

Voluntary Standard
For Repulping and Recycling
Corrugated Fiberboard Treated to
Improve Its Performance in the
Presence of Water and Water Vapor

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Note: Pages 13, 14, and 15 are the Application and Materials forms. They are a part of this document but are also posted separately in “Word” format for ease in filling out these pages.

INTRODUCTION

Disposing of treated corrugated that cannot be recycled can be a financial and logistical burden on the supply chain for these packages. While treated corrugated containers are the most practical and cost-effective way to ship produce, meats, seafood and other items, certain treatments to improve performance in the presence of water or water vapor have made recycling difficult. **It is desirable from both increased recyclable fiber availability and environmental standpoints to encourage the development of treated corrugated that may be recycled into other paper products using common mill technology.**

The corrugated products industry recognizes the solution to this problem should be industry-wide, primarily because the recycling mills cannot effectively identify all treatments specific to particular companies. Different treatment systems may have different impacts on recycling processes; mill operators have even considered some to be highly detrimental.

To address and evaluate the technical as well as the educational aspects of this objective, a joint committee was formed consisting of the Fibre Box Association and the American Forest & Paper Association (AF&PA) members who represented manufacturers of containerboard, corrugated containers, and others who utilize recovered corrugated container fiber. Their work was to evaluate the repulpability and recyclability of moisture barrier treatments or coatings applied to liners or combined corrugated board in an effort to establish a minimum threshold for moisture barrier treated or coated corrugated that is intended, and labeled, to be recyclable into new containerboard and other paper products.

After numerous meetings, tests, and legal reviews, the committee developed this Voluntary Standard for repulpability and recyclability. The Standard contains a test method and test report. Box manufacturers can register treatments and coated board combinations with the Fibre Box Association if they do the following:

- Have a lab approved by the FBA (3rd party or internal) certify that treatment has passed the test protocol.
- Forward the completed Test Report, lab certification, and required samples to the FBA.
- Provide a copy of the Company and Material Information Forms (pages 13-15 of this document) to the FBA signed by an officer of their company.
- Once the "Treatment" Registration letter is received by the applicant, follow the marking guidelines as called for in the protocol.

For additional information, call:

Fibre Box Association (FBA):
25 Northwest Point Blvd. Suite 510
Elk Grove Village, IL 60007
847-364-9600
Fax 847-364-9639
www.fibrebox.org

PURPOSE

1. The application of this Voluntary Protocol is only for “linerboard (including Kraft Paper), corrugating medium, combined board, and corrugated products made from these materials, collectively known as “corrugated fiberboard”. The purpose is to encourage the development of treatments to corrugated fiberboard that will provide water resistance or some other desirable characteristic that are repulpable and recyclable, and will replace existing treatments that also provided water resistance or some other desirable characteristic, but did not allow the corrugated fiberboard to be repulpable or recyclable. The goal is to return to the OCC stream corrugated fiberboard that formerly was not accepted into that stream.
2. This standard establishes a repeatable method for simulating a commonly used subset of repulping and recycling processes. It is intended to evaluate the impact of repulping and recycling treated corrugated fiberboard on containerboard mill operations and final products.
3. This standard establishes a method for identifying treated corrugated that can be repulped and recycled in this selected subset of processes. It establishes minimum levels of performance for the handsheets made from treated corrugated, repulped and recycled in accordance with a detailed test protocol given in Appendices A & B. This standard is not intended to preclude the development or use of any technological advances in mill or treatment processes. It is intended to encourage the development, use and repulping and recycling of treated corrugated products for use in high-moisture environments.

SCOPE

1. This standard applies repulping and recycling process technology either in effect or readily achievable in mills currently involved in recycling.
2. This standard establishes a **screening method** to determine the repulpability and recyclability of treated corrugated products that have not previously been considered recyclable.
3. The test method in this standard has two parts:
Part 1 determines the **repulpability** of treated corrugated by determining fiber-on-fiber yield when only the treated corrugated is processed in accordance with this standard (Appendix A).
Part 2 determines the **recyclability** of the treated corrugated by evaluating its effect on mill operations and finished products when it is added to untreated corrugated in the amounts specified (Appendix B).
4. This voluntary standard does not relieve the user from compliance with all applicable local, state and federal laws and regulations, and contractual agreements.
5. This standard is not intended to address the functionality or marketability of the treated corrugated or of mill products that use the treated corrugated as a fiber source.
6. This standard does not address all of the factors that should be considered in the development of a repulpable and recyclable treatment. The companies that develop treatments and treated corrugated and test them under this standard are responsible for making sure that, in addition to being repulpable and recyclable, the products will be safe and suitable for their intended applications— e.g., packaging in contact with food—and will not create other non-desirable environmental effects at the point of use or disposal.
7. Treated corrugated containers recovered for recycling should not be contaminated by their contents, such as hazardous or perishable materials.

DEFINITIONS of KEY TERMS

Fiber-on-fiber yield is the amount of fiber that remains after the processing action, expressed as a percentage of the fiber present in the material to be tested.

