

**COMPETENCY MODEL FOR
MACHINIST
CLASS CODE 3763**

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

- 2. Mathematics
- 5. Learning Ability
- 8. Safety Focus
- 12. Conscientiousness
- 20. Job Knowledge
- 23. Equipment Operation
- 24. Mechanical Aptitude
- 48. Shares Knowledge and Information

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.

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.

5. LEARNING ABILITY – Readily acquires and applies new information.

Level of Competency Required by Job:

Level 1: Learn job-related information, rules, and procedures, and apply them correctly.

Level 2: Learn and apply extensive job-related information correctly. Make reasonable inferences when specific information needed in a given instance was not presented.

Level 3: Access new job-related information via print or electronic media, in educational/training programs, and/or by speaking with others, and apply it correctly to the job.

Examples of Behavioral Indicators:

- Recalls information presented in educational/training programs.
- Recognizes how to apply newly acquired information to the job.
- Applies new information to the job in a way that increases productivity.
- Applies “lessons learned” from prior work experiences to current work.
- Answers questions/coaches others who received the same instruction.

Performance Levels:

Satisfactory

Learns new information and applies it appropriately to situations/issues.

Superior

Readily acquires new information, makes appropriate inferences based on it, and integrates it with prior learning and experience to maximize its use in a variety of situations or with respect to a variety of issues.

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 Area

1. Knowledge of pertinent safety rules and regulations as required by the California Occupational Safety and Health Administration (Cal-OSHA) when cutting and shaping metals and other materials in the fabrication of parts and the construction, assembly, installation, or repair of various types of machinery, equipment, tools, and dies, including the proper use of personal protective equipment (PPE) sufficient to ensure the safety of oneself and others.

12. CONSCIENTIOUSNESS – Dependable, reliable, diligent, and attends to all aspects of assignments (the “details”).

Level of Competency Required by Job:

- Level 1: Remain on-task and make every reasonable effort to complete work in time allotted. Note discrepancies and takes action or informs appropriate person when “things don’t seem right” in information or data.
- Level 2: Note when own work logically relates to the work of others and coordinate with them and when additional tasks must be performed to complete an assignment and perform/assign them. Recognize when, despite best efforts, work will not be done and notifies supervision.***
- Level 3: Attend to each area of responsibility, and if all are not being addressed, arrange for transfer or elimination of some of them. Ensure that all aspects of programs/projects are properly addressed to ensure success.

Examples of Behavioral Indicators:

- Seeks all necessary information to do the job well.
- Learns from experience so can recognize when things are not right.
- Maintains a high level of task-related behavior.
- Continues to work diligently in the absence of supervision.
- Fully attends to seemingly minor as well as major aspects of each work assignment.

Performance Levels:

Satisfactory

Fully attends to work at hand; notes details, errors, and discrepancies and follows-up as necessary. Reliably performs and completes work. Punctual; respectful of others’ time.

Superior

Notes relationship of own work to work of others to ensure all aspects are coordinated. Performs additional tasks and otherwise follows-up to ensure thoroughness.

20. JOB KNOWLEDGE – Knows information required to perform a specific job. Includes both widely available courses of study (for example, chemistry, human resources management, graphic arts) and City-specific information (parking regulation and ticketing practices; purchasing procedures; provisions of the City Charter).

Level of Competency Required by Job:

Level 1: Knowledge is concrete, factual, and/or procedural and may be defined by the organization. Situations in which it is applied are quite consistent.

Level 2: Knowledge is substantive and may be defined by an external trade, field, or profession. Situations in which it is applied vary and, as such, require breadth and depth of understanding.

Level 3: Knowledge is abstract, conceptual, and/or complex and may be supported by a well-defined academic discipline or authoritative sources (e.g., laws, ordinances, government guidelines/regulations/codes). Situations in which it is applied may vary greatly or be novel.

Examples of Behavioral Indicators:

- Performs work correctly/avoids technical (job content related) errors.
- Answers technical questions about work accurately.
- Asks few technical questions about the performance of routine work activities.
- Offers advice (“coaching”) to new employees regarding their work.
- Develops training programs for other employees.
- Sought out as a source of information by others.

Performance Levels:

Satisfactory

Sufficient job knowledge to perform work correctly independently. Answers technical questions about work correctly.

Superior

Expertise in technical job information sufficient to serve as a resource to others. May develop training manuals/ programs and/or give internal and/or external presentations related to work.

