

**The National Exhibition Centre
International Convention Centre
NEC and NIA Arena**

Rules and Regulations

Part 5 - Electrical Stand Installations and Mains Supplies

To be observed and performed by all Licensees, promoters, standholders,
exhibitors and other sub-licensees and their contractors,
sub-contractors, agents and servants

By order of the Board of Directors
The National Exhibition Centre Limited
Birmingham, West Midlands, B40 1NT

Date: October 2006

These Rules and Regulations are subject to revision or
addition at any time and details of any revisions or
additions can be obtained from the Company

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Part 5 - Electrical Stand Installations and Mains Supplies

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Electrical Stand Installations and Mains Supplies

1. Conditions

Regulations

All electrical installations on stands, features, displays or exhibits shall comply with:

i. Local Authorities

The Local Authorities and applicable Acts.

ii. Health and Safety at Work

The Health and Safety at Work, etc., Act 1974.

The Electricity at Work Regulations 1989.

iii. Association of Event Venues & Association of Exhibition Contractors

The "Association of Event Venues & Association of Exhibition Contractors
"Regulations for Stand Electrical Installations" contained herein.

UK Electrical Supplies

These comply with the EU Harmonized Voltage Band of + 10% and – 6%

Single phase 230v 50hz (216v to 253v)

Three phase 415v 50hz (376v to 440v)

All electrical appliances used by exhibitors must be compatible with standard UK voltage provided by the Venue, as to ensure safety in use.

Any appliance exhibited which falls outside the Venues standard tariff electrical supply ratings, must be clearly and unambiguously marked and as such not convoluted.

For non-standard voltage and frequencies, the client may be allowed to bring suitable voltage transformers and frequency converters if written permission is given by the venues approved person.

The Venue will not supply electricity to any installation, which does not comply with these regulations or requirements.

2. Testing

i. Stand Installations

It is the responsibility of the person undertaking the electrical installation to carry out the appropriate inspection and testing to verify compliance with these regulations upon completion of the installation. The person undertaking the testing and inspection must be a competent person.

Upon satisfactory testing and inspection, the competent person must sign and submit a *Connection and Energisation Form* to the venue mains installer (Sample of the form is attached).

Once the Venue Mains Installer has received the signed form from the electrical installers competent person the venue mains installer will after a visual check energise the system.

Venue printed forms only to be submitted: a photocopy will not be accepted.

Where found to be satisfactory the supply will be connected to the electricity supply and energised. If the an installation is found to be unsatisfactory, the supply will not be connected and the Venue will advise the person responsible, who must rectify any faults and advise the venue when the installation is ready for re-inspecting by re-submission of the Connection and Energisation Form.

ii. Re-Testing

Where stands are not complete and fail the test as a result of the installation not being finished, a charge will be made for re-testing.

Where stands fail the test, for whatever reason, more than twice, a charge will be made for re-testing.

iii. Modification or Addition to Stand Installations

If, after initial inspection and energising of mains supplies, modifications or additions are made to the stand installations, these must be recorded, tested and inspected by the competent person undertaking and notified to the venue.

iv. Appliances

Any electrical appliance connected to a socket must have been PAT tested and labelled by a competent person before it is plugged in and energised. The responsibility for ensuring this testing is carried out is that of the person, or persons, responsible for bringing the equipment into the exhibition hall.

v. Responsibility

The Venue will not accept responsibility for:

Delays

Delay in energising installations found unsatisfactory or where insufficient time has been allowed for testing.

Faults

Any faults discovered in installations after testing and energising by the Venues.

3. Electrical Contractors

i. Competent Persons –Inspection and Testing

Competent persons, qualified by training and experience and properly supervised only shall be allowed to carry out inspection and testing of electrical stand wiring installations.

Competent persons for this purpose shall be qualified to the standard of City and Guilds 236 part 1 and Part 2; City and Guilds 2330 Part 1 and Part 2 or equivalent.

ii. **Competent Persons – Installation**

Stand wiring installations shall only be carried out by competent electricians, qualified by training and experience, who are properly supervised.

- An individual will be classed as competent having worked in the exhibition electrical industry for at least 5 years.
- He/she will have worked with qualified electricians for at least 5 years.
- He/she will be competent in all aspects of electrical installation, wiring, connection, mains distribution etc.

The competent person will not be classed as qualified for testing of installations. A qualified electrician will always supervise the competent person.

iii. **Competent Persons – Proof of Qualifications**

All persons undertaking any electrical inspection and testing or electrical installation of stands, features, displays shall provide and make available for inspection to the Organiser and the Venue, the name of the competent persons together with documentary proof of qualifications of all persons working on electrical installations in the halls. Persons who do not provide proof of qualification or competence, will not be allowed to carry out electrical installation work and the venue will not energise their installation.

4. **Floor Ducts and Service Tunnels under the Hall Floors**

i. **Exclusion**

Ducts set into the floors of the Hall and the service tunnels under the floors of the Halls, where applicable, do not form part of the hired floor space. Access to and use of the floor ducts is limited to employees of the Venue, or contractors employed by the Venue, for the purpose of installing main supply cables and piped services.

ii. **Limited Use**

The Venue will consider limited use of the floor ducts, where applicable, for purposes other than those specified above, provided that the installation in the ducts is carried out by or under the supervision of the Venue's Mains Installer and that such use has been agreed in writing, prior to the commencement of the Licence Period.

iii. **Access**

No person shall enter the service tunnels, switch rooms or other service areas without permission in writing from the Venue's Mains Installer or his nominees.

