application manual

A PRATICAL GUIDE TO CORRECT LAYING OF POLYMER BITUMEN MEMBRANES

Introduction • Transport • Loading/unloading • Storage • Handling on site • Conservation • Period of use and climatic conditions for application • Smoothing • Water, ice • Concrete laying surface • Laying on ridged sheeting • Timber laying surface • Laying on top of old applications • Laying on non-heat sensitive panels • Laying on a concrete road surface • Alignment of the sheets • Unrolling sheets at low temperatures • Membrane surfaces • Flame bonding • Sealing of overlaps • Spot bonding • Two or more layer coverings • Flame bonding on vertical surfaces • Projections with metal runners • Protected projections • Projections with flashing • Skylights • Drainage outlets • Exhaust outlet • Internal angle • External angle • Painting • Additional information

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SPOT BONDING

PERFOBASE is a perforated sheet which is laid dry on a laying surface pretreated with **INDEVER PRIMER**. It allows the overlaid membrane to be spot bonded uniformly through the holes. Alternatively, the membrane can be spot bonded during unrolling, locating the spots evenly. Special care should be taken in bonding head-to-tail overlaps.

TWO OR MORE LAYER COVERINGS

When the waterproof covering consists of two or more layers, it is **essential** that they adhere well to each other.
There is no justification for less careful application because the covering has more layers. If so, the same rules for poor laying are run as for a single layer. If the layers are not bonded well to each other, water will find its way from the external layer through the innumerable channels created between the layers until it finds a weak spot in the join of the layers below and give rise to a leak.
Effectiveness of a multi-layer covering is guaranteed only by complete adhesion between all the layers.

FLAME BONDING ON VERTICAL SURFACES

INDEX membranes
not slip even if
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ALIGNMENT OF THE SHEETS

Unroll the sheet and align it by overlapping the edge on the nearest sheet. Then partially roll it up again from both ends and start the flame-bonding process.

UNROLLING SHEETS AT LOW TEMPERATURES

When temperatures are low, do not bang the rolls or unroll them in a way that may damage the membrane. Unroll them with care and without kicking them.

LAYING ON RIDGED SHEETING

If the membrane is to be laid directly on
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TIMBER LAYING SURFACE

Sheets of bituminised paper or ROLLBASE should
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MEMBRANE SURFACES

The underside of the sheet is m
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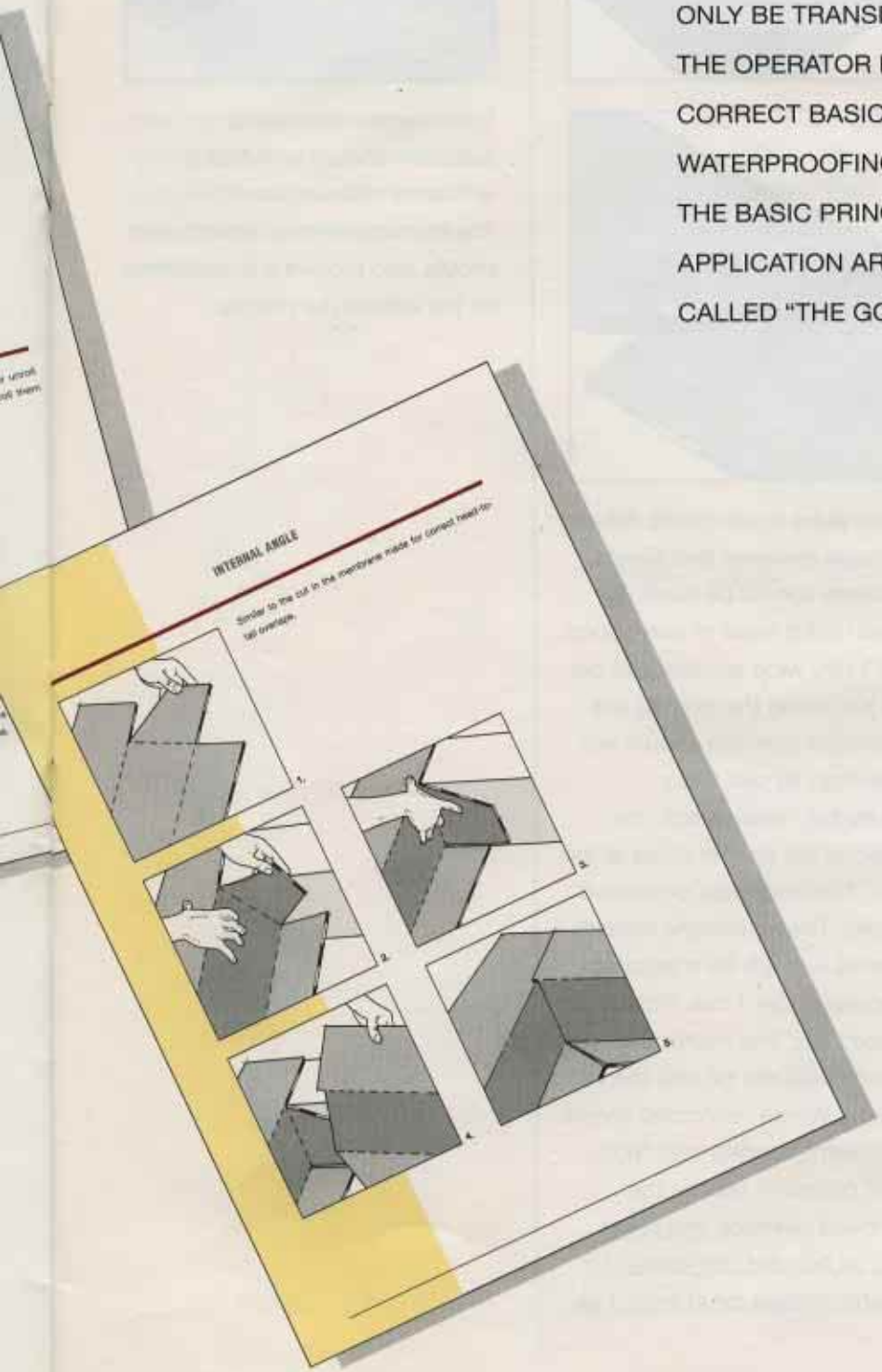
When heated, the **FLAMINA** mem
material is ready for bonding. The
may also be covered with **FLAMINA**
layer of sand/grain talc. This helps
detaches even at high temperatures.

