

COMPETENCY MODEL FOR WASTEWATER TREATMENT ELECTRICIAN (5615)

The following competencies have been identified as those that best separate superior from satisfactory job performance in the class of **WASTEWATER TREATMENT ELECTRICIAN**. (Numbers refers to the order of the competencies in the Competency Bank.)

1. Reading Comprehension
2. Mathematics
8. Safety Focus
24. Mechanical Aptitude
26. Electrical Understanding
29. Fact Finding
35. Teamwork
47. Written Communication

On the following pages are descriptions of each competency, including a definition, the level of the competency required for the class (*italicized*, **bolded**, and underlined), examples of behavioral indicators, and satisfactory and superior performance levels.

1. READING COMPREHENSION – Comprehends and correctly applies information presented in written form. Makes correct inferences; draws accurate conclusions.

Level of Competency Required by Job:

- Level 1: Concrete, specific job-related information (work orders; instructions; material/equipment labels)
- Level 2: **General information related to field of work and assignments; (articles in trade publications; technical/instructional manuals; memos; letters; e-mails; reports)**
- Level 3: Abstract/complex information (highly technical articles/ reports in specialized area; legal or other regulatory material)

Examples of Behavioral Indicators:

- Follows written instructions correctly.
- Learns information presented in writing.
- Identifies relevant written information.
- Interprets written legal regulatory material accurately.

Performance Levels:

Satisfactory

Reads instructions correctly. Learns from manual and other printed material.

Superior

Learns from manual and may answer others' questions. Explains information presented in written form to others.

Reading Comprehension Knowledge Areas

1. Knowledge of electrical drawings, such as wiring diagrams, single-line diagrams, ladder diagrams, blueprints, schematics and circuit designs, sufficient to effectively read, understand and apply them to various electrical work.
2. Knowledge of types of reference materials and their location, such as intranet information systems, plant reference libraries, plant manuals and technical journals, sufficient to access and reference when needed to perform job requirements.

2. MATHEMATICS – Performs arithmetic or higher-level mathematical computations accurately.

Level of Competency Required by Job:

- Level 1: Perform arithmetic computations (add, subtract, multiply, divide, ratios, percentages).
- Level 2: **Use algebra (substitute numbers for letters in a formula), geometry (angles, distances, area), and/or descriptive statistics (mean/median/mode, standard deviation, range).**
- Level 3: Apply and interpret calculus, inferential statistics (t-tests, correlations, ANOVA, multiple regression) or other very high level mathematics.

Examples of Behavioral Indicators:

- Quickly and accurately performs arithmetic computations.
- Appropriately selects and applies formulas for stated purpose.
- Correctly identifies an appropriate analysis for a specific purpose and selects the appropriate computer program for computation.
- Accurately interprets and presents results of mathematical/statistical computations.

Performance Levels:

Satisfactory

Knows mathematical requirements of the job and performs them correctly. Verifies work to ensure accuracy.

Superior

Identifies additional opportunities for the application of mathematics in work. Answers questions/trains others to assist them in their use of mathematics.

8. SAFETY FOCUS – Performs work in a way that minimizes risk of injury to self or others.

Level of Competency Required by Job:

- Level 1: Maintain awareness of unsafe conditions and actions to avoid injury.
- Level 2: Follow safety rules/procedures; avoid known hazards in the work environment.
- Level 3: **Carefully follow safety rules and procedures and consistently use all necessary safety equipment.**

Examples of Behavioral Indicators:

- Wears seat belt.
- Ensures safe physical work environment by taking actions such as eliminating unstable stacks of materials, closing drawers so filing cabinets will not tip over, and keeping pathways clear of tripping hazards.
- Reviews safety procedures before beginning each job with known hazards.
- Follows safety procedures while performing work even when it takes more time.
- Uses safety equipment such as goggles, gloves, and earplugs as required or warranted.
- Frequently checks safety equipment for proper condition and operation.

Performance Levels:

Satisfactory

Maintains awareness of personal safety to avoid injury or property damage during all work activities.

Superior

“Safety first.” Places avoidance of injury or property damage above all other job requirements. Mentions the need to follow safe work practices to co-workers. Actively seeks ways to avoid injury.

