Vacuum Tightness Test

Method for Sumps and Spill Containment Basins

Introduction:

This method may be used to test the tightness of product, STP, piping, transition sumps or spill containment basins in order to comply with State of Rhode Island Department of Environmental Management regulations and U.S. EPA regulations. Generally, this method is not appropriate for under-dispenser containment due to presence of product piping, electrical conduit, and other components which interfere with placement of test plugs. A vacuum tightness test for sumps and spill containment basins is a fast and effective method to determine if a component is liquid tight, however, may be difficult or impossible to successfully use on components that were not designed to be tested with this method, or if they are damaged, worn, otherwise in poor condition. In addition, this method requires specialized equipment, training, and expertise, and generally has a high failure rate due to difficulty in obtaining a proper seal. However, when successful, this method can quickly determine if a component is liquid tight without generation of waste liquids.

Eligibility requirements:

Generally, any spill containment basins or sump is eligible for vacuum tightness testing, however, the success rate is much higher with certain components that are designed to be tested using this method. Under-dispenser containment is generally not able to be tested using this method due to multiple obstructions preventing a test fitting from being properly placed.

Initial Survey:

Prior to commencing any test, the tester must perform a survey of any component that is to be tested. The following conditions must be met in order to move on to the next step:

- Inspect all boots, seals, compression fittings, joints, and bulkhead fittings for evidence of cracking, severe degradation, tears, or other damage. All damaged components must be replaced prior to proceeding.
- Inspect the inside of the sump, under-dispenser containment, or spill containment basin and ensure that it is clean and contains no liquid or other debris;
- Inspect the interior walls of the sump, under-dispenser containment, or spill containment basin for evidence of cracks, holes, fiberglass delamination, excessive rust, staining/discoloration, or evidence of liquid instruction. You may need to clean the interior of the sump in order to provide a good view of all surfaces. In the event the component has any damage beyond superficial rust, corrosion, or abrasion, it must be repaired or replaced prior to testing.

If these conditions are met, a vacuum tightness test method may be performed.

Vacuum Tightness Test Method:

Note: The vacuum tightness test method procedure outlined in PEI RP-1200 may also be used.

1) Download the Vacuum tightness test form from our website at http://www.dem.ri.gov/ust
2) Inspect and clean the mating surface of the spill containment basin or sump where the test fitting will be placed. The mating surface should be clean and free of contaminants, structurally sound, and free from deep scratches, abrasions, cuts, deformities, or other abnormalities that may prevent forming a tight seal.
3) Apply the test plug to the component being tested and connect to an intrinsically safe and explosion-proof vacuum pump rated for use in explosive and flammable atmospheres. The setup should contain a shut-off valve to isolate the pump from the component and vacuum gauge to monitor the vacuum in the component.
4) Slowly apply a vacuum to the component until a vacuum of 30 inches of water column is present in the component. If 30 inches of water column cannot be reached, either the component is not liquid-tight, or, the test setup is not compatible with the component being tested.
5) Once 30 inches of water column in the component has been reached, close the valve to isolate the component. Record the vacuum indicated on the pressure gauge on the test form. This is considered t = 0 min.
6) Allow the system to rest, undisturbed, for 1 minute. Record the vacuum indicated on the pressure gauge on the test form. This is considered t = 1 min.
7) If the indicated vacuum after 1 minute (t = 1 min) is ≥ 26 inches of water column, the component is considered liquid tight and has passed the test. If the indicated vacuum is < 26 inches of water column, the component has failed the tightness test.
8) All data collected during the test, as well as the initial and final indicated vacuum, must be recorded on the DEM-provided test form and submitted to DEM within 30 days of the test, or in the case of failed tests, 7 days.