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# **Carbon Fiber Remanufacturing**

## **Comprehensive Recycling Program**

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### 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)
- 60,000+ lbs/month yarn manufacturing capacity
- Needed mat and veil materials available to customer specifications



## 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*)



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#### Fiber Forms Recovered by CFR

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



## 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*)



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## 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



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## Material Acquisition Options

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



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#### 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





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#### 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



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## CFR 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 is a division 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.



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## ReComposite Services Summary

ReComposite has been solely dedicated to recovery and recycling solutions for the composites industry and advanced materials market for over 3 years. Our alliance with CFR has resulted in a mutual enhancement to our services. The following summarizes ReComposite's offered services:

### Supporting Role

- Development, support, and implementation of recycling solutions
- Engineering solutions and resources
- Supply chain quality control methods
- General and administrative program support

### Corporate Excess Materials Recovery Goals

- Efficient high yield solutions
- Produce uniform broadgood materials to industry requirements for re-use
- Decrease scrap volume to landfill
- Engineer technical materials to increase scrap value (capture fiber potential)



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