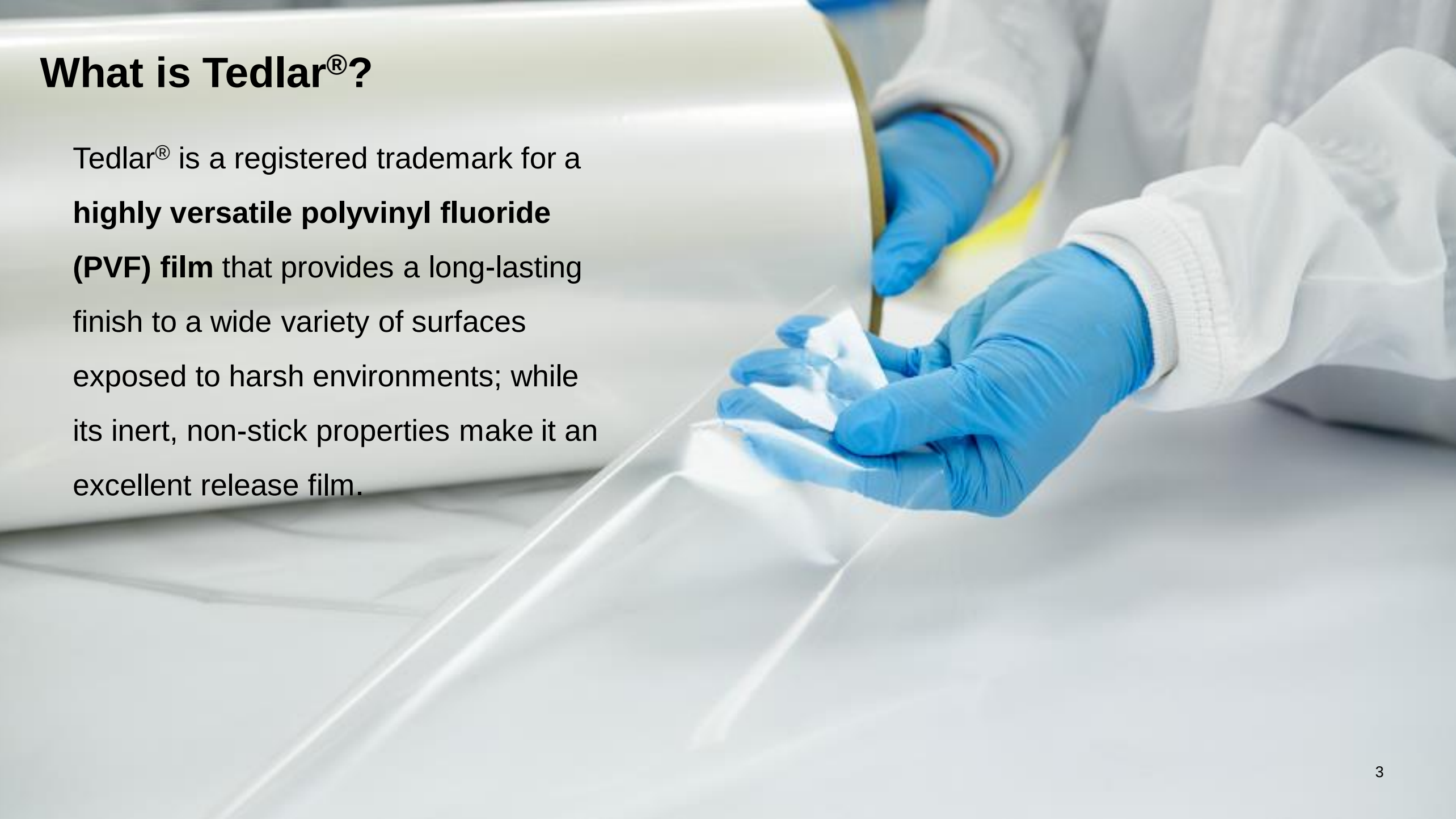
Tedlar® PVF
Surface Protection for Interiors in Healthcare Environment

Agenda

- Tedlar® Overview
- Tedlar® Wallcoverings
- Unique Values in Healthcare
- Performance and Testing
- Various Applications for Interiors
- Case show

What is Tedlar®?

Tedlar® is a registered trademark for a **highly versatile polyvinyl fluoride (PVF) film** that provides a long-lasting finish to a wide variety of surfaces exposed to harsh environments; while its inert, non-stick properties make it an excellent release film.



Why Tedlar®?

