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

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Preface

This fourth Edition of the "Code of Practice for the Electrical Safety in Beer Dispense in Licensed Premises" was first published during April 2011, and supersedes previous issues immediately on publication.

The purpose of this Code is to give guidance to all stakeholders involved in the design, manufacture, purchase, import, supply, installation and the maintenance of electrical equipment used for the storage and dispensing of draught beer in licensed premises, with the objective of ensuring electrical safety. The Code also provides a basic reference for brewers, retailers and licensees.

The Code is not intended to apply to any other electrical installation or equipment (whether or not employing electrical energy from any source) used for any other purpose within licensed premises, or to the method or standard of installation.

It is a companion to, and may be used in conjunction with, the document entitled "Code of Practice for the Dispense of Beer by Pressure Systems in Licensed Premises", which specifically addresses the safety of pressure systems in beer dispensing. It is important that, in using this Code, no adjustments, alterations, modifications, or the like, should be made to any beer dispense equipment which could jeopardise the safe working practices advocated in the Pressure Code of Practice.

This Code is based on the best current practices that are employed by many organisations, both within and outside, the brewing industry. It is recognised that procedures differing from those specifically defined in the Code may result from advances in technology. It is not the intention of this Code to prohibit the use of new techniques or technology where they present equal, or improved safety, of any of the aspects of the equipment.

From time-to-time, it is the intention of British Beer and Pub Association to update this Code to reflect such changes in practice and/or developments in statutory requirements. The Association requests that anyone responsible for the introduction of new technology, which appears to present significant departures from the provisions of this edition of this Code, communicates sufficient detail of the development to allow future editions to fully encompass the changes introduced.

Current legislation in the field of electrical safety is embodied in "The Electricity at Work Regulations 1989", Statutory Instrument 1989 No. 635. They impose duties on both employers (and self-employed persons) and employees.

Since the previous edition of the Code was issued, many of the British Standards quoted have been updated, and therefore some of the numbers have changed. The numbers presented in the text are for the current versions.

The Health & Safety Executive has been consulted during the drafting of this Code and has contributed towards its development. The members of the Working Party who drafted this document wish to thank them for their invaluable advice and assistance given during the preparation of the original document in 1974/5 and the later revisions in 1990 and 1995.

The British Beer and Pub Association has taken professional advice and exercised all reasonable

care in the preparation of this Code of Practice. With the rapid developments in technology and legislation, readers should not assume that the advice contained herein remains current, without taking professional advice on statutory requirements and good practice. While great care has been taken to check the contents of the Code, no responsibility can be accepted for inaccuracies or omissions in any of the information, advice or opinion presented.

1. Introduction

1.1 General

1.1.1 This Code of Practice is concerned with electrical equipment used within the beer dispense industry.

1.1.2 Electrically operated or controlled equipment used for the delivery of beer into, or the dispense of beer, within licensed premises, may present a hazard to anyone not fully conversant with the dangers associated with these electrical systems. The purpose of this Code of Practice is to inform the reader of the procedures and standards established by the British Beer and Pub Association, which will, when adopted, eradicate or minimise such hazards.

1.1.3 Electrical equipment used for, or associated with, beer dispensing is usually, although not always, owned or leased from the supplier of the equipment (predominantly the beer supplying brewery), who usually undertakes responsibility for the installation, maintenance and service of the equipment through their own or a contracted organisation.

1.1.4 Because of the nature of the beer supply market, frequently more than one supplying brewery is involved, each taking responsibility for their own equipment. The licensed premises where the equipment is installed may be owned, or operated, by one of a number of types of organisation. It is clear that the responsibilities imposed, under the various legislation, may fall upon a number of duty holders. From the outset, each duty holder should establish the extent of his duties.

1.2 General Duties under health and safety legislation

Current health and safety legislation, in the form of the Health and Safety at Work etc. Act 1974, places a number of general duties on stakeholders.

1.2.1 Any person who designs, manufactures, imports or supplies articles for use at work is to:

- ensure that the article is designed and constructed to be safe and without risk to health at all times when it is being set, used, cleaned or maintained.

- carry out testing and examination, as necessary, to ensure that the article is designed and constructed to be safe and without risk to health at all times when it is being set, used, cleaned or maintained.

- take such steps, as are necessary, to ensure that the person they have supplied the article to, is provided with adequate information about the use for which the article is designed, or has been tested and about any conditions necessary to ensure that it will be safe, and without risks, to health at all such times.

1.2.2 Any person who installs articles for use at work, in premises where the article is to be used, is to:

- ensure that the way the article is installed will make sure it is safe and without risk to health at all times when it is being set, used, cleaned or maintained by a person at work.

- carry out testing and examination, as necessary, to ensure that the article installed is safe and without risk to health at all times when it is being set, used, cleaned or maintained by a person at work.

- take such steps, as are necessary, to ensure that the person they have supplied the article to, is provided with adequate information about the use for which the article is designed, or has been tested, and about any conditions necessary to ensure that it will be safe, and without risks to health, at all such times.

1.2.3 Any person who manufactures, imports or supplies any substance for use at work is to:

- ensure that the substance will be safe and without risk to health, at all times when it is being used, handled, processed, stored or transported by a person at work.

- take such steps as are necessary to ensure that the person they have supplied the substance to is provided with adequate information about the use, the control measures necessary to ensure that it will be safe and without risks to health, at all such times, and provide relevant first aid information.

1.3 Specific duties under health and safety legislation

Current health and safety legislation, in the form of The Electricity at Work Regulations 1989, The Low Voltage Electrical Equipment (Safety) Regulations 1989, the 17th Edition of the Institution of Electrical Engineering Regulations and The Electrical Equipment (Safety) Regulations 1994, place a number of specific duties on stakeholders.

1.3.1 Employers and self-employed persons have a duty to ensure that precautions are taken, in areas under their control, against the risk of death or personal injury, from electricity in work activities.

1.3.2 Manufacturers and installers of equipment have a duty to ensure that their electrical equipment is safe, constructed / installed in accordance with principles generally accepted as good engineering practice and confirm with the principal elements of the safety objectives contained in The Electrical Equipment (Safety) Regulations 1994.

1.4 Other legislative considerations

Manufacturers and installers of equipment using electrical energy should acquaint themselves with legislative requirements other than those mentioned, which deals only with the safety aspects. Other subjects may include, for example, radio interference, the electronic environment, regulations made under the EMC Directive, Local Authority Regulations, fire precautions etc. Rules, requirements and / or procedures specified in British Standards should be followed, where deemed appropriate.

1.5 Safety considerations

1.5.1 The Health & Safety Executive have published a number of documents offering advice and guidance on aspects of compliance with the Electricity at Work Regulations and, more importantly, on the aspects of electrical hazards. Attention is drawn particularly to HSDE Guidance leaflet indg231 - "Electrical safety and you".

See Appendix C and D for a full list of references.

1.5.2 It is recommended that appropriate personnel be trained in those aspects of First Aid, which may become necessary in cases of electric hazard.

2. Scope

2.1 This Code of Practice is applicable to the design, manufacture, testing, installation, use and maintenance of electrical equipment used for, or in connection with, the storage and dispensing of draught beer, cider and wine in licensed premises, and intended to be connected to a rated supply voltage, not exceeding 250 V alternating current (when measured phase-to-neutral), and a rated frequency not exceeding 50 Hz, with an individually rated installed power not exceeding 24 kW.

2.2 This Code of Practice relates only to equipment and electrical systems falling within its scope. In licensed premises there will be other equipment and the remainder of the electrical system not covered by this Code. Equipment and electrical systems in the premises, not subject to this Code of Practice, (except for the licensee's private quarters) will still need to comply with the Regulations.

2.3 This Code is not intended to cover, or make provisions for, other equipment which may be used on licensed premises, nor for the remaining electrical installation. Where recommendations within this Code of Practice appear to be applicable to any other equipment, or electrical installation, it is by way of coincidence and not of design. This Code cannot be taken to be the only advice required for the safe or legal operation of any equipment, or installation, not within its scope. Specifically excluded, therefore, is any apparatus used for the dispense of any beverage other than beer, cider or wine.

2.4 Cellar services personnel responsible for installation and maintenance of dispense equipment may not be qualified electricians. All equipment connected directly to fixed wiring should be installed by a skilled person. To avoid direct connection of equipment to fixed wiring, it is recommended that flexible cables with plugs and sockets should be used. Where mixed voltages are employed, it is important that plugs and sockets of different configurations, made to an appropriate British Standard, should be used for each voltage.

3. Definitions

3.1 Beer

Beer is a generic term and includes ales, lagers and stouts and the low alcohol, and alcohol free, forms of these beverages. Wherever the word is encountered, it is also

taken to include, where the context so admits, ciders and the low alcohol, and alcohol free, forms of these beverages.

3.2 Dispense equipment

3.2.1 Automatic change-over unit

A device, which may be electrically operated and is normally used in conjunction with kegs, casks or tanks to facilitate automatic change-over from an empty to a full cask, keg or tank.

3.2.2 Beer meter

Apparatus designed to deliver a prescribed volume of beer into a glass, or other drinking vessel, at each operation.

3.2.3 Beer dispense pump

A pump driven by an electric motor usually operating at 240 or 110 volts and used to pump beer from a cask, keg or tank to the point of dispense.

3.2.4 Beer cellar

A room or store, whether temperature controlled or not, situated at any level within licensed premises in which beer is stored and dispensed.

3.2.5 Cowl

A display unit normally associated with the dispense of draught beverages, often illuminated, and usually fitted on the bar counter adjacent, or attached to, the beverage dispense point.

3.2.6 Fob detector

A unit, installed in the beer pipe between a cask, keg or tank and a dispense point, which is designed to generate a signal when a deficiency of liquid is detected, the signal generally being used to prevent further operation of the dispense system, and thereby preventing the complete exhaustion of the dispense system.

3.2.7 In-line cooler

A device installed in the beer supply pipe between the beer cask, keg or tank and the dispense point for the purpose of controlling the beer temperature.

3.2.8 Line cooler

A device for cooling a secondary coolant, which is circulated through tracer pipes, installed and insulated with the beer pipes and which keeps the beer lines cool within the insulation.

3.3 Transformers

3.3.1 Transformer

A transformer includes the windings, core/s, terminals, any safety devices, wiring,

switches and/or any other components mounted within the enclosure of the transformer, including the enclosure.

3.3.2 Isolating transformer

A transformer, the input and output windings of which are electrically separated by double or reinforced insulation to limit, in the circuit supplied by the output windings, hazards due to accidental simultaneous contact with the earth and with live parts or parts of the body, which may become live in the event of an insulation fault.

3.3.3 Associated transformer

A transformer designed to supply specific appliances or equipment and either incorporated in, or not incorporated in, but specially designed to be used only with the specific appliance/s or equipment.

3.3.4 Incorporated transformer

An associated transformer, which is designed to be built into a specific appliance, or piece of equipment, with the enclosure providing the protection against electric shock.

3.3.5 Transformer for specific use

An associated transformer which, without being incorporated in an appliance or equipment, is fixed to, or delivered with, the appliance or equipment.

3.3.6 Fail-safe transformer

A transformer, which after abnormal use, fails to function but presents no danger to the user or surroundings.

3.4 Other electrical equipment

3.4.1 Distribution board

An assembly containing switching or protective devices (e.g. fuses or circuit breakers) associated with one or more outgoing circuits, fed from one or more incoming circuits, together with terminals for the neutral and protective circuit conductors. It may also include signalling and other control devices. Means of isolation may be included in the board or may be provided separately.

3.4.2 Earthing conductor

A protective conductor connecting the main earthing terminal of an installation to an earth electrode, or to other means of earthing.

3.4.3 Protective conductor

A conductor used for some measure of protection against electric shock and intended for connecting together any of the following parts:

- exposed-conductive-parts
- extraneous-conductive-parts
- the main earthing terminal

- earth electrode/s
- the earthed point of the source, or an artificial neutral.

3.4.4 Electrically operated CO_2 or mixing gas regulating system

A device for electrically sensing and controlling the CO_2 or mixed gas supply, to beer casks, kegs or tanks.

3.4.5 Insulated and sheathed cable

Cable which, in addition to the basic insulation, has a further overall sheath of material for mechanical protection.

3.4.6 Junction (Joint) box

A box forming part of a wiring installation, provided to contain joints in the conductors of the cable of the installation.

3.4.7 Bar valve switch

A manually operated electrical switch usually fitted to, or adjacent to, the beer dispense point for the control of the beer dispense meter or pump.

3.4.8 Socket outlet

A device, provided with female contacts, which is intended to be installed with the fixed wiring, and intended to receive a plug. A luminaire track system is not regarded as a socket outlet.

3.4.9 Connector

The part of a cable coupler, or of an appliance coupler, which is provided with female contacts and is intended to be attached to the end of the flexible cable remote from the supply.

3.4.10 Plug

A device, provided with contact pins, which is intended to be attached to a flexible cable, and which can be engaged with a socket-outlet or with a connector.

3.4.11 Residual current device

A mechanical switching device or association of devices intending to cause the opening of the contacts, when the residual current attains a given value under specified conditions.

3.4.12 Fuse

A device, that by the fusing of one or more of its specially designed and proportioned components, opens the circuit in which it is inserted, by breaking the current when this exceeds a given value, for a sufficient time. The fuse comprises all the parts that form the complete device.

3.4.13 Fuse element

A part of a fuse designed to melt when the fuse operates.

3.4.14 Fuse link

A part of a fuse, including the fuse elements, which requires replacement by a new, or renewable fuse link, after the fuse has operated *and* before the fuse is put back into service.

3.5 Voltage

3.5.1 Voltage, nominal

Voltage by which an installation (or part of an installation) is designated. The following ranges of nominal voltage (r.m.s. values for a.c.) are defined:

Extra Low
Normally not exceeding 50 volts a.c, or 120 volts ripple free d.c. whether between conductors or to Earth.

Low
Normally exceeding extra low voltage but not exceeding 1000 volts a.c. or 1500 volts d.c. between conductors, or 600 volts a.c. or 900 volts d.c. between conductors and Earth.

