PRODUCT BULLETIN

APPLICATION AND REMOVAL METHOD
Micro-perforated Films:
MICRO1 / MICRO2 / MICRO6 / MICRO170UV

REQUIRED EQUIPMENT

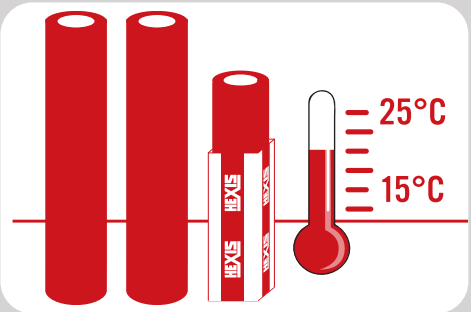
- A squeegee (refer to our catalogue)
- Rigid for flat surfaces
- Soft for curved surfaces
- A cutter
- Masking tape
- Liquids for the cleaning of application surfaces:
  - SHAGREMOV
  - SHAGCLEAN
  - HEXIS'O
- PG836 laminate (flat surfaces)
- PC50MICP2 laminate (curved surfaces)
- A HEX901 tape
- A heat gun
- A 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

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: 1 year when stored under the above conditions.



FEATURES

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

PREPARING YOUR APPLICATION SURFACE

The micro-perforated films can be applied to a wide variety of substrates, such as vehicle or building windows, as long as 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.

CONTENTS

Application methods are based upon HEXIS' experience and are non-restrictive. Comply with instructions to ease application of HEXIS films.
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. It is 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 SEALING FOR MICRO-PERFORATED FILMS:, page 10).

› Make sure the rear window wipers are in good condition. The durability of the micro-perforated films will depend on it.

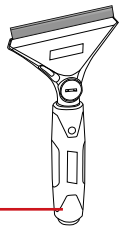
2. PRELIMINARY CLEANING OF THE SUBSTRATE:

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.

⚠ *Do not forget to carry out a preliminary trial on a small surface 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 in order to remove any surface contamination (excess rubber, stuck-on dust, adhesive traces, etc.).

SHAGREMOV
Powerful cleaning and degreasing agent

To remove persistent adhesive traces on the substrate, spray the SHAGREMOV product on the traces and rub with a clean cloth until all traces are removed.

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

2.2. Degrease:

SHAGCLEAN
Cleaning and degreasing agent

Degrease the application surface with the SHAGCLEAN product while paying particular attention to the edges.

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

2.3. Wash:

For vehicle windows: Clean with SHAGCLEAN.

For building glass surfaces: Clean with HEXIS'O.

Use a clean cloth for every window that must be cleaned.

HEXIS'O
Cleaning and degreasing agent

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 below).

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

Chart 1: Recommended laminates

You may also use the HEX901 tape during application in order to avoid deformation of the micro-perforated films 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 printed films stacked on sheet racks in a ventilated room to dry.

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 THE FILMS:

Micro-perforated films are perfectly suitable for applications to windows of vehicles or buildings (except for the micro-perforated MICRO6 film).

A protective sealing for micro-perforated films (cf. chapter 5. EDGE SEALING FOR MICRO-PERFORATED FILMS:, page 10) 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.

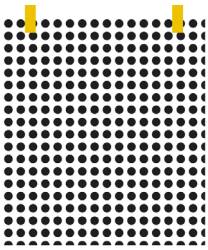


Figure 01

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

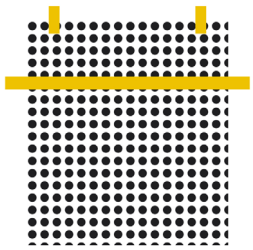


Figure 02

› Apply a strip of masking tape across the graphic, at about 10 cm (4 in.) from the top edge. (FIG. 32)

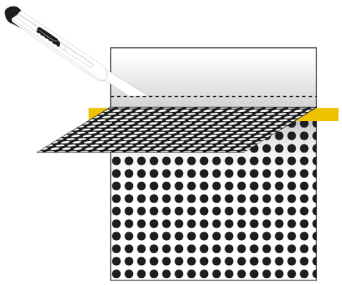


Figure 03

› Remove the liner from the top down to the hinge and cut the liner without touching the micro-perforated film. (FIG. 03)

