

Application Development Center EMS-GRIVORY
Answer to Technical Inquiry No.: 2021-0179



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Date: 21.05.2021

Company: LIXIL
Country: Japan (JP)

Material: Grivory FE10765 (G7V-5HL)
Application: Window handle

Problem Description / Target of the Customer:

GVS-5H+UV stabilized could not pass LIXIL's weatherability test.

Before testing Grivory FE10765, they request us to prove better weathering resistance than GVS+UV stabilized.

Please run following comparison weatherability test.

- Condition
 - 1. Without rain: based on PV 3929
 - 2. With rain: based on PV 3930
- Measurement time
 - 0, 100, 300, 500, 800, 1000 hrs
- Measurement
 - Gloss (60 °)
 - Color (L*a*b)
- Grade & Colors
 - Grivory G7V FE10765 L2132.12 White
 - Grivory G7V FE10765 L2133.24 Ivory
 - Grivory GVS-5H T20329-23.3 White
 - Grivory GVS-5H T20330.20-1 Ivory

*Color plates can be sent to ECCH.

Result / Solution / Proposal:

Please find attached the weathering results according to PV 3929 (table 1)and PV 3990 (table 2):

Weathering test acc. PV 3929		Color measurement			Discoloration			Gloss 60°	
		L*	a*	b*	dE	dL	da	db	
A) Grivory G7V FE 10765 white L2132.12 1mm color plate	Original	96.1	-1.1	4.1	0	0	0	0	17.2
	100h	95.4	-1.0	5.0	1.3	-0.8	0.1	0.9	8.9
	300h	94.6	-0.9	6.0	2.4	-1.3	-0.1	2.0	2.5
	500h	93.2	-0.8	7.9	5.2	-3.0	0.2	4.3	1.9
	800h	91.2	0.2	11.4	8.7	-5.0	0.9	7.0	1.9
	1000h	90.3	0.5	12.0	10.0	-6.0	1.0	8.0	1.9
B) Grivory G7V FE 10765 white L2133.24 1mm color plate	Original	86.9	-0.4	7.3	0	0	0	0	22
	100h	86.7	-0.1	9.0	1.5	-0.4	0.3	1.4	6.5
	300h	86.5	-0.2	8.9	1.6	-0.5	0.3	1.5	7.8
	500h	86.3	-0.1	8.7	1.6	-0.8	0.3	1.3	6.9
	800h	86.5	0.0	9.2	1.9	-1.1	0.0	1.5	7.3
	1000h	86.3	0.2	9.2	2.0	-1.3	0.1	1.6	7.6
C) Grivory GVS-5H ivory T20330.20-1 3mm color plate	Original	89.4	-0.6	7.9	0	0	0	0	74
	100h	88.0	-0.3	11.2	3.4	-1.4	0.2	3.1	70
	300h	87.4	-0.2	11.9	4.6	-2.0	0.4	4.1	58
	500h	83.9	0.6	14.8	8.8	-5.6	1.2	6.8	25
	800h	85.1	0.9	15.2	8.3	-4.5	1.3	6.9	19
	1000h	85.4	0.9	16.1	8.7	-4.0	1.3	7.6	18
D) Grivory GVS-5H white T20329.23-3 3mm color plate	Original	95.0	-0.9	4.4	0	0	0	0	74
	100h	94.0	-0.7	7.2	2.9	-0.8	0.1	2.8	22
	300h	92.2	-0.7	11.5	7.8	-2.7	0.1	7.3	7
	500h	90.7	-0.8	13.0	9.6	-4.2	0.1	8.6	4
	800h	90.9	-0.2	14.8	11.0	-4.2	0.4	10	3
	1000h	90.9	-0.4	14.2	11.1	-4.5	0.3	10	3

