

CSC SCIENTIFIC - USA

Moisture Analysis Equipment

Karl Fischer



The Karl Fisher titration is a technique for the determination of moisture content developed by a chemist named Karl Fischer. It is based on a reagent which reacts with water and converts the water into a non conductive chemical.

In the 1990's the Company began it's development of instruments that use **Karl Fischer titration** for moisture testing. This instrument is called the Aquapal III. The Karl Fisher method provides for the specific detection of water. In addition, it is an easy way to detect the presence of moisture in other liquids such as oil.

There are two methods used to perform the test:

One is known as volumetric. With this method the moisture determination is based on the amount of volume of reagent used to convert the water.

The other method of Karl Fischer moisture determinations known as the coulometric method. In this approach, the reagent and solvent are in the same liquid. The reagent is released by the induction of an electrical current. the amount of current required to convert the water is the determinant of the amount of moisture. The coulometric Karl Fischer instrument is often referred to as a **coulometer**.

The advantage of the colometric method is the capability to accurately measure small amounts of moisture. The volumetric method is preferred when moisture levels get high, when complex solvents are needed to release bound water in the sample or when other complex chemical reactions affect the combined reagent/solvents use in the econometric methods.

Coulometric Titrators - Aquapal III

Features

- **FAST**
- Test complete in less than one minute.
- Two step operation: press start and add your sample.
- **AUTOMATIC**
- Microprocessor performs all calculations.
- **PORTABLE**
- Small enough for the lab; rugged and durable to last in the field.
- **ASSURED ACCURACY**
- Test results are not affected by sample accumulation or solvent addition (crude and lube oils) which leads to inaccurate readings.



Volumetric Titrators Model Number MKA-610-TT

- **Volumetric Karl Fischer Moisture Titrator**
- Intuitive, easy-to-use GUI utilizing a high-resolution touch-screen LCD monitor with integral CPU
- **Graphical control of method**, sample, & result files
- Real-time display of titration curves
- Data sorting capability w/full statistical functionality
- **Second channel** available for concurrent operation of an optional Potentiometric, Coulometric Karl Fischer, or Volumetric Karl Fischer Titration Module
- Software conforms to GLP Guidelines
- **Master Control Unit, w/Touch-Screen LCD**
- Twin volumetric burettes
- Automatic solvent exchanging system
- Magnetic stirrer base unit, w/cell holder
- Twin platinum electrode



Loss-On-Drying



Some of the specific operating features include:

- Three operational modes
- Sample sizes from a few grams to 100 grams
- Results to +/- 0.2 % moisture
- Readouts in grams - % moisture - % solids - % dry weight
- On site calibration checks with the included calibration weight
- Printer ready
- Output port for computer connection.

On-Line Moisture Measurement and Control

There is an debate about whether continuous moisture measurement systems and and equipment should be referred to as **on-line** or **in-line**. We have chosen to take sides and use the term on-line. This is about **on-line** moisture detection, moisture measurement and moisture control. If one or more of the following three conditions exist at your facility, you are a candidate for **on-line** moisture detection, measurement and control.

1. You have a continuous process that can be controlled by adjusting a variable such as heat, speed, an additive, etc. to control to preset moisture levels.
2. The out put of the process is improved by tight control of moisture. That could be taste, color, smooth running process, size and the like.
3. The economic impact of controlling moisture in the process is significant (lost product, high cost rework, customer returns).



Indirect Methods Bench Top Analyzer

Sinar AP Moisture Analyzer

The Sinar AP Moisture Analyzer is world renowned for quickly and accurately determining moisture content in coffee. From parchment and green bean to roasted and ground coffee, the Sinar AP allows you to determine the quality of your coffee quickly and accurately without having to use charts, scales or thermometers. The Sinar's portable and rugged design ensures that repeatable and reliable testing can be done anywhere, in the field during harvest or during the roasting and grinding process. Not only is the Sinar accurate, all calibrations have been verified for accuracy and meet industry requirements, it offers crucial moisture readings in just 6 seconds.