Interiors

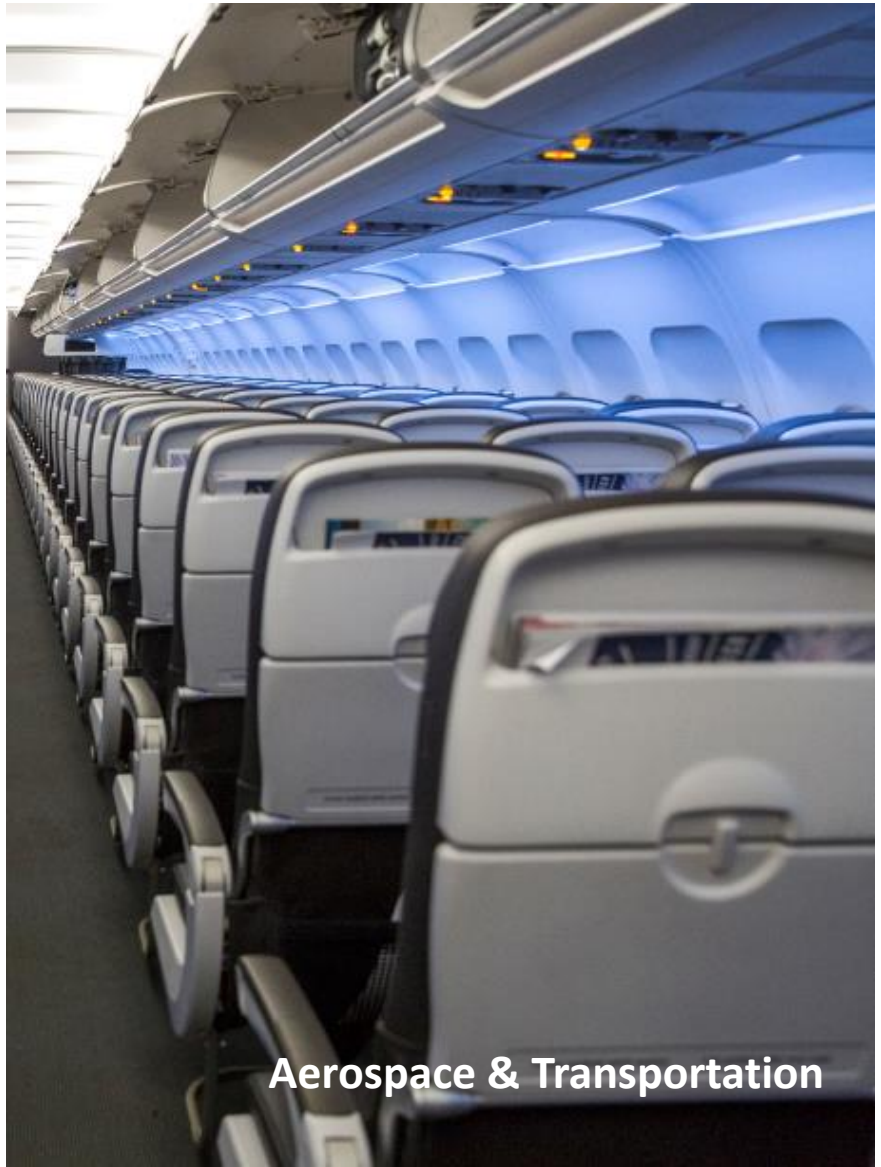
- ✓ **Mold and bacterial resistant**
- ✓ **Cleanability**
- ✓ **Solvent resistant**
- ✓ **Flame resistant**
- ✓ **Long term protection**
- ✓ **Eco-friendly**
- ✓ **Endurable style**

Exteriors

- UV & weather stability
- Chemical resistance
- Stain / dirt resistant
- Range of surface gloss
- Low toxicity & volatiles
- Bendability
- Low gas/vapor permeability

