



## STANDARD OPERATING PROCEDURES UNIT : ELECTRICAL

Title

**Temporary Electrical Power Supply**

**1. Purpose**

- 1.1. This SOP is to be used for the purpose of providing Temporary Electrical Power Supply within HPL complex for use by Contractors / Vendors assigned to carry out the jobs, without hampering the normal operation of the Plants and Processes.
- 1.2. This SOP is in addition to all HPL Safety Rules, Regulations and Procedures.

**2. Introduction**

- 2.1. The Operation & Maintenance jobs / jobs related to construction work for Projects / PCPs / Process related activities are carried out within the plant in conjunction with the continuous operation of the existing plants and utilities, and hence, it is important that the electrical safety is maintained for the temporary connections to avoid electrical safety hazards and failure or mal-function of electrical systems due to electrical faults.
- 2.2. The SOP is being used to eliminate root causes of faults in temporary electrical power system, which can cause fatalities to human beings, fires in case of faults and cause hindrance the normal operation of the Plants and Processes.
- 2.3. The required power supply will be extended from the existing electrical distribution system which is responsible for the operation of the plant, and hence it has to be ensured that no interruption takes place in the main plant operation because of any fault in the temporary power supplied to the Service Department / Contractor.
- 2.4. The utility power points are limited inside the Plants both ISBL and OSBL and hence, the requirement of temporary power supply should be applied judiciously.
- 2.5. In OSBL diesel operated machines should be preferred keeping in mind the long length of power cables required to be laid for providing temporary power specially for small duration jobs.

**3. Electrical Safety Requirements**

- 3.1. All certified and standard PPE has to be used by personnel operating the electrical equipment.
- 3.2. All DBs shall be housed in proper shed or provided with necessary protection against rain and unauthorised access for operation of the switchgear.
- 3.3. The DB / shed shall be clearly demarcated with danger tape and un-authorised access is not allowed.
- 3.4. Electrical "Danger" boards and fire extinguisher shall be provided near the DB / shed.
- 3.5. Insulating mats shall be made available in front of all DBs and all electrical operations of the switchgear shall be carried out by standing on top of the insulating mat.
- 3.6. Contractor / Vendor shall deploy one certified and trained Electrician for operations of electrical DBs, motors and other equipment. Only authorised personnel are allowed to operate electrical equipment.
- 3.7. Contractor / Vendor have to provide electrical insulating gloves and face shield for use by the Electrician for any electrical operation in addition to the standard PPE.

**4. Requirements**

The following requirements are to be complied by all concerned.

**4.1. Power Supply applicable**

- 4.1.1. In general all hand tools, welding machines, etc.. shall be suitable for operation with 230 V, AC, 50 Hz, 1 phase + Neutral system. The current rating shall be limited to 16A.
- 4.1.2. Welding machines, hydro-jetting machines or other large machines which are temporarily installed in one location for use shall be suitable for operation with 415 V, AC, 50 Hz, 3 phase + Neutral system.

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- 4.1.3. Temporary electrical equipment requiring two phase supply shall be avoided.
- 4.1.4. Area illumination and fixed type lighting fixtures used for temporary area lighting shall be suitable for operation with 230 V, AC, 50 Hz, 1 phase + Neutral system with maximum current rating of 16A.
- 4.1.5. Portable lights and hand lamps shall be suitable for 24 V system.
- 4.1.6. HPL Electrical Department shall provide the power supply along with the cable if necessary from the nearest utility power point available as per the following.

#	Job	Issue related to Plants
1.	Fabrication, Erection, Stress Relieving.	HPL shall provide up to 20 m power cable up to the Distribution Board of the Contractor. The DB and onwards cables are in Contractor scope.
2.	Hydrojetting machines	HPL shall provide cable up to Contractor machine Control Panel / DB. <b>Exception for IOP:</b> HPL shall provide 100 m cable from nearest power source. Cable laying / removal and DB in Contractor scope. Onward cabling if required shall be done by Contractor or diesel engine to be used.
3.	Fabrication yard	Permanent outlets are provided and to be used. Additional cabling in Contractor's scope.
4.	HDPE piping and fabrication.	HPL scope: Up to Contractor DB with 20 m maximum.
5.	Insulation	HPL scope: Cable max 50 m along with extension board.
6.	Insitu Puff insulation	HPL scope: Cable max 50 m along with extension board.
7.	Chemical cleaning	HPL shall provide up to 20 m power cable up to the Distribution Board of the Contractor. The DB and onwards cables are in Contractor scope.

