

PRODUCT BULLETIN

APPLICATION AND REMOVAL METHOD

Micro-perforated films:

MICRO1 / MICRO2 / MICRO6 / MICRO50 / MICRO170UV

REQUIRED EQUIPMENT

- › A squeegee (refer to our catalogue)
- › Rigid for flat surfaces
- › Soft for curved surfaces
- › A cutter
- › A SHAGCUT liner cutting tool
- › Masking tape
- › Liquids for the cleaning of application surfaces:
 - › SHAGREMOV
 - › SHAGCLEAN
 - › HEXIS' O
 - › PG836 laminate (flat surfaces)
 - › PC50MICP2 laminate (curved surfaces)
 - › A HEX901 tape
 - › A SHAGGUN heat gun
 - › A PISTLASER3 laser thermometer
 - › A SCRUBFLOOR window scraper
 - › A HEXCROCH hook
 - › FPG836 sealing tape (flat surfaces)
 - › FPC50MICP2 sealing tape (curved surfaces)
 - › VR7077 sealing varnish
 - › A felt sheet

FEATURES

TYPE OF PVC	THICKNESS			PERFORATION			PRINTABILITY				
	Polymeric	Monomeric	160 µm	165 µm	180 µm	30-32%	40%	50%	Solvent and Eco-solvent	UV	Latex
MICRO1	✓		✓			✓					✓
MICRO2	✓			✓		✓			✓		✓
MICRO6		✓	✓			✓			✓		
MICRO50	✓		✓					✓	✓	✓	✓
MICRO170UV		✓			✓		✓			✓	

PREPARING YOUR APPLICATION SURFACE

The micro-perforated films can be applied to a wide variety of substrates, such as vehicle or building windows, provided the target surface is smooth, non-porous and free from any traces of oil, grease, wax, silicone or other contaminants.

For further information on each film used, please refer to the technical data sheets available on our website at www.hexis-graphics.com.

STORE YOUR FILMS UNDER APPROPRIATE CONDITIONS

Keep the films away from all major sources of heat (radiators and heaters, direct exposure to sunlight, etc.): the ideal temperature ranges from 15 °C to 25 °C (from 59 °F to 77 °F) (with a maximum of 20 °C (68 °F) for the MICRO170UV film).

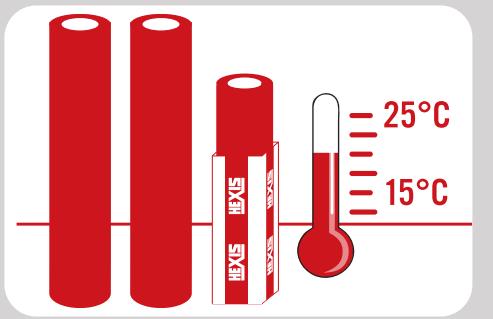
Store them in an atmosphere with low humidity (relative humidity of 50 %).

Keep your films in their original packaging. Each opened roll must be stored vertically or suspended in order to avoid pressure marks on the contact surface, in a dust-free environment.

Shelf life before application: One year when stored under the above conditions.

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Application methods are based upon HEXIS' experience and are non-restrictive. Comply with instructions to ease application of HEXIS films. The illustrations in this document are representative and not binding; the accessories and products used may differ depending on technical and commercial developments. HEXIS also offer training sessions for beginners and professionals to achieve optimum results.

1. RECOMMENDATIONS:

- › The micro-perforated films are intended for application to glass surfaces. They are not to be immersed in water.
- › The micro-perforated films are designed to adhere to any untreated mineral glass surface. Any treatment of the glass may alter the adhesion and lead to problems.
- › Side-by-side film application is preferable to overlapping installation for aesthetic reasons.
- › The micro-perforated MICRO6 film must only be applied to flat surfaces.
- › It is strongly recommended to laminate micro-perforated films that will be applied to vehicle rear windows.
- › HEXIS recommend that you reinforce the edges of the micro-perforated films with sealing tape (cf. chapter 5. EDGE PROTECTOR FOR MICRO-PERFORATED FILMS; page 11).
- › Make sure the rear window wipers are in good condition. The durability of the micro-perforated films will depend on it.

2. PRELIMINARY CLEANING OF THE SUBSTRATE:

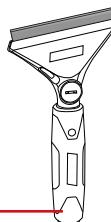
To avoid unexpected outcomes, always assume that every substrate is dirty and needs to be cleaned.

