

TEST REPORT

Red Leaf Stone Anchors Tensiles and Chemical

Report No.: TR00146-R2
Date: August 15, 2013
Prepared for: Red Leaf Stone Anchors
108 – 8410 Ontario St.
Vancouver, BC V5X 4S6
Equipment Used: MTS Criterion test frame, Powertech asset PLI2124
MTS 20 kip load cell, Powertech asset PLI2123
MTS 50 mm Extensometer, Powertech asset PLI1979

SUMMARY OF RESULTS:

The results for both chemical composition and tensile tests meet the requirements of AISI 316 specifications as listed in ASTM A666-03 "Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate and Flat Bar".

TESTS CONDUCTED:

Powertech Labs Inc. has conducted a series of tests on a variety of anchors, as requested by Red Leaf Stone Anchors. The following samples were provided for testing:

- 2 anchors marked HA03-354A and HA03-354B (see shop drawings in Appendix B)
- 2 2.5cmx15.2cmx0.5cm flat rectangular pieces of the same heat as the 2 anchors listed above

Testing was performed with guidance from procedures in the following standards:

- ASTM A751, "Standard Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products".
- ASTM E8, "Standard Test Methods for Tensile Testing of Metallic Materials".

TEST PROCEDURE:

Tensile Tests:

Two samples were tested in accordance with ASTM E8/E8M-11 "Standard Test Methods for Tension Testing of Metallic Materials". Rectangular flat tension test samples with a 2-inch gauge were machined in accordance with Section 6 of the standard. Properties measured include 0.2% offset yield strength (σ_{ys}), ultimate tensile strength (σ_{UTS}), and elongation to failure (ϵ_f).

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Chemical Composition:

Two anchors marked HA03-354A and HA03-354B were sent to MetalTest Inc. in Kent, WA, USA for chemical composition analysis by optical emissions spectroscopy. Tests were performed in accordance with ASTM A751.

TEST RESULTS:

Tensile Tests:

A summary of tensile test results is located in Table 1. The table also shows the minimum required mechanical properties for AISI 316 grade as listed in ASTM A666-03. As shown in the table the tested material meets the specifications listed.

Table 1: Summary of tensile test results

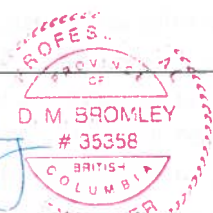
Sample	A (mm ²)	σ_{ys} (MPa)	σ_{uts} (MPa)	ϵ_f (%)
1	62.2	336	747	51.8
2	62.6	339	745	51.1
Average	62.4	337	746	51.5
ASTM A666-03	-	205	515	40

Chemical Composition Analysis:

As reported by MetalTest Inc., composition of specified alloying elements is presented in the Appendix. All measured quantities fall within the specified compositional ranges of AISI 316 as specified in ASTM A666-03 (see Appendix A).

CONCLUSIONS:

The samples provided meet requirements of chemical composition, yield and tensile strength and elongation for AISI 316 grade as specified in ASTM A666-03 "Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate and Flat Bar".

<p>Tested By:</p> <p style="text-align: center;"><i>Mojan Sohi</i></p> <hr/> <p>Mojan Sohi, E.I.T Materials Engineering</p>	<p>Reported By:</p> <p style="text-align: center;"><i>DB</i></p> <div style="text-align: center;">  </div> <hr/> <p>Darren Bromley, P.Eng. Materials Engineering</p>
<p>Date Signed: August 15th, 2013</p>	

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Appendix A:

METALTEST, INC.
 1205 5th Avenue South
 Kent, Washington 98032
 Phone (253) 813-5970 Fax (253) 813-5971
 (800) 200-1376 8/1/2013

Powertech Labs Inc 12388 88 th Avenue Surrey BC, Canada V3W 7R7 Contact: Mojan Sohi	LAB 161324 PO LWRP MATL Alloy Steel SPEC N/A TEST METHOD OES - Chemical Analysis SIZE
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Identification

ID:	1 and 2
Qty:	2 Samples

Chemical Analysis Results:

ID 1 - HA03-354A

C	Mn	P	S	Si	Cr	Ni	Mo	Cu	W	V	Co
0.015	1.350	0.034	0.008	0.316	16.55	10.05	2.081	0.387	0.056	0.063	0.122
Sn	Al	Nb	Ti	B	Se	Ta	Fe				
0.000	0.004	0.010	0.004	0.0008	0.001	0.001	Rem				

ID 2 - HA03-354B

C	Mn	P	S	Si	Cr	Ni	Mo	Cu	W	V	Co
0.016	1.347	0.032	0.008	0.312	16.71	10.18	2.146	0.366	0.057	0.058	0.120
Sn	Al	Nb	Ti	B	Se	Ta	Fe				
0.000	0.004	0.010	0.004	0.0010	0.001	0.001	Rem				

Acceptance criteria not specified. Results reported for customer information.
 Results for both samples conform to typical chemical analysis requirements for 316/316L stainless steel.

