Moisture Analyser

Plastics resins which are affected by moisture, can be classified as two types:

Non-Hygroscopic Resins collect moisture only on the surface of the pellet. This surface moisture can be dried by exposing the resin to a continual blow of the hot air

Hygroscopic Resins collect moisture inside the core of the pallet and can be best dried by dehumidifying dryers.

Hygroscopic resins like PA, ABS, PET, PC, PS etc., which have a high affinity for moisture, need to be dried thoroughly and properly to ensure quality and finish of the final product. Improper and inadequate drying can result in loss of structural, impact strength and tensile strength, cosmetic defects and many other moisture related defects and deficiencies.

With hygroscopic materials, you must force low dew point heated air over the material to make the molecules of moisture disengage from the polymer chains to the surface of the pellets where that all-important airflow carries the moisture away. Dew Point is the temperature at which moisture in the air begins to condense. The low vapour pressure (dew point) of the dry air surrounding the pellets causes the freed moisture molecules to migrate to the surface of the pellet.

Most plastic processors measure dewpoint on their material dryer and then dry the material according to the material drying guidelines set down by the supplier or by using a generic table like the one below. This is obviously good practice but, the amount of drying time is very much dependent upon the amount of moisture within the material and the efficiency of the dryer itself.

The best way to of checking exactly how dry the material really is and to ensure batch-to-batch consistency is to use a moisture analyzer. The results of this can be incorporated into your quality procedure and give real traceability.

How Does it Work? The moisture analyzer comprises of a balance and an integrated heater. The analyzer will first weigh the material sample in a foil tray at the start of the process; it will then heat the sample up, removing the moisture, and continue heating sample until it stops losing weight. This data is then used to calculate the moisture content based on the moisture loss rate, known as a drying curve.

PMB Highlights

Navigating the built in applications is easy with the intuitively designed keypad. Access to the main functions is quick and a special lock out feature allows the supervisor to set up access to all or certain functions so users do not inadvertently change the settings. The colour coded keypad highlights the tare and start keys for easy recognition.

Multiple communications options lets you pick the right interface for your needs. USB or RS-232 both included as standard. Supports USB flash drive with automatic record keeping function to save each test result.

Store a range of procedures for different products that can be recalled at a touch of a button, to make setup and changing from one product to another simple.

Technical Specifications

Model	PMB 53	PMB 202
Capacity	50g	200g
Readability	0.001g/0.01%	0.01g/0.05%
Repeatability (S.D.)*	0.005g/0.05% (10g sample)	0.02g/0.2% (10g sample)
Pan Size	90mm ø	
Temperature Range	50°C to 160°C in 1°C intervals	
Analysis Time	Max 99 minutes	
Program Timing	Manual shut off, Timed, Auto, Times/Auto	
Weighing Units	g (grams), % M (percent moisture), % S (percent solids), ATRO % M (percent moisture / dry bases) ATRO % S (percent solids / dry bases)	
Languages	English, German, French, Spanish	
Stabilization Time	2-3 secs	
Interface	USB Host, USB I/O, RS-232	
Internal Memory	Up to 99 test results 49 Programmable user settings for configuration	
External Memory	External memory available with USB drive for additional configurations and to store test results.	
Calibration	External	
Heating Element	Single 400W halogen heater	
Heating Options	Standard (one step) Step - up to 3 temp setting Ramp	
Display	Backlit LCD display with dual digits and capacity tracker, 24mm high digits	
Power Supply	Power cord, factory set for 110v or 22v 50/60hz	
Operating Temperature	32° - 104°F / 0°-40°C	
Overall Dimensions	360 x 250 x 185mm (LxWxH)	
Net Weight	6kg	

Features

- USB port host for memory card and USB I/O interface
- RS-232 interface
- Built-in memories for storing products and settings
- 3 settings for heating sample, ramp up, step and standard
- Automatic test start setting for when the lid is closed
- Pan lifter to easily remove samples
- Large backlit display with dual text prompts
- Security locking slot for Kensington™ type lock and cable

Accessories

- Kensington™ type lock and cable
- RS-232 cable
- USB cable
- USB Memory stick
- Adam DU Data collection software
- Adam printer
- Printer paper

PMB Moisture Analyser

The PMB's fast response time and easy-to-use functionality make it the ideal moisture analyser for a range of different applications. The automatic test setting function lets you quickly run multiple tests without additional user input and the built-in memories lets you store that data for future reference. The PMB offers smart features that have been developed to give you the ultimate performance for moisture analysis.

