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## TPU Color PPF vs PVC Vinyl Wrap

### A Technical Comparison from Material to Application

#### ► Purpose of This Document

This document provides a technical comparison between **TPU-based Color Paint Protection Film (Color PPF)** and **PVC-based Vinyl Wrap Film**, focusing on material characteristics, structural design, performance behavior, and application positioning.

The objective is to support informed product selection and portfolio planning rather than product promotion.

# 1. Material Fundamentals

## TPU (Thermoplastic Polyurethane)

TPU is an elastomeric polymer characterized by high elasticity, impact resistance, and long-term durability.

In automotive films, TPU is primarily used where **mechanical protection and surface resilience** are required.

Key material characteristics:

- High elongation and elastic recovery
- Strong resistance to tearing and puncture
- Stable mechanical behavior over extended time periods

## PVC (Polyvinyl Chloride)

PVC is a thermoplastic polymer widely used in color-change films due to its **processability, visual versatility, and cost efficiency**.

Key material characteristics:

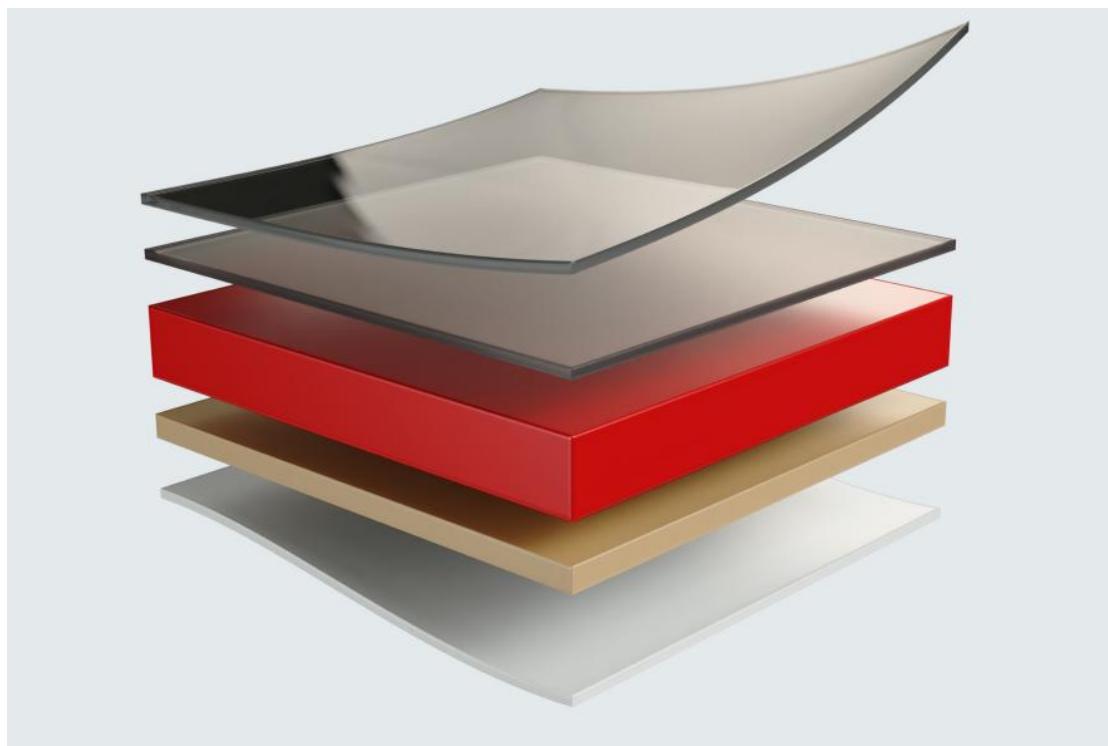
- Good formability under heat
- Efficient large-scale processing
- Optimized for visual customization rather than protection

## 2. Film Structure Comparison

### TPU Color PPF – Typical Structure

TPU Color PPF is a multi-layer system engineered for both protection and appearance:

- PET protecting liner (Gloss Finish Only)
- Functional surface coating (often self-healing under heat)
- TPU Color Layer (TPU Based, Rui-Chuang Developed)
- Acrylic adhesive
- PET releasing liner

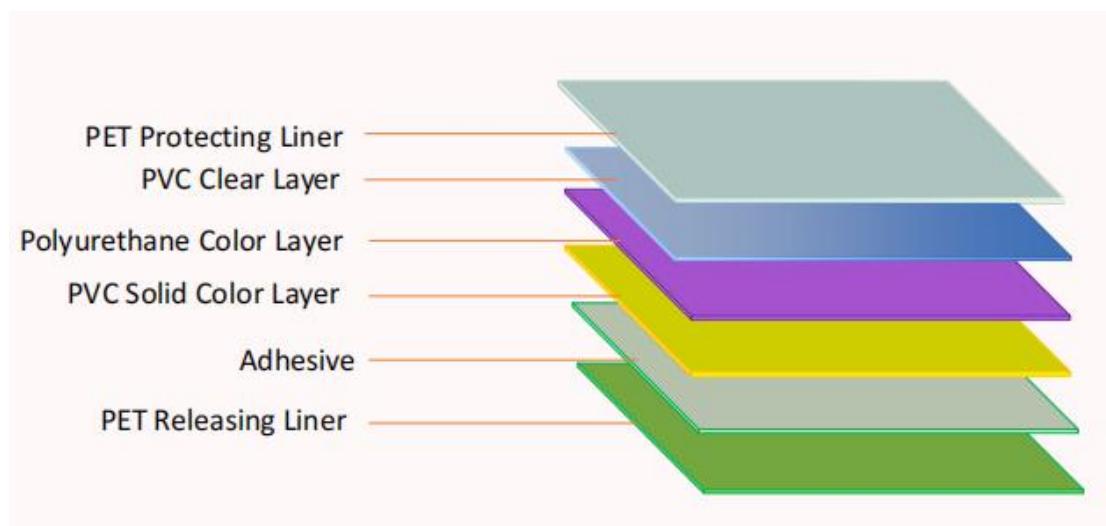


This structure allows functional layers to work together while maintaining flexibility and optical clarity.

## PVC Vinyl Wrap – Typical Structure

PVC vinyl wraps prioritize color and surface finish:

- PET protecting liner (Gloss Finish Only)
- PVC Clear Film
- Color Layer
- PVC Base layer (Black or White)
- Acrylic adhesive
- PET releasing liner



The structure is simpler and optimized for efficient color production and installation.

### 3. Mechanical & Physical Performance

Item	TPU	PVC
Thickness of Working Layer	Solid Color	175 ± 10 um
	Regular	205 ± 10 um
	Special Effects	TBA
Thickness of Protecting Layer	45 - 55 um	36 um
Thickness of Releasing Layer	75 - 85 um	125 - 155 um
Dimentional Stability (70°C, 2 h)	<0.2mm/150mm	<0.5mm/150mm
Tensile Strength	>25MPa	>25MPa
Elongation at Break	>200%	>80%
Initial Adhesive Strength (20 mins after installation)	8N/25mm	6N/25mm
Adhesive Strength (24h after installation)	12N/25mm	10N/25mm
Scratch Healing Ability	Self-healing Under Heat	None
Typical Service Life	5-7 yrs	2-3 yrs