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QUALITY STONE QUARRIES LLC  
792 EAST MAIN STREET  
LEWISVILLE TX 75033-3356  
USA



Analysis No.	TS-S&T1901752
Report Date	28 January 2019
Quarry/Fabricator	Same
Date Sampled	08 January 2019
Where Sampled	Lewisville, TX USA
Sample Received	14 January 2019
Sampled By	Client

This is to attest that we have examined Natural Stone identified: Azul Blue Sandstone

When examined to the applicable requirements of:

ASTM C 97-15	"Standard Test Method for Absorption and Bulk Specific Gravity of Dimensional Stone"
ASTM C 99-15	"Standard Test Method for Modulus of Rupture of Dimensional Stone"
ASTM C 170-15	"Standard Test Method for Compressive Strength of Dimensional Stone"
ASTM C1353-15 <sup>1</sup>	"Standard Test Method for Abrasion Resistance of Dimension Stone Subjected to Foot Traffic Using a Rotary Platform Abraser"
ASTM C 880-15	"Standard Test Method for Flexural Strength of Dimension Stone"

The material has the following average properties:

Average % Absorption	2.12
Average Bulk Specific Gravity	149.5 lbs/ft <sup>3</sup> 2 396 kg/m <sup>3</sup>
Modulus of Rupture Perpendicular	Dry 1 500 psi
Compressive Strength Perpendicular	Dry 18 600 psi
Abrasion Resistance	9.9 lw
Flexural Strength Perpendicular	Dry 1 400 psi

<sup>1</sup>NOTE: For Igneous Samples we run ASTM C 241 for Sedimentary and Metamorphic Samples we run ASTM C 1353

END OF ANALYSIS

The attached Report of Test is an integral portion of this Summation Certificate.

Merrill Gee P.E. – Engineer in Charge



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Analysis No.	TS-S&T1901751
Report Date	28 January 2019
Quarry/Fabricator	Same
Date Sampled	08 January 2019
Where Sampled	Lewisville, TX USA
Sample Received	14 January 2019
Sampled By	Client

This is to attest that we have examined Natural Stone identified: Hazelnut Brown Sandstone

When examined to the applicable requirements of:

ASTM C 97-15	"Standard Test Method for Absorption and Bulk Specific Gravity of Dimensional Stone"
ASTM C 99-15	"Standard Test Method for Modulus of Rupture of Dimensional Stone"
ASTM C 170-15	"Standard Test Method for Compressive Strength of Dimensional Stone"
ASTM C1353-15 <sup>1</sup>	"Standard Test Method for Abrasion Resistance of Dimension Stone Subjected to Foot Traffic Using a Rotary Platform Abraser"
ASTM C 880-15	"Standard Test Method for Flexural Strength of Dimension Stone"

The material has the following average properties:

Average % Absorption	2.30
Average Bulk Specific Gravity	148.1 lbs/ft <sup>3</sup> 2 373 kg/m <sup>3</sup>

Modulus of Rupture Perpendicular	Dry	1 500 psi
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Compressive Strength Perpendicular	Dry	18 300 psi
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Abrasion Resistance	9.8 lw
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<sup>1</sup>NOTE: For Igneous Samples we run ASTM C 241 for Sedimentary and Metamorphic Samples we run ASTM C 1353

Flexural Strength Perpendicular	Dry	1 400 psi
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END OF ANALYSIS

The attached Report of Test is an integral portion of this Summation Certificate.

Merrill Gee P.E. – Engineer in Charge



## **ASTM STANDARDS**

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### REFERENCES

- A. ASTM A 82 – Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
- B. ASTM A 153 – Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- C. ASTM A 580 – Standard Specification for Stainless Steel Wire.
- D. ASTM A 666 – Standard Specification for Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
- E. ASTM C 91 – Standard Specification for Masonry Cement.
- F. ASTM C 97 – Standard Specification for Absorption and Bulk Specific Gravity of Dimensional Stone.
- G. ASTM C 144 – Aggregate for Masonry Mortar.
- H. ASTM C 150 – Standard Specification for Portland Cement.
- I. ASTM C 170 – Standard Specification for Compressive Strength of Dimensional Stone.
- J. ASTM C 270 – Mortar for Unit Masonry.
- K. ASTM C 568 – Standard Specification for Limestone Dimensional Stone.
- L. ASTM C 780 – Preconstruction Evaluation of Mortar for Plain & Reinforced Masonry.
- M. ASTM C 880 – Standard Specification for Flexural Strength of Dimensional Stone.
- N. ACI 530/ASCE 5/TMS 402 – Building Code Requirements for Masonry Structures.
- O. ACI 530.1/ASCE 6/TMS 602 – Specifications for Masonry Structures.
- P. National Concrete Masonry Association TEK 8-2A for masonry cleaning.

