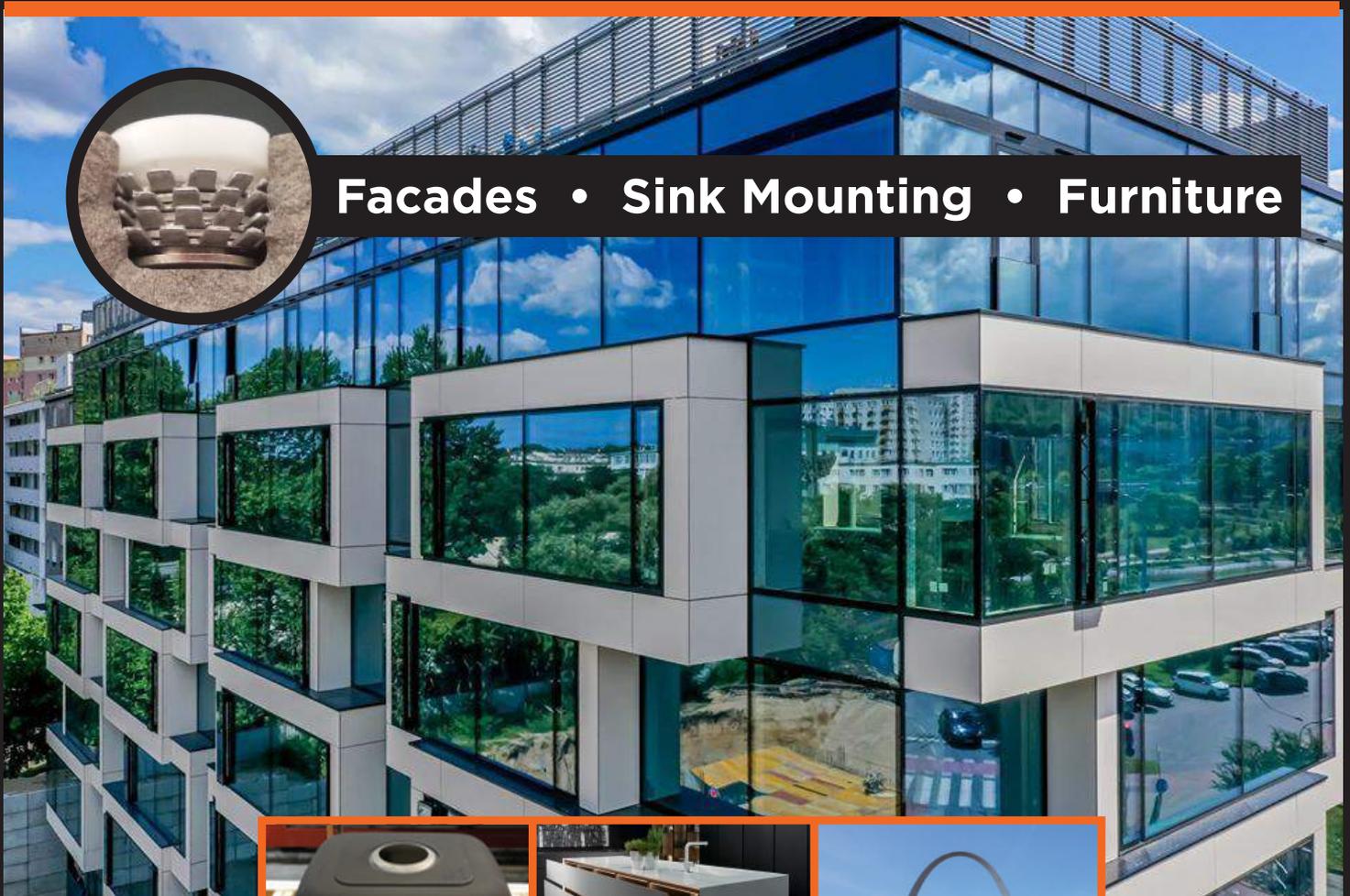


**KEEP-NUT<sup>TM</sup>**  
**Independent ASTM Testing**  
from the  
**Natural Stone**  
**Institute Laboratory**



Labratory Test Reports

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# Laboratory Test Report

Member # 4729  
Contact # 8249

Client: Specialinsert srl/ Chemical Concepts  
Trade Name of Material: Black Absolute  
Finish: Polished  
Country of Origin: none specified.  
Test Procedure: C1354 Strength of Individual Stone Anchorages in Dimension Stone  
Rift Orientation: none specified.  
Preconditioning: none, room temperature  
Load: Tension

Trade Name: <b>Black Absolute - 30mm - Granite - Tension</b>							Anchor: <b>H8 Keep-Nut®</b>	
Specimen Number	Load Direction	Panel Thickness (mm)	Hole Depth (mm)	Hole Dia. (mm)	Load @ Failure (lbs-F)	Load @ Failure (kN)	Rate of Crosshead Travel	Mode of Failure
H8-BA-T-1	Tension	30.55	8.72	11.82	1,165	5.18	0.075 to 0.085 in./min. (1.9 to 2.2 mm/min)	Overload 1K cell; switched to 10K, then break detect.
H8-BA-T-2	Tension	30.51	8.97	11.93	1,491	6.63		Anchor pulled apart leaving crown of anchor in bottom of hole.
H8-BA-T-3	Tension	30.37	8.68	11.87	1,606	7.15		Keep-Nut partially pulled from specimen.
H8-BA-T-4	Tension	30.76	9.04	11.97	1,392	6.19		Keep-Nut pulled apart leaving crown of Keep-Nut in bottom of hole.
H8-BA-T-5	Tension	30.55	8.97	11.95	1,480	6.59		Center of Keep-Nut pulled out.
<b>Average:</b>					<b>1,427</b>	<b>6.35</b>		
Standard Deviation:					164.9	0.73		
Coefficient of Variation:					11.6%	11.6%		

Trade Name: <b>Black Absolute - 30mm - Granite - Tension</b>							Anchor: <b>H15 Keep-Nut®</b>	
Specimen Number	Load Direction	Panel Thickness (mm)	Hole Depth (mm)	Hole Dia. (mm)	Load @ Failure (lbs-F)	Load @ Failure (kN)	Rate of Crosshead Travel	Mode of Failure
H15-BA-T-1	Tension	30.57	15.11	12.01	1,909	8.50	0.075 to 0.085 in./min. (1.9 to 2.2 mm/min)	Center of Keep-Nut pulled out.
H15-BA-T-2	Tension	30.54	15.01	11.99	1,646	7.32		Keep-Nut pulled apart leaving crown of Keep-Nut in bottom of hole.
H15-BA-T-3	Tension	30.12	15.32	12.04	1,658	7.38		
H15-BA-T-4	Tension	30.57	15.01	12.03	1,606	7.15		
H15-BA-T-5	Tension	30.59	15.16	12.04	1,891	8.41		
<b>Average:</b>					<b>1,742</b>	<b>7.75</b>		
Standard Deviation:					145.7	0.65		
Coefficient of Variation:					8.4%	8.4%		

Tests performed by: **R. Lawson**  
Date: **September 23, 2020**

These tests were performed on a Applied Testing Systems Universal Testing Machine Model 910. Loads were measured on Interface Model 1020AF-12.5K-B Load Cell, Serial No. 561415A, Last Date of Calibration: May 27, 2020, traceable to the National Institute of Standards Technology (NIST).