Safety Focus Knowledge Areas

1. Knowledge of Cal/OSHA regulations and safety principles and procedures regarding working near energized lines or equipment and maintaining a clean workplace sufficient to safely perform job requirements and minimize hazards.
2. Knowledge of Cal/OSHA regulations and safety principles and practices related to personal protective equipment (PPE) and other safety equipment, such as gloves, hard hats, safety goggles, respiratory protection, reflective clothing, arc flash suits, and electrical protective clothing, sufficient to be protected in different work situations, such as when working near high voltage or in areas where there is high fire danger.
3. Knowledge of CPR and first aid procedures, such as chest compressions, rescue breathing, bleeding control, resuscitation, and usage of an automated external defibrillator (AED) in case of electric shock, sufficient to take immediate action to prevent further harm in case of injury.
4. Knowledge of hazardous conditions and substances present in wastewater treatment and cogeneration plants, such as toxic, asphyxiating, and/or explosive gasses, high pressure gas and liquid systems, sewage and sludge, extremely high or low temperatures, diseases and biological hazards, sufficient to use appropriate PPE and apply engineered safety procedures.
5. Knowledge of hazardous energy control procedures, such as Lockout/Blockout and engineered plant-specific procedures regarding isolating points of hazards, sufficient to safely de-energize electrical equipment, mechanical moving parts, and valves.
6. Knowledge of Cal/OSHA and department procedures for confined space entry, including air and hazardous gas monitoring, engineered air ventilation systems, supervisory forms, proper monitoring, adequate respiratory PPE, and fit testing, sufficient to ensure safety of personnel while performing work.
7. Knowledge of traffic control procedures, such as directing traffic with signs, cones and flagging, and setting up guardrails to any ground openings, sufficient to ensure the safety of self, the public, and other employees.
8. Knowledge of fall protection safety equipment and procedures, such as guardrails, handrails, tripod usage, non-slip surfaces, ladders safety, and use of safety harness systems, sufficient to reduce the likelihood falls.

9. Knowledge of safe rigging and hoisting practices, such as communication amongst the crew, hand signals, watching for potential obstructions, and loading equipment within safe carrying capacity, sufficient to safely complete assignments that require rigging and hoisting.

24. MECHANICAL APTITUDE – Accurately predicts the impact of forces on objects and assesses the behavior of other physical phenomena (e.g., volume, weight, velocity). Readily learns work involving the application of mechanical principles.

Level of Competency Required by Job:

- Level 1: Maintain a safe work environment by ensuring objects in it are stable, tools and equipment are properly used.
- Level 2: **Know the physical properties of objects in the work environment and correctly anticipate the action of forces upon them; performs work accordingly (correctly and safely).**
- Level 3: In-depth understanding of mechanical and physical phenomena sufficient to design and/or oversee the construction of systems.

Examples of Behavioral Indicators:

- Recognizes the impact of an earthquake on objects in the work environment and re-arranges them as possible to avoid possible damage or destruction and potential to cause injury.
- Uses tools properly to accomplish work correctly and safely.
- Recognizes the effects of various actions on objects and performs only those actions that will accomplish intended result and will not cause property damage or injury.
- Systems designed and/or for which construction is overseen operate as intended upon completion.

Performance Levels:

Satisfactory

Recognizes the operation of mechanical/physical phenomena sufficient to readily learn and perform work of a mechanical nature.

Superior

Displays exceptional insight into the operation of mechanical phenomena, and makes correct inferences regarding it. Promptly and accurately troubleshoots problems.

Mechanical Aptitude Knowledge Areas

1. Knowledge of hand and power tools, such as screwdrivers, pliers, saws, power drills, electrical benders, grinders, and pipe threaders, sufficient to choose the proper tools for various job assignments.
2. Knowledge of principles of mechanics, such as hydro flow, air flow and valve positions, sufficient to safely and correctly handle and place equipment, tools, devices, or materials while working with or near equipment with moving parts.

26. ELECTRICAL UNDERSTANDING – Comprehends the concept and the operation of flow of electrical current.

Level of Competency Required by Job:

- Level 1: Know the properties of electricity relevant to the work environment and work to be performed in order to correctly perform work and recognize hazards that will be created by the failure to do so.
- Level 2: **Sufficient understanding of electricity to recognize problems and determine repair needed to prevent disaster/restore operation.**
- Level 3: In-depth understanding of electrical principles and phenomena sufficient to design and/or oversee the installation of complex electrical systems.

Examples of Behavioral Indicators:

- Ensures safe physical work environment by taking actions such as eliminating exposed electrical wire, faulty connections, empty sockets, and overloaded circuits.
- Recognizes the danger of fire from faulty electrical installations.
- Uses tools, equipment, and instruments properly to accomplish electrical work correctly and safely.
- Systems designed and/or for which installation is overseen perform as intended upon completion.

Performance Levels:

Satisfactory

Understands the operation of electricity sufficient to readily learn and perform electrical work.

Superior

Displays exceptional insight into the operation of electrical systems, and makes correct inferences regarding them. Promptly and accurately troubleshoots problem.