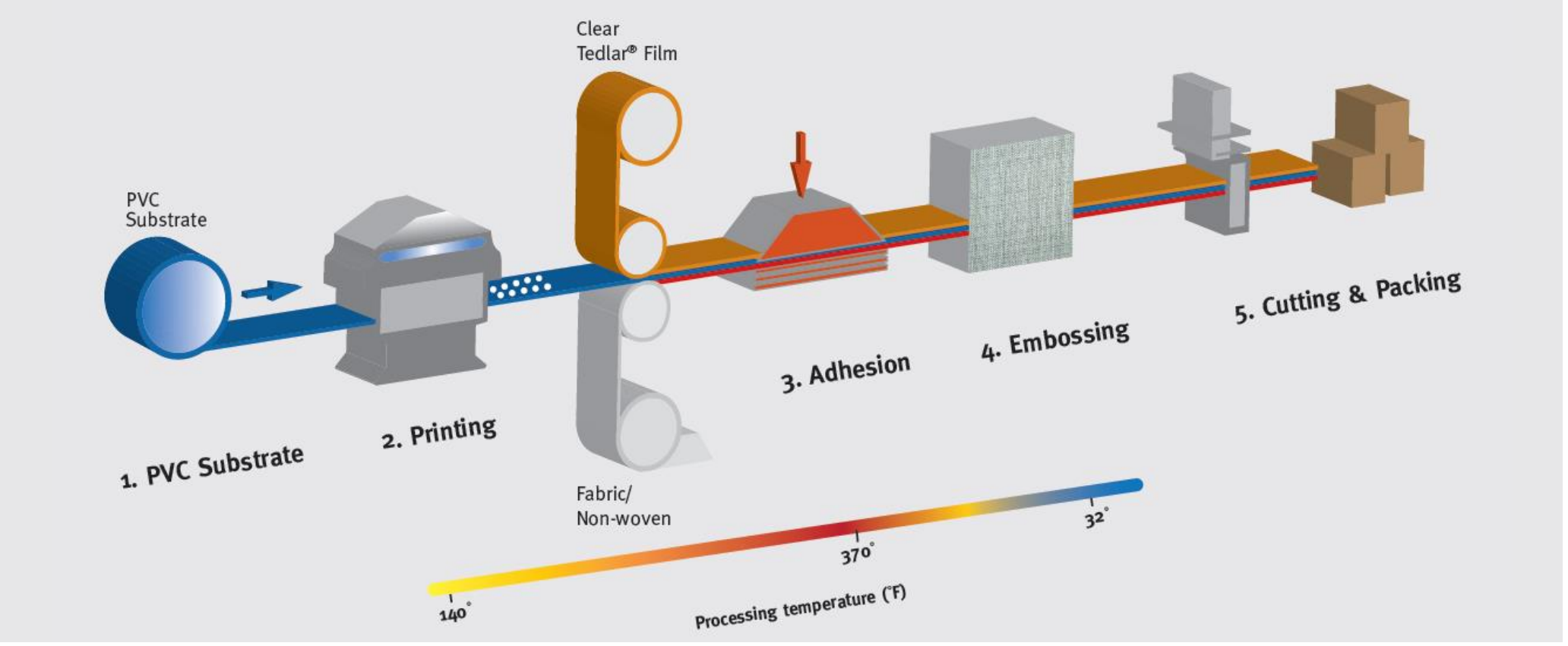
Tedlar® PVF Applications

For every surface worth protecting

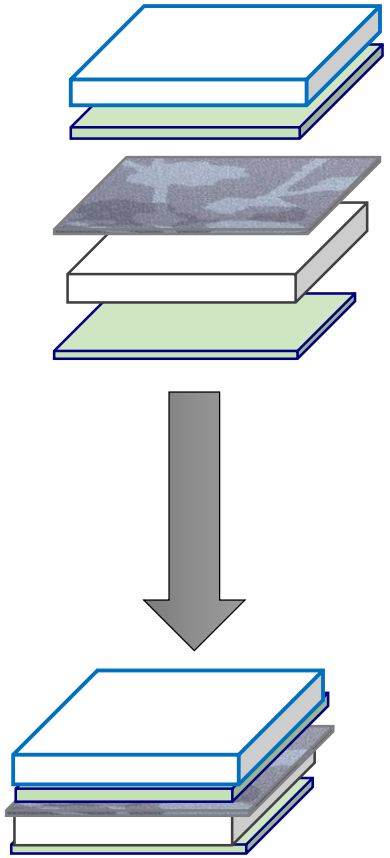


Manufacturing Process

TEDLAR® film becomes a part of the wallcovering after being adhered at a high temperature; this means no peeling, or reapplying of the film, ever.



Product structure



½ mil clear TEDLAR® with adhesive

Printing

PVC film

Fabric/non-woven substrate

Tedlar® in Healthcare

Still going strong: Tedlar® protected wallcoverings at delivering durability and style for 30+ years

Omega Medical Center in Delaware region, built in1985.

Atlantic City Hospital, built in 1960s.

" The Tedlar® based wallcoverings have lasted a long time – better, in fact, than any other wallcovering used elsewhere in the building. It's a heavy-duty product that is aesthetically pleasing."

---- Siobhan Hawkins, Director of Operations, Omega Medical Center

Unique Values for Healthcare Interiors

✓ Mold and Bacteria resistance

- Tedlar® surface does not provide nutrients to enable mold or bacteria growth, certified by MicroStar Labs, ASTM G21 and JIS Z 2801. UL 2824
- Mildew growth resistant with zero additive

✓ Flame resistance

- Non-flammable and low smoke toxicity, used in aircrafts; Exceed the ASTM E84 Class A rating.
- Meet Grade B1, GB8624-2012, Chinese regulation

✓ Long-term Protection

- Provide a protective barrier against most staining agents and cleaning solvents, including: bleach, alcohols, ketones (acetone, MEK) and even strong acids and alkalis.

✓ Easy Cleaning

- Stain resistant to various species in healthcare environment, easy to clean completely after 24h

✓ Safe and GREEN

- Greenguard GOLD certificate
- Designers & Architects can earn **LEED** points and customers get environmentally certified materials & stylish, healthier indoor spaces.

