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Urea-formaldehyde foam cavity wall insulation: reducing formaldehyde vapour in dwellings

A H Cockram, MCIBS and P J Arnold

In a limited number of cases after a dwelling has been insulated by filling the cavity walls with urea-formaldehyde foam, the formaldehyde vapour given off by the foam has caused discomfort and irritation to the occupants. This paper suggests what the householder, installer or builder can do to reduce the concentration of the vapour.

BACKGROUND

Over one million dwellings have been insulated with urea-formaldehyde foam cavity wall insulation during the last twenty years or so with substantial benefits in energy conservation both to the occupants and to the nation as a whole. However, in a limited number of cases, formaldehyde vapour given off by the foam could be the cause of people suffering discomfort and irritation, typically to the eyes, nose and throat. The emission of vapour is greatest during the first few days after installation, but it can continue for some months or years depending upon the formulation of the foam.

In a traditional cavity wall, the plaster and masonry inner leaf usually provides an adequate barrier to the passage of vapour into the room atmosphere, the vapour escaping mainly through the outer leaf. However, should there be a discontinuity in the inner leaf through which the foam or vapour can penetrate, the concentration of vapour in the room atmosphere may become sufficiently high to cause discomfort, especially if the occupants are susceptible to very low concentrations of formaldehyde vapour.

REMEDIAL MEASURES

The measures given below may help to reduce the vapour concentration. Some can be carried out by the householder but others may require the specialist services of the installer of the foam or a builder. Additional treatment to that outlined in this paper may be required if noticeable concentrations of formaldehyde

vapour occur in houses with plasterboard linings. In these cases individual advice may be necessary.

Ventilation

The first step is to increase the house ventilation. This extra ventilation may only be required to give temporary relief while the other work outlined here is carried out, or it may be needed permanently, particularly in homes that are well sealed with extensive double glazing and are without chimney flues. It can be provided by slightly opened fanlights or by installed proprietary horizontal slot or plastic disc ventilators in window frames or glass, preferably on opposite sides of the house especially in upper rooms.

Removal of excess foam

Any excess foam should be removed from the loft and the living space. It is often found at the head of the cavity wall in the loft, and behind bath panels where it enters through gaps around waste and overflow pipes. Vapour from small quantities of excess foam in unoccupied loft spaces is not likely to cause noticeable concentrations of formaldehyde vapour when there is reasonable natural ventilation, either from openings at the eaves and gable end walls or where there is no sarking felt, but it is still advisable to remove the excess foam.

Precautions should be taken while removing the foam. Ventilate each location well. Avoid direct contact with the foam since it may irritate the skin of sensitive people; it is advisable to wear gloves and protect the arms and face adequately from accidental contact. After removal the foam should be placed in polythene bags, sealed and disposed of via the usual refuse collection service.

Sealing accessible gaps

Gaps where foam has entered should be sealed with a suitable material such as gun-grade sealing compound, a non-shrinkable general-purpose filler or a cement and sand mortar.

accessible gaps

able levels of formaldehyde vapour persist. If these measures have been carried out, it will be necessary to proceed to a more detailed inspection of the property in order to find hidden places where foam has escaped from the cavity, so that it can be removed, and where there may be a passage for the entry of vapour, so that any gaps can be sealed.

The most likely locations are:

- 1 At the top of the cavity walls. In chalet-styled properties where rooms have been constructed within the existing loft space, the foam may be hidden but the vapour can still reach these rooms. However, where access is available, excess foam should be cleared away and cross-ventilation provided for the spaces between the walls of these rooms and the roof. Ventilation openings can be made in the soffit or fascia board at the eaves either by a continuous slot or by a series of discrete holes sufficiently small to prevent the entry of birds.
- 2 Around pipes which bridge the cavity wall or pierce the inner leaf.
- 3 Around floor joists and under suspended timber or chipboard flooring of both ground and upper floors. Inspection will probably entail removing floorboards or panels adjacent to the external walls. It is also possible for vapour to diffuse into the living space through the unplastered blockwork of the inner leaf between floor joists. As this location is particularly difficult to reach, it is advisable for the installer of the foam or another appropriate agency to establish the vapour concentration in the joist space before attempting remedial action. If the concentration is found to be unacceptably high, attempts can be made to seal the blockwork by plastering the surface, but it may still not be possible to achieve a sufficiently vapour-tight barrier. The addition of an impermeable floor covering such as pvc sheeting or hardboard, and ceiling decoration with an oil-based paint plus vinyl wallpaper, may help to improve conditions. Gaps at skirting-boards, edge-cracks, light roses and electrical outlets should be sealed.
- 4 At airbricks and ventilation openings. The foam should be concealed behind a sleeve or liner fitted across the cavity.
- 5 Through cracks under window sills and at reveals to window and door frames.

6 Around power points and wall-mounted switches.

7 Inside unused chimney flues.

FURTHER INFORMATION

Further information about formaldehyde vapour associated with urea-formaldehyde foam insulation is given in *BRE Information Paper IP25/82*¹. A general discussion on cavity wall insulation including urea-formaldehyde foam is given in *BRE Digest 236*².

CONCLUSIONS AND RECOMMENDATIONS

The following measures may help to improve conditions in dwellings where people are experiencing discomfort.

- 1 Slightly increase the ventilation of the property.
- 2 Look for obvious places where the foam has entered the loft and/or living space:
 - (a) Remove any visible foam *with care*.
 - (b) Seal the gaps and cracks that are evident.
- 3 If this fails, consider inspecting, removing foam from and sealing more inaccessible places.

REFERENCES

- 1 **Building Research Establishment.** Formaldehyde vapour from urea-formaldehyde foam insulation. *BRE Information Paper IP25/82*. Garston, BRE, 1982.
- 2 **Building Research Establishment.** Cavity insulation. *BRE Digest 236*. London, HSMO, 1980.

ADDITIONAL READING

British Standards Institution. Specification for urea-formaldehyde (UF) foam for thermal insulation of cavity walls. *British Standard BS 5617:1978*. London, BSI, 1978.

British Standards Institution. Code of practice for thermal insulation of cavity walls (with masonry inner and outer leaves) by filling with urea-formaldehyde (UF) foam. *British Standard BS 5618:1978*. London, BSI, 1978.

British Standards Institution. Amendment No 3 to BS 5618:1978. *Amendment AMD 4130*, 30 November 1982. London, BSI, 1982.