

Bringing Plastics Full Circle

Reaching Higher with Recycled Plastics

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REGAIN
Polymers Limited

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Overview

- **About REGAIN**
 - Brief Background
 - What do we do?
 - Investments and future plans
- **Technical Challenges to Recycling**
 - Contamination
 - Technical / Physical performance
- **Technical Solutions**
- **Case-Studies**
 - Paint Cans
 - Cable Trough
 - Air-Ducts
 - Water Soak-Away

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Brief Background

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- Began as a LINPAC Subsidiary in 1992
 - Rapid growth initially
 - Investment challenges latterly
- Chamonix Private Equity Acquisition Jan 2011
 - Strategy for Growth
 - Inward Investment
- 45,000MT Capacity
- £25million Turnover (2011)



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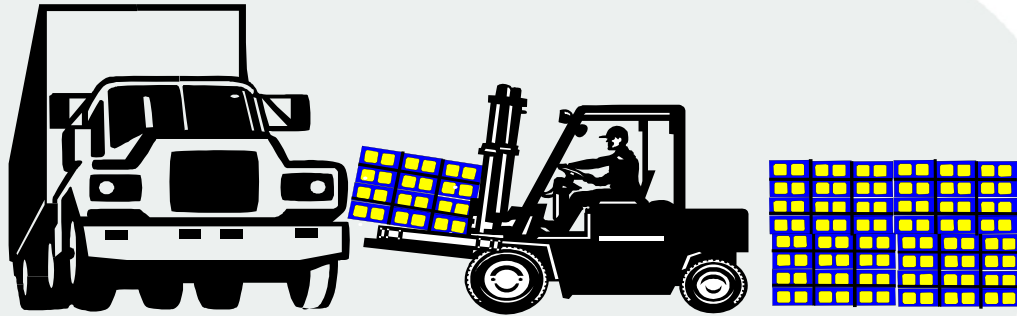
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What do we do?

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The Recycling Process



Waste plastic materials are brought to our Allerton Bywater site by road transport and stored until ready to use.

