



# Insulation

Caravan and motorhome insulation advice



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The information below covers practical information on improving insulation, as well as a list of useful contacts who can help.

### Insulation

#### Glass fibre wall insulation

This type of insulation is found in the older (generally prior to the early 1980s or so) timber framed caravans of traditional 'coachbuilt' construction, and has the disadvantage of sagging in the vertical sections, leaving the upper portions unprotected. Glass fibre is still sometimes used in areas such as some caravan roof cavities, where the shape of the roof makes it impractical to use expanded polystyrene, and in some panel van conversion homes.

#### Expanded polystyrene insulation

This replaced glass fibre because of its rigidity, and then became the obvious material for bonded walls and floors once 'sandwich' construction became commonplace in the 1980s.

Sandwich bonding is the current construction technique used by most caravan manufacturers and coachbuilt motorhome converters in an effort to reduce weight and cost. This doubles as insulation, the 'filling' being either expanded polystyrene (white) or Styrofoam (blue) insulation. The amount of insulation varies, with 22-25mm thickness on average, usually more in the 'winterised' vehicles and in the floor area.

### Condensation

One of the main problems of inadequate insulation - apart from feeling cold - is condensation.

In any confined living area there will be more than average humidity in the air because of the moisture in our breath coupled with that caused by the domestic activities of washing, boiling kettles, simmering saucepans etc. The more confined the living space the higher the atmosphere's relative humidity.

It is inevitable that this humidity will condense on any cool surface, for example on windows, walls and also underneath mattresses and other soft furnishings.

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The Club does not endorse the listed products and you should satisfy yourself as to their suitability. As always, check that the installation of an after-market accessory does not invalidate your Warranty.

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### Improving your insulation

Little needs to be done to improve wall insulation in modern caravans or motorhomes, although there are certain wall coverings available, made from PVC/Vinyl foam, which can help to keep inner walls warmer and thus reduce condensation. Older models could benefit from this treatment too, but to replace or repair the glass fibre insulation is a major task involving stripping the vehicle down.

One area where a major improvement can often be made is the floor, which may not be as well insulated as the walls. Foam sheeting, which has fire retardant properties, preferably 25mm or thicker, is quite easy to cut and stick to the underside of the caravan. Take care to use the correct adhesive - contact adhesive, such as Evostick, is usually recommended. For large sheets, additional support can be provided using large plywood battens, screwed into place. A thick foam backed carpet will also be beneficial.

## Windows

Double skinned acrylic windows are fitted as standard in nearly all modern caravans and motorhomes but older models can be updated, either by replacing existing windows with new units, or by the DIY addition of perspex/acrylic sheeting on the inside. Your hardware store should be able to supply flexible UV stabilised acrylic sheet that can be cut to size.

This can be edged with rubber draught insulating strips and small brass screws used to fix this to the caravan wall. In summer, the sheet can be removed and the brass screws replaced to avoid unsightly holes. Thermal linings added to curtains may also help reduce condensation.

For the non-double glazed cab windows of motorhomes, thermal screens can be fitted which attach to the inside or outside of the windows while the vehicle is on site.

## Misting

Dometic Ltd. sells Seitz caravan windows and advises that the acrylic used in doubleglazed caravan windows is to some degree hygroscopic. This means that under certain conditions moisture will slowly permeate the material. For this reason acrylic caravan windows are not sealed units, so any moisture can escape from between the panes. Under most circumstances there will be no significant moisture between the panes, but it can occur if it is cool outside, the air inside is moist and the inside of the caravan becomes warm very quickly. In this case condensation can form between the panes, as the temperatures and humidity do not have time to balance.

To clear condensation, if your window has plugged ventilation holes, remove the plugs, park your caravan with the affected window(s) slightly open and towards the direct sun. This will slowly draw the moisture out of the air between the panes and from the panes themselves. It is impossible to say how long this will take; it all depends on how much moisture is there and on the conditions. You may need to be patient! The process can be speeded up by placing a warm, dry towel against the outside pane in hot sunshine.

Please be aware that the condensation can appear to go away, only to come back very quickly. This is because there is still moisture within the hydroscopic acrylic material, which needs longer to be drawn out.

