REFERENCES

1. Dykes, Y. <u>Flexography: Principles and Practices</u>. 5th ed.: Foundation of Flexographic Technical Association, Inc.1999 : 33-36.

2. Jansen, V., and Breakspeare, R. High quality, cost effectibe printing witht carrugated postprint. <u>Flexo & Gravure Asia</u> 2 (October 2003): 14-18.

3. Jansen, V., and Sandig, H. Defining new quality standard in flexo printing. <u>Flexo & Gravure Asia</u> 1 (September 2002): 10-13.

4. Wachtmann, K., and Fiencke, J. The Choice of compressible undercut. <u>Flexo & Gravure International</u> 8 (March 2002): 26-27.

5. Shirmer K. H., and Albrecht, J. <u>Advances in Printing Science and Technology</u> 1(1959): 229.

6. Massing, B., and Schaeffeler, M. Flexo and Gravure inks for package printing-comparison of ink systems. <u>Flexo&Gravure Asia</u> 3 (2003): 14-17.

7. Leach, E. P., and Pierce, R. J. <u>The Printing Ink Manual</u>. 5th ed. Blueprint,inc., 1993.

8. Marmur, A. Equilibrium contact angles:theory and measurement.colloids and Surfaces. <u>A: Physicochemical and Engineering Aspects.</u> (1996): 116 , 55-61.

9. Paterson, A.; Robin, M.; Fermigier, M.; Jenffer, P.; and Hulin, J.P. Effect of density and spatial distribution of wettability hetrogeneities on contact angle. <u>Journal of Petroleum Science and Engineering</u>, 20 (1998): 127-132

10. Bank, W. H., and Mill, C. C. <u>Journal of Colloid Science</u> (1954): 137.

11. Lagerstedt, P., and Kolseth, P. Influence of surface energertics on ink transfer in flexo printing. <u>Advances in printing science and technology</u> 23: Bristol, J.A. Ed., Pentech press, London. (1995): 270-297.

12. De Grace, J. H. and Margin, P.J. A mechanistic approach to ink transfer Part III Effect of substrate properties and press condition. <u>Advances in printing science and technology</u> 21: Bristol, J.A. Ed., Pentech press, London. (1993): 312-326.

13. Lindholm, G., and Ström, G. On-line Measurements of Ink Film Thickness in a Flexo Press. <u>Advances in printing science and technology</u> 21: Bristol, J.A. Ed., Pentech press, London. (1993): 337-353.

14. Stuttgart, D. Technical comparison of the different plate making processes in flexography. <u>DFTA-TZ</u> (2001): 1-11.

15. Thompson, B. <u>Printing Materials:Science and Technology</u> Pira International, 1998.

16. Binner, W. Selection and checking of anilox rollers. <u>NarrowWebTech</u> 1 (2001): 6-10.

17. Seow, S. Anilox roll technology optimizes flexo printing. <u>Flexo&Gravure Asia Pacific</u> 2 (2001): 67-70.

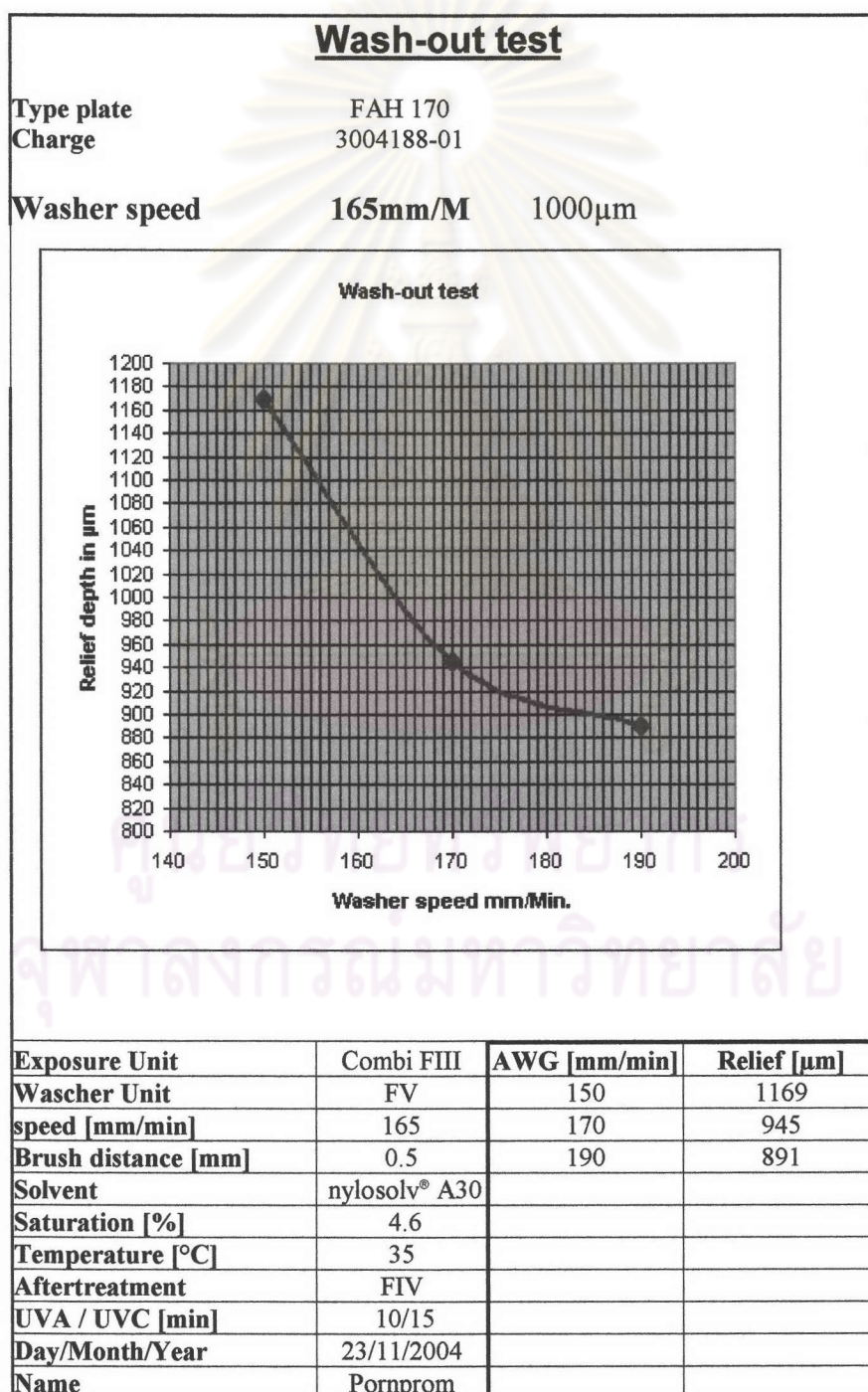18. Cotton, J.W. <u>Flexography Principles and Practices</u>. Third edition. FTA,inc., (1998).

APPENDICES

APPENDIX A

PROCESSING FLEXO PRINTING PLATES AND CHECK QUALITY

OF EACH PLATE

Speed washer

nyloflex$^®$ FAH 170

Table A-1 Determination of wash-out test on nyloflex$^®$ FAH 170.

Exposure Unit	Combi FIII	AWG [mm/min]	Relief [µm]
Wascher Unit	FV	150	1169
speed [mm/min]	165	170	945
Brush distance [mm]	0.5	190	891
Solvent	nylosolv® A30		
Saturation [%]	4.6		
Temperature [°C]	35		
Aftertreatment	FIV		
UVA / UVC [min]	10/15		
Day/Month/Year	23/11/2004		
Name	Pornprom		

nyloflex® ACE 170

Table A-2 Determination of wash-out test on nyloflex® ACE 170.

