FACT SHEET

Recycling and Recovery of Polyurethanes

LIST OF FACT SHEET REFERENCES WITH SUGGESTED READING MATERIAL

Note:

The development of plastics recovery & recycling technology started in the 1990's due to legislation dealing with end-of-life plastics waste in major market sectors such as packaging, automotive and electrical & electronics.

Prior to this, the technology to process plastic waste did not exist as most of the material ended up in landfill sites. As long as cheap landfill sites are available, options such as Feedstock Recycling, which is more complex and costly options than Energy Recovery, will not be chosen. If the waste stream has to be recycled due to legal reasons such as minimum quota for recycling and reuse, energy recovery options are discriminated against and cannot be practiced to the extent they otherwise might be.

The lack of treatment technologies and the non-applicability of processing technologies from other traditional materials such as glass, metal and paper resulted in large process developments at all stages.

Many inventions on plastics handling and conversion processes were made during this time. Many of these technologies for reuse and material recycling are in existence and practiced by medium and smaller size companies. However, the incredible speed of development and the lack of understanding by many market entrepreneurs resulted in some failures during scale-up and large-scale operation, mostly due to insufficient economics. The fact that few operating examples for feedstock recycling plants exist nowadays is due to a lack cost effective logistic chain and sufficient volume.

However, the fact that even very large scale recycling operations, such as gasification of mixed plastics at Schwarze Pumpe (SVZ), Germany, did finally end up in bankruptcy is not a sign that this technology for plastics recovery was technically not successful. On the contrary, many techniques for mixed plastics recovery originating from coal e.g. hydrogenation or conventional oil based hydrocarbon processing such as pyrolysis technology from the BP consortium, UK, have shown at sufficiently large scale, that it is technically possible to conduct mixed plastics operations for many years.

The development of energy recovery technology for general plastics and mixed waste plastics started at the same time in the 1990's. Three different routes: mono combustion, co-combustion with fossil fuels and waste incineration are available and have been researched through companies and associations interested in plastic-as-fuel. The main reason for the spurt in technology development was the proven successful large scale results, that waste plastics can substitute solid and liquid fossil fuels efficiently and without negative impacts on equipment and the environment.

The following 2012 updated reference list has been established based on earlier published ISOPA fact sheet literature. Older and not publicly available literature as well as outdated company literature has been eliminated.

Structure of List of Reference:

- Official nomenclature-based: Reuse, Material Recycling, Feedstock Recycling and Energy Recovery
- Technical documentation, suggested reading
- Reference Plant: operators, equipment manufacturers, with website information

Reuse:

Oil binder

Mobius (Oil spill), www.mobiustechnologies.com

Insulating mortar

Thermogran® FLOOR , www.isola.be

Material Recycling:

Densification: (Baling, Briquetting), Grinding, Milling

Equipment manufactures: Pallmann, Kahl, Tecaro, Herbold, Alpine, Berstorff, Silverson, Hennecke

Sorting, Shredding, Washing, Drying

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Adhesive Pressing and Particle Bonding

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Oertel (ed.), Polyurethane Handbook, Hanser Publishers, Munich, Vienna, New York 1993, Pages 615-627, ISBN I-56990-157-0

Das PLATEC-Konzept zur industriellen Aufbereitung und Wiederverwertung von Produktions- Reststoffen

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Operating Companies (many more to add, see options in practice brochure):

- Agglorex BVBA www.agglorex.com
- ORSA SRLwww.univa.va.it
- BACHL, spol. Sr. O www.bachl.cz
- BSW GmbH Berleburger Schaumstoffwerk www.berleburger.de

Feedstock Recycling

Chemolysis: Hydrolysis, Aminolysis & Glycolysis

W.J. Farissey, Final report to PURRC, Flexible post-consumer task force, March 23,1992

E. Grigat: Hydrolyse von Kunstoffabfael1en, Kunststoffe 68 (1978) 5, p. 281-284

G. Bauer: FAT - Schriftenreihe Nr 86 (Forschungsvereinigung Automobiltechnik e.V), Frankfurt 1990

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Thermal Processes: Gasification, Pyrolysis, Hydrogenation

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APME Eco efficiency Study on automotive Plastics, contracted to Oeko Institute , Germany

See www.plasticseurope.org

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