

The DuPont logo, consisting of the word "DUPONT" in a red, serif font inside a red oval.The Tyvek logo, consisting of the word "Tyvek." in a blue, sans-serif font.A close-up photograph of a green pea pod, partially open, showing several bright green peas inside. The pod is wrapped in a light-colored, textured protective material, likely Tyvek.

DUPONT™ TYVEK® PROTECTIVE PACKAGING

Technical Handbook

www.packaging.tyvek.com

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1. INTRODUCTION

1.1 WHAT IS TYVEK®?

Tyvek® is a registered trademark of DuPont for its family of tough, durable sheet products made of high density polyethylene (HDPE). The sheet is formed first by spinning continuous strands of very fine interconnected filaments, and then bonding them together with heat and pressure. The result is a bright white spun bonded sheet.

Tyvek® offers all the best characteristics of paper, film and fabric in one material. This unique balance of properties, which cannot be found in any other material, makes Tyvek® lightweight yet strong; vapor-permeable, yet water- and chemical-resistant; as well as puncture-, tear- and abrasion-resistant. Tyvek® is also low-linting, smooth and opaque.

1.2 A CHOICE OF “HARD” OR “SOFT” STRUCTURE TYPES FOR A WIDE RANGE OF APPLICATIONS

- Type 10, a “hard,” area-bonded product, is a smooth, stiff non directional substrate with good printability in both sheet and roll form. It has high opacity, excellent whiteness and good surface stability.
- Types 14,15 and 16 are “soft,” point-bonded products with an embossed pattern, providing a fabric-like, flexible substrate with good printability and tear resistance.

Tyvek® is used where barrier, durability and breathability are required. It offers excellent splash and dry protection against particulates and provides an excellent bacterial barrier.

The outstanding low-linting, combined with barrier properties, make Tyvek® an excellent material in several application fields.

1.3 AVAILABILITY

Tyvek® is available in a wide range of rolls and formats. (Roll width max. 3m).

Please contact us for further details.

Telephone number: +352 3666-5589

Homepage: www.packaging.Tyvek.com

Roll good supply: http://www2.dupont.com/Tyvek_packaging/en_GB/contact/contact-us.html (Link to contact form on the website)

1.4 PRODUCT FEATURES

Strength

Tyvek® is tear resistant whether wet or dry. Due to its unique structure it remains strong even when folded.

High opacity

The high opacity of Tyvek® is a result of multiple light refraction between the fine filaments and air within the sheet.

Dimensional stability

Between 0 and 100% relative humidity, Tyvek® remains dimensionally stable. Under these circumstances, dimensions change less than 0, 01%.

High flex strength

Tyvek® can be creased and bent almost indefinitely without losing its strength.

Low linting

Tyvek® is made of continuous fibers and under normal conditions produces no free lint particles. It is therefore suitable for direct contact with sensitive parts.

1. INTRODUCTION

Lightweight

Other materials need more than double basis weight to achieve similar strength as Tyvek®. The density of Tyvek® is 0,38 g/cm³.

Water resistance

DuPont™ Tyvek® is highly resistant to penetration by water. In fact, water in contact with Tyvek® does not “wet” its surface, which means that water does not spread but remains as droplets on the surface.

The physical properties of spun bonded olefin products are not affected by water; Tyvek® is equally strong wet or dry under ordinary conditions and ambient temperature.

Food contact

Tyvek® styles suitable for direct food contact according to COMMISSION REGULATION (EU) No 10/2011 on plastic materials and articles intended to come into contact with food and / or the requirements of title 21 of the US Code of Federal Regulations (21 CFR 177.1520) FDA, are available. Details for the certification as well as a copy of the certificate are available upon request.

Moisture vapor transmission

Tyvek® resists to water penetration, while allowing moisture vapor to pass through thanks to its filament structure.

Chemical resistance

Tyvek® is unaffected by most acids, bases and salts. Prolonged exposure to oxidizing agents such as concentrated nitric acid or sodium persulphate may cause some loss of strength.

Neutral pH

Spun bonded olefin has a neutral pH = 7. Therefore, it is neither acidic nor basic. The styles that are corona treated and antistatic treated also have a pH = 7.

Resistance to microbial penetration.

