



Biodegradation Analysis Report



1085

Applicant : NYTEX COMPOSITES CO. LTD.

**Address : No. 6. Ln. 468. sec. 4. Changsui Rd.,
Peitou Hsiang, Changhwa Country, Taiwan, R.O.C.**

Sample name : GT-0010N

Test method : ISO 14855-1

**Plastic Industry Development Center
Biodegradation Laboratory**

Caleb Wang

Group Leader



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1. Sample information

Assignment no : 099A011-J310092-1E

Sample name : GT-0010N

Applicant : NYTEX COMPOSITES CO. LTD.

No. 6. Ln. 468. sec. 4. Changsui Rd., Peitou Hsiang, Changhwa Country,
Taiwan, R.O.C.

Date received : 2010 / 06 / 12

Date tested : 2010 / 07 / 10

Test method : ISO 14855-1

1.1 Overview of test result

Sample name : GT-0010N

Reference material : ADVANTEC Filter Paper , No. 2 (5 μ m) , D= 110mm , Shape : circles

Volume of test vessels : 2000 ml

Method of CO₂ determination : Wet Gas Meter and Carbon dioxide detector

	Test material	Reference material
45 days biodegradation rate (%)	54.69	81.48
Overall biodegradation rate (%)	90.66	99.11
Test duration (day)	115	77
Observation	Samples are completely degraded	Filter paper are completely degraded

Validity criteria

- ◆ Degree of biodegradation of reference material after 45 days > 70% ?
 - Yes □ No
- ◆ Difference between percentage biodegradation of reference material in the different vessel at end of test < 20% ?
 - Yes □ No
- ◆ Average CO₂ production in the blank vessels after 10 days in the range 50 mg to 150 mg CO₂/ g volatile solids ?
 - Yes □ No



1.2 Received sample

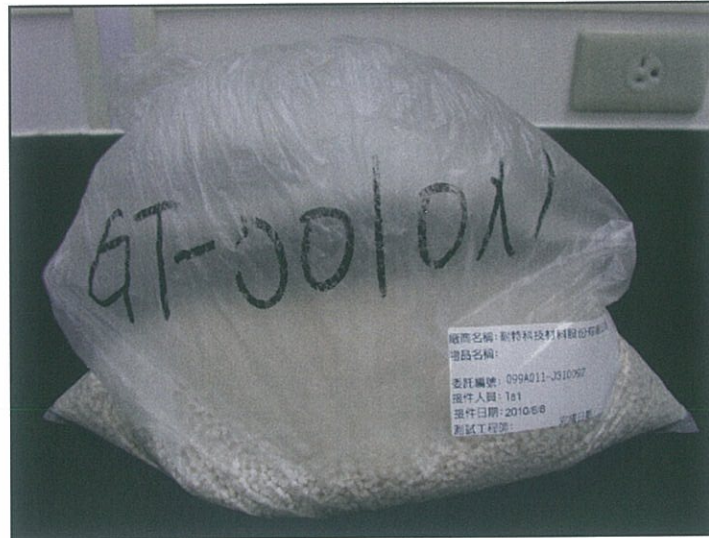
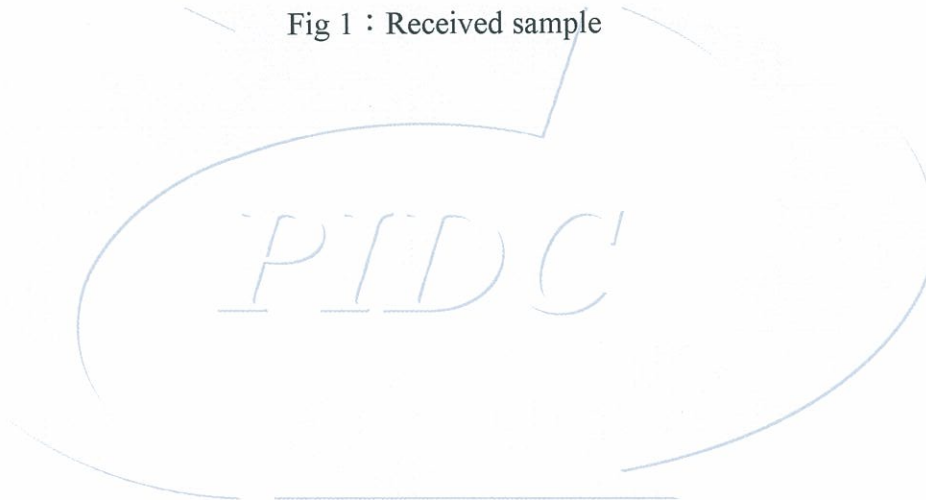