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### DESIGN/PERFORMANCE REQUIREMENTS

- A. Design Requirements: Perform Work in accordance with ACI530/ASCE 5/TMS 402 Building Code Requirements for Masonry Structures, ACI 530.1/ASCE 6/TMS 602 Specifications for Masonry Structures and the applicable Building Code.
- B. Design foundations, supporting walls, anchorage, spans, fastening, and joints under direct supervision of Professional Engineer experienced in design of this work and licensed at project location.





QUALITY  
STONE  
QUARRIES

## **SUBMITTALS**

- A. Manufacturers data sheets on each product to be used, including:
  - 1) Preparation instructions and recommendations.
  - 2) Storage and handling requirements and recommendations.
  - 3) Installation Methods.
- B. Design Data: Submit design mix when Property specification of ASTM C270 is to be used, with required environmental conditions, and admixture limitations.
- C. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- D. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
  - 1) Size: 4 foot x 4 foot
  - 2) Include all stone unit types and sizes to be used including a typical corner condition, special shapes and mortar joint treatment.  
Clean the sample panel using the same materials and tools as planned for the final stone masonry construction.
  - 3) Do not proceed with remaining work until workmanship is approved by Architect.
  - 4) Do not remove sample panel until construction activities of this section have been approved by the Architect.

## **QUALITY ASSURANCE**

- A. Preconstruction Meetings: Conduct preconstruction meetings including the Architect, Contractor, Stone Masonry Contractor, and the Flashing Contractor to verify project requirements, substrate conditions, manufacturer's installation instructions and other requirements.

## **DELIVERY, STORAGE, AND HANDLING**

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store stone materials on pallets on a dry level surface. Pallets shall not be stacked and shall be covered with tarps.
- C. Store mortar materials under cover and in an area where temperature is maintained between 40 degrees F to 110 degrees F.

## **PROJECT CONDITIONS**

- A. Hot and Cold Weather Requirements: In accordance with ACI 530.1/ASCE 6/TMS 602 Specifications for Masonry Structures.

- B. Ambient temperature shall be 40 degrees F or above during erection of stone masonry. When ambient temperature falls below 50 degrees F, mortar mixing water shall be heated.



## **PRODUCTS**

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Style: Quality Stone - Hazelnut Chopped

- 1) Heights: 4" - 8"
- 2) Lengths: 8 inches to 31 inches
- 3) Nominal Thickness: 3 inches to 5 inches
- 4) Color: Tan, Chocolate, Cream, Cinnamon

Style: Quality Stone – Hazelnut Chopped

- 1) Heights: 3" - 8"
- 2) Lengths: 8 inches to 24 inches
- 3) Nominal Thickness: 3 inches to 5 inches
- 4) Color: Tan, Chocolate, Cream, Cinnamon

Style: Quality Stone – Hazelnut Chopped

- 1) Heights: 5"
- 2) Lengths: 8 inches to 24 inches
- 3) Nominal Thickness: 4 inches
- 4) Color: Tan, Chocolate, Cream, Cinnamon

Style: Quality Stone – Hazelnut Squares/Recs

- 1) Heights: 4" - 14"
- 2) Lengths: 8 inches to 18"
- 3) Nominal Thickness: 3 inches to 5 inches
- 4) Color: Tan, Chocolate, Cream, Cinnamon

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Style: Quality Stone – Hazelnut Squares/Recs

- 1) Heights: 4" - 14"
- 2) Lengths: 8 inches to 18 inches
- 3) Nominal Thickness: 2 ½ inches
- 4) Color: Tan, Chocolate, Cream, Cinnamon

Style: Quality Stone – Hazelnut Squares/Recs

- 1) Heights: 4" - 14"
- 2) Lengths: 8 inches to 18 inches
- 3) Nominal Thickness: 5 inches

- 4) Color: Tan, Chocolate, Cream, Cinnamon

Style: Quality Stone – Hazelnut Random Builders

- 1) Heights: Irregular
- 2) Lengths: Irregular
- 3) Nominal Thickness: 3 inches to 5 inches
- 4) Color: Tan, Chocolate, Cream, Cinnamon

