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PRODUCT BULLETIN & APPLICATION INSTRUCTIONS

TeckWrap Film 180 series

TeckWrap 180 series is polymeric calendared vinyl film designed for midterm outdoor application.

Features:

- An intermediate hybrid vinyl film with removable adhesive
- Initial adhesion is low; maximum adhesion is achieved in 48 hours
- New air drain technology (ADT) ensures fast and easy bubble free installation
- 150-180 micron thickness provides overall protection of surface

Application

- Fleet graphics, lettering, marking, decals, and decorative elements
- Wall graphics, signature, advertising and window graphics
- Full (smooth and medium curved surfaces) and partial vehicle graphics (chrome films)

TeckWrap Film 190 series

TeckWrap 190 series is a polymeric calendared vinyl film designed for long-term outdoor application.

Features:

- An advanced polymeric vinyl film with removable adhesive
- High-tech formulation with longer durability
- Initial adhesion is low; maximum adhesion is achieved in 48 hours
- New air drain technology (ADT) ensures fast and easy bubble free installation
- A multilayered film designed for full car wrapping
- 120-130 micron thickness

Application

- Fleet graphics, lettering, marking, decals, and decorative elements
- Full vehicle graphics

Limitations

Films are not recommended for following uses:

- Compound curves and extreme angles (should be wrapped partially)
- Low surface energy substrates like plastic materials
- Weak binding surfaces like pile fabric or acrylic paint
- Painted surfaces with poor paint
- Dusty or grassy surfaces
- Rusty metal surfaces like iron, copper, brassy, silver; surfaces with silicon, wax or any other coating (ceramic, quartz)
- Moist or cold surfaces with weak binding
- Other films (not TeckWrap)

Adhesive



Henkel solvent polyacrylate, removable
180 Peel strength 20min 0.596kg
180 Peel strength 1 hour 1.106kg
180 Peel strength 3 hours 0.998kg

180 Peel strength 7 hours 1.113kg
180 Peel strength 24 hours 1.422kg
180 Peel strength 48 hours 1.653kg

Storage



This information is general. Refer to your film's specification at www.teckwrap.com

Rolls should be stored in original boxes until there is a need to use them. Rolls should be kept on plastic caps in the horizontal position. This prevents from dints and tightens. When the box is opened tube with the film should be stored on bars in proper room temperature. Apply the film within the period mentioned in the product specifications of the film that you are using. Store printed film on the core tube printed side out. The printed film must be completely dry before packaging.

Avoid storing rolls in the vertical position for a long period. Store cuts in the tube. Do not apply pressure on the tube or cuts. Seal the tube or store cuts in TeckWrap plastic cover.



The best conditions for storage is normal room temperature 20-23 °C and humidity 30-50%. In high temperatures, one can face the destruction of adhesive. In high humidity, vinyl is often deformed and warped. The room should be clean and dry. It is restricted to store vinyl films close to a source of heat or at places under direct sunlight. The best condition for storage is dry and cool places, protected from direct UV. Shelf life is 2 years from the production date.

Application Tools

- High density felt squeegee
- Cutter (Knives with 30 and 45-degree blades)
- Professional temperature controllable heat gun
- An infrared thermometer, gloves, felt, towel

Pre Install

- Take a roll accurately from its storage place. Keep it for 24 hours in the place where it will be cut to equalize temperature. The work with cold vinyl film in places with normal temperature can cause deformation of the film
- In the 24 hours, the roll should be kept in the original package that protects it from humidity
- Follow the recommended application temperature. In temperatures below recommended properties of the adhesive are getting worse and sticking of edges is hardened

Surface Cleaning

24 hours before application



- Clean the surface with soap liquid. Hand cleaning of organic and nonorganic wastes, removal of exhausted solution. Clean away any petrochemical contaminants (tar, oil, grease)
- Use good automotive cleaner and wax remover
- Wipe down the surface with isopropyl alcohol
- Clean the surface with abrasive clay to remove the rest of contamination

Drying

- Use a dry cloth or paper towel to dry the surface
- Make sure that the surface, edges, corrugations, hollows, and joints of the vehicle are arid
- Carefully remove remaining humidity under rubber seals

