Marking films - Application guide

The application techniques that we will describe should help users by making their job easier, or by saving them time.
However, we know that all the advice in the world cannot replace the skill and experience of professional users, without whom no high-quality work would be possible.

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1. MACtac and the quality

For more than 40 years MACtac has always been an innovative company and has helped its Customers to increase their productivity.
But MACtac is not only focused on new products. Quality and consistency have become the key words for today's industrial world. That is why MACtac has put together continuous quality improvement systems to enable employees to deliver top quality products and top quality service to our Customers.
But Quality is also a question of manufacturing equipment. Here too MACtac has to be considered as an industry leader with the latest investment in manufacturing and finishing equipment at its European site. This new fully automated plant is considered as the jewel of the self-adhesive industry which guarantees quality consistency to satisfy customer demands.
Ultimately, satisfied and successful customers are the measure of MACtac quality. Pursuing this value will continue to drive MACtac into the future.

2. Basic tools for vinyl application

pair of scissors
cutter
ruler
pair of cotton gloves or a piece of cotton fabric
felt squeegee
plastic squeegee
masking tape
variable-power hot air gun
clean room - heated if necessary

3. Storage

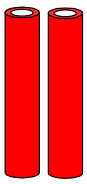
MACtac provides a two-year storage guarantee for its marking films on condition that they have been kept at temperatures of 15 to 25°C and at humidity of 40 to 60%.

Temperature
15 – 25°C

Humidity
40 – 60%

Also avoid directly exposing the vinyl to high temperatures (near radiators, in direct sunlight, etc.)

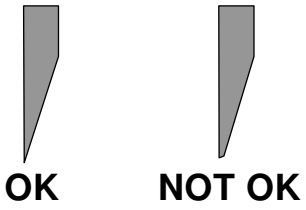
OK



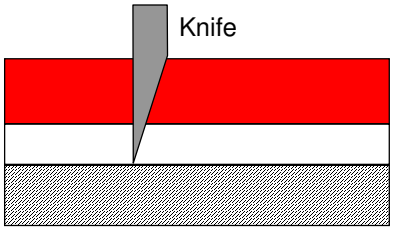
NOT OK

Any part-used rolls should be kept upright or hung on racks.
At no time should they be placed on their sides as this could lead to large areas of matification appearing throughout the roll.

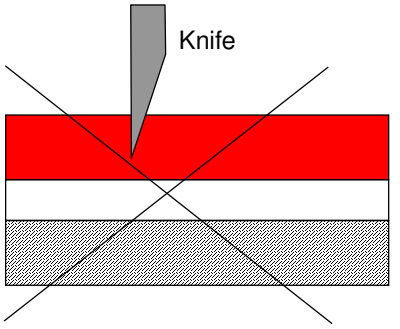
4. Cutting Process



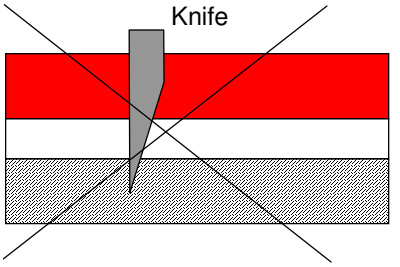
Use a knife with a sharp blade. Blunt or worn knives will result in untidy cuts (known as “jagged edging”).



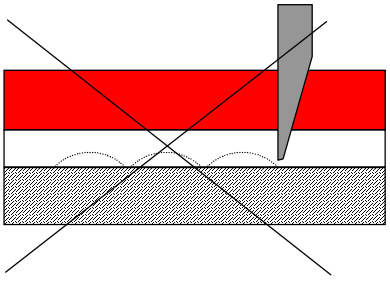
Cut to the correct depth. The knife should cut all the way through the vinyl and the adhesive.



If the cut is not deep enough (the vinyl and/or if the adhesive is not cut all the way through), the letters and logos that you have cut out could be pulled away during stripping.



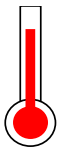
If cuts are too deep, then the backing could split when the letters or logos are being transferred onto the MACtransfer tape.