# Chemical Concepts



## Laboratory Test Report

**Member #** 4729

**Contact #** 8249

Client: Specialinsert srl/ Chemical Concepts  
 Trade Name of Material: Black Absolute  
 Finish: Polished  
 Country of Origin: none specified.  
 Test Procedure: C1354 Strength of Individual Stone Anchorages in Dimension Stone  
 Rift Orientation: none specified.  
 Preconditioning: none, room temperature  
 Load: Shear

Trade Name: <b>Black Absolute - 30mm - Granite - Shear</b>							Anchor: <b>H8 Keep-Nut®</b>	
Specimen Number	Load Direction	Panel Thickness (mm)	Hole Depth (mm)	Hole Dia. (mm)	Load @ Failure (lbs-F)	Load @ Failure (kN)	Rate of Crosshead Travel	Mode of Failure
H8-BA-S-1	Shear	30.69	8.67	12.04	2,933	13.05	0.075 to 0.085 in./min. (1.9 to 2.2 mm/min)	Keep-Nut separated. Anchor shaft bent.
H8-BA-S-2	Shear	30.38	8.53	12.07	2,788	12.41		
H8-BA-S-3	Shear	30.36	8.50	12.05	2,694	11.99		
H8-BA-S-4	Shear	30.66	8.72	12.04	2,887	12.85		
H8-BA-S-5	Shear	30.37	8.51	12.01	2,905	12.93		
<b>Average:</b>					<b>2,841</b>	<b>12.64</b>		
Standard Deviation:					98.9	0.44		
Coefficient of Variation:					3.5%	3.5%		

Trade Name: <b>Black Absolute - 30mm - Granite - Shear</b>							Anchor: <b>H15 Keep-Nut®</b>	
Specimen Number	Load Direction	Panel Thickness (mm)	Hole Depth (mm)	Hole Dia. (mm)	Load @ Failure (lbs-F)	Load @ Failure (kN)	Rate of Crosshead Travel	Mode of Failure
H15-BA-S-1	Shear	30.17	15.38	12.01	3,554	15.82	0.075 to 0.085 in./min. (1.9 to 2.2 mm/min)	Shear failure of threaded anchor shaft.
H15-BA-S-2	Shear	30.14	15.08	12.05	3,453	15.37		
H15-BA-S-3	Shear	30.07	15.01	12.04	3,335	14.84		
H15-BA-S-4	Shear	30.68	15.46	12.07	3,350	14.91		
H15-BA-S-5	Shear	30.21	15.26	12.08	2,920	12.99		
<b>Average:</b>					<b>3,322</b>	<b>14.78</b>		
Standard Deviation:					241.6	1.08		
Coefficient of Variation:					7.3%	7.3%		

Tests performed by: **R. Lawson**  
 Date: **September 25, 2020**

These tests were performed on a Applied Testing Systems Universal Testing Machine Model 910. Loads were measured on Interface Model 1020AF-12.5K-B Load Cell, Serial No. 561415A, Last Date of Calibration: May 27, 2020, traceable to the National Institute of Standards Technology (NIST).

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# Laboratory Test Report

Member # 4729  
Contact # 8249

Client: Specialinsert srl/ Chemical Concepts  
Trade Name of Material: Caledonia  
Finish: Polished  
Country of Origin: Canada  
Test Procedure: C1354 Strength of Individual Stone Anchorages in Dimension Stone  
Rift Orientation: none specified  
Preconditioning: none, room temperature  
Load: Tension

Trade Name: Caledonia - 30mm - Granite - Tension						Anchor: H8 Keep-Nut®		
Specimen Number	Load Direction	Panel Thickness (mm)	Hole Depth (mm)	Hole Dia. (mm)	Load @ Failure (lbs-F)	Load @ Failure (kN)	Rate of Crosshead Travel	Mode of Failure
H8-C-T-1	Tensile	30.62	8.69	11.97	514	2.29	0.075 to 0.085 in./min. (1.9 to 2.2 mm/min)	Keep-Nut pulled out. Partial failure cone. Anchor pulled from specimen. Failure cone around anchor hole.
H8-C-T-2	Tensile	31.38	9.03	11.99	628	2.79		
H8-C-T-3	Tensile	31.48	9.52	12.01	536	2.39		
H8-C-T-4	Tensile	31.29	8.62	12.02	624	2.78		
H8-C-T-5	Tensile	31.55	9.76	12.01	785	3.49		
<b>Average:</b>					<b>617</b>	<b>2.75</b>		
Standard Deviation:					106.7	0.5		
Coefficient of Variation:					17.3%	17.3%		

Trade Name: Caledonia - 30mm - Granite - Tension						Anchor: H15 Keep-Nut®		
Specimen Number	Load Direction	Panel Thickness (mm)	Hole Depth (mm)	Hole Dia. (mm)	Load @ Failure (lbs-F)	Load @ Failure (kN)	Rate of Crosshead Travel	Mode of Failure
H15-C-T-1	Tensile	31.19	15.99	12.00	1,287	5.73	0.075 to 0.085 in./min. (1.9 to 2.2 mm/min)	Keep-Nut partially pulled from specimen. Cracks radiating from anchor hole. Keep-Nut completely pulled from specimen. Cracks radiating from anchor hole. Keep-Nut partially pulled from specimen. Cracks radiating from anchor hole.
H15-C-T-2	Tensile	31.30	15.67	12.05	1,479	6.58		
H15-C-T-3	Tensile	31.24	16.10	12.04	1,216	5.41		
H15-C-T-4	Tensile	31.44	16.14	12.05	1,135	5.05		
H15-C-T-5	Tensile	31.51	16.07	12.08	1,196	5.32		
<b>Average:</b>					<b>1,263</b>	<b>5.62</b>		
Standard Deviation:					132.6	0.6		
Coefficient of Variation:					10.5%	10.5%		

Tests performed by: **R. Lawson**  
Date: **September 23, 2020**

These tests were performed on a Applied Testing Systems Universal Testing Machine Model 910. Loads were measured on Interface Model 1020AF-12.5K-B Load Cell, Serial No. 561415A, Last Date of Calibration: May 27, 2020, traceable to the National Institute of Standards Technology (NIST).



# Laboratory Test Report

Member # 4729

Contact # 8249

Client: Specialinsert srl/ Chemical Concepts  
 Trade Name of Material: Caledonia  
 Finish: Polished  
 Country of Origin: Canada  
 Test Procedure: C1354 Strength of Individual Stone Anchorages in Dimension Stone  
 Rift Orientation: none specified  
 Preconditioning: none, room temperature  
 Load: Shear

Trade Name: Caledonia - 30mm - Granite - Shear						Anchor: H8 Keep-Nut®		
Specimen Number	Load Direction	Panel Thickness (mm)	Hole Depth (mm)	Hole Dia. (mm)	Load @ Failure (lbs-F)	Load @ Failure (kN)	Rate of Crosshead Travel	Mode of Failure
H8-C-S-1	Shear	31.60	9.81	12.03	1,722	7.66	0.075 to 0.085 in./min. (1.9 to 2.2 mm/min)	Partial failure cone. Anchor shaft bent.
H8-C-S-2	Shear	31.40	9.72	12.04	2,403	10.69		
H8-C-S-3	Shear	31.26	9.52	12.07	1,999	8.90		
H8-C-S-4	Shear	31.24	9.70	12.04	2,095	9.32		
H8-C-S-5	Shear	31.55	9.99	12.00	2,187	9.73		
<b>Average:</b>					<b>2,081</b>	<b>9.26</b>		
Standard Deviation:					250.4	1.11		
Coefficient of Variation:					12.0%	12.0%		

Trade Name: Caledonia - 30mm - Granite - Shear						Anchor: H15 Keep-Nut®		
Specimen Number	Load Direction	Panel Thickness (mm)	Hole Depth (mm)	Hole Dia. (mm)	Load @ Failure (lbs-F)	Load @ Failure (kN)	Rate of Crosshead Travel	Mode of Failure
H15-C-S-1	Shear	31.09	15.63	12.07	3,012	13.40	0.075 to 0.085 in./min. (1.9 to 2.2 mm/min)	Stone failure - cracked through anchor hole.
H15-C-S-2	Shear	31.10	15.81	12.09	3,203	14.25		Partial failure cone.
H15-C-S-3	Shear	31.34	16.16	12.10	2,733	12.16		Stone failure - cracked through anchor hole.
H15-C-S-4	Shear	31.42	15.77	12.05	3,431	15.27		Stone failure - cracked through anchor hole.
H15-C-S-5	Shear	31.30	15.96	12.03	2,850	12.68		Stone failure - cracked through anchor hole.
<b>Average:</b>					<b>3,046</b>	<b>13.55</b>		
Standard Deviation:					278.6	1.24		
Coefficient of Variation:					9.1%	9.1%		

Tests performed by: **R. Lawson**  
 Date: **September 25, 2020**

These tests were performed on a Applied Testing Systems Universal Testing Machine Model 910. Loads were measured on Interface Model 1020AF-12.5K-B Load Cell, Serial No. 561415A, Last Date of Calibration: May 27, 2020, traceable to the National Institute of Standards Technology (NIST).

