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APPENDIX

Statistic of Data

Standard deviation (s), Equation (A1) and t distribution was used to determine the distribution of experiments values [29].

$$s = \sqrt{\frac{\sum(x_i - x)}{n-1}} \qquad (A1)$$

where n is the number of sample,

x_i is the experimental of i experiment,

x is the arithmetic experimental mean of a set of values.

The true data (μ) was calculated following the equation (A2). The t-values were obtain from the tabulated statistical table.

$$\mu = x \pm \frac{(tSD)}{\sqrt{n}} \qquad (A2)$$

From the statistical table :

At 90% confidence, n= 3, to obtain t = 2.92.

At 90% confidence, n =5, to obtain t = 2.13.

The set of values was often a single result which deviated from the mean far more than any of the other, the result should be rejected. The Q-test was one of the most reliable of the objective tests available[29].

$$Q = \frac{\text{suspect value - nearest value}}{\text{largest value - smallest value}} \qquad (A3)$$

The Q-test was employed in this study to check whether or not it was reliable to reject a value which deviated far from the mean. The Q experimental value was determined from equation (A3) which was finally compared with those tabulated in a statistical table. If Q (experimental) > Q (table), the value could be reject. In this thesis, Q was equal to 0.64 at 90% confidence for 5 results.

1. The MA Grafted and MFI of PP-g-MA

Table 1.1 Variation of screw speed.

	Screw Speed (rpm)			
	100	90	80	60
MA grafted	0.22	0.18	0.18	0.18
onto PP	0.18	0.18	0.21	0.21
	0.19	0.22	0.18	0.20
Mean	0.20	0.20	0.19	0.20
SD	0.02	0.02	0.02	0.02
t x SD/sqrt n	0.03	0.04	0.03	0.03
MFI	5.36	4.43	4.90	4.94
2.19kg/230°C	5.33	4.27	4.73	5.01
	5.38	4.38	4.64	4.87
Mean	5.36	4.36	4.76	4.94
SD	0.02	0.08	0.13	0.07
t x SD/sqrt n	0.04	0.14	0.22	0.12

Table 1.2 Variation of amount of DCP.

	Amount of DCP (phr)			
	1	2	3	4
MA grafted	0.19	0.40	0.55	0.88
onto PP	0.20	0.39	0.52	0.95
	0.22	0.41	0.51	0.95
Mean	0.20	0.40	0.53	0.93
SD	0.02	0.01	0.02	0.04
t x SD/sqrt n	0.03	0.01	0.03	0.06
MFI	9.56	24.20	50.74	159.6
2.19kg/230°C	9.72	24.92	50.24	161.0
	9.40	24.39	50.85	147.4
Mean	9.57	24.50	50.61	156.0
SD	0.16	0.37	0.33	7.49
t x SD/sqrt n	0.27	0.63	0.55	12.63

Table 1.3 Variation of amount of MA.

	Amount of MA (phr)					
	5.0	5.5	6.0	6.5	7.0	8.0
MA grafted	0.88	0.88	0.71	0.62	0.54	0.58
onto PP	0.95	0.84	0.74	0.63	0.53	0.57
	0.95	0.85	0.77	0.59	0.52	0.57
Mean	0.93	0.86	0.74	0.61	0.53	0.57
SD	0.40	0.02	0.03	0.02	0.01	0.01
t x SD/sqrt n	0.07	0.03	0.05	0.04	0.02	0.01
MFI	159.6	122.9	63.31	11.75	9.73	10.36
2.19kg/230°C	161.0	122.9	63.19	11.58	9.73	10.15
	147.4	122.8	65.44	12.49	9.61	10.09
Mean	156.0	122.8	63.98	11.94	9.69	10.20
SD	7.48	0.03	1.27	0.48	0.07	0.14
t x SD/sqrt n	12.61	0.05	2.13	0.82	0.12	0.24

2. Physical Properties of PP/EVA blends with PP-g-MA

Table 2.1 Izod impact strength.

