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Anti-smudge additive

OPTOOL DAC-200

PRODUCT INFORMATION

OPTOOL DAC-200 is an additive designed for UV-curable acrylic hard coatings. By adding DAC-200 to hard coating formulations, it imparts excellent anti-smudge properties, especially fingerprint resistance, and abrasion resistance to treated surfaces. Leveraging these features, DAC-200 can be applied to a variety of devices, such as smartphone and foldable smartphone resin films, touch displays in aircraft and automobiles, and VR goggles.

Features

OPTOOL DAC-200, as well as the hard coated surface treated with this product, has the following characteristics.

Fingerprint removability	Low friction and high durability	High compatibility
		
Fingerprints are easy to wipe off, keeping the surface clean.	Provides smooth tactile feel and excellent scratch resistance.	Can be added to a wide variety of hard coating agents.

1) Fingerprint removability

With the addition of DAC-200, fingerprints and dirt on the hard coated surface can be easily wiped away.

Fig.1 Effectiveness of the DAC-200 additive versus the untreated sample



2) Low friction and high durability of hard coated surface

The addition of DAC-200 to hard coatings not only increases anti-smudge properties but also enhances durability against scratches and abrasion. Compared to our conventional product (DAC-100), it improves scratch resistance, steel wool (SW) abrasion resistance, and eraser abrasion resistance, maintaining the aesthetics of displays over a longer term.

Table 1. Basic Properties of Additive Hard Coating

		AS additive		
Item	**Unit**	**No additive**	**DAC-200**	**Conventional product DAC-100**
Water contact angle*1)	°	63	117	115
Oil contact angle*2)	°	9.8	64.6	63.8
Coefficient of kinetic friction*3)	-	-	0.07	0.07
Haze*4)	%	0.33	0.98	1.09
Optical transmittance*4)	%	90.7	92.1	91.8
Pencil hardness*5)	-	2H	3H	3H
Scratch resistance*6)	cycles	-	**360**	190
Steel wool abrasion resistance*7)	cycles	-	**10,000**	2,000
Eraser abrasion resistance*8)	cycles	-	**10,000**	7,000

Evaluation sample: Substrate: PET film, Additive content: 0.5 wt% (solid content), Film thickness: 4–5 μm

*1) Liquid volume: 2 μL

*2) n-Hexadecane, Liquid volume: 2 μL

*3) Friction element: OA paper (20 × 20 mm), Load: 1.69 N (200 gf), Test speed: 200 mm/min

*4) Haze meter NDH 7000SP (Nippon Denshoku Industries)

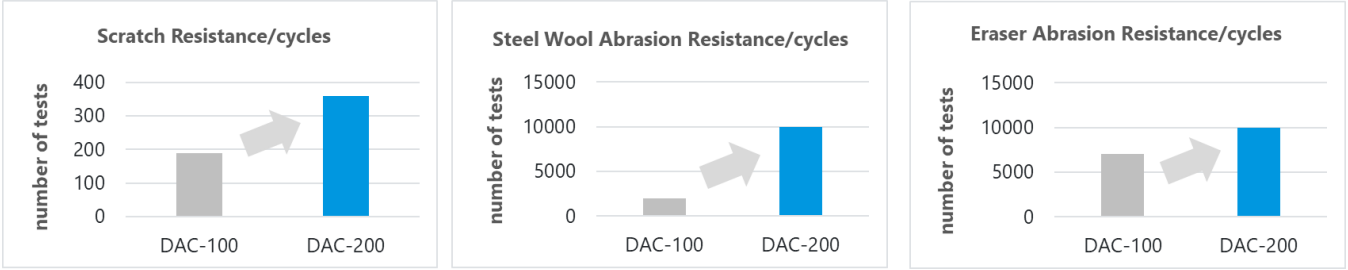
*5) ASTM D3363

*6) Steel wool: #0000, Load: 1.5 kgf, Contact area: 1 cm^2

*7) Number of cycles until water contact angle drops below 95°; Steel wool #0000, Load: 1 kgf, Contact area: 1 cm^2

*8) Number of cycles until water contact angle drops below 95°; Friction element: Eraser, Load: 1 kgf, Contact area: 0.6 cm^2

Fig.2 Durability comparison of hard coatings with additive



*DAC-100: Our conventional product

3) High compatibility

Compared to conventional products, DAC-200 has improved solvent solubility, expanding the options of usable hard coating systems. Increased solvent solubility enables the utilization of high-performance hard coating agents for a wide range of applications and products.