Wash-out test

| Type plate | ACE 170 |
| Charge | 3004998-01 |

Washer speed   **240mm/M**   1000µm

Wash-out test

Exposure Unit	Combi FIII	AWG [mm/min]	Relief [µm]
Wascher Unit	FV	200	1213
speed [mm/min]	240	220	1118
Brush distance [mm]	0.5	240	994
Solvent	nylosolv® A30		
Saturation [%]	4.6		
Temperature [°C]	36		
Aftertreatment	FIV		
UVA / UVC [min]	10/15		
Day/Month/Year	23/11/2004		
Name	Pornprom		
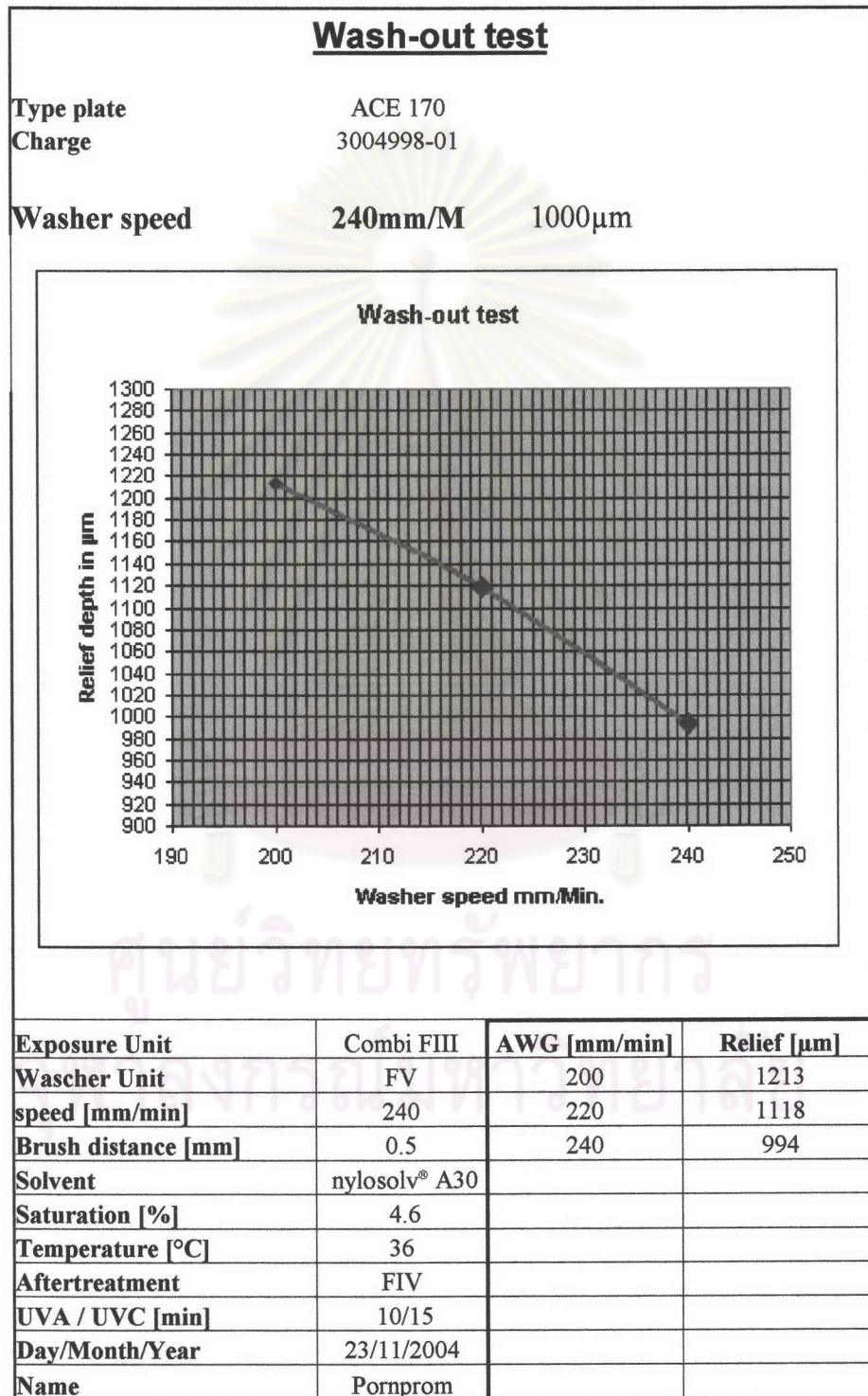
nyloflex® FAH DII 170

Table A-3 Determination of wash-out test on nyloflex® FAH DII 170.

Exposure Unit	Combi FIII	AWG [mm/min]	Relief [µm]
Wascher Unit	FV	120	1358
speed [mm/min]	165	140	1192
Brush distance [mm]	0.5	160	1040
Solvent	nylosolv® A30	180	912
Saturation [%]	4.6		
Temperature [°C]	34		
Aftertreatment	FIV		
UVA / UVC [min]	10/15		
Day/Month/Year	12/1/2004		
Name	Pornprom		
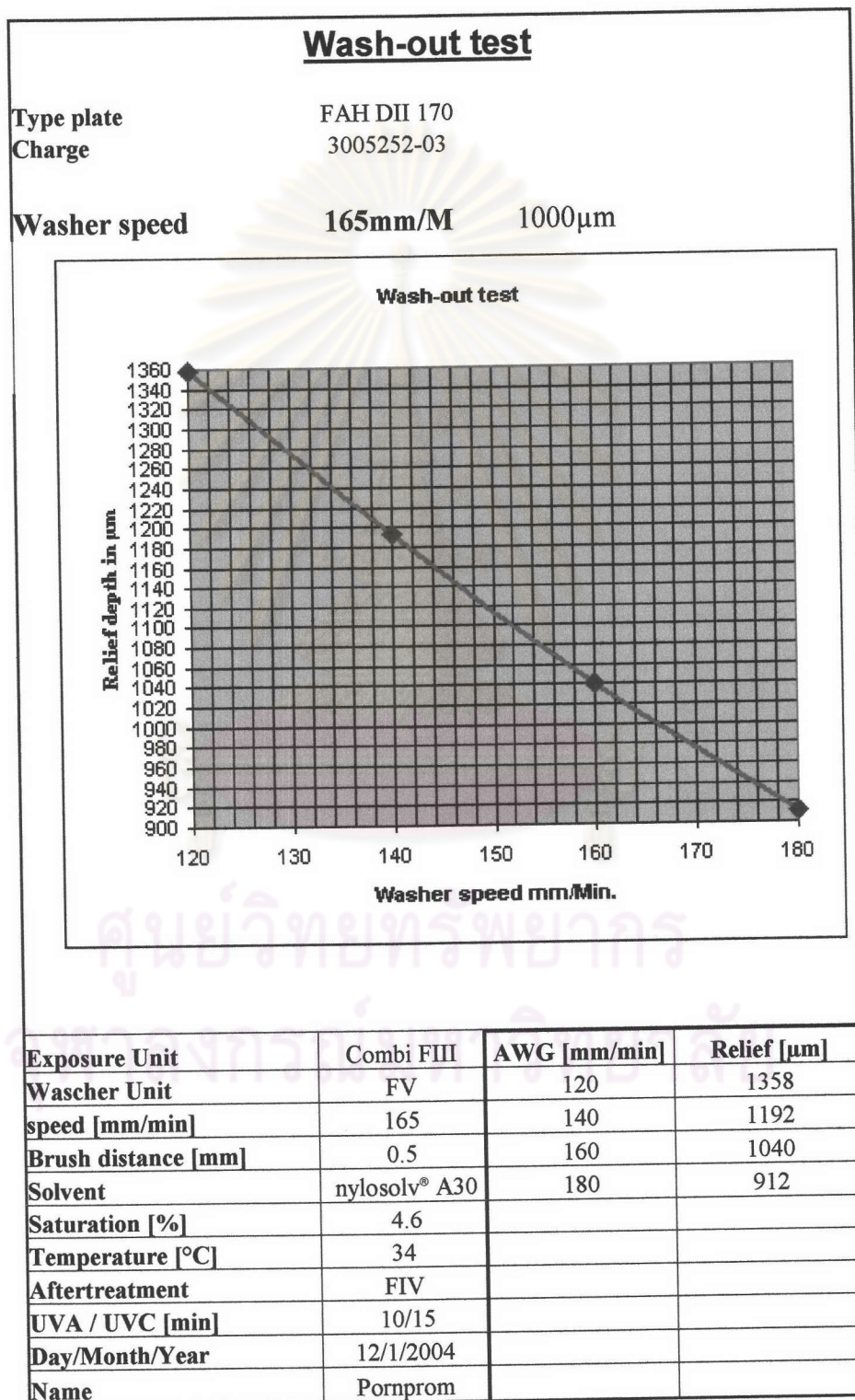
nyloflex® ACE DII 170

Table A-4 Determination of wash-out test on nyloflex® ACE DII 170.