5. **Main Switchgear and Distribution**

i. **Block Mains**

Every stand shall be supplied by a separate mains cable except where, by approval of the Venue, a single mains cable may be installed to supply a block of up to six adjoining stands. This approval will only be given where the electrical installation is on continuous walling on all stands within the block is the responsibility of a single contractor.

The crossing of gangways via fascia or floors with sub-mains shall be prohibited.

24 hour VENUE mains supplies shall **NOT** be used as Block Mains.

Specialist exhibitions that necessitate 24 hour Black Mains will be considered for exemption from this ruling provided that suitable and sufficient risk assessments accompany the request which must be presented to the venue 4 weeks prior to the exhibition build up.

ii. Minimum Cable Size (Sub-Mains)

The minimum acceptable cable size (subject to 20A loading) for the wiring of block sub-main supplies shall be 2.5mm².

iii. Isolation

Each mains supply shall have its own means of isolation situated in an accessible position on each stand.

Each of the stands on a block fed from a single supply shall have its own means of isolation situated in an accessible position on the stand.

Where a stand is to be sub-divided into sections then this shall constitute a Block of stands and shall have a separate means of isolation for each individual section/stand.

iv. Location of Boards

Distribution boards and similar equipment shall be installed adjacent to the fused isolators provided by the Venue. The mounting board provided by the contractor for this equipment shall be of sufficient size to allow the fused isolator provided by the Venue to be fixed thereon. The distribution board shall be provided with suitable cable entry protection and tested prior to arrival on site.

Switch and fuse gear, motor controls, starters, etc., shall be readily accessible, suitably connected and out of reach of public gangways.

The electrical contractor responsible for the stand installation shall supply suitable cabling to connect his installation to the fused isolators on the main supply cables supplied by the Venue.

v. External Supplies

Supplies external to Halls shall generally be limited to a maximum rating of 100 amps 3 phase Neutral and Earth or 100 amps single phase Neutral and Earth.

Where circumstances dictate supplies exceeding 100 amps as absolutely essential, these will only be provided following full consultation with the Venue.

Earth leakage (RCD) protection of not more than 30 mA rating shall be provided (by the contractors) for all wiring beyond the termination point of the Venue's supply.

6. Earthing

i. Regulations and Codes of Practice

Metal conduit, metal casing of apparatus, frames of motors, etc., shall be efficiently bonded to earth using the earthing system provided within the Venue's permanent electrical distribution system. This Regulation shall apply to all matters covered by the British Standard 7671 (IEC 364) referred to in clause 1. Where separate special regulations and codes of practice have been prepared and approved by the Authorities (i.e., electrical installations in caravans, electro-medical equipment, "all insulated apparatus", and appliances which conform to the standards of double insulation) the current edition of these special regulations shall take precedence.

ii. Lighting Fittings

At every lighting point an earth terminal shall be provided and connected to the earth continuity conductor of the final sub-circuit.

iii. Metal Framework, etc.

Where the electrical bonding to earth of metal framed stands, metal water pipes, sinks and other items is necessary, this shall be to an earth conductor which terminates at the Venue's electrical supply. The bonding conductor shall have a minimum cross section area of 6mm^2 . Under no circumstances shall any of these items be used as the sole means of earthing an electrical installation.

Where block mains are employed on metal framed stands, the stand framework shall be bonded at the incoming main position and also at the termination point of **every** sub-main. The bonding conductor shall have a minimum cross section area of 6mm^2 .

iv. Insulation Sleeving

Every earth continuity conductor shall, wherever exposed, including within all termination enclosures, be totally insulated using green and yellow PVC sleeving.

v. Use of Residual Current Devices (RCD's)

Final circuits rated up to 32A shall be provided with additional protection to reduce/control the risk of electric shock from direct contact by the fitting of an RCD with an operating current not exceeding 30mA and a tripping time not exceeding 40mS at 5IAN.

RCD's are considered as supplementary protective devices and should be installed in addition to an approved rated fuse or other excess current devices.

RCD's shall be performance tested immediately before or at each show but not exceeded annually.

7. Electrical Wiring

i. Material Specification

Stand wiring may be Thermoplastic, elastomeric or other plastic sheathed cable, not less than 1.5mm² and cross sectional area and 300/500 volt grade, complying with BS6004 (IEC227) and with a current density not exceeding that recommended in BS7671 (IEC364).

Flexible cables used for circuit wiring in approved manufactured systems, must also have a current density not exceeding that recommended in BS 6500 Table 16.

ii. Identification

Identification of all wiring shall be in accordance with the colour or numbering systems recommended by BS7671 (IEC364).

iii. Joints

Joints shall not be made in cables except where necessary as a connection to equipment/accessories. In such cases insulated screwed connection shall be used, and shall be enclosed in totally insulated enclosures.

iv. Metal Sheathed Cable

Location

Mineral insulated metal sheathed cable may be used in approved conditions and where it is not liable to mechanical damage.

Current Capacity

Current capacities must be in accordance with the "exposed to touch" conditions of BS7671 (IEC364). All joints, connections, terminations and fixings, etc., must be made using accessories, which are specifically designed for use with the type of cable installed.

v. Excess Current Protection

All circuits must be separately protected for excess current with fuses or other means of close excess current protection.

