



UNIVERSITY OF
BIRMINGHAM

Health and Safety Guidance

Guidance on Equipment Provided for Use at Work

GUIDANCE/1/EPUW/04

Equipment provided for use at work is very varied and the risks to health and safety associated with the use of equipment can range from minimal to very high depending on the type of equipment and how and where it is used. University Health and Safety Policy (UHSP/0/01) requires Heads of Budget Centres to ensure that equipment provided for use at work is suitable for its purpose, maintained in a safe condition and any risks associated with the equipment are eliminated or adequately controlled.

This document, a revision of GUIDANCE/1/EPUW/99, is intended to help Budget Centre compliance with Health and Safety Policy. Guidance is given on the **selection, use** and **maintenance** of equipment and also on the **construction/supply/installation** of equipment at the University.

Further information and advice may be obtained from the Health and Safety Unit.

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GUIDANCE/1/EPUW/04

CONTENTS

	Page
INTRODUCTION	
1. Who is the guidance aimed at?	1
2. Key terms	1
3. Application of the guidance	2
4. Identifying risks	2
5. Supporting documentation	2
GUIDANCE	3
1. Acquisition of equipment	3
2. Use of equipment	3
3. Management of equipment	3
4. Budget Centres who construct, modify or supply equipment	5
NOTES	5
a) Information, instruction and training	5
b) Inspection of equipment after installation	5
c) Monitoring the condition of equipment	5
d) Maintenance arrangements for the equipment	6
e) Statutory inspection, examination and testing	6
f) Controls and control systems	6
g) Isolation from sources of energy	8
h) Dangerous parts of machinery	8
i) High or very low temperatures	9
'CE' Marking	8
Who should be able to demonstrate that the equipment meets the EC standard and CE mark equipment?	9
Equipment checklist	10

Guidance on Equipment Provided for Use at Work

GUIDANCE/1/EPUW/04

INTRODUCTION

1. WHO IS THE GUIDANCE AIMED AT?

This guidance is aimed at those who:

- use;
- order and/or purchase;
- design;
- construct and/or modify;
- install
- maintain

equipment and systems.

2. KEY TERMS

Work equipment

This guidance covers all *work equipment* from the largest, most sophisticated machines to simple office equipment and applies to all equipment, whether for use on or off the campus. It includes new and second hand equipment that the University owns, rents, leases or borrows and includes both proprietary equipment and also equipment made in-house.

Examples of *work equipment* include hand and power tools, machines, workshop equipment, lifting equipment, laboratory equipment, kitchen equipment, office equipment, sports equipment etc.

Work equipment also includes *systems* where individual items work together as a whole. Motor vehicles that are not privately owned are also included.

In Use

The guidance covers equipment *in use*. As well as normal use, *in use* includes stopping and starting the equipment, repair, modification, maintenance, servicing, cleaning and transporting the equipment.

CE marking

The **CE** marking on a piece of equipment is a certification by the manufacturer/supplier/importer that the equipment is safe and meets the relevant supply law and standards. However it is the responsibility of the user to check that the equipment, and the way it is used, is indeed safe. (See Checklist, page 10.)

Note: in certain circumstances the University may undertake the **CE** certification and marking duties. (See page 9.)

Competent person

A *competent person* is a person(s) with the necessary knowledge and experience to carry out the work required. The person may be a member of the University staff or may be brought in from an outside organisation.

3. APPLICATION OF THE GUIDANCE

Selection and use of equipment

This guidance is primarily intended for equipment that may present significant risks by its intrinsic nature and method of operation, agents used in conjunction with it or the environment it is used in.

For example:

- machinery, electrical equipment, pressurised equipment, equipment that emits radiation, equipment used at height etc.;
- equipment used in association with chemical, radioactive or biological agents etc.;
- equipment that is used in particular environments including wet, explosive or other adverse environment.

For most proprietary equipment, if recently purchased and used in low risk environments, no action will be needed, e.g. general office equipment, personal computers, etc.

