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APPENDICES

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Appendix

A. Properties of LDPE 1902F and LLDPE 1810FI

a) LDPE 1902F

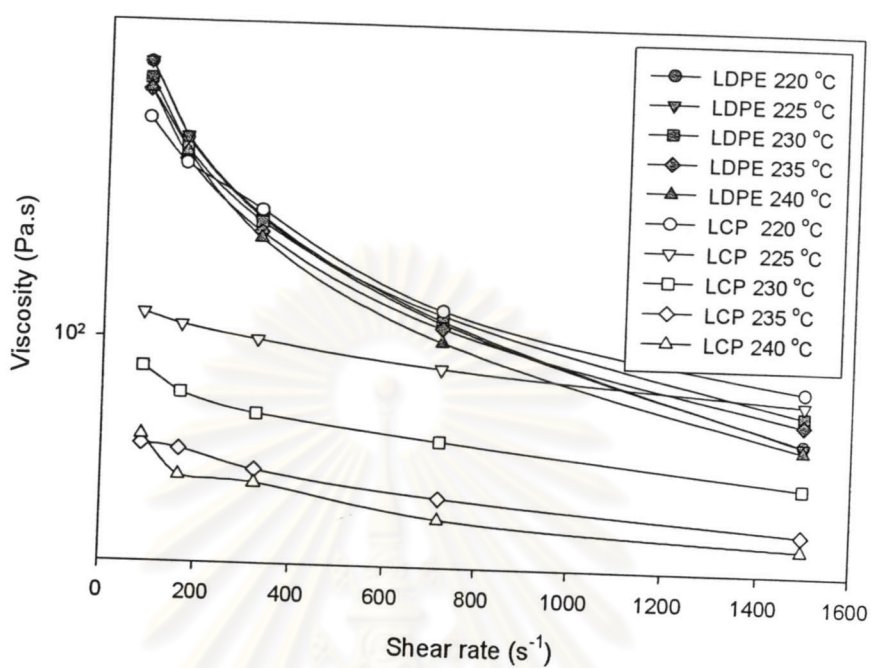
Physical Properties	Unit	Testing Method	
MELT FLOW RATE	g/10 min.	ASTM D 1238	2.0
DENSITY	g/cm ³	ASTM D 1505	0.919
TENSILE STRENGTH AT BREAK	kg./cm ²	ASTM D 638	MD:300,TD:230*
ELONGATION AT BREAK	%	ASTM D 638	MD:180,TD:590*
ELMENDORF TEAR STRENGTH	g/25 micron	ASTM D 1922	MD:370,TD:100*
DART IMPACT STRENGTH (AT 12 MICRON)	g	ASTM D 1709	150*
HAZE	%	ASTM D 1003	7*
GLOSS	%	ASTM D 2457	80*