Right Before Application

- Check the surface for contaminations
- Clean dirt after dismantling of elements
- Degrease the surface. Degrease curves and corners
- Clean dust from the surface with towels
- Keep in mind that clean surface ensures high-quality application and the best result

Application



- Keep the roll 24 hours in a place where it will be cut to climates the roll. Working with a cold film in a place with normal temperature can cause deformations on the film surface.
- Wrapping must be done in a clean room. Moistening the room floor in winter period to minimize dust (anti-electrostatic measures)
- Don't overstretch vinyl film. We recommend stretching any film, including textured ones less than 10%
- We recommend cold wrapping method with an installation of calendared and hybrid films
- Use leeching technique on delicate surfaces. Use the method of relief cuts to decrease the tension of the vinyl film
- Use clean, sharp, correctly aligned blades for film cutting
- Use pre-stretch technique for wrapping of a compound and curved elements
- Use adhesive promoter for surfaces with low energy and compound curves when wrapping
- When the adhesive promoter is not used on compound curves, we recommend wrapping in 3mm-5mm overlaps
- Please keep in mind that various plastics contain in part release agents and softeners. These can be released (gas emission) when exposed to heat, e.g., through strong sunlight and thereby influence the adhesive effect and bubble formation of the film. Same may happen if the surface was painted recently
- Apply edge sealer or transparent laminate film on edges of the film to protect them
- After application, one should keep the wrapped surface in room temperature (18-23°C) for at least 48 hours to ensure complete adhesion. The wrapped surface can be washed only after 3 days. Do not expose wrap to rain or snow in 48 hours after application.

Exploitation

Please note that films are by nature more vulnerable than paintwork. Special care is needed when applying and cleaning the film.

- It's recommended to use aftercare products with neutral pH for vinyl films to prolong its life period. Please remember that the wrapped surface needs the same care as the painted surface.
- The film is wash ready. Please do not apply waxes, polishes or clear coating.
- Avoid using harsh chemicals and brushes when cleaning the surface. When you use pre-spraying cleaner and high-pressure cleaners, use it with caution.
- Avoid pointing the spray bar directly to the surface and edges.
- Do not direct the water stream at a sharp angle to the edge. Hold the nozzle 70cm away from and perpendicular to the film. Excessive pressure during washing can damage the applied film by forcing water underneath the film.
- The rest of the polishes have to be cleaned totally. We recommend removing aggressive impurities like tree resin, dead insects or bird droppings quickly. Use warm soapy water and a soft brush or sponge for cleaning. Rinse thoroughly after cleaning. Allow drying naturally. Do not leave the water on the surface.

The film has primary self-healing feature when small scratches on it can be removed by gentle heating of the surface at 20-30°C. While healing a film do not keep heat gun close to a surface and do not aim at a single spot.

The vinyl film just like car paint can be destroyed by prolonged exposure to extreme heat and pollutants. We recommend to take care of the film and keep it under the shade. Long exposure to direct sunlight can lead to faster color fading and change the adhesive properties.

Precipitation like rain may have pollutants. We recommend washing the vehicle more often during winter time to clean off chemical reagents.

Removal

We recommend removing the film after 2 years (general). Please refer to the exploitation chart of each series for exposure types and periods.

- Depending on climate zone and exploitation period some removable adhesive may stay on the surface. The type of surface to which a particular film is applied can affect both the initial adhesion and final adhesion. Flat and vertical surfaces are the easiest. Horizontal and curved are may be more difficult.
- Removal is not warranted if the original surface of the substrate has weak paint or has been painted mainly, has top coating, scratches or damages. The initial and final adhesion is affected by the type of substrate, exploration period and exposure. Exposure to higher temperatures and UV light (sunlight) affects the removal process. Prolonged exposure to these elements can make the film vulnerable, changing its tensile strength. The film in this condition may tear and break easily, making removal very difficult.
- We recommend removal of the film in 17-23°C room temperature. The film can become fragile when the temperature is low and break into pieces when pulled. When the room temperature is too hot, the excessive heat can reactivate the adhesive, and the removal of some material can be more difficult causing adhesive residue.