Fulfilment of these requirements will ensure compliance with *The Provision and Use of Work Equipment Regulations 1998* and *The Supply of Machinery (Safety) Regulations 1992*.

Construction and Supply

This guidance is aimed at Budget Centres who construct and/or supply equipment.

4. IDENTIFYING RISKS

In order to identify the risks and ensure that they are adequately controlled it may be necessary to carry out risk assessments of the equipment and its use.

5. SUPPORTING DOCUMENTATION

A **check list** is provided on the back of this document to guide Budget Centres.

Risk Assessment Guidance for laboratories (GUIDANCE/2/RAL/97), workshops (GUIDANCE/10/RAW/98) and offices (GUIDANCE/7/RAO/98) is available from the Health and Safety Unit to assist Budget Centres carry out assessments on machinery, electrical equipment and other equipment that may present a significant hazard.

<https://intranet.birmingham.ac.uk/hr/wellbeing/worksafe/topics/riskassessment.aspx>

Procuring New Equipment

This document helps address the following issues before purchasing or otherwise obtaining new equipment:

- Ensuring that the equipment complies with all regulatory and statutory requirements (*including CE Marking, etc.*).
- Identification of the services and location requirements (e.g. *electrical supply required, water supply, specialist gases, monitoring systems, etc.*).
- How the equipment will be safely operated (*risk assessment and training provisions*).

<https://intranet.birmingham.ac.uk/hr/wellbeing/worksafe/topics/equipment.aspx>

GUIDANCE

1. ACQUISITION OF EQUIPMENT

Anyone who selects/orders/purchases equipment (including new or second hand and whether owned by the University or leased, hired, rented or borrowed) should ensure that the equipment:

- is suitable for the environment it will be used for; e.g. a wet environment, a flammable atmosphere, a confined space, outdoors, etc.
- is suitable for the purpose it is intended to use it for; e.g. lifting gear lifting weights within its rating; correct tool being used for a particular job, etc.

and that:

- it is suitable and that sufficient information about safe operation, testing, maintenance etc. is provided.

Anyone who takes delivery of equipment should ensure that:

- it is as specified;
- it is undamaged and safe to use;
- the necessary information is enclosed.

Additionally:

Most new or second hand equipment should conform to a type that meets the safety standards required by the EC. It should be confirmed that the equipment is of this type when selecting/ordering. On delivery the equipment should be examined to ensure it has a **CE** mark and, if necessary, supporting documentation. (See Checklist, page 10.)

2. USE OF EQUIPMENT

Anyone who uses equipment should ensure that:

- it is safe to use; e.g. undamaged, in good condition etc.
- it is suitable for the environment it in which it will be used; e.g. a wet environment, a flammable atmosphere, a confined space, outdoors, etc.
- it is used safely and within the parameters that it was designed for; e.g. lifting gear lifting weights within its rating; correct tool being used for a particular job, etc.
- they have had sufficient information, instruction and training to be able to operate the equipment safely. (See Note a)

3. MANAGEMENT OF EQUIPMENT

Anyone who is responsible for the management of the equipment should ensure that:

- users have had sufficient information, instruction and training to be able to use/operate it safely; (See Note a)
- it is installed correctly; (See Note b)
- where necessary its condition is regularly monitored; (See Note c)
- it is maintained in a safe condition and that the maintenance can be carried out safely; (See Note d)
- where required, statutory inspection, examination and testing is carried out; (See Note e)

- where appropriate suitable controls and control systems are in place including operating and emergency stop controls; (*See Note f*)
- where appropriate it can be isolated safely from sources of energy including internal and external energy; (*See Note g*)
- it is stable; e.g. there is no danger from tipping, rocking falling over etc.
- it is appropriately marked; e.g. stop and start controls, the maximum speed of an abrasive wheel, the maximum safe working load on a lifting beam, the contents of a gas cylinder, storage containers with their contents and any associated hazards, etc.
- if appropriate warning signs and devices are in place; e.g. *visual, audible etc.*
- there is suitable and sufficient space to operate equipment safely;
- there is suitable and sufficient lighting to operate equipment safely;
- good ergonomic principles have been considered;
- Any particular personal protective equipment is required.

