Lehigh Cement Company Cape Canaveral, FL Plant. Individual shipments may vary.

Test Data on ASTM "Standard" Requirements

Chemical (C989, Table 2)			Physical (C989, Table 1)		
Item	Limit	Result	Item	Limit	Result
Sulfide S (%)	2.5 max	0.9	+45 µm (No. 325) Sieve (%)	20 max	0.49
Sulfate Ion - SO ₃ (%)	NA	3.4	Blaine Fineness (m ² /kg)	-	534
			Air Content (%)	12 max	5.0
			Slag Activity Index (SAI %)		
			Average of Last 5 Samples:		
			Avg 7 Day Index	95 min	99
			Avg 28 Day Index	115 min	121
			Current Samples:		
			7 Day Index	90 min	101
			28 Day Index	110 min	121

Test Data on CCRL Reference Cement

Chemical			Physical		
Item	Limit	Result	Item	Limit	Result
Total Alkalies as Na ₂ O (%)	0.60 - 0.90	0.64	Blaine Fineness (m ² /kg)	-	363
C ₃ S	-	65	Compressive Strength MPa (psi):		
C ₂ S	-	8	7 Day	-	4358
C ₃ A	-	7	28 Day	35 (5000) min	38.2 (5450)
C ₄ AF	-	8			

Optional Test Data

Chemical			Physical		
Item	Limit	Result	Item	Limit	Result
% Total Alkalies	-	0.40	Specific Gravity	-	2.89
% Cl (Chloride)	-	0.01	1 Day Accelerated (C-1073) psi	-	2312

Certification Statement

Lehigh Slag Cement meets Section 929-1 and 929-5 of FDOT Specifications

Dennis S. Thompson (Laboratory Manager)

Material Certification Report

LEHIGH
HEIDELBERGCEMENT Group

Brand Name: Lehigh Slag Cement

Material: GGBFS

DATE: 01-Mar-2015

Type: ASTM C989 Grade 120

General Information

Supplier: Lehigh Cement Company
Address: 575 Cargo Road
Cape Canaveral, Florida 32920

Manuf. Location: Lehigh Cement Company
575 Cargo Road
Cape Canaveral, Florida 32920

The following information is based on monthly average test data. The data is typical of GGBFS shipped by Lehigh Cement Company Cape Canaveral, FL Plant. Individual shipments may vary.

Test Data on ASTM "Standard" Requirements

Chemical (C989, Table 2)			Physical (C989, Table 1)		
Item	Limit	Result	Item	Limit	Result
			+45 μ m (No. 325) Sieve (%)	20 max	0.79
Sulfide S (%)	2.5 max	0.9	Blaine Fineness (m ² /kg)	-	538
			Air Content (%)	12 max	4.7
Sulfate Ion - SO ₃ (%)	NA	3.3	Slag Activity Index (SAI %)		
			Average of Last 5 Samples:		
			Avg 7 Day Index	95 min	98
			Avg 28 Day Index	115 min	121
			Current Samples:		
			7 Day Index	90 min	99
			28 Day Index	110 min	122

Test Data on CCRL Reference Cement

Chemical			Physical		
Item	Limit	Result	Item	Limit	Result
Total Alkalies as Na ₂ O (%)	0.60 - 0.90	0.64	Blaine Fineness (m ² /kg)	-	363
C ₃ S	-	65	Compressive Strength MPa (psi):		
C ₂ S	-	8	7 Day	-	4358
C ₃ A	-	7	28 Day	35 (5000) min	38.2 (5450)
C ₄ AF	-	8			

Optional Test Data

Chemical			Physical		
Item	Limit	Result	Item	Limit	Result
% Total Alkalies	-	0.40	Specific Gravity	-	2.89
% Cl (Chloride)	-	0.01	1 Day Accelerated (C-1073) psi	-	2341

Certification Statement

Lehigh Slag Cement meets Section 929-1 and 929-5 of FDOT Specifications

Dennis S. Thompson (Laboratory Manager)

4/30/2015

Tank Closure Mix Design Specification C-SPP-F-00055 Rev. 4

Admixtures used for mix design:

Type I/II Cement = 6.94 lbs.

Type 100 Slag = 11.67 lbs.

Flyash = 20.17

Recover = as required / added 0.7 oz.

HRWR = allowed 2.22 oz. / only used 1.11 oz.

EXE 958 = 11.11 grams = allowed 2.3 oz. / only used 1.15 oz.

Water = 22.44 lbs.