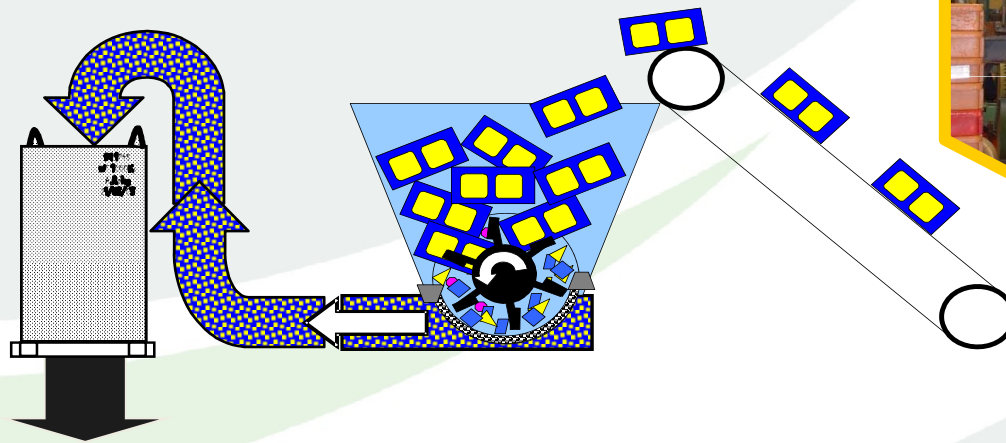
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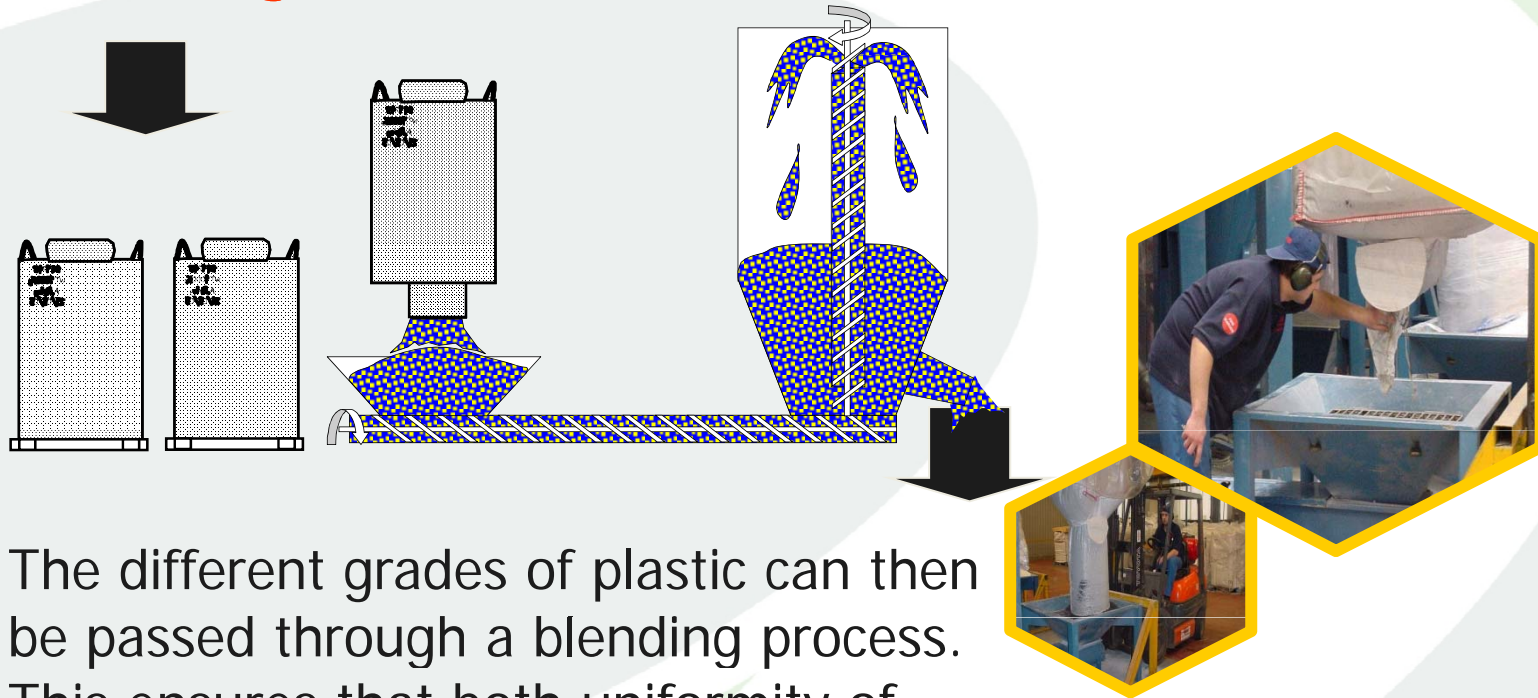
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Washing & Granulation

The waste plastic is then chopped or granulated into small pieces prior to passing through the washing and drying process. The resultant clean regrinds are then stored in intermediate bulk prior to further processing.