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# Chemical Concepts



## Laboratory Test Report

**Member #** 4729

**Contact #** 8249

Client: Specialinsert srl/ Chemical Concepts  
 Trade Name of Material: Delicatus Ice  
 Finish: Polished  
 Country of Origin: Brazil  
 Test Procedure: C1354 Strength of Individual Stone Anchorages in Dimension Stone  
 Rift Orientation: none specified  
 Preconditioning: none, room temperature  
 Load: Tension

Trade Name: Delicatus Ice - 30mm - Granite - Tension						Anchor: H8 Keep-Nut®		
Specimen Number	Load Direction	Panel Thickness (mm)	Hole Depth (mm)	Hole Dia. (mm)	Load @ Failure (lbs-F)	Load @ Failure (kN)	Rate of Crosshead Travel	Mode of Failure
H8-DI-T-1	Tensile	30.74	9.04	12.05	530	2.36	0.075 to 0.085 in./min. (1.9 to 2.2 mm/min)	Keep-Nut pulled out. Partial failure cone.
H8-DI-T-2	Tensile	30.40	9.33	12.00	422	1.88		Keep-Nut partially pulled out with partial failure cone.
H8-DI-T-3	Tensile	30.02	8.52	12.05	264	1.17		
H8-DI-T-4	Tensile	30.65	8.54	12.00	473	2.10		
H8-DI-T-5	Tensile	30.27	8.70	12.00	399	1.78		
<b>Average:</b>					<b>418</b>	<b>1.86</b>		
Standard Deviation:					99.6	0.44		
Coefficient of Variation:					23.8%	23.8%		

Trade Name: Delicatus Ice - 30mm - Granite - Tension						Anchor: H15 Keep-Nut®		
Specimen Number	Load Direction	Panel Thickness (mm)	Hole Depth (mm)	Hole Dia. (mm)	Load @ Failure (lbs-F)	Load @ Failure (kN)	Rate of Crosshead Travel	Mode of Failure
H15-DI-T-1	Tensile	30.61	15.11	12.05	786	3.50	0.075 to 0.085 in./min. (1.9 to 2.2 mm/min)	Keep-Nut pulled out. Partial failure cone.
H15-DI-T-2	Tensile	30.59	15.78	12.04	774	3.44		Keep-Nut partially pulled from specimen. Cracks radiating from anchor hole.
H15-DI-T-3	Tensile	30.58	15.38	12.02	821	3.65		
H15-DI-T-4	Tensile	30.78	15.13	12.02	792	3.52		
H15-DI-T-5	Tensile	30.70	15.73	12.03	717	3.19		
<b>Average:</b>					<b>778</b>	<b>3.46</b>		
Standard Deviation:					38.2	0.17		
Coefficient of Variation:					4.9%	4.9%		

Tests performed by: **R. Lawson**  
 Date: **September 23, 2020**

These tests were performed on a Applied Testing Systems Universal Testing Machine Model 910. H8 loads were measured on Interface Model 1210AF-1K-B Load Cell, Serial No. 560894-A. H15 loads were measured on Interface Model 1020AF-12.5K-B Load Cell, Serial No. 561415A, Last Date of Calibration for both cells: May 27, 2020, traceable to the National Institute of Standards Technology (NIST).

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# Chemical Concepts



## Laboratory Test Report

**Member #** 4729

**Contact #** 8249

Client: Specialinsert srl/ Chemical Concepts  
 Trade Name of Material: Delecatius Ice  
 Finish: Polished  
 Country of Origin: Brazil  
 Test Procedure: C1354 Strength of Individual Stone Anchorages in Dimension Stone  
 Rift Orientation: none specified  
 Preconditioning: none, room temperature  
 Load: Shear

Trade Name: Delicatus Ice - 30mm - Granite - Shear						Anchor: H8 Keep-Nut®		
Specimen Number	Load Direction	Panel Thickness (mm)	Hole Depth (mm)	Hole Dia. (mm)	Load @ Failure (lbs-F)	Load @ Failure (kN)	Rate of Crosshead Travel	Mode of Failure
H8-DI-S-1	Shear	30.66	8.99	12.04	2,006	8.93	0.075 to 0.085 in./min. (1.9 to 2.2 mm/min)	Anchor shaft bent, stone broken.
H8-DI-S-2	Shear	30.24	8.72	12.02	2,125	9.46		
H8-DI-S-3	Shear	30.43	8.83	12.06	1,624	7.23		
H8-DI-S-4	Shear	30.34	8.62	12.04	1,530	6.81		
H8-DI-S-5	Shear	30.53	9.06	12.07	1,555	6.92		
<b>Average:</b>					<b>1,768</b>	<b>7.87</b>		
Standard Deviation:					277.0	1.23		
Coefficient of Variation:					15.7%	15.7%		

Trade Name: Delicatus Ice - 30mm - Granite - Shear						Anchor: H15 Keep-Nut®		
Specimen Number	Load Direction	Panel Thickness (mm)	Hole Depth (mm)	Hole Dia. (mm)	Load @ Failure (lbs-F)	Load @ Failure (kN)	Rate of Crosshead Travel	Mode of Failure
H15-DI-S-1	Shear	31.09	15.64	12.05	1,762	7.84	0.075 to 0.085 in./min. (1.9 to 2.2 mm/min)	Anchor shaft failed, stone broken.
H15-DI-S-2	Shear	30.48	15.50	12.03	2,124	9.45		Anchor shaft bent, stone broken.
H15-DI-S-3	Shear	30.57	15.73	12.09	2,179	9.70		
H15-DI-S-4	Shear	30.64	15.52	12.01	2,329	10.36		
H15-DI-S-5	Shear	30.62	15.50	12.10	2,546	11.33		
<b>Average:</b>					<b>2,188</b>	<b>9.74</b>		
Standard Deviation:					288.8	1.29		
Coefficient of Variation:					13.2%	13.2%		

Tests performed by: **R. Lawson**  
 Date: **September 24, 2020**

These tests were performed on a Applied Testing Systems Universal Testing Machine Model 910. Loads were measured on Interface Model 1020AF-12.5K-B Load Cell, Serial No. 561415A, Last Date of Calibration: May 27, 2020, traceable to the National Institute of Standards Technology (NIST).

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# Laboratory Test Report

Member # 4729  
 Contact # 8249

Client: Specialinsert srl/ Chemical Concepts  
 Trade Name of Material: Caledonia - Polycor Ultra-Thin 1CM  
 Finish: polished  
 Country of Origin: Canada  
 Test Procedure: C1354 Strength of Individual Stone Anchorages in Dimension Stone  
 Rift Orientation: none specified  
 Preconditioning: none, room temperature

Trade Name: Caledonia - 10mm - Granite				Load Direction: <b>Parallel to the Surface (Shear)</b>			Anchor: H6 Keep-Nut®	
Specimen Number	Load Direction	Panel Thickness (mm)	Hole Depth (mm)	Hole Dia. (mm)	Load @ Failure (lbs-F)	Load @ Failure (kN)	Rate of Crosshead Travel	Mode of Failure
C-S-1	Shear	10.67	6.21	12.10	1,630	7.25	0.085 to 0.095 in./min. (2.2 to 2.4 mm/min)	Anchor pulled out of stone.
C-S-2	Shear	10.47	6.49	12.04	1,551	6.90		Anchor pulled from specimen. Cracks noted on polished face.
C-S-3	Shear	10.30	6.13	12.08	356	1.58		Anchor pulled out of stone.
C-S-4	Shear	10.44	6.33	12.05	1,539	6.85		
C-S-5	Shear	10.43	6.64	12.11	1,892	8.42		
<b>Average:</b>					<b>1,394</b>	<b>6.20</b>		
Standard Deviation:					597.2	2.66		
Coefficient of Variation:					42.9%	42.9%		

Trade Name: Caledonia - 10mm - Granite				Load Direction: <b>Perpendicular to the Surface (Tension)</b>			Anchor: H6 Keep-Nut®	
Specimen Number	Load Direction	Panel Thickness (mm)	Hole Depth (mm)	Hole Dia. (mm)	Load @ Failure (lbs-F)	Load @ Failure (kN)	Rate of Crosshead Travel	Mode of Failure
C-T-1	Tension	10.45	6.55	12.02	427	1.90	0.085 to 0.095 in./min. (2.2 to 2.4 mm/min)	Anchor partially pulled from stone.
C-T-2	Tension	10.49	6.43	12.01	247	1.10		
C-T-3	Tension	9.74	*	*	497	2.21		
C-T-4	Tension	10.43	*	*	456	2.03		
C-T-5	Tension	9.81	*	*	313	1.39		
<b>Average:</b>					<b>388</b>	<b>1.73</b>		
Standard Deviation:					104.3	0.46		
Coefficient of Variation:					26.9%	26.9%		

\* Keep-Nut installed by others.