To prevent condensation forming in the future, it is important that there is adequate ventilation in the caravan to prevent the build-up of moist air inside. In particular, make sure the ventilation provided by the manufacturer is not blocked. Also, provide additional ventilation by:

- leaving roof lights ajar
- leaving any partition doors open
- not leaving water in the sink when you are not using it
- not having the caravan too warm inside at night
- increasing the ventilation in wet or humid weather



## Heating

It must be remembered that gas heaters which do not have an intake and exhaust flue to the outside of the caravan will greatly increase the likelihood of condensation - one of the main by-products of burning gas is water.

Space heating systems, including central heating, which employ the use of flues for air intake and removal of burned gases, are obviously the best bet for continuous use in winter.

To be totally safe, any form of gas heating should not be left on whilst the caravan occupants are sleeping, for although, in theory, flued heaters with fixed ventilation together with some adjustable ventilation (eg windows) are safe, situations have arisen where an underfloor flue has been blocked by drifting snow or wind-blown rubbish, sometimes with fatal results.

## Ventilation

From September 1998, all new caravans and motorhomes meeting European Standards (i.e. the overwhelming majority of caravans and many motorhomes built in the UK, plus some imported models) have a specified minimum area of fixed ventilation. This minimum is less than that specified previously by a British Standard for caravans only,

but has been tested to ensure safety levels are retained. This is intended to help improve heat retention and reduce problems with draughts.

No matter how tempting it may be to block these vents, this must never be done. Not only will it increase the risk of condensation, but it could be positively dangerous when gas appliances are in use.

If additional ventilation is desired (particularly to address condensation issues in winter, when opening a window is hardly an ideal solution), fitting an additional roof ventilator can be effective. Many different types are available operating by natural air movement or electrically. Some caravans have extractor fans fitted as standard, but any competent DIY enthusiast can easily fit one without specialist tools, ensuring that all holes cut in panels are particularly well sealed against damp and rain.

### Dehumidifying

Crystalline or gel-based chemical products are available which can remove moisture from the air to reduce condensation. They require regular changing and often have a limited effectiveness. Mains powered electric dehumidifiers are much more effective, but they are expensive, and need their moisture-retaining tanks emptied on a regular basis.

### Other tips

Under-mattress condensation can be alleviated by perforating the bedding locker tops if made of solid plywood. Considerable benefit will also be obtained by:

- laying a thick blanket, doubled, under the mattress and airing the blanket if possible during the day
- or consider using a specialist mattress underlay which is designed to aid removal of the moisture that builds up in the mattress. Hessian or rush-type beach mats could also be used.

If mattresses can be reversed this would help each time the bed is made, so that any slight condensation on the mattress underside will evaporate during the day. When the caravan is left for a period of time, stand the mattresses on their sides, so that there is free circulation of air around them. For winter storage it is preferable to remove them to a warm house.

## Insulation ratings for new vehicles

Caravans built to European Standards (i.e. 1999 models from September 1998 onwards) are given one of three grades to indicate the effectiveness of their insulation and their heating systems:

- Grade 1 rating specifies a minimum degree of insulation but does not measure the capabilities of the heating system. These caravans should be considered suitable for 'seasonal' rather than all year round use.
- Grade 2 rating requires the same level of insulation but adds a requirement for a heating system capable of maintaining the interior at 20 °C when it is 0 °C outside. This grade should be suitable for 'extended seasonal' usage, or all year round in reasonably favourable climates like the UK.
- Grade 3 has a higher standard for both insulation and heating, such that the interior can be kept at 20°C when it is -15°C outside. It also requires that the water system can be filled and will then operate when the outside temperature is -15°C. These caravans should be habitable all year round in almost any weather conditions.

Caravan rated to Grade 3 have started to become widely available in the UK over the past few years. The standard for motorhomes is somewhat different and remains less commonly adopted by manufacturers. There are three grades, but these indicate heating classification, not insulation performance. In fact, there is no specific requirement for motorhomes to have insulation although clearly most, if not all, will have.

Grade 1 means the heating has not been rated. Grade 2 heating will achieve 20 °C inside when it is 0 °C outside. Grade 3 heating will achieve 20°C inside when it is -5°C outside and also requires that the fresh (but not waste) water supply must operate when it is -15°C outside. The reason for the less stringent requirement compared to caravans is that motorhomes will almost invariably include a relatively poorly insulated cab area (without double glazed windows or particularly effective insulation in the doors, say) which is open to the habitation area. This makes it virtually impossible to specify an overall insulation level for the vehicle at a meaningful level.