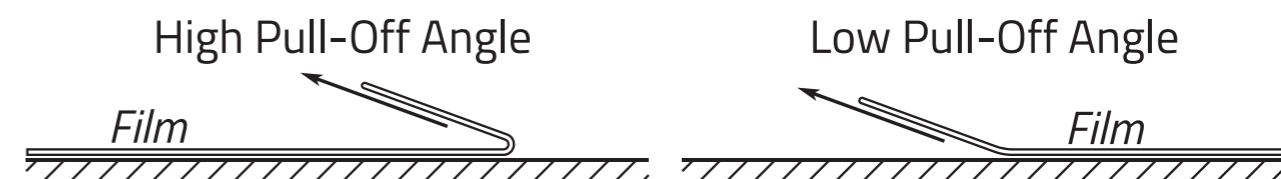
Please refer to the chart below for the removal details.

Series	Product Type	Removal Information	Method	Residue Amount	Period	Adhesion Strength	Pull of Angle
190	Gloss metallic	This film can be removed easily with heat within exploitation period	Heating	Less then 25%	2 years	Medium	High
190	Chameleon and Glitter Metallic (matte and gloss)		Heating	Less then 30%	2 years	High	High
190	Matte Metallic		Heating	Less then 30%	2 years	High	High
180	Gloss Aluminium		No heat	Less then 30%	2 years	Low	Low
180	Satin & Matte Chrome		No heat	Less then 30%	2 years	Medium	Low
180	Mirror Chrome	This film can be removed with aid chemicals and polishing. These films may leave more than 40% adhesive residue	No heat	More then 40%	1 year	High	Low
180	High Gloss	This film can be removed easily with heat within exploitation period	No heat	Less then 25%	2 years	Low	High
180	Matte		No heat	Less then 25%	2 years	Low	High
180	Carbon		Heating	Less then 30%	2 years	High	High

General Recommendations

Before purchasing and using, a customer shall determine the suitability of the product for its intended use. All information about product use and recommendations are listed at the product pages at www.teckwrap.com

When the film is removed during the warranty period of the climatic zone, the surface should be heated first, and film pulled at a low angle with slow speed except for chrome films. Do not heat chrome film during uninstal. To avoid adhesive residue on the substrate during uninstal we recommend to pull off the chrome film quickly, or "snap" it off at a low angle. Refer to the graphics.



Caution



Certain films like metallic films have directional characteristics, for best results do not alternate between lengthwise and widthwise graphic panels. One need to handle metalized films with care as the appearance of the metalized layer could change upon crumpling, overstretching, too strong heating. The film may scratch during application, or during a day in and out use.

Special care must be taken to avoid scratching the film. Marks may be visible, and you may not be able to work them out because of the metallic finish. Scratching of the film is not covered by warranty. We recommend using a steam vacuum or IRR heater for installation of metalized films and dry application only. Before purchasing and using, a customer shall determine the suitability of the product for its intended use. One should have high installation skills in the wrapping of chrome and metalized films. Chrome and metalized films are generally used for partial custom design.

Disclaimer

The films mentioned in this bulletin are covered by TeckWrap product warranty and limitation of liability. All TeckWrap products are sold with the understanding that a buyer has independently determined the suitability of products for its purpose. TeckWrap products are warranted to be free of defects in material for the period of shelf life. In case of product defects communicated in mentioned period, TeckWrap will consider and determine the existence of the defect and further decide at its sole discretion, to either replace defective product without charge or compensate it with money in such amount, as TeckWrap deems reasonable. This action is the exclusive right and only obligation of TeckWrap Inc. This warranty does not cover the cases of normal wearing and transportation. In no event will TeckWrap Inc. be liable and responsible for labor, consequential damages, or incidental damages of any kind. Please forward your reclamation letters by email to crm@teckwrap.com.