Blending of Materials

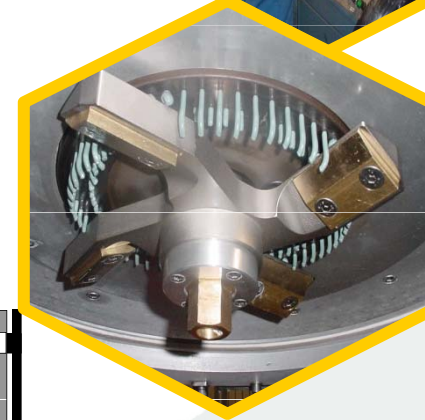
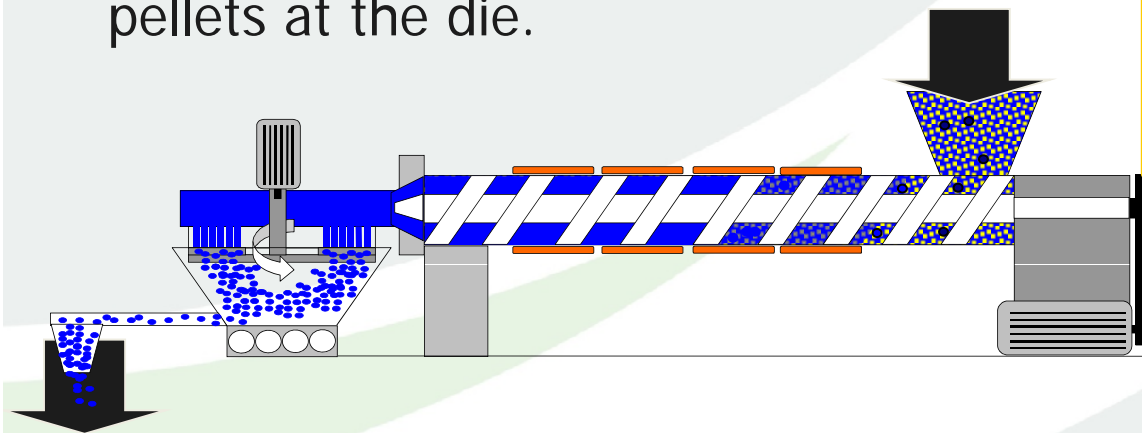


The different grades of plastic can then be passed through a blending process. This ensures that both uniformity of product and the precise specification required by our customers can be met.

The Extrusion Process

Material from the fountain blender is then run through an extruder. Colouring agent called masterbatch can also be added at this stage.

Material is gradually heated and passed through de-gassing and filtering stages before finally being chopped into small pellets at the die.



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Finished Product



The pellets are then packaged to customer requirements and dispatched by road transport.



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End use applications



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Where are we Going?

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Strategic Investment

- Geographic Expansion
 - RRPL Rainham, Essex December 2011



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Strategic Investment

- Extrusion Capacity May 2012
 - £1.2 Million, Increase to 45kT



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Strategic Investment

- Product Development centre
– Opening Q2 2013



Why use Recycled Polymer?

- Environmental
 - Corporate Social Responsibilities
 - Consumer Perception
 - Environmental benefits
 - 30% of Carbon Emissions versus Prime
- Commercial Advantages
 - Cost benefits
- Legislative Drivers
 - Government Targets
 - 5% per year to 2017
 - 47% of UK domestic waste recycled by 2017

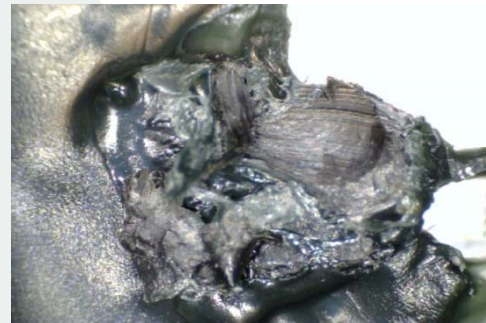
Packaging Waste

- HDPE / PP (& PET) widely recycled
- PET / HDPE Food contact developments
- PP stream increasingly available
- Scale means consistency
- Sorting methods variable
 - NIR / Automatic faster but produces lower quality
 - Hand Sort more expensive
 - Black Detection difficult in NIR systems
- Single polymer construction



