



FleXFOLD+

Flexible hard coat for PET and CPI (50 micron) films



Description

FleXFOLD+ is a siloxane polymer based coating designed for flexible PET and CPI plastic films. FleXFOLD+ forms highly transparent, optically clear and flexible hard coating, which is scratch and chemical resistant, easy to clean and has excellent optical properties. FleXFOLD+ is capable of withstanding dynamic folding with below 1.5 mm radius and as such is ideal for foldable display and touch screen applications. Compatible with standard AF treatments.

Main Applications

- Foldable Displays
- Protective overlays
- Lighting Fixtures / Luminaires

Key features

- Truly flexible coating
- Scratch Resistant Hard-Coat
- Easy-to-Clean
- Chemically Resistant
- Cost savings through improved energy efficiency
- Reduced surface reflection

Technical Background

Plastics are everywhere due to their light weight and design flexibility. However, most of the commonly used plastics are easily scratched, susceptible to degradation by various chemicals and suffer mechanical stress when folded to a small bending radius. Optitune's robust hard coats help circumvent these issues while delivering excellent optical properties.

How to Apply

This is a double-layer coating, TPD150 applied on top of FleXFOLD layer using a roll-to-roll (R2R) or sheet coating process followed by thermal and UV curing steps. Coating can be carried out using slot/die, gravure, reverse gravure, Meyer bar or other method. Plasma or corona pre-treatment may be necessary depending on substrate manufacturer grade. After final curing, a stable coating performance is achieved.

FlexFOLD+

Performance on (50 micron) PET and CPI films

Optical Performance	PET (bare)	PET (FlexFOLD+)	CPI (bare)	CPI (FlexFOLD+)
Transmittance % at 550 nm	90.4%	90.8%	90.2%	91.7%
Reflectance % at 550 nm	4.8%	4.4%	6.6	4.6
Haze Cmod	0.5	0.5	0.3	0.3
L*	95.4	96.1	95.6	96.9
a*	-0.03	-0.07	-0.7	-0.7
b*	0.6	0.6	2.2	1.9

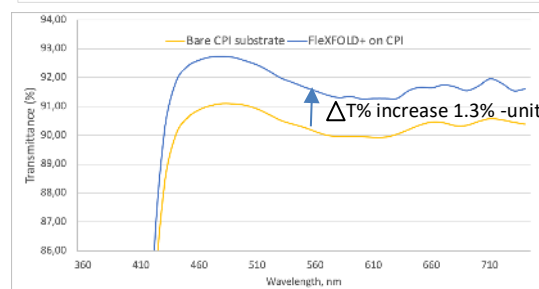
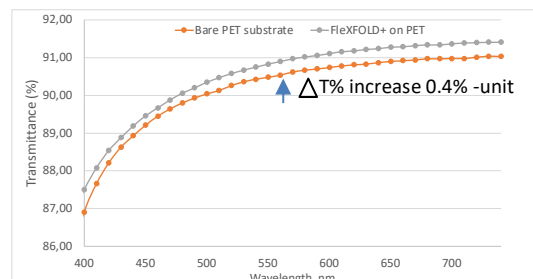


Table 1. Optical performance comparison (ASTM D1003)

Graph 1. FlexFOLD+ increases T% across visible light spectrum on PET and CPI films

Mechanical / Physical Performance	No coating	FlexFOLD + (TPD*) (PET)	FlexFOLD + (TPD*) (CPI)	Standard
Pencil Hardness	< 9B	H-2H	4H	ASTM D3363, Elcometer Tester
Adhesion	n/a	5B	5B	ASTM D3359-09, Elcometer crosshatch tester
Foldability	n/a	200 000 cycles - PASS	200 000 cycles - PASS	Outfolding 5 mm (R = 2.5 mm)/Infolding 3 mm (R=1.5mm)
Abrasion Resistance (steel wool)	VERY POOR	No scratches after 2500 cycles Contact angle >100 after 5000 cycles	No scratches after 2500 cycles Contact angle >100 after 5000 cycles	TABER® Linear Abraser - Model 5750 1000 g, 20 x 20 mm abradant, 2" stroke, 60 cycles per minute
Rubber abrasion	VERY POOR	Contact angle >100 after 10000 cycles	Contact angle >100 after 10000 cycles	Minoan rubber abrasion test, TABER ® Linear Abraser-Model 5750, Minoan rubber 1 kg weight lead, 40 cycles / min, stroke 15 mm
Chemical rubber abrasion	VERY POOR	Contact angle >100 after 10000 cycles	Contact angle >100 after 7000 cycles	Minoan rubber abrasion test, 99,9% ethanol, TABER ® Linear Abraser-Model 5750, Minoan rubber 1 kg weight lead, 40 cycles / min, stroke 15 mm
Water Contact Angle	70°	115°	116°	Mobile surface analyzer, MSA One-Click SFE

Table 2. Mechanical performance of bare 50 µm PET film and FlexFOLD+ coated PET and CPI film. *TPD150 applied on top of FlexFOLD layer provides improved AF function

Solution properties, storage, and handling

Solution should be stored below room temperature, preferably -18°C, in a well-ventilated place. Keep containers tightly closed and protected from sources of heat and light. Shelf life is 6 months from the date of manufacture. For working safety, consult product Material Safety Data Sheet.

The information given is based on our best knowledge at the date of issue but carries no guarantee or acceptance of responsibility. For further data on products toxicological, ecological and safety aspects, please consult the MSDS. It is the responsibility of the user of the product to ensure to satisfaction that the product is suitable for the intended purpose and methods of use. We do not accept responsibility for any harm caused by the use of this information.