Handsheets are sheets made from a suspension of fibers in water in an operation, whereby each sheet is formed separately by draining the pulp suspension on a stationary sheet mold.

OCC (Old Corrugated Containers) is a grade of waste paper comprised of untreated corrugated boxes that have been used for the purpose for which they were originally purchased and have subsequently been source separated from other waste.

Recyclable means used paper, including in-plant and post-consumer waste paper and paperboard, which is capable of being processed into new paper or paperboard using the process defined in this standard.

Recyclability test sample consists of a minimum of 20% (by weight) of the treated corrugated to be tested and the remainder of the untreated corrugated.

Repulpable means the test material that can undergo the operation of re-wetting and fiberizing for subsequent sheet formation, using the process defined in this standard.

Treated corrugated is the combined board or boxes that have been subjected to a specific treatment for the purpose of improving its performance in the presence of water or water vapor. The level of treatment used in the test must be equal to or greater than the level of treatment to be used in the field.

Untreated corrugated/control is the same combined board or boxes that have not been subjected to any treatment to improve performance in the presence of water or water vapor.

TEST METHOD

Preliminary Analysis: Before beginning the test protocol, determine the moisture content of the treated corrugated sample.

PART 1: Repulpability

A 100% charge of treated corrugated is repulped in a Modified Waring Blender and a British Disintegrator in water at a pH of 7 (± 0.5 pH) that is maintained at 125°F ($\pm 10^\circ$) following the procedure outlined in Appendix A. The pulped material is separated in a screen with 0.010-inch or smaller slots to determine fiber recovery as a percentage of the amount of fiber charged. Detailed procedures for repulpability are given in Appendix A.

PART 2: Recyclability

Mix a minimum of 20% treated corrugated and the remainder of the same untreated corrugated in a laboratory-scale pulper at pH 7 (± 0.5 pH) and 125°F ($\pm 10^\circ$). This is the recyclability test sample. As a control, a charge of 100% of the same untreated corrugated is also pulped using identical conditions. Each pulped material is passed through (in succession) a pressure screen equipped with a basket with 0.062 inch holes, the same screen or a similar screen equipped with a basket with 0.010 inch slots and a reverse centrifugal separator under conditions specified in the procedure

Handsheets (3.0 gram) are made from the final stage (cleaner) accepts. For each batch tested, the handsheets are pressed and dried with heat and tested for product performance properties. Properties include slide angle, short span compressive strength (STFI), bursting strength and water drop penetration, using the established TAPPI official test methods. Appearance tests shall be done according to the procedure outlined in Appendix B. The final sheets shall have no more than 15 spot counts, or not exceeding 30% greater counts than the control, with an area of $\geq 0.4 \text{ mm}^2$ area, averaged over 3 sheets. The properties and appearance of the handsheets from the recyclability test sample and untreated corrugated tests will be compared. Detailed procedures for recyclability are given in Appendix B.

PART 3: Performance Levels

Treated corrugated satisfying all of the requirements of the voluntary standard will be regarded as repulpable and recyclable. There are three general performance requirements: fiber yield, operational impact and product requirements.

Fiber yield from the repulpability test must be at least 80% based on the total weight, or 85% based on the bone dry fiber charge to the pulper.

Operational impact is acceptable if:

1. The entire procedure can be completed without using an acid wash to clean the flat screen in the Repulpability Test or dismantling the pressure screens to clean them before finishing the Recyclability Test, and
2. There is no visible deposition on any part of the disintegrator during the Repulpability Test or in the pulper during the Recyclability Test.

Product requirements are satisfied if:

1. The appearance of the handsheets made from the recyclability test sample shows no substantial difference from that of the handsheets made from the control and the spot count is ≤ 15 counts, or not exceeding 30% greater counts than the control, with an area $\geq 0.4 \text{ mm}^2$, averaged over 3 sheets.
2. The decrease in the slide angle of the handsheets (the average of five first slides) made using the recyclability test sample from the slide angle of the handsheets made from the control must be no greater than 15%.
3. STFI and burst strength of the handsheets made using the recyclability test sample, normalized to the sheet basis weight, must show no more than a 10% decrease from the respective values for the control. All test results are to be reported in English units.
4. The water drop penetration of handsheets made from the recyclability test sample must not exceed the water drop penetration of the control handsheets by more than 200 seconds.