Features

- **FAST**
Receive moisture test results in 6 seconds.
- **ACCURATE**
Revised calibrations ensure accurate results, +/-
- **PORTABLE**
Battery operated unit weighs less than 2 kg so you can test anywhere.0.03%.
- **EASY**
No need to grind your sample.
- **FLEXIBLE**
Unit allows 7 calibration curves that you can choose from a large database or you can make your own to meet all your testing needs.

Sinar AgriPro

AgriPro Moisture Meter

A Hand Held Moisture Meter is an instrument that you can take to the product and conduct a test on the spot.

The **AgriPro** fulfills that need. To operate the AgriPro, simply:

1. Unscrew the cover,
2. Fill the measurement cell,
3. Screw down the cover, and
4. Press the test button.

**** In seconds you get a moisture reading ****

This ability to take the unit with you lets you test your product in the field, in the storage area, on the line or at any point where the knowledge moisture levels is important. Each AgriPro comes with calibration s for 19 different products.

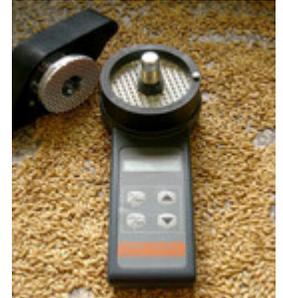
Other helpful features are:

Easy to read Digital readout -- See the results anywhere

Averaging facility -- Automatically average reading from repeated samples

Temperature Compensation -- Do not need to have controlled environment.

Hand Held -- Carry it anywhere



The third item in this group is a **Moisture Probe** useful for sampling the moisture in storage bins or storage piles.



The **moisture probe** is used to penetrate into a stack, pile or holding container. The probe acts as a moisture detector at various levels in the stack of material. A single reading can be used as for quick go-no-go evaluation or readings can be taken at varying depths to get moisture profiles.

The radio frequency, dielectric and capacitance moisture sensors offer the fastest and most convenient solution for measuring moisture content in many materials. For example the design concept of the Sinar bench top models is based on the simultaneous sensing of capacitance, weight and temperature of the sample being tested, providing accurate moisture reading in only a few seconds!

Particle Size

Sieves



If your process must have traceability or sieve testing is critical to your process or customer requirements, the Mesh Certified Test Sieve (MCTS) could be the solution. The manufacturing process is thorough and tuned to provide a consistent result. In addition, the MCTS are available at economical prices.

Why use Mesh Certified Test Sieves?

The development of quality standards and procedures under the auspices of ISO have led to a need for traceability to a base standard. Mesh Certified Test Sieves solve the problem of references to accepted wire mesh tolerances (ASTM or ISO) through information contained on the certificate that is provided with each sieve. The Mesh Certified Test Sieve we provide are by Endecotts and include a serial number that ties down the traceability to a each sieve.

Companies with test sieving operations that are critical to process and/or customer requirements use Mesh Certified Test Sieves to provide a known base line for evaluating sieve test results and to expose individual sieves that are out of tolerance. They are also used as masters (master stacks) to check deterioration in performance of the sieve units in every day use.

About the construction

The Mesh Certified Test Sieves (MCTS) supplied by CSC are produced by Endecotts, Ltd. The company is an ISO certified manufacturer. Endecotts manufacturing tolerances for these mesh certified sieves are so tight that approximately 30% of the mesh inspected is discarded as not suitable for Endecotts Mesh Certified Sieves.

This tight process control along with unique frame characteristics have given these sieves a World Class reputation. One of the special benefits of the sieve construction is a fillet. The fillet covers the solder connection between the mesh to the frame. This keeps particles from being caught in the crevices and makes cleaning easier.

Mid-Point Sieves



What Is A Mid-Point Sieve?