Microbial barrier test data consistently prove that Tyvek® holds out bacterial spores and test particles better than other porous packaging materials even under the most rigorous conditions. In addition, a long-term shelf-life study proved conclusively that Tyvek® can maintain sterility for at least five years if package integrity is not compromised.

Compatibility with a broad range of sterilization methods

Only Tyvek® is compatible with all of the most commonly used sterilization methods. No matter which process you use: ethylene oxide (EO), gamma, electron-beam, steam (under controlled conditions) or newer methods, such as low-temperature oxidative sterilization processes, Tyvek® will retain its protective properties, color and flexibility.

Temperature range

Tyvek® retains its toughness and flexibility until -75°C. Tyvek® begins to shrink at 118°C and melts at 135°C. When processing Tyvek® web under tension, the temperature should not exceed 80°C.

Flammability

A strip of clean untreated Tyvek®. When first exposed to an open flame shrinks away from it. If the flame follows the strip, it will catch fire, burn slowly and drip molten polymer.

Aging/UV-resistance

Physical properties of spun bonded olefin are degraded with extended exposure to direct sunlight (ultraviolet rays), although at least one to three months of useful outdoor life can be expected in many applications. UV resistance can be improved with opaque coatings. Styles of spun bonded Olefin containing UV inhibitors are available for applications requiring higher UV resistance.

1. INTRODUCTION

Corona treatment

Most Tyvek® styles that will be printed on are corona (discharge) treated to improve ink and coating adhesion.

Through corona treatment, the surface is oxidized from both sides and the inks as well as glues or coatings adhere better.

The fiber structure of Tyvek® allows inks to penetrate and therefore increases the abrasion resistance of the print. Corona treatment on Tyvek® lasts for several years.

Static

To reduce the build-up of static electricity during sheet and roll handling operations, some styles are also coated with an antistatic agent.

Spun bonded olefin destined for use in the packaging of food stuff or pharmaceutical products are neither corona nor anti-static treated.

Toxicity

Tyvek® is classified as non-toxic. Testing on skin resulted in no irritation, swelling or allergic reaction.

Rot and mildew resistant

Tyvek® does not degrade after being buried in soil for an extended period. Clean Tyvek® will not promote the formation of mildew or other micro-organisms.



2. HOW TO CONVERT TYVEK®



2.1 GENERAL

Although Tyvek® brand spun bonded olefin is processed in much the same way as paper or plastic films and on the same equipment; it does require different handling techniques for optimum results. For this reason, we strongly recommend that those who have never before worked with spun bonded olefin conduct a pilot run to fully test each conversion operation before beginning full-scale production.

Here are a few tips to keep in mind:

- Spun bonded olefin cannot be crush-cut as easily as paper. Its filaments are very strong and each must be completely severed; “hangers” will not break off.
- Spun bonded olefin elongates more than paper and will stretch up to 30% before breaking. To minimize distortion or neck-down, keep web tension as low as practical 1.4 N/cm during processing.
- Spun bonded olefin is a thermoplastic material and it melts sharply at 135°C.
- When coating or laminating spun bonded olefin, the web temperature in the oven should not exceed 80°C.

2.2 SLITTING, SHEETING, CUTTING

Knives, dies and punches must be set to close tolerances. A sharp, slightly rounded edge gives longer service than a pointed edge for crush cutting, but a sharp edge is preferred for other slitting methods.

2.3 ROTARY DIE PUNCHING

Because soft steel male/female rotary dies dull quickly when set to the close tolerances required to punch Tyvek® cleanly, the use of rotary dies made of hardened tool steel or tungsten carbide is recommended.

2.4 DIE CUTTING

Tyvek® can be die-cut using either steel rule, male/female or closed dies. Tyvek® fibers must be completely cut and dies must be in good condition with sharp, nick-free edges. Dull dies cause edges to curl. When using closed dies, the use of a side cutter with internal relief is recommended. De-aerate and keep lift height below 7.2cm (3 inches) when die cutting to avoid oversizing top blanks.

2.5 PUNCHING

Tyvek® can be punched on tag, letterpress and rotary line-hole equipment. Best results are obtained from sharp, well registered and close fitting punches. Punches may be either smooth or serrated and cut best if ground concave on the ends. A soft self-honing male punch in a hardened female die is recommended.

2.6 FOLDING

Tyvek® will take a dead fold and can be folded on conventional bindery folders. An increase in roller and spring tension will produce sharper creases. Due to the inherent slippery surface of Tyvek®, soft, rubber-covered rollers will aid feeding.

