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APPENDIXES

APPENDIX A

DATA OF TENSILE PROPERTIES

Tensile Test
ASTM D638-90

Instron Corporation
Series IX Automated Materials Testing System 1.19
Date: 30 July 1993

Operator name: Mr. Somchai

Sample Identification: PP-TRM
Interface Type: 4200 Series

Machine Parameter of Test:
Sample Rate (pts/sec): 10.000
Crosshead Speed (mm/min): 5.000
Extensometer Switch Value: 250.000% offset
Humidity (%): 50
Temperature (deg. C): 25

Dimensions:

	Spec1	Spec2	Spec3	Spec4	Spec5
Width (mm)	4.95	5.55	5.80	5.95	5.60
Thickness (mm)	2.70	2.70	2.75	2.75	52.70
Ext. gauge len (mm)	25.00	25.00	25.00	25.00	25.00
Spec gauge len (mm)	64.00	64.00	64.00	64.00	64.00

Sample Comment: Homo-PP, two roll mill

Specimen Number	Stress at Max Load (MPa)	% Strain at Max Load (%)	Stress at Thresh Yield (MPa)	%Strain at Thresh Yield (%)	Stress at Auto Break (MPa)	%Strain at Auto Break (%)	Modulus (MPa)
1	30.53	11.300	30.20	10.396	10.24	103.400	1091.00
2	30.10	9.208	29.80	8.306	21.50	206.600	1065.00
3	31.98	9.101	31.63	8.246	22.22	172.500	1061.00
4	32.32	9.208	31.50	8.269	21.16	115.400	1021.00
5	33.38	8.725	33.03	7.922	22.90	204.200	1083.00
Mean	31.66	9.508	31.23	8.628	19.60	160.420	1064.20
SD	1.34	1.02	1.28	1.00	5.28	48.67	27.15

Tensile Test
ASTM D638-90

Instron Corporation
Series IX Automated Materials Testing System 1.19
Date: 06 July 1993

Operator name: Mr. Somchai

Sample Identification: 1-60ss
Interface Type: 4200 Series

Machine Parameter of Test:
Sample Rate (pts/sec): 10.000
Crosshead Speed (mm/min): 5.000
Extensometer Switch Value: 250.000% offset
Humidity (%): 50
Temperature (deg. C): 25

Dimensions:

	Spec1	Spec2	Spec3	Spec4	Spec5
Width (mm)	5.60	5.45	5.30	5.80	6.00
Thickness (mm)	2.85	2.80	2.85	2.85	2.80
Ext. gauge len (mm)	25.00	25.00	25.00	25.00	25.00
Spec gauge len (mm)	64.00	64.00	64.00	64.00	64.00

Sample Comment: 10%, A-174

Specimen Number	Stress at Max Load (MPa)	% Strain at Max Load (%)	Stress at Thresh Yield (MPa)	%Strain at Thresh Yield (%)	Stress at Auto Break (MPa)	%Strain at Auto Break (%)	Modulus (MPa)
1	25.90	5.892	25.90	4.913	25.40	6.309	1251.00
2	27.62	6.250	27.62	5.987	26.74	8.456	1415.00
3	26.30	6.160	26.13	5.101	25.77	7.812	1276.00
4	25.01	5.506	24.85	5.396	24.20	7.195	1250.00
5	25.57	5.744	25.57	5.101	25.41	5.772	1233.00
Mean	26.08	5.910	26.01	5.300	25.50	7.109	1285.00
SD	0.98	0.30	1.02	0.42	0.91	1.09	74.27

Tensile Test
ASTM D638-90

Instron Corporation
Series IX Automated Materials Testing System 1.19
Date: 06 July 1993

Operator name: Mr. Somchai

Sample Identification: 3-60ss
Interface Type: 4200 Series

Machine Parameter of Test:
Sample Rate (pts/sec): 10.000
Crosshead Speed (mm/min): 5.000
Extensometer Switch Value: 250.000% offset
Humidity (%): 50
Temperature (deg. C): 25

Dimensions:

	Spec1	Spec2	Spec3	Spec4	Spec5
Width (mm)	5.80	5.65	5.40	5.40	5.90
Thickness (mm)	2.80	2.80	2.85	2.85	2.95
Ext. gauge len (mm)	25.00	25.00	25.00	25.00	25.00
Spec gauge len (mm)	64.00	64.00	64.00	64.00	64.00

Sample Comment: 20%, A-174

Specimen Number	Stress at Max Load (MPa)	% Strain at Max Load (%)	Stress at Thresh Yield (MPa)	%Strain at Thresh Yield (%)	Stress at Auto Break (MPa)	%Strain at Auto Break (%)	Modulus (MPa)
1	21.98	3.429	21.99	3.195	21.49	3.678	1597.00
2	23.08	4.016	23.08	3.597	22.06	5.101	1566.00
3	22.33	3.494	22.33	3.597	22.33	3.597	1550.00
4	23.20	3.722	23.02	3.544	22.68	4.242	1683.00
5	22.83	4.196	22.67	3.866	22.67	4.537	1455.00
Mean	22.68	3.771	22.62	3.560	22.25	4.231	1570.20
SD	0.52	0.33	0.46	0.24	0.50	0.62	82.37

Tensile Test
ASTM D638-90

Instron Corporation
Series IX Automated Materials Testing System 1.19
Date: 06 July 1993

Operator name: Mr. Somchai

Sample Identification: 5-60ss
Interface Type: 4200 Series

Machine Parameter of Test:
Sample Rate (pts/sec): 10.000
Crosshead Speed (mm/min): 5.000
Extensometer Switch Value: 250.000% offset
Humidity (%): 50
Temperature (deg. C): 25

Dimensions:

	Spec1	Spec2	Spec3	Spec4	Spec5
Width (mm)	6.00	5.70	5.20	5.50	5.40
Thickness (mm)	2.85	2.90	2.85	2.90	2.90
Ext. gauge len (mm)	25.00	25.00	25.00	25.00	25.00
Spec gauge len (mm)	64.00	64.00	64.00	64.00	64.00

Sample Comment: 30%, A-174

Specimen Number	Stress at Max Load (MPa)	% Strain at Max Load (%)	Stress at Thresh Yield (MPa)	%Strain at Thresh Yield (%)	Stress at Auto Break (MPa)	%Strain at Auto Break (%)	Modulus (MPa)
1	22.13	3.050	22.14	2.926	21.82	3.732	1796.00
2	21.60	3.167	21.60	3.087	20.46	4.349	1717.00
3	22.65	3.443	22.46	3.436	22.28	3.544	1750.00
4	21.71	3.171	21.71	3.007	21.37	3.383	1549.00
5	22.80	3.142	22.80	2.899	22.46	3.436	1694.00
Mean	22.18	3.195	22.14	3.071	21.68	3.689	1701.20
SD	0.54	0.15	0.50	0.22	0.80	0.39	93.32