✓ Chemical resistance

- Solvent resistant

✓ Endurable style

- Prevent color fade
- Scrub resistant, ideal for high traffic areas

Testing Results

- CCC-W-408D

Exceeds Type II classification for wallcovering, scrubability and abrasion test

- ASTM E84 Class A

Flame and smoke spread

- ASTM G21
- UL 2824

Mold and mildew resistant

- JIS Z 2801

Bacterial resistant, against MRSA & E.coli test

- RoHS Compliant

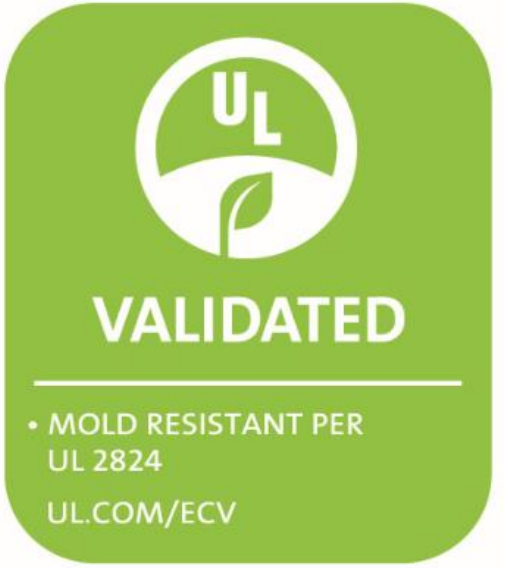
VOC restriction

Mold and Bacteria Resistance

Certificated by

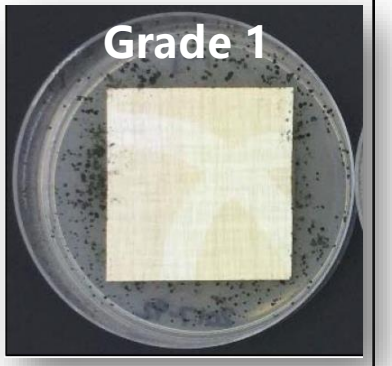
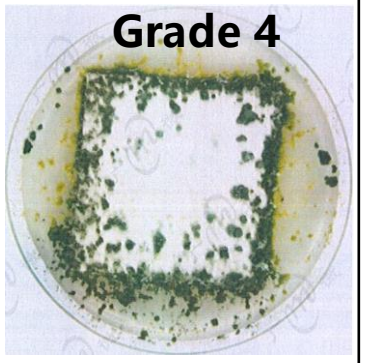
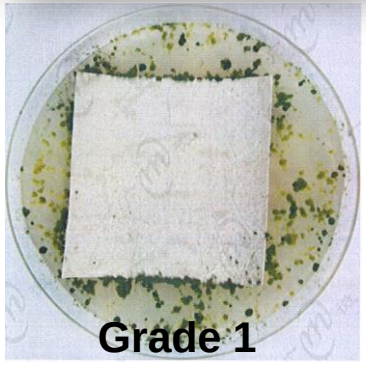
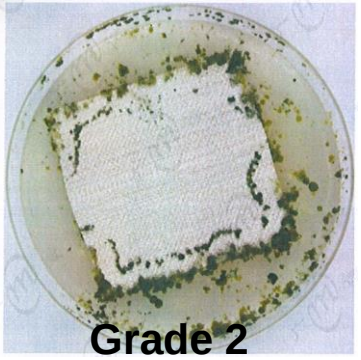
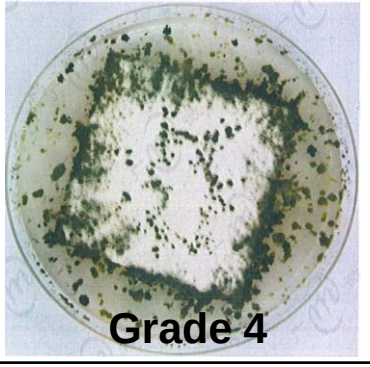
- **ASTM G21, mildew-resistance achieving a rating of 0 or 1**
- **JIS Z2801, having antibacterial effectiveness for MRSA and E.coli**
- **GREENGUARD mold resistant per UL 2824**

ASTM G21: Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi	
Legend for Growth Rating	
Observed Growth	**Rating**
None	**0**
Traces of Growth (less than 10%)	**1**
Light Growth (10% to 30%)	2
Medium Growth (30% to 60%)	3
Heavy Growth (60% to complete coverage)	4



Mold Resistance Test

Tedlar® PVF surface keeps mod-resistant Grade 1 after material aging.

