Fourth Edition April 2011

Code of Practice for Electrical Safety in Beer Dispense in Licensed Premises 2011 - Appendices

Issued by the
British Beer and Pub Association

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Appendix A

Appendix A1

Health and Safety at Work etc. Act 1974

General Overview

1. The Health and Safety at Work etc Act 1974 (the Act) is concerned with the health, safety and welfare of people at work and with protecting those who are not at work (members of the public, etc) from risks to their safety and health arising from work activities.

2. The Act places general duties on all stakeholders (Service Providers, Breweries and Pub Chains) within the beer dispense industry. The general duties placed on employers to their employees are as follows:

   a. It shall be the duty of every employer to ensure, so far as is reasonably practicable, the health, safety and welfare at work of all his employees.

   b. Without prejudice to the generality of an employer's duty under the preceding sub-section, the matters to which that duty extends include in particular:

      (i) the provision and maintenance of plant and systems of work that are, so far as is reasonably practicable, safe and without risks to health;

      (ii) arrangements for ensuring, so far as is reasonably practicable, safety and absence of risks to health in connection with the use, handling, storage and transport of articles and substances;

      (iii) the provision of such information, instruction, training and supervision as is necessary to ensure, so far as is reasonably practicable, the health and safety at work of his employees;

      (iv) so far as is reasonably practicable as regards any place of work under the employer's control, the maintenance of it in a condition that is safe and without risks to health and the provision and maintenance of means of access to and egress from it that are safe and without such risks;

      (v) the provision and maintenance of a working environment for his employees that is, so far as is reasonably practicable, safe, without risks to health, and adequate as regards facilities and arrangements for their welfare at work.

3. These duties are taken from Section 2.1 and 2.2 of the Act. It is therefore not a comprehensive list of the duties placed on employers to their employees but they are deemed appropriate for inclusion within this Code of Practice. These general duties are all relevant to the safe operation and maintenance of electrical equipment within the beer dispensing industry.

4. However, subsequent Regulations have enhanced these general duties and in terms of electrical safety include the Electricity at Work Regulations 1989. Other Regulations applicable to this Code of Practice include the IEE Wiring Regulations for Electrical Installations. In addition the IEE (the Institute of Electrical Engineers) have issued a Code of Practice for In-Service Inspection and Testing of Electrical Equipment.

5. The Electricity at Work Regulations 1989 were made under the Health and Safety at Work etc Act 1974. The purpose of the Regulations is to require precautions to be taken against the risk of death or personal injury from electricity in work activities.

6. Section 3 of the Health and Safety at Work etc Act 1974 places general duties on employers and self-employed to persons other than their employees. In particular:

   a. it shall be the duty of every employer and self-employed person to conduct his undertaking in such a way as to ensure, so far as is reasonably practicable, that persons not in his employment who may be affected are not exposed to risks to their safety or health.

   b. in such cases as may be prescribed, it shall be the duty of every employer and every self-employed person, to give to persons (not being his employees) who may be affected by the way in which he conducts his undertakings, information about the way in which he conducts his undertaking if it might affect their health and safety.

7. Clearly, this impacts on all stakeholders (Manufacturers, Service Providers, Breweries and Pub Chains) within the industry. It is vitally important that suitable and sufficient risk assessments are undertaken for all activities likely to create significant risks. The measures adopted to control such risks need to be effectively communicated to all groups of people likely to be affected by such activities.

8. Section 4 of the Health and Safety at Work etc Act 1974 places general duties on persons concerned with premises to persons other than their employees. This section imposes duties on persons in relation to those who:

   a. are not their employees; but

   b. use non-domestic premises made available to them as a place of work or as a place where they may use plant or substances provided for their use there.

9. In addition it shall be the duty of each person who has, control of premises to which this section applies, to ensure, so far as is reasonably practicable, that the premises, all means of access or egress, and any plant or substance in the premises or, as the case may be, provided for use there, are safe and without risks to health.

10. Where a person has, by virtue of any contract or tenancy an obligation of any extent in relation to:

    a. the maintenance or repair of any premises to which this section applies or any means of access thereto or egress there from; or

    b. the safety of or the absence of risks to health arising from plant or substances in any such premises;

    that person shall be treated, for the purposes of paragraph 9 (above), as being a person who has control of the matters to which his obligation extends.

11. All stakeholders (Service Providers, Breweries and Pub Chains) must ensure that those in "control" of such undertakings are suitably aware of their responsibilities. This is

particularly important in terms of electrical safety. When formulating contractual arrangements it is important to clearly identify these responsibilities which should clearly include electrical inspection and test.

12. Section 6 of the Health and Safety at Work etc Act 1974 places general duties on manufacturers etc as regards articles and substances for use at work. In particular:

    a. it shall be the duty of any person who designs, manufactures, imports or supplies any article for use at work:

        (i) to ensure, so far as is reasonably practicable, that the article is so designed and constructed as to be safe and without risks to health when properly used:

        (ii) to carry out such testing and examination as may be necessary for the performance of the duty imposed on him by the preceding paragraph:

        (iii) to take such steps as are necessary to secure adequate information about the use for which it is designed and has been tested, and about any conditions necessary to ensure that, when put to that use, it will be safe and without risks to health.

    b. it shall be the duty of any person who undertakes the design or manufacture of any article for use at work to carry out any necessary research with a view to the discovery and, so far as is reasonably practicable, the elimination or minimisation of any risks to health or safety to which the design or article may give rise.

    c. it shall be the duty of any person who erects or installs any article for use at work in any premises where that article is to be used by persons at work to ensure, so far as is reasonably practicable, that nothing about the way in which it is erected or installed makes it unsafe or a risk to health when properly used.

13. Clearly, apart from the specific requirements on manufacturers to design and construct electrical equipment that is safe, they must also provide adequate information about the use for which it is designed and about any conditions necessary to ensure that, when put to that use, it will be safe and without risks to health.

14. Manufacturers of beer dispense equipment must therefore provide adequate information to enable service providers to make an informed assessment of the environmental conditions necessary to prevent deterioration when the equipment is installed. The designer and manufacturer of such items must therefore take into account the typical conditions for which the electrical equipment is likely to be exposed, namely damp conditions found in cellars.

15. There is also a duty placed on those installing such equipments (Service Providers) to ensure that where the equipment is to be used by persons at work to ensure, so far as is reasonably practicable, that nothing about the way in which it is installed makes it unsafe or a risk to health when properly used.

16. Clearly, there is a joint responsibility to ensure that the equipment is suitably installed in an environment which won't give rise to danger or injury.

Appendix A2

The Low Voltage Directive (2006/95/EC)

Purpose

1. The Low Voltage Directive 2006/95/EC is one a series of measures introduced under Article 100a of the Treaty of Rome. Article 100a directives all have the primary objective of creating a single European market in goods and services with the objective of providing producers and consumers with the benefits of economies of scale that this offers.

2. The effect of the Directive has been to introduce identical requirements for the design and certification safety of electrical products in every country within the European Economic Area (EEA).

Scope

3. The Directive applies to all apparatus operating on any AC supply between 50 and 1 000 volts or DC supply between 75 and 1 500 volts. Recent guidance from the European Commission has made it clear that the voltage limits referred to are the supply voltage or any voltage generated which appears at an output terminal, and not voltages generated within and confined internally to the equipment.

Enforcement and penalties

4. The Directive is implemented in the UK by the Low Voltage Electrical Equipment (Safety) Regulations 1994.

5. The Directive is enforced in the United Kingdom by the Trading Standards Service for equipment used in the home and the Health and Safety Executive for equipment used at work.

6. It is an offence to supply electrical equipment which does not comply with the requirements of the Regulations. Any person committing an offence is liable, under summary conviction, to imprisonment, a fine or both.

7. The manufacturer would also be required to recall or replace any non-compliant apparatus. The enforcing authorities have the power to suspend or prohibit sale of apparatus for which they have reasonable evidence that it does not comply.

Requirements

8. The requirements of the Directive can be divided into essential protection requirements and administrative requirements.

9. The essential protection requirements are contained in Annex I to the Directive. They require the equipment to be safe, it must bear the manufacturer's name and address and it must be supplied with any necessary instruction to allow it to be used safely.

10. However, the Principle Elements of the Safety Objectives for Electrical Equipment Designed for Use within Certain Voltage Limits (taken from the Directive) have been included below, since they form the basis on which electrical safety is to be managed within the beer dispense industry.

Principle elements of the safety objectives for electrical equipment designed for use within certain voltage limits

General Conditions

11 (a) The essential characteristics, the recognition and observance of which will ensure that electrical equipment will be used safely and in applications for which it was made, shall be marked on the equipment, or if this is not possible, on the accompanying notice.

(b) The brand name or the trade mark should be clearly printed on the electrical equipment or, where that is not possible, on the packaging.

(c) The electrical equipment, together with its component parts, should be made in such a way as to ensure that it can be safely and properly assembled and connected.

(d) The electrical equipment should be so designed and manufactured as to ensure that protection against electrocution hazards is assured, providing that the equipment is used in applications for which it was made and is adequately maintained.

Protection against hazards arising from the electrical equipment

12. Measures of a technical nature should be prescribed, in order to ensure that:

(a) persons and domestic animals are adequately protected against the danger of physical injury or other harm which might be caused by direct or indirect contact;

(b) temperatures, arcs or radiation which would cause a danger, are not produced;

(c) persons and domestic animals are adequately protected against non electrical dangers caused by the electrical equipment which are revealed by experience;

(d) the insulation must be suitable for foreseeable conditions.

Protection against hazards which may be caused by external influences on the electrical equipment.

13. Technical measures are to be laid down, to ensure that the electrical equipment:

(a) meets the expected mechanical requirements in such a way that persons, domestic animals and property are not endangered;

(b) shall be resistant to non-mechanical influences in expected environmental conditions, in such a way that persons, domestic animals and property are not endangered;

(c) shall not endanger persons, domestic animals and property in foreseeable conditions of overload.

14. The administrative requirements include the compilation of technical documentation. The manufacturer must produce a file of evidence which describes the product and how it is shown to comply with the Directive. This will typically include information on how to identify the equipment, a copy of the instructions, a wiring diagram, test reports and records of assessment to applicable standards.

15. The manufacturer must demonstrate control over production. The Directive requires that all units produced by the manufacturer comply with its requirements. The manufacturer will therefore need appropriate quality control procedures.

16. The manufacturer must also sign a Declaration of Conformity along with a document to identify the equipment and confirm the steps they have taken to comply with the Directive. This document is kept on file by the manufacturer.

EC declaration of conformity

17. The EC declaration of conformity must contain the following elements:

    a. name and address of the manufacturer or his authorised representative established within the Community

    b. a description of the electrical equipment

    c. reference to the harmonised standards

    d. where appropriate, references to the specifications with which conformity is declared

    e. identification of the signatory who has been empowered to enter into commitments on behalf of the manufacturer or his authorised representative established within the Community

    f. the last two digits of the year in which the CE marking was affixed.

18. Finally, the manufacturer will put a CE logo on the product. It must be put on the equipment, or on its packaging or instructions.

Standards

19. Because the essential protection requirements of the Directive are so generic, they don't provide the necessary detail to anyone actually designing or manufacturing electrical equipment. Therefore for those manufacturing such items reference will be made to relevant standards.

20. In terms of electrical safety the standard often quoted by manufacturers will be BS EN 60335-1:2002+A2:2006, which is titled Household and Similar Electrical Appliances – Safety - General Requirements. A number of Standards (or part of Standards) will be quoted by manufacturers for which their products will comply.

21. These Standards will be listed by manufacturers as part of their Internal Production Control. This is a specific requirement (Annex IV) of the Low Voltage Directive (2006/95/EC).

Independent product assessment

22. There is no requirement under the Directive for manufacturers to have their products examined and certified by a third party before they can be CE marked. Manufacturers within the beer dispense industry are encouraged to seek advice from the British Beer and Pub Association.