Style: Quality Stone – Hazelnut 1" Minus Patio

- 1) Heights: Irregular
- 2) Lengths: Irregular
- 3) Nominal Thickness: 1 inch minus
- 4) Color: Tan, Chocolate, Cream, Cinnamon

Style: Quality Stone – Hazelnut 1 ½" Patio

- 1) Heights: Irregular
- 2) Lengths: Irregular
- 3) Nominal Thickness: 1 inch – 1 ¾ inch
- 4) Color: Tan, Chocolate, Cream, Cinnamon

Style: Quality Stone – Hazelnut 2" Patio

- 1) Heights: Irregular
- 2) Lengths: Irregular
- 3) Nominal Thickness: 1 ¾ inch – 2 ¼ inch
- 4) Color: Tan,

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Style: Quality Stone – Hazelnut 2 ½" Patio

- 1) Heights: Irregular
- 2) Lengths: Irregular
- 3) Nominal Thickness: 2 ¼ inch – 2 ½ inch
- 4) Color: Tan, Chocolate, Cream, Cinnamon

Style: Quality Stone – Hazelnut 1 ½" Slabs

- 1) Heights: Irregular
- 2) Lengths: Irregular

- 3) Nominal Thickness: 1 inch – 1 ¾ inch
- 4) Color: Tan, Chocolate, Cream, Cinnamon

Style: Quality Stone – Hazelnut 2" Slabs

- 1) Heights: Irregular
- 2) Lengths: Irregular
- 3) Nominal Thickness: 1 ¾ inch – 2 ¼ inch
- 4) Color: Tan, Chocolate, Cream, Cinnamon

Style: Quality Stone – Hazelnut 2 ½" Slabs

- 1) Heights: Irregular
- 2) Lengths: Irregular
- 3) Nominal Thickness: 2 ¼ inch – 2 ½ inch
- 4) Color: Tan, Chocolate, Cream, Cinnamon

Style: Quality Stone – Hazelnut 3" Slabs

- 1) Heights: Irregular
- 2) Lengths: Irregular
- 3) Nominal Thickness: 2 ¾ inch – 3 ¼ inch
- 4) Color: Tan, Chocolate, Cream, Cinnamon

Style: Quality Stone - Azul Chopped

- 1) Heights: 4" - 8"
- 2) Lengths: 8 inches to 31 inches
- 3) Nominal Thickness: 3 inches to 5 inches
- 4) Color: Blue, Caramel Blue, Onyx Blue

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Style: Quality Stone – Azul Chopped

- 1) Heights: 3" - 8"
  - 2) Lengths: 8 inches to 31 inches
  - 3) Nominal Thickness: 3 inches to 5 inches
  - 4) Color: Blue, Caramel Blue, Onyx Blue
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Style: Quality Stone – Azul Chopped

- 1) Heights: 5"
- 2) Lengths: 8 inches to 31 inches



- 3) Nominal Thickness: 3 inches to 5 inches
- 4) Color: Blue, Caramel Blue, Onyx Blue

Style: Quality Stone – Azul Squares/Recs

- 1) Heights: 4"- 14"
- 2) Lengths: 8 inches to 18"
- 3) Nominal Thickness: 3 inches to 5 inches
- 4) Color: Blue, Caramel Blue, Onyx Blue

Style: Quality Stone – Azul Squares/Recs

- 1) Heights: 4"- 14"
- 2) Lengths: 8 inches to 18 inches
- 3) Nominal Thickness: 2 ½ inches
- 4) Color: Blue, Caramel Blue, Onyx Blue

Style: Quality Stone – Azul Squares/Recs

- 1) Heights: 4"- 14"
- 2) Lengths: 8 inches to 18 inches
- 3) Nominal Thickness: 5 inches
- 4) Color: Blue, Caramel Blue, Onyx Blue

Style: Quality Stone – Azul Random Builders

- 1) Heights: Irregular
- 2) Lengths: Irregular
- 3) Nominal Thickness: 3 inches to 5 inches
- 4) Color: Blue, Caramel Blue, Onyx Blue

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Style: Quality Stone Azul 1" Minus Patio

- 1) Heights: Irregular
- 2) Lengths: Irregular
- 3) Nominal Thickness: 1 inch Minus
- 4) Color: Blue, Caramel Blue, Onyx Blue

Style: Quality Stone – Azul 1 ½" Patio

- 1) Heights: Irregular
- 2) Lengths: Irregular

- 3) Nominal Thickness: 1 inch – 1  $\frac{3}{4}$  inch
- 4) Color: Blue, Caramel Blue, Onyx Blue