Applying too much pressure when using a blunt knife could result in the knife bouncing off the backing paper, which means that the adhesive will not be cut all the way through.

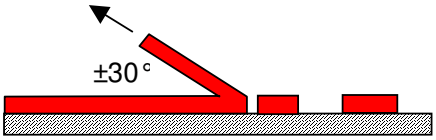
5. Weeding Process

Maximum
1 hour



Temperature :
15-23°C
Max 25°C

MACtac recommends vinyl weeding takes place soon after cutting.
If weeding is delayed too long and if the ambient temperature is too high, the adhesive layer could "reseal" itself and could therefore hamper the ease of weeding.



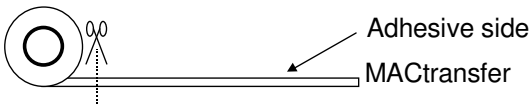
For best weeding results, use a cleaving angle of ±30° and pull at a steady speed.

6. Application Tape (AT) Usage Method:

The application tape should preferably be laminated using a laminator.

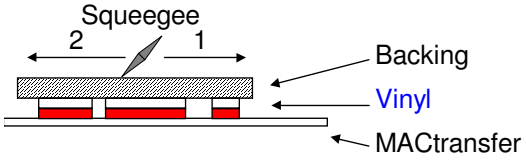
If this is not possible, then use the following procedure:

1.



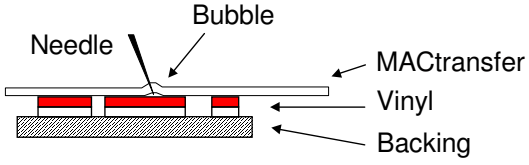
Roll the AT out on a table with the adhesive facing upwards.
Cut a band wider than the lettering / logo to be transferred.

2.



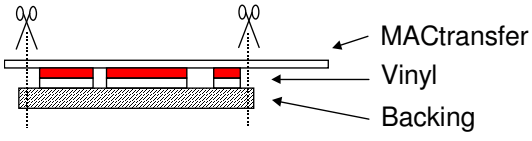
Place the lettering / logo on the AT.
Squeegee the reverse side of the marking film backing with a stiff plastic squeegee, working outwards from the centre.

3.



Turn the layers over and prick any air bubbles trapped between the application tape and the vinyl using a needle or a cutter (bubbles could cause wrinkling when applying the marking film on the substrate).

4.



Cut the AT to the same size as the marking film.
To carry the vinyl with the AT on it to the place where it is to be applied, roll it up with a diameter of at least 5 cm, with the AT facing outwards, or carry it flat.

7. Cleaning the application surface

Even if they appear clean, all surfaces should be cleaned using the procedure below:

Clean with soapy water, then rinse with clean water (do not leave any traces of soap on the surface).
Clean away any grease using isopropyl alcohol or denatured petrol.
Dry the surface using a dry cloth or a clean paper towel which will not leave any small pieces behind, before the isopropyl alcohol or denatured petrol has had a chance to evaporate.

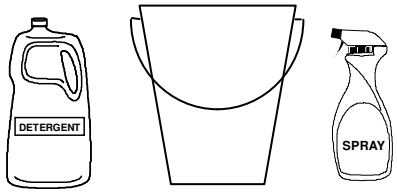
8. Marking Films Application Method

A wet method or dry method application technique may be used. The method chosen should suit the size of the decorative feature to be applied and the complexity of the surface to be decorated. Dry application is the most reliable method.

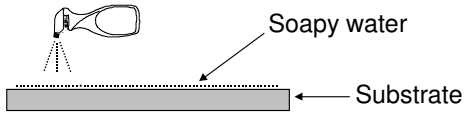
8.1. Wet method

This method of application produces very little initial adhesion. This allows the applicator to position the vinyl where required, avoiding air bubbles and folds.
The adhesion will gradually increase after several hours as the water evaporates.
The final adhesion will be reached after 24 or 48 hours.
It is not advisable to apply a marking film using the wet method in temperatures lower than 15°C.

