

Control of lichens, moulds and similar growths

Algae, lichens and mosses are often found on external surfaces of buildings, especially in rural districts. Their appearance is often regarded as desirable and they are rarely destructive although they may have undesirable effects. Means of encouraging their growth, and of destroying them, are set out in this digest.

Mould growths on internal surfaces are evidence of dampness which should be cured before the affected surface is treated with one of the toxic washes recommended. Moulds may also grow on external paintwork.



The growths discussed in this digest are those that are to be found on building materials, in conditions where their needs of moisture, food and light are met. Some of them need only moisture, minute quantities of mineral salts, and light; others require more elaborate food materials but do not need light. For the purpose of the digest it is not necessary to identify the organisms but some of their characteristics are set out in the table on page 2. When established, they can exist under a wide range of moisture conditions and many can withstand drying out; for active growth they require a fairly high level of moisture in the building material or an atmospheric humidity of over 85 per cent. At lower relative humidities growth is slower and ceases below 70 per cent. In this country, moisture conditions are more generally favourable on northern than on southern aspects, though lichens often flourish on south-facing substrates.

External surfaces

Lichens and mosses are commonly seen on roofs and outer walls in rural districts. The resulting appearance is often regarded as mellow and pleasing, and it may be desired to encourage rather than destroy them, particularly where there is a harsh contrast between old surfaces and new materials introduced in the course of repairs. A traditional method for encouraging growth is to apply a wash of cow dung and water; human urine or skimmed milk are also said to be effective. Algae occur in most districts where water runs freely over a surface and cause unsightly green or black stains.

Although organisms are rarely destructive, their acidic metabolic products can weaken asbestos-cement and eat into limestone. Lichens may obscure carvings and inscriptions; algae may produce disfiguring stains on masonry, brickwork or renderings;

mould may attack paints and plastics. Moss may impede the shedding of water from roofs or lead to blockage of gutters and downpipes. Where it is desired to prevent or destroy such growths, one of the toxic washes discussed later may be used. These take a few days to become effective and, in wet weather, may be washed out before they have time to act. They should preferably be applied during a dry spell; the action is hastened if thick surface growths are partly removed or torn with a wire brush and the wash then well brushed in. The wash, repeated if necessary, kills the growth but the dead organism takes some time to disappear. If the wall is to be painted or rendered, the dead matter must be removed so as to obtain a good bond for the new finish; this may be done by scraping or wirebrushing and is often more effective when the dead organism is dry. (Do not scrape or wirebrush asbestos-cement except when wet). A further toxic wash at this stage, whether or not the wall is to be painted or rendered, can delay re-establishment of the growth.

Some lichen growths are not killed by toxic washes nor removed by wire brushing. They must be removed before masonry coatings are applied or the life of the coating may be reduced significantly. A severe cleaning system, such as high-pressure water, may be needed. The effective life of chemical treatments depends on the porosity of the surface and on the extent to which it is washed by rain: on a porous sheltered surface, growth may be prevented for two or three years; a dense concrete or a cement paint finish may require retreatment at the beginning of each rainy season. The application of a colourless water-repellent after the toxic wash has dried will increase the effective life of the wash, but it should be remembered that the use of a water-repellent may not always be appropriate⁽¹⁾ and may interfere with subsequent

Organic growths on buildings

Organism	Food needed from surface	Light requirements	Appearance	Remarks
Algae	Mineral salts	Necessary	Green, red or brown powders or filaments which may or may not be slimy according to the conditions	May occur on all types of building surfaces outdoors
Lichens (combinations of certain algae and fungi)	Mineral salts	Necessary	Leathery plates of tissue with crinkled edges and often with cup-shaped fruit bodies—usually orange, grey or black.	May be found on stone and slate, on asbestos-cement roofs and decking tiles, concrete roofing tiles and renderings, and other concrete surfaces
Liverworts and mosses	Mineral salts	Necessary	Some liverworts occur as leathery tissue with smooth edges, not unlike lichens in appearance; others resemble mosses	Usually found in angles, crevices and on surfaces where soil and dirt have accumulated
Fungi (moulds, mildew and yeasts)	Organic material	Unnecessary	Moulds appear as spots or patches which may spread to form a furry layer on the surface—grey green, black or brown. Mould may grow within a paint film causing a stain, usually pink or purple, but the mould itself may not be visible	May be found on paint, distemper, wallpaper or the paste used to fix it, and on dirt and dust when these contain suitable food; vinyl finishes may be stained. Yeasts have been found occasionally in places where appropriate nutrients were available
Bacteria	Various	Unnecessary	Not visible individually to the naked eye	Sulphate-reducing bacteria in gypsum plaster may cause dark stains in paints containing lead and may promote deterioration of limestone and corrosion of steel