Additionally, assessments should be made and suitable control measures put in place to prevent or reduce to an acceptable level risks from:

- specific hazards associated with the equipment; e.g. *noise, vibration, radiation, chemical and other hazardous substances etc.*
- specific hazards associated with the type of equipment; e.g. *from the use of lasers, pressure systems, display screen equipment, ladders, etc.*
- contact with dangerous parts of moving machinery; (*See Note h*)
- contact with electricity;
- contact with hot or very cold equipment or substances being produced; (*See Note i*)
- material falling from equipment; e.g. *a loose scaffolding board falling or molten metal spilling from a ladle, etc.*
- material held in the equipment being unexpectedly thrown out; e.g. *swarf from a machine tool;*
- parts of the equipment breaking off and being thrown out; e.g. *an abrasive wheel bursting, etc.*
- parts of equipment coming apart; e.g. *the collapse of scaffolding or false work, etc.*
- overheating or fire due to friction; e.g. *bearings running hot, electric motor burning out, ignition by a welding torch, thermostat failing or a cooling system failure, etc.*
- an explosion of the equipment due to a pressure build-up; e.g. *due to the failure of a pressure relief valve or the unexpected blockage or sealing off of pipe work, etc.*
- an explosion of substance in the equipment; e.g. *due to an exothermic chemical reaction or unplanned ignition of a flammable gas or welding work on a container with flammable residues.*

If the equipment conforms to a type which meets the safety standards required by the EC (i.e. has a **CE** mark), then the design of the equipment should adequately control the risks. However, this may not always be so. Equipment that could pose a significant risk to health and safety should still be assessed. (See page 10.)

Two or more pieces of equipment may not pose a risk when working separately but may when working together. The risks posed by the whole system should be considered. Similarly, if equipment is modified there may be an increase in risk and these risks should be considered.

4. BUDGET CENTRES WHO CONSTRUCT, MODIFY OR SUPPLY EQUIPMENT

Any Budget Centre that constructs, modifies and/or supplies equipment (new or second hand) should ensure that:

- the equipment is safe to use;
- adequate information, instruction and training is provided so that it can be used safely;
- if the equipment is for use by another organisation that where necessary it complies with the relevant EC product directive standards and is **CE** marked.

The supply of equipment includes equipment sold, leased, rented, lent or given to another organisation.

NOTES

a) Information, instruction and training

Information and instruction can be either verbal or written depending on circumstance. The more complicated or unusual the equipment the more likely it will need to be in writing. Most information and instructions will be based on documentation from the manufacturer or supplier.

Information, instruction and training should be given on:

- the condition in which, and the methods by which, the work equipment may be used;
- foreseeable abnormal situations, e.g. maintenance work, malfunction and breakdown and emergencies and the action to be taken when/if such a situation were to occur; and
- any conclusions to be drawn from experience in using the equipment.

The information, instruction and training should be easily understood and take into account people's capabilities. Where necessary and appropriate, (e.g. where only authorised persons can operate equipment, records of instruction and training should be kept.)

b) Inspection of equipment after installation

When equipment is installed or re-installed good practice dictates that it is checked to ensure it functions correctly and safely. There are some examples of equipment however where safety is critically dependent on the installation. These include equipment where guarding is provided by presence-sensing devices (e.g. light curtains, pressure sensitive mats etc.) A 'suitable' inspection by a 'competent' person should be made before such equipment is put into service.

c) Monitoring the condition of equipment

The deterioration in the condition of a piece of equipment could result in significant risk. Therefore its condition will need to be monitored and inspected regularly, e.g.:

- most fairground equipment;
- machines where there is a need to approach the danger zone during normal operation, e.g. horizontal injection moulding machines, paper cutting guillotine, die casting machines, shell moulding machines;
- complex automated equipment;
- integrated production lines.