- 4.1.7. Cable laying / removal and DB in Contractor scope. Onward cabling if required shall be done by Contractor or diesel engine to be used.
- 4.1.8. Contractor has to ensure that the cables, if supplied by HPL are of proper condition. In case any cable issued to contractor as per above table is found to be damaged while returning to Electrical Department, the cost of the cable will be recovered from the Contractor.
- 4.2. Temporary Power Outlets
- 4.2.1. Single phase loads will be supplied with power from fixed 230V AC, 16 A Utility receptacles with 3 pin metal clad plug top. In case of classified areas FLP socket outlets with FLP plug tops shall be used. The 3 pins are configured for 1 Phase + Neutral + Earth.
- 4.2.2. In case of hand-tools which are available with inbuilt small length of power cable along with plug top, necessary small extension board shall be used near the job location. The extension board shall be metallic in case of ISBL areas. Wooden extension boards are only allowed inside buildings and safe areas.
- 4.2.3. Three phase loads will be supplied with power from fixed 415V AC Utility receptacles with 5 pin metal clad plug top. In case of classified areas FLP socket outlets with FLP plug tops shall be used. The 5 pins are configured for 3 / 2 Phases + Neutral + Earth.

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- 4.2.4. Distribution Boards with multiple single phase and three phase outlets, properly designed and protected against short circuits and earth faults in the outgoing outlets, may be used where many machines are to be provided with temporary power.
- 4.2.5. Plug tops if required from Electrical Dept for use, shall be issued from the Substation after due authorisation by HPL Service Dept Engineer. After completion of the job, the plug tops shall be returned to the Substation. In case of damage / loss of plug top necessary amount shall be deducted from the Contractor's bill as applicable.
- 4.3. Electrical Protection for Safety
- 4.3.1. Two / three phase power supply cannot be provided for hand tools.
- 4.3.2. All temporary power loads are to be protected against short circuits by means of HRC fuse / MCB / MCCB of proper rating.
- 4.3.3. Rewireable types of fuses are not allowed inside the complex.
- 4.3.4. Oil immersed Star-Delta starters are not acceptable.
- 4.3.5. All temporary power loads are to be protected with earth fault protection by means of ELCB / ELMCB / Earth Fault Relay of suitable rating.
- 4.3.6. Double earthing shall be provided for all machines and equipment.
- 4.3.7. As an exception, where full insulated hand-tools are used, which have only 2 pins for phase and neutral connection, separate earthing is not required.
- 4.4. Type of Cables
- 4.4.1. All cables are to be armoured and distribution equipment used shall be adequately sized and rated and approved by HPL-Electrical Department and shall be supplied by the Contractor, whenever they are engaged for jobs. Cables used for portable hand-tools like grinding machine, drill machine, etc.. shall be of minimum 3c x 2.5 mm<sup>2</sup>, insulated flexible copper cable in single length without joints. Cables used for any 3 phase power requirement (like welding machine, mixer motors, vibrating machine, winch machine, motors, etc..) shall be with armoured flame retardant PVC copper cable up to 16 mm<sup>2</sup> and aluminium / copper for higher sizes. The cable sizing will be as per the machine rating. There should not be any physical damage of cable and healthiness of cable to be ensured.
- 4.4.2. Large machines requiring 3 phase power (like welding machine, mixer motors, vibrating machine, winch machine, centrifuge machine, hydrojetting machines, motors, etc..) shall be supplied power by using minimum 4c x 4 mm<sup>2</sup> armoured FR (flame retardant) PVC copper cable. In case of higher capacity machines higher size cables should be used. (4 cores: 3 Phases + Neutral and Armour as Earth). The cable size should be properly used so that overheating of the cable and consequent fire incidents should be avoided.
- 4.4.3. A separate earth wire / cable of minimum needs to be provided for § 4.4.2 above and run along with the main power cable.
- 4.4.4. Any 415V, AC temporary installation which will be kept connected, either in ON or OFF condition, to the HPL Power System shall be provided with armoured FR cables of suitable size and rating.
- 4.4.5. However, non-armoured flexible cables are allowed, for single phase connections if proper protection of cables is taken against any unintended mechanical damage. For this purpose the non-armoured cables shall be routed through pipe sleeves or conduits or inverted "C" channels or rubber cable bridge which are suitable to protect the cable.
- 4.4.6. Non-armoured cables cannot be laid on ground directly and through drains and road crossings.

