



Claims vs. Facts

Microplastics and BPA in Wind Turbine Blades

Wind turbine blade coating is **not toxic** and does not account for large – or any – emissions of BPA or microplastics.

Background

In July 2021, a small group from Norway calling themselves “The Turbine Group” (TTG) released a self-published report that falsely claims that wind turbine blades are shedding dangerous amounts of microplastics and bisphenol A (BPA). This report has not been peer-reviewed or published in any academic journals, so it has not been examined by experts in the field of study, which is common practice in science literature. The report has led to false stories in local and international media outlets, resulting in increased concern among residents who are seeking information on living near wind turbines.

CLAIM: Wind turbine blades are emitting large amounts of bisphenol A (BPA) and microplastics into their surrounding environments.

FACT: Wind turbine blades contain only microscopic traces of residual BPA and therefore do not account for large, or any, emissions of BPA or microplastics to the environment.

- TTG attempts to extrapolate from the results of a peer-reviewed research paper from the University of Strathclyde (Pugh & Stack, 2021), but their report ignores the fact that the Pugh & Stack study was performed on uncoated, centimeter-sized, laboratory samples exposed to worst-case conditions. The authors of this scientific paper have not endorsed the predictions made by TTG and have, in fact, clarified that the TTG estimations need to be refined downwards quite significantly.

*“While we welcome continued research into the sustainability of wind turbine blades, we cannot endorse the predictions of erosion in the ‘Forensing fra vindturbinvinger’ report which includes some maps from a recent University of Strathclyde paper showing the important effects of climate variables on erosion rates. Our research simulated worst-case scenarios of leading edge blade erosion (the blade tip) on an uncoated, centimeter-sized blade segment in a laboratory setting. We have identified that the authors of the report may have overestimated the total blade erosion rates based on their assumptions of leading edge erosion behaviour only. While we are very pleased that they took an interest in our research and paper, **we wish to clarify that their calculations need to be refined downwards quite significantly.**”*

– Professor Margaret Stack, Tribology group, University of Strathclyde

- Once the BPA-based epoxy glue used in manufacturing of turbine blades is hardened in the factory prior to delivery to a project site, the blades only contain microscopic traces of residual BPA.
- If released to a natural environment, the trace amounts of BPA will rapidly undergo biodegradation and thereby be removed.
- The extremely low potential for BPA emissions from wind turbine blades does not pose a risk to the environment or people, and is much lower compared to what the [U.S. Food and Drug Administration](#) has approved for human exposure from food and beverage packaging.

CLAIM: Erosion caused by rain releases BPA and microplastics from wind turbine blades into the environment.

FACT: Wind turbine blades' protective coatings are non-toxic and contain negligible amounts of BPA, and the blades are specifically designed to have high resistance to weathering.

- Wind turbine blades can operate in harsh weather conditions for 20-30 years and technology continues to advance.
- When weathering occurs, it affects mostly the paint and coatings that provide protection from the elements for the composite materials that make up the rest of the blade. The paint and coatings are non-toxic, and except in limited circumstances, are BPA free. The amount of BPA, if present, is negligible.
- TTG wrongly assumes all blade material 'lost' due to leading edge erosion has the same material ratio as the entirety of the blade. Generally, blades include composite materials containing plastics (epoxy glue) and glass fibers that may vary in ratio depending on the manufacturer.
 - For perspective, to meet the claim, yearly blade erosion would have to result in removal of 2 centimeters (cm) deep (15 to 20 layers of glass fibers), 5 (cm) wide area the length of 11 meters along a blade. This amount of erosion is not seen in the real world and would make the blade inoperable, so it would be replaced.
- TTG wrongly assumes that erosion happens throughout the volume of the blade, while it in fact is only the most exposed area (generally the blade tip) that meets such extreme conditions that it can lead to erosion. For this reason, blade tips are specifically reinforced to minimize this effect.

Industries that use epoxy resins as a key component:

- 1 Renewable Energy
- 2 Building & Construction
- 3 Aerospace
- 4 Paints & Coating
- 5 Food & Water
- 6 Home & Leisure
- 7 Automotive

Epoxy resins contribute to a more sustainable world as a key ingredient in a variety of products and technologies that:

