

PET RECYCLING WITH ACAT: Saves Resources, Protects The Environment



The word „Plastic“ - is colloquially synonymous for all kinds of plastics. It describes a substance that does not occur in nature, but must be produced. The starting point of the plastics production is crude oil - a resource not available indefinitely. And the final product poses more and difficulties with disposal problems. Two reasons why one should handle it with care and caution.

Plastics are produced by polymerization. Polymers: (poly = many, meros = part). Nomen est omen. In fact, carbon compounds are extracted from the raw material crude oil. In addition to these carbons, the plastic also contains the elements hydrogen, oxygen, nitrogen and sulphur. By adding plasticizers, stabilizers, reinforcing agents, fire retardants and dyes, the properties of the respective plastic can be individually influenced. Thus,

many different plastics can be produced with a wide variety of properties. Plastics are mainly distinguished according to the following properties:

THERMOPLASTICS:

Thermoplastics consist of long macromolecules making it possible to form these plastics under the influence of heat. Thermoplastics can be processed in different ways; for exam-

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ple they can be melted, injection moulded, foamed or glued. Primarily we know the injection moulding, in which plastic is heated and pressed into a mould under great pressure. The starting material is granulated thermoplastics. In this way, for example, the PET bottles are produced, we use almost daily.

THERMOSETS:

Unlike thermoplastics thermosets are produced by the hardening of powdery basic substances. Under high pressure and high temperature the basic substance is pressed into a mold to link the macromolecules together. Thermosets are used, for example, in mattresses, shoe soles or protective helmets.



ELASTOMERS:

Elastomers are wide-meshed cross-linked polymers. The main characteristic of these plastics is their enormous extensibility. Elastomers are able to return to their original shape even after extreme elongation. We know elastomers as rubber bands or sterile disposable gloves. One problem of all types of plastic is their disposal. We all know the frightening images of animals trapped in plastic waste

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and the reports of huge floating „plastic islands“ in the oceans. According to current studies, around 50 billion plastic parts are floating in the oceans of our planet.

These parts collect in the so-called current vortices of the oceans when they are carried along by the flow. Today there are five of these garbage collections in the oceans, two in the Pacific, two in the Atlantic and one in the Indian Ocean. The area of one of these „plastic islands“ is estimated to be 16 times the size of Austria. The surprising thing is that these huge „islands“ represent only one percent of the total plastic waste. The remaining 99 percent of the plastic in the sea is not visible on the surface.

WHERE IS THE REST TO FIND?

The answer is micro plastics! The majority of the packaging materials and other plastic products are not found in their original form in the oceans, but they appear much more

inconspicuous: as micro plastics. This term is used to describe plastic pieces with a size of up to five millimetres, with the smallest particles being only a few micrometres in size and thus they are invisible to the naked eye. In this form, plastic can only be detected under the microscope.

In the form of micro plastics the plastic waste is less visible in the sea, however it is no less problematic. On the contrary! This makes it even easier for the small plastic particles to find their way into the ecosystem. For example, fish and other marine animals also absorb micro plastics in their natural environment in addition to their food. This can become particularly problematic because the micro plastics in water attract chemicals, bind them chemically and this way it can get toxic characteristics. Primary micro plastics are plastics that are already small in their original form. This includes, for example, tiny plastic beads added to cosmetics to enhance the cleaning



The caustic solution is neutralized with AluStar® products to clean the waste water.

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The PET bottles and the containers are shredded. In several further steps the labels and other impurities are separated.

effect. These products and the containing micro plastics find their way with the waste water into the sewage system. However, these particles are so small that to the present day it has not been possible to develop suitable filters for sewage treatment plants to remove them from wastewater. Another type of primary micro plastics are small plastic pellets used to make other plastic products. They too can get into the rivers and finally the oceans via the drains of factories. The effects are devastating: On some beaches of the Canary Islands in one kilogram of sand up to 100 grams of micro plastics can be detected and plastic pellets account for a large proportion of the total quantity.

The secondary micro plastics are plastic particles having detached themselves from larger plastic parts, such as electronic waste or the like. Therefore, it is particularly important to be careful when using plastics.

It is recommended to use recirculating plastic such as PET if possible. PET – RECYCLE PLASTICS! For the production of PET polyethylene terephthalate (PET) no plasticizers and NO bisphenol A is used, as it is often wrongly claimed. In the recycling process PET must first be separated from other plastics such as PVC, HDPE bottles and impurities such as aluminum etc. Then the PET bottles and the containers are shredded. In several further steps the labels and other impurities are sepa-

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rated. The PET flakes enter the mixing screw, where they are mixed with 50% caustic soda (sodium hydroxide). In the kiln the flake-lye mixture is heated to temperatures from 197 to 207 degrees Celsius. The hot caustic solves a thin PET layer from the surface of the flakes. In this way, the impurities are removed. The PET flakes are washed with water and then dried. Finally, a laser sorter measures the structure of the flakes and ejects any foreign material particles (such as silicon). At the end of the recycling process, the flakes are of such a high quality that they are suitable for food packaging.

ENVIRONMENTALLY FRIENDLY CLEANING OF WASTE WATER

To clean the waste water the caustic solution is neutralized with AluStar® products. The dirt particles are separated with FlocStar® products and various other products are used in the cooling and in the boiler area.

Thus, ACAT can make a significant contribution to the sustainable use of resources as well as to the protection of our environment, both in the reuse of PET products and in the water cycle.