Tensile Test
ASTM D638-90

Instron Corporation
Series IX Automated Materials Testing System 1.19
Date: 06 July 1993

Operator name: Mr. Somchai

Sample Identification: 7-60ss
Interface Type: 4200 Series

Machine Parameter of Test:
- Sample Rate (pts/sec): 10.000
- Crosshead Speed (mm/min): 5.000
- Extensometer Switch Value: 250.000% offset
- Humidity (%): 50
- Temperature (deg. C): 25

Dimensions:

	Spec1	Spec2	Spec3	Spec4	Spec5	Spec6
Width (mm)	5.80	5.40	5.30	5.45	5.60	5.50
Thickness (mm)	2.95	2.90	2.95	2.95	2.90	2.90
Ext. gauge len (mm)	25.00	25.00	25.00	25.00	25.00	25.00
Spec gauge len (mm)	64.00	64.00	64.00	64.00	64.00	64.00

Sample Comment: 40%, A-174

Specimen Number	Stress at Max Load (MPa)	% Strain at Max Load (%)	Stress at Thresh Yield (MPa)	%Strain at Thresh Yield (%)	Stress at Auto Break (MPa)	%Strain at Auto Break (%)	Modulus (MPa)
1	18.67	2.244	18.36	2.044	18.20	2.777	1867.00
2	19.71	2.344	19.71	2.067	19.71	2.511	1904.00
3	21.12	2.346	21.12	2.178	21.12	2.658	1895.00
4	18.20	2.378	18.20	2.222	17.70	3.007	1806.00
5	20.00	2.544	20.00	2.400	19.67	2.953	1908.00
6	21.88	2.300	21.71	2.166	21.71	2.523	1967.00
Mean	19.93	2.36	19.85	2.18	19.69	2.74	1891.17
SD	1.40	0.10	1.42	0.13	1.57	0.21	53.01

Instron Corporation
Series IX Automated Materials Testing System 1.19
Date: 12 July 1993

Operator name: Mr. Somchai

Sample Identification: 9-60ss
Interface Type: 4200 Series

Machine Parameter of Test:
Sample Rate (pts/sec): 10.000
Crosshead Speed (mm/min): 5.000
Extensometer Switch Value: 250.000% offset
Humidity (%): 50
Temperature (deg. C): 25

Dimensions:

	Spec1	Spec2	Spec3	Spec4	Spec5
Width (mm)	5.65	5.35	5.85	5.85	5.60
Thickness (mm)	3.00	3.00	2.95	3.00	3.00
Ext. gauge len (mm)	25.00	25.00	25.00	25.00	25.00
Spec gauge len (mm)	64.00	64.00	64.00	64.00	64.00

Sample Comment: 50%, A-174

Specimen Number	Stress at Max Load (MPa)	% Strain at Max Load (%)	Stress at Thresh Yield (MPa)	%Strain at Thresh Yield (%)	Stress at Auto Break (MPa)	%Strain at Auto Break (%)	Modulus (MPa)
1	15.36	1.721	15.36	1.721	15.36	1.853	1911.00
2	15.22	1.711	15.05	1.569	15.05	2.000	1920.00
3	15.40	2.531	15.40	2.258	15.40	2.694	1908.00
4	16.67	2.268	16.52	2.262	16.52	2.572	2092.00
5	15.34	2.167	15.18	2.163	15.18	2.481	1948.00
Mean	15.60	2.080	15.50	1.995	15.50	2.320	1955.80
SD	0.60	0.36	0.59	0.33	0.59	0.37	77.76

Tensile Test
ASTM D638-90

Instron Corporation
Series IX Automated Materials Testing System 1.19
Date: 12 Dec 1993

Operator name: Mr. Somchai

Sample Identification: 12-60ss
Interface Type: 4200 Series

Machine Parameter of Test:
Sample Rate (pts/sec): 10.000
Crosshead Speed (mm/min): 5.000
Extensometer Switch Value: 250.000% offset
Humidity (%): 50
Temperature (deg. C): 25

Dimensions:

	Spec1	Spec2	Spec3	Spec4	Spec5
Width (mm)	6.00	6.20	5.90	5.95	5.90
Thickness (mm)	2.85	2.85	2.85	2.80	2.80
Ext. gauge len (mm)	25.00	25.00	25.00	25.00	25.00
Spec gauge len (mm)	64.00	64.00	64.00	64.00	64.00

Sample Comment: 10%, A-1100

Specimen Number	Stress at Max Load (MPa)	%Strain at Auto Break (%)	Modulus (MPa)
1	25.89	7.007	1297.00
2	26.03	6.040	1315.00
3	25.57	6.336	1295.00
4	25.77	8.054	1249.00
5	26.03	6.550	1230.00
Mean	25.86	6.797	1277.20
SD	0.19	0.79	35.92

Tensile Test
ASTM D638-90

Instron Corporation
Series IX Automated Materials Testing System 1.19
Date: 12 Dec 1993

Operator name: Mr. Somchai

Sample Identification: 14-60ss
Interface Type: 4200 Series

Machine Parameter of Test:
Sample Rate (pts/sec): 10.000
Crosshead Speed (mm/min): 5.000
Extensometer Switch Value: 250.000% offset
Humidity (%): 50
Temperature (deg. C): 25

Dimensions:

	Spec1	Spec2	Spec3	Spec4	Spec5
Width (mm)	5.80	5.85	5.80	6.05	5.90
Thickness (mm)	2.80	2.80	2.85	2.80	2.85
Ext. gauge len (mm)	25.00	25.00	25.00	25.00	25.00
Spec gauge len (mm)	64.00	64.00	64.00	64.00	64.00

Sample Comment: 20%, A-1100

Specimen Number	Stress at Max Load (MPa)	%Strain at Auto Break (%)	Modulus (MPa)
1	22.70	5.584	1457.00
2	22.12	4.940	1418.00
3	22.32	5.476	1493.00
4	22.53	6.470	1512.00
5	21.93	6.060	1524.00
Mean	22.32	5.706	1480.80
SD	0.31	0.58	43.30

Tensile Test
ASTM D638-90

Instron Corporation
Series IX Automated Materials Testing System 1.19
Date: 12 Dec 1993

Operator name: Mr. Somchai

Sample Identification: 16-60ss
Interface Type: 4200 Series

Machine Parameter of Test:
Sample Rate (pts/sec): 10.000
Crosshead Speed (mm/min): 5.000
Extensometer Switch Value: 250.000% offset
Humidity (%): 50
Temperature (deg. C): 25

Dimensions:

	Spec1	Spec2	Spec3	Spec4	Spec5
Width (mm)	5.95	5.45	5.90	5.60	6.15
Thickness (mm)	2.80	2.80	2.85	2.85	2.80
Ext. gauge len (mm)	25.00	25.00	25.00	25.00	25.00
Spec gauge len (mm)	64.00	64.00	64.00	64.00	64.00