2. HOW TO CONVERT TYVEK®

2.7 PERFORATING

To make clean tearing perforations a 10:1 cut to reserve ratio is recommended, e.g. 8.0 mm cut: 0.8 mm reserve (5/16 in.: 1/32 in.). Tear initiation can be assured by positioning a cut at the edge of the sheet.

2.8 EMBOSSING

Tyvek® can be embossed with either high or low pressure equipment. Cold embossing does not significantly reduce the strength of Tyvek®. It does, however, reduce opacity. Embossing cylinders used for Tyvek® usually are very shallow, having a depth of only 0.13-0.65 mm (5-25 mils).

A Shore D hardness of 70-80 for the rubber backup cylinder is preferred.

2.9 HOT FOIL STAMPING

This is readily accomplished on Tyvek® due to its thermoplastic nature. A variety of foils is available from suppliers for label and book cover applications. A foil that will transfer cleanly to Tyvek® between 135 -160°C should be chosen. Large, solid foil-stamped areas tend to pucker and distort Tyvek® and should be avoided.

To avoid pucker and distortion, Tyvek® 105g/m² or self-adhesive coated Tyvek® is recommended.

2.10 DYEING

Conventional textile dyeing processes do not impart permanent color to Tyvek®. However, Tyvek® can be printed on by flexographic or gravure processes.

2.11 LAMINATING

Tyvek® can be extrusion-, adhesive-, flame-, ultrasonic-, thermal- and calender laminated. Extruded low density polyethylene (LDPE) is an excellent adhesive for laminating foil and film to Tyvek®. Polyurethane adhesives can be used to adhere a variety of films and fabrics to Tyvek®. When laminating Tyvek® to paper or board, it is important to completely cover Tyvek® with adhesive to prevent bubble formation. Polyurethane adhesives or hotmelt (Euromelt 772 from Henkel or Lunamelt KC2010 from H.B. Fuller) are recommended. Recycled board is not recommended, since the board can contain remaining solvents or binders, which can cause bubble formation.

2.12 GLUING

A number of adhesives can be used to glue spun bonded olefin, either to itself or to other substrates. In general, water-based adhesives that provide quick tack and fast drying are preferred. However, the first step in choosing an adhesive is to determine how it will react.

Natural product adhesives based on dextrin, casein or animal by-products can be used to adhere Tyvek® to itself and a variety of paper materials. Water based synthetic lattices such as the ethylene/vinyl acetate adhesives form fiber tearing bonds with Tyvek®. Hot melt polyamide adhesives are available which form good bonds to Tyvek® with a variety of materials. Acrylic pressure sensitive adhesives are commonly used with a release liner. Please refer to the solvents list before using your adhesive. Some of the components may interact with Tyvek®.

2. HOW TO CONVERT TYVEK®

2.13 SEWING

Tyvek® can be sewn on conventional sewing machines. Best results are obtained with machines equipped with puller or drop-feed. Smooth, rubber covered rolls should be used rather than knurled metal rolls, which tend to leave impressions on Tyvek®.

When stitching Tyvek®, lowest possible stitch frequency (2-3 stitches/cm with low tension) and the smallest needle should be used. The needle should have a flat point to produce perforating slits. It can be recommended to use chain and aligned stitches, especially 2,5 cm chain stitch.

2.14 SEALING AND COATING

Coatings are used to color, improve print fidelity, add gloss or mask the fiber pattern in Tyvek®. Air-knife coating is preferred for aqueous coating because it applies a uniform thickness. Usually an increase in binder content is needed to achieve acceptable coating adhesion to Tyvek®. The air knife also produces a very smooth surface which is ideal for printing. Gravure coating is preferred for solvent-based systems, particularly where deep coloration is required. Tyvek® can be extrusion coated using special polymers. When coating or laminating Tyvek®, the web temperature should not exceed 80°C.

High seal strength can be achieved using hot-bar or impulse techniques sealing Tyvek® to Tyvek®. Heat sealing Tyvek® to itself or other films is usually accomplished by applying a heat seal coating such as branched (low density) polyethylene (LDPE) to one of the materials (please consult chapter 3). Tyvek® cannot be dielectrically sealed under ordinary conditions because it is non-polar. Ultrasonic sealing can be used to create fiber tearing seals with most of Tyvek® styles and without the puckering that is often associated with heat seals.



