Some things, you want to keep forever, but definitely not the plastic!

About GDT
- Established in 1996
- Specialized in plastic raw material
- Exclusive Distributor of d2w in Lebanon
- Launched d2w in May 2009
Symphony Environmental Technologies Plc

- The only quoted company in Controlled-life Plastic Technology
- Shares traded on ‘AIM’ market of the London Stock Exchange “SYM” also on the Plus Market in London and in New York under Bank of NY ADR program “SETPY”
- Headquartered in London
- Global Brands are d2w and d2p and d2Detector
- Active in 96 countries worldwide
- Chief Scientist, Professor Gerald Scott DSc, FRSC, C.CHEM, FIMMM
- Symphony provides a high quality global service through its multi-lingual scientific, technical, and customer service teams
- Our Chairman is a Member of the European Parliament.

Let’s talk about plastic

- You can use it?
- You can re-use it?
- You can Abuse it!
Plastic is Fantastic

Especially with $d_2w$

Plastic is made from a by-product of oil.
Less than 3% of oil is made into plastic.
It makes good environmental sense to use it for plastic production, otherwise it could be flared off.
**Environmental Benefits of Plastic**

- A million square meters of cellophane  
  Energy: 180 tonnes
- A million square meters of PP Film  
  Energy: 76 tonnes
- A million glass bottles  
  Energy: 230 tonnes
- A million PET bottles  
  Energy: 66 tonnes
- 60 miles of cast iron Pipe  
  Energy: 2000 tonnes
- 60 miles of Plastic Pipe  
  Energy: 270 tonnes
Plastic is critical to everyday life because it is:

- Lightweight
- Flexible
- Strong/Durable
- Heat sealable
- Impervious to moisture
- Printable
- Recyclable
- Reusable

*FACT
EVERY YEAR, APPROXIMATELY 200 MILLION TONS OF PLASTIC IS PRODUCED GLOBALLY.
PLASTICS CAN TAKE MANY DECADES TO BREAK DOWN.

Globally only 3% is recycled.

University of Cambridge
Discarded Plastic!

Fact:
Plastics can take many decades to break down.
Danger of Discarded Plastic!

Researchers estimate the vortex is twice the size of the US state of Texas and four times the size of Japan. The patch includes plastics, chemical sludge and other debris that has been trapped by the currents.

One of the coordinators of Project Kaisei, Doug Woodring said: "When a [sperm] whale in California washed up six months ago, they opened its stomach and it had 400 kilos of plastic and netting inside,"

Charles Moore, an ocean researcher credited with discovering the Pacific garbage patch in 1997 said: “Humanity’s plastic footprint is probably more dangerous than its carbon footprint”
The Plastic Disposal Issue

Current preferred options for disposal of plastic waste:
- Traditional landfill
- Incineration
- Recycling
- Composting

BUT ONLY IF IT CAN BE COLLECTED

NOT preferred options:
- Litter

TO BE AVOIDED

So what do we do about it?

Symphony has the solution!
**d2w® Eco-compatible Plastic Technology**

Complete degradation 2 – 5 years after the end of the products’ predetermined useful life span* 

If littered, degradation can take place within a few short months when exposed to hot climatic conditions

* Depends on product type and exposure conditions

---

**d2w® Eco-compatible additive system**

- The d2w oxo-biodegradable technology is a masterbatch system that is added with the basic polymer resin during the manufacturing process.
- No changes to extrusion process required.
- No impact on line speeds or plant maintenance.
- No requirement for special training for labour.
- It is just a process of “adding degradability” to conventional plastics

![Diagram](diagram.png)
The Process

The catalytic effect of the d2w additive breaks these chains and generates free radicals.

The free radicals combined with the available oxygen atoms will create hydro peroxides.

The resulting short-chain hydro peroxides are available for consumption by microorganisms. After the degradation process the harmless residues are CO2, H2O and Biomass.

STAGE 1
Pre-degradant: metal stearate, thermo and photo oxidant

STAGE 2
Oxidation: oxygen/UV/heat Short chain hydrophilic

STAGE 3
CO2 + H2O + Biomass Biodegradation

NO HEAVY METALS!

Carbon
Hydrogen
Oxygen
Microorganism (Stenotrophomonas sp., Pseudomonas sp., Rhodococcus sp., Acinetobacter sp. etc)

Eco-compatible Plastic

The Composition

S1 S2
1st stabiliser 2nd stabiliser Prodegradant trigger

Prodegradant trigger - The catalytic action creating the free radicals is arrested and controlled by two stabilizer packages.