Before applying the film to the surface to be wrapped, we recommend you comply with the instructions that follow.

 *Perform a preliminary trial on a small surface area to check the compatibility of the products with the substrate.*

2.1. Scrape:

SCRUBFLOOR
Window scraper



Scrape the windows that will be covered with the micro-perforated film using the SCRUBFLOOR scraper with soapy water in order to remove any surface contamination (excess rubber, stuck-on dust, adhesive traces, etc.).

2.2. Degrease:

SHAGCLEAN
Cleaning and
degreasing agent



Degrease the application surface using a microfibre cloth soaked with the SHAGCLEAN or HEXIS'O product while paying particular attention to the edges.

HEXIS'O
Cleaning and
degreasing agent



The nature of the film to be applied also entails particular treatments (cf. technical data sheets available on www.hexisgroup.com).

3. LAMINATING MICRO-PERFORATED FILMS:

HEXIS recommend laminating the micro-perforated films, not only to protect the film during its life cycle, but also to facilitate the application and removal procedure (see table 1 on page 3).

	MICRO1	MICRO2	MICRO6	MICRO50	MICRO170UV
PG836	✓	✓	✓	✓	
PC50MICP2	✓	✓		✓	✓

Table 1: Recommended laminates

You may also use the HEX901 tape during application, in the event of high temperatures or if the micro-perforated film is not laminated, in order to avoid deformation of the micro-perforated film and scratches that can be caused by the scraper.

Ensure that the films are dry before application: the printed micro-perforated films are touch-dry after a maximum of 15 minutes following application, but it is recommended to leave the prints flat for 24 hours before laminating, cutting and applying them.

Advice: To ensure that the solvents evaporate completely, leave the film rolls to dry whilst not being wound too tightly.

3.1. For flat surfaces:

It is recommended to laminate the film with the super transparent, adhesive-coated, cold laminate PG836 (except for the micro-perforated MICRO170UV film).

 *Use only cold laminates applied with the help of a laminator.*

3.2. For slightly curved surfaces:

Only the cast cold laminate PC50MICP2 is recommended for curved surfaces such as vehicle rear windows.

4. APPLYING MICRO-PERFORATED FILMS:

Micro-perforated films are perfectly suitable for applications to windows of vehicles or buildings, except for the MICRO6 film that can only be used for buildings.

A protective sealing for micro-perforated films (cf. chapter 5. EDGE PROTECTOR FOR MICRO-PERFORATED FILMS; page 11) can be used on the borders of these films.

It is mandatory to use the so-called "dry" application method with the micro-perforated films.

THE WET APPLICATION METHOD IS STRICTLY PROHIBITED.

APPLY THE MICRO-PERFORATED FILMS ONLY TO THE GLASS SURFACE, NEVER TO THE SEALS.

Both the ambient and the glass substrate temperature must comply with the minimum application temperature of 10 °C (50 °C).

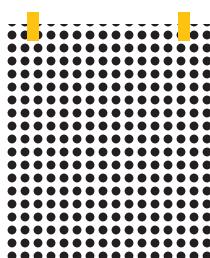


4.1. For building windows:

› During application to building windows, keep a distance of 1 mm (0.04 in.) from the edge of the window, or 5 mm (0.2 in.) if you want to apply an edge protector between the window seals and the border of the micro-perforated film.

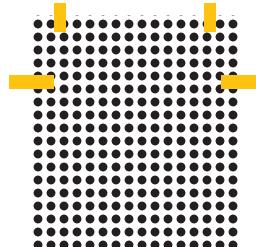
 *The application to window seals may later lead to the film peeling off.*

› Position the micro-perforated film, still protected by its liner, on the target surface.



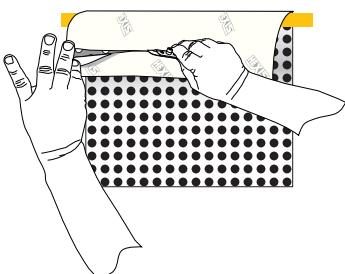
› Tape the micro-perforated film into place at the top using masking tape. (FIG. 01)

Figure 01



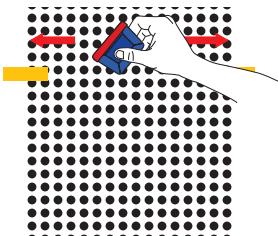
› Apply a strip of masking tape at both sides of the graphic, at about 20 cm (8 in.) from the top edge. (FIG. 02)