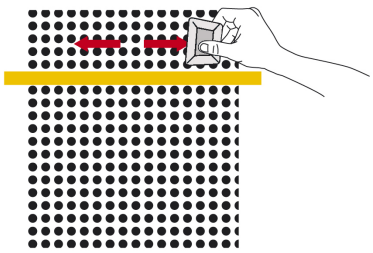


Figure 04

› Apply the film with the squeegee previously covered with felt, carrying out movements from the centre towards the borders. (FIG. 04)

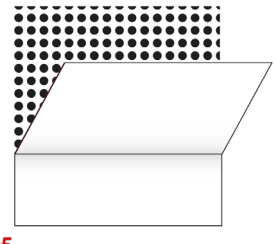


Figure 05

› Once the graphic is correctly positioned and applied to the top, remove the masking tape and the liner. (FIG. 05)

› Then proceed with the squeegeeing of the micro-perforated film. Firmly move the squeegee from the centre outwards. 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 micro-perforated film at 1 mm (0.04 in.) from the edge of the window, or at 5 mm (0.2 in.) from the edge if you want to apply a protective sealing.

⚠ *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.*

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

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 CUTVINYL, in the centre of the graphic, from top to bottom. (FIG. 06)

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

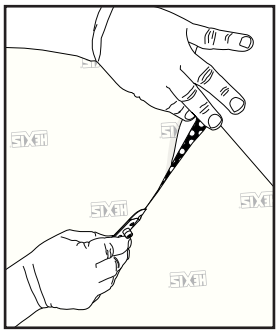


Figure 06

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. 07). This will ensure a perfect visual seam.

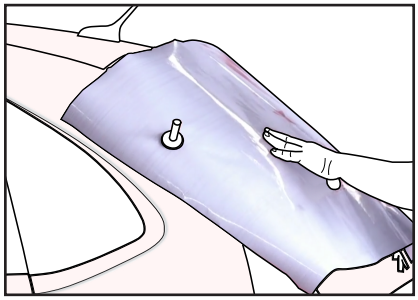


Figure 07

› Make a small opening in the compound with the cutter to allow the wiper motor shaft to pass through. (FIG. 08)

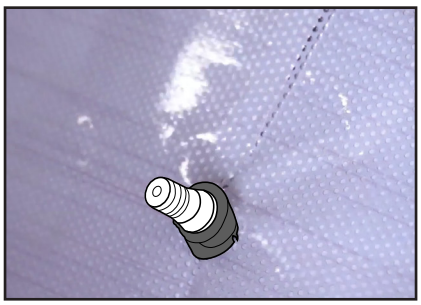


Figure 08

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

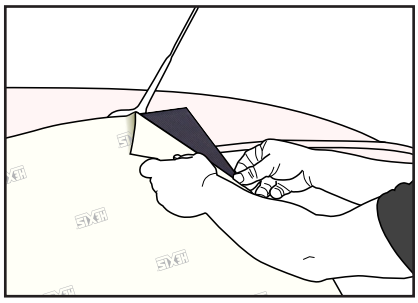


Figure 09

› 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)

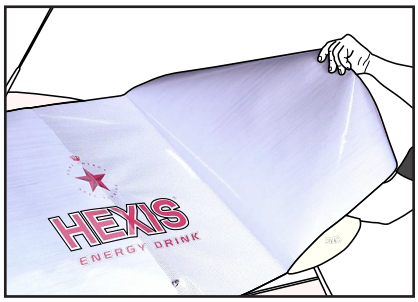


Figure 10

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

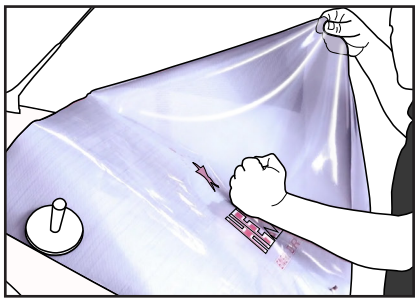


Figure 11

› 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 right side of the compound as described above.

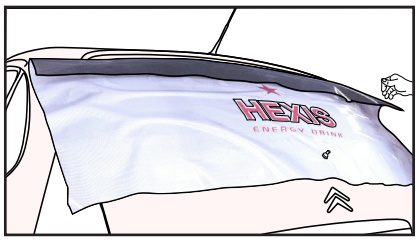


Figure 12

› 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. 12)

Note: This reduces the stress on the film during the application of the compound to the upper part of the window.

