New Developments in Recycling Fiber and Carpet Waste

Presented by:
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Fiber & Carpet Scrap Forms

- Fiber Bales
- Carpet Rolls
- Carpet Squares
Why Is Carpet So Difficult To Recycle?
Answer:
Carpet is a complex combination of different polymers and additives with different properties and methods of recovery.
Value of the recovered material is highest when they are separated.
This Presentation Covers
Carpet Recycling Techniques and Equipment, Focusing on...
Size Reduction Equipment
Separation Technology
Repelletizing Systems
Single-shaft Shredders are good for breaking up carpet into 1-3” sized pieces.

Grinders are used to further reduce the particle size for finer separation if needed.
Designed for Operator to “Dump & Run”

Hydraulically powered ram feeder is controlled by shredder amp feedback to feed consistently without constant operator attention.
Single-Shaft Shredders: Rotor Designs

Standard Rotor Design

Works great for materials like hard scrap and purgings.

Film and Fiber Rotor Design

Fiber and carpet are difficult to handle- special design prevents wrapping and increases throughput.
Carpet squares are made up of the face fiber and the backing.

In order to recover the highest value, it is necessary to separate the face fiber from the backing before recycling.
Carpet Square Recovery

**Step 1. Size Reduction**

Carpet squares and trims are chopped into small pieces using a single shaft shredder, followed by a grinder:

- **Scrap material**
  - **Shredder** reduces to 1 to 3 inch pieces
  - **Elutriator**
    - Final particle size 1/4 to 3/8 inch for separation
  - **Grinder**
  - Fiber
  - Backing
Separation Technology

Step 2. Elutriators

Use air to separate the ground up materials by density. There are two common methods:

Method #1: Cyclonic Separation

Ground Scrap from grinder → "heavier" backing

"lighter" face fiber
Method #2: Multi-aspirator

Separation Technology

Ground Scrap from grinder

Aspirator

Fiber

Backing
Broadloom Carpet Recovery
Broadloom Carpet Recovery

Step 1. Size Reduction

Carpet is chopped into small pieces using a single shaft shredder, followed by a grinder:

- **Scrap carpet**
- **Shredder** reduces to 1 to 3 inch pieces
- **Vibratory conveyor with metal detection**
- **Grinder**

Final particle size 3/16 to 1/4 inch ready for separation.
2. Centrifugal Separation system The small pieces are separated by density using liquid.

3. The two waste streams are then recovered separately...
We’ve Covered Size Reduction Equipment & Separation Technology

Now, We’ll Discuss Repelletizing Technology
Traditional Repelletizing Systems

- Ram-Stuffer
- Densifier Drum

Traditional designs require pre-cutting.
Twin Screw Repelletizing

Fiber is chopped to 6-8mm using grinder... and fed to twin screw extruder with crammer-densifier.
New Technology For Repelletizing—Integrated Shredder-Extruder Combo

ONE-STEP Operation:
Requires No Prior Size-Reduction For Most Materials Including Fiber, Carpet, Nonwovens...
Feed Loose Scrap via Conveyor

LOOSE SCRAP bales, loose fiber, bobbins, burn-offs, cut pieces...

Conveyor is controlled by Hopper level sensor.

Machine does not require continuous, labor-intensive feeding.

Repelletize without PRE-CUTTING!

High-Quality PELLET$ Out!
Material Transport Into Extruder

Shred…
Compact…
“Warm-Feed” the Extruder IN ONE-STEP

For a Copy of the Video clip shown at this Conference, Call 678-428-9262.
Dual Venting Removes Gases From Melt

Removes:
- Spinning oils
- Excess Water
- Process Lubricants
- Other Volatiles

From the End Pellets, Improving Quality.

closed under vacuum

open for cleaning
One-Step Fiber Repelletizing @2500 pph

Can handle complete bales!
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“The Extrusion & Recycling Specialists”