

DETERMINATION OF DRY MATTER IN TOBACCO, TOBACCO PRODUCTS, FIBRE-BASED MATRICES AND TOBACCO DERIVED PRODUCTS BY LOSS ON DRYING

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Purpose

To describe the determination of the dry matter (moisture content) in tobacco, tobacco products, fibre-based matrices and tobacco derived products (also called purified products) at APS.

Applies to

Analytical and Product Science (APS)

General information

Principle of the method

Dry content (dry matter): The amount of dry matter remaining following the evaporation of water and volatile compounds expressed in %.

For APS, the dry matter is used to calculate the concentration of chemical components per unit of dry matter in a sample.

When determining the dry matter, no single component is measured, but the concentration obtained depends on the temperature and the length of time the sample was in the oven. The selected temperature and duration are tested to achieve a stable weight. The capacity of the method is 200 single analyses/week.

Note: All reference documents and additional information stated “available upon request” are in Swedish. They are available upon request but need to be translated into English first.

Instruction scope, measurement range and measurement uncertainty

See method description MTB Determination of the Dry matter in tobacco, tobacco products, fibre-based matrices and tobacco derived products by loss on drying.

Measurement range: dry content 30–98%

Combined relative measurement uncertainty for all APS sample types: 3.2%

Literature references

(b) (4)

Internal reference documents (available upon request)

(b) (4)

and

tobacco derived products by loss on drying in QEMS

Risk assessment and safety instructions

Summarised risk assessment

The work is conducted with adequate ventilation in the room, and no work is to be performed if the ventilation system malfunctions. The work can be performed at an open bench and no risk mitigation measures need to be implemented. However, you must observe the hygienic limit values in the Work Environment Authority's regulations.

See (b) (4)

Hazard and precautionary statements

Silica gel with yellow/orange moisture indicator

(b) (4)

P261 – Avoid breathing dust/fume/gas/mist/vapours/spray.

Equipment

Apparatus and laboratory utensils

(b) (4)

Analytical scale

Desiccator cabinet with silica gel

Computer with the (b) (4) program and (b) (4) weighing program.

Tray with sample cups and lids (wall glass PP 25 ml)

Timer

(b) (4)

temperature monitoring software

Chemical

Silica gel 2.5-6 mm with yellow-orange moisture indicator, "Yellow gel" (desiccant for desiccator)

Hazard symbol: Not subject to labelling

Check samples

Check samples are analysed for each analysis timepoint. The check sample is a (b) (4) and it must be stored in a (b) (4)

Maintenance

The silica gel in the desiccator cabinet is (b) (4) or earlier if the gel has turned transparent. (b) (4)

The silica gel is activated by (b) (4). The activated silica gel is yellow and when it contains moisture it turns translucent.

Sample handling

Sample storage and preparation

The sample is stored in accordance with (b) (4) (available upon request).

Sample amount

The sample is prepared in accordance with (b) (4).
The minimum amount of sample for performing an analysis is (b) (4) grams.

Analysis

General information

- There are (b) (4), one of which is a check sample. (b) (4).
- For each weight transfer, check that the correct sample number is selected and the cursor appears in the correct box.
- After weighing in, it is important to (b) (4) until an even sample surface is achieved.
- (b) (4) in order to reach the correct temperature.

- For a whole sample series, the (b) (4), if the sample is missing, the last package sample is analysed. The sample to be analysed has (b) (4) (this is input upon registration). The results are then manually entered by placing the cursor in Dry Matter (Raw Result) and copying the "Value" under Data Item to Dry Matter (Raw Manual Entry) for the remaining samples in the series.

(b) (4), and then rounded automatically in (b) (4) to 1 decimal place.

Calibration and verification of apparatus

(b) (4)

The oven should always be on. The temperature of the oven is to be (b) (4), the oven is set at the correct temperature using the temperature log. The oven temperature is logged using the

(b) (4)

Following the calibration of (b) (4), the ovens must be checked to show (b) (4). If any adjustment is required, see the (b) (4).

(b) (4)

(b) (4)

and when the adjustment of temperature was made, if any.

Analytical procedure

Check samples and samples are to be handled in the same way. All weighing is done directly to

(b) (4)

- Weighing in
- Drying
- Cooling
- Weighing out

Weighing in

1. Make a QC batch in LV, see (b) (4), of which one (b) (4).
2. Weigh out the samples in LV as specified in the QC list
3. Place the lid and cup on the scales. **Tare.**
4. Weigh out (b) (4)
5. Enter the weight in the **Sample weight** box or press the **Send** key on the scales.
6. *After weighing in, it is important to shake the sample cup gently until an even sample surface is achieved.*
7. Place the sample cup on the tray with the lid next to it, see [Figure 1](#).



Figure 1

8. **Read** and enter the **Tare weight** (negative weight) or **press the Send key** to the **Tare weight** box
9. Go to the next sample.
10. (b) (4)
11. Save the results.
12. If more samples are to be analysed, continue with the (b) (4) and repeat from point 2.

Drying

1. Place the tray/trays with sample cups with relevant lid in the heating oven for 2 hours, and turn on the timer.
2. Remove the tray/trays from the oven and attach the lid immediately.
3. Work with one oven at a time

Cooling

Place the entire tray with sample cups in the desiccator cabinet for 60 minutes.

Weighing out

1. Weigh out the samples according to the (b) (4)
2. **Reset** the scales and set the sample cups.
3. Place the cursor for weighing out in the (b) (4) **Enter** the weight or press the **send** key on the scales. Go to the next sample. Weigh out all the samples.
4. Save the results.
5. (b) (4)
6. Assess the analysis results, see instruction (b) (4).