LAYING ON TOP OF OLD APPLICATIONS

If the condition of the old application allows it to be retained, it can be used as a substrate (see Technical Specification no. 5).
Pitched and weakened areas must be removed and blisters must be flattened.
Spread a layer of **INDEVER** primer first.

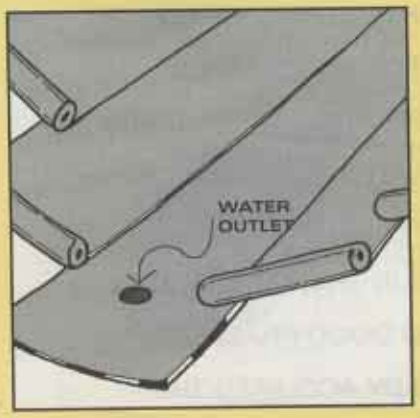
INTRODUCTION

CORRECT APPLICATION OF WATERPROOFING MATERIALS IS ESSENTIAL FOR SUCCESSFUL ROOFING PROTECTION. THIS PUBLICATION GIVES INSTRUCTIONS ON HOW WATERPROOFING MATERIALS SHOULD BE APPLIED. THE SUGGESTIONS CONTAINED IN THIS MANUAL CAN ONLY BE TRANSLATED INTO GOOD PRACTICE IF THE OPERATOR HAS ALREADY ACQUIRED THE CORRECT BASIC TECHNIQUES IN LAYING WATERPROOFING SHEETS. FOR THIS REASON, THE BASIC PRINCIPLES FOR CORRECT APPLICATION ARE SUMMARISED IN 6 POINTS CALLED "THE GOLDEN RULES".



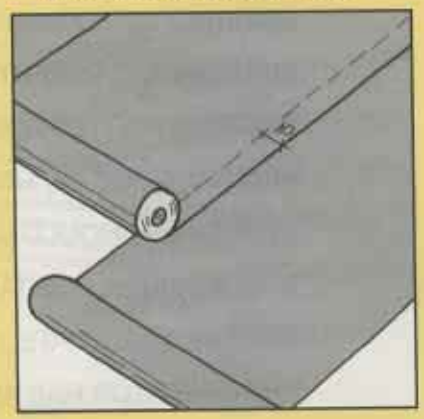
THE 6 GOLDEN RULES FOR CORRECT APPLICATION

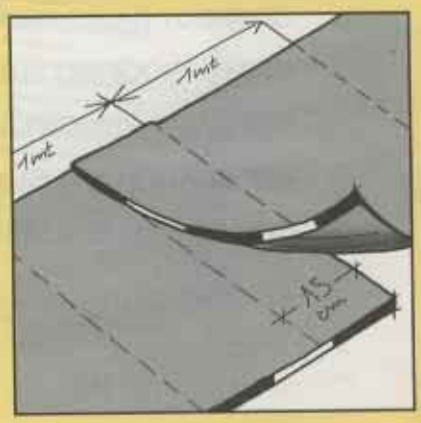
1. Arrangement of the sheets



The sheets should be laid overlapping each other starting from water outlets or roof valleys.

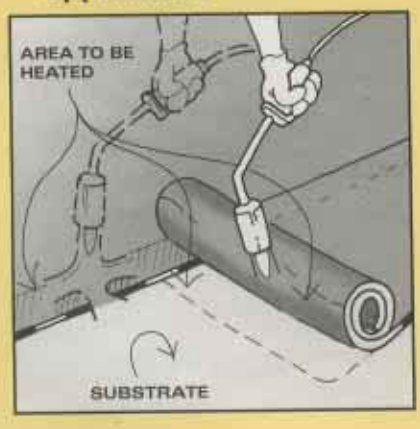
2. Side-to-side and head-to-tail overlaps





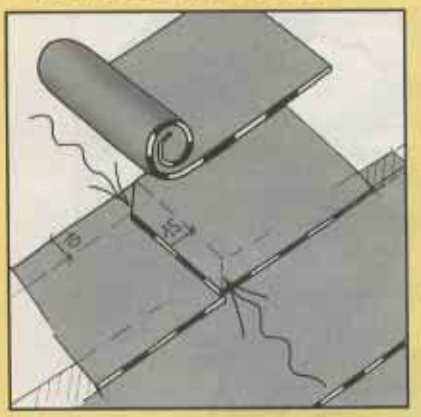
Side-to-side: these create the join lengthwise between two sheets. The sheets should be carefully bonded until a bead of compound about 1 cm. wide is squeezed out of the join along the overlap line. Side-to-side overlaps should not be less than **10 cm.** wide.
Head-to-tail: these create the joins along the shorter sides of the sheets. They too must be treated with care. The membrane should be heated enough for a bead of a compound about 1 cm. wide to be squeezed out. The overlapped section should not be less than **15 cm.** wide. Where reinforced sheets are laid semi-bonded with "non-woven" polyester near to the head-to-tail overlaps, the sheet should be bonded completely to the laying surface for at least **1 m**.

3. Fully bonded application



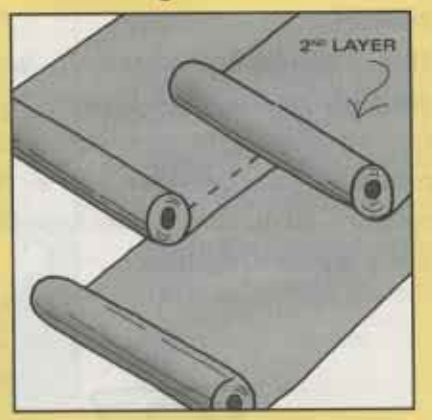
Both the membrane and substrate should be heated, with emphasis on the roll.
The membrane sheet already laid should also receive a direct flame on the area of the overlap.

4. 45° cut on the head-to-tail overlap



Head-to-tail overlaps should also have a 45°, 10 cm. wide section removed from the edge of the sheet in contact with the laying surface.