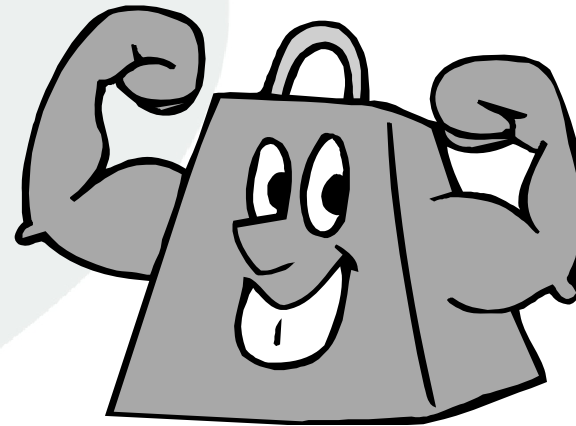
Challenges - Contamination

- Caused by:
 - Mixed Collections
 - Automated Sorting
 - Lack of knowledge
- Solutions
 - Process Scrap
 - Better control
 - Easier identification
 - Supplier Audits
 - Training
 - Density Separation
 - Melt Filtration
 - Temperature control
 - Process Control / monitoring

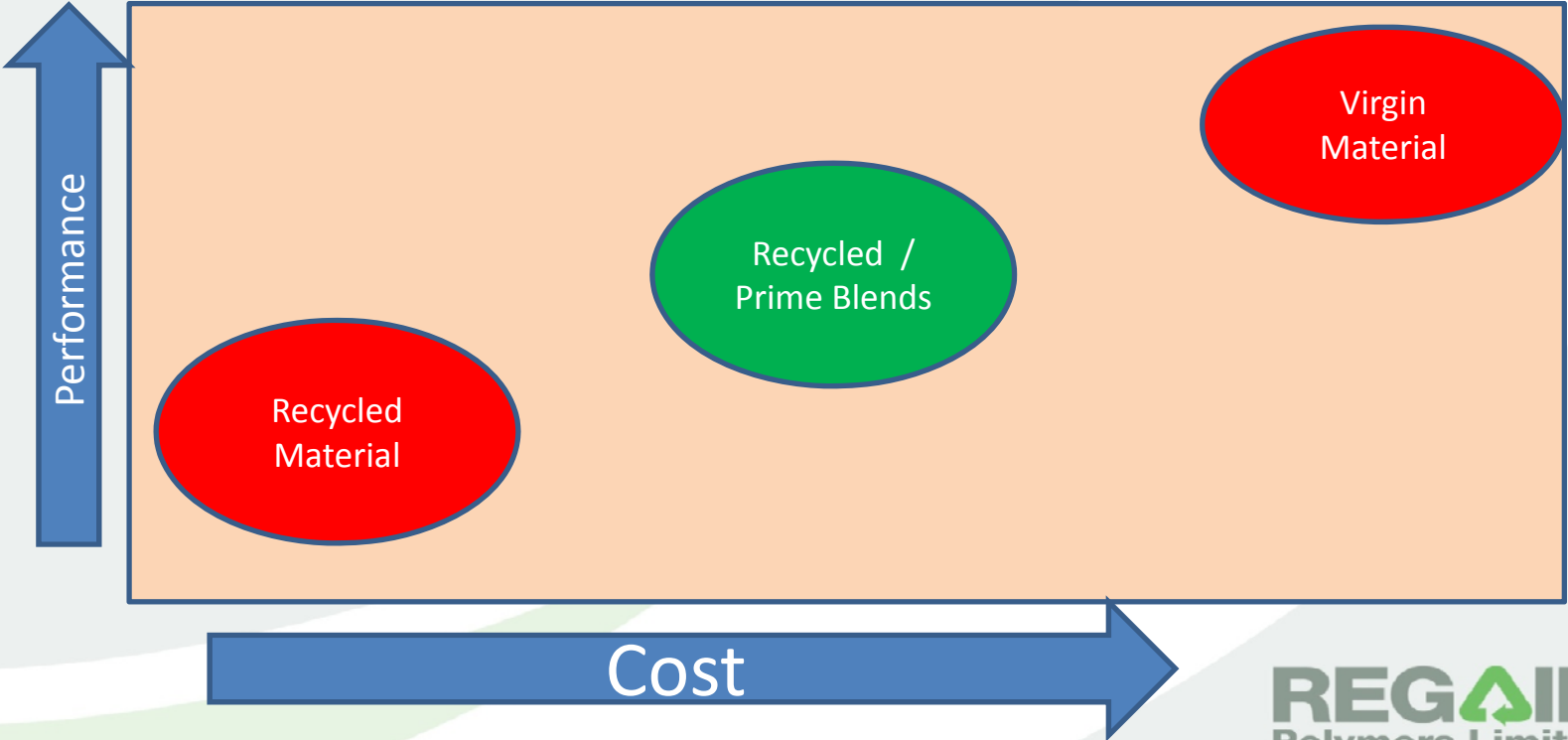


Challenges – Physical Performance

- Demanding Applications...
 - High Impact Strength
 - Stiffness
 - Creep
 - Stress-Crack Resistance
- Recyclate Limitations:
 - Feedstock availability
 - Lack of “Single Streams”
 - Impurities
 - Physical Contamination

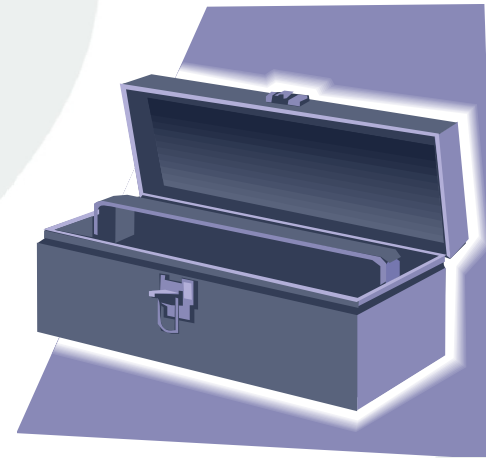


Bridging The Gap



Other “tools” in the Box

- Impact Modifiers
 - VLDPE
 - mPP
 - TPE
- Nucleating Agents
- Odour Neutralisers
- Anti-Scratch Additives
- High Performance Talcs
- Recycled Filler Systems
- Process Aids
 - Waxes
 - Fatty Acid Systems



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Case Studies

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Case-Study: Paint Cans