Fig 1 : Received sample



2. Experiments

2.1 Flow chart of experiment

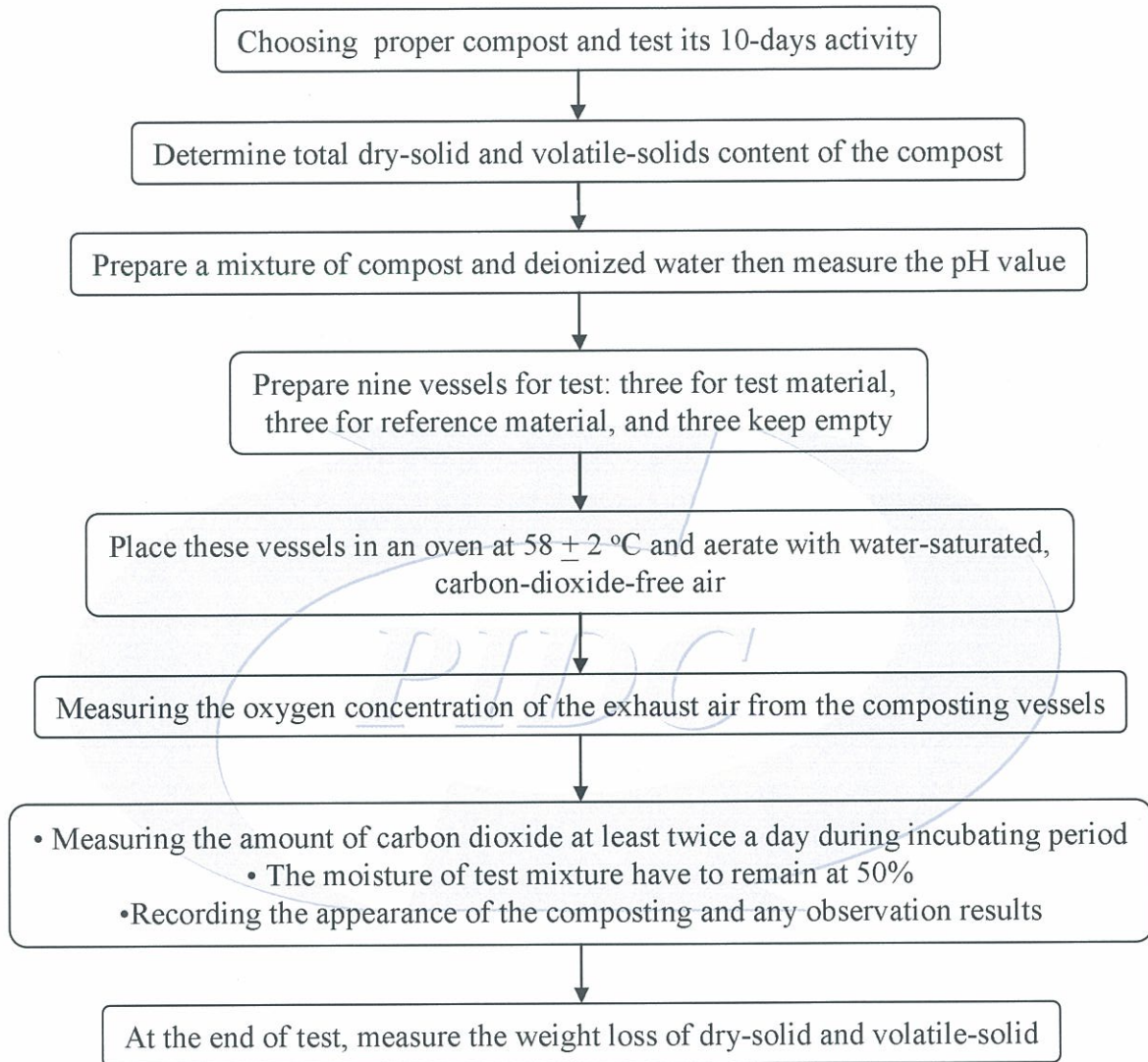


Fig 2 : Flow chart of experiment

2.2 Equipments

(1) Wet gas meter and Carbon dioxide detector

The amount of carbon dioxide was measured by wet gas meter (Figure 3) and carbon dioxide detector (Figure 4), the wet gas meter measure range of 2 to 600 liter per hour; measurement precision to 0.01 liter; the carbon dioxide detector measures the minimum concentration of up to 0.01%.

(2) Thermal and humid controlled oven

The biodegradation test was proceeding in the temperature and humidity controlled oven (Figure 5) for maintaining proper temperature and humidity. Capacity is 1.4 m³.

(3) Vessel

The vessel used for biodegradation test was high pressure conical flask (Fig 6), volume: 2000 ml. It was provided by Pyrex Co. Ltd.