3. TYVEK® FOR THERMAL SEALING

Seal ability of plain Tyvek® to itself or to other films can be achieved with heat or with ultrasonic welding technology. However the processing window and parameters are very narrow and need to be thoroughly defined. The seal visual quality is often a critical factor.

In order to optimize the sealing process and the visual attributes of the seals DuPont introduced the heat sealable Tyvek® 2058L. This Tyvek® style, primarily designed for active packaging that is intended to come into contact with foodstuffs, is in compliance with European Parliament and Council Regulation (EC) No 1935/2004, Commission Regulation (EU) No 10/2011, Commission Regulation (EC) No 2023/2006 (GMP for food) and Federal Food, Drug and Cosmetic Act (FDA) requirements of Title 21.

The seal coating is applied at very low quantity and only on one side, therefore, users have to keep track of the coated side as they handle the product, so that coated side to coated side are sealed together, facing the inside of the package.

This coated grade of Tyvek® provides a uniform and non-peelable seam, which allows obtaining good results in drop testing. This test is required for powder bags, such as desiccants or oxygen scavengers, which usually are produced on vertical form-fill-seal machines.

It would be wise to validate production parameters before going into full production.

Setting sealing parameters:

The seal strength developed during a heat sealing process depends upon several factors, including:

- Sealing dwell time
- Sealing temperature
- Sealing pressure
- Characteristics of the sealant
- Test method used to determine the seal strength, seal integrity and visual criteria.

Sealing dwell time refers to the clamp closed time during which the interface between the two webs is raised to a temperature that is high enough to either melt or activate the sealant.

Some manufacturers operate at very high platen temperatures to achieve shorter clamp closed times which leave only very little time for the seal to form.

With that short of a sealing time, anything that can affect the rate of temperature increase at the sealing surface can have a significant effect.

Common factors include:

- Variation in platen temperature
- Non-uniform heat transfer due to uneven contact or pressure
- Material thickness

Therefore, high platen temperatures and short clamp closed times can produce significant variability in seal strength.

Longer clamp closed times and lower platen temperatures will produce more uniform seal strengths.



4. PRINTING

Tyvek® can be successfully printed by using traditional as well as some digital processes, in both sheet and roll form.

4.1 GENERAL

Tyvek® can be printed the same way as paper, although some of its physical properties do require special attention.

Tyvek® grades with corona treatment on both sides to improve ink adhesion and is coated with an antistatic agent to facilitate sheet printing and converting, are available in the products range.

Tyvek® has no grain direction.

Tyvek® has a smooth and rough side. The difference can be felt or viewed using a low power magnifying glass or exposing to reflective light. Although Tyvek® is printable on both sides, it is recommended to use the smooth side for one-sided or full-coverage printing.

Tyvek® has a unique filament swirl pattern which is used to great effect in certain applications. This will show through most inks. It may be minimized by using light colors or a busy pattern.

4.2 PRECAUTIONS

Tyvek® is not as absorbent as paper and therefore inks may take longer to dry. The open nature of the Tyvek® surface, however, allows faster drying than other plastic/film substrates. In the timeline, three days should be allowed for two-sides printing due to the need of min. 24 hours dry time before printing the second side.

Tyvek® has an inherent thickness variation which can be compensated by adding more pressure.

Tyvek® is more elastic than paper and should be handled under the lowest tension possible to avoid distortion and mis-registration. Heavy edge to edge ink coverage and subsequent die cutting to smaller sizes may cause curling. This effect can be avoided by leaving a 1-2 cm border on all sides.

Solvents: certain solvents used in some inks, paints and adhesives may cause swelling of Tyvek®. This effect is often reversible after evaporation of the solvent. If a binder or vehicle is present in the solvent, the distortion may be permanent. Tyvek® may also be swollen or cockled by some plasticizers and aliphatic hydrocarbon resins used in inks and low molecular weight adhesives. This effect is generally permanent and may not be apparent for some time after application.

Please refer to page 15: list of solvents and their effects on Tyvek®.

4.3. PRINTING ON TYVEK® FOR FOOD/PHARMA

Styles of Tyvek® for food and pharmaceutical packaging can be printed in much the same way as paper, using standard commercial printing equipment. However, because of the unique requirements of the food and pharmaceutical packaging industries, these styles have no antistatic coating and are not corona treated.