5. Double layer covering



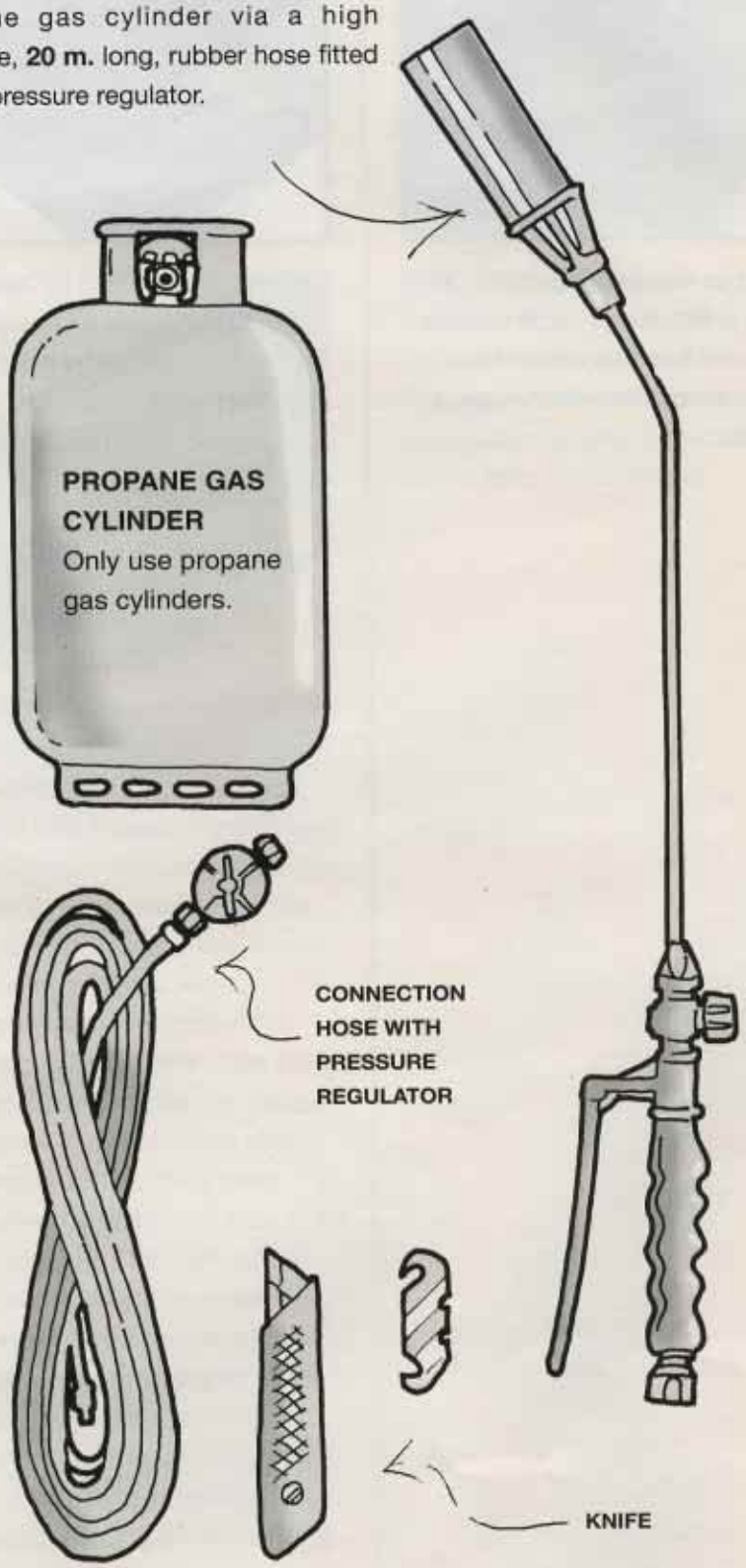
If a second layer is to be applied, it should be placed on top of the 1 st layer overlaps and must be **completely flame-bonded.**

6. Head-to-tail overlaps of Mineral Finished membranes

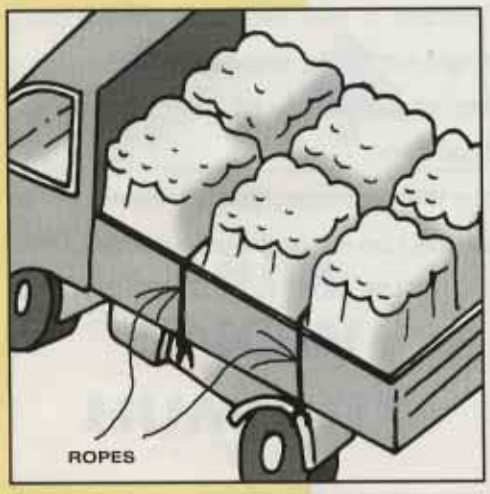
The bonding areas on side-to-side overlaps are free from Mineral but for the head-to-tail Mineral Finished overlaps the underlying membrane needs to be heated to draw the compound to the surface. This is done by persistent heating and will give perfect bonding of the two edges when the compound on the upper sheets has also been heated.

TORCH

This is the application tool. Its length depends on the type of work to be carried out. It is connected to a propane gas cylinder via a high pressure, **20 m.** long, rubber hose fitted with a pressure regulator.



TRANSPORT



Rolls of the waterproofing material are grouped on pallets and covered with thick, shrink-wrap polyethylene sheeting. However, long journeys on bumpy roads or sharp braking, especially during summer months or on a long trailer, can cause the rolls to tip over. Ropes tied between the rows and across the sides of the trailer can prevent this occurrence. The ropes should be pulled tight and padded so as not to leave imprints on the rolls.

LOADING / UNLOADING

INDEX membranes and heat insulation materials are made to resist the mechanical stress they undergo during application. However, handling operations should be carried out with care to prevent squashing or contact with sharp or pointed surfaces. During low temperatures, sharp impacts should be avoided which may cause the membrane to break and detachment of the insulating strips from the Thermobase.

STORAGE

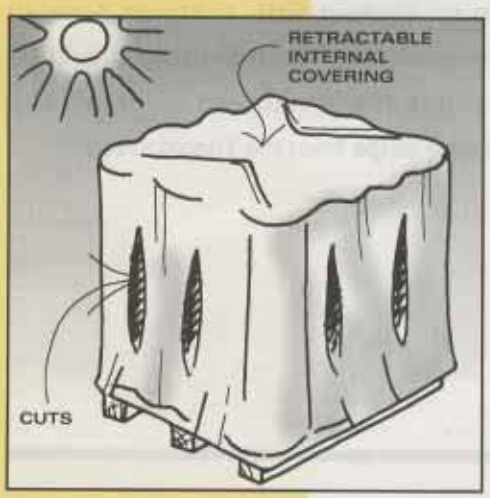
The materials should be stored under cover. The rolls should always be stored vertically on a smooth, flat surface except for those supplied with a rigid, internal reinforcing roll or support which can be placed horizontally for a limited period under cover. Also under cover, pallets can be stacked two high provided wooden planks are interposed to distribute the weight evenly. Thermobase rolls are also stored vertically in the same manner as the membranes except for rolls with selvedge which can be laid flat.

