

## 4 Job description of an Electrician for assembly works

### 4.1 TASKS:

The tasks of an electrician during a plant installation are critical for ensuring the safe and efficient functioning of the plant's electrical systems. Here's a general outline of key responsibilities:

#### 4.1.1 Planning and Preparation

- **Review Blueprints and Schematics:** Study electrical plans, blueprints, and diagrams for the plant's electrical systems, ensuring they match the design and specifications.
- **Ensure Compliance with Codes:** Ensure that all electrical work complies with local electrical codes, regulations, and industry standards (such as NEC in the U.S.).
- **Coordination with Other Teams:** Coordinate with engineers, project managers, and other tradespeople (plumbers, HVAC, etc.) to make sure electrical needs are properly integrated into the overall plant design.
- **Order Materials and Equipment:** Ensure the right electrical components (wiring, panels, outlets, switches, etc.) are ordered and on hand before installation begins.

#### 4.1.2 Installation of Electrical Systems

- **Power Supply Systems:** Install power supply systems, including main distribution boards (MDBs), transformers, circuit breakers, and other components.
- **Wiring and Cabling:** Run cables, conduits, and wiring through walls, ceilings, and underground to connect the different parts of the plant (machines, lighting, HVAC, etc.).
- **Lighting Systems:** Install and connect plant lighting systems, both general and emergency lighting, ensuring they are positioned according to the plant's layout.
- **Panel and Switchboard Setup:** Install electrical panels, switchboards, and other control equipment for managing power distribution.
- **Motor and Machinery Wiring:** Install electrical connections to machines, motors, pumps, compressors, and other heavy equipment.

#### 4.1.3 Testing and Troubleshooting

- **Conduct Electrical Tests:** Perform continuity tests, insulation resistance tests, and power tests to ensure the wiring and components are installed correctly.
- **Troubleshoot Issues:** Identify and fix any issues in the wiring, connections, or equipment. This might involve checking for faults, shorts, or incorrect wiring.

- **Check for Grounding:** Ensure proper grounding of electrical systems to minimize electrical hazards and prevent damage to equipment.

#### 4.1.4 Safety and Compliance Checks

- **Safety Protocols:** Follow all safety protocols when working with high-voltage systems, including using personal protective equipment (PPE), lockout/tagout procedures, and ensuring proper ventilation in areas with hazardous conditions.
- **Compliance Verification:** Verify that installations meet national and local electrical codes and environmental safety regulations.
- **Documentation:** Complete detailed documentation of all installations, including wire connections, equipment specifications, and any alterations made during installation.

#### 4.1.5 System Integration and Commissioning

- **Integrate Automation Systems:** Install and configure any automation or control systems, such as programmable logic controllers (PLCs) or SCADA systems, if applicable to the plant.
- **Final Checks:** Perform system-wide checks to ensure all electrical components are working together and the plant operates efficiently.
- **Commissioning:** After installation, assist with the commissioning process, ensuring that the electrical systems are fully operational, tested, and ready for production.

#### 4.1.6 Ongoing Maintenance (if required during installation)

- **Maintenance Planning:** In some cases, the electrician may be involved in setting up maintenance schedules or systems for the ongoing monitoring and servicing of electrical equipment.
- **Spare Parts Inventory:** Ensure that critical electrical components, such as fuses, circuit breakers, and spare wiring, are readily available for future repairs or upgrades.

#### 4.1.7 Coordination with Other Trades

- **Work with Other Trades:** Collaborate with mechanical, plumbing, and HVAC technicians to ensure electrical systems are properly integrated into the plant's infrastructure.
- **Work Scheduling:** Electrical installations often need to be completed in stages to align with other construction activities, so electricians may need to adjust their schedule based on the progress of other teams.

#### 4.1.8 Final Documentation and Handover

- **Update Electrical Schematics:** Ensure that as-built electrical schematics are updated to reflect the final installation.

- **Training:** Provide operational training to plant staff or maintenance personnel on the electrical systems installed and how to safely operate and troubleshoot basic issues.
- **Handover of Documentation:** Submit all relevant documentation, including test reports, as-built drawings, and equipment manuals, to the project manager or plant owner.