They are often treated with a heat seal adhesive coating. Because these factors may adversely affect automatic sheet feeding and ink adhesion, special steps must be taken to obtain optimum printing results. When printing on Tyvek® food and pharmaceutical packaging styles, we recommend testing before proceeding with production operations. It is also important to establish the suitability of the ink in those applications where direct contact with food or pharmaceutical products may occur.

4. PRINTING

4.4 INKS

In general, we recommend using inks developed for printing on synthetic material.

It is possible to use standard paper inks on Tyvek® with satisfactory results, but this will depend generally on the ink formulation and the amount of ink coverage.

Always do a test and wait one day. We do recommend, however, that inks developed for use on PE synthetic are chosen.

Please ask your ink manufacturer for the right ink for Tyvek®.

Some hydrocarbon solvents used in certain commercial inks may cause swelling or cockling. It is suggested that inks containing less than 3% residual solvents are used on Tyvek®.

If Tyvek® swells or cockles within 30 minutes of printing, the ink probably contains a residual solvent or plasticizer. Aniline dye inks are not recommended for use on Tyvek®

4.5 SPECIAL NOTES FOR ADHESIVE-COATED TYVEK®

When selecting offset inks, it is important to advise the ink supplier if the Tyvek® style has an adhesive coating because special ink formulations may be required to prevent ink set-off to the coated surface. In some cases, printing is done on the adhesive side. This also should be discussed with the ink supplier to ensure optimum compatibility between the ink and the coating.



4. PRINTING

4.6 DIFFERENT PRINTING TECHNOLOGIES

Flexo printing

Low temperature drying is the key to printing Tyvek® by flexography. Web temperature should be kept below 80°C and tension below 1.4 N/cm of width. This will help prevent mis-registration.

The use of powered rollers and short unsupported web spans will help to maintain low unwind and processing temperatures.

Use recommended inks. Most ink suppliers have flexo inks for Tyvek® in their product selection. Some hydrocarbon solvents used in certain flexo inks may cause swelling or cockling.

Ink suitability should be tested before production.

Many different flexo inks are suitable for Tyvek®, like volatile solvent, water based and UV-curing inks, in each case, the volume of ink on Anilox roll needs to be adapted to the type of Tyvek® and to the print layout.

Pigmented polyamide/alcohol inks increase adhesion and rub resistance. Water-based inks for PE print well, but drying time may be extended due to the low water absorption of Tyvek®.

When printing on Tyvek® without corona or/and antistatic treatment like the styles which can come in direct contact with food stuff, microcrystalline wax is usually added to inks to reduce set off.

Reduce the web temperatures prior to wind up on a chill roller. This helps to prevent blocking and minimizes distortion and is essential for printing on Tyvek® styles without corona and antistatic treatment.

To help overcome the inherent thickness variation of Tyvek®, mount plates with 0.38 - 0.55 mm of sticky back closed cell foam tape.

Cyrel® Photopolymer plates produce the best overall print quality. Thin plates with thickness of 45/1.14mm can be used without any problem. The hardness of these plates should be 75°C Shore A.

Harder plates at thickness of 67/1.7mm or 100/2.54mm can be used, when mounted with sticky back closed cell foam tape, to compensate the thickness variation with the foam and not with the plate. There is no difference for digital or analog plates. Multi-color process printing is best accomplished with Cyrel® Photopolymer plates with 48 lines/cm screen, same requirements are valid for screen and full tone areas.

Guidelines:

For water and solvent based inks, Anilox rolls with 260-340 L/cm and a volume of 3.5-4.5 g/cm³ are used for screen, volume of 4.5-6.0 g/cm³ are used for full tone.

For UV-curing inks, same Anilox rolls can be used but for enough coverage on full tone, the transferred volume should be higher than 8g/cm³.