Table 1: Weathering results according to PV 3929

Weathering test acc. PV 3930		Color measurement			Discoloration			Gloss 60°	
		L*	a*	b*	dE	dL	da	db	
A) Grivory G7V FE 10765 white L2132.12 1mm color plate	Original	95.8	-1.1	4.6	0	0	0	0	17.8
	100h	95.7	-1.1	5.2	0.6	-0.1	0	0.6	5.9
	300h	94.7	-1.3	6.2	1.9	-1.2	-0.2	1.4	2.2
	500h	94.5	-1.8	6.5	2.5	-1.5	-0.3	2	2.3
	800h	94.4	-1.1	6.6	2.8	-1.8	-0.4	2.2	2.8
	1000h	94.4	-1	6.5	2.9	-1.8	-0.4	2.3	2.9
B) Grivory G7V FE 10765 white L2133.24 1mm color plate	Original	87.2	-0.5	7.7	0	0	0	0	22
	100h	86.8	-0.3	8.7	1.1	-0.3	0	1.1	8.9
	300h	86.9	-0.4	8.8	1.3	-0.1	-0.1	1.3	8
	500h	87.4	-0.7	8.4	1.1	0.3	-0.1	1	6.1
	800h	88.1	-0.3	8.2	1	0.4	0.0	0	2.8
	1000h	88	-0.3	8.2	1.0	0.4	0	0.9	2.5
C) Grivory GVS-5H ivory T20330.20-1 3mm color plate	Original	89.1	-0.8	8.4	0	0	0	0	76
	100h	87.5	-0.5	10.3	2.5	-1.6	0.3	1.9	69
	300h	88.5	-0.6	11.1	2.7	-0.6	0.2	2.6	48
	500h	88.5	-0.8	10.5	2.3	-0.6	0.3	2.2	20
	800h	89.4	0	10.3	2.1	-0.1	0.3	2	5
	1000h	88.6	-0.1	9.3	1.3	-0.9	0.2	0.9	3
D) Grivory GVS-5H white T20329.23-3 3mm color plate	Original	94.8	-1.1	4.9	0	0	0	0	73
	100h	94.2	-0.8	5.6	0.6	-0.2	0.2	0.5	32
	300h	94.9	-0.8	5.1	0.6	0.5	0.2	0.1	3
	500h	95	-0.5	5.0	0.4	-0.3	0.1	0.1	2
	800h	95	-0.6	5.5	0.5	-0.3	0.2	0.4	2
	1000h	95	-0.5	5.3	0.6	-0.4	0.3	0.3	2

Table 2: Weathering results according to PV 3930

The test series A and B can not be compared with test series C and D since the reference gloss is completely different.

Comparing the two different weathering standards PV 3929 is more critical than PV 3930.

After 1000h aging according to PV 3930 there are no significantly changes visible by eye (dE < 3).