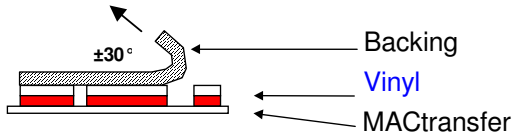
Advantages of the wet method:
Allows the vinyl to be applied to surfaces in high ambient temperatures (>25-30°C).
It makes it easier to apply large sections of vinyl on flat or slightly curved surfaces.

1. 

Prepare a solution of soapy water (one capful of detergent to 10 litres of water) and pour it into a spray bottle.

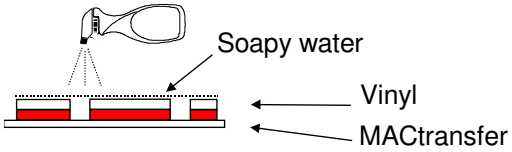
2. 

Use the spray bottle to wet the entire substrate surface (do not use a sponge or a cloth as these can leave dust, fluff, etc.).

3. 

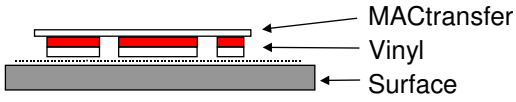
Make sure the adhesive film is flat on a table. Pull the backing off it (and not the reverse) at an angle of 30°.

4.



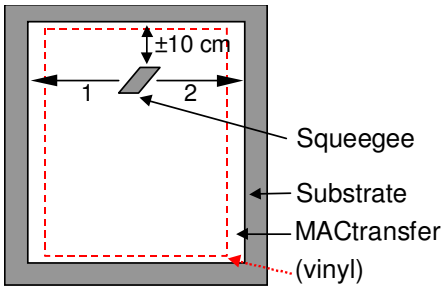
Wet the adhesive all over using a spray bottle.

5.



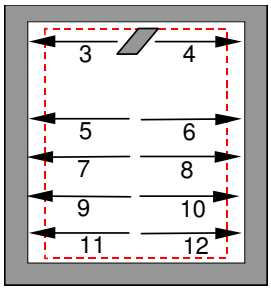
Place the marking film on the wet substrate surface.
If the vinyl does not have any application tape on it, wet the entire surface of the film. This will make it easier to slide the plastic squeegee without scratching the vinyl

6.



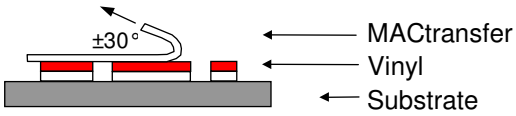
Squeegee horizontally, working from the centre outwards to the left and then the right stopping ±10 cm from the top edge of the vinyl.
Apply enough pressure to squeeze out any water trapped between the adhesive and the substrate surface.

7.



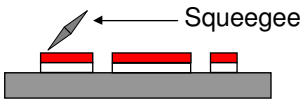
Squeegee the last 10 cm of the top edge working from the centre outwards, to the left and then the right.
Continue to squeegee horizontally moving from the centre outwards with overlapping movements.
Check that no pockets of water have been trapped. If this is the case, squeegee from the centre to the edge in order to squeeze it out.
Wipe the vinyl and the edges.

8.



If the marking film is covered with AT, pull it off at a steady speed, at a cleaving angle of 0 to 30°.
It is advisable to wait between 30 and 90 minutes (depending on the ambient temperature) before removing the AT.
It should not be left in contact with the vinyl for more than 24 hours.

9.



After these 30-90 minutes squeegee the film again, paying particular attention to the edges.

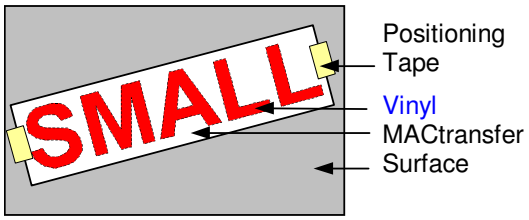
8.2. Dry method

Dry application is a safer application method because the marking film reaches its final adhesion quicker than using the wet application method.