The first stabilizer protects the prodegradant trigger transition during the manufacturing process.

The second stabilizer ensures that the finished product fulfills its functionality and sustains an adequate shelf life.
The Degradation Process

Embrittlement of plastic bag

Continuing fragmentation

The Biodegradation Process

Scanning Electron Microscope (SEM)

Human Hair
Un-oxidised film. Film intact and limited microbial activity on surface due to the surface being hydrophobic

Pollen
Furrows and ridges eroded into the surface of the film by microbial activity

Cracks and fissures on surface of oxidised, hydrophilic film

Microbial colonisation on surface of oxidised, hydrophilic film
Responsible use of plastic

The Three R’s

- **REDUCE**: $d_2w$ will reduce the burden of persistent plastic waste in the environment
- **REUSE**: $d_2w$ products can continue to be reused for a finite amount of time
- **RECYCLE**: $d_2w$-based products can be recycled and made from recycled plastic polymers

Is this how you want your brand to be thought of?
The Brand Value

Protect your brand investment

- Plastic packaging helps to keep your product fresh and/or intact until used
- The marketing message helps to sell the product and create the value
- After the product is used the marketing message needs to vanish otherwise it becomes a liability rather than an investment asset
- The counterfeit position - After the product is used, the label and also the container needs to self-destruct so as to avoid counterfeit products being produced using your packaging

- a brand you can trust!

Certifications

- **Food contact Approved.** All grades of d,w are compliant with requirements of:
  - The European Union 2002/72/EEC regulations for Direct Food-contact and all amendments.
  - The FDA American requirements for direct food-contact materials.
  - CFIA Canadian requirements for direct food-contact materials
  - Brazilian ANVISA requirements for Direct Food-Contact
- **Degradable** - tested according to ASTM standard D6954 and ISO 4892/2, ISO 4892/3
- **Biodegradable** - tested by independent laboratories to ISO 17556 and 14855
  - Applus (Spain), PYXIS (UK), University of Pisa (Italy), RAPRA (UK) land UFSCar / UNESP (Brasil)
- **Non-Ecotoxic** in compost tested according to OECD 208 and EN13432 - tested by independent laboratories Applus and OWS (Belgium)
- **Absence of restricted chemicals** according to REACH directive
- **Certified** by the Oxo-biodegradable Plastic Association (“OPA”) – www.biodeg.org
Applications
- Bread Bags
- Carrier / Supermarket
- Retail Bags
- Trash
- Laundry
- Magazine / Newspaper
- Shrink-wrap / pallet-wrap
- Bottles, Cups, Cutlery

Some of d2w Users in Lebanon
Some major users of d₂w

Certification Program

- All manufacturers making products using d₂w additive are issued with a Certificate for display at their premises and the unique number provides Q/C traceability
- All users are entitled to a certificate as part of the PR marketing program.
Quality Assurance & Authenticity

DOES YOUR PLASTIC PRODUCT REALLY HAVE d2ADDITIVES INSIDE OR SOMETHING ELSE? YOU NEVER KNOW...

BUT NOW YOU CAN IN ONLY 60 SECONDS!

d2Detector

detecting additives, quality control and anti-counterfeiting

---

d2Detector – Testing

**All in less than 60 seconds!**

- A hand held unit to confirm the correct level of d2additives
- Put nose of sensor flush against samples for testing.
- Pull trigger
- Screen will display the result giving the exact reading of d2w parts per million (ppm)
- Green light will indicate pass, Red light will indicate failure of test.
Growing Distribution Network
All around the world – 96 countries

Legislation in favor of $d_2w$

- Argentina: some states
- Brazil: some states and cities
- Congo-Brazzaville: Nationwide
- Gabon: Nationwide
- Italy: Nationwide
- Mauritius: Nationwide
- Mexico: Mexico City
- Montenegro: Nationwide
- Morocco: Nationwide
- Peru: Nationwide
- Rwanda: Nationwide
- Serbia: Nationwide
- Slovenia: Nationwide
- UAE: Nationwide
- Yemen: Nationwide
- Pakistan: Nationwide (Feb 2013)
Ministry of Environment in Lebanon certifies d2w!

Certificate of Appreciation from The Ministry of Environment in Recognition of

D2W

For its contribution to a cleaner environment by promoting eco-friendly technology

June 6, 2010

Making a difference with d2w
The Innovation the World needs

d2w

Tel: +961-1- 25 75 98 / 9
Mobile: +961-3-340320
www.gdt-lb.com