	Tedlar® PVF	EVOH	PP	PVC
Before aging		Grade 0	Grade 0	
After aging				N/A

Aging condition: 85℃/85% humidity，1000 hours

Easy-cleaning Test I

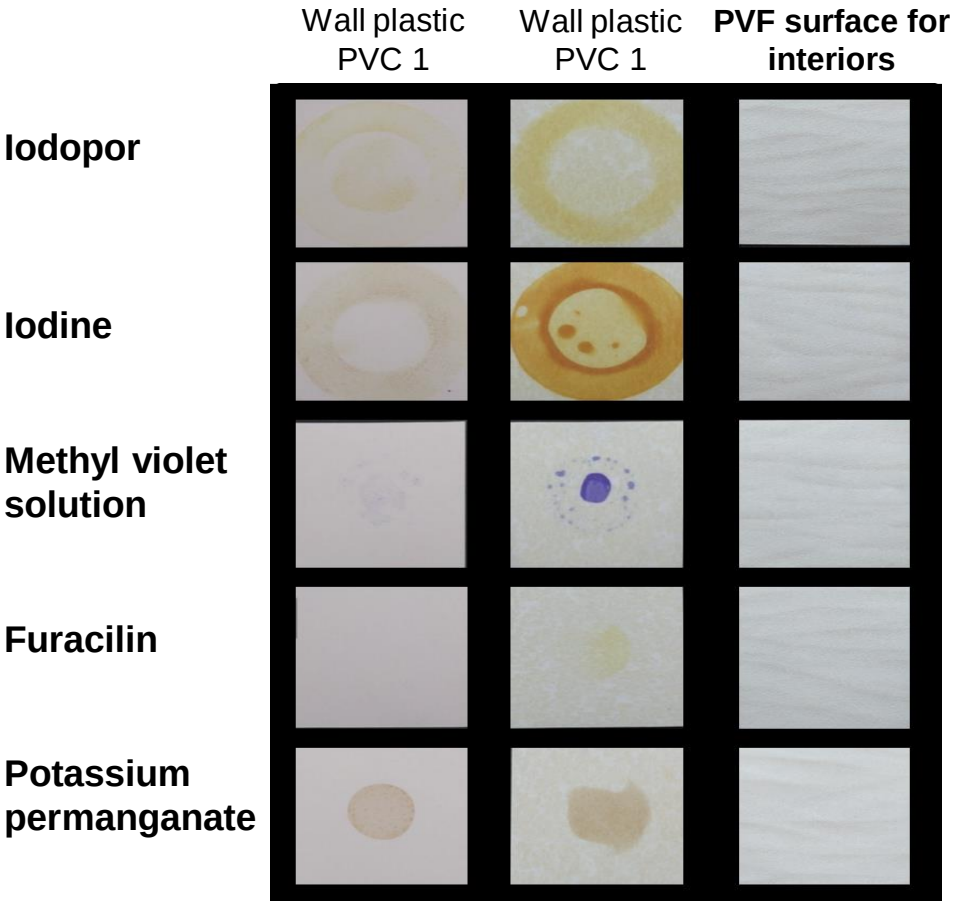
For critical areas: Clinic/Patient room/Emergency point etc.

Before aging

Stains	PVF	Wall plastic PVC 1	Wall plastic PVC 2	EVOH	PP	Melamine panel
	Alcohol	Alcohol	Alcohol	Alcohol	Alcohol	Alcohol
iodophor	5	1	1	4	2	5
iodine	3	1	1	2	2	5
Methyl violet solution	5	1	1	4	4	4
Furacilin	5	5	1	-	-	-
potassium permanganate	5	1	1	2	5	3

After aging

Stains	PVF	Wall plastic PVC 1	Wall plastic PVC 2	EVOH	PP
	Alcohol	Alcohol	Alcohol	Alcohol	Alcohol
Iodophor	5	1	1	2	2
iodine	3	1	1	2	2
methyl violet solution	4	1	1	2	4
Furacilin	5	3	1	-	-
potassium permanganate	5	1	1	2	3



Note: leaving stains 24hours before cleaning 5 = completely clean up; 4 = slight stains left 3 = trace left; 2 = obvious stains left; 1 = can not be cleaned up at all
Aging test: 15days aging test in 85℃ temperature and 85% humidity

Easy-cleaning Test II

For public areas: reception/lobby/waiting area

- All products were applied to TEDLAR™ Wallcovering and allowed to set for 24 hours. Utilizing the following methods, all products were successfully removed from the TEDLAR™ wallcoverings.

Dry Cloth Cleaning	Wet Cloth Cleaning	Detergent	Solvent
Acid Solutions*	Coffee	Ketchup	Ball Point Pen
Acetone	Grape Juice	Black Crayons	Spray Paint
Butanone	Mustard Sauce	Brown Shoe Polish	
Ethylalcohol	Red Wine	Lipstick	
Gasoline	Tea Stains	White Board Marker	
Glycol	Worcestershire sauce	Oily Pen	
Toluene	Chocolate Syrup	Asphalt	
	Brake Fluid	Mercurochrome	
	Iodine		
	Sodium Hydroxide		

*Acid solutions include: acetic acid, 10% nitric acid, 20% hydrochloric acid, and 30% sulfuric acid

Abrasion resistance

Type III surface protection in a type II weight.

- **TEDLAR™ Wallcoverings** offer exceptional stain and abrasion resistance. They provide a protective barrier against most staining agents and cleaning solvents, including: bleach, alcohols, ketones (acetone, MEK) and even strong acids and alkalis. This barrier ensures staining agents can be easily cleaned, leaving an undamaged, good-as-new appearance that can be maintained over a long period of time. TEDLAR™ Wallcoverings Type II vinyl wallcovering passes the CCC-W-408D **scrubbability and abrasion test** for Type III wallcovering.