The lowest application temperature for marking films on flat or slightly curved surfaces is 10°C.
On three-dimensional surfaces that require the vinyl to be shaped (over rivet heads, corrugations, welded areas, etc.) only MACfleet 6500 or IMAGin JT 5529 P may be used.
Their minimum application temperature is also 10°C but require the use of a heat gun.

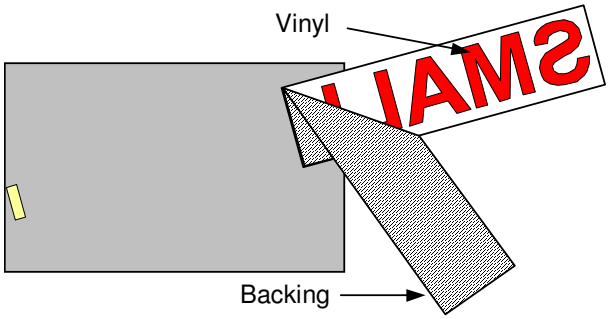
8.2.A. Small surface areas (< 0.5 m²)

1.



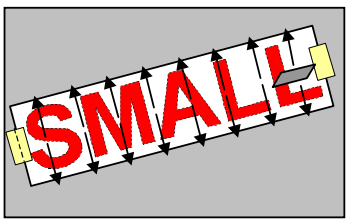
Place the application tape on top of the lettering or logo.
Position the lettering or the logo WITHOUT REMOVING THE BACKING, using positioning tape at each end.

2.



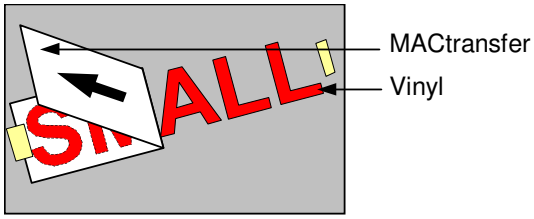
Cut one edge of the positioning tape.
Peel the backing off.

3.



Position the lettering or the logo once again on the spot marked by the piece of positioning tape.
Squeegee quickly and firmly from the centre outwards in overlapping movements.

4.

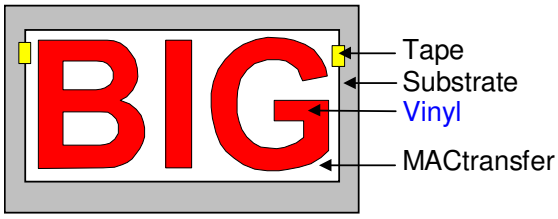


Pull the AT off at steady speed, at a cleaving angle of 0 to 30°.
Prick any air bubbles (*) trapped between the vinyl and the substrate.

(*) In the event that “tiny bubbles” of air get trapped between the marking film and the substrate surface (bubbles which have a diameter < 2 mm), there is no need to do anything as they will disappear after a few days due to the porosity of the vinyl.
If the bubbles are over 2 mm in diameter, use the following procedure:
1 - try to collect the bubbles together without putting the vinyl out of shape.
2 - prick the bubble at one end.
3- pushing from the side opposite the opening, squeeze the air out through the opening

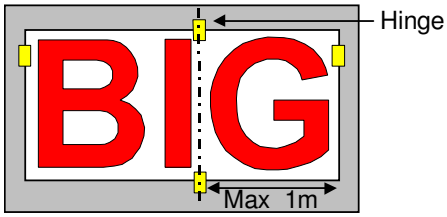
8.2.B. Large flat surfaces (>1 m²) : hinge method

1.