Figure 02



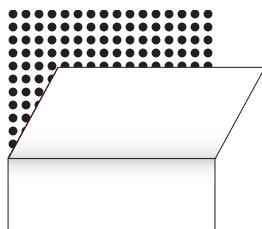
› Make a slit with the SHAGCUT in the liner, at a distance of about 5 to 10 cm from the edge, then remove the upper part. (FIG. 03)

Figure 03



› Start applying the film with a squeegee covered with felt by forming a 30° angle with the substrate and working from the centre towards the edges. (FIG. 04)

Figure 04



› Once the graphic is correctly applied to the top, remove the masking tape strips, then gradually remove the rest of the liner while applying the film. (FIG. 05)

Figure 05

› Firmly move the squeegee from the centre outwards again. Continue until the whole micro-perforated film is applied to the surface.

› Firmly press the squeegee in the corners and over the film edges.

Advice: To avoid damage to the graphic while working with the squeegee, you may use a light application tape such as the HEX901 tape.

› Cut the excess film with a cutter, while taking care not to scratch the glass and to spare the window seals. A gap of half a millimetre or 5 mm, if you want to apply an edge protector, will be present between the window seals and the edges of the micro-perforated film.

› Proceed as follows in order to protect window seals and avoid serrated cuts:

HEXIS tip: Break off a tooth of the cutter blade before cutting the glass. A blunt or worn blade is usually the cause of scratches on glass during application.

- The squeegee must be leant on the outer edge of the seal (FIG. 06).
- The cutter blade (CUTLAME) must be leant on the squeegee.
- The cutter (CUTVITRE) must form a 45-degree angle with the window.
- Then move simultaneously the squeegee-cutter assembly along the glass seal, with the cutter blade situated in the middle of the squeegee.

 *The application to seals may later lead to the film peeling off.*

› Apply, if necessary, the protective sealing (cf. chapter 5. EDGE PROTECTOR FOR MICRO-PERFORATED FILMS; page 10).



Figure 06

4.2. For vehicle windows:

Once the micro-perforated film is laminated with the PC50MICP2 laminate, you can start applying the micro-perforated film to the vehicle windows.

4.2.1. For rear windows:

› Make a slit in the liner using the SHAGCUT, in the centre of the graphic, from top to bottom. (FIG. 07)

Note: This makes it easier to remove the liner during the application of the film.

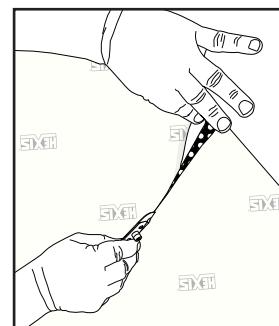


Figure 07

4.2.1.a. Film positioning and application:

› When the micro-perforated film is used as part of a full vehicle wrap, pre-position and align the film with the already applied graphic using magnets or small strips of masking tape. The masking tape strips should be positioned at the top centre and bottom centre of the micro-perforated film (FIG. 08). This will ensure a perfect visual seam alignment.

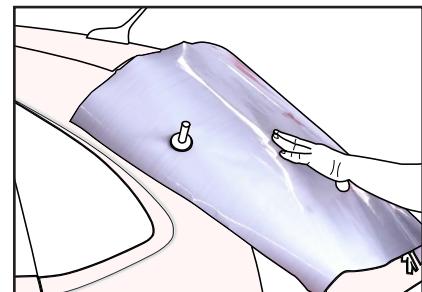


Figure 08

› Make a small opening in the compound with the cutter to allow the wiper motor shaft to pass through. (FIG. 09)

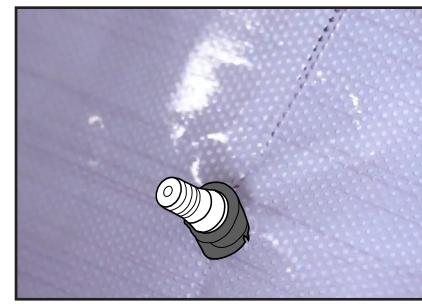


Figure 09

- › In order to remove correctly the liner, proceed as follows:

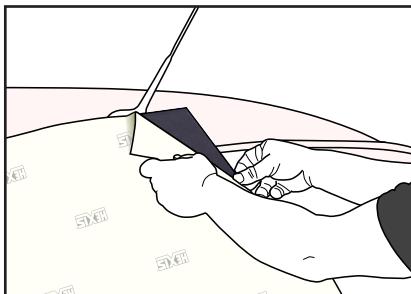


Figure 10

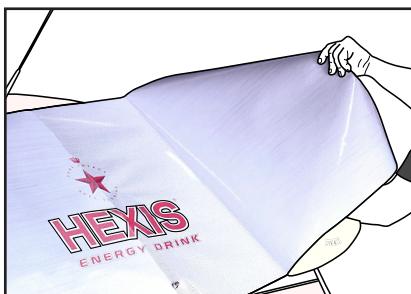


Figure 11

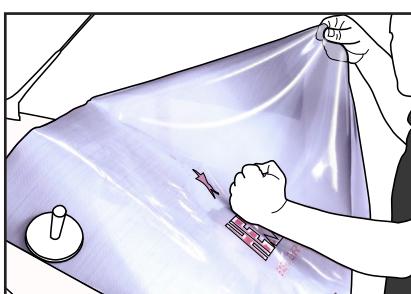


Figure 12

- › Fold the right side of the micro-perforated film over the left side.
- › Start removing the paper liner from the compound, from the top centre of the compound as shown in the adjacent illustration. (FIG. 09)

- › Remove the liner from the centre to the outer edge of the compound. (FIG. 10)



Figure 13

- › Apply the centre of the compound with the edge of your hand to fix it on the glass. (FIG. 11)
- › Gently put the film back on the glass.

- › Remove the liner from the left side of the compound as described above.

- › Fold down the top of the film so that the adhesive side does not come into contact with a bodywork part such as spoilers. (FIG. 13)



Figure 14

- › Stretch the film fairly tightly by holding it by the ends. (FIG. 14)

Note: On convex surfaces, tunnels will form from the centre of the compound to the corners. The formation of tunnels at this stage is normal.

- › Pull on the bottom and then on the top of the film to reduce the tunnels that have formed during the previous step. (FIG. 15)

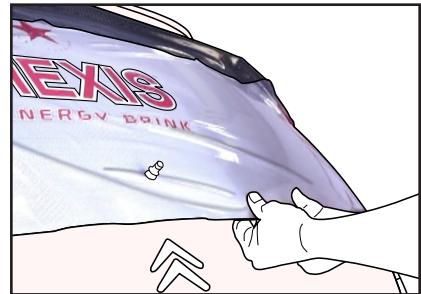


Figure 15

Note: Tensile stress was applied to the film during these steps. These constraints will be necessary to allow the film to adapt fully to the glazing when tensions are later released.

The application of the film on the right side is finished.

- › For the left side, peel off the film up to the centre axis of the rear window.
- › Slightly heat the compound so that the film can be stretched a little bit again. (FIG. 16)

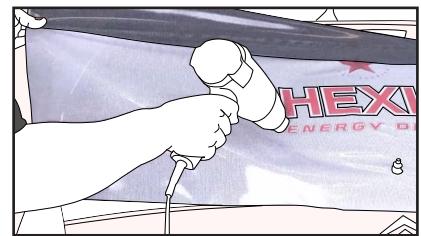


Figure 16

- › Then proceed as you did for the right-hand side to apply the film.

- › Heat the bottom of the film to 30 °C - 40 °C (86 °F - 104 °F) with the heat gun to release the tension previously applied to the film and thus reduce the tunnels that have formed during application. (FIG. 17)

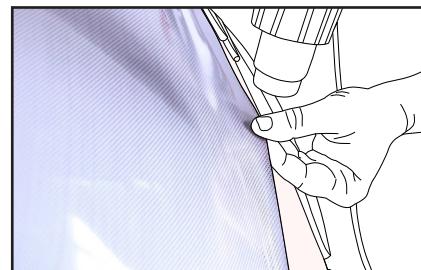


Figure 17

- › Pre-cut the top of the film so that only 1 to 2 cm (0.4 to 0.79 in.) of the film overhangs the window. (FIG. 18)

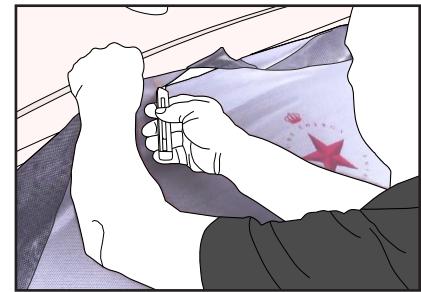


Figure 18

- › As for the bottom, heat the top of the film to 30 °C - 40 °C (86 °F - 104 °F) using the heat gun to reduce the tensions created during the first steps of film application. (FIG. 19)