HANDLING ON SITE

Only keep on site the number of rolls necessary for the day's use. Place the rolls upright on a flat, smooth surface. Use a crane and suitable lifting attachment to lift the rolls onto the roof on a pallet in good condition.

If it is necessary to open the packaging and lift the rolls onto the roof separately, use the correct crane accessories, then stand the rolls upright. Do not use ropes to tie and lift the rolls.

CONSERVATION

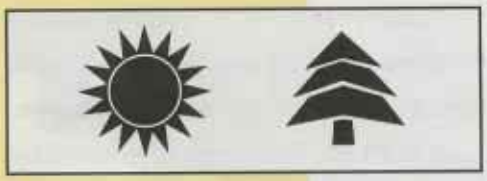


Pallets should be stored in a dry location out of direct sunlight. During summer, pallets with shrink-wrap covers left in the sun can quickly reach temperatures of 70°C and that causes progressive blackening of the talc or slate chips on the rolls from the top to the bottom until the membrane starts to stick to itself or until it looks unattractive. In the case of non-woven polyester reinforced membranes, heat also causes the heads of the rolls to retract with consequent tearing of the membrane.

Heat also causes bituminous membranes to progressively lose their flexibility. If what occurs naturally during work happens while the material is still in rolls, cracking and difficulty in unrolling may occur when it comes to application.

If it is necessary to store pallets in the sun, even for short periods, it is better to remove the covering completely or at least to make slits in the sides for ventilation and protect the top with wooden planks or laths. In wintertime the rolls should be left in a temperature above +5°C for 24 hours before laying but should not be left in the open air overnight. Only those rolls that are to be laid during the day's work should be taken to the site. A good practice is to always take the oldest rolls from the store and not to leave any rolls stored for more than 12 months.

PERIOD OF USE AND CLIMATIC CONDITIONS FOR APPLICATION

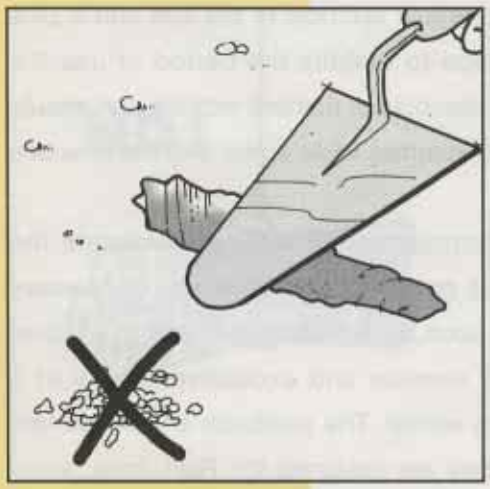


RAIN
SNOW
HUMIDITY

Some types of products show symbols of the sun and a pine tree on the packing tape to identify the period of use the product was made for. Membranes marked with the sun should preferably be laid during summer, while those with the pine tree during winter.

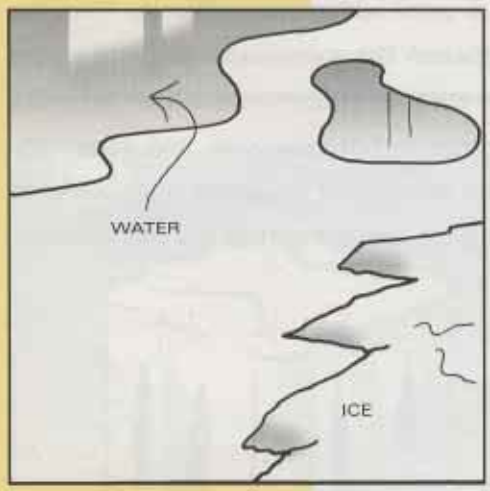
Not to follow this recommendation will not invalidate the efficiency of the finished covering but will create unnecessary problems during laying such as excessive softness of a winter membrane laid during summer and excessive rigidity of a summer roll laid during winter. The products should be laid during the conditions they are designed for. Rain, frost, snow and high humidity can all affect adhesion of the membrane to the laying surface and overlaps. At temperatures lower than +5°C, it is probable that ice will be present on the surface to be covered and the rolls will unroll with greater difficulty. Also, the dampness trapped between the membrane and the laying surface may give rise to blisters. In such cases, it is better not to lay material. In summer, in hot countries, and especially when rolls are being laid on thermal insulation, it is better to apply the material during the coolest part of the day avoiding the midday period.

SMOOTHING



The laying surface must be smooth and flat. A concrete surface is acceptable if no bumps greater than **10 mm.** are found under a **2 m.** rule in any direction, and no bumps greater than **3 mm.** are found under a rule of **0.20 m.** The surface should be trowelled and all cracks and gaps should be filled with mortar. Any projections and site residue such as nails, sheeting, bits of wood etc. must be removed.

WATER, ICE

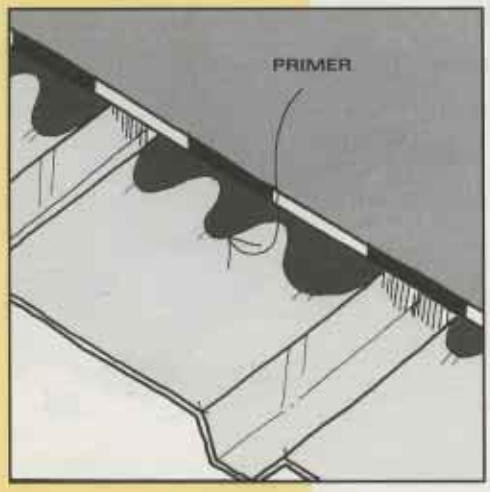


The laying surface must be clean and dry before application. Laying surfaces made of concrete or concrete tiles should be left to dry for between 8 days and 3 weeks depending on the season.