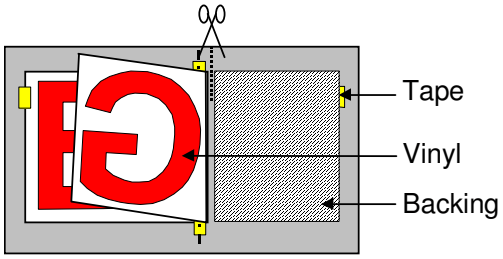
For surfaces of this kind, it is absolutely necessary to apply AT to the lettering or logo. Position the lettering or the logo WITHOUT REMOVING THE BACKING by using a piece of positioning tape at each end.

2.



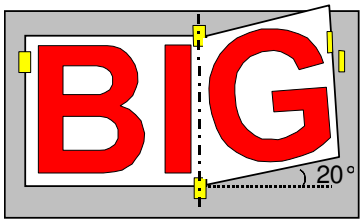
Make a hinge perpendicular to the largest dimension of the letters or logo, no more than 1m away from any one of the edges.

3.



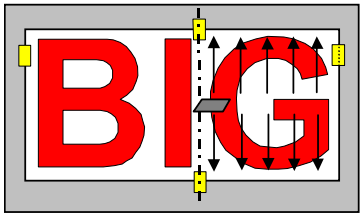
Cut the positioning tape.
Fold one half on top of the other.
Remove and cut the backing as far as the hinge.

4.



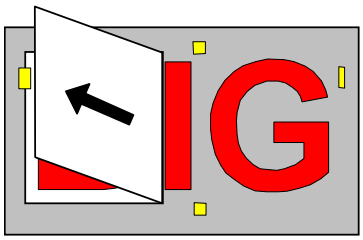
Fold the hinge back making sure that you leave a space between the MACfleet and the substrate surface (angle of ±20°) in order to avoid it sticking too soon.

5.



Squeegee firmly from the centre outwards in overlapping movements.

Repeat the same set of actions for the other section of the lettering or logo.

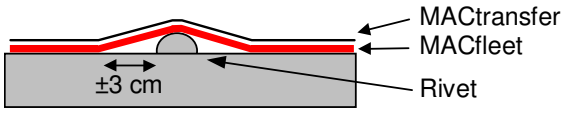
7. 

Remove the AT at a steady speed, at a cleaving angle of between 0 and 30°.

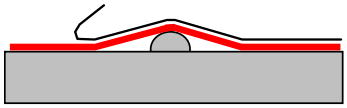
Prick any air bubbles trapped between the vinyl and the substrate and squeegee once more.

8.2.C. 3 dimensional surfaces : rivets

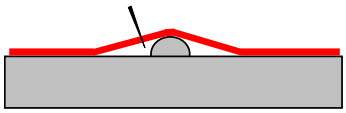
If decorating a vehicle with rivets, only MACfleet 6500 or IMAGin JT 5529 P can be used.

1. 

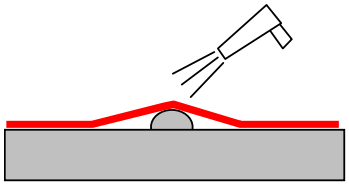
Apply the MACfleet, using the dry method described earlier, to the whole area of the surface of application, leaving a ±3 cm gap between the vinyl and the substrate, around rivets.

2. 

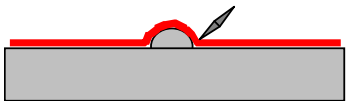
Remove the application tape at a steady speed and a cleaving angle of 0 to 30°.

3. 

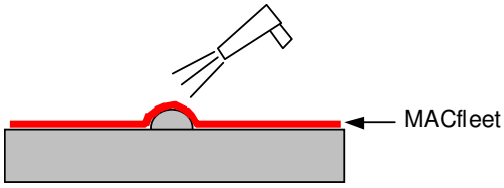
Collect the bubble around the rivet without putting the vinyl out of shape.
Prick several holes in the vinyl around the rivet.

4. 

Heat MACfleet 6500 with a heat gun (at ±250 °C).
Squeeze out any air trapped between the MACfleet and the rivet using your finger.

5. 

Press the film firmly around the rivet with your finger or a plastic squeegee.

6. 