Chemical Resistance Test I

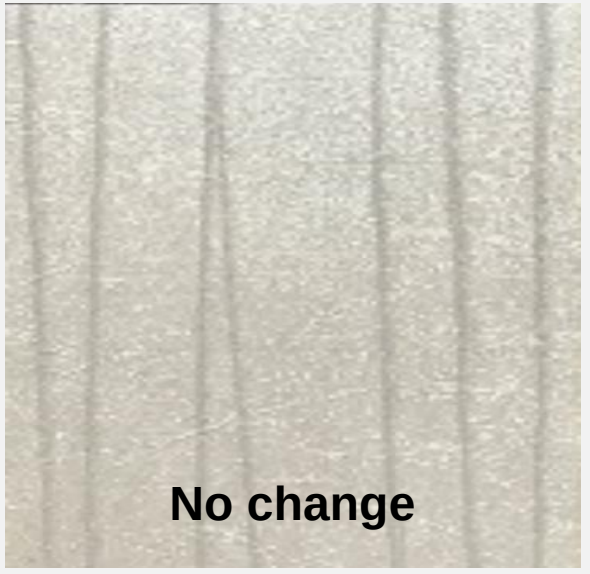
◆ **Cleaning by disinfectant**

Composition of disinfectant： Peracetic Acid, Sodium hypochlorite, Glutaraldehyde

PVC plastic 1

PVC plastic 2

Tedlar® wallcovering

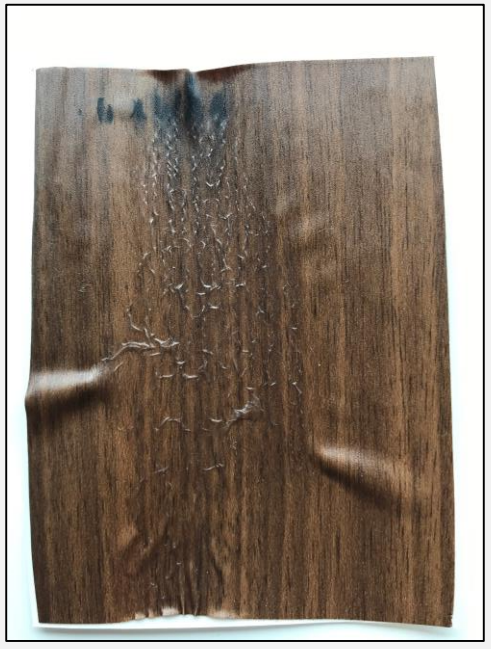


24 hours test in 37% HCl

Chemical Resistance Test II

◆ **Cleaning by solvent**

PVC sample1



Damaged

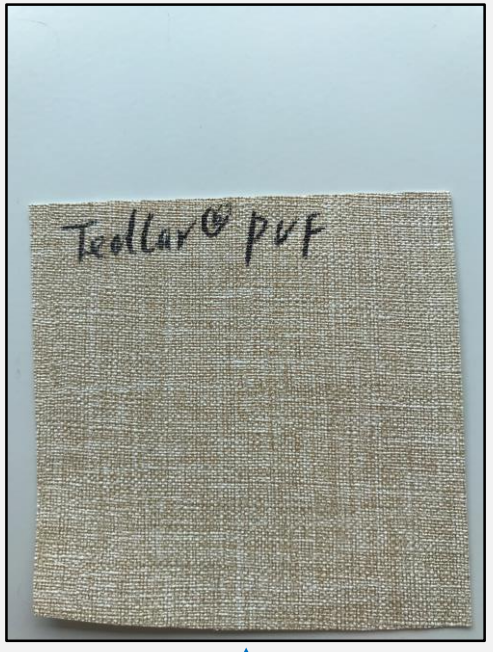
PVC sample 2

Damaged

PVC sample 3

Damaged

Tedlar® wallcovering



No change

Chemical resistance

(After exposure to the environments, marked with an X below, Tedlar® showed no significant change in tensile strength, elongation to break, or pneumatic impact strength.)

	1-Year Immersion at Room Temperature	2-Hour Immersion at Boil	31-Day Immersion at 75°C (167°F)
Acids			
Acetic Acid (glacial)	X		X
Hydrochloric Acid (10% & 30%)			X
Hydrochloric Acid (10%)	X	X	
Nitric Acid (20%)	X		
Nitric Acid (10% & 40%)			X
Phosphoric Acid (20%)	X		
Sulfuric Acid (20%)	X		
Sulfuric Acid (30%)			X
Bases			
Ammonium Hydroxide (12% & 39%)	X		
Ammonium Hydroxide (10%)			X
Sodium Hydroxide (10%)	X	X	
Sodium Hydroxide (10% & 54%)			X
Solvents			
Acetone	X	X	
Benzene	X	X	
Benzyl Alcohol			X
Dioxane (14)			X
Ethyl Acetate			X
Ethyl Alcohol			X
n-Heptane	X		
Kerosene	X		
Methyl Ethyl Ketone			X
Toluene			X
Trichloroethylene			X
Miscellaneous			
Phenol	X		
Phenol (5%)			X
Sodium Chloride (10%)	X		
Sodium Sulfide (9%)			X
Tricresyl Phosphate			X

Comparison to other materials

	Paint	Typical Type II Vinyl	TEDLAR™ Wallcoverings	Tile/Stone	Painted Wall Panels
Cleansability	+	+++	++++	++	++
Durability	+	++	+++	+++	++++
Chemical Resistance	-	-	+++	++++	+
Mold and Mildew	+	+	++++	+	++
Flame Resistance	-	++	++	++++	+++
Installment	Easy	Medium	Medium	Difficult	Medium
Repair /Replacement	Easy	Medium	Medium	Difficult	Medium
Cost	$	$$	$$	$$$	$$$

TEDLAR™ Wallcoverings offer **excellent cleansability, durability, and chemical resistance** with ability to be replaced easily when needed all while being **cost effective versus tile and stone**.