The frequency of inspection will depend on the rate of deterioration. This will be affected by several factors including the harshness of the environment and frequency of operation. Extra inspections will be required in the event of exceptional circumstances including major modifications, refurbishment or repairs, known or suspected damage or substantial change of use. Records should be kept of inspections.

d) Maintenance arrangements for the equipment

Equipment should be maintained in a safe condition. Different equipment will need different maintenance regimes ranging from no maintenance to regular and planned preventative maintenance; e.g. electrical equipment, microbiological safety cabinets, centrifuges, pressure systems.

Some parts of equipment; e.g. guards, ventilation equipment, emergency shutdown systems, pressure relief valves should be maintained to do their job at all times. The necessity to maintain other parts may be less obvious, e.g. ensuring bearings are lubricated or filters are not blocked. Failure to do this may lead to parts seizing, overheating or failing.

Equipment and systems should be made and installed to allow for safe maintenance. This is best done when the equipment is isolated from the power source. However if maintenance has to be carried out while equipment is running, arrangements should be made to do this safely. Even when equipment is isolated there may still be risks, e.g. from chemical residues, radiation, biological agents etc.

Where necessary and appropriate a maintenance schedule should be drawn up and records kept to identify trends in condition and to demonstrate that maintenance has been carried.

e) Statutory inspection, examination and testing

Legislation sets out inspection and testing requirements for certain equipment. However, these are minimum requirements and regular maintenance will be required to ensure equipment is in a safe condition at all times. Records should be kept of all inspections and tests.

The table below lists the equipment at the University that requires statutory examination.

Pressure systems	Written scheme of examination drawn up by a 'competent' person which will give details of the parts to be examined and frequency. Examination carried out by a 'competent' person. See University Policy UHSP/10/PS/97, <i>Pressure Systems</i>
Lifting equipment (including hooks, chains, slings, eyes etc.)	Examination by a 'competent' person either in accordance with a written scheme of examination drawn up by a 'competent' person or, in the case of passenger carrying equipment, every 6 months and for all other equipment, every 12 months.
Power presses stamping out cold metal	Examination by a 'competent' person every 12 months for a press with fixed guards and every 6 months for others.
Local exhaust ventilation (including fume cupboards and micro-biological safety cabinets)	Thorough examination and test by a 'competent' person every 14 months.
Radiation monitors	Thorough examination and test by a 'competent' every 12 months.
Scaffolding	Inspection by a 'competent' person before scaffolding is used for the first time and then every 7 days. Also after substantial addition, dismantling or other alteration and after any event likely to affect its strength or stability.
Excavations	Inspection by a 'competent' person before anyone carries out work in an excavation at the start of every shift. Also after any fall of rock, earth or other material or other event likely to affect the strength or stability of the excavation.

f) Controls and control systems

Some types of work equipment are powered by human effort and although its use involves risk of injury, its physical characteristics and the fact that it is under close human control makes the provision of controls inappropriate; e.g. human powered guillotines, hand-drills and lawn mowers.

Other human powered work equipment may not need start controls but it may be appropriate to provide other controls; e.g. stop controls on a trolley.

On equipment powered by means other than human effort then start, stop and where appropriate emergency stop controls, will be required.

The regulations on controls do not apply only to equipment with moving parts; but also to other equipment that might produce a risk; e.g. X-ray generators or lasers. Individual items may have appropriate controls. However if the equipment is part of a complex system then the controls will have to be viewed in an overall context.

Starting controls:

The starting control(s) may be separate or combined with the operating/stopping controls. They should be designed and installed to prevent inadvertent or accidental operation.

It should not be possible to start or restart equipment other than by using the starting control; e.g. resetting a protection device should not cause equipment to start.

Stopping controls:

Where necessary for health and safety all equipment should have a control(s) that will bring it to a halt in a safe condition. This will include all accessible moving dangerous parts. However parts of equipment that do not present a risk; e.g. a suitably guarded cooling fan, do not need to be positively stopped and may be allowed to idle.

The stop control should override any starting or operating control.