Finish off by stabilising the MACfleet with a heat gun (air temperature at ±650°C).

8.2.D. 3 dimensional surfaces : corrugations

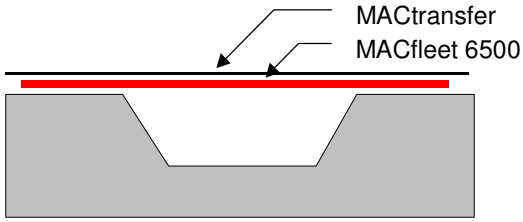
If decorating a vehicle with corrugations, only MACfleet 6500 or IMAGin JT 5529 P can be used.

1.

Ideal substrate temperature : 18-25°C

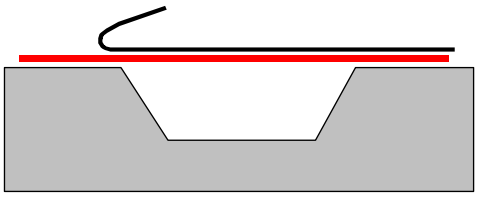
The ambient temperature and the angled surface of the object have to be ideally between 18 and 25°C.
Clean the substrate surface and remove any grease using isopropylic alcohol.

2.



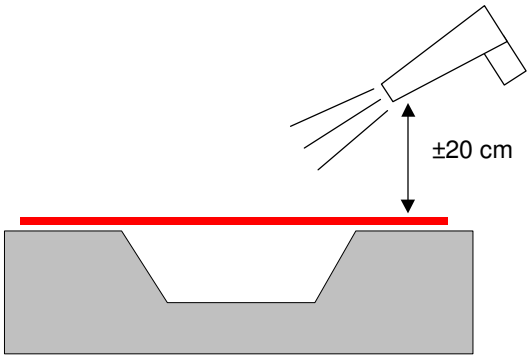
Apply MACfleet 6500 using MACtransfer application tape over the 3 dimensional surface. The application tape is used to give more stability to the vinyl during the first stages of application.

3.



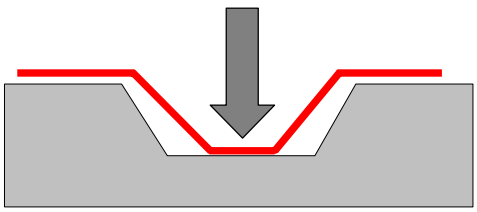
Remove the AT.

4.



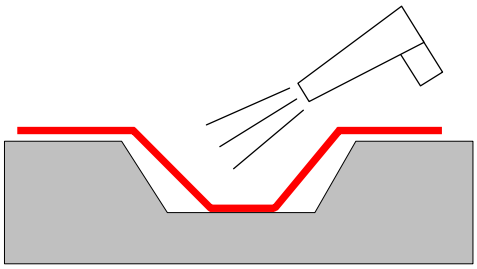
Heat MACfleet 6500 with an industrial air gun (air temperature: ±250°C).
The vinyl itself must reach a temperature of ±60°C before being shaped..
At this temperature, the adhesive will be "activated". This will help to reach 100% of its sticking capacity to the surface.
NB: Take care not to burn the vinyl. Use quick movements with the industrial air gun, keeping it ±20 cm away from the vinyl.

5.



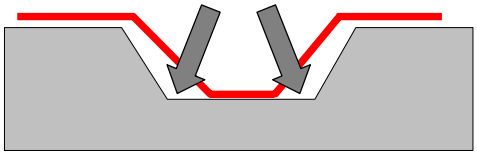
Press the vinyl into the corrugation using your finger covered by a cotton glove.

6.



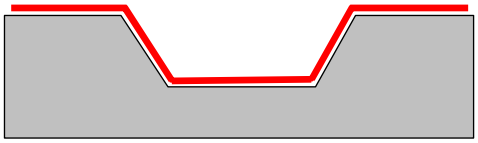
Heat any areas that have not yet come into contact with the substrate.

7.