CERTIFICATION AND MARKING (Self-Certification)

1. Tests for Parts 1 and 2 are repeated twice. For each set of tests, the results for the first treated sample must be compared to the results for the first untreated sample tested. Similarly, the results of the second treated sample must be compared to the results of the second untreated sample. If the recyclability test sample passes all tests on both trials, it satisfies the standard. If it passes all tests on one trial, but fails some on the other, it may be retested in a third trial. The recyclability test sample must pass all tests in the third trial to satisfy the standard.
2. Manufacturers of treated corrugated or corrugated treatments may self-certify their own product by using any capable laboratory, working in accordance with the detailed protocol provided in this standard. The laboratory may be internal to the company or a third party laboratory. All laboratories (internal and third party) shall certify that their facilities and equipment are suitable for testing the tendered product within the instructions and tolerances of this standard.
3. Treated corrugated must be recertified if there is any significant change in treatment product, substrate chemistry or any increase in the ratio of treatment to fiber. Minor modifications to a treatment material, which do not affect the water resistance or the repulpability/recyclability of the treated boxes, will not require recertification. However, if the chemistry of the treatment material is changed such that the water resistance is increased or the repulpability/recyclability of treated containerboard could reasonably be expected to be more difficult, the treatment material has to be recertified. The substrate chemistry will be considered to have been changed, requiring recertification, if wet strength chemicals, a high level of sizing chemicals or other chemicals significantly affecting the repulpability of the substrate (which were not used in the original certification test) are used in conjunction with the previously approved treatment product.

Note: Conventional wet strength linerboard and corrugating medium, by definition, is considered to be not repulpable/recyclable unless it has passed the tests in this Voluntary Standard. Wet strength containerboard may not be substituted for standard kraft or recycled containerboard without being re-certified at a lab and re-registered with the FBA. Conventional water resistant corrugating adhesives may be substituted for lower grades of moisture resistant or domestic corrugating adhesive; however, the substitution of proprietary or special corrugating adhesives with known extra water resistance would require re-certification by a lab and re-registration with the FBA.

4. Once a treatment material has been approved at one location, it does not have to be recertified to be used at another location, if it is applied at the previously approved, or lower, treatment-to-fiber ratio and is applied on standard kraft or recycled containerboard. All locations of the company registering the treatment material may use the treated material without further registration, as long as the treatment-to-fiber ratio is not exceeded and it is applied on standard kraft or recycled containerboard.

However, if a different company purchases treated containerboard or treatment chemicals, or performs production functions on purchased sheets, or markets treated materials under the name of a company that has not registered the use of these treated materials, that company must register their use of these treated materials with the FBA. The same restrictions regarding not exceeding the treatment-to-fiber ratio and the application on standard kraft or recycled containerboard continue to apply. Companies selling registered treatments or treated materials to companies that will be re-selling previously registered treatments or treated materials are required to provide sufficient technical information so that the company purchasing the treatments and/or the treated containerboard for resale can comply with the

treatment-to-fiber ratio maximums and that the application is on standard kraft or recycled containerboard. (See the “Option B” registration procedure on pages 13-14 of this document.)

Multiple trade names may be used for the same registered treatment as long as the treatment is applied or the treated materials are combined so that the previously approved, or lower, treatment-to-fiber ratio is not exceeded and the application is on standard kraft or recycled containerboard. All trade names for a given registered treatment or treated material must be reported to the FBA on a continuing basis with additions, deletions, and changes reported within 30 days of implementation. Identical trade names may not be used for different registered treatments or treated materials. However, a common “Family Name” with varying prefixes and/or suffixes is allowed.

The objective of having all sellers of registered treatments or treated materials report all relevant trade names is to allow the FBA to know who is producing treatments and treated materials and how they may be identified in the marketplace. This information is critical to permit the FBA to facilitate tracing any complaints from containerboard mills back to a box plant.

5. Marking

If the repulpable/recyclable certification marking (as shown below) is used, it must clearly appear on the box with the box manufacturer’s name and location.

See Appendix D for guidelines on use of this symbol.

MODIFIED CORRUGATED RECYCLES SYMBOL



SAMPLES

1. In addition to common basis weights and except for the treatment(s), to the extent possible, control and treated samples should be made as alike as possible. (eg. common rolls of containerboard for non-treated components, consecutive corrugated runs, etc.)
2. Because of differences in pilot plant equipment, test labs will each have their own sample size, quantity, etc requirements. Consult with your test lab to understand their sample submission parameters.

APPENDIX A: REPULPABILITY TEST PROCEDURE

PURPOSE

To determine the repulpability of corrugated board. (Note that the Repulpability Test must be run at least twice on the treated corrugated board. The sample must pass two out of three tests.)

APPARATUS

- Specimen Cutting Device
- Balance (accurate to 0.01 gram)
- Waring Blender (with special blade, see Figure 1)
- Hot Water 125° F ± 10° F (52° C ± 5° C)
- British Disintegrator (Standard Apparatus for Pulp Evaluation No. 270)
- Open Flat Screen 10 Cut (0.010”), such as the Valley or Somerville screens
- Aluminum Weighing Pans
- Laboratory Oven at 221°F (105°C)

SPECIMEN TESTING

1. Cut corrugated board into 1 1/4 in. (31.8 mm) by 4 in. (102 mm) strips.
2. Weigh out .055 lb. (25 gm.) of corrugated board.
3. Place sample in 1500 ml. of water at 125° F ± 10° F (52° C ± 3° C).¹
4. Preheat blender and British disintegrator to 125° F ± 10° F.
5. Blend in a one-gallon Waring blender (equipped with special blades) on low speed (15,000 rpm) for four minutes.
6. Rinse all fibers from the blender with 500 ml. of hot water.
7. Deflake for five minutes in the British disintegrator (2000 ml. total volume) at 3000 rpm.
8. Run on .010” (.254 mm) slotted open flat screen, maintaining 1” water head, – for 20 minutes; save the accepts and rejects in aluminum weighing pans.
9. Dry in a laboratory oven for 12 hours (± 4 hours) at 221°F (105°C).
10. Weigh the pans and record the net weight of accepts, rejects, and the sum of the accepts and rejects.

