Topic: PET BOTTLES RECYCLING FOOD GRADE PACKAGING APPLICATION
1. RECYCLING v.s. FOOD PACKAGING

2. WHO is CHANG WOEN MACHINERY?

3. HOW DIFFICUT is it in the washing line to achieve FOOD GRADE output?

4. What other plastic can be recycled?
RECYCLING v.s. FOOD PACKAGING
SEXY Topics, ever since year 2015
Output Application:

- Fiber Grade
- Filament Grade
- Sheet Grade
- Bottle Grade

Will it survive the low crude oil price environment?
Trend of rPET Application
2015 to 2018

1. Total collection, 16% increased.
2. Sheet & Food Grade increased.
Demands for rPET in Textile Application

Booming up to 12.6 Million Ton/Yr capacity by all kinds of big brand textile & sport wear

Ad. from adidas

Easy to throw out.

Better to throw on.

Ad. from Everlane
Demands for rPET in Food Grade Package

Expect for 2.85 ~3.0 Million Ton/Yr capacity to be achieved in year 2020.

A European Strategy for Plastics in a Circular Economy

To ensure that all plastic packaging is recyclable by 2030

“EVIAN will make all of its plastic bottles from 100% recycled plastic by 2025”

“Coca-Cola is committing to circularity.”

“Embracing a circular economy with PET as a reusable material.”

“A common EU target for recycling 75% of packaging waste by 2030.”

PepsiCo Recycling


“Adidas will only use recycled plastics by 2024.”
What reasons drive brand owner for recycling activities?

1. CO2 emission
2. Closed Loop /Sustainability
3. Consumer Conscious
4. Good for Earth
What drives brand owner for recycling activities?

1. CO2 emission

Year 2008
PAS 2050/ISO 14067
Life Cycle Assessment
  Auditor: SGS
  Customer: FENC
  Washing Line: ChangWoen

2019
ISO 14067:2018
Carbon Footprint Verification, CFV
  Auditor: Thailand FDA
  Customer: Indorama
  Washing Line: ChangWoen
What drives brand owner for recycling activities?

2. Closed Loop / Sustainability

Closing the Loop

- Purchase & Use
- Disposal & Collection
- Sorted & Baled
- Separation
- Washed & Flaked
- Extrusion into Pellets
- Preform
- Bottle Manufacture
- Labeling & Filling
- Visy's Material Recovery Facility (MRF)
- Plastics sorted by type at Visy's RPET plant
- Coloured, Mixed, HDPE, Glass, & Mixed
What drives brand owner for recycling activities?

3. Consumer Conscious

What consumer thinks nowadays .......

Source | WRAP, UK.
Using Recycled Content In Plastic Packaging: The Benefits
www.wrap.org.uk

83% believe that products in recycling packaging are having a positive impact on the environment.

86% of respondents felt that it would be “very” or “quite” good if packaging contained recycled plastic.

78% said that they would feel more positive about a product or manufacturer whose pack contained recycled plastic.

An amazing 90% of respondents said that manufacturers and retailers should “just get on with it” and use as much recycled plastic as possible.
What drives brand owner for recycling activities?

A2011 LCA compared vPET, rPET & PLA
Results of LCA shows that in a direct comparison with vPET, rPET & PLA would represent the following environmental benefits:

4. Good for Earth

- **GLOBAL WARMING (Co2)**: Reduced by more than 15%
- **WATER USE**: Reduced by more than 45%
- **SOLID WASTE**: Reduced by more than 35%
- **FOSSIL FUEL DEPLETION**: Reduced by more than 25%

Based on 350 ml juice bottle – numbers can vary based on individual LCA’s source. RMIT University Report LCA research.
Trends in EU in bottled water industry

Nestle & Danone are both producing bottles with rPET content of 25~50%
In Europe, Evian is manufacturing its water bottles with 50% rPET content.

In the UK, several other water bottles are at 25-30% and aiming to get to 50%
Trends in EU in bottled water industry

A UK non-profit water bottle, Belu is at 50% recycled content using rPET content.
Examples of rPET package in Juice Beverage

In the US, **Naked** have launched the reNEW bottle made of **100%** post-consumer recycled PET content.