Electrical Understanding Knowledge Areas

1. Knowledge of wastewater treatment electrical equipment, such as motors, generators, pumps, actuated valves, control systems, uninterrupted power supplies and other electrical equipment, sufficient to maintain operation of wastewater treatment facilities.
2. Knowledge of electrical codes, including the National Electrical Code, and the Los Angeles Municipal Code, and Cal/OSHA requirements and state safety orders applicable to electrical work, sufficient to effectively and safely perform electrical work and remain within compliance.
3. Knowledge of different types of electrical installations at wastewater treatment facilities, such as motor control systems, lighting systems, and other distribution systems at pumping plants, water treatment plants, and air treatment plants, sufficient to maintain and effectively operate all electrical equipment.
4. Knowledge of common electrical problems, such as open circuits, grounded circuits, short circuits and faulted electrical equipment, sufficient to identify and diagnose the problem and repair as needed.
5. Knowledge of direct current (DC) electrical voltage sources used at wastewater treatment facilities, such as DC powered switch gears, DC voltage variable frequency drives (VFDs), capacitors, emergency lighting systems, control boards, and fire suppression systems, sufficient to effectively troubleshoot electrical issues.
6. Knowledge of alternating current (AC) theory, including variations in voltage and current, connecting circuits in series or parallel, variations in phase or frequency, and induction effects, sufficient to identify how changing conditions will affect AC circuits related to equipment, such as motors, generators, transformers, capacitors, coils, and protective devices.
7. Knowledge of programmable control systems, such as VFDs, programmable logic controllers (PLC), motor controls, and motor protection devices and controllers, sufficient to make effective program changes.
8. Knowledge of electrical meters, such as ammeters, voltmeters, meggers, oscilloscopes, process meters, hi-pots and phase rotation meters, sufficient to effectively test electrical equipment and voltage sources.

29. FACT FINDING – Obtains required information through questioning, review of existing materials, or securing new materials to answer a question or address a problem.

Level of Competency Required by Job:

- Level 1:** Look up information available in the workplace (including use of the internet) or by asking questions of co-workers or supervisor.
- Level 2: Interview individuals and/or obtain necessary information from files, the library, and/or the internet.
- Level 3: Conduct in-depth interviews/interrogations or depositions. Locate obscure reference material containing germane information by correctly identifying needed information, making logical inferences regarding where it might be available, and discerning from newly acquired information relevant additional materials.

Examples of Behavioral Indicators:

- Asks a series of insightful questions in a logical order.
- Correctly identifies persons most likely to have the needed information.
- Listens carefully to responses from others to discern all relevant information stated.
- Makes logical assumptions about where certain types of information might be found; or asks others who are likely to know.
- Persists in locating relevant information until a sufficient amount is available to permit answering question or addressing the problem fully.

Performance Levels:

Satisfactory

Obtains necessary information through scrutiny of existing files and other resources, correctly identifying and obtaining other sources of information, and/or asking questions.

Superior

Exhibits great insight in identifying who would have certain information, or in what materials it might be located. Carefully crafts questions to extract needed information. Persists until sufficient information is gathered to formulate a logical conclusion.

35. TEAMWORK – Interacts effectively with others to achieve mutual objectives; readily offers assistance to others to facilitate their goal accomplishment.

Level of Competency Required by Job:

- Level 1: Work effectively as a member of a work unit or project team. Readily offer assistance to others when they have too much work or have too little.
- Level 2: **Work effectively as a team member in which different people have different roles/responsibilities and perspectives. Identify points for collaboration with co-workers; readily offer and request assistance.**
- Level 3: Work effectively as a part of an interdependent team (your work gets done only if the work of the whole team is done; evaluation of team performance is more relevant than individual performance).

Examples of Behavioral Indicators:

- Discusses work-related matters with co-workers.
- Offers and requests assistance readily.
- Offers and is receptive to suggestions.
- Identifies problems with workflow that will prevent team from accomplishing its goals.
- Provides constructive criticism and feedback to team members to improve overall functioning of team.
- Assigns credit to team for accomplishments.

Performance Levels:

Satisfactory

Cooperates with co-workers and fulfills responsibilities as a member of a project team. Maintains a focus on common objectives and offers and requests assistance readily.

Superior

Sees the team as a whole; acknowledges that performance of the team is what in reality is evaluated by others. If anyone fails, everyone on the team fails.

47. WRITTEN COMMUNICATION – Communicates effectively in writing.

Level of Competency Required by Job:

- Level 1: Write notes/e-mails. Completes forms with some open-ended responses (sentences).
- Level 2: **Write letters, articles/reports, and/or detailed descriptions of activities/occurrences.**
- Level 3: Write lengthy reports, instruction manuals, in-depth analyses/reviews of complex issues and/or articles for publication. Reviews the written work of others.

Examples of Behavioral Indicators:

- Writing includes the necessary information to convey the intended message.
- Sufficiently few errors in spelling, punctuation, grammar to not interfere with the intended message or distract the reader.
- Little editing or re-writing needed to produce a final product.
- Composes materials efficiently.
- Information is presented in a well organized manner.
- Tone and degree of formality are appropriate to the purpose and audience.

Performance Levels:

Satisfactory

Writes material that clearly communicates the necessary information; needs little editing.

Superior

Precisely uses words and organizes information in a way that enhances presentation of the message. Virtually no editing needed.