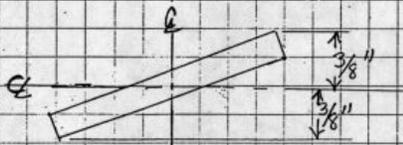
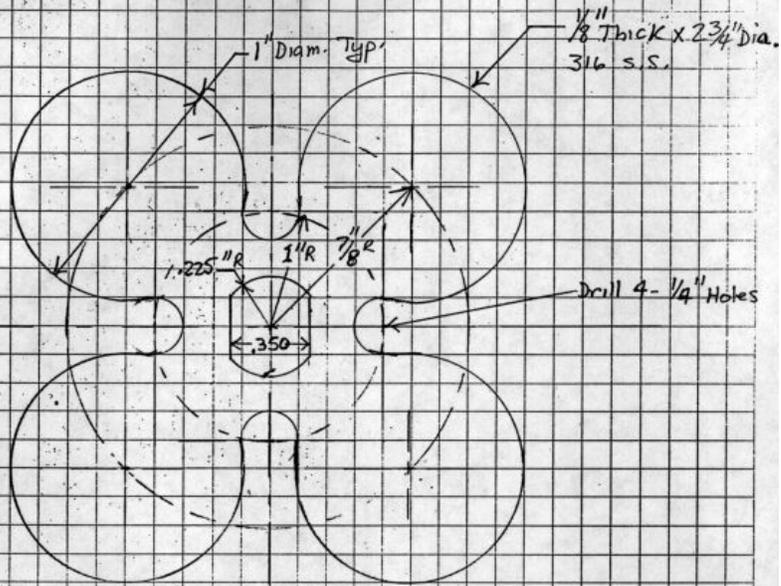
CALCULATION

$$\% \text{ of Rejects} = \frac{\text{Net Rejects} \times 100}{\text{Net Accepts} + \text{Net Rejects}}$$

REPORT

Percentage of rejects to the nearest 0.1%.

WARING BLENDER SPECIAL PROPELLER



Bend Blades as shown
To form a Right Hand Prop.

6-28-94
J.S.

FIGURE 1

APPENDIX B: RECYCLABILITY TEST PROCEDURE

Note: Both the Control sample and the sample of Treated and Untreated test material must be tested at least twice and must pass two out of three tests.

1. Obtain a sample of the treated corrugated to be evaluated. From this sample, select a sufficient amount of material for the test. The selection should be as representative as possible of the material as a whole. Also obtain a sufficient amount of untreated corrugated to run the protocol. Selection of the charge size will depend upon the capacity of the pilot plant pulper to be used. Pulping is to be carried out at 3% consistency, or, at the consistency recommended by the pulping equipment manufacturer.
2. Determine the moisture content [TAPPI T 412]. Perform steps 3 through 9 twice—once with the untreated “control” sample, once with the “recyclability test sample.”
3. Use selected sample materials of any convenient size, but no smaller than 1 x 1 inch square. Bring the equipment to 125°F ($\pm 10^\circ$). Adjust the pH of the charge so that after pulping the pH will be equal to 7 (± 0.5 pH). Raise the temperature of the pulper to 125°F ($\pm 10^\circ$). Charge the pulper and pulp for 15 minutes while maintaining 125°F ($\pm 10^\circ$).
4. Repeat step 3 until sufficient material has been obtained for the following steps. Maintain the temperature of the pulp at 125°F ($\pm 10^\circ$) until it is used in step 5.
5. Combine the pulp from several batches, as necessary, and dilute to the manufacturer’s recommended consistency with water heated to 125°F ($\pm 10^\circ$). Adjust the pH to 7 (± 0.5 pH). Preheat a screen with 0.0625 inch holes to 125°F ($\pm 10^\circ$) and maintain the temperature throughout this screening step. Pass the pulp sample through the preheated screen at a volumetric reject rate of 10% of the feed rate or at appropriate volumetric reject rate based on manufacturer’s specifications or recommendations.
6. With the accepts from step 5, repeat the procedure in step 5, using a screen basket with 0.010 inch slots, again maintaining the temperature, consistency and a 10% reject rate or at a rate based on manufacturer’s specifications.
7. Pass the accepts from step 6 through a lightweights reverse centrifugal-type cleaner, maintaining the temperature at 125°F ($\pm 10^\circ$), consistency, and the pressure differential specified for the cleaners being used. Determine the volumetric reject rate and report.
8. From the accepts from step 7, form handsheets according to TAPPI T 205 with the following conditions:
 - The slurry should be vigorously agitated (without causing a change in fiber distribution in the slurry) and maintained at 125°F ($\pm 10^\circ$) and pH 7 (± 0.5 pH).
 - Dry the sheets under restraint to 7% moisture content on a surface dryer maintained at 250 – 275°F.
 - Recondition to TAPPI standard conditions prior to testing.