Style: Quality Stone – Azul 2" Patio

- 1) Heights: Irregular
- 2) Lengths: Irregular
- 3) Nominal Thickness: 1  $\frac{3}{4}$  inch – 2  $\frac{1}{4}$  inch
- 4) Color: Blue, Caramel Blue, Onyx Blue

Style: Quality Stone – Azul 2  $\frac{1}{2}$ " Patio

- 1) Heights: Irregular
- 2) Lengths: Irregular
- 3) Nominal Thickness: 2  $\frac{1}{4}$  inch – 2  $\frac{1}{2}$  inch
- 4) Color: Blue, Caramel Blue, Onyx Blue

Style: Quality Stone – Azul 1  $\frac{1}{2}$ " Slabs

- 1) Heights: Irregular
- 2) Lengths: Irregular
- 3) Nominal Thickness: 2  $\frac{1}{4}$  inch – 2  $\frac{1}{2}$  inch
- 4) Color: Blue, Caramel Blue, Onyx Blue

Style: Quality Stone – Azul 2" Slabs

- 1) Heights: Irregular
- 2) Lengths: Irregular
- 3) Nominal Thickness: 1  $\frac{3}{4}$  inch – 2  $\frac{1}{4}$  inch
- 4) Color: Blue, Caramel Blue, Onyx Blue

Style: Quality Stone – Azul 2  $\frac{1}{2}$ " Slabs

- 1) Heights: Irregular
- 2) Lengths: Irregular
- 3) Nominal Thickness: 2  $\frac{1}{4}$  inch – 2  $\frac{1}{2}$  inch
- 4) Color: Blue, Caramel Blue, Onyx Blue

Style: Quality Stone – Azul 2  $\frac{1}{2}$ " Slabs

- 1) Heights: Irregular
- 2) Lengths: Irregular
- 3) Nominal Thickness: 2  $\frac{1}{4}$  inch – 2  $\frac{1}{2}$  inch
- 4) Color: Blue, Caramel Blue, Onyx Blue

Style: Quality Stone – Azul 3" Slabs

- 1) Heights: Irregular
- 2) Lengths: Irregular
- 3) Nominal Thickness: 2 ¾ inch – 3 ¼ inch
- 4) Color: Blue, Caramel Blue, Onyx Blue

## **ACCESSORIES**

- A. Wall Ties: Formed steel wire, 22 gauge (0.73 mm) diameter, hot-dip galvanized to ASTM A 153 finish:
    - 1) Eye and pintle type
    - 2) Ladder Wire for concrete reinforcement compliant with ASTM A 82.
    - 3) Wall strap for bolted attachment to studs
    - 4) Wire loop for embedment in back-up masonry
    - 5) With provision for vertical adjustment after attachment
  - B. Wall Ties: Formed steel wire, 22 gauge (0.73 mm) diameter, stainless steel conforming to ASTM A 580:
    - 1) Eye and pintle type
    - 2) Wall strap for bolted attachment to studs
    - 3) Wire loop for embedment in back-up masonry
    - 4) With provision for vertical adjustment after attachment
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- C. Other Anchors in Direct Contact with Stone: ASTM A 666, Type 304, stainless steel sizes and configurations required for support of stone and applicable superimposed loads.
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## **MORTAR**

- A. Masonry Cement: Complying with ASTM C 91
  - 1) Type S
  - 2) Color, gray is recommended
  - 3) Color, white is optional

- B. Portland Cement: Complying with ASTM C 150
  - 1) Type I
  - 2) Color, gray is recommended
  - 3) Color, white is optional
- C. Mortar Aggregate: Complying with ASTM C 144, standard masonry washed sand type.
- D. Hydrated Lime: Complying with ASTM C 207:
  - 1) Type S
  - 2) Type SA
- E. Water: Clean and potable

## **MIXES**

- A. Mortar Mixes:
  - 1) Mortar for Structural Masonry: Complying with ASTM C 270, using Proportion Specification.
  - 2) Type S
- B. Mortar Mixing
  - 1) Mix Mortar ingredients in accordance with ASTM C 270. Mix only in quantities needed for immediate use.
  - 2) Do not use anti-freeze compounds to lower freezing point of mortar.

## **EXAMINATION**

- A. Do not begin installation until substrates have been properly prepared
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Do not begin installation until backing structure is plumb, bearing surfaces are level and substrates are clean and properly prepared.
- D. Verify that built-in items are in proper location, and ready for roughing into masonry.
- E. Notify Architect of unsatisfactory preparation before proceeding.
- F. Refer to Building Code for all restrictions and requirements.