⚠ *The film should never be pulled at the vertical folds at the risk of the film peeling off later.*

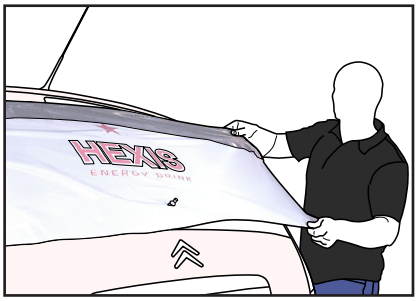


Figure 13

› Stretch the film fairly tightly by holding it by the ends. (FIG. 13)

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. 14)

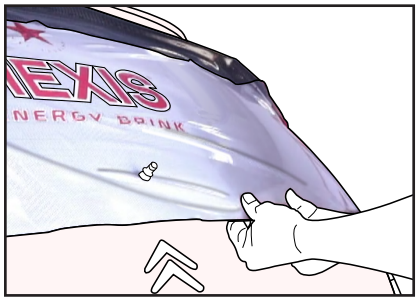


Figure 14

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 to the centre axis of the rear window.

› Slightly heat the compound so that the film can be stretched a little bit again. (FIG. 15)

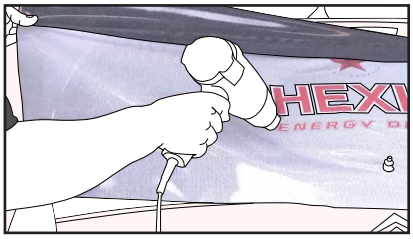


Figure 15

› 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. 16)

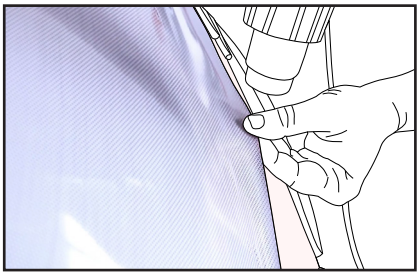


Figure 16

› 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. 17)

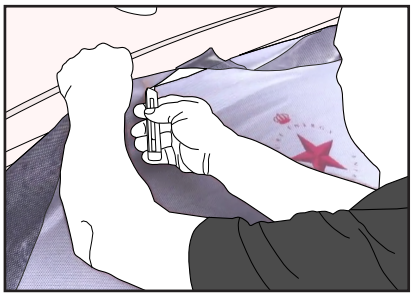


Figure 17

› 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. 18)

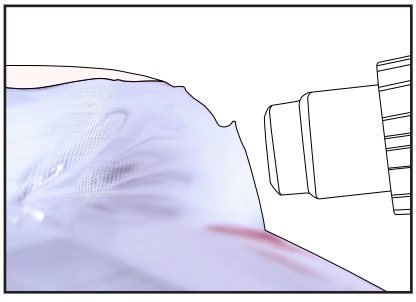


Figure 18

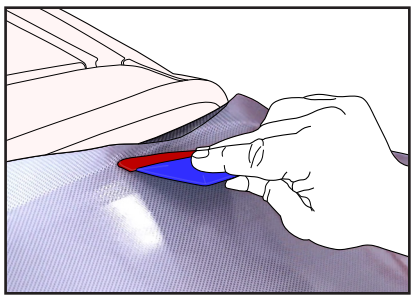


Figure 19

› Apply the film up to the edge of the window with the squeegee without exerting any pressure. (FIG. 19)

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

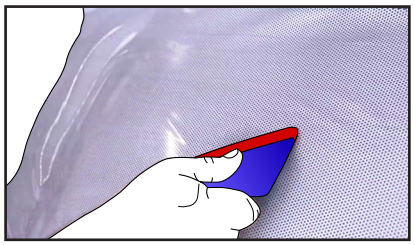


Figure 20

› 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. 20)

4.2.1.b. Film cutting:

Peripheral cuts:

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

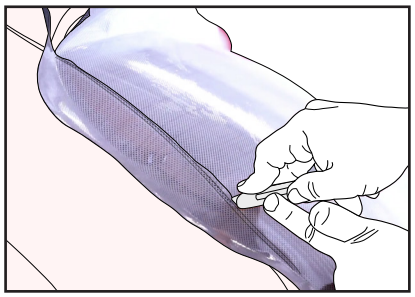


Figure 21

› 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. 21)

› 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.