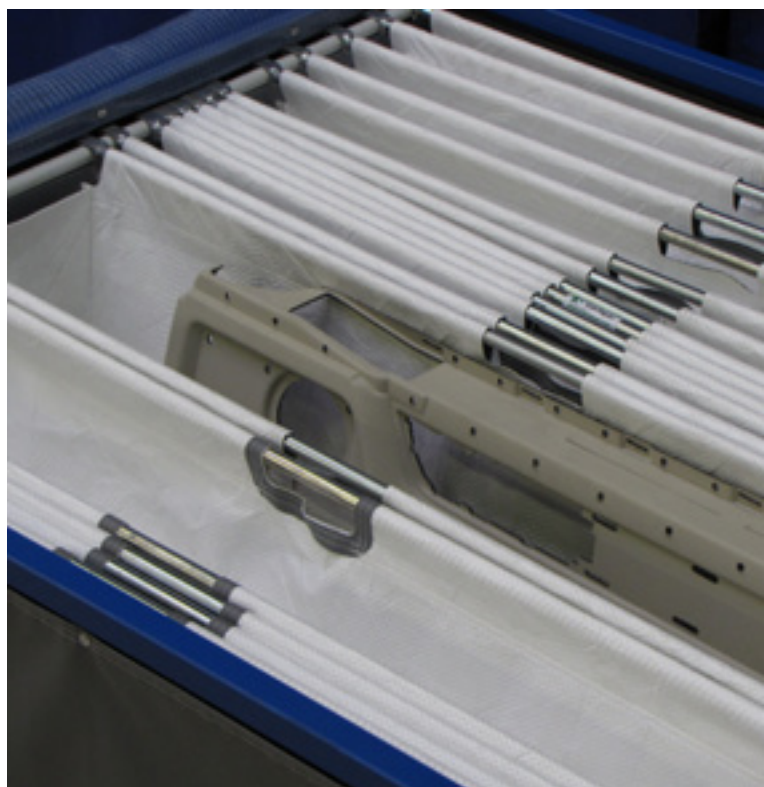


Photo courtesy  Calligra

4. PRINTING

Offset printing

Design, prepress and printing tips (ICC-profile) can be downloaded from our website:

www.graphics.dupont.com

Tyvek® is dimensionally stable and handles well on large or small, single and multicolor offset machines and on vertical, flatbed or rotary letterpress machines in sheet or web form.

Use recommended inks

Most ink suppliers have offset inks for Tyvek® or for synthetic substrate. It is important to use low solvent content inks.

The inks should contain less than 3% volatile solvent, since hydrocarbon solvents found in most offset inks will swell and distort Tyvek®.

Add more impression

Usually Tyvek® will require about 0.08 - 0.10 mm additional impression compared to a sheet of paper of equivalent thickness, because it is more compressible.

Reduce level of dampening solution

Tyvek® does not absorb water as readily as paper, for this reason, the press should be run with less dampening solution. If the printing is dull or washed out, the amount of dampening solution should be reduced and its pH (7 is ideal) should be verified. Do not increase ink volume.

Print with the minimum ink film thickness

This will minimize dot distortion, sheet distortion and the appearance of fibre swirl and will also reduce ink drying time. Offset inks dry more slowly on Tyvek® than on paper. When doing full coverage multi-color printing, keep the pile height below 50 cm.

Winding the sheets will accelerate drying. Tyvek® is unaffected by alcohol and alcohol substitute dampening solution additives.



Either side of Tyvek® can be printed. Generally, the smooth side is recommended.

Conventional blankets of medium hardness are recommended.

It is recommended that 4 colors work is conducted only on 4 colors machines, because Tyvek® is subject to stretching.

Gravure

Tyvek® is suitable for printing on equipment used for single/multi-color printing of paper, films and fabrics. The same techniques involved in flexo printing should also be applied to gravure with the following additions:

Cylinders with 39 lines/cm or more are preferred.

Type C nitrocellulose gravure inks are most widely used and they are often modified by the addition of an alkyd resin to improve ink hardness and adhesion.

Other printing technologies

Screen printing, thermal transfer printing and some digital printing are also technologies which can be used to print on Tyvek®. For additional information about printing on Tyvek®, refer to the DuPont™ Tyvek® User's Manual or the technical handbook on www.graphics.dupont.com

5. AN EFFICIENT USE OF RESOURCES

DuPont is committed to the efficient and safe handling of plastics waste and advocates a resource optimization and waste management system with the following priorities:

1. **Resource minimization**
2. **Recycle/reuse**
3. **Recover energy**
4. **Landfill**

DuPont is certified ISO 14001: 2004

5.1 RESOURCE MINIMIZATION

Tyvek® is very strong and light weight, so less material is needed to perform many functions. The weight of material in a product made from Tyvek® can be much lower than the one made from other materials for the same or superior performance.

