

# Biodegradability Redefined and Volatile Organic Compounds Update

Government regulations are changing the rules for compliance – but what are they?

BY BOB WATERLOO, *Technical Sales Manager, Concrete Release Agents, Hill & Griffith Co., Indianapolis*

Have you ever played a game with others and in the middle of the game they start changing the rules? Frustrating, isn't it? Or maybe you played a game and nobody knew what to expect next. You don't know if the old rules apply, or if they are making the game up as they go along (perhaps so they can win?). On the other side of the coin, perhaps the changes were made so that the playing field is leveled, or perhaps the original "rules" were unreasonable and left everyone confused and in doubt.

It appears that this is what is happening with the definition of biodegradability. New federal rules, regulations and definitions are now in effect, but there has been little in the way of notification to the players. The purpose of this paper is to provide precasters with current information on this changing environmental landscape to help them make decisions regarding form release agents.

## Biodegradability

One thing is for certain: Humans generate a lot of garbage (both personal and industrial), some of which is considered toxic waste and some of which will contaminate our environment. Perhaps we won't see the impact of this contamination for years to come. Other waste, both personal and industrial, will degrade back to the natural environment over a short period of time and may even be beneficial to our environment. But how do we know what is – and what is not – environmentally acceptable? And what are we using in our plants that is environmentally responsible or detrimental to the environment?

As outlined in "Form Release and the Law" (Precast Inc., Jan/Feb 2006), the word "biodegradable" has been terribly misused. Given enough time, everything is biodegradable. Unfortunately, in many cases, by the time the degrading process has taken place, the environment is contaminated. For that reason, and many others, I'm sure, the U.S. Environmental Protection Agency (EPA) issued guidelines as to how and when the word "biodegradable" can and should be used. Further,

while there is no official organization to verify the use of the claim of biodegradability, the U.S. Federal Trade Commission (FTC) has issued some general guidelines on what type of products qualify as legitimately biodegradable. They have even sued some companies for unsubstantiated, misleading and/or deceptive use of the term on product labels.

More attention is now being paid to biodegradability, and many agencies, companies and organizations are getting involved. Again, given enough time, anything is biodegradable.

Because the word "biodegradable" has been inappropriately used in the past, it is important that we understand how it is truly defined and what criteria a product must meet in order to be considered biodegradable. One definition of "biodegradability" can be found in the EPA 1998, "Fate, Transport and Transportation Test Guidelines, Office of Prevention, Pesticides and Toxic Substances (OPPTS) 835.3100, Aerobic Aquatic Biodegradation"; and in EPA 712-C-98-O and ASTM D-5864-00, "Standard Test Methods for Determining Aerobic Aquatic Biodegradation of Lubricants or Their Components." This reference gives everyone the guidelines to be followed when determining biodegradability and using the word "biodegradable" in claims relating to various products, including concrete form release agents. The U.S. EPA definition includes an allowable "28-day half-life" of materials in order to be considered biodegradable. Half-life is the time required for the decay of one-half of a given component in a system.

Precast operations that are near free-running water or have relatively shallow aquifers should be especially concerned about contaminants in the soil that may adversely affect the environment. A word of caution: Just because a release agent is "water-based" does not necessarily mean it will meet the EPA requirement to be classified as biodegradable. If you plan to use a form release (or any material, for that matter) that claims to be biodegradable, ask whether the material meets the 28-day half-life criteria that U.S. EPA describes. As there are often misunderstandings on the term "biodegradable," it is



- Readily Biodegradable – Rapid and complete mineralization
- Inherently biodegradable – 20 percent to 70 percent biodegradable within 28 days
- Non-biodegradable – Negligible removal of material under test conditions

The OECD recommends that degradation rates, or half-lives, are preferably determined in simulation biodegradation tests conducted under conditions that are realistic for the particular environment they are subject to or presented with (surface water, sediment, soil, etc.).

The OECD's 301-B CO<sub>2</sub> Evaluation Test (Modified Sturm) is probably the most recognized test in the lubricant (petroleum solvent) industry, and is listed in the EPA Guidelines.

The EPA and FTC now recognize ASTM OECD-301 B Modified Sturm procedures within ASTM-5684-00 and CEC-33-T-82 as "Standard Test Methods for Determining Aerobic Aquatic Biodegradation of Lubricants." While these tests may be expensive, they provide reliable and repeatable results for testing of biodegradability. The test method "covers the determination of the degree of aerobic aquatic biodegradation of fully formulated lubricants or their components on exposure to bacterial inoculums under laboratory conditions," according to the "Renewable Lubricants Manual" (see listing in sidebar "References").