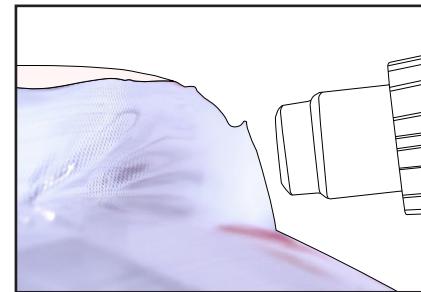


Figure 19

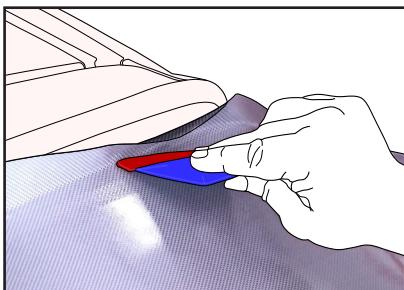


Figure 20

- › Apply the film up to the edge of the window with the squeegee without exerting any pressure. (FIG. 20)

Note: If this is done correctly, no creases should be present and the film should not peel off subsequently.

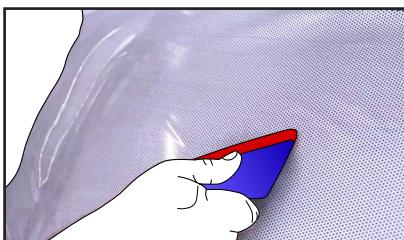


Figure 21

- › Immediately after the film application, run the felt-covered squeegee over the entire compound from the centre of the film towards the edges. This prevents the formation of bubbles. (FIG. 21)

4.2.1.b. Film cutting:

Peripheral cuts:

Remove the excess film from around the glass by making a flush cut.

- › Push out one tooth of a cutter blade.
- › Starting from one of the top corners of the window, place the cutter blade on the edge of the glass.
- › Incline the cutter slightly towards the centre axis of the pane and at an angle of 45° to the cutting direction.
- › Cut the film completely. (FIG. 22)
- › Do the same for the other side of the window as well as for the bottom and the top side.

! *The tip of the cutter should not be in contact with the glass at the risk of scratching it. HEXIS absolve themselves from any liability in the case of damage caused during the application steps.*

- › Heat the edges of the film to between 30 °C and 40 °C (86 °F and 104 °F) while applying pressure with the squeegee to make them adhere firmly to the glass.
- › Slightly round off the corners of the film to avoid any risk of it peeling off from these areas.

Internal cut:

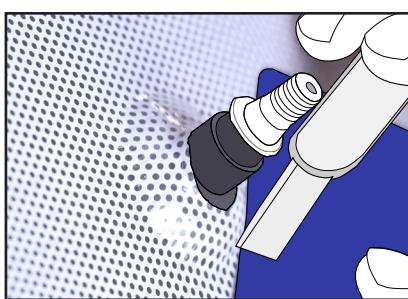


Figure 23

- › Push out 5 or 6 teeth of a cutter blade.
- › Place the cutter blade against the squeegee with the tip protruding slightly from beyond the squeegee.
- › Move the squeegee and the cutter at the same time, along the rubber protection of the wiper shaft, to cut the film. (FIG. 23)

! *Apply moderate pressure with the cutter on the rubber so as not to damage it.*

- › Lift the rubber with the HEXCROCH hook. (FIG. 24)
- › Apply the excess film with the squeegee under the seal.
- › Heat the film to between 30 °C and 40 °C (86 °F and 104 °F) to work the memory effect of the film at the seam.
- › The windscreens wiper can be remounted.
- › The film application on the rear window is complete.

Advice: Limit the use of the rear windscreens wipers as much as possible.