Surface Protection from all angles

Tedlar® film can be laminated on various substrates to create different applications for interiors

- Wallcoverings (wallpaper or laminated panel)
- Door and window
- Ceiling panel
- Floor materials
- Furniture surface
- Acoustical panel

PVF film or wallcovering laminated on different substrates:

PVC

Metal

Wood or plasterboard

Case study

Healthcare Environment

Premium Wallcovering Delivers Best Value for Busy Emergency Room

- Mississippi Baptist Medical Center in Jackson

Renovated emergency room

Facility managers at the Mississippi Baptist Medical Center in Jackson weren't guessing when choosing wallcoverings for a renovated emergency room area. Relying on more than 20 years of experience with wallcoverings protected with DuPont *Tedlar®* PVF film, they confidently selected LSI's Versa vinyl wallcovering with *Tedlar®*. The job used 2,500 sq yd (2,090 sq m) of wallcovering in waiting rooms, treatment areas, corridors, restrooms and other high-traffic areas.

Benefits Gained

Lower lifetime costs. Studies conducted by Mississippi Baptist Medical Center's management show that wallcovering protected with *Tedlar®* is the most economical solution for heavily used hospital areas because it minimizes the need for repair.

Lasting good looks. In the busy emergency room, with 30,000 patient visits annually, *Tedlar®* helps wallcovering resist abrasion, scuffing and staining.

Easy maintenance. Most soil wipes off *Tedlar®* with mild cleaners. More stubborn materials can be removed with strong solvents without damage to wallcoverings.

Material Chosen and Why

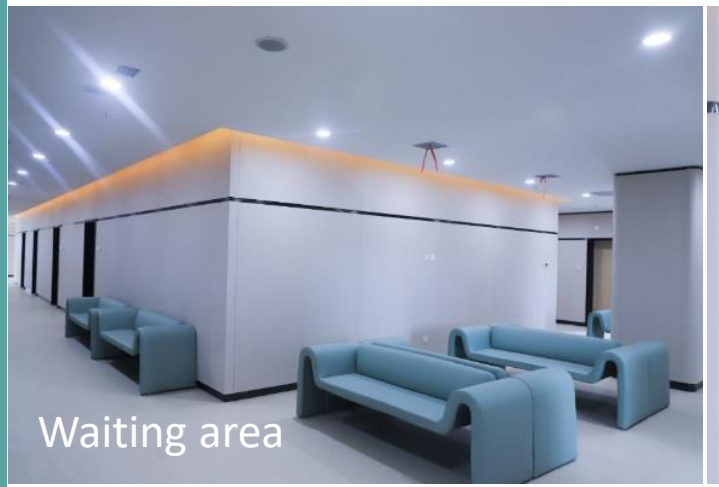
Wallcovering protected with *Tedlar®* meet rigorous requirements for resistance to staining, abrasion and scuffing, easy cleanability and low lifetime costs.

Tedlar® PVF Interior Surface perfectly combine **Tedlar® wallcoverings' superior functionalities and durable metal board** that enables enduring style and extreme cleanliness. The **modular parts** with installation steps that can meet all the requirements for the healthcare environment construction.

Application area: patient room, public area, waiting area.

Hospital in Changsha Guangxiu, Hunan China

VIP guests area: metal panel laminated with Tedlar® wallcovering


Waiting area

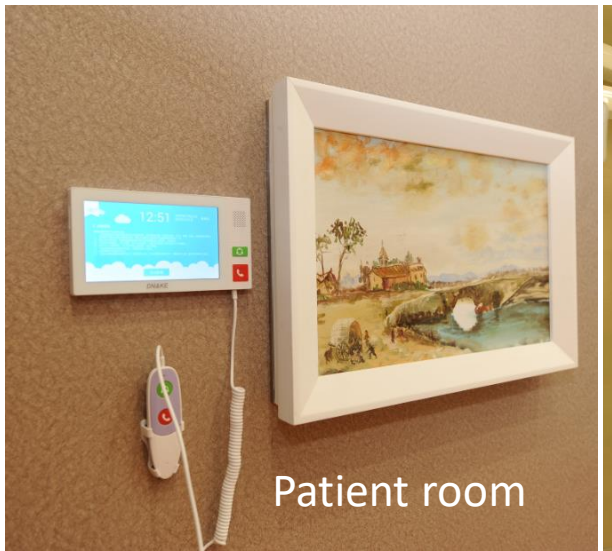

Corridor

Modern healthcare environment creation for a private maternity hospital. Over 30,000 sqm Tedlar® wallcoverings laminated on fiber cement board pre-installed, covering doctor's office, corrido, VIP patient room and operation room. **Stain resistant, easy-cleaning and durable protection** are key elements for owners of the hospital to choose Tedlar®. Panel system installation keeps onsite installation clean and efficient.