The actual voltage of the installation may differ from the nominal value by a quantity within normal tolerances.

3.5.2 Reduced low voltage system

A system in which the nominal phase to phase voltage does not exceed 110 volts and the nominal phase to earth voltage does not exceed 63.5 volts.

3.5.3 SELV (safety extra-low voltage)

An Extra-low voltage system, which is electrically separated from Earth and from other systems in such a way that a single fault cannot give rise to the risk of electric shock.

3.5.4 Function extra-low voltage

Any Extra-low voltage system in which not all of the protective measures required for SELV have been applied.

3.6 Terms used in legislation

3.6.1 As low as is reasonably practicable (ALARP)

For a risk to be ALARP it must be possible to demonstrate that the cost involved in reducing the risk further would be grossly disproportionate to the benefit gained. The ALARP principle arises from the fact that infinite time, effort and money could be spent on the attempt of reducing a risk to zero. It should not be understood as simply a quantitive measure of benefit against detriment. It is more a best common practice of judgement of the balance of risk and societal benefit.

3.6.2 Injury

Means death or injury to persons from:

- electric shock
- electric burn
- fires of electrical origin
- electric arcing or
- explosions initiated or caused by electricity

It does not include secondary injuries caused as a result of an electrical injury, for example, injuries received by falling from a ladder as a result of an electric shock.

3.6.3 Must

"Must" implies an imperative in order to comply with Statutory Regulations.

3.6.4 Shall

"Shall" implies a strong recommendation to adopt the suggested method in meeting the requirement, although there may be acceptable alternatives, particularly given technological progress.

3.6.5 Should

"Should" is used to signify that the particular subject needs careful consideration and that a certain amount of discretion may be exercised in meeting the requirement.

3.6.6 So far as is reasonably practicable (SFAIRP)

This means the same as ALARP and SFAIRP and ALARP are interchangeable.

3.7 Miscellaneous

3.7.1 Apparatus

Things collectively necessary for the performance of some activity of function.

3.7.2 Make dead (Electrically)

Cut-off, or isolated, from all its sources of electrical energy.

3.7.2 Electrical equipment

Any item for such purposes as generation, conversion, transmission, distribution or utilisation of electrical energy, such as machines, transformers, apparatus, measuring instruments, protective devices, wiring materials, appliances and luminaires.

3.7.3 Fixed equipment

Equipment fastened to a support or otherwise secured in a specific location.

3.7.4 Instructed person

A person adequately advised or supervised by skilled persons to enable him to avoid dangers which electricity may create.

3.7.5 Isolation

Disconnection and separation from the source of electrical energy in such a way that the disconnection and separation remains secure.

3.7.6 Portable equipment

Electrical equipment which is moved while in operation or which can easily be moved from one place to another while connected to the supply.

3.7.7 Skilled person

A person with technical knowledge or sufficient experience to enable him to avoid dangers which electricity may create.

3.7.8 Stationary equipment

Electrical equipment which is either fixed, or equipment which is designed to be stationary after installation, which will be operated only whilst stationary, but which may be equipped with any convenient carrying means as deemed necessary to facilitate transport, installation and removal from the site where it is to be operated

4. Legislation

4.1 Introduction

4.1.1 The Health and Safety at Work etc. Act 1974, imposes on individuals at work, various general duties of care to others. The individuals are employers, self-employed, employees and others. The Act also empowers the Secretary of State to introduce regulations to further the aims of the Act.

4.1.2 The Electricity at Work Regulations, 1989, (the "Regulations") were made under the Health & Safety at Work Act, 1974, and came into force on 1st April, 1990.

4.1.3 The Consumer Protection Act 1987 (the Act) transfers into UK law the European Community's Product Liability Directive. The Act makes producers liable for loss or damages caused to consumers by defective products. Producers have an obligation to ensure that their products are safe and free from defects. The Act places liability on producers, importers and own-branders. The Act also empowers the Secretary of State to introduce safety regulations.

4.1.4 The Electrical Equipment (Safety) Regulations 1994, broadly apply to most consumer, commercial and industrial electrical equipment designed for use within the voltage ranges 50 V ac to 1000 V ac and 75 V dc to 1500 V dc. These regulations apply to both domestic and workplace electrical equipment placed on the market, on or after 1st January 2007. Their purpose is to remove technical barriers to trade and establish a European Union single market and provide a high level of protection for consumers.

Products covered by this legislation are required to carry the CE Marking.

4.1.5 Certain components of electrical equipment may, in themselves, be considered to be electrical equipment. In such cases steps should be taken to ensure that they satisfy the requirements of the Electrical Equipment (Safety) Regulations 1994, if it is intended that they are to be supplied as separate items. In the beer dispense industry such components would include the major assemblies making up the various electrical equipment (chillers, coolers etc.) and would, for example, include electrically operated pumps. In these situations the manufacturers will need to ensure that these components meet the requirements of the Electrical Equipment (Safety) Regulations 1994 and may, under the Regulations, affix CE marking to the packaging, instruction booklet or guarantee certificate of such components.

4.1.6 The general duty of care required of individuals (the "duty holders") under the Health & Safety at Work Act, is, under the Regulations, interpreted specifically in relation to work on or near electrical systems, conductors and electrical equipment. This does not modify, reduce or replace the general duty of care in any other work activities.

4.1.7 There is a statutory duty on the employer and self-employed "to comply with the Regulations in so far as they relate to matters which are within his control".

4.1.8 Employees have a statutory duty, whilst at work, to co-operate with their employer in relation to matters affecting health and safety.

4.1.9 The duty imposed on duty holders is either absolute, i.e. the regulation must be complied with absolutely, regardless of cost or any other consideration, or is qualified, in some regulations, by the words "so far as is reasonably practicable". In this latter case the duty holder must assess the risks pertaining to a particular situation and the costs (in terms of the physical difficulty, time, trouble and expense) involved in eliminating those risks.

4.1.10 The Health & Safety Executive (HSE) publication "Memorandum of guidance on the Electricity at Work Regulations 1989" provides detailed guidance on the Regulations and it is recommended that it should be read generally by all personnel involved with work on, or near, electrical systems, and particularly by duty holders.

4.1.11 Various European Directives have supplemented the existing Regulations regarding the manufacture and distribution of products within the European Union (EU). These Directives place duties on manufacturers and suppliers of new work equipment and aim to achieve the free movement of products in the EU by removing different national controls and harmonising essential health and safety requirements. Article 100A Directives set out essential health and safety requirements, which must be satisfied before products can be sold in the EU.

4.1.12 Products which comply with the Directives must be given free circulation within the EU. Suppliers must ensure that their products comply with the legal requirements of the applicable Directives. In the beer and dispense industry the common directives are:

- Low Voltage Directive (2006/95/EC)

- EMC Directive (2004/108/EC)

4.2 Modified and refurbished electrical equipment

4.2.1 Modified and refurbished equipment is included within the scope of the Electrical Equipment (Safety) Regulations 1994. Where equipment is refurbished to its original specification it will be treated as second-hand equipment. However, if the refurbishment uses different types of components, then it will be considered as modified electrical equipment.

4.2.2 Modified equipment will need to be assessed by the person carrying out the modifications to determine whether the modification may have introduced hazards or risks which were not covered by the original design solution. If this assessment determines that the original manufacturers design has been modified, to such an extent that the original risk assessment no longer covers the equipment, then it is likely that the equipment would be considered as new equipment rather than second-hand equipment. This will require the person carrying out the modification to carry out all of those exercises required of an original manufacturer, for example preparation of a technical file, drawing up a declaration of conformity and placing the CE marking on the product.

4.3 Second-hand electrical equipment

4.3.1 The safety of second hand equipment, that is supplied in the course of business, is controlled by the Electrical Equipment (Safety) Regulations 1994. Second hand electrical equipment need not satisfy the CE marking requirement, and needs neither the EC Declaration of Conformity, nor the Technical Documentation. Equipment is classed as second hand if it has previously been supplied to an end user in the European Economic Area (EEA). An end user means the consumer and includes commercial and industrial consumers.

4.3.2 Whilst there is no mandatory requirement for second-hand equipment to undergo any safety testing, a supplier is required to supply only equipment that is safe, so as to avoid the committing of an offence, under the Electrical Equipment (Safety) Regulations 1994.

4.3.3 The supply of electrical equipment, that is in need of reconditioning or repair, to someone who carries on a business of repairing and reconditioning electrical equipment is excluded from the Electrical Equipment (Safety) Regulations 1994 by virtue of the Consumer Protection Act 1987. Similarly the sale of articles as scrap is also excluded. However, if the electrical equipment is subsequently supplied to someone who does not carry on such a business, it is subject to the requirements of the Electrical Equipment (Safety) Regulations 1994. Suppliers should note that second-hand equipment is excluded from CE Marking requirements.

4.4 Hired and leased electrical equipment

4.4.1 The safety of electrical equipment that is supplied, by way of hiring it out in the course of business, is also controlled by the Electrical Equipment (Safety) Regulations 1994.

4.4.2 Suppliers of such equipment must ensure that it satisfies the safety requirements, however, there is no requirement to comply with General Condition 1(b) of the Safety Objectives provided for in the Electrical Equipment (Safety) Regulations 1994.

4.4.3. Hired / leased equipment is to be considered as new equipment, when it is supplied for the first time to an end-user in the European Economic Area (EEA), and as second-hand, when further supplied.

4.5 End users

4.5.1 An "end user" is the consumer and includes commercial and industrial consumers, therefore a business that hires equipment must ensure that it is safe. Although there is no mandatory requirement for the equipment to undergo any safety testing, a supplier may consider such testing advisable, as a means of satisfying themselves that the equipment is safe.

4.6 Furnished accommodation

4.6.1 The Electrical Equipment (Safety) Regulations 1994, apply to any person who supplies electrical equipment in the course of a business. Therefore, the safety of any electrical equipment, that is supplied as part of furnished accommodation, that is hired, or let, in the course of a business, is controlled by the Regulations.

4.6.2. Equipment which is supplied as part of a furnished accommodation is treated as hired / leased equipment in the course of business and it is considered as second-hand, provided that it has been previously supplied to an end user in the European Economic Area (EEA).

4.6.3 Estate agents, letting agents and anyone else who hires or lets furnished accommodation are strongly advised to seek their own independent legal advice as to whether they do so in the course of a business. This is particularly relevant to Pub Chains who frequently lease furnished premises.

4.6.4 Suppliers of electrical equipment, supplied in the above manner, must ensure that it satisfies the safety requirements of the Electrical Equipment (Safety) Regulations 1994. As with other second hand equipment, there is no mandatory requirement for the equipment to undergo any safety testing, but a supplier may wish to arrange for testing to check the safety of any equipment.

4.7 Provision of information

4.7.1 Any special instructions, or requirements, for the safe installation and/or operation of fixed or stationary equipment, must be given to installers and users (whether for the purpose of operating or maintaining the equipment). It is recommended that the information is supplied with the equipment, either in the form of a permanently attached rating plate or, if the equipment is of such a small size as to make this impractical, supplied with the packing for the equipment.

4.7.2 Manufacturers and/or suppliers of electrical equipment, designed and intended to be used as a component within a system, have a duty to provide such information as will enable the designer of the system to ensure that the system, as designed, will be safe to install, use and maintain. Manufacturers should issue a statement in writing, with the

equipment, confirming that it has been manufactured and tested in compliance with current statutory requirements.

4.8 Understanding the duty holders responsibilities

4.8.1 This Code of Practice is concerned with electrical equipment confined within its scope. Electrical equipment used for, or associated with, beer dispensing is usually, although not always, owned or leased by the supplier of the equipment (predominantly the beer supplying brewery), who also usually undertakes responsibility for the installation, maintenance and service of the equipment, through his own, or a contracted organisation.

4.8.2 Because of the nature of the beer supply market, frequently more than one supplying brewery is involved, each taking responsibility for its own equipment. The licensed premises, where the equipment is installed, may be owned, or operated by, one of a number of types of organisation. It is clear that the responsibilities imposed under the various Regulations may fall upon a number of duty holders. From the outset, each duty holder should establish the extent of his duties.

4.8.3 The Brewers' Society booklet gives the following advice:

- "A licensee who is a tenant or owner / occupier is an employer and is the main duty holder. Tenant licensees should check their tenancy agreement to establish the extent to which he or his landlord is responsible for the maintenance and repair of any of the electrical installations and equipment.
- Where any responsibility lies with the landlord under the agreement, the tenant still remains responsible under the Regulations for establishing that the electrical systems in the public house are safe.
- "A licensee who is an employee (e.g. a licensed house manager or club steward) should seek guidance from his employer to establish which duties he will be required to undertake."

4.9 IEE Regulations

4.9.1 In England and Wales, the Building Regulations (Approved Document: Part P) require that electrical installations are designed and installed according to the principles given in British Standard BS 7671.

4.9.2 The IEE Wiring Regulations BS 7671 are the national standard to which all industrial and domestic wiring must conform. The current (17^{th} edition) Regulations contain many major changes in order to align with European documents. The IEE Wiring Regulations are produced by the IET, fully known as the Institution of Engineering and Technology.

4.9.3 The Standard sets out the following technical requirements intended to ensure that electrical installations conform to the fundamental principles:

a. Assessment of general characteristics

b. Protection for safety

c. Selection and erection of equipment

d. Inspection and testing

e. Special installations or locations.

4.10 Overview of the Electricity at Work Regulations 1989

4.10.1 The purpose of the Electricity at Work Regulation 1989 (Regulations) is "to require precautions to be taken against the risk of death or personal injury from electricity in work activities".

4.10.2 The Electricity at Work Regulations 1989 impose the duty on employers (and self-employed persons) to comply with the provisions of the Regulations in matters within their control and require precautions to be taken against the risk of death or personal injury from electricity in work activities.

4.10.3 In addition, employees have the duty to comply with the Regulations and to co-operate with their employer to enable their employer to comply with the Regulations.

4.10.4 The duty imposed on is either absolute, i.e. the Regulation must be complied with regardless of cost or any other consideration, or is qualified, by the words "so far as is reasonably practicable". In this latter case the duty holder must assess the risks pertaining to a particular situation and the costs (in terms of the physical difficulty, time, trouble and expense) involved in eliminating those risks.

4.11 Application of the Electricity at Work Regulations 1989

4.11.1 The Regulations apply to all work on, or near, electricity and apply equally to all electrical installations and equipment at work, whether permanent or temporary, fixed or portable, mains or battery operated. Any work performed on, or near, electricity must be done by someone who is competent to do that particular class of work.

4.11.2 Apart from the requirements of Part III of the Regulations (which apply to mines only) all the Regulations apply to licensed premises. Employees have a statutory duty to take reasonable care for the health and safety of themselves and others who may be affected by their acts or omissions, and must not abuse any electrical equipment or system.

4.11.3 The training and instruction of all persons who install, repair or use electrical equipment is of paramount importance. Anyone using electrical equipment must be instructed in its safe operation, including how and where to switch off and isolate it, when required. Employees should be made aware of the dangers associated with electricity, and the actions to be taken should any incidents occur.

4.11.4 The Regulations do not refer to "competent persons". There is a statutory obligation for persons "engaged in any work activity where technical knowledge or experience is necessary to prevent danger" to possess "such knowledge or experience, or is under such degree of supervision as may be appropriate having regard to the nature of the work". Persons competent to work on or near, electricity need not be trained electricians, but it is essential that they have adequate technical knowledge and experience, commensurate with the work activity they are undertaking, or are adequately supervised. The following are examples of what may constitute technical

knowledge and experience:

- adequate experience of electrical work
- adequate understanding of the system to be worked on and practical experience of that class of system
- understanding of the hazards which may arise during the work and the precautions which need to be taken
- ability to recognise at all times, whether it is safe for the work to continue.

Employers need to assess the class of electrical work to be undertaken, and to ensure that persons carrying out the required work are competent to do so.

4.12 Requirements of the Electricity at Work Regulations 1989

4.12.1 All electrical systems and equipment connected to the systems, are to be constructed and maintained, in such a way as to prevent danger.

4.12.2 Work activities, which include the operation, use and maintenance of electrical systems and equipment, must be carried out safely.

4.12.3 Equipment provided for the purpose of protecting persons working on, or near, electrical systems must be suitable for that use, and be properly maintained.

4.12.4 Equipment must be of sufficient strength and capability for its intended use without giving rise to danger. "Strength" includes electrical strength, as well as mechanical strength.

4.12.5 Where it is reasonably foreseeably that equipment may be subject to adverse or hazardous conditions, it must be of suitable construction, or be protected, as necessary to ensure its safe operation.

4.12.6 All conductors within a system must be either covered with insulating material and protected as necessary, or have suitable precautions taken, that will prevent danger.

4.12.7 Precautions must be taken, by earthing or other suitable means, to prevent danger when any conductor in a system becomes charged. The conductor may become charged as a result of normal operation, or due to a fault arising.

4.12.8 The integrity of earthing or other reference conductors, must be preserved. There must not be a way of breaking the conductor, or introducing high impedance into the conductor, if it can be expected to give rise to danger, unless suitable precautions are taken to prevent that danger.

4.12.9 To prevent danger, all connections and joints in a system must be mechanically and electrically suitable for their use.

4.12.10 To prevent danger every part of the system must be protected from being subject to excess current.

4.12.11 To prevent danger, equipment must be capable of being cut-off and isolated from its electrical supply. If any equipment is fed from more than one supply, then all supplies must be capable of being cut off and isolated, this requirement includes battery supplied electricity. Where the electrical equipment is itself a generator of electrical energy, precautions should be taken to prevent danger.

4.12.12 If equipment has been made dead to prevent danger whilst work is carried out on, or near, the equipment, precautions must be taken to prevent the equipment becoming electrically charged during the time that the work is carried out.

4.12.13 No-one must work on, or near, any live conductor (other than one which is suitably insulated to prevent danger) if danger may arise by such work activity, unless there is no suitable alternative and that suitable precautions are taken to prevent injury, including, where necessary, the provision of suitable protective equipment.

4.12.14 When working on, or near, electrical equipment, there must be adequate means of access, working space and lighting to allow the work to be carried out safely.

4.12.15 All personnel working on electrical systems and equipment must be adequately trained and competent, to ensure that the work is carried out safely, or supervised by such a person.

4.13 Electrical equipment

4.13.1 Manufacturers and/or suppliers of electrical equipment have a responsibility for ensuring that the equipment is designed and constructed to be fit for its purpose, and that the appropriate requirements of the Regulations are met. Any special instructions or requirements for the safe installation and/or operation of fixed or stationary equipment must be given to installers and users (whether for the purpose of operating or maintaining the equipment). It is recommended that the information given in Appendix E is supplied with the equipment, either in the form of a permanently attached rating plate or, if the equipment is of such a small size as to make this impractical, supplied with the packing for the equipment.

4.13.2 Manufacturers and/or suppliers of electrical equipment designed and intended to be used as a component within a system, have a duty to provide such information as will enable the designer of the system to ensure that the system, as designed, will be safe to install, use and maintain. Manufacturers should issue a statement in writing, with the equipment, confirming that it has been manufactured and tested in compliance with current statutory requirements.

4.13.3 The installer of the equipment must install the equipment in such a way as to prevent a risk of danger. This means that, in addition to installing the equipment in accordance with IEE Wiring Regulations and any statutory requirements (for example, local authority regulations), the installation must comply with any special instructions issued by the manufacturer. Where a piece of equipment is supplied as a number of separately identifiable components for "assembly" by interconnection during installation, only those items supplied by the manufacturer, or designer of the system should be used. No alternative unit should be substituted, unless the system designer

has deemed it safe to do so. Substitution of what appear to be identical components from different manufacturers (for some components, even, the same manufacturer) in a system at any stage after that system has been designed, can constitute a new design. "Mixing and matching" of apparently identical components can lead to overloading and, hence, danger.

4.13.4 During installation of equipment, care must be exercised so that any person working on or near the installation is not put at risk of injury. On completion of an installation, the installer should state, in writing, that the equipment is safe to use. Where equipment is supplied with electrical power from a fixed socket, care must be exercised to ensure that the supplying circuit is of such strength that it will not become overloaded by the installation of the equipment. Installation should include a functional test of the equipment.

4.13.5 Beer dispense equipment is normally owned by the (beer) supplying brewery, however this is not always the case; sometimes the equipment may be leased or rented. However the equipment is supplied, the responsibility for its maintenance should be clearly established.

4.13.6 Portable electrically powered tools and/or portable dispensing equipment may be taken onto licensed premises from time to time. Portable equipment must be safe to use, and the person responsible for the supply of such equipment may be required to provide evidence to the effect that the equipment is safe to use.

4.13.7 Suppliers of equipment who employ contractors for the installation, service, repair and/or maintenance should ascertain that the contractor is aware of their duties and obligations, and that the contractor is competent to carry out the specified work.

4.13.8 Care should be taken to ensure that only the correct rating and type of overcurrent protective device, such as a fuse or MCB, is installed in the equipment or the electrical supply to it. Where equipment is supplied through adjustable overload devices, such devices must be properly adjusted.

4.13.9 Where additions and/or alterations or modifications are carried out on existing installations, care must be exercised that the work is undertaken in such a way so as to not give rise, so far as is reasonably practical, to danger.

4.13.10 Equipment sent for overhaul and not provided with a rating plate giving the information, as appropriate, set out in Appendix E should be fitted with it at the time of the overhaul/refurbish. If access to the original design data is not possible, as much of the information as is available should be given.

4.13.11 Disused electrical equipment should be isolated from any source of electrical energy. Additionally, where disused equipment provided with a permanently attached cable and plug (and intended to be supplied by means of a plug and socket connection) is faulty, the plug should be removed to prevent accidental or casual reconnection to the supply.

4.14 Maintenance and inspection

4.14.1 There is a requirement on duty holders to maintain electrical equipment so as to prevent, so far as is reasonably practicable, danger. To comply with this requirement there is a need to establish maintenance, inspection and service programmes. Because of the variety of equipment type, working conditions and frequency of use, the programmes will call for different inspection and maintenance routines for different equipment. Whoever is responsible for the maintenance of the equipment should be responsible for drawing-up these maintenance and inspection regimes. Many factors need to be taken into account, for example:

- the type of equipment (e.g. size, weight, function)
- use of equipment (e.g., fixed, stationary, portable)
- electrical protection (e.g., class of insulation, fusing arrangement, other protection devices, earthing)
- mechanical protection (e.g., resistant to shocks, protection of conductors)
- environmental factors (e.g., position of installation, dampness, temperature, dusty atmosphere, likely to be exposed to water, likely abuse)
- history (e.g., previous inspection record)

4.14.2 The frequency of inspection and/or maintenance visits need not be the same for all equipment. When installed in different locations, it is possible for identical equipment to have different inspection' requirements if one of the above factors becomes a controlling factor. For example, some equipment, if located on the beer cellar floor, may have trailing cables and be exposed to sprayed water. The same equipment, when installed on the cellar wall, has no trailing cable and may be protected from sprayed water. Although the equipment is the same, it would sensible to have an inspection regime to reflect the differing circumstances of these two situations.

4.14.3 Inspection and test results should be recorded in an inspection/test log book. Results from previous inspections may be used in considering inspection/maintenance frequency. All inspection/test regimes should be subject to regular formal review. The maintenance/test records for all the installations under the duty holder's control should be consolidated for the review.

4.14.4 Inspections and/or tests should be specified, including acceptance criteria. (see Appendix F)

4.14.5 All work on dispense equipment should be carried out with the equipment isolated from every electrical power source. This applies whether the work to be done is of an electrical nature or not. If the equipment is such that work may be undertaken on it remote from the means of isolating the equipment, the method of working must ensure that the equipment cannot be re-energised by re-connection of the isolating means during the time the work progresses.

4.14.6 Isolation of equipment which is subject to automatic operation should remove all power sources from the equipment before work commences. When the power is re-

connected, the equipment must be capable of safe starting without imposing any risk of danger to anyone.

4.14.7 The desirability of isolating equipment before work commences may, on occasions, render it almost impossible to locate and repair faults within the system. The Regulations recognise this and lay out the conditions which must prevail before it is reasonable to allow work on or near live conductors. Dispense equipment is often operated at extra low voltage. Some voltages are sufficiently low (maximum 24 volts ac/dc) to allow safe servicing of the equipment with the conductors live. Such servicing should not be done without sufficient training and/or knowledge of the equipment concerned. Suitable test equipment must be available and used. The practice of working on live conductors is permissible only providing that the conditions imposed by Regulation 14 are met. There must be a proper consideration of any risks which are likely to occur, before such work commences. The arrangement of the equipment should be such that a person exposed to the extra low voltage cannot thereby be exposed to any other higher voltage. It must be possible to ascertain that any exposed conductive parts or conductors have not become subject to any higher voltages before the work commences. The person assessing the risks involved should be qualified to make the assessment and must be other than the person conducting the service. Procedures which need to be followed before commencing the work should be specified as, and constitute, part of the work activity. In no other circumstances should service on live conductors be allowed on site, unless the person involved is a qualified electrician and/or has adequate experience and knowledge of electricity and the equipment being tested. The HSE booklet "Electricity at Work, Safe Working Practices" gives advice on the procedures which should be adopted.

5. CE Marking requirements

5.1 Introduction

5.1.1 CE marking is a visible declaration by the manufacturer or his authorised representative that the electrical equipment to which it relates satisfies all the provisions of the Regulations. Equipment bearing the mark will be taken as meeting the requirements and thereby entitled to free circulation throughout the European Economic Area (EEA) provided that the equipment satisfies those requirements.

5.1.2 The CE marking requirements consist of three parts, all of which must be satisfied and include:

- the affixing of the mark;
- the drawing up of an EC Declaration of Conformity;
- compiling and holding the Technical Documentation.

5.1.3. CE marking should be affixed to the electrical equipment or, where this is not possible, to the packaging, the instruction booklet, or the guarantee certificate. Manufacturers or authorised representatives may decide for practical reasons to affix it to both the product and its packaging.

5.1.4. The mark must be visible, particularly to the enforcement authorities, easily legible and in

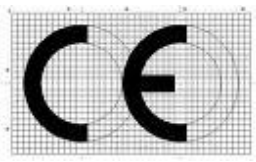
an indelible form. By affixing CE marking to the equipment, the manufacturer is making a statement that they have objective evidence that the equipment meets the requirements of all relevant Directives. It is for the manufacturer to decide which Directives are relevant to his equipment. These Directives are normally detailed on the Declaration of Conformity.

5.1.5. The presence of CE marking does not mean that the electrical equipment cannot be challenged by an enforcement authority if they have reasonable grounds for suspecting an infringement of the Regulations.

5.1.6. The Beer Dispense Industry and in particular those procuring electrical equipment should note that CE marking is not a European safety mark or quality symbol intended for "users" and should not be presented as such. Its purpose is to indicate to enforcement authorities that the electrical equipment to which it relates is intended for sale in the EEA and signifies a declaration, which is rebuttable, by the manufacturer or his authorised representative that the equipment satisfies the requirements and is entitled to access those markets.

5.1.7. It should also be noted that CE marking is specific only to a range of Directives. A list of these Directives is shown at "CE Marking Directives". It can only be applied to products covered by such Directives and under the conditions contained in them. While it is not an offence under the Regulations to affix CE marking to items which are not electrical equipment or covered by another Directive requiring CE marking, such an action could constitute an offence under section 1 of the Trade Descriptions Act 1968 and may result in prosecution and a subsequent fine. This can apply to any person in the supply chain.

5.2 Example of CE Mark



If the mark is reduced or enlarged the proportions given in the graduated drawing must be respected. The two letters of the CE marking must have substantially the same vertical dimension, which must not be less than 5mm. The grid does not form part of the mark and is for information only.

5.3 Non-CE Marked electrical equipment

5.3.1 Suppliers of non CE marked equipment will be required, if requested to do so by an enforcement authority, to give information which they have about:

- the date when the electrical equipment was first supplied in the EEA, and
- the basis on which the electrical equipment does not bear CE marking.