Wash-out test

Type plate	ACE DII 170
Charge	3005372-13

Washer speed   **225mm/M**   1000μm

Wash-out test

Exposure Unit	Combi FIII	AWG [mm/min]	Relief [μm]
Wascher Unit	FV	200	1047
speed [mm/min]	225	220	1010
Brush distance [mm]	0.5	240	970
Solvent	nylosolv® A30	260	922
Saturation [%]	4.6		
Temperature [°C]	35		
Aftertreatment	FIV		
UVA / UVC [min]	10/15		
Day/Month/Year	1/12/2004		
Name	Pornprom		
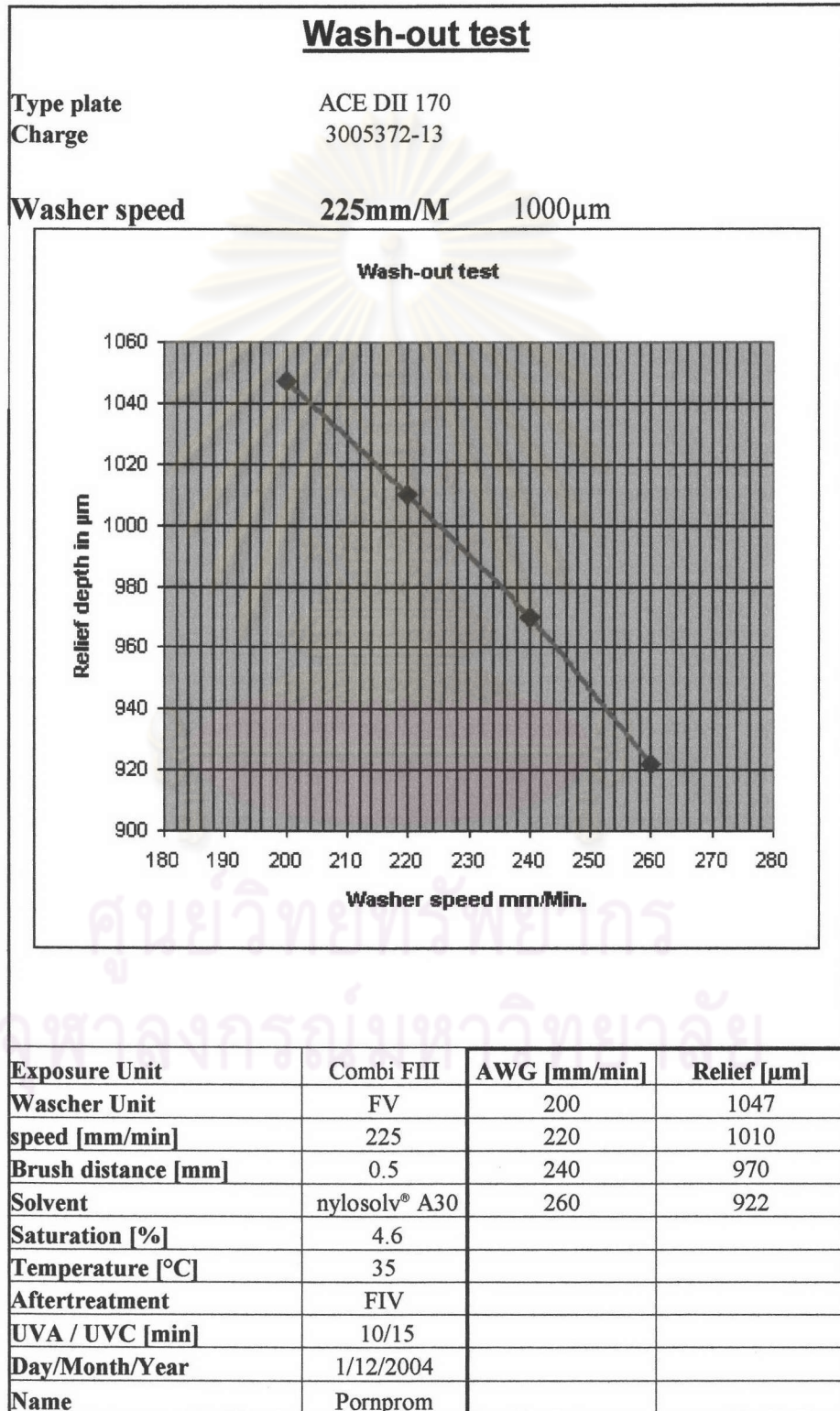
Back exposure

    nyloflex® FAH 170

Table A-5 Determination of back exposure test on nyloflex® FAH 170.

Back Exposure

Type plate	FAH 170
Charge	3004188-01

Back exposure	14 Sec.	800 μm

Back exposure

Exposure Unit	Combi FIII	Back exposure [s]	Relief [μm]
Wascher Unit	FV	0	950
speed [mm/min]	165	10	874
Brush distance [mm]	0.5	15	660
Solvent	nylosolv® A30	20	600
Saturation [%]	`4.5	25	400
Temperature [°C]	35		
Dryer Unit	F IV		
UVA / UVC [min]	10 / 15		
Day/Month/Year	23/11/2004		
Name	Pornprom		
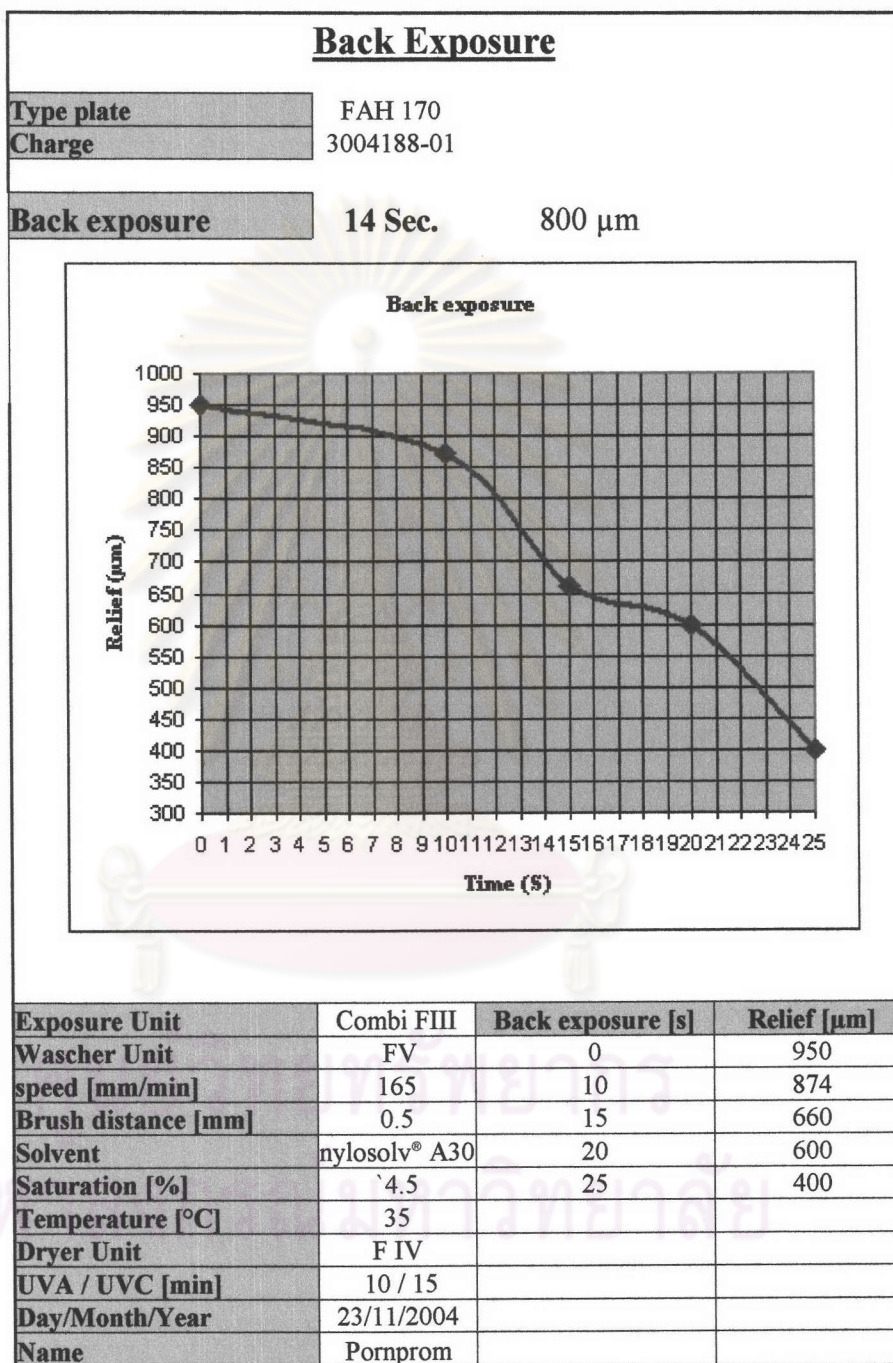
nyloflex® ACE 170

Table A-6 Determination of back exposure test on nyloflex® ACE 170.

