A Trainer Resource Manual for Insulation and Building Treatments

Manual Four: Introduction to External Wall Insulation
CITB-Construction Skills has made every effort to ensure that the information contained within this publication is accurate. Its content should be used as guidance material and not as a replacement for current regulations or existing standards.

All rights reserved. No part of this publication may be reproduced, stored in a Retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission in writing from ConstructionSkills.
Asset Skills, CITB-ConstructionSkills and Summit Skills have formed a partnership under the banner of the Green Deal Skills Alliance to ensure all installers have the right skills, competency and knowledge to correctly undertake the installation of insulation and renewable measures identified through the initial property assessment.

For the purpose of these manuals, installer or operative are the terms we use for the individual technician who undertakes the work as opposed to the organisation.

In addition, the Department for Energy and Climate Change (DECC) is to develop and deliver a formal and consistent assessment, accreditation and training scheme for individuals and/or organisations undertaking Green Deal type works.

These series of manuals have been developed as an additional resource for organisations including schools, colleges, training providers, trade organisations, manufacturers, installation contractors and individuals who may be interested in a career in, or change of career to, the insulation sector.

As such the manuals can be used for information, learning and development purposes so anyone can access and use some or all of the manuals and the information contained within them. They also support specialist technical information and training resources available through manufacturers, trade associations and training providers.

The Manuals cover the following insulation areas:

Manual One: Loft Insulation
Manual Two: Cavity Wall Insulation
Manual Three: Draught Proofing
Manual Four: External Wall Insulation
Manual Five: Internal Wall Insulation
Manual Six: Roofing Insulation

Each manual provides an overview of:

• Green Deal
• relevant insulation trade
• health and safety legislation relevant to the job
• health and safety risks, assessment, responsibilities and management
• personal equipment used to protect individuals
• tools and equipment used on the job
• materials used on the job
• good customer and installer care and communication
• examples of approaches to preparation, installation and completion of the job
• sources of industry guidance

The series has been developed with support from stakeholder organisations including Sector Skills Councils, main contractors, installation companies, materials manufacturers, energy conservation agencies and trade organisations.
Guide to sections

To assist accessibility to information in each section of the resource manual, navigation links have been built into every area. Simply click on each subject header and it will bring up the appropriate materials.

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Over a quarter of the UK’s greenhouse gas emissions come from existing housing stock. Given the government’s target of reducing these emissions by 80% by 2050, successfully tackling carbon emissions from existing housing stock will be critical.

The Green Deal is the coalition government’s flagship policy for improving the energy efficiency of buildings in Great Britain and will be available from autumn 2012.

It will allow a new financial mechanism that will allow a range of measures, such as insulation, heating or lighting, draught proofing to be installed in people’s homes and businesses at no upfront cost.

The Green Deal is based on the principle that some energy efficiency measures related changes to properties have the potential to pay for themselves. The Government expects the policy will see billions of pounds lent every year with 14 million of the UK’s 27 million homes expected to benefit. It also predicts it will create 100,000 jobs by 2015.

The Green Deal will allow householders to install energy efficiency measures paying for the improvements with the savings on their fuel bills. Although householders will repay the cost over time, this is not a conventional personal loan as the charge will be attached to the meter and paid back through future fuel bills.

Should the homeowner decide to move, the new homeowner will take on the financial responsibility of the energy efficiency, whilst having the benefit of a more energy efficient property.

To ensure that real savings can be made, the energy saving measures recommended for properties will need to be appropriate to the construction of the property, correctly installed, correctly operated and suitably maintained.

A competent property assessment and installation workforce is therefore essential for the success of the Green Deal.

As mentioned in the Foreword earlier, Asset Skills, CITB-ConstructionSkills and Summit Skills have formed a partnership under the banner of the Green Deal Skills Alliance to ensure that the necessary steps are in place to ensure that the Green Deal initiative proves to be successful going forward.

‘Through our ‘Green Deal’, we will encourage home energy efficiency improvements paid for by savings from energy bills. We will also take measures to improve energy efficiency in businesses and public sector buildings’.

The Coalition: “our programme for government (May 2010)”
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2.0 Introduction

Attention is drawn throughout this training manual to the hazards and risks to work related ill-health and safety associated with installation of external wall insulation.

Trainers or installers should aim to get into the habit of evaluating the health and safety requirements of a particular task, assessing the risks for themselves, deciding what control measures are needed and how they should be applied, and in selecting and using the appropriate personal protective equipment when the risks cannot be controlled by other means.

Users should have a full understanding of what their responsibilities are for work related health and safety, along with the responsibilities of employers. If that is achieved, they will be in a better position when they are on site to ask questions about risk assessments, method statements, safe places and systems of work, and perhaps to refuse to work unsafely. If we can encourage this approach within the workforce then, hopefully, levels of health and safety on site will improve. Installers should also be made aware of their employer’s responsibility to ensure that adequate welfare facilities are provided and the possible need to question the situation when they are not provided.

It must be emphasised that any work carried out on site has the potential to cause serious health problems if the risks are not adequately controlled. The way to determine the particular hazards associated with individual activities, and the required level of risk control, is through carrying out appropriate and sufficient risk assessments.

Trainers should stress to trainees that poor manual handling and slips, trips and falls are the most common cause of lost time due to injuries. However, the training they should receive and the explanation of company and site rules, along with other health and safety procedures they have been shown, will enable them to work safely and without risk to their health, or to the health and safety of others who may be affected by what they do.

Other health and safety regulations specify the way in which associated work activities must be carried out and the duties placed on employers and employees to ensure they are. A summary of relevant regulations is included for trainees within this publication.

Health and safety icons

At various places throughout the text of this Trainer Resource Pack, the ‘Health and Safety icon’ is displayed, see below. This is to draw attention to particular health and safety issues which are relevant to the passage of text.

This symbol identifies Health and Safety issues that operatives should be aware of when carrying out practical activities.
2.1 Risk assessments

The Management of Health and Safety at Work Regulations require that a risk assessment is carried out for every work task to be undertaken. This assessment is intended to identify any risks to health and safety which may be inherent in the task, and to detail any control measures necessary to reduce the risks to an acceptable level. Risk assessments must be carried out by someone competent in the work activity being assessed to enable all the risks and hazards to health and/or safety to be identified.

Risk assessments must be suitable and sufficient, and take into account such factors as the complexity of the task and the competency of the person(s) undertaking the work. The findings of the assessment must be recorded so that any person with an interest in its content can check that statutory requirements have been met and potential problems identified. They should also be in a format so that the installer understands the risks and the necessary controls required to carry out the task safely. Written risk assessments may be stored in an electronic format, providing copies can be retrieved and printed if requested.

Ideally, the risk assessment process would identify methods of working which would not put anyone’s health or safety at risk. It is obvious however that in practice this is not always possible, although a good knowledge of the work techniques available to those involved in installation can significantly reduce the risks.

The following list, which is not exhaustive, highlights areas that should be considered when carrying out a risk assessment:

- the competence and experience of the person(s) who will carry out and/or supervise the work
- the adoption of safe and healthy work procedures and practices, means of access and egress, availability of manufacturers’ information, training that has been undertaken or is required
- the physical environment in which the work is to be carried out e.g. occupied domestic property
- fire precautions and procedures, availability of fire extinguishers, means of escape, alarms, etc
- the possible need for health surveillance through exposure to hazardous substances, noise or vibration
- manual handling, avoidance of potentially harmful manual handling but, where manual handling is unavoidable, the use of correct lifting procedures
- the control and suppression of harmful dust/fibres or other materials
- the adoption of other control measures in preference to using personal protective equipment (PPE)
- confined spaces, e.g. lack of ventilation, fire trap/risk
- structural stability of external walls
- falls from height
- possible asbestos/disturbed asbestos from fire curtains, lagging etc
- competence, knowledge, skills/training and experience

Hand – Gloves
Arms – Long sleeves
2.2 Personal protective equipment (PPE)

The need for PPE where the risks cannot be controlled by other means, availability, proper fit and adequate maintenance of the correct type, and suitable for the task, for example:

- safety helmets, to protect the head from falling objects and knocks
  
  Note: The wearing of safety helmets in most situations is required by law

- gloves, to protect against cuts, abrasions, chemicals, contaminants, etc

- eye protection for use in the proximity of dust, hazardous substances, flying articles, etc
  
  Note: light eye protection is not suitable as impact resistant protection such as goggles for disk cutting

- hearing protection, to protect against noise

- overalls, to prevent contact with dust, chemicals, etc. and to cover any loose clothing

- respiratory protective equipment (RPE) should have a BS EN number and/or a CE logo

- disposable masks

Health risks which need to be considered in relation to external wall insulation include:

- manual handling, carrying materials and equipment into the premises and particularly the loft area

- respiratory problems, the potential for contracting serious respiratory diseases, such as occupational asthma, resulting from the inhalation of existing harmful substances or insulation materials in the course of insulation and cutting operations

- noise induced hearing loss, caused by failing to protect the hearing when working in noisy environments

- dermatitis and other skin complaints, resulting from the failure to protect exposed skin from contact with adhesives, cement mixes, harmful dusts etc., or persistently working with wet hands

- asbestos

Safety risks which need to be considered in relation to external wall insulation include:

- working at height, the risk of accidents if working platforms are not level, properly secured and with all guard rails in place

- use of cutting equipment, cutting and related techniques carry the risk of physical injury and exposure to hand-arm vibration

- unsupervised work, operators may be required to work in small teams or on their own without direct supervision

- working in confined spaces, means a space that has limited openings for entry and exit, unfavourable natural ventilation or not designed for continuous worker occupancy

- access/ladder

- protection of others if working in an occupied premises, elderly tripping over materials, leads, inquisitive children, etc

- fire risk, hot works, smoking, being trapped in a loft
2.3 Employee health and safety responsibilities

- cooperate with the employer, other contractors and customers and follow any information, instructions and training that are given
- do not interfere with, or misuse anything, that the employer has provided in the interests of health, safety or welfare
- take care at all times and make sure that you do not endanger yourself or any other person
- use all tools and equipment safely and in accordance with instructions given or training received
- do not use any items of plant, tools or equipment unless you are authorised and competent to do so
- report any defects in equipment or potential hazards to a supervisor as soon as possible
- do not remove any safety guards or render inoperative any safety device fitted to any equipment
- use personal protective equipment supplied by the employer correctly; take care of it and report any loss or defects
- use the employer’s safe systems of work and report to a supervisor any work situation that might present a danger
- follow all company and site health and safety rules
- recognise the importance of personal cleanliness, especially when working with substances harmful to the skin or hazardous to health
- wear hearing protectors in designated areas where signs are displayed
- understand and comply with all signs and notices that are displayed
- report all accidents to a supervisor
- safely prepare each task
- do each task responsibly
- continue to be alert to the continuing changes on site
- know when to stop if you think anything is unsafe
- keep learning
2.4 Summary of relevant health and safety legislation

The following guidance applies to working on site in general. Certain aspects may therefore be more relevant to some trades than others. However, all operatives working on site should have an appreciation of all the legislation listed.

