

LUCIFRAL[®]

UV Curing Hard Coat Material for film



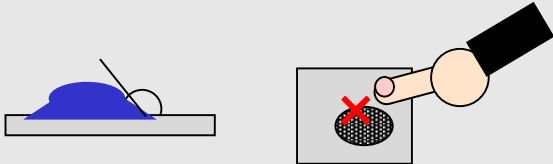
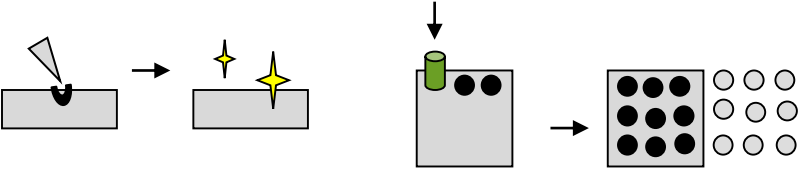
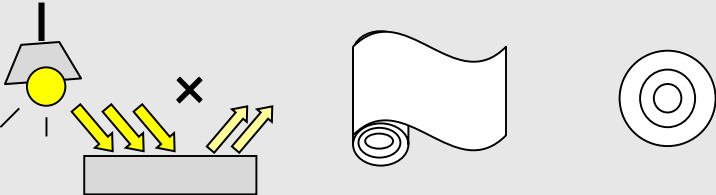
Nippon Paint Industrial Coatings Co., Ltd.

Feb. 2018



What is LUCIFRAL®?

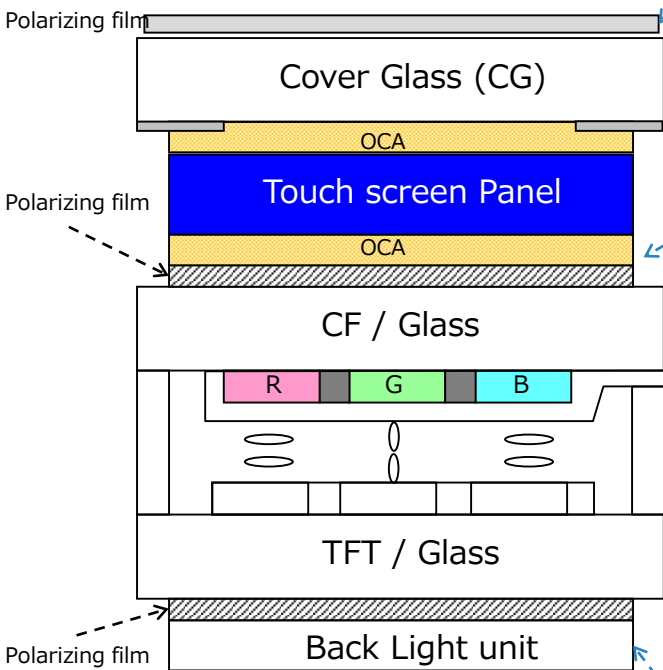
LUCIFRAL®, UV Curing Hard Coat Material for film, can provide many kinds of function by controlling paint film surface condition and property.

Elemental technology	Examples of application
Surface condition	 <p>wettability anti fingerprint</p>
Physical property	 <p>shape memory workability</p>
Surface roughness	 <p>anti glare anti blocking anti Newton ring</p>

Examples of Application

anti fingerprint, antifouling,
anti glare, wettability,
shape memory

Cross-section of touch screen

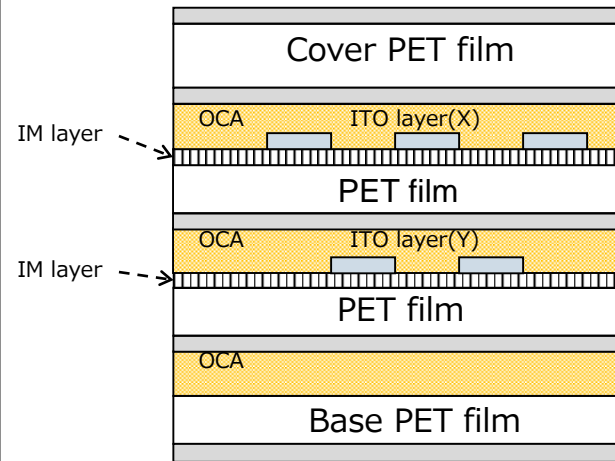


wettability

anti blocking,
anti Newton ring

anti blocking,
anti Newton ring,
wettability

Touch Screen Panel



Examples of Application

housing equipment



PC, smartphone



car



LUCIFRAL sample list

	Product	Feature
	NAB-012	anti blocking
	NAB-016	anti blocking, wettability
	NAN-1000	anti sparkle, anti Newton ring
*)	NAG-1000	low haze, anti glare
	G-720	anti fingerprint, high hardness
	NEH-4100	transfer property, workability, anti fingerprint
*)	NEH-4400	transfer property, workability, anti fingerprint, high hardness
*)	MDF-002	shape memory, anti fingerprint
*)	MDF-003	shape memory, anti fingerprint, high hardness