Back exposure

Type plate	ACE 170
Charge	3004998-01

Back exposure	**60 Sec.**	800 µm

Back exposure

Exposure Unit	Combi FIII	Back exposure [s]	Relief [µm]
Wascher Unit	FV	0	981
speed [mm/min]	170	18	966
Brush distance [mm]	0.5	40	907
Solvent	nylosolv® A30	50	838
Saturation [%]	3.0	60	763
Temperature [°C]	35	70	683
Dryer Unit	F IV		
UVA / UVC [min]	10 / 15		
Day/Month/Year	13/7/2004		
Name	Pornprom		
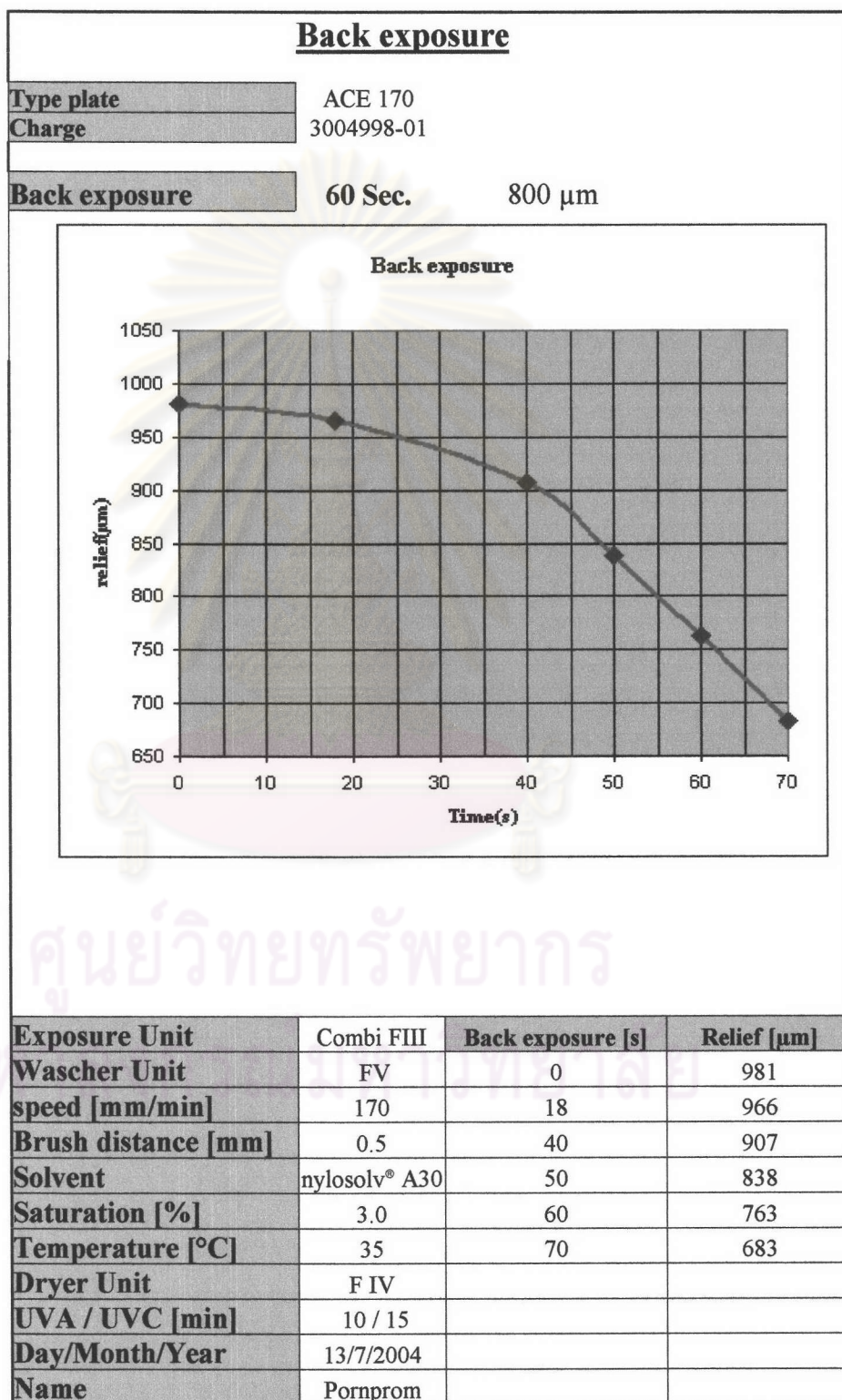
nyloflex® FAH DII 170

Table A-7 Determination of back exposure test on nyloflex® FAH DII 170.

Back exposure

Type plate	FAH DII 170
Charge	3005252-03

Back exposure	18 Sec.	800 μm

Exposure Unit	Combi FIII	Back exposure [s]	Relief [μm]
Wascher Unit	FV	0	1211
speed [mm/min]	165	5	1147
Brush distance [mm]	0.5	10	994
Solvent	nylosolv® A30	20	739
Saturation [%]	`3.7	25	665
Temperature [°C]	35	30	596
Dryer Unit	F IV		
UVA / UVC [min]	10 / 15		
Day/Month/Year	12/2/2004		
Name	Pornprom		
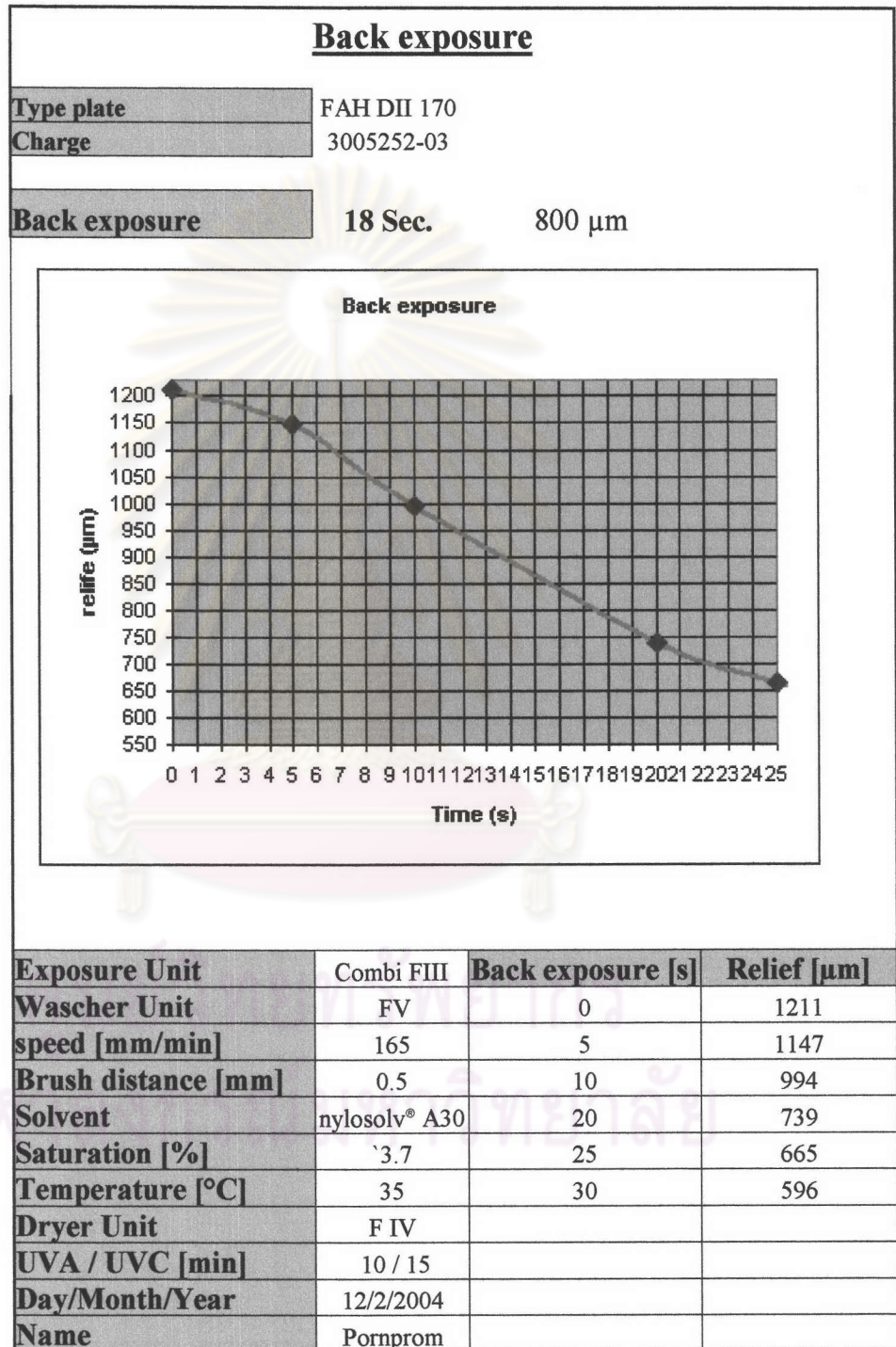
nyloflex[®] **ACE DII 170**

Table A-8 Determination of back exposure test on nyloflex[®] ACE DII 170.

