



Melinex[®] PET film
for Durable Cards

Delivering *Speciality Film Solutions*

Melinex[®] PET film

Why choose Melinex[®] PET film?

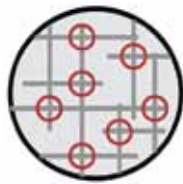
Melinex[®] Polyester Film, sometimes referred to as Melinex[®] PET, has a long history of providing custom designed films for use in the cards market. With outstanding thermal properties and controlled profile consistency, Melinex[®] films are the ultimate materials for a multitude of card applications.

	Melinex [®]	PC	PETG	PVC
Durability	✓✓✓	✓✓	✓	✓
Temperature Resistance	✓✓✓	✓✓✓	✓	✓
Environmental Credentials	✓✓✓	✓	✓✓✓	✓
Solvent Resistance	✓✓✓	✓	✓✓	✓
Ease of Use	✓✓	✓	✓✓	✓✓✓
Cost Effectiveness	✓✓	✓	✓✓	✓✓✓

What is Melinex[®] PET film?



PVC, PETG and Polycarbonate (PC) are all amorphous polymer materials which means their structure is made up of polymer chains which have no specific structure.



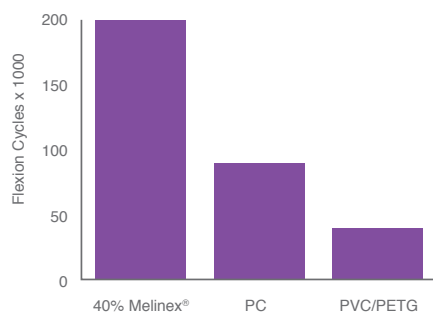
Melinex[®] is DTF's brand name for PET film and is a biaxially oriented crystalline material with polymer chains locked together in a specific lattice structure. This means it is a much higher performing material than PETG. The structure gives it enhanced durability and excellent temperature resistance.

Melinex[®] PET film and the Environment

- PET is the most widely recycled polymer in the world
- Melinex[®] PET film substrates can be produced with post-consumer polymer made from recycled bottles
- Melinex[®] PET film can be produced from raw materials derived from plant materials
- The manufacture of Melinex[®] PET film does not include the use of controversial chemicals such as BisPhenol A
- Melinex[®] PET film is widely used in food contact applications

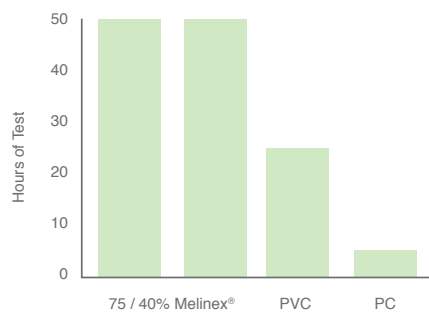
Technical Benefits of Cards made with Melinex® PET film

Flex Resistance



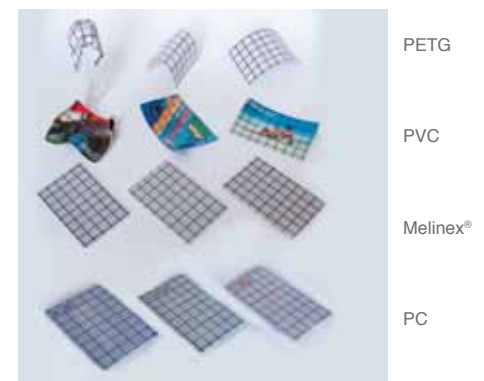
- ISO Flex Test uses repeated flexions of card to simulate day to day use.
- Appearance of card monitored through cycles to check for cracks and card failures.
- Cards containing Melinex® PET film showed no failures at the end of the test, other cards failed in the region of implant module.

Solvent Resistance



- Melinex® PET film has excellent resistance to embrittlement and premature failure caused by plasticisers found in wallets.
- Test method involves adding a small droplet of dioctyl phthalate (DOP) plasticizer to the card surface and placing it in a static stress fixture.
- Test measures hours before card fracture occurs (Test methods: INCITS322 & ISO24789-2).

Temperature Resistance



After 5 mins at 150 C After 5 mins at 100 C After 5 mins at 85 C

- Melinex® PET film provides excellent performance at elevated temperatures due to the crystallisation process (230°C for extended period) during manufacturing.
- Melinex® PET film offers superior thermal stability compared to both PETG and PVC.
- Melinex® PET film is used extensively in flexible electronics applications (continuous use - 70°C – 130°C).

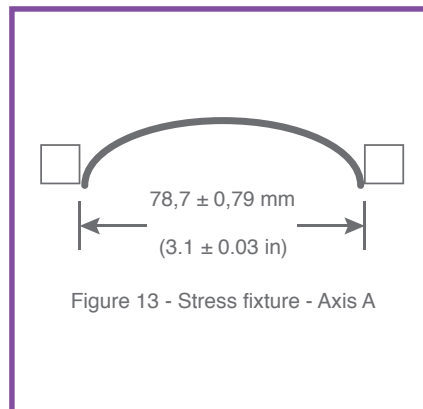
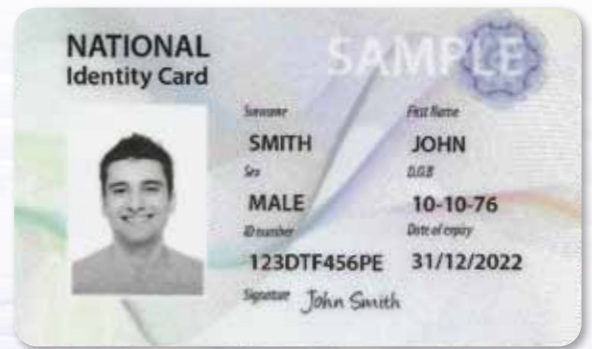


Figure 13 - Stress fixture - Axis A

Melinex[®] PET film ID Cards

Global threats to national security, tighter border controls and the need to identify people in a wide range of situations makes secure ID documents increasingly important.

