



# COMMERCIAL TESTING LABORATORIES

A DIVISION OF CTL/THOMPSON, INC.

December 16, 2002

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Attention: Mr. Ric Meyers

Subject: Mohs Hardness Testing  
Rock Sample "Cherokee"  
CTL Job No.: CT-10578

Dear Mr. Meyers:

This report presents results of the Mohs Hardness Testing that you requested be conducted on a sample of rock submitted by you to our laboratory on December 9, 2002. The hardness determinations were performed using our Mohs Hardness kit. Three pieces were submitted and the set was identified by you as "Cherokee." The sample's hardness is indicated by the tendency of minerals of a known hardness to scratch the sample or resist being scratched by the sample. Ten minerals of known hardness are used in the test to establish the Mohs Hardness Scale. A hardness of 1 is soft, represented by the mineral talc. A hardness of 10 is the hardest, represented by the mineral diamond.

Using the Mohs Hardness kit it was determined that the "Cherokee" sample has a hardness of 4.5 on the Mohs scale.

If you have any questions regarding this information please do not hesitate to call.

Very truly yours,

COMMERCIAL TESTING LABORATORIES

Andrew W. Flynn  
Laboratory Manager  
AWF/JLG/awf

Reviewed by:

Jeffrey L. Groom, P.E.  
Principal



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Analysis No. TS-S&T 00113  
 Report Date 17 May 2002  
 Date Sampled 14 March 2002  
 Where Sampled Denver, CO  
 Sample Received 15 March 2002  
 Sampled By Client

This is to certify that we have examined: Dimensional Stone identified: Cherokee, Quarried in Colorado, USA

When examined to the applicable requirements of:

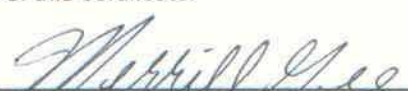
- ASTM C 97-96 "Standard Test Methods for Absorption and Bulk Specific Gravity of Dimensional Stone"
- ASTM C 99-87 "Standard Test Method for Modulus of Rupture of Dimensional Stone"
- ASTM C 170-90 "Standard Test Method for Compressive Strength of Dimensional Stone"
- ASTM C 241-90 (R97) "Standard Test Method for Abrasion Resistance of Stone Subjected to Foot Traffic"
- ASTM C 880-98 "Standard Test Method for Flexural Strength of Dimension Stone"

The above identified material had the following values:

TEST RESULTS PERPENDICULAR TO BEDDING				
STANDARD	TEST	AVERAGE	TEST	AVERAGE
ASTM C 97	ABSORPTION (3)	1.71%	BULK SPECIFIC GRAVITY (3)	2.413
ASTM C 99 MODULUS of RUPTURE	DRY (5) WET (5)	1 300 psi 1 200 psi		
ASTM C 170 COMPRESSIVE STRENGTH	DRY (5) WET (5)	16 300 psi 15 200 psi		
ASTM C 241 ABRASION RESISTANCE	DRY (3)	13.4 Ha		
ASTM C 880 FLEXURAL STRENGTH	DRY (5) WET (5)	1 700 psi 1 500 psi		

\* Number in parenthesis is the number of samples tested that the average was calculated on.

The attached Report of Test is an integral portion of this certificate.

  
 Merrill Gee P.E. - Engineer in Charge

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[REDACTED]

Analysis No. TS-S&T 00114  
 Report Date 17 May 2002  
 Date Sampled 14 March 2002  
 Where Sampled Denver, CO  
 Sample Received 15 March 2002  
 Sampled By Client

This is to certify that we have examined: Dimensional Stone identified: Cherokee, Quarried in Colorado, USA

When examined to the applicable requirements of:

ASTM C 67-01 "Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile  
 Section 8.0 Freezing and Thawing"

The above identified material had the following values:

ASTM C 67 SECTION 8.0 FREEZING AND THAWING - 50 CYCLES			
SAMPLE	WEIGHT LOSS%	EXAMINATION	RATING
A	0.37	No Cracks, Flaws or Separation	Pass
B	0.42	No Cracks, Flaws or Separation	Pass
C	0.39	No Cracks, Flaws or Separation	Pass
D	0.31	No Cracks, Flaws or Separation	Pass
E	0.45	No Cracks, Flaws or Separation	Pass

The attached Report of Test is an integral portion of this certificate.



*Merrill Gee*  
 Merrill Gee P.E. - Engineer in Charge

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