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Environmental Test Report
For
IntegriCo Composites, LLC
COMPOSITE RAIL TIES
Testing Per IntegriCo Specification

Prepared For: IntegriCo Composites, LLC
4310 Lucius McCelvey Drive
Temple, TX 76504

Prepared By: National Technical Systems
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Issued: November 21, 2008


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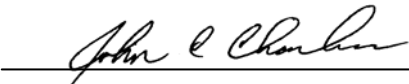
SIGNATURE PAGE

Service For: IntegriCo Composites, LLC
4310 Lucius McCelvey Drive
Temple, TX 76504

This is to certify that the preceding report is true and correct to the best of my knowledge.

Approved by: 
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REVISIONS

Revision	Reason for Revision	Date
0	Original	November 11, 2008
1	Added additional data clarification to table on Page 7	November 13, 2008
2	Corrected table to reflect the actual temperature conditions during the test.	November 21, 2008



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1.0 PURPOSE

The purpose of this report is to present the test methods, conditions and test equipment used to perform testing on Composite Rail Ties. The tests conducted were in accordance with the test requirements as specified in Section 2.0.

2.0 REFERENCES

- a. IntegriCo Composites, LLC Purchase Order: RN-100208-NTS
- b. National Technical Systems Quotation Number: P-1008-4075
- c. Union Pacific *Thermal Cycle Test of Composite Ties Test Specification* with IntegriCo Composites Exception
- d. National Technical Systems Safety Manual
- e. National Technical Systems Quality Manual

3.0 DESCRIPTION OF TEST ITEM

IntegriCo Composites 7" X 9" X 102" composite is a railroad crosstie with borate treated oak core and plastic exterior.



3.1 Receiving Inspection

The Composite Rail Ties were received at the NTS-Plano Test Facility. The Composite Rail Ties were examined for evidence of shipping damage. No anomalies were detected as a result of transportation.

4.0 SUMMARY

The test program consisted of subjecting the Composite Rail Ties to the testing described in this report. NTS certifies that the testing described herein conforms to the requirements of the referenced documents noted above.

The test results are tabulated in the test summary below and the referenced test data and graphs are presented in Appendix A, test equipment information is presented in Appendix B, and photographs of items under test are presented in Appendix C.

Test	Test Specification	Test Location	Date
High / Low Temperature	IntegriCo Composites, LLC Test Specification	NTS Plano, TX	11/10/08

5.0 TEST PROCEDURE

The following test procedure was provided by Union Pacific. IntegriCo made one exception to the procedure (see bullet item two).

- The composite tie is brought to a neutral temperature (usually room temperature $\pm 72^{\circ}\text{F}$)
- The tie is then cut to length to fit the oven/freezer, 64 inches. (Equal distances are cut from both ends of tie to achieve 64 inches). Exception per IntegriCO Composites representative: **Do not cut tie to length.**
- Pins are then embedded from the smooth side of the tie 6.5 inches into the tie equal distance from each end for measuring purposes, set apart at $56\frac{1}{2}$ inches (gauge). The distance is recorded and the diameter of each pin is recorded.
- The tie is then placed into the oven/freezer and heated to 160°F for a minimum of 24 hours.
- After the 24 hours, the distance between the pins is measured to determine if there has been any expansion/contraction in the tie. This measurement is recorded also record the diameter of each pin.
- Upon completion of the measurements ramp the temperature in the chamber to 0°F and hold at 0°F for a minimum of 24 hours.
- After the 24 hours, the distance between the pins is measured to determine if there has been any expansion/contraction in the tie. This measurement is recorded also record the diameter of the pins.
- Upon completion of the measurements turn off the chamber open door and allow the temperature to ramp back to standard lab ambient
- After a minimum of 12 hours, the distance between the pins is measured to determine if there has been any expansion/contraction in the tie. This measurement is recorded also record the diameter of the pins.
-

6.0 TEST RESULTS

See below and Table in Section 4.0 of this report for summary of results, all data is presented in Appendix A.

6.1 High / Low Temperature

Testing was conducted at NTS Plano TX from 11/5/08 to 11/10/08. The composite rail ties were subjected to High / Low Temperature Test. The composite rail ties **conformed** to the test requirements as outlined in the Union Pacific procedure.