5.2 RECYCLE/REUSE

Mechanical recycling

Being 100% HDPE, Tyvek® or products made from Tyvek® can be mechanically recycled into products such as underground cable protection piping, automotive parts, blown film, packaging cores and flowerpots. Products made from Tyvek® which are printed, glued, welded or sewn can also be recycled as can Tyvek® which has been extrusion coated or laminated with a polymer of the same family. Polyethylene can normally be recycled 4 to 5 times before physical properties are substantially affected.

Chemical feedstock recycling

Tyvek® can be chemically recycled with other polymers. In this process the original material is separated into its chemical components, which are then recovered for reuse.

5.3 ENERGY RECOVERY

When incinerated in excess oxygen Tyvek® yields only water and CO₂. It is excellent in fuel yielding: two or more times the energy of coal, and is equal to oil in generating heat. Incineration of HDPE does not contribute to acid rain.

5.4 LANDFILL

Whilst DuPont does not encourage landfill, Tyvek® can, as a last resort, be safely disposed of in this way. It will not leach into groundwater because it is chemical inert and doesn't contain binders, fillers and plasticizers.

5.5 WHERE TO RECYCLE TYVEK®

At the end of their useful life, products made from Tyvek® can be recycled via your local recycler for polyethylene waste. Additionally DuPont has set up a network of recyclers who have agreed to take back items made from Tyvek® for mechanical recycling into other products. (The items sent for recycling must not have been in contact with any hazardous substance):

Ravago Plastics Luxembourg S.A.

Rue des Ateliers
Zoning industriel de Latour
B - 6761 Virton
Tel.: +32-63-581 736, Fax: +32-63-581 738

B-Plast 2000

D - 26605 Aurich
Tel.: +49 4941 60020

Paprec Plastiques 44

5-7 rue Piliers de la Chauviniere
BP 60195-F-44802 Saint Herblain cedex
Tel.:+33(0)2 40 16 96 00

MANUFACTURERS OF ADHESIVES RECOMMENDED FOR TYVEK®

H.B. Fuller

<http://www.hbfuller.com/eimea/about-us>

Henkel

<http://www.henkel.com>

Planatol Klebetechnik GmbH

<http://www.planatol-adhesive.com>

SOLVENTS

Order of increasing swelling effect of solvents on Tyvek® ⁽¹⁾

Preferred solvents

Glycerol
 Diethylene glycol
 Propylene glycol
 Triethylene glycol
 Ethylene glycol
 Methyl alcohol
 Ethyl alcohol
 Diacetone alcohol
 "Carbitol" ⁽²⁾
 "Carbitol" acetate
 Dipropylene glycol
 Methyl "Cellosolve" ⁽²⁾
 Dipropylene glycol methylether
 Methyl iso-butyl carbinol
 "Cellosolve" ⁽²⁾
 iso-Propyl alcohol

Solvents to be used sparingly

Raw linseed oil
 Dibutyl phthlate
 iso-Butyl alcohol
 Methyl "Cellosolve" acetate
 Propylene glycol methylether
 Acetone
 Butyl "Cellosolve"
 "Cellosolve" acetate
 n-Butyl alcohol
 n-Propyl alcohol
 n-Hexyl alcohol
 n-Pentyl alcohol
 iso-Propyl acetate
 Butyl "Cellosolve" acetate
 2-Octyl alcohol
 Butyl "Carbitol" acetate
 n-Decyl alcohol
 Ethyl acetate
 iso-Butyl acetate
 Methyl ethyl ketone
 n-Propyl acetate
 Methyl iso-butyl ketone
 Cyclohexanone
 Diethyl ketone

Solvents to be avoided

n-Butyl acetate
 Sun spirits
 Pine oil
 "Lactol" ⁽³⁾ spirits
 SDW turpentine
 Dichloromethane
 Tetrahydrofuran
 Mineral spirits T
 Pentane
 Petroleum ether
 Pinene
 Rubber solvent
 VM + P naphtha
 Toluene
 Naphthol spirits
 Xylene
 Kerosene
 Magic Oil ⁽⁴⁾

(1) These data are provided as a guide for selecting solvents for inks or coatings.

(2) Union Carbide Chemicals & Plastics.

(3) Union Oil Co. of California.

(4) Magie Bros. Oil Co.



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