CONCRETE LAYING SURFACE

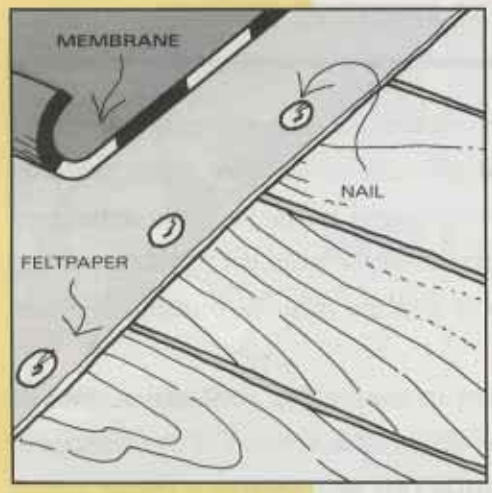
Once points **2)** and **3)** have been carried out, **INDEVER** bituminous adhesive primer is spread on the areas where the membrane will be anchored (see Technical Specifications). The primer carries out the important functions of preparing the receiving surface and increasing adhesion. Leave to dry for between **2** and **24** hours.

LAYING ON RIDGED SHEETING



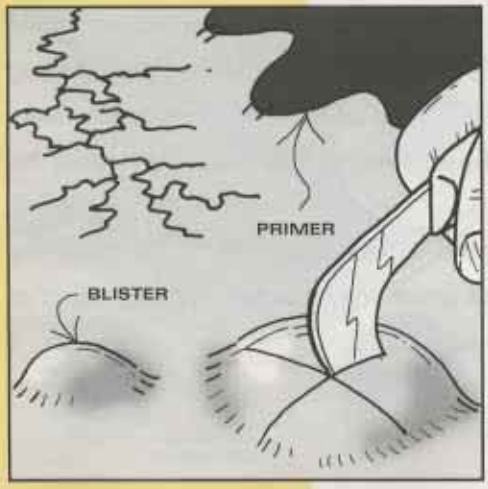
If the membrane is to be laid directly on a ridged sheet (see Technical Specification no. 6), spread **INDEVER** primer and wait for it to dry before application of the membrane.

TIMBER LAYING SURFACE



Sheets of bituminised paper or ROLLBASE should be fixed to timber surfaces with large head nails to protect the wood from the torch-flame. Then the membrane should be bonded using the total adherence principle.

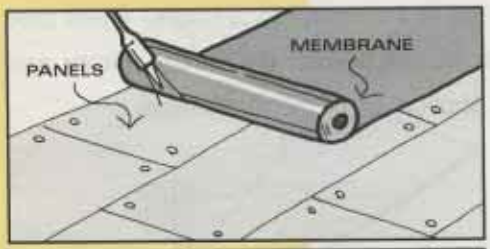
LAYING ON TOP OF OLD APPLICATIONS



If the condition of the old application allows it to be retained, it can be used as a substrate (see Technical Specification no. 3). Perished and weakened areas must be removed and blisters must be flattened.

Spread a layer of **INDEVER** primer first.

LAYING ON NON-HEAT SENSITIVE PANELS



Two possibilities exist: heat-bonding the membrane on THERMOBASE directly onto the upper surface of the panel; alternatively, applying it on top of bituminised glass-fibre felt stuck to the panel with hot blown bitumen.

LAYING ON NON-HEAT SENSITIVE PANELS

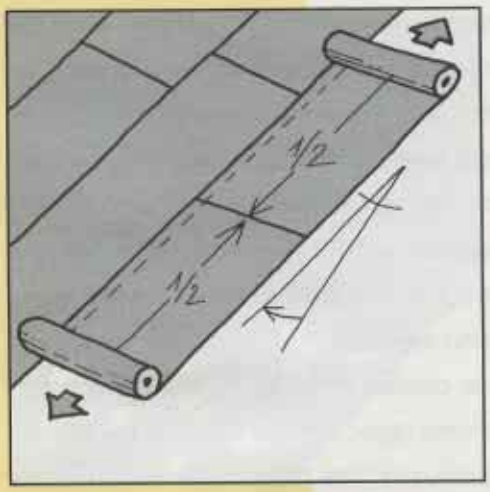
The heavy usage the membrane will be put to means that total adherence is required and use of 4-5 mm. thick material reinforced with heavy non-woven polyester. Total adherence risks the formation of blisters which raise the membrane if laid on damp surfaces or if applied in unfavourable climatic conditions.

It is therefore important to ensure the concrete surface is smooth and completely set, to take account of the dampness of the support, to use **INDEVER MOTORWAYS** primer across the whole surface and to flame-bond the material as evenly as possible without leaving any areas unstuck which may cause blisters, especially near the overlap line of the sheets.

Some experts say that use of membranes protected with white slate, such as HELASTOPOL PONTS, or painting the covering with lime reduces the likelihood of blisters forming. If blisters should be apparent before asphalt is laid, they must be repaired.

(Attention should be paid to the presence on the concrete surface of curing agents which may intertere with adhesion of the membrane and primer).

ALIGNMENT OF THE SHEETS

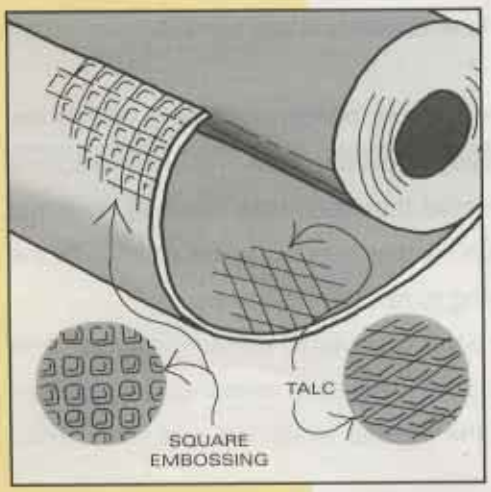


Unroll the sheet and align it by overlapping the edge on the nearest sheet. Then partially roll it up again from both ends and start the flame-bonding process.