Test the handsheets for:

- Basis Weight [TAPPI T220]
- Slide Angle [TAPPI T 815]
- Short Span Compression (STFI) [TAPPI T 826]
- Bursting Strength [TAPPI T 403]
- Water Drop Penetration [TAPPI T 831]

Note 1. The Slide Angle test on the handsheets is to be tested blotter side to blotter side.

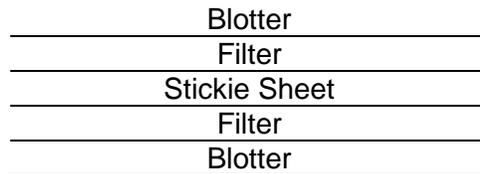
Note 2. The Water Drop Penetration test is to be conducted with five (5) drops each on the wire side and the blotter side of the handsheets.

Note 3. Basis Weight, STFI, Bursting Strength and the Indexed Value are to be reported in English units.

9. If the test must be halted to clean **any** post pulping apparatus in **any** aspect of the procedure, note your observations on the test report.
10. Report the results using the form provided (Appendix C).

HANDSHEET PREPARATION FOR STICKIES/SPOT COUNT TEST

1. Plug in Carver press and pre-heat top and bottom platens to 350° F.
 - Caution: use gloves and wear safety glasses when using Carver press – the plates get very hot and can burn you.
2. Dilute test stock to approximately 1% consistency.
3. Form and dry a 500 ml check sheet.
 - Couch off the excess water with two blotters, the round metal plate, and the roller.
 - Dry on top of a new blotter in the speed dryer.
4. Weigh the handsheet and mark its identification and dry weight on the topside of the handsheet (not the wire side).
5. Calculate the amount of slurry to use for test sheets using the following formula:
 - $2.00 \text{ grams} \div \text{dry sheet weight} \times 500 = \text{mls of slurry to use for test sheets.}$
6. Form 3 handsheets for testing by using the calculated amount of slurry.
7. Place sheets on blotters and dry on the speed dryer, then mark their identification on the topside of each sheet.
8. Remove test sheets from the speed dryer (drying period is 3-5 minutes).
9. Place each test sheet between filter paper and blotters in the following configuration (bottom to top):



10. Set the stacks of test sheets on top of each other and press them in the pre-heated Carver press for five minutes at 350° F and 500 psi. Watch to see that the pressure gauge maintains 500 psi.
11. Remove the test sheets from the Carver press and weigh each sheet.
 - Record dry weight on each sheet
12. Count the spots in the handsheets that are $\geq 0.4 \text{ mm}^2$ in area using any appropriate analysis tools, such as the dirt count estimator in TAPPI T-537 or the image analysis system mentioned in TAPPI T-277 and TAPPI T-563.

Appendix C: APPLICATION, MATERIALS and TEST REPORT

(To be completed by submitter.)

COMPANY APPLICATION

Submitted Information:

Company Name: _____

DBA (if applicable): _____

Division (if applicable): _____

Product Management:

Contact Name: _____ Position: _____

Address: _____

Phone: _____ Fax: _____ E-mail: _____

Company Function(s):

Corrugated Converter Containerboard Mill Treatment/Coating Vendor Other: _____

Treatment/Product Information:

Product Name(s) (as applicant plans to market and sell it/them): _____

Treatment Type; i.e., emulsion (aqueous), modified wax, solvent-based coating, other (describe "other"):

Treatment 1: _____

Treatment 2: _____

Treatment 3: _____

Wax Application(s) Addressed: (Check all that apply to this Treatment/Product and describe "other")

Wax Cascade/Wax Dip Wax Surface Coat Other:(Describe) _____

Wax Impregnated Medium Wax Impregnated Liners

(If more than one wax application is addressed, multiple submissions or the application with the highest lbs of treatment(s) per lb of fiber must be submitted.)

Affirmation: *To be signed by a person who is an officer of the above company and authorized to represent/bind the above company.*

Note: Please check one of the options below:

Option A: _____

- All materials and information submitted to the lab and FBA for the purposes of testing and certification of the above product are accurate as represented above.
- Appropriate company personnel have thoroughly read and understood the voluntary standard, and have prepared and submitted materials and information in accordance with the standard.