Sand 99.44 lbs. absorption factor = 0.6%

#8 Stone 44.44 lbs. absorption factor = 0.36%

FOR INFORMATION ONLY

Results Using Type 100 Slag (4/30/15):

Flow = 27/28 Avg. = 27.5"

Unit Wt. = 133.6

Air Content = 1.1%

Concrete Temp. 68°

Ambient 61°

Five (5) Compressive Strength Cyl, Cast at 10:00am (All 5 cyl. will be broken at 28)

Two (2) 6 x 12 in. cylinders was cast for Heat of Hydration

One (1) 6 x 12 in. cylinders was cast for Bleed Water

28 day avg. Ps. 2180
2140
2100
2140 psi

Results Using Type 120 Slag (4/30/15):

Flow = 28.5/28.5 Avg. = 28.5"

Unit Wt. = 133.8

Air Content = 1.0%

Concrete Temp. 66°

Ambient 64°

Five (5) Compressive Strength Cyl, Cast at 11:00am (All 5 cyl. will be broken at 28)

Two (2) 6 x 12 in. cylinders was cast for Heat of Hydration

One (1) 6 x 12 in. cylinders was cast for Bleed Water

28 day avg. Ps. 2200
2140
2210
2180 psi

BLOCK 22 – (Continued from Page 1)

References: 1) SRR Tank Closure Grout Specification # C-SPP-F-00055, Revision 4, "Furnishing and Delivery of Tank Closure Grout".

2) 28-day Compressive Strength Test results from AECOM, SRS Concrete Laboratory, dated 4/30/2015, (Page 14 of this SDDR).

3) Slag Cement Material Certification reports per Block 17 (pages 2-13) of this SDDR.

4) SRR IOM # SRR-CWDA-2015-00057, Revision 0, dated May 12, 2015, "Evaluation of the Use of Grade 120 Slag Cement in Tank Closure Grout versus Performance Assessment Assumptions".

5) SRR Report # VSL-15R3740-1, Revision 0, Final Report, "Investigation of Alternate Ground Granulated Blast Furnace Slag for the Saltstone Facility", by Vitreous State Laboratory, The Catholic University of America, Washington, DC 20064, dated July 24, 2015.

SRR DISPOSITION: Modify SRS Requirements

Considering material unavailability, SRR agrees to allow the use of slag cement which complies with ASTM C 989 Grade 100 or Grade 120 per the specification change proposed by the grout supplier in Block 17 of this SDDR, subject to the conditions stated below:

- a) The grout supplier shall meet all other requirements in the specification (Ref.1), including the grout mix requalification tests required in Sections 1.1.2.5, 3.2.1.2.B, and 3.4.4.2.
- b) Verification of compliance of the requalification test results with the specification requirements shall be completed by the grout supplier prior to using the proposed material in the grout mix.

Technical Justification:

- The material certification reports (Ref.3), the 28-day compressive strength test report (Ref.2) and the SRR IOM (Ref.4) showed that the Slag Cement Grade 120 met the ASTM C989 physical and chemical properties.
- Conclusion in page 5 of the SRR IOM (Ref.4), states "Use of the Grade 120 Slag Cement during H-Tank Farm waste tank closure is consistent with the inputs and assumptions contained within the HTF PA, and could be carried out in compliance with the HTF

Performance Objectives detailed within the PA, assuming other grout performance and testing requirements are met”.

- An investigation of alternate ground granulated blast furnace slag (GGBFS) (Ref.5), utilized as a component in saltstone, tank closure grout, and the SDU concrete at SRS, was performed. Investigation included testing on the present Holcim GGBFS slag and four potential alternative GGBFS materials.

The report (Ref.5, page 17) recommended that – “...Lehigh Grade 120 GGBFS appears to be a reasonable replacement for the current Holcim Grade 100 GGBFS and is the recommended selection based on the results from the present work. Lafarge Grade 120 GGBFS is the second best choice amongst the materials tested and is recommended as a back-up option...”.

The report (Ref.5, page 4) also stated that substituting Grade 100 slag with the higher Grade 120 slag will result in higher compressive strength, because of the smaller particle size and enhanced reactivity of the higher grade slag.

Based on above rationale and data, ASTM C989, Grade 120 may be used as an optional Slag Cement material.

DESCRIPTION OF SPECIFICATION CHANGES:

- a) **REPLACE** “Grade 100” with “Grade 100 or Grade 120”, at the end of the Sections 3.2.3.3.A, 3.2.3.3.B and 3.2.3.3.C (page 10) of the referenced specification.
- b) **ADD** the following sentence at the end of the Section 3.2.3.3.A:
“The recommended material sources for the Grade 120 Slag Cement shall be Lehigh Grade 120 (preferred) or the Lafarge Grade 120 (optional).”
- c) **REPLACE** SLAG CEMENT MATERIAL GRADE “100” by “100/120” in the Cementitious Material column, on page 1 of the Attachment 5.5 of the referenced specification.