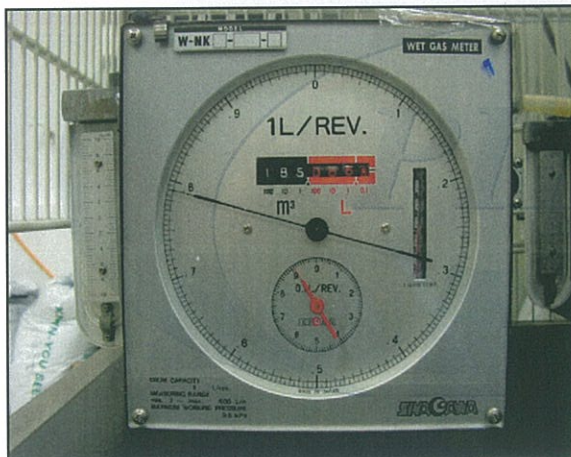


Fig 3 : Wet gas meter



Fig 4 : Carbon dioxide detector

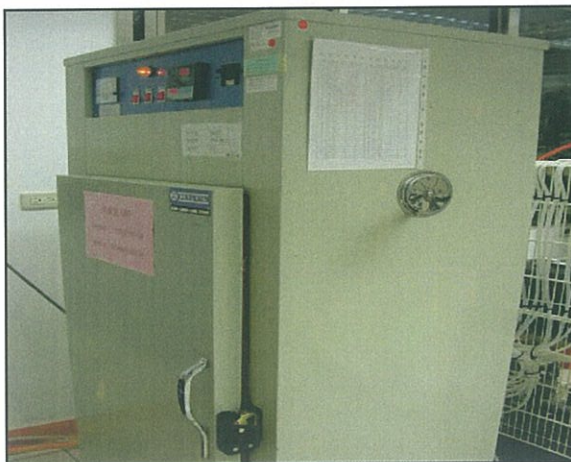


Fig 5 : Oven

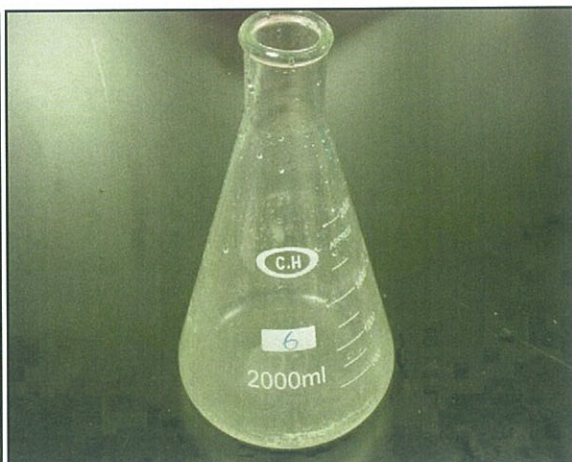


Fig 6 : Vessel

3. Results

3.1 Appearance of compost and sample

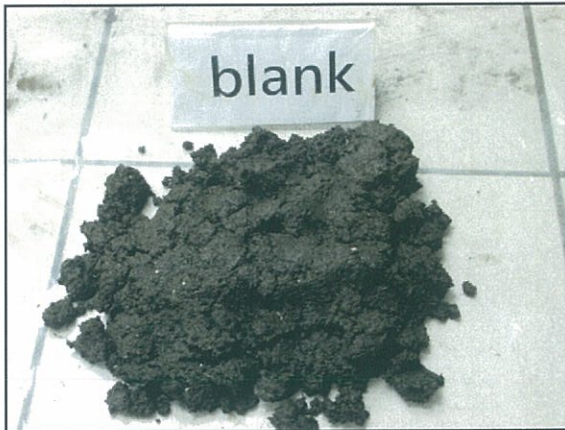


Fig 7 : (a) Before test



Fig 7(b) : After test

Fig 7 : Compost without any material before and after test

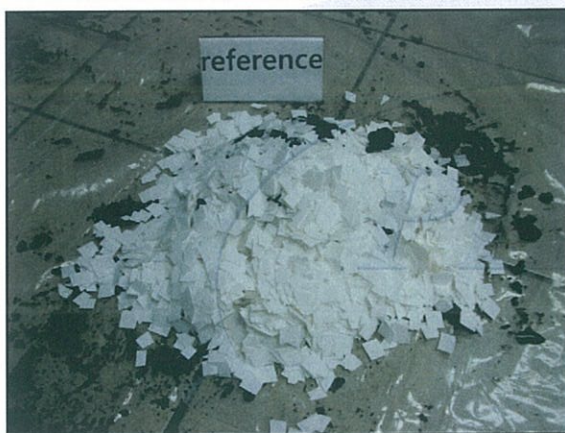


Fig 8(a) : Before test

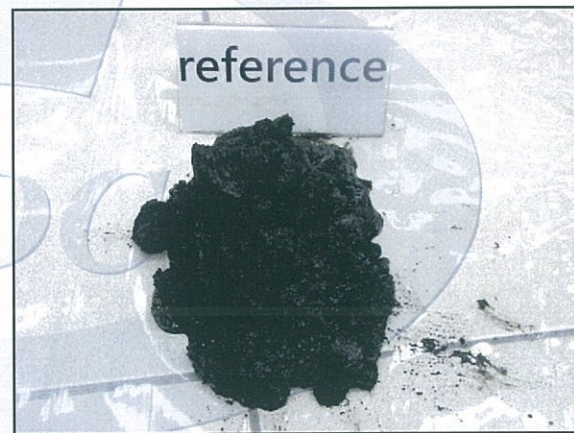


Fig 8(b) : After test

Fig 8 : Compost with reference material before and after test

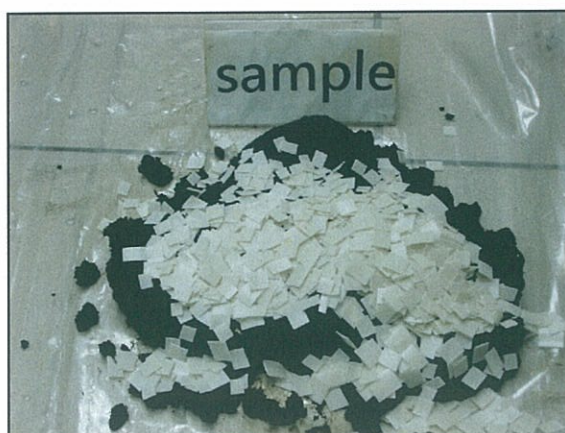


Fig 9(a) : Before test

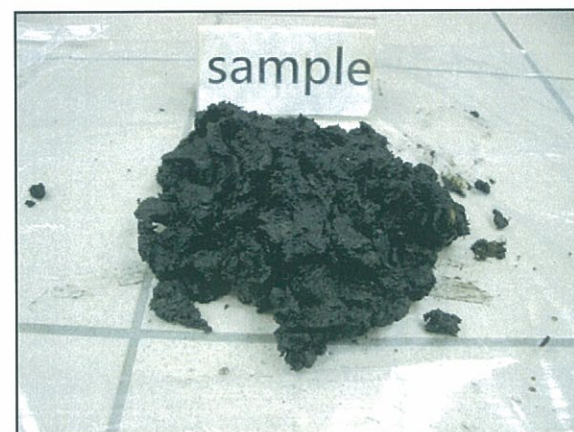


Fig 9(b) : After test

Fig 9 : Compost with test material before and after test

3.2 Properties of compost

Table 1 : Properties of compost

Total dry solids (%)	Moisture content (%)	Volatile solids (%)	Ash (%)	Compost Activity Test (mg - CO ₂ / g - volatile solid)	Carbon/Nitrogen ratio (%)
73.8	26.2	38.1	61.9	146.75	25.6

3.3 Compost activity test

Table 2 : The amount of CO₂ for the first 10 days

Day	Amount of carbon dioxide (mg)
1	4000
2	3600
3	3500
4	4000
5	4900
6	5000
7	5600
8	5200
9	4100
10	3450
Total	43350

$$\frac{43350}{295.4} = 146.75 \text{ mg - CO}_2 / \text{g - volatile solid}$$

3.4 Total amount of organic carbon for test and reference samples

Table 3 : Total amount of organic carbon

	Total amount of organic carbon (TOC), (g / g)	Theoretical amount of evolved carbon dioxide, (ThCO ₂), (g)	Size (cm × cm)	Thickness (mm)	Shape	Total dry solids (%)	Moisture content (%)
Reference material	0.3996	73.26	1×1	0.11	sheet	97.5	2.5
Test material	0.6728	123.35	1×1	0.89	sheet	99.1	0.9



3.5 The amount of sample and compost in the test vessel

Table 4 : The amount of sample and compost in the test vessel

	Compost		Sample	
	Weight (g)	Total dry solid (g)	Weight (g)	Total dry solid (g)
Blank	600	442.8	None	None
Reference	600	442.8	100	97.5
Sample	600	442.8	100	99.1

3.6 The pH value before and after test

Table 5 : The pH values before and after test

	Blank 1	Blank 2	Blank 3
Before test	7.50	7.43	7.51
After test	7.52	7.53	7.57

Table 6 : The pH values before and after test

	Reference material 1	Reference material 2	Reference material 3
Before test	7.42	7.41	7.46
After test	7.53	7.49	7.52

Table 7 : The pH values before and after test

	Test material 1	Test material 2	Test material 3
Before test	7.39	7.41	7.42
After test	7.41	7.44	7.46