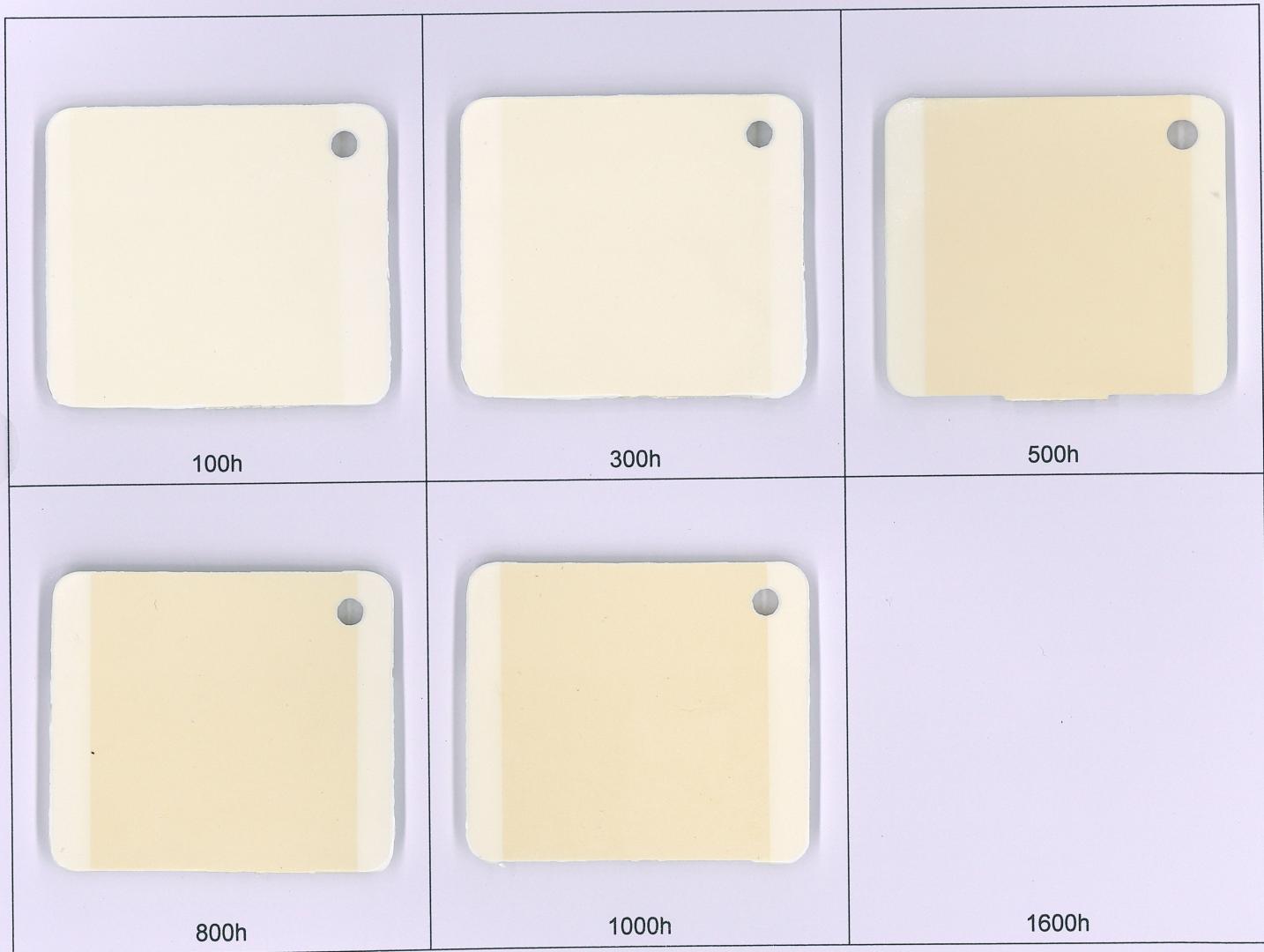
After 1000h aging according to PV 3929 only test series B show very little change in discoloration.