Table 2. Solubility in solvents

Solvent		DAC-200	Conventional product DAC-100
Alcohol ether Ester ether	Propylene glycol monomethyl ether (PGME)	A	B
	Propylene glycol monomethyl ether acetate (PGMEA)	A	A
	Diethylene glycol ethyl methyl ether (DEGEE)	A	B
Ketone	Methyl ethyl Ketone (MEK / Butanone)	A	A
	Methyl isobutyl ketone (MIBK)	A	B
	Acetone	A	A
Ester	Ethyl acetate	A	B
	n-Butyl acetate	B	B
Alcohol	Ethanol	D	D
	Isopropanol	D	D
Aromatic	Toluene	D	C
Aliphatic hydrocarbon	n-Hexane	D	D

Test conditions: A sample with a solid content of 20 wt% was diluted 5-fold with the above solvents (solid content 4 wt%) and well stirred, after which the appearance was observed.

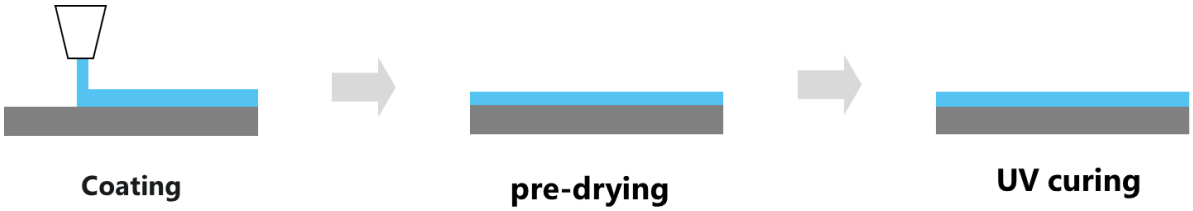
- **A**: Completely dissolved
- **B**: Appears clear, but small particles remain on the vessel wall
- **C**: Uniformly dispersed, but slightly turbid
- **D**: Insoluble (turbid, turbid with sediment, clear liquid with sediment, phase separation, etc.)

Composition information

Item		Value
Appearance		Whitish～Light yellow
Solid content		15～25 mass%
Solvent	Propylene glycol monomethyl ether acetate	40～50 mass%
	Methyl ethyl ketone (MEK)	30～40 mass%

Usage instructions

Add OPTOOL DAC-200 at 0.1 to 5% solid content ratio to hard coat formulation.



Coating methods: Bar coat, dipping, spray, spin coat, roll coat, etc.

→ Pre-Drying: 60-110°C for 2 to 15 minutes

→ UV Curing: High-pressure mercury lamp 400-1200 mJ/cm^2 N2 purge

Application examples

- **Resin films for smartphones and foldable smartphones**
- **Touch panels such as in-vehicle displays (panel surface or resin film)**

By making fingerprints and dirt less likely to adhere, screens stay clean and clear. The screen is protected against daily operational contact and becomes less prone to scratches. Furthermore, touch operation becomes smoother, enhancing usability and the user experience. These features can be sustained for a long time.









- **Smart glasses and VR goggles**

In smart glasses and VR goggles that require high resolution, dirt such as fingerprints significantly affects image visibility and comfort. By using DAC-200, surfaces become resistant to dirt and easy to clean.





*The values and processing examples described are representative examples and do not guarantee the quality or characteristics of this product.

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For questions or sample requests, feel free to contact us.

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