Adam Equipment's PMB moisture balances sets a new standard for moisture analysis. Use the USB interface and connect a memory stick to download the results as they are taken and store them for future analysis, no need for additional software to take readings from the balance giving the user total freedom to collect data on a production floor or in the field.

With over 35 years of experience in the production of weighing instruments you can trust Adam for quality products that offer a range of features designed for a variety of applications.

Material	Grade	Shrinkage	Mould Temp		Melt Temp		Shear Rate	HDT(A)	Density	Drying Temp	Drying Time	Max Moisture Content
		Average	Min	Max	Min	Max	/s			C	Hours	%
ABS	General Purpose	0.5-0.7%	50	70	240	250	50,000	100	1.05	80	1-2	0.02%
ASA	General Purpose	0.5-0.7%	60	80	240	270	50,000	96	1.09	N/A	N/A	N/A
EVA	General Purpose	0.5-0.7%	15	40	160	210	30,000	45	0.95	N/A	N/A	N/A
GPPS	General Purpose	0.5-0.7%	15	50	210	245	30,000	75	1.05	N/A	N/A	N/A
HDPE	General Purpose	1-2%	15	30	180	220	40,000	60	0.94	N/A	N/A	N/A
HIPS	General Purpose	0.5-0.7%	15	50	210	245	40,000	65	1.05	N/A	N/A	N/A
LCP	General Purpose	-	70	110	290	320	40,000	250	1.62	140-160	4.00	-
LDPE	General Purpose	2-3%	20	30	170	220	40,000	78	0.94	N/A	N/A	N/A
LLDPE	General Purpose	2-3%	20	30	170	220	40,000	72	0.94	N/A	N/A	N/A
PA11	General Purpose	1.2-1.5%	40	65	225	285	40,000	75	1.02	80	2-4	0.10%
PA12	General Purpose	0.3-1.5%	65	105	220	275	40,000	81	1.02	80	2-4	0.10%
PA6	General Purpose	0.8-1.5%	40	95	280	305	40,000	150	1.13	80	2-4	0.10%
PA66	General Purpose	1-2%	40	95	279	304	40,000	200	1.15	80	2-4	0.10%
PBT	General Purpose	1.4-1.7%	65	93	238	254	50,000	160	1.40	120	2-4	0.02%
PC	General Purpose	0.5-0.7%	66	104	279	296	50,000	138	1.20	120	2-4	0.02%
PC/ABS	General Purpose	0.5-0.7%	60	82	243	277	50,000	112	1.15	100-110	2-4	0.02 - 0.05%
PEEK + 30% GF	General Purpose	-	175	205	380	400	40,000	365	1.53	150	4.00	-
PEI + 30% GF	General Purpose	-	120	150	360	370	40,000	270	1.48	120-150	4.00	0.05%
PES	General Purpose	0.6-0.7%	140	180	340	390	40,000	240	1.35	130-150	4.00	0.02%
PETP	General Purpose	-	130	140	270	290	50,000	115	1.35	110	4-6	0.02%
PMMA	General Purpose	0.5-0.7%	72	89	217	217	40,000	110	1.20	80	1-2	-
POM (co)	General Purpose	1.4-2.2%	60	120	190	230	40,000	120	1.45	81	2-5	-
POM (ho)	General Purpose	1.4-2.2%	60	120	190	230	40,000	120	1.45	81	2-5	<0.2%
PP	General Purpose	1.4-2.0%	20	50	228	246	100,000	98	0.92	N/A	N/A	N/A
PP EPDM	General Purpose	1.4-2.0%	20	50	228	246	100,000	98	0.92	N/A	N/A	N/A
PPO - PS Blend	General Purpose	0.7-1.4%	90	120	280	300	50,000	130	1.11	80-100	2-3	-
PPS	General Purpose	0.5-0.7%	135	180	310	330	40,000	155	1.42	150	6.00	0.04%
PPVC	General Purpose	0.5-0.7%	20	50	180	205	50,000	70	1.45	N/A	N/A	N/A
PS	General Purpose	0.5-0.7%	15	50	210	245	40,000	77	1.05	N/A	N/A	N/A
PSU	General Purpose	0.6-0.8%	140	160	360	370	40,000	183	1.20	120-150	4.00	0.05%
PUR	General Purpose	0.7-1.6%	50	90	220	240	20,000	77	1.40	100-110	1-2	0.07%
SAN	General Purpose	0.5-0.7%	40	60	200	230	30,000	105	1.06	80	1-2	0.20%

Figure 1: Material Information