*) in development

Anti-blocking clear hard coat material

	Product	NAB-012	NAB-016
	Anti blocking	good	good
	Wettability	-	good
material film	Non volatile (%)	50	50
	Solvent	MIBK	MEK
	Film thickness (μm)	2	2
	Haze (%)	0.5	0.3
	Total light transmittance (%)	90.0	90.0
	Anti blocking	good	good
	Steel wool resistance (*1)	no scratch	no scratch
	Pencil hardness (*2)	H	H
	Wetting index (mN/m)	34	44

(*1) 500g/cm² 10 rounds

(*2) JIS K5600

These data are based on our tests at February 2018 and do not guarantee your evaluations.
Please evaluate performance actually according to this data.
These products can be used only in JAPAN.
Please contact us before exporting them.

※ These data may be changed without prior notice.

※ Product names, company names are trademarks of Nippon Paint Co., Ltd., Japan, and or registered trademarks of other countries.

※ ©Copyright 2018 NIPPON PAINT INDUSTRIAL COATINGS Co., Ltd., All rights reserved.

No anti blocking coated

Anti blocking coated (NAB series)



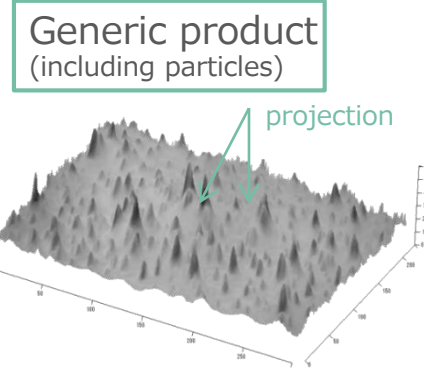
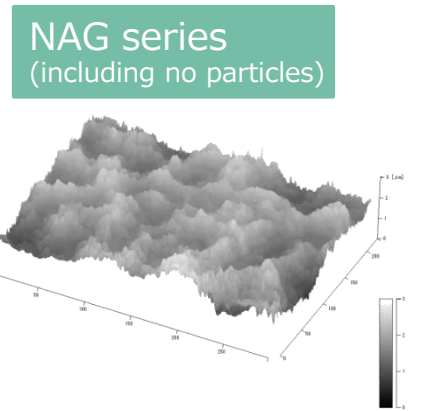
Fig. Appearance after scratch test*3)

*3) test condition: 200gf/cm²×72hours

【coating condition at Lab.】
dilution : to NV=40% with MIBK
substrate : optical film (100μm)
coating : bar coater
drying : 80 deg. C. ×60sec.
UV lamp : 300mJ/cm²

Anti-Newton ring & Anti-glare clear hard coat material

	Product	NAN-1000	NAG-1000 (in development)
	Feature	Anti sparkle Anti Newton ring	Anti glare Low haze
material film	Non volatile (%)	40	50
	Solvent	IPA / IBA	MIBK / IBA
	Film thickness (μm)	5	5
	Haze (%)	2	2
	Total light transmittance (%)	89.5	89.0
	Anti sparkle	good	-
	Anti Newton ring	good	good
	Steel wool resistance (*1)	slight scratch	no scratch
	Pencil hardness (*2)	H	3H



【coating condition at Lab.】
 substrate : optical film (100μm)
 coating : bar coater
 drying : 80 deg. C. ×60sec.
 UV lamp : 300mJ/cm²

(*1) 500g/cm² 10rounds
 (*2) JIS K5600

These data are based on our tests at February 2018 and do not guarantee your evaluations.
 Please evaluate performance actually according to this data.
 These products can be used only in JAPAN.
 Please contact us before exporting them.
 ※ These data may be changed without prior notice.
 ※ Product names, company names are trademarks of Nippon Paint Co., Ltd., Japan, and or registered trademarks of other countries.
 ※ ©Copyright 2018 NIPPON PAINT INDUSTRIAL COATINGS Co., Ltd., All rights reserved.