Exposure Unit	Combi FIII	Back exposure [s]	Relief [µm]
Wascher Unit	FV	0	1150
speed [mm/min]	225	10	1097
Brush distance [mm]	0.5	20	1052
Solvent	nylosolv® A30	30	1039
Saturation [%]	`4.2	40	968
Temperature [°C]	32	50	878
Dryer Unit	F IV	60	800
UVA / UVC [min]	10 / 15	70	765
Day/Month/Year	12/1/2004		
Name	Pornprom		
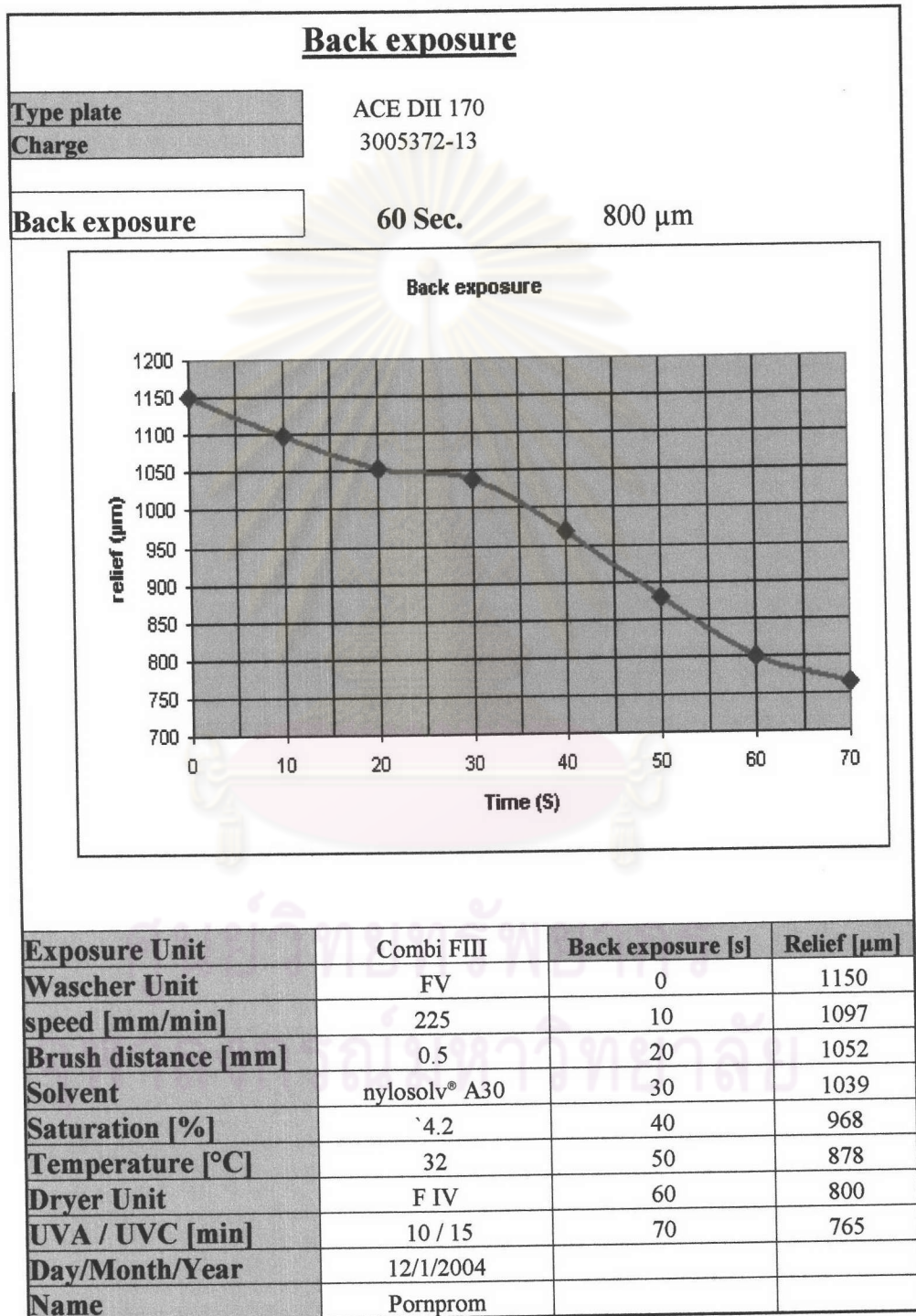
Check each plate quality

nyloflex® FAH 170
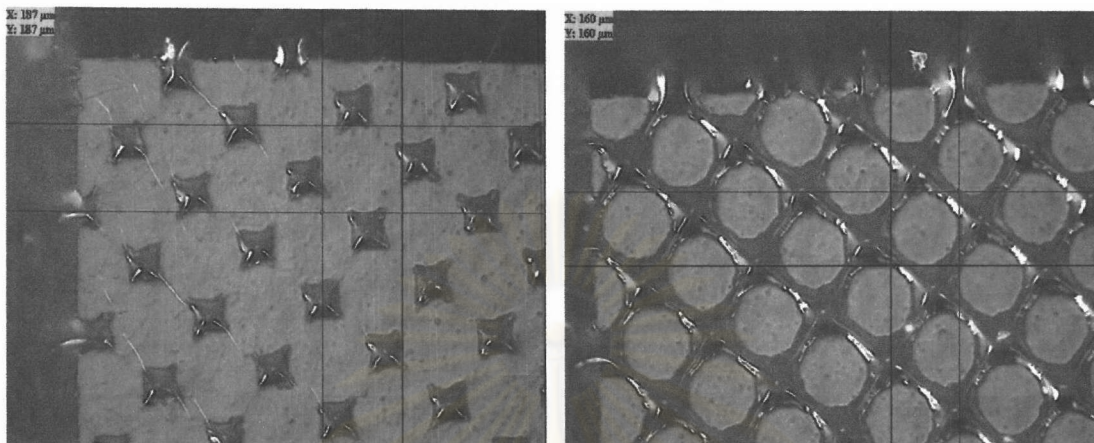
(a)

(b)
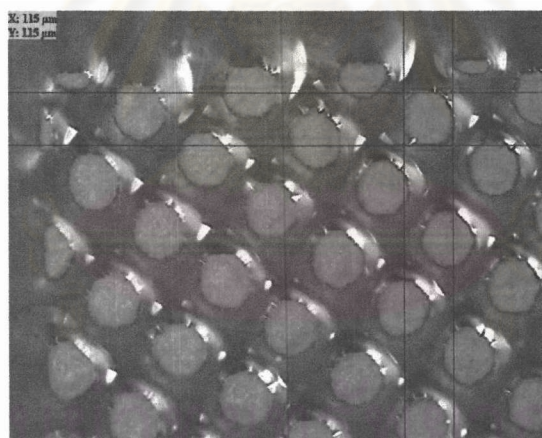
(c)

Figure A- 1 Roundness determination on tested nyloflex® FAH 170 at (a) 75 %, (b) 50 %, (c) 25 %

nyloflex®ACE 170
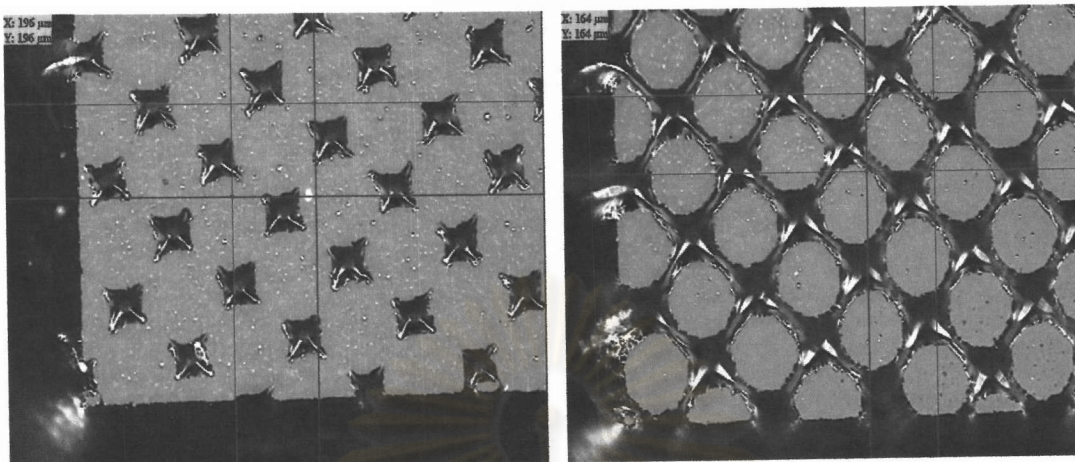
(a)

(b)
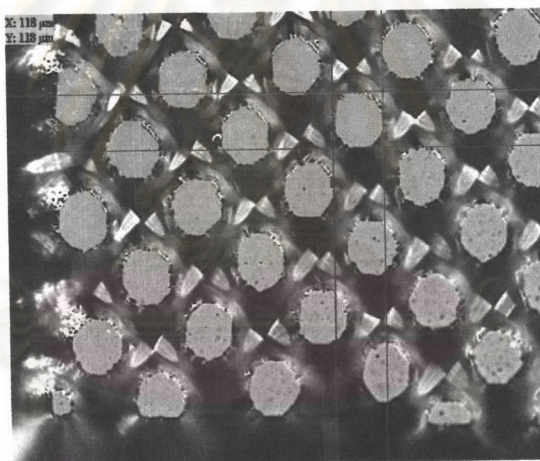
(c)