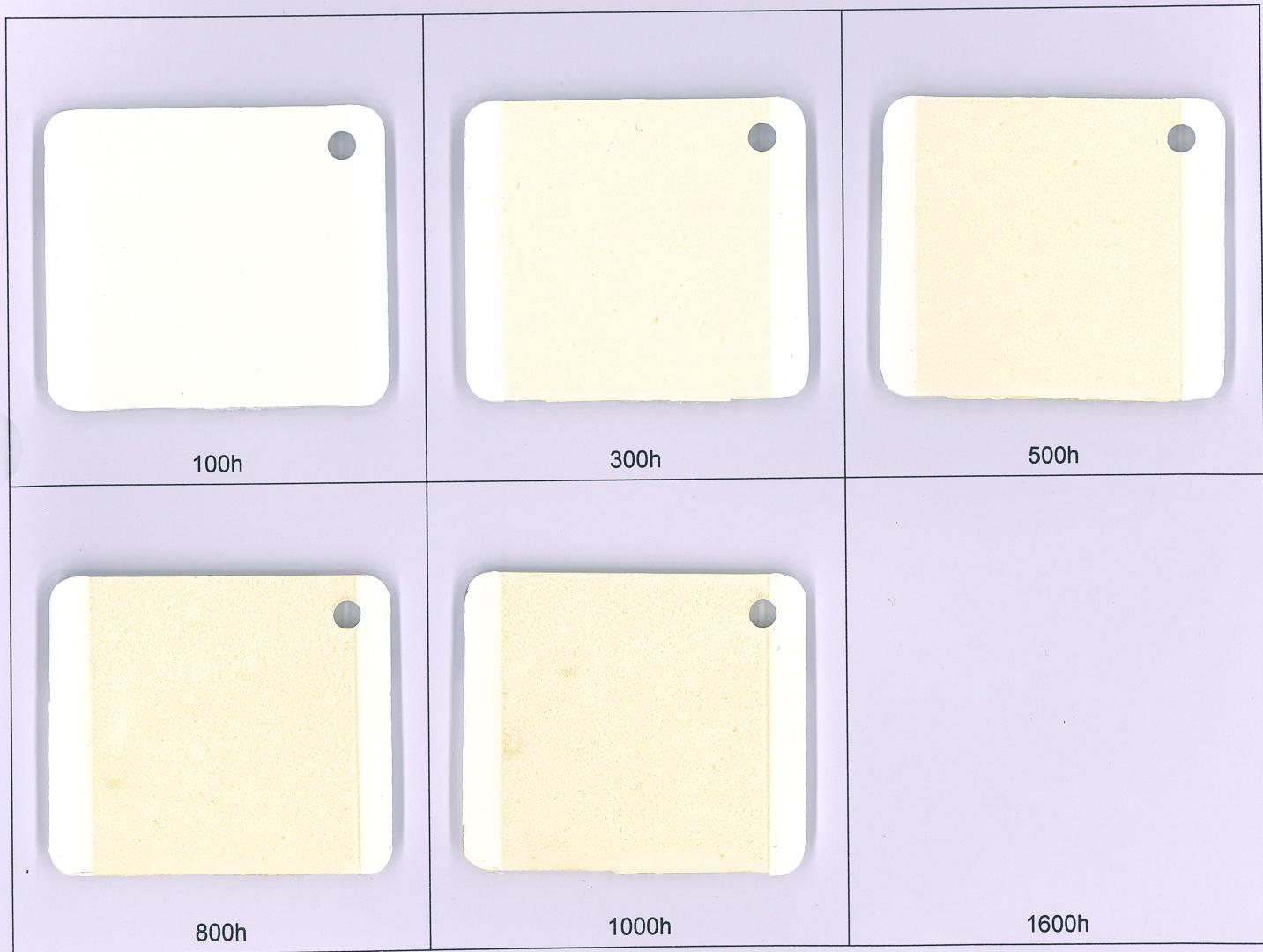
The loss of gloss appears due to the polymer degradation at the surface and thus exposure of the glass fibers.

Please find attached the scanned material cards.