## **PREPARATION**

- A. Clean surfaces thoroughly prior to installation
- B. Stone must be clean and free of all foreign material including but not limited to mud, dirt, mortar, rust, and ice.
- C. Coordinate placement of reinforcement, anchors and accessories, flashings and weep holes and other moisture control products supplied by other sections.
- D. Clean all built-in items of loose rust, ice, mud, or other foreign matter before incorporating into the wall.
- E. All ferrous metal and/or wood built into the wall shall be primed or galvanized.

## **INSTALLATION**

- A. Install masonry and mortar in accordance with ACI 530.1/ASCE 6/TMS 602 Specifications for Masonry Structures.
- B. Maintain masonry courses to uniform dimension(s). Form vertical and horizontal joints of uniform thickness.
- C. Pattern Bond:
  - 1) Lay stone with split-face, honed-face, or weathered-edge exposed. Take care to avoid a concentration of any one color to any on wall surface.
  - 2) Maintain an approximate 3/8 inch joint, as stone allows.
  - 3) Do not use stacked vertical joints
  - 4) Lay out work in advance and distribute color range of stone uniformly over total work area.
- D. Anchoring: Tie stone to backing as required by the Building Code. As a minimum tie stone to backing with metal ties as follows:
  - 1) Provide minimum one tie per 2 square feet of wall surface area.
  - 2) Maximum spacing between adjacent ties shall be 16 inches vertically and 32 inches o.c. horizontally.
  - 3) Ties shall be imbedded in horizontal joints to a 2 inch minimum depth.
  - 4) Provide additional ties at openings within 12 inches of opening.
- E. Joining Work: Where fresh masonry joints partially set masonry.
  - 1) Remove loose stone and mortar.
  - 2) Clean and lightly wet surface of set masonry.
  - 3) To avoid a horizontal run of masonry, rack back ½ the length of stone in each course.

F. Structural Support: If required, provide temporary bracing during installation of masonry work. Maintain bracing in place until building structure provides permanent support.

G. Joints:

- 1) Lay stone with approximate 3/8 inch mortar joint as stone allows.
- 2) Tool joints when "thumb print" hard with a round jointer slightly larger than the width of the joint.
- 3) Trowel-point or concave tool exterior joints below the grade.
- 4) Flush cut joints to be finished with a soft brush only.
- 5) Retempering of mortar is not permitted.
- 6) Use non-corrosive stone shims as required to maintain uniform joint thickness.

H. Flashing:

- 1) Clean surface of masonry smooth and remove any projections, which could damage flashings.
- 2) Place flashing on a bed of mortar.
- 3) Cover flashing with mortar.
- 4) Provide weep hole vent devices at head joints placed every 16 inches along the first course immediately above the flashing or as recommended by weep vent manufacturer.
- 5) Use a non-corrosive, fluid conducting polymer mesh such as "Mortar Net", "Control Cavity", "CavClear" or equal to keep the air space behind the installed veneer stone, clear of mortar and mortar droppings.

I. Control and Expansion Joints: Keep joint open and free of debris.

J. Sealant Recesses: Provide open joint 3/4 inch deep and 1/4 inch wide, where masonry meets doors, windows and other exterior openings.

K. Cutting and Fitting: Cut and fit for chases, pipes, conduit, sleeves, grounds, and other penetrations and adjacent materials. Coordinate with other sections of work to provide correct size, shape, and location.

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## **FIELD QUALITY CONTROL**

A. Test mortar and grout.

B. Testing of Mortar Mix: In accordance with ASTM C 780, Annex A4, for mortar aggregate ratio and ASTM C 780, Annex A5, for mortar water content.

## **PROTECTION**

A. Protect installed products until completion of project.

B. Cover the top of unfinished stone masonry work to protect it from the weather.

- C. Touch-up, replace or repair damaged products before Substantial Completion.
- D. Maintain proper freeze-thaw standards per International Masonry Institute.

### **CLEANING**

- A. Promptly remove excess mortar from the face the stone as work progresses. Clean stone masonry with a stiff nylon brush and clean water only.
- B. Do not use any acid based products for cleaning.

### **DISCLAIMER**

- A. All information listed in the Quality Stone Technical Data section is general in nature thus all specific data should be accessed thru American Society for Testing and Materials ([www.astm.org](http://www.astm.org)) and/or International Masonry Institute ([www.imiweb.org](http://www.imiweb.org)). Building codes are not listed in Quality Stone's Technical Data section and should be adhered to accordingly.