- Treated corrugated products represented (by this company or licensee), as certified to the voluntary standard, meet and will continue to meet the certification and marking sections of the standard as they are manufactured, tendered for commerce and enter the recycling stream.
- Should this company sell treated containerboard, treated combined board, or treatment chemicals to another company that plans to sell finished corrugated products to the marketplace, or even sell treated containerboard, treated combined board, or treatment chemicals to a second company that will resell finished corrugated products to the marketplace, the "Option A" company must advise purchasers that in order to market the purchaser's products as having passed the Voluntary Standard testing protocol and use the "Corrugated Recycles A" symbol, the purchasing company must complete this Company Submission form and forward it to the FBA with the "Option B" section (below) checked. The FBA will review the completed form, will register the purchasing company's treated product(s), and will provide the purchaser with its own "WPxyz" registration number.
- In addition to advising the purchasing company/companies of the need to register with the FBA, the "Option A" company must provide the purchasing company/companies with sufficient information to manufacture the finished product(s) to conform to the same or lower treatment-to-fiber ratio as the corrugated products originally certified.

Or,

Option B: _____

- These treated corrugated products are being certified based on testing done by another company. We will manufacture them with similar substrates and will have the same or lower treatment-to-fiber ratio as the corrugated products originally certified.
- We acknowledge that we have been provided with sufficient information to manufacture the finished product(s) to conform to the same or lower treatment-to-fiber ratio as the corrugated products originally certified.
- Should we sell our treated products to a company or companies that will be selling finished treated product(s) to the market place under their own name, using ours or their trade name, and whether or not the purchasing company performs any manufacturing/processing on the corrugated products, we will follow the requirements in the fourth and fifth bullet points, above, in the "Option A" section of this form.

Signed: _____ **Date:** ___/___/___ **Phone:** _____

Print Name: _____ **Title:** _____

FBA Use Only	<input type="checkbox"/> Laboratory Test Report Received
Registration Number: _____	Testing Lab: _____
Company: _____	Testing Date: _____
Date Information Received: _____	Signed by: _____
Received By: Dave Carlson _____	<input type="checkbox"/> Control Material Samples <input type="checkbox"/> Handsheets – Control
Date Response Sent to Company: _____	<input type="checkbox"/> Treated Material Samples <input type="checkbox"/> Handsheets – Treated
Signed: _____	

MATERIAL SUBMISSION INFORMATION FORM (to be completed by submitter)

(1) Component	(2) Nominal Basis Weight (Lbs./MSF)	(3) Treatment(s) (Dry lbs. applied per MSF)	(4) Processes (How is/are treatment(s) applied)	(5) Adjusted Basis Weights (Increase medium wt. by TU factor)	(6) Adjusted Dry Lbs. Applied (Increase medium app. wt. by TU factor)	(7) Lbs. of Treatment per lb. of Fiber
L ₁						Column 3 ÷ Column 2
M ₁						Column 3 ÷ Column 2
L ₂						Column 3 ÷ Column 2
M ₂						Column 3 ÷ Column 2
L ₃						Column 3 ÷ Column 2
M ₃						Column 3 ÷ Column 2
L ₄						Column 3 ÷ Column 2
Totals	N/A	N/A	N/A			Column 6 ÷ Column 5

- L₁ is always the outside liner: SW = L₁ x M₁ x L₂; DW = L₁ x M₁ x L₂ x M₂ x L₃; TW = L₁ x M₁ x L₂ x M₂ x L₃ x M₃ x L₄
- TU = Take Up Factor: Use 1.53 for A flute; Use 1.43 for C flute; Use 1.32 for B flute; Use 1.26 for E flute
- To convert treatment lbs./ton to lbs./MSF (if necessary): [lbs. applied/ton ÷ lbs./MSF of substrate] ÷ 2000 lbs./ton = lbs./MSF of treatment applied.
- If more than one treatment is applied to a single component, add the information to the same cell as the cell will expand to accommodate the additional information.
- Normal manufacturer's joint adhesive and printing inks need not be reported as they are routinely accepted into the OCC stream today.
- Conventional water resistant corrugating adhesives may be substituted for lower grades of moisture resistant or domestic corrugating adhesive; however, the substitution of proprietary or special corrugating adhesives with known extra water resistance would require re-certification by a lab and re-registration with the Fibre Box Association (FBA). If a special corrugating adhesive is used that contributes to the water resistant properties of the "Treatment", over and above that of a conventional water resistant corrugating adhesive, then the special corrugating adhesive must be reported. Use the "Comments" section below to report the dry lbs. applied.

Comments:

REPORT RESULTS: REPULPABILITY PROCESS (PART I)

Completed by lab

Note: To be completed by Lab Manager actively involved in the test process.