The Health and Safety at Work, etc. Act 1974

This is the main piece of health and safety legislation. It requires employers to provide safe places of work and safe systems of work. Provided for the establishment of the Health and Safety Commission (HSC) and Health and Safety Executive (HSE) and their powers, it also covers the penalties which can be imposed by courts if an offence is committed.

Risk assessments explain:
- the hazards of the job, e.g. an open loft hatch
- the risks, e.g. a person falling through the hatch
- the controls needed to minimise the risk to a safe level, e.g. close the hatch or put guard rails around the hatch

The regulations indicate the general principles of prevention which must be adhered to when deciding upon risk control measures. For example:
- avoiding the risk, e.g. using floor-standing or bench mounted rather than hand-held equipment
- combating risks at source, e.g. suppressing dust by wet techniques rather than relying solely on PPE
- adapting to technical progress, e.g. buying new work equipment which is designed to produce a cleaner cut or which incorporates low vibration technology

The regulations also put legal duties on employers with regard to:
- providing employees with comprehensive information of the risks identified by the assessment and the measures implemented to control those risks
- ensuring that employees are capable, in all respects, of carrying out the work that they are required to do in a safe manner and without risks to health
- cooperating with other employers, where the employees of more than one employer share a workplace, in the interests of health and safety
The Control of Substances Hazardous to Health Regulations (COSHH)

These regulations often referred to as COSHH, include the following requirements:
- know the product or substance you are to work with, e.g. concrete
- assess the health hazards, e.g. inhalation of dust, dermatitis, burns
- eliminate the hazard or control the risks, e.g. prevent or reduce exposure, use effective control measures, use PPE as a last resort
- provide information, instruction, training and supervision, e.g. the risk of dermatitis, controls and use of PPE
- provide appropriate health surveillance, e.g. lung function tests, skin checks
- monitor the effectiveness of controls, e.g. decrease in skin conditions when gloves are worn
- keep records of monitoring and health surveillance
- prepare accident, incident and emergency plans, e.g. first aid, fire procedures, contact with emergency services

The Construction (Design and Management) Regulations (CDM)

These regulations, often referred to as CDM, place a clear emphasis on the need for everyone on site to be competent, for co-operation between all parties on site, and for the co-ordination of work activities so as to avoid, or reduce, health and safety risks. The main contractor, or principal contractor if the project is notifiable, must ensure that these requirements are complied with.

Every construction project or building project no matter how small is a CDM job.

The following parts of the CDM Regulations apply to all projects:
- general management duties
- duties relating to health and safety on construction sites
- welfare facilities
- reports of inspections

Projects which are expected to last over 30 days, or 500 person days, must be notified to the HSE. On these projects there are additional duties:
- the client must appoint a principal contractor and a CDM co-ordinator
- the principal contractor must compile a health and safety plan which contains the risk assessments for all of the work which will be taking place
- the site must have clear health and safety rules, and employees on site must have the opportunity to express their opinion, as regards safety provisions

The CDM Regulations are supported by an Approved Code of Practice and Guidance Notes.
The Provision and Use of Work Equipment Regulations
These regulations often referred to as PUWER, require that:
• equipment is used for the purposes for which it was designed
• consideration is given to the working conditions and the health and safety of the person(s) where the equipment is to be used
• equipment is used only for operations and under conditions where it is suitable
• equipment is maintained and inspected as is appropriate

Employers must always consider:
• the nature and condition of the equipment
• the place where it is to be used
• the purpose for which it is to be used
• its suitability for the job in hand

Information, instruction, training and supervision must include:
• conditions and methods in which the equipment will be used
• any foreseeable abnormal conditions and appropriate action
• any conclusions drawn from experience when using the equipment
• safe working methods
• possible risks that may be found and precautions to be taken

With particular regard to cutting, due attention must be paid to the requirement for competence in those workers who mount (fit) and/or use abrasive wheels due to the inherent risk of the wheels breaking up when rotating at high speed if these activities are not carried out safely. The HSE publication ‘Safety in the Use of Abrasive Wheels’ (HSG17) provides further details.

The Manual Handling Operations Regulations
These regulations place legal duties on both the employer and the employee. The employer must attempt to avoid the need for manual handling, which involves a risk of injury, by identifying other suitable ways of moving loads. Where this is not possible, the employer should assess all tasks that involve a risk of injury by:
• undertaking a risk assessment of each task
• implementing control measures to reduce the risks
• providing suitable training and information to employees
• reviewing risk assessments when necessary e.g. when there is a change in task

The employee must co-operate with the employer by:
• using appropriate equipment as they have been instructed
• working according to the method statement or work instructions.

When lifting, consider - task, individual, load, environment
The Control of Noise at Work Regulations

These regulations require that employers assess the noise levels which employees are exposed to while they are working, and then to prevent or reduce the risk to health from the exposure to noise by reducing the level of the noise where necessary. The main hazard to health is deafness which can be caused by very high noise levels over a short period of time, or lower noise levels over a longer period of time.

If the noise level exceeds certain figures, employers must provide employees with information on the levels and what they must do to protect their hearing. As a general rule, a noise level is too high if you have to raise your voice to have a conversation with someone who is about 2 metres away.

When employers have done everything that they can to reduce the noise, yet it is still above certain levels, they must provide hearing protection for employees. This may be ear plugs or ear muffs, and employees must be trained in how to use, and look after them, properly.

At higher noise levels, employers must create ‘hearing protection zones’, identify them by signs, and ensure that everyone entering the zones wears hearing protection.

The Electricity at Work Regulations

These regulations mainly deal with the safety of fixed electrical installations, but they do require that persons are competent, and that safe systems of work are implemented, if an electrical hazard exists. All necessary information, instruction, training and supervision must be given, and written safe systems of work should form part of the ‘permit to work’ procedure.

The Control of Vibration at Work Regulations

The use of hand-held tools which cause vibration will expose the user to a risk of hand-arm vibration. This vibration damages the nerves and blood supply and can cause vibration white finger. This shows up as a loss of feeling in the fingers, pins and needles, numbness and blanching (going white) at the ends of fingers. It is usually worse in cold weather.

Employers have a duty to risk assess the use of vibrating tools, and then to either eliminate any risk they pose or to limit the use of vibrating tools so that limits set out in the regulations are not exceeded. One way of doing this is work sharing or job rotation on the tools.

Newer tools have been designed to produce a lot less vibration. ‘Anti-vibration’ gloves do not have much effect in reducing the harmful effects of vibration, although they may help a little by keeping the hands warm.
The Work at Height Regulations

Above ground, there is no safe working height!

A high percentage of fatalities and serious injuries in the construction industry are caused by falling from height. The main hazards include falls from the edges of flat or sloping roofs, falls through fragile roof and ceiling materials, and falls from ladders and scaffolds.

‘Work at height’ means working in any place from which a fall from that height would be likely to result in personal injury.

Before work commences, the Work at Height Regulations require that employers assess the work, eliminate the need to work at height or, if that is not possible, to prepare risk assessments by the following hierarchy:

1. avoid work at height
2. prevent falls
3. protect fall
4. mitigate/minimise fall

These must show the hazards that have been identified and the control measures to be implemented to produce a safe system of working at height.

Another requirement of the regulations is that everyone who works at height, or plans/supervises such work, must be competent or under the supervision of a competent person.
Introduction to Working at Height

Falls from height continue to be the main cause of fatalities and major injuries within the construction industry. Falls that cause injuries do not always occur from a great height. Death and major injuries have resulted on many occasions from falls from less than 2 m above the ground.

Working at height should be regarded as working in any place from where a fall could cause personal injury.

Falls resulting from the use of ladders, working on or near to roof edges or fragile materials continue to figure prominently amongst the accident statistics.

A risk assessment must be carried out before performing any work at height.

Preventing falls

Ideally falls should be prevented by physical barriers and equipment.

Methods include scaffolding, mobile towers, (MEWPs), podiums, edge protection systems and netting, brick guards or solid boards should be used to prevent falls of materials.

Plastic barriers, netting or rope and pins are not suitable as edge protection to prevent people from falling.

Roof work

When working above ground level, there is no safe height.

A worker could be killed or seriously injured in a fall from less than 2 m. Prevention is better than cure – risk assessments and method statements will, if properly carried out, result in a safe system of work.

In a three-year period, 63 people died in accidents during roof maintenance. None would have died if simple precautions had been taken. 30 deaths were due to falls through fragile roof materials and 12 to falls from sloping roofs. Falls from flat roofs also occurred. The cause of these accidents was the absence of a safe system of work.

Often the work is of very short duration but a safe system must always be established as the risk of a fall is the same for a five-minute job as it is for a five-day job. Many projects will involve roof work at some stage, whether the job is new build, maintenance, refurbishment or extending an existing building or, carrying out surveys.

The main hazards include:

- falls from the edges of flat or sloping roofs
- falls through fragile roof materials
- falls from ladders and scaffolds

Work on roofs is often carried out in situations where the hazards involved place others, including members of the public, at risk. Poor weather conditions can add to existing dangers.

Safe systems of work

Before work starts a risk assessment must be carried out to identify the hazards and enable control measures to be put in place. A safe system of working will be derived from this, which may be written down in the form of a method statement. The safe system of working must be communicated to everyone involved in the job.

If the work is to be sub-contracted, ensure that the sub-contractor understands this requirement.
Equipment
Make sure that all equipment used when working at height is safe, tested and well maintained. Make doubly sure that the equipment is right for the job and only used as intended.

HSG33 Health and safety in roof work. This booklet contains expert advice from the HSE and is a useful source of further information for companies that carry out roof work.

Training
Training produces well-instructed, safe-working employees. Without proper and specific training in roof work, employees would be a liability at height, not only to themselves but to other workers.

Supervision
A roof is no place for an unsupervised trainee. Always ensure that all roof workers are adequately and properly supervised.

Fragile materials
Many deaths occur each year as a result of falls through fragile roof material. When working on roofs be aware of fragile surfaces such as glass, plastic, asbestos-cement or any other material that may fail under a person’s weight. They may not be immediately obvious as they may be dirty, covered in moss or debris or they may have been painted.

Reports of accidents show that skylights are a particular problem.

Work should not proceed on or near to a fragile surface until the appropriate measures, as highlighted by the findings of a risk assessment, have been taken. Ideally a safe system of work would be devised to enable the job to be carried out without anyone actually having to go on to the roof.

However, where that is not possible:
• measures must be taken to spread the loading on the roof sufficiently to prevent failure of the roof material, e.g. a stable, temporary working platform with guard-rails
• if necessary a ‘soft landing’ fall-arrest system, e.g. safety nets, airbags and so on, should be positioned below the area where work will be carried out
• load-bearing covers that cannot be dislodged should be fitted over skylights, particularly where fragile skylights are fitted to an otherwise load-bearing roof
Flat roofs

If there is no integral safety rail, high parapet or other effective barrier, edge protection must be provided. This may take the form of:
• a working platform around the external perimeter of the roof
• complete with guard-rails and toe-boards, or
• securely anchored double guard-rails and toe-boards positioned on the roof and set as far back from the edge as possible whilst allowing the work to take place

Always consider the wind chill factor. Cold hands, fingers and feet that cannot feel can cause an accident.