Appendix A3

Electricity at Work Regulations 1989

Regulation 4 - Systems, work activities and protective equipment

1. This regulation considers the work activities, systems of work and protective equipment.

   (a) *All systems shall at all times be of such construction as to prevent,* so *far as is reasonably practicable, danger.*

   (b) *As may be necessary to prevent danger, all systems shall be maintained* so *as to prevent,* so *far as is reasonably practicable, such danger.*

   (c) *Every work activity, including operation, use and maintenance of a system and work near a system, shall be carried out in such a manner as not to give rise,* so *far as is reasonably practicable, to danger.*

   (d) *Any equipment provided under these Regulations for the purpose of protecting persons at work on or near electrical equipment shall be suitable for the use for which it is provided, be maintained in a condition suitable for that use, and be properly used.*

2. Regulation 4 covers, in a general way, those aspects of electrical systems and equipment, and work on or near these, which are fundamental to electrical safety.

Construction

3. The word construction in the Regulation has a wide application. It may be considered to cover the physical condition and arrangement of the components of a system at any time during its life. It will include aspects such as the design of the system and the equipment comprising that system.

4. In assessing the suitability of the construction of electrical systems, consideration should be given to all likely or reasonably foreseeable conditions of actual application or use of the electrical equipment in the system. This will include the testing, commissioning, operation and maintenance of the equipment throughout the life of the system. In particular consideration should be given to:

   (a) the manufacturer's assigned or other certified rating of the equipment;

   (b) the likely load and fault conditions;

   (c) the need for suitable electrical protective devices;

   (d) the fault level at the point of supply and the ability of the equipment and the protective devices to handle likely fault conditions;

   (e) any contribution to the fault level from the connected loads such as from motors;

   (f) the environmental conditions which will have a bearing on the mechanical strength and protection required of the equipment;

   (g) the user's requirements of the installation;

   (h) the manner in which commissioning, testing and subsequent maintenance or other work may need to be carried out.

5 The safety of a system depends upon the proper selection of all the electrical equipment in the system and the proper consideration of the inter-relationship between the individual items of equipment. For example, electrical protection against overloads and earth faults etc may need to be provided in one part of a system to protect another, possibly remote part of the system.

6. Also, where electrical energy is transformed or converted from one voltage to another, precautions should be taken to prevent danger arising from the lower voltage conductors becoming charged above their normal voltage. See Separated Extra Low Voltage (SELV)

Maintenance

7. Regulation 4(2) is concerned with the need for maintenance to be done in order to ensure safety of the system rather than with the activity of doing the maintenance in a safe manner (which is required by regulation 4(3)).

8. The obligation to maintain arises only if danger would otherwise result. The quality and frequency of maintenance should be sufficient to prevent danger, so far as is reasonably practicable. See danger.

9. Regular inspection of equipment is an essential part of any preventive maintenance programme. Practical experience of use may indicate an adjustment to the frequency at which preventive maintenance needs to be carried out. This is a matter for the judgment of the duty holder who should seek all the information he needs to make this judgment including reference to the equipment manufacturers' guidance.

10. Records of maintenance, including test results, preferably kept throughout the working life of an electrical system will enable the condition of the equipment and the effectiveness of maintenance policies to be monitored. Without effective monitoring duty holders cannot be certain that the requirement for maintenance has been complied with.

11. British Standard Codes of Practice offering guidance on maintenance are referred to in Appendix 2 to the Electricity at Work Regulations. Advice on inspection and testing of some fixed installations is given in the IEE Wiring Regulations.

Undertaking Maintenance

12. Regulation 4(3) requires that work activities of any sort, whether directly or indirectly associated with an electrical system, should be carried out in a way which, as far as is reasonably practicable, does not give rise to danger. See Regulations 12 to 16.

Work activities associated with electrical systems

13. In the case of work of an electrical nature it is preferable that the conductors be made dead before work starts. (See regulations 12, 13 and 14.) In such cases it is essential that the equipment be isolated (note that 'isolation' is defined in regulation 12(2) which will include securing by locking off etc; see also paragraph 15 under this regulation) and the

conductors proved dead at the point of work before the work starts. Where a test instrument or voltage indicator is used for this purpose this device should itself be proved preferably immediately before and immediately after testing the conductors.

14. Proper safe systems of work incorporating safety isolation procedures are important for work upon equipment which is to be made dead before work starts. These are also discussed under regulations 12 and 13. Some work, such as fault finding may require electrical equipment to remain energised during the work. In these cases if there may be danger from live conductors, regulation 14 makes particular requirements and regulation 4(4) is also likely to be relevant in terms of the protective equipment which may need to be provided.

15. The operation, maintenance and testing of electrical systems and equipment should be carried out only by those persons who are competent for the particular class of work. (See also regulation 16.)

Safety of Protective Equipment

16. The term 'protective equipment' can be of wide application but typically includes those special tools, protective clothing and insulating screening materials etc necessary to undertake work safely on live electrical equipment.

17. The requirement for suitable precautions to prevent injury may arise under Regulation 14. The regulation makes three particular requirements of the protective equipment that it be:

    (a) suitable for use,

    (b) maintained in that condition and

    (c) properly used.

    Advice on safe working practices may be found in the Health and Safety Executives Guidance notes. These are listed at Appendix 1 to the Electricity at Work Regulations 1989.

    Specifications for certain types of protective equipment such as insulating gloves and floor mats are listed in Appendix 2 of the same Regulations.

Electricity at Work Regulations

Regulation 6 - Adverse or hazardous environments

1. This regulation considers if the equipment is to be placed in a hostile environment

   (a) Electrical equipment which may reasonably foreseeably be exposed to:

   (i) mechanical damage;

   (ii) the effects of the weather, natural hazards, temperature or pressure;

   (iii) the effects of wet, dirty, dusty or corrosive conditions; or

   (iv) any flammable or explosive substance, including dusts, vapours or gases,

   shall be of such construction or as necessary protected as to prevent, so *for as is reasonably practicable, danger arising from such exposure.*

2. The Regulation draws attention to the kinds of adverse conditions where danger could arise if equipment is not constructed and protected in order to withstand such exposure. The Regulation requires that electrical equipment should be suitable for the environment and conditions of use to which it may reasonably foreseeably be exposed in order that danger which may arise from such exposure will be prevented so far as is reasonably practicable.

3. The following paragraphs detail some of the conditions which electrical equipment may be subjected to. Guidance is given in these paragraphs and additional guidance may be found in the documents listed in Appendices 1 and 2 of the Electricity at Work Regulations 1989. Particular attention should be paid to the IP rating (Index of Protection) of equipment (see Index of Protection).

Effects

4. The conditions at which the Regulation is directed are those occurring naturally as well as those resulting from human activities, including the following:

   (a) mechanical damage including impact, stress, strain, abrasion, wear, vibration and hydraulic and pneumatic pressure

   (b) temperature and pressure

   (c) liquids which include water and other liquids and their effects, including humidity, condensation, flooding, splashing, or immersion in these, cleaning with liquids, hosing down and solvent and solvent vapour action (electrically conducting and non-conducting liquids may present different aspects of electrical danger)

   (d) dirty conditions which include all contamination as a result of liquids or solids (electrically conducting and non-conducting dusts may present different aspects of electrical danger)

   (e) corrosive conditions which include all chemical action and reactions and electro chemical effects

   (f) flammable substances including flammable dusts and flammable vapours; explosive

substances which include both any mixture of solids, liquids or gases which is capable of exploding;

5. In gauging the suitability of equipment for particular environments or conditions of use it is necessary to consider only those effects or exposures which are reasonably foreseeable.

Mechanical damage

6. The mechanical damage to which electrical equipment may be subjected varies considerably from one environment to another. For example, equipment designed for use in an office is unlikely to be suitable without further protection or careful siting in a cellar.

7. This regulation requires the mechanical protection, if necessary, of the insulation which is required under Regulation 7. Further suitable protection in addition to basic insulation may be necessary to form the physical protection necessary to ensure the continuing integrity of basic insulation, e.g. conduits or a trunking for single insulated conductors or the armouring or tough external sheathing of composite or multi core electric cable.

Weather, natural hazards and extreme conditions

8. Precautions which are taken to protect a site, structure or building from natural hazards and extreme weather conditions may give some protection to the associated electrical installation, but additional protection or precautions may be necessary.

9. Extremes of temperature, pressure or humidity may result either from climatic conditions or from adjacent equipment or from the use of the electrical equipment itself. Standards frequently quote the range of service conditions for electrical equipment, including temperature limits, and users should consider these when selecting equipment.

Corrosive effects

10. If substances are present in the environment which either alone, in combination, or in the presence of moisture can cause accelerated corrosion of metallic enclosures or fittings, special materials or surface treatments may be necessary. In these cases it would be recommended that much of the electrical equipment, e.g. motors, be of a type which is totally enclosed by an appropriate corrosion resistant housing, i.e. not ventilated to the atmosphere.

11. Insulating materials and other materials used in electrical equipment may be affected by chemical agents or solvents. Cubicles housing electrical control equipment in hostile environments may need to be kept purged or pressurised with clean air or, in special cases, inert gas. See Appendix *2* of the Electrical Regulations 1989.

Dirt and dusts

12. Most industrial enclosures for electrical equipment do not resist the entry of fine dusts. Equipment should be constructed so as to resist the entry of dust and dirt where this may

give rise to electrical and mechanical failures. Regular inspection and cleaning as necessary is recommended where dirt and dusts are likely to accumulate.

Combustible dusts

13. In cloud form, some dusts create an explosion hazard while layers of combustible dust on electrical equipment can give rise to fire hazards. The selection, construction or installation of the equipment so exposed to combustible dust should be such as to guard against the possibility of ignition. The maximum temperature attainable on the surface of any electrical equipment where these dusts may be deposited should be considered in the selection of the equipment. The temperature of such surfaces should always be below the temperature at which any charring or smoking of dust takes place. However, appropriate dust control measures and general cleanliness which minimise the problem at source are to be preferred.

Potentially explosive atmospheres

14. If electrical equipment is used where a flammable or explosive atmosphere is likely to occur the equipment shall be so constructed that it is not liable to ignite that atmosphere.

15. The selection and installation of equipment for use in potentially explosive atmospheres should be guided by the recommendations contained in the HSE guidance and British Standards on the subject (see Appendices 1 and 2 of the Electrical Regulations 1989). Existing installations complying with the recommendations of earlier standards should be acceptable for continuing service, subject to proper maintenance.

16. It is recommended that the choice of electrical equipment be from that which has been certified as being in conformity with an appropriate standard. Uncertified electrical equipment should not be used unless it will provide at least an equivalent level of safety to that provided by appropriately certified equipment.

Other flammable substances

17. Much electrical equipment generates heat or produces sparks and this equipment should not be placed where either the heat emitted or the occurrence of sparking is likely to lead to the uncontrolled ignition of any substance.

18. The construction of the equipment should either exclude the substances from any part of the equipment which may be a source of ignition (e.g. by suitable enclosure) or should ensure that the equipment operates at sufficiently low temperature and energy levels as not to be a source of ignition under likely conditions of use and fault.

Classification system of ingress protection (IP rating)

19. There is an internationally recognised system of classifying the degree of protection provided by enclosures against the ingress of solid objects and moisture, and the protection afforded against contact with any live parts within the enclosure for all types of

electrical equipment. The system is commonly known as the IP rating system (IP = Index of Protection). See IP rating system.

Ingress Protection Ratings

EN 60529 outlines an international classification system for the sealing effectiveness of enclosures of electrical equipment against the intrusion into the equipment of foreign bodies and moisture. This classification system utilizes the letters "IP" ("Ingress Protection") followed by two or three digits. (A third digit is sometimes used. An "x" is used for one of the digits if there is only one class of protection; i.e. IPX4 which addresses moisture resistance only.)

