# GUIDANCE NOTE No. 6
## Safe Use of Liquid Applied Waterproofing Systems

This Guidance Note covers both specific coating material requirements and all other site and contractual requirements. LRWA Guidance Note No. 5: Health & Safety is concerned with those site and contractual requirements. This note covers aspects of specific coating materials and how these relate to current manufacturers' obligations and legal requirements.

## 1. Introduction

LRWA Guidance Note No. 5: Health & Safety gives advice on the provision of a safe working environment for roofing contractors. Guidance Note No. 5 should be read in conjunction with this Guidance Note which has been prepared to give detailed information relevant to the safe handling, use and application of liquid applied waterproofing systems.

Liquid coatings fall into a number of generic categories. LRWA Guidance Note No. 3 describes the generic types of LAWS available for use in waterproofing and currently being used in the UK and throughout Europe.

In the following sections this Guidance Note considers the specific safety issues associated with each of the generic types of LAWS. Detailed practical advice is given on how the composition of these products determines appropriate handling and use.

Information is provided on the safe storage of LAWS and on the safe use of equipment used in product application. Risk assessment is considered with specific reference to the provision of healthy and safe working conditions when LAWS are being used.

## 2. Generic Materials Safety Notes

There are seven distinct types of materials as shown in the European Technical Approval (ETA) definitions – Parts 2-8 inclusive – and are as described in LRWA Guidance Note No. 3; more may be added in the future. The main hazards associated with each type are as follows:

**POLYMER MODIFIED BITUMEN EMULSIONS & SOLUTIONS (ETA PART 2) and BITUMEN EMULSIONS & SOLUTIONS (ETA PART 7)**

Liquid applied roofing compounds containing bitumen or polymer-modified bitumen are available as either solvent based formulations or aqueous emulsions. In both cases inert fillers and fibres may be incorporated in the formulation.

Solar reflective products are also produced. Again, these products may be in the form of a solvent-based formulation or an aqueous emulsion. Apart from the ingredients already mentioned, they may also contain metal flake or polymer base pigments. The solvent based formulations contain a volatile organic solvent and may be classified as flammable. Other handling hazards may include those of inhalation, skin contact, eye contact, ingestion and environmental release.

Aqueous bitumen emulsions are generally classified as non-hazardous, although transient irritation may be caused if splashed in the eyes. In all cases, the manufacturer's Material Safety Data Sheet (MSDS) should be consulted for appropriate handling instructions.

**GLASS REINFORCED RESILIENT UNSATURATED POLYESTER RESINS (ETA PART 3)**

Polyester resins have traditionally been used in factory environments so their potential hazards are well understood and documented. Providing straightforward precautions are followed, their use in on-site works is both safe and uncomplicated. The hazards normally associated with polyester resins are:

**Styrene**
Polyester resins contain a reactive monomer, which is normally styrene. When used externally, emissions should not normally present a problem, however, since styrene is heavier than air, precautions are required when working within enclosed spaces.

**Peroxides**
These are used as an initiator (catalyst) in the curing of unsaturated polyester resins. Peroxides used within approved systems are provided in small kit sized quantities and providing they remain within the proper container, the hazards are limited and easily controlled. Organic peroxides are thermally sensitive and a hazardous decomposition can occur if the product is not stored and used as defined on its packaging.
In all cases the manufacturer's MSDS should be consulted for appropriate handling instructions.

**UNSATURATED POLYESTERS (ETA PART 4)**
These products are made up of two liquid components containing polyester resins with styrene, and a catalyst in powder form. When handling the liquids the hazards include those of inhalation, skin contact, eye contact, ingestion, flammability, and environmental release. They give off heavy fumes and should be used in well-ventilated areas to avoid inhalation and the risk of build up of flammable vapours.

The powder catalyst should be handled so as to avoid skin contact, eye contact and inhalation of the dust, which may cause skin or respiratory sensitisation. The catalyst should be kept away from foreign matter, which it may oxidise and cause to ignite.

Foodstuffs and beverages should be kept away from these products and hands should be washed at breaks and end of work. Although potentially hazardous to health if incorrectly handled, these substances are safe to use with simple precautions.

**HOT APPLIED POLYMER MODIFIED BITUMENS (ETA PART 5)**
Polymer modified bitumens consist of bitumen with additional synthetic and natural rubbers as well as other components such as fillers. They are delivered to site in cakes of material weighing approximately 22.6Kg each, packaged in cardboard.