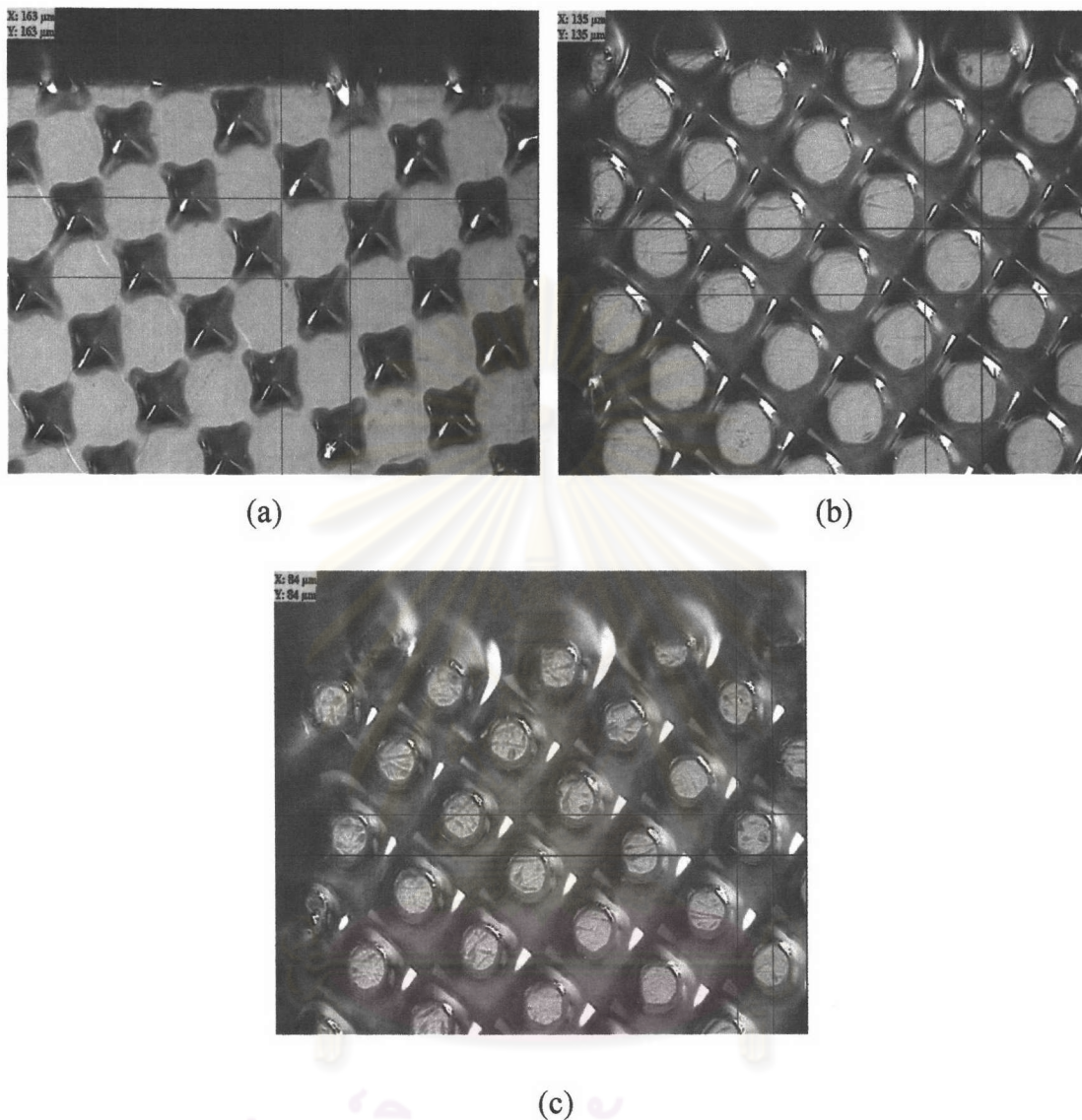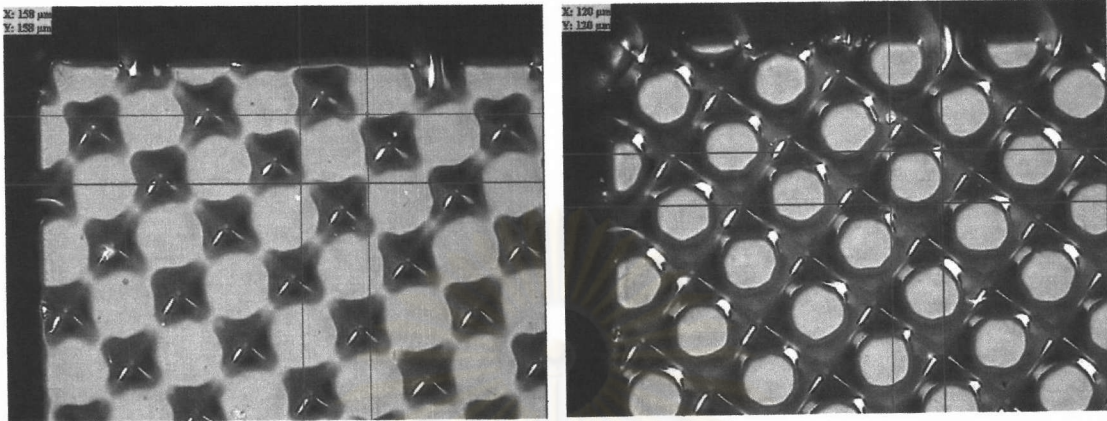Figure A- 2 Roundness determination on tested nyloflex® ACE 170 at (a) 75 %, (b) 50 %, (c) 25 %
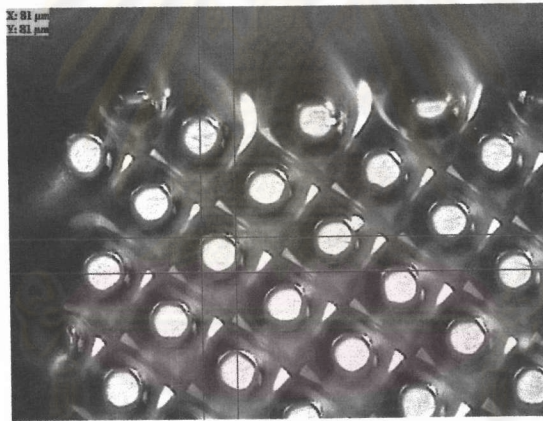
nyloflex® FAH DII 170

(a)

(b)

(c)

Figure A- 3 Roundness determination on tested nyloflex® FAH DII 170 at (a) 75 %, (b) 50 %, (c) 25 %

nyloflex® ACE DII 170

(a)

(b)

(c)

Figure A- 4 Roundness determination on tested nyloflex® ACE DII 170 at (a) 75 %,

(b) 50 %, (c) 25 %
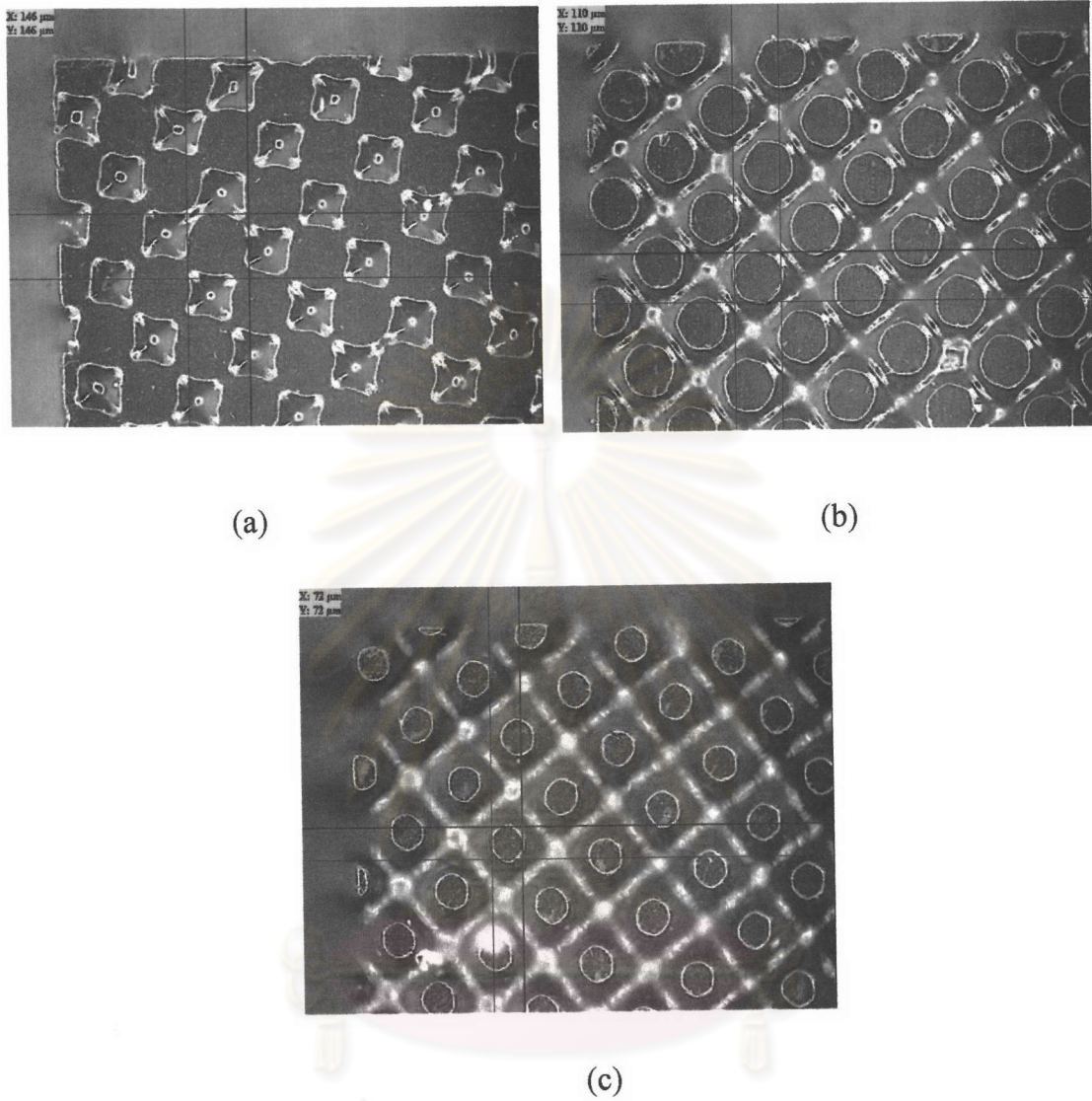
DuPont® DPU 67

(a)