Tests performed by: R. Lawson  
 Date of Testing: January 12, 2021  
 Date of Report: January 15, 2021  
 Reviewed by: C. Muehlbauer

These tests were performed on a Applied Testing Systems Universal Testing Machine Model 910. Tension loads were measured on Interface Model 1210AF-1K-B Load Cell, Serial No. 560894-A. Shear loads were measured on Interface Model 1020AF-12.5K-B Load Cell, Serial No. 561415A, Last Date of Calibration for both cells: May 27, 2020, traceable to the National Institute of Standards Technology (NIST).



# Laboratory Test Report

Member # 4729  
 Contact # 8249

Client: Specialinsert srl/ Chemical Concepts  
 Trade Name of Material: American Mist - Polycor Ultra-Thin 1CM  
 Finish: polished  
 Country of Origin: US  
 Test Procedure: C1354 Strength of Individual Stone Anchorages in Dimension Stone  
 Rift Orientation: none specified  
 Preconditioning: none, room temperature

Trade Name: American Mist - 10mm - Granite				Load Direction: Parallel to the Surface (Shear)			Anchor: H6 Keep-Nut®	
Specimen Number	Load Direction	Panel Thickness (mm)	Hole Depth (mm)	Hole Dia. (mm)	Load @ Failure (lbs-F)	Load @ Failure (kN)	Rate of Crosshead Travel	Mode of Failure
AM-S-1	Shear	9.66	6.11	12.05	2,398	10.67	0.085 to 0.095 in./min. (2.2 to 2.4 mm/min)	Anchor partially pulled from stone. Shear failure of threaded anchor bolt
AM-S-2	Shear	9.72	6.30	12.02	2,393	10.64		Anchor pulled out of stone.
AM-S-3	Shear	9.58	6.15	12.03	2,580	11.48		
AM-S-4	Shear	9.87	5.50	12.09	2,440	10.85		
AM-S-5	Shear	9.69	6.03	12.04	2,701	12.01		
<b>Average:</b>					<b>2,502</b>	<b>11.13</b>		
Standard Deviation:					134.4	0.60		
Coefficient of Variation:					5.4%	5.4%		

Trade Name: American Mist - 10mm - Granite				Load Direction Perpendicular to the Surface (Tension)			Anchor: H6 Keep-Nut®	
Specimen Number	Load Direction	Panel Thickness (mm)	Hole Depth (mm)	Hole Dia. (mm)	Load @ Failure (lbs-F)	Load @ Failure (kN)	Rate of Crosshead Travel	Mode of Failure
AM-T-1	Tension	9.79	5.58	12.03	795	3.54	0.085 to 0.095 in./min. (2.2 to 2.4 mm/min)	Anchor partially pulled from stone.
AM-T-2	Tension	9.78	5.86	12.02	856	3.81		
AM-T-3	Tension	9.63	5.92	12.07	719	3.20		
AM-T-4	Tension	9.84	5.89	12.01	782	3.48		
AM-T-5	Tension	9.68	5.56	12.10	752	3.35		
<b>Average:</b>					<b>781</b>	<b>3.47</b>		
Standard Deviation:					51.3	0.23		
Coefficient of Variation:					6.6%	6.6%		

Tests performed by: R. Lawson  
 Date of Testing: January 12, 2021  
 Date of Report: January 15, 2021  
 Reviewed by: C. Muehlbauer

These tests were performed on a Applied Testing Systems Universal Testing Machine Model 910. Tension loads were measured on Interface Model 1210AF-1K-B Load Cell, Serial No. 560894-A. Shear loads were measured on Interface Model 1020AF-12.5K-B Load Cell, Serial No. 561415A, Last Date of Calibration for both cells: May 27, 2020, traceable to the National Institute of Standards Technology (NIST).



# Laboratory Test Report

Contact # 84633

Test Specimens Provided by: SPECIALINSERT SRL  
 Via Monfalcone 144  
 10136 TORINO (ITALY)

Trade Name of Material: Lapitec Sintered Stone - 12 mm  
 Finish: polished  
 Country of Origin: Italy  
 Test Procedure: C1354 Strength of Individual Stone Anchorages in Dimension Stone  
 Riff Orientation: none specified  
 Preconditioning: none, room temperature

Trade Name: <b>Lapitec Sintered Stone - 12 mm</b>				Load Direction: <b>Parallel to the Surface (Shear)</b>			Anchor: <b>H6 Keep-Nut®</b>	
Specimen Number	Load Direction	Panel Thickness (mm)	Hole Depth (mm)	Hole Dia. (mm)	Load @ Failure (lbs-F)	Load @ Failure (kN)	Rate of Crosshead Travel	Mode of Failure
S-H6-1	Shear	12.44	7.49	12.05	1,505	6.69	0.085 to 0.095 in./min. (2.2 to 2.4 mm/min)	Stone fractured into multiple pieces.
S-H6-2	Shear	12.57	7.75	12.07	1,433	6.37		
S-H6-3	Shear	12.43	7.55	12.05	1,404	6.25		
S-H6-4	Shear	12.63	7.57	12.08	1,503	6.69		
S-H6-5	Shear	12.49	7.55	12.07	1,345	5.98		
<b>Average:</b>					<b>1,438</b>	<b>6.40</b>		
Standard Deviation:					68.1	0.30		
Coefficient of Variation:					4.7%	4.7%		

Trade Name: <b>Lapitec Sintered Stone - 12 mm</b>				Load Direction: <b>Perpendicular to the Surface (Tension)</b>			Anchor: <b>H6 Keep-Nut®</b>	
Specimen Number	Load Direction	Panel Thickness (mm)	Hole Depth (mm)	Hole Dia. (mm)	Load @ Failure (lbs-F)	Load @ Failure (kN)	Rate of Crosshead Travel	Mode of Failure
T-H6-1	Tension	12.66	7.71	12.07	473	2.10	0.085 to 0.095 in./min. (2.2 to 2.4 mm/min)	Anchor partially pulled from specimen. Stone fractured through entire length.
T-H6-2	Tension	12.68	7.49	12.01	392	1.74		
T-H6-3	Tension	12.62	7.65	12.06	444	1.98		
T-H6-4	Tension	12.52	7.44	12.02	404	1.80		
T-H6-5	Tension	12.63	7.61	12.03	466	2.07		
<b>Average:</b>					<b>436</b>	<b>1.94</b>		
Standard Deviation:					36.4	0.16		
Coefficient of Variation:					8.3%	8.3%		

Tests performed by: R. Lawson  
 Date of Testing: January 14, 2021  
 Date of Report: January 18, 2021  
 Reviewed by: C. Muehlbauer

These tests were performed on a Applied Testing Systems Universal Testing Machine Model 910. Tension loads were measured on Interface Model 1210AF-1K-B Load Cell, Serial No. 560894-A. Shear loads were measured on Interface Model 1020AF-12.5K-B Load Cell, Serial No. 561415A, Last Date of Calibration for both cells: May 27, 2020, traceable to the National Institute of Standards Technology (NIST).