3.7 Controlled aerobic composting test

(1) Test material

Total organic carbon (TOC) : 0.6728 g / g

Theoretical amount of evolved carbon dioxide, (ThCO₂) : 123.35 g

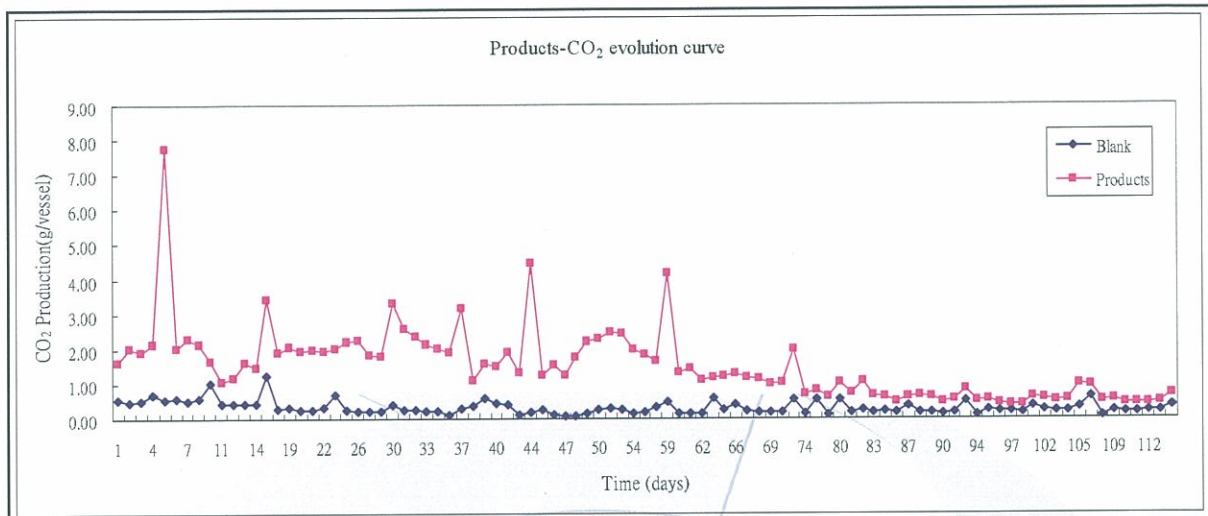


Fig 10 : CO₂ Evolution curve of test material

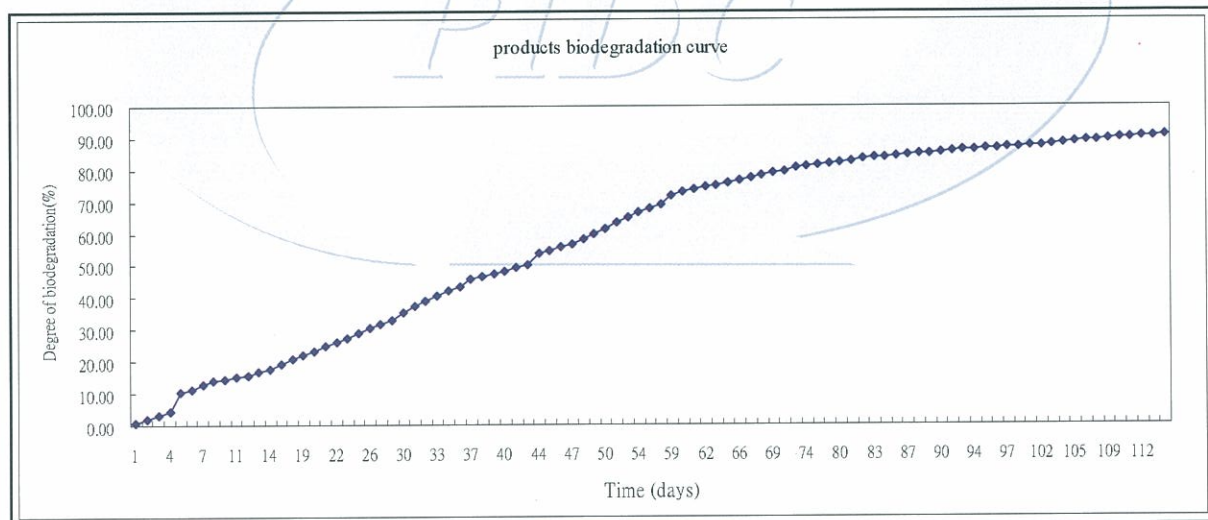


Fig 11 : Biodegradation curve of test material



Table 8 : Controlled aerobic composting test data of test material

Day	(CO ₂)	(CO ₂)	(CO ₂)	(CO ₂)	(CO ₂)	(CO ₂)	(CO ₂)	(CO ₂)	D	D	D	D
	B ₁	B ₂	B ₃	B _{mean}	t ₁	t ₂	t ₃	t _{mean}	t ₁	t ₂	t ₃	t _{mean}
	g/vessel	g/vessel	g/vessel	g/Vessel	g/Vessel	g/Vessel	g/Vessel	g/Vessel	%	%	%	%
1	0.42	0.81	0.47	0.57	1.81	1.76	1.29	1.62	1.01	0.97	0.59	0.86
2	0.42	0.69	0.35	0.49	1.46	2.49	2.15	2.03	1.80	2.60	1.93	2.11
3	0.45	0.69	0.44	0.53	1.45	2.78	1.55	1.93	2.54	4.44	2.76	3.25
4	0.59	0.99	0.53	0.70	2.27	2.25	1.94	2.15	3.82	5.70	3.77	4.43
5	0.45	0.80	0.41	0.55	2.32	9.33	11.55	7.73	5.25	12.86	12.70	10.27
6	0.45	0.84	0.44	0.58	0.91	3.44	1.71	2.02	5.52	15.19	13.62	11.44
7	0.48	0.71	0.37	0.52	1.95	2.82	2.05	2.27	6.67	17.07	14.86	12.87
8	0.48	0.80	0.53	0.60	2.15	1.71	2.54	2.13	7.92	17.97	16.44	14.11
10	0.91	1.54	0.61	1.02	1.71	1.79	1.52	1.67	8.48	18.59	16.84	14.64
11	0.35	0.58	0.34	0.43	1.37	0.82	1.04	1.08	9.24	18.91	17.34	15.17
12	0.34	0.61	0.35	0.44	1.34	1.15	1.05	1.18	9.97	19.50	17.84	15.77
13	0.35	0.56	0.39	0.43	1.58	1.29	2.05	1.64	10.90	20.20	19.15	16.75
14	0.31	0.66	0.35	0.44	1.71	1.38	1.29	1.46	11.93	20.96	19.84	17.58
17	1.18	1.62	0.94	1.25	3.68	3.74	2.88	3.43	13.91	22.99	21.16	19.36
18	0.22	0.40	0.22	0.28	2.20	1.64	1.95	1.93	15.47	24.10	22.52	20.70
19	0.25	0.52	0.27	0.35	2.59	1.71	1.88	2.06	17.28	25.21	23.76	22.09
20	0.19	0.37	0.19	0.25	2.54	1.57	1.79	1.97	19.15	26.29	25.01	23.48
21	0.19	0.38	0.17	0.25	2.85	1.50	1.67	2.01	21.26	27.31	26.17	24.91
22	0.27	0.48	0.27	0.34	2.77	1.44	1.64	1.95	23.23	28.21	27.22	26.22
24	0.60	1.02	0.53	0.72	2.05	2.14	1.92	2.04	24.31	29.38	28.20	27.30
25	0.17	0.37	0.19	0.24	2.76	1.92	1.94	2.20	26.35	30.75	29.57	28.89
26	0.19	0.32	0.21	0.24	2.89	2.14	1.76	2.26	28.50	32.30	30.81	30.54
27	0.17	0.37	0.17	0.24	1.70	2.17	1.67	1.85	29.68	33.87	31.97	31.84
28	0.17	0.34	0.17	0.23	1.69	1.69	2.00	1.79	30.87	35.06	33.42	33.11
30	0.34	0.62	0.29	0.42	3.21	3.14	3.61	3.32	33.13	37.28	36.00	35.47
31	0.22	0.33	0.20	0.25	3.86	2.07	1.77	2.57	36.06	38.77	37.24	37.36
32	0.23	0.39	0.20	0.27	2.29	2.48	2.32	2.36	37.70	40.56	38.90	39.06
33	0.20	0.32	0.19	0.24	2.39	2.03	2.00	2.14	39.45	42.02	40.34	40.60
34	0.15	0.33	0.14	0.21	2.20	1.95	1.95	2.03	41.07	43.44	41.75	42.09
35	0.08	0.16	0.13	0.12	2.12	1.74	1.90	1.92	42.69	44.76	43.19	43.54