5.4 Marks other than CE Marking

5.4.1 Other marks, for example, an approval mark from a Certification Body, may appear on or with the equipment but they cannot be used to declare compliance with the Regulations, only CE marking can be used for this purpose. Any other marks that are present must not reduce the visibility or legibility of CE marking.

5.5 EC Declaration of Conformity

5.5.1 An EC Declaration of Conformity is a written declaration by the manufacturer or his authorised representative that the equipment to which the CE marking has been affixed complies with the requirements of the Regulations. For the purposes of the Regulations the Declaration must identify:

- the name and address of the manufacturer or his authorised representative established in the Community
- a description of the electrical equipment;

  (It is recommended that a full description is given including type, model and any other information that clearly relates the equipment to the Declaration)
- a reference to the harmonised standards that have been applied;

  (reference to standard numbers and/or clauses adopted should suffice)
- where appropriate, references to the specification with which conformity is declared;

  (This will apply where a harmonised standard has not been applied. In such circumstances reference should be made to the international standard or national standard that has been applied. If a standard has not been applied reference should be made to what other specifications have been adopted or to the Safety Objectives that have been applied and satisfied)
- the signatory who has been empowered to enter into commitments on behalf of the manufacturer or his authorised representative established within the Community;

  (This should identify an individual within the manufacturer's or his authorised representative's organisation)
- the last two digits of the year in which CE marking was affixed;
- a copy of the EC Declaration of Conformity must be kept with the technical documentation (see Technical Documentation).

5.5.2 A copy of the EC Declaration of Conformity is not required to accompany each product but a copy must be retained within the territory of the EEA by the manufacturer, the authorised representative or failing that the importer who first places the equipment on the market in the EEA. A copy of the Declaration must also be kept with the technical documentation (See Technical Documentation).

5.5.3 Where an enforcement authority has reasonable grounds for suspecting that a product does not satisfy the safety requirements, that authority may, by virtue of its powers under the Act, request that a copy of the Declaration be made available for inspection purposes within a reasonable time. Failure to provide a copy could amount to an offence under the Act.

5.6 Technical documentation

5.6.1 The Technical Documentation provides the enforcement authorities with the means of assessing the conformity of the electrical equipment to the requirements of the

Regulations. It must, as far as is relevant for such assessment, cover the design, manufacture and operation of electrical equipment. The Documentation must include:

- a general description of the electrical equipment

  (This requirement could normally be met by the description (including model number etc) found in the users handbook)

- conceptual design and manufacturing drawings and schemes of components, sub-assemblies, circuits etc.

  (This could be met by a general assembly drawing and / or photographs plus a block diagram. The drawings should relate to a particular model number and year of manufacture. Circuit diagrams may also be required)

- descriptions and explanations necessary for the understanding of the drawings and schemes referred to above and the operation of the electrical equipment

  (To some extent the users handbook may meet this requirement but it may be necessary to include a schematic operation description)

- a list of the standards applied in full or in part and descriptions of the solutions adopted to satisfy the safety requirements of the Regulations / Directive where standards have not been applied

  (This refers to the harmonised standards that have been applied in full or in part. If a harmonised standard has not been applied a list of either the international or national standards should be provided. If no standards have been applied references should be made as to how the safety requirements have been satisfied)

- results of design calculations made, examinations carried out, etc.

  (In many cases test reports will meet this requirement if they can demonstrate that the design calculations have been made correctly)

- test reports

  (This could include test reports drawn up by the manufacturer, a notified body or any other person the manufacturer considers to be competent)

- a copy of the EC Declaration of Conformity (See Declaration of Conformity).

5.6.2 To assist UK manufacturer's and authorised representatives the above guidance has been agreed with the enforcement authorities in the UK on what may be incorporated to make up the various elements of the Technical Documentation. If there is any doubt, manufacturers are strongly advised to contact either their local authority trading standards department (for consumer products) or the local Office of the Health and Safety Executive (for industrial products).

5.6.2 It is the manufacturer's responsibility to compile the relevant Documentation whether he is established in the EEA or not. However, the information must be kept within the EEA for inspection purposes (see below) and this responsibility will fall on either:

- the manufacturer, if he is based in the EEA; or
- the authorised representative; or
- the person who first places the equipment on the market in EEA countries.

5.6.3 The documentation does not have to be assessed by an approved body but it must be possible to identify whether or not the equipment has undergone any independent testing, certification or approval. The documentation must also be kept for a period of not less than 10 years after manufacture of the equipment to which it relates has ceased.

5.7 Internal production controls

5.7.1 The manufacturer is responsible for ensuring that his manufacturing process is such that the production of the electrical equipment conforms to that described in the relevant Technical Documentation.

5.8 Inspection of the EC Declaration of Conformity

5.8.1 If there are reasonable grounds for suspecting that a product is unsafe the enforcement authorities may request that the EC Declaration of Conformity and/or Technical Documentation is made available for inspection purposes within a reasonable period of time. Failure to make the documentation available could amount to an offence under the Act.

5.8.2 If there is any doubt about the content of either the EC Declaration of Conformity or the Technical Documentation or should a request be made to inspect any of this information, suppliers should contact their local authority trading standards department or Office of the Health and Safety Executive for advice.

5.9 Language of the EC Declaration of Conformity

5.9.1 The Regulations do not contain any specific provisions concerning the language of either the EC Declaration of Conformity or the Technical Documentation. However, it is reasonable to expect that this information should be in one of the official languages of the EEA (e.g. English, French or German etc). A translation into a specific language should only be necessary if it is not possible to understand the content of documentation.

EC DECLARATION OF CONFORMITY

(in accordance with EN ISO 17050-1:2004)

We Hot Buns Ltd
Of Unit 29, Balm Cake Industrial Estate, Cobland, AB12 C34, UK

In accordance with the following Directive(s):

2006/95/EC	The Low Voltage Directive
2004/108/EC	The Electromagnetic Compatibility Directive
98/37/EC	The Machinery Directive

Hereby declare that:

Equipment	Oven
Model Number:	Very Hot 1
Serial Number:	10000C

Is in conformity with the applicable requirements of the following documents:

Ref No.	Title	Edition/Date
BS EN 746-1	Industrial thermoprocessing equipment. Common safety requirements for industrial thermoprocessing equipment	1997
EN 60204-1	Safety machinery. Electrical equipment of machines. General requirements	2006
BS EN 61000-6-1	Electromagnetic compatibility (EMC). Generic standards. Immunity for residential, commercial and light-industrial environments	2001
BS EN 61000-6-3	Electromagnetic compatibility (EMC). Generic standards. Emission standard for residential, commercial and light-industrial environments	2001

I hereby declare that the equipment named above has been designed to comply with the relevant sections of the above referenced specifications. The unit complies with all applicable Essential Requirements of the Directives.

Signed:

AB

Name: Andy Ball

Position: Chief Baker

Location: Cobland

On: 1st January 2010

CE09

Document ref. No.
1234/01A1234

5.10 The Safety Requirements

5.10.1 All electrical equipment must be:

Safe

(This has the same meaning as in section 19(1) of the Sale of Goods Act, in that there should be no risk, apart from one reduced to a minimum, that the electrical equipment will in any way cause death or personal injury to any person. However, to comply with the terms of the Directive this meaning has been extended to include the risk of death or injury to domestic animals and damage to property)

Constructed in accordance with principles generally accepted within Member States as constituting good engineering practice in relation to safety matters

(Electrical equipment is generally considered to be constructed in accordance with good engineering practice if it is manufactured to comply with the specifications of a harmonised standard (See Harmonised Standard) or, in their absence, to an equivalent level of safety to that provided by such a standard. However, use of a standard, though advised, is not mandatory - the legal requirement is to comply with the requirements of Annex 1 of the Regulations)

Electrical equipment shall be designed and constructed to ensure that it is safe when connected to the electricity supply system by providing a level of protection against electric shock which relies upon a combination of insulation and the protective earthing conductor contained within the electricity supply system or which achieves that level of safety by other means

(Electrical equipment will be presumed to satisfy this requirement if it is constructed to include protective earthing, is double insulated or provides an equivalent level of safety. For further guidance suppliers should refer to the relevant harmonised standards which may be purchased from the British Standards Institution)

Designed and constructed to conform to the Principal Elements of the Safety Objectives.

(The Principal Elements of the Safety Objectives ("the Safety Objectives") must be satisfied if the electrical equipment is to be taken to meet the safety requirements of the Regulations. It is for the manufacturer to decide on how these objectives should be met but it should be remembered that a presumption of conformity with the safety requirements will be afforded to electrical equipment which has been designed and constructed to meet the specifications of a harmonised standard)

5.11 How to comply with the safety requirements

5.11.1 Electrical equipment that is constructed to meet the safety provisions of one of the following in an accepted hierarchy of standards and requirements will be taken to satisfy the safety requirements of the Regulations, unless there are reasonable grounds for suspecting that it does not so comply.

5.12 Harmonised Standards

5.12.1 Electrical equipment which complies with the safety provisions of a harmonised Standard

will be presumed to comply with the safety requirements of the Regulations. Standards are regarded as being harmonised once they have been drawn up by common agreement between the National Standards Bodies notified to the European Commission by the Member States under Article 5 of the Low Voltage Directive. The United Kingdom National Standards Body is the British Standards Institution (BSI).

5.12.2 In drawing up a harmonised standard the relevant CENELEC (the European standards making body) technical committee ensures that the agreed standard takes into account the Safety Objectives of the Low Voltage Directive (See Principal Elements of the Safety Objectives for Electrical Equipment Designed for Use within Certain Voltage Limits).

5.12.3 Although harmonised standards and their amendments have equal validity in all Member States they may include a Special National Condition/s for individual Member States that will require a departure from the general specifications, (in general due to the differences such as climate or in the electrical supply system and wiring rules in various Member States).

5.12.3 Manufacturers who wish to supply their products in the EEA as a whole or in selected State's markets are therefore advised to ensure that their equipment complies with any such conditions that may exist for the market/s concerned and which are noted in the relevant standards.

5.12.3 The British Standards Institute (BSI) are responsible for publishing harmonised standards and any amendments as identically worded British Standards. Copies of the standards can be purchased from BSI.

5.12.4 A list of harmonised standards that have been drawn up by common agreement under the Low Voltage Directive is periodically published in the *Official Journal of the European Communities* ("the Official Journal"). This publication may be purchased from The Stationery Office Ltd. The list of harmonised standards may also be viewed on the Commission website at:

http://europa.eu.int/comm/enterprise/newapproach/standardization/harmstds/reflist.html

5.13 International Standards

5.13.1 Where no relevant harmonised standard exists, electrical equipment which complies with the specification of a standard published by the International Electrotechnical Commission (IEC) (details of which have been published by the European Commission in the *Official Journal*) will be presumed to comply with the safety provisions of the Regulations. Such standards will only be published if the Commission is satisfied that they adequately reflect all relevant Safety Objectives.

5.13.2 Suppliers should note that to date this option has not been activated, as IEC standards are normally accepted by CENELEC with common modifications for the European market.

5.14 National Standards

5.14 Where no relevant harmonised standard or international standard exists, electrical equipment will be presumed to comply with the safety provisions of the Regulations, if it

is constructed to conform to the safety provisions of either:

- a published British Standard; or
- a published standard of the Member State of the manufacturer;

(provided that such a national standard does in fact satisfy the safety requirements of the Regulations)

5.15 Electrical Equipment that does not conform to any published standard

5.15.1 Electrical equipment that does not conform to any of the accepted hierarchy of standards, perhaps because it is an innovative product, must nevertheless comply with the basic requirement to be safe. Manufacturers and suppliers of such products will need to consider what steps to take to satisfy themselves as to the compliance of the electrical equipment with the requirements of the Regulations.

5.16 Use of Notified Bodies

5.16.1 Where electrical equipment has not been manufactured to comply with the specifications of one of the above standards, suppliers may consider it prudent to have the equipment assessed for safety by a notified body or other independent third party. Third party tests are not mandatory but if there are any doubts about the safety of the equipment such a report may help establish that it is safe.

5.16.2 Notified Bodies are appointed for their ability to assess products to the requirements of the Directives.

6 Transformers and Enclosures

6.1 General

6.1.1 A safety transformer must be used to supply SELV and PELV systems and it comply with the requirements of BS EN 61558-2-6: 2009 (Safety of power transformers, power supply units and similar products for supply voltages up to 1 100 V – Part 2-6: Particular requirements and tests for safety isolating transformers and power supply units incorporating safety isolating transformers).

6.1.2 BS EN 61558-2-6: 2009 covers transformers with a rated supply voltage not exceeding 1100 volts, an output voltage not exceeding 50 volts a.c. or 120 volts ripple-free d.c. and the rated output not exceeding:

- 10 kVA for single phase transformers
- 16kVA for polyphase transformers.

6.1.3 Transformers are often employed in equipment used for, or in connection with, beer storage and dispense. They are used, generally, to reduce the voltage of the incoming electrical supply for safety reasons. Examples of their most common use are the following situations:

- to supply electrical energy from a portable unit at a reduced voltage to portable tools used for the installation, modification, extension, alteration, maintenance

and removal of dispense equipment

- to supply electrical energy from a fixed unit at a reduced voltage to electric pumps, both portable and fixed
- to supply electrical energy from a fixed unit at a reduced, voltage or a functional extra-low voltage to fixed or portable cellar tank lighting
- to supply electrical energy from a fixed unit at a functional extra-low voltage to beer dispense and associated equipment
- as a component in an electronic circuit or the power supply of electronic equipment used in or associated with beer dispense. These applications require special consideration and are not within the scope of this section.