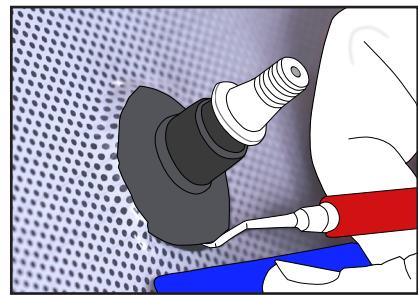


Figure 24

4.2.2. For fixed side windows:

- › When the micro-perforated film is used as part of a full vehicle wrap, pre-position and align the film with the already applied graphic using strips of masking tape. The masking tape strips should be positioned at the top centre and bottom centre of the micro-perforated film. This will ensure a perfect visual seam.
- › As before, turn the right side of the micro-perforated film over the left side, separate the paper liner from the PVC, cut the liner, remove it and apply the film to the right centre. Then fold the left side, remove the remaining liner and apply the film to the left centre.
- › Stretch and apply the micro-perforated film over the entire pane up to its edges and in the corners. (FIG. 25)

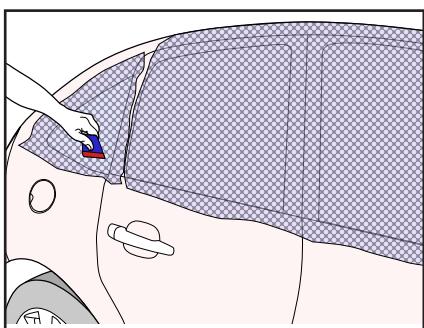


Figure 25

- › Take the cutter and cut the film 1 mm (0.04 in.) from the seals.

! *The application to seals may later lead to the film peeling off. Protect the integrity of the window seals while carefully cutting in order to avoid touching them with the cutter.*

Advice: In order to avoid serrated cuts, the cutter blade must be inclined, directed towards the seal.

4.2.3. For movable windows:

Note: The micro-perforated film can be applied to the movable windows. Nevertheless, we recommend you to limit the frequency of opening and closing these windows.

- › Start with the windows closed and properly cleaned on the outside.
- › When the micro-perforated film is used as part of a full vehicle wrap, pre-position and align the film with the already applied graphic using strips of masking tape. The masking tape strips should be positioned at the top centre and bottom centre of the micro-perforated film. This will ensure a perfect visual seam.
- › As before, fold the right side of the micro-perforated film over the left side, separate the paper liner from the PVC, cut the liner, remove it and apply the film to the right centre. Then fold the left side, remove the remaining liner and apply the film to the left centre.
- › Stretch and apply the micro-perforated film over the entire pane up to its edges and in the corners. (FIG. 26)

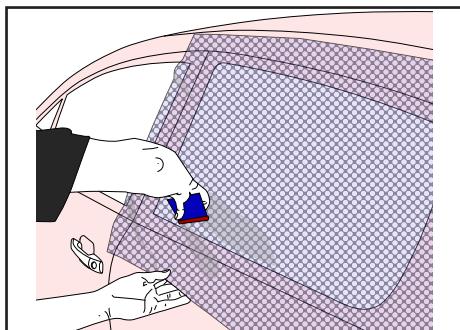


Figure 26

The film can be cut according to 2 methods:

- cut with overlap if the vehicle model allows it,
- cut along the edges of the seals.

4.2.3.a. Cut with overlap

- › Cover the seals with masking tape to protect them during cutting.
- › Cut the film leaving a 2 mm overlap at the bottom and at both sides of the window so that it can be slid under the outer weather strip.

4.2.3.b. Cut along the edges

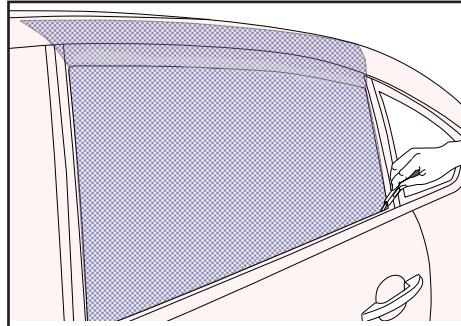


Figure 27

- › Cut the film at the bottom of the window and at the 2 lateral sides 1 mm (0.04 in.) from the seals. (FIG. 27)

Advice: In order to avoid serrated cuts, the cutter blade must be held at an angle of 45° to the window and must be directed towards the edge of the window.

! *The application to seals may later lead to the film peeling off. Protect the integrity of the window seals while carefully cutting in order to avoid touching them with the cutter.*

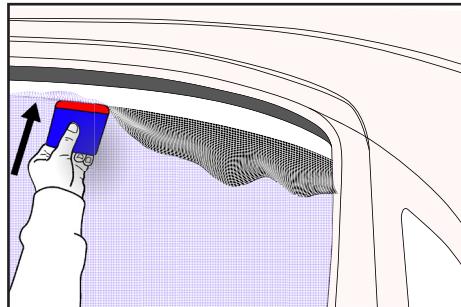


Figure 28

- › When applying to the top of the window, slightly open the window (2-3 cm (0.79 in.-1.18 in.)).

