YuMe Lunch Bag

product specification, definition and related terms

Yume Lunch Bag is a multi-layer bag which each of the layers has been carefully chosen to offer a range of features and benefits to Yume owner. The followings are the specification and characteristics of each layer from outside inwards. At the end of this section, there are some review and definition of some related and frequently used terms and related claims which is relevant to Yume lunch bag.

**Paper bag:**

It is a face of Yume bag, an artwork with colourful and stylish designs that brings style and beauty to our routine everyday life.

However it is not a simple and normal paper, it is a flashspun high-density polyethylene fibers, a nonwoven synthetic material commonly in the market famous as Tyvek® from DuPont which is very strong and more durable than paper, difficult to tear but can easily cut with scissors or a knife. Water vapour can pass through Tyvek®, but liquid water cannot.

Tyvek® can resist repeated folding and flexing without tearing. It can also be printed, glued, laminated, sewn, stapled and fixed. Tyvek® is not affected by most acids, bases and salts. It has excellent rot and mildew resistance and resist soiling and staining. Tyvek® is almost indestructible and can endure temperatures ranging from -75 °C to +118 °C.

Important properties of Tyvek® are:

- Light weight
- Non-toxic
- Class A flammability rating
- Chemical resistance
- Dimensional stability
- Scratch resistance
- Antistatic
- Opacity
- Neutral pH
- Tear resistance

Although the material used is making the actual Yume bag is not from DuPont Company but it is assumed to be its equivalent and have the same properties and specifications.
Polyethylene (PE) Foam:

Polyethylene foam (or PES) is a crosslinked closed-cell structure PE sponge (XLPE Foam) that has an excellent insulation property against heat, liquids, noise and steam. It is very lightweight with soft elastic properties with operating temperature between -60 °C to +100 °C.

Important properties of PE foams are:

- Impact and vibration absorption
- Weather and chemical resistance including splash resistance to oils
- Acoustic and thermal insulation properties
- Non-dusting
- Buoyancy with low water absorption
- Impervious to mildew, mould, rot and bacteria

Aluminium Coated, PEVA backed PET film

We look at each layer separately:

1) PEVA:

Ethylene Vinyl Acetate (EVA) also known as poly (ethylene-vinyl acetate) (PEVA), is the copolymer of ethylene and vinyl acetate. There are three different types of EVA copolymer, which differ in the vinyl acetate (VA) content and the way the materials are used.

The EVA copolymer which is based on a low proportion of VA (approximately up to 4%) may be referred to as vinyl acetate modified polyethylene. It has some of the properties of a low-density polyethylene but increased gloss (useful for film), softness and flexibility. The material is generally considered as non-toxic. The EVA copolymer which is based on a medium proportion of VA (approximately 4 to 30%) is referred to as thermoplastic ethylene-vinyl acetate copolymer and is a thermoplastic elastomer material. It is not vulcanized but has some of the properties of a rubber or of plasticized polyvinyl chloride particularly at the higher end of the range. The EVA copolymer which is based on a high proportion of VA (greater than 40%) is referred to as ethylene-vinyl acetate rubber.
Ethylene vinyl acetate copolymer resins are inherently flexible, tough, and clear. They are a proven solution for sealants in meat and dairy packaging structures, footwear, wire and cable insulation, as well as photovoltaic encapsulants and sheets. PEVA replaces PVC in non-invasive medical tubing and bag applications. PEVA provides excellent impact strength, puncture resistance, flex crack resistance, and adhesion.

2) PET Film:

PET film or PolyEthylene Terephthalate film is a thermoplastic polymer (from the family of polyester resins), which can be bi-axially oriented (BOPET film), bubble extruded, and co-extruded (co-extruded PET film). Polyester film is one of the most common substrates (with common trade names of Maylar®, Melinex®, Hostaphan®, etc.) used in the converting industry because of its balance of properties in relation to other thermoplastic polymers. Service temperatures of PET films are from -70 °C to 150 °C.

PET Film is comparable or better than other thermoplastics in the following categories:

- Specific gravity
- Elongation
- Melting point
- Tensile strength
- Tear strength
- Oxygen permeability
- Water vapor transmission rate
- Insulation breakdown
- Dielectric constant
- Wide service temperature range
- Dimensional stability

3) Metallised PET:

Metallised PET is a PET film coated with a thin layer of metal, usually aluminium. They offer the glossy metallic appearance of an aluminium foil at a reduced weight and cost. Metallised PET is widely used for decorative purposes and food packaging.