At times it may be necessary to temporarily remove the edge protection, e.g. if work has to be carried out at the roof edge. If so, the safe system of work, established from the risk assessment, must specify the alternative method of fall prevention to be used whilst the edge protection is missing. The edge protection must be reinstated as soon as possible.

Where it is not practical to install edge protection of any description it may be necessary for a harness and lanyard to be worn by the person(s) at risk of falling. If so, the free end of the lanyard must be secured to a safe anchor point such as a latch-way system or a dead weight anchor. A short ‘restraint’ lanyard might be used thus preventing the wearer from approaching too close to the edge, depending upon the ‘range of travel’ required by the person on the roof.

Sloping roofs

Sloping roofs are those over 30° pitch, or less if slippery conditions prevail. Work should only be carried out by people who are:
• physically capable
• appropriately trained

When working on sloping or slippery roofs, always use:
• a roof ladder or temporary work platform that is securely fixed and a catch barrier or a platform, or
• a three-board (600 mm) wide working platform with guard-rails and toe-boards

On steep roofs, those over 50°, a working platform at the eaves is essential, preferably with an additional third handrail.

Avoid roof work in high winds, remember that the eddying and funnelling effects of wind, which can be caused by nearby buildings and pitched roofs, can make a roof dangerous in windy conditions.

The handling of materials and panels at heights in windy conditions can be dangerous, for those on the roof and on the ground.
Roof ladders and temporary work platforms

It is essential that roof ladders and temporary work platforms are:

- good, well maintained and strong enough for the job
- properly supported
- securely fixed against slipping or being dislodged

In addition, temporary work platforms should be a minimum of 600 mm wide and fitted with double guard-rails and toe-boards on both sides, unless the nature of the work requires that they are left off one side, in which case alternative fall-protection measures must be taken.

Do not set ridge hooks onto ridge or capping tiles as the downward pressure of the ladder and a person’s weight will cause the tiles to loosen.

When moving across a roof, where one temporary work platform is not sufficient, use two platforms, one to work from and one to move across, ready for your next change of position.

Roof scaffolds

This type of working platform is used where work has to be carried out. Such access platforms are usually a form of lightweight aluminium scaffold that is designed for the specific purpose. These platforms can be used as a safe means of access, where at one time an improvised working platform may have been used.

This type of work has been the cause of many serious accidents because a safe means of access and/or a stable working platform with guard-rails and toe-boards was not used.

This type of work must never be attempted by standing on the roof and/or standing a freestanding ladder on the roof and leaning it against a wall or a chimney. Alternatively, safe access platforms conforming to the regulations may be built from tube and fitting scaffold.

Scaffolding

The design, erection, alteration and dismantling of scaffold should only be done by competent workers, or be carried out under the supervision and direction of competent persons. It is an offence for anyone else to erect, modify or dismantle a scaffold. All but ‘standard scaffolds’ must be designed by a competent scaffold designer.

Further guidance on this is available at, www.hse.gov.uk/construction/scaffoldinginfo.htm.

Working on scaffolds

Before starting work on scaffolds check that the scaffold has been inspected within the previous seven days by a competent person, that the access route is safe and there are no gaps between boards.

Do not overload loading bays or working platforms and secure loose materials.

Edge protection

Guard-rails should be placed along the outside edges and at the ends of each working platform from where a person could fall and suffer personal injury, as shown in a risk assessment.

Occasionally, guard-rails are necessary on the inner edge of working platforms. A minimum of two guard-rails should be installed.
The top guard-rail should be at least 950 mm above the working platform and the other mid-way between the top guard-rail and the top of the toe-board.

There should be no unprotected gap of more than 470 mm.

A substantial barrier that cannot be displaced may be fitted as an alternative to the mid guard-rail, but it must have fall-protection properties equal to or better than a mid guard-rail.

Toe-boards should be fitted to all working platforms and are usually formed by securing a scaffold board on edge. There should not be more than 470 mm gap between the top of the toe-board and the mid guard-rail.

The Confined Spaces Regulations
Work in confined spaces is always potentially hazardous.

A confined space is one which is substantially, though not always entirely, enclosed. It is a place where there is a reasonably foreseeable risk of serious injury resulting from exposure to hazardous or flammable atmospheres or other conditions, e.g. a loft, cellar or an inadequately ventilated basement room, manhole, ceiling void or duct.

There are a number of main dangers to operatives which are:
• suffocation from lack of oxygen
• injury from collisions with internal loft trusses or beams
• inhalation of a toxic atmosphere
• injury from combustion of a flammable atmosphere

There may be other dangers associated with the unexpected start-up of machinery or exposed electrical conductors, etc.

For working in confined spaces, employers must ensure a safe system of work. This will include proper procedures that are reviewed and updated regularly, risk assessments, method statements, a permit to work system, and details of adequate rescue facilities.
Personal Protective Equipment at Work Regulations

Employers must provide, free of charge, any personal protective equipment or clothing (PPE), or any respiratory protective equipment (RPE) which the employer’s risk assessment has identified as being necessary for employees to carry out their work safely and without risks to their health.

The use of PPE and RPE must only be resorted to when there are no other reasonably practicable ways of controlling the risks. PPE and RPE will protect the wearer, but only if it is the correct PPE or RPE for the job, in good condition and used properly. Where RPE is used, ‘face-fit’ testing should be carried out by a competent person to ensure that it forms a good seal around the face.

Two important factors that must be considered are:

• eye protection, must be selected so that it is appropriate for the specific hazard, e.g. high speed impact of flying particles or fine dusts

• filtering face masks or an appropriate respirator, must be selected by a competent person. ‘Nuisance dust masks’, as are available through DIY and other retail outlets, are not manufactured to the required standards and should not be regarded as RPE
2.5 Other regulations

Safeguarding Young People & Vulnerable Adults in the Workplace

An employer should be aware that under the Training for Employment Regulations 1990 (Health & Safety law), learners participating in work experience are regarded as the placement provider’s employees for the purpose of health and safety and, as a result, the employer has a particular duty of care to:

- assess risks to the learner/young person before they start the placement
- ensure the risk assessment takes into account their inexperience, immaturity, lack of awareness of existing or potential risks and possible learning difficulties or disabilities
- introduce control measures to eliminate or minimise risks, specific factors relating to the work experience must be addressed in the risk assessment, i.e. prohibit the use of named pieces of equipment or tasks
- allocate a suitable, competent supervisor, CRB checked where appropriate, to the learner for the duration of their placement
- provide PPE, free of charge, if required
- communicate any key findings of the risk assessment and control measures to the learner on or before arriving at the placement

REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals) is the system for controlling chemicals in the EU. It became law in the UK on 1st June 2007.

REACH adopts and builds on an existing system for passing information in a structured way down to chemicals users, the safety data sheet (SDS). This should accompany materials down through the supply chain, providing the information that users need to ensure chemicals are safely managed. REACH will also allow for information on uses of chemicals to be passed back up the supply chain, so that these can be reflected in the SDS.

Downstream users of chemicals, i.e. those who use them at work, will need to comply with any conditions described in the SDS. Where SDS has attached exposure scenarios that detail how chemicals may be used, then users should implement the required risk management measures, or use equivalent measures. For more information see UK REACH CA Information Leaflet Number 4, What REACH Means for Users of Chemicals and the Agency’s ‘Guidance for Downstream Users’.

For advice on the application of REACH obligations, you can contact the UK REACH Competent Authority’s national helpdesk:
Email: UKREACHCA@hse.gsi.gov.uk
Website: www.hse.gov.uk/reach

There are numerous regulations dealing with the health and safety aspects of specific issues. There are too many to list in full but a selection is given below.

- accident reporting
- asbestos
- compressed gases (LPG)
- consultation with employees
- electricity
- environmental protection
- fire
- first aid
- lead
- lifting equipment
- safety signs and signals
Asbestos
The duty to manage asbestos requires the preparation of a plan on how to manage the risks from asbestos on the premises, including how to assess the potential risks from asbestos. The condition of the asbestos will influence whether it should be removed or left in place. If it is in good condition and unlikely to be damaged or disturbed the best option is probably to leave it where it is. If it is in poor condition, or likely to be damaged or disturbed, you may need to consult with a specialist contractor to decide what action to take. For more information go to http://www.hse.gov.uk/asbestos/information.htm

Health and safety guidance
The Health and Safety Executive publish a wide variety of guidance materials in connection with the way in which employers should implement the regulations. These include the following.

- Noise at Work, Guidance for Employers
  Publication number INDG 362

- Protecting The Public, Your Next Move
  Publication number HSG 151

A catalogue of publications can be obtained, and orders placed with, HSE Books. Telephone: 01787 881165; website www.hsebooks.co.uk
Introduction

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3.1 General 26
3.2 Overview of external wall insulation 28
3.3 Contract documentation 37

Other sections in this manual
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2. Health, safety and welfare 6
3. Introduction 24
4. Tools and equipment 46
5. Materials, components and their selection 57
6. Preparation and installation 61
7. Sources of industry guidance 81
3.0 Learning objectives

1. Be aware of the main benefits of insulation as an effective method of energy conservation.

2. Understand why it is important to complete the relevant contract documentation.

3. Understand the purpose of a contract data sheet.

4. Understand the purpose of a method statement.
3.1 General
This information is designed to allow maximum flexibility in its use and is not dependent on any particular method. The package consists of a number of sections which can be delivered progressively or on a modular basis. Each section is subdivided into a number of 'subject areas', each with its own introduction.

Learning objectives
Learning objectives are listed at the start of each section. They are included to help direct the use of material within a training programme.

Tools and equipment
It is the responsibility of the trainer or installer to demonstrate the various types of tools and equipment used in carrying out external wall insulation and how to use them correctly and safely.

Standards, regulations and guidance documents
Industry standards, regulations and guidance sources are listed in this publication.

ALL systems should hold European Technical Approval and where this is not available then the system can be approved by the local certifying body inline with construction products directive.

An appreciation of the relevant standards and guidance documents will help to ensure that a good standard of work is achieved and that client expectations are achieved.

Responsibility
Operatives need to understand the need for care and attention to detail. A good standard of work must be achieved to comply with the requirements of the Green Deal.

Scope
This manual sets out to provide an introduction for external wall insulators across the full range of current techniques. The training must be supported by practical tasks with trainees carrying out appropriate work under the supervision of a competent trainer.

No matter how carefully an external wall insulation solution is designed and specified, the resultant quality is dependent on the:
- quality of the installation
- skill of the installer(s)
- knowledge of the materials being used
- understanding the information required to carry out the installation activity

Duties of an installer
An installer is responsible for setting out the area to be insulated and the subsequent installation of appropriate materials in the external wall area. When insulating private dwellings, it is common practice in the construction industry for this to be carried out by a firm of specialist contractors or sub-contractors who supply the materials and the labour for installing them.

The general planning and preparation may be undertaken by the building contractor, who may also be responsible for supplying the raw materials together with the required plant, equipment and facilities. In other circumstances the green deal provider may be responsible for all aspects of installation from planning through to clearing up depending on the size of the project.
Customer care and communication

The following points may seem obvious as to be trivial but remember this: as far as the customer is concerned, this may be their first experience of external wall insulation. You will be judged on what is important to them, not what matters to you.