	Distance in Inches			
Temp °C	Tie 28	Tie43	Tie 44	Tie AVG
23.0	56.496	56.441	56.479	56.472
71.1	56.539	56.477	56.548	56.521
-17.7	56.450	56.404	56.328	56.394
23.0	56.485	56.434	56.431	56.450

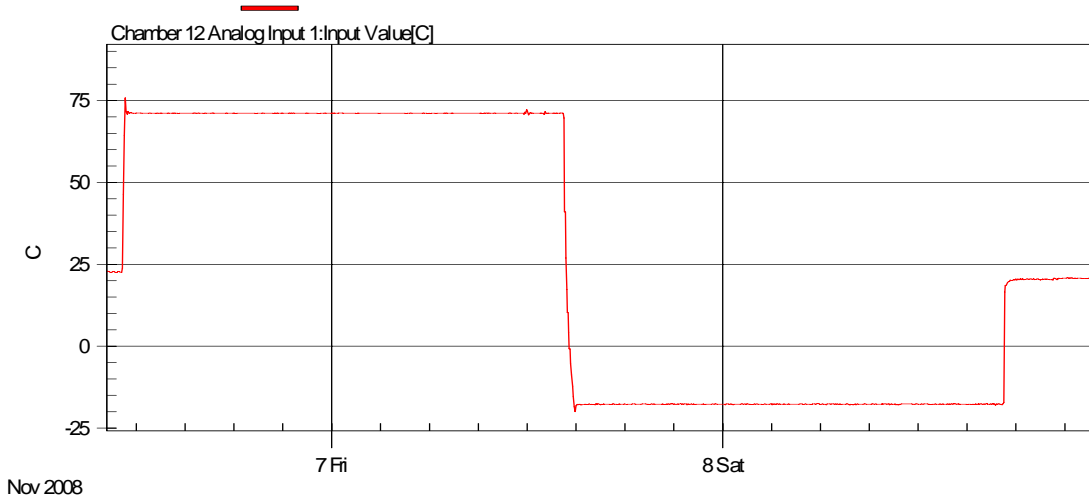


APPENDIX A

TEST DATA



High/Low Temperature A8345 IntegriCo





APPENDIX B

TEST EQUIPMENT LIST*

*The instrumentation used in the performance of these tests is periodically calibrated and standardized within the manufacturer's rated accuracies. The calibration procedures and practices are in accordance with ANSI NCSL Z540-1, and ISO Guide 25. Certification of calibration is on file subject to inspection by request.



High / Low Temperature Test Equipment List:

CHAMBER 12

NTS ID#	Manufacturer	Description	Model No.	Cal Date	Cal Due
ENV-1076-P	Russell	Temp/Humidity Chamber	ECM 3-30-30	N/A	N/A
ENV-1040-P	Omega	Over/Tem Protection	CN76133	N/A	N/A
ENV-1140-P	Watlow	Temp/Humidity Controller	F-4	01/24/08	01/24/09

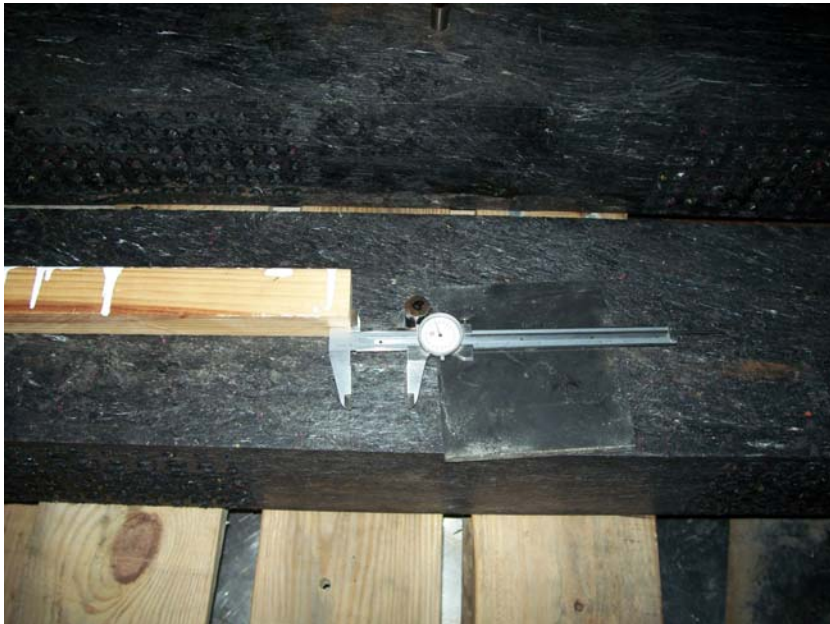


APPENDIX C

PHOTOGRAPHS



High / Low Temperature Test Setup



High / Low Temperature Test Setup



High / Low Temperature Test Setup