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- 4.4.7. In case internal distribution of temporary power is required from a Main Distribution Panels to Sub Distribution Panels the same shall be carried out by using armoured FR PVC multi-strand cables of proper size.
- 4.4.8. Cables shall be of proper insulation level and properly insulated without any joints.
- 4.5. Proper protection and safety of cables is the responsibility of the Contractor which is using the temporary power supply.
- 4.6. Cable terminations
- 4.6.1. All cables are to be properly terminated. The end connections of three / two phase power connections are to be through cable glands and terminated with proper size and type of glands.
- 4.6.2. Armoured cables should be glanded in such a manner that the armour is properly used in the gland for earthing.
- 4.6.3. The terminations inside the DBs / terminal boxes junction boxes shall be such that there is no stress or tension on the connectors or terminal strip. If required, necessary supports shall be provided to the cables.
- 4.7. Distribution Boards
- 4.7.1. Temporary Distribution Boards will be used when the volume of job is large such as Project / Shutdown related jobs and multiple temporary power connections are required to be provided.
- 4.7.2. The Distribution Boards (DB) have to be tested and certified by CES(E) for their healthiness before they are brought for operation inside the Plants. The User shall keep the test certificate issued by CES (E) all the time and the same may be asked to be produced any time by HPL Safety / Electrical Department. This test certificate will be a pre-requisite for the energisation of the Distribution Boards.
- 4.7.3. The single phase loads shall be protected against short circuits and earth faults. For this purpose switch - fuses / MCBs for short circuit protection and ELCB for earth fault protection are to be used. Combined ELMCB for both short circuit and earth fault protection are also allowed to be used.
- 4.7.4. The single line diagrams of the DB(s) with all requisite protections appropriately marked are to be submitted for approval by HPL Electrical Department. The maximum fault level in LT distribution network at HPL is 50 kA for 1 sec and hence the various components viz. HRC fuses, SFUs, components, busbars, DBs etc.. used shall be suitably chosen for this purpose.
- 4.7.5. The DB(s) shall have provision for double earthing connection.
- 4.7.6. The fuse selection / breaker trip settings / relay settings at the DB end shall be properly co-ordinated with upstream HPL side switchboard breaker / fuse trip settings. In general the settings shall be lower than HPL sending end settings.
- 4.7.7. The electrical protection of the DB shall be such as to ensure that the sending end (HPL side) breaker / fuse should not trip / operate in case of any downstream earth fault or over current at the load side to avoid disturbance in the electrical system of the running Plant. This can be ensured only if all the equipment along with their distribution network at construction / O&M job site remains in healthy condition during the entire period of work.
- 4.7.8. All the electrical components beginning from the incoming SFU to various temporary machines used for construction / O&M jobs must have a minimum IR (Megger) value of 3 MΩ with 500V/1000 V Megger all the time otherwise the DB will not be energised or alternately energised DB stands liable to be de-energised.
- 4.7.9. All openings in the DBs shall be properly sealed to avoid ingress of moisture, water, vermin and rodents. Cable glanding shall be proper to ensure that there are no openings remaining.