Trial No.: _____

Date Run: ___ / ___ / ___

	Set #1:	Set #2:	Set #3 (if required)
Is sample representative of the material as a whole?	Y/N	Y/N	Y/N
STARTING SAMPLE:			
Moisture Content	____%	____%	____%
Temperature Range (°F)	_____	_____	_____
Amount of Fiber in Charge (0.0g)	_____	_____	_____
Temp & pH Maintained	Y/N	Y/N	Y/N
Hot Slurry Charged To Flat Screen, as Instructed	Y/N	Y/N	Y/N
FINISHED SAMPLE:			
Oven Dry Mass	_____	_____	_____
Amount of Fiber Accepted	_____	_____	_____
Yield of Sample	_____	_____	_____
Observe and note deposition on vessel walls, screens, moving parts, etc.			
Deposition Observed? If yes, detail below.	Y/N	Y/N	Y/N

SUMMARY

Operational Impact:

pass/fail

pass/fail

pass/fail

Yield:

pass/fail

pass/fail

pass/fail

Notes, details:

TEST REPORT: RECYCLABILITY PROCESS (PART 2)

Completed by lab

Trial No.: _____

Date Run: ___ / ___ / ___

	Recyclability Test Sample:	Untreated:
Is sample representative of the lot as a whole?		Y/N
Moisture Content:		_____% (calculated)
Pulping at 3% Consistency: 20/80% Charge by Wt. - If greater than 20/80% ratio used , specify here: Temp & pH Conditions Maintained, per App. B, #3 No. of Batches Required	Y/N Y/N _____ Y/N _____	Y/N Y/N _____ Y/N _____
0.0625 Screens 1% (note if different) Consistency, Temp & pH, per App. B, #5 10% Volumetric Reject Rate	Y/N Y/N	Y/N Y/N
0.010 Basket: Temp, pH & Reject Rate, per App B, #6	Y/N	Y/N
Reverse Cleaners: Temp & Pressure Differential, per App B, #7 Determine Volumetric Reject Rate	Y/N _____	Y/N _____
Was it necessary to stop the test to clean any apparatus at any time during this procedure?	Y/N	Y/N
Deposition observed? If yes, detail below.	Y/N	Y/N
Were the required Temp & pH maintained throughout the entire protocol?	Y/N	Y/N

Notes, details:

TEST REPORT: HANDSHEET FORMATION AND PRODUCT PERFORMANCE

Completed by lab

Trial No.: _____ Date Run: ___ / ___ / ___

Was TAPPI T-205 used to form the handsheets, and were temp & pH maintained, dried to 7% moisture content under restraint at 250-275 °F, per App. B, #8? Yes/No _____ (Initials)

Product Performance Control Recyclability Test Sample

1. Slide Angle T-815 (Note: Test blotter side to blotter side.)

Handsheet #	Test Data	Handsheet #	Test Data
_____	_____ °	_____	_____ °
_____	_____ °	_____	_____ °
_____	_____ °	_____	_____ °
_____	_____ °	_____	_____ °
_____	_____ °	_____	_____ °

$\bar{X}_C = \text{_____}^\circ$

$\bar{X}_R = \text{_____}^\circ$

Is $\bar{X}_R \geq 0.85 \bar{X}_C$? Yes/No _____ (Initials)

2. Water-Drop Penetration T-831 (Note: Test 5 drops each on the wire side and on the blotter side.)

Handsheet #	Test Data	Handsheet #	Test Data
_____	_____ sec	_____	_____ sec
_____	_____ sec	_____	_____ sec
_____	_____ sec	_____	_____ sec
_____	_____ sec	_____	_____ sec
_____	_____ sec	_____	_____ sec

$\bar{X}_C = \text{_____} \text{ sec}$

$\bar{X}_R = \text{_____} \text{ sec}$

Is $\bar{X}_R \leq \bar{X}_C + 200$? Yes/No _____ (Initials)

TEST REPORT: PRODUCT PERFORMANCE (CONTINUED)

Completed by lab

Trial No.: _____

Date Run: ___ / ___ / ___

Product Performance

Control

Recyclability Test Sample

3. Short Span Compression (STFI) T-826

Handsheet #	Basis Wt.	STFI Value	Indexed Value	Handsheet #	Basis Wt.	STFI Value	Indexed Value
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

$\bar{X}_C =$ _____

$\bar{X}_R =$ _____

Is the indexed STFI of the treated recyclability test sample no more than 10% lower than that of the control (untreated) test sample?

Yes/No

(Initials)

Notes, details:

TEST REPORT: PRODUCT PERFORMANCE (CONTINUED)

Completed by lab

Trial No.: _____

Date Run: ___ / ___ / ___

Product Performance Control

Recyclability Test Sample

4. Burst Strength T-403

Handsheet #	Basis Wt.	Burst Value	Indexed Value	Handsheet #	Basis Wt.	Burst Value	Indexed Value
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

$\bar{X}_C =$ _____

$\bar{X}_R =$ _____

* Is the indexed burst of the treated recyclability test sample no more than 10% lower than that of the untreated control test sample?

Yes / No

(Initials)

Notes, details:

• **Product Appearance**

STICKIES/SPOT COUNT TEST VALUES AVERAGE COUNT FOR 3 SHEETS

Material	Trial #1	Trial #2	Trial #3
_____	_____	_____	_____
_____	_____	_____	_____

Is the spot count ≤ 15 , or, no more than 30% greater than that of the control?