**M&S**, Sainsbury supermarket own juice bottles now contain **50-100%** rPET content.
Examples of rPET package in Juice Beverage

In the UK, **Innocent**, Light colored Juice bottle such as Orange and Apple at 35% rPET content.
### Brand Owner’s Targets & Timeline on Recycling

<table>
<thead>
<tr>
<th>Brand Owner</th>
<th>Partner(s) &amp; Investment(s)</th>
<th>Year</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
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<tr>
<td>Nestle Waters NA</td>
<td>How2Recycle® Closed Loop Fund</td>
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<td>Coca-Cola</td>
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</tbody>
</table>

- Nike: 20% rPET
- Nestle Waters NA: 50% recycled content
- How2Recycle® Closed Loop Fund: 100% recycled or renewable content
- Danone: 100% recyclable / 25% rPET, Carbon neutral
- Textile Exchange: 25% rPET
- Ikea: 100% recyclable
- Adidas: 100% rPET
- Unilever: 100% recyclable / 25% rPET
- Pepsico: 100% recyclable, compostable, or biodegradable
- Walmart: 0 waste to landfill, 100% recyclable packaging in private label products
- Volvo: 25% recycled content
- Coca-Cola: 50% recycled content
A brief conclusion of chapter 1.
RECYCLING v.s. FOOD PACKAGING
1. RECYCLING v.s. FOOD PACKAGING

2. WHO is CHANG WOEN MACHINERY?

3. HOW DIFFICUT is it in the washing line to achieve FOOD GRADE output?

4. What other plastic can be recycled?
### BUSINESS AREAS/SECTOR

<table>
<thead>
<tr>
<th>Sector</th>
<th>Numbers</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Wash Tech</strong></td>
<td>36</td>
<td>Washing line for HDPE bottle, LDPE, PP film, PET bottle, RDF line, Sorting line. 8.5 million USD/year</td>
</tr>
<tr>
<td><strong>Shredder/Crusher</strong></td>
<td>12</td>
<td>Crusher 200 units/year, Shredder 120 units/year. 15.1 million USD/year</td>
</tr>
<tr>
<td><strong>History</strong></td>
<td>34Y</td>
<td>Established 1985, 1st PET washing line Asia 1992, 1st B2B for PET recycling 2007</td>
</tr>
</tbody>
</table>

**Established 1985**
- **1st** PET washing line Asia 1992
- **1st** B2B for PET recycling 2007
Taiwan

1992, 1st PET washing line in Taiwan
2004, 1st Trial for Food Grade Application
2007, B2B delivered to Coca-Cola

The No. 1 machine maker for recycling activities in plastic material & industrial waste material.

19 references in SEAN countries for rPET Food Grade Application & Fiber Application

34 years History as established in 1985.
CHANG WOEN References & Agents Worldwide

- U.S., California
- Vietnam, HCM
- Japan, Tokyo
- Greece, Crete
- Italy, Breccia
- Turkey, Istanbul
- Russia, St. Petersburg
- South Africa, Cape Town
- Brazil, Sao Paolo
CHANG WOEN Manufacturing

Taiwan Quality

72 references of all kinds washing line in Japan

Unlike Chinese

265 references in Asia
WE ARE NOT VERY BIG
WE KNOW RECYCLING BUSINESS INSIDE OUT
Sport Wear 2018 FIFA

This is FIFA Jersey
NIKE Sport Wear

This is Jersey
Adidas | Ocean Plastic Waste

Case Study 2018
Ocean Plastic Recycling

18 bottle/pair
Ocean Clean Up
Adidas | Ocean Plastic Waste

- 250 Hr Collection
- Manual Sorting
- Hot Washing
- 70 Tons Bottle Input
- Trommel, 54% Loss
- Crushing
Adidas | Cycle of Bottles to Sport Wear

1. Marine plastic waste in coastal areas such as the Maldives...
2. Is collected by Parley and its global clean-up network...
3. Baled and sent to Parley supply chain partners...
4. Where they are shredded and reworked...
5. To become a high performance polyester yarn: Parley Ocean Plastic™...
6. Which is used to create Adidas x Parley products.
7. The journey of an Adidas x Parley product
水果盒/雞蛋盒 Thermoforming Sheet/Tray Package

This is Thermoforming Tray

FDA approval

120~250 micron
泡殼盒/玩具包裝盒  Thermoforming Sheet/Tray Package

Blister for Electronics Package

Personal Care Package

Thermoforming Toy Package

This is Thermoforming Tray
This is Coke Bottle
Recycling Process  Segregation, Sorting, Washing, De-contamination