37	0.28	0.32	0.25	0.28	4.27	2.40	2.86	3.18	45.92	46.48	45.29	45.89
38	0.31	0.43	0.34	0.36	1.03	1.15	1.09	1.09	46.46	47.12	45.88	46.49
39	0.36	0.80	0.57	0.58	2.33	1.29	1.16	1.60	47.88	47.71	46.35	47.31



Day	(CO ₂)	(CO ₂)	(CO ₂)	(CO ₂)	(CO ₂)	(CO ₂)	(CO ₂)	(CO ₂)	D	D	D	D
	B ₁	B ₂	B ₃	B _{mean}	t ₁	t ₂	t ₃	t _{mean}	t ₁	t ₂	t ₃	t _{mean}
	g/vessel	g/vessel	g/vessel	g/Vessel	g/Vessel	g/Vessel	g/Vessel	g/Vessel	%	%	%	%
40	0.37	0.58	0.38	0.44	1.55	1.46	1.50	1.50	48.78	48.54	47.22	48.18
41	0.32	0.56	0.29	0.39	2.07	1.90	1.73	1.90	50.14	49.77	48.30	49.40
42	0.08	0.18	0.07	0.11	1.03	1.49	1.43	1.32	50.89	50.90	49.37	50.39
44	0.14	0.27	0.18	0.19	3.92	5.65	3.86	4.48	53.91	55.34	52.35	53.87
45	0.21	0.32	0.23	0.25	1.04	1.27	1.47	1.26	54.54	56.18	53.34	54.69
46	0.07	0.12	0.10	0.10	2.06	1.19	1.43	1.56	56.14	57.07	54.42	55.88
47	0.08	0.12	0.06	0.09	1.27	1.18	1.29	1.25	57.10	57.96	55.40	56.82
48	0.09	0.09	0.05	0.08	1.73	1.93	1.70	1.79	58.44	59.47	56.72	58.21
49	0.13	0.22	0.11	0.15	2.44	2.10	2.13	2.22	60.30	61.05	58.32	59.89
50	0.22	0.32	0.25	0.26	1.86	2.82	2.14	2.27	61.59	63.13	59.84	61.52
52	0.23	0.41	0.26	0.30	2.40	2.38	2.62	2.47	63.29	64.83	61.72	63.28
53	0.21	0.30	0.21	0.24	2.13	2.69	2.53	2.45	64.82	66.82	63.58	65.08
54	0.14	0.22	0.13	0.16	1.70	2.63	1.60	1.98	66.06	68.84	64.75	66.55
55	0.15	0.27	0.13	0.18	1.41	1.59	2.56	1.85	67.06	69.98	66.67	67.90
56	0.26	0.51	0.25	0.34	1.57	1.84	1.56	1.66	68.05	71.21	67.66	68.97
59	0.43	0.67	0.38	0.50	3.99	2.85	5.63	4.16	70.89	73.13	71.83	71.95
60	0.11	0.16	0.12	0.13	1.57	0.93	1.50	1.33	72.06	73.78	72.94	72.92
61	0.11	0.21	0.12	0.15	1.67	1.03	1.64	1.44	73.29	74.49	74.15	73.98
62	0.11	0.25	0.09	0.15	1.49	0.79	1.01	1.10	74.38	75.02	74.84	74.75
63	0.46	0.83	0.45	0.58	0.89	1.69	0.99	1.19	74.64	75.92	75.18	75.25
64	0.20	0.38	0.19	0.26	1.01	1.32	1.35	1.22	75.25	76.79	76.06	76.03
66	0.31	0.61	0.28	0.40	1.42	1.17	1.27	1.29	76.08	77.41	76.77	76.75
67	0.14	0.35	0.14	0.21	0.85	1.10	1.62	1.19	76.59	78.14	77.91	77.55
68	0.13	0.28	0.12	0.17	0.79	1.07	1.57	1.15	77.10	78.88	79.05	78.34
69	0.15	0.26	0.14	0.18	0.80	0.98	1.21	0.99	77.60	79.53	79.89	79.00
70	0.15	0.31	0.14	0.20	1.11	0.98	1.04	1.04	78.34	80.16	80.57	79.69
73	0.48	0.79	0.43	0.56	1.68	2.00	2.32	2.00	79.25	81.34	81.99	80.86
74	0.12	0.25	0.12	0.16	0.72	0.64	0.79	0.72	79.70	81.73	82.50	81.31
76	0.46	0.77	0.42	0.55	0.95	0.77	0.74	0.82	80.02	81.90	82.65	81.53
77	0.07	0.18	0.10	0.12	0.99	0.56	0.35	0.63	80.73	82.26	82.84	81.94
80	0.48	0.78	0.39	0.55	1.14	1.17	0.77	1.03	81.20	82.77	83.02	82.33
81	0.13	0.29	0.15	0.19	1.10	0.55	0.52	0.72	81.94	83.06	83.29	82.76
82	0.19	0.46	0.15	0.27	0.93	1.39	0.93	1.08	82.47	83.98	83.82	83.43



