

Microplastics: Scientific Facts & Uses

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Microplastics

- [‘Microplastics’](#) are defined as any synthetic solid particle or polymeric matrix, with regular or irregular shape and with size ranging from 1 µm to 5 mm, of either primary or secondary manufacturing origin, which are insoluble in water.
- [‘Primary Microplastics’](#) is a term typically used to refer to microplastics originally manufactured to be that size. Primary microplastics can include but are not limited to microbeads as they can also refer to industrial plastic powders and pellets.
- [‘Secondary Microplastics’](#) are defined as small particle pieces that have resulted from the fragmentation and weathering of larger plastic items.
- Microplastics are composed of mostly [six major types of petroleum-based polymers](#): polyethylene (PE), polypropylene (PP), expanded polystyrene (PS), polyvinyl chloride (PVC), polyamide (PA), also known as nylon and polyethylene terephthalate (PET)
- Microplastics in the marine environment are typically found as [pellets, fragments, or fibers](#) and are composed of diverse polymers, some denser than seawater and expected to sink to the seafloor, such as [polyamide, polyester, polymerizing vinyl chloride \(PVC\), and acrylic](#), among others. Others are lighter than seawater and are often found floating at the surface, including polyethylene, polypropylene, and polystyrene.
- Microplastics contain [many types of additives](#), such as plasticizer, flame retardant, heat stabilizer, filler, impact modifier, antioxidant, colorant, lubricant, and light stabilizer.
- Primary Microplastics are extensively used in [industry and manufacturing](#), for example: as abrasives in air/water-blasting to clean the surfaces of buildings and ships’ hulls; as powders for injection moulding; and, more recently, for 3D printing.
- They are also used in so-called [personal care and cosmetic products \(PCCPs\)](#), often to improve the cleaning function or impart colour - examples include toothpaste, cosmetics, cleansing agents and skin exfoliators.

Microbeads

- Microbeads are defined as a plastic sphere, typically less than or equal to 5 mm in size. Microbeads can vary in chemical composition, size, roundness and density.
- Globally, microbeads are used in personal care products, other consumer applications, and various industrial applications. Examples included below:
- [Personal Care Products](#): scrubs/peelings, shower/bath products, facial cleaners, creams, deodorants, make-up foundations, nail polishes, eye colours, shaving creams, bubble baths, hair colorings, insect repellants, toothpaste, eye shadows, blush powders, hairsprays, liquid makeups, mascaras, baby products, lotions, and sunscreens.

- Microbeads and other plastic ingredients are present in different personal care products at different percentages, ranging from less than [1% to more than 90%](#) in some cases.
- For example, a typical exfoliating shower gel can contain roughly as much microplastic in the cosmetic formulation as is used to [make the plastic packaging it comes in](#).
- Consumer uses/products including [cleaning products and printer toner](#).
- [Industrial products](#) such as abrasive media (i.e. plastic blasting at shipyards, production facilities such as garment and car parts),
- Industry (i.e. oil and gas exploration, textile printing, and automotive molding),
- Other plastics products (i.e. anti-slip and anti-blocking applications) and medical applications (biotechnology and biomedical research)
- Each year the US emits enough microbeads to [wrap around the world 7x](#).

Microfibers

- Microfibers, a type of microplastic is a [threadlike particle](#) less than 5 millimeters long.
- Microfibers - also called microplastic fibers - are a [subset of microplastics](#)
- [ALL fabrics and fibers shed](#), whether natural or synthetic.
- Fiber shedding from textiles may occur through [all stages of the production process](#), as well as at the consumer use/wash phase.
- Examples of products that shed microfibers - tires, fashion apparel, sport/outdoor apparel, industrial textiles (i.e. carpets), and [home textiles](#) (i.e. bedding, furniture, window treatments, towels).
- A single domestic wash can release around [700,000 fibers to wastewater](#).
- Microfibers are one of the most common global microplastic pollutants [along shorelines, in surface waters](#) and in the [open ocean](#).

Nurdles/Pellets

- Nurdles are categorized under primary microplastics and are the form 'raw' plastics are produced in, for transport to production facilities for further processing.
- Nurdles are plastic resin beads/pellets, that come in a variety of colors, are [disk or cylindrical](#) in shape and a few mm in diameter - about the [size of a lentil](#).
- They are unintentionally spilled into the environment and found [floating in water](#) and on shorelines worldwide.
- Plastic resin pellets serve as both a [transport medium and a potential source of toxic chemicals](#) in the marine environment.
- [Countless billion nurdles are used each year](#) to make nearly all our plastic products but many end up washing up on our shores.