STONE PAPER COMPANY

Presentation
MINERAL RESIN

The Raw Materials
An Eco-Innovation

Stone Paper

- Sustainable
- No Water Pollution
- Minimized CO$_2$ Production
- Photo Degradable
- Easy to Recycle
What is Stone Paper?

- Stone Paper is an unique material made from rich minerals and PE resin
- No hazardous content (MSDS, REACH, RoHS, EU Standards)
- Meets Food contact compliance (SGS Report)
- Eco-Solution
  - Sustainable
    - Significant reduction in the dependence on fossil based plastics
    - Renewable resources utilization loop:
      Materials ➔ Products ➔ Recycled Materials ➔ New Products
  - Recyclable
    - Up-to 98-100% recyclable into new Stone Paper products or fertilizer/cement
  - Green Production
    - Much less water usage, less energy consumption, less waste production, no water or air pollution
Stone Paper Product Range

**SP**
- For plastic film applications
- 80 – 100 microns thick
- 70% calcium carbonate + 30%PE

**RP**
- For paper applications
- 100 – 200 microns thick
- 80% calcium carbonate + 20%PE

**RB**
- For plastic/paper board applications
- 200-400 microns thick
- 60% calcium carbonate + 40%PE

**ST**
- For plastic board applications
- 400-700 microns thick
- 60% calcium carbonate + 40%PE
Sources of Main Composition

- **Calcium Carbonate**
  - 100% sourced from Hua Lien, Taiwan – from a licensed quarry [Certificate](#)
  - Every incoming batch is traceable
- **Virgin Polyethylene (HDPE)**
  - Sourced from Formosa Plastics (a company)
## Test Reports

<table>
<thead>
<tr>
<th>MSDS</th>
<th>REACH</th>
<th>RoHS</th>
<th>EU Standards</th>
<th>Food Coompliance</th>
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<td><strong>Calcium Carbonate</strong></td>
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Test reports conducted by SGS [Website]
The Recycling System

- **Full Stone Paper Recycling Process**
  - **Post-Industrial**
    - Scrapes from the production line can be re-used (named R-Series) – Flow Chart
  - **Post-Consumer**
    - Stone paper made products can be recycled & re-made into recycled Stone Paper products – Flow Chart
  - **End-of-Life**
    - Left over Stone Paper from furnace can be used as ingredients for other applications – Flow Chart
    - Reduced greenhouse gas
CO₂ Release during Incineration

Stone Paper produces only 1/3 of PP’s & 1/2 of pulp paper’s CO₂, when burned in a furnace ……

Calculations: (1) Energy need for obtaining Raw Material; (2) Stone Paper vs. Plastic Film; (3) Stone Paper vs. Pulp Paper
Stone Paper Made Products
Some Developed Applications

Paper Related
- Paper Bags
- Books
- Posters
- DM
- Cards
- Tags
- Wallpaper
- Boxes

Plastic Related
- Boards
- Synthetic Leather
- Fans
- Lamp Shades
- Injections
- Castings
- Molds
- In-mold labels

For IKEA
- Place Mats
- Light Shades
- Coasters
- Floor Mats
LUNG MENG TECH. CO.
The Raw Materials Supplier
Introduction

- Founded in 1990’s
- Team
  - 120 personnel: 80 direct & 40 in-direct labor (sales, mechanical & chemical engineers)
- Presence
  - Patents in 40 countries
  - Main Geographical Regions:
    - North America, South America,
    - Europe, Middle East, Asia Pacific
  - Production Management
    - Shan Shang District. Tainan, Taiwan
  - Asia Procurement Management
    - Ban Chiao District. Taipei, Taiwan
Certificates

- ISO9001 Certified
- ISO14001 Certified
- Cradle to Cradle Certified
What is C2C?