2019 Update:

Incorporate with Indorama & Wellman & ChangWoen

for Food Grade approval certification in Thailand.
Our Customer List  rPET Business Related – PET Resin Maker

- Far Eastern Group
- Nan Ya Plastics
- Shinkong
- Indorama Ventures
PET Washing Line Capacity
V.S.
Local Bottles Collection

Taiwan
6,000/9,000 TPM

Philippine
8,000/25,000 TPM

Vietnam
4,200/16,000 TPM

Indonesia
9,000/48,000 TPM

Malaysia
3,000/6,500 TPM

Thailand
15,000/35,000 TPM
CHANG WOEN PET Recycling

Taiwan
No Compromise

PET,
Not a waste if you know how to distinguish it and recycle it.

Bottle Source:
- Post Consumer Bottle
- Cooking Oil Bottle
- Beer Bottle

0.5 TPH ~ 6.0 TPH input capacity

Output application:
- Fiber Grade
- Filament Grade
- Sheet Grade
- Bottle Grade
CHANG WOEN PET Recycling

Taiwan

1st Food Grade B2B for PET recycling in Asia 2007
CHANG WOEN PET Recycling

Bottle Pre-Wash
- Most dirt removal
- Distinguish PVC bottle
- Chemical Re-usage

Label Remover
- Shrinkage Label
- Dust
- 1,600 Ton lifetime of nails
CHANG WOEN PET Recycling

Taiwan Case Study

Turbo Friction Wash
Removes Ink & Sticker

Crusher

☑ Less powder generated
☑ Stable performance on ampere
☑ Clean cut for flakes output
☑ Quick maintenance - 1 hr Knife change
CHANG WOEN PET Recycling

Case Study
Thailand

Shredder | Size you decide, Capacity we deliver
CHANG WOEN PET Recycling

Case Study: Thailand

Before Wash

After Wash

INDORAMA VENTURES

ECORAMA

PCR PET FLAKES

INDORAMA POLYESTER INDUSTRIES PCL.

NAKHONPATHOM, THAILAND
CHANG WOEN PET Recycling
Case Study
Malaysia
CHANG WOEN PET Recycling
Case Study
Malaysia
We can do

**FIBER GRADE**

Taiwan supplies 52% of clothes to World Cup soccer players by 2014. And the figure will come up 75% by 2018.

And 100% of those clothes suppliers & yarn suppliers use Chang Woen washing line to produce the PET bottle flakes in the beginning.
We can do

SHEET GRADE

According to records, annual consumption of PET sheet made of virgin PET for food package industry only consumes 17% of total PET production by year 2017, says 17 million tons per year, which has been raised 20% from year 2018.

It's predicted to be raised another 15~20% of consumption by 2020.
250,000 tons of PET material consumed for bottle package will be recycled material introduced by 2025, says Coca-Cola.

200,000 tons of rPET is targeted to obtain for package for our personal cleaning content product by 2025, says Unilever.
1. RECYCLING v.s. FOOD PACKAGING
2. WHO is CHANG WOEN MACHINERY?
3. HOW DIFFICULT is it in the washing line to achieve FOOD GRADE output?
4. What other plastic can be recycled?
The concept of 10 ppm

Which one is virgin PET?  Which one is 100% RPET
The concept of 10 ppm

What is the concept of 10 ppm contamination?
<table>
<thead>
<tr>
<th>管制項目 Property</th>
<th>品質規範 Specification</th>
<th>備註 Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 實質黏度 at 25℃ Intrinsic Viscosity</td>
<td>0.70±0.03</td>
<td></td>
</tr>
<tr>
<td>2 容積密度 g/cm³ Bulk Density</td>
<td>0.38±0.05</td>
<td>ASTM D1895</td>
</tr>
<tr>
<td>3 水分 Max. % Moisture</td>
<td>&lt; 1.2</td>
<td></td>
</tr>
<tr>
<td>4 PVC Max. PPM</td>
<td>&lt; 80</td>
<td></td>
</tr>
<tr>
<td>5 鋁片 Max. PPM Aluminum</td>
<td>&lt; 10</td>
<td></td>
</tr>
<tr>
<td>6 懸浮固體 Max. PPM Floatable Contamination (HDPE, PP, Labels, Glues)</td>
<td>&lt; 150</td>
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<tr>
<td>7 懸浮 PE Max. PPM</td>
<td>&lt; 50</td>
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<tr>
<td>8 總雜質率 Max. PPM Total Contamination</td>
<td>&lt; 200</td>
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### Specification of Product Quality (Ultra Filament Grade)