First number (Protection against solid objects)	Definition	Second number (Protection against liquids)	Definition
0	No protection	0	No protection
1	Protected against solids objects over 50mm (e.g. accidental touch by hands	1	Protected against vertically falling drops of water
2	Protected against solids objects over 12mm (e.g. fingers)	2	Protected against direct sprays up to 15^{o} from the vertical
3	Protected against solids objects over 2.5mm (e.g. tools and wires)	3	Protected against direct sprays up to 60^{o} from the vertical
4	Protected against solids objects over 1mm (e.g. tools, wires and small wires	4	Protected against sprays from all directions - limited ingress permitted
5	Protected against dust - limited ingress (no harmful deposit)	5	Protected against low pressure jets if water from all directions - limited ingress permitted
6	Totally protected against dust	6	Protected against strong jets of water e.g. for use on shipdecks - limited ingress permitted
		7	Protected against the effects of temporary immersion between 15cm and 1m. Duration of test 30 minutes
		8	Protected against long periods of immersion under pressure

Electricity at Work Regulations

Regulation 8 - Earthing or other suitable precautions

1. Precautions shall be taken, either by earthing or by other suitable means, to prevent danger arising when a conductor (other than a circuit conductor) which may reasonably foreseeably become charged as a result of either the use of a system, or a fault in a system, becomes so charged. For the purposes of ensuring compliance with this regulation, a conductor shall be regarded as earthed when it is connected to the general mass of earth by conductors of sufficient strength and current-carrying capability to discharge electrical energy to earth.

2. This Regulation applies to any conductor, other than a circuit conductor, which is liable to become charged either as a result of the use of a system or a fault in a system. The regulation requires that precautions be taken to prevent danger resulting from that conductor becoming charged.

3. Because the regulation applies to any conductor (other than circuit conductors), this may include the conductive parts of equipment, such as outer metallic casings, which can be touched, which although not live, may become live under fault conditions.

4. Conductors which, although not part of a system, are within electrostatic or electromagnetic fields created by a system may be subject to this regulation. Appropriate precautions are necessary if the induced voltages or currents are large enough to give rise to danger.

Danger

5. Dangers which may arise as a result of failure to take the necessary precautions include:

   (a) risk of shock from conductors which may be touched and which become charged at dangerous voltage relative to earth or to other exposed conductors

   (b) risk of burns, fire, arcing or explosion due to currents of excessive magnitude and/or duration in such conductors

6. The requirements of the regulation may be responded to in several different ways, depending on the circumstances, including, ensuring that:

   (a) such conductors do not become charged. This has the effect of excluding the conductors from the scope of this regulation

   (b) if such conductors do become charged the values of voltage and current and the duration are such that danger will not arise

   (c) if such conductors do become charged the environment is such that danger will not arise.

7. Techniques employed for achieving the above include:

   (a) double insulation

   (b) earthing

(c) connection to a common voltage reference point on the system;

(d) equipotential bonding

(e) use of safe voltages

(f) earth-free non-conducting environments

(g) current/energy limitation, and

(h) separated or isolated systems.

The above techniques may be employed singly or in combination.

Double insulation

8. The principle of 'double insulation' is that the live conductors of the electrical equipment are covered by two discrete layers or components of insulation, each of which would adequately insulate the conductor, but which together ensure an improbability of danger arising from insulation failure. This arrangement avoids the need for any external metalwork of the equipment to be connected to a protective conductor or to earth. Double insulation has been found to be particularly suitable for certain types of portable equipment, e.g. electric motor driven tools etc, and the need for an earthing protective conductor is eliminated. See Appendix 2 to the Electrical Regulations 1989 for relevant standards.

9. However, the integrity of this protective provision for safety depends upon the layers of insulation remaining in sound condition and this in turn requires that the equipment be properly constructed, used and maintained.

Earthing

10. It is the practice in the UK for the public electricity supply system at the usual distribution pressures of 230 volts single phase, 400 volts three phase, to be referenced to earth by a deliberate electrical connection made at the distribution substations or power transformers. It is the existence of this system earthing which enables earth faults on electrical equipment to be detected and the electrical supply to faulty equipment to be cut off automatically.

11. Many 240/400 volt power installations are so designed that the automatic interruption of the supply upon the occurrence of an earth fault is performed by fuses or automatic circuit breakers (MCBs etc). In most cases these devices will have been selected to provide the additional protective function of interrupting excess current required under Regulation 11. In these circumstances it is essential that the earth fault current be large enough to rupture the fuse quickly.

12. The magnitude of the fault current under full earth fault conditions is governed mainly by the combined impedance of the fault loop which will include the impedance of the fault itself, that of the earthing or protective conductors, the circuit conductors and that of the source. Tests should therefore be carried out on new installations and at appropriate intervals thereafter to ascertain that the earth fault (loop) impedances are low enough to

ensure that the electrical protective devices such as fuses, circuit breakers etc will operate in the event of a breakdown of insulation leading to an earth fault.

13. Acceptable parameters of earth loop impedance and interruption times etc for final installations up to 1000 volts may be found in the IEE Wiring Regulations (See Appendix 2 in the Electrical Regulations 1989). It is rarely sufficient to rely upon an earth rod or rods to provide sufficient conductance for return fault currents. Separate protective earth cables or conductors connected to the neutral point of the supply are usually necessary unless other measures such as the use of sensitive residual current protection equipment is used to detect earth fault currents.

14. For the duration of the fault, the electrical bonding of exposed conductive parts and their connection to earth serves to limit the shock risk from the transient voltages appearing between metallic enclosures of equipment in the system or between a metallic enclosure and earth. Equipment earthing therefore includes the bonding of metallic enclosures, cable armouring, conduits and trunking etc, so that these conductors are electrically continuous and securely connected to the general mass of earth at one or more points.

15. Earthing and bonding conductors must be suitable for the maximum current which they may carry under fault conditions and be capable of surviving the worst case fault. Their construction and strength must be adequate to withstand likely wear and tear. Where it might otherwise be difficult to ensure the continued effectiveness of earthing and bonding arrangements it may be necessary to provide supplementary protection such as protective earth conductor monitoring.

Residual Current Devices

16. Many accidents have been caused by the metalwork of portable or transportable equipment becoming live as a result of the combined effects of a fault and high impedance protective conductor connections. The danger may be reduced by the use of a residual current device (RCD) designed to operate rapidly at small leakage currents (typically not exceeding 30 MA) although these devices do not eliminate the risk of electric shock. RCD's should be considered only as providing a second line of defence. They should be operated regularly using the test trip button. This test trip procedure is important in maintaining the effectiveness of most types of RCD.

Connection to a Common Voltage Reference Point

17. In the case of UK public electricity supply systems where transformer neutral points are connected to earth, the voltage reference point is the general mass of earth. Other reference points, to which systems may be referenced and to which bonding conductors are connected, may be chosen to suit particular circumstances.

Equipotential bonding

18. Equipotential bonding is the electrical interconnection of all exposed and extraneous conductors, which may become electrically charged, in such a way that dangerous voltages between any of the conductors which may be simultaneously touched are limited.

Use of safe voltages

19. Reduced voltage systems are particularly appropriate for portable and transportable equipment, in highly conducting locations such as boilers and tunnels where the risk of mechanical damage to equipment and trailing cables is high, where the body may be damp and have large areas of contact with the conducting location and on construction sites.

20. One example is that of building or construction site supply systems operating at 55-0-55V ac single phase, or at l l0V three phase with a phase earth voltage of 64V ac Another example is that of an extra low voltages system operating at or below 50V ac or 120V dc as recommended internationally. Supply systems like these are referenced to earth and are therefore a special case of systems operating at reduced voltage for which bonding and earthing of all metallic enclosures are still recommended.

21. Separated Extra Low Voltage Systems are employed throughout the beer dispense industry.

Earth-free, non-conducting environments

22. If a system is supplied from a source which is earth-referenced, the path for fault current and the existence of dangerous potentials to earth can be eliminated in a defined area by ensuring that the area is 'earth-free'. This does not necessarily mean that metallic components or fittings need to be prohibited but rather that no part of the defined area is earthed. It is easier to ensure the integrity of an 'earth-free' area by constructing it from non-metallic components in which case it is more appropriately known as a non-conducting location or area. 'Earth-free' and 'non-conducting' areas are of rather specialised application and are used mainly in certain types of testing of electrical equipment.

Current limitation

23. If fault currents which cause electric shock are inherently limited by appropriate passive devices, e.g. high integrity resistors, then protection by earthing or other means may not be required. In the conventional dry, working environment, for example, if the current is limited preferably to one milli-ampere but certainly to no more than 5 mA (milliamperes) this will not usually present a risk of injury from electric shock to persons in good health who may be subjected to it only occasionally and for a short time only. However, even this low level of current may give perceptible shock which although by itself is unlikely to be physiologically dangerous, may give rise to a consequential injury such as from a fall induced by the shock.

Separated or isolated systems

24. If safety depends on the supply system not being referenced to its immediate environment, whether true earth or surrounding metalwork, no potential should normally exist between live conductors and earth or exposed metallic parts. However, all systems are to some

extent referenced to their environment by capacitive or inductive coupling or by leakage. For this reason, reliance cannot necessarily be placed on the circuit conductors of separated or isolated systems being at zero potential relative to their environment. Unless the isolated system is a very small and localised one, the leakage current may be large enough to provide a path for a fatal electric shock. Any difference in potential is likely to be greatest on extensive systems but, in all cases when the voltages or currents could be dangerous, precautions are needed. Examples of isolated systems are those supplied from the secondary winding of an isolating transformer or the winding of an alternator where there is no connection between them and any other source of electrical energy.

25. The isolation of a power system from earth may reduce the risks associated with a single fault. However, if this first fault has the effect of referencing the system to earth or other exposed conductor, subsequent faults may lead to very destructive and hazardous short circuits so extra precautions will be necessary to prevent this danger. These may include the bonding of metallic enclosures; earth fault detection; insulation monitoring or the use of an earth-free non-conducting environment. Regular inspection and testing to ensure that system isolation integrity is maintained will also be necessary.

Electricity at Work Regulations

Regulation 14 - Work on or near live conductors

1. No person shall be engaged in any work activity on or so near any live conductor (other than one suitably covered with insulating material so as to prevent danger) that danger may arise unless:

   (a) it is unreasonable in all the circumstances for it to be dead, and

   (b) it is reasonable in all the circumstances for him to be at work on or near it while it is live, and

   (c) suitable precautions (including where necessary the provision of suitable protective equipment) are taken to prevent injury.

2. The Regulation is concerned only with those situations where persons are at work on or near live electrical conductors which may foreseeably give rise to danger. Such work is permitted only if conditions (a) and (b) and (c) are satisfied. 'Work' is not confined to electrical work but includes any work activity.

The need for the conductor to be live

3. If danger may otherwise arise it is always preferable from the point of view of safety that work on or near such electrical equipment should be carried out when that equipment is dead.

4. Regulation 14 recognises that there are circumstances, however, in which it is unreasonable, having regard to all relevant factors, for the equipment to be dead whilst work proceeds. An example of this might be where it was found necessary to undertake some testing. The operation of some components may need to be connected to check their operation. However, other methods should be undertaken whenever possible. In addition, it may be possible to undertake some testing with specially adapted test cables or rigs, thus significantly reducing the likelihood of contact with live parts.

5. All stakeholders (Service Providers, Breweries and Pub Chains) should bear in mind at the time of ordering, purchase and installation of plant, the manner of operation, maintenance and repair of the electrical equipment which will be necessary during the life of the plant.

6. It is recommended that the design of electrical equipment and of the installation should eliminate the need for live work which puts persons at risk of injury. This can often be done by careful thought at the design stage of installations, for example by the provision of alternative power in feeds, properly laid out distribution systems to allow parts to be isolated for work to proceed and by designing equipment housings etc to give segregation of parts to be worked on and protect persons from other parts which may be live.

7. It is recommended that equipment which combines power and control circuitry should be arranged so that the power circuits are physically separate and segregated from logic and control circuits or so placed, recessed or otherwise arranged that the risk of accidental contact is eliminated. Diagnostic work on the low power voltage circuits may then proceed with less risk to personnel. Where regular measurements of voltage, current etc are to be

made, consideration should be given to appropriate test and measuring equipment, e.g. voltmeters, ammeters, etc or test points being built into the equipment.

8. The factors which would be considered in deciding whether it was justifiable for work to proceed with the conductors live would include the following:

   a. when it is not practicable to carry out the work with the conductors dead, e.g. where for the purposes of testing it is necessary for the conductors to be live;

   b. the creation of other hazards, by making the conductors dead, such as to other users of the system, or for continuously operating process plants etc;

   c. the need to comply with other statutory requirements;

   d. the level of risk involved in working live and the effectiveness of the precautions available set against economic need to perform that work.