If you are an individual working on site or as part of a project team, perhaps with other contractors, ensure you effectively communicate with the whole team to coordinate work and minimise disruption to the client and ensure work is carried out in the most efficient way:

- check you are at the right address, and identify yourself, showing your credentials
- talk to the customer personally, without being over-familiar, customers like their names being used
- don’t park vehicles on the customers drive without permission
- explain to the customer what you intend to do before you start work
- remind the customer that you will need access to the building and what you have to do inside. To you it may just be a property, but to them it’s their home
- advise the customer of any precautions needed e.g., removal of materials or possessions that restrict access to the external walls and also clearance of any materials
- remove all the above if the customer is unable to do so
- if it is a semi-detached house or flat, ask if the neighbours are aware of the work being carried out, if they are not, then let them know what’s happening
- ask customers and neighbours to move any items that might be affected by the work
- put down dust sheets where required
- clear up any mess as soon as possible and dispose of waste in the appropriate manner
- ask permission if you need to use the customer’s toilet facilities
- try not to get involved in any disputes with the customer, or respond negatively to any complaints or criticism
- point out any problems or defects to the customer before starting work and report on the installation sheet
- when using towers, ladders, planks or scaffolding etc., explain to the customer what you are doing and why
- if any damage is caused, however small, inform the customer and report the matter to your organisation. Tell the customer that the matter will be dealt with appropriately and quickly
- if the customer complains you should record their complaint and refer the matter back to your organisation with the same assurance that it will be dealt with quickly
- if customers ask about guarantees, refer them to the appropriate person and let them know ahead of the work what is covered and for how long including provision of any guarantee certificate
- on completion of the work, request for the customer to inspect the work area and sign the relevant paperwork
- ensure any equipment and materials being used do not cause a hazard to the customer
- be mindful of the elderly and children when carrying out the work e.g. leaving ladders unattended, etc
3.2 Overview of external wall insulation

Applications

External wall insulation is used in a wide variety of building types and applications. Examples include:
- domestic properties
- non domestic properties
- educational buildings
- hotels
- heritage and visitor centres
- public buildings
- restaurants, cafes and pubs
- retail areas

Advantages of External Wall Insulation

- reduce utility bills
- reduce a buildings carbon footprint
- keep a building warmer in winter
- keep a building cooler in summer
- prevent internal condensation
- improve a buildings energy efficiency rating
- reduce noise from outside, e.g. traffic
- can increase property value through improved energy rating
- opportunities to access grants towards costs
What is external wall insulation (EWI)?

EWI systems generally comprise of an insulation layer mechanically or adhesively fixed to the existing wall and covered with a render coat.

An EWI system can radically alter the appearance of a property unless it is already rendered and planning permission as well as Building Regulations compliance may well be required prior to installation.

Special attention will need to be paid, for instance, to window sills, rainwater downpipes gutters, and eaves. Relocation or changes to the roofline may be required to accommodate the thickness of the system.

EWI systems can deliver high levels of thermal performance, eliminate thermal bridging and cause minimum disruption to the occupants of buildings.

EWI systems are always installed by specialist installers.
A system of finishing the external envelope of a building to:

- exceed requirements (0.3W/m²K in England and 0.27W/m²K in Scotland) of Part L Building Regulations to improve thermal properties
- provide weather protection
- eliminate condensation
- allow greater design freedom

**Externally**, provides strength, resists water, prevents invasion and decorates.

**Internally**, reduces sound and reduces heat loss.
Why use EWI?

- eliminates cold bridging
- no internal disruption
- high levels of insulation easily achieved
- protects the fabric of the building
- improved aesthetics
- application to any wall type
- ease of quality control

Moisture protection

Problems caused by excessive moisture. Moisture movement within the materials making up a structure can lead to local accumulations sufficient to cause problems including:

- rot
- corrosion
- frost damage
- wetting of insulation
- staining of internal surfaces
- damage to equipment within the building

End result:

- all resulting in poor living conditions
- ill health to occupants
- rapid deterioration of building fabric

Problems caused by excessive moisture
Features and benefits

- keeps heat in
- sheds water
- eliminates condensation
- stabilises structure
- no dewpoint problems
- reduces noise
- does not encroach
- protects and decorates

Insulation options

Look for:
- insulation value (Lambda/k)
- fire performance
- water resistance
- vapour permeability
- gas content (HCFC/CFC)
- impact resistance
- acoustic performance
- dimensional stability
Traditional brick slip system

**Structural EWI system**

**Insulation**
Phenolic/PIR/EPS/Cork
Typically 60 to 70mm Phenolic to achieve the 0.30W/m2K, dependant upon house structure.

**Structural supports**
Top hat galvanised steel sections spanning structural elements.

**Method of fixing**
Steel Rails, direct to existing columns.
Insulation, fixed back to steel rails.

**Base coat and reinforcement**
High polymer base coat, with glass fibre reinforcement mesh.

**Render beads**
Range of system beads and trims.
Powder coated galvanised/ stainless steel/ PVC.

**Render finishes**
Silicone textured self-coloured render.
Tradition polymer modified render systems.
Brick slip systems.
Insulated render systems
The benefits – minimal maintenance

• intervals between maintenance cycles extended
• through-coloured render so no need for over-painting
• surface soiling cleaned by power washing
• European Technical Approval, minimum 30 years life expectancy

The benefits – refurbishment

• protection characteristics
• material authenticity for renovation
• minimal disruption
• improved thermal performance
• maintains living space for improved rentability

The benefits – summary

• complete design freedom, colours, textures
• thermally upgraded
• minimal maintenance
• environmentally-friendly, sustainable buildings
• reduced carbon footprint
• improved indoor climate

INCA insurance guarantee

• INCA/QANW insurance backed warranty scheme
• covers design, materials, workmanship
• provides technical comfort and assurance for designer, client and building owner
• available only on INCA BBA and BRE systems applied by INCA
• registered installers
Introduction

3.2

Choice of finish:

- all systems should hold European Technical Approval and where this is not available then the system can be approved by the local certifying body inline with construction products directive
- choice of finish including plain, spar dashed and brick effect
- resistant to cracking
- vapour permeable
- weather resistant
- durable
- low maintenance

Traditional Brick Slip System – Brick Slip Application
3.3 Contract documentation

Introduction

Both the contractor and the client will benefit if all the details of the work undertaken are agreed well before the work start date and put down in writing on an installation sheet. Some contractors complete simple quotation forms that are signed by the client and effectively determine the basis of the job. However, formal installation sheets are more rigorous and will remove any doubts should problems be encountered during the work or after it is completed. A method statement should also be issued.

Method statements are closely linked with risk assessments and an example of an installation sheet and a method statement are given in this section.

Party wall agreement

The Act provides a framework for preventing and resolving disputes in relation to party walls, boundary walls and excavations near neighbouring buildings.

Anyone intending to carry out work anywhere in England and Wales of the kinds described in the Act must give adjoining owners notice of their intentions.

Where the intended work is to an existing party wall a notice is given even when the work will extend beyond the centre line of a party wall. Adjoining owners can agree with the building owner’s proposals or reach agreement with the building owner on changes in the way the works are to be carried out, and in their timing. Where there is no written consent or agreement, the Act provides for the resolution of ‘disputes’.

The Act recognises two main types of party wall.

Party wall type (a)

It is a ‘party wall’ if it stands astride the boundary of land belonging to two or more different owners.

Such a wall is part of one building, or separates two or more buildings, or consists of a ‘party fence wall’.

A wall is a ‘party fence wall’ if it is not part of a building, and stands astride the boundary line between lands of different owners and is used to separate those lands, e.g. a garden wall. This does not include such things as wooden fences.

Party wall type (b)

A wall is also a “party wall” if it stands wholly on one owner’s land, but is used by two or more owners to separate their buildings.

An example would be where one person has built the wall in the first place, and another has butted their building up against it without constructing their own wall.

Only the part of the wall that does the separating is ‘party’, sections on either side or above is not ‘party.

The Act also uses the expression ‘party structure’. This is a wider term, which could be a wall or floor partition or other structure separating buildings or parts of buildings approached by separate staircases or entrances, e.g. flats.
Installation sheet

It is advisable to have all the possible options listed on the installation sheet. This will serve to prevent any oversights, clarify what is to be done for the benefit of both parties and, ultimately, speed up completion of the job. The installation sheet can be used in legal disputes as it provides evidence of the work specification that has been agreed by all parties. It is therefore important that all information on the sheet is completed fully and accurately.

Two items that are not always found on Installation Sheets are a section detailing any changes agreed during the work and a place for signatures acknowledging and authorising the changes. It is necessary to have two identical copies of the sheet, one retained by the client and the other by the contractor carrying out the work. Both copies should be available on site.

The installation sheet typically includes:

- date
- site address
- description of work
- location where the work will be carried out
- client and contractor contact details
- other relevant information such as extras, agreed changes/variations
- a signature of client and contractor representatives

A sample installation sheet is shown on the following page.
## Introduction 3.3

### Date:

### Installer (Company telephone number(s))

### Vehicle Reg

### Customer/Client

<table>
<thead>
<tr>
<th>Site induction received</th>
<th>Yes</th>
<th>No</th>
<th>Number of Hours</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
</table>

### Site contract

### Description of work

<table>
<thead>
<tr>
<th>Areas of work</th>
</tr>
</thead>
</table>

### Standing time and reason

### Extras, agreed changes/variations

<table>
<thead>
<tr>
<th>Additional plant</th>
</tr>
</thead>
</table>

### For the Company

### For the Client
Method statements

A method statement details exactly how the work is to be carried out. The objective is to ensure that contract works are conducted safely and without risk to health. They form part of the management procedures in respect of the project and provide important information for contractors and operatives who will carry out the work. Two copies are normally provided, one for the client and one for the contractor.