Note that vehicles such as panel van conversions are especially difficult to insulate effectively, due to factors such as their metal sides and floors.

## Useful addresses

| Item  | Comments  |
|---|---|
| Replacement windows                               | <ul style="list-style-type: none"> <li data-bbox="517 362 820 573">✉ Exhaust Ejector Co Ltd<br/>11 Wade House Road<br/>Shelf, Halifax<br/>West Yorkshire<br/>HX3 7PE<br/>Tel: 01274 679524<br/><a href="http://www.eeco-ltd.com">www.eeco-ltd.com</a></li> <li data-bbox="517 586 1043 766">✉ Airborn<br/>Unit 42, First Avenue<br/>Deeside Industrial Park East<br/>Flintshire CH5 2NU<br/>Tel: 01244 280838<br/><a href="http://www.ppa-group.com/Leisure_about.asp">www.ppa-group.com/Leisure_about.asp</a></li> <li data-bbox="517 779 874 990">✉ Miriad Products<br/>Polyplastic BV<br/>Park Lane<br/>Dove Valley Park<br/>South Derbyshire DE65 5BG<br/>Tel: 01283 586060<br/><a href="http://www.miriad-products.com">www.miriad-products.com</a></li> </ul>   |
| Extractor fans                                    | <ul style="list-style-type: none"> <li data-bbox="517 1030 1212 1120">✉ Fiamma Turbo Vent 1 12V extractor fan<br/>Available through main caravan accessory stockists<br/><a href="http://www.fiamma.com/products/QMP.asp?Fam=P05">http://www.fiamma.com/products/QMP.asp?Fam=P05</a></li> <li data-bbox="517 1155 1037 1402">✉ Flettner 2000 wind powered extractor fan<br/>Flettner Ventilator Ltd<br/>Kingsbury House Business Centre<br/>468 Church Lane<br/>Kingsbury<br/>London NW9 8UA<br/>Tel: 020 8200 2321<br/><a href="http://www.flettner.co.uk">www.flettner.co.uk</a></li> <li data-bbox="517 1415 1388 1594">✉ Dometic GY20 Ventilator operated by natural movement of outside air<br/>Dometic UK Ltd<br/>The Brewery<br/>Blandford St Mary<br/>Dorset DT11 8LS<br/>Tel: 0844 626 0133</li> </ul> |
| Nationwide manufacturers of polyurethane sheeting | <ul style="list-style-type: none"> <li data-bbox="517 1635 1152 1814">✉ Kingspan Insulation Ltd<br/>Pembroke<br/>Leominster<br/>Herefordshire HR6 9LA<br/>Tel: 01544 388601<br/><a href="http://www.insulation.kingspan.com/uk/index.htm">http://www.insulation.kingspan.com/uk/index.htm</a></li> </ul>  |
| Motorhome cab insulation screens Silverscreens    | <ul style="list-style-type: none"> <li data-bbox="517 1859 842 2038">✉ (J&amp;M Designs)<br/>PO Box 9<br/>Cleckheaton<br/>W Yorks BD19 5YR<br/>Tel: 01274 872151<br/><a href="http://www.silverscreens.co.uk">www.silverscreens.co.uk</a></li> </ul>  |

| Item   | Comments   |
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| Portable Mains Dehumidifier<br>(Trade name Mitsubishi) | <ul style="list-style-type: none"> <li> <span style="font-size: 1em; vertical-align: middle;">☰</span> Meaco<br/>           Unit 4, 1 Cobbet Park<br/>           Moorfield Road<br/>           Slyfield Industrial Estate<br/>           Guildford, Surrey GU1 1RU<br/>           Tel: Free call 0500 41845<br/>           Tel: 01483 234900<br/> <a href="http://www.meaco.com">www.meaco.com</a> </li> </ul> |
| Mattress underlay                                      | <ul style="list-style-type: none"> <li> <span style="font-size: 1em; vertical-align: middle;">☰</span> The Natural Mat Company<br/>           99 Talbot Road<br/>           London, W11 2AT<br/>           Tel: 020 7985 0474<br/> <a href="http://www.airflowsprings.com">www.airflowsprings.com</a> </li> </ul>  |
| Silica Gel Crystals                                    | <ul style="list-style-type: none"> <li> <span style="font-size: 1em; vertical-align: middle;">☰</span> Moisture Mate<br/>           Available from Camping/Caravanning Accessories Shops         </li> </ul>   |