b) LLDPE 1810FI

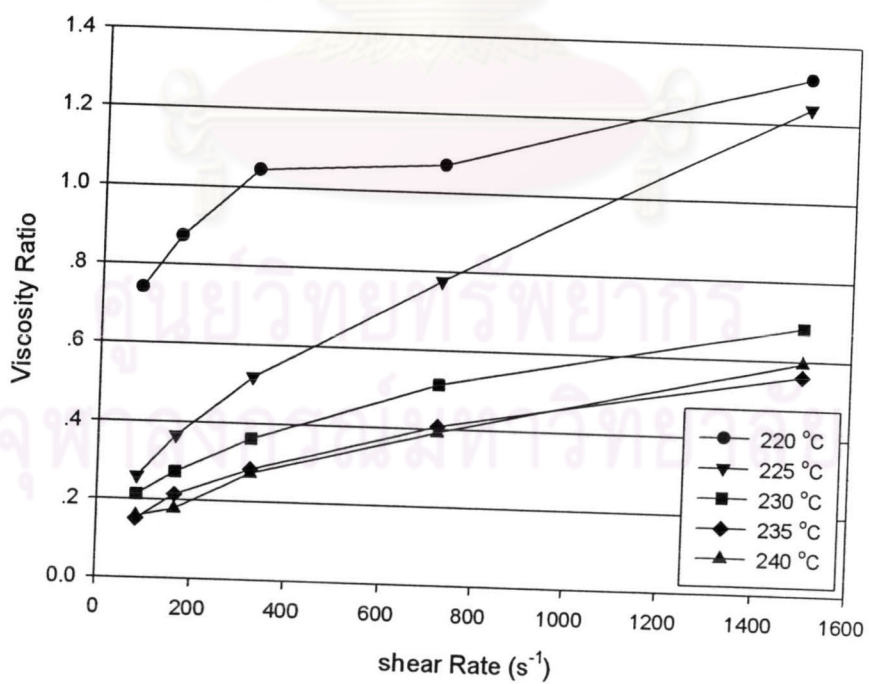
Physical Properties	Unit	Testing Method	
MELT FLOW RATE	g/10 min.	ASTM D 1238	1.0
DENSITY	g/cm ³	ASTM D 1505	0.918
TENSILE STRENGTH AT YIELD	kg./cm ²	ASTM D 638	MD:105,TD:110*
TENSILE STRENGTH AT BREAK	kg./cm ²	ASTM D 638	MD:410,TD:320*
ELONGATION AT BREAK	%	ASTM D 638	MD:620,TD:840*
ELMENDORF TEAR STRENGTH	g/25 micron	ASTM D 1922	MD:145,TD:370*
DART IMPACT STRENGTH (AT 12 MICRON)	g	ASTM D 1709	150*
HAZE	%	ASTM D 1003	11*
GLOSS	%	ASTM D 2457	55*

B. Preliminary Results of Rheological Study

a) Viscosity of Pure LDPE and LCP at Different Temperatures



b) Viscosity Ratio (η_{LCP}/η_{LDPE}) at Different Temperatures



C. Raw Data of OTR and WVTR

a) Temperature Effect and Using of Mixing Elements

Film	OTR1	OTR2	OTR3	Ave (SD)	WVTR1	WVTR2	WVTR3	Ave. (SD)
LDPE_T1	5232	5219	5222	5224.33 (6.81)	0.02885	0.02564	0.02564	0.0267 (0.0019)
LDPE_T2	4824	4792	4781	4799.00 (22.34)	0.06410	0.06410	0.09615	0.0748 (0.0185)
LDPE_T3	5312	5307	5310	5309.67 (2.52)	0.06410	0.09615	0.09615	0.0855 (0.0185)
LDPE_T4	5194	5206	5198	5199.33 (6.11)	0.06410	0.03205	0.03205	0.0427 (0.0185)
LDPE_T5	5330	5341	5335	5335.33 (5.51)	0.06410	0.09615	0.09615	0.0855 (0.0185)
LDPE_T6	5149	5154	5145	5149.33 (4.51)	0.06410	0.06410	0.03205	0.0534 (0.0185)
10LCP_T1	5594	5576	5550	5573.33 (22.12)	0.0962	0.0962	0.0962	0.0962 (0.0000)
10LCP_T2	4491	4453	4451	4465.00 (22.54)	0.0641	0.0962	0.0641	0.0748 (0.0185)
10LCP_T3	5453	5425	5372	5416.67 (41.14)	0.0321	0.0128	0.0641	0.0363 (0.0259)
10LCP_T4	5096	5001	4995	5030.67 (56.66)	0.0128	0.0641	0.0128	0.0299 (0.0296)
10LCP_T5	5412	5384	5394	5396.67 (14.19)	0.0641	0.0641	0.0641	0.0641 (0.000)
10LCP_T6	3207	3175	3164	3182.00 (22.34)	0.0641	0.0641	0.0641	0.0641 (0.000)
10LCP_T1ME	4653	4686	4679	4672.67 (17.39)	0.1603	0.1603	0.0962	0.1389 (0.0370)
10LCP_T2ME	5763	5803	5772	5779.33 (20.98)	0.0962	0.0962	0.0962	0.0962 (0.0000)
10LCP_T3ME	5621	5627	5696	5648.00 (41.68)	0.0962	0.0962	0.0641	0.0855 (0.0185)
10LCP_T4ME	5007	5062	5042	5037.00 (27.84)	0.0641	0.0641	0.0641	0.0641 (0.0000)
10LCP_T5ME	5482	5460	5429	5457.00 (26.63)	0.0641	0.0641	0.0128	0.0470 (0.0296)
10LCP_T6ME	4769	4756	4775	4766.67 (9.71)	0.0641	0.0128	0.0128	0.00299 (0.0296)