A mid-point sieve has had the mesh inspected. The sieve is then selected as a mid-point if the results give tolerances that are in the middle of the ASTM Standard. For example, the ASTM permissible variations for the mesh of a No. 40 sieve (425 μ) are:

1. Average Opening $\pm 19\mu$
2. Opening Dimension of 396 μ not exceeded by more than 5% of the openings
3. maximum individual opening 502 μ

The mid-point would have a variation in Average Opening of $\pm 9.5\mu$, opening dimension of 396 μ not exceeded by more than 2.5% of the openings and a maximum individual opening of 463.5 μ . The effect of this tightened tolerance is an improvement in variation of approximately 30%. These results are traceable to a NIST standard.

Working Sieves

What Do We Mean By Working Sieves?

Because we carry high precision Mid-Point and Mesh Certified Test Sieves (MCTS) we need to make a distinction between them and the work-horse sieves used day to day. These sieves that do not require special inspection but need to conform to the basic standards of ASTM E-11, we call **Working Sieves**. The **Working Sieves** are available in Brass frames with brass or Stainless Steel mesh. We also supply stainless steel frames with stainless steel mesh. **Working Sieves** are available with 8 inch and 12 inch diameter frames. The frames are full height and one half height depths.



These sieves are constructed using ASTM standard wire cloth (mesh) and are supplied with a Certificate of Conformance. The mesh has not been individually inspected. Each sieve has a serial number which is related to a lot number.

Working Sieves are used in a diverse range of industries that include construction, mining, food, soil testing pharmaceuticals. They can be checked against master stacks, master samples or calibration spheres (beads) to test for wear or mesh damage.

There are no more economical and practical sieves for everyday use where extra tight and traceable standards are not required.

**** An Every Day Work Horse ****

Summary

These **Working Sieves** are the intelligent choice for the application that has a limited requirement for traceability but needs a work horse sieve to perform on test after test.

Special Sieves

WET WASH SIEVES



WET WASHING SIEVES Extremely useful sieves for samples that need to be separated with the help of wet washing. Available in 8 inch diameter to 4 or 8 inches deep with brass or stainless steel frames. A complete range of aperture sizes with optional support medium for fine mesh

POCKET SIEVES

High Quality Pocket Sieves are specifically designed for testing small samples either in the laboratory or on-site! These brass sieves have a range of interchangeable mesh discs of different aperture sizes. It is supplied complete with sieve brush and belt pouch.



AIR JET SIEVES

Uniquely made for use with air jet systems. They are available in 200mm diameter brass or stainless steel frames and an extensive range of aperture sizes.

ELECTROFORMED SIEVES

Electroformed Sieves are produced to provide extremely high precision sieve openings. Sieve Calibration Microspheres

Sieving

Sieving is sometimes referred to as the **Cinderella of the particle-size analysis**, because it performs most of the work but gets little of the credit.

New high-tech processes of Sedimentation, Laser Diffraction and Image Analysis get most of the headlines. Issues affecting the universal implementation of these methods vs. sieving are high instrument cost, calibration, extensive operator training and procedural discipline.

Sieving has occasionally a bad name because tests are sometimes performed with subpar sieve mesh. Consequently, ***much has been made of obtaining sieves certified via ASTM or ISO mesh standards.***

Sieve Certification

Optical approaches can accomplish this, either with a microscope or video image analysis. Results are



presented in terms of maximum and minimum aperture size on the warp and on the weft, largest admissible openings and average openings. The number of openings measured is specified, means are calculated and a report is then generated.

The proscribed optical certification methods examine only a small number of the openings -- usually less than 1percent. For example, a 63-micron sieve has 2.5 million apertures; the ASTM method requires less than 1000 apertures. Opening size tolerances can exceed 10 percent. A 63-micron sieve has allowable tolerances of 12 microns or almost 20 percent.

Thus, a certification report can be viewed as only an insurance policy; assurance that a sieve's mesh is within a required specification. It is not a valuable predictor of a sieve' performance.

