

## **US EPA Waste Characterization** **The Test Methods That Matter Most**

When it comes to determining if a waste is hazardous from a disposal standpoint, there is only one test method that matters. USEPA mandates the use of Method 1311, Toxicity Characteristic Leaching Procedure (TCLP) for determining if a waste is hazardous or non-hazardous for disposal purposes. Some vendors are encouraging the use of other test protocols for their client's wastes. This bulletin clarifies that the TCLP is used for legal waste classification and that the Multiple Extraction Procedure (MEP) provides long-term stability when that type of data is needed. The Synthetic Precipitation Leach Procedure (SPLP) will also be discussed as a test protocol for limited applications.

When considering options for waste treatment, the first target is to produce a waste that is not hazardous according to EPA RCRA regulatory limits. If baghouse dusts, foundry sands or spent blasting media, for instance, are characteristic hazardous wastes, they cannot be safely disposed until the characteristics are treated (or stabilized in-process through the addition of reagents) below federal and state regulatory standards.

The TCLP test was designed to test for these characteristics by simulating leaching in an acidic landfill environment. The EPA has designed other testing methods, including the SPLP (Synthetic Precipitation Leaching Procedure) and MEP (Multiple Extraction Procedure) tests. These three tests have some important differences.

According to the EPA Solid Waste Manual 846, the SPLP test (Method 1312) "is designed to determine the mobility of both organic and inorganic analytes present in liquids, soils and wastes." Townsend et al, 2003 defined the SPLP as a lab test developed by the US EPA to simulate the effect of acid rain on land-disposed wastes, when acid rain was a problem in the US. The method uses a diluted sulfuric and nitric acid mix (with a pH of 4.2) as the leaching solution.

In that same EPA Manual, MEP Method 1320 "is designed to simulate the leaching that a waste will undergo from repetitive exposure to acidic leachate." This method uses a TCLP followed by 9 extractions of the simulated acid rain on the same sample. Generally speaking, the MEP is a more stringent test for the following reasons:

- SPLP tumbles the sample in a single extraction for 18 +/- 2 hours (similar to TCLP)
- MEP tumbles the sample in an initial TCLP extraction, followed by 9 additional full extractions (24 hours per each extraction)
- MEP extraction fluid is a sulfuric/nitric mix that is 20 to 100 times more acidic than SPLP

The 10 total MEP extractions include 240 hours of tumbling. Because of this, the acid leach of MEP is 13 times longer than SPLP (18 hours of tumbling). The TCLP and SPLP were designed to simulate 100 years exposure in a landfill. The MEP was designed to simulate 1000 years in a landfill. For long-term performance testing, it is clear that the EPA has developed the MEP to address this need, not the SPLP.

At least one of our competitors apparently agrees that the MEP is the more stringent test. If you go to the following webpage: [www.envioblend.com/chemistry/epa-tests/](http://www.envioblend.com/chemistry/epa-tests/), you will find that they compare the TCLP, SPLP and MEP. They state the following: “Even more stringent is the use of MEP, involving an initial extraction with acetic acid (much like the TCLP) and at least 8 subsequent extractions with a synthetic acid rain solution (sulfuric/nitric acid). This procedure simulates 1000 years of freeze and thaw cycles and a prolonged exposure to a leaching medium.”

Please remember that the TCLP is the current protocol required by EPA to characterize a waste for disposal purposes. If you want to provide an extra layer of protection to ensure that your waste is long-term stable, you should consider using the method EPA designed for long-term stability, i.e., the MEP test.

<b><u>TEST METHOD</u></b>	<b><u>TCLP (EPA METHOD 1311)</u></b>	<b><u>SPLP (EPA METHOD 1312)</u></b>	<b><u>MEP (EPA METHOD 1320)</u></b>
<b>Leaching Solution</b>	Acetic Acid	60% Sulfuric Acid, 40% Nitric Acid	60% Sulfuric Acid, 40% Nitric Acid
<b>Leaching Solution pH</b>	As low as 2.88	As low as 4.2	3.0
<b>Extraction Cycles</b>	1	1	10
<b>Time in Acid Bath</b>	18 Hours	18 Hours	240 Hours
<b>Simulated Weathering</b>	100 Years in a Landfill	100 Years Exposure to Acid Rain	1,000 Years in a Landfill