b) Screw Speed Effect

Film	OTR1	OTR2	OTR3	Ave (SD)	WVTR1	WVTR2	WVTR3	Ave. (SD)
LDT2SS12	4824	4792	4781	4799.00 (22.34)	0.06410	0.06410	0.09615	0.0748 (0.0185)
LDT2SS20	5596	5597	5590	5594.33 (0.97)	0.06410	0.03205	0.03205	0.0427 (0.0185)
LDT2SS40	5443	5457	5437	5445.67 (10.26)	0.06410	0.09615	0.09615	0.0855 (0.0185)
LDT2SS60	5598	5597	5600	5598.33 (1.53)	0.03205	0.03205	0.03205	0.0321 (0.0000)
LDT6SS12	5149	5154	5145	5149.33 (4.51)	0.06410	0.06410	0.03205	0.0534 (0.0185)
LDT6SS20	5229	5232	5234	5231.67 (2.52)	0.03205	0.03205	0.03205	0.0321 (0.0000)
LDT6SS40	5193	5192	5195	5193.33 (1.53)	0.06410	0.12436	0.09615	0.0949 (0.0301)
LDT6SS60	5246	5247	5244	5245.67 (2.08)	0.06410	0.03205	0.06410	0.0534 (0.0185)
10LCPT2 SS12	4491	4453	4451	4465 (22.54)	0.0641	0.0962	0.0641	0.0748 (0.0185)
10LCPT2 SS20	5874	5888	5859	5873.67 (14.50)	0.1280	0.1282	0.1282	0.1281 (0.0001)
10LCPT2 SS40	5946	5860	5859	5888.33 (49.94)	0.1282	0.1282	0.1282	0.1282 (0.0000)
10LCPT2 SS60	5472	5543	5496	5503.67 (36.12)	0.1282	0.1280	0.1280	0.1281 (0.0001)
10LCPT6 SS12	3207	3175	3164	3182.00 (22.34)	0.0641	0.0641	0.0641	0.0641 (0.000)
10LCPT6 SS20	5520	5512	5505	5512.33 (7.51)	0.0641	0.0962	0.0641	0.0748 (0.0185)
10LCPT6 SS40	6024	5938	5927	5963.00 (53.11)	0.1282	0.1282	0.1282	0.1282 (0.0000)
10LCPT6 SS60	6115	6117	6078	6103.33 (21.96)	0.0962	0.0962	0.0641	0.0855 (0.0185)

c) Compatibilizer Content

Film	OTR1	OTR2	OTR3	Ave (SD)	WVTR1	WVTR2	WVTR3	Ave. (SD)
10LCP0.0Nu	5180	5154	5188	5174.00 (17.78)	0.1603	0.1603	0.1282	0.1496 (0.0185)
10LCP0.1Nu	5169	5167	5149	5161.67 (11.02)	0.1282	0.1282	0.1282	0.1282 (0.000)
10LCP0.5Nu	4491	4453	4451	4465.00 (22.54)	0.0641	0.0962	0.0641	0.0748 (0.0185)
10LCP1.0Nu	4526	4485	4508	4506.33 (20.55)	0.0641	0.0641	0.0641	0.0641 (0.000)
10LCP2.0Nu	5239	5224	5233	5232.00 (7.55)	0.0641	0.0641	0.0641	0.0641 (0.000)
10LCP4.0Nu	4801	4647	4784	4744.00 (84.43)	0.0641	0.0641	0.0962	0.0748 (0.0185)
10LCP10.0Nu	4647	4640	4671	4652.67 (16.26)	0.0641	0.0641	0.0641	0.0641 (0.000)