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4.7.10. All DBs shall be located in a proper shed for monsoon protection.

### 4.8. Earthing

4.8.1. All temporary machines used within the HPL complex shall have the provision of double earthing. If armoured cables are used and properly glanded at both ends of the cable, then earth connection through the armour can be considered as one earth point. The other earth has to be made to the machine body as safety earth.

4.8.2. In single phase 230V AC system using 3c flexible cables, the third core is to be used as earth. Another separate earth to the body of the machine shall be provided.

4.8.3. In three phase 415V AC system, using flexible cables minimum 5c cables are to be used. The fourth core will be used as the Neutral and the fifth core shall be used as Earth. Another separate earth to the body of the machine shall be provided.

4.8.4. HPL will provide one earth connection from system earth through the armour of the main power supply cable. The second earthing is to be taken from existing nearby earth bus as shown by HPL Electrical Engineer.

4.8.5. The second earth as per the double earthing philosophy, for the temporary power distribution network and distribution boards shall be from a separate standard earth pit conforming to IS: 3043 for jobs of duration more than 15 days or DBs located OSBL and nearby earth bus is not available.

### 4.9. Portable Hand Tools

4.9.1. All portable hand tools shall be powered by 24V DC or if 230V AC is being used, then the hand tool has to be protected by an Earth Leakage Circuit Breaker (ELCB) of suitable rating 100mA for single phase and 300mA for 3 Phase sensitivity. The Contractor shall provide necessary distribution board with ELCB and MCB(s).

4.9.2. The cables connecting the machine should be in one length without any joints and in good condition without any damage to the insulation. The tools are to be connected through proper and suitable plug tops based on the plug sockets available within the Plant.

### 4.10. Hand lamps

4.10.1. Hand-lamps will be provided on request from the Maintenance / Process Departments in the workplace.

4.10.2. All hand-lamps will be rated for 24V operation. The 230/24V transformer has to be located within 15m of the 230V socket outlet. Each hand-lamp will be connected from individual 24V outlet. The flexible cable connecting the hand-lamp shall be without joints and care should be taken that the cable is not damaged during use.

4.10.3. Hand-lamps shall not be used without the covering protective glass and guard.

4.10.4. In case of any damage of the hand-lamp, while in use, the hand-lamp shall be switched off and to be notified to Job-In-Charge immediately. Connection will be provided from power source of 230V outlets.

### 4.11. Welding Machines

4.11.1. All welding rectifiers are to be equipped with Voltage Reduction Device.

4.11.2. The welding machines along with the cables will be tested and certified from HPL-Electrical Department. The certificate will be renewed after expiry of the same. The cable will be checked by the Contractor and User Department regularly to ensure the healthiness of the same. In case of any defect, the cables have to be replaced immediately.

4.11.3. The welding machine has to be connected by armoured 4 core cable (as directed by HPL Electrical department) with proper mechanical protection such as pipe sleeve or heavy duty rubber cable bridge or inverted channel (as applicable) from the standard 3 phase receptacle provided in the Plant, under proper Permit. The incoming cable has to be properly rated and

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is to be provided by the Owner of the welding machine. In case of working in licensed area (Sphere / Tank farm), the welding machine will be located outside the dyke area with proper shed & barricading as permitted by safety regulations. A local distribution board with proper short circuit protection (switch with HRC fuse and / MCB) and earth leakage protection (ELMCB / ELCB / RCCB) has to be provided. The outgoing welding cables shall be in one single length and properly insulated without any breaks or taping. The return cable shall be connected to the job as near as possible.

4.11.4. The DC welding cables should be properly insulated without any joints and in single length. The flexible cable connecting the welding machine to the regulator should also be properly insulated and in a single length without any joints.

4.11.5. A standard welding machine will be connected from a 63A, 3ph+Neutral+Earth point. The distribution board should have a 63A SFU / MCB, TPN, 4 pole incomer with earth fault protection (ELCB / RCCB / ELMCB).