Application area: diagnostic office, patient room, labor room, ultrasound diagnosis area

Hospital in Chengdu Xinan, Sichuan China

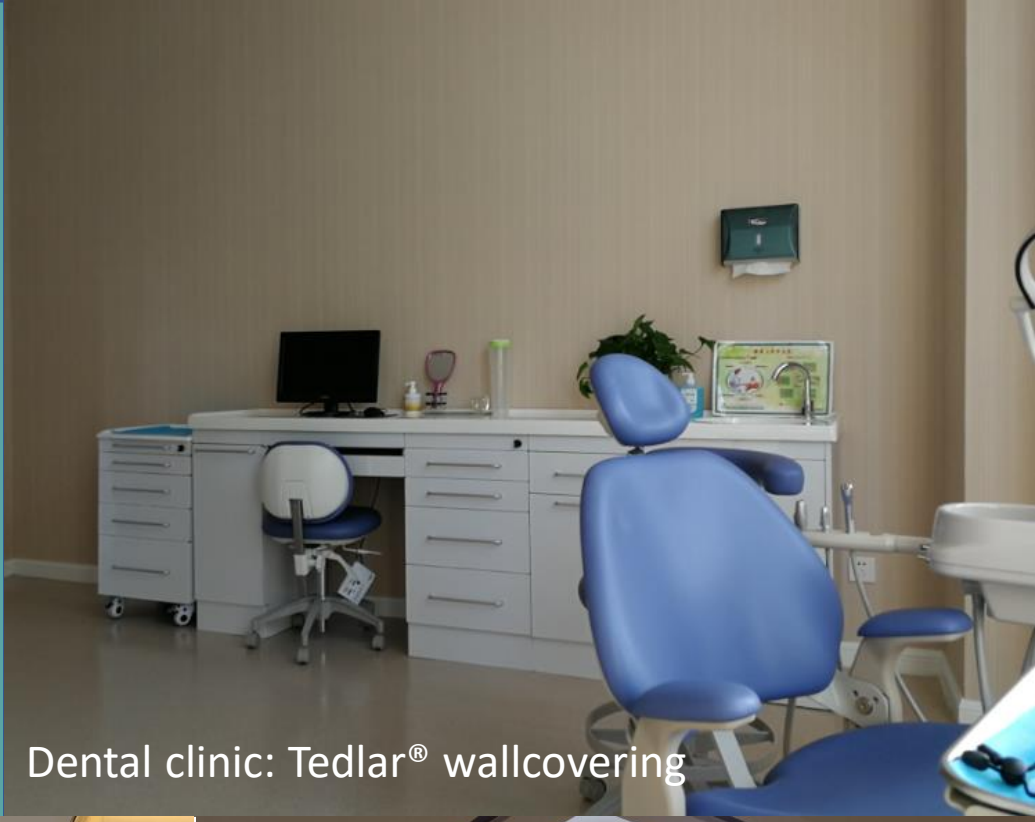

Diagnostic office: fiber-cement plasterboard laminated with Tedlar® wallcovering


Patient room

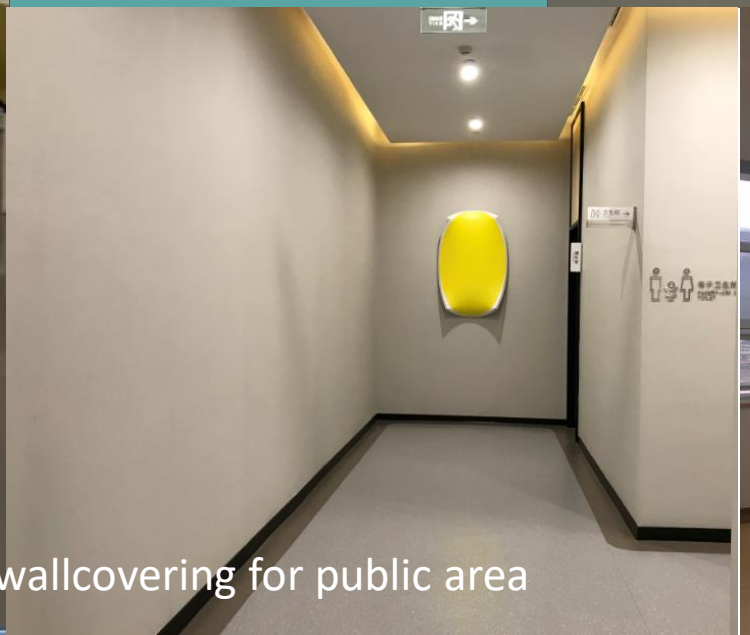

labor room

More cases in Healthcare are coming!

Children Health Management Center: Tedlar® wallcovering for public area



Dental clinic: Tedlar® wallcovering



Traditional Chinese Medicine Hospital

THANKS