› Cut the corners of the film slightly to avoid any risk of it peeling off from these areas.

Internal cut:

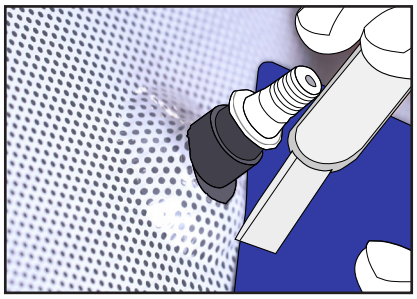


Figure 22

› Push out 5 or 6 teeth of a cutter blade.

› Place the cutter blade against the squeegee with the tip protruding slightly 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. 22)

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

› Lift the rubber with the HEXCROCH hook. (FIG. 23)

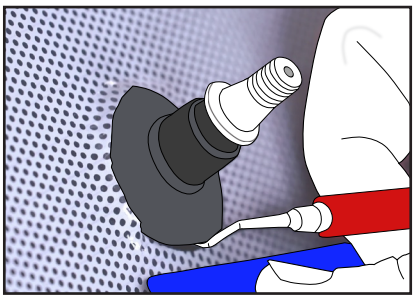


Figure 23

› 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 windscreen wiper can be remounted.

› The film application on the rear window is complete.

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

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 small 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 right centre. Then fold the left side, remove the remaining liner and apply the left centre.

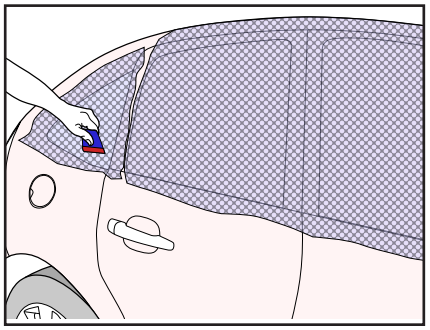


Figure 24

› Stretch and apply the micro-perforated film over the entire pane up to its edges and in the corners. (FIG. 24)

› 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 moveable side windows:

Note: The micro-perforated film can be applied to the moveable side windows. Nevertheless, we recommend you to limit the frequency of opening and closing of 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 small 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 right centre. Then fold the left side, remove the remaining liner and apply the left centre.

› Stretch and apply the micro-perforated film over the entire pane up to its edges and in the corners. (FIG. 25)

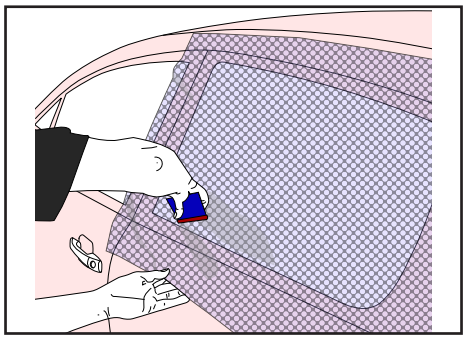


Figure 25

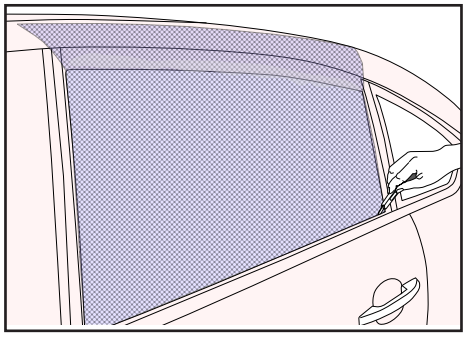


Figure 26

› Cut the film at the bottom of the window and at the 2 lateral sides 1 mm (0.04 in.) from the seals. (FIG. 26)

Note: At the bottom of the window, if the model of the car allows it, you can cut the film leaving a 2-mm (0.08 in.) overhang in order to push it under the outside rubber lip.