UNROLLING SHEETS AT LOW TEMPERATURES

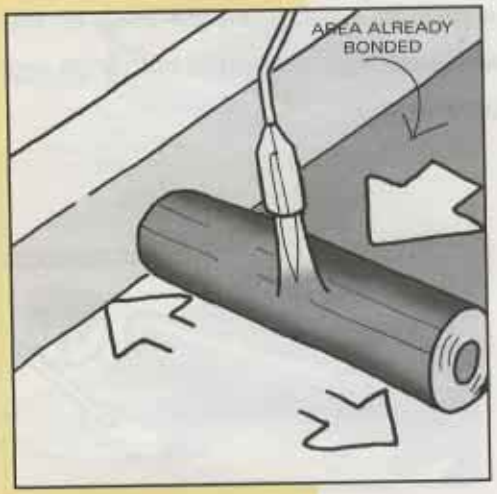
When temperatures are low, do not bang the rolls or unroll them in a way that may damage the membrane. Unroll them with care and without kicking them.

MEMBRANE SURFACES



The underside of the sheet is the surface to be treated. It is embossed with squares and lined with a thin film of **FLAMINA**. When heated, the **FLAMINA** film melts to indicate when the material is ready for bonding. The upperside of the membrane may also be covered with **FLAMINA** or perhaps covered with a layer of serigraph talc. This helps to ensure the wrapping detaches even at high temperatures.

FLAME BONDING



Polymer-bitumen waterproofing membranes bond with the application of heat and do not require materials such as solvents, adhesives etc. Use of a propane gas burner is used to heat the sheet to make it adhesive. As the material is heated, the Flamina film retracts, the upperside blackens until it takes on a shiny appearance, the embossing flattens down, the surface becomes shiny and the membrane is ready to be bonded to the support and overlaps.

The INDEX trademark is printed in white on the flamina film which disappears to indicate retraction has reached the correct point. Flame heating causes the film to retract and the embossed pattern to flatten; further heating can cause the polyester reinforcement to be damaged, which melts at 260°C, and causes shrinkage, waving, curling and, in the worst case, will burn holes in the material.

On the other hand, insufficient heating will not bond the material adequately to the surface, between layers or on overlaps.

SEALING OF OVERLAPS, WHAT NOT TO DO

Sealing of overlaps with a trowel, spatula or other tools has been shown to do more harm than good. First, it nicks and therefore weakens the membrane reinforcement, and often the upper protective layer is removed and the reinforcement is left exposed.

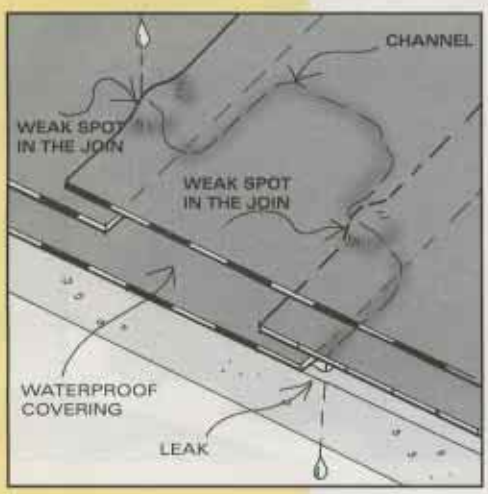
It often happens that operators bond only 1 or 2 cm. of the overlap hoping that sealing of overlaps will create an adequate seal but they do not realise that such little bonding does not create enough adhesion for the overlap to be sealed. In the end, time is lost by having to rework the overlap.

It is safer and faster to bond the overlap correctly the first time while the sheet is being unrolled, making the molten compound leak out of the overlap which will seal the overlap once and for all.

SPOT BONDING

PERFOBASE is a perforated sheet which is laid dry on a laying surface pretreated with **INDEVER PRIMER**. It allows the overlaid membrane to be spot bonded uniformly through the holes. Alternatively, the membrane can be spot bonded during unrolling, locating the spots evenly. Special care should be taken in bonding head-to-tail overlaps.

TWO OR MORE LAYER COVERINGS



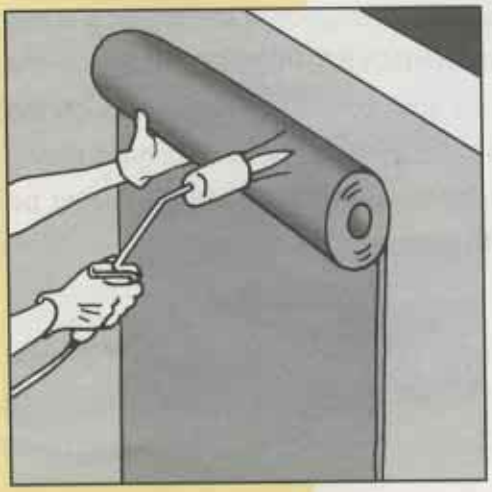
When the waterproof covering consists of two or more layers, it is **essential** that they adhere well to each other.

There is no justification for less careful application because the covering has more layers. If so, the same risks for poor laying are run as for a single layer. If the layers are not bonded well to each other, water will find its way from the external layer through the innumerable channels created between the layers until it finds a weak spot in the join of the layers below and give rise to a leak.

Effectiveness of a multi-layer covering is guaranteed only by complete adhesion between all the layers.

FLAME BONDING ON VERTICAL SURFACES

INDEX membranes have excellent resistance to creep and do not slip even if bonded to a vertical surface. By flame-heating both the membrane and the bonding surface, the material will hold tenaciously without need for mechanical support. The sheets "take" when they cool, i.e. when the molten adhesive compound turns solid again.

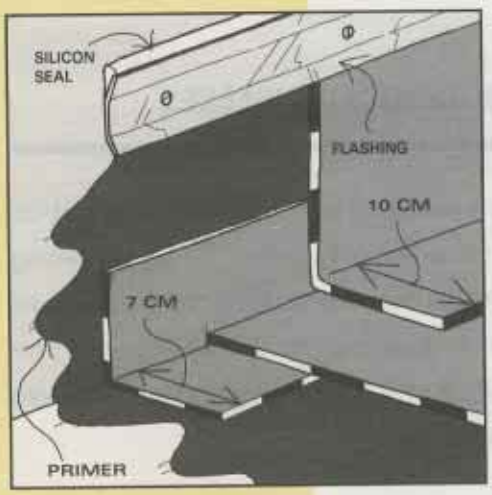


In summer, the membrane and bonding surface may be so hot that it is necessary to wait for a long time until cooling takes place and the material holds. If this happens, the operator is obliged to hold the material up with his hands until cooling occurs; if he doesn't, the sheet will not stay attached and will fall.