The need to be near uninsulated live conductors

9. Persons at work are permitted to be near live conductors only if this is reasonable in all the circumstances. If, for example, it would be reasonable for the work to be carried out at a safe distance away from the conductors then it would be prohibited for that work to be done close to the conductors.

10. Persons whose presence near the live conductors is not necessary should not be so near the conductors that they are at risk of injury.

The need to take precautions to prevent injury

11. The precautions necessary to comply with this Regulation need to be commensurate with the risk. The Safe System of Work should:

   a. allow only persons who are competent to do so work on or near exposed, live conductors (See Regulation 16)

   b. indicate within what limits the work is to be attempted

   c. indicate what levels of competence apply to each category of such work; and incorporate procedures under which the person attempting the work will report back if the limits specified in the system are likely to be exceeded.

   These requirements should all be built into the Stakeholders health and safety arrangements.

12. Suitable precautions should include as appropriate:

   a. the use of people who are properly trained and competent to work on live equipment safely (See Regulation 16)

   b the provision of adequate information to the person carrying out the work about the live conductors involved, the associated electrical system and the foreseeable risks

   c the use of suitable tools, including insulated tools, equipment and any protective

clothing

d. the use of suitable insulated barriers or screens

e. the use of suitable instruments and test probes

f. accompaniment by another person or persons if the presence of such person or persons could contribute significantly to ensuring that injury is prevented

g. the restriction of routine live test work (for example product testing) to specific areas and the use of special precautions within those areas such as isolated power supplies, non-conducting locations etc

h. effective control of any area where there is danger from live conductors.

Accompaniment

13. A duty holder's judgement as to whether a person carrying out work subject to Regulation 14 should be based on considerations of how injury is to be prevented. If an accompanying person can substantially contribute towards the implementation of safe working practice, then he should be present. He should be trained to recognise danger and, if necessary, to render assistance in the event of an emergency.

14. Some examples of electrical work where it is likely that the person carrying out the work should be accompanied are:

a. electrical work involving manipulation of live, uninsulated, power conductors at say, 230 volts using insulated tools, and

b. other work on or near bare live conductors where a person working on their own would not be capable of undertaking the work safely without assistance in, for example, keeping other persons from the work area.

Control of the area

15. Effective control of an area where there is danger from live conductors means ensuring that those who are not competent to prevent the occurrence of injury and those whose presence is unnecessary are not permitted into the area. If the person undertaking the work is continuously present while danger exists from the live conductors, and the area is small enough to be under his constant supervision and control, then further precautions to control access may not be necessary. If, however, the area is too large for the person to exercise effective surveillance, or he is not continuously present, then effective control will need to be secured by other means such as the provision of lockable enclosures or barriers, and warning notices indicating the presence of live conductors.

(The above examples are given without prejudice to the requirements of regulation 14, the criteria of which must be followed in each case before live work is undertaken.)

Testing

16. Regulation 14 will often apply to electrical testing. Testing to establish whether electrical conductors are live or dead should always be done on the assumption that they may be live

and therefore it should be assumed that this Regulation is applicable until such time as the conductors have been proved dead.

17. When testing for confirmation of a “dead” circuit, the test instrument or voltage indicator used for this purpose should itself be proved, preferably immediately before and immediately after testing the conductors.

18. Although live testing may be justifiable it does not follow that there will necessarily be justification for subsequent repair work to be carried out live.

Protective equipment

19. Examples of protection of a person from the effects of electricity are suitable clothing including insulating helmets, goggles and gloves, insulating materials used as fixed or temporary screening to prevent electric shock and to prevent short circuit between live conductors or between live conductors and earth, insulating mats and stands to prevent electric shock current via the feet and insulated tools and insulated test probes.

20. There should be procedures for the periodic examination and where necessary testing of this protective equipment and replacement as necessary.

Emergency resuscitation and first aid

21. It may be helpful to place notices or placards giving details of emergency resuscitation procedures in the event of electric shock at those locations where persons may be at greater risk of electric shock than most. Such places might include electrical test areas, sub-stations and laboratories but for resuscitation techniques to be effective, those required to exercise them must receive proper training and regular practice.

22. Service providers undertaking work in licensed premises may not have access to first aid provision or second man working. This needs to be considered when developing appropriate safe systems of work.

23. The Health and Safety (First Aid) Regulations 1981 make various requirements for the provision of suitably trained first aiders at places of work.

Electricity at Work Regulations

Regulation 15 - Working space, access and lighting

1. For the purposes of preventing injury, adequate working space, adequate means of access, and adequate lighting shall be provided at all electrical equipment on which or near which work is being carried out in circumstances which may give rise to danger.

2. The purpose of the regulation is to ensure that sufficient space, access and adequate illumination are provided while persons are working on, at or near electrical equipment in order that they may work safely. The requirement is not restricted to those circumstances where live conductors are exposed but applies where any work is being done in circumstances which may give rise to danger. The regulation makes no requirement for such space, access or illumination to be provided at times other than when work is being carried out.

Working space

3. Where there are dangerous exposed live conductors within reach the working space dimensions should be adequate:

   a. to allow persons to pull back away from the conductors without hazard, and

   b. if persons need to pass one another, to do so with ease and without hazard.

Lighting

4. Natural light is preferable to artificial light but where artificial light is necessary it is preferable that this is from a permanent and properly designed installation. However, there will always be exceptions and special circumstances where these principles cannot be achieved where hand lamps or torches etc will be the sole or most important means of lighting. Whatever level of lighting is used it must be adequate to enable injury to be prevented.

Electricity at Work Regulations

Regulation 16 - Persons to be competent to prevent danger and injury

1. No person shall be engaged in any work activity where technical knowledge or experience is necessary to prevent danger or, where appropriate, injury, unless he possesses such knowledge or experience, or is under such degree of supervision as may be appropriate having regard to the nature of the work.

2. The object of the regulation is to ensure that persons are not placed at risk due to a lack of skills on the part of themselves or others in dealing with electrical equipment.

3. This regulation uses both of the terms, 'injury' and 'danger'. The regulation therefore applies to the whole range of work associated with electrical equipment where danger may arise and whether or not danger (or the risk of injury) is actually present during the work.

4. It will include situations where the elimination of the risk of injury, i.e. the prevention of danger, for the duration of the work is under the control of a person who must therefore possess sufficient technical knowledge or experience, or be so supervised, etc to be capable of ensuring that danger is prevented. This would be achieved through adequate isolation.

5. The Regulation also covers those circumstances where danger is present, i.e. where there is a risk of injury, as for example where work is being done on live or charged equipment using special techniques and under the terms of Regulation 14. In these circumstances persons must possess sufficient technical knowledge or experience or be so supervised etc, to be capable of ensuring that injury is prevented.

Technical knowledge or experience

6. The scope of "technical knowledge or experience" may include:
    a. adequate knowledge of electricity
    b. adequate experience of electrical work
    c. adequate understanding of the system to be worked on and practical experience of that class of system
    d. understanding of the hazards which may arise during the work and the precautions which need to be taken
    e. ability to recognise at all times whether it is safe for work to continue.

Allocation of responsibilities

7. All those personnel in the beer dispense industry that may come into contact with electricity must be trained and instructed to ensure that they understand the safety procedures which are relevant to their work and should work in accordance with any instructions or rules directed at ensuring safety which have been laid down by their employer.

Supervision

8. The Regulation recognises that in many circumstances persons will require to be supervised to some degree where their technical knowledge or experience is not of itself sufficient to ensure that they can otherwise undertake the work safely. The responsibilities of those undertaking the supervision should be clearly stated to them by those duty holders who allocate the responsibilities for supervision and consideration should be given to stating these responsibilities in writing.

9. Where the risks involved are low, verbal instructions are likely to be adequate but as the risk or complexity increase there comes a point where the need for written procedures becomes important in order that instructions may be understood and supervised more rigorously.

10. In this context, supervision does not necessarily require continual attendance at the work site, but the degree of supervision and the manner in which it is exercised is for the duty holders to arrange to ensure that danger, or as the case may be, injury, is prevented.

Appendix A4

Provision and Use of Work Equipment 1998

Regulation 4 - Suitability of Work Equipment

1. *(a) Every employer shall ensure that work equipment is so constructed or adapted as to be suitable for the purpose for which it is used or provided.*

   (b) In selecting work equipment, every employer shall have regard to the working conditions and to the risks to the health and safety of persons which exist in the premises or undertaking in which that work equipment is to be used and any additional risk posed by the use of that work equipment.

How risk assessment and the Management Regulations link with the Provision and Use of Work Equipment Regulations

2. This regulation deals with the safety of work equipment from three aspects:

   (a) its initial integrity

   (b) the place where it will be used, and

   (c) the purpose for which it will be used.

3. The selection of suitable work equipment for particular tasks and processes makes it possible to reduce or eliminate many risks to the health and safety of people at the workplace. This applies both to the normal use of the equipment as well as to other operations such as maintenance.

4. The risk assessment carried out under regulation 3(1) of the Management Regulations will help to select work equipment and assess its suitability for particular tasks. Most Dutyholders will be capable of making the risk assessment themselves using expertise within their own organisations to identify the measures which need to be taken regarding their work equipment.

5. In a few cases, for example where there are complex hazards or equipment, it may need to be carried out in conjunction with the help of external health and safety advisers, appointed under Regulation 7 of the Management of Health and Safety at Work Regulations.

6. For many items of work equipment used within the Beer Dispense Industry there is sufficient knowledge and experience to determine what measures need to be taken to comply with previous legal requirements. Generally, these measures will ensure compliance with the Provision and Use of Equipment Regulations. Where this is not the case, there is usually a straightforward method of identifying the measures that need to be taken, through consultation with the Technical Committee of British Beer and Pubs Association. However, the user will need to decide whether these are appropriate.

7. Where guidance does not exist, or is not appropriate, the main factors that need to be taken into account are the severity of any likely injury or ill health likely to result from any hazard present, the likelihood of that happening and the numbers of people exposed. This

will then identify the measures that need to be taken to eliminate or reduce the risk to an acceptable level.

8. Further guidance on risk assessment is to be found in the Management of Health and Safety at Work Regulations Approved Code of Practice. This is freely available for downloading from the Health and Safety Executives (HSE) Website.

Regulation 4(1)

9. Regulation 4(1) states that equipment must be suitable, by design, construction or adaptation, for the actual work it is provided to do. This means in practice that when work equipment is selected there is a specific requirement to ensure that it is suitable for the work to be undertaken. It is also important to ensure that it is used in accordance with the manufacturer's specifications and instructions. If work equipment is adapted it must still be suitable for its intended purpose.

Regulation 4(2)

10. This regulation requires an assessment of the location in which the work equipment is to be used and to take account of any risks that may arise from the particular circumstances. Such factors can invalidate the use of work equipment in a particular place. For example, electrically powered equipment is not suitable for use in wet or flammable atmospheres unless it is designed for this purpose. In such circumstances suitably protected electrical equipment or alternative pneumatically or hydraulically powered equipment should be used.

11. Work equipment should be installed, located and used in such a way as to reduce risks to users of such equipment and for other workers, such as ensuring that there is sufficient space between the moving parts of work equipment and fixed or moving parts in its environment.

12. It is also important to consider the fact that work equipment itself can sometimes cause risks to health and safety in particular locations which would otherwise be safe. For example the insulation on electrical equipment can deteriorate in damp and humid atmospheres unless been suitably designed for such environments.

Regulation 4(3)

13. This requirement concerns each particular process for which the work equipment is to be used and the conditions under which it will be used. Dutyholders must ensure that the equipment is suitable for the process and conditions of use.

14. Equipment must be suitable, by design, construction or adaptation, for the actual work it is provided to do. This means in practice that Dutyholders should ensure that it is suitable for the work to be undertaken and that it is used in accordance with the manufacturer's specifications and instructions. If work equipment is adapted it must still be suitable for its intended purpose.