Using Melinex[®] PET films for ID cards provides security and extended life time; that's why over 300 million ID cards issued each year use Melinex[®] PET films from DuPont Teijin Films.



Laser Engravable Melinex® PET film ID Cards

110 µm (4 mil) Melinex® LEO
152 µm (6 mil) Melinex® CORE2
White PVC/PETG/Module
152 µm (6 mil) Melinex® CORE2
110 µm (4 mil) Melinex® LEO

— - Indicates guilloche background printing

- Overlay allows laser personalisation
- Melinex® CORE2 gives significantly increased toughness and durability compared with PVC or PETG solutions
- Less expensive than polycarbonate solutions
- Laser Engravable PVC or PETG can be used in place of Melinex® LEO.

Melinex® PET films for Driver's Licence and Clear Window Cards

50 µm (2 mil) PVC Overlay
250 µm (10 mil) PVC core stock
152 µm (6 mil) Melinex® 342 (clear)
250 µm (10 mil) PVC core stock
50 µm (2 mil) PVC Overlay

— - Indicates guilloche background printing

- Simple structure
- Increased mechanical and thermal performance vs standard PVC cards
- Printing on PVC
- Typical applications include Driver's license, clear window ID, additional security feature
- Addition of clear Melinex® PET film provides more durable window card for ID applications vs clear PVC and/or PC
- Two side heat seal assists with lamination to PVC
- Can be incorporated into any interior layer of card for added durability.

Melinex® PET films for Campus Card

50 µm (2 mil) PVC Overlay
175 µm (7 mil) PVC core stock
307 µm (12 mil) Melinex® CORE2
175 µm (7 mil) PVC core stock
50 µm (2 mil) PVC Overlay

— - Indicates guilloche background printing

- Simple structure
- Increased mechanical and thermal performance vs standard PVC cards
- Printing on PVC
- 40% Melinex® / 60% PVC is the industry standard and preferred composition for campus cards
- RFID, Chip, Dual Interface, Blanks
- Superior durability, passes laundry test, excellent temperature and solvent resistance.

Xavier Study of 9000 cards tested in a Campus environment concluded that cards using Melinex® PET film were the most durable.¹

¹ Tushie, David, "Longer Card Expiration Requires Better Card Durability," Card Manufacturing magazine (June 2015; Vol 24;4 pgs 22-23)

Melinex[®] PET film for increased durability in Financial Cards

Changing lifestyles have led to an increase in the use of financial cards for payment of goods and services, replacing cash payments. This has resulted in the need for more durable payment cards to:

- Handle increased usage in contact and contactless payment methods
- Meet longer issued life expectancies (from 3 to 5+ years expiration)
- Protect more sensitive and intricate security features
- Minimize increasing costs for replacement cards due to mechanical failures.


Melinex[®] PET film adds durability and longer life expectancy to financial card applications.



Melinex® Cards Product Range

FILM TYPE	THICKNESS MICRON/(GAUGE)	PROPERTIES	TYPICAL APPLICATIONS
Melinex® CORE 1	152, 254*, 307* (600, 1000, 1210)	Opaque toughened film. 1-side heat sealable, 1-side printable. Accepts UV curable and solvent based inks using offset litho and screen printing.	Ideal for use with PVC or PETG overlays in laminated card applications.
Melinex® CORE 2	152, 307 (600, 1210)	Opaque toughened film. 2-side heat sealable. Accepts UV curable and solvent based inks using offset litho and screen printing.	Ideal for use with Melinex® overlay films to produce tamper evident 100% Melinex® PET card structures. Often used in campus cards.
Melinex® 342	75, 100, 152 (300, 400, 600)	Clear 2-side heat sealable. Accepts UV curable and solvent based inks using offset litho and screen printing.	For use in applications such as inlay for Driver's Licenses, picture window ID's.
Melinex® LEO	110 (430)	Transparent 1-side heat sealable laser engravable film.	Suitable as protective overlay on blank or partial ink coverage. Tamper evident structure when used with Melinex® CORE2.
Melinex® SPO	105* (415)	Transparent 1-side heat sealable, printable with dye diffusion thermal transfer colour photo personalisation.	Suitable as protective overlay on blank or partial ink coverage. Tamper evident structure when used with Melinex® CORE2.
Melinex® SRO	100 (400)	Transparent 1-side heat sealable, suitable for D2T2 colour personalisation via re-transfer process.	Suitable as protective overlay on blank or partial ink coverage. Tamper evident structure when used with Melinex® CORE2.

* Subject to higher minimum order quantity



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