

ANALYSIS OF 4' X' 4' X 24" FLOAT

Manufactured by

Hendren Plastics

For use on

AMEREN CONTROLLED WATERS LAKE OF THE OZARKS

(February 12, 2009)



INTRODUCTION

AmerenUE of St. Louis, MO has adopted specifications for boat docks and flotation devices for use on Lake of the Ozarks. Floats are randomly chosen from a local supplier's inventories and sent to an approved testing organization for specific durability and destructive testing to meet and conform to compliance standards as set forth by AmerenUE.

This report reflects the results of the testing of an encased or encapsulated float(s) received on Thursday, February 12, 2009. The encased or encapsulated float was selected by Mr. Douglas Beck of Lake Ozark Environmental, and submitted for approval for use on Lake of the Ozarks by AmerenUE, with a date mark of 02/22/2008. The float was marked with manufacturing brandings 02/2009.

A top and side view of the float is shown on the cover page of this report.

Any measurements of less than the compliance standard as set forth by AmerenUE are highlighted in yellow.

PUNCTURE TESTING

As per D4833-00e1 - Standard Test Method of Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products.

1. Scope

- 1.1 This test method is used to measure the index puncture resistance of geotextile geomembranes, and related products.
- 1.2 The use of Test Method D4833-00e1 may be inappropriate for testing some woven geomembranes or related products which have large openings.
- 1.3 The values stated in SI units are to be regarded as the standard. The values per inch-pound units are for information only.
- 1.4 This standard does not purport to address all safety concerns, if any, assume its use. It is the responsibility of the user of this standard to establish acceptable safety and health practices and determine the applicability of regulatory limitations prior to use.

2. Test Procedure

- 2.1 The Puncture testing is performed by the dropping of a 3/4" round steel bar which is 20" in length and 2-1/2 pounds in weight thru a guide tube. The end of the bar is rounded and blunt with a 1/4" diameter flat on the end. The bar is dropped from a height of 4-1/2 feet on the various randomly picked locations of the float encasement.

3. Results

Testing showed Slight indentation with no puncture or fracture.

Float passes compliance standard as set forth by AmerenUE.

THICKNESS MEASUREMENT

1. Test Procedure

1.1 The float encasement was cut into segments approximately one foot by one foot (1'x1') as shown on attached diagram (**Appendix A**). Measurements are taken with a micrometer on flat surfaces and with calipers on curved surfaces. Measurement locations are indicated on the diagram (**Appendix A**) with resultant thickness in thousandths of an inch.

2. Results

2.1 Compliance standard as set forth by AmerenUE requires a thickness of not less than .125 inches.

High Measurement .410 inches

Low Measurement .168 inches

Float *passes* compliance standard as set forth by AmerenUE.

VISUAL INSPECTION OF FOAM FLOATATION

Upon inspection of the interior of the encased or encapsulated float, the foam block appeared to have beads well fused with some areas of loose beads. The fill hole was sealed.

WATER ABSORPTION

As per “The Seven Day Hunt Absorption Test ”.

1. Scope

1.1 To provide early indication of the relative absorbency of foams

2. Test Procedure

- 2.1 Precisely prepare 1/16 cu. ft. samples. Size of each sample is to be 5.0” x 5.0” x 4.32”. Cutting is to be by an “electrical hot wire” or like cutting device, in order to give consistent dimensioning. From a float 5’ or less in length, it is recommended to take three (3) samples, one from each of the two diagonally opposite corners and one from the center. For floats greater than 5’ in length, four (4) samples are recommended at diagonally opposite corners and at the third point between corners.
- 2.2 Weigh the 1/16 cu. ft. samples on accurate scales which read in one tenth ounces. Air dry the sample and weigh daily until the weight has remained the same for three (3) consecutive days.
- 2.3 Place foam samples into a five quart or larger container with at least a 4.82” vertical dimension. Place a weight on a board on top of the container and fill the container to the top with water. Place a ½” thick spacer between the foam and the weighted board so that the foam is completely submerged with about a ½” head of water over the top. Water may need to be added due to evaporation.
- 2.4 At designated time periods, one hour and daily for seven days remove the foam and weigh. Prior to weighing, remove foam, allow to drain for five (5) seconds, then weigh foam.
- 2.5 Subtract the dry weight at time of immersion from the seven day wet weight to determine absorption in ounces. Multiply the difference in ounces by 16 to determine the conversion of absorption for one cubic foot in ounces; then divide by 16 to arrive at the absorption in pounds per cubic foot.

If the increase in weight is less than 3.0 lbs. / cu. ft. at seven days the float meets the specification for water absorption commonly called for by governmental and private organizations.

Three (3) samples of foam are taken from the submitted float. A sample from the following locations; top corner, bottom corner, and center.

These samples were prepared; air dried and weighed in accordance with the “Seven Day Hunt Absorption Test (**As above**). Actual reading and increases are on attached table (**Appendix B**).

3. Results

3.1 Compliance standard as set forth by AmerenUE require water absorption of less than 3.0 lbs / cu. ft. at seven days testing.

The seven day increase results are as follows:

<u>Top Corner</u>	<u>Center</u>	<u>Next to Center</u>	<u>Bottom Corner</u>
2.88 lbs/cu ft	2.80 lbs/cu ft	N/A lbs/cu ft	2.704 lbs/cu ft

Float *passes* compliance standard as set forth by AmerenUE.

DENSITY

1. Results

1.1 Compliance standard as set forth by AmerenUE requires a minimum density of 0.8 lbs / cu. ft.

Density of the three dried samples is as follows:

<u>Top Corner</u>	<u>Center</u>	<u>Next to Center</u>	<u>Bottom Corner</u>
.992 lbs/cu ft	1.264 lbs/cu ft	.N/A lbs/cu ft	.912 lbs/cu ft

Float *passes* compliance standard as set forth by AmerenUE.

RECOMMENDATIONS AND CONCLUSIONS

The encased or encapsulated polystyrene foam *passes* the compliance standards as set forth by AmerenUE.

CONSULTANT STATEMENT

The testing of the received product and completion of this report has been prepared in accordance with generally accepted practices. This document identifies the manufactured product based on currently available information provided by the manufacture and determines conformity to required specifications as set forth by AmerenUE. This plan identifies the dimensions and materials of the product tested. However, Lake Ozark Environmental, LLC was not involved with the construction of the product tested. Therefore, Lake Ozark Environmental, LLC can make no guarantee as to the overall integrity or usability of such products.

Lake Ozark Environmental, LLC is in no way responsible for the implementation of the recommendations herein prescribed or for the collection, maintenance or adherence to the standards as required by AmerenUE.

Lake Ozark Environmental, LLC.
PO Box 2325
Lake Ozark, Missouri 65049
Office Phone: 573-964-6956

Douglas Beck
Certified Environmental Compliance Manager # 4553
