

LIMITED DISTRIBUTION

Carbon Fiber Remanufacturing

Comprehensive Recycling Program



CONTENT OWNER:





LIMITED DISTRIBUTION

CFR Comprehensive Recycling Program – *Responsibility & Sustainability*

Carbon Fiber Remanufacturing Current Rates and Capacity Summary

- Recycling Rate: ~130,000 lbs./month (*and Growing*)
- 60,000 sf warehouse in Ohio, 100,000 sf of warehouse in NC and SC
- 300,000 lbs/month fiber detangling capacity
- 200,000 lbs/month precision cutting capacity (Facility#1)
- 80,000 lbs/month precision cutting capacity (Facility#2)
- Needed mat and veil materials available to customer specifications



LIMITED DISTRIBUTION

CFR Comprehensive Recycling Program – *Responsibility & Sustainability*

Carbon Fiber Remanufacturing Inventory Summary

- 62% Carbon Content Fiber
 - Over 2,400,000 lbs in stock
 - 50,000 lbs/month recovered preform
 - 40,000 lbs/month recovered tow on spool
- ~95% Carbon Content Fiber
 - Over 30,000 lbs fiber in stock
 - Negotiating ongoing volume (*available by 2012*)



LIMITED DISTRIBUTION

CFR Comprehensive Recycling Program – *Responsibility & Sustainability*

Fiber Forms Recovered by CFR

- 60% - 99% Carbon content fiber (dry fiber solutions)
 - Tow
 - Preform
 - Wovens
 - Braids
 - Detangled
 - Scrap ends
 - Off-spec fiber



LIMITED DISTRIBUTION

CFR Comprehensive Recycling Program – *Responsibility & Sustainability*

Carbon Fiber Remanufacturing Typical Product Forms

Although our process retains the virgin properties of the individual fibers, the recovered materials are not equivalent to the virgin continuous tow. Therefore new product forms and market applications must be developed. Our current forms include:

- Precision cut fiber
- Milled fiber
- Molding compounds
- Thread / Yarn (fire retardant, reinforcement, blends)
- Rolled broadgoods
 - Insulation needled mat & non-woven veil
 - Rigid board insulation
 - Unidirectional reinforcements (*coming soon*)



LIMITED DISTRIBUTION

CFR Comprehensive Recycling Program – *Responsibility & Sustainability*

Recycling Quality Control = Preserving Fiber Value

Many costs are included in the process to take a variety of fiber forms and generate uniform commercial products. In order for this model to be cost effective the fiber must retain a quality and associated value. CFR actively monitors our processing plants and operations using the following tools:

- Supply Chain Manufacturing Plans
- Supply Chain FOD Programs
- Toll Processor Quality Audits
- Toll Processor Mfg Plans & FOD Programs
- Product Qualification Procedures
- Batch/Lot Testing (Third Party Lab)
- Certificate of Conformance with Data @ Shipment



LIMITED DISTRIBUTION

CFR Comprehensive Recycling Program – *Responsibility & Sustainability*

Material Acquisition Options

- CFR acquisition to avoid landfill costs
- Material processed and returned in new form to generators specification
- Structured as charitable contribution



LIMITED DISTRIBUTION

CFR Comprehensive Recycling Program – *Responsibility & Sustainability*

Scrap Source Benefits

- Protection of Normal Product Integrity
- Recovery Costs from Scrap
- Non-disclosure of Fiber Source
- Certified 'Green' Disposal Program
- Destruction of Proprietary Forms
- Diversion from Landfill



LIMITED DISTRIBUTION

CFR Comprehensive Recycling Program – *Responsibility & Sustainability*

End User Benefits

- Discounted Pricing on High Demand Technical Fiber
- Certified 'Green' Products
- Controlled Quality and Condition
- Retained Properties
- Large On-going Availability
- Engineering Support
- Entrée to New Markets / Improved Product Performance



LIMITED DISTRIBUTION

CFR Comprehensive Recycling Program – *Responsibility & Sustainability*

Carbon Fiber Remanufacturing LLC Corporate Background

Carbon Fiber Remanufacturing (CFR) develops alternatives to land filling of excess post-industrial carbon fiber materials. The carbon fiber industry conservatively estimates that 30% of carbon fibers become excess or part of the waste stream in the manufacturing process.

CFR processes carbon fiber scrap, end cuts, off-spec, and preforms by detangling, milling, cutting, and preparing the materials for use in target applications developed by CFR in team with manufacturing clients. Critical to its ability to manage the waste streams is the ongoing development of secondary uses and markets for carbon fiber scrap.

CFR was initially developed inside of AdTech International, Inc. established in 1997 which has developed efficient and desirable solutions to a wide range of excess and problematic assets and materials of industry and commerce.

Contact Information

CFR / Carbon Fiber Remanufacturing
P.O. Box One
215 S. Main Street
Whitewater, KS 67154 USA

Telephone: (316) 799-2166

Tony Guhr, Director, Program Management
Email: TGuhr@CarbonFiberRemanufacturing.com