PP-g-MA	Izod Impact Strength (J/m)				
	0 phr	2 phr	4 phr	6 phr	10 phr
	41.2	38.3	26.2	36.1	25.3
PP/EVA	35.6	40.1	27.3	30.2	26.4
95/5	41.5	41.3	25.9	31.9	25.0
	34.3	34.3	31.5	32.6	25.0
	-	39.5	-	-	-
Mean	38.2	38.7	27.7	32.7	25.4
SD	3.7	2.7	2.6	2.5	0.7
t x SD/sqrt n	3.5	2.6	2.5	2.4	0.6
	42.0	55.4	44.2	41.5	44.3
PP/EVA	37.2	49.1	44.0	40.4	37.8
90/10	41.3	53.7	45.8	48.8	41.5
	37.4	53.9	53.4	44.0	41.5
	39.9	49.5	43.8	44.4	39.7
Mean	39.5	52.3	46.3	43.8	41.0
SD	2.2	2.8	4.1	3.2	2.4
t x SD/sqrt n	2.1	2.7	3.9	3.1	2.3
	68.0	77.8	71.0	77.0	80.5
PP/EVA	75.8	90.3	74.2	67.9	82.6
80/20	76.7	88.6	78.7	70.9	82.4
	75.6	93.4	73.0	72.5	75.1
	-	82.7	76.7	70.6	-
Mean	74.0	86.6	74.7	71.8	80.1
SD	4.0	6.3	3.1	3.4	3.5
t x SD/sqrt n	3.9	6.0	2.9	3.2	3.3
	105	104	112	107	108
PP/EVA	106	121	112	118	112
70/30	117	113	102	110	113
	113	118	111	106	108
	-	115	109	115	-
Mean	110	114	109	111	110
SD	6	6	4	5	2
t x SD/sqrt n	6	6	4	5	2
	152	166	132	125	132
PP/EVA	150	171	147	144	118
60/40	153	162	141	133	118
	157	160	132	132	136
	158	-	131	123	-
Mean	154	165	137	131	126
SD	3	5	7	8	10
t x SD/sqrt n	3	5	7	8	9
	553	549	484	460	358
PP/EVA	561	551	493	499	350
50/50	509	552	502	517	370
	552	558	458	495	361
	525		530		334
Mean	540	553	494	493	355
SD	22	4	26	24	14
t x SD/sqrt n	21	4	25	23	13

Table 2.2 Tensile strength at yield.

	Tensile Strength (MPa)				
PP-g-MA	0 phr	2 phr	4 phr	6 phr	10 phr
	36.36	37.18	36.45	36.68	35.20
PP/EVA	36.52	37.17	36.31	36.90	34.55
95/5	36.25	37.10	36.45	36.55	34.92
	35.80	36.57	36.63	36.93	34.86
	-	36.36	-	35.26	36.63
Mean	36.23	36.88	36.46	36.46	35.23
SD	0.31	0.38	0.13	0.69	0.81
t x SD/sqrt n	0.30	0.37	0.13	0.66	0.78
	28.95	31.94	32.34	31.84	33.06
PP/EVA	28.60	31.51	31.38	32.31	33.00
90/10	29.56	31.88	32.84	32.40	33.29
	33.76	31.50	31.17	32.77	33.82
	34.09	31.71	31.24	33.50	31.75
Mean	30.99	31.71	31.80	32.57	32.98
SD	2.70	0.20	0.75	0.62	0.76
t x SD/sqrt n	2.58	0.20	0.72	0.59	0.72
	27.68	27.56	28.89	28.82	28.25
PP/EVA	26.60	27.87	28.33	28.74	28.44
80/20	27.30	27.83	28.45	27.41	27.59
	27.02	28.52	28.19	27.69	28.54
	27.65	28.22	28.75	28.70	28.62
Mean	27.25	28.00	28.52	28.27	28.29
SD	0.45	0.37	0.29	0.67	0.41
t x SD/sqrt n	0.43	0.36	0.28	0.64	0.41
	24.31	23.76	25.10	24.58	24.97
PP/EVA	23.99	24.58	25.21	26.01	25.12
70/30	24.54	25.15	25.38	25.07	25.23
	23.24	25.99	24.88	25.26	25.40
	22.65	25.51	25.56	25.07	26.06
Mean	23.75	25.00	25.23	25.20	25.35
SD	0.79	0.86	0.26	0.52	0.42
t x SD/sqrt n	0.75	0.82	0.25	0.49	0.40
	21.94	21.06	21.68	22.41	23.75
PP/EVA	21.61	20.83	21.65	22.94	23.38
60/40	20.95	21.13	21.17	20.91	23.43
	22.78	21.26	20.71	20.92	23.42
	21.04	20.91	21.13	22.98	23.20
Mean	21.67	21.04	21.27	22.03	23.43
SD	0.74	0.17	0.41	1.04	0.20
t x SD/sqrt n	0.71	0.17	0.39	0.99	0.19
	16.74	18.06	18.02	19.56	21.29
PP/EVA	17.30	17.14	18.67	19.40	20.42
50/50	17.79	16.66	18.63	18.81	19.36
	17.19	16.82	18.82	19.52	19.73
	16.69	17.60	17.00	18.73	19.43
Mean	17.14	17.26	18.23	19.20	20.05
SD	0.45	0.58	0.75	0.40	0.81
t x SD/sqrt n	0.43	0.55	0.71	0.39	0.77

Table 2.3 Elongation at break.