Sieve Calibration

In some circles, the development of microspheres with tolerances as tight as +/- 0.5 microns in diameter has started a revolution in thinking about sieve certification and calibration.

The re-certification or certification is an expensive and laborious process, requiring special equipment and technician patience. It should be emphasized that the end result is no more than an insurance policy and is not a true predictor of a sieve's performance. Microsphere calibration standards, however, bring the promise of not only the insurance policy that sieve calibrations are traceable, but also produce specific numerical results that predict performance of a test sieve.

Calibrated Microspheres



Accessory Equipment

5510 Ultrasonic Cleaner

Cleaning your sieves using the CSC Scientific 5510 Ultrasonic is a faster, more thorough, and safer method than any other. Tiny, microscopic bubbles are created by ultrasonic sound waves that move through a specially formulated cleaning solution, removing the most stubborn dirt and contaminants. A built-in heater and degas feature help the whole process work even better. The CSC Ultrasonic cleaner makes a scrubbing action powerful enough to eliminate blinding and thoroughly clean your sieves.



Features

- **FAST**
Cleans sieves in less than 5 minutes
- **AFFORDABLE**
Save money by extending the lifetime of your sieves
- **SAFE**
Removes the toughest grime without damaging expensive sieves
- **CAPACITY**
 - 1 – full height 8in sieve
 - 2 – half height sieves

Sample Dividers

The Handheld Sample Divider allows you to split your samples and ensures you retain the characteristics of your original sample. The stainless steel construction of the sample divider makes it durable and virtually non-corrodable. You can choose slot widths of either $\frac{1}{2}$ inch or $\frac{1}{4}$ inch to best fit your needs.



Sieve Cleaning Brushes

Sieve cleaning brushes are ideal to keep your sieves working optimally. They are simple to use and are shaped to be make cleaning fast and spotless.



Sieve Shakers



Meinzer II Sieve Shaker

The CSC Meinzer II Sieve Shaker separates different size components in ground, granular or particulate mixtures by rapid machine sieving. The Meinzer II is ideal for use on aggregates, cements, chemicals, pharmaceuticals, cosmetics, grains, seeds, coal, soils, tobacco blends, or any dry material requiring size analysis. The newly developed clamping system is very easy to use. The Meinzer II accepts up to 8 full-height 8" sieves or 15 half-height sieves, plus a lid and receiver.

Features

- **QUIET OPERATION**
Acceptable noise level for the plant or lab.
- **COMPACT SIZE**
Only 10" diameter footprint.
- **TWO WAY SIEVING ACTION**
Simultaneous vertical and horizontal motion.
- **BUILT-IN TIMER**
Adjustable 60 minute timer with automatic shutoff.
- **PORTABLE**
Light-weight, 36 lbs.
- **MAINTENANCE-FREE**
No internal moving parts.
- **AFFORDABLE**

Powermatic Sieve Shaker

The Powermatic Sieve Shaker is rugged no-nonsense shaker, ideal for heavy-duty applications. It is equipped with two maintenance free sealed motors to transmit the exact vibrations and movement to the sample for optimum performance. The low voltage removable control unit allows the unit to be controlled from a bench wall, or other convenient locations. The Powermatic is perfect for use in the field or production area.



Features

- **QUIET**
Virtually silent in operation, ideal for on-site, production, or lab testing.
- **MAINTENANCE FREE**
Two sealed motors offset at strategic angles transmitting the exact vibration frequency and movement for optimum performance.
- **EASY TO USE**
60-minute timer and uniquely designed clamping system allows user to change sieve stacks in seconds.
- **FLEXIBILITY**
Detachable control unit for convenient use Now available: Screening sieves for continuous small scale screening operations.
- **CAPACITY**
18" Sieves – 5 full height sieves

Octagon Sieve Shaker

The **Octagon 2000 Sieve Shaker** provides precise particle size analysis for laboratory or on-site use, all within safe and acceptable sound limits.