- Paint Cans
- 25% Recycled Content
- Marketing Accepted colour change
- Consistency Critical
- High Post Consumer Packaging Content
- Increase to 50% next challenge
- Bought-in additional stiffness with Virgin



<http://www.youtube.com/user/REGAINPolymers>

Case Study : Cable Duct

- Long Lifetime
 - 20+ Years
- Concrete replacement
- Installation Costs
- Low cost solution
- Filler / Feed critical



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HVAC Air Duct for Nissan

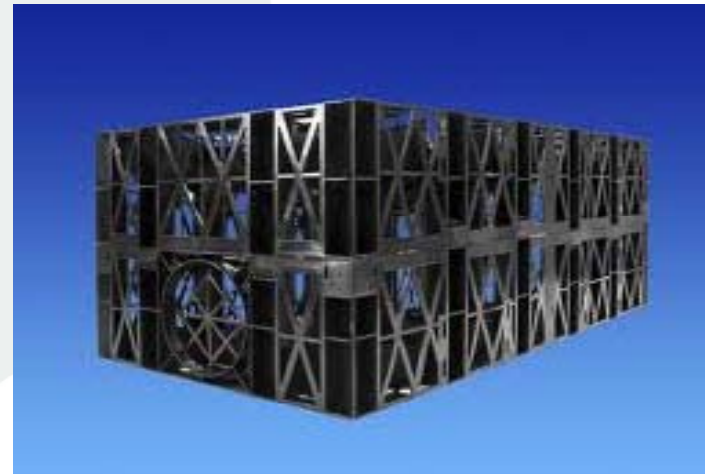
- Blow-Moulded
- Odour Neutraliser
- Rheological Control
- Contamination Critical
- Control of Dimensions



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Case Study : Water Soak - Away

- Complex moulding
 - Control of MFI
 - Crystallisation Temp
 - Flow Paths
- Demanding Application
 - High Stress
 - Long-Term Creep
 - Impact Strength
- A-65P10
 - 10% Virgin



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Thanks for Listening

Any Questions?

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