Weathering test acc. PV 3929**A) Grivory G7V FE 10765 white L2132.12**

Weathering test acc. PV 3929**B) Grivory G7V FE 10765 white L2133.24**

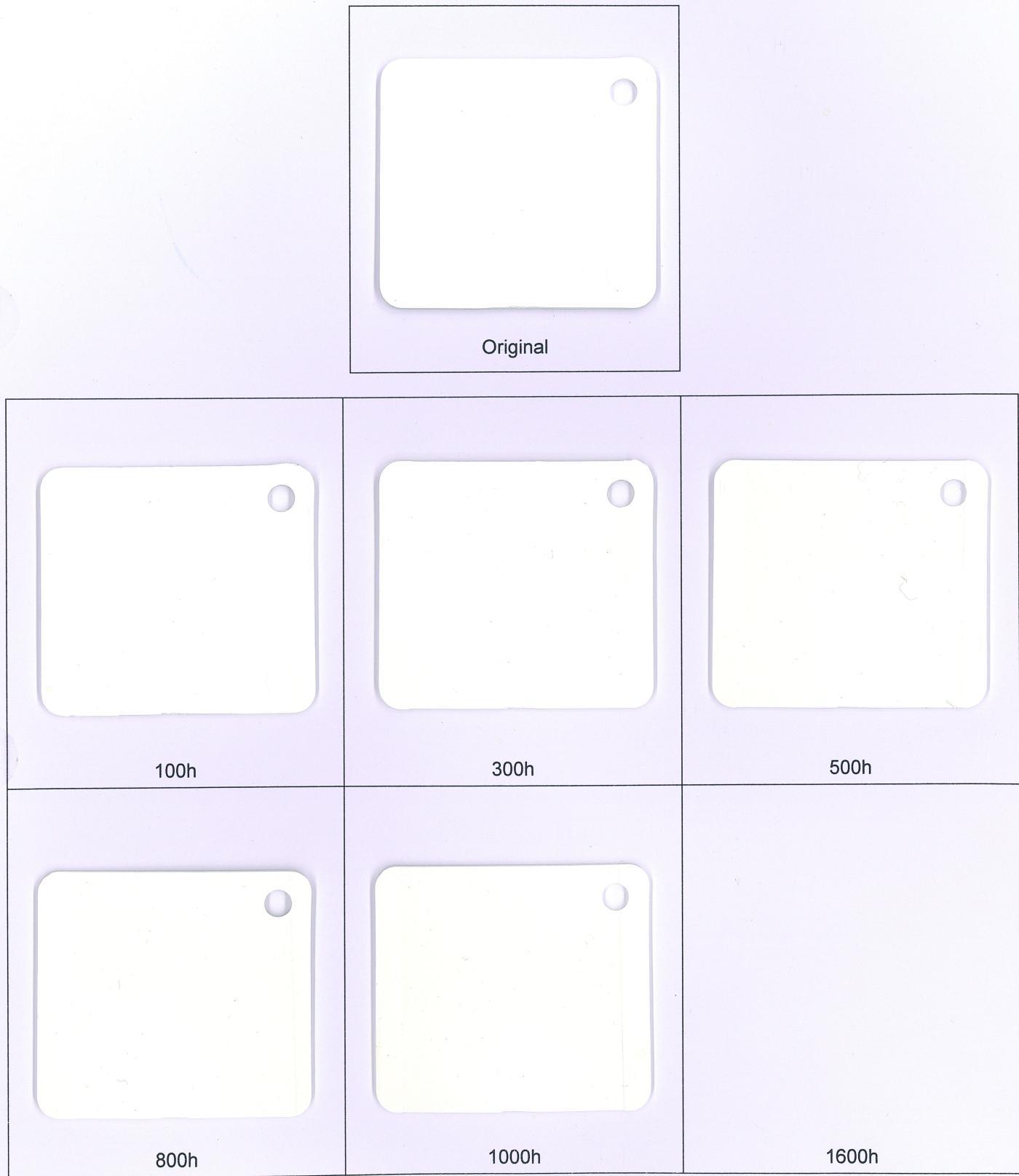
Weathering test acc. PV 3929**C) Grivory GVS-5H ivory T20330.20-1**