<table>
<thead>
<tr>
<th>管制項目</th>
<th>Property</th>
<th>品質規範</th>
<th>Specification</th>
<th>備註</th>
<th>Test Method</th>
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<tr>
<td>01</td>
<td>實質黏度 at 25°C</td>
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<td>0.71±0.03</td>
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<td>Intrinsic Viscosity</td>
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<td>02</td>
<td>容積密度 g/cm³</td>
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<td>0.33±0.05</td>
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<td>ASTM D1895</td>
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<td>Bulk Density</td>
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<td>03</td>
<td>水分 Max. %</td>
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<td>Moisture</td>
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<td>PVC Max. PPM</td>
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<td>Total Contamination</td>
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<td>白度 Whiteness, Lb value</td>
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<td>1.5 ±1.5</td>
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<td>11</td>
<td>熱烘烤色變異</td>
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<td>No color changes No agglomeration No crystal caking</td>
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Quality Standards/ Request for FDA & Coca-Cola PCR CLEAR PET Flake:

<table>
<thead>
<tr>
<th>ATTRIBUTE SPECIFICATION</th>
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<tbody>
<tr>
<td>01 INTRINSIC VISCOSITY</td>
<td>(0.71 - 0.80) dL/gm</td>
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<td>02 CIE (L, a, b)* COLOR</td>
<td>3.0 MAX. “b*” value</td>
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<td>03</td>
<td>50.0 MIN “L*” value</td>
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<td>04</td>
<td>-1.00 ± 1.0 “a*” value</td>
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<td>05 FINES</td>
<td>0.4% MAX.</td>
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<td>06 FLAKE pH</td>
<td>7.00 ± 0.5</td>
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<tr>
<td>07 VOLATILES</td>
<td>&lt; 1 ppm</td>
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<td>08 MOISTURE CONTENT</td>
<td>1% MAX</td>
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<td>09 BULK DENSITY</td>
<td>25-33 lbs/ft³</td>
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<td>10 FLOATABLE CONTAMINATION</td>
<td>&lt; 10 ppm</td>
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<tr>
<td>11 PVC CONTAMINATION</td>
<td>&lt; 10 ppm</td>
</tr>
<tr>
<td>12 GLUE CONTAMINATION</td>
<td>&lt; .005 % Residue</td>
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<td>13 PETG CONTAMINATION</td>
<td>&lt; 10 ppm</td>
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<td>14 METAL CONTAMINATION</td>
<td>&lt; 5 ppm</td>
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<tr>
<td>15 OTHER – NON MELTING</td>
<td>&lt; 10 ppm</td>
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<tr>
<td>16 GREEN PET CONTAMINATION</td>
<td>&lt; 100 ppm</td>
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<td>17 Other Color Flake (not incl light blue)</td>
<td>&lt; 10 ppm</td>
</tr>
</tbody>
</table>

500 kg of flakes in 1 Jumbo bag

PVC 5 ppm = 2.5 g flakes = 40 pcs flakes

P.O. 10 ppm = 5 g flakes = 85 pcs flakes
What key points are there for recycled material into Food Grade application?

1. Ensure recycling process is food safe.
2. U.S. FDA & E.U. EFSA regulations
3. Decontamination Processes
4. Challenge test
What key points are there for recycled material into Food Grade application?

1. Ensure recycling process is food safe.
   Any material applied to food contact uses are highly regulated and monitored as well as recycled material.

   But, global regularity frameworks vary among countries.

US FDA v.s. EU EFSA
What key points are there for recycled material into Food Grade application?

Focus is on potential dietary exposures to substances & safety of such exposure.

Focus is on levels of substance and plastic migration into food.
What key points are there for recycled material into Food Grade application?

Good news is that most countries agree on that materials must be inert in order to protect the purity of food, such as:

1. Migration of substances shall not endanger human health.
2. Migration cannot bring an unacceptable changes in the composition of food.
3. Migration cannot deteriorate the characteristics of food.
4. Packaging material are complex, those migration of chemical substances may impact to food, whether virgin or recycled. Reducing migration from packaging to the food is always important!
What key points are there for recycled material into Food Grade application?