Metallised PET has a reflective silvery surface similar to aluminium foil and is highly flammable. The coating also reduces the permeability of the film to light, water and oxygen. The properties of the PET remain, such as higher toughness, the ability to be heat sealed, and a lower density at a lower cost than an aluminium foil. This gives metallised films some advantages over aluminium foil and aluminium foil laminates. Some very high barrier metallised PET are available using PEVA, but are not yet cost effective.
against foil laminates. \textsuperscript{x}

A surface or reverse printable bi-axially oriented PET films exhibiting excellent adhesion and bright foil appearance. Consistency good handling properties, heat stability, slip and high tensile strength for easy lamination and also excellent WVTR, OTR, and light barrier properties are some of its specific advantages.

**Yume Bag:**

Considering all the above mention properties which any of the elements of the bag provides, the Yume bag have the following specification:

- Light weight
- High modulus and tensile strength
- High tear strength (tear resistance)
- Scratch resistance
- High chemical resistance (against most of usual chemicals can be used in the application)
- Non-toxic
- High thermal insulation
- Low water absorption
- Impervious to mildew, rot, mould and bacteria
- High puncture resistance
- Low permeability (against water, smell, moisture)
- It is compliant with regulation of FDA 21 CFR 177.1630 (f, g, h) and EU Directive 2002/72 & 2011/10

Following are more Yume bag characteristics and related definition:

**Service temperature:**

Different elements used in structure of Yume bag have different service temperature. Service temperature of Tyvek is between -75 C to +118 C. This range for PE foams are from -40 C to 70 C. PET film has a service temperature of -70 C to 150 C and this range for PEVA layer is from -40 C to 80 C. So considering a combo structure of the Yume bag, the safe service temperature of the whole bag could be between -40 C to 70 C.

**Microwave safe:**

Considering the above service temperature and the frequency microwave energy, Yume bag is microwavable and it should be advised NOT to use in microwave.

Metallised film can be used a susceptor packaging which absorb electromagnetic energy and convert it to heat. This type of packaging is used in industrial heating processes or microwave cooking.\textsuperscript{xi} However the same effect, which will cause rapid increase of bag temperature plus having layers with low melting point and low service temperature, will cause the high damage to the bag.
To test the theory, a sample of Yume bag has been placed in the microwave for a field test and above picture was the outcome.

**So Yume bag should NOT be used in microwave.**

**Non-toxic:**

“Non-toxic” is a marketing term used to describe many products. Searching the meaning of that on the web, you can find this description: xii

“Non-toxic” is not meaningful and can be misleading. There is no definition or standard used for judging whether a consumer product or its ingredients are “non-toxic,” and no assurance that such a claim has been independently verified. A product that does not meet the definition of “toxic” according to the Consumer Product Safety Commission should not necessarily be considered non-toxic.”

However, we can also claim that Yume bag does not have any toxic effect of food (cold or warm) packaged or kept in it and it is completely safe for the purpose it is designed for.

**BPA free:**

Bisphenol A (BPA) is an organic synthetic compound. BPA is an industrial chemical that has been used to make certain plastics and resins since the 1960s. BPA is found in polycarbonate plastics and epoxy resins. Polycarbonate plastics are often used in containers that store food and beverages, such as water bottles. They may also be used in other consumer goods.

Some research has shown that BPA can seep into food or beverages from containers that are made with BPA. Exposure to BPA is a concern because of possible health effects of BPA on the brain, behaviour and prostate gland of fetuses, infants and children. Additional research suggests a possible link between BPA and increased blood pressure.

However, the Food and Drug Administration (FDA) states "BPA is safe at the current levels occurring in foods" based on extensive research, including two more studies issued by the agency in early 2014. The European Food Safety Authority (EFSA) reviewed new scientific information on BPA in 2008, 2009, 2010, 2011 and 2015: EFSA’s experts concluded on each occasion that they could not identify any new evidence which would lead them to revise their opinion that the known level of exposure to BPA is safe; however, the EFSA does recognize some uncertainties, and will continue to investigate them. xiii

There is no BPA based polymer used in the structure of Yume bag so we safely can claim that this product is “BPA free”.