4.11.6. The cable connecting from the distribution board / main switch to the welding machine shall be 4 core armoured.

#### 4.12. Specific to Welding Machines

4.12.1. During welding it has to be ensured that no welding connection is made with the HPL earth network / earth strips or existing structurals to avoid circulating current in HPL earth grid. In case the same is required then a separate earth grid for this purpose has to be made.

4.12.2. The positive and negative leads of the welding machine output should be directly connected to the job.

4.12.3. The welding machine will be located within 2m of the power outlet and necessary welding cables (2 lengths for +ve and -ve) shall be run to the job site. The welding cables shall be properly insulated and without joints.

#### 5. **Testing & Certification of Temporary Electrical Equipment**

5.1. The Contractor, bringing in the machines has to carry out self-check for the healthiness/fitness of the machine/equipment. The original test certificate or a copy of the test certificate from the machine manufacturer shall be provided along with the machine.

5.2. All the machines and accessories will be inspected and tested by the HPL-Electrical Department and a certificate will be issued for healthiness of the machine and permission for use. The certificate will have to be renewed on expiry of the same. The Certificate Number and validity shall be mentioned in the Job Work Permit and to be shown to the Permit Issuer at the time of permit issue. In case the machine is taken out of HPL Plant, a new certificate has to be issued or the existing one has to be renewed.

5.3. Only after proper testing of the electrical machines, hand tools, etc.. and after issue of certificate from CES(E), and on production of the certificates, the "Material In Gatepass" for temporary electrical equipment will be allowed for entry by Security at Gate.

5.4. All portable hand tools, machines, etc.. shall be provided with electrical connection only at the request of HPL Engineers and will not be provided to Contractor(s) directly. All portable electrical equipment to be used is tested and certified as "Fit to Use" by CES(E). Responsibility of periodic (half-yearly) testing of portable equipment lies with contractors. The "Fit to Use" certificate has to be retained and maintained by the contractor. The validation of the certificate is for 6 months only. The certificate is to be revalidated every six months. If the Contractor machines particularly hydro jetting machines, which are in the field for more than 6 months, revalidation certificate will be issued by Plant-Electrical. Re-validation of welding machine, grinding machine, etc.. are to be certified by CES -Electrical only. For re-validation of equipment which are installed and in use like Power Distribution board etc. checking of healthiness and certification will be done by respective plant Electrical.

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- 5.5. For re-certification of temporary electrical equipment the serial no. of the machine which is mentioned in the previous certificate should match with the machine Sr. No. under test. Machine Sr. No. should be clearly written on machine nameplate. The nameplate of the portable electrical equipment should be clearly visible mentioning rated current, rated voltage, frequency, rated power, rpm, hazardous area classification etc. as applicable. Where nameplate data is not visible, original manufacturer data sheets are to be provided for the certification clearly matching with machine Sr. No. and Model No. Proper weather protection to be provided.
- 5.6. Insulation resistance value should be minimum  $\geq 1.5 \text{ M}\Omega$  for welding machines and  $\geq 3 \text{ M}\Omega$  for all other electrical equipment including cables.
- 5.7. General
- 5.7.1. All the temporary electrical equipment used in hazardous area within the Plant shall be duly certified for hazardous area operation or necessary Hot Work Permits valid for the period of energisation of the electrical equipment shall be available.
- 5.7.2. Before first energisation of the DB(s) a joint visit by HPL team consisting of Electrical, Safety, Process, Service Department and Contractor (if applicable) will be carried out to ensure safety of the men and the temporary installation where power is being supplied
- 5.7.3. All equipment using electrical power supply shall be provided with rain protection before the power supply is energised.
- 5.7.4. Service Department and Contractor shall ensure Electrical Safety of their men and machines as per the standard practice of HPL or as directed by the HPL Safety Department or the Plant Electrical persons.
- 5.7.5. It is the responsibility of the User Dept to ensure that the Contractor returns the equipment, plug tops, cables, etc.. issued from Electrical Dept in good, clean and proper condition, so that they can be reused.
- 5.7.6. All statutory, PESO and OISD guidelines for temporary power supply connections have to be adhered to by the Contractor and ensure that the same is implemented in the field.
6. **Specific responsibilities to be carried out by Contractor**
- 6.1.1. The Contractor has to ensure that his equipment and electrical distribution network are installed and maintained by a licensed electrician / Supervisor to take care of the safety of his men and machines.
- 6.1.2. It is the responsibility of the Contractor to ensure that the machines are provided with incoming power supply cables of suitable length. HPL Electrical Department shall provide the power supply along with the cable if necessary from the nearest utility power point available as per § 4.1.6.
- 6.1.3. Under special circumstances the power cables may be issued by Electrical Department, if available with them, on non-refundable per day chargeable basis + refundable security deposit. The amount of per day charges and security deposit shall be decided on case to case basis based on size and length of cable. The amount is to be deposited to HPL Finance Department and necessary receipt obtained, which shall be produced to Electrical Department. In case of damage to the cables issued, the security deposit shall be forfeited by HPL.
- 6.1.4. If under special circumstances the power cables are issued by Electrical Department, it is the responsibility of the Contractor to collect the cables from the Substation responsible for providing the connection, and lay the cables as per instructions of HPL Engineer In-Charge. Proper care shall be taken while laying the cable including necessary protection against mechanical damage of the cables. Laying of cables where movement of personnel and equipment and vehicles shall be avoided, and in case the same is unavoidable proper