Anti fingerprint clear hard coat material

	Product	G-720
	Feature	Anti fingerprint High hardness
material film	Non volatile (%)	75
	Solvent	MIBK
	Film thickness (μm)	5
	Haze (%)	0.1
	Total light transmittance (%)	90.0
	Anti fingerprint	good
	Steel wool resistance (*1)	no scratch
	Pencil hardness (*2)	3H
	Contact angle (water)	76°
	Contact angle (n-dodecane)	<5°

(*1) 500g/cm² 10 rounds

(*2) JIS K5600



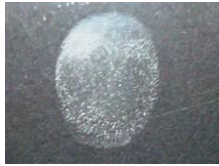

sample	initial stage	after wiping 1 time
G-720		
conventional		

Fig. Result of anti fingerprint test

LUCIFRAL[®] G-720 provides good removal of fingerprint.

【coating condition at Lab.】
 dilution : to NV=40% with MIBK
 substrate : optical film (100μm)
 coating : bar coater
 drying : 80 deg. C. ×60sec.
 UV lamp : 300mJ/cm²

These data are based on our tests at February 2018 and do not guarantee your evaluations.
 Please evaluate performance actually according to this data.
 These products can be used only in JAPAN.
 Please contact us before exporting them.

※ These data may be changed without prior notice.

※ Product names, company names are trademarks of Nippon Paint Co., Ltd., Japan, and or registered trademarks of other countries.

※©Copyright 2018 NIPPON PAINT INDUSTRIAL COATINGS Co., Ltd., All rights reserved.

Decorative clear hard coat material

【material】

Product	NEH-4100	NEH-4400 (in development)
Feature	Anti fingerprint	High hardness
Non volatile (%)	50	50
Solvent	A agent : IPA / MEK B agent : butyl acetate	A agent : MEK B agent : IBA
Formula	A agent : B agent = 2:1	A agent : B agent = 36:1



【film】

	Feature	NEH-4100	NEH-4400 (in development)
B stage	Extensibility (%)	≥170	≥170
	Stickiness	no stickiness	no stickiness
A stage	Film thickness (μm)	5	5
	Haze (%)	<1.0	1.0
	Anti fingerprint	good	good
	Steel wool resistance (*1)	slight scratch	no scratch
	Pencil hardness (*2)	H	2H

(*1) 500g/cm² 10 rounds

(*2) JIS K5600

【coating condition at Lab.】
 formula: mixing both A and B agent
 substrate : optical film (100μm)
 coating : bar coater
 drying : 150 deg. C. ×60sec.

【UV curing condition】
 UV lamp : 600mJ/cm² ...NEH-4100
 300mJ/cm² ...NEH-4400

These data are based on our tests at February 2018 and do not guarantee your evaluations.
 Please evaluate performance actually according to this data.
 These products can be used only in JAPAN.
 Please contact us before exporting them.

※ These data may be changed without prior notice.

※ Product names, company names are trademarks of Nippon Paint Co., Ltd., Japan, and or registered trademarks of other countries.

※ ©Copyright 2018 NIPPON PAINT INDUSTRIAL COATINGS Co., Ltd., All rights reserved.

Shape memory clear material

	Product	MDF-002 (in development)	MDF-003 (in development)
	Feature	Anti fingerprint Shape memory	Anti fingerprint Shape memory High hardness
material	Non volatile (%)	40	40
	Solvent	MIBK	MIBK
film	Film thickness (μm)	20	20
	Haze (%)	0.2	0.2
	Total light transmittance (%)	90.0	90.0
	Anti fingerprint	good	good
	Steel wool resistance (*1)	no scratch	no scratch
	Pencil hardness (*2)	HB	F
	Extensibility (%)	130	110

(*1) 500g/cm² 10 rounds

(*2) JIS K5600

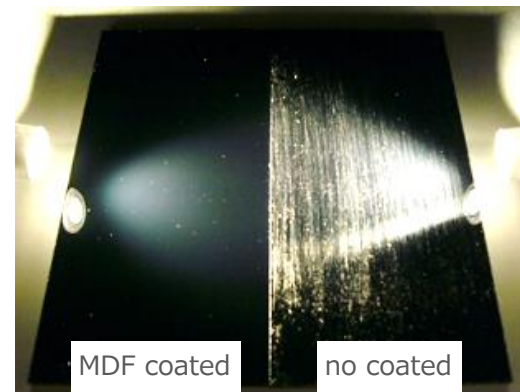


Fig. Appearance of film after scratching by a brass brush

substrate: : black acrylic plate
film thickness : 20μm
condition of scratching : 1kg × 10 rounds
(brass brush)

[coating condition at Lab.]
substrate : optical film (100μm)
coating : bar coater
drying : 80 deg. C. ×60sec.
UV lamp : 300mJ/cm²

Shape memory coating means as follows.
Scratch on the film will disappear quickly.
Coating film recovers as if initial non scratch shape is memorized.
In addition to this, MDF series provide good anti fingerprint property.