Method statements typically include the following information:

- date
- client and contractor contact details
- who will supervise the work
- the qualifications of the operatives who will carry out the work
- plant and equipment to be used
- location where the work will be carried out
- description of the work
- sequence of works
- instruction of operatives in safe systems of work
- signature of supervisor

Quotations should include:

- the location and area of the job
- full details of all materials to be used, including product names and standards to which they conform
- details of the installing method proposed
- how the contractor proposes to form details such as around windows
- the quotation and how long it is valid for, including a clause for a cooling off period
- payment terms
- details of any insurance or company-backed labour and materials guarantee that protects against latent defects
Extract of a Generic Risk Assessment (Domestic Retrofit)

COMPLETED BY: Health, Safety & Environmental Advisor      DATE:

Risk Rating: = Likelihood x Severity

1-4 Acceptable, no further action required, but ensure controls are maintained
10 – 16 Tolerable, look to improve within set time scale
17 – 25 Unacceptable, stop activity and make immediate improvements

<table>
<thead>
<tr>
<th>Likelihood</th>
<th>Risk Rating without workplace precautions</th>
<th>Risk Rating with workplace precautions</th>
<th>Action Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very unlikely</td>
<td>First aid injury or illness</td>
<td>Acceptable</td>
<td>Monitor and review</td>
</tr>
<tr>
<td>Unlikely</td>
<td>Minor Injury or Illness</td>
<td>Acceptable</td>
<td>Monitor and review</td>
</tr>
<tr>
<td>Fairly Likely</td>
<td>3 Day Injury or Illness</td>
<td>Acceptable</td>
<td>Monitor and review</td>
</tr>
<tr>
<td>Likely</td>
<td>Major Injury or Illness</td>
<td>Acceptable</td>
<td>Monitor and review</td>
</tr>
<tr>
<td>Very Likely</td>
<td>Fatality, disabling injury</td>
<td>Acceptable</td>
<td>Monitor and review</td>
</tr>
</tbody>
</table>

Persons liable to be affected by Activity

- Installation Operatives
- Occupants
- General Public
- Third party contractors

Potential risks to affected persons

- Slips, Trips and Falls
- Muscular - skeletal injuries, cuts, abrasions
- Electrocution
- Skin irritation
- Respiratory tact irritation
- Eye irritation /injury
- Impact Injuries

Risk Assessment Summary – External Wall (domestic retrofit)

<table>
<thead>
<tr>
<th>RA No</th>
<th>Hazard</th>
<th>Risk Rating without workplace precautions</th>
<th>Risk Rating with workplace precautions</th>
<th>Action Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Manual Handling</td>
<td>Tolerable</td>
<td>Acceptable</td>
<td>Monitor and review</td>
</tr>
<tr>
<td>2</td>
<td>Environment / work process</td>
<td>Tolerable</td>
<td>Acceptable</td>
<td>Monitor and review</td>
</tr>
<tr>
<td>3</td>
<td>Environment / work process (fragile surfaces)</td>
<td>Tolerable</td>
<td>Acceptable</td>
<td>Monitor and review</td>
</tr>
<tr>
<td>4</td>
<td>Fire</td>
<td>Tolerable</td>
<td>Adequate</td>
<td>Monitor and review</td>
</tr>
<tr>
<td>5</td>
<td>Electricity</td>
<td>Tolerable</td>
<td>Adequate</td>
<td>Monitor and review</td>
</tr>
<tr>
<td>6</td>
<td>Working at Height/falls</td>
<td>Tolerable</td>
<td>Adequate</td>
<td>Monitor and review</td>
</tr>
<tr>
<td>7</td>
<td>Insulation Material/ Dusts</td>
<td>Tolerable</td>
<td>Acceptable</td>
<td>Monitor and review</td>
</tr>
<tr>
<td>8</td>
<td>Inexperienced operative</td>
<td>Unacceptable</td>
<td>Acceptable</td>
<td>Monitor and review</td>
</tr>
<tr>
<td>9</td>
<td>Slips trips and Falls</td>
<td>Unacceptable</td>
<td>Acceptable</td>
<td>Monitor and review</td>
</tr>
<tr>
<td>10</td>
<td>Incorrect Survey Data</td>
<td>Tolerable</td>
<td>Acceptable</td>
<td>Monitor and review</td>
</tr>
<tr>
<td>11</td>
<td>Asbestos</td>
<td>Tolerable</td>
<td>Acceptable</td>
<td>Monitor and review</td>
</tr>
<tr>
<td>12</td>
<td>Bats</td>
<td>Adequate</td>
<td>Acceptable</td>
<td>Monitor and review</td>
</tr>
<tr>
<td>13</td>
<td>Rats</td>
<td>Adequate</td>
<td>Acceptable</td>
<td>Monitor and review</td>
</tr>
<tr>
<td>14</td>
<td>Domestic Pets / animals</td>
<td>Adequate</td>
<td>Acceptable</td>
<td>Monitor and review</td>
</tr>
<tr>
<td>15</td>
<td>Drugs Paraphernalia</td>
<td>Adequate</td>
<td>Acceptable</td>
<td>Monitor and review</td>
</tr>
<tr>
<td>16</td>
<td>Lone Working</td>
<td>Unacceptable</td>
<td>Acceptable</td>
<td>Monitor and review</td>
</tr>
<tr>
<td>17</td>
<td>Insects, wasps nests etc</td>
<td>Tolerable</td>
<td>Acceptable</td>
<td>Monitor and review</td>
</tr>
<tr>
<td>18</td>
<td>Temperature / Humidity</td>
<td>Adequate</td>
<td>Acceptable</td>
<td>Monitor and review</td>
</tr>
<tr>
<td>19</td>
<td>Confined Spaces</td>
<td>Tolerable</td>
<td>Adequate</td>
<td>Monitor and review</td>
</tr>
<tr>
<td>20</td>
<td>Personal Hygiene</td>
<td>Tolerable</td>
<td>Acceptable</td>
<td>Monitor and review</td>
</tr>
<tr>
<td>21</td>
<td>Vulnerable Groups</td>
<td>Tolerable</td>
<td>Acceptable</td>
<td>Monitor and review</td>
</tr>
<tr>
<td>22</td>
<td>Solar panel Installations</td>
<td>Adequate</td>
<td>Acceptable</td>
<td>Monitor and review</td>
</tr>
<tr>
<td>23</td>
<td>Use of Hand Tools</td>
<td>Adequate</td>
<td>Acceptable</td>
<td>Monitor and review</td>
</tr>
</tbody>
</table>
### Extract from a Risk Assessment document

**TASK:** External Wall Installation  
**Site Address:**

<table>
<thead>
<tr>
<th>SIGNIFICANT HAZARD</th>
<th>PROBABILITY</th>
<th>SEVERITY</th>
<th>RISK FACTOR</th>
<th>PERSONS AFFECTED</th>
<th>CONTROL MEASURES</th>
<th>ADDITIONAL MEASURES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slips, trips and falls</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>Operatives</td>
<td>1. ALL work areas to be kept clean, tidy and debris free</td>
<td>1. Correct storage of materials</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Other workers</td>
<td>2. Protect from falls through hatch/ladder</td>
<td>Storage areas to be away from major thoroughfares</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Site visitors</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Other workers</td>
<td>2. Correct storage of tools and equipment</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Site visitors</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Back Injuries and muscular injuries</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>Operatives</td>
<td>1. Manual handling to be limited to 25Kg Male 16Kg for female as a lone lift, greater lifts to be via team lifting i.e. 2 or more operatives involved</td>
<td>1. Storage area of materials to be in the vicinity of work area</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2. PPE – gloves when handling metal products</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PPE – specialist gloves</td>
</tr>
</tbody>
</table>
Extract from a Risk Assessment document continued...

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Probability</th>
<th>Severity</th>
<th>Risk Factor</th>
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</thead>
<tbody>
<tr>
<td>Electrocut</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Operations</td>
<td>1. ALL power tools to be P.A.T. Tested every twelve months</td>
<td>1. Power tools to be visually checked daily 2. Operatives to notify Technician when tools need repair, replacement</td>
<td></td>
</tr>
<tr>
<td>Ear damage</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Operations</td>
<td>1. Signage to be in place when operating power tools that generate noise levels of 80dB(A) or more 2. Ear protection to be worn when noise levels of 85dB(A) or more PPE – EAR plugs</td>
<td>1. Signs can be obtained from Line Manager 2. Ear protection available from Technician PPE – JSP Ear defenders available</td>
<td></td>
</tr>
<tr>
<td>Inhalation of mineral fibres</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Operations</td>
<td>1. Correct use of knives to cut the materials 2. Use of correct PPE PPE – Disposable suits Dust Masks MP1 Gloves</td>
<td>1 Ensure operatives report any personal health problems</td>
<td></td>
</tr>
</tbody>
</table>

Key:
Probability = Probable 3, Possible 2, Unlikely 1.
Severity = Death 3, Serious 2, Minor 1.
Risk Factor = High Risk 6 – 9, Medium Risk 4 – 5, Low Risk 1 – 3

Note: This risk assessment content is for training purposes only
### Introduction

**Approved Installer Practical Check list**

<table>
<thead>
<tr>
<th><strong>Install starter track:</strong></th>
<th><strong>Tick box on completion</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Installed in the correct position.</td>
<td></td>
</tr>
<tr>
<td>Fitted level and securely 300mm fixings.</td>
<td></td>
</tr>
<tr>
<td>Corners mitred or butted correctly.</td>
<td></td>
</tr>
</tbody>
</table>

**Installing insulation:**

<table>
<thead>
<tr>
<th><strong>Install starter track:</strong></th>
<th><strong>Tick box on completion</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulation cut to provide tight joints with no gaps.</td>
<td></td>
</tr>
<tr>
<td>Bonding compound mixed to the correct consistency.</td>
<td></td>
</tr>
<tr>
<td>Bonding compound applied to insulation to provide 40% minimum addition.</td>
<td></td>
</tr>
<tr>
<td>Insulation installed to the correct specification stretcher bond leaving no vertical joints.</td>
<td></td>
</tr>
<tr>
<td>Insulation surface smooth and flat with no lips.</td>
<td></td>
</tr>
<tr>
<td>Mechanical fixings installed securely and using the correct fixing pattern.</td>
<td></td>
</tr>
</tbody>
</table>

**Application of backing mesh and corner beads coat:**

<table>
<thead>
<tr>
<th><strong>Install starter track:</strong></th>
<th><strong>Tick box on completion</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Backing coat materials mixed to the correct consistency.</td>
<td></td>
</tr>
<tr>
<td>Stress patches applied to all areas as specified.</td>
<td></td>
</tr>
<tr>
<td>Stress patches correct size and overlap where required.</td>
<td></td>
</tr>
</tbody>
</table>
### Applying top coat of render:

<table>
<thead>
<tr>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apply primer coat leaving no misses or shadowing.</td>
</tr>
<tr>
<td>Sheeting down of the work area, including masking of window/doors.</td>
</tr>
<tr>
<td>Application of render top coat applied evenly, machine or hand applies.</td>
</tr>
<tr>
<td>Internal and external angles left neat and tidy.</td>
</tr>
<tr>
<td>Overall appearance of finished surface left with an even texture with no misses.</td>
</tr>
</tbody>
</table>
Tools and equipment

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4.1 Introduction 48
4.2 PPE 48
4.3 Hand tools and their maintenance 50
4.4 Power tools and their maintenance 53

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4.0 Learning objectives

1. Understand the items of personal protective equipment which will be required when working on site.
2. Understand why it is important to keep checklists of tools required for each job.
3. Understand the general tools used in external wall installation.
4. Understand how tools and equipment used for external wall installation are maintained.
5. Be aware of the basic maintenance procedures for portable power tools.
6. Be aware of the alternative power sources used for powering tools.
7. Understand the voltage rating for electrical power tools used on site.
4.1 Introduction

The tools described in this section may differ slightly depending on the manufacturer’s design. Their purpose and use, however, remain the same. The listing is not exhaustive as new tools appear periodically and, also, most contractors have preferred tools that they use for particular applications. The selection of the right tools for the job, together with proper use and maintenance, are essential for safe and efficient production of good quality work.

It is good practice to have a listing of the tools needed for a particular job. It is useful to keep a copy of the list in the van so that a check can be made before leaving for site. If a tool is removed from the van, this can be noted on the list so that it can be replaced or retrieved before attending site.

