POWDER PAINT

water content determination

Despite being powdery and fine, the powder paint is not a hygroscopic product. During its production and application, only a small amount of moisture may be absorbed by outer layers of the paint. It is assumed that the maximum moisture content in the powder paint is about 0.5%. The limit amount of water may be exceeded when water steam condenses as a result of substantial temperature fluctuations between the room, e.g. paint shop, and paint. This being the case, paint particles conglomerate, which makes application on the painted product a way more difficult. In such cases the powder paint must be acclimatized. The powder paint moisture is an essential technological and quality parameter that must be specified quickly and precisely; this is possible with the use of MA R, MA X2, MA X7 and MA 5Y moisture analyzers by Radwag.



The application note includes basic information for validation of the powder paint drying method with the use of MA R, MA X2, MA X7 and MA 5Y moisture analyzers by Radwag Wagi Elektroniczne. The application note may be the basis for elaborating own drying method with a 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. As for powder paints, the drying temperature must not cause the sample structure to change, e.g. capping, shell formation, etc.

SAMPLE PREPARATION

Before testing, samples must be stored in a sealed packaging.

ACCESSORIES

Laboratory dryer, glass weighing vessels with a lid, AS 220.X2 analytical balance, laboratory spoon.

METHOD DESCRIPTION

Place the sample with a mass of ca. 3 g in pre-dried glass weighing vessels. 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). Put the weighing vessels with the sample and lids in the temperature-controlled laboratory dryer. Dry samples at the temperature of 45^{o}C for 3 hours. After this period, remove vessels and put into the desiccator to let them cool down and then weigh. 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 or record the sample mass growth after drying.

RESULT

Sample name	**POWDER PAINTS**			
Type	**R1018S-H61-422.04**	**R3011S-H63-279-03**	**R60019-161-1257-12**	**W0215.S-HD4-511-14**
Color	yellow	red	green	gray
Water content (%)	0.20	0.18	0.17	0.16
Standard deviation (%)	0.006	0.002	0.004	0.007

POWDER PAINT – WATER CONTENT ANALYSIS 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 a sealed packaging.

ACCESSORIES

MA R, MA X2, MA X7 and MA 5Y moisture analyzer, laboratory spoon, disposable aluminum weighing pans.

METHOD DESCRIPTION

Set drying parameters presented below. Collect the sample with a mass of ca. 5 g and distribute a thin layer of the sample throughout the weighing pan. Lock the drying chamber manually or automatically.

DRYING PARAMETERS / RESULTS

Type	**R1018S-H61-422.04** /yellow/	**R3011S-H63-279-03** /red/	**R60019-161-1257-12** /green/	**W0215.S-HD4-511-14** /gray/
Drying profile	Standard			
Drying temperature	50°C			
Sample mass (g)	~ 5 ÷ 6			
End of analysis	Auto 2			
Water content (%)	0.19	0.18	0.17	0.19
Standard deviation (%)	0.01	0.02	0.02	0.01
Analysis time $\acute{x}$ (min)	2			

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

Type	**R1018S-H61-422.04**	**R3011S-H63-279-03**	**R60019-161-1257-12**	**W0215.S-HD4-511-14**
Water content – Ref. (%)	0.19 ± 0.01	0.18 ± 0.02	0.17 ± 0.02	0.19 ± 0.01
Water content – MA (%)	0.20 ± 0.06	0.18 ± 0.07	0.17 ± 0.12	0.16 ± 0.12
Analysis accuracy (%)	|0.01|	|0.00|	|0.00|	|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.