Characteristics / TeckWrap 180 series

Film Type	High performance hybrid calendered self adhesive film
Thickness of film (C=10 micron)	15-18C±0.5C
Thickness of film with release liner	20-23C±0.5C
Color range	See color swatch
Adhesive	Henkel solvent polyacrylate, low initial adhesion, curetime 48 hours, air release
Adhesive color	Transparent
Release liner	Kraft white silicone-coated paper with double sided polyethylene coating, 145 g./m ²
Exploitation period & Outdoor durability	When applied on the recommended surfaces in climatic zone of Central Europe the exploitation period is 3 years The final period depends on surface exploitation factors, color of the film and climatic conditions. For details see chart bellow
Dimensional stability	Shrinkage less than 0,20%
Breaking Strength	23.4 N/10mm (Average) Test Method: ASTM D3759/D3759M-05
180° Peel Strength, to steel panel	5.6 N/10mm (Average) Test Method: ASTM D3330/D3330-04
Chemical resistance	Resists mild alkalis, mild acids, fuel,water, salt
Light Ageing in UV Exposure	Test Method: ASTM D4329-13 Cycle A & ISO 105-A02:1993/Cor.2:2005, Test result: 4-5 out of 5. Exposure cycle: ASTM D4329-13 cycle A, Lamp type: UVA- 340 8h UV at (60±2.5) C BPT, 0.89W/(m ² •nm)@340nm, 4h condensation at (50±2.5) C BPT, Exposure duration: 48h
Plastification	Between 25%-32%
Package	Film is rolled colour-side-out on 8cm (diam) core. Roll is set into plastic cover and placed to carton box. Roll standard size 1.52m x 18m (59.8" x 708,6" , 4.98ft x 59ft, 1.66yd x 19,6yd)
Weight	13-14 kg
Shelf life	2 years from date of production. If stored in cooler temperatures +10°C to +20°C for optimal quality, relative humidity 50%, in original package, away from direct sun light, clean and dry place
Suitable surfaces	Simple, flat and smooth surfaces, simple and moderate curves.
Application temperature	+17°C to +25°C
In use temperature	-50°C to +60°C
Recommended Temperature	-30°C to +60°C
Post heating	Over 110°C
Application method	Dry only

Horizontal exposure	ZONE 1	ZONE 2	ZONE 3
TeckWrap 180 series	2 years	1 year	Up to 1 year
Vertical exposure	ZONE 1	ZONE 2	ZONE 3
TeckWrap 180 series	3 years	2 year	Up to 1 year

Zone 1: North, West, Central & Eastern Europe, North America (excl.: USA desert´s - zone 3)

Zone 2: South Europe, Central & South coastal area (from Perth to Brisbane), New Zealand

Zone 3: Greater Middle East, Africa, Australien Desert area & North of Brisbane coastal area, USA (Arizona, California, Florida, Nevada, New Mexico, Texas, Utah), Mexico

Characteristics / TeckWrap 190 series

Film Type	High performance polymeric calendered film with ADT, multilayered
Thickness of film (C=10 micron)	12-13C±0.5C
Thickness of film with release liner	17-18C±0.5C
Color range	See color swatch
Adhesive	Henkel solvent polyacrylate, low initial adhesion, curetime 48 hours, air release
Adhesive color	Transparent
Release liner	Kraft white silicone-coated paper with double sided polyethylene coating, 145 g./m ²
Exploitation period & Outdoor durability	When applied on the recommended surfaces in climatic zone of Central Europe the exploitation period is 3 years The final period depends on surface exploitation factors, color of the film and climatic conditions. For details see chart below
Dimensional stability	Shrinkage less than 0,18%
Breaking Strength	25.4 N/10mm (Average) Test Method: ASTM D3759/D3759M-05
180° Peel Strength, to steel panel	6.6 N/10mm (Average) Test Method: ASTM D3330/D3330-04
Chemical resistance	Resists mild alkalis, mild acids, fuel, water, salt
Light Ageing in UV Exposure	Test Method: ASTM D4329-13 Cycle A & ISO 105-A02:1993/Cor.2:2005, Test result: 4-5 out of 5. Exposure cycle: ASTM D4329-13 cycle A, Lamp type: UVA- 340 8h UV at (60±2.5) C BPT, 0.89W/(m ² •nm)@340nm, 4h condensation at (50±2.5) C BPT, Exposure duration: 48h
Plastification	Between 27%-33%
Package	Film is rolled colour-side-out on 8cm (diam) core. Roll is set into plastic cover and placed to carton box. Roll standard size 1.52m x 18m (59.8" x 708,6" , 4.98ft x 59ft, 1.66yd x 19,6yd)
Weight	13-14 kg
Shelf life	2 years from date of production. If stored in cooler temperatures +10°C to +20°C for optimal quality, relative humidity 50%, in original package, away from direct sun light, clean and dry place
Suitable surfaces	Flat and curved surfaces
Application temperature	+17°C to +25°C
In use temperature	-50°C to +60°C
Recommended Temperature	-30°C to +30°C
Post heating	Over 100°C
Application method	Dry only