6.2 Construction

6.2.1 Transformers should be designed to a written specification, and purchased in accordance with the specification. The specification should encompass the following requirements:

a. The design should comply with the appropriate sections of BS EN 61558-2-1: 2007

b. The insulation between input and output winding/s shall consist of double or reinforced insulation, rated for the working voltage (unless the requirements of 3f. are complied with). In addition the following shall apply:

- For class I transformers not intended for connection to the mains supply by means of a plug, the insulation between the input windings and the body connected to earth shall consist of at least basic insulation rated for the input voltage. The insulation between the output windings and the body connected to earth, shall consist of at least basic insulation, rated for the output voltage
- For class I transformers intended for connection to the mains supply by means of a plug, the insulation between the input windings and the body shall consist of at least basic insulation and the insulation between the output windings and the body shall consist of at least supplementary insulation (both basic and supplementary insulation rated for the working voltage);
- For class II transformers, the insulation between the input windings and the body shall consist of double or reinforced insulation, rated for the input voltage. The insulation between the output windings and the body, shall consist of double of double or reinforced insulation, rated for the output voltage, for SELV circuits' basic insulation only is required.

c. For transformers with intermediate conductive parts (e.g. the iron core) not connected to the body and located between the input and output windings, the following requirements are acceptable:

- For class I and class II transformers, the insulation between the input and output windings via the intermediate conductive parts shall consist of double or reinforced insulation, rated for the working voltage
- For class II transformers, the insulation between the input windings and the body, and between the output windings and the body via the intermediate conductive parts shall consist of double or reinforced insulation, rated for the input and output voltages, for SELV circuits basic insulation only is required

- For transformer different from independent (IP00), the insulation between the input and output windings via the intermediate conductive parts shall consist of double or reinforced insulation, rated for the working voltage.

d. As an alternative to c. above, for class I transformer not intended to be connected by means of a plug and for transformer different from independent (IP00), if the construction assure that all laminated plated of the iron core are connected to the earth (e.g. by soldering or welding) and if in the data sheet or instruction sheet clearly state that the safety of the transformer depends on the earth connection and that is not possible to use in class II equipment, that the following apply: the insulation between the input winding and the intermediate conductive part connected to earth, and between the output windings and the intermediate conductive part connected to earth, shall consist of at least basic insulation, rated for the input and output voltage.

e. In addition to 3c. and 3d., the insulation between the intermediate conductive parts and the input windings shall consist of at least basic insulation, rated for the input and output voltage. An intermediate conductive part not separated from the input or output windings or the body by at least basic insulation is considered to be connected to the relevant parts/s.

f. For class I transformers not intended for connection to the mains supply by means of a plug, the insulation between the input and output windings may consist of basic insulation plus protective screening instead of double or reinforced insulation, provided the following conditions are complied with:

- The insulation between the input winding and the protective screen shall comply with the requirements for basic insulation, rated for the input voltage
- The insulation between the protective screen and the output winding shall comply with the requirements for basic insulation, rated for the output voltage
- The protective screen shall, unless otherwise specified, consist of a metal foil or of a wire wound screen extending at least the full width of the input winding and shall have no gaps or holes
- Where the protective screen does not cover the entire width of the input winding, additional adhesive tapes or equivalent insulation shall be used to ensure double insulation in that area
- If the protective screen is made of a foil, the turns shall be insulated from each other. In case of only one turn, it shall have an isolated overlap of at least 3 mm
- The wire of a wire wound screen and the lead out wire of the protective screen shall have a cross-sectional area at least corresponding to the rated current of the overload device to ensure that if a breakdown of insulation should occur, the overload protective device will open the circuit before the lead-out wire is destroyed
- The lead-out wire shall be soldered to the protective screen or secured in an equally reliable manner.

For the purpose of 3f., the term "winding" does not include internal circuits

g. There shall be no connection between output circuits and the protective earth, unless this is allowed for associated transformers by the relevant equipment

standard.

h. There shall be no connection between output circuits and the body, unless this is allowed for associated transformers by the relevant equipment standard.

i. The input and output terminals for the connection of external wiring shall be so located that the distance measured between the points of introduction of the conductors into these terminals is not less than 25 mm. If a barrier is used to obtain this distance, the measurement shall be made over and around the barrier which shall be of insulating material and permanently fixed to the transformer.

j. Portable transformers having a rated output not exceeding 630 VA shall be class II.

k. There shall be no connection between the output circuits and the body, unless – for associated transformers – is allowed by the relevant equipment standard.

l. For transformers for connection to the mains by the means of a plug of any type (incorporating or not), the alternative with basic insulation plus protective screening is not allowed.

6.3 Protection against electric shock

6.3.1 Transformers shall be enclosed and provided with adequate protection against contact with hazardous live parts and shall have no risk of an electric shock from stored charge on capacitors.

6.3.2 Transformers shall be constructed to provide adequate protection against accessibility to hazardous live parts.

- the insulation between the protective screen and the output winding shall comply with the requirements for basic insulation, rated for the output voltage

6.3.3 The insulating properties of lacquer, enamel, paper, cotton, oxide film on conductive parts and sealing compound shall not be considered as giving the required protection against accidental contact with hazardous live parts.

6.4 Terminals for external conductors

6.4.1 Transformers intended to be permanently connected to fixed wiring, and transformers other than those provided with external flexible cords with type Y or Z attachments shall be provided with terminals in which connection is made by means of screws, nuts or equally effective devices.

6.4.2 For transformers with type X attachment, soldered connections may be used for external conductors, provided that the conductor is so positioned or fixed that reliance is not placed upon soldering alone to maintain the conductor in position, unless barriers are provided so that creepage resistance and clearance between hazardous live parts and other conductive parts cannot be reduced to less than 50% of the values specified in Clause 26 of BE EN 61558-1, should the conductor break away at the soldered joint.

6.4.3 For transformers with type Y and Z attachments, soldered, welded, crimped and similar connections may be used for external conductors.

6.4.4 For class II transformers, the conductor shall be so positioned or fixed that reliance is not placed upon soldering, crimping, or welding alone to maintain the conductor in position, unless barriers are provided so that creepage distances and clearances between hazardous live parts and other conductive parts cannot be reduced to less than 50% of the values specified in Clause 26 of BE EN 61558-1, should the conductor break away at the soldered or welded joint, or slip out of the crimped connections.

6.4.5 Terminals for type X attachment with a special cord, and types Y and Z attachments shall be suitable for their purpose.

6.4.6 Terminals, other than those with type Y or Z attachments, shall be so fixed that when the clamping means is tightened or loosened, the terminal does not loosen up, internal wiring is not subjected to stress, and creepage distances and clearances are not reduced below the values specified in Clause 26 of BE EN 61558-1.

6.4.7 Terminals other than those with type Y or Z attachments shall be so designed that they clamp the conductor between metallic surfaces with sufficient contact pressure, and without damage to the conductor.

6.4.8 Terminals provided for connection to fixed wiring, and terminals with type X attachment shall be located near their associated terminals of different polarities and the protective earth, if any.

6.4.9 Terminal blocks and similar devices shall not be accessible without the aid of a tool, even if the hazardous parts are not accessible.

6.4.10 Terminals or terminations of transformers with type X attachment shall be so located or shielded that, should a strand of wire from a stranded conductor pull out when the conductors are fitted, there shall be no risk of accidental connection between live parts and accessible conductive parts, and in the case of class II transformers, between live parts and conductive parts separated from accessible conductive parts by supplementary insulation only.

6.4.11 Terminals without pressure plate shall be provided with at least two clamping screws if the current exceeds 25 A.

6.4.12 Terminal screws, other than screws of terminals for the connection of protective earth conductors shall not come into contact with any accessible conductive parts. For class II transformers, they shall also not touch any conductive parts separated from accessible conductive parts by basic or supplementary insulation only when the screws are loosened up as far as possible.

6.5 Provisions for protective earthing

6.5.1 Accessible conductive parts of class I transformers which may become live in the event of an insulation break down shall be permanently and reliably connected to a protective earth terminal within the transformer.

6.5.2 Class II transformers shall have no provision for earthing the transformer except

for functional purposes.

6.5.3 Protective earth terminals for connection to fixed wiring, and protective earth terminals with type X attachment shall comply with the requirements of Clause 23 of BE EN 61558-1. Their clamping means shall be adequately locked against accidental loosening, and it shall not be possible to loosening, and it shall not be possible to loosen them without the aid of a tool.

6.5.4 All parts of the protective earth terminal shall be such that there is no risk of corrosion resulting from contact between these parts and the copper of the protective earth conductor, or any other metal that is in contact with these parts.

6.5.5 If the body of the protective earth terminal is part of the enclosure of aluminium or aluminium alloy, precautions shall be taken to avoid the risk of corrosion resulting from contact between copper and aluminium or its alloys.

6.5.6 If the body of the protective earth terminal shall be of brass or other metal not less resistant to corrosion, unless it is a part of the metal frame or enclosure, in which case, the screw or nut shall be of brass or other metal equally resistant to corrosion.

6.5.7 The connection between the protective earth terminal and parts required to be connected thereto shall be of low resistance.

6.5.8 For class I transformers with external flexible cables or cords, the arrangement of the terminals, or the length of the conductors between the cord anchorage and the terminals, shall be such that the current-carrying conductors are stretched before the protective earth conductor if the cord pulls out of the cord anchorage.

6.6 Markings and other information

6.6.1 Transformers shall be marked with the:

a. rated supply voltage/s or the rated supply voltage range/s in volts

b. rated output voltage/s in volts or kilovolts

c. rated output in volt-amperes or kilovolt-amperes and volt-amperes reactive or kilovolt amperes reactive for reactors

d. rated output current/s in amperes or milliamperes as an alternative to the marking of the rated output

e. rated supply frequency/ies in hertz

f. rated power factor, if other than unity for transformers rated above 25 VA

g. symbol or abbreviation AC for alternating current or DC for direct current output

h. symbol indicating the kind of transformer as indicated in the relevant part 2 of BS EN 61558; if an IP00 transformer or and associated transformers have circuits corresponding to different parts 2 in the same construction (e.g. SELV output circuit according to Part 2-6 and 230 V output circuit according to Part 2-4) the relevant symbols have to be used.

i. name or trade mark of the manufacturer or responsible vendor

j. model or type reference

k. vector group in accordance with IEC 60076-1 (for three-phase transformers if required)

l. symbol for class II construction, for class II transformers only

m. symbol for class III construction, for class III transformers only

n. indication of the protection index IP, if other than IP00

o. rated maximum ambient temperature ta, if other than 25 °C; *It is recommended that the values of ta are given in steps of 5 °C*

p. rated minimum ambient temperature tamin ,if lower than + 10 °C and if a temperature sensitive device is used.

q. *It is recommended that the values of tamin are given in steps of 5 °C.*

r. duty cycle, if any, unless the operating time is limited by the construction of the transformer or corresponds to the operating conditions specified in the relevant part 2. The marking of short-time duty cycle or intermittent duty cycle shall correspond to normal use. The operating time for transformers with short-time duty shall be expressed in seconds (s) or minutes (min); the operating time and the resting time of transformers with intermittent duty cycle shall be expressed in seconds (s) or minutes (min), separated by an oblique stroke

s. declared values of the rated maximum operating temperature of the winding, increase in multiples of 5 °C and indication of the rated life expectancy, for tw-marked transformers only

t. transformer/s to be used with forced air cooling where the fan is not a part of the transformer shall be marked with “AF” followed by the air speed, expressed in m/s.

u. In addition, the manufacturer shall be prepared to provide the purchaser with the following information (in the literature or otherwise):

- for stationary transformers with a rated output exceeding 1 000 VA, the short-circuit voltage expressed as a percentage of the rated supply voltage
- the electrical function of the transformer.

If the transformer has more than one output winding,

6.6.2 Transformers with protection index IP00, or associated transformers, may be marked with only the name (or trade mark) of the manufacturer or responsible vendor and the type reference (or catalogue reference). Other characteristics shall then be provided in the data sheets of the transformer or the manufacturer’s instruction sheet. This information shall enable the replacement of the original transformer with an equivalent transformer.

6.6.3 If the transformer can be adjusted for different rated supply voltages, the adjusted voltage shall be easily and clearly discernible.

6.6.4 Transformers with tapped or multiple output windings shall be marked with:

- the rated output voltage for each tapping or winding, unless the transformer is

intended for special purposes involving frequent changes in output voltage

- the rated output for each tapping or winding; if the rated output for all tapings or windings is the same, at least one tapping or winding shall be marked.

The arrangement of the connections necessary to obtain the various output voltages shall be clearly indicated on the transformer.

6.6.5 Non-inherently short-circuit proof transformers with incorporated fuses and nonshort-circuit proof transformers designed to be protected by fuses shall, in addition, be marked with the rated current (amperes or milliamperes) of the protecting fuse-link, followed or preceded by the symbol for the time current characteristics of the fuses in accordance with the relevant publication, if applicable.

6.6.6 Non-inherently short-circuit proof transformers with incorporated replaceable protective devices other than fuses, and non-short-circuit proof transformers designed to be protected with protective devices other than fuses shall, in addition, be marked with the manufacturer's model or type reference of the protective device, and/or the ratings of the protective device.

In addition, a symbol in accordance with Annex V can be used.

Non-inherently short-circuit proof transformers with non-replaceable protective devices need no additional marking regarding the protective device.

The marking shall contain sufficient information to ensure proper replacement of the protective device.

6.6.7 When replaceable protective devices other than fuses are used, appropriate information about their replacement shall be provided in an instruction sheet or the equivalent accompanying the transformer.

6.6.8 Terminals intended exclusively for the neutral conductor shall be identified by the symbol for neutral.

6.6.9 Protective earth terminals shall be identified by the symbol for earthing.

Terminals of input and output windings shall be clearly identified.

6.6.10 If any point of a winding or a terminal is connected to the frame or core, it shall be marked with the relevant symbol.

6.6.11 Transformer shall be provided with markings clearly indicating the manner in which the transformer is to be connected, unless it is evident from the design of the transformer.

6.6.12 For transformers with type X, Y and Z attachments, the instruction sheet shall contain the following information or the equivalent:

- for type X attachments having a specially prepared cord:

  "If the external flexible cable or cord of this transformer is damaged, it shall be replaced by a special cord or assembly available from the manufacturer or his service agent";

- for type Y attachments:

  "If the external flexible cable or cord of this transformer is damaged, it shall be

replaced by the manufacturer or his service agent or a similar qualified person in order to avoid a hazard";

- for type Z attachments:

  "The external flexible cable or cord of this transformer cannot be replaced; if the cord is damaged, the transformer shall be scrapped".