# Laboratory Test Report

Contact # 84633

Test Specimens Provided by: SPECIALINSERT SRL  
 Via Monfalcone 144  
 10136 TORINO (ITALY)

Trade Name of Material: Lapitec Sintered Stone - 20 mm  
 Finish: polished  
 Country of Origin: Italy

Test Procedure: C1354 Strength of Individual Stone Anchorages in Dimension Stone  
 Rift Orientation: none specified  
 Preconditioning: none, room temperature

Trade Name: Lapitec Sintered Stone - 20 mm				Load Direction: Parallel to the Surface (Shear)			Anchor: H8 Keep-Nut®	
Specimen Number	Load Direction	Panel Thickness (mm)	Hole Depth (mm)	Hole Dia. (mm)	Load @ Failure (lbs-F)	Load @ Failure (kN)	Rate of Crosshead Travel	Mode of Failure
S-H8-1	Shear	20.64	10.05	12.03	2,347	10.44	0.085 to 0.095 in./min. (2.2 to 2.4 mm/min)	Anchor pulled out. Partial failure cone.
S-H8-2	Shear	20.57	10.15	12.04	2,475	11.01		
S-H8-3	Shear	20.81	10.37	12.07	2,400	10.68		
S-H8-4	Shear	20.87	10.36	12.03	2,325	10.34		
S-H8-5	Shear	20.86	10.47	12.05	2,147	9.55		
<b>Average:</b>					<b>2,339</b>	<b>10.40</b>		
Standard Deviation:					121.8	0.54		
Coefficient of Variation:					5.2%	5.2%		

Trade Name: Lapitec Sintered Stone - 20 mm				Load Direction: Perpendicular to the Surface (Tension)			Anchor: H8 Keep-Nut®	
Specimen Number	Load Direction	Panel Thickness (mm)	Hole Depth (mm)	Hole Dia. (mm)	Load @ Failure (lbs-F)	Load @ Failure (kN)	Rate of Crosshead Travel	Mode of Failure
T-H8-1	Tension	20.70	10.29	12.03	669	2.98	0.085 to 0.095 in./min. (2.2 to 2.4 mm/min)	Anchor partially pulled out.
T-H8-2	Tension	20.85	10.42	12.04	699	3.11		Anchor pulled out. Stone failed.
T-H8-3	Tension	21.00	10.49	12.07	797	3.55		Anchor partially pulled out.
T-H8-4	Tension	20.73	10.24	12.03	595	2.65		
T-H8-5	Tension	20.65	10.12	12.05	618	2.75		
<b>Average:</b>					<b>676</b>	<b>3.01</b>		
Standard Deviation:					79.3	0.35		
Coefficient of Variation:					11.7%	11.7%		

Tests performed by: R. Lawson  
 Date of Testing: January 14, 2021  
 Date of Report: January 18, 2021  
 Reviewed by: C. Muehlbauer

These tests were performed on a Applied Testing Systems Universal Testing Machine Model 910. Tension loads were measured on Interface Model 1210AF-1K-B Load Cell, Serial No. 560894-A. Shear loads were measured on Interface Model 1020AF-12.5K-B Load Cell, Serial No. 561415A, Last Date of Calibration for both cells: May 27, 2020, traceable to the National Institute of Standards Technology (NIST).

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# Laboratory Test Report

Contact # 84633

Test Specimens Provided by: SPECIALINSERT SRL  
 Via Monfalcone 144  
 10136 TORINO (ITALY)

Trade Name of Material: Lapitec Sintered Stone - 30 mm  
 Finish: polished  
 Country of Origin: Italy  
 Test Procedure: C1354 Strength of Individual Stone Anchorages in Dimension Stone  
 Rift Orientation: none specified  
 Preconditioning: none, room temperature

Trade Name: Lapitec Sintered Stone - 30 mm				Load Direction: Parallel to the Surface (Shear)			Anchor: H15 Keep-Nut®	
Specimen Number	Load Direction	Panel Thickness (mm)	Hole Depth (mm)	Hole Dia. (mm)	Load @ Failure (lbs-F)	Load @ Failure (kN)	Rate of Crosshead Travel	Mode of Failure
S-H15-1	Shear	31.05	17.28	11.94	2,439	10.85	0.085 to 0.095 in./min. (2.2 to 2.4 mm/min)	Anchor pulled from stone. Stone fractured into multiple pieces.
S-H15-2	Shear	31.02	16.42	12.04	2,702	12.02		Shear failure of threaded anchor bolt.
S-H15-3	Shear	31.07	16.50	12.05	2,626	11.68		
S-H15-4	Shear	31.02	16.83	12.05	2,825	12.57		
S-H15-5	Shear	31.12	16.44	12.05	2,537	11.29		
<b>Average:</b>					<b>2,626</b>	<b>11.68</b>		
Standard Deviation:					148.5	0.66		
Coefficient of Variation:					5.7%	5.7%		

Trade Name: Lapitec Sintered Stone - 30 mm				Load Direction: Perpendicular to the Surface (Tension)			Anchor: H15 Keep-Nut®	
Specimen Number	Load Direction	Panel Thickness (mm)	Hole Depth (mm)	Hole Dia. (mm)	Load @ Failure (lbs-F)	Load @ Failure (kN)	Rate of Crosshead Travel	Mode of Failure
T-H15-1	Tension	30.95	16.42	12.06	1,323	5.88	0.085 to 0.095 in./min. (2.2 to 2.4 mm/min)	All stones fractured through anchor hole.
T-H15-2	Tension	30.89	16.52	12.06	1,636	7.28		
T-H15-3	Tension	30.84	16.34	12.05	1,385	6.16		
T-H15-4	Tension	30.90	16.35	12.04	1,675	7.45		
T-H15-5	Tension	30.92	16.32	12.06	1,640	7.30		
<b>Average:</b>					<b>1,532</b>	<b>6.81</b>		
Standard Deviation:					164.5	0.73		
Coefficient of Variation:					10.7%	10.7%		

Tests performed by: R. Lawson  
 Date of Testing: January 14, 2021  
 Date of Report: January 18, 2021  
 Reviewed by: C. Muehlbauer

These tests were performed on a Applied Testing Systems Universal Testing Machine Model 910. Loads were measured on Interface Model 1020AF-12.5K-B Load Cell, Serial No. 561415A, Last date of calibration: May 27, 2020, traceable to the National Institute of Standards Technology (NIST).



# Laboratory Test Report

Contact # 84633

Client: Specialinsert srl/ Chemical Concepts  
 Trade Name of Material: Neolith Sintered Stone  
 Finish: various  
 Country of Origin: Spain  
 Test Procedure: C1354 Strength of Individual Stone Anchorages in Dimension Stone  
 Rift Orientation: n/a  
 Preconditioning: none, room temperature  
 Load: Tension

Trade Name: <b>Neolith Sintered Stone - light colors - 12 mm</b>				Load Direction: <b>Perpendicular to the Surface (Tension)</b>			Anchor: <b>H6 Keep-Nut®</b>		
Specimen Number	Load Direction	Panel Thickness (mm)	Hole Depth (mm)	Hole Dia. (mm)	Load @ Failure (lbs-F)	Load @ Failure (kN)	Rate of Crosshead Travel	Mode of Failure	
H6-Lt-T-1	Tension	13.08	8.72	12.01	497	2.21	0.075 to 0.085 in./min. (1.9 to 2.2 mm/min)	Stone fractured through anchor hole.	
H6-Lt-T-2	Tension	12.97	8.26	12.00	418	1.86			
H6-Lt-T-3	Tension	13.08	8.65	12.01	464	2.06			
H6-Lt-T-4	Tension	12.02	7.49	12.01	208	0.93			
H6-Lt-T-5	Tension	12.03	7.38	12.01	353	1.57			
H6-Lt-T-6	Tension	12.30	7.62	12.01	430	1.91			
H6-Lt-T-7	Tension	12.41	7.62	12.01	432	1.92			
<b>Average:</b>					<b>400</b>	<b>1.78</b>			
Standard Deviation:					95.6	0.43			
Coefficient of Variation:					23.9%	23.9%			

Trade Name: <b>Neolith Sintered Stone - light colors - 12 mm</b>				Load Direction: <b>Parallel to the Surface (Shear)</b>			Anchor: <b>H6 Keep-Nut®</b>		
Specimen Number	Load Direction	Panel Thickness (mm)	Hole Depth (mm)	Hole Dia. (mm)	Load @ Failure (lbs-F)	Load @ Failure (kN)	Rate of Crosshead Travel	Mode of Failure	
H6-Lt-S-1	Shear	12.33	7.20	12.01	1,681	7.48	0.075 to 0.085 in./min. (1.9 to 2.2 mm/min)	Stone fractured through anchor hole.	
H6-Lt-S-2	Shear	12.23	7.50	12.01	1,491	6.63			
H6-Lt-S-3	Shear	12.01	7.52	12.01	1,121	4.99			
H6-Lt-S-4	Shear	11.80	7.65	12.01	1,344	5.98			
H6-Lt-S-5	Shear	12.96	8.46	12.01	2,181	9.71			
H6-Lt-S-6	Shear	12.98	8.20	12.00	2,535	11.28			
H6-Lt-S-7	Shear	12.77	8.12	12.00	2,369	10.54			
<b>Average:</b>					<b>1,817</b>	<b>8.09</b>			
Standard Deviation:					545.5	2.43			
Coefficient of Variation:					30.0%	30.0%			

Tests performed by: R. Lawson  
 Date of Testing: Monday, March 8, 2021  
 Date of Report: Thursday, March 11, 2021  
 Reviewed by: C. Muehlbauer

These tests were performed on a Applied Testing Systems Universal Testing Machine Model 910. Tension loads were measured on Interface Model 1210AF-1K-B Load Cell, Serial No. 560894-A. Shear loads were measured on Interface Model 1020AF-12.5K-B Load Cell, Serial No. 561415A, Last Date of Calibration for both cells: May 27, 2020, traceable to the National Institute of Standards Technology (NIST).