Sample Comment: 30%, A-1100

Specimen Number	Stress at Max Load (MPa)	%Strain at Auto Break (%)	Modulus (MPa)
1	21.88	2.631	1525.00
2	21.53	3.785	1636.00
3	21.92	4.993	1554.00
4	22.13	4.456	1546.00
5	21.64	2.680	1531.00
Mean	21.82	3.709	1558.40
SD	0.24	1.05	44.89

Tensile Test
ASTM D638-90

Instron Corporation
Series IX Automated Materials Testing System 1.19
Date: 12 Dec 1993

Operator name: Mr. Somchai

Sample Identification: 18-60ss
Interface Type: 4200 Series

Machine Parameter of Test:
Sample Rate (pts/sec): 10.000
Crosshead Speed (mm/min): 5.000
Extensometer Switch Value: 250.000% offset
Humidity (%): 50
Temperature (deg. C): 25

Dimensions:

	Spec1	Spec2	Spec3	Spec4	Spec5
Width (mm)	5.75	5.60	5.80	5.20	5.45
Thickness (mm)	2.90	2.90	2.90	2.85	2.90
Ext. gauge len (mm)	25.00	25.00	25.00	25.00	25.00
Spec gauge len (mm)	64.00	64.00	64.00	64.00	64.00

Sample comment: 40%, A-1100

Specimen Number	Stress at Max Load (MPa)	%Strain at Auto Break (%)	Modulus (MPa)
1	18.33	3.034	1454.00
2	18.37	3.356	1589.00
3	17.78	2.389	1640.00
4	19.23	2.604	1540.00
5	18.12	2.577	1654.00
Mean	18.37	2.792	1575.40
SD	0.54	0.39	81.44

Tensile Test
ASTM D638-90

Instron Corporation
Series IX Automated Materials Testing System 1.19
Date: 12 Dec 1993

Operator name: Mr. Somchai

Sample Identification: 20-60ss
Interface Type: 4200 Series

Machine Parameter of Test:
Sample Rate (pts/sec): 10.000
Crosshead Speed (mm/min): 5.000
Extensometer Switch Value: 250.000% offset
Humidity (%): 50
Temperature (deg. C): 25

Dimensions:

	Spec1	Spec2	Spec3	Spec4	Spec5
Width (mm)	5.25	5.85	5.45	5.20	5.50
Thickness (mm)	3.00	3.00	2.95	2.95	2.95
Ext. gauge len (mm)	25.00	25.00	25.00	25.00	25.00
Spec gauge len (mm)	64.00	64.00	64.00	64.00	64.00

Sample Comment: 50%, A-1100

Specimen Number	Stress at Max Load (MPa)	%Strain at Auto Break (%)	Modulus (MPa)
1	14.86	2.470	1721.00
2	15.17	2.255	1798.00
3	14.33	2.067	1885.00
4	14.65	1.906	1798.00
5	14.52	2.121	1751.00
Mean	14.71	2.164	1790.60
SD	0.32	0.21	62.12

Tensile Test
ASTM D638-90

Instron Corporation
Series IX Automated Materials Testing System 1.19
Date: 13 July 1993

Operator name: Mr. Somchai

Sample Identification: 21-60ss
Interface Type: 4200 Series

Machine Parameter of Test:
Sample Rate (pts/sec): 10.000
Crosshead Speed (mm/min): 5.000
Extensometer Switch Value: 250.000% offset
Humidity (%): 50
Temperature (deg. C): 25

Dimensions:

	Spec1	Spec2	Spec3	Spec4	Spec5
Width (mm)	5.65	5.55	5.55	5.85	5.60
Thickness (mm)	2.80	2.80	2.80	2.80	2.80
Ext. gauge len (mm)	25.00	25.00	25.00	25.00	25.00
Spec gauge len (mm)	64.00	64.00	64.00	64.00	64.00

Sample Comment: 10%, untreated

Specimen Number	Stress at Max Load (MPa)	% Strain at Max Load (%)	Stress at Thresh Yield (MPa)	%Strain at Thresh Yield (%)	Stress at Auto Break (MPa)	%Strain at Auto Break (%)	Modulus (MPa)
1	26.47	5.867	26.30	5.667	25.79	7.400	1303.00
2	26.09	7.400	26.08	5.470	25.22	10.330	1281.00
3	26.60	6.670	26.43	5.833	26.26	9.033	1322.00
4	24.75	6.333	24.75	5.480	24.75	6.470	1249.00
5	26.54	7.200	26.54	6.000	25.68	8.733	1336.00
Mean	26.09	6.69	26.02	5.690	25.54	8.393	1298.20
SD	0.78	0.63	0.73	0.23	0.58	1.50	34.40

Tensile Test
ASTM D638-90

Instron Corporation
Series IX Automated Materials Testing System 1.19
Date: 12 July 1993

Operator name: Mr. Somchai

Sample Identification: 23-60ss
Interface Type: 4200 Series

Machine Parameter of Test:
- Sample Rate (pts/sec): 10.000
- Crosshead Speed (mm/min): 5.000
- Extensometer Switch Value: 250.000% offset
- Humidity (%): 50
- Temperature (deg. C): 25

Dimensions:

	Spec1	Spec2	Spec3	Spec4	Spec5
Width (mm)	5.75	5.15	5.25	5.50	5.50
Thickness (mm)	3.00	2.95	2.85	2.90	2.80
Ext. gauge len (mm)	25.00	25.00	25.00	25.00	25.00
Spec gauge len (mm)	64.00	64.00	64.00	64.00	64.00

Sample Comment: 20%, untreated

Specimen Number	Stress at Max Load (MPa)	% Strain at Max Load (%)	Stress at Thresh Yield (MPa)	%Strain at Thresh Yield (%)	Stress at Auto Break (MPa)	%Strain at Auto Break (%)	Modulus (MPa)
1	19.30	4.205	19.14	3.291	18.52	5.074	1349.00
2	18.90	3.909	18.91	3.794	18.55	5.211	1433.00
3	19.19	5.303	19.02	3.749	18.66	6.651	1409.00
4	17.84	4.891	17.67	4.343	17.67	5.760	1374.00
5	17.78	4.800	17.61	4.000	17.08	5.669	1380.00
Mean	18.60	4.622	18.47	3.835	18.10	5.673	1389.00
SD	0.74	0.56	0.76	0.38	0.69	0.62	32.57

Tensile Test
ASTM D638-90

Instron Corporation
Series IX Automated Materials Testing System 1.19
Date: 29 July 1993

Operator name: Mr. Somchai

Sample Identification: 25-60n
Interface Type: 4200 Series

Machine Parameter of Test:
Sample Rate (pts/sec): 10.000
Crosshead Speed (mm/min): 5.000
Extensometer Switch Value: 250.000% offset
Humidity (%): 50
Temperature (deg. C): 25

Dimensions:

	Spec1	Spec2	Spec3	Spec4	Spec5
Width (mm)	5.45	5.45	5.75	5.80	5.50
Thickness (mm)	2.80	2.85	2.85	2.85	2.85
Ext. gauge len (mm)	25.00	25.00	25.00	25.00	25.00
Spec gauge len (mm)	64.00	64.00	64.00	64.00	64.00

Sample Comment: 30% untreated

Specimen Number	Stress at Max Load (MPa)	% Strain at Max Load (%)	Stress at Thresh Yield (MPa)	%Strain at Thresh Yield (%)	Stress at Auto Break (MPa)	%Strain at Auto Break (%)	Modulus (MPa)
1	17.06	4.188	17.06	3.248	16.36	5.530	1405.00
2	17.11	3.785	17.11	3.248	16.94	4.081	1476.00
3	16.38	3.517	16.38	3.087	15.73	4.134	1440.00
4	17.05	4.527	16.89	3.356	16.08	6.792	1399.00
5	16.27	4.644	16.27	3.597	15.58	5.906	1625.00
Mean	16.77	4.132	16.74	3.307	16.14	5.289	1469.00
SD	0.41	0.48	0.39	0.19	0.54	1.17	92.50

Tensile Test
ASTM D638-90

Instron Corporation
Series IX Automated Materials Testing System 1.19
Date: 29 July 1993

Operator name: Mr. Somchai

Sample Identification: 27-60n
Interface Type: 4200 Series

Machine Parameter of Test:
Sample Rate (pts/sec): 10.000
Crosshead Speed (mm/min): 5.000
Extensometer Switch Value: 250.000% offset
Humidity (%): 50
Temperature (deg. C): 25

Dimensions:

	Spec1	Spec2	Spec3	Spec4	Spec5
Width (mm)	5.90	6.00	6.00	5.65	5.50
Thickness (mm)	2.90	2.90	2.90	2.95	2.90
Ext. gauge len (mm)	25.00	25.00	25.00	25.00	25.00
Spec gauge len (mm)	64.00	64.00	64.00	64.00	64.00

Sample Comment: 40%, untreated

Specimen Number	Stress at Max Load (MPa)	% Strain at Max Load (%)	Stress at Thresh Yield (MPa)	%Strain at Thresh Yield (%)	Stress at Auto Break (MPa)	%Strain at Auto Break (%)	Modulus (MPa)
1	14.44	4.698	14.28	3.302	14.12	6.282	1316.00
2	13.89	4.295	13.73	3.248	13.58	5.074	1384.00
3	14.35	4.940	14.19	3.248	13.73	6.040	1471.00
4	14.02	4.993	13.85	3.034	13.69	5.611	1566.00
5	14.14	3.383	13.97	2.899	13.63	4.430	1671.00
Mean	14.17	4.462	14.00	3.146	13.75	5.487	1481.60
SD	0.23	0.66	0.23	0.17	0.21	0.75	141.47

Tensile Test
ASTM D638-90

Instron Corporation
Series IX Automated Materials Testing System 1.19
Date: 13 July 1993

Operator name: Mr. Somchai

Sample Identification: 29-60ss
Interface Type: 4200 Series

Machine Parameter of Test:
Sample Rate (pts/sec): 10.000
Crosshead Speed (mm/min): 5.000
Extensometer Switch Value: 250.000% offset
Humidity (%): 50
Temperature (deg. C): 25

Dimensions:

	Spec1	Spec2	Spec3	Spec4	Spec5
Width (mm)	5.45	5.30	5.50	5.30	5.70
Thickness (mm)	3.00	3.10	2.95	3.00	2.95
Ext. gauge len (mm)	25.00	25.00	25.00	25.00	25.00
Spec gauge len (mm)	64.00	64.00	64.00	64.00	64.00

Sample Comment: 50%, untreated

Specimen Number	Stress at Max Load (MPa)	% Strain at Max Load (%)	Stress at Thresh Yield (MPa)	%Strain at Thresh Yield (%)	Stress at Auto Break (MPa)	%Strain at Auto Break (%)	Modulus (MPa)
1	12.72	2.537	12.71	2.146	11.76	3.024	1576.00
2	12.42	3.415	12.09	2.497	12.25	3.758	1547.00
3	12.41	2.568	12.08	2.201	12.24	3.248	1428.00
4	12.83	4.722	12.58	2.107	12.66	4.752	1601.00
5	12.77	3.668	12.61	2.846	12.45	4.215	1395.00
Mean	12.63	3.382	12.41	2.359	12.27	3.799	1509.40
SD	0.20	0.90	0.30	0.31	0.33	0.70	92.13

Tensile Test
ASTM D638-90

Instron Corporation
Series IX Automated Materials Testing System 1.19
Test Date: 20 July 1993

Operator name: Mr. Somchai

Sample Identification: 22-60ss
Interface Type: 4200 Series

Machine Parameter of Test:
Sample Rate (pts/sec): 10.000
Crosshead Speed (mm/min): 5.000
Extensometer Switch Value: 250.000% offset
Humidity (%): 50
Temperature (deg. C): 25

Dimensions:

	Spec1	Spec2	Spec3	Spec4	Spec5
Width (mm)	5.80	5.65	5.70	5.70	6.00
Thickness (mm)	2.70	2.70	2.65	2.75	2.75
Ext. gauge len (mm)	25.00	25.00	25.00	25.00	25.00
Spec gauge len (mm)	64.00	64.00	64.00	64.00	64.00

Sample Comment: 10%, 2% Epolene

Specimen Number	Stress at Max Load (MPa)	% Strain at Max Load (%)	Stress at Thresh Yield (MPa)	%Strain at Thresh Yield (%)	Stress at Auto Break (MPa)	%Strain at Auto Break (%)	Modulus (MPa)
1	26.74	5.824	26.57	5.120	26.23	8.349	1297.00
2	25.87	5.760	25.69	4.992	25.16	8.054	1338.00
3	26.66	5.536	26.66	5.056	26.13	7.200	1379.00
4	26.03	6.688	26.03	5.248	24.83	8.512	1325.00
5	26.36	5.216	26.36	4.520	26.19	5.632	1323.00
Mean	26.33	5.805	26.26	4.987	25.71	7.549	1332.40
SD	0.38	0.55	0.40	0.28	0.66	1.19	30.00

Tensile Test
ASTM D638-90

Instron Corporation
Series IX Automated Materials Testing System 1.19
Date: 28 July 1993

Operator name: Mr. Somchai

Sample Identification: 24-60ss or 32-60ss
Interface Type: 4200 Series

Machine Parameter of Test:
Sample Rate (pts/sec): 10.000
Crosshead Speed (mm/min): 5.000
Extensometer Switch Value: 250.000% offset
Humidity (%): 50
Temperature (deg. C): 25

Dimensions:

	Spec1	Spec2	Spec3	Spec4	Spec5	Spec6
Width (mm)	5.50	5.50	5.45	5.40	5.40	5.45
Thickness (mm)	2.80	2.85	2.80	2.80	2.80	2.80
Ext. gauge len (mm)	25.00	25.00	25.00	25.00	25.00	25.00
Spec gauge len (mm)	64.00	64.00	64.00	64.00	64.00	64.00