6.6.13 Transformers for indoor use only shall be marked with the relevant symbol.

6.6.14 Class II transformers shall be marked with the graphical symbol IEC 60417-5172 (DB:2002-10) placed adjacent to the supply information (e.g. on the rating plate), such that it is obvious the symbol is part of the technical information and can in no way be confused with the manufacturer's name or any other identification (see 7.2.3 of IEC 61140).

6.6.15 Class II transformer with parts to be mounted, shall be delivered with all parts which make them class II after mounting according to the mounting instruction of the manufacturer and shall be marked with the class II symbol. Moreover, if the transformer can be mounted without the covers (e.g. on a distribution box), the marking for class II shall be placed on a part which, effectively, provides the class II characteristics (e.g., on a cover for terminal to connect to the supply).

6.6.16 When symbols are used on equipment or in instructions, they shall be in accordance with Clause 8.11 of BS EN 61558-1.

6.6.17 The different positions of regulating devices and the different positions of switches shall be indicated by figures, letters or other visual means.

6.6.18 If numbers are used for indicating the different positions, the "off" position shall be indicated by the figure "0" and the position for a greater output, input, etc. shall be indicated by a higher figure.

6.6.19 The figure "0" shall not be used for any other indication. Indications used shall be comprehensible without the knowledge of languages, national standards, etc.

6.6.20 Marking shall not be placed on screws or other easily removable parts.

6.6.21 Marking shall, with the exceptions mentioned below, be clearly discernible when the transformer is ready for use.

6.6.22 Marking related to the terminals shall be so positioned that it is clearly discernible, if necessary after removal of the cover; it shall be such that there can be no confusion between input terminals and output terminals.

6.6.23 Marking related to the interchangeable protective devices shall be positioned adjacent to the bases of these devices, and shall be clearly discernible after removal of any cover and the protective device.

6.6.24 Information shall be provided when it is necessary to take special precautions for installation or use (in the catalogue, data sheet or instruction sheet):

- non-inherently short-circuit proof transformer with non-self-resetting or non-replaceable protective device and non-replaceable intentional weak parts shall have an information explaining the protective devices cannot be reset or replaced after a short-circuit or an overload
- for transformers generating a protective earth conductor current greater than 10 mA and are intended for permanent connection, the protective earth conductor current shall be clearly stated in the instruction and indication shall be given that the installation shall be made according to the wiring rules
- for associated transformers and IP00 transformers, an informative note shall indicate that a 10 % over or under voltage may appear in the supply and the rated output of the transformer shall be selected accordingly
- for stationary transformers with a rated output exceeding 1 000 VA, the short-circuit voltage expressed as a percentage of the rated supply voltage;
- the electrical function of the transformer
- the limiting temperature of the winding under abnormal conditions which shall be respected when the transformer is built into an appliance as information for appliance design
- for tw transformers, the specified constant S other than 4 500 , the symbol S together with its appropriate value in thousands, (e.g., ”S6”, if S has a value of 6 000)

  Preferred values of S are: 4 500, 5 000, 6 000, 8 000, 11 000 and 16 000
- for transformers not designed for series and/or parallel connection with more than one output winding, that the transformer is not intended for series/parallel connection.

6.6.25 Marking shall be durable and easily legible.

6.7 Supply connection and other external flexible cables or cords

6.7.1 All cables, flexible cords and connecting means referred to in this clause shall have appropriate current and voltage ratings suitable for the ratings of the **transformers** to which they are connected.

6.7.2 Separate entries shall be provided for the input and output wiring.

6.7.3 Inlet and outlet openings for external wiring shall be so designed that the protective covering of the cord can be introduced without risk of damage.

6.7.4 Inlet and outlet openings for flexible cables or cords shall be of insulating material, or be provided with bushing of insulating material which is substantially free from ageing effects under conditions expected in service. The openings of bushings shall be so shaped as to prevent damage to the cord.

6.7.5 Bushings for external wiring shall be reliably fixed, and shall be such that they are unlikely to be damaged by the material in which they are mounted.

6.7.6 Bushings shall not be of natural rubber unless they form part of a cord guard.

6.7.7 Fixed transformers shall be so designed that, after the transformer has been fixed to its support in the normal way, it shall be possible to connect the rigid or flexible conductors of the external wiring.

6.7.8 Transformers other than those intended to be permanently connected to fixed wiring may be provided with an appliance inlet on the input side.

6.7.9 The space for the wires inside the transformer shall be adequate to allow the conductors to be easily introduced and connected, and the cover, if any, fitted without risk of damage to the conductors or their insulation.

6.7.10 It shall be possible to connect the external supply wires to terminals without their insulation coming into contact with hazardous live parts of a different polarity, including live parts of the output circuits.

6.7.11 For portable transformers provided with power supply cords, the length of the cord shall

- not exceed 2 m for cross-sectional area of 0.5 mm^2
- exceed 2 m for cross-sectional areas greater than 0.5 mm^2.

6.7.12 Power supply cords of both transformers with protection index of IPX0 and transformers for “indoor use only” with protection index higher than IPX0, shall be as follows:

- for transformers with a mass not exceeding 3 kg, not lighter than light polyvinyl chloride sheathed flexible cable or cords (60227 IEC 52) or ordinary tough rubber sheathed flexible cable or cords (60245 IEC 53);
- for transformers with a mass exceeding 3 kg, not lighter than ordinary polyvinyl chloride sheathed flexible cable or cords (60227 IEC 53) or ordinary tough rubber sheathed flexible cable or cords (60245 IEC 53)
- Power supply cords of transformers with protection index higher than IPX0, except for transformers for “indoor use only”, shall be polychloroprene sheathed cord and shall not be lighter than ordinary polychloroprene sheathed cord (60245 IEC 57).

6.7.13 Power supply cords may be cord sets fitted with appliance couplers in accordance with IEC 60320, provided the transformers are single-phase portable transformers with input current not exceeding 16 A at the rated output.

6.7.14 The nominal cross-sectional area of external flexible cables or cords shall not be less than shown in Table 9 of BS EN 61558-1.

6.7.15 Each Power supply cord of class I transformers shall have a green/yellow coloured cord connected to the protective earth terminal of the transformer and to the protective earth contact of the plug, if any.

6.7.16 Power supply cords of single-phase portable transformers having an input current at rated output not exceeding 16 A shall be provided with plugs complying with IEC 60083

or IEC 60906-1. Other portable transformers may be provided with plugs complying with IEC 60309.

6.7.17 External flexible cables or cords shall be attached to the transformer by type X, Y or Z attachments unless otherwise specified in the relevant part 2.

6.7.18 For type Z attachments, moulding the enclosure of the transformer and the external flexible cable or cord together shall not affect the insulation of the cord.

6.7.19 Inlet openings shall be designed and shaped, or be provided with an inlet bushing such that the protective covering of the external flexible cable or cord can be introduced without risk of damage.

6.7.20 The insulation between the conductor and the enclosure shall consist of the insulation of the conductor and, in addition:

- for class I transformers, at least basic insulation; and
- for class II transformers, at least double or reinforced insulation.

The sheath of an external flexible cable or cord equivalent to at least that of a cord complying with IEC 60227 or 60245 is regarded as basic insulation.

A lining or a bushing of insulating material in a metallic enclosure is only regarded as supplementary insulation if it complies with the relevant requirements.

An enclosure of insulating material is regarded as reinforced insulation, in which case, two separate insulations are not necessary.

6.7.21 Inlet bushings shall:

- be so shaped as to prevent damage to the external flexible cable or cord;
- be reliably fixed;
- not be removable without the aid of a tool; and
- not be of natural rubber, except if it is an integral part of the rubber sheath of the external flexible cable or cord for type X with a special cord, type Y and type Z attachments for class I transformers.

6.7.22 Transformers provided with cords which are moved while in operation shall be constructed so that the cord is adequately protected against excessive flexing where it enters the transformer. Cord guards, if any, shall be of insulating material and be fixed in a reliable manner.

6.7.23 The part of the transformer comprising the cord entry, the cord guard, if any, and the external flexible cable or cord is fixed to the oscillating member so that when the latter is at the middle of its travel, the axis of the cord where it enters the cord guard or inlet is vertical and passes through the axis of oscillation. The major axis of the section of flat cords shall be parallel to the axis of oscillation.

6.7.24 Stationary transformers intended for use with external flexible cables or cords and portable transformers shall be provided with cord anchorages for strain relief including

twisting where they are connected within the transformer, and for protection of the insulation of the conductors against abrasion.

6.7.25 For type X attachments, glands shall not be used as cord anchorages in portable transformers unless they have provisions for clamping all types and sizes of cables and cords which might be used as external flexible cables or cords. Production methods, such as, moulded-on designs, tying the cord into a knot or tying the ends with string, are not allowed; labyrinths or similar means are permitted, provided it is clear how the external flexible cable or cord is to be assembled.

6.7.26 For type X attachments, the cord anchorage shall be so designed or located that:

- replacement of the cord is easily possible
- it is clear how strain relief and prevention of twisting are to be obtained
- it is suitable for connection of different types of cords, unless the **transformer** is designed to accommodate only a specific type of cord
- the entire flexible cable or cord with its covering, if any, is capable of being mounted into the cord anchorage
- it does not damage the cord and is unlikely to be damaged when it is tightened or loosened in normal use, and
- the cord cannot touch the clamping screws of the cord anchorage if these screws are accessible or in contact with accessible **conductive parts**.

6.7.27 For type X with a special cord, and type Y and Z attachments, the cores of the external flexible cable or cord shall be insulated from accessible conductive parts by insulation complying with the requirements for basic insulation for class I transformers, and the requirements for supplementary insulation for class II transformers.

6.7.28 This insulation may consist of:

- a separate insulating barrier fixed to the cord anchorage; - a special lining fixed to the cord, or
- for class I transformers, the sheath of a sheathed cord.

6.7.29 For type X with a special cord, and type Y attachments, the cord anchorage shall be so designed that:

- the replacement of the external flexible cable or cord does not impair compliance with this standard;
- the entire flexible cable or cord with its covering, if any, is capable of being mounted into the cord anchorage;
- it does not damage the cord and is unlikely to be damaged when it is tightened or loosened in normal use; and
- the cord cannot touch the clamping screws of the cord anchorage if these screws are accessible or in contact with accessible conductive parts;

6.7.30 The space for the supply cables or the external flexible cable or cord provided inside for the connection:

a. to fixed wiring and for type X and Y attachments shall be designed to:

- permit checking the proper connection and positioning of the conductors prior to fitting of cover, if any
- ensure the covers, if any, can be fitted without risk of damage to the conductors or their insulation
- prevent, for portable transformers, the un-insulated end of the conductor, should it pull free from the terminal, from coming into contact with accessible conductive parts, unless, for type X and Y attachments, the cord is provided with terminations that are unlikely to pull free from the conductor, and

b. to fixed wiring and for type X attachments, in addition shall be: - adequate to allow the conductors to be easily introduced and connected; and

- designed such that covers, if any, giving access to terminals for external conductors can only be removed with the aid of a tool.

6.8 Resistance to rusting

6.8.1 Ferrous parts, the rusting of which might cause the transformer to become unsafe, shall be adequately protected against rusting.

This requirement applies to the outer surfaces of iron cores, in which case, protection by a coating of varnish is deemed to be adequate.

7 Residual Current Devices

7.1 General requirements

The following requirements RCD requirements apply to the fixed wiring within the licensed premises.

7.1.1 Licensed premises should have a residual current device (RCD) to safeguard personnel against contact with a live conductor, with permanently fixed devices being the preferred option.

7.1.2 The RCD may be portable, in which case strict rules should be applied to prevent its removal, damage or misuse.

7.1.3 RCDs are not to be used as the sole means of protection against direct contact with live conductors.

7.1.4 All electrical circuits in excess of 55 volts (110 volts CTE supplies) in the cellar supplying beer dispense and storage equipment should be protected by means of a residual current device (RCD).

7.1.5 The maximum tripping level for the RCD must be 30 milliamps with a maximum tripping

time of 40 milliseconds at a residual current of 150mA.

7.1.6 The residual current device fitted shall have a test button. This test facility shall be operated at regular intervals to ensure the device is fully operational. This should be carried out by the licensee at monthly intervals and by members of maintenance staff immediately before carrying out any maintenance work in the cellar. An operational test as required by the IEE Wiring Regulations should be carried out regularly as well as the "pushbutton test".

7.1.7 The residual current device fitted should be manufactured to a recognised standard.

7.1.8 RCDs may not offer any protection against electric shock when the phase and neutral conductors are contacted simultaneously.

7.1.8 RCDs sited in the electricity supply to a transformer will offer no protection to electric shock in the output (reduced voltage) electricity supply.

8 Plug and Socket Outlets (200-250 volts ac)

8.1 General requirements

The following requirements apply to those socket outlets connected to the fixed wiring within the licensed premises.

8.1.1 All socket outlets should be located close to the site of the equipment or appliance they are intended to supply, so that the two metre flexible cord or cable attached to the equipment or appliance is well within reach of its socket without strain being imposed on the flexible cord or cable.

8.1.2 Socket outlets shall be of the 3-pin type, in good condition and comply with BS 1363 or BS EN 60309-1. The preferred option is for socket to comply with BS EN 60309-1: 2008.

8.1.3 All socket outlets shall be installed and tested by Skilled Personnel to the current IEE Wiring Regulations.

8.1.4 The supply cable to all socket outlets should be of such a type and size as to comply with the IEE Wiring Regulations.

8.1.5 All socket outlets either in the Cellar or Bar areas should be connected to the same phase of supply.

8.1.6 No individual beer dispensing equipment or system, or associated equipment, should be supplied from more than one socket outlet. There shall be no cross connections between individual items of equipment unless they have been specifically designed to be so connected.