- › Apply the micro-perforated film using the squeegee up to the top of the window. (FIG. 28)

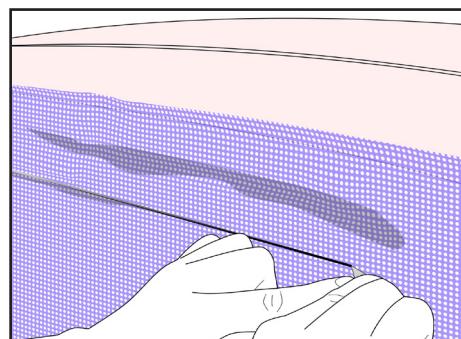


Figure 29

- › Cut the micro-perforated film flush with the top of the window. (FIG. 29)

- › Push out one tooth of a cutter blade.

- › Starting from one of the top sides of the window, place the cutter blade on the edge of the glass.

- › Incline the cutter slightly towards the centre axis of the pane and at an angle of 45° to the cutting direction.

- › Cut the film completely.

- › Finish by firmly pressing with the squeegee on the top of the film.

HEXIS tip: In order to enhance the adhesion of the film to the top of the movable vehicle windows, you can use 1-cm (0.4-in.) wide sealing strips (cf. paragraph: 5.1.2).

- › Wind up the window, the application is complete.

5. EDGE PROTECTOR FOR MICRO-PERFORATED FILMS:

5.1. Edge protector:

To enhance the adhesion of the films, HEXIS recommend that you use edge protectors for micro-perforated films: FPG836 for flat surfaces or FPC50MICP2 for slightly curved surfaces. We recommend it particularly when the surface requires frequent or high-pressure cleaning.

5.1.1. Flat surfaces

› Apply the strip by overlapping it 5 mm (0.2 in.) over the window and the rest over the micro-perforated film. (FIG. 30)

! *Apply the edge protector only to the glass, never to the seals.*

Advice: it is preferable to use sealing strips rather than the VR7077 sealing varnish for most applications.

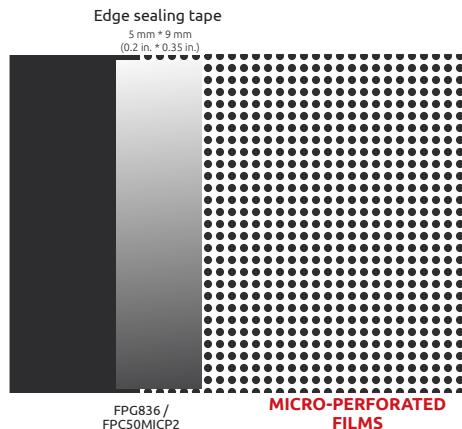


Figure 30

5.1.2. Curved rear windows or the top of movable windows:

› In order to enhance the adhesion of the film to a curved rear vehicle window or to the top of a movable vehicle window, you can use 1-cm (0.4-in.) wide sealing strips.

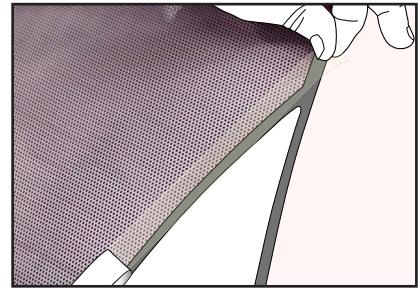


Figure 31

› Apply 5 mm (0.2 in.) of tape to the film and 5 mm (0.2 in.) to the glazing. (FIG. 31)

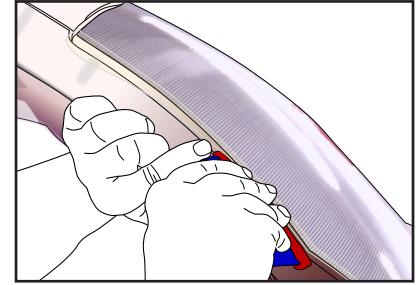


Figure 32

› When the film is applied flush with the window border, the sealing tape must be folded:
 - In the case of movable lateral windows behind the window.
 - In the case of curved rear windows between the window and the window seal using a squeegee. (FIG. 32)

! *The sealing tape must only be applied to the window and not to the seals. It is important to slide the sealing tape under the seal.*

5.2. Edge sealing varnish:

The VR7077 sealing varnish must be applied only to reinforce the tightness and the adhesion of the edges of micro-perforated films undergoing heavy external stress without modifying the adhesion properties of the films.