In brief:
- keep a list of the tools needed for each type of job
- keep a copy of the lists in the van or toolbox
- note on lists, when back in the depot, any tool that has been removed or needs replacing

In addition to the tools specifically required for carrying out installation of external wall insulation, various tools will be required for carrying out more general tasks.

4.2 Personal protective equipment (PPE)

The following list gives the PPE that should be available when carrying out work on site. All items may not be used on any one job, but they should all be available.

- Face mask (respiratory equipment)
- Goggles
- Footwear
- Gloves
- Hard hat
- Hi-visibility jacket
- Overalls
- Range of clothing for cold/inclement or hot weather
- Safety body harness and associated equipment

Miscellaneous items
These include:
- HSE approved first aid kit for each vehicle
- Accident book, must comply with the Data Protection Act
- Boot/shoe covers
- Demarcation barriers and tape
- Dry powder fire extinguisher
Personal protective equipment (PPE)

Safety boots
These are designed to help brace the ankles, with steel toe-caps to protect the feet. Some prefer to use safety trainers for the same purpose, which should have a treaded rubber sole. In any event, ordinary shoes or footwear, with smooth leather soles should not be worn. Likewise Wellington boots should not be used on ladders or on roofs.

Safety helmet
Tested, and correctly dated.

Goggles
For use when working with cutting tools or with materials that are irritating to eyes

Knee pads

Single use-disposable dust mask

Ear protectors

Hi - visibility jacket

Safety gloves
Plant and equipment inspection
The most appropriate access equipment will be selected prior to commencement of any works.

All tools and equipment used is suitable for its application and are regularly inspected and serviced as required.

Unless special arrangements are made items of portable hand held electrical equipment operate at 110v and are subject to inspection by a competent person to meet the regulations and manufacturers guidelines. This inspection takes place at minimum of once every 6 Months.

The following equipment shall be used for this type work:
• power drills
• ladders with protection system
• hand tools
• modular bridging systems
• scaffolding
• mobile elevating working platforms

4.3 Hand tools and their maintenance
The following hand tools are widely used for external wall insulation.

Hand tools may differ slightly depending on the manufacturer’s design but in each case the purpose remains the same.

Introduction
Good work practice, such as proper tool usage and maintaining tools in good condition, is an essential part of an operative’s life. It helps to provide safe working for the user and others. Good quality hand tools are expensive to buy and unless correctly maintained will need to be replaced frequently, resulting in extra cost to the operative and damage to the work.

It is difficult to achieve a good standard of work using dirty and blunt tools. Hand tools stored with a protective film of oil should be cleaned with a dry cloth before use.
4.3 Tools and equipment

Care and maintenance

Only use hand tools for the purpose for which they are designed. Hand tools are manufactured for specific applications. Using them for other purposes could shorten their life and result in damage or unsafe conditions.

Hand tools should be:

- handled with respect and not misused
- kept clean while being used
- thoroughly cleaned and checked after use
- kept in good working order

Remember:

- tools should have their cutting edges inspected for damage at regular intervals
- worn cutting edges/teeth should be sharpened or the tools replaced
- damaged cutting tools blades should be replaced
- saw blades should be replaced when teeth are worn
- spirit and laser levels should be handled carefully and regularly checked for accuracy

Storage

Always ensure that:

- hand tools are stored in tool bags/boxes for protection, safety and security
- hand tools are oiled to protect from rust if not in continuous use
- cutting knives are sheathed or retracted
- saw teeth are protected by a plastic or timber saw guard
- sharp edges of tools, e.g. chisel tips, are protected by a plastic cap
The following hand tools may be used during the installation process:

- Measuring tape
- Large spirit level
- Insulation knife
- General purpose retractable trimming knife
- Sealant gun
- Hammers
- Trowels
- Hop-up
- Hacksaw
- Rasp
- Laser level
- Broom
- Dustpan
- Notched trowel
- Large mixing bucket
4.4 Power tools and their maintenance

Power tools are expensive and so any problems with them can delay your work or lead to costly replacement. You want them to last as long as possible so effectively maintenance is key to maximising their lifespan and performance.

Check your power cord – Once your power cord wears out, the tool’s life is over. Check your cords to be sure they’re free of abrasions and cuts. Be sure your power cords are not lying across high traffic areas where they might get stepped on; this can cause them to wear out quickly. Be sure you’re not over-using a single outlet with several different power tools; these tools use up a lot of electricity and could easily overload your outlets.

Keep your work area clean – Dust, resin, and sawdust can get inside your power tools, wearing out delicate components. Clean up resin and sawdust build-up as often as possible, as this will reduce the chances of your tools wearing out from internal accumulation. Clear up any liquid spillage to prevent water and damp from damaging power tools on the job or during storage.

Clean your tools after every use – Flush out your power tools after every use with an air compressor or aerosol can. This will make sure there is no debris building up inside the tool. In addition, use a clean rag to wipe your tools down on the outside and where there is access to the inside each time before storage. Use a dry rag or occasionally a gentle, diluted cleaning agent. Keeping them clean will prevent them from getting clogged and damaged because of internal build-up. Always refer to the manufacturer’s guidance as this is often the best source of information relating to each tool.

Perform preventive maintenance – While large-scale repairs should be left to professionals, you can undertake some preventive maintenance depending on your level of skill. Keep internal parts lubricated; flatten tabletops and tool surfaces and check electrical components for wear and tear on a regular basis. You may be able to perform basic repairs on some internal components yourself, or replace a single part instead of the entire tool. This can save you money and keep your tools in working order for longer however you should always refer to the manufacturer’s guidance.

Oil pneumatic and compressed air tools – Often, flushing out and oiling your tools is enough to maintain them however avoid over-oiling as this can cause a build-up of sludge that can cause damage. If you under-oil, this can cause problems including drying up and cracking as well as allowing internal friction to build up which can also cause long-term damage. For compressed air tools, be sure to fill the tank with oil before every use and drain it after. If you leave the tank full after use, you can cause serious rust damage. Again refer to the manufacturer’s guidance.

Keep your tools in a safe place – Store all power tools in a dry environment with a median air temperature, avoid leaving them on site or in a vehicle in very hot, cold, humid, or wet conditions as this can cause serious damage to the tools especially if it’s done regularly.
The following power tools may be used during the installation process:

- Electric saw
- Cordless screwdriver
- Hot wire cutter
- Paddle mixer
- Circuit breaker
- Rotary/hammer drill
- Electric grinder
Introduction

When used correctly, portable power tools enable the work to be carried out:

- with less effort
- more quickly
- with greater accuracy

Power is from either:

- mains electricity, the principal source for many years, or
- rechargeable battery, now increasingly popular

There are advantages and disadvantages with each type of power tool

Mains supply versus battery operated tools

<table>
<thead>
<tr>
<th>Mains supply</th>
<th>Battery operated (cordless)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advantages</td>
<td>Advantages</td>
</tr>
<tr>
<td>Mains electricity provides constant supply.</td>
<td>No trailing cables/leads to restrict movement.</td>
</tr>
<tr>
<td>More powerful.</td>
<td>Can be used instantly without setting up supply.</td>
</tr>
<tr>
<td>Requires mains power source.</td>
<td>Safer to use because of the lower voltage at which they operate.</td>
</tr>
<tr>
<td>Requires transformer if using 110V tools.</td>
<td>Disadvantages</td>
</tr>
<tr>
<td>Trailing cables/leads create a safety hazard.</td>
<td>Battery requires recharging and checks carried out to ensure batteries are at full working power.</td>
</tr>
<tr>
<td>Potential for serious or fatal electric shock</td>
<td></td>
</tr>
<tr>
<td>Requires the availability of a residual current device (RCD).</td>
<td></td>
</tr>
</tbody>
</table>

Note: Any voltage above 110 volts is more likely to cause injury in the event of an electric shock. Tools working on 110 volts are considered to be relatively safe provided they are correctly maintained and are only operated by operatives who have been properly trained in their use.

Mains powered 110 volt work station

Where mains operated tools are in use on site, all possible precautions must be taken to avoid the risk of injury due to electric shock. 110 volt tools must be used and a work station set up using a transformer as shown in the illustration. The transformer reduces the mains power from 240 volts to 110 volts.

Note: Any voltage above 110 volts is more likely to cause injury in the event of an electric shock. Tools working on 110 volts are considered to be relatively safe provided they are correctly maintained and are only operated by operatives who have been properly trained in their use. With 110 volt supply, these must comply with European Standard BS EN 60309-2. This standard is designed to prevent 110 volt tools being plugged into a 240 volt supply, or vice versa.
The plug and cable are identified by colour and the plug shaped so that it will fit only a socket designed for the same voltage.

**Electric power tools**
These must comply with European Standard BS EN 60745-2-1.

Battery operated (cordless) tools
These are referred to as cordless portable power tools because there is no trailing cable or lead. Two batteries are normally required:
- one in use on the power tool
- the other on charge

The charging unit is powered by mains electricity (240 volts) and should include an RCD, residual current device, in the power supply.

Note: Batteries are available to supply various voltages and power life, capacity. Details are printed on the battery and the manufacturer’s use instructions must be followed. It is the responsibility of the user to ensure that the batteries are fully charged and operational.
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5.0 Learning objectives

1. Understand the various types of insulation when installing external wall.
5.1 Insulation materials

There are various types of insulation available for external walls. The choice depends most upon the use and the degree of energy saving required.

The most common materials are:

**Mineral fibre (rock fibre)**

Offers good insulation performance at a mid-range cost and is the best choice where fire resistance is top of the list of requirements.

Mineral wool has a high compressive strength making it a robust and durable system with high impact strength, which is less prone to damage. The highly breathable nature of mineral wool is perfect for existing solid wall properties, allowing for a cleaner, healthier living environment.

**PUR/PIR (polyurethane foam)**

Rigid polyurethane foam (PUR/PIR) is ideal for renovation when the emphasis is on energy efficiency. Low thermal conductivity means thinner insulation for any specified insulation level and thinner insulation means it is easier to fit into the building. The insulation performance is high even with modest material thicknesses. The term rigid polyurethane foam (PUR/PIR) stands for a family of insulation materials that, in addition to polyurethane (PUR) also includes polyisocyanurate (PIR) rigid foam.
5.1 Materials, components and their selection

### Phenolic

Normally comes at a higher cost than EPS or mineral fibre but gives a very high insulation performance, typically requiring less thickness of comparable insulations.

### Expanded polystyrene (EPS)

One of the most cost effective solutions to give good insulation performance, combined with the benefit of being lightweight and easy to work with:

- low thermal conductivity
- high compressive strength
- excellent shock absorption
- excellent dimensional stability
- inherently resistant to water
- non-dusting
- will not rot, mildew or support bacterial growth
- low material/installation costs
- broad range of densities and sizes
- easy to handle and apply
- simple to cut and shape
- tolerates broad range of temperatures
- easy to recycle
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6.0 Learning objectives

1. Understand how to apply safe working practices, follow procedures, report problems and establish the authority needed to rectify them, to:
   • install external wall insulation
   • assemble, operate, clean and disassemble installation equipment
   • measure and calibrate equipment
   • carry out pre-installation checks
   • use hand tools, power tools and installation/ancillary equipment
   • use access equipment

2. Understand information and/or instructions derived from risk assessments and method statement.

3. Understand the different types of information, their source and how they are interpreted in relation to, drawings, specifications, schedules, suppliers’ information and regulations governing buildings.