These tasks ensure that the electrical systems of the plant are not only installed correctly but are also safe, functional, and ready for operation.

## 4.2 Qualification:

The qualifications required for an electrician specializing in plant installation generally depend on the specific location and industry standards, but there are several key certifications and competencies that are commonly expected. Here's an outline of the typical qualifications:

### 4.2.1 Basic Education Requirements

- **High School Diploma or Equivalent:** Most electricians will have completed secondary education with a focus on subjects like mathematics, physics, and technical drawing, which are important for understanding electrical systems.

### 4.2.2 Formal Electrical Training

- **Apprenticeship Program:** Most electricians go through an apprenticeship program that lasts anywhere from 3 to 5 years. These programs combine on-the-job training with classroom instruction.
  - Apprenticeships typically cover topics such as electrical theory, wiring systems, safety regulations, and troubleshooting.
  - Some apprenticeships are focused specifically on industrial or plant installations, so they include specialized training.

### 4.2.3 Industry-Specific Certifications

- **Certified Electrician:** In many regions, electricians must hold certification or licensure to work legally in their field. This could be a specific certification for industrial or commercial electrical work.
  - In the U.S., electricians may need to pass the National Electrical Code (NEC) exam to be licensed.
  - In the UK, electricians might be required to have a Level 3 NVQ Diploma in Electrotechnical Services (Electrical Installation).
- **Plant-Specific Certifications:** For plant installations, electricians often need additional qualifications, such as:

- **PLC (Programmable Logic Controller) Training:** Since plants often use PLCs for controlling equipment, knowledge of how to install and maintain these systems is essential.
- **Industrial Wiring Certifications:** Some electricians pursue certifications in industrial electrical systems, which can include high-voltage installations, machinery control, and distribution systems commonly used in plants.

#### 4.2.4 Specialized Skills for Plant Installations

- **Power Distribution Systems:** Knowledge of how to design and install large-scale power distribution systems, including transformers, circuit breakers, and switchgear.
- **Motor and Drive Systems:** Many plants use large motors and motor control centers (MCCs), so understanding how to install and maintain these systems is vital.
- **Automation Systems:** Electricians involved in plant installation must often work with automated systems, including robotics, conveyor systems, and other plant machinery.
- **Safety Regulations:** In plant installations, ensuring compliance with safety standards is critical. Electricians must be familiar with local and international safety standards, such as:
  - **IEC 60204:** Safety of machinery - Electrical equipment of machines.
  - **NFPA 70E:** Standard for Electrical Safety in the Workplace (U.S.).

#### 4.2.5 Experience

- **Relevant Work Experience:** Experience in electrical installation, particularly in industrial or manufacturing environments, is essential. This experience might include previous work with plant equipment, industrial wiring, and control systems.
- **Troubleshooting Skills:** Being able to diagnose and repair electrical faults in complex plant systems is a crucial part of the job.

#### 4.2.6 Soft Skills and Traits

- **Attention to Detail:** Plant installations require precise wiring and connections. Small errors can result in significant problems, so attention to detail is key.
- **Problem-Solving Abilities:** Plants are complex environments with intricate electrical systems, so strong troubleshooting skills are a must.
- **Teamwork:** Many plant installations involve working as part of a larger team, often alongside engineers and other specialists.
- **Communication Skills:** Electricians must be able to communicate effectively with other members of the plant installation team and report progress or issues clearly.

#### 4.2.7 Licensing and Regulatory Compliance

- **Licensing:** Depending on the region, electricians may need to be licensed. For instance, in the U.S., a Master Electrician's License may be required for those doing high-level work.
- **Regulatory Compliance:** Electricians must ensure that all installations comply with local electrical codes, safety standards, and environmental regulations.

#### 4.2.8 Additional qualifications

- Autonomous installation of cable channels
- Reading and understanding of circuit diagrams
- Wiring of terminal boxes and control cabinets according to diagram
- Proficient in the English language at least minimum Level B1

For plant installations, electricians need a combination of formal training, specific certifications, and practical experience. Industrial settings often require a deeper understanding of power distribution systems, control systems, automation, and safety regulations. Depending on your location, you may want to check specific regional requirements or certifications, as these can vary widely.