Sample Comment: 20%, 2% Epolene

Specimen Number	Stress at Max Load (MPa)	% Strain at Max Load (%)	Stress at Thresh Yield (MPa)	%Strain at Thresh Yield (%)	Stress at Auto Break (MPa)	%Strain at Auto Break (%)	Modulus (MPa)
1	26.32	3.812	26.32	3.490	25.97	4.054	1692.00
2	24.66	3.221	24.49	2.926	24.49	3.248	1653.00
3	25.51	3.624	25.51	3.463	25.33	3.732	1655.00
4	26.10	4.081	26.10	3.597	24.32	6.362	1541.00
5	26.10	3.785	26.10	3.544	25.92	3.893	1649.00
6	26.04	2.95	26.04	2.82	25.86	2.980	1615.00
Mean	25.79	3.58	25.76	3.31	25.32	4.04	1634.17
SD	0.61	0.42	0.68	0.34	0.74	1.20	51.77

Tensile Test
ASTM D638-90

Instron Corporation
Series IX Automated Materials Testing System 1.19
Date: 29 July 1993

Operator name: Mr. Somchai

Sample Identification: 26-60n
Interface Type: 4200 Series

Machine Parameter of Test:
- Sample Rate (pts/sec): 10.000
- Crosshead Speed (mm/min): 5.000
- Extensometer Switch Value: 250.000% offset
- Humidity (%): 50
- Temperature (deg. C): 25

Dimensions:

	Spec1	Spec2	Spec3	Spec4	Spec5
Width (mm)	5.40	5.15	5.25	5.15	5.50
Thickness (mm)	2.80	2.80	2.80	2.80	2.80
Ext. gauge len (mm)	25.00	25.00	25.00	25.00	25.00
Spec gauge len (mm)	64.00	64.00	64.00	64.00	64.00

Sample Comment: 30%, 2% Epolene

Specimen Number	Stress at Max Load (MPa)	% Strain at Max Load (%)	Stress at Thresh Yield (MPa)	%Strain at Thresh Yield (%)	Stress at Auto Break (MPa)	%Strain at Auto Break (%)	Modulus (MPa)
1	22.72	2.094	22.55	2.085	22.55	2.320	1955.00
2	22.34	1.987	22.15	1.799	22.15	1.987	2030.00
3	22.10	2.201	22.10	2.040	21.91	2.255	2091.00
4	22.52	2.577	22.34	2.443	22.15	2.819	2190.00
5	23.01	1.987	23.01	1.933	23.01	2.010	1978.00
Mean	22.54	2.169	22.43	2.060	22.35	2.278	2048.80
SD	0.35	0.24	0.37	0.24	0.43	0.34	94.71

Tensile Test
ASTM D638-90

Instron Corporation
Series IX Automated Materials Testing System 1.19
Date: 13 July 1993

Operator name: Mr. Somchai

Sample Identification: 28-60ss
Interface Type: 4200 Series

Machine Parameter of Test:
Sample Rate (pts/sec): 10.000
Crosshead Speed (mm/min): 5.000
Extensometer Switch Value: 250.000% offset
Humidity (%): 50
Temperature (deg. C): 25

Dimensions:

	Spec1	Spec2	Spec3	Spec4	Spec5
Width (mm)	6.00	5.80	5.25	6.10	5.40
Thickness (mm)	2.85	2.85	2.85	2.90	2.85
Ext. gauge len (mm)	25.00	25.00	25.00	25.00	25.00
Spec gauge len (mm)	64.00	64.00	64.00	64.00	64.00

Sample Comment: 40%, 2% Epolene

Specimen Number	Stress at Max Load (MPa)	% Strain at Max Load (%)	Stress at Thresh Yield (MPa)	%Strain at Thresh Yield (%)	Stress at Auto Break (MPa)	%Strain at Auto Break (%)	Modulus (MPa)
1	21.98	1.749	21.98	1.631	21.98	1.933	2290.00
2	22.73	1.975	22.57	1.916	22.57	2.282	2173.00
3	22.43	2.146	22.25	2.141	22.25	2.255	2194.00
4	24.74	2.371	24.58	2.050	24.58	2.470	2165.00
5	23.37	1.718	23.37	1.718	23.37	1.718	1985.00
Mean	23.05	1.992	22.95	1.891	22.95	2.132	2161.40
SD	1.07	0.27	1.05	0.22	1.05	0.30	110.53

Tensile Test
ASTM D638-90

Instron Corporation
Series IX Automated Materials Testing System 1.19
Date: 13 July 1993

Operator name: Mr. Somchai

Sample Identification: 30-60ss
Interface Type: 4200 Series

Machine Parameter of Test:
Sample Rate (pts/sec): 10.000
Crosshead Speed (mm/min): 5.000
Extensometer Switch Value: 250.000% offset
Humidity (%): 50
Temperature (deg. C): 25

Dimensions:

	Spec1	Spec2	Spec3	Spec4	Spec5
Width (mm)	5.80	5.80	5.35	5.30	5.80
Thickness (mm)	3.00	2.95	2.95	2.90	2.90
Ext. gauge len (mm)	25.00	25.00	25.00	25.00	25.00
Spec gauge len (mm)	64.00	64.00	64.00	64.00	64.00

Sample Comment: 50%, 2% Epolene

Specimen Number	Stress at Max Load (MPa)	% Strain at Max Load (%)	Stress at Thresh Yield (MPa)	%Strain at Thresh Yield (%)	Stress at Auto Break (MPa)	%Strain at Auto Break (%)	Modulus (MPa)
1	22.68	1.432	22.53	1.416	22.53	1.450	2269.00
2	22.75	1.294	22.59	1.234	22.75	1.432	2204.00
3	24.83	1.208	24.83	1.208	24.83	1.208	2482.00
4	24.63	1.462	24.45	1.369	24.63	1.462	2280.00
5	24.90	1.450	24.90	1.450	24.90	1.450	2471.00
Mean	23.96	1.369	23.86	1.335	23.93	1.400	2341.20
SD	1.14	0.11	1.20	0.11	1.18	0.11	126.94

Tensile Test
ASTM D638-90

Instron Corporation
Series IX Automated Materials Testing System 1.19
Date: 06 July 1993

Operator name: Mr. Somchai

Sample Identification: 31-60ss
Interface Type: 4200 Series

Machine Parameter of Test:
Sample Rate (pts/sec): 10.000
Crosshead Speed (mm/min): 5.000
Extensometer Switch Value: 250.000% offset
Humidity (%): 50
Temperature (deg. C): 25

Dimensions:

	Spec1	Spec2	Spec3	Spec4	Spec5
Width (mm)	6.20	5.25	5.60	5.25	5.30
Thickness (mm)	2.80	2.80	2.80	2.80	2.75
Ext. gauge len (mm)	25.00	25.00	25.00	25.00	25.00
Spec gauge len (mm)	64.00	64.00	64.00	64.00	64.00

Sample Comment: 20%, 1% Epolene

Specimen Number	Stress at Max Load (MPa)	% Strain at Max Load (%)	Stress at Thresh Yield (MPa)	%Strain at Thresh Yield (%)	Stress at Auto Break (MPa)	%Strain at Auto Break (%)	Modulus (MPa)
1	23.04	3.839	23.04	3.221	22.27	4.859	1342.00
2	25.02	3.946	24.84	3.839	24.84	4.188	1383.00
3	23.63	4.780	23.63	4.161	23.11	5.289	1355.00
4	24.29	4.052	24.29	3.570	23.74	4.805	1534.00
5	22.10	2.631	22.10	2.631	22.10	2.631	1453.00
Mean	23.62	3.850	23.58	3.484	23.21	4.354	1413.40
SD	1.12	0.77	1.07	0.59	1.13	1.04	79.91

Tensile Test
ASTM D638-90

Instron Corporation
Series IX Automated Materials Testing System 1.19
Date: 06 July 1993

Operator name: Mr. Somchai

Sample Identification: 32-60ss
Interface Type: 4200 Series

Machine Parameter of Test:
Sample Rate (pts/sec): 10.000
Crosshead Speed (mm/min): 5.000
Extensometer Switch Value: 250.000% offset
Humidity (%): 50
Temperature (deg. C): 25

Dimensions:

	Spec1	Spec2	Spec3	Spec4	Spec5	Spec6
Width (mm)	5.50	5.50	5.45	5.40	5.40	5.45
Thickness (mm)	2.80	2.85	2.80	2.80	2.80	2.80
Ext. gauge len (mm)	25.00	25.00	25.00	25.00	25.00	25.00
Spec gauge len (mm)	64.00	64.00	64.00	64.00	64.00	64.00

Sample Comment: 20%, 2% Epolene

Specimen Number	Stress at Max Load (MPa)	% Strain at Max Load (%)	Stress at Thresh Yield (MPa)	%Strain at Thresh Yield (%)	Stress at Auto Break (MPa)	%Strain at Auto Break (%)	Modulus (MPa)
1	26.32	3.812	26.32	3.490	25.97	4.054	1692.00
2	24.66	3.221	24.49	2.926	24.49	3.248	1653.00
3	25.51	3.624	25.51	3.463	25.33	3.732	1655.00
4	26.10	4.081	26.10	3.597	24.32	6.362	1541.00
5	26.10	3.785	26.10	3.544	25.92	3.893	1649.00
6	26.04	2.953	26.04	2.819	25.86	2.980	1615.00
Mean	25.79	3.58	25.76	3.31	25.32	4.04	1634.17
SD	0.61	0.42	0.68	0.34	0.74	1.20	51.77

Tensile Test
ASTM D638-90

Instron Corporation
Series IX Automated Materials Testing System 1.19
Date: 06 July 1993

Operator name: Mr. Somchai

Sample Identification: 33-60ss
Interface Type: 4200 Series

Machine Parameter of Test:
Sample Rate (pts/sec): 10.000
Crosshead Speed (mm/min): 5.000
Extensometer Switch Value: 250.000% offset
Humidity (%): 50
Temperature (deg. C): 25

Dimensions:

	Spec1	Spec2	Spec3	Spec4	Spec5	Spec6
Width (mm)	5.80	5.15	5.60	5.25	5.80	5.80
Thickness (mm)	2.85	2.80	2.85	2.90	2.80	2.80
Ext. gauge len (mm)	25.00	25.00	25.00	25.00	25.00	25.00
Spec gauge len (mm)	64.00	64.00	64.00	64.00	64.00	64.00

Sample Comment: 20%, 3% Epolene

Specimen Number	Stress at Max Load (MPa)	% Strain at Max Load (%)	Stress at Thresh Yield (MPa)	%Strain at Thresh Yield (%)	Stress at Auto Break (MPa)	%Strain at Auto Break (%)	Modulus (MPa)
1	26.47	3.624	26.47	3.487	26.16	3.785	1437.00
2	24.76	3.042	24.57	3.012	24.57	3.060	1533.00
3	26.07	4.328	25.90	4.027	25.57	4.752	1644.00
4	25.39	3.517	25.39	3.261	25.21	3.732	1652.00
5	26.12	3.521	26.12	3.323	25.63	3.544	1608.00
6	26.78	3.979	26.61	3.946	25.95	4.913	1702.00
Mean	25.93	3.67	25.84	3.51	25.52	3.96	1596.00
SD	0.74	0.44	0.76	0.40	0.57	0.72	95.99

Tensile Test
ASTM D638-90

Instron Corporation
Series IX Automated Materials Testing System 1.19
Date: 06 July 1993

Operator name: Mr. Somchai

Sample Identification: 34-60ss
Interface Type: 4200 Series

Machine Parameter of Test:
Sample Rate (pts/sec): 10.000
Crosshead Speed (mm/min): 5.000
Extensometer Switch Value: 250.000% offset
Humidity (%): 50
Temperature (deg. C): 25

Dimensions:

	Spec1	Spec2	Spec3	Spec4	Spec5
Width (mm)	5.70	5.95	5.60	6.30	5.20
Thickness (mm)	2.80	2.95	2.80	2.80	2.80
Ext. gauge len (mm)	25.00	25.00	25.00	25.00	25.00
Spec gauge len (mm)	64.00	64.00	64.00	64.00	64.00

Sample Comment: 20%, 4% Epolene

Specimen Number	Stress at Max Load (MPa)	% Strain at Max Load (%)	Stress at Thresh Yield (MPa)	%Strain at Thresh Yield (%)	Stress at Auto Break (MPa)	%Strain at Auto Break (%)	Modulus (MPa)
1	25.90	3.674	25.90	3.549	25.26	3.812	1724.00
2	25.54	3.852	25.39	3.758	25.39	3.893	1554.00
3	26.54	4.110	26.54	4.027	26.37	4.134	1569.00
4	26.17	3.880	26.17	3.570	25.41	4.188	1486.00
5	26.37	3.386	26.37	3.195	26.18	3.436	1458.00
Mean	26.10	3.780	26.07	3.620	25.72	3.893	1558.20
SD	0.40	0.27	0.45	0.31	0.51	0.30	103.53

Tensile Test
ASTM D638-90

Instron Corporation
Series IX Automated Materials Testing System 1.19
Date: 06 July 1993

Operator name: Mr. Somchai

Sample Identification: 35-60ss
Interface Type: 4200 Series

Machine Parameter of Test:
- Sample Rate (pts/sec): 10.000
  Crosshead Speed (mm/min): 5.000
  Extensometer Switch Value: 250.000% offset
  Humidity (%): 50
  Temperature (deg. C): 25