re-decoration, for example, with cement paint. Mould and algal growths resembling dirt deposits occur outdoors on paint surfaces and wood stains. In the early stages they can be washed off but moulds may penetrate and damage the films. Coatings vary in their susceptibility but few are positively resistant throughout their life.

Internal surfaces

Mould growth on internal surfaces is evidence of dampness. This may be due to rain penetration, to deficiencies in damp-proof coursing, leakage from plumbing, defects in the rainwater disposal system, or to condensation. Moulds may also appear in a new building before the water used in construction has dried out; during this period, flueless gas, paraffin or oil heaters should not be used to accelerate drying because of the large amount of water vapour they produce.

The cause of dampness should first be cured⁽²⁾ and the walls allowed to dry thoroughly before any further step is taken. It may not always be practicable to achieve this completely but a partial cure is better than none at all. In breweries and bakehouses, conditions may be conducive to mould growth even if the ventilation is good.

Where the organism is growing on undecorated stone, brick or concrete, a toxic wash should be applied to the affected surface and its surroundings.

After a suitable interval the area should be brushed down and rinsed with a small quantity of water if this is necessary to restore its appearance. The treatment should be repeated if any signs of new growth become apparent.

On decorated surfaces, the procedure will depend on the type of decoration and the extent to which it is affected. In general, decoration that has been attacked should be stripped; the surface should be sterilised by application of a toxic wash and kept under observation for a week or so, a further wash being applied if there are signs of renewed growth. When dry, the surface may be redecorated. If the area of attack is small, local stripping and sterilisation may be all that is required.

Where attack is slight and the existing decoration will withstand treatment with a toxic wash and is sufficiently absorptive to be impregnated by it, it may be sufficient to clean down without stripping and then to apply the toxic wash, allow to dry and redecorate. Oil-bound distemper, which may be difficult to strip, can sometimes be dealt with in this way.

Vinyl wall-coverings are relatively impermeable to moisture and prone to encourage mould growth beneath them on damp or freshly-built walls producing pink or black stains. The recommended fungicidal adhesives are essential but these may not be effective in excessively damp conditions.

In food-processing and other rooms where condensation is prevalent, organisms may grow in dust deposited on the surfaces. Such surfaces should be kept clean by frequent washing. Where they are painted the use of a paint incorporating a toxic ingredient will prevent the growth of organisms in the paint film at least for some time; the protection afforded is particularly valuable during the early life of the paint film when it is most sensitive to attack.

Use of toxic washes

Chemicals used as pesticides in toxic washes and masonry treatments are scrutinised for safety in use under the Pesticides Safety Precautions Scheme⁽³⁾ (PSPS). Indeed, all pesticidal products are subject to control. Further information on the PSPS and clearance procedures can be obtained from the secretariats⁽⁴⁾. All orders and specifications should be limited to products cleared under the Scheme. It should be noted that cleared products will eventually include a registration number on the label plus a phrase stating that the product has been cleared. (Most products include this information now but a few firms are still using up old labels).

A list of the active chemicals contained in products cleared through the PSPS as safe for use as toxic washes is given below.

A list of the products themselves is given on page 4.

Active chemicals contained in products cleared through the PSPS as safe for use as toxic washes.

- cetylpyridinium bromide
- pentachlorophenyl laurate
- and p-chloro-m-cresol
- dichlofluanid
- dichlorophen
- disodium octaborate hexahydrate
- dodecylamine salicylate
- quaternary ammonium compounds
- sodium hypochlorite
- 2-phenyl-phenol salts
- sodium pentachlorophenoxide
- pentachlorophenol
- tri-n-butyl tin oxide (TBTO) quaternary ammonium compounds

The efficacy of toxic washes will vary according to the circumstances. Household bleach (sodium hypochlorite solution) is readily available and is effective with a wide range of organic growths but has no residual activity. It is not suitable for eradicating lichens prior to application of masonry coatings.

