

Gap Analysis Tool

Mechanical Technologist Grade 1

In the rows below, select "Do It All The Time", "Limited Experience" or "Never Do This" based on your current knowledge and experience. Based on your responses, you can assess your overall preparedness for each Domain.

	Do It All The Time	Limited Experience	Never Do This
101. Assist in fabrication used to maintain plant facilities and equipment using the following methods: •horizontal welding with acetylene and arc welders •heating and cutting materials •familiarity with metal working tools, materials and equipment to use			
102. With an understanding of engine principles perform basic engine maintenance such as: •replace oil, belts, filters and spark plugs •obtain oil and fuel samples •take hydrometer readings of coolant and battery fluids			
103. With a basic understanding of pump principles perform maintenance on centrifugal, positive displacement, and vacuum pumps such as: •servicing, lubricating, and adjusting pumps •removing and installing packing and most mechanical seals			
104. Assist in the cleaning and repair of wet wells with consideration given to: •proper application of coating •basic knowledge of level control •basic knowledge of odor control			
105. Conduct basic operation and maintenance of pipelines and valves such as: •repairing of piping •installing basic layouts of piping systems such as galvanized, PVC, stainless steel, and copper tubing •cutting and threading pipes •making minor modifications to existing piping systems •identification and application of valve types			
106. Understand and perform the basic operations and maintenance of compressors and blowers including: •lubrication •identify types of valves •types of cooling systems			

<p>107. Safely and effectively repair and maintain process equipment and related components with a basic understanding of process equipment purpose and function such as:</p> <ul style="list-style-type: none"> •chemical feed systems and effects of delivered chemicals on associated equipment •solids removal systems (grinders, bar screens, comminutor, etc.) •conveyance systems •digesters •Heat exchangers, Boilers and Steam cleaning systems 			
<p>108. Perform shop mathematics and techniques to calculate or determine:</p> <ul style="list-style-type: none"> •efficiency of pumps •horsepower •flow rates •volumes and area •measurements •pressure 			
<p>109. Safely and effectively repair and maintain equipment with an understanding of basic electrical principles related to mechanical systems such as:</p> <ul style="list-style-type: none"> •volts, amps, watts, ohms •voltage rating •motor identification •battery principles 			
<p>110. Repair and maintain mechanical systems while adhering to industry safety standards and regulations pertaining to CCR Title 8 or equivalent state regulations:</p> <ul style="list-style-type: none"> •lock tag verification (LTV) (formerly Lockout/Tagout) and Blocking/Isolation •confined space entry •slips, trips and falls prevention •proper lifting •trench safety •crane safety •vehicle safety •tool safety •stored energy •electrical safety •chemical safety •fire safety •Safety Data Sheet (MSDS) •gas detection systems •proper use of PPE (Personal Protective Equipment) •traffic control •rigging safety •safety in and around wet wells 			

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<p>111. Assist qualified person with lifting and moving heavy machinery or equipment with an understanding of:</p> <ul style="list-style-type: none"> •crane operation •rigging and lifting procedures •fork lifts operation 			
<p>112. Repair and maintain mechanical systems with the knowledge of proper use of tools such as:</p> <ul style="list-style-type: none"> •hand tools •power tools •machine/shop tools •hydraulic/pneumatic tools •measurement tools •computers and systems 			
<p>113. Apply appropriate construction methods and materials to perform general maintenance such as:</p> <ul style="list-style-type: none"> •pipe fitting •framing •concrete forming, pouring, and finishing •painting/coating 			
<p>114. Perform basic maintenance and repair by interpreting and applying information from:</p> <ul style="list-style-type: none"> •operations and maintenance manuals •basic plant drawings •equipment specifications •diagrams •schematics •written and verbal design instructions •understand the purpose of a pump curve 			
<p>115. Establish and maintain effective working relationships with every person encountered in the workplace to help incorporate the concept of teamwork.</p>			
<p>116. Communicate clearly and concisely in English, both verbally and in writing with respect to:</p> <ul style="list-style-type: none"> •completing and accepting work orders •purchase requests •warehouse requisitions •accident reporting •radio and telephone communication •written and computerized records 			
<p>Total Per Category</p>			
<p>You may want to focus your studying in the areas where you selected "Limited Experience" or "Never Do This". See Mechanical Technologist Candidate Handbook.</p>			

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Mechanical Technologist Grade 2

In the rows below, select "Do It All The Time", "Limited Experience" or "Never Do This" based on your current knowledge and experience. Based on your responses, you can assess your overall preparedness for each Domain.

	Do It All The Time	Limited Experience	Never Do This
201. Perform fabrication to maintain facilities and equipment using the following methods: <ul style="list-style-type: none"> •multi position welding with acetylene and arc welders •knowledge of materials and tools to use 			
202. With an understanding of engine operations and engine types, perform engine repair and maintenance such as: <ul style="list-style-type: none"> •changing oil, belts, filters and spark plugs •troubleshooting and performing corrections •obtain hydrometer readings, oil and fuel samples and based on results interpret and correct 			
203. With a thorough knowledge of pump principles regarding centrifugal, positive displacement, and vacuum pumps, perform pump maintenance and repair with techniques and principles such as: <ul style="list-style-type: none"> •servicing, lubricating, adjusting, maintaining and rebuilding pumps •removal and installation of packing and mechanical seals •read and interpret pump curves and efficiencies •alignment techniques •vibration analysis •troubleshooting and performing corrections •basic pump hydraulics •complete proper installation and removal techniques •identify the major components of a pump •preventative and predictive maintenance 			
204. Clean and repair wet wells with an understanding of methods such as: <ul style="list-style-type: none"> •knowledge of proper coating •repairing and maintenance of level control devices •septic prevention •odor control systems •predictive and preventive maintenance 			

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<p>205. With knowledge of pipelines and valves, perform maintenance and repair such as:</p> <ul style="list-style-type: none"> •change piping •proficient pipe layout •piping systems of galvanized, PVC, stainless steel, and copper tubing •proper connecting techniques •pipe inspection and repair •modifying existing piping systems •knowledge in application of valve, actuators types and associated repairs •piping support systems •expansion systems •technics and devices used to stop/repair leaks 			
<p>206. Repair and maintain mechanical systems with knowledge of the operation, maintenance and repair of compressors and blowers and associated components such as:</p> <ul style="list-style-type: none"> •lubrication •air receivers and tanks •types of valves •cooling systems •troubleshooting and applying corrections •control systems •filtration systems •predictive and preventive techniques •vibration analysis 			
<