WC GEL, WASHING GEL, LIQUID SOAP

water content determination

The structure of high-quality chemical products contains numerous carefully dosed ingredients thanks to which these products become effective in a relatively diverse environment. What is required is aggressive impact, e.g. WC gel, but also suitable reaction to dirt and water presence, as in a washing gel and liquid soap. The key to designing these phenomena well is surface-active substances, the so-called surfactants. The real amounts of each ingredient added to the mixture must be supervised, which eventually determines the quality and efficiency of the product. One of engineering parameters of numerous chemical product is dry matter, that is a part of the sample that remains after removing all volatile elements. The method of measuring dry matter to be used in testing must guarantee accuracy and highly precise measurements, which can be assured with the use of the MA R, MA X2, MA X7 and MA 5Y moisture analyzers by Radwag.

The application note includes basic information for validation of the WC gel, washing gel, liquid soap drying method with the use of MA R, MA X2, MA X7 and MA 5Y moisture analyzers series by Radwag Wagi Elektroniczne. The application note may be the basis for elaborating own drying method with special regard to distinctive features of the product in question.

Metrology, Research and Certification Center, Radwag Wagi Elektroniczne, Poland
Toruńska 5, 26-600 Radom, Poland +48 48 386 60 00, e-mail: office@radwag.com, www.radwag.com

TERMS

ACCURACY of determining water / dry matter content is the difference between the result of the water / dry matter content received in the moisture analyzer method and the result of the water / dry matter content received while drying the same sample through a reference method.

PRECISION is a degree of compliance between independent results of the test, received in specific conditions. The measure of precision is a standard deviation from a series of several measurements.

REFERENCE METHOD

The reference method parameters are usually specified in standards or other discipline-specific documents as the so-called guides. If such documents are unavailable, the drying temperature that does not cause the sample to change colors is used. Such an approach applies to previously dehydrated products and raw products.

SAMPLE PREPARATION

Before testing, sample must be stored in sealed containers. Fluid and semi-fluid products must be mixed before testing.

ACCESSORIES

Dryer, quartz sand, weighing vessels with a lid, rods, AS 220.X2 balance, laboratory spoon.

METHOD DESCRIPTION

Weigh glass vessels with a glass rod and pre-dried quartz sand in the amount of ca. 15 g. Mix the sample with a mass of ca. 5 g and put into the glass weighing vessels on pre-dried quartz sand. Mix the sample with sand by means of the glass rod that must be left in the vessel. Use of sand as a foundation is aimed at elimination creation of the shell on the surface of the sample in question. Weigh vessels again and specify the real mass of the sample in question with the use of the balance whose weighing accuracy is 0.1 mg (AS 220.X2). Place weighing vessels with the sample and lids in the temperature-controlled laboratory dryer. Dry samples at the temperature of 105^{o}C for 3 hours. After this period, remove vessels and put into the desiccator until they cool down and weigh afterwards. Place samples in the laboratory dryer again and keep on drying them for 30 minutes. Cool them down and weigh again. Repeat the procedure until you obtain a stable sample mass or record the sample mass growth after drying. Calculate the dry matter content as a quotient of the post-drying sample mass (m_2) and pre-drying sample mass (m_1).

RESULTS

Sample name	WC GEL	WASHING GEL	LIQUID SOAP
Dry matter content (%)	18.15	16.59	9.69
Standard deviation (%)	0.09	0.04	0.01

WC GEL, WASHING GEL AND LIQUID SOAP – DRY MATTER CONTENT DETERMINATION WITH THE MOISTURE ANALYZER

The water content testing with the use of the moisture analyzer (IR radiation) entails two phenomena: convection and radiation. The sample temperature rises from outer layers to the bottom of the sample. The temperature gradient in the sample structure minimizes through optimization of the thickness of the dried sample and drying temperature.

SAMPLE PREPARATION

Before testing, samples must be stored in sealed packaging. Fluid and semi-fluid products must be mixed before testing.

ACCESSORIES

MA R, MA X2, MA X7 and MA 5Y moisture analyzer, glass weighing vessels with a lid, laboratory spoon, pipette.

METHOD DESCRIPTION

Set drying parameters presented below. Distribute a thin layer of the sample with a mass of ca. 1.5 ÷ 2 g throughout the weighing pan. Lock the drying chamber manually or automatically.

DRYING PARAMETERS / RESULTS

Sample name	WC GEL	WASHING GEL	LIQUID SOAP
Drying profile	Standard		
Drying temperature	120°C		
Sample mass (g)	~ 1.5 ÷ 2.5		
End of analysis	Auto 3		
Dry matter content (%)	18.28	16.71	9.66
Standard deviation (%)	0.04	0.18	0.16
Analysis time $\acute{x}$ (min)	~ 9	~ 18	~ 19

ACCURACY OF THE MA R, MA X2, MA X7, MA 5Y METHOD

Sample name	WC GEL	WASHING GEL	LIQUID SOAP
Dry matter content (%) Ref.	18.15 ± 0.09	16.59 ± 0.04	9.69 ± 0.01
Dry matter content (%) MA	18.28 ± 0.04	16.71 ± 0.18	9.66 ± 0.16
Analysis accuracy (%)	|0.13|	|0.12|	|0.03|

RESERVATION

The method in question has been verified by the Research Laboratory, yet the results do not include factors arising from diversity of tested samples, operators' personal skills as well as measuring capability used by moisture analyzer users. For this reason Radwag shall not be held responsible for drying parameters but they can be used to elaborate own drying method.