

## Determination of Water Content in Plastic Pellets

### 1. Apparatus

- a. AQUACOUNTER Coulometric Karl Fischer Titrator Model AQ-2100S
- b. AQUACOUNTER Solid Evaporator EV-2000

### 2. Reagents

- a. Anode solution: HYDRANAL Coulomat AG
- b. Cathode solution: HYDRANAL Coulomat CG

### 3. Sample

- a. PE
- b. EVA dry
- c. EVA wet

### 4. Test Procedure

- ① Press the F1 [EV START] key to start blank elimination.
- ② When the blank elimination is completed, press the SAMPLE key.
- ③ Remove the glass stopper of evaporation chamber and put 2 - 4 g of sample (depending on the moisture content) into the evaporation chamber.
- ④ Press the TITRATION key to start the measurement.

#### Titration parameter settings:

Parameters	Values
Cal Mode	0
T-Timer	10 min for EVA sample 20 min for PE sample
Current	Slow
Heating Temperature	150°C
Carrier Gas Flow	200mL/min

## 5. Result and Discussion

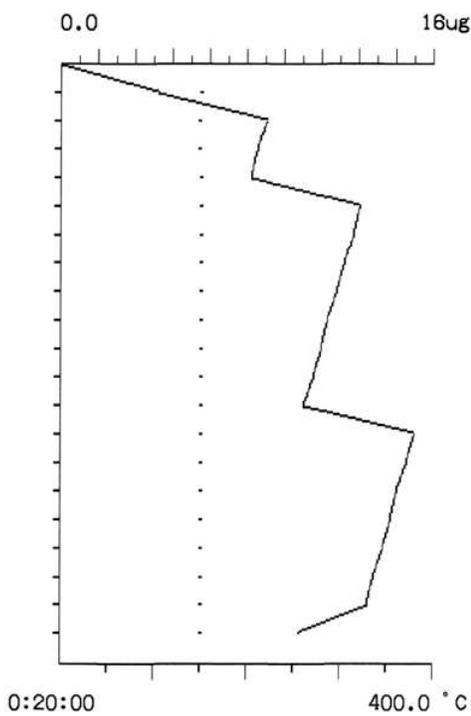
**Table 1. Analytical Result of Plastic Pellets**

Sample		Sample Size (g)	Water (ugH <sub>2</sub> O)	Water (ppm)	Statistics	
PE	1	2.1635	16.6	7.7	<b>AVG(3)</b>	<b>3.0 ppm</b>
	2	4.3892	10.3	2.3	SD	4.0 ppm
	3	4.6482	0.0	0.0	CV	118 %
EVA wet	1	1.6910	175.6	103.8	<b>AVG(3)</b>	<b>105 ppm</b>
	2	2.0545	216.7	105.5	SD	0.9 ppm
	3	2.4955	261.3	104.7	CV	0.81 %
EVA dry	1	2.1872	164.0	75.0	<b>AVG(3)</b>	<b>72 ppm</b>
	2	2.1284	146.7	68.9	SD	3.1 ppm
	3	1.8770	132.8	70.8	CV	4.4 %

Table 1. shows the analytical result of plastic pellet samples. Using the solid evaporator EV-2000, good reproducibility was obtained except for PE sample which contains very low moisture under 5 ppm. Each sample has started to melt under the heating temperature of 150 degree C.

\*\*\*\*\* AQ-2100 Result \*\*\*\*\*

Analysis Name Resin  
 Date 2005/05/26 12:14  
 Sample No. 2  
 ID Code PE  
 Total H2O 10.3 ug  
 Tit Time 0:21:01  
 Back Ground 6 ug/min  
 H2O 10.3 ug  
 Size 4.38920 g  
 \*Conc 2.3 ppm  
 Temp. -----  
 Humid. -----