What Migration issue can be?
What key points are there for recycled material into Food Grade application?

2. U.S. FDA & EFSA regulations

(A) Definition
Within FCN (Food Contact Notification sys.), the Food Contact Substance is defined by the FDA in U.S. as:

“Any substance intended for use as a component of materials used in manufacturing, packing, packaging, transporting, or holding food and have a technical effect on the food.”
What key points are there for recycled material into Food Grade application?

2. U.S. FDA & EFSA regulations

(B) Case-by-Case
To address any safety concerns around recycling, the FDA considers each proposed use of recycled plastic on a case-by-case principle and issues advice as to whether the recycling process is expected to produce plastic suitable for food-contact applications.
What key points are there for recycled material into Food Grade application?

2. U.S. FDA & EFSA regulations

(C) List of Submissions as guidance
The FDA provides a “List of Submissions” for which the agency issued a favorable opinion on the suitability of a specific process for producing post-consumer recycled (PCR) plastic to be used in the manufacturing of food contact articles as further guidance.

These requirements are described in 21 CFR, Parts 174 through 179.
What key points are there for recycled material into Food Grade application?

3. Decontamination Processes
How can we Decontaminate during recycling process?

<table>
<thead>
<tr>
<th>In Washing Line</th>
</tr>
</thead>
<tbody>
<tr>
<td>De-Label</td>
</tr>
<tr>
<td>Sticker</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>In Extrusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat</td>
</tr>
</tbody>
</table>
What key points are there for recycled material into Food Grade application?

3. Decontamination Processes

The initial level of contamination was 600-800 ppm obtained by soaking the flake in contact with the contaminants for 14 days at 40 deg C.

Simulates the PET bottle being abused with contaminants for 1 year at ambient conditions.

The limiting levels specify the limit that will not transmit more than 10 ppb to the food with the most aggressive simulant for fatty foods.
3. Decontamination Processes

What surrogates of contamination shall be de-con. and what will be examined?

<table>
<thead>
<tr>
<th>Surrogate Chemical</th>
<th>Flake Initial ppm</th>
<th>Flake After Wash ppm</th>
<th>Flake After High Temp Decontamination ppm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chloroform</td>
<td>592±77</td>
<td>300±24</td>
<td>&lt;0.1</td>
</tr>
<tr>
<td>Toluene</td>
<td>736±163</td>
<td>237±32</td>
<td>0.2±0.01</td>
</tr>
<tr>
<td>Chlorobenzene</td>
<td>649±83</td>
<td>225±26</td>
<td>0.4±0.03</td>
</tr>
<tr>
<td>Phenylocyclohexane</td>
<td>795±186</td>
<td>507±104</td>
<td>0.6±0.45</td>
</tr>
<tr>
<td>Benzophenone</td>
<td>694±180</td>
<td>419±88</td>
<td>1.2±0.99</td>
</tr>
</tbody>
</table>
What key points are there for recycled material into Food Grade application?

3. Decontamination Processes

Input Flake

- Acetaldehyde, C2H4O
- Ethylene Glycol, C2H6O2
- Limonene, C10H16
What key points are there for recycled material into Food Grade application?

3. Decontamination Processes

Washed Flake

- Acetaldehyde, C2H4O
- Ethylene Glycol, C2H6O2
- Limonene, C10H16
What key points are there for recycled material into Food Grade application?

4. Challenge test

A challenge test is meant to simulate drastic contamination of plastic packaging by consumers with commonly available toxic substances and the ability of a process to remove these contaminants.

Long story short, they put surrogates of contamination into rPET flakes, and challenging if your recycling process can remove it or not.
What key points are there for recycled material into Food Grade application?

4. Challenge test

US FDA Validation of Recycling Processes

- Any recycling process must demonstrate its ability to remove potential contaminants due to consumer misuse.

- A series of representative chemicals or their surrogates are used to spike the plastic flake in a “Challenge Test”.

- 100% of flake is contaminated for 2 weeks at 40 deg.C (Flakes absorb up to 10 times more contaminants than bottles)
What key points are there for recycled material into Food Grade application?

4. Challenge test

How does “Challenge Test” work?