Day	(CO ₂) _{B1}	(CO ₂) _{B2}	(CO ₂) _{B3}	(CO ₂) _{Bmean}	(CO ₂) _{t1}	(CO ₂) _{t2}	(CO ₂) _{t3}	(CO ₂) _{tmean}	D _{t1}	D _{t2}	D _{t3}	D _{tmean}
	g/vessel	g/vessel	g/vessel	g/Vessel	g/Vessel	g/Vessel	g/Vessel	g/Vessel	%	%	%	%
83	0.11	0.34	0.15	0.20	0.82	0.35	0.80	0.66	82.98	84.11	84.31	83.80
84	0.16	0.32	0.18	0.22	0.74	0.58	0.54	0.62	83.40	84.40	84.57	84.12
85	0.12	0.31	0.11	0.18	0.31	0.51	0.61	0.48	83.50	84.67	84.91	84.36
87	0.27	0.56	0.23	0.35	0.61	0.61	0.62	0.62	83.72	84.88	85.13	84.58
88	0.11	0.30	0.11	0.17	0.63	0.76	0.64	0.68	84.08	85.36	85.51	84.98
89	0.11	0.28	0.14	0.18	0.66	0.60	0.58	0.61	84.47	85.70	85.84	85.34
90	0.09	0.25	0.08	0.14	0.64	0.40	0.39	0.47	84.87	85.91	86.04	85.61
91	0.15	0.33	0.13	0.20	0.69	0.49	0.49	0.55	85.27	86.14	86.27	85.89
93	0.33	0.75	0.50	0.52	0.83	0.86	0.84	0.84	85.52	86.41	86.53	86.15
94	0.08	0.17	0.08	0.11	0.46	0.60	0.52	0.53	85.80	86.81	86.86	86.49
95	0.18	0.37	0.18	0.25	0.51	0.73	0.38	0.54	86.01	87.21	86.97	86.73
96	0.18	0.35	0.18	0.23	0.54	0.41	0.37	0.44	86.26	87.35	87.08	86.90
97	0.13	0.34	0.17	0.22	0.40	0.35	0.42	0.39	86.41	87.46	87.25	87.04
98	0.16	0.25	0.16	0.19	0.38	0.27	0.59	0.41	86.56	87.53	87.57	87.22
101	0.31	0.61	0.18	0.36	0.74	0.57	0.58	0.63	86.86	87.70	87.75	87.44
102	0.21	0.35	0.23	0.26	0.51	0.65	0.59	0.58	87.06	88.01	88.02	87.70
103	0.17	0.31	0.18	0.22	0.43	0.53	0.57	0.51	87.22	88.26	88.30	87.93
104	0.16	0.32	0.20	0.23	0.48	0.41	0.75	0.54	87.43	88.41	88.73	88.19
105	0.25	0.47	0.24	0.32	1.22	0.96	0.76	0.98	88.16	88.94	89.09	88.73
107	0.61	0.85	0.42	0.62	0.98	0.98	0.92	0.96	88.45	89.23	89.33	89.00
108	0.09	0.08	0.10	0.09	0.83	0.38	0.35	0.52	89.05	89.46	89.54	89.35
109	0.14	0.31	0.17	0.21	0.66	0.38	0.58	0.54	89.41	89.60	89.84	89.62
110	0.15	0.29	0.15	0.20	0.33	0.41	0.54	0.42	89.52	89.77	90.12	89.80
111	0.12	0.32	0.10	0.18	0.32	0.49	0.55	0.45	89.63	90.03	90.42	90.03
112	0.15	0.28	0.23	0.22	0.36	0.59	0.35	0.43	89.74	90.33	90.52	90.20
113	0.19	0.31	0.18	0.23	0.33	0.59	0.51	0.48	89.83	90.63	90.75	90.40
115	0.31	0.58	0.22	0.37	0.69	0.70	0.69	0.69	90.08	90.89	91.01	90.66