Respectfully,



cn=Wayne Langley, o=Metaltest
 Inc., ou=Lab Manager,
 email=waynegr@metaltest-inc.
 com, c=US
 2013.08.01 16:19:21 -0700

Wayne Langley
 Lab Manager

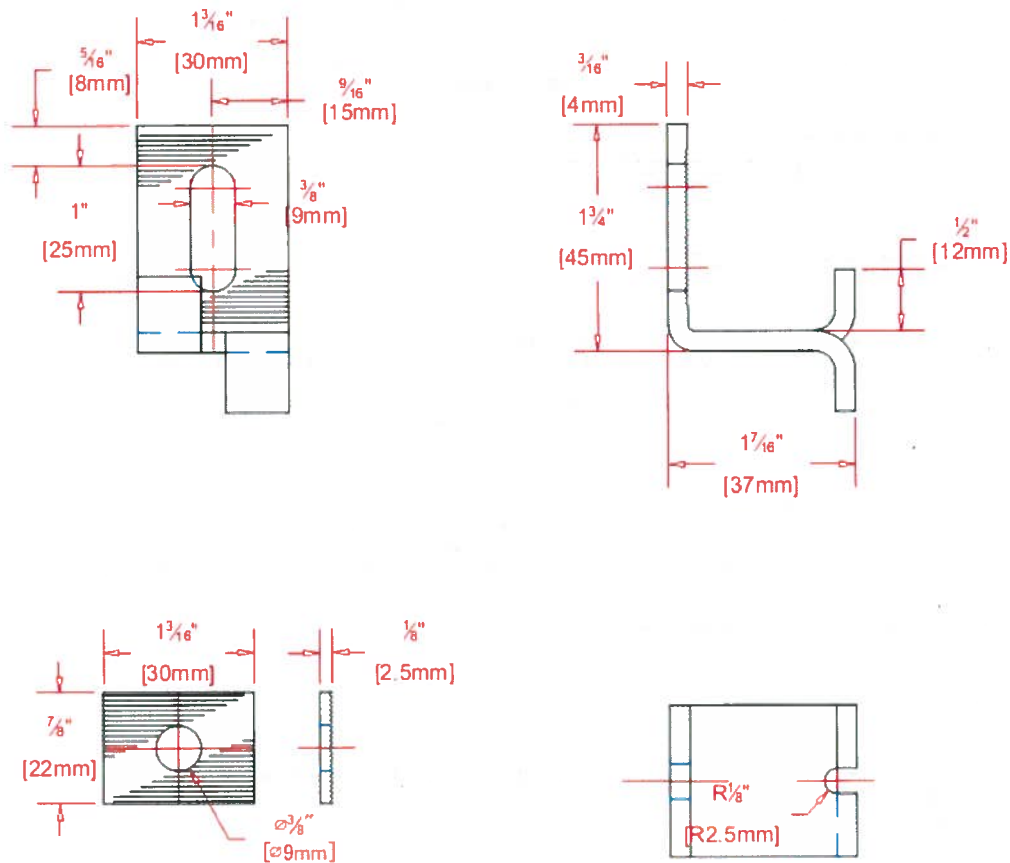
THIS CERTIFICATE SHALL NOT BE REPRODUCED EXCEPT IN FULL, WITHOUT THE WRITTEN APPROVAL OF METALTEST, INC. THE RECORDING OF FALSE, FICTITIOUS, OR FRAUDULENT STATEMENTS OR ENTRIES ON THIS DOCUMENT MAY BE PUNISHED AS A FELONY UNDER FEDERAL LAW.

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Appendix B:

Red Leaf Stone Anchors

Available : Stainless 304 or 316, Electro-galvanized



SERRATED WASHER

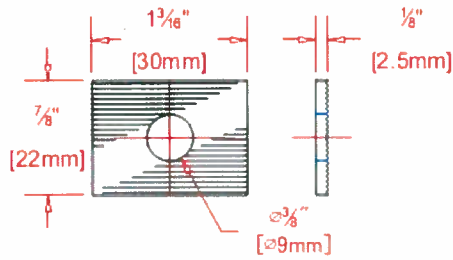
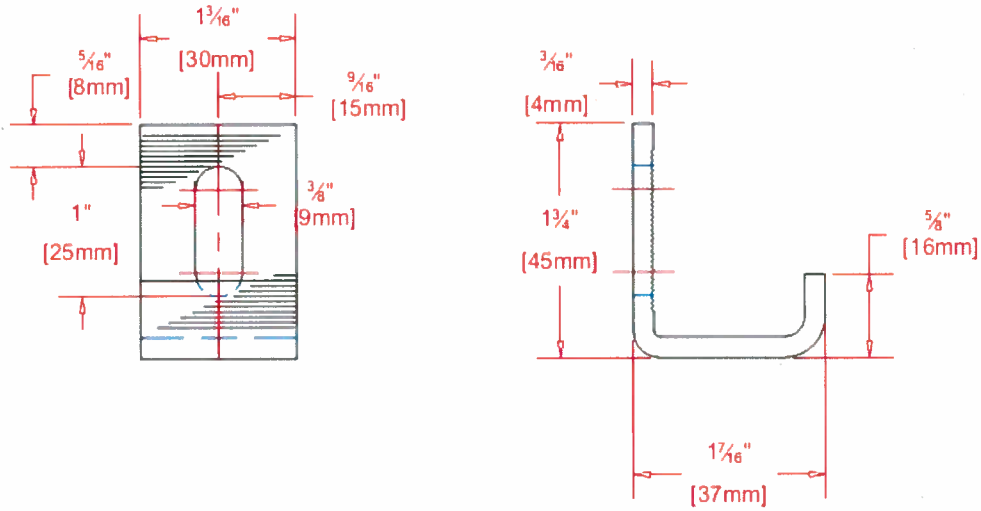
Product Number
HA03 - 354 A

May 2013

Red Leaf Stone Anchors Tensiles and Chemical

Red Leaf Stone Anchors

Available : Stainless 304 or 316, Electro-galvanized



SERRATED WASHER

**Product Number
HA03 - 354 B**

May 2013