• Once the contaminants are mixed with the flakes, sealed and stored for 2 weeks at 40°C with periodic agitation.

• After the contaminants are drained and flakes are rinsed, the concentration of each surrogate is then determined in the polymer.

• The challenged polymer is then subjected to the proposed recycling process, and the reprocessed polymer should be analyzed for residual contaminants.
What key points are there for recycled material into Food Grade application?

4. Challenge test

- Recycled plastics must be obtained from an authorized process and the process shall work under a Quality Assurance system.

- The main legislation controlling all food contact materials and articles is European Regulation (EC) number 1935/2004.

- These national regulations also create offences for failing to comply and the penalties that may be imposed by the Courts.
What key points are there for recycled material into Food Grade application?

4. Challenge test

Regulation EC 1935/2004 on materials and articles intended to come into contact with food, and

Article 3 of the regulation:
- Any material or article intended to come into contact directly or indirectly with food must be sufficiently inert to preclude substance from being transferred to food in quantities large enough to:
  - Endanger human health or
  - To bring about an unacceptable change in the composition of the food or
  - A deterioration in its organoleptic (taint and odor) properties.
What key points are there for recycled material into Food Grade application?

4. Challenge test

Regulation EC No. 282/2008 on recycled plastic materials and articles intended to come into contact with foods

The recycling process must be one that is ultimately approved by the European Food Safety Authority (EFSA) and has been demonstrated in a challenge test to be effective in removing any harmful materials that may have contaminated the packaging. In all cases the recycled material must comply with the requirements of Article 3 of regulation (EC) No. 1935/2004.
What key points are there for recycled material into Food Grade application?

EFSA has more limit and examined on recycling process as technical detailed as following:

4. Challenge test

- Process Validation and Process details
- Hazard Analysis Critical Control Points
- Analytical test procedures
- Challenge test results with surrogates
- Decontamination efficiency of recycling process
- Manufacture of test products
- Migration test results
- Microbiological and Sensory (Taste and Odor) test results
- Trial audit
A brief conclusion of chapter 3.

**HOW DIFFICUT** is it in the washing line to achieve **FOOD GRADE** output?

1. It’s difficult, but it’s been well proven worldwide.
2. E.U. EFSA is much strict than U.S. FDA
3. Decontamination V.S. Challenge test

Listen to Expert !!!!
Chang Woen Machinery is at your service at all time
1. RECYCLING v.s. FOOD PACKAGING
2. WHO is CHANG WOEN MACHINERY?
3. HOW DIFFICUT is it in the washing line to achieve FOOD GRADE output?
4. What other plastic can be recycled?
CHANG WOEN Product Structure

- PET Bottle Washing Line
- PE/PP Film Washing Line
- PE/PP Bottle Washing Line
- ABS/PS Rigid Plastic Washing Line
- Tire Recycling Line
- Woods/ Furniture Shredding Process

Food Grade
Film Grade
Extru. Grade
Blow Molding Grade
Inject Grade
Wood Chips
Taiwan
No Compromise

HDPE, Not a waste if you know how to distinguish it and recycle it.

- Milk Bottle
- Grease & Cooking Oil Bottle
- Shampoo Bottle
- Pesticide Bottle

HDPE line adopted by Unilever in Indonesia
HDPE line adopted by P&G in Russia

0.5 TPH ~ 4.0 TPH input capacity

Blow Molding Bottle
Injection Molding Bucket / Crates
Injection Molding Home Appliance
Input capacity: 4.0TPH
Loss of Contamination: 10~20%
Output capacity: 3.6TPH
Motor List: 299.25kw
Power consumption: 239.4kw
CHANG WOEN HDPE Recycling in Tainan, Taiwan
CHANG WOEN HDPE Recycling in Tainan, Taiwan
CHANG WOEN Product Structure

- PET Bottle Washing Line
- PE/PP Film Washing Line
- PE/PP Bottle Washing Line
- ABS/PS Rigid Plastic Washing Line
- Tire Recycling Line
- Woods/ Furniture Shredding Process

Food Grade
- Food Grade
- Film Grade
- Extrusion Grade
- Blow Molding Grade
- Inject Grade
- Wood Chips
CHANG WOEN LDPE/PP Film Recycling

A.G. Film Recycling
Post Consumer Film Recycling
In House Film Recycling