Yes/No

(Initials)

PASS/FAIL SUMMARY

	Trial #1	Trial #2	*Trial #3
1. Substrate, samples, specimens appropriate? - treated and untreated (pass/fail)	_____	_____	_____
2. Fibre Yield \geq 85%? (pass/fail)	_____	_____	_____
3. Operational Impact acceptable? (pass/fail)	_____	_____	_____
4. Product Performance acceptable? (pass/fail)	_____	_____	_____
5. Product Appearance/Spot Count Acceptable? (Pass/Fail)	_____	_____	_____
Overall Pass / Fail - by trial:			

MATERIAL AS SUBMITTED "PASSES" VOLUNTARY STANDARD.

(Write pass or fail): _____ Signed: _____ Date: ____ / ____ / ____
 Name: _____
 Name of Lab: _____

TEST REPORT (CONTINUED)

Completed by lab

Affirmation:

The facilities and equipment in this lab are suitable for testing the tendered product within the instructions and tolerances of the current voluntary standard.

Personnel running and reporting these tests are competent and trained to accurately do so. They have followed the letter and spirit of the subject voluntary standard.

Objective and subjective information, as contained herein, is accurate.

Signed: _____ Lab Manager

_____ Name

_____ Title

_____ Name of Lab

_____ Phone

____ / ____ / ____ Date

Instructions if material "passes":

Testing Lab Manager:

- Make two (2) photocopies of the entire Report Document for a total of three (3), sets of documents. An original signature is required on this page (22) of each set of Report Documents.
- Prepare three (3) "Report Packages" consisting of the following:
 - A copy of the signed Report Document
 - 2 @ 12" x 12" samples of the control material
 - 2 @ 12" x 12" samples of the treated material
 - 3 representative hand sheet samples from each of the control and treated evaluations.
 - Retain one of the "copies" of the Report Packages indefinitely.
- Send the original and remaining copy of the Report Package to the submitting company.
NOTE: The "Original" Report Package contains the Report Document from which the two copies were made. The "Original" should have the data entries and other comments shown in their original ink state. A Corporate Officer must complete the page 14 signature page.

Submitting Company (If the Submitting Company wishes to receive FBA certification):

- Send the complete "Original" Report Package as described above, including samples to the FBA.
- When you receive your FBA Certification Letter with the FBA Certification Number, you may imprint/certify packaging made using this treatment material as meeting this voluntary standard, **provided; 1) the material is used on substrates similar to those tested, and 2) at application levels less than or equal to those tested.**

Appendix D

THE CORRUGATED RECYCLES SYMBOL

The Fibre Box Association (FBA) has adopted a mark, the *Corrugated Recycles* symbol, which can be used to both promote the recycling of corrugated and promote its ultimate recyclability. FBA grants permission to its box manufacturers to use the symbol according to the following guidelines.

What Does the Corrugated Recycles Symbol Mean?

The term *Corrugated Recycles* is both a statement of fact and a way to promote recycling. By printing the symbol on corrugated products, the corrugated customer and ultimate consumer are aware of corrugated's inherent recyclability.

Placing the symbol on a corrugated container *does not* indicate that "this container is made from recycled material." Rather, it simply means that "this container can and should be recycled."

When Do I Use the Corrugated Recycles Symbol?

FBA recommends placing the *Corrugated Recycles* symbol on all corrugated products that are readily recyclable. "Readily recyclable" corrugated products are those that have not been coated or otherwise treated with substances that are not repulpable or are of limited repulpability.

Coated/treated corrugated products that have passed the AF&PA/FBA Repulpability/Recyclability Standard Protocol (*originally issued 2/1/05 with administrative [non-testing related] revisions issued on 11/20/07, 5/15/10, and 8-16-13*) and have met all its requirements may carry the special "Corrugated Recycles" logo.

What is the Special Coated/Treated "Corrugated Recycles" Logo?

It is the *Corrugated Recycles* symbol, with or without extra wording, with the letter "A" positioned immediately to its right. The "A" must be of a type size at least as large as the open box pictured inside the Corrugated Recycles symbol. The name of the container manufacturer that is certifying the box has passed this protocol, along with the manufacturing location, must also be obvious on the container.

When Don't I Use the Corrugated Recycles Symbol?

Do not place the *Corrugated Recycles* symbol on corrugated containers that are not readily recyclable. The special "Corrugated Recycles" logo with the accompanying "A" cannot be placed on any corrugated container that has not passed the Repulpability/Recyclability Standard Protocol.

What Can I Add to the Pictorial Corrugated Recycles Symbol?

The pictorial *Corrugated Recycles* symbol is the black box and encircling arrow. As you implement the use of the symbol in your particular region, you are encouraged to add the words "Corrugated Recycles," or an equivalent phrase, near the pictorial marking in the appropriate language to your region.

Where Else Can I Use the Corrugated Recycles Symbol?

The *Corrugated Recycles* symbol may be placed on ancillary materials to help promote the recyclability and recycling of corrugated—e.g., on company or association stationery, Web sites, etc.

FBA recommends that organizations wishing to use the international Corrugated Recycles symbol check with local authorities regarding packaging marking regulations.