Clarifying Misleading Claims About Biodegradable VCI

NTIC is committed to transparency, scientific integrity, and environmental responsibility. Recently, misleading marketing claims have surfaced in the corrosion prevention industry, including assertions that certain polyethylene-based VCI (Vapor or Volatile Corrosion Inhibitor) films are "100% biodegradable in landfill" and the "only truly biodegradable VCI film." These claims warrant clarification, as they misrepresent science and pose risks of greenwashing.

False or Unsupported Claims Identified

A company has marketed its VCI film with the following statements:

- "100% biodegradable in landfill"
- "The only truly biodegradable VCI film"

These claims are scientifically and legally questionable for several reasons:

1. Landfills Are Poor Biodegradation Environments: Many landfills are largely anaerobic environments whose microbes and low oxygen conditions lead to poor and/or incomplete anaerobic biodegradation. Under these conditions, even organic materials like food and paper can remain intact for decades. Over time, organic material may slightly decompose, producing methane gas (a harmful greenhouse gas, with a global warming potential 23 times that of carbon dioxide). Because organic waste cannot fully biodegrade inside a landfill in short timescales, the carbon and nutrients contained in the waste material are lost. Polyethylene-based films, even when modified with pro-degradant additives, do not meet any recognized standard for complete biodegradation in landfills within a reasonable timeframe.

2. Unqualified Biodegradable Claims: The U.S. Federal Trade Commission (FTC) Green Guides caution against unqualified "biodegradable" claims. To use this term legally in marketing, a product must fully break down into natural elements within one year after customary disposal. Without peer-reviewed data or certified testing (e.g., ASTM D5511, D5526), such claims are unfounded. Items destined for **landfills**, incinerators, or recycling facilities will not degrade within a year, so **unqualified biodegradable claims as noted below shouldn't be made.**

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Unqualified Biodegradable Claim: ASTM D5511 biodegradability testing has shown 99.7% biodegradation in 1,697 days less than 5 years) under anaerobic conditions.
Our Response: This claim will not meet FTC guidelines as the time for biodegradation is more than 1 year.

Unqualified Biodegradable Claim: ASTM D5526 biodegradability testing demonstrates up to 36.6% biodegradation in 391 days under landfill conditions.
Our Response: This claim will not meet FTC guidelines as the material has not biodegraded completely in more than 1 year.

Because such biodegradability claims are inherently misleading, since 2013, California has banned the terms "biodegradable," "degradable," and "decomposable" or any form of these terms, or imply in any way that the plastic will break down, biodegrade or decompose in a **landfill or other environment**, from being used in connection with consumer products through California Public Resources Code Section 42357. Additionally, it is illegal in Maryland, Minnesota, and Washington to use the term "biodegradable" in marketing claims related to plastic products and/or bags without verified 3rd party certification and testing that meets standards such as ASTM D6400 or D6868.

3. Inappropriate use of ASTM standards: ASTM D5511 and D5526 are commonly referenced by companies to claim biodegradation in a landfill. However, close review reveals that these are both Test Methods and not Test Standards with biodegradation pass/fail criteria.

- ASTM D5511 (Standard Test Method for Determining Anaerobic Biodegradation of Plastic Materials Under High-Solids Anaerobic-Digestion Conditions)
- ASTM D5526 (Standard Test Method for Determining Anaerobic Biodegradation of Plastic Materials Under Accelerated Landfill Conditions)

These test methods are designed to yield a percentage of carbon conversion in the sample to carbon in the gaseous form and provide guidance on how to conduct the test and report results. It does not specify any pass/fail criteria. Both Test Methods clearly call out the following in their scope -

- **Scope 1.4** Claims of performance shall be limited to the numerical result obtained in the test and **not be used for unqualified "biodegradable" claims**. Reports shall clearly state the **percentage of net gaseous carbon generation** for both the test and reference samples at the completion of the test. Furthermore, results **shall not be extrapolated past** the actual duration of the test.

- Note 1: There is no known ISO equivalent to this standard.

Newer test methods to measure biodegradability in landfills, such as ASTM D7475 (Standard Test Method for Determining the Aerobic Degradation and Anaerobic Biodegradation of Plastic Materials under Accelerated Bioreactor Landfill Conditions) calls out the huge variety and discrepancy of landfills in their testing, cautioning the following:

- "It is cautioned that the results of any laboratory landfill simulation cannot be directly extrapolated to actual disposal environments: confirmation to real world exposure is ultimately required as with all ASTM Standards. This confirmation is essential for landfills **as the types of landfills vary widely, some are even heavily lined, tombs, and these will limit degradation severely**".

In contrast, test standards such as ASTM D6400 and EN 13432 do provide pass-fail criteria, and are used by certification bodies such as BPI or TUV Austria to ensure that products meet the scientific requirements to make claims of compostability.

- ASTM D6400 specifically requires that a material must physically disintegrate in a commercial composting facility, biodegrade at a comparable rate to known compostable materials (typically 90% conversion to CO_2 within 180 days), and not produce toxic effects in the resulting compost.
- EN 13432 similarly mandates that all packaging components, including inks and additives, be tested for heavy metals and eco-toxicity, ensuring the end product is environmentally benign and suitable for composting.