Horizontal exposure	ZONE 1	ZONE 2	ZONE 3
TeckWrap 190 series	2 years	1 year	Up to 1 year
Vertical exposure	ZONE 1	ZONE 2	ZONE 3
TeckWrap 190 series	4 years	3 year	Up to 2 year

Zone 1: North, West, Central & Eastern Europe, North America (excl.: USA desert´s - zone 3)

Zone 2: South Europe, Central & South coastal area (from Perth to Brisbane), New Zealand

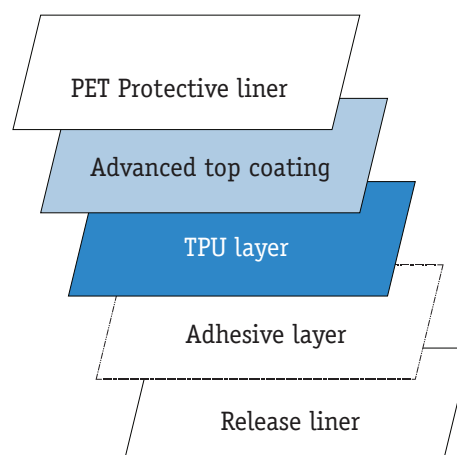
Zone 3: Greater Middle East, Africa, Australien Desert area & North of Brisbane coastal area, USA (Arizona, California, Florida, Nevada, New Mexico, Texas, Utah), Mexico

TeckWrap TPU PPF 290

TeckWrap Clear TPU Paint Protection film is advanced film designed to achieve long term protection of vehicle surface

Technical specification

Protective film (μm)	55
TPU film (μm)	185
Release film (μm)	90
Glue adhesion (gf/inch)	525
Elongation (%)	218
Breaking strength (kgf/inch)	7.6
Chromaticity blackness (5pt)	3.5
Flatness / Orange peel (5pt)	3
Gloss (% ,@60°)	92.5
Anti-oil pen stain (Deli Marker pen, 5pt)	5
Solvent resistance (Marker pen, 5pt)	3.5
Solvent resistant corrosion (DMF)	30
Resistance to scratching (5pt)	4
Normal temperature scratch repair degree (1hr, 5pt)	4.5
Normal temperature scratch repair degree (24hr, 5pt)	4.5(90%)
Heating scratches completely repair ability (70°C, 5pt)	4.5



The adhesive has a viscous force of 222 gf/inch (at temperature of 24 °C, and a humidity of 54%)

Physical properties

Size	1.52m x 15m (59.8" x 590.6", 4.98ft x 49.2ft, 1.66yd x 16.4yd)
Storage temperature	+14C - +20C with 50% relative humidity
Shelf-life	1 year from production date (save LOT number)
Application	On wet surface
Warranty	5 years from production date. The product are warranted to be free of defects in material. In case of product defects communicated in mentioned period, TeckWrap will consider and determine the existence of the defect and further decide at its sole discretion, to either replace defective product without charge or compensate it with money in such amount, as TeckWrap deems reasonable
Topcoating features	solvent and stain resistance, resistance to heavy metals, resistance to scratches, self-healing

Resistance tests by SGS (N.D. = Notdetected <MDL)

Heavy metals

Test Items	Unit	Test Method	MDL	Results
Cadmium (Cd)	mg/kg	With reference to IEC 62321-5:2013(Determination of Cadmium by ICP-OES)	0.5	N.D.
Lead (Pb)	mg/kg	With reference to IEC 62321-5:2013(Determination of Cadmium by ICP-OES)	5	N.D.
Mercury (Hg)	mg/kg	With reference to IEC 62321-4:2013(Determination of Cadmium by ICP-OES)	2	N.D.
Hexavalent Chromium (Cr VI)	mg/kg	With reference to IEC 62321:2008 (Determination of Hexavalent Chromium by spot test/Colorimetric Method using UV-Vis)	1	N.D.