Application

15. In the Beer Dispense Industry it will be the various stakeholders (Service Providers, Breweries and Pub Chains) that will be responsible for ensuring compliance with this Regulation. It is well known that the environments in which this work equipment may be located vary significantly. It is therefore the Beer Dispense Industry's policy that those responsible for supplying such equipment comply with the requirements of this Regulation.

16. The installers of the equipment must have the necessary competence to undertake a suitable assessment of the location and the possible impact on the work equipment being installed. As previously stated the location should be considered when determining a suitable maintenance programme.

Provision and Use of Work Equipment

Regulation 6 - Inspection

1. *(a) Every employer shall ensure that, where the safety of work equipment depends on the installation conditions, it is inspected:*

(i) after installation and before being put into service for the first time, or

(ii) after assembly at a new site or in a new location, to ensure that it has been installed correctly and is safe to operate.

(b) Every employer shall ensure that work equipment exposed to conditions causing deterioration which is liable to result in dangerous situations is inspected:

(i) at suitable intervals, and

(ii) each time that exceptional circumstances which are liable to jeopardise the safety of the work equipment have occurred, to ensure that health and safety conditions are maintained and that any deterioration can be detected and remedied in good time.

Inspection

2. The requirement for the inspection of work equipment builds on the current but often informal practice of regular in-house inspection of work equipment, some of which is already recommended in other HSE guidance. In terms of electrical equipment see the Code of Practice for In-service Inspection and Testing of Electrical Equipment.

3. Inspection does not normally include the checks that are a part of the maintenance activity although certain aspects may well be common. Nor, for the purposes of this regulation, does inspection include a pre-use check that an operator may make before using the work equipment. Additionally, while inspections need to be recorded, such checks do not.

Identifying what needs to be inspected

4. Where the risk assessment under regulation 3 of the Management of Health and Safety at Work Regulations 1999 has identified a significant risk to the operator or other workers from the installation or use of the work equipment, a suitable inspection should be carried out.

Significant risk

5. A significant risk is one which could foreseeably result in a major injury or worse. Inspection is only necessary where there is a significant risk resulting from:

(a) incorrect installation or re-installation

(b) deterioration, or

(c) as a result of exceptional circumstances which could affect the safe operation of the work equipment.

The types of major injury are listed in Schedule 1 of the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995.

Purpose of an inspection

6. The purpose of an inspection is to identify whether the equipment can be operated, adjusted and maintained safely and that any deterioration (for example defect, damage, wear) can be detected and remedied before it results in unacceptable risks.

What should be included in the inspection?

7. The extent of the inspection required will depend on the potential risks from the work equipment. Inspection should include, where appropriate, visual checks, functional checks and testing. The extent of the inspection that is needed will depend upon:

   (a) the type of equipment

   (b) where it is used, and

   (c) how it is used.

8. An inspection will vary from a simple visual external inspection to a detailed comprehensive inspection, which may include some dismantling and/or testing. An inspection should always include those safety-related parts which are necessary for safe operation of equipment, for example overload warning devices and limit switches.

Testing

9. As part of an inspection, a functional or other test may be necessary to check that the safety-related parts, for example interlocks, protection devices, controls etc are working as they should be and that the work equipment and relevant parts are structurally sound, for example non-destructive testing of safety-critical parts. The need for any testing (for example non-destructive testing of safety-critical parts) should be decided by the competent person who determines the nature of the inspection.

Competent persons

10. Stakeholders (Service Providers, Breweries and Pub Chains) should ensure that persons who determine the nature of the inspections required and who carry out inspections are competent to do so. The competent person should have the necessary knowledge and experience.

11. In 'Determining the nature of the inspection' – the knowledge and experience required by a person to determine the nature of the inspection needs to be sufficient for them to be able to decide what the inspection should include, how it should be done and when it should be carried out. Experienced, in-house employees such as those holding technical qualifications may be able to do this.

12. They should know what will need to be inspected to detect damage or faults resulting from deterioration. They should also be able to determine whether any tests are needed during the inspection to see if the equipment is working safely and is structurally sound. Where doubt exists advice should be sought from the manufacturers.

13. The person who actually carries out the inspection may not necessarily be the same person who determines the nature of the inspections. The actual inspection will normally be done by an in-house employee with an adequate knowledge of the equipment to:

    (a) enable them to know what to look at (know the key components)

    (b) know what to look for (fault-finding), and

    (c) know what to do (reporting faults, making a record, who to report to).

14. Stakeholders (Service Providers, Breweries and Pub Chains) must ensure that their employees are given appropriate information, instruction and training so they can carry out the inspection properly and to avoid danger to themselves and others.

15. The necessary level of competence will vary according to the type of equipment and where and how it is used. Stakeholders (Service Providers, Breweries and Pub Chains) having adopted a suitable scheme of inspection for the equipment must therefore ensure that those employed to undertake the work have the necessary competence. This may be identified through task and training needs analysis.

16. This may result in a structured approach to the inspection of equipment. The beer dispense equipment is varied within the industry and therefore the complexities of the equipment will also vary along with the skill sets of those employed to undertake such inspections. Therefore it is extremely important to ensure that service engineers are not expected to undertake work which falls outside of their skill set. The complexity of the inspection must be suitably matched to the skill set of the engineer.

Regulation 6(1) Installation

17. Where work equipment is of a type where the safe operation is critically dependent on it being properly installed (or re-installed), and where failure to carry this out would lead to a significant risk to the operator, or other worker, a suitable inspection is to be carried out before the equipment is put into service. This is particularly important for the installation of equipment in premises that will need to be connected to the fixed electrical installation via a socket and plug arrangement.

18. Stakeholders must ensure that the fixed electrical installation is compliant with the IEE Wiring Regulations and in particular that there is a current Electrical Installation Certificate (premises less than five years old) or a Periodic Inspection Report. Periodic Inspection Reports should be no older than five years.

19. Beer dispense equipment should not be installed where the fixed installation has not been suitably inspected or does not comply with the IEE Wiring Regulations. This may put the installation technician and other workers at risk. See Installation.

Regulation 6(2) 'Conditions causing deterioration' and 'Dangerous situations'

20. Where work equipment is of a type where the safe operation is critically dependent on its condition in use and deterioration would lead to a significant risk to the operator or other worker, suitable inspections must be undertaken. All stakeholders (Manufacturers, Service Providers, Breweries and Pub Chains) remain responsible for identifying areas where significant risk could result.

21. If failure or fault of the equipment cannot lead to significant risk or if safety is guaranteed through appropriate maintenance regimes to comply with Regulation 5, inspection may not be necessary.

22. The frequency of any inspections should be based on how quickly the work equipment or parts of it are likely to deteriorate and therefore give rise to a significant risk. This should take into account the type of equipment, how it is used and the conditions to which it is exposed.

23. The inspection frequency may be different for the same type of equipment because the rate of deterioration can vary in different situations. Where equipment is located in a harsh environment (for example, some particular damp and humid cellars), it is likely to need more frequent inspection than if located in a reasonably dry location.

24. To ensure that appropriate inspection intervals and procedures are in place, they should be reviewed in the light of experience. Intervals between inspections can be lengthened if an inspection history has shown that deterioration is negligible or the interval between inspections should be shortened if substantial amounts of deterioration are detected at each inspection.

25. It is therefore industry practice for service engineers to record the basic condition of electrical equipment and in particular the results of basic test such as earth continuity and insulation. This will allow service providers to build the necessary data on which suitable inspection regimes can be developed.

Regulation 6(2) Exceptional circumstances

26. Regulation 6(2) states that an inspection is necessary 'each time that exceptional circumstances which are liable to jeopardise the safety of the work equipment have occurred.'

Exceptional circumstances which may result in the need for inspection include:

(a) major modifications, refurbishment or major repair work

(b) known or suspected serious damage

(c) substantial change in the nature of use, for example from an extended period of inactivity.

Regulation 6 (3) Records

27. Every employer shall ensure that the result of an inspection made under this regulation is recorded and kept until the next inspection under this Regulation is recorded.

28. Records do not have to be kept in a particular form. They can be handwritten or stored electronically – from a pre-printed form to an entry in a diary. There are no legal requirements stating what they contain. However, a record should normally include:

    (a) information on the type and model of equipment

    (b) any identification mark or number that it has

    (c) its normal location

    (d) the date that the inspection was carried out

    (e) who carried out the inspection

    (f) any faults, and/or

    (g) any action taken

    (h) to whom the faults have been reported

    (i) the date when repairs or other necessary action were carried out.

Provision and Use of Work Equipment Regulations

Regulation 8 Information and instructions

1. (a) *Every employer shall ensure that all persons who use work equipment have available to them adequate health and safety information and, where appropriate, written instructions pertaining to the use of the work equipment.*

(b) Every employer shall ensure that any of his employees who supervises or manages the use of work equipment has available to him adequate health and safety information and, where appropriate, written instructions pertaining to the use of the work equipment.

(c) Without prejudice to the generality of paragraphs (1) or (2), the information and instructions required by either of those paragraphs shall include information and, where appropriate, written instructions on –

(i) the conditions in which and the methods by which the work equipment may be used

(ii) foreseeable abnormal situations and the action to be taken if such a situation were to occur, and

(iii) any conclusions to be drawn from experience in using the work equipment.

(d) Information and instructions required by this regulation shall be readily comprehensible to those concerned.

How Regulation 8 links with other health and safety law

2. This Regulation builds on the general duty in the Health and Safety at Work etc Act 1974 to provide employees with the information and instructions that are necessary to ensure, so far as is reasonably practicable, their health and safety. It also links with the general requirement in the Management of Health and Safety at Work Regulations to provide information to employees relating to their health and safety.

3. The Health and Safety (Consultation with Employees) Regulations 1996 (HSCER) require employers to consult their employees on the information required under other regulations, including the Provision and Use of Work Equipment Regulations, about risks to their health and safety and preventative measures in place.

What does Regulation 8 require?

4. Regulation 8 places a duty on employers to make available all relevant health and safety information and, where appropriate, written instructions on the use of work equipment to their workforce. Workers should have easy access to such information and instructions and be able to understand them.

Written instructions

5. Regulation 8 refers to written instructions which can include the information provided by manufacturers or suppliers of work equipment such as instruction sheets or manuals, instruction placards, warning labels and training manuals. It can also include in-house instructions and instructions from training courses. There are duties on manufacturers and suppliers to provide sufficient information, including drawings, to enable the correct installation, safe operation and maintenance of the work equipment. In terms of the Beer Dispense Industry this responsibility normally falls to the Supplier.

Consultation with employees

6. Under the Consultation with Employees Regulations, employers must consult their employees about these matters before decisions and changes are made. There are also requirements for consultation within the Safety Representatives and Safety Committees Regulations 1977 which provide for the appointment of safety representatives by recognised trade unions. The Health and Safety (Consultation with Employees) Regulations 1996 apply to employees that are not covered by the 1977 Regulations. The 1996 Regulations require employers to consult their employees on matters which link with the requirements of the Provision and Use of Work Equipment Regulations and particularly its requirements for information and instruction. This includes:

   (a) any measures which may affect their health and safety

   (b) information they must have about risks to health and safety and preventive measures

   (c) any arrangements for getting a competent person to help comply with health and safety requirements

   (d) planning and organising of any health and safety training, and

   (e) the health and safety consequences of any new equipment or technology.

7. These requirements for consultation link with several of the provision and Use of Work Equipment Regulations requirements, for example information, instruction and training on new work equipment.

Application

8. This Regulation applies to all stakeholders (Service Providers, Breweries and Pub Chains) to ensure that any written instructions (Safe Systems of Work) are available to the people directly using the work equipment. This will also include maintenance instructions for people involved in maintaining the work equipment.

9. In the Beer Dispense Industry this responsibility will fall to the supervisors and managers who will need to ensure that the written instructions (based on the risk assessment process) remain suitable and sufficient. Some Service Providers and Breweries provide their maintenance employees with electronic information. Pub Chains and Tenants may provide the information in hard copy.

10. However, information can be made available verbally where it is considered sufficient. It is the responsibility of the stakeholder to decide what is appropriate, taking into consideration the individual circumstances. Where there are complicated or unusual circumstances, the information should be in writing. Other factors need to be taken into consideration, such as the degree of skill of the workers involved, their experience and training, the degree of supervision and the complexity and length of the particular job.

