



Metallized Polyester Films

Metallized Polyester MT5000 for Alufoil replacement



TPL and Polyplex are aware of the high requirements of a met PET in order to substitute Alufoil. Therefore, we have developed a special metallized polyester film type MT5000, which almost equals the specifications of Alufoil and brings some additional advantages.

In the table you find a comparison of the characteristics of Alufoil and MT5000:



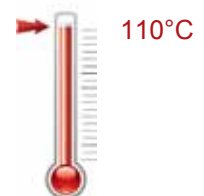
No.	Properties	Alufoil (6.5 my)	Met PET – MT5000 (12 my)
1	G.S.M. (gm/m2)	17.55	16.8
2	OTR (cc/m ² /day)	< 0.1 (unflexed)	< 0.5
3	WVTR (gm/m ² /day)	< 0.1 (unflexed)	< 0.3
4	Runability on Machine (Lamination m/c)	Low Speed	High Speed
5	Ease of Printing (Gravure)	Difficult	Easy
6	Lamination (Wastage)	High	Low
7	Pin Holes	High	Low
8	Bi-Metallic Corrosion / Oxidation	Yes	No
9	Contamination	Risky	No
10	Damage (Transit/Handling)	Sensitive	Negligible
11	Temperature resistance		Up to 110°C, 30 min
12	CO ₂ – kg/m ²	0.69	0.34
13	Energy Consumption Mj/m ²	11.2	8.0



Probably the most important issue, when substituting Alufoil, are the barrier properties of the met PET. MT5000 offers a supreme barrier to both **oxygen (< 0.5)** and **water vapour (< 0.3)**, which is almost equaling the barrier of Alufoil and at the same time has a superior **metal adhesion (600 gm/25 mm**, Polyplex Method), in comparison to other met PET films.

Furthermore, met PET has an improved runability in comparison to Alufoil. This allows machines to run at a higher speed. Additionally, met PET can be printed more easily and efficiently. The good flex-crack resistance compared to Alufoil based laminates secures the barrier properties of MT5000.

The good temperature resistance of MT5000 allows its application even when thermal treatment of the packed product at high temperatures (up to 110°C) is required, such as **hot filling or pasteurization**.

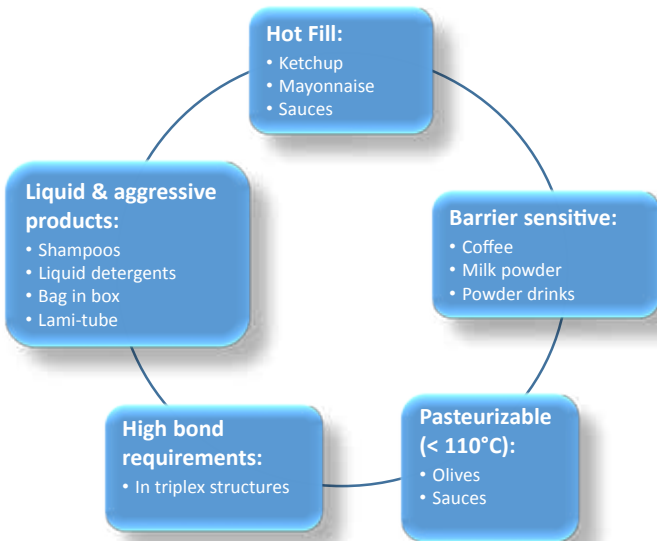


Pinholes can lead to a reduction of the moisture and oxygen barrier and creates leakage. This leads to an accelerated degradation of the packed food products. MT5000 PET film is much more resistant to pinholes than Alufoil and therefore helps to improve food safety.



Aluminium Pinholes from natural sources (Lee Murray, 2005)

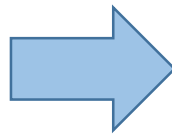
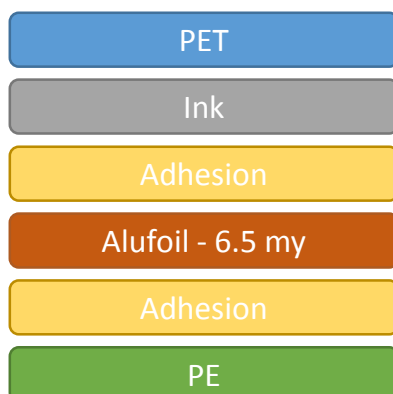
Application segments



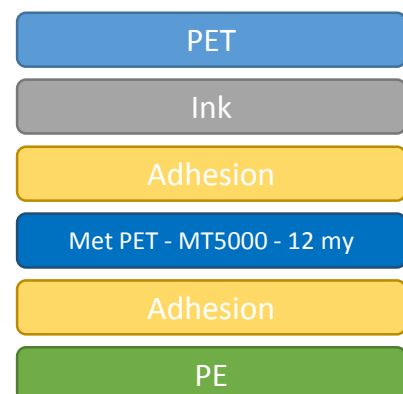
MT5000 can be used, due to its superior characteristics, in various application segments like Hot Fill applications, packaging of barrier sensitive products as well as liquids and aggressive products. In addition, it can be used in case of high bond requirements and in pasteurization processes up to 110°C.