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## Volatile Organic Compounds in the United States and Canada

**United States.** In September 1999, the Environmental Protection Agency enacted Volatile Organic Compounds (VOC) regulations that affect the concrete industry. These regulations can be found in the Federal Register, Vol. 63, No. 176, Friday, Sept. 11, 1998, under 40 CFR-59, [AD-FRL-6149-7], RIN 2060-AE55, National Volatile Organic Compound Emission Standards for Architectural Coatings, pages 44848-48887. There are 64 materials used in the concrete industry that are subject to VOC regulations and limits. Concrete form release agents are listed (specifically) and allowed a maximum of 450 gallons per liter (g/L). Further, some individual states have passed legislation allowing a maximum of 250 g/L or 2.1 pounds per gallon of VOCs. Fifteen states and the District of Columbia have passed legislation reducing the allowable levels of VOCs in concrete form release agents from 450 g/L (federal allowable levels) to 250 g/L. Keep in mind that any state can have more stringent requirements than the federal levels, but no state can be less stringent than federal levels. As of today, the following states have maximum allowable levels of VOCs of 250 g/L: California, Illinois, Ohio, Virginia, Connecticut, Delaware, Maine, Vermont, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island and the District of Columbia. All of these states are members of the South

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Coast Air Quality Management District (SCAQMD), the Ozone Transport Commission (OTC) or the Lake Michigan Air Directors Consortium (LADCO). While individual states have taken the initiative to make changes in lower allowable VOC levels, the EPA has yet to act on making the requirements nationwide. We can, however, expect the bureaucracy to follow suit in the near future based on the number of states that have already taken this step forward.

The U.S. EPA has been forecasting changes to the VOCs (on form release agents and other products), but has not taken any steps to make these changes. It continues to forecast "in six months," but has not yet taken any definitive action. Is EPA leaving the individual states to make the changes in anticipation of a federal mandate? Perhaps so, considering the activity of state legislatures to take matters into their own hands without federal government involvement.

**Canada.** The Canadian Ministry of the Environment – Environment Canada has also become a player on VOCs. Dating back to April 26, 2008, the Ministers of Environment and Health published a Notice of Intent entitled "Federal Agenda on the Reduction of Emissions of Volatile Organic Compounds from Consumer and Commercial Products." This document outlined a series of measures intended to reduce emissions. The then-proposed "Volatile Organic Compound (VOC) concentration Limits for Architectural Coating Regulations" were published in the Canada Gazette, Part I, on April 26, 2008. The proposed regulations set out specific VOC concentration limits for 49 categories of architectural coatings, including form release compounds. In the case of concrete form release agents, the effective date for a maximum allowable level of VOCs of 250 g/L is Sept. 9, 2012.

### Conclusions

- Biodegradable/biodegradability continues to be left to ambiguous interpretation. However, there are now established test methods that give positive indications of the environmentally friendly or responsible attributes of many materials, including form release agents. It behooves you and your supplier to discuss and substantiate claims of biodegradability in order to protect your operation and your environment.
- Biodegradability "redefined" has some benefits to the precast industry as there are some petroleum solvents that are readily and inherently biodegradable. On the negative side, there is a price to be paid for this quality.
- We can expect the U.S. EPA to continue its efforts in reducing VOCs to a federal level of 250 g/L.
- Without specific testing, it is difficult for a supplier to the industry to make claims regarding biodegradability and VOC compliance. As definitions become more specific, and allowable testing procedures are outlined, suppliers must invest in the precast industry by making reliable data available to the precaster. ■

*Bob Waterloo is technical sales manager, Concrete Release Agents, Hill & Griffith Co., based in Indianapolis. He can be reached at (317) 432-2797 or bwaterloo@HillAndGriffith.com. Please visit Hill & Griffith's Web site at www.HillAndGriffith.com or www.grifcote.com.*

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## References

- "Renewable Lubricants Manual," Chapter 6, Understanding Biobased & Biodegradable, United Bio Lube, Hartville, Ohio
- "Form Release and the Law," Precast Inc., Jan/Feb 2006
- "Volatile Organic Compound (VOC) Concentration Limits for Architectural Coatings Regulations," Canada Gazette, Part 1, April 26, 2008
- ASTM D5864-05, "Standard Test Method for Determining Aerobic Aquatic Biodegradation of Lubricants or Their Compounds"
- U.S. Environmental Protection Agency, "Fate, Transport and Transformation Test Guidelines, OPPTS 835.3100 Aerobic Aquatic Biodegradation," EPA 712-C-98-0, April 1996
- OECD Guideline for Testing of Chemicals, April 2005, Proposal for Revised Introduction to the OECD Guidelines for Testing of Chemicals, Section 3; Part 1: Principles and Strategies Related to the Testing of Degradation of Organic Chemicals
- "Understanding Biobased and Biodegradable," United Bio Lube, Palo Alto, Calif.
- Federal Trade Commission Web site – "What Does 'Biodegradable' Claim Really Guarantee?"
- Illinois Pollution Control Board; "Proposed New 35 ILL ADM. CODE, Part 223, Standards and Limitations for Organic Material Emission for Area Resources," May 7, 2009

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