8.1.7 Where surface mounted socket outlets are installed, they should be of the metalclad type or in damp or corrosive areas be of robust non-metalclad construction.

8.1.8 The metal case of any metalclad socket outlet shall be suitably bonded to the incoming protective conductor as required by the IEE Wiring Regulations.

8.1.9 Multi-way adaptors shall not be used. Multi-way socket outlets, made to BS 196, or BS 1363 should be used where several separate supplies are required at one position.

8.1.10 If an appliance does not incorporate a fuse in the phase conductor a fused plug shall be used for connecting the appliance to the supply point. The fuse rating shall be appropriate to the rating of the appliance. The fuse should only be in the phase conductor of a single phase supply, or in each phase conductor in the case of a three-phase supply.

8.1.11 All plugs should be to BS 1363/A (the "A" signifying "rough handling" use) or BS 4343.

9 Hand Held Inspection Lamps and Portable Power Tools

Nearly a quarter of all reportable electrical accidents involve portable electrical equipment, with the vast majority of these accidents being due to electric shock.

9.1 Hand held inspection lamps

9.1.1 The Health and Safety Executive's (HSE) produce a guidance document on electric hand lamps titled “Guidance Note PM 38, Selection and use of electric hand lamps"

9.1.2 The risk of electric shock, when using a hand lamp can be reduced by:

- The use of ‘all insulated’ or ‘double insulated’ construction (known as Class II), which is designed for 230 volts operation, and for which no earthing connection is necessary. The bulb should be adequately protected by a robust cage of insulating material or a transparent insulating enclosure. It should be noted that some fluorescent tube type lead lamps in this category use a resistive flexible cable as part of the ballast gear, and this should not be shortened without reference to the supplier.
- In some cases, a 110 volts centre tapped to earth supply may be available. This is safer than a 230 volt system, because there are only 55 volts between each of the two live conductors and earth. However, the use of even lower voltages is recommended under some conditions.
- The use of voltages not exceeding 50 volts ac or 120 volts dc (ripple free), supplied from a transformer of the double wound type, will give electrical separation from the mains input power supply, and reduce the risk of serious shock.

9.1.2 Where the environmental conditions are such that electricity can be easily conducted, for example in a wet beer cellar, it is recommended that hand-lamps should and trailing leads should not be used at voltages not exceeding 25 volts. Alternatively suitable battery powered lamps may be used.

9.2 Portable power tools

9.2.1 The Health and Safety Executive's (HSE) produce a guidance document on portable electrical equipment titled “HSG 107, Maintaining portable and transportable electrical equipment".

9.2.2 Nearly a quarter of all reportable electrical accidents involve portable equipment, with the vast majority of these accidents being due to electric shock.

9.1.3 Hand tools should preferably be supplied at 110 volts ac from a portable transformer, or be battery operated.

9.1.4 If 240 volt ac tools are used, they should be ‘all insulated’ or ‘double insulated’ construction (known as Class II). If Class I tools are used they must be protected by a residual current circuit breaker.

9.1.5 Technicians using power tools shall be suitably trained in their care and use.

9.3 User equipment checks

9.3.1 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, e.g. 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).

9.3.2 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 (e.g. the defective equipment could be labelled as ‘faulty’ and its associated plug removed).

10 Bar Equipment

10.1 Counter illumination

10.1.1 The supply voltage to the illuminated cowls or displays shall not be greater than a nominal 24 volts ac between conductors. This requirement does not exclude the use of fluorescent illumination units incorporating an appropriately designed integral inverter to drive the fluorescent bulb, which requires voltages well in excess of 24 volts ac to initiate illumination.

10.1.2 The inverter shall be enclosed within the cowl or display or the counter bracket. If the latter" position is chosen, the method of fixing should be such as no possible adjustment of the bracket can interfere with or damage the inverter. The inverter should be provided with a conformal coating as a basic protection against electric shock and to prevent tracking. Together with a non-conducting enclosure, this should offer a degree of protection against electric shock at least equal to Class II equipment.

10.1.3 If the design is such as to prevent electric shock arising from a fault occurring in the inverter, the wiring to the fluorescent bulb holder or the fluorescent bulb, the inverter (suitably protected against mechanical damage) may be mounted externally of the cowl and counter bracket.

10.1.4 The extra-low voltage supply cable to the cowl shall be flexible twin core insulated and sheathed. Each cowl should be supplied by a continuous length of cable from the point of supply which may be either a transformer or a junction box. Alternatively the cable need not be continuous if it is joined by a cable coupler (preferably) or a splash-proof plug and socket, but not more than one such plug and socket should be installed in any one cable. The conductors in the extra-low voltage supply cable should have minimum cross-sectional area of 0.5 mm^2.

10.1.5 Suitable precautions shall be taken within the cowl to ensure that undue strain cannot be exerted on the cable terminal block or lamp holder. The supply cable to the cowl shall be installed as described in the installation instruction. Careful attention should be given to the design of cowls to ensure that no danger of overheating occurs either to the internal cable or the components of the cowl.

10.2 In-line coolers

10.2.1 The supply cable to the coolers shall be installed as indicated for the transformers. Where a cooler is supplied with an integral cowl illumination transformer, the transformer shall be separately fused and switched and comply with the general requirements for transformers. Where the cooler has a metal casing it shall be bonded to the incoming protective conductor.

10.3 Bottle cooling equipment

10.3.1 Remote condensing units supplying cooled shelves or cabinets shall be installed to the requirements of the cellar temperature control. Bottle cooling shelves and cabinets with integral condensing units shall be installed as for in-line coolers.

10.4 Bar valve switches

10.4.1 The wiring to bar valve switches shall be flexible insulated, sheathed and colour coded. They should be installed as for transformers. The cable shall be adequately secured adjacent to the point where it enters the enclosed switch.

10.4.2 The supply voltage to bar valve switches shall be extra low voltage.

10.4.1 Bar valve switches should be adequately protected against the ingress of moisture.

10.5 Bar valves

10.5.1 The wiring to bar valves shall comply with the requirements for bar valve switches.

11 Cellar Equipment

11.1 Cellar electrical supply

11.1.1 All electrical equipment installed in the cellar area should be connected to a dedicated, labelled distribution board separated from the remainder of the electrical installation of the premises. The distribution board should be located in the cellar area, preferably outside the cellar entrance. This distribution board shall be provided with a load breaking isolator on the input side, either fitted locally or integrated into the distribution board. All sub-circuits shall be identified and the isolator clearly marked to indicate its duty.

11.1.2 All low voltage electrical circuits in excess of 110V shall be protected by a residual current device.

11.1.3 Cellar lighting, excluding cellar tank lighting, should be supplied from a distribution board separate from that used to supply the cellar installed equipment.

11.2 Cables

11.2.1 All cables utilised shall be rated, at not less than, the declared nominal voltage of the supply system and their current rating shall be adequate for the installed load as prescribed in the IEE Regulations.

11.2.2 In determining the type of cable to use for the wide variety of the individual applications to be found within the cellar environment, the following points should be considered:

- the electrical characteristics required, for example, current carrying capacity, operating voltage, voltage drop, conductor material
- the insulation required, for example, the materials employed, single or reinforced insulation;
- any special considerations for specialist application, for example, twisted pairs for electronic applications (see IEE Regulations Wiring Regulations, Chapter 52 and Annex 4 for the selection of cables);
- installation particulars, for example, surface mounted, metal or plastic conduit, embedded in insulation, any current capacity reductions as a result of method of

installation;

- environmental factors, for example, ambient temperature, humidity, mechanical protection;
- operational factors, for example, whether fixed wiring, portable tool cord, trailing across damp or wet floors, the class of equipment being supplied;
- legal requirements, for example, building regulations,' licensing requirements, IEE Wiring Regulations (in Scotland), The Electricity at Work Regulations, 1989, etc.

11.2.3 All wiring concealed in walls shall be installed vertically and/or horizontally to the point or switch being supplied. Diagonal routes shall be avoided.

11.2.4 Fixed surface wiring should not be installed below 1 metre (3 feet 3 inches) from the floor level.

11.3 Beer dispense pumps

11.3.1 Beer dispense pumps shall be supplied at 110 volt from a transformer or at 240 volt with a current operated residual current device.

11.3.2 Where possible beer dispense pumps should be mounted on the wall of the cellar at a minimum height of 1 metre (3 feet 3 inches) from the floor level and should be of splash-proof construction meeting minimum requirements of IP 23 (BS 5490) which indicates that it has a minimum protection against damage by solid objects greater than 12 mm diameter and the ingress of water sprayed at 60° from the vertical.

11.3.3 When mounted below 1 metre they must also be protected from mechanical damage.

11.3.4 Due to conditions prevailing in cellar areas, all flexible cables installed below 1 metre (3 feet 3 inches) above the cellar floor, should be protected against any risk of mechanical damage. The supply cable to the pumps shall be securely fixed by means of a cable grip device at the pump terminal block and the supply plug. A grommet or cable gland shall be fitted at the entry to the pump terminal block.

11.3.5 All plugs and socket outlets are to be in accordance with BS EN 60309-1: 1999 and BS EN 60309-2: 1999 (Two-pole and earthing-pin plugs, socket-outlets and socket-outlet adaptors), BS 1363-5: 2008 (13A plugs, socket-outlets, adaptors and connection units. Specification for fused conversion plugs), BS EN 60309-2: 1999, IEC 60309-2: 1999 (Plugs, socket-outlets and couplers for industrial purposes).

11.3.6 All metal pump motor cases shall be connected to the incoming protective conductor.

(Wiring to be in accordance with manufacturers data)

11.4 Cellar located meter dispense systems

11.4.1 All beer dispense meter control units (power packs) should be of splash-proof construction meeting with a protection index IP23 or greater. This indicates that it is protected against damage by solid objects greater than 12 mm diameter and the

ingress of water sprayed at 600 from the vertical.

11.4.2 Where the dispense meter control unit is housed in a metal case, the case shall be bonded to the incoming protective conductor.

11.4.3 The low and extra low voltage connections shall be completely segregated both mechanically and electrically, within the beer dispense meter control unit. Further, the low voltage connections should be totally enclosed within the beer dispense meter control unit and clearly labeled to indicate the voltage contained within that section. The extra low voltage section should also be clearly labeled to indicate the voltage in that area.

11.4.4 Transformers contained within the beer dispense equipment shall comply with the general requirements for transformers. They will normally be incorporated transformers, thereby being designated to Class I.

11.4.5 The supply cable to the beer meter control unit shall be installed as for transformers.

11.4.6 Incoming and outgoing supply cables should be suitably gripped with a cord grip device and all entries to the beer dispense meter control unit shall be fitted with suitable grommets.

11.4.7 Spring loaded terminals on terminal blocks are not recommended.

11.4.8 Where possible cellar dispense meters should be mounted on the wall of the cellar at a minimum height of 1 metre (3 feet 3 inches) from the floor level and should be of splash proof construction meeting the requirements of IP23. When mounted below 1 metre from the floor it shall be protected from mechanical damage.

(Installation Guides based on manufacturers data sheets)

11.5 Air compressors

1.5.1 All compressor motors above 0.37 kW (1/2 H.P.) shall be provided with control apparatus, incorporating a no-volt coil and a suitable device affording protection against excess current in the motor, or in the cables between the device and the motor. The control apparatus should be clearly marked indicating its duty.

11.5.2 If the compressor is installed in a damp area or in the cooled cellar the electric motor and control gear shall have a protection index IP23 or greater.

11.5.3 Flexible cables used on air compressors shall be insulated and sheathed with the exception of low voltage supply in excess of 250 volts where armoured cables or single-core insulated cables enclosed in flexible conduit shall be used.

11.5.4 Any flexible metal conduit shall not be relied upon to provide the protective conductor. The flexible conduit should be bonded at each end and should not exceed 46 cm (1 foot 6 inches) in length.

11.5.5 Where a compressor is supplied at low voltage in excess of 250 volts then a notice

shall be installed adjacent to the compressor indicating the voltage.

11.5.6 Compressors shall be provided with a means of isolation from the electrical supply. This shall be readily accessible and adjacent to the compressor. Flexible cables supplying compressors shall be installed as for transformers.

11.6 Automatic change-over units and fob detectors

11.6.1 Transformers included in, or associated with, either remote or automatic beer cask, keg or tank change-over units or fob detectors shall comply with the general requirements for transformers.

11.6.2 All external wiring in connection with units shall be flexible, insulated and sheathed. The units shall be fitted with grommets and suitable cable grip devices.

11.6.3 All low and extra low voltage terminals shall be mechanically and electrically segregated. Spring loaded terminals on terminal blocks are not recommended.

11.7 Electrically operated CO_2 or mixed gas regulatory systems

11.7.1 For voltages in excess of 120 volts ac, the low voltage supply cable to any junction box shall be of continuous length not exceeding 2 metres (6 feet 6 inches).

11.7.2 Where this equipment is Class I, the low voltage supply cable for voltages in excess of 120 volts ac shall be 3-core flexible insulated and sheathed. All electrical connections shall be protected from ingress of moisture.

11.7.3 Where this equipment is Class I, any metal casing of the regulator shall be bonded to the incoming protective conductor.

11.7.4 Where fitted, the indicator lamp holder shall be of the all insulated type.

11.7.5 Units should be designed to shut off gas supplies in event of electrical failure.

11.8 Cellar temperature control

11.8.1 The heater/s, evaporator/s, condensing unit/s and the total control circuit/s together forming an individual refrigeration system shall be supplied from a distribution board by an independent circuit which includes adequate means of protection against excess current. A means of local isolation should be provided adjacent to the condensing unit, or each condensing unit (if more than one is installed in the individual refrigerating system). The total system should be capable of isolation by means of a common isolator.

11.8.2 Provision shall be made so that the means of isolation can be secured in the open position. It is preferred that the means of securing the isolator in the open position is a locking device controlled by a removable key which, once used, should be removed from the device and be carried by the Maintenance or Inspection Engineer whilst work is being carried out on the equipment.