Digital controls – **adjustable intervals, time, vibration, and amplitude** - allow you to duplicate test results from your current shaker with ease, **from 3 in. to 20um**. The unit is powered by an electromagnetic drive that has no rotating parts, eliminating maintenance and virtually all noise. The rapid vertical and side to side motion created prevents apertures from blinding and offers accurate, repeatable results test after test.



Features

- **WHISPER-QUIET**
Ideal noise level for use in the plant, lab, or even at your desk!
- **MAINTENANCE FREE**
Powered by electromagnets, offering no moving parts to replace.
- **EASY TO USE**
Digital controller allows user to control time, amplitude and continuous or intermittent vibrations.
- **FLEXIBILITY**
Uniquely designed clamping system allows user to change sieve stacks in seconds.
- **ACCURATE**

Exacting horizontal and vertical sieving motion created offers particles maximum time seeking apertures.

Dura Tap™ Test Sieve Shaker for 8" and 12" Test Sieves



A Sieve Shaker Built to Take a Beating

Answering the call for a **heavy-duty test sieve shaker**, CSC Scientific now offers the **DuraTap™**. This unit is designed to succeed where others fail.

Gone are the days of needing to buy "**accessory packs**" of repair parts for **expected breakdowns** like other rotating-tapping sieve shakers require.

The **DuraTap™** doesn't use typical plastic wear-sensitive parts. This industrial-strength shaker is engineered with **rugged steel and alloy materials** ready to withstand the everyday, harsh duty cycles. In addition, **grease fittings are provided** to ensure longer life of the shaker bearings. Each **DuraTap™** is "burned in" by continuously running it for over 4 hours, guaranteeing performance right out of the box.

In summary the **DuraTap™** is a **heavy-duty test sieve shaker** with the motion proscribed in many operating standards. It is made with rugged steel and alloy materials ready to withstand the everyday, harsh duty cycles.

The **DuraTap™** is a direct replacement for the **RoTap™** but with redesigned components that extend operational life.

Sonic Sifter



A Powerful Tool:

The Original Sonic Sifter Separator

A superior sieving instrument, the Sonic Sifter Separator is precise, versatile and ideal for research and quality assurance applications. It's especially effective with "difficult" dry powder materials previously considered too fine for particle analysis.

Specially designed 3" (75mm) diameter acrylic-framed sieves and a patented oscillating air column allows this unit to achieve efficiencies previously seen only with wet sieving for materials in powdered, granular or pellet form— and is capable of achieving separations over the range of 3 μ m to 5.6mm.

- A unique oscillating air column moves even the finest particles through a stack of screens.
- The Sonic Sifter is virtually maintenance free.
- Quiet operation makes this unit suitable for most laboratory installations.
- There's no screen wear or particle attrition.
- Digital timer for precise operation.
- Capacity of six standard or three precision sieves per test run.

Particle separations can be accomplished in less than 10 seconds under favorable conditions. And testing times can be cut by up to 90%, compared to other methods.

The SonicSifter is a unique instrument designed specifically for the separation and distribution measurement of small sized samples.

MLS 200 Vacuum Siever

The MLS 200 makes sieving fine or electrostatic particles effortless and gives accurate results in less than 3 minutes. Using positive and negative air pressure, the MLS 200 pulls your dry material, sized from 20 um to 1.00 mm, through the sieve and ensures apertures do not blind. You can easily reproduce test results using a manual control dial to adjust both forms of air pressure. In addition, you can use your standard 8 inch test sieves with the MLS 200 – no special sieves are needed!

Features

- **VERSATILE**
Precisely analyze electrostatic or dry material ranging from 20um to 1.00mm
- **FAST**
Accurate sieve results in less than 3 minutes
- **EASY TO USE**
Cover sieve with lid, select test time and press star
- **DURABLE**
All stainless steel with polished surfaces, including the gear box
- **CAPACITY**
8" sieve – 1 full height sieve
200mm sieve – 1 full height sieve