Flame Retardants-PBBs/PBDEs

Test Items	Unit	Test Method	MDL	Results
Monobromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS)	5	N.D.
Dibromobiphenyl	mg/kg		5	N.D.
Tribromobiphenyl	mg/kg		5	N.D.
Tetrabromobiphenyl	mg/kg		5	N.D.
Pentabromobiphenyl	mg/kg		5	N.D.
Hexabromobiphenyl	mg/kg		5	N.D.
Heptabromobiphenyl	mg/kg		5	N.D.
Octabromobiphenyl	mg/kg		5	N.D.
Nonabromobiphenyl	mg/kg		5	N.D.
Decabromobiphenyl	mg/kg		5	N.D.
Monobromodiphenyl	mg/kg		5	N.D.
Dibromodiphenyl	mg/kg		5	N.D.
Tribromodiphenyl	mg/kg		5	N.D.
Tetrabromodiphenyl ether	mg/kg		5	N.D.
Pentabromodiphenyl ether	mg/kg		5	N.D.
Hexabromodiphenyl ether	mg/kg		5	N.D.
Heptabromodiphenyl ether	mg/kg		5	N.D.
Octabromodiphenyl ether	mg/kg		5	N.D.
Nonabromodiphenyl ether	mg/kg		5	N.D.
Decabromodiphenyl ether	mg/kg		5	N.D.

Installation stages

- Cleaning of a surface with soap liquid - hand cleaning of all organic and nonorganic contaminations - washing off soap liquid
- Cleaning of a surface using abrasive clay for cleaning contaminations
- Degreasing of all surfaces where the film will be bent
- Drying of a surface, checking the surface for impurities, measuring and marking of film on elements
- Cleaning of dust from surfaces using sticky dust wipes
- Applying of liquid on a surface, taking off the liner, watering the adhesive surface of the TPU film, installing of film on the surface
- Forming of film on the surface, rolling of the film using instruments, bending of film, heating the element
- Cleaning of liquid excesses, drying of the wrapped surface, polishing

Installation liquid

For the application of PPF film, several mixtures can be used. They have different characteristics and effects.

1. Water

Doesn't soften adhesive; the adhesive stays active. Water is not recommended when PPF is applied on large surfaces, because there is a risk of complete adhesion.

2. Soap mixture

Soap mixture is a mixture of liquid soap and water in the following proportion, 15 parts of soap with 100 parts of water. It's essential that soap's PH is 0 (zero). The soap mixture softens adhesive; the films slides on a surface. PPF is more comfortable to be applied and formed; air and water bubbles can be moved out easily. However, it takes more time to apply PPF using soap mixture.

3. Alcohol mixture

Alcohol mixture - a mixture of 95% alcohol and water in the following proportion, 3-4 parts of alcohol and 6-7 parts of water. This liquid activates adhesive and strengthens its adhesion with a surface. When used, there is a risk of early adherence with surface and signs from uneven stretching.

General recommendations

- It's recommended to use hard polyurethane squeegees for larger surfaces and softer Teflon squeegees for bending of vinyl edges. Any tool used for application must be with proper edges and must be kept clean. The edges on the toll must be sharp.
- The cleanliness and quality of water directly affect the quality of installation. The water sprayer should also be kept clean.
- One can damage any film with uneven stretching; PPF is not an exclusion. The film should be stretched evenly and properly. It should be stretched when it's already on the surface. It shouldn't be lifted when stretched. When lifted, the material absorbs heat faster, and there is a risk of uneven stretching. The failure of an application can be seen as broken reflections or lines on PPF.
- It's recommended to use alcohol mixture or clean water for small and simple elements (surface under door handles, protection of back wheel arches, doorways, etc.) and a combination of soap mixture and alcohol mixture for medium size elements of medium difficulty. The alcohol mixture can be used at edges to achieve stronger adhesion.
- The edges of PPF should be heated significantly. The temperature of PPF can be raised to more than 80 Celsius when edges are bent.
- The protective layer on of PPF should be pulled off right before installation.
- The surface of PPF should be moistened with liquid during application to prevent the film from scratching