11. The information and written instructions should be easy to understand. They should be in clear English and/or other languages if appropriate for the people using them. They should be set out in logical order with illustrations where appropriate. Standard symbols should be used where appropriate.

12. Special consideration should be given to any employees with language difficulties or with disabilities which could make it difficult for them to receive or understand the information or instructions.

13. The information provided should cover the following:

    (a) all health and safety aspects arising from the use of the work equipment

    (b) any limitations on these uses

    (c) any foreseeable difficulties that could arise;

    (d) the methods to deal with them, and

    (e) using any conclusions drawn from experience using the work equipment, you should either record them or take steps to ensure that all appropriate members of the workforce are aware of them.

Provision and Use of Work Equipment Regulations

Regulation 10 - Conformity with Community requirements

1. (a) Every employer shall ensure that an item of work equipment conforms at all times with the essential requirements, other than requirements which, at the time of its being first supplied or put into service in any place in which these Regulations apply, did not apply to work equipment of its type.

(b) In this regulation "essential requirements", in relation to an item of work equipment, means requirements relating to the design and construction of work equipment of its type in any of the instruments listed in Schedule 1 (being instruments which give effect to Community directives concerning the safety of products).

(c) This regulation applies to items of work equipment provided for use in the premises or undertaking of the employer for the first time after 31st December 1992.

** Paragraphs (1) and (2) substituted by SI 2002/2174, regulation 7(a).*

Overview

2. This regulation aims to ensure that when work equipment is first provided for use in the workplace after 5 December 1998, it meets certain health and safety requirements. It contains duties that complement those on manufacturers and suppliers in other legislation regarding the initial integrity of equipment.

3. There are legal requirements covering all those involved in the chain of supply of work equipment which are designed to ensure that new work equipment is safe. For example, Section 6 of the Health and Safety at Work etc Act 1974, places general duties on designers, manufacturers, importers and suppliers to ensure this so far as is reasonably practicable.

4. Existing legislation on the manufacture and supply of new work equipment is increasingly being supplemented by new and more detailed regulations implementing EC Directives made under Article 100A of the Treaty of Rome. These new regulations place duties on the manufacturer and supplier of new work equipment.

Article 100A Directives

5. The aim of Article 100A Directives is to achieve the free movement of goods in the Community Single Market by removing different national controls and harmonising essential health and safety requirements. Examples important to safety at work include the Machinery, the Personal Protective Equipment, the Pressure Equipment and the Simple Pressure Vessels Directives.

Essential health and safety requirements

6. Article 100A Directives set out 'essential health and safety requirements' which must be satisfied before products may be sold in the European Economic Area. Products which comply with the Directives must be given free circulation within the European Economic Area. These Directives also apply to equipment made and put into service in-house.

Suppliers must ensure that their products, when placed on the market, comply with the legal requirements implementing the Directives applicable to their product. It is a common feature of these Directives that compliance is claimed by the manufacturer affixing a mark – 'CE Marking' – to the equipment.

Application

7. Regulation 10 places a duty on the user of work equipment. When first providing work equipment for use in the workplace the employer should ensure that it has been made to the requirements of the legislation implementing any product Directive that is relevant to the equipment.

8. In the Beer Dispense Industry the employer of the person using the electrical equipment may be a tenant or a pub chain. However, the owner of the electrical equipment may be either the Service Provider or the Brewery. In some cases the Service Provider is part of the Brewery. It is also fair to say that the Service Provider and the Brewery will actually specify such electrical equipment.

9. It is therefore the Beer Dispense Industry's intention to provide a coherent approach to ensuring compliance with this particular Regulation by placing the duty on the suppliers of electrical equipment.

10. This means that in addition to specifying that work equipment should comply with current health and safety legislation, the supplier should also specify that it should comply with the legislation implementing any relevant EC Directive (in particular the low voltage directive). Where appropriate, the supplier must check to see that the equipment bears a CE marking and is accompanied by the relevant certificates or declarations (the supplier should ask for a copy of the EC Declaration of Conformity), as required by relevant product Directives.

11. The supplier must also check that adequate operating instructions have been provided with the equipment and that there is information about residual hazards such as noise and heat. More importantly, the supplier should ensure that the equipment is suitably designed for its intended purpose and location (for example to work safely in a cellar environment).

Provision and Use of Work Equipment Regulations

Regulation 22 - Maintenance Operations

1. *(a) Every employer shall take appropriate measures to ensure that work equipment is so constructed or adapted that, so far as is reasonably practicable, maintenance operations which involve a risk to health or safety can be carried out while the work equipment is shut down, or in other cases:*

   (b) maintenance operations can be carried out without exposing the person carrying them out to a risk to his health or safety; or

   (c) appropriate measures can be taken for the protection of any person carrying out maintenance operations which involve a risk to his health or safety.

2. Whilst Regulation 5 requires that equipment is maintained, Regulation 22 requires that equipment is constructed or adapted in a way that takes account of the risks associated with carrying out maintenance work, such as routine and planned preventive maintenance. Compliance with this regulation will help to ensure that when maintenance work is carried out, it is possible to do it safely and without risk to health.

3. In most cases the need for safe maintenance will have been considered at the design stage and attended to by the manufacturer. However, those responsible for maintenance activities will need to ensure that the measures provided by the manufacturer are suitably reviewed and assessed.

4. Ideally, there is no risk associated with the maintenance operation. For example, keeping the beer dispense equipment clean including the any filters. If, however, the maintenance work might involve a risk, this regulation requires that the installation should be designed so that the work can, so far as is reasonably practicable, be carried out with the equipment isolated.

5. If equipment will have to be running or working during a maintenance operation and this presents risks, the Service Provider should take additional measures to enable the operation of the equipment in a way that reduces the risk.

6. Other measures that can be taken to protect against any residual risk include wearing personal protective equipment and provision of instruction and supervision. Although the actual use of these measures falls outside the scope of this regulation, the work equipment should as far as possible be installed to be compatible with their use including maintenance.

7. The design of equipment in relation to maintenance work on it may also be affected by other legislation. In particular, electrically powered equipment is subject to the Electricity at Work Regulations 1989 as regards risks of injury from electric shock or burn, or from explosion or ignition initiated by electricity. See The Electricity at Work Regulations 1989 and in particular the Safe System of Work.

Application

8. All maintenance work undertaken by Service Providers must be in strict compliance with the instructions provided by the manufacturer, which specifies routine and special maintenance procedures to be carried out at particular intervals. Some of the procedures will be necessary to keep the equipment in working order, whilst others will be required for safety reasons.

   Appropriate techniques should be selected through risk assessment and used independently or in combination to address the risks involved.

9. Different maintenance management techniques have different benefits and may include the following:

   (a) Planned preventive maintenance involves replacing parts and consumables or making necessary adjustments at preset intervals so that risks do not occur as a result of the deterioration or failure of the equipment.

   (b) Condition-based maintenance involves monitoring the condition of safety-critical parts and carrying out maintenance whenever necessary to avoid hazards which could otherwise occur.

   (c) Breakdown maintenance involves carrying out maintenance only after faults or failures have occurred. It is appropriate only if the failure does not present an immediate risk and can be corrected before risk occurs, for example through effective fault reporting and maintenance schemes.

10. Where safety-critical parts could fail and cause the equipment or other protection devices to fail and lead to immediate or hidden potential risks, a formal system of planned preventative or condition-based maintenance is likely to be needed. This will have been considered by the manufacturer when devising his maintenance scheme.

11. In the Beer Dispense Industry it may not always be clear who is responsible for undertaking safety related maintenance. The majority of the electrical equipment may not be owned by the user. Some electrical equipment will be leased or provided by the Pub Chains. Some will be provided by the Breweries.

12. It is important that all stakeholders (Service Providers, Breweries and Pub Chains) to establish which party will carry out the safety-related maintenance. This is particularly important for equipment on long-term hire. It is therefore recommended that the responsibilities are clearly defined in the terms of the agreement and appropriately recorded in writing.

13. In many cases, this safety-related maintenance work may not carried out by the person with the ultimate responsibility (Pub Chain, Brewery etc) for the work equipment, in the mistaken belief that the other party will do it. Again, if the Service Provider is some distance from the user site, it would be uneconomical for their employees to carry out simple checks and make minor adjustments, so the user may agree to carry them out. However, both parties should agree exactly what they are responsible for.

Maintenance log

14. There is no requirement to keep a maintenance log. However, it is recommended that a record of maintenance is kept for all high-risk equipment. A detailed maintenance log can provide information for future planning of maintenance activities and inform maintenance personnel and others of previous action taken. If a maintenance log is held then it should be kept up to date.

15. Maintenance procedures should be carried out in accordance with any manufacturer's recommendations which relate to the equipment, for example periodic lubrication, replacement and adjustment of parts.

16. All maintenance activities must be suitably assessed with appropriate implementation of adequate preventative and protective measures. These may include barriers, safe systems of work and personal protective equipment.

17. Personnel employed to undertake such work must be provided with suitable and sufficient information, instruction and training and where necessary supervision. All personnel engaged in such activities must be competent to undertake the work safely and not be put into a position that may expose them or others to unacceptable hazards and risks.

18. Electrical Equipment must be suitably sited to ensure that maintenance workers are not exposed to unacceptable risks. This is particularly important in cellars and bar areas. However, the risk assessment process should include the working environment and therefore identify potential problems before they are realised.

Appendix B

Electrical Safety Policy (example)

Introduction

1. The Electricity at Work Regulations 1989 came into force on 1st April 1990. Their purpose is to require precautions to be taken against the risk of death or personal injury from electricity, in work activities. In the main, the Regulations are concerned with the prevention of danger; from electric shock, electric burn, electric explosion or arcing or from fire or explosion initiated by electrical energy.

2. When those who design, construct, operate or maintain electrical installations and equipment need advice they should refer to appropriate guidance, such as may be found in national, international and harmonised or industry standards along with codes of practice or HSE guidance. If in doubt they should seek competent advice.

3. The Institution of Electrical Engineers Requirements for Electrical Installations (the IEE Wiring Regulations) is a code of practice which is widely recognised and accepted in the UK, and compliance with them is likely to achieve compliance with relevant aspects of the 1989 Regulations. They relate principally to the design, selection, erection, inspection and testing of electrical installations. The IEE Regulations have the status of a British Standard BS 7671: 2001. The IEE Wiring Regulations apply only to installations operating at up to 1000 volts AC.

4. Only those who have both the knowledge and the experience to make the right judgments and decisions and the necessary skill and ability to implement them effectively should undertake work subject to these Regulations. A little knowledge is often sufficient to make electrical equipment function but a much higher level of knowledge and experience is usually needed to ensure safety.

COMPANY XYS - Electrical Safety Arrangements

5. COMPANY XYZ, will in consultation with their employees and representatives:

   a. Ensure electrical installations and equipment are installed in accordance with statutory requirements and IEE Wiring Regulations (BS7671 Requirements for Electrical Installations);

   b. Maintain fixed installation in a safe condition by carrying out routine safety tests in accordance with IEE recommendations (every 5 years except Industrial units e.g. workshops, every 3 years);

   c. Inspect and test portable equipment in accordance with the IEE Code of Practice for In-service Inspection and Testing of Electrical Equipment;

   d. Promote and implement a safe system of work for maintenance, inspection and testing of beer dispense equipment;

   e. Forbid work on live equipment by COMPANY XYZ employees unless absolutely necessary and in strict compliance with internal Safe Systems of Work developed in accordance with the Electricity at Work Regulations 1989;

f. Forbid work on live equipment by non COMPANY XYZ employees, for example contractors in which case a Permit-to-Work will be raised prior to commencement of any work.

f. Maintain detailed records all faults and occurrences along with inspections and testing to meet the requirements of the IEE Wiring Regulations (BS7671 Requirements for Electrical Installations).

Management Responsibilities

6. COMPANY XZY, has a statutory requirement to provide a safe working environment. All reasonable precautions are taken to provide a safe working environment and every effort is to be taken to minimise risk. The _____ has made it clear in his health and safety policy statement that he is fully committed to providing a safe working environment.