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d) LCP Content Effect

Film	OTR1	OTR2	OTR3	Ave (SD)	WVTR1	WVTR2	WVTR3	Ave. (SD)
5LCP_T2	5425	5395	5419	5413.00 (15.87)	0.1603	0.1603	0.1603	0.1603 (0.000)
10LCP_T2	4491	4453	4451	4465.00 (22.54)	0.0641	0.0962	0.0641	0.0748 (0.0185)
15LCP_T2	4148.00	4122.00	4104.00	4124.67 (22.12)	0.1603	0.1603	0.1603	0.1603 (0.000)
20LCP_T2	3576.00	3535.00	3511.00	3540.67 (32.87)	0.1923	0.1923	0.1603	0.1816 (0.0185)
30LCP_T2	2759	2722	2709	2730.00 (25.94)	0.1603	0.1603	0.1282	0.1496 (0.0185)
40LCP_T2	1831.00	1888.00	1875.00	1864.67 (29.87)	0.1603	0.1603	0.1603	0.1603 (0.000)
5LCP_T6	4354	4349	4350	4351.00 (2.65)	0.0641	0.0641	0.0641	0.0641 (0.0000)
10LCP_T6	3207	3175	3164	3182.00 (22.34)	0.0641	0.0641	0.0641	0.0641 (0.000)
15LCP_T6	2827	2846	2821	2831.33 (13.05)	0.0321	0.0321	0.0321	0.0321 (0.0000)
20LCP_T6	2751	2763	2748	2754.00 (7.94)	0.0641	0.0641	0.0641	0.0641 (0.0000)
30LCP_T6	1611	1634	1615	1620.00 (12.29)	0.0641	0.0641	0.0641	0.0641 (0.0000)

e) Post-Die Drawing Effect

Film	OTR1	OTR2	OTR3	Ave (SD)	WVTR1	WVTR2	WVTR3	Ave. (SD)
LDPE_T2DR3.0 (T~ 30µm)	8281	8278	8290	8283.00 (6.24)	0.0962	0.1603	0.0962	0.1175 (0.0370)
LDPE_T2DR2.0 (T~ 40µm)	6171	6170	6174	6171.67 (2.08)	0.0321	0.0321	0.0321	0.03219 (0.000)
LDPE_T2DR1.5 (T~ 60µm)	4824	4792	4781	4799.00 (22.34)	0.0656	0.0641	0.0962	0.0753 (0.0181)
LDPE_T2DR1.2 (T~ 80µm)	3715	3734	3723	3724.00 (9.54)	0.0321	0.0321	0.0321	0.0321 (0.0000)
LDPE_T2DR1.0 (T~ 100µm)	3123	3134	3130	3129.00 (5.57)	0.0288	0.0256	0.0256	0.0267 (0.0019)
LDPE_T2DR0.8 (T~ 120µm)	2578	2585	2573	2578.67 (6.03)	0.0641	0.0321	0.0288	0.0417 (0.0195)
LDPE_T6DR3.0 (T~ 30µm)	8593	8605	8582	8593.33 (11.5)	0.0962	0.0962	0.0962	0.0962 (0.000)
LDPE_T6DR2.0 (T~ 40µm)	6618	6632	6638	6629.33 (10.26)	0.0641	0.0641	0.0641	0.0641 (0.000)
LDPE_T6DR1.5 (T~ 60µm)	5149	5154	5145	5149.33 (4.51)	0.0641	0.0641	0.0321	0.0534 (0.0185)
LDPE_T6DR1.2 (T~ 80µm)	4510	4518	4502	4510.00 (8.00)	0.0321	0.0321	0.0321	0.0321 (0.000)
LDPE_T6DR1.0 (T~ 100µm)	3995	3998	3982	3991.67 (8.5)	0.0288	0.0256	0.0256	0.0267 (0.0019)
LDPE_T6DR0.8 (T~ 120µm)	3573	3589	3583	3581.67 (8.0)	0.0321	0.0321	0.0641	0.0428 (0.0185)
10LCP_T2DR1.0	3629	3633	3635	3632.33 (3.06)	0.0962	0.1603	0.0962	0.1175 (0.0370)
10LCP_T2DR1.5	4491	4453	4451	4465.00 (22.54)	0.0641	0.0962	0.0641	0.0748 (0.0185)
10LCP_T2DR2.0	7648	7651	7662	7653.67 (7.37)	0.0641	0.0641	0.0641	0.0641 (0.000)
10LCP_T2DR3.0	11199	11183	11204	11195.33 (10.97)	0.0641	0.0641	0.0641	0.0641 (0.000)
30LCP_T2DR1.0	1579	1576	1578	1577.67 (1.53)	0.0641	0.0641	0.0641	0.0641 (0.0000)
30LCP_T2DR1.5	2759	2722	2709	2730.00 (25.94)	0.0641	0.0641	0.0641	0.0641 (0.0000)
30LCP_T2DR2.0	3410	3425	3414	3416.33 (7.77)	0.0641	0.0641	0.0962	0.0748 (0.0185)