The main hazards associated with such materials are the same as those for hot bitumen, eg burns to exposed skin/eyes from splashing of material or spillage. Operators should wear gloves and safety glasses or goggles, and have full protection by clothing to arms, legs and torso. The operatives should also be competent and familiar with the workings of the heating machinery to ensure safe operation and avoid overheating of materials/unsafe operation.

**POLYURETHANES (ETA PART 6)**
This class of product can contain substances hazardous to health if misused but are safe with elementary precautions. They exist in one, two or three component systems and the hazard for each part, as well as the mixed material, should be known before use. The main hazardous substances are sensitisers by skin contact or inhalation and can be summarised as:

**Solvents**
Not all polyurethanes contain these and are described as 100% solids; or the level is very low, described as high solids. Products containing solvents can be classed as flammable and the hazard to health is caused by inhalation. Wearing appropriate filter masks will control this hazard.

**Isocyanates**
These can be 'free' as in some two component systems; or blocked / pre-reacted to vastly reduce the hazard. The form and levels of these ie monomeric; or polymeric/ complexed must be considered – the latter being preferred. The type is also important with some aromatic species being more hazardous, and specific labelling regulations may apply. Isocyanates are used up in the drying/reaction process but are still hazardous in wet material. Guard against splashes, confined space breathing and when spray applying. Inhalation hazards can be controlled by filter masks and protection against skin contact by gloves and eye safety glasses.

The application by spraying can be controlled and safe providing appropriate machinery is used and correct precautions are taken. Consideration should be given to protection of spray drift by wind.

**WATER DISPERSIBLE POLYMERS (ETA PART 8)**
These emulsified/dispersed range of coatings contain a variety of very low risk chemicals. Often the ingredients are too low in concentration or hazard to be classified on the MSDS. However, if uncontrolled skin contact is allowed, or evaporating liquids are breathed in confined spaces, then health hazards can result. Evaporating liquids are mainly water but evaporable co-solvents may be used to assist film formation, and alkaline liquids evolving low levels of ammonia are commonly used and should be guarded against by proper ventilation. NOTE: this is not a problem when used outdoors as fresh air dilution is infinite.

## 3. Risk Assessment

There are obligations from the manufacturer and legal requirements to be included in all stages of LAWS supply and application, the following non-exhaustive list covers these:

**a) Regulations and material safety data sheets (brief explanation, some are expanded in Section 4 following)**

**The Construction (Design and Management) Regulations (CDM)**
The CDM Regulations have the main purpose of establishing a safety management network at all stages of a construction project. Obligations are imposed on everyone, but principally the CDM Co-ordinator and principal contractor. There must be a safety plan to combat risks at source and this will involve a method statement from suppliers based on their own health and safety plans. LRWA member manufacturers of LAWS are compliant with these aims.

**COSHH Regulations**
The Control of Substances Hazardous to Health Regulations are designed to protect workers against the risk of exposure to substances considered to be hazardous to health. The use of such substances arises out of, or in connection with, work undertaken under the control of the employer. The hazards that may be associated with the chemicals used in LAWS will be shown in the CHIP Safety Data Sheets from the LAWS manufacturer.

**CHIP Regulations**
- identify the hazards of the chemicals and classify
- provide information about the hazards
- package the chemicals safely

**Material Safety Data Sheets**
(see Section 4 for fuller explanation)

**Background to the Chemicals**
**(Hazard Information and Packaging for Supply) Regulations – CHIP Regulations:**
- aims to help protect people and the environment from the ill effects of chemicals
- applies to single substances and to mixtures or preparations
- ensures adequate information is provided
- ensures chemicals are packaged safely

**b) Contractors risk assessment**
Responsible contractors will produce their own COSHH documents which can relate to the information from the manufacturer of the LAWS, and can be made site specific. Information can include:
- substance identification and obtaining manufacturers' MSDSs
- method of working ie. mixing and applying
- location of use ie. external, internal, confined
- person at risk
- nature of hazard
- risk potential/level of risk
- controls to be implemented – including work permits
- personal protective equipment/fire precautions/first aid

**c) Miscellaneous**

There are specific items to consider in any use of LAWS and these include:

- awareness of sources of ignition eg. solvents, flammable organic resins, roof drying with heat, any source of naked flames
- awareness of source/use of electricity, transformers, earthing for mixers, and application equipment
- storage of reactives or dangerous materials
- awareness of other site operatives and members of the public within proximity of the works
- avoidance of internal nuisance via air intakes, eg. do not mix LAWS components near air intakes – with permission, temporarily block off or switch off