(CO₂)_B= Measured cumulative CO₂ production by blank

(CO₂)_t= Measured cumulative CO₂ production by test or reference material

$$(CO_2)_{Bmean} = [(CO_2)_{B1} + (CO_2)_{B2} + (CO_2)_{B3}] / 3$$

$$D = [(CO_2)_t - (CO_2)_{Bmean}] / ThCO_2$$

$$D_{mean} = (D_{t1} + D_{t2} + D_{t3}) / 3$$

(2) Reference material

Total organic carbon (TOC) : 0.3996 g / g

Theoretical amount of evolved carbon dioxide, (ThCO₂) : 73.26 g

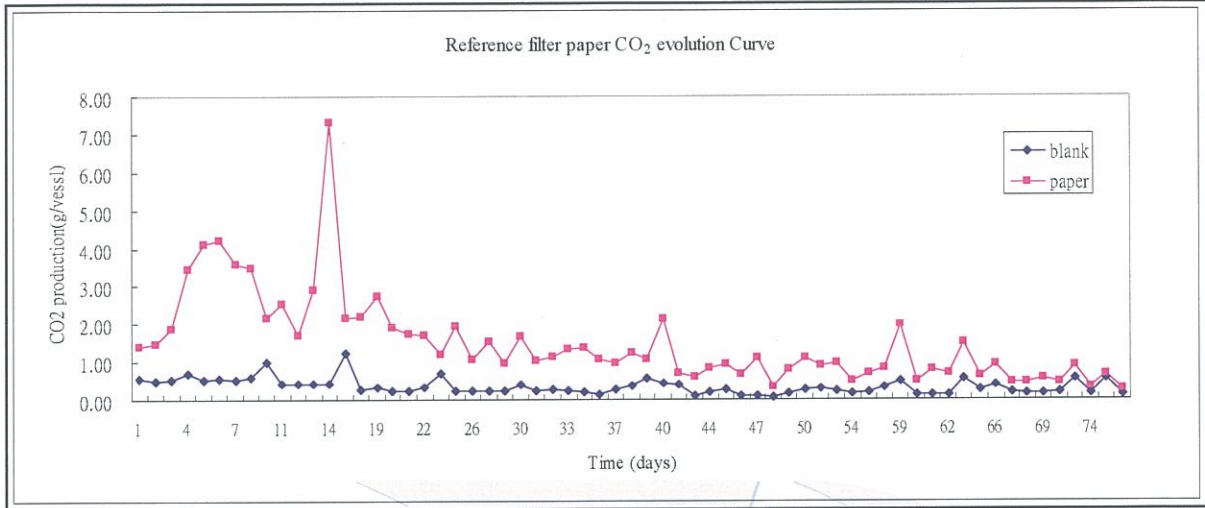


Fig 12 : CO₂ Evolution curve of reference material

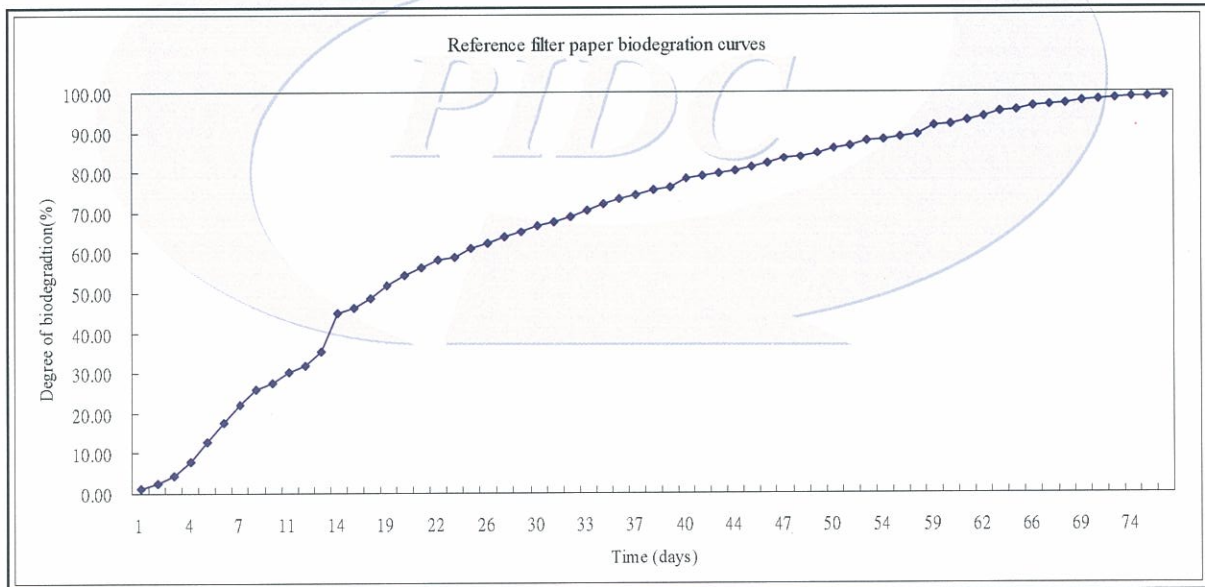


Fig 13 : Biodegradation curve of reference material



Table 9 : Controlled aerobic composting test data of reference material

Day	(CO ₂)	(CO ₂)	(CO ₂)	(CO ₂)	(CO ₂)	(CO ₂)	(CO ₂)	(CO ₂)	D	D	D	D
	B ₁	B ₂	B ₃	B _{mean}	t ₁	t ₂	t ₃	t _{mean}	t ₁	t ₂	t ₃	t _{mean}
	g/vessel	g/vessel	g/vessel	g/Vessel	g/Vessel	g/Vessel	g/Vessel	g/Vessel	%	%	%	%
1	0.42	0.81	0.47	0.57	1.57	1.37	1.26	1.40	1.37	1.09	0.95	1.14
2	0.42	0.69	0.35	0.49	1.51	1.57	1.34	1.47	2.76	2.56	2.11	2.47
3	0.45	0.69	0.44	0.53	2.10	1.81	1.68	1.86	4.89	4.30	3.68	4.29
4	0.59	0.99	0.53	0.70	3.80	3.50	3.03	3.44	9.12	8.11	6.86	8.03
5	0.45	0.80	0.41	0.55	4.86	3.86	3.59	4.10	15.00	12.61	11.00	12.87
6	0.45	0.84	0.44	0.58	4.54	4.23	3.86	4.21	20.40	17.58	15.48	17.82
7	0.48	0.71	0.37	0.52	3.90	3.13	3.74	3.59	25.01	21.14	19.87	22.01
8	0.48	0.80	0.53	0.60	3.56	2.92	3.97	3.48	29.04	24.29	24.47	25.93
10	0.91	1.54	0.61	1.02	2.07	2.10	2.34	2.17	30.47	25.76	26.27	27.50
11	0.35	0.58	0.34	0.43	2.33	2.19	3.07	2.53	33.07	28.17	29.88	30.37
12	0.34	0.61	0.35	0.44	1.47	1.90	1.79	1.72	34.47	30.16	31.73	32.12
13	0.35	0.56	0.39	0.43	2.42	3.50	2.79	2.90	37.18	34.34	34.94	35.49
14	0.31	0.66	0.35	0.44	10.22	5.23	6.55	7.33	50.51	40.85	43.29	44.88
17	1.18	1.62	0.94	1.25	2.03	2.41	2.04	2.16	51.58	42.43	44.36	46.13
18	0.22	0.40	0.22	0.28	2.04	2.37	2.22	2.21	53.98	45.28	47.01	48.76
19	0.25	0.52	0.27	0.35	2.53	2.83	2.89	2.75	56.95	48.66	50.48	52.03
20	0.19	0.37	0.19	0.25	1.34	2.17	2.18	1.90	58.44	51.28	53.12	54.28
21	0.19	0.38	0.17	0.25	1.22	2.17	1.84	1.74	59.76	53.89	55.29	56.31
22	0.27	0.48	0.27	0.34	1.54	1.80	1.74	1.69	61.40	55.88	57.20	58.16
24	0.60	1.02	0.53	0.72	1.03	1.37	1.17	1.19	61.83	56.77	57.82	58.81
25	0.17	0.37	0.19	0.24	1.84	2.01	2.00	1.95	64.00	59.18	60.23	61.14
26	0.19	0.32	0.21	0.24	1.02	1.10	1.13	1.08	65.07	60.36	61.45	62.29
27	0.17	0.37	0.17	0.24	1.37	1.60	1.67	1.54	66.61	62.21	63.40	64.07
28	0.17	0.34	0.17	0.23	0.87	1.06	0.93	0.95	67.49	63.34	64.36	65.06
30	0.34	0.62	0.29	0.42	1.47	1.93	1.67	1.69	68.93	65.40	66.07	66.80
31	0.22	0.33	0.20	0.25	0.84	1.28	0.95	1.02	69.74	66.80	67.03	67.86
32	0.23	0.39	0.20	0.27	1.04	1.09	1.34	1.15	70.78	67.91	68.48	69.06
33	0.20	0.32	0.19	0.24	1.18	1.49	1.34	1.34	72.07	69.62	69.99	70.56
34	0.15	0.33	0.14	0.21	1.24	1.46	1.44	1.38	73.47	71.33	71.67	72.16
35	0.08	0.16	0.13	0.12	0.97	1.13	1.09	1.07	74.63	72.70	73.00	73.44
37	0.28	0.32	0.25	0.28	0.84	0.97	1.13	0.98	75.38	73.64	74.16	74.39
38	0.31	0.43	0.34	0.36	1.06	1.35	1.33	1.25	76.34	74.98	75.49	75.60
39	0.36	0.80	0.57	0.58	0.96	1.01	1.29	1.09	76.86	75.57	76.45	76.29