Advice: It is preferable to use sealing strips rather than the VR7077 sealing varnish for most applications.

Using VR7077 varnish is at the installer's own discretion.

› Ensure that all surfaces are completely dry.

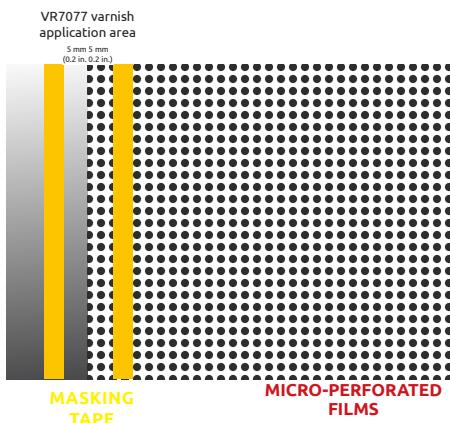


Figure 33

- › Apply 2 strips of masking tape: (FIG. 33)
 - › 1 to the substrate at 5 mm (0.2 in.) from the edge of the micro-perforated film.
 - › 1 to the micro-perforated film at 5 mm (0.2 in.) from its edge.

› Apply the varnish with a brush in one single layer; wear gloves and protective goggles.

› Remove the masking tape 15 minutes after application.

› Drying time is variable depending on the thickness of the varnish coat and surrounding temperature. For a film with an average coat, optimal drying time is 24 hours. Any physical aggression (cleaning, abrasion, etc.) must be avoided by all means during that period of time.

⚠ In all cases, avoid any contact between the varnish, the window seals and the de-icing system of the window.

Before using any of our liquids, please refer to the technical data sheets available on our website www.hexis-graphics.com.

6. CLEANING AND MAINTENANCE OF THE MICRO-PERFORATED FILMS:

The micro-perforated films must be cleaned with care: apply medium water pressure at a minimum distance of 50 cm (20 in.) and a maximum water temperature of 35 °C (95 °F).

The micro-perforated films should not be cleaned within the first 24 hours following their application. Premature cleaning may affect the adhesive strength, which may result in the film peeling off.

› HEXIS are not liable for any adhesive-coated films cleaned with unspecified additives from cleaning stations.

7. REMOVAL OF THE MICRO-PERFORATED FILMS:

To remove the micro-perforated films, we recommend the following method:

› Using a heat gun, start from a corner and heat the film to a temperature of around 50 °C (122 °F) (use the laser thermometer).

⚠ Use the heat gun with reason to preserve the properties of the film.

› Gently lift the corner with the cutter without damaging the glass substrate, and gradually remove the film, which has been heated; the film should form a 70- to 80-degree angle with the substrate.

⚠ A more or less wide angle will cause the film to break more easily.

› Always proceed gradually by heating small areas while carefully removing the film so as to limit the risk of leaving any adhesive on the substrate.

› Continue to carefully heat and gently peel off the film until it is completely removed while keeping a watchful eye on the heat applied, on the pulling angle of the film, and the pulling speed.

› If any adhesive remains on the substrate, take a cloth soaked with our SHAGREMOV product and rub the surface until all traces disappear. This product should previously be tested on a small area.

Advice: Always carry out a test on a small area before cleaning the entire substrate.

› Acetone may be used to ease the removal of the VR7077 sealing varnish.

! *The liquid may damage seals; therefore, take the necessary precautions before performing the clean-up.*

Before using any of our liquids, please refer to the technical data sheets available on our website www.hexitis-graphics.com.

For further technical information, please refer to the Technical Data Sheets available for free download from our website www.hexitis-graphics.com on the "Professionals" pages.

Due to the great variety of substrates and the growing number of new applications, the installer must check the suitability of the medium for each application. None of the information constitutes however a binding guarantee. The seller cannot be held liable for indirectly related damages and assumes no liability for claims that are higher than the replacement value of the purchased product. All specifications are subject to potential changes without prior notice. Our specifications are automatically updated on our website www.hexitis-graphics.com.