**Phthalate free:**

Phthalates or phthalate esters are esters of phthalic acid and are mainly used as plasticisers (substances added to plastics to increase their flexibility, transparency, durability, and longevity). They are mainly
used to soften PVC but used in a wide range of common products, and are released into the environment. xiv

Due to the ubiquity of plastics (and therefore plasticizers) in modern life, the vast majority of people are exposed to some level of phthalates. You’ll find phthalates in perfume, hair spray, deodorant, almost anything fragranced (from shampoo to air fresheners to laundry detergent), nail polish, insect repellent, carpeting, vinyl flooring, the coating on wires and cables, shower curtains, raincoats, plastic toys, and your car’s steering wheel, dashboard, and gearshift. (When you smell “new car,” you’re smelling phthalates.)

Several phthalates are "plausibly" endocrine disruptors. The long-term health effects of exposure to endocrine disruptors, such as phthalates, are unclear. Authors of a 2006 study of boys with undescended testis hypothesized that exposure to a combination of phthalates and anti-androgenic pesticides may have contributed to that condition. A scientific review in 2013 came to the conclusion that epidemiological and in vitro studies generally converge sufficiently to conclude that phthalate anti-androgenicity is plausible in adult men. xv

**Considering that none of the polymeric layers of Yume bag contains Phthalate, so we can claim that Yume bag is “Phthalate free”.**

**Recyclability:**

Almost all the individual ingredient and layers used in construction of Yume bag is recyclable. No multi-layer bag considered as “recyclable” and that is because of this simple fact that all of these layers which is made of different material are not simply separable or the process of separating these layers are not economic. Another would be the fact that in lack of huge number of similar product which can make the industrial process separation of layers (if possible) economical, it is simply worth to break down the package into its individual layers and the whole package will ends in landfills.

**Yume lunch bag is NOT a recyclable product.**

**Eco-friendly:**

Environmentally friendly or environment-friendly, (also referred to as eco-friendly, nature-friendly, and green) are sustainability and marketing terms referring to goods and services, laws, guidelines and policies that claim reduced, minimal, or no harm upon ecosystems or the environment. Companies use these ambiguous terms to promote goods and services, sometimes with additional, more specific certifications, such as Ecolabels xvi. Their overuse can be referred to as greenwashing. xii

Eco-friendly literally means earth-friendly or not harmful to the environment. This term most commonly refers to products that contribute to green living or practices that help conserve resources like water and energy. Eco-friendly products also prevent contributions to air, water and land pollution. Making a truly eco-friendly product keeps both environmental and human safety in mind. At a minimum, the
product is non-toxic. Other eco-friendly attributes include the use of sustainably grown or raised ingredients, produced in ways that do not deplete the ecosystem. Organic ingredients or materials are grown without toxic pesticides or herbicides. Products with "made from recycled materials" contain glass, wood, metal or plastic reclaimed from waste products and made into something new. Biodegradable products break down through natural decomposition, which is less taxing on landfills and the ecosystem as a whole.

Companies sometimes label their products "eco-friendly" or "environmentally friendly" without them truly being so. Called "greenwashing," marketing campaigns perpetuate this practice, aimed at helping companies increase their product sales by appealing to ecologically conscious buyers.

The Australian Trade Practices Act has been modified to include punishment of companies that provide misleading environmental claims. Any organization found guilty of such could face up $1.1 million in fines. In addition, the guilty party must pay for all expenses incurred while setting the record straight about their product or company's actual environmental impact. xviii

**Considering the ambiguities around the terms “eco-friendly” and all the discrepancies and also the fact that it is not recyclable and to avoid greenwashing, it is suggested to avoid using “eco-friendly” term.**

References:

i  [https://en.wikipedia.org/wiki/Tyvek](https://en.wikipedia.org/wiki/Tyvek)


iv  [https://propolyethylene.ru/vspenenniy/](https://propolyethylene.ru/vspenenniy/)


xii  [https://en.wikipedia.org/wiki/Bisphenol_A](https://en.wikipedia.org/wiki/Bisphenol_A)

xiii  [https://en.wikipedia.org/wiki/Phthalate](https://en.wikipedia.org/wiki/Phthalate)

xiv  [https://en.wikipedia.org/wiki/Phthalate](https://en.wikipedia.org/wiki/Phthalate)