Detached sheets should not be reheated immediately in another attempt to attach them to the surface; instead, the operator should wait for them to cool. If not, the sheet will never cool and will therefore not succeed in sticking to the surface.

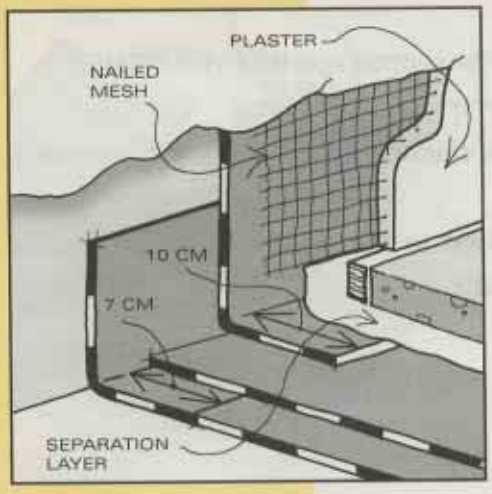
Summary: the sheet and laying surface are both heated for vertical applications, and the material is held in place until it cools enough for adhesion to take place.

PROJECTIONS WITH METAL RUNNERS



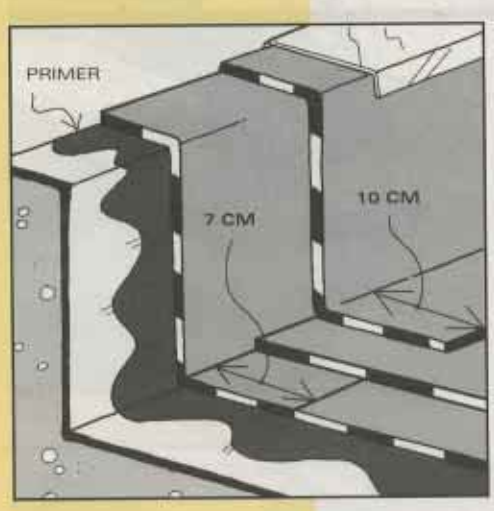
If no seating has been created for the covering on a vertical wall, a runner will have to be nailed and sealed above the edge of the sheeting. The membrane must be completely bonded to the laying surface along the edge of roofs and on the flat.

PROTECTED PROJECTIONS



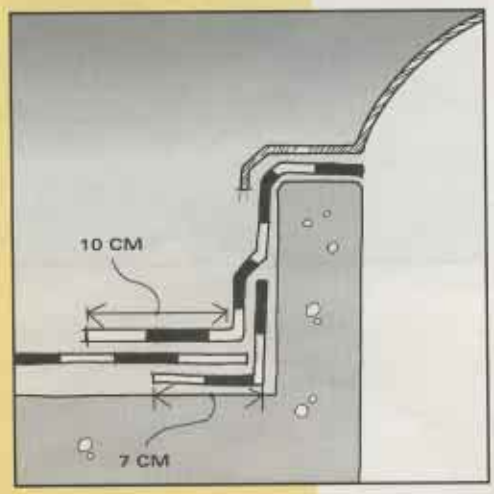
If a seating has been created for the covering, the material is bonded there and then covered with a metal mesh to which the mortar anchors itself (see Technical Specification nos.1 and 2).

PROJECTIONS WITH FLASHING

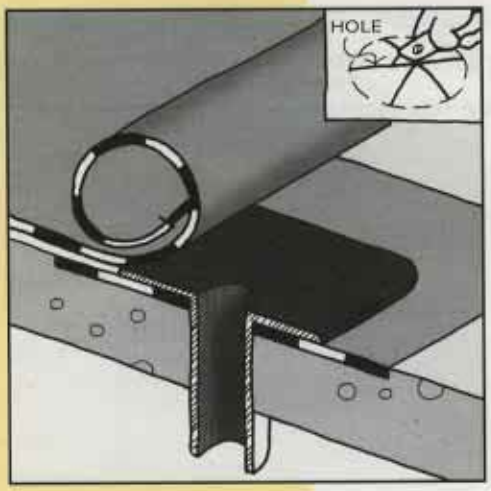


If the waterproofing covering is to be bonded to the perimeter walls, these will then be covered with nailed flashing.

SKYLIGHTS



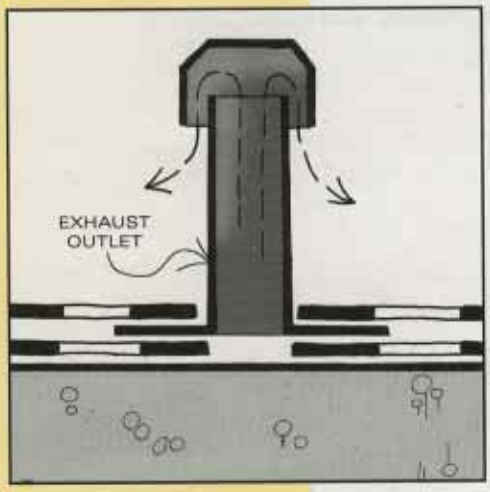
DRAINAGE OUTLETS



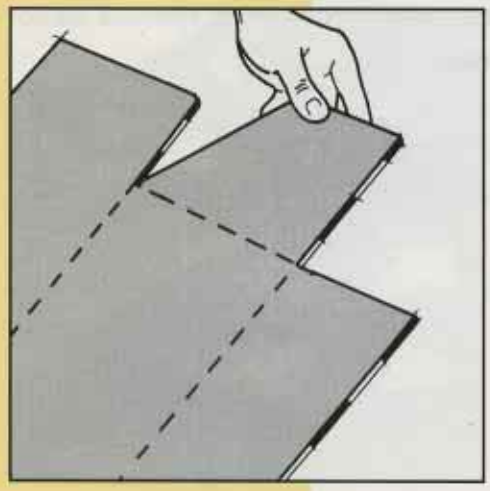
Do as follows:

1) Paint the seating in the support with INDEVER PRIMER. 2.
2) Bond a piece of membrane in the seating.
3) Bond the flat of the drainage outlets onto the flame-drawn membrane.
4) Bond the finishing layer to both the membrane and the flat of the drainage outlet.