8. Lighting Circuits

i. Maximum Capacity

Lighting circuits, serving more than one fitting, shall not carry more than 1200 VA and all sections of the wiring system shall be capable of carrying its circuit full load current. Where discharge lighting is connected the appropriate reduction shall be made (normally to 800 VA). All apparatus over 1000 VA shall be individually fused.

ii. Mains Load

Where the lighting load to any stand or feature is in excess of 14000 VA, the circuit shall be arranged to be suitable for connection to a 3 phase supply with neutral and phase conductors being of equal size.

iii. Flexible Cords

Limitations

The use of flexible cords for stand wiring is generally prohibited other than where forming part of a manufactured system, and then fully in accordance with paragraph 9.

Flexible cords or cables used in approved manufactured systems for circuit wiring shall have a cross sectional area of not less than 1.5mm² and comply with BS6500 Table 16.

Construction

Flexible cords shall be of circular section, fully insulated and sheathed, and the only form of jointing shall be purpose made non-reversible flex connectors, being shrouded and having an earth terminal.

Length

For static appliances, flexible cords shall not exceed 2 metres in length and for mobile appliances (e.g., vacuum cleaners) the length shall be kept to a minimum.

iv. Lampholders

Lampholders of lighting systems must have screw clamp or screw terminal connections between the conductors and the plungers of the lampholders. Lampholders using spikes for connections shall not be used.

9. Special Lighting Systems

i. Track Lighting Systems

These may be used provided the track and all the accessories are of the same make, and also provided the loading on the system is compatible with the rating of the sub-circuit wiring and fuse, and complies with the requirements of paragraph 6. Earthing and paragraph 11.1. Protection of Wiring.

ii. Other Lighting Systems

Only systems designed and manufactured to suit their intended use shall be permitted and these must comply with paragraph 11.1. and **all** other aspects of the Regulations.

Where a system is wired in flexible cords and cables wholly or in part, an RCD of maximum rating of 30mA tripping current shall be installed at the source of the installation and fitted in an accessible position for switching, testing and resetting purposes. Suitable overcurrent protection must be provided as required under regulation 8.

iii. Client's Own Equipment

Where "client's own" equipment is used this must comply with all regulations and is subject to testing and spot checks.

10. Separated extra low voltage lighting systems previously known as Safety Extra Low Voltage Lighting System

i. Transformers

Multiple connection Separated Extra Low Voltage (SELV) Transformers shall be of Class II safety isolating type conforming to BS3535 (IEC742, IEC1140, EN60742), or providing an equivalent degree of safety, having a fused primary connection. Every secondary connection shall be individually fused to its appropriate rating or shall be fitted with a manual re-set protective device approved by the Venues Engineer.

Transformers shall be clearly labelled indicating the precise details of any integral secondary circuit protective device: that they are manual re-set and shall include the rated transformer power output in VA.

ii. Positioning

Particular care shall be taken when installing SELV transformers, which shall be fixed at high level, allowing adequate ventilation and access for testing/fuse replacement.

iii. Cable Sizing

Selection of cabling for SELV circuits shall take into consideration both volt drop and current carrying restraints subject to a maximum volt drop on 12v supplies of 0.6 volts.

Cabling from SELV transformers supplying Extra Low Voltage track shall be of sufficient size for the full current rating of the transformer.

iv. SELV Fitting

Shall comply fully with IEC598 and the relevant British Standard.

v. Catenary/Uninsulated Pole Low Voltage Systems

The use of uninsulated catenary or uninsulated pole separated extra low voltage systems is prohibited.

vi. Earthing of SELV Equipment

Secondary windings of SELV transformers, fittings and lighting track connected to same shall not be earthed.

vii. Power Circuits

Circuits feeding 13 amp socket outlets shall be radials. Where there is more than one socket per circuit, maximum rating of over-current protective device shall be 16A amps. Total load shall not exceed 3000 watts and not more than 3 sockets shall be permitted on that circuit. A 30mA RCD protective device shall be fitted.

viii. Coils/Reels of Flexible Cord/Cable

Coils of flexible cord or cable loose or on reels and forming part of the circuit shall not be permitted.

11. Protection of Wiring

i. Final Stand Wiring

All electrical wiring, where liable to mechanical damage or interference, shall be tough overall sheathed or armoured or enclosed in protective conduit, trunking or cladding. Conductive materials including flooring used to provide mechanical protection shall be efficiently continuously bonded to earth. Where tough overall sheathed cables are used without further protection, i.e., without armour or protective conduit trunking or cladding, such cables shall have stranded conductors and shall have a degree of flexibility.

A 30mA RCD must be fitted to final stand wiring circuits up to 32A.

ii. Temporary Supplies

The wiring of temporary supplies shall be subject to the requirements above. In circumstances where full mechanical protection is impracticable the supply may be provided if 30 mA RCD protection is installed.

12. Local Switches and Socket Outlets

i. Local Switches

Local switches shall be fixed out of reach of the public and shall be mounted and protected in a similar way to distribution fuse boards (Clause 04.c.).

ii. Socket Outlets

Construction

Socket outlets shall be of the switched type to BS 1363 (198A) of metal clad industrial type or suitable equivalent to BS 1363 (1995) for mechanical protection and be provided with suitable cable entry protection.

Location

Socket outlet enclosures shall be securely fixed to walls, partitioning or floors in such way that they shall not be subject to mechanical damage and shall be located not less than 2 metres (measured horizontally) from any sink unit. Suitable consideration must be given to the ingress of moisture. Wall sockets shall be a minimum of 300mm above floor or work surface level.

iii. Water Heaters

Water heaters shall be connected via fused spur outlets - **NOT SOCKET OUTLETS.**

iv. Floor Sockets

Where a floor mounted socket outlet is essential, it shall be adequately protected from the accidental ingress of water, and shall be of surface mounted pattern.

v. Plugs

Multiple Connections

Not more than one flexible cord shall be connected to one plug.

Fuses

The rating of fuses in fused plugs shall be appropriate for both the equipment and flexible cord connected thereto.

Non-flexible cords shall not be connected into plugs

vi. Adaptors**Restrictions**

Multi-way plug-in type and bayonet adaptors shall not be used.

Limitations on Use

The use of Trailing/Block type 4 way fused sockets shall be restricted to the following:

One 4-way unit per fixed socket outlet, subject to a maximum loading of 500 watts total and its plug shall be fused accordingly.

A maximum flexible cord length of 2 metres from plug to Trailing Block Unit.

13. Electric Motors**i. Isolators**

Every motor shall be provided with an effective means of isolation on all poles and such isolators shall be adjacent to the motor that they control.

ii. Starting

Motors in excess of 7.5 kw (10 hp) shall be fitted with current limiting devices for starting, i.e., shall not be started "direct-on-line". Where, however, the "direct-on-line" starting of a motor is essential to the satisfactory operation of the machine, details of such requirements shall be submitted in advance to the Venue for dispensation.

iii. Overload and No Volt Release

Every motor in excess of 0.375 kw (½ hp) shall be fitted with a starter having an overload release in each phase line.

Every motor shall be provided with a suitable means to prevent automatic restarting after a stoppage, due to a drop in voltage or a failure of the supply, where unexpected re-starting of the motor might cause danger.

14. Guarding Equipment**i. Electrical Equipment and Exhibits**

Electrical equipment and exhibits shall be guarded as necessary to prevent accidental contact with live metal, moving parts, live terminals, etc., and accidental short circuiting.

ii. Conditions of Operation

Proper consideration shall be given to the conditions under which the equipment is being demonstrated, which may well differ from the conditions under which it is normally installed and for which the normal safeguards will no longer be appropriate.

iii. Lighting Fittings

Lighting fittings mounted below 2 metres from floor level or otherwise accessible to accidental contact shall be firmly and adequately fixed and so sited or guarded as to prevent risk of injury to persons or materials.

iv. Heat Generation

Incandescent lamps and other apparatus or appliances with high temperature surfaces shall, in addition to being suitably guarded, be arranged well away from combustible exhibits and in such a manner as would prevent contact therewith. Stands containing a concentration of electrical apparatus, lighting fittings or lamps liable to generate abnormal heat shall have well ventilated ceilings, which shall be made of incombustible materials.

15. Transformers and Frequency Converters

i. Step-up Transformers

Step-up transformers shall not be installed without the written permission of the Venue's Engineer. Where such permission is requested, drawings and full details shall be submitted at the time of application. Where, however, step-up transformers are used as an integral part of any electronic or similar apparatus, appliance or equipment, and providing the use of such step-up transformers conforms with the customary practice within a particular industry, or where the installation of the transformer conforms with the conditions of paragraph 18 below, no such permission will be required.

ii. Step-Down Transformers

Step-down transformers shall have separately wound primary and secondary windings. The iron core and frame shall be connected to earth. In addition to the normal fuse protection on the phase line(s) of the primary circuit, the secondary circuit shall be fitted with fuse protection in the phase line(s) and with three phase transformers, the neutral connected to earth.

iii. Auto-Transformers

Auto-transformers shall not be used, except as an integral part of motor starters, unless the written permission of the Venue has been obtained.

iv. Location

Transformers shall be placed in positions out of reach of the public and must be adequately ventilated.

v. Oil-Filled Transformers

Oil-filled transformers containing more than 20 litres of oil shall be mounted in a suitable catch-pit or tray capable of containing the entire quantity of oil plus a margin of 10%.

vi. Frequency Converters

The Venue shall be notified in advance of the intention to provide apparatus to convert the frequency of the electrical supply to any machine or exhibit.

16. Space for Working

Electrical apparatus (other than exhibits and portable equipment) shall be fixed in position with adequate space for operation and maintenance.

17. Chokes and Capacitors

i. Location

Choke and capacitor equipment for fluorescent lighting shall be fixed in accessible and well-ventilated positions away from combustible material and shall be spaced at least 10mm there from by an air gap or by non-combustible material.

ii. Connecting Wiring

Where choke and capacitor equipment for fluorescent lighting is not contained within the lighting fitting, any connecting wiring exceeding 1.0 metre in length shall be of PVC sheathed, PVC insulated flexible construction, placed well away from readily flammable articles and shall not be installed under flooring or in spaces enclosed by stand construction.

18. Suspended Lighting Fittings

Suspended lighting fittings (other than single lamp pendants) shall be provided with adequate means of suspension independent of the electrical conductors. Heavy lighting fittings shall be provided with a secondary means of suspension.

19. Lighting of Cages

Any artificial lighting of cages or enclosures for livestock shall be arranged outside the cages or enclosures and any heating shall be to the satisfaction of the relevant Authorities.

20. Lighting of Signs

i. Fixing

Electrically operated or illuminated signs shall not be fixed on woodwork or cloth unless effectively protected by non-combustible material.

ii. Construction and Wiring

Internally illuminated signs shall be constructed of approved materials and wired in approved type cables (not flexible cords), which are related to the expected internal ambient temperature and adequately ventilated.

iii. **Location**

Illuminated signs that in any way resemble exit notices and similar mandatory signs shall not be positioned in such a way as to cause confusion to the public.

21. Lighting of Showcases

i. **Externally**

Unless the exhibits are of an incombustible nature, showcases shall be illuminated from the outside only. A valid PAT test is required and the label clearly visible.

ii. **Internally**

Internally illuminated showcases shall be constructed of suitably approved materials and wired in approved type cables (not flexible cords) and adequately ventilated. The minimum c.s.a of the cable shall be 1.5mm². The units shall be fused at the correct current rating to protect cable and equipment.

22. Electrical Discharge Lamp Installations

Discharge tube signs or lamp installations used as illuminated units on stands, or as part of an exhibit, whether of high or low voltage operations, shall be regarded as high voltage for the purpose of these Regulations, and conform to the following conditions:

i. **Location**

The sign or lamp exhibit shall be installed out of reach of or shall be adequately protected from the public.

ii. **Installation**

Signs

The fascia or stand fitting material behind luminous signs of this nature shall be incombustible material and protected as required by BS7671 (IEC364).

High Voltage Gear

High voltage gear shall be mounted on incombustible material and protected as required by BS7671 (IEC364).

iii. **Fireman's Switch**

A separate electric circuit must be used to supply such signs or lamp exhibits, and shall be controlled by an approved pattern "Fireman's emergency switch" located in an accessible and visible position and labelled "Fireman's Switch" in a visible and fully accessible position in accordance with the Authority's requirements.

iv. **Approval**

The Venue shall be advised by persons responsible for installing this type of apparatus of their proposals prior to installation on site. No installation of this type will be permitted unless approved by the Venue's Engineer in writing.

23. Electrical Cookers, Kettles, Irons, Radiators, etc.

i. General

The use of radiators or heaters with exposed elements is not permitted. Any apparatus, which has a hot surface, and all electrical appliances such as electric kettles, radiators, irons, etc., shall be guarded where necessary and stood or mounted on incombustible material. All appliances under this heading which are liable to exceed a surface temperature of 70°C shall be supplied from a socket outlet having a pilot lamp indicating whether the appliance is switched on or not. Kettles, irons, radiators and similar appliances shall not be connected to the lighting circuit; they shall be separately connected to the electrical supply, or in accordance with paragraph 506k. Electric cookers shall be wired on an independently fused final sub-circuit complete with 30mA RCD protection. All equipment shall be PAT tested and labelled.

ii. Electric Kettles

Electric kettles shall be fitted with an automatic safety device whereby in the event of boiling dry the kettle will be automatically disconnected.

iii. Adjacent Construction

Walls adjacent to all electrical cookers, irons, kettles, hotplates, etc., shall be protected with non-combustible material. Shelves are not allowed immediately above any of the appliances, and adequate ventilation shall be provided.

24. Batteries

i. General

Charged batteries may only be exhibited as part of electric lighting, ignition or starting for motor vehicles, boat engines, small demonstration house lighting plants or other small working devices. No stand lighting shall be connected thereto. The use of approved purpose made self-contained secondary lighting fittings both of a maintained and non-maintained pattern will be permitted provided that they are connected to a 24 hour supply.

iii. Terminals

All terminals of charged batteries, whether in use or not, shall be fitted with a cover of non conducting incombustible material.

iv. Switches and Fuses

A double pole metal clad switch with suitable fuses shall be fitted and shall control all connections serving such appliances.

v. Charging

Current Regulations

The battery charging unit shall be fitted with an automatic current regulator which cuts off the mains supply to the rectifier when the battery is fully charged, and is otherwise of an approved type.

vi. Times for Charging

The battery shall not be charged on the stand except at times when the public is not in the Hall.

Charger Isolation

The circuit to the charger unit shall be directly connected to the Venue's supply with its own isolator, separate from all other circuits, to permit the isolation of these other circuits without affecting the charging circuit.

Enclosure

The vehicles or equipment and its charger must stand in a free and enclosed space, the battery box cover shall be removed and the gas vents of the cells shall be cleared and inspected daily.

No Smoking Signs

"No Smoking" signs shall be displayed in the vicinity of the charging operation.

v. Batteries Not in Use

Charged batteries not in use on exhibit vehicles or other exhibits shall be disconnected at both terminals.

25. Harmonic Distortion

The Venue's mains normally provide an acceptably "clean supply". No protection is incorporated in the mains to counteract interference produced by other exhibitor's equipment connected to the same source of supply. All sensitive/vulnerable equipment should be protected by filters etc.

Electrical equipment that produces harmonic distortion can cause problems for the local area supply board, the Venue, and other clients in the Hall. This equipment may only be used if adequate precautions and harmonic filters are used.

The customer's equipment shall not under any circumstances emit into the supply any currents in excess of the following:

Third harmonics in excess of 48A RMS and /or in excess of 15% of load current;
Fifth harmonics in excess of 28A RMS and no harmonic current emissions in excess of the recommendations given in the Electricity Association's Engineering Recommendations G5/4.

The Venue reserves the right to:

- Refuse to connect any suspect equipment and disconnect any known problem equipment.
- Connect only via a physically separate supply (i.e. a generator)
- Impose additional charges to cover the costs of remedial works, depending on the exact nature of the harmonics being produced by the load.
- Recover any costs to repair damage to the Venue's supply equipment or to others equipment.

26. Electro Magnetic Compatibility

Any electrical equipment radiating a magnetic field could cause problems for the Venue and other clients in the hall. This equipment may only be used if adequate precautions and suitable screening is provided.

Any extra costs involved to overcome the magnetic problems will be the responsibility of the installer.

Liability for any costs/damage to Venue's supply equipment or others equipment lies with the installer.

The Venue reserves the right to refuse to connect up any suspect equipment and disconnect any known problem equipment.

27. Mains Supply

i. Right of Supply

All current for consumption on the Premises, howsoever generated, shall be supplied by the Company.

ii. Standard Supplies

The standard VENUE supplies comply with the EU Harmonized Voltage Band of + 10% and – 6%:

Single Phase 230V: 50 cycles per second AC supply, earthed neutral between 2 and 100 amps any one supply (316v to 253v).

Three Phase 415V: 50 cycles per second AC supply, earthed neutral between 5 and 600 amps any one supply (376v to 440v).

iii. Separate Lighting and Machinery Mains

Separate mains shall be supplied by the Company for machinery and for lighting and small power.

iv. 24 Hour Supplies

24 hour supplies are available for any standard supplies during the open period and by arrangement for breakdown of an exhibition.

24 hour supplies cannot be guaranteed during build up.

v. "Clean" Supplies

The Company's mains normally provide an acceptably "clean" supply. No protection is incorporated in mains to counteract interference produced by other exhibitors' equipment connected to the same source of supply. All sensitive/vulnerable equipment should be protected by filters, etc.

vi. Non-Standard Supplies

Alternating current supplies which are non-standard in voltage, current or frequency and direct current supplies may be arranged on application to the Company.

vii. Neutrals

Neutrals are earthed at the Company's sub-station.

viii. Load Limitation

The Company, at its own discretion, will limit the power rating of a supply or supplies where, in the Company's opinion, the load or combination of loads requested may have an adverse effect on the supplies to other exhibitors. Where it is proposed by the Organiser to group exhibitors demonstrating heavy current consuming machines in such a way as to cause an abnormal demand (i.e., in excess of 100 watts per square metre) in a particular section of the exhibition, the Organiser should discuss this arrangement with the Company prior to the final allocation of stand space to exhibitors and should endeavour to conform to any rearrangement required by the Company.

ix. Power Factor

The Company aims to achieve a minimum .9pf on site but is required by the Electricity Supply Authority to maintain a Power Factor of not less than 0.92 lagging. Where electrical machines or equipment at an exhibition are such that in the opinion of the Company the Power Factor is likely to fall below 0.92, Power Factor correction apparatus shall be supplied and installed by the person responsible for the electrical installation.

x. Correction Apparatus

Correction apparatus shall be connected on the "load" side of the main switches controlling the supply to the stand or individual piece of equipment. The scale of provision shall be that agreed by the Company.

xi. Notification

The Company will notify Organisers, within a reasonable time after it becomes apparent, of the likelihood of correction apparatus being required at the exhibition.

28. Main Supply Cables

i. Supply and Installation

All main supply cables from the Company's electrical distribution system to the point of supply, which may be either an exhibit, stand or group of stands, shall be supplied and installed by the Company.

ii. Termination

Each cable will be terminated with a fused isolator or circuit breaker supplied by the Company.

iii. Separate Lighting and Machinery Mains

Separate mains will be supplied for machinery from those used for the provision of lighting and small power. A machine is defined as a single item of plant or equipment, which could not be connected using a 13-amp socket or spur unit.

iv. Connection of Machinery to Lighting Mains

Connection of machinery to lighting mains will be permitted.

v. Connection of Lighting or Small Power to Machinery Mains

Connection of lighting or small power to machinery mains is prohibited. If any such connections are made, then the party responsible for placing the order for electrical supplies to that stand will be required to order and have installed an appropriate lighting main. Where this is not practical the stand will be subject to a surcharge equivalent to the late order cost of the lighting main which would otherwise have been installed.

vi. Proliferation of Mains Cables

Where installation of a number of small supplies would, in the opinion of the Company, lead to an unacceptable proliferation of mains cables, the Company may, at its discretion, either itself install a large main cable and provide the mains ordered by sub distribution within the block, or instruct the nominated electrical contractor that only a single main will be installed to the group of stands.

vii. Access for Installation

The main supply cables to stands or exhibits will be installed before or immediately after the starting date of the Licence Period, provided that the supply has been ordered from the Company by the agreed date (see paragraph 29.1 below). Before occupying the stand site, exhibitors and their contractors must check with the Company that the supply cables have been installed and, if not, shall only occupy areas of the stand site permitted by the Company until such time as the supply cables are installed.

29. Ordering of Main Supply Cables

i. Placing of Orders

Main supply cables shall be ordered from the Company by the Organiser, electrical contractors, exhibitors or their nominated representatives using procedures and at charges for standard supplies agreed between the Company and the Organiser. Orders will only be accepted when made in writing. The standard VENUE mains order form is the required method for placing orders. Copies of the form are available from the Company.

ii. Deadline for Orders

Orders for main supply cables shall be placed with the Company not later than four weeks prior to the commencement of the Licence Period.

iii. Late Orders

Completion

The Company will not guarantee to complete orders received after the deadline, prior to the opening of the exhibition. In any event, priority will be given to the completion of those orders placed before the deadline.

Procedure

The Company reserves the right to deal with orders placed after the deadline in the order in which they are received.

Surcharge

Orders for mains supplies received by the Company after the deadline will be subject to a 20% surcharge.

Payment

The Company reserves the right to refuse to connect a supply until payment has been received.

iv. Routing and Termination Positions

All orders should indicate specific positions required for termination and routing of main supply cables and must contain full information of these positions, including a dimensional plan showing their location on the stand and the location and orientation of the stand in the Hall. If this information is not given, the supply cable will be routed and terminated at a position at the discretion of the Company. The Company accept no responsibility for any costs involved in relocating a supply cable or altering stand fittings or stand electrical installations unless an adequate location plan for the supply cable is submitted with the order.

The main cable(s) shall be brought on to the stand from a duct within the area of the stand. Connections from a duct on an adjacent stand shall not be permitted unless: either there is no duct on the stand, or the Organiser and adjacent stand holder have given their prior permission. The VENUE cannot guarantee the availability of mains services – unless the exhibition stand has a service duct line running through it.

Note: Persons responsible for designing the layout of stands, or the electrical installation of stands, should acquaint themselves with the location of the underfloor service ducts in the Halls used for installing stand services to ensure that stand layouts can, or are designed to, permit the termination of main cables over, or as close as possible to, the floor ducts. These floor ducts are shown on the layout plans of the exhibition, issued by the Organiser.

v. Alterations to Orders

Termination Position

Where the termination position of a main supply cable is altered after the deadline date for placing orders, this will be treated by the Company as a late order and will be subject to a 20% surcharge.

Rating

Where the rating of a main supply is changed after the deadline date for placing orders, the new main supply will be treated as a late order and will be subject to a 20% surcharge. When the change falls outside the cable size range and therefore requires the installation of a new cable, the surcharge will be applied to the difference between the 2 tariffs for the 2 mains involved. The cable ranges used at the VENUE are:

2 to 32A, 40 to 63A, 80 to 100A, 125 to 160A, 200 to 315A, 450A and 630A

vi. Cancellation of Orders

Cancellation of orders will only be accepted by the Company when made in writing. Where such written cancellation is received by the Company later than one week prior to the commencement of the Licence Period, the main supply ordered will be charged at half the full rate and thereafter at the full rate. If a supply is ordered and not cancelled in writing then the supply will be charged at full rate.

30. Time of Operation of Electrical Supplies

i. During Exhibition

Main stand electrical supplies will be switched on half an hour before opening and off half an hour after the close of the exhibition each day, except for the last day when switch off will be at the time of the close of the exhibition. Power requirements outside normal exhibition open hours must be booked by 3pm on the required day. Provision of this service will incur an extra cost.

ii. During Build-Up

During the build-up period of an exhibition, supplies that have been tested and connected will normally be switched on half an hour after normal starting time and off half an hour before the normal finishing time of the exhibition industry. Additionally, there may be interruptions to the supply to allow the Company to make extra connections.

iii. Variations

By agreement between the Company and the Organiser the times of the switching for connections may be varied to meet the needs of the exhibition. Such requests should be made at least half a working day in advance of the requirement.

iv. During Breakdown

All mains supplies are switched off at the closing time of the exhibition on the last day. Where an exhibitor requires a mains electrical supply after the close of an exhibition, the request for such supply should be made to the Company, through the Organiser, by midday on the last open day of the exhibition. Reinstatement of mains supplies will be subject to safety procedures and additional charges will be incurred should this service be provided.

v. Stand Circuits

All stand circuits not requiring continuous supplies shall be switched off by the exhibitor, using the stand isolator, as soon as possible after the close of the exhibition each day.

vi. 24 Hour Supplies

Where continuity of supply is required this should be indicated by ordering a 24 hour supply. The continuous supply will be from the opening morning until the close of the exhibition. During the build-up period the supply will normally be switched on and off as for standard supplies. By arrangement between the Organiser and the Company it may be possible to agree to improved continuity of supply.

Appendix I: Connection & Energisation Form

CONNECTION & ENERGISATION FORM

Duct Ref.....

To Be Completed By Stand Wiring Contractor:

Main located on Stand Number	Hall No.
	Main Supply/Main No.....
IS THIS A MODIFICATION FORM YES/NO	Main Size.....Amps

PSC.....kA^{*}.

Ze.....Ω^{*}.

Cable No.....

Switch No.....

* denotes reading can be obtained/known value or by test

Testing will be carried out on the venue main supply and the supply energised after satisfactory tests have been carried out by Stand Wiring Contractor. If not this form will be completed as failed and returned to Stand Wiring Contractor. Installations failing a second inspection may be subject to a re-test charge. Completed certificate should be left with N.E.C Mains Contractor.

Visual Check	Yes / No	Earth Loop Random Test	Pass/Fail
Voltage	230 / 400	Insulation resistance > 20 MΩ	Yes / No
Polarity correct	Yes / No	Earth Bond Present	Yes / No
RCD Test Button Operation	Pass/Fail		
Neutral Connected Firmly & Correctly in Isolation Switch:			Yes / No

Installation Inspection Pass / Fail Remarks.....

Tested By (Print).....(Sign).....

TEST INSTRUMENTS

Type Serial No.....
 Type Serial No.....

Time Stamps & Notes

PASS	
------	--

FAIL	
------	--

Completed Form Handed in by Contractor
TIME STAMP IN

Block Main Energised
TIME STAMP OUT

Note: Final circuits rated upto 32 amps shall be protected by an RCD with a 30 mA operating current. RCD units must be labelled and tested at regular intervals by Stand Holder/Exhibitor.

Exhibition... ..

	Stand:	Stand:	Stand:	Stand:	Stand:	Stand:
Circuit Description / Designation						
Points Served						
Conductor Size						
Cable Type						
C.P.C Size						
Protective Device						
Rating						
RCD Test Label Installed						
Insulation Resistance						
Earth Bond Present						
Visual Inspection						

Key: Device Cable Type
M = MCB PVC/PVC
R = RCD PVC
MR = RCBO SWA
H = HRC

CONTRACTOR DECLARATION

I request that the electrical supply ordered be finally connected and energised and certify that the installation has been checked, tested and is complete, ready for energisation. The electrical installation on the stand complies fully with the requirements of the Electricity at Work Regulations 1989 and the EVA Regulations for Stand Electrical Installations 2001 and any amendments thereafter.

Name (Print)..... Signed.....

On Behalf of COMPANY NAME (Block Capitals).....

NOTE: ALL DETAILS ABOVE SHOULD BE COMPLETED IN FULL. ENERGISATION TIME MAY BE AFFECTED IF NOT CORRECTLY COMPLETED.

Notes.....

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Appendix II: Procedure for the Electrical Testing of Exhibition Stands

This procedure document details the work to be covered by the appointed/official electrical contractor and relates to the Connection & Energisation of Exhibition Stands Form.

The following tests should only be carried out by a suitably qualified person to the standard of City & Guilds 236 Part 1 and Part 2; City & Guilds 2330 part 1 and part 2 or equivalent.

The following actions should be undertaken as part of the testing procedure:

Visual Inspection:

- Ensure that in the connection of cables and conductors they remain undamaged, tight, secure and complete.
- Ensure all connectors are fully enclosed in suitable terminal enclosures (BS6220).
- Ensure equipment is mechanically sound, free from damage and that all cable entry and exit points are protected with suitable glands and covers.
- Ensure that all wiring is mechanically protected where required.
- Ensure that the RCD test label is visible and up-to-date. Testing frequency is a minimum of every 6 months.
- Ensure that all lighting installations are compliant with current exhibition regulations.
- Ensure that the earth bond is visible.

Earth Bond:

Where mains are employed on metal-framed stands the stand framework must be bonded at the incoming main position and also at the termination point of every sub main. The bonding conductor must have a minimum cross section area of 6mm sq.

Required Installation Information:

The Installer will provide the following data at the time of installation:

- Points served
- Conductor size
- Cable type
- CPC Size
- Protective Device
- Rating

Insulation Resistance:

Ensure that the insulation test is completed and the reading recorded on the form.

RCD Test Log Number:

Ensure that the RCD log number is recorded on the form. The RCD log shall be available for reference from the contractor.

Test Instruments:

The contractor shall ensure that all relevant information regarding the calibration of test equipment is recorded. Records shall be available upon request.

Once testing is complete the test sheet shall be signed by the tester and submitted to the venue for energisation.

Appendix III - Procedure for the Venue Mains Electrical Inspection

The venue will carry out the following inspection of the mains and cursory visual inspection of the exhibition stand wiring prior to energising the mains supply.

Visual Checks:

- Connection of cables / conductors – Are they tight / secure?
- Identification of cables / conductors – Are they connected to correct place?
- Is the cabling of the correct size for the load it is required to carry?
- Check the cable that is connected from the installation to the NEC mains supply switch – cables which are too small / undersized will not be accepted.
- Are all electrical junction points enclosed so that they cannot be touched?
- It is important to ensure that no live parts can be touched or are left exposed!
- Is there any damage to accessories or equipment, making it electrically unsafe?
- Are the fuses / circuit breakers correct size for the equipment and cabling?

Generally – check that everything is in order before energising the supply

Polarity:

- This check is both visual and by use of a test meter (ohmmeter)
- Are the phases and neutral and earth (cpc) conductors correctly connected throughout the installation?
- Incorrect polarity can mean that protective devices such as circuit breakers and fuses are not connected in the phase conductor, which is potentially dangerous
- Incorrectly connected neutral and phase conductors will cause equipment damage

Insulation:

- This check/test is carried out by use of an Insulation Resistance Tester which operates at a test voltage of 500volts / 1000volts d.c. producing a test reading measurement in MegOhms (1,000,000 Ohms)
- This test confirms that there is no breakdown in the insulation of cabling or equipment, which could produce a shock or fire risk.

Continuity:

- This check/test is carried out using a Low Resistance Ohmmeter producing a test reading which is measured in Ohms / milliOhms.
- This check ensures that protective conductors are continuous and correctly connected to ensure that safety protective devices (fuses, circuit breakers RCD's) operate as designed.
- The readings obtained should be very low as they indicate the resistance of connected cabling and earthing conductors.

RCD Test Label:

This is a requirement in the UK for a label to be attached to any distribution board RCD (Residual Current Device).

Random Earth Loop Test

- The Mains Installer will randomly select 1 socket outlet on each mains supply.
- Before testing the socket the mains installer needs to measure the loop impedance at the source of the supply (Z_s), this is undertaken using an earth loop impedance tester.
- The test shall be carried out at the socket by plugging the test meter into the outlet and taking a reading. The reading obtained will be the full earth fault loop impedance including the external fault loop (Z_e) the value must then be compared with the maximum value by comparing with the manufacturers data or by using the BS7671 tables giving the maximum permissible values of earth fault loop impedance for various fuses and mcb's.