WATER ABSORPTION PROPERTIES OF BARRY B-NETS

A comparative analysis involving knotted poly-ethylene and knotless nylon (polyamide) fibers

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VISION :

Quality and safety are essential, because we take people's lives to heart.

MISSION :

Barry manufactures and transforms high quality products associated with cordage, nets and textiles and offers associated services aimed at protecting people and goods.

Our clients are manufacturers or providers of products or services, particularly in the public service, sport, show business and safety, and often involves fall protection, rescue or confined spaces.

We respond to customer needs by establishing fabrication standards which meet or exceed strict industry norms. Our products and services reflect our unique expertise and innovative solutions in textile, deceleration and biomechanics and bear the Barry mark of excellence.

Water absorption properties of Safety B-Nets

Project : A comparative analysis involving knotted polyethylene and knotless nylon (polyamide) fibers.

Objective : Determine the water absorption properties of B-Netting immerged in water.

Presented to :

Date : May 23, 2003

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1. Summary

- Knotted polyethylene samples (supplied by ADIC) of new and un-used B-Net were provided by Le Massif;
- Knotless nylon (polyamide) samples (supplied by Barry) of new and un-used B-Net were provided by Lake Louise Winterstart;
- Knotless nylon (polyamide) samples of un-coated material was supplied by Barry;
- Test samples were cut to a 30 cm. X 30 cm. square;
- Test samples were weighed dry and then subjected to immersion in water for a 24 hour period;
- Results indicated that coated knotless nylon (polyamide) has the lowest water absorption characteristic compared to knotted polyethylene and un-coated knotless nylon (polyamide).

2. Study specifications

Customer name and address:	Internal Study
Customer representative:	N/A
Order number:	N/A
Witness for customer:	N/A
Test purpose:	Compare water absorption properties of various B-Net materials
Test nature:	Water absorption calculated by weight
Test site:	Barry Technologies International 6110 des Grandes Prairies Montreal (Qc) H1P 1A2
Test date:	May 12th and 13th, 2003
Test personel:	J.-F. Robitaille, Special Project Manager

3. Introduction

During the April-May 2003 F.I.S. Technical Advisors meeting held in Strasbourg, France, discussions were held concerning the possible disadvantage of using nylon (polyamide) in the manufacture of safety B-Nets. It is generally held that nylon may be too absorbent when exposed to water, which in turn, may be an undesirable feature which could reduce net strength upon freezing.

The present study was initiated in order to dissipate any confusion and myths concerning the properties of these fibers. Also it was demonstrated that nylon which receive special coatings are, in fact, more water repellent than the typical polyethylene fibers commonly used in the manufacture of safety nets.

4. Test certification

The undersigned certify that the tests herein described were carried out in accordance with the procedure listed in these pages, and that all equipment used was in calibration.

Water absorption tests conducted by: _____

Mr Jean-François Robitaille
Special Project Manager
Barry Technologies International

Prepared by: same

Approved by: _____

Mr Peter Barry
President
Barry Technologies International

* The original copy is signed and kept on file at Barry Cordage Ltd, Montreal, Canada

5. Interpretation of data

Note 1: The weight gain after immersion is directly attributed to water absorption by the materials.

Note 2: Excess water was shaken off the samples after immersion and samples were weighed immediately after removal from the immersion basins.

The weight gain is expressed as a water absorption percentage (%).

6. Materials and Methodology

6.1 Test samples

6.2 Instrumentation and methodology

6.1 Test samples

- All test samples were prepared on May 12th, 2003 and weighed dry. Samples were subjected to immersion in fresh water, at 20°C for a 24 hour continuous period.
- All test samples were removed from their immersion basin on May 13th, 2003. Excess water was shaken off, and samples were immediately weighed.
- 2 test samples measuring 30 cm. X 30 cm. were removed from 2 B-Nets and 2 test samples were removed from new un-coated nylon nets (polyamide);
- A total of 6 samples were weighed, from 3 different material types.

6.1.1 Test samples

Sample ID.:

SAMPLE #	DESCRIPTION	SUPPLIER	NOTE
1	Un-coated knotless nylon (polyamide)	N/A	Virgin material
2	Un-coated knotless nylon (polyamide)	N/A	Virgin material
3	Knotted polyethylene	ADIC	B-Net (ADIC)
4	Knotted polyethylene	ADIC	B-Net (ADIC)
5	Coated knotless nylon (polyamide)	Barry	B-Net (Barry)
6	Coated knotless nylon (polyamide)	Barry	B-Net (Barry)

6.2 Instrumentation

Water immersion basin: clear mylar basin filled with fresh water
@ 20°C
Basin dimension: 30 cm. x 20 cm. X 10 cm.

Scale: Ohaus triple beam scale
Model # Series 700

6.2.1 Methodology

- Prepare samples 30 cm. X 30 cm.;
- Weigh samples (dry);
- Immerse in water basin for 24 hours (water temperature 20°C);
- Remove samples from basin after 24 hours;
- Shake off excess water;
- Weigh samples immediately (wet);
- Tabulate the data.

7. Result summary - Table I

Comparison of results from the three types of nets indicate that coated knotless nylon nets have absorbed on average 20% less water than un-coated knotless nylon nets, and 6% less than knotted polyethylene nets.

SAMPLE #	TYPE	Dry Weight (g)	Wet weight (g)	Difference (g)	Water %
1 N/A	Un-coated knotless nylon (polyamide)	18,0	27,4	9,4	52,2
2 N/A	Un-coated knotless nylon (polyamide)	17,8	26,7	8,9	50,0
3 ADIC	Knotted polyethylene	18,2	24,7	6,5	35,7
4 ADIC	Knotted polyethylene	18,2	24,8	6,6	36,3
5 Barry	Coated knotless nylon (polyamide)	19,9	25,7	5,8	29,1
6 Barry	Coated knotless nylon (polyamide)	20,0	25,9	5,9	29,5

7. Result summary - Table I (cont 'd)

- All netting samples showed an increase in weight after immersion in water;
- The coated nylon (polyamide) nets have absorbed the least when compared to polyethylene and uncoated nylon (polyamide).

8. Interpretation of test results

- This study has demonstrated that, contrary to the generally held notion, the coated nylon (polyamide) Barry B-Nets have picked up and retained less water than the knotted polyethylene B-Nets (ADIC);
- Predictably, the coated nylon has picked up less water than its un-coated counterpart.

9. Conclusion

The present report demonstrates that there exists significant differences between knotted polyethylene versus knotless nylon 's (polyamide) ability to absorb or retain moisture.

The most water repellent material tested was the Barry coated knotless nylon.

A comparative study showing the effects of water on tensile strength, both wet and frozen solid, will be undertaken shortly to provide more information on these products.

Previous studies have demonstrated that the tensile strength of wet materials is decreased by 10-15% when compared to the dry strength of the same materials.

How this is affected by freezing may provide useful information to consider when using the safety materials in wet/cold environments.