The equipment does not necessarily have to stop immediately if it would not be safe for it to do so; e.g. it may be necessary to complete a sequence or cycle to prevent an unsafe build up of heat or pressure or allow the controlled run down of a large rotating part with high inertia.

Usually operating the stop control should bring the equipment to a complete halt with all power off. However, this may not always be desirable; e.g. if materials are held by a magnetic clutch or grab or where power is required to prevent collapse or uncontrolled movement. In these cases a safe system of work should be implemented to isolate the equipment from the power source.

If there is internally stored energy that could lead to risk from operating the stop control, there should be effective means to isolate or dissipate the stored energy to ensure safety.

Operating controls:

If it is not possible for the operator to see all the parts of the equipment and it is possible that people may be in a position of danger but not seen; e.g. where guards have been removed for maintenance, then interlocks, etc. should be provided.

In some cases it is not practicable for the operator at the controls to ensure no one is at risk; e.g. crane drives, excavator operators, etc. In such cases safe systems of work should be set up; e.g. signallers.

Where there is a risk to persons from hazards, other than dangerous parts of equipment, including persons some distance away; e.g. a vehicle reversing, then it may not be possible for the operator to see all those who may be at risk. In these cases an audible warning may be necessary.

Emergency stop controls:

Emergency stops should be provided where other safeguards are not adequate to prevent risk when some irregular event occurs; e.g. a person becoming exposed to a hazard, a failure or malfunction of a machine (over-speed, failure to stop, etc.). However if such an event can happen very quickly, e.g. the failure of the protection system on a hand-fed power operated guillotine, it is unlikely that an emergency stop would be of benefit since people would not have time to react. In such cases it would not be appropriate to provide an emergency stop control.

When provided, an emergency stop should be sited at each control point and other appropriate locations so that action can be taken quickly. They should be clearly identified.

Emergency stops should halt work equipment quickly but under control so as not to create an additional hazard. They should be easily reached and actuated. They should not be used as functional stops during normal operations.

Control systems:

A control system is defined as a system or device that responds to input signals and generates an output signal that causes equipment to operate.

If a control system fails it should lead to a fail safe condition and not impede the operation of any stop or emergency stop control.

g) Isolation from sources of energy

Equipment should be provided with an easily identifiable and readily accessible means to isolate it from all sources of energy. This is primarily to allow maintenance, etc. to be done safely.

If there is more than one person working on equipment that has been isolated or there is a chance of it being connected to the energy source accidentally then it should be 'locked off'.

Energy may be external or internal. Internal energy; (e.g. the equipment's potential energy or chemical or radiological energy may not be able to be isolated. However there should be means of preventing such energy from adversely affecting workers by restraint, barrier or shielding.)

h) Dangerous parts of machinery

Effective measures should be taken to prevent access to dangerous parts or to stop the movement of dangerous parts before any person can reach them.

Risk assessments should be carried out to evaluate the nature of possible injury, its severity and likelihood of occurrence both during normal operations during other activities such as setting, cleaning, maintenance and repair. Control measures based on the hierarchy of measures should then be applied; i.e.:

1. elimination if possible of the need to use the equipment;
2. fixed enclosing guards;
3. other guards or protection devices;
4. protection appliances (jigs, holders, push sticks, etc.);
5. the provision of information, instruction, training and supervision.

i) High or very low temperatures

People should be prevented from being injured by coming in contact with equipment, or substances produced, which are at high or low temperatures.

Control measures based on the hierarchy of measures (see f) above) should then be applied. Ideally the need to use high or very low temperatures should be eliminated. If they cannot, equipment should be insulated and/or failing that, guarded. Personal protective equipment should only be used as a last resort.

'CE' MARKING

The majority of new work equipment is required to conform to EC product directive standards. Manufacturers/suppliers certify that their equipment conforms by producing a declaration of compliance and marking the equipment with a **CE** mark.

Purchasers should ensure that when they purchase equipment it conforms to these standards.

Usually a check that the equipment has a **CE** mark will be sufficient, but for complicated/high risk equipment even if **CE** marked, the purchaser should ask for a copy of the manufacturer's/supplier's EC declaration of compliance.