Termination

Log out, discard the sample and brush/wipe the sample cup.

Documentation

The logbook records the date of analysis, the executor, the check sample number, the control chart deviation, (b) (4)

Data

Collection and storage of data

The results are saved in (b) (4). The data is saved and stored directly in (b) (4)

Calculations

Dry content is calculated in accordance with the principle.

$$\text{Sample's dry content in \%} = 100 - \left(\frac{A - B}{A} \right) \cdot 100$$

Weighed out amount of sample = A

Weighed out amount of sample = B

From (b) (4)

The dry content of the sample in % = (weighing out + tare weight)*100/weighing in where the tare weight is negative

Raw data

Saved in (b) (4)

Quality assurance

One check sample per tray is analysed for each analysis.

Control Chart

(b) (4) have a control chart (b) (4). One check sample is analysed for each analysis timepoint. See (b) (4) (available upon request). The results are automatically transferred to (b) (4) and added to an X chart. The limits of the control charts are (b) (4), alarm limit and (b) (4), action limit.

(b) (4)

Case 1:

If the check sample value falls outside (b) (4) (alarm limit) a record is made in the control chart/log book. The samples can be approved.

Case 2:

If two measurements in a row fall outside (towards the same side or opposite sides) two standard deviations a note is made in the control chart and in the log book. No results are reported and the samples are re-analysed. The check sample is included in the statistics. (b) (4)

Perform one or a few of the following actions:

- Check the oven temperature.
- Dry the yellow gel.
- Replace with a new check sample jar.

Case 3:

When a measurement falls outside 3 standard deviations (action limit), a note is made in the control chart and in the log book. No results are presented and the samples are re-analysed. The check sample is included in the statistics. Contact the person responsible for the method for a joint assessment.

One or more of these measures are to be taken:

- Check the oven temperature.
- (b) (4)
- Replace with a new check sample jar.

(b) (4) (series) or if ten results in a row represent a trend, the person responsible for the method is contacted for a joint assessment. The series can also be labelled in the control chart when the (b) (4) from the bottom, the check sample can be replaced with a new one.

(b) (4)

Inspection of Measurement Equipment at the Lab

If the check falls outside the limit, a check of the temperature is made in (b) (4) and a reassessment of the sample is performed.

Reporting of analysis results

Dry matter is stated in % and reported to the client to at least one decimal point of accuracy.

Revision history

Date	Comments
150410	(b) (4)
150604	
150903	
170822	
180409	

Person responsible

Director APS

Appendix 1 Risk assessment of chemicals

- A: Substances with very high health hazard
B: Substances with high health hazard
C: Substances with moderate health hazard
D: Substances with low health hazard
E: Substances hazardous to the environment
F: Flammable substances

Substance	Hazard abbreviation, category, code, symbol code and signal word	Hazard category A-F	Quantity (Factor)	Physical characteristics (Factor)	Working practices (Factor)	Exposure	Risk level
(b) (4)							

Measures for risk levels

Risk level 1 work can be performed at an open bench and no risk mitigation measures need to be implemented. However, you must observe the hygienic limit values in the Work Environment Authority's regulations.

Risk level 2 work can be performed at ventilated work places such as fume cupboards, draw benches or spot extractors. Possible risk mitigation measures must be considered.

If work is conducted on a daily basis with substances in a very high or high hazard category, additional protective measures may be required such as

- notifying other laboratory staff about the risk that exists,
- not to work alone,
- considering wearing additional personal protective equipment,
- considering using the fully sealed fume cabinet.

Risk level 3 work should be performed in compliance with specific local procedures. In addition, special safeguards may need to be taken depending on the type and frequency of the substance being handled.

Risk mitigation measures are needed such as the option of using alternative chemicals, or reducing the volume involved in the application of the chemical. By way of example, the risk level can be lowered if the stage involving the risk is performed in a sealed fume cabinet rather than previous more open handling. Consider the benefits of work justifying the major risk moments.

Personal protective equipment

Protective goggles:

Protective goggles must always be worn.

Protective gloves:

Unless otherwise specified in the safety data sheet, protective gloves should be worn when handling substances or mixtures in;

(b) (4)

- This also applies to substances or mixtures labelled with the supplemented hazard statements (b) (4) or (b) (4), and for substances listed in (b) (4) in the Swedish Work Environment Authority regulations on hygiene limit values or for mixtures involving substances of this kind.

Respiratory protection:

Unless otherwise specified in the safety data sheet, respiratory protection should be used for substances or mixtures for the below-mentioned hazard types in conjunction with specific H-statements. However, it is only in the case of sufficiently severe aerosol and vapour formation that protection should be worn and then a personal assessment must be made for each individual method:

(b) (4)

- Also observe the hygienic limit values set in the (b) (4) regulations.

Measures for Hazard types E and F

For environmentally hazardous classified substances, i.e. Hazard type E, the option of using alternative chemicals should be investigated.

For explosive and flammable substances, etc., Hazard type F, the option of using alternative chemicals should be investigated. In addition, special safeguards may need to be taken depending on the type of the substance being handled. For example, (b) (4) (b) (4), even if it is at risk level 1 due to the fact that it is not classified in terms of health risks (Hazard type D). This is investigated on a case by case basis. This may also apply to substances with what we call "Additional hazard information" as per (b) (4)

Summarised risk assessment of the method:

The work is conducted with adequate ventilation in the room, and (b) (4).

The work can be performed at an open bench and no risk mitigation measures need to be implemented.

Risk mitigation measures:

Substances hazardous to the environment:

Flammable substances: