**Sand Testing Modules**

## ST1: Sand Sampling Methods

Two tests will be performed in this module: AFS 1101-13-S: Sampling of Sand and AFS 1104-13-S: Sampling of Bagged Sand. Topics that will be covered: purpose of the tests, basic variables that factor into the tests, and performing the tests in a virtual environment. By the end of this module, you will be able to obtain a representative sample of free falling sand entering or exiting a bulk storage container (rail car, bin, barge, palletainer, intermediate bulk storage container, etc.) and obtain a sample of bagged sand which represents the lot from which the sample was obtained. (0.1 CEU)

## ST2: Sieve Analysis and Grain Fineness Number (AFS GFN)

Two tests will be performed in this module: the AFS 1105-12-S: Sieve Analysis (Particle Determination of Sand) and the AFS 1106-12-S: Grain Fineness Number, AFS GFN, Calculation tests. Topics that will be covered: purpose of the tests, basic variables that factor into the tests, and performing the tests in a virtual environment. By the end of this module, you will be able to determine the particle size distribution of loose, dry sand using standard test sieves and calculate the AFS Grain Fineness Number (AFS GFN), an estimate of the average sieve size of a sand sample. (0.1 CEU)

## ST3: Methylene Blue Clay Test

In this module, the AFS 2210-00-S: Methylene Blue Clay Test, Ultrasonic Method, Molding Sand test will be performed. Topics that will be covered: purpose of the test, basic variables that factor into the test, and performing the test in a virtual environment. By the end of this module, you will be able to measure the amount of live (active) clay present in a sample of molding sand. (0.1 CEU)

## ST4: AFS Clay

The AFS 2110-04-S: Clay, AFS Method test will be the focus of this module. Topics that will be covered: test objectives, basic test variables, and performing the test in a virtual environment. By the end of this module, you will be able to determine the percentage of clay (and other particles that settle at a rate of less than one inch per minute in water–typically material <20 microns). (0.1 CEU)

## ST5: Compactability

In this module, the AFS 2220-00-S: Compactability of Molding Sand Mixtures, Rammer Method sand test will be performed. Topics that will be covered: purpose of the test, basic variables that factor into the compactability test, and performing the test in a virtual environment. By the end of this module, you will be able to determine the percentage decrease in the height of a loose mass of sand under the influence of compaction. (0.1 CEU)

## ST6: pH of Sand

In this module, the AFS 5113-00-S: pH of Sand test will be performed. Topics that will be covered: purpose of the test, basic variables that factor into the test, and performing the test in a virtual environment. By the end of this module, you will be able to determine the alkalinity or acidity of sand, expressed in terms of pH. (0.1 CEU)

## ST7: Acid Demand Value (ADV) of Sand

In this module, the AFS 1114-00-S: Acid Demand Value (ADV) of Sand test will be demonstrated. Module topics will include: purpose of the ADV test, basic variables that factor into the test, and performing the test in a virtual environment. By the end of this module, you will be capable of measuring the Acid Demand Value of sand. (0.1 CEU)

## ST8: AFS Permeability for Green Sand

The AFS 5224-13-S: Permeability, Standard AFS 2 in. Dia. x 2 in. Test Specimen test will be the focus of this e-learning module. Prior to performing this test, you must complete the following sand tests: AFS 5222-13-S: 2 in. Diameter x 2 in. Specimen Preparation, Rammer Method and AFS 2251-00-S: Riddling, Molding Sand. These tests are incorporated in this module. Module topics that will be covered: purpose of the test, basic test variables, and performing the test in a virtual environment. By the end of this module, you will be able to determine the permeability of a Standard AFS (2 in. Dia. x 2 in.) test specimen. (0.1 CEU)