e) Post-Die Drawing Effect (Cont.)

Film	OTR1	OTR2	OTR3	Ave (SD)	WVTR1	WVTR2	WVTR3	Ave. (SD)
30LCP_T2DR3.0	4200	4184	4193	4192.33 (8.02)	0.0641	0.0962	0.1282	0.0962 (0.0321)
10LCP_T6DR1.0	2203	2244	2246	2231 (24.27)	0.0641	0.0641	0.0641	0.0641 (0.000)
10LCP_T6DR1.5	3207	3175	3164	3182.00 (22.34)	0.0641	0.0641	0.0641	0.0641 (0.000)
10LCP_T6DR2.0	4621	4585	4596	4600.67 (18.45)	0.0962	0.0641	0.0962	0.0855 (0.0185)
10LCP_T6DR3.0	6715	6686	6642	6681 (36.76)	0.0962	0.0962	0.0962	0.0962 (0.000)
30LCP_T6DR1.0	1207	1206	1200	1204.33 (3.79)	0.0641	0.0641	0.0641	0.0641 (0.0000)
30LCP_T6DR1.5	1611	1634	1615	1620.00 (12.29)	0.0641	0.0641	0.0641	0.0641 (0.0000)
30LCP_T6DR2.0	2050	2041	2040	2043.67 (5.51)	0.0962	0.0641	0.0641	0.0748 (0.0185)
30LCP_T6DR3.0	2428	2498	2459	2461.67 (35.08)	0.0962	0.1282	0.0962	0.1068 (0.0185)

f) Using of LLDPE/LDPE as a Matrix

Film	OTR1	OTR2	OTR3	Ave (SD)	WVTR1	WVTR2	WVTR3	Ave. (SD)
LL/LD_T2	3296	3297	3290	3294.33 (3.79)	0.1282	0.1282	0.0962	0.1175 (0.0185)
LL/LD_T6	3480	3478	3482	3480 (2.00)	0.0641	0.0321	0.0321	0.0427 (0.0185)
10LCP/LL/LD_T2	2917	2920	2919	2918.67 (1.53)	0.0641	0.0641	0.0961	0.07479 (0.0185)
10LCP/LL/LD_T6	2323	2320	2325	2322.67 (2.52)	0.0321	0.03205	0.03205	0.03205 (0.00)