



Biodegradable Nitrile Testing Methods Briefing

What Is It?

New treatments to nitrile rubber allow treated gloves to break down, or biodegrade, in natural elements such as landfills at much faster rates than untreated gloves which could be 100+ years.

To understand how well SW® EcoTek® biodegradable nitrile performs, it is important to know how nitrile biodegradability is tested and measured. It is also important to understand testing methods to understand competitors' claims.

What to Know.

There are two accepted and respected methods for testing biodegradability – ASTM D5511 and ASTM D5526. Both were established by ASTM International.

SW used the ASTM D5526 method to test EcoTek because it runs longer than the ASTM D5511 and better simulates real-world landfill conditions. It is the more stringent of the two tests.

ASTM D5511 is a shorter test, in a simulated laboratory condition, and assumes long-term expected biodegradability timing based on short-term measures.

SW nitrile gloves with EcoTek meet the same safety and sustainability standards as SW untreated gloves, as proven by certifications from the Food and Drug Administration (FDA), European Council (CE), Underwriters Laboratories (UL), and Cradle to Cradle™ (C2C).

The Common Question.

What are the differences between the ASTM D5526 and the ASTM D5511?

The ASTM D5526 test used by SW is considered the more reliable test of the two. It can be run for as long as required to establish the time it takes for a glove to break down – providing a more accurate assessment of the time it takes.

The ASTM D5511 test is a shorter test in ideal laboratory conditions. It is traditionally 30 days long. This test is frequently used as a “stand-in” while the longer ASTM D5526 is being run. SW did not use this test because the results do not accurately reflect how long and how completely a glove will break down.

Another Common Question.

What do you mean by break down? How do you know when it is broken down?

Something is determined to have broken down when it has released all its carbon gas and no toxic residue remains. (See Additional Tests section for more details.)

Additional Tests.

Additional testing includes BMP tests which indicate a material's potential for biodegradation, and the ASTM E1963 test which determines whether a material is harmful to plant life.

ASTM D5526 Details

ASTM D5526 stands for Standard Test Method for Determining Anaerobic Biodegradation of Plastic Materials Under Accelerated Landfill Conditions. The test mimics the most common landfill conditions. Glove samples are placed in three different, oxygen-free simulated landfill environments with varying amounts of solid wastes, at a constant temperature - often referred to as wet, moderate, and dry conditions. The breakdown of these samples is measured over time until the test ends after a requested number of days, or no further decay is measured. The biodegradability of the glove is then measured as the percentage difference between the remaining solid material, and the total original material.



The ASTM D5526 test run for EcoTek ran to completion, lasting 2.5 years with its samples breaking down by 92.6%.

**ASTM D5511
Details**

ASTM D5511 stands for Standard Test Method for Determining Anaerobic Biodegradation of Plastic Materials Under High-Solids Anaerobic-Digestion Conditions. The test measures biodegradation under ideal landfill conditions in the laboratory. Samples of a glove are placed in a system where the levels of waste within are managed to encourage maximum bacterial activity. As with the ASTM D5526, the remaining solids are subtracted from the total original sample to provide the total amount of biodegradation.

ASTM International forbids extrapolating the final biodegradation percentage and timeline from this test because it presents a false sense of security. ASTM recommends that this test not be cited if ASTM D5526 results exist for the same material.

**Additional
Details**

Details for additional testing, certifications and approvals are below.

**ASTM E1963
Details**

The ASTM E1963 verifies whether or not a material is toxic to plant life. Samples of a material are introduced to a number of plants and the development of these plants is monitored. Any material that can be shown to inhibit proper growth and development of the plants is considered toxic.

BMP Details

Bio Methane Potential (BMP) tests are a series of short tests that measure the methane output of a sample as it is consumed by anaerobic bacteria. These tests may only be relied upon to determine if a material has the potential to biodegrade. There are no established standards for BMP tests and results may vary from lab to lab.

**CE Certification
Details**

Certification from the CE is mandatory for any medical device being sold in the European Economic Area, including gloves. SW nitrile gloves with EcoTek are certified as a Category III device, suitable for use in situations with the greatest risk for exposure to deadly or permanently disabling substances.

**FDA Certification
Details.**

The 510k approval from the FDA is given when a medical device is shown to be at least as safe as similar existing equipment on the market. This requires third party testing to be submitted to the FDA for approval.

**UL Certification
Details**

The UL NFPA 1999 is a certification from Underwriters Laboratories and the National Fire Prevention Association that ensures that the product protects EMS responders from blood and bodily fluid-borne pathogens. It also sets standards for resistances to known Chemical, Biological, Radiation, and Nuclear agents.

**C2C Certification
Details**

Cradle to Cradle™ is a voluntary material health certification process to ensure that a product is composed of materials, and made by processes, that adhere to a specific philosophy. This philosophy treats the environment as a complete organism whose metabolic process should be nurtured by avoiding toxins, non-biodegradable materials, or unduly wasteful manufacturing techniques.