## ST9: Wet and Dry Compression Strength for Green Sand

In this module, the AFS 5202-09-S: Compression Strength, Green or Dried sand test will be performed. Prior to performing this test, you must complete the following sand tests: AFS 5222-13-S: 2 in. Diameter x 2 in. Specimen Preparation, Rammer Method and AFS 2251-00-S: Riddling, Molding Sand. These tests are incorporated in this module. Topics that will be covered: purpose of the tests, basic variables that factor into the tests, and performing the tests in a virtual environment. By the end of this module, you will be able to determine the compression strength of an AFS 2 in. Dia. x 2 in. specimen. (0.1 CEU)

## ST10: Moisture Determination for Sand Testing

In this module, the AFS 2216-00-S: Moisture, Infrared, Determination in Molding Sand test and the AFS 2219-00-S: Moisture Determination, Oven Method test will be performed. Topics that will be covered: purpose of the tests, basic variables that factor into the tests, and performing the tests in a virtual environment. By the end of this module, you will be able to determine the moisture content in foundry sand mixes and additives and determine the percentage of moisture in sand. (0.1 CEU)

## ST11: Loss on Ignition (LOI)

In this module, the AFS 5100-12-S: Loss on Ignition (LOI) test will be performed. This module also incorporates the AFS 5101-12-S: Magnetic Material, Removal, and Determination sand test as part of the LOI test. Topics that will be covered: purpose of the tests, basic variables that factor into the tests, and performing the tests in a virtual environment. By the end of this module, you will be able to measure the weight change of a sample, consisting of weight losses and weight gains when a sample is fired at 1,800°F [982°C]. This includes weight loss due to volatilization of organics, weight loss due to removal of chemically bound water, weight loss due to dissociation or inorganic compounds with one or more components given off as a gas, and weight gain due to oxidation reactions (specifically chromite, olivine, and magnetite). You will also be able to remove magnetic materials in a sand sample and determine magnetic content. (0.1 CEU)

## ST12: Wet Tensile Strength for Green Sand

In this module, the AFS 2206-12-S: Tensile, Wet Molding Sand test will be performed. Topics that will be covered: purpose of the tests, basic variables that factor into the tests, and performing the tests in a virtual environment. By the end of this module, you will be able to measure the wet tensile strength of bentonite-bonded molded sands. (0.1 CEU)

## ST13: Tensile Strength for Chemically Bonded Sand

In this module, the AFS 3301-08-S: Tensile Strength, 1 in. Thick Tensile Specimen test will be performed. Prior to taking this module, you must complete the following sand test module: AFS 3315-00-S: Specimen Preparation, 1 in. Thick Specimen, Hot Box, Warm Box/Cold Box. This test is incorporated in this module. Topics that will be covered: purpose of the tests, basic variables that factor into the tests, and performing the tests in a virtual environment. By the end of this module, you will be able to determine tensile strength of 1 in. thick tensile specimens. (0.1 CEU)

## ST14: AFS 2 in. Dia. x 2 in. Specimen Preparation, Rammer Method

The AFS 5222-13-S: AFS 2 in. Dia. x 2 in. Specimen Preparation, Rammer Method test will be taught in this module. In addition, the AFS 2251-00-S: Riddling, Molding Sand is part of this test and is included. Module topics will include: purpose of the tests, basic variables that factor into the tests, and performing the tests in a virtual environment. By the end of this module, you will be able to prepare a (2 in. diameter x 2 in.) test specimen for the testing of green sand and the dried physical properties of mold and core sands. (0.1 CEU)

## ST15: Friability

The AFS 2248-11-S: Friability sand test will be taught in this module. In addition, the AFS 2251-00-S: Riddling, Molding Sand and AFS 5222-13-S: AFS 2 in. Dia. x 2 in. Specimen Preparation, Rammer Method tests are part of the Friability test and included in this module. Module topics will include: purpose of the tests, basic variables that factor into the tests, and performing the tests in a virtual environment. By the end of this module, you will be able to measure the resistance to surface abrasion of green molding sands. (0.1 CEU)