PP-g-MA	Elongation at break (%)				
	0 phr	2 phr	4 phr	6 phr	10 phr
	17.9	21.8	22.0	23.1	20.1
PP/EVA	17.9	20.1	22.4	21.9	22.6
95/5	17.1	20.1	23.5	22.6	19.4
	18.4	22.6	22.2	21.6	19.7
	-	21.4	23.1	20.4	21.6
Mean	17.8	21.2	22.6	21.9	20.7
SD	0.5	1.1	0.6	1.0	1.4
t x SD/sqrt n	0.5	1.1	0.6	1.0	1.3
	182	150	154	156	201
PP/EVA	206	153	157	184	176
90/10	217	168	139	187	196
	213	157	158	184	211
	229	181	-	197	-
Mean	210	162	152	181	196
SD	17	13	9	15	15
t x SD/sqrt n	17	12	9	15	14
	476	303	269	330	273
PP/EVA	453	384	260	294	339
80/20	515	323	256	278	311
	434	332	232	326	333
	428	311	256	280	343
Mean	461	330	255	302	320
SD	36	32	13	25	29
t x SD/sqrt n	34	31	13	24	28
	598	561	541	638	632
PP/EVA	618	637	624	645	572
70/30	581	609	617	573	573
	592	589	537	589	632
	599	-	-	643	543
Mean	598	599	580	617	590
SD	13	32	47	34	40
t x SD/sqrt n	13	30	45	32	38
	558	663	561	175	189
PP/EVA	634	607	652	183	171
60/40	673	640	635	199	161
	676	636	578	194	160
	596	-	-	168	-
Mean	627	637	606	184	170
SD	51	23	44	13	13
t x SD/sqrt n	48	22	42	12	13
	538	384	266	224	271
PP/EVA	447	444	302	249	266
50/50	477	458	295	247	263
	433	426	275	217	312
	464	-	-	-	312
Mean	472	428	285	234	285
SD	40	32	17	16	25
t x SD/sqrt n	38	31	16	15	24

Table 2.4 Hardness.

PP-g-MA	Rockwell Hardness (R Scale)				
	0 phr	2 phr	4 phr	6 phr	10 phr
	111.8	111.4	111.5	110.7	110.8
PP/EVA	111.7	112.0	112.1	110.7	111.4
95/5	108.5	111.3	112.0	110.2	111.1
	110.7	111.6	111.6	110.2	111.2
	110.7	111.3	111.9	109.7	111.6
Mean	110.7	111.5	111.8	110.3	111.2
SD	1.3	0.3	0.3	0.4	0.3
t x SD/sqrt n	1.3	0.3	0.2	0.4	0.3
	107.8	109.0	108.5	107.9	108.3
PP/EVA	108.8	108.4	108.0	108.6	108.8
90/10	108.4	108.2	108.4	108.4	108.7
	109.0	109.0	108.2	108.4	108.4
	106.5	109.2	108.1	108.4	108.7
Mean	108.1	108.8	108.2	108.3	108.6
SD	1.0	0.4	0.2	0.3	0.2
t x SD/sqrt n	0.95	0.4	0.2	0.3	0.2
	99.3	100.4	102.0	101.3	98.8
PP/EVA	99.6	100.6	102.3	100.2	100.0
80/20	100.5	100.5	101.7	100.4	100.5
	100.3	100.0	100.0	99.9	100.6
	99.2	101.1	100.9	100.3	101.1
Mean	99.8	100.5	101.4	100.4	100.2
SD	0.6	0.4	0.9	0.5	0.9
t x SD/sqrt n	0.6	0.4	0.9	0.51	0.8
	89.1	89.2	88.7	90.3	90.9
PP/EVA	87.9	90.8	89.2	90.1	91.2
70/30	89.1	89.4	88.7	90.3	91.1
	89.8	89.0	89.8	90.2	91.9
	87.5	90.2	89.9	90.2	
Mean	88.7	89.7	89.3	90.2	91.3
SD	0.9	0.8	0.6	0.1	0.5
t x SD/sqrt n	0.9	0.7	0.6	0.1	0.4
	75.6	74.9	76.4	78.6	79.0
PP/EVA	75.9	75.7	76.5	78.4	81.7
60/40	76.3	77.7	76.6	80.2	82.8
	77.4	77.3	76.5	79.8	81.9
	77.7	77.2	77.0	79.3	-
Mean	76.6	76.6	76.6	79.2	80.1
SD	0.9	1.2	0.3	0.8	1.6
t x SD/sqrt n	0.9	1.1	0.2	0.7	1.5
	70.4	71.0	71.2	72.4	71.2
PP/EVA	69.3	71.8	71.1	71.4	70.5
50/50	70.0	71.2	70.9	70.9	71.4
	69.4	72.1	71.8	71.5	70.1
	70.4	71.9	70.9	71.6	71.1
Mean	69.9	71.6	71.2	71.5	70.8
SD	0.5	0.5	0.4	0.5	0.5
t x SD/sqrt n	0.5	0.5	0.3	0.5	0.5

- : Suspect value

VITA

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