Routine Testing

# SOP for Periodic SmartCal™ Test

## of Moisture Analyzers

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# General

**The SmartCal test is a rapid test which checks the moisture analyzer's overall functionality. SmartCal is a granular substance which releases a defined amount of moisture depending on the selected drying temperature. Intended use is the verification of METTLER TOLEDO Halogen Moisture Analyzers.**

## Basic Rules for Handling Moisture Analyzers

- Before using a moisture analyzer, make sure the instrument was left on power for a sufficient period of time (mentioned in the user manual).
- Make sure the moisture analyzer is leveled.
- Minimize environmental influences, e.g. draft or direct sunlight.
- Distribute samples gently and evenly on the sample pan.

## Basic Rules for Handling SmartCal

**Important to know**

- The granular test substance is double-packed in a stick inside a blister pack.
- The stick should only be removed from the blister pack immediately before use.
- Do not use any damaged or expired sticks.
- After the SmartCal test, the used test substance can be disposed of as normal waste.

**How to Store SmartCal**

- SmartCal should be stored in the same room as the moisture analyzer they are used with, since temperature differences between the test substance and their surroundings can lead to measurement errors.

**How to Handle SmartCal**

- The SmartCal test result requires a normalization to ambient conditions (%RH and room temperature).
- When performing a SmartCal test, use the sample pan handler.
- Use the complete contents of the stick (approx. weight 8.5 g).

# SmartCal Routine Test

## Preparation

- Before the test is performed, SmartCal test substance and the thermohygrometer must be acclimatized to the ambient temperature of the moisture analyzer.
- When the test is performed, the heating unit of the moisture analyzer should be at room temperature.
- If a sensitivity test needs to be done as well, please perform the sensitivity test first (to avoid waiting time for cooling down).
- Use instrument predefined test procedures or set instrument to the SmartCal test parameters:
  – Switch-off time: 10 minutes
  – Drying program: standard drying
  – Display: %MC
  – Drying temperature: 70, 100, 130 or 160 °C
    (Select the temperature closest to the drying temperature normally used)

## Test Procedure

- If required by instrument menu enter ambient temperature and ambient humidity.
- Place the sample pan handler with the aluminum sample dish in the instrument and tare.
- Remove a SmartCal stick from the blister pack, open it and distribute the entire contents evenly over the sample pan (whole pan covered with granules).
- Start the test measurement immediately after distributing the sample.
- Read the displayed result (%MC, $\%MC_N$) from the instrument.
- If the result is shown as MC% record ambient temperature and ambient humidity as well.

## Evaluation

- If the unit of the displayed result is $\%MC_N$, no normalization is needed. If the unit of the displayed result is MC% normalize the displayed result – using the ambient conditions recorded above – either manually with normalization table or with the Excel measurement report.
- Evaluate whether the normalized result exceeds the defined control limits.[1)]

## Deviation

**Control Limit** [1)]

- If the control limit is exceeded, reduce error sources (see SmartCal user manual) and repeat the test (after cooling down of the moisture analyzer).
- If the control limit is exceeded again, report supervisor that the control limit was not met.
- Let the moisture analyzer cool down, perform weight and then temperature adjustment, let the moisture analyzer cool down and repeat the SmartCal test.
- If the control limit is still exceeded, report the problem to the supervisor. Optionally, contact METTLER TOLEDO's service organization for advice.
- Mark the moisture analyzer as "out of control limits".

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1) – Values within the control limit: no action is necessary.
– Values beyond the control limit show that the moisture analyzer is no longer under control and immediate action is therefore required.

## Recommended Control Limits for SmartCal Test

| Drying Temperature | cSmartCal | SmartCal |
|---|---|---|
| 70 °C | 3.4 - 4.4 $\%MC_N$ | 3.3 - 4.5 $\%MC_N$ |
| 100 °C | 5.4 - 6.4 $\%MC_N$ | 5.3 - 6.5 $\%MC_N$ |
| 130 °C | 7.6 - 8.8 $\%MC_N$ | 7.5 - 8.9 $\%MC_N$ |
| 160 °C | 10.1 - 11.7 $\%MC_N$ | 10.0 - 11.8 $\%MC_N$ |

Control limits are valid for METTLER TOLEDO Halogen Moisture Analyzers.

**www.mt.com/moisture**
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