Day	(CO ₂)	(CO ₂)	(CO ₂)	(CO ₂)	(CO ₂)	(CO ₂)	(CO ₂)	(CO ₂)	D	D	D	D
	B ₁	B ₂	B ₃	B _{mean}	t ₁	t ₂	t ₃	t _{mean}	t ₁	t ₂	t ₃	t _{mean}
	g/vessel	g/vessel	g/vessel	g/Vessel	g/Vessel	g/Vessel	g/Vessel	g/Vessel	%	%	%	%
40	0.37	0.58	0.38	0.44	2.17	1.92	2.35	2.14	79.21	77.58	79.05	78.61
41	0.32	0.56	0.29	0.39	0.54	0.77	0.78	0.69	79.41	78.09	79.58	79.03
42	0.08	0.18	0.07	0.11	0.50	0.64	0.62	0.59	79.94	78.81	80.28	79.68
44	0.14	0.27	0.18	0.19	0.54	0.89	1.03	0.82	80.42	79.76	81.42	80.53
45	0.21	0.32	0.23	0.25	0.70	1.33	0.81	0.95	81.03	81.23	82.18	81.48
46	0.07	0.12	0.10	0.10	0.73	0.53	0.77	0.67	81.89	81.81	83.10	82.27
47	0.08	0.12	0.06	0.09	1.47	0.63	1.20	1.10	83.77	82.55	84.62	83.65
48	0.09	0.09	0.05	0.08	0.29	0.28	0.45	0.34	84.07	82.82	85.13	84.01
49	0.13	0.22	0.11	0.15	0.77	0.80	0.86	0.81	84.91	83.70	86.09	84.90
50	0.22	0.32	0.25	0.26	1.02	0.96	1.32	1.10	85.95	84.66	87.53	86.04
52	0.23	0.41	0.26	0.30	0.67	1.14	0.90	0.90	86.44	85.80	88.35	86.86
53	0.21	0.30	0.21	0.24	0.84	0.89	1.15	0.96	87.26	86.68	89.58	87.84
54	0.14	0.22	0.13	0.16	0.34	0.66	0.50	0.50	87.51	87.36	90.04	88.30
55	0.15	0.27	0.13	0.18	0.63	0.80	0.69	0.71	88.11	88.19	90.74	89.01
56	0.26	0.51	0.25	0.34	0.69	1.12	0.69	0.83	88.59	89.25	91.22	89.69
59	0.43	0.67	0.38	0.50	2.48	1.78	1.64	1.97	91.29	91.00	92.77	91.69
60	0.11	0.16	0.12	0.13	0.52	0.55	0.45	0.50	91.82	91.57	93.21	92.20
61	0.11	0.21	0.12	0.15	0.81	0.82	0.80	0.81	92.72	92.49	94.10	93.11
62	0.11	0.25	0.09	0.15	0.80	0.50	0.85	0.72	93.61	92.98	95.05	93.88
63	0.46	0.83	0.45	0.58	1.10	2.19	1.18	1.49	94.32	95.17	95.87	95.12
64	0.20	0.38	0.19	0.26	0.65	0.69	0.53	0.62	94.86	95.76	96.25	95.62
66	0.31	0.61	0.28	0.40	0.77	1.29	0.78	0.95	95.36	96.97	96.77	96.37
67	0.14	0.35	0.14	0.21	0.40	0.62	0.42	0.48	95.62	97.53	97.07	96.74
68	0.13	0.28	0.12	0.17	0.45	0.43	0.51	0.46	95.99	97.88	97.53	97.13
69	0.15	0.26	0.14	0.18	0.62	0.43	0.64	0.56	96.59	98.22	98.15	97.65
70	0.15	0.31	0.14	0.20	0.46	0.46	0.51	0.47	96.94	98.57	98.57	98.03
73	0.48	0.79	0.43	0.56	0.93	1.10	0.64	0.89	97.45	99.30	98.68	98.47
74	0.12	0.25	0.12	0.16	0.33	0.38	0.27	0.33	97.68	99.60	98.82	98.70
76	0.46	0.77	0.42	0.55	0.79	0.56	0.71	0.68	98.00	99.60	99.03	98.88
77	0.07	0.18	0.10	0.12	0.29	0.26	0.30	0.28	98.24	99.79	99.29	99.11



$(CO_2)_B$ = Measured cumulative CO_2 production by blank

$(CO_2)_t$ = Measured cumulative CO_2 production by test or reference material

$(CO_2)_{Bmean} = [(CO_2)_{B1} + (CO_2)_{B2} + (CO_2)_{B3}] / 3$

$D = [(CO_2)_t - (CO_2)_{Bmean}] / ThCO_2$

$D_{mean} = (D_{t1} + D_{t2} + D_{t3}) / 3$

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