EXHAUST OUTLET



INTERNAL ANGLE

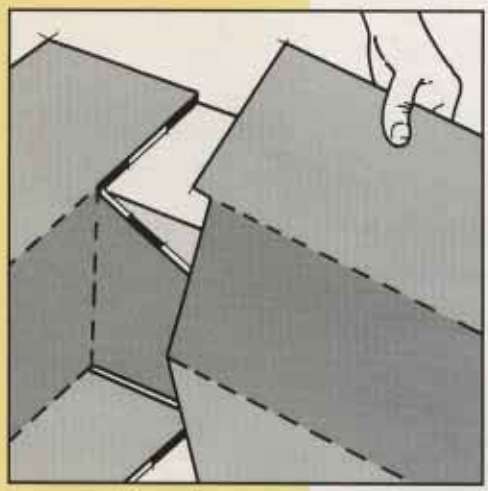


1.

Similar to the cut in the membrane made for correct head-to-tail overlaps.

2.

3.



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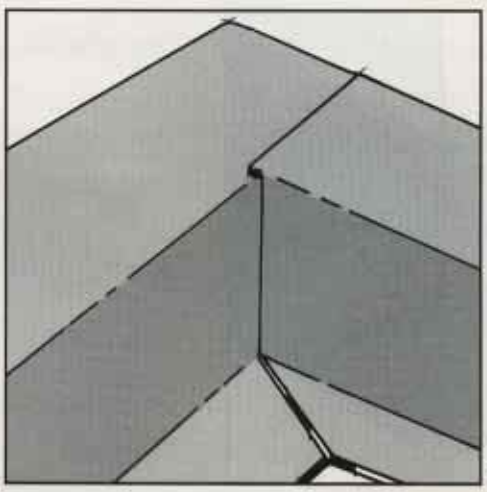
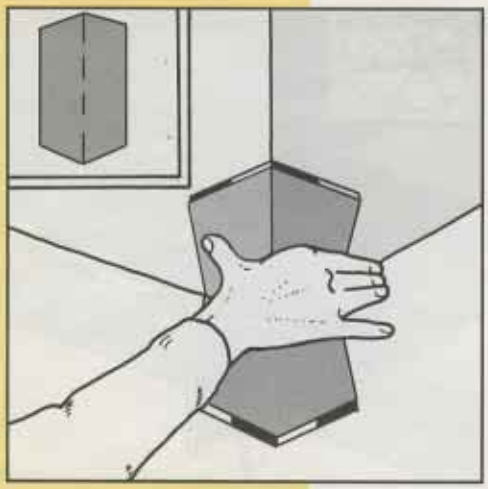


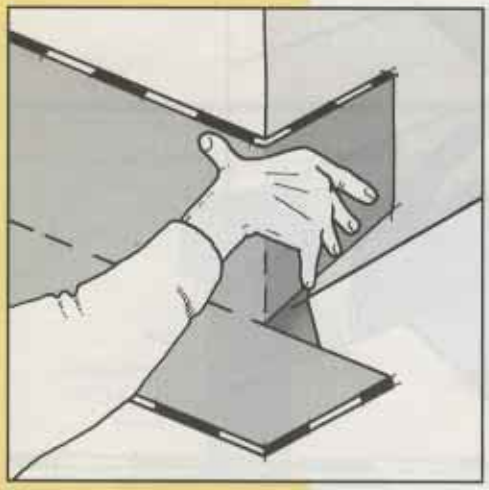
5.

EXTERNAL ANGLE

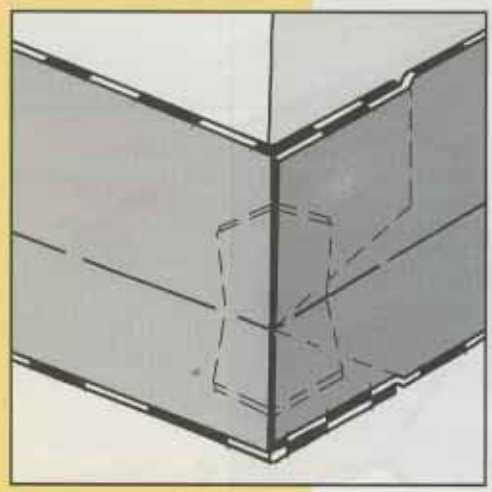


1.

Particular care should be taken to ensure that overlaps do not leave holes or cuts exposed.

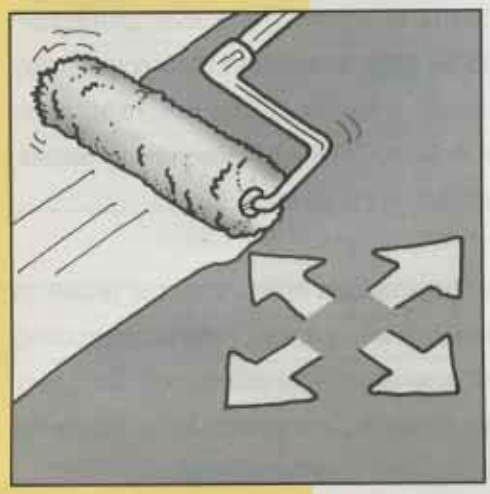


2.



3.

PAINTING



Protective paint should be spread with a roller **crossways in two layers**. A brush can be used for small areas or details. Depressions on a roof will cause pools of water to form which may give rise to paint coming loose. Do not paint areas of the roofing that are permanently covered in water (see the 3rd Division's operating manual).

ADDITIONAL INFORMATION

Problems which affect the integrity of the roof protection system are often caused by poor treatment of the covering by non-specialist personnel who work on the roof after waterproofing has been finished (workmen assembling aerials, fixing guttering, inserting roof windows etc.).

It is recommended that the attention of the Client is drawn to this situation and the presence and advice of the waterproofing specialist is requested whenever alterations, extraordinary maintenance, installation of aerials, advertising signs, guttering or air-conditioning etc. are to be made to the roof.

MAINTENANCE

The life of a waterproofing covering is in direct relation to the care and maintenance it receives.

Regular inspections are recommended with particular attention to be paid to checking the functionality of metal runners, drainage outlets, overflow pipes etc., and the removal of leaves, moss and any other plants that may obstruct the water drainage system.

TECHNICAL PUBLICATIONS

INDEX has published a series of **TECHNICAL SPECIFICATIONS** aimed at helping roofing designers and constructors. The Specifications try to resolve problems related to the application of membranes taking account of the various situations that arise in different circumstances.

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