Existing Foil Based Laminate Configuration



Replaced MT5000 Based Laminate Configuration



Advantages of metallized PET

There are many advantages, which make it attractive to switch from Alufoil to met PET like the costs, the ecological as well as the technological aspect.

Cost Aspect

The main driver for changing from Alufoil to a met PET is probably the cost aspect. Met PET not only has a lower price per kilo, it also has a lower density, namely 1.4 (Alufoil 2.7). Additionally, the converting cost is reduced, as machines can be run faster using met PET.

Cost Aspect

- Cheaper and lower unit weight
- Allows simplification of the laminate structure
- Printing/laminating at higher speed

Ecological Aspect

- Lower use of energy (30%) and CO2 emissions (50%) in production
- Reduction of overall weight for same performance

Technological Aspect

- Easy handling
- Better resistance to flex cracking
- Even with thickness reduced to 9 my the full barrier is provided

Simplification of the laminate structure

As the metallized side is inside the laminate, there is no risk of barrier degradation due to scratches. Therefore, using met PET, a simplification of the unprinted packaging structure can be achieved. At the same time, the volume of the packaging material and hence waste is reduced. This calculates directly into cost reduction.



Carbon footprint & Energy Consumption



A study of the EMA compared the carbon footprint and the energy consumption of the production of an Alufoil laminate structure (PET // Alufoil // PE) with the one of a met PET laminate (PET met // PE) used for coffee packaging.

The study concluded that the production of Alufoil laminates is highly energy intensive and has a big need of natural resources. Using met PET laminates the CO₂-output is reduced by around 50%. Furthermore, the met PET laminate production uses almost 30% less energy.

	Met PET laminate	Alufoil laminate
CO ₂ (kg/m ²)	0.34	0.69
Energy Consumption (Mj/m ²)	8.0	11.2

Source: EMA Study



Technological Aspect

One of the technological advantages of using met PET against Alufoil is the matter of downgauging. Met PET can be reduced easily to 9 my without losing the highly valued barrier properties. Using Alufoil, downgauging is limited, due to increasing loss of barrier and the difficulty in foil handling during printing and lamination. Furthermore, met PET offers a better flex-crack resistance and less pinholes.

„If all the coffee packed in the world would change from aluminium foil structure to met PET structure, the power saving would be 14.4 billion MJ. This would prevent a CO₂ emission of 1.4 million tonnes, which is equivalent to the CO₂ generated by 1'225'000 passengers flying from New York to Tokyo.“ (EMA Study)

Requirements for Alufoil replacement

Alufoil replacement is a demanding task and the suitability of MT5000 for any such application must be thoroughly tested by the converter. The most important requirements for the substitution material are depicted in the illustration below.

- Barrier Properties
- Lamination Bond Strength
- Seal Strength
- Shelf Life
- Machine Runability (FFS)

Energy Management - Certification ISO50001



Polyplex Europe has achieved the ISO50001 certification in energy management in 2014, confirming the improvement of the energy management system and the resulting energy performance. The standard aims to help organizations to continuously reduce their energy use, and therefore energy costs and greenhouse gas emissions. This positions Polyplex as pioneering in the management of energy.

Interview with Amit Prakash, General Manager of Polyplex Europe

TPL: First, we would like to congratulate you on the ISO50001 certification in energy management. What is the motivation of Polyplex to reduce their energy consumption?

Amit Prakash: We in Polyplex have always wanted to make our organization energy efficient. We have carried out many energy projects for efficient energy usage, which have not only reduced our energy consumption but also the carbon footprint of the organization, hence making our organization better and eco-friendlier. To have a better management of energy and a more efficient usage, we have planned to go for ISO50001 certification and achieved it.



Amit Prakash

TPL: What measures did you take to achieve this reduction in energy usage? What investments or reorganizations have you done?

Amit Prakash: To achieve this certification firstly we measured power and fuel consumption across the whole facility. Then, various steps were taken, which were mainly focused on reducing unnecessary end-use of resources, increasing efficiency, reducing energy wastage and finding superior energy alternatives. We have invested in various projects like:

1. **Replacing the lightings** all across the facility with less energy consuming and more efficient LED fixtures.
2. **Replacing all the inefficient pumps and motors** with the efficient ones.
3. **Chill roll free cooling project**, wherein the system was designed to use naturally available cooling of atmosphere during winter.
4. **Installation of oxygen trim systems for the hot oil boilers** for the efficient usage of fuel.

Apart from these, we have also prepared an **ENERGY POLICY** for the organization.

TPL: By how much were you able to reduce your energy consumption?

Amit Prakash: As of now, we are **saving electricity of 187'854 kWh/Month** and **Natural gas of 3'401 Sm³/month**.

*„These savings correspond to the electricity consumption of 288 Swiss citizens. “
(Swiss Federal Office of Statistics & Association of the Swiss electricity companies)*



TPL: What further investments or actions are planned for the reduction of the energy consumption?

Amit Prakash: In future, we have planned various investments in the facility, few of which are:

1. Direct melt casting instead of the extrusion process for the film plant.
2. Oxygen trim system in the offline coater for the efficient usage of combustion fuel.
3. Natural cooling system instead of chilled water cooling for Metallizer-4.
4. Installation of VFD's, wherever applicable, for the efficient usage of electricity.



Outlook:
Next Mailing - End applications for metallized PET films