(b)

(c)

Figure A- 5 Roundness determination on tested DuPont® DPU 67 at (a) 75 %, (b) 50 %, (c) 25 %

APPENDIX B

TEST QUALITY OF EACH PLATE DOT GAIN AND UNIFORMITY

DOT GAIN

Table B-1 Comparison of tone reproduction on plates nyloflex® FAH 170, nyloflex®

ACE 170, nyloflex® FAH DII 170, nyloflex® ACE DII 170 and DuPont® DPU 67.

dot (%) file	nyloflex® FAH 170	nyloflex® ACE 170	nyloflex® FAH DII170	nyloflex® ACE DII170	DuPont® DPU67
	dot (%) plate	dot (%) plate	dot (%) plate	dot (%) plate	dot (%) plate
0	0	0	0	0	0
2	4.6	5	0.3	0.4	0.9
3	7	7.3	0.5	0.7	1
4	8.3	8.5	0.9	1.5	1.5
5	10.4	10	1.2	2.4	1.9
10	17.6	16.1	3.9	7	6.1
15	22.3	21.5	8	10.5	10.2
20	29.9	26.9	13.7	14	13.7
25	35	32.5	18.1	17.8	17.2
30	39.8	37.6	21.9	21.5	21.3
35	43.5	41.8	26.25	25.5	24.9
40	47.9	46.4	30.6	29.2	28.9
45	49.1	48.5	35.6	33.6	33.3
50	56.2	54.9	40.2	37.3	37.6
55	62.1	60.4	43.9	41.8	42.2
60	70.75	66.3	48.5	45.2	45.8
65	74.7	70	56.1	51.1	53.95
70	79.5	74.5	64	63.2	62.1
75	84.5	79.3	68.4	69.1	67.3
80	87.9	83.7	73.3	72.6	72.2
85	91.2	88.1	79.2	78.4	77.1
90	94.4	92.2	85.7	85.1	83.5
95	97.4	96.1	92.3	95.6	90.3
96	97.8	96.8	93.8	97.5	93.2
97	98.6	97.5	95.2	98.2	97.6
98	99.6	98.8	98.5	98.7	99
100	99.8	99.6	99.58	99.62	99.9

Table B-2 Comparison of density values on prints using nyloflex® FAH 170,

nyloflex® ACE 170, nyloflex® FAH DII 170, nyloflex® ACE DII 170 and DuPont®

DPU 67.

dot (%) file	nyloflex®FAH 170 dot (%) paper	nyloflex® ACE 170 dot (%) paper	nyloflex® FAH DII170 dot (%) paper	nyloflex® ACE DII170 dot (%) paper	DuPont ®DPU67 dot (%) paper
0	0.1	0.1	0.1	0.1	0.1
2	0.15	0.13	0.11	0.12	0.11
3	0.16	0.15	0.12	0.13	0.11
4	0.16	0.15	0.12	0.13	0.12
5	0.18	0.16	0.12	0.13	0.12
10	0.21	0.2	0.13	0.15	0.15
15	0.24	0.23	0.16	0.18	0.17
20	0.26	0.26	0.18	0.21	0.2
25	0.3	0.28	0.21	0.22	0.22
30	0.31	0.31	0.23	0.23	0.23
35	0.34	0.33	0.26	0.26	0.25
40	0.36	0.35	0.28	0.28	0.28
45	0.37	0.36	0.31	0.3	0.29
50	0.43	0.41	0.35	0.32	0.31
55	0.48	0.45	0.37	0.33	0.33
60	0.52	0.49	0.39	0.36	0.36
65	0.55	0.52	0.42	0.37	0.4
70	0.59	0.54	0.46	0.41	0.45
75	0.61	0.59	0.52	0.48	0.48
80	0.62	0.61	0.53	0.53	0.52
85	0.63	0.62	0.54	0.58	0.56
90	0.65	0.64	0.59	0.59	0.58
95	0.66	0.67	0.64	0.65	0.61
96	0.65	0.67	0.66	0.7	0.62
97	0.64	0.65	0.69	0.7	0.62
98	0.65	0.65	0.7	0.7	0.62
100	0.71	0.69	0.72	0.71	0.68

Table B-3 Comparison of tone reproduction on prints using nyloflex® FAH 170,

nyloflex® ACE 170, nyloflex® FAH DII 170, nyloflex® ACE DII 170 and DuPont®

DPU 67.

dot (%) file	nyloflex® FAH1 70 dot (%) paper	nyloflex® ACE1 70 dot (%) paper	nyloflex® FAH DII170 dot (%) paper	nyloflex® ACE DII170 dot (%) paper	DuPont ®DPU67 dot (%) paper
0	0	0	0	0	0
2	9	6	2	1	2
3	11	8	3	1	3
4	12	10	3	2	4
5	15	12	3	2	5
10	21	19	6	6	11
15	26	25	11	12	17
20	30	31	17	18	22
25	36	37	21	20	25
30	39	41	25	21	29
35	44	45	30	27	32
40	47	48	34	32	37
45	50	50	40	36	39
50	59	57	46	38	43
55	66	63	51	42	47
60	77	68	52	45	52
65	81	72	59	48	58
70	84	78	66	56	67
75	86	84	72	66	73
80	89	86	74	74	79
85	92	90	77	80	85
90	94	93	84	85	89
95	94	97	92	92	94
96	94	97	94	97	94
97	94	94	99	97	95
98	95	96	99	97	95
100	100	100	100	100	100

UNIFORMITY

Table B-4 Uniformity of printed dots on in paper using nyloflex® FAH 170 plate.

nyloflex FAH DII 170	25(%)		50(%)		75(%)		100(%)	
file	density	dot area (%)	density	dot area (%)	density	dot area (%)	density	dot area (%)
point1	0.16	30.83	0.31	51	0.63	76.5	1.14	92.8
point2	0.15	29.17	0.32	52.11	0.66	78	1.16	93.14
point3	0.16	30.83	0.33	53.23	0.66	78	1.17	93.3
point4	0.15	29.17	0.32	52.11	0.64	77	1.15	93
point5	0.15	29.17	0.32	52.11	0.64	77	1.14	92.8
$\bar{x}$	0.154	29.834	0.320	52.112	0.646	77.300	1.152	93.008
σ_n	0.005	0.813	0.006	0.705	0.012	0.600	0.012	0.195
σ_{n-1}	0.005	0.909	0.007	0.788	0.013	0.671	0.013	0.218

Table B-5 Uniformity of printed dots on in paper using nyloflex® ACE 170 plate.

nyloflex ACE 170	25(%)		50(%)		75(%)		100(%)	
file	density	dot area (%)	density	dot area (%)	density	dot area (%)	density	dot area (%)
point1	0.26	45.00	0.5	68.5	0.81	84.5	1.17	93.3
point2	0.25	43.67	0.49	68	0.83	85.34	1.15	93
point3	0.25	43.67	0.51	69	0.8	84	1.15	93
point4	0.26	45.00	0.5	68.5	0.8	84	1.13	90.68
point5	0.25	43.67	0.5	68.5	0.81	84.5	1.15	93
$\bar{x}$	0.254	44.201	0.500	68.500	0.810	84.468	1.150	92.596
σ^n	0.005	0.653	0.006	0.316	0.011	0.490	0.013	0.965
σ^{n-1}	0.005	0.730	0.007	0.354	0.012	0.548	0.014	1.079

Table B-6 Uniformity of printed dots on in paper using nyloflex® FAH DII 170 plate.

| nyloflex FAH DII 170 | 25(%) | | 50(%) | | 75(%) | | 100(%) | |
file	density	dot area (%)	density	dot area (%)	density	dot area (%)	density	dot area (%)
point1	0.16	30.83	0.31	51	0.63	76.5	1.14	92.8
point2	0.15	29.17	0.32	52.11	0.66	78	1.16	93.14
point3	0.16	30.83	0.33	53.23	0.66	78	1.17	93.3
point4	0.15	29.17	0.32	52.11	0.64	77	1.15	93
point5	0.15	29.17	0.32	52.11	0.64	77	1.14	92.8
$\bar{x}$	0.154	29.834	0.320	52.112	0.646	77.300	1.152	93.008
σ^{n}	0.005	0.813	0.006	0.705	0.012	0.600	0.012	0.195
σ^{n-1}	0.005	0.909	0.007	0.788	0.013	0.671	0.013	0.218

Table B-7 Uniformity of printed dots on in paper using nyloflex® ACE DII 170 plate.

nyloflex ACE DII 170	25(%)		50(%)		75(%)		100(%)	
file	density	dot area (%)	density	dot area (%)	density	dot area (%)	density	dot area (%)
point1	0.14	27.5	0.29	48.75	0.6	75	1.14	92.8
point2	0.14	27.5	0.27	47.75	0.6	75	1.18	93.44
point3	0.13	25.83	0.29	48.75	0.57	73	1.18	93.44
point4	0.14	27.5	0.29	48.75	0.59	74	1.16	93.14
point5	0.14	27.5	0.29	48.75	0.59	74	1.2	93.44
$\bar{x}$	0.138	27.167	0.286	48.550	0.590	74.200	1.172	93.252
σ^n	0.004	0.666	0.008	0.400	0.011	0.748	0.020	0.254
σ^{n-1}	0.004	0.745	0.009	0.447	0.012	0.837	0.023	0.284

Table B-8 Uniformity of printed dots on in paper using DuPont® DPU 67 plate.