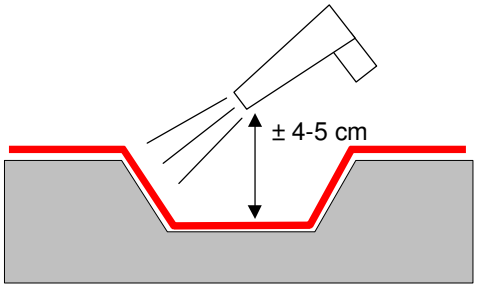
Press down once more using your finger.
Take care to obtain 100% contact between MACfleet and the bodywork.
Prick any air bubbles that appear.

8.



During the shaping of the MACfleet into the corrugation, considerable tension is put on the vinyl.
It is essential to release this tension otherwise the vinyl will pop-out after few weeks.

9.



In order to cancel the tension, proceed as follows:
Re-heat the MACfleet in all the areas where it has been shaped with a heat gun (±650°C).
Keep the heat gun at a distance of 4-5 cm from the MACfleet.
Move the heat gun very slowly: 20 seconds are required to stabilise 50 cm of MACfleet.

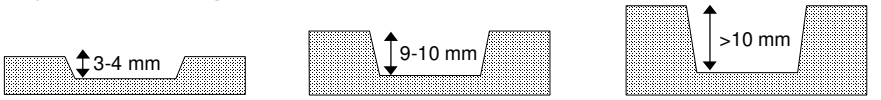
The decoration should not be exposed to temperatures lower than 10°C during the first 3-4 hours.

Important remarks:
Adhesion to plastics such as ABS, PP or rubber is always difficult. Do not decorate surfaces of this kind if you require long-life decoration.
Any images printed on MACfleet 6500 or IMAGin JT 5529 P can be protected using LF 3699 lamination film.
Before lamination check first to ensure that the inks are completely dry and have good anchorage to the vinyl. The over-lamination is done using a professional laminating machine.
Although MACfleet is an exceptionally conformable film, it is sometimes impossible to stabilise perfectly the vinyl due to the degree of complexity of the recess or substrate. In these instances the vinyl may lift away from the corrugation.
In these cases, MACtac recommend to cut MACfleet.
The following factors may have an influence on the vinyl conformability and in such instances vinyl cutting recommendations are given.

8.2.E. Limit of conformability of MACfleet 6500 (or IMAGin JT 5529 P)

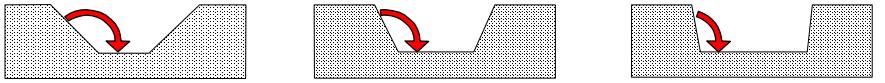
Principal factors influencing the limit of conformability:

Depth of the corrugation/recess



Easy application | Difficult application | Very difficult application

Angle of the corrugation/recess



Easy application | Difficult application | Very difficult application

The chemical nature and the surface tension of the paint.

Age of the paint: adhesion of MACfleet 6500 is better on worn paints than on totally new paints.

Paint surface aspect (smooth, rough)

Number of layers of MACfleet !
It is evident that with 2 layers of vinyl the conformability is reduced.
NB: The 2 layers could be:
2 CAD CAM films (a red + a blue MACfleet by example) or
a printed MACfleet (or JT 5529 P) laminated with LF 3699

Explanation on the reduction of conformability with 2 layers of MACfleet

When MACfleet is stretched, the film and the adhesive thickness are reduced.
In consequence the adhesion decrease with the elongation.

Tension increases with the elongation → at a certain stage of elongation, the tension is equivalent to the adhesion (= maximal elongation supported by the adhesive).
In conclusion we should not stretch the vinyl more than this maximal elongation otherwise the MACfleet will pop-out from the corrugation… even if the film has been stabilised with a heat gun !

The level of tension obtained with the elongation of 2 layers of MACfleet is always higher that that obtained with 1 layer.
In conclusion, a decoration requiring the use of 2 layers of MACfleet will have a lower conformability than with only 1 layer. There is a higher risk of the films popping-out from a deep corrugation. We therefore recommend cutting the films in the corrugation to prevent any lifting.