Dimensions:

	Spec1	Spec2	Spec3	Spec4	Spec5
Width (mm)	5.35	5.50	5.50	5.60	5.40
Thickness (mm)	2.80	2.80	2.80	2.80	2.80
Ext. gauge len (mm)	25.00	25.00	25.00	25.00	25.00
Spec gauge len (mm)	64.00	64.00	64.00	64.00	64.00

Sample Comment: 20%, 5% Epolene

Specimen Number	Stress at Max Load (MPa)	% Strain at Max Load (%)	Stress at Thresh Yield (MPa)	%Strain at Thresh Yield (%)	Stress at Auto Break (MPa)	%Strain at Auto Break (%)	Modulus (MPa)
1	23.66	3.195	23.65	2.899	23.30	3.275	1595.00
2	24.75	2.900	24.75	2.571	24.40	3.034	1652.00
3	24.40	3.678	24.23	3.463	23.53	4.403	1496.00
4	24.66	2.800	24.65	2.686	24.65	2.953	1730.00
5	24.85	3.100	24.85	2.814	24.58	3.329	1664.00
Mean	24.46	3.135	24.43	2.887	24.09	3.399	1627.40
SD	0.48	0.34	0.49	0.35	0.63	0.58	87.73

APPENDIX B

DATA OF IZOD IMPACT PROPERTY

Impact Resistance
ASTMD256-90b

Specimen	Width (mm)	Impact Strength (J/m)	Specimen	Width (mm)	Impact Strength (J/m)
Detail: 10%, untreated			Detail: 10%, 2% Epolene		
1	2.80	35.71	1	2.75	29.09
2	2.85	35.09	2	2.80	35.71
3	2.90	34.48	3	2.80	35.71
4	2.80	35.71	4	2.80	35.71
5	2.80	28.57	5	2.75	29.09
mean	2.83	33.91	mean	2.78	33.06
SD	0.04	3.03	SD	0.03	3.63
Detail: 20%, untreated			Detail: 20%, 2% Epolene		
1	2.80	28.57	1	2.85	35.09
2	2.90	34.48	2	2.85	35.09
3	2.85	28.07	3	2.80	28.57
4	2.90	34.48	4	2.80	28.57
5	2.90	34.48	5	2.85	28.07
mean	2.87	32.02	mean	2.83	31.08
SD	0.04	3.38	SD	0.03	3.67
Detail: 30%, untreated			Detail: 30%, 2% Epolene		
1	2.80	28.57	1	2.90	27.59
2	2.80	28.57	2	2.90	27.59
3	2.90	34.48	3	2.85	28.07
4	2.90	34.48	4	2.90	34.48
5	2.80	28.57	5	2.90	27.59
mean	2.84	30.93	mean	2.89	29.06
SD	0.05	3.24	SD	0.02	3.03
Detail: 40%, untreated			Detail: 40%, 2% Epolene		
1	2.90	34.48	1	2.90	27.59
2	2.85	28.07	2	2.95	33.90
3	2.90	27.59	3	2.90	27.59
4	2.90	27.59	4	2.95	27.12
5	2.90	34.48	5	2.90	27.59
mean	2.89	30.44	mean	2.92	28.76
SD	0.02	3.69	SD	0.03	2.88
Detail: 50%, untreated			Detail: 50%, 2% Epolene		
1	2.95	33.90	1	2.95	27.12
2	3.00	26.67	2	2.95	27.12
3	2.95	33.90	3	2.95	27.12
4	2.95	27.12	4	2.95	27.12
5	3.00	26.67	5	2.95	27.12
mean	2.97	29.65	mean	2.95	27.12
SD	0.03	3.88	SD	-	-

Impact Resistance
ASTMD256-90b

Specimen	Width (mm)	Impact Strength (J/m)	Specimen	Width (mm)	Impact Strength (J/m)
Detail: 10%, A-1100			Detail: 10%, A-174		
1	2.80	35.71	1	2.80	35.71
2	2.80	35.71	2	2.80	35.71
3	2.80	35.71	3	2.80	35.71
4	2.80	35.71	4	2.80	35.71
5	2.80	35.71	5	2.80	35.71
mean	2.80	35.71	mean	2.80	35.71
SD	-	-	SD	-	-
Detail: 20%, A-1100			Detail: 20%, A-174		
1	2.90	34.48	1	2.90	34.48
2	2.90	34.48	2	2.85	35.09
3	2.90	34.48	3	2.85	35.09
4	2.90	34.48	4	2.80	35.71
5	2.90	34.48	5	2.90	34.48
mean	2.90	34.48	mean	2.86	34.97
SD	-	-	SD	0.04	0.51
Detail: 30%, A-1100			Detail: 30%, A-174		
1	2.90	34.48	1	2.85	28.07
2	2.85	35.09	2	2.80	35.71
3	2.85	28.07	3	2.85	35.09
4	2.85	35.09	4	2.85	35.09
5	2.90	34.48	5	2.80	35.71
mean	2.87	33.44	mean	2.83	33.93
SD	0.03	3.02	SD	0.03	3.29
Detail: 40%, A-1100			Detail: 40%, A-174		
1	3.00	33.33	1	3.00	33.33
2	2.95	33.90	2	2.95	33.90
3	2.95	33.90	3	2.95	33.90
4	3.00	33.33	4	2.95	33.90
5	3.00	33.33	5	2.95	33.90
mean	2.98	33.56	mean	2.96	33.79
SD	0.03	0.31	SD	0.02	0.25
Detail: 50%, A-1100			Detail: 50%, A-174		
1	3.00	33.33	1	3.00	33.33
2	3.00	33.33	2	3.00	33.33
3	3.00	33.33	3	3.00	33.33
4	3.00	33.33	4	3.05	32.79
5	3.00	33.33	5	3.00	33.33
mean	3.00	33.33	mean	3.01	33.22
SD	-	-	SD	0.02	0.24

Impact Resistance
ASTM D256-90b

Specimen	Width (mm)	Impact Strength (J/m)	Specimen	Width (mm)	Impact Strength (J/m)
Detail: PP			Detail: 20%, 3% Epolene		
1	2.75	36.36	1	2.85	28.07
2	2.80	35.71	2	2.80	28.57
3	2.75	36.36	3	2.85	33.90
4	2.75	36.36	4	2.85	28.07
5	2.80	35.71	5	2.80	28.57
mean	2.77	36.10	mean	2.83	29.44
SD	0.03	0.36	SD	0.03	2.51
Detail: 20%, 1% Epolene			Detail: 20%, 4% Epolene		
1	2.80	28.57	1	2.90	27.59
2	2.80	28.57	2	2.90	27.59
3	2.85	28.07	3	2.90	34.48
4	2.90	34.48	4	2.85	28.07
5	2.90	34.48	5	2.90	27.59
mean	2.85	30.83	mean	2.89	29.06
SD	0.05	3.33	SD	0.02	3.03
Detail: 20%, 2% Epolene			Detail: 20%, 5% Epolene		
1	2.85	35.09	1	2.80	28.57
2	2.85	35.09	2	2.80	28.57
3	2.80	28.57	3	2.80	28.57
4	2.80	28.57	4	2.80	28.57
5	2.85	28.07	5	2.80	28.57
mean	2.83	31.08	mean	2.80	28.57
SD	0.03	3.67	SD	-	-