Advice: In order to avoid serrated cuts, the 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.*

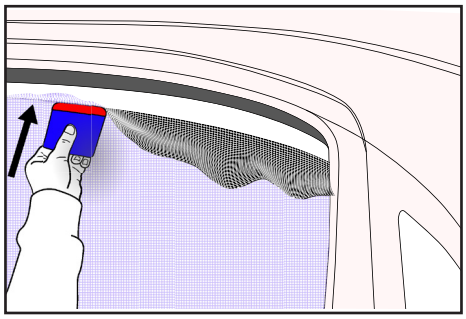


Figure 27

› 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. 27)

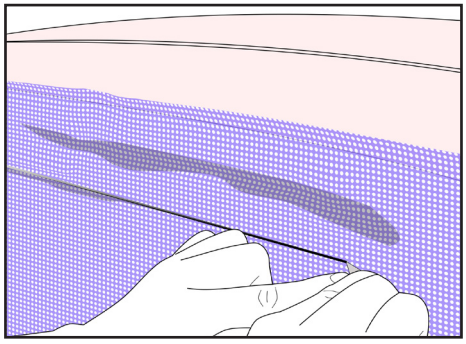


Figure 28

› Cut the micro-perforated film flush with the top of the window. (FIG. 28)

› Firmly press with the squeegee on the top of the film.

› Wind up the window, the application is complete.

5. EDGE SEALING 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

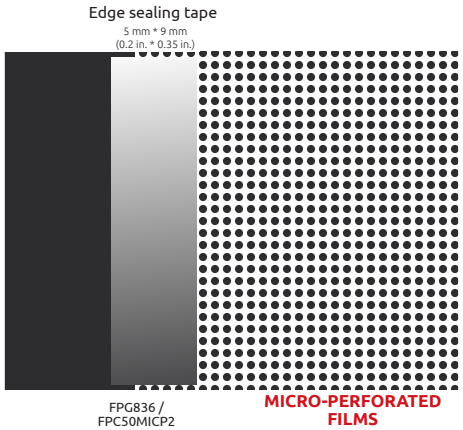


Figure 29

› Apply the strip by overlapping it by approximately 5 mm (0.2 in.) over the window and 9 mm (0.35 in.) over the micro-perforated film. (FIG. 29)

⚠ *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.

5.1.2. Curved rear window:

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

› Apply 5 mm (0.2 in.) of tape to the film and 5 mm (0.2 in.) to the glazing. (FIG. 30)

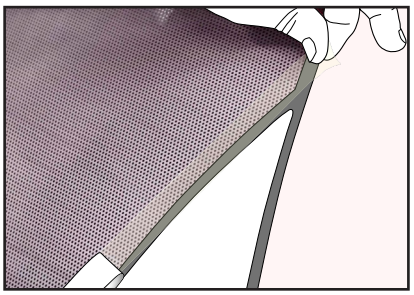


Figure 30

› When the film is applied very close to the window border, the sealing tape must be pushed under the window and the window seal using the squeegee. (FIG. 31)

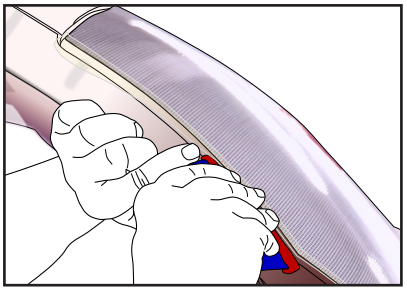


Figure 31

⚠ *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 seal and adhesion of the edges of the 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.

› Apply 2 strips of masking tape. (FIG. 32)
- › 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.

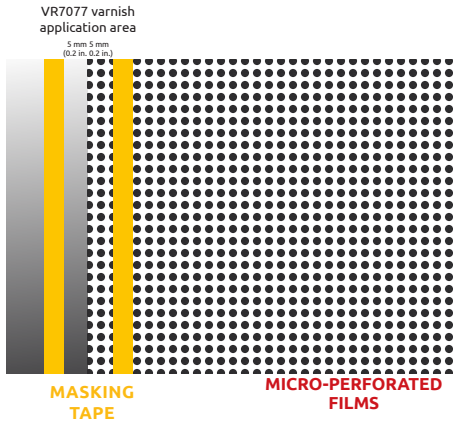


Figure 32

› 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:

Exercise care when cleaning the micro-perforated films with high-pressure cleaners: apply medium water pressure at a minimum distance of 50 cm (20 in.) and a maximum water temperature of 35 °C (95 °F).

› It is strongly recommended to wait at least 24 hours after the application of the micro-perforated films before cleaning. Premature cleaning may affect the adhesive strength, which may result in the film peeling off.

› HEXIS are not liable for any adhesive 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.hexis-graphics.com.

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