11.8.3 All isolators should be clearly marked to indicate their duty. They should be capable of switching the supply on load. Except as provided above for condensing units, parts of the electrical circuit, particularly evaporator fans, should not be capable of local isolation unless both the total plant and the electrical circuitry has been expressly designed to allow safe local isolation without endangering other parts of the plant or compromising total plant operation.

11.8.4 The cables connecting the units to their fixed supply points shall be insulated and sheathed. Any conducting parts of the outer case of a refrigeration unit shall be separately bonded to the protective conductor.

11.8.5 Where condensing units and associated equipment are installed outdoors, they shall be protected from the external influences of the weather. Where the equipment does not, by its construction, have the characteristics relevant to the external influences of its location, it shall be provided with additional protection, such additional protection being such as to not adversely affect the operation of the protected equipment. When siting any equipment forming a part of a refrigeration system, any Local Authority Regulations shall be complied with.

11.9 Cellar tanks

11.9.1 The voltage supplying the Cellar tank illuminating light shall not exceed 55 volts ac between any conductor and earth.

11.9.2 The supply cable to the light unit should be insulated, heat resistant and sheathed.

11.9.3 The light fittings shall be fitted with a device to prevent any strain occurring on the cable connections.

11.9.4 The metal casing of the light fittings shall be separately bonded to the protective conductor.

11.9.5 Cellar tanks shall be bonded to earth.

11.9.6 Cellar tank lighting may be provided by battery power. In this event, the installation should comply with any appropriate part of the IEE Regulations Wiring Regulations.

11.10 Cellar tank refrigeration

11.10.1 The supply to the refrigeration condensing unit on cellar tanks should be via a switched socket outlet and fused plug.

11.10.2 The cable supplying the condensing unit shall be of the flexible, insulated and sheathed type. Where necessary the cable should be given protection against mechanical damage and it should be as short as possible and in any event not exceeding 2 metres (6 feet 6 inches) in length. The cable shall be secured by a suitable device to prevent any strain on the cable terminal connections and all such connections should be of the screwed type. (See also TEE Regulations, section 522)

11.11 Sump pumps

11.11.1 Sump pumps and associated electrical equipment should be installed as for beer dispense pumps with the exception that plugs and socket outlets shall not be used. They shall be connected to the supply by means of a radial final sub-circuit. A local isolating switch shall be provided.

11.11.2 Sump pumps with submersible motors are not recommended and it is preferred that the motor and float switch be mounted outside the sump above floor level and that the construction of both should be totally enclosed and splash-proof having a protective index of IP54 or greater. Where submersible motor pump units are employed, it is essential that the cable entry to the motor is entirely watertight to protective index of IP 68 or greater. If the cable passes through a sump cover, a suitable grommet shall be used to protect the cable. Where flexible cables are used they shall be given additional protection.

11.12 Remote coolers

11.12.1 All coolers supplied and fitted shall comply with all current legislation (Electrical Equipment safety Regulations and Machinery Directive 2006/42/EC and Supply of Machinery (Safety) Regulations 2008)

11.12.2 Where the case is metal it should be earth bonded to the incoming protective conductor. All coolers are to be supplied with a cable of suitable size for the load of the unit and have a moulded plug (to BS 1363), with an appropriate fuse.

11.12.3 All coolers are to be connected to a single socket outlet and should be sited so as to allow free air movement around the unit.

11.12.4 All coolers should be fitted with a suitable PAT tested earth bolt

12 Delivery Tankers

12.1.1 The pumps on delivery tankers shall be supplied at extra low voltage, or at 110 V a.c., supplied from a centre tapped transformer, or at 240 V a.c. protected by a residual current device. They shall not be capable of producing pressure within a cellar tank in excess of its safe working pressure.

12.1.2 Where a transformer is used it shall comply with section 7 and, whilst in operation, it shall always be sited within the confines of the premises to which the beer is being delivered.

12.1.3 Portable transformers shall be fitted with a maximum cable length of 2 metres (6 feet 6 inches) of metal braided 3-core P.V.C. or metal braided T.R.S. on the 240 V supply side.

12.1.4 The low voltage cable to the tanker discharge pump or compressor shall be metal braided 3-core P.V.C. or metal braided T.R.S.

12.1.5 The cable connection to the tanker shall be permanently connected by means of a compression gland and cable grip device.

12.1.6 The cable to the tanker from the source of supply should be contained on a suitable

reel.

12.1.7 Plugs and socket outlets for tanker discharge equipment shall be of an industrial type having unique connection facilities and shall comply with BS 196 or 4343, provided with keyway positions appropriate to the voltage. The socket outlet for tanker discharge equipment should be labelled to indicate its duty.

12.1.8 The supply to the delivery pump or compressor shall be equipped with a control switch or isolator.

12.1.9 Pumps for cleaning-in-place shall not be capable of producing pressure within a cellar tank in excess of its safe working pressure.

13 Installation

13.1 General

13.1.1 Where additions and/or alterations or modifications are carried out on existing installations, care must be exercised that the work is undertaken in such a way so as to ensure that the work is carried out safely.

13.2 Risk assessment

13.2.1 Risk assessments must be carried out on the activities being carried out and where required method statements developed for the work. The following should be considered when carrying out the risk assessment:

- Is there adequate lighting available for the work to be carried out safely
- Does the electricity supply need to be isolated and how can we stop it being inadvertently energised again before the work is completed
- Has an asbestos survey been carried out
- Are there hazards associated with gases, for instance in a basement cellar
- Is there good access to the work area
- Do heavy objects need to be moved to gain access, for instance are there kegs in the way
- Do you need to carry in and fit heavy pieces of equipment
- Do you need to work at height
- Is there evidence of rats in the area

This is not an exhaustive list and there may be many more questions to ask depending on the work being carried out.

13.2.2 The person assessing the risks involved should be qualified to make the assessment and must be other than the person conducting the service.

13.3 Isolation

13.3.1 All work on dispense equipment should be carried out with the equipment isolated from

every electrical power source. This applies whether the work to be done is of an electrical nature or not. If the equipment is such that work may be undertaken on it remote from the means of isolating the equipment the method of working must ensure that the equipment cannot be re-energised by re-connection of the isolating means during the time the work progresses.

13.3.2 Isolation of equipment which is subject to automatic operation should remove all power sources from the equipment before work commences. When the power is re-connected, the equipment must be capable of safe starting without imposing any risk of danger to anyone.

13.3.3 The desirability of isolating equipment before work commences may, on occasions, render it almost impossible to locate and repair faults within the system. The Regulations recognise this and lay out the conditions which must prevail before it is reasonable to allow work on or near live conductors.

13.4 Electrical supply

13.4.1 All electrical equipment installed in the cellar area should be connected to a dedicated, labelled distribution board separated from the remainder of the electrical installation of the premises.

13.4.2 The distribution board should be located in the cellar area, preferably outside the cellar entrance. This distribution board shall be provided with a load breaking isolator on the input side, either fitted locally or integrated into the distribution board. All sub-circuits shall be identified and the isolator clearly marked to indicate its duty.

13.4.3 All low voltage electrical circuits in excess of 110 volts shall be protected by a residual current device.

13.4.4 Cellar lighting, excluding cellar tank lighting, should be supplied from a distribution board separate from that used to supply the cellar installed equipment.

13.4.5 All socket outlets are to be installed in accordance with BS 7671 (Requirements for Electrical Installations).

13.4.6 Socket outlets shall be installed in such a manner that flexible cables to an appliance do not cross the floor area, or any walkway.

13.4.7 When installing equipment or appliances, they should be installed so that their flexible cords or cables do not cross any floor area or walkway to reach the nearest socket outlet.

13.4.8 Socket outlets should be sited away from walkways, to prevent mechanical damage.

13.5 Socket outlet test procedure

13.5.1 Before any apparatus is connected to a socket outlet for the first time, the outlet should be checked to ensure that the supply is of correct polarity and that an effective earth is provided. If any defect is found with the socket outlet then the apparatus shall not be connected and any remedial work required shall be carried out by a qualified person.

13.5.2 The use of a socket tester indicating the condition of the live, neutral and earth conductor is a satisfactory way of carrying out the test. The socket tester used should be of the type which illuminates three lights when the conductors are correctly connected. This ensures that failure of a light cannot wrongly indicate a correctly connected socket. A neon screwdriver is not recommended for such testing as it only gives an indication of the live terminal condition and not that of the neutral or earth connection.

13.6 Circuit breaker

13.6.1 At all times, care should be taken to ensure that only the correct rating and type of overcurrent protective device, such as a fuse or MCB, is installed in the equipment or the electrical supply to it. Where any equipment is supplied through adjustable overload devices, such devices must be properly adjusted.

13.7 Separated extra low voltage

13.7.1 Dispense equipment is often operated at extra low voltage. Some voltages are sufficiently low (maximum 24 volts ac/dc) to allow safe servicing of the equipment with the conductors live. Such servicing should not be done without sufficient training and/or knowledge of the equipment concerned. Suitable test equipment must be available and used.

14 Legislation Applicable to Stakeholders

14.1 Manufacturer

Legislation	Regulations				
Electricity at Work Regulations 1989	4 Systems, work activities, and protective equipment	6 Adverse or hazardous environments	8 Earthing or other suitable precautions	13 Precautions for work on equipment made dead	14 Work on or near live conductors
	15 Working space, access and lighting	16 Persons to be competent to prevent danger and injury			
Provision and Use of Work Equipment Regulations 1998	4(1) Suitability of Work Equipment	4(2) Assessment of Work Location	4(3) Suitability of Process	6 Installation	8 Information and Instructions
	10 Conformity with Community Requirements	11 Dangerous parts of machinery	22 Maintenance Operations		
Supply of Machinery (Safety) Regulations 2008	3 General Prohibitions & Obligations	11 General Duties	12 Requirements for Supply of Relevant Machinery	22 EC Declaration of Conformity	25 EC Mark
Health and Safety At Work Act 1974	6 General Duties of Manufacturer				
Simple pressure Vessels Regulations 1991	4 Safety Requirements	5 Obligations of Manufacturers	10 EC Certificate of Adequacy		
Electrical Equipment (Safety) Regulations 1994	5 Requirements for Electrical Equipment to be safe	7 Conformity with Other Standards and Requirements	9 CE Marking	10 EC Declaration of Conformity	14 Prohibition on Supply
Electromagnetic Compatibility Regulations 1992	4 Electromagnetic Disturbance	5 Protection Requirements	6 Relevant Apparatus	7 General Conditions	

14.2 Service provider

Legislation	Regulations				
Electricity at Work Regulations 1989	4 Systems, work activities, and protective equipment	6 Adverse or hazardous environments	8 Earthing or other suitable precautions	9 Integrity of referenced conductors	10 Connections
	13 Precautions for work on equipment made dead	14 Work on or near live conductors	15 Working space, access and lighting	16 Persons to be competent to prevent danger and injury	
Provision and Use of Work Equipment Regulations 1998	4(1) Suitability of Work Equipment	4(2) Assessment of Work Location	4(3) Suitability of Process	5 Maintenance	6 Installation
	8 Information and Instructions	10 Conformity with Community Requirements	11 Dangerous parts of machinery	22 Maintenance Operations	
Health and Safety At Work Act 1974	7 General duties of employees				
Management of health and Safety Regulations 1999	3 Risk Assessment	5 Health and Safety Arrangements	10 Information for Employees	13 Capabilities and Training	14 Employees Duties
Personal Protective Regulations 2002	12 CE Marking				
Pressure Systems (Safety) Regulations 2000	5 Provision of Information and Marking	6 Installation	7 Safe Operating limits	8 Written Scheme of Examination	11 Operation
	12 Maintenance	13 Modification and Repairs			
Manual Handling Regulations 1992	5 Duties of Employees				

14.3 Pub Chain

Legislation	Regulations				
Electricity at Work Regulations 1989	4 Systems, work activities, and protective equipment	6 Adverse or hazardous environments	8 Earthing or other suitable precautions	13 Precautions for work on equipment made dead	14 Work on or near live conductors
	15 Working space, access and lighting	16 Persons to be competent to prevent danger and injury			
Provision and Use of Work Equipment Regulations 1998	4(1) Suitability of Work Equipment	5 Maintenance	6 Installation	7 Specific risks	8 Information and Instructions
	9 Training	10 Conformity with Community Requirements	22 Maintenance Operations		
Health and Safety At Work Act 1974	4 General Duties	7 General Duties of Employees at Work	8 Duty not to interfere with or misuse		
Management of health and Safety Regulations 1999	3 Risk Assessment	5 Health and Safety Arrangements	9 Contacts with external services	10 Information for Employees	
Personal Protective Regulations 2002	12 CE Marking				
Manual Handling Regulations 1992	4 Duties of Employer	5 Duties of Employees			
Regulatory Reform Fire (Safety) order 2005	3 Responsible person	4 General Precautions	8 General Fire Precautions	11 Fire Safety Arrangements	12 Elimination or reduction of risks from dangerous substances
	13 Fire-fighting and fire detection	14 Emergency routes and exits	23 General duties		

14.4 Owner Landlord

Legislation	Regulations				
Electricity at Work Regulations	4 Systems, work activities, and protective equipment	10 Connections	11 Means of Protecting from Excess of Current	12 Means for cutting off the supply and for isolation	16 Persons to be competent to prevent danger and injury
Provision and Use of Work Equipment Regulations	4 Suitability of Work Equipment	5 Maintenance	6 Installation	7 Specific Risk	8 Information and Instructions
	9 Training	11 Dangerous Parts of Machinery	12 Protection against specified hazards	19 Isolation from Sources of Energy	21 Lighting
	22 Maintenance Operations	23 Markings	24 Warnings		
Regulatory Reform Fire (Safety) order 2005	3 Responsible person	4 General Precautions	5 Duties under the RRF(S)O	8 General Fire Precautions	22 Co-operation and co-ordination
	29 Alterations notices				
Control of Asbestos Regulations 2006	4 Duty to Manage Asbestos	5 Identification	6 Assessment	10 Information, instruction & Training	11 Prevention or Reduction of Exposure
	12 Use of Control Measures	13 Maintenance of Control Measures	16 Duty to Prevent or Reduce the Spread of Asbestos		