Job Knowledge Areas

1. Knowledge of methods used to cut and shape metal and other materials such as turning, milling, broaching, grinding, and fitting sufficient to fabricate and repair various types of machinery and equipment.
2. Knowledge of physical properties and uses of cast iron, steel, brass, aluminum, copper, bronze, plastic and other innovative materials for the fabrication of parts including tensile and yield strength sufficient to select and use the proper materials under appropriate conditions such as high temperature or corrosion resistance and cathodic protection.
3. Knowledge of methods used to disassemble, repair, and reassemble various types of machinery including gas, diesel, and marine engines, steam and hydraulic turbines, fire apparatus and pumps, vehicular and construction equipment, water distribution and power generating equipment, asphalt and sewage treatment plant equipment, and other mechanical, hydraulic, pneumatic, and electrical assemblies such as the use of pneumatic tools and other special equipment sufficient to correctly disassemble assemblies without causing damage, effectively eliminate defects by performing repairs, and correctly reassemble assemblies for future use.
4. Knowledge of methods used to inspect various types of machinery and equipment including measuring run out by using a dial indicator and using precision measuring tools such as micrometers and calipers sufficient to effectively perform inspections on equipment parts, detect defects, and determine if a part is worn out, the extent of repairs needed, and if new equipment is being fabricated according to blueprints and specifications.
5. Knowledge of methods used to interpret technical drawings, blueprints, and hand sketches such as bolt circle drawings including referencing appropriate symbols and determining the appropriate configurations of mechanical pieces sufficient to accurately complete work assignments based on such information.
6. Knowledge of methods used to rotate and reciprocate shafts such as pumps, transmissions, and turbines, including aligning them to reduced tolerances by using dial test indicators on the faces and rims, or laser alignment tools such as Optalign sufficient to ensure smooth operation of shafts.

23. EQUIPMENT OPERATION – Operates specialized equipment in performance of job duties.

Level of Competency Required by Job:

Level 1: Operate equipment based on on-the-job training.

Level 2: Operate equipment based on attendance at a training program and practice.

Level 3: Operate equipment for which in-depth, complex training was required and which may require certification.

Examples of Behavioral Indicators:

- Operates equipment proficiently.
- Operates equipment with strict adherence to safety procedures.
- Understands the operation of equipment used on the job and correctly answers questions about it.
- Willingly participates in any training necessary to maintain up-to-date knowledge of equipment operation.

Performance Levels:

Satisfactory

Operates equipment safely and with a high degree of proficiency.

Superior

Operates equipment with extreme proficiency and correctly answers questions about its operation. Trains and/or coaches others in the operation of equipment.

Equipment Operation Areas

1. Operation of heavy shop equipment including overhead cranes and forklifts sufficient to properly lift and move heavy equipment, machinery, and materials in a safe and efficient manner.
2. Operation of precision machine tools and equipment including engine lathes, mills, vertical turret lathes, grinders, and drill presses by manually using dial indicators and hand tools such as wrenches and selecting the appropriate cutting tools, speed of feed rates, holding techniques, and order of operations to cut, turn, grind, lap, shape, mill, bore, drill, thread, groove, test, broach, and slot materials such as cast iron, steel, nickel alloys, brass, aluminum, copper, bronze, and plastic sufficient to correctly and effectively cut and shape metal and other materials in a safe and efficient manner.
3. Operation of computer and program numerical control (CNC) machinery including milling machines and lathes by manually setting up the machinery using dial indicators and hand tools such as wrenches, and writing and editing programs and subroutines using G-Code such as G99 and computer-aided design or computer-aided manufacturing (CAD/CAM) software including MasterCAM sufficient to ensure that CNC machinery and equipment is operating in a safe and efficient manner.

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.

48. SHARES KNOWLEDGE AND INFORMATION – Conveys all information relevant to each involved party in a thorough and timely manner.

Level of Competency Required by Job:

Level 1: Provide job-related information as it becomes available to others who are likely to need it or to whom it might be helpful.

Level 2: **Keep all involved parties informed of work/project progress and other new information. Tailors content, level of detail, and timing of information provided to the perspective of each recipient.**

Level 3: Recognize different needs for different information and provide all affected parties with a description of the “big picture” as well as the breadth and detail of information relevant to their perspective.

Examples of Behavioral Indicators:

- Provides thorough explanations with all relevant details.
- Uses multiple means of communicating (e.g., e-mail, telephone, meetings).
- Provides status reports of work/project progress to all involved parties.
- Informs others of changes at the earliest feasible time.
- Uses multiple addressees and “copies” others so all parties see exactly the same information and know who already has been informed.
- Draws from job knowledge and work experience to provide thorough descriptions and explanations.

Performance Levels:

Satisfactory

Readily communicates new, job-related information to all employees to whom it is relevant. Provides a level of detail and explanation appropriate to the recipient.

Superior

Ensures that all involved parties are provided the maximum amount of information feasible in as timely a manner as possible to facilitate work/project status. Shares knowledge and experience to serve as a mentor and coach to others.