4. Generation of "fragments" and accelerated pollution: The majority of global plastics consists of polymers with carbon–carbon backbones, whose environmental persistence and low cost have resulted in a massive reservoir of plastic waste that resides in landfills and the environment. PE and PP, commonly used in packaging, are carbon-carbon backbone polymers which are highly stable and resistant to breakdown, leading to their persistence in the environment. Addition of additives to help accelerate their breakdown under UV exposure results in smaller fragments not visible to the naked eye and generate a new harmful material for the environment, microplastics. These fragmented pieces may be invisible to the naked eye, yet microplastic effects have been shown to be seriously detrimental. Several organizations worldwide have banned the use of these technologies.

- Closed Loop Partners Composting Consortium – "Oxo-degradable plastics persist as huge quantities of microplastics (i.e., smaller than 5 mm in size), which take thousands of years to fully disintegrate and cause significant harm to marine and soil life."
- Sustainable Packaging Coalition (SPC) - "…does not support the use of any kind of degradability additives in packaging, including additives that seek to **make packaging more degradable in landfills**, marine environments, or open environments (e.g., as litter)."
- US Plastics Pact - "Problematic and Unnecessary Materials" include "degradable and biodegradable materials that are **not certified compostable**, including bio-assimilating, oxo-degradable, oxo biodegradable, and photodegradable materials used in plastics packaging."
- Ellen MacArthur Foundation – "Oxo-degradable plastic packaging is not a solution to plastic pollution and does not fit in a circular economy."
- EU Single Use Plastic Directive - "The following SUP products cannot be placed on the market: products made from oxo-degradable plastic."

5. Unsupported Superlatives (e.g., "Truly Biodegradable"): Statements that a product is the "only truly biodegradable" option are inherently unverifiable and designed to disparage competitors unfairly. No industry or regulatory body recognizes this language, and such statements are not based on objective criteria or third-party validation.

6. Risk of Greenwashing: Promoting vague or unverifiable environmental benefits misleads consumers and may violate advertising laws. Regulatory agencies such as the FTC in the U.S. and similar bodies in the EU (e.g., the Green Claims Directive) are actively investigating greenwashing. Misleading claims damage industry credibility and reduce trust in sustainability innovations.

NTIC embraces a science-based approach to sustainable packaging. Our development of films using post-consumer recycled (PCR) content and biobased technologies is grounded in:

- Compliance with global environmental standards.
- Use of certified testing protocols (e.g., ASTM, ISO).
- Transparent disclosure of environmental benefits and limitations.

We do not make claims of biodegradability unless validated by:

- Independent lab testing.
- Recognized certification bodies (e.g., TÜV Austria, BPI).
- Context-specific disposal scenarios (e.g., industrial composting, anaerobic digestion).

NTIC encourages our customers, distributors, and industry partners to evaluate "green" product claims critically. Sustainability must be built on scientific evidence, not marketing language. We remain committed to developing corrosion protection solutions that are both effective and environmentally responsible, without compromising our integrity.

To offer a verified and environmentally sound alternative, NTIC has invested in scientifically verified compostable technologies that adhere to international standards. ZERUST® Natur-VCI® film is a fully compostable and biodegradable corrosion-inhibiting packaging solution that meets ASTM D6400 and EN 13432 standards and is certified 100% compostable by TÜV Austria. Unlike polyethylene-based films with unsubstantiated biodegradability claims, Natur-VCI® is designed to break down under industrial composting conditions without leaving persistent residues or harmful byproducts. It is also proven to provide effective corrosion protection as validated by the NACE Standard TM0208 VCI performance test. This allows industrial users to protect metals during storage and shipment with the confidence that the packaging can be responsibly disposed of in facilities equipped for composting compliant materials.

Furthermore, while compostable and biodegradable packaging may sound appealing, their practicality in industrial settings is significantly limited. These materials often come at a higher cost than conventional polyethylene films and typically have shorter shelf and usage lives, which can compromise performance and product protection. Importantly, for a product to be accepted into an industrial composting facility, every component—including labels, adhesives, and any attached materials—must also be fully compostable. If even one element, such as PE tape or petroleum-based oils, is non-compostable, the entire item becomes ineligible and is ultimately landfilled. In the U.S., industrial composting is largely restricted to food-related waste streams, and the infrastructure to support broad-based composting of industrial materials is lacking. As a result, large manufacturers would need to implement their own costly internal composting systems. In contrast, more scalable and environmentally viable solutions lie in the use of post-consumer recycled (PCR) plastics and closed-loop recycling programs, such as NTIC/ZERUST's ZeCycle initiative, which reclaims used ZERUST® films and reintegrates them into ZERUST® ICT®510-PCR30 VCI films, supporting a circular economy without compromising protection or performance.

For more information or to receive technical documentation on NTIC's sustainability practices, please contact our technical support or sustainability teams at TechSupport@ntic.com.

Thank you,
NTIC/ZERUST® Technical Support

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