# Laboratory Test Report

Contact # 84633

Client: Specialinsert srl/ Chemical Concepts  
 Trade Name of Material: Neolith Sintered Stone  
 Finish: various  
 Country of Origin: Spain  
 Test Procedure: C1354 Strength of Individual Stone Anchorages in Dimension Stone  
 Rift Orientation: n/a  
 Preconditioning: none, room temperature  
 Load: Tension

Trade Name: <b>Neolith Sintered Stone - dark colors - 12 mm</b>				Load Direction: <b>Perpendicular to the Surface (Tension)</b>			Anchor: <b>H6 Keep-Nut®</b>		
Specimen Number	Load Direction	Panel Thickness (mm)	Hole Depth (mm)	Hole Dia. (mm)	Load @ Failure (lbs-F)	Load @ Failure (kN)	Rate of Crosshead Travel	Mode of Failure	
H6-Dk-T-1	Tension	12.50	7.74	12.00	268	1.19	0.075 to 0.085 in./min. (1.9 to 2.2 mm/min)	Stone fractured through anchor hole.	
H6-Dk-T-2	Tension	12.40	7.87	12.01	480	2.14			
H6-Dk-T-3	Tension	11.93	7.02	12.00	501	2.23			
H6-Dk-T-4	Tension	12.34	7.31	12.01	325	1.45			
H6-Dk-T-4	Tension	11.92	7.12	12.01	396	1.76			
<b>Average:</b>					<b>394</b>	<b>1.75</b>			
Standard Deviation:					99.4	0.44			
Coefficient of Variation:					25.2%	25.2%			

Trade Name: <b>Neolith Sintered Stone - dark colors - 12 mm</b>				Load Direction: <b>Parallel to the Surface (Shear)</b>			Anchor: <b>H6 Keep-Nut®</b>		
Specimen Number	Load Direction	Panel Thickness (mm)	Hole Depth (mm)	Hole Dia. (mm)	Load @ Failure (lbs-F)	Load @ Failure (kN)	Rate of Crosshead Travel	Mode of Failure	
H6-Dk-S-1	Shear							Fractured during set-up.	
H6-Dk-S-2	Shear	12.74	8.60	12.00	1,923	8.56	0.075 to 0.085 in./min. (1.9 to 2.2 mm/min)	Stone fractured through anchor hole.	
H6-Dk-S-3	Shear	12.75	8.37	12.01	1,909	8.50			
H6-Dk-S-4	Shear	12.77	8.17	12.01	2,036	9.06			
H6-Dk-S-5	Shear							Broken when received.	
<b>Average:</b>					<b>1,956</b>	<b>8.70</b>			
Standard Deviation:					69.6	0.31			
Coefficient of Variation:					3.6%	3.6%			

Tests performed by: R. Lawson  
 Date of Testing: Monday, March 8, 2021  
 Date of Report: Thursday, March 11, 2021  
 Reviewed by: C. Muehlbauer

These tests were performed on a Applied Testing Systems Universal Testing Machine Model 910. Tension loads were measured on Interface Model 1210AF-1K-B Load Cell, Serial No. 560894-A. Shear loads were measured on Interface Model 1020AF-12.5K-B Load Cell, Serial No. 561415A, Last Date of Calibration for both cells: May 27, 2020, traceable to the National Institute of Standards Technology (NIST).



# Laboratory Test Report

Contact # 84633

Client: Specialinsert srl/ Chemical Concepts  
 Trade Name of Material: Neolith Sintered Stone  
 Finish: various  
 Country of Origin: Spain  
 Test Procedure: C1354 Strength of Individual Stone Anchorages in Dimension Stone  
 Rift Orientation: n/a  
 Preconditioning: none, room temperature  
 Load: Shear

Trade Name: <b>Neolith Sintered Stone - Aspen Grey - 20 mm</b>				Load Direction: <b>Perpendicular to the Surface (Tension)</b>			Anchor: <b>H8 Keep-Nut®</b>	
Specimen Number	Load Direction	Panel Thickness (mm)	Hole Depth (mm)	Hole Dia. (mm)	Load @ Failure (lbs-F)	Load @ Failure (kN)	Rate of Crosshead Travel	Mode of Failure
H8-Dk-T-6	Tension	19.67	8.21	12.01	804	3.58	0.075 to 0.085 in./min. (1.9 to 2.2 mm/min)	Stone fractured through anchor hole.  Asymmetrical pull out cone.
H8-Dk-T-7	Tension	19.69	8.57	12.01	846	3.76		
H8-Dk-T-8	Tension	19.39	8.12	12.00	893	3.97		
H8-Dk-T-9	Tension	19.49	8.47	12.00	616	2.74		
H8-Dk-T-10	Tension	19.82	8.55	12.01	870	3.87		
<b>Average:</b>					<b>806</b>	<b>3.59</b>		
Standard Deviation:					111.1	0.49		
Coefficient of Variation:					13.8%	13.8%		

Trade Name: <b>Neolith Sintered Stone - Aspen Grey - 20 mm</b>				Load Direction: <b>Parallel to the Surface (Shear)</b>			Anchor: <b>H8 Keep-Nut®</b>	
Specimen Number	Load Direction	Panel Thickness (mm)	Hole Depth (mm)	Hole Dia. (mm)	Load @ Failure (lbs-F)	Load @ Failure (kN)	Rate of Crosshead Travel	Mode of Failure
H8-Dk-S-1	Shear	19.54	8.37	12.01	2,520	11.21	0.075 to 0.085 in./min. (1.9 to 2.2 mm/min)	Stone fractured through anchor hole.
H8-Dk-S-2	Shear	19.73	8.26	12.01	2,555	11.37		
H8-Dk-S-3	Shear	19.50	8.25	12.00	2,439	10.85		
H8-Dk-S-4	Shear	19.83	9.20	12.01	2,567	11.42		
H8-Dk-S-5	Shear	19.62	9.35	12.01	2,803	12.47		
<b>Average:</b>					<b>2,577</b>	<b>11.47</b>		
Standard Deviation:					136.0	0.61		
Coefficient of Variation:					5.3%	5.3%		

Tests performed by: R. Lawson  
 Date of Testing: Monday, March 8, 2021  
 Date of Report: Thursday, March 11, 2021  
 Reviewed by: C. Muehlbauer

These tests were performed on a Applied Testing Systems Universal Testing Machine Model 910. Tension loads were measured on Interface Model 1210AF-1K-B Load Cell, Serial No. 560894-A. Shear loads were measured on Interface Model 1020AF-12.5K-B Load Cell, Serial No. 561415A, Last Date of Calibration for both cells: May 27, 2020, traceable to the National Institute of Standards Technology (NIST).