APPENDIX C

DATA OF HARDNESS PROPERTY

Hardness Property
ASTM D2240-91

Specimen	Width (mm)	Hardness (Scale D)	Specimen	Width (mm)	Hardness (Scale D)
Detail: 10%, untreated			Detail: 10%, 2% Epolene		
1	5.55	54.00	1	5.70	59.00
2	5.55	55.00	2	5.80	60.00
3	5.60	55.00	3	5.70	60.00
4	5.60	52.00	4	5.60	59.00
5	5.55	52.00	5	5.60	60.00
mean	5.57	53.60	mean	5.68	59.60
SD	0.03	1.52	SD	0.08	0.55
Detail: 20%, untreated			Detail: 20%, 2% Epolene		
1	5.70	55.00	1	5.95	62.00
2	5.70	55.00	2	5.65	64.00
3	5.65	58.00	3	5.80	63.00
4	5.70	57.00	4	5.60	63.00
5	5.65	56.00	5	5.70	63.00
mean	5.68	56.20	mean	5.74	63.00
SD	0.03	1.30	SD	0.14	0.71
Detail: 30%, untreated			Detail: 30%, 2% Epolene		
1	5.70	59.00	1	5.80	67.00
2	5.80	62.00	2	5.85	70.00
3	5.90	61.00	3	5.90	70.00
4	5.85	62.00	4	5.80	67.00
5	6.00	63.00	5	5.80	69.00
mean	5.85	61.40	mean	5.83	68.60
SD	0.11	1.52	SD	0.04	1.52
Detail: 40%, untreated			Detail: 40%, 2% Epolene		
1	5.95	65.00	1	5.95	78.00
2	5.95	65.00	2	5.85	73.00
3	5.95	65.00	3	5.95	76.00
4	6.05	65.00	4	5.80	73.00
5	6.05	66.00	5	5.95	75.00
mean	5.99	65.20	mean	5.90	75.00
SD	0.05	0.45	SD	0.07	2.12
Detail: 50%, untreated			Detail: 50%, 2% Epolene		
1	6.00	69.00	1	6.10	84.00
2	6.10	68.00	2	6.00	86.00
3	6.05	70.00	3	6.00	85.00
4	6.10	72.00	4	5.95	82.00
5	6.10	72.00	5	6.00	78.00
mean	6.07	70.20	mean	6.01	83.00
SD	0.04	1.79	SD	0.05	3.16

Hardness Property
ASTM D2240-91

Specimen	Width (mm)	Hardness (Scale D)	Specimen	Width (mm)	Hardness (Scale D)
Detail: 10%, A-1100			Detail: 10%, A-174		
1	5.60	66.00	1	5.80	56.00
2	5.65	66.00	2	5.65	59.00
3	5.60	66.50	3	5.65	56.00
4	5.70	64.00	4	5.75	55.00
5	5.60	67.50	5	5.65	55.00
mean	5.63	66.00	mean	5.70	56.20
SD	0.04	1.27	SD	0.07	1.64
Detail: 20%, A-1100			Detail: 20%, A-174		
1	5.85	67.00	1	5.60	58.00
2	5.75	69.50	2	5.65	58.50
3	5.70	66.50	3	5.70	58.00
4	5.75	68.50	4	5.65	57.00
5	5.70	69.50	5	5.65	57.00
mean	5.75	68.20	mean	5.65	57.70
SD	-	-	SD	0.04	0.67
Detail: 30%, A-1100			Detail: 30%, A-174		
1	5.75	67.00	1	5.80	58.50
2	5.75	68.50	2	5.75	59.00
3	5.75	69.00	3	5.75	60.00
4	5.65	70.00	4	5.65	60.00
5	5.70	68.00	5	5.90	59.00
mean	5.72	68.50	mean	5.77	59.30
SD	0.04	1.12	SD	0.09	0.67
Detail: 40%, A-1100			Detail: 40%, A-174		
1	5.85	70.00	1	5.95	64.00
2	5.80	70.00	2	5.95	63.00
3	5.85	70.00	3	5.95	65.00
4	5.80	70.00	4	5.90	63.00
5	5.80	70.00	5	5.95	62.00
mean	5.82	70.00	mean	5.94	63.40
SD	0.03	0.00	SD	0.02	1.14
Detail: 50%, A-1100			Detail: 50%, A-174		
1	3.00	72.00	1	6.05	68.00
2	3.00	73.50	2	6.10	67.00
3	3.00	72.00	3	6.10	66.00
4	3.00	72.00	4	6.15	68.00
5	3.00	71.00	5	6.05	67.00
mean	3.00	72.10	mean	6.09	67.20
SD	0.00	0.89	SD	0.04	0.84

Hardness Property
ASTM D2240-91

Specimen	Width (mm)	Hardness (Scale D)	Specimen	Width (mm)	Hardness (Scale D)
Detail: PP			Detail: 20%, 3% Epolene		
1	5.60	43.50	1	5.60	55.00
2	5.50	43.50	2	5.60	55.00
3	5.45	43.50	3	5.70	60.50
4	5.40	42.50	4	5.80	60.00
5	5.45	43.00	5	5.70	55.00
mean	5.48	43.20	mean	5.68	57.10
SD	0.08	0.45	SD	0.08	2.88
Detail: 20%, 1% Epolene			Detail: 20%, 4% Epolene		
1	5.60	57.00	1	5.65	59.00
2	5.65	57.00	2	5.65	58.00
3	5.80	57.00	3	5.80	58.50
4	5.60	56.50	4	5.80	56.00
5	5.75	57.00	5	5.60	55.00
mean	5.68	56.90	mean	5.70	57.30
SD	0.09	0.22	SD	0.09	1.72
Detail: 20%, 2% Epolene			Detail: 20%, 5% Epolene		
1	5.70	57.50	1	5.60	55.00
2	5.60	57.00	2	5.70	58.00
3	5.75	57.50	3	5.75	60.00
4	5.65	56.00	4	5.70	58.00
5	5.60	58.00	5	5.60	55.00
mean	5.66	57.20	mean	5.67	57.20
SD	0.07	0.76	SD	0.07	2.17

VITA

Mr. Somchai Lumpoopinitpong was born on January 1, 1969 in Bangkok. He received Bachelor's Degree of Industrial Chemistry from the Faculty of Science, Chiang Mai University in 1989 and he has been a graduate student in the Multidisciplinary Program of Petrochemistry-Polymer, Petrochemical Technology Division, Graduate School, Chulalongkorn University since 1990.