Although it is undesirable in principle to introduce soluble salts, particularly sodium salts, into porous building materials, there is no evidence that in the concentrations normally specified by suppliers, any of the washes will harm building materials. The advice of suppliers should be sought in cases of uncertainty.

Redecoration (see also Digests 197 and 198)

Where there may be moisture in the backing, a fairly porous type of decoration—distemper, matt emulsion paint, flat oil paint—will allow drying to continue. When the source of moisture is heavy condensation, an impermeable finish, eg high gloss paint and polyurethane paint are likely to be most durable. They will not allow condensed moisture to reach the backing but have the disadvantage that condensed moisture may run or drip from the surface. Anti-condensation paints may prevent this but often these are less suitable where a readily cleaned finish is required; mould-resistant varieties are available.

If condensation arises from a commercial process that can be interrupted for no more than a short time, if at all, the surface should be made as dry as possible before the decoration is applied; if necessary it should be dried out carefully with a blow-lamp or an electric heater. Asbestos-cement, however, is liable to shatter if it is strongly heated; it should not be dried with a blow-lamp and great care should be taken if an electric heater is used. Similar care is needed when drying gypsum plaster; overheating may decompose it.

Mould-resistant paints Decorative paints containing toxic ingredients are difficult to obtain in small quantities. Special types are supplied by several manufacturers for industrial applications where control of dampness is not possible, eg cellars and breweries. Some may not be compatible with normal decorative paints. Toxic ingredients in paint protect only the paint film; they do not sterilise an infected backing or necessarily prevent the growth of organisms in dirt deposited on the paint film. Mercurial compounds have been used in the past but fungicides less toxic to man are now available. It is not usually possible to obtain paints with a specified fungicide and manufacturers rarely divulge the agents they incorporate.

Paints for external walls vary in susceptibility to algae and few additives seem entirely successful. Paints with a cement base or emulsion binder tend to be rather more affected than those with a chlorinated rubber basis.

Fungicidal emulsion paints

Inclusion of products in this list does not imply BRE approval as effective under service conditions.

Product	Supplier
Asipo	A Leete & Co Ltd
Fungichek	Silexine Paints Ltd
Steracryl	Donald Macpherson & Co Ltd
Steridex	Liquid Plastics Ltd
Vanguard	Vanguard Paints Ltd

Products for the control of biological growths (moulds, mildew, algae, lichens, mosses, etc.) on masonry which have been cleared through the Pesticides Safety Precautions Scheme: May 1982.

This list does not claim to be exhaustive; inclusion of a product does not imply BRE approval. Addresses of suppliers can be obtained from any Building Centre or from the Paintmakers Association or Great Britain Ltd or the Chemical Industries Association, both at: Alembic House, 93 Albert Embankment, London SE1 7TU.