7. He has appointed the _____ as the _____ Electrical Safety Supervisor (ESS). The role of this appointment is to ensure that _____ meets its legal and moral obligations with regard to the safe use of all fixed and mains powered equipment. If there are any other issues regarding electrical safety, the ESS must be informed at the first instance.

8. All electrical safety documentation is subject to random inspections by the ESS. In the unfortunate circumstances of a serious incident _____ may be required to produce all electrical safety documents in a court of law to demonstrate compliance with the applicable legislative provisions, in particular, the Electricity at Work Regulations 1989 and the IEE Wiring Regulations. However, the latter may depend upon the contractual arrangements of the leased facility and those who may be deemed to have control over such a facility (Landlord / Tenant).

9. Although the _____ has been given the overall responsibility of electrical safety within _____, everyone has a legal and moral responsibility to ensure compliance with the procedures detailed in this document. All managers are to be familiar with this policy

10. If further information on electrical safety is required or if there are any issues within this directive then the ESS should be contacted in the first instance.

Fixed Installation/s

11. To meet the requirements of the IEE Wiring Regulations the fixed installations of the leased estate within _____ must be periodically inspected and tested. The ultimate responsibility of maintaining compliance with these Regulations is agreed when the facilities are originally leased and will normally form part of the contractual arrangements. The facilities are normally managed by _____ and they will normally arrange to have these inspections and tests undertaken. However, it remains _____ policy to maintain appropriate records for all inspection and test undertaken to meet the

requirements of these Regulations irrespective of who is responsible for arranging such work.

12. There are three types of record that may apply to an electrical installation. They include an Electrical Installation Certificate which is issued prior to the facility being occupied for the first time to demonstrate that the installation is safe and that it has been installed in accordance with the IEE Wiring Regulations. A Periodic Inspection Report for an Electrical Installation that is normally more than five years old. These periodic inspections are normally undertaken every five years. Finally, a Minor Works Certificate, which is required for all additions and alterations to an installation that does not extend to the provision of a new circuit.

13. Copies of such records are to be held in the Facility Log Book. The ESS is to ensure that appropriate records are maintained for each facility within _____.

Portable Electrical Equipment/s

14. The objective of the IEE Code of Practice for In-service Inspection and Testing of Electrical Equipment is to give advice on in-service inspection and testing to determine whether electrical equipment is fit for continued service or whether maintenance or replacement is necessary. All _____ Stationary (S), Moveable (M), Portable (P), Handheld (H) or Information Technology Equipment (I.T) is to inspected and tested in accordance with this code of practice.

15. There are three categories of in-service inspection and testing:

    User Checks: _____ employees are to undertake an "operator check" prior to switching on a portable appliance. This should normally be a before user check to ensure the integrity of the item as not been compromised since it was last used. For example, the cable and plug has not been damaged. However, this will be dependant upon the likelihood of damage. A stationary item is unlikely to become damaged.

    Formal Visual Inspections: These inspections are visual only and therefore do not include any form of testing. The _____ is responsible for undertaking or arranging for these inspections to be undertaken. The _____ may undertake these inspections, but should be under the direction and where necessary the supervision of the _____. The inspections should be recorded in accordance with Appendix 1, and suitably recorded at Appendix 2.

    Combined Inspections and Tests – These combined inspection and tests are to be undertaken by external contractors in accordance with Appendix 1. The _____ are to arrange such Combined Inspections and Tests. The _____ are also responsible for ensuring that the contractors chosen to undertake the work have the appropriate level of competence. The "Access to Work" procedure must be adopted for all contractors undertaking work with _____.

16. The periodicity of the inspection and testing at Appendix 1 was taken from the Code of Practice for In-Service Inspection and Testing of Electrical Equipment and may be subject to modification by the _____.

17. Faulty portable appliances must not be used and the nature of the fault immediately reported to the _____ - for electrical appliances being used at _____. Electrical faults occurring on portable appliances being used on other sites must be reported to the _____.

18. Extension Leads - Where extension leads are necessary they must be of a minimum length and not used whilst coiled. Extension leads must not be added to extension leads and should be protected by a residual current device (RCD), with a residual rating not exceeding 30mA. All leads must be safely routed.

Information, Instruction and Training

19. The risk assessment process undertaken in accordance with _____ will identify the necessary information, instruction and training for _____ employees to undertake their work safely. In addition the _____ Recruitment, Placement and Training process undertaken in accordance with _____ will ensure that only suitably trained personnel undertake potentially hazardous work involving the electrical inspection and test of equipment.

Hazardous Environments

20. The hazardous environments in _____ generally relate to cellars. These cellars are under the day to day management of the _____. He / she is responsible for ensuring that the applicable safe systems of work are developed and implemented for all electrical work being undertaken within the cellars. He /she is also responsible for undertaking the facilities specific induction training which includes the precautions to be taken when working with electrical equipment (especially in damp environments).

21. In cases where a danger from electrical shock exists the working area should be capable of being suitably isolated in the case of an emergency. This should be risk based and in compliance with the appropriate Standards and best practice. Access must be restricted to authorised persons.

22. It is _____ to have all dispensing equipment fitted with a residual current device. The operation of these devices should be routinely tested by pressing the test button on the device. In addition the residual current device should be subjected to a formal test using a residual current device tester. This test measures the time it takes to trip the device. These measurements should measure the trip times on both the positive and negative cycles of the supply. The _____ remains responsible for undertaking such tests.

Appendix C

References

1 Legislation

- Health and Safety at Work etc. Act, 1974.
- Consumer Protection Act, 1987.
- The Electricity at Work Regulations, 1989
- The Low Voltage Electrical Equipment (Safety) Regulations, 1989
- The Provision and Use of Work Equipment Regulations 1998
- The Electrical Equipment (Safety) Regulations 1994, SI 1994
- The Electromagnetic Compatibility Regulations, SI 1992
- Council Directive No. 73/23/EEC on the harmonisation of the laws of member States relating to electrical equipment designed for use within certain voltage limits, as amended by Council Directive No. 93/68/EEC (the "CE marking" Directive).
- Council Directive No. 89/336/EEC (the "EMC Directive") on the approximation of the laws of the Member States relating to electromagnetic compatibility, as amended by Council Directive 92/31/EEC and Article 9.4 of the Telecommunications Terminal Equipment Directive.

2 Published by HSE.

- "Memorandum of Guidance on the Electricity at Work Regulations 1989", Guidance on Regulations, Health and Safety series booklet HS(R)25; ISBN 9780717662289 (available from HSE)
- "The Electricity at Work Regulations 1989. An open learning course"; ISBN 0 11 885443 7 (available from HMSO)
- HSE Guidance Note GS 27 "Protection Against Electric Shock", ISBN 0 11 883583 1 (available from HMSO)
- HSE Guidance Note GS 37 "Flexible leads, plugs, sockets etc", ISBN 0 11 883519 X (available from HMSO)
- HSE Guidance Note GS 38 "Electrical Test Equipment for use by Electricians", ISBN 0 11 885650 2 (available from HMSO)
- HSE Guidance Note PM 32 "The Safe Use of Portable Electrical Apparatus (electrical safety)"; ISBN 0 11 885590 5 (available from HMSO)
- HSE Guidance Note PM 38 "Selection and Use of Electric Handlamps", ISBN 0 11 886360 6 (available from HMSO)
- HSE series booklet HS(G)85 "Electricity at Work - Safe Working Practices", ISBN 9780717621644 (available from HSE)

3 Other Publications

- "Code of Practice for the Dispense of Beer by Pressure Systems in Licensed Premises, 1994" Issued by the Brewers and Licensed Retailers Association (available from Brewing Publications Ltd., 42, Portman Square, London W1H OBB)
- "The Electricity at Work Regulations, 1989, Guidance for Licensees", August 1992 (available from Brewing Publications Ltd., 42, Portman Square, London W1H OBB)
- "Regulations for Electrical Installations" (IEE Wiring Regulations), 16th Edition, 1991 (available from The Institute of Electrical Engineers, PO Box 96, Stevenage, Herts. SG1 2SD)(now also BS 7671: 1992)
- "The Electricity at Work Regulations, 1989, Guidance for the Soft Drinks Industry", February 1993 (available from The British Soft Drinks Association Ltd., 20/22, Stukeley Street, London, WC2B 5LR)

Appendix D

Standards

1 British Standards related to this document

- BS 646: 1958, Specification. Cartridge fuse-links (rated up to 5 amperes) for a.c. and d.c. service. (do not confuse with BS ISO/IEC 646 : 1991) **Current, but superseded**
- BS 1362: 1973, Specification for general purpose fuse-links for domestic and similar purposes (primarily for use in plugs).
- BS 1363-5: 2008, 13A plugs, socket-outlets, adaptors and connection units. Specification for fused conversion plugs.
- BS 2754: 1976, Memorandum. Construction of electrical equipment for protection against electric shock.
- BS 2950: 1958, Specification. Cartridge fuse-links for telecommunications and light electrical apparatus.
- BS 3036: 1958, Specification. Semi-enclosed electric fuses (ratings up to 100 amperes and 240 volts to earth).
- BS 6500: 2000, Electric cables. Flexible cords rated up to 300 / 500 V, for use with appliances and equipment intended for domestic, office and similar environments.
- BS 7071 : 1992, Specification for portable residual current devices.
- BS 7288: 1990, Specification for socket-outlets incorporating residual current devices (SRDC's).
- BS 7671: 2008, Requirements for electrical installations. IEE Wiring Regulations. 17th edition
- BS EN 60127-1: 2006, Miniature fuses. Definitions for miniature fuses and general requirements for miniature fuse links.
- BS EN 60127-2: 2003+A2: 2010, Miniature fuses. Cartridge fuse-links.
- BS EN 60127-4: 2005+A1: 2009, Miniature fuses. Universal modular fuse-links (UMF). Through hole and surface mount types.
- BS EN 60127-10: 2002, IEC 60127-10: 2001, Miniature fuses. User guide for minature fuses.
- BS 60269-1: 2007+A1: 2009, BS 88-1: 2007, Low voltage fuses. Supplementary requirements for fuses for example by authorised persons (fuses mainly for industrial application). Examples of standardised systems of fuses A to J.
- BS 60269-2: 2010, BS 88-2: 2010, Low voltage fuses. Supplementary requirements for fuses for example by authorised persons (fuses mainly for industrial application). Examples of standardised systems of fuses A to J.
- BS 60269-3: 2010, BS 88-3: 2010, Low voltage fuses. Supplementary requirements for fuses for use by unskilled persons (fuses mainly for household and similar applications). Examples of standardised systems of fuses A to F.
- BS 60269-4: 2010, Low voltage fuses. Supplementary requirements for fuse-links for the protection of semiconductor devices.

- OD IEC/TR 60269-5: 2010, PD 88-5: 2010, Guidance for the application of low voltage fuses.
- BS EN 60309-1: 1998, IEC 60309-1: 1997, Plugs, socket-outlets and couplers for industrial purposes. General requirements.
- BS EN 60529: 1992, Specification for degrees of protection provided by enclosures (IP code).
- BS EN 61558-2-6: 2009, Safety of power transformers, power supply units and similar products for supply voltages up to 100 V - Part 2-6: Particular requirements and tests for safety isolating transformers and power supply units incorporating safety isolation transformers.

Appendix E

Rating Information

Rating plate information

1 It is recommended that the following specified items be permanently marked on the rating plate of the equipment, irrespective of whether or not they form part of any current statutory requirement, and in addition to any other current statutory requirements:

a) model type or number

b) serial number, where appropriate

c) voltage(s) of the incoming electrical supply

d) the rated current in amps when running

e) number of phases

f) frequency or range of frequencies

g) type and rating of all internal fuses

h) class of insulation

i) date of insulation and earth continuity test carried out by manufacturer

j) BS or other recognised standard to which the equipment has been tested

k) manufacturer's name

1) date of manufacture.

2 In addition to the above information, the equipment should carry a label giving the ownership of the equipment, together with such other information as may be specified by the owner.