4. Understand how to communicate and work effectively with the customer and any other trades on site to ensure the work is carried out efficiently and effectively in a coordinated way, minimising risk to property and individuals.
6.1 Preparation

Preparation of external wall insulation

Prior to the installation team’s arrival on site, an assessment of the property would have been completed as to the suitability of the property to have external wall installed.

The installation process will be completed in accordance with the relevant BBA certificates and the operations manuals supplied by material manufacturers.

Considerations prior to starting work

Means of access

On arrival the installer’s vehicle will be parked as close as possible to the property to be insulated in a position to cause the minimum amount of obstruction to pedestrians and other vehicles as is reasonably practicable.

Access will be required to the following areas of the property:

Footpaths, walkways and driveways

All footpaths, walkways and driveways will be kept clear of obstructions/vehicles and the working areas will be isolated from general access.

Stairways

Stairways will be kept clear of obstructions at all times.

Emergency

Safe access and egress will be a prime consideration during the installation and will be maintained at all times in the case of an emergency. The operatives will have a mobile phone to contact either the emergency services or line manager in the event of an emergency.

Deliveries to site

The insulation material and equipment will be brought onto the site on the day of the installation unless prior arrangements have been made with the customer.

Special lifting equipment will be required.

Offloading of equipment

The Installation team will be responsible for offloading all of the goods associated with installation from delivery vehicles.
Pre-installation checks

Pre-installation checks will be made to check the installation can proceed in a manner that ensures safety to the installers, owner/occupiers and does not present a potential to damage the property or its contents.

Warning signs are displayed in appropriate areas.

Any persons present must be informed of the process and are to be made aware of potential hazards, e.g. trailing cables, and to remove themselves from the area of work for the benefit of their own safety. In particular they are informed not to use any access equipment or enter into the working area.

All PPE and RPE to be worn are to be worn in operational areas.

Men at work signs will be displayed at the front and rear of the vehicle/working area, to provide a warning to third parties who could be affected by the activities taking place.

Hazard warning signs will be displayed internally at the exit points of the property to warn the householder of the potential hazards before exiting the property

Safety aspects of fitting external wall insulation

When using insulation make sure that you wear a snug fitting facemask to prevent nose and throat irritation and also wear protective gloves to prevent the hands from making contact with insulation materials as this can cause severe irritation.

Suitable safety goggles should be worn to ensure that external wall insulation does not come into contact with the eyes as it will cause extreme discomfort and possibly damage the eyes due to its abrasive nature.

Similarly, try to cover your body with as much protective clothing as possible, this includes wearing long sleeved tops, tucking shirts/t-shirts and socks into trousers, tuck gloves into your sleeves, etc.

Disposable overalls are ideal for protecting you from the insulating materials and can be discarded after use, the only downside of these is that they can be torn relatively easily and so care must be taken not to snag them on any stray nails or rough timber.

HEALTH & SAFETY

Hands – Gloves  
Eyes – Goggles  
Face – Masks  
Ears – Hearing protection  
Body – Overalls  
Feet – Safety boots  
Falls – Safe system of working  
Access – Working at height
Working at height

The following types of access equipment are available to access the high level working areas, the choice taken is based on the assessors report prior to installation and the on the spot site risk assessment completed by the senior supervisor at the site.

- scaffolding
- MEWP
- mobile towers
- modular bridging systems
- conservatory platform
- ladders with the ladder restraint with fall protection system
- sloping roof system in conjunction with the ladder restraint with fall protection system

Any specialist access equipment that is required will be identified and supplied prior to commencement of the installation. Any access equipment to be provided by an external contractor such as scaffolding, MEWP’s, etc must be checked before use to ensure that it is suitable for use.

The following items should have been allowed for prior to commencement of works:

- existing rainwater goods should be removed and replaced following the completion of works. All rainwater should be suitably removed on a temporary basis, ensuring that no run off water can affect the surface of the EWI system during installation
- all protrusions through the system like, flues, waste pipes, overflows, air bricks, etc should be extended accordingly. Allow for sleeves to flue extensions. Allow for all plumbing modifications associated with the installation of the system
- due care should be taken where there might be the necessity to move drainage entry points. Liaise with the relevant electrical/gas service/BT providers where any movement or adaptation of meters, mains cables, gas pipes, telephone cables are required

Where required, allow for temporary fixing and re-fixing.

All wall mounted items like, satellite dishes, lights, and brackets, gate posts etc should be removed and re-fixed after the completion of the installation. Please ensure that one of the insulation fixing plates is used or that a tanalised timber plate is fitted to accept the reinstatement of items.

Relevant flashings and cills should be allowed for with emphasis upon roof overhangs and window cill extensions.
Where scaffolding is erected to stand away from the wall the installer must have a gap management process in place.
Pre-installation

Before any work has been undertaken a full survey of the property must be completed by a competent person. This would include a comprehensive U value calculation, type of insulation to be used, condensation risk analysis and colour of the top coat. If mechanical fixings are to be used a pull out test will also be carried out to establish the type and length of fixing required.

All external services must be removed before the installation commences e.g.
- satellite dishes
- soil pipes
- outside taps
- guttering
- rain pipes
- outside lighting

These must be removed by a qualified trade’s person; they will also have to be reinstalled once the rendering is complete.

How scaffold is to be erected must be taken into account, there must be enough clearance from the wall to allow for the insulation which can be up to 150mm thick and there should be space available to work.

Preparation of background

The next stage would be to check the substrate e.g.
- damp
- efflorescence
- mould growth
- decaying brickwork

Any of the above must be treated using a liquid algaecide before the insulation is installed.

Boiler flues

Boiler flues may need to be extended. Best practice is that all external wall Insulation technicians should undergo boiler flue awareness training. Boiler flues should only be worked on by a registered certified engineer for the type of appliance i.e. Gas Safe Registered. A boiler flue should never be removed only replaced and/or extended.

Areas affected by algae or mould growth need to be treated prior to the installation
Existing wall areas affected by algae or mould growth

Cover and mask all surfaces that are not to be treated, such as windows, doors, cills, timber, glass, and metal.

Any accumulation of dirt in severely soiled areas should be removed mechanically by brushing. Wash the surface down and allow to dry. The background surface must be dry so that the full absorptive capacity is available for a deep penetration of the biocide.

Algaecide is supplied ready to use and should be applied using a roller or similar. Dependent upon the background it may be necessary to roll the surface more than once. If the treatment is carried out prior to the installation of the EWI or render systems then the algaecide should be allowed to dry for 24 hours. Once dry, continue with the installation.

Once all of the wall areas have been treated, and the background is solid of construction the installer would check for high and low areas in the background.

There are a few ways of doing this, the first method for a normal or high rise building would be to use a string line method.

This would be completed by putting a nail in the top of the wall and another at the bottom and tying the string line to the nails. Using packing shims behind the line at the top and bottom, any deviations along the length of the line can then be established. Repeating this process at 1 metre centres will provide a profile of the face of the wall identifying any high or low areas.
6.2 Installation

Once this has been completed the position of the starter track can be assessed, this must be above the damp proof course (DPC) or a minimum of 150mm above ground. If the building has had any previous damp problems and has been injected, you would normally set the starter track off at the joint above the holes drilled in the brickwork.

It is crucial that when installing the starter track that it sits above the DPC, if the DPC is bridged it will allow for water track up the back of the render. This will inevitably cause the insulation system to fail and void any guarantee.

It is very important that the starter track is installed level and flat to the wall; the correct amount of fixing must be used. The fixings must be installed at a maximum of 300mm apart, it is preferred not to fix into the vertical mortar joints of the wall as they are mostly half filled with mortar when first built.

If the starter track is installed incorrectly it will not support the insulation as it should. When cutting the starter track it is best to use a hack saw and the track should be cut square true and neat leaving no sharp edges, some systems will have connectors to join lengths. Internal or external joints should be mitred using a mitre box to leave the best possible finish.

Once the background has been prepared and the starter track installed, the doors, windows and soffits can be prepared.

With some systems windows are prepared by using a frame sealer or joint sealing tape. These two products will allow the insulation to fit to the window casement snug and tight. This will prevent any drafts or cold spots around the windows and doors, it will also allow for any slight thermal or mechanical movement there may be.

There is also the underside of the soffit to seal. This requires the use of sill band.

The method of fixing the insulation and the mechanical fixings used will depend on the type of substrate.
The common rules for all of these properties are that the insulation must follow a brickwork pattern, stretcher bond, with no straight vertical joints. This pattern of fixing must continue through to all internal and external joints.

When installing the insulation whether it is EPS or mineral wool you would start on either of the bottom corners of the wall. The material used for bonding the insulation to the wall can be applied by using a hawk and trowel or a machine.

It is important to apply the material to the insulation in accordance with the manufacturer’s recommendations, the coverage on the back of the insulation should be no less than 40%.
Note: Always be aware of polystyrene dust as a by-product of cutting and rasping the insulation. If possible always use a hot wire cutter or hot wire knife and if possible dispose of dust generated by the rasping of board. Protect vulnerable areas from airborne dust.

Once the insulation has sufficient adhesive on it, it should be applied to the wall gently slipped into the starting track and tapped so it adheres to the background. Then so on until the wall is complete, making sure that all of the insulation fits tight to one another.

If you leave any gaps between the insulation, this will affect the performance of the system, cold spots. Remember to check the flatness of the wall as you go along, this is very difficult to rectify later, if at all. The insulation flatness can be adjusted by the amount of adhesive used.

When installing mechanical fixings care must be taken! If the fixings are not recessed into the insulation this will increase the amount of backing and could result in spotting marks on the completed job. If the fixings are to deep this will weaken the hold on the insulation.

Once the wall has be insulated the bonding compound will have to cure for 24 hrs, this is to allow the bonding compound to set hard naturally.

When the compound has had sufficient time to set and harden the wall will need to be secured with mechanical fixings. These vary in length and type, NTU nail fixings will be suitable for solid background, and STR U fixings are often used for weaker backgrounds, no fines. It is important that the correct type and length of fixing is used dependent on the thickness of the insulation.

Spotting marks, seen here, are the result of fixings which are not recessed into the insulation.
An example of a mechanical fixing plan as shown in red below

**Traditional board fixing – fixing pattern**

- fixings per board
- domino 5 pattern
- extra fixings at building corners and around openings
- boards laid in stretcher bond flat back to the wall surface
- no board pieces narrower than manufacturer’s recommendations to be used
- maximum gap between boards is 3mm
- all gaps to be filled (up to 3mm use foam fillers, over 3mm board slithers should be used)
Once all of the fixings are in place it is time to apply the backing coat. The backing coat can be applied either by machine or by hand. Check materials are in date and mixed to the guidelines provided by the material data sheets, following the health and safety procedure on the back of the bags.