These data are based on our tests at February 2018 and do not guarantee your evaluations.
Please evaluate performance actually according to this data.
These products can be used only in JAPAN.
Please contact us before exporting them.

※ These data may be changed without prior notice.

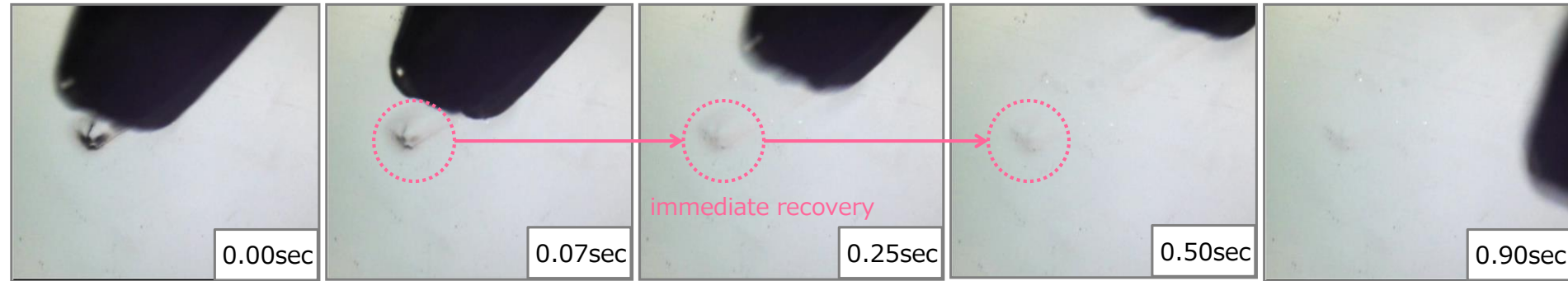
※ Product names, company names are trademarks of Nippon Paint Co., Ltd., Japan, and or registered trademarks of other countries.

※ ©Copyright 2018 NIPPON PAINT INDUSTRIAL COATINGS Co., Ltd., All rights reserved.

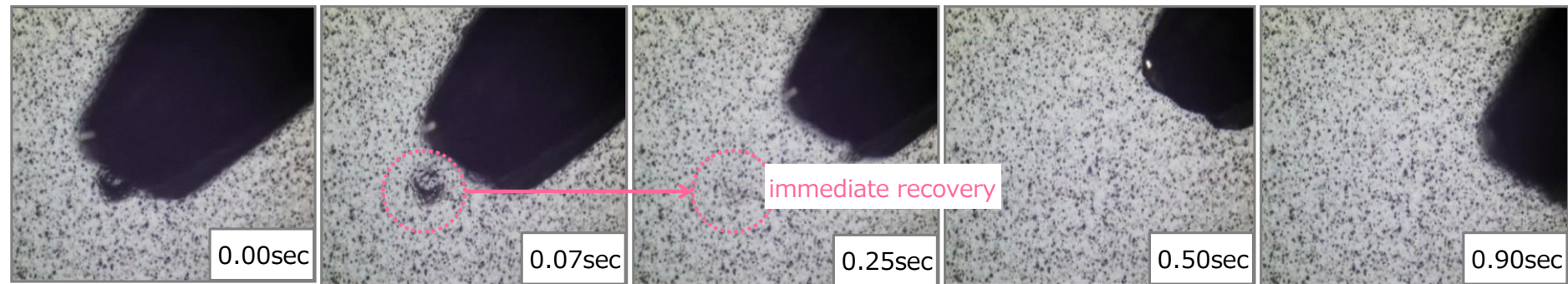
Recovering property of shape memory clear material

Scratch by tweezers recovered within 1 second.

Clear film surface



Imprint texture surface



These data are based on our tests at February 2018 and do not guarantee your evaluations.
Please evaluate performance actually according to this data.
These products can be used only in JAPAN.
Please contact us before exporting them.

※ These data may be changed without prior notice.

※ Product names, company names are trademarks of Nippon Paint Co., Ltd., Japan, and or registered trademarks of other countries.

※ ©Copyright 2018 NIPPON PAINT INDUSTRIAL COATINGS Co., Ltd., All rights reserved.