Appendix F

Inspection Procedures

Typical routine

Electrical checks

1 Although a good initial level of safety can be achieved by correct selection and use of equipment and its connectors and cables, lasting safety can only be attained by ongoing and effective maintenance. Users should treat their equipment reasonably, including stopping it if defects occur and reporting them.

2 In many cases (eg Class I equipment), the safety of portable electrical equipment depends on the continued integrity of the earthing, and correct connections, of the fixed electrical installation up to and including the socket supplying the equipment. So you should also correctly select, use and maintain the fixed installation, although this is outside the scope of this book - see *Inspection and testing* (Guidance Note 3) from the Institution of Electrical Engineers (IEE)6 for guidance on inspection and testing of the fixed electrical installation.

3 Maintenance can include visual inspection, testing, repair and replacement. Maintenance will determine whether equipment is fully serviceable or remedial action is necessary. Routine inspection and appropriate testing, where necessary, are normally part of any overall strategy for ensuring that work equipment is maintained in a safe condition.

4 Cost-effective maintenance of portable electric equipment can be achieved by a combination of:

- Checks by the user
- Formal visual inspections by a person trained and appointed to carry them out
- Combined inspection and tests by an electrically competent person or by a contractor.

5 Management should follow up these procedures by monitoring the effectiveness of the system and taking action where faults are found, particularly when faults are frequent.

User checks (visual)

The person using the equipment should be encouraged to look at it critically and check for signs that it may not be in sound condition, for example:

- Damage (apart from light scuffing) to the cable sheath
- Damage to the plug, for example the casing is cracking or the pins are bent
- Inadequate joints, including taped joints in the cable
- The outer sheath of the cable is not effectively secured where it enters the plug or the equipment. Obvious evidence would be if the coloured insulation of the internal cable cores were showing
- The equipment has been subjected to conditions for which it is not suitable, eg it is wet or excessively contaminated
- Damage to the external casing of the equipment or there are some loose parts or screws;

- Evidence of overheating (burn marks or discoloration).

These checks also apply to extension leads and associated plugs and sockets. The user should make visual checks when the equipment is taken into use and during use. Any faults should be reported to management and the equipment taken out of use immediately. Management should take effective steps to ensure that the equipment is not used again until it is repaired by a person competent to carry out the task (eg the defective equipment could be labelled as 'faulty' and its associated plug removed).

Formal visual inspections

The most important component of a maintenance regime is usually the formal visual inspection, carried out routinely by a trained person. Such inspections can pick up most potentially dangerous faults and the maintenance regime should always include this component.

To control the risks and to monitor the user checks, a competent person should carry out regular inspections that include visual checks similar to those listed in the user checks, but undertaken in a more formal and systematic manner. Additional checks could include:

- Removing the plug cover and ensuring that a fuse is being used (eg it is a fuse not a piece of wire or a nail etc)
- Checking that the cord grip is effective
- Checking that the cable terminations are secure and correct, including an earth where appropriate, and there is no sign of internal damage, overheating or ingress of liquid or foreign matter.

The formal visual inspection should not include taking the equipment apart. This should be confined, where necessary, to the combined inspection and testing.

The trained person can normally be a member of staff who has sufficient information and knowledge of what to look for, and what is acceptable, and who has been given the task of carrying out the inspection. To avoid danger, trained people should know when the limit of their knowledge and experience has been reached. Simple, written guidance relating to the visual inspection can be produced that summarises what to look for and which procedures to follow when faults are found or when unauthorised equipment is found in use. This guidance can also help equipment users.

The formal visual inspections should be carried out at regular intervals. The period between inspections can vary considerably, depending on the type of equipment, the conditions of use and the environment. For example, equipment used on a construction site or in a heavy steel fabrication workshop will need much more frequent inspection than equipment such as floor cleaners in an office. In all cases, however, the period between inspections should be reviewed in the light of experience. Faulty equipment should be taken out of service and not used again until properly repaired. If necessary, it should be tested.

The pattern of faults can help management decide what action to take, depending on whether the faults show:

- The wrong equipment is being selected for the job
- Further protection may be necessary in a harsh environment
- The equipment is being misused.

Combined inspection and tests

The checks and inspections outlined in the previous paragraphs will, if carried out properly, reveal most (but not all) potentially dangerous faults. However, some deterioration of the cable, its terminals and the equipment itself can be expected after significant use. Additionally, the equipment itself may be misused or abused to the extent that it can give rise to danger. Some of these faults, such as loss of earth integrity (eg broken earth wire within a flexible cable), or deterioration of insulation integrity, or contamination of internal and external surfaces, cannot be detected by visual inspection alone. Periodic combined inspection and testing is the only reliable way of detecting such faults, and should be carried out to back up the checks and inspection regime. Testing is likely to be justified:

- Whenever there is reason to suppose the equipment may be defective (but this cannot be confirmed by visual inspection)
- After any repair, modification or similar work
- At periods appropriate to the equipment, the manner and frequency of use and the environment.

The inspection carried out in conjunction with testing should usually include checking:

- The correct polarity of supply cables
- Correct fusing
- Effective termination of cables and cores
- That the equipment is suitable for its environment.

Such combined inspection and testing requires a greater degree of competence than that required for inspection alone, because the results of the tests may require interpretation and appropriate electrical knowledge will be needed. However, it can often be carried out by a competent employee.

People carrying out testing of portable electrical equipment should be appropriately trained for this work. It is the employer's duty to ensure that they are competent for the work they are to carry out. Basically, there are two levels of competency.

- The first level is where a person not skilled in electrical work routinely uses a simple 'pass/fail' type of portable appliance tester (PAT), where no interpretation of readings is necessary. The person would need to know how to use the PAT correctly. Providing the appropriate test procedures are rigorously followed and acceptance criteria are clearly defined, this routine can be straightforward
- The second level is where a person with appropriate electrical skills uses a more sophisticated instrument that gives actual readings requiring interpretation. Such a person would need to be competent through technical knowledge or experience related to the type of work.

Some combination of the actions should provide the most cost-effective way of ensuring, so far as is reasonably practicable, that equipment will be maintained in a safe condition wherever it is used. The actions are relatively simple. The more extensive inspection and testing can be carried out less frequently if the maintenance system includes formal visual inspections and monitoring of the user checks.

Maintenance and test records

Although there is no requirement in the EAW Regulations to keep maintenance logs for portable and transportable electrical equipment, the EAW Memorandum5 does refer to the benefits of recording maintenance, including test results. A suitable log is useful as a management tool for monitoring and reviewing the effectiveness of the maintenance scheme and also to demonstrate that a scheme exists. It can also be used as an inventory of equipment and a check on the use of unauthorised equipment (eg domestic kettles or electric heaters brought to work by employees).

The log can include faults found during inspection, which may be a useful indicator of places of use, or types of equipment, that are subject to a higher than average level of wear or damage. This will help monitor whether suitable equipment has been selected. Entries in a test log can also highlight any adverse trends in test readings that may affect the safety of the equipment, thus enabling remedial action to be taken. Be careful when interpreting trends where a subsequent test may be done with a different instrument to that used for an earlier test, as differences in the results may be due to difference in the instruments rather than deterioration in the equipment being tested.

Records do not necessarily have to be on a paper system. Test instruments are available that store the data electronically, which can then be downloaded directly onto a computer database. Duty holders with large amounts of equipment will find it useful to label equipment to indicate that the equipment has been tested satisfactorily, ie has been passed as safe, and when the date for the next test is due. Otherwise, individual items may be missed on consecutive occasions.

Frequency of inspection and combined inspection and testing

Deciding on the frequency of inspection and testing is a matter of judgement by the duty holder, and should be based on an assessment of risk. This can be undertaken as part of the assessment of risks under the Management of Health and Safety at Work Regulations 1999.

Factors to consider when making the assessment include the following:

- Type of equipment and whether it is hand-held or not
- Manufacturer's recommendations
- Initial integrity and soundness of equipment
- Age of the equipment
- Working environment in which the equipment is used (eg wet or dusty) or likelihood of mechanical damage
- Frequency of use and the duty cycle of the equipment
- Foreseeable abuse of the equipment
- Effects of any modifications or repairs to the equipment
- Analysis of previous records of maintenance, including both formal inspection and combined inspection and testing.

Table 1 sets out the suggested frequency of formal visual inspections and combined inspections and electrical tests for portable and transportable electrical equipment. It gives suggested starting intervals when implementing a maintenance programme. Where one figure is given, this is a guide for anticipated average use conditions; more demanding conditions of use will require more frequent formal visual inspections, and/or combined inspections and tests. Where a range is shown, the small interval is for more demanding conditions of use and the longer interval is for

less demanding ones. It is up to the duty holder, with appropriate advice where necessary, to assess the conditions affecting equipment, which may lead to potential damage and/or deterioration and should determine the maintenance regime.

Table 1 Suggested initial maintenance intervals

Type of business	User checks	Formal visual inspection	Combined inspection and test
Equipment hire	N/A	Before issue/after return	Before issue
Construction (For indication only. See *Electrical safety on construction sites*[3] for more detail)	110 V – Weekly 230 V mains – Daily/every shift	110 V – Monthly 230 V mains – Weekly	110 V – Before first use on site then 3-monthly 230 V mains – Before first use on site then monthly
Light industrial	Yes	Before initial use then 6-monthly	6 – 12 months
Heavy industrial/high risk of equipment damage	Daily	Weekly	6 – 12 months
Office information technology, eg desktop computers, photocopiers, fax machines	No	1 – 2 years	None if double-insulated, otherwise up to 5 years
Double-insulated equipment ***not*** hand-held, eg fans, table lamps	No	2 – 3 years	No
Hand-held, double-insulated (Class II) equipment, eg some floor cleaners, kitchen equipment and irons	Yes	6 months – 1 year	No
Earthed (Class I) equipment, eg electric kettles, some floor cleaners	Yes	6 months – 1 year	1 – 2 years
Equipment used by the public, eg in hotels	By member of staff	3 months	1 year
Cables and plugs, extension leads	Yes	1 year	2 years

Appendix G

Key changes affecting this document since the 3rd Edition (1995)

Sixteen years have passed since the last version of this document was launched and during that time there have been a number of changes both to the health and safety legislation and British Standards relating to the brewing Industry, which are incorporated into the new document.

New sections in the document

There have been a number of new sections added to the new document:

Section 1 Introduction, which has taken the information from the Scope of the old document, updated and added further information to make it easier to read for the user.

Section 5 CE Marking Requirements, CE Marking details were not in the old document and were only introduced in 1993 and are now a requirement contained in current legislation.

Section 13 Installation, has been included to give guidance to service providers and those involved with the installation of the equipment.

Section 14 Legislation Applicable to Stakeholders, this section defines the legislation that applies to the stakeholders, including manufacturers, service providers, pub chains and owner landlords.

Changes to the sections in the document

Section 3 Definitions (formally Section 2), "3.6 Terms used in legislation" has been added to ensure that the reader fully understands the meaning of terms used in the current legislation.

Section 4 Legislation (formally Section 3), has been revised to include how to meet the requirements of the legislation when carrying out certain activities and where applicable updated the legislation and its requirements.

Section 6 Transformers and Enclosures (Formally Section 4), this section has seen a substantial revised as BS EN 61558-2-6: 2009 has been introduced which has lead to a number of changes in the requirements, causing the section to grow substantially.

Section 7 Residual Current Devices (Formally Section 5), this section has been simplified.

Section 8 Plug and Socket Outlets (200-250 volts ac) (Formally Section 6), there are not any significant changes to this section.

Section 9 Hand Held Inspection Lamps and Portable Power Tools (Formally Section 7), "9.3 User equipment checks" has been added.

Section 10 Bar Equipment (Formally Section 8), there are not any significant changes to this section.

Section 11 Cellar Equipment (Formally Section9), there are not any significant changes to this section.

Section 12 Delivery Tankers (Formally Section 10), there are not any significant changes to this section.

Appendices, the appendices have been updated, in Appendix A guidance on current health and safety legislation is included, in Appendix B the is an example of an electrical safety policy, Appendix C has references to legislation, Appendix D has relevant British Standards, Appendix E has rating information requirements and Appendix F has inspection procedures.