Due to the various parameters influencing the limit of stretching, it is almost impossible to define precisely what is the maximal elongation possible for 1 or 2 layers of MACfleet 6500 or IMAGin JT 5529 P.

As an indication, here are some practical approaches:
It is possible to apply 1 layer of MACfleet 6500 (or JT 5529 P without lamination film) on a Ford Transit (depth of this corrugation is 10-11 mm) without cutting the film:
This application represents an elongation of 22%.
The percentage of elongation is calculated as follow: (D2 – D1) / D1 x 100

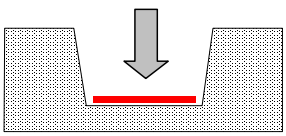
If 2 layers of MACfleet 6500 (or JT 5529 P with lamination film LF 3699) are applied on this Ford Transit, the tension created cannot be cancelled with the heat gun ⇒ the 2 layers of vinyl will lift after a few weeks.
To prevent this lifting, the converter will need to cut the film in the corrugation.

But 2 layers of MACfleet 6500 (or JT 5529 P with lamination film LF 3699) could be applied on a Renault Kangoo as this application represents an elongation of 11% (depth of the corrugation being ±5 mm).
In this case it is not necessary to cut the films.

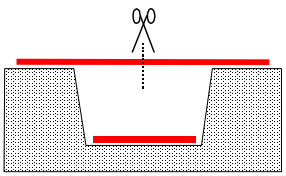
8.2.F. How to cut MACfleet 6500 when applied in very deep corrugations

As seen previously, where there is an element of risk to the application it will be necessary to cut the vinyl. The cutting method is different in the case of a coloured plotter film or a printed image.

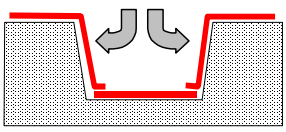
Decoration realised with coloured MACfleet 6500 (plotter film)

1. 

Before applying the decoration on the car, cut a strip of MACfleet 6500 (same colour as the one used in the decoration) and apply it without tension inside the corrugation.

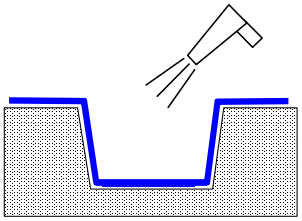
2. 

Apply the decoration on the vehicle.
Cut the film.

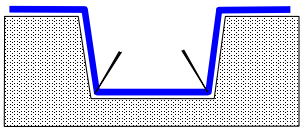
3. 

Apply the cut vinyl without tension in the corrugation.

Decoration realised with a printed MACfleet 6500 (or IMAGin JT 5529 P)

1. 

The printed MACfleet (with or without lamination film LF 3699) application procedure is globally the same as the one described at point 8.2.D:
Heat the vinyl(s)
Stretch the film(s) in the corrugation
Stabilise it (them) with a heat gun (650 °C).

2. 

After the stabilisation process, let the film(s) cool down for 5 minutes and then cut the film(s) in the corrugation with a cutter in all the angles.

Remark :
It is important to stabilise the decoration BEFORE cutting. This could limit the shrinkage to 1-2mm.
If the decoration is not stabilised first, the shrinkage could be up to 3-4mm.

8. Vinyl Removal

In the case of short-term advertising campaigns, removable self-adhesive films MACal 8900 Pro and IMAGin JT 5800 R could be used. These films can be removed without any difficulty at ambient temperature (from 15 to 40°C).

In the case of markings with permanent self-adhesive vinyls, they are much easier to remove using heat:

Heat the vinyl to a temperature of 70-80°C using a heat gun (air temperature of ±300°C).
Peel off the permanent marking film - small pieces at a time.
Chemical products for easier vinyl removal are also available in the shops. Follow the manufacturer's instructions carefully.
Any residue of adhesive can be removed by rubbing with a towel soaked in isopropyl alcohol, denatured petrol or a shop-bought "adhesive remover".