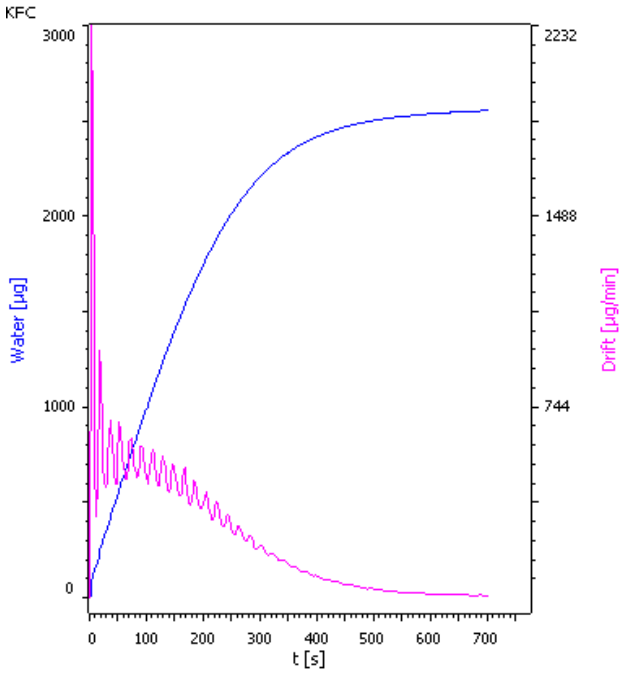
KF Application Note K-049

Water in plastic pellets

Interference-free determination based on ASTM D6869



The water content, also called moisture content, of plastics is an important quality parameter, as it affects the properties and processability of some plastics. A high water content can lead to degradation of the plastic by hydrolysis or cause surface imperfections. Additionally, it can affect the physical properties of some plastics.

For this analysis, the oven technique is used, as volatile compounds present in plastics will interfere, if the water content is directly determined by coulometric Karl Fischer titration.

The water content determination in polycarbonate pellets, performed with the 885 Compact Oven Sample Changer and 899 Coulometer, is described in this Application Note.

Metrohm

Method description

Sample

Plastic pellets (polycarbonate)

Sample preparation

Approximately 3 g of sample is weighed into the sample vial, tightly closed with the cap and placed on the rack of the 885 Compact Oven Sample Changer.

Solutions

HYDRANAL®-Coulomat AG Oven

Configuration

885 Compact Oven Sample Changer	2.885.0010
899 Coulometer	2.899.0010
Remote cable	6.2141.390
Double Pt-wire electrode	6.0341.100
Generator electrode without diaphragm	6.0345.100

Analysis

All measurements are carried out at the same temperature using the same parameters.

After starting the sample series, the Sample Changer moves to the conditioning vial, the needle pierces the septum, the gas flow is started, and the titration vessel is conditioned. Then a determination with an empty sample vial is carried out to prepare the system and rinse all tubing. Following the system preparation, three blank values (empty sample vials) are determined and the mean value of the blank is saved as common variable. This value is subtracted from the EP of the sample determination. Subsequently, the water content of the samples is determined. Between two sample measurements, the titration vessel is conditioned again.

Parameters 899 Coulometer

Conditioning	on
Start drift	10 µg/min
Drift correction	auto
Automatic start	off
Stabilizing time	10 s
Cond. stop time	off
Pause	0 s
Endpoint at	50 mV
Titration rate	optimal
Stop criterion	rel. drift
Relative stop drift	10 µg/min
Extraction time	120 s
Generator electrode	without diaphragm
Generator current	400 mA
Stirring rate	15
I(pol)	10 µA
Temperature	25 °C
Stop time	off

Parameters 885 Compact Oven Sample Changer

Temperature	250 °C
Flow rate	50 mL/min
Gas supply	valve
Gas type	nitrogen
End of series	conditioning

Results

Mean (n = 10) [µg/g]	RSD [%]
766.7	0.55

KF Application Note K-049
Version 2, published in February 2019

Metrohm