# Laboratory Test Report

DATE of Report: 28 May, 2020

Project Number:

Test Specimens Provided by: Chemical Concepts/Specialinsert

## Test Data Tables

Trade Name of Material:			Anchor Type:			Date Tested:		
SapienStone			H6 Keep-Nut®			04 November, 2019		
Specimen Number	Load Direction	Panel Thickness (mm)	Hole Depth (mm)	Hole Diameter (mm)	Load @ Failure (lbs-F)	Load @ Failure (kN)	Rate of Crosshead Travel	Mode of Failure
1	Tensile	12.67	6.5 mm (Tolerance of +1.0, -0.0 verified by "go/no-go" Gauge)	12 mm (Tolerance verified by "go/no-go" Gauge)	677	3.01	0.075 to 0.085 in./min. (1.9 to 2.2 mm/min)	Specimen failure - flexural fractures radiating from anchor hole on back face.
2	Tensile	12.61			639	2.84		
3	Tensile	12.63			604	2.69		
4	Tensile	12.67			590	2.63		
5	Tensile	12.63			560	2.49		
<b>Average:</b>					<b>614</b>	<b>2.73</b>		
Standard Deviation:					45.2	0.20		
Coefficient of Variation:					7.4%	7.4%		

Trade Name of Material:			Anchor Type:			Date Tested:		
SapienStone			H6 Keep-Nut®			04 November, 2019		
Specimen Number	Load Direction	Panel Thickness (mm)	Hole Depth (mm)	Hole Diameter (mm)	Load @ Failure (lbs-F)	Load @ Failure (kN)	Rate of Crosshead Travel	Mode of Failure
1	Shear	12.67	6.5 mm (Tolerance of +1.0, -0.0 verified by "go/no-go" Gauge)	12 mm (Tolerance verified by "go/no-go" Gauge)	1,685	7.50	0.075 to 0.085 in./min. (1.9 to 2.2 mm/min)	Shear failure of bolt shaft.
2	Shear	12.63			1,690	7.52		
3	Shear	12.71			1,698	7.56		
4	Shear	12.70			1,703	7.58		
5	Shear	12.65			1,576	7.01		
<b>Average:</b>					<b>1,670</b>	<b>7.43</b>		
Standard Deviation:					53.2	0.24		
Coefficient of Variation:					3.2%	3.2%		



# Laboratory Test Report

Contact # 84633

Client: Specialinsert srl/ Chemical Concepts  
 \*Trade Name of Material: Crossville Porcelain / Notorious / Femme Fatale  
 \*Finish: Unpolished with Cross-Sheen®  
 \*Country of Origin: Italy  
 Test Procedure: C1354 Strength of Individual Stone Anchorages in Dimension Stone  
 Rift Orientation: n/a  
 Preconditioning: none, room temperature  
 Load: see below  
 \* Stone identification information provided by client.

Trade Name: Crossville Porcelain Notorious "Femme Fatale" 12.5 mm				Load Direction: Perpendicular to the Surface (Tension)			Anchor: H6 Keep-Nut®	
Specimen Number	Load Direction	Panel Thickness (mm)	Hole Depth (mm)	Hole Dia. (mm)	Load @ Failure (lbs-F)	Load @ Failure (kN)	Rate of Crosshead Travel	Mode of Failure
H6-FF-T-1	Tension	12.50	6.03	12.01	487	2.17	0.075 to 0.085 in./min. (1.9 to 2.2 mm/min)	Porcelain failure with cracks radiating from anchor.
H6-FF-T-2	Tension	12.50	6.17	12.11	529	2.35		
H6-FF-T-3	Tension	12.50	6.93	12.12	568	2.53		
H6-FF-T-4	Tension	12.50	6.59	12.12	513	2.28		
H6-FF-T-5	Tension	12.50	6.57	12.03	580	2.58		
H6-FF-T-6	Tension	12.50	6.47	12.03	524	2.33		
H6-FF-T-7	Tension	12.50	6.36	12.04	558	2.48		
H6-FF-T-8	Tension	12.50	6.58	12.06	522	2.32		
H6-FF-T-9	Tension	12.50	6.25	12.06	515	2.29		
H6-FF-T-10	Tension	12.50	6.32	12.05	617	2.75		
<b>Average:</b>					<b>541</b>	<b>2.41</b>		
Standard Deviation:					38.7	0.17		
Coefficient of Variation:					7.2%	7.2%		

Trade Name: Crossville Porcelain Notorious "Femme Fatale" 12.5 mm				Load Direction: Parallel to the Surface (Shear)			Anchor: H6 Keep-Nut®	
Specimen Number	Load Direction	Panel Thickness (mm)	Hole Depth (mm)	Hole Dia. (mm)	Load @ Failure (lbs-F)	Load @ Failure (kN)	Rate of Crosshead Travel	Mode of Failure
H6-FF-S-1	Shear	12.50	6.45	12.14	2,014	8.96	0.075 to 0.085 in./min. (1.9 to 2.2 mm/min)	Porcelain failure. Anchor bolt bent.
H6-FF-S-2	Shear	12.50	6.24	12.08	2,203	9.80		
H6-FF-S-3	Shear	12.50	6.73	12.08	2,080	9.26		
H6-FF-S-4	Shear	12.50	6.54	12.08	1,995	8.88		
H6-FF-S-5	Shear	12.50	6.60	12.16	2,507	11.16		
H6-FF-S-6	Shear	12.50	6.11	12.02	1,919	8.54		
H6-FF-S-7	Shear	12.50	6.70	12.05	2,330	10.37		
H6-FF-S-8	Shear	12.50	6.25	12.04	2,307	10.27		
H6-FF-S-9	Shear	12.50	6.35	12.15	2,322	10.33		
H6-FF-S-10	Shear	12.50	6.63	12.13	2,394	10.65		
<b>Average:</b>					<b>2,207</b>	<b>9.82</b>		
Standard Deviation:					195.7	0.87		
Coefficient of Variation:					8.9%	8.9%		

Tests performed by: R. Lawson  
 Date of Testing: Tuesday, July 6, 2021  
 Date of Report: Tuesday, July 20, 2021  
 Reviewed by: C. Muehlbauer

These tests were performed on a Applied Testing Systems Universal Testing Machine Model 910. Tension loads were measured on Interface Model 1210AF-1K-B Load Cell, Serial No. 1181515A. Shear loads were measured on Interface Model 1020AF-12.5K-B Load Cell, Serial No. 561415A, Last Date of Calibration for both cells: May 24, 2021, traceable to the National Institute of Standards Technology (NIST).



# Laboratory Test Report

DATE of Report: 28 May, 2020

Project Number:

Test Specimens Provided by: Chemical Concepts/Specialinsert

## Test Data Tables

Trade Name of Material: Envel™			Anchor Type: H8 Keep-Nut®			Date Tested: 04 November, 2019		
Specimen Number	Load Direction	Panel Thickness (mm)	Hole Depth (mm)	Hole Diameter (mm)	Load @ Failure (lbs-F)	Load @ Failure (kN)	Rate of Crosshead Travel	Mode of Failure
1	Tensile	15.93	9 mm (Tolerance of +1.0, -0.0 verified by "go/no-go" Gauge)	12 mm (Tolerance verified by "go/no-go" Gauge)	438	1.95	0.075 to 0.085 in./min. (1.9 to 2.2 mm/min)	no visible failure.
2	Tensile	15.35			394	1.75		cracks radiating from anchor hole.
3	Tensile	15.52			496	2.21		anchor partially pulled from specimen. cracks radiating from anchor partially pulled from specimen.
4	Tensile	15.47			416	1.85		anchor partially pulled from specimen.
5	Tensile	15.52			457	2.03		anchor partially pulled from specimen.
<b>Average:</b>					<b>440</b>	<b>1.96</b>		
Standard Deviation:					39.1	0.17		
Coefficient of Variation:					8.9%	8.9%		

Trade Name of Material: Envel™			Anchor Type: H8 Keep-Nut®			Date Tested: 04 November, 2019		
Specimen Number	Load Direction	Panel Thickness (mm)	Hole Depth (mm)	Hole Diameter (mm)	Load @ Failure (lbs-F)	Load @ Failure (kN)	Rate of Crosshead Travel	Mode of Failure
1	Shear	15.57	9 mm (Tolerance of +1.0, -0.0 verified by "go/no-go" Gauge)	12 mm (Tolerance verified by "go/no-go" Gauge)	1,568	6.98	0.075 to 0.085 in./min. (1.9 to 2.2 mm/min)	Shear failure of bolt shaft and anchor partially dislodged.
2	Shear	15.30			1,432	6.37		Anchor completely dislodged.
3	Shear	15.52			1,621	7.21		Anchor completely dislodged.
4	Shear	15.26			1,555	6.92		Shear failure of bolt shaft and anchor partially dislodged.
5	Shear	15.36			1,647	7.33		Anchor completely dislodged.
<b>Average:</b>					<b>1,565</b>	<b>6.96</b>		
Standard Deviation:					83.2	0.37		
Coefficient of Variation:					5.3%	5.3%		