Any new equipment supplied for use at work should meet the standards and be **CE** marked. Similarly, any second hand equipment that originally met the standard and was **CE** marked should be to the standard and **CE** marked when re-supplied.

As well as individual items being to the EC standard and being **CE** marked, systems where items individual items work together should be to the standard and **CE** marked.

However it should be noted that in most cases the declaration and CE marking is done by the manufacturer/supplier themselves. Having a declaration and CE mark is no guarantee that the equipment is safe. The user is responsible for checking that the equipment is in fact safe.

Who should be able to demonstrate that the equipment meets the EC standard and CE mark equipment?

- If new or second hand equipment is purchased from an EC country it is the manufacturer's or supplier's/agent's duty.
- If new or second hand equipment is purchased from a country outside the EC but through a supplier/agent in the EC it is the supplier's/agent's duty.
- If new or second hand equipment is purchased directly from a manufacturer or a supplier/agent outside the EC the manufacturer/supplier/agent does not have the duty. However the manufacturer/supplier/agent may demonstrate that it complies and may **CE** mark it. If not it is the purchaser's duty.
- If a Budget Centre manufactures or modifies and supplies equipment to another organisation, the Budget Centre has the duty. Similarly if the Budget Centre supplies second hand equipment it has the duty.

EQUIPMENT CHECKLIST

SELECTION OF EQUIPMENT		
Is it suitable for the environment it will be used in?	YES	NO
Is it suitable for the purpose it is intended to be used for?	YES	NO
Does it conform to a type that meets the safety standards required by the EC? i.e. CE marked and, if necessary, is there supporting documentation. (See page 8)	YES	NO N/A
If it is part of a system does each item and the whole system working together meet the safety standards required by the EC? (i.e. CE marked)	YES	NO N/A

TAKING DELIVERY OF EQUIPMENT		
Is it as specified?	YES	NO
Is it undamaged and safe to use?	YES	NO
Has it a CE mark and if necessary is there supporting documentation? (See page 8)	YES	NO N/A

USING EQUIPMENT		
Is it safe to use? (NB Having a CE mark is no guarantee that it is safe, see page 8.)	YES	NO
Is it suitable for the environment it is being used in?	YES	NO
Is it being used safely and within the parameters it was designed for?	YES	NO
Have users had sufficient information, instruction and training to be able to operate it safely?	YES	NO

MANAGEMENT OF EQUIPMENT		
Is it installed safely?	YES	NO N/A
Are arrangements in place to monitor its condition?	YES	NO N/A
Are suitable maintenance arrangements in place?	YES	NO N/A
Are statutory inspections, examinations or tests required and have they been done?	YES	NO N/A
Are records kept?	YES	NO N/A
Are suitable controls and control systems in place including operating and emergency stop controls?	YES	NO N/A
Can it be isolated safely from sources of energy including internal and external energy?	YES	NO N/A
Is it stable?	YES	NO N/A
Is it appropriately marked?	YES	NO N/A
Are warning signs and devices in place?	YES	NO N/A
Is there suitable and sufficient lighting to operate equipment safely?	YES	NO N/A

Continued on next page

MANAGEMENT OF EQUIPMENT (Continued)

Where appropriate, have assessments been made and suitable control measures put in place to prevent or reduce to an acceptable level risks from (refer to *Risk Assessment Guidance (GUIDANCE/17/RA/00)*):

Specific hazards associated with the equipment?	YES NO N/A
Contact with dangerous parts of moving machinery?	YES NO N/A
Contact with electricity?	YES NO N/A
Contact with hot or very cold equipment or substances being produced?	YES NO N/A
Material held in the equipment being unexpectedly thrown out?	YES NO N/A
Parts of the equipment breaking off and being thrown out?	YES NO N/A
Overheating or fire due to friction?	YES NO N/A
An explosion of the equipment due to a pressure build-up?	YES NO N/A
An explosion of a substance in the equipment?	YES NO N/A