## 3. Safe Use and Storage of Materials on Site

**a) Materials on site**

- ensure all containers are labelled
- observe manufacturers' recommendations on storage conditions
- ensure a secure storage area
- provision of suitable absorbent materials to deal with spills (see 4 e))
- recognition of Manual Handling Regulations

**b) Product hazards**

LAWS may contain organic solvents and substances with a variety of potential hazards, these include:

- flammability – as defined by flash point as a measure of combustion
- inhalation and skin irritants – substances which could irritate and for which control measures are shown on the manufacturer's MSDS with hazard information on the product label
- label warning symbols, these may include:
  - Xi – indicating irritant
  - Xn – indicating harmful
  - C – indicating corrosive
  - T – indicating toxic and will include appropriate risk (R) and safety (S) phrases.
- Materials Safety Data Sheet (MSDS) – standard manufacturers' CHIP safety data sheets are essential reading prior to handling any materials. They contain information under 16 headings which are shown as following:
  1. Product and company identification
  2. Composition/information on ingredients
  3. Hazard identification
  4. First aid measures
  5. Fire fighting measures
  6. Accidental release measures
  7. Handling and storage
  8. Exposure control/personal protection
  9. Physical and chemical properties
  10. Stability and reactivity
  11. Toxicological information
  12. Ecological information
  13. Disposal considerations
  14. Transport information
  15. Regulatory information
  16. Other information

**c) Building regulations**

A LAWS specification must satisfy the UK Building Regulations. The three relevant physical properties to be satisfied are resistance to fire, fitness of materials and workmanship, and resistance to moisture. On site all LAWS and ancillary materials must be stored and handled in a safe manner appropriate to the specific hazards involved. Whilst detailed information is always available from the LAWS supplier, LRWA Guidance Note No. 5 provides general advice and references to the provision of a safe and healthy working environment.

**d) Other hazardous materials**

**Biocidal Washes**
Biocidal washes are used in the removal of moss, lichen and algal growths from roof surfaces. They form part of the preparatory work prior to the application of a LAWS. These products are usually supplied in the form of concentrates designed for dilution in water prior to use. The manufacturer's instructions on dilution rates should be strictly followed. Biocidal washes contain biologically active ingredients and are covered by the Control of Pesticides Regulations. It is important to follow specific handling and disposal instructions from the manufacturer.

**Solvents**
Organic solvents may be used in the cleaning of application tools and for surface cleaning and degreasing. Such solvents are usually of low viscosity where spilling and splashing risks are high. They are often flammable or highly flammable, are environmental pollutants and require skin and eye protection when handling.

**Primers**
Primers are used for adhesion promotion and substrate stabilisation prior to the application of LAWS. Such products are usually of a similar composition to the subsequently applied LAWS and the same hazards apply. Additionally, primers are generally of lower viscosity than LAWS and the risks of spilling and splashing are, therefore, increased.

**e) Disposal**

All LAWS must be disposed of in a safe and environmentally responsible manner.
LAWS wastes, including emptied containers, are controlled wastes. Disposal should be in accordance with local, state or national regulations. Detailed and specific advice will be contained in the manufacturer's MSDS. In the event of accidental spillages LAWS must not be allowed to contaminate drains or water courses. A suitable inert material (see MSDS) should be used to absorb spills followed by disposal as described above for LAWS wastes.

**f) Equipment safety**

**Preparation**
Water Blasting/Power Washing Equipment – the equipment is used for pre-cleaning to facilitate the inspection of substrates and very often as an integral part of the surface cleaning/preparation process to remove semi-adherent contaminants etc prior to product application.

The equipment operates at high pressures, usually in excess of 150 Bar (2000 psi) at the nozzle, therefore regular inspection and maintenance is essential. Specific health and safety precautions should follow the recommendations of the equipment supplier. Minimum consideration should include:

(a) ensure all hoses are free from splits, kinks and excessive wear
(b) ensure all connections are correctly aligned and firmly fixed
(c) ensure all gauges are in good working order
(d) ensure all electrical components and connections are in safe working order
(e) ensure triggers, nozzles etc on discharge lances/ hoses are free from excessive wear and operating properly and safely
(f) wear suitable protective equipment and protect adjacent personnel, fixed plant and machinery etc.

**Application**
Airless Spray Equipment – CAUTION, this is high-pressure equipment and although not often used there are various types for which the manufacturer's specific safety instructions must be obtained and followed.

**Personal protective equipment**
Refer to the individual product MSDS for the specific item of personal protective equipment which is required.

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