Dupont DPU 67	25(%)		50(%)		75(%)		100(%)	
file	density	dot area (%)	density	dot area (%)	density	dot area (%)	density	dot area (%)
point1	0.17	32.44	0.31	51	0.61	75.5	1.18	93.44
point2	0.16	30.83	0.32	52.11	0.62	76	1.09	91.8
point3	0.18	34	0.34	54.23	0.6	75	1.1	92
point4	0.18	34	0.32	52.11	0.62	76	1.1	92
point5	0.15	29.17	0.31	51	0.61	75.5	1.14	92.8
$\bar{x}$	0.168	32.088	0.320	52.090	0.612	75.600	1.122	92.408
σ^{n}	0.012	1.873	0.011	1.180	0.007	0.374	0.034	0.620
σ^{n-1}	0.013	2.094	0.012	1.319	0.008	0.418	0.038	0.693

APPENDIX C

CALCULATION OF INK TRANSFER

Table C-1 Calculation of ink quantity on anilox roll (A)

Anilox Roll (l/cm,cm3/m2)	Area (m2)	Volume (cm3)	Specific Volume of Ink (g/cm3)	Weight (g)
400/3.0	0.0072	0.0216	1.05	0.02268

nyloflex® FAH 170

Table C-2 Value of ink quantity on the plate after transfer to substrate (B′) and ink quantity on substrate after printing (C) in test using nyloflex® FAH 170 plate.

Position	Weight (g)
B'	0.0194
C	0.0094

Table C-3 Determine value of the ink transfer coefficient from ink transfer model in test using nyloflex® FAH 170 plate.

Coefficient	
$\omega = 1/(1+(B'/C))$	0.326389
$\upsilon = 1-(1/(1+(B'/C)))$	0.673611
$\beta = C(1+(B'/C))/(A+B')$	0.684411
$\alpha = 1-C(1+(B'/C))/(A+B')$	0.315589

Table C-4 Determine value of the ink quantity on anilox roll after transfer to the plate(A′) and ink quantity on plate before transfer to substrate(B) from ink transfer model in test using nyloflex® FAH 170 plate.

Position	Weight (g)
$A'=\alpha(A+B')$	0.01328
$B=\beta(A+B')$	0.0094

nyloflex® ACE 170

Table C-5 Value ink quantity on the plate after transfer to substrate (B′) and ink quantity on substrate after printing (C) in test using nyloflex® ACE 170 plate.

Position	Weight (g)
B'	0.0523
C	0.01958

Table C-6 Determine value of the ink transfer coefficient from ink transfer model in test using nyloflex® ACE 170 plate.

Coefficient	
$\omega = 1 / (1+(B'/C))$	0.272398
$\upsilon = 1 - (1 / (1+(B'/C)))$	0.727602
$\beta = C (1+(B'/C))/ (A+B')$	0.958656
$\alpha = 1 - C (1+(B'/C))/ (A+B')$	0.041344

Table C-7 Determine value ink quantity on anilox roll after transfer to the plate(A′) and ink quantity on plate before transfer to substrate(B) from of the ink transfer model in test using nyloflex® ACE 170 plate.

Position	Weight (g)
$A'= \alpha(A+B')$	0.0031
$B= \beta (A+B')$	0.07188

nyloflex® FAH DII 170

Table C-8 Value ink quantity on the plate after transfer to substrate (B′) and ink quantity on substrate after printing (C) in test using nyloflex® FAH DII 170 plate.

Position	Weight (g)
B'	0.1035
C	0.01426

Table C-9 Determine value of the ink transfer coefficient from ink transfer model in test using nyloflex® FAH DII 170 plate.

Coefficient	
$\omega = 1 / (1+(B′/C))$	0.121094
$\upsilon = 1 - (1 / (1+(B′/C)))$	0.878906
$\beta = C (1+(B′/C))/ (A+B′)$	0.93327
$\alpha = 1 - C (1+(B′/C))/ (A+B′)$	0.06673

Table C-10 Determine value ink quantity on anilox roll after transfer to the plate(A′) and ink quantity on plate before transfer to substrate(B) from of the ink transfer model in test using nyloflex® FAH DII 170 plate.

Position	Weight (g)
$A'= \alpha(A+B′)$	0.00842
$B= \beta (A+B′)$	0.11776

nyloflex ® ACE DII 170

Table C-11 Value ink quantity on the plate after transfer to substrate (B′) and ink quantity on substrate after printing (C) in test using nyloflex® ACE DII 170 plate.

Position	Weight (g)
B′	0.2054
C	0.0122

Table C-12 Determine value Ink transfer coefficient from of the ink transfer model in test using nyloflex® ACE DII 170 plate.

Coefficient	
$\omega = 1 / (1+(B′/C))$	0.056066
$\upsilon = 1 - (1 / (1+(B′/C)))$	0.943934
$\beta = C (1+(B′/C)) / (A+B′)$	0.954051
$\alpha = 1 - C (1+(B′/C)) / (A+B′)$	0.045949

Table C-13 Determine value ink quantity on anilox roll after transfer to the plate(A′) and ink quantity on plate before transfer to substrate(B) from of the ink transfer model in test using nyloflex® ACE DII 170 plate.

Position	Weight (g)
$A′= \alpha(A+B′)$	0.01048
$B= \beta (A+B′)$	0.2176

DuPont® DPU 67

Table C-14 Value ink quantity on the plate after transfer to substrate (B') and ink quantity on substrate after printing (C) in test using DuPont® DPU 67 plate

Position	Weight (g)
B'	0.0165
C	0.00998

Table C-15 Determine value of the ink transfer coefficient from ink transfer model in test using DuPont® DPU 67 plate.

Coefficient	
$\omega = 1 / (1+(B'/C))$	0.376888
$\upsilon = 1 - (1 / (1+(B'/C)))$	0.623112
$\beta = C (1+(B'/C))/ (A+B')$	0.675855
$\alpha = 1 - C (1+(B'/C))/ (A+B')$	0.324145

Table C-16 Determine value ink quantity on anilox roll after transfer to the plate(A') and ink quantity on plate before transfer to substrate(B) from of the ink transfer model in test using Dupont® DPU 67 plate.

Position	Weight (g)
$A' = \alpha(A+B')$	0.0127
$B = \beta (A+B')$	0.02648

APPENDIX D

QUESTIONNAIRE FOR EVALUATION OF TONE GRADATION.

Table D-1 Questionnaire for ranking tone gradation quality.

<u>PART I</u> Please mark in the box ranking tone gradation quality which matches you status.

SEX

☐ MALE   ☐ FEMALE

AGE

☐ 20-30 YEAR   ☐ 30-40 YEAR   ☐ 40-50 YEAR

☐ 50 UPPER

<u>PART II</u> Please observe the original image with printed on tone gradation quality and

mark your judgment in the table below.

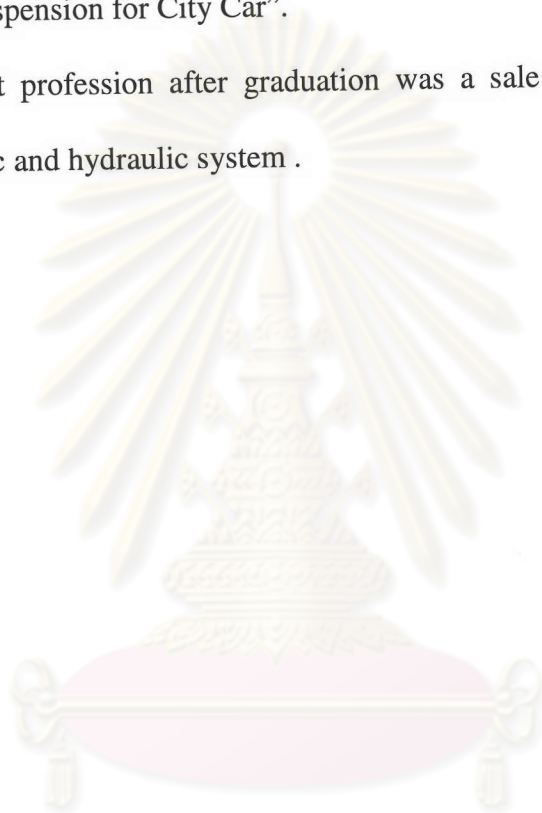|	VERY GOOD	GOOD	FAIRLY GOOD	BAD	VERY BAD
nyloflex® FAH 170					
nyloflex® ACE 170					
nyloflex® FAH DII 170					
nyloflex® ACE DII 170					
DuPont® DPU 67					

<u>REMARK</u>

Very good = 5, Good = 4, Fairly Good = 3, Bad = 2, Very Bad = 1

VITA

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