# Laboratory Test Report

DATE of Report: 28 May, 2020

Project Number:

Test Specimens Provided by: Chemical Concepts/Specialinsert

## Test Data Tables

<b>STONES IN THIS GROUP WERE PRECONDITIONED TO 75 FREEZE/THAW CYCLES PRIOR TO TESTING</b>								
Trade Name of Material: 15.8mm Envel®				Anchor Type: H8 Keep-Nut®			Date Tested: 20 April, 2020	
Specimen Number	Load Direction	Panel Thickness (mm)	Hole Depth (mm)	Hole Diameter (mm)	Load @ Failure (lbs-F)	Load @ Failure (kN)	Rate of Crosshead Travel	Mode of Failure
1	Tensile	15.16	8.24	12.06	387	1.72	0.075 to 0.085 in./min. (1.9 to 2.2 mm/min)	Anchor partially pulled from specimen. Cracks radiating from
2	Tensile	14.43	8.29	12.14	442	1.97		Anchor partially pulled from specimen. No visible cracks.
3	Tensile	14.39	8.40	12.03	362	1.61		Anchor partially pulled from specimen. Cracks radiating from
4	Tensile	15.62	8.57	12.02	421	1.87		Anchor partially pulled from specimen. No visible cracks.
5	Tensile	15.61	8.30	12	385	1.71		
<b>Average:</b>					<b>399</b>	<b>1.78</b>		
Standard Deviation:					31.8	0.14		
Coefficient of Variation:					8.0%	8.0%		

<b>STONES IN THIS GROUP WERE PRECONDITIONED TO 75 FREEZE/THAW CYCLES PRIOR TO TESTING</b>								
Trade Name of Material: 15.8mm Envel®				Anchor Type: H8 Keep-Nut®			Date Tested: 20 April, 2020	
Specimen Number	Load Direction	Panel Thickness (mm)	Hole Depth (mm)	Hole Diameter (mm)	Load @ Failure (lbs-F)	Load @ Failure (kN)	Rate of Crosshead Travel	Mode of Failure
1	Shear	15.37	8.44	12.03	1,699	7.56	0.075 to 0.085 in./min. (1.9 to 2.2 mm/min)	Anchor pulled from specimen.
2	Shear	15.78	8.39	11.95	1,449	6.45		Anchor pulled from specimen, cracking specimen.
3	Shear	15.19	8.24	11.88	1,522	6.77		Anchor pulled from specimen.
4	Shear	15.49	8.35	12.05	1,632	7.26		Anchor pulled from specimen.
5	Shear	15.20	8.52	12.01	1,484	6.60		Shear failure of threaded anchor bolt.
<b>Average:</b>					<b>1,557</b>	<b>6.93</b>		
Standard Deviation:					104.9	0.47		
Coefficient of Variation:					6.7%	6.7%		



# Laboratory Test Report

DATE of Report: 28 May, 2020

Project Number:

Test Specimens Provided by: Chemical Concepts/Specialinsert

## Test Data Tables

Trade Name of Material: Envel™			Anchor Type: H15 Keep-Nut®			Date Tested: 04 November, 2019		
Specimen Number	Load Direction	Panel Thickness (mm)	Hole Depth (mm)	Hole Diameter (mm)	Load @ Failure (lbs-F)	Load @ Failure (kN)	Rate of Crosshead Travel	Mode of Failure
1	Tensile	18.86	15.5 mm (Tolerance of +1.0, -0.0 verified by "go/no-go" Gauge)	12 mm (Tolerance verified by "go/no-go" Gauge)	556	2.47	0.075 to 0.085 in./min. (1.9 to 2.2 mm/min)	anchor pulled from specimen - cracks radiating from anchor hole.
2	Tensile	18.82			482	2.14		anchor partially pulled from specimen - cracks radiating from
3	Tensile	19.10			585	2.60		cracks radiating from anchor hole.
4	Tensile	18.84			665	2.96		anchor partially pulled from specimen - cracks radiating from
5	Tensile	19.18			718	3.20		anchor partially pulled from specimen - cracks radiating from
<b>Average:</b>					<b>601</b>	<b>2.68</b>		
Standard Deviation:					92.5	0.41		
Coefficient of Variation:					15.4%	15.4%		

Trade Name of Material: Envel™			Anchor Type: H15 Keep-Nut®			Date Tested: 04 November, 2019		
Specimen Number	Load Direction	Panel Thickness (mm)	Hole Depth (mm)	Hole Diameter (mm)	Load @ Failure (lbs-F)	Load @ Failure (kN)	Rate of Crosshead Travel	Mode of Failure
1	Shear	19.20	15.5 mm (Tolerance of +1.0, -0.0 verified by "go/no-go" Gauge)	12 mm (Tolerance verified by "go/no-go" Gauge)	1,660	7.39	0.075 to 0.085 in./min. (1.9 to 2.2 mm/min)	Shear failure of bolt shaft and flexural cracking on back face of test specimen.
2	Shear	19.09			1,659	7.38		
3	Shear	19.13			1,516	6.75		
4	Shear	19.13			1,531	6.81		
5	Shear	18.77			1,590	7.08		
<b>Average:</b>					<b>1,591</b>	<b>7.08</b>		
Standard Deviation:					68.2	0.30		
Coefficient of Variation:					4.3%	4.3%		



# Laboratory Test Report

DATE of Report: 28 May, 2020

Project Number:

Test Specimens Provided by: Chemical Concepts/Specialinsert

## Test Data Tables

<b>STONES IN THIS GROUP WERE PRECONDITIONED TO 75 FREEZE/THAW CYCLES PRIOR TO TESTING</b>								
Trade Name of Material: 19mm Envel®				Anchor Type: H15 Keep-Nut®			Date Tested: 20 April, 2020	
Specimen Number	Load Direction	Panel Thickness (mm)	Hole Depth (mm)	Hole Diameter (mm)	Load @ Failure (lbs-F)	Load @ Failure (kN)	Rate of Crosshead Travel	Mode of Failure
1	Tensile	18.72	15.19	11.96	560	2.49	0.075 to 0.085 in./min. (1.9 to 2.2 mm/min)	Anchor partially pulled from specimen. Cracks radiating from anchor hole.
2	Tensile	19.15	15.22	11.98	628	2.79		
3	Tensile	19.21	15.22	12.02	629	2.80		
4	Tensile	19.14	14.97	12.06	663	2.95		
5	Tensile	18.98	15.02	12	664	2.95		
<b>Average:</b>					<b>629</b>	<b>2.80</b>		
Standard Deviation:					42.3	0.19		
Coefficient of Variation:					6.7%	6.7%		

<b>STONES IN THIS GROUP WERE PRECONDITIONED TO 75 FREEZE/THAW CYCLES PRIOR TO TESTING</b>								
Trade Name of Material: 19mm Envel®				Anchor Type: H15 Keep-Nut®			Date Tested: 20 April, 2020	
Specimen Number	Load Direction	Panel Thickness (mm)	Hole Depth (mm)	Hole Diameter (mm)	Load @ Failure (lbs-F)	Load @ Failure (kN)	Rate of Crosshead Travel	Mode of Failure
1	Shear	19.13	14.90	12.01	1,654	7.36	0.075 to 0.085 in./min. (1.9 to 2.2 mm/min)	Shear failure of threaded anchor bolt and cracked specimen.
2	Shear	18.84	15.25	12.01	1,462	6.51		
3	Shear	19.14	15.07	12.03	1,576	7.01		
4	Shear	18.76	15.14	11.88	1,613	7.18		
5	Shear	19.17	15.22	12.07	1,549	6.89		
<b>Average:</b>					<b>1,571</b>	<b>6.99</b>		
Standard Deviation:					72.5	0.32		
Coefficient of Variation:					4.6%	4.6%		



**Please contact us with any additional questions.  
We are happy to help!**

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