Weathering test acc. PV 3929**D) Grivory GVS-5H white T20329.23-3**



Weathering test acc. ISO 4892 ~ PV 3930

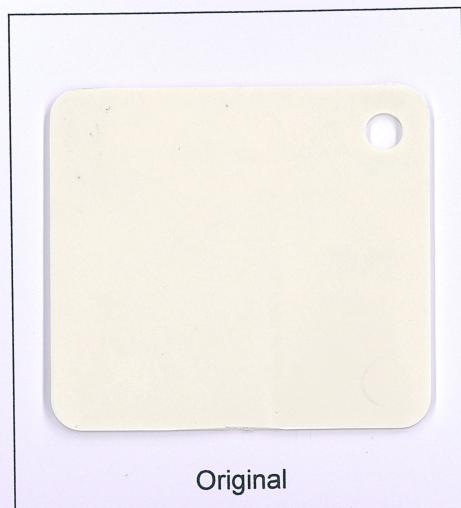
A) Grivory G7V FE 10765 white L2132.12



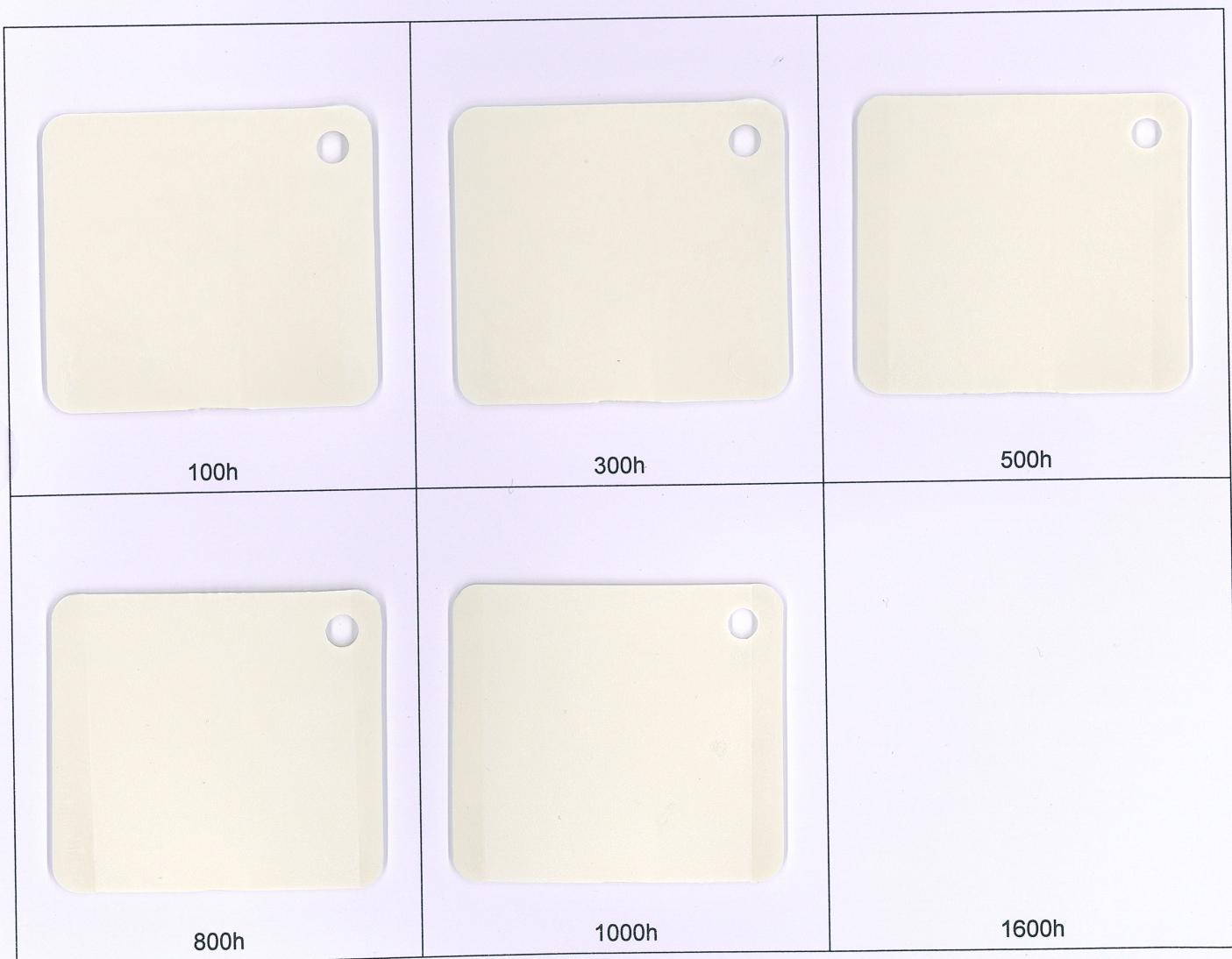


Weathering test acc. ISO 4892 ~ PV 3930

B) Grivory G7V FE 10765 white L2133.24



Original





Weathering test acc. ISO 4892 ~ PV 3930

C) Grivory GVS-5H ivory T20330.20-1





Weathering test acc. ISO 4892 ~ PV 3930

D) Grivory GVS-5H white T20329.23-3