- C2C stands for Cradle to Cradle
  - Accredited by MBDC – Member of U.S. Green Building Council
- Criteria
  - Material Safety
    - Does not contain hazardous material (heavy metals, pigments, halogen compounds, etc)
  - Material Reutilization
    - Recovery and recycling at end of product life
  - Energy required for production
  - Water usage and discharge quality
  - Social responsibility
    - Fair labor practices
- TLM, First Taiwan manufacturing plant silver certified
Technology

- **R&D**
  - 20 years of research and development
  - Patented Stone Paper machineries
  - In house developed Stone Paper pellets (patent)
  - In house designed press machinery (patent)
  - In house designed automatic coating, cutting, and packaging techniques
Sustainability Campaign

- Recycling
  - Closed loop recycling system

- Reusing
  - Industrial waste used to make new products via in-house recycling system
  - Post consumer products used to make recycled products via different converters

- Reducing
  - Lower volume PE input to the environment
    - Low HDPE, high Calcium Carbonate composition
  - Reduce CO$_2$ output into the air
    - Lower CO$_2$ output compared to PP plastics
  - Reduce waste via controlled production system
    - Reuse Stone Paper waste to make Recycled-Series (R-series)
    - What is R-Series?

<table>
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<tr>
<th>Reuse Material and Percentage</th>
<th>Recycle back to mill</th>
<th>Recycle via Plastic #2 or #7 channel</th>
<th>Photo-degrade</th>
<th>Furnace</th>
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<tbody>
<tr>
<td>Reuse PE %</td>
<td>98-100%</td>
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<tr>
<td>Reuse Stone Powder %</td>
<td>98-100%</td>
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<tr>
<td>Reuse Stone Paper %</td>
<td>98-100%</td>
<td>98-100%</td>
<td>60-80%</td>
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What is R-Series?

- **R** is for Recycled. R-Series is a category of eco-solution products from the mill which uses anywhere from 20-100% recycled Stone Paper material.

- **Recyclability**
  - In house recycling system recycles left industrial waste from the mill’s manufacturing process to make R-Series Stone Paper.

- **Sustainability**
  - Disposed R-Series products can be reused in different applications through different processes.
    - Boards, furniture, injection products, castings
  - Even if burned in a furnace, R-Series can reuse up to 80% of its material.
    - Building materials, roads, fertilizer

- **Composition**
  - Recycled Stone Paper + Virgin Stone Paper
  - [View Chart]
APPENDIX
Post Industry Recycling System

Industrial Waste from TLM

R-Pellet

And back to...

Add some...

PE Resin

Convert into...

R-Paper
R-Board
R-Thermal
R-Paper Film
Injection Products

Convert to...

Industrial Waste from mill
Post Consumer Recycling System

Recycled Products

- PE Resin
  - Heated with...
  - Becomes...

Other Recycled Plastic Products

- Converter’s Recycled Pellets
  - Mix in some...
  - Becomes...

- Recycled Plastic Products
  - Convert into...

And back to...

Other Recycled Plastic Products

- Recycled Products
End of life Recycling System

Recycled Finished Products

Furnace

Construction Materials

CaCO$_3$ (Low Temp)

Fertilizer and Cement Production

CaO (High Temp)
R-Series Material Composition

- **R-Series Material Composition**
  - **New Material**
  - **Recycled Material**

### R-Series

- **R-Paper (RP)**
  - 80% New
  - 20% Recycled (R-Pellet)

- **R-Film (SP)**
  - 70% New
  - 30% Recycled (R-Pellet)

- **R-Board (RB)**
  - 20% New
  - 80% Recycled (R-Pellet)

- **R-Thermal (ST)**
  - 20% New
  - 80% Recycled (R-Pellet)

- **R-Pellet**
  - 100% Recycled Material
Furnace Process System

Recycled Finished Products → Furnace → Stone Powder

Pure Stone Paper

Construction Materials (Concrete) → Construction Materials (Bricks) → Stone Paper (Incoming future)

Additive

Examples of materials and processes involved:
- Recycled Finished Products
- Furnace
- Stone Powder
- Pure Stone Paper
- Construction Materials (Concrete)
- Construction Materials (Bricks)
- Stone Paper (Incoming future)
Post Consumer Recycling System

Standard Recycling Procedure

Recycled Products

- Cut into pieces
- Other Recycled Plastic pieces
- Recycling Company
- Pieces of plastic

Not Standard Recycling Process

- Furnace
- Impurities Powder
- Construction Materials (Concrete / Bricks)
- Construction Waste Process
- Stone Paper (Pure Stone Powder needed)
- If Pure Stone Powder

Additive

- Standard Recycling Process
- Extrusion
- Molding injection
- Plastic Board
- flower pat

Converters