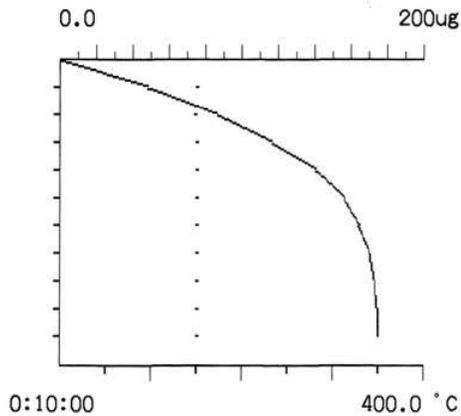
T-Data Time	ug	Conc	°C
0:01:00	4.2	1.0 ppm	151
0:02:00	8.9	2.0 ppm	149
0:03:00	8.5	1.9 ppm	149
0:04:00	8.2	1.9 ppm	150
0:05:00	12.9	2.9 ppm	150
0:06:00	12.6	2.9 ppm	150
0:07:00	12.2	2.8 ppm	150
0:08:00	11.9	2.7 ppm	151
0:09:00	11.5	2.6 ppm	151
0:10:00	11.2	2.6 ppm	151
0:11:00	10.9	2.5 ppm	150
0:12:00	10.5	2.4 ppm	150
0:13:00	15.2	3.5 ppm	150
0:14:00	14.9	3.4 ppm	150
0:15:00	14.5	3.3 ppm	150
0:16:00	14.2	3.2 ppm	150
0:17:00	13.9	3.2 ppm	150
0:18:00	13.5	3.1 ppm	151
0:19:00	13.2	3.0 ppm	151
0:20:00	10.3	2.3 ppm	151

Fig 1. Titration curve for the sample PE.

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***** AQ-2100 Result *****
Analysis Name      Resin
Date              2005/05/26 14:12
Sample No.       1
ID Code          EVA-Wet
Total H2O        175.6 ug
Tit Time         0:11:02
Back Ground      5 ug/min
H2O              175.6 ug
Size             1.69100 g
*Conc            103.8 ppm
Temp.            26.0 °C
Humid.           55.0 %

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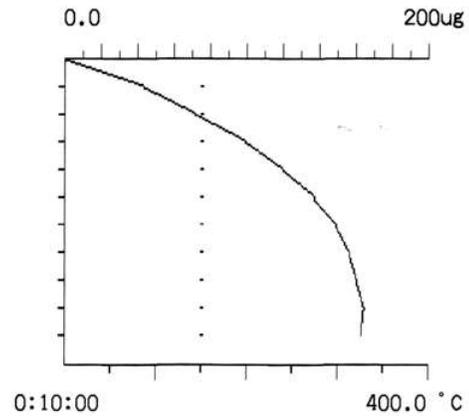
T-Data Time	ug	Conc	°C
0:01:00	48.4	28.6 ppm	150
0:02:00	86.7	51.3 ppm	149
0:03:00	117.0	69.2 ppm	150
0:04:00	141.2	83.5 ppm	150
0:05:00	157.3	93.0 ppm	150
0:06:00	165.4	97.8 ppm	151
0:07:00	171.4	101.4 ppm	151
0:08:00	173.4	102.5 ppm	151
0:09:00	175.5	103.8 ppm	151
0:10:00	175.6	103.8 ppm	150

Fig.2 Titration curve for sample PE wet.

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***** AQ-2100 Result *****
Analysis Name      Resin
Date              2005/05/26 16:39
Sample No.       2
ID Code          EVA-Dry
Total H2O        164.0 ug
Tit Time         0:11:01
Back Ground      5 ug/min
H2O              164.0 ug
Size             2.18720 g
*Conc            75.0 ppm
Temp.            26.0 °C
Humid.           55.0 %

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T-Data Time	ug	Conc	°C
0:01:00	43.8	20.0 ppm	151
0:02:00	71.7	32.8 ppm	150
0:03:00	99.8	45.6 ppm	150
0:04:00	120.7	55.2 ppm	150
0:05:00	137.7	63.0 ppm	150
0:06:00	149.5	68.4 ppm	150
0:07:00	157.4	72.0 ppm	150
0:08:00	161.2	73.7 ppm	151
0:09:00	165.0	75.4 ppm	151
0:10:00	164.0	75.0 ppm	151

Fig.3 Titration curve for sample PE dry.