It is important at this stage to highlight any stress points such as the corners of windows and doors, if any brick work has had to be made good or if there has been any movement in the back ground prior to installation.

The backing coat is applied at approximately 5mm thickness; the mesh is then applied into the material. The mesh must be 100% covered and pushed back as flat as possible. The minimum size of the patches will vary depending on the system being used.

Once the stress points have been addressed the corner beads can be installed. These are applied by hand, making sure that the bead is fully bonded with 100% coverage behind the mesh, and this is classed as a high impact area and will increase its strength. Use a spirit level while installing the beads to keep them true and plumb.
Now all of the stress points have been addressed and the beads have been fitted the whole area will need covering with backing coat and mesh. The thickness depends on the system being installed.

The best method of completing this is starting at the top of the wall and working your way down in 1 meter strips. Once the first strip of mesh has been installed take care when installing the next one, the tram lines indicate a 100mm overlap to improve strength and prevent any cracking. Whist 100% coverage is required it is critical that the mesh is flat to the wall, without any deviation.

Now the mesh has been covered the finish coat needs to be applied in accordance with manufacture's data sheet and contract specification.

By using a spatula to flatten and smooth the material will ensure that the backing coat is level, flat and smooth. If any lines, hollows, bumps or deviations are left in the backing coat this will show though the top coat of render and will not be aesthetically pleasing to the eye.

Now that the backing coat has been completed sufficient time must be allowed for the material to dry, a rule of thumb here is 1 day per millimetre of material dependent on the weather conditions.

**Primer coat**
Where primer is required the colour of the primer may be determined by the colour of the top coat render. The primer coat is simply applied by brush, spray or roller, making sure that the wall area has had an even coverage.

The drying time for the primer coat may vary depending on the weather conditions and the system being installed.

**Top coat renders**
Larger areas machine application is preferred. The render is applied in one coat; thickness will depend on the grain size of the render.

There are two main types you can use:
- silicone-based renders which come in pre mixed 25kg tubs and grain sizes of 1.0, 1.5, 2.0, and 2.5mm. The choice of colours is vast with silicone render it can be matched to sample colours if needed, there is also no need to treat the finished product
- mineral renders need to be mixed with water, so gauging the water is essential; if this is not mixed correctly the render will look patchy. It also has to be treated with a solution once the render has dried. Mineral renders do not have the range of colours as silicone renders, but they do come in varying grain sizes 1.5, 2, 3 and 5mm

Once mesh is applied it is then covered with a backing coat
It is important that before the top coat of render is applied that all window doors etc are masked and sheeted down. The render can be applied by either machine or by hand.

When applying the render by hand you must mix the render up in the tub it comes in using a mechanical whisk, this will mix any sediment that has settled to the top of the tub. You can, if needed add a small amount of water, remember to gauge the amount of water to keep the colour and consistency of the render equal throughout until the job is complete.

Care must be taken with the amount of material you put on your hawk as it is a very wet mix. Wastage and cleaning could add to the overall costs.

Depending on suction of the background and weather conditions will determine the length of time between troweling the material on and rubbing up with a plastic trowel. If the material is too wet or dry you will get an inconsistent finish and will not be pleasing to the eye.

Applying the render by machine

Although the render is applied by machine it will still need mixing prior to the hopper being loaded, again you can add a small amount of water to thin down the render, remembering to gauge the amount of water to keep the consistency of the colour and texture constant. Once again it is very important to give the wall an even coat; this is achieved by having the machine set up correctly and using a small circular motion with the spray gun. Once the material has had sufficient time to cure, it would be rubbed up the same as if the material had been hand applied.

If using a mineral base render the next operation would be to seal the surface of the render to prevent any staining once the installation has been completed. Remember to allow the render to dry before applying.

Once all of the rendering has been completed, the masking and sheeting can be removed and the work area cleaned. Be very careful not to damage your work especially where scaffold boards are in situ.
Installation of the plinth

The plinth is installed under the starter track of the render. It is designed to be fitted below the damp course. The plinth detail is installed in a very similar way as the render system, the differences being that you can only use high density insulation fixed following the manufacturer’s recommendation and contract specification.

When installing the insulation the coverage on the back of the board is 100%, the material is applied by hand using a 10mm notched trowel.

Mechanical fixings must be installed at a maximum 300mm centres vertically and horizontally, these are the same fixings used in the render system.

It is important to install the gravel trap at the bottom of the plinth to stop any splash back and staining of the plinth.

The plinth will need the mesh applying to the same specification as the render. Once this has been completed the two common finishes are:

- a bond adhesive, a plain face finish applied to a thickness of up to 10mm for traditional brick slips
- synthetic brick slips require a thinner thickness, this may be as little as 4 or 5mm in accordance with manufacturers instructions
- if desired, this can be painted to a contrasting colour
- sticking brick slips onto the insulation; this would give the building a more traditional look

Traditional brick slip system – profiles mesh

- pre-adhered plastic profiles
- notch scrim adhesive
- bed mesh into scrim adhesive
- 10mm gap between adjacent sheets
- continually check for level
- 6 Stainless Steel DHM fixings per sheet
**Movement joints** can also be installed if required; these are only installed if there is a movement joint in the brick or block work. These can also be used if the building has had an extension and the brick stretcher bond has been broken.

If the building has no soffits, and the render system were left open to the elements the insulation system would fail.

There is a soffit profile trim that can be used to run along the top of the wall, this profile is designed to allow water to run off the top. The profile is screwed into the brickwork at the same time as the starter track, 300mm fixing centres to be used. The back of the profile bead will need to be sealed with a suitable silicone sealant to prevent the ingress of water.

This diagram shows a stop profile trim, it is designed for vertical installation. This trim would leave a nice sharp clean finish at the end of the wall if needed. The most common use would be on semi detached dwellings and only one of the houses was being rendered.
Approved installer Job Knowledge Questions and Answers

1. What must be completed before any work is undertaken?
   A complete site survey, including a full specification of the installation.

2. What must be taken into consideration when the scaffold is being erected?
   There must be allowance for a 225mm minimum distance between the building and the scaffold, allowing the thickness of the insulation and working area.

3. What is the minimum coverage of bonding compound needed when installing insulation slabs?
   The minimum coverage on the insulation slabs is 40%.

4. What are the maximum fixing centres when installing starter track and other profile trims?
   The maximum fixing centres is 300mm.

5. What TWO names are given to style of fixing the insulation to the wall?
   Brickwork pattern and stretcher bond.

6. With regards to the mechanical fixing of the insulation what TWO rules must be followed?
   The fixing must be of the right type, and length. They should break the surface of the insulation slab and they must follow the fixing pattern according to the specification.

7. What substrate are STU R fixings on?
   STU R fixings are used on weak or no fines backgrounds.

8. Name THREE areas where additional mesh would be applied?
   Additional mesh would need to be applied in stress areas such as at the corner doors, window corners, if brickwork had been made good or if there has been any movement in the background.

9. When applying the mesh what TWO details must be taken into account?
   The mesh must have 100% coverage, the tram lines must overlap.

10. What is the maximum thickness of the final backing coat?
    The maximum thickness is dependent on the system being used.
11. With regards the backing coat what must be achieved before the top coat is applied?
The backing coat must be left straight, regular and smooth before the top coat is applied.

12. What is the drying time of the backing coat before the top coat of render is applied?
24hrs per millimeter is a general guide and is dependent on humidity and climate.

13. What TWO things must be taken into account when applying primer coat?
Primer coat must be applied with an even coverage leaving no shadows and match the colour of the
top coat of render.

14. By doing what would eliminate cold spots?
By making sure the mechanical fixing do not protrude the surface of the insulation slab.

15. Name TWO types of finishes that can be achieved on the plinth detail?
Brick slips and plain face render.

16. What length of time is need for the bonding coat set before mechanical fixing are installed?
24hrs.

17. If the substrate was found to be defective with damp how would treat the surface before continuing
installation?
Any excess salt would need to be brushed off and then treated with an Algaecide.

18. How would thermal and mechanical movement be allowed for with regards the installation around
windows and doors?
Using the seal tape and AFU trim around the window and doors would accommodate movement.

19. What would be the consequences if the system is not installed to the correct specification?
By not following the systems specification the warranty Guarantee would be invalided and the
system would fail.
Making good

The importance of making good after the installation cannot be over-emphasised. Leaving the property in the same condition that you found it in is the best possible recommendation and source of new leads.

Post-installation checks

On completion of the installation checks must be completed to establish that procedures identified in system designers manual have been adhered to.

Post-installation checks will be carried to ensure that all tools, materials have been removed and the installation meets the industry and company quality and health and safety standards.

The site will be cleared of all tools, equipment and materials, residual dust will be brushed up and removed. Insulating material that may fall onto clients pathways will be removed.

A final inspection of the work and site will be carried out by the supervisor in conjunction with the customer, prior to the site being vacated.
Sources of industry guidance

7.1 Associations and relevant bodies

Other sections in this manual

1. Background to Green Deal 5
2. Health, safety and welfare 6
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5. Materials, components and their selection 57
6. Preparation and installation 61
7. Sources of industry guidance 81
### 7.1 Associations and Relevant Bodies

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<tr>
<th>Name</th>
<th>Website</th>
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<tr>
<td>NEA National Energy Action</td>
<td><a href="http://www.nea.org.uk">www.nea.org.uk</a></td>
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<tr>
<td>NIA National Insulation Association</td>
<td><a href="http://www.nationalinsulationassociation.org.uk">www.nationalinsulationassociation.org.uk</a></td>
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<tr>
<td>INCA Insulated Render and Cladding Association</td>
<td><a href="http://www.inca-ltd.org.uk">www.inca-ltd.org.uk</a></td>
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<tr>
<td>EAE European Association for External Thermal Insulation Composite Systems</td>
<td><a href="http://www.ea-etics.com">www.ea-etics.com</a></td>
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<tr>
<td>EEP Energy Efficiency Partnership</td>
<td><a href="http://www.eeph.org.uk">www.eeph.org.uk</a></td>
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<tr>
<td>FMB Federation of Master Builders</td>
<td><a href="http://www.fmb.org.uk">www.fmb.org.uk</a></td>
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<tr>
<td>NHIC National Home Improvement Council</td>
<td><a href="http://www.nhic.org.uk">www.nhic.org.uk</a></td>
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<tr>
<td>CSCS ConstructionSkills Certification Scheme</td>
<td><a href="http://www.cscs.uk.com">www.cscs.uk.com</a></td>
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<tr>
<td>DPAA Draught Proofing Advisory Association</td>
<td><a href="http://www.dpaa-association.org.uk">www.dpaa-association.org.uk</a></td>
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<tr>
<td>NFRC National Federation of Roofing Contractors</td>
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<td>EST Energy Saving Trust</td>
<td><a href="http://www.energysavingtrust.org.uk">www.energysavingtrust.org.uk</a></td>
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<td>BBA British Board of Agrément</td>
<td><a href="http://www.bbacerts.co.uk">www.bbacerts.co.uk</a></td>
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<td>BSI British Standards (Training and Assessment)</td>
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