Product	Supplier	Product	Supplier
Sodium Pentachlorophenoxide		2-phenyl-phenol salts	
Berger Fungicidal Solution	Berger Paints	Brunosol Concentrate (sodium salt)	Stanhope Chemical Products Ltd
Cuprinol Dry Rot Killer for Brickwork and Masonry	Cuprinol Ltd	Cementone Fungicide Solution	Cementone-Beaver Ltd
Cuprinol Wall Solution	Cuprinol Ltd	Coltex 40	Coalite group PLC
Dry Rot Killer — Solignum	Solignum Ltd	Mystox WFA (sodium salt)	Catomanco Ltd
Iscosan Fungicidal Solution	Spencer Paints and Wall Coverings	Saturin 30 (sodium salt)	British Building and Engineering Appliances Ltd
Mosgo	Agrichem Ltd	Sodium Hypochlorite	
Mosgo P	Agrichem Ltd	Blue Circle Fungicide	Blue Circle Industries
Mystox D 15%	Catomanco Ltd	Fungicide Wash DR59	England, Hughes and Bell Ltd
Nubex Fungicide FS15	Tenneco Organics	Dichlorofluenid	
Phoenicol Mould Eradicator Barrier	Phoenix Preservation	Hydepark Fungicidal Wash	Mathews, Maclay and Manson Ltd
Phoenicol Mould Eradicator Binder	Phoenix Preservation	Mebosan NT Fungicidal Wash	Mebon Ltd
Phosyn Fungicidal Wall Solution	Phosyn Chemicals Ltd	Dichlorophen	
Pitan Fungicidal Solution	Allweather Evode Paints	Bacdet	Winton Chemicals Ltd
Seculate	Pearl Paints	Halophane Aerosol No 1	Winton Chemicals Ltd
Sodium Penta	Cuprinol Ltd	Halophane Aerosol No 3	Winton Chemicals Ltd
Solignum Anti-fungus Concentrate	Solignum Ltd	Halophane 105	Winton Chemicals Ltd
Pentachlorophenol		Halophane 106D	Winton Chemicals Ltd
Valspar Fungicidal Solution	Goodlass Wall Co Ltd	Lichenite	Winton Chemicals Ltd
Federated Paints Fungicidal Wash	Federated Paints Ltd	Murphys Super Moss Killer and Fungicide	Murphy Chemicals Ltd
Quaternary Ammonium compounds		Panacide	BDH Chemicals Ltd
Carsons Sunway Anti-Fungus Solution	Bestobell Paints	Phoenicol Mould Eradicator Finite	Phoenix Preservation
Gloquat C	ABM Chemicals	Phoenicol Mould Eradicator Steriliser	Phoenix Preservation
Hadfields Anti-fungus Solution	Bestobell Paints	Super Mould Kill	Kingston Direct Sale
Killgerm Algamine	Killgerm Chemicals Ltd	TBTO — quaternary ammonium compounds	
Silexine's Dentolite Solution (concentrate) Sterilising Wash	Silexine Paints Ltd	Grangers Moss Killer	Grangersol Ltd
Dodecylamine Salicylate		Murosol 4x	Wykamol Ltd
Beaver Fungicidal Solution	Hygienic Paint Co Ltd	Murosol 20x	Wykamol Ltd
Blackfriar Antimould Solution 195/9	E Parsons and Sons Ltd	Protim Wall Solution (TBTO only)	Protim Ltd
Blundell Permoglaze Fungicidal Wash	Blundell Permoglaze Ltd	Remtox TE	Remtox Chemicals Ltd
Efrilux Fungicidal Solution V319	Sigma Coatings	Stannicide AQ	Thomas Swan Co Ltd
Fungicidal Solution 45/PV5	T & R Williamson Ltd	Trisol 20	Triton Chemical Manufacturing Co Ltd
Hyperion Mould Inhibiting Solution	Hird-Hastie Paints Ltd	Miscellaneous	
Ken Kill	Kenitex Chemicals (UK) Ltd	CA3 ⁽¹⁾	ESMI Chemicals
Manor Fungicidal Wash	Shipleys Paint Varnish	Mystox QL ⁽¹⁾	Catomanco Ltd
MP118 Fungicidal Wash	Dufay Titanine Ltd	Solignum Mosskiller ⁽²⁾	Solignum Ltd
Nuodex 87	Nuodex Ltd		
Polybond Fungicidal Wash	Polybond Ltd		
Polycell Fungicidal Wash	Polycell Products Ltd		
SWS Fungicide	Stewart Wales Somerville		
Torkill Fungicidal Solution Grade	Tor Coatings		
Torkill, Fungicidal Solution Grade W	Tor Coatings		
Unisil S Waterproofing Fungicidal Solution	Unitas Paints Ltd		
Unitas Fungicidal Wash	Unitas Paints Ltd		
Unitas Fungicidal Wash Solvent Based	Unitas Paints Ltd		

⁽¹⁾ formulation based on cetylpyridinium bromide, pentachlorophenyl laurate and p-chloro-m-cresol.

⁽²⁾ formulation based on disodium octaborate hexahydrate.

References

- 1 Colourless treatments for masonry; BRE Digest 125; HMSO
- 2 Protection from rain; Building Research Establishment, Garston, Watford WD2 7JR; 50p
- 3 Pesticides Safety Precautions Scheme, Pesticides Branch MAFF, Great Westminster House, Horseferry Road, London SW1P 2AE
- 4 Plant Pathology Laboratory, Hatching Green, Harpenden, Herts AL5 2BD
Pest Infestation Control Laboratory, Block B, Government Buildings, Hook Rise South, Tolworth, Surbiton, Surrey KT6 7NF
Health and Safety Executive, Occupational Medicine and Hygiene Laboratory, 403 Edgware Road, London NW6 6LN

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