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protection against mechanical damage shall be taken. During the period the cables are issued to the Contractor, it is the responsibility of the Contractor to ensure proper safety and protection of the cables.

6.1.5. After completion of the job, the cables, if supplied by HPL are to be properly rolled / coiled, cleaned and handed over to the Substation from where the cable was issued. The cables shall be in proper condition as it was when issued.

6.1.6. If Distribution Boards are required for proper distribution of temporary power supply, the DBs have to be arranged by the Contractor as per HPL requirements mentioned above.

6.1.7. In case of damage of any of the equipment of HPL on account of fault, intentional or unintentional on the part of the Contractor, HPL reserves the right to recover the cost of such damage from Contractor's bill. Cost of HRC fuses replaced at the terminals of HPL due to any fault in the Contractor's installation shall be to Contractor's account as per rates decided by HPL.

6.1.8. Contractor to intimate power peak power requirement at any given time prior to start the job.

### 7. User Dept Actions & Responsibilities

7.1. The User Dept shall ensure that the requirements of this SOP are shared with the Contractor / Vendors well in advance.

7.2. The User Dept shall ensure that the power requirements in terms of machines to be deployed, rating (voltage, kW and current), are made available by the Contractor / Vendor.

7.3. User Dept shall fill up the data for testing and certification of electrical equipment in HPL CES(E) portal.

7.4. User Dept shall ensure that there are no violations by the Contractor / Vendor during the job execution. The health of all electrical equipment and accessories provided by HPL are properly maintained and taken proper care. All damages to HPL property shall be recovered from the Contractor / Vendor.

### 8. Responsibility

- HPL Service / User Department requiring Temporary Power Supply
- HPL Electrical Department Engineer In-Charge
- Contractor Supervisor
- HPL Safety Department

### 9. Abbreviations used

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| <ul style="list-style-type: none"> <li>• SOP: Standard Operating Procedures</li> <li>• HPL: Haldia Petrochemicals Limited, Haldia</li> <li>• PCP: Plant Change Proposal</li> <li>• ISBL: Inside Battery Limit</li> <li>• OSBL: Outside Battery Limit</li> <li>• V: Volt</li> <li>• AC: Alternating Current</li> <li>• FLP: Flameproof</li> <li>• MCB: Miniature Circuit Breaker</li> </ul> | <ul style="list-style-type: none"> <li>• MCCB: Moulded Case Circuit Breaker</li> <li>• ELCB: Earth Leakage Circuit Breaker</li> <li>• ELMCB: Earth Leakage Miniature Circuit Breaker</li> <li>• FR: Flame retardant</li> <li>• DB: Distribution Board</li> <li>• LT: Low Tension</li> <li>• SFU: Switch Fuse Unit</li> <li>• HRC: High Rupture Capacity</li> <li>• O&amp;M: Operation and Maintenance</li> <li>• IR: Insulation Resistance</li> </ul> |
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### Field Check List

#	Description	Responsibility	Remarks
1.	<b>Equipment Safety Checks</b>		
1.1.	Temporary electrical driven machines have been tested and certified by CES(E).	User Dept / Contractor	
1.2.	Temporary Distribution Board(s) if required have been tested and certified by CES(E).	User Dept / Contractor	
1.3.	Cables if required have been tested and certified by CES(E).	User Dept / Contractor	
2.	<b>Site checks</b>		
2.1.	Equipment used are suitable for Hazardous Area Classification / Valid Hot Work Permit is available.	User Dept / Contractor / Elect	
2.2.	Equipment and DBs are certified and proper for use.	Elect	
2.3.	Rain protection provided for electrical machinery and DB.	Elect	
2.4.	Cables used are healthy and without joints and there is no damage to cable insulation.	Elect	
2.5.	Cables have been laid properly.	Elect	
2.6.	Armoured cables or flexible cables with proper mechanical protection are used for 415V connections.	Elect	
2.7.	Care has been taken to ensure that there are no chances for cables to be mechanically damaged by accident.	Contractor / Elect	
2.8.	Plugs tops are proper and FLP tops have been used in hazardous areas.	Elect	
2.9.	All connections are with proper and necessary size of lugs and glands have been provided as required.	Elect	
2.10.	The terminations are proper and there is no stress or tension in the terminals.	Elect	
2.11.	Double earthing connections have been provided for all equipment.	Elect	
2.12.	Insulation Resistance checked and found > 3 MΩ (> 1.5 MΩ for welding machines) with 500V Megger.	Elect	
2.13.	All terminations and connections are checked and found properly tightened.	Elect	
2.14.	Necessary and proper rating of fuse / MCB for protection against short circuits available and checked.	Elect	
2.15.	Necessary and proper rating of ELCB / ELMCB / Earth Fault Relay for protection against earth faults available and checked.	Elect	
2.16.	Relay settings, as required, checked and acceptable.	Elect	
2.17.	Fuse / MCB co-ordination with upstream feeders checked and acceptable.	Elect	
3.	<b>Machine and DB Checks:</b>		
3.1.	DB is meeting HPL requirements as per SOP.	Elect	
3.2.	Ensure and check double earthing for machine and DB have carried out.	Elect	
3.3.	Check proper size and type of glands and lugs have been used for cable terminations.		
3.4.	Check functionality and healthiness of control wiring terminations.	Elect	
3.5.	Check Fuse / MCB / Relay setting and trip value of HPL sending end feeder.	Elect	

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## STANDARD OPERATING PROCEDURES UNIT : ELECTRICAL

Title

Temporary Electrical Power Supply

#	Description	Responsibility	Remarks
3.6.	Check the cable used for power supply to the equipment is of correct capacity, rating without joints and properly terminated in the junction boxes or switches at both ends.	Elect	
3.7.	Confirm Machine has proper fuse and switch etc.. of specified rating before using in field.	Elect	
3.8.	Check for operation of ON/OFF isolator switch.	Elect	
4.	Complete electrical system inspected and found satisfactory and ready for energisation.	Elect	
5.	Energisation / De-energisation after receiving request slip from Process.	Elect	

Note:

All non-conformances have to be informed to the User Dept / Contractor so that corrective actions are taken and all compliances are fulfilled before energisation of the temporary power supply.

<b>User Dept for Temp Power Supply</b>			
<b>Name of Contractor</b>			
<b>Contract No and validity date</b>			
<b>Dept</b>	<b>Name</b>	<b>Signature</b>	<b>Date</b>
<b>Process</b>			
<b>HSEF</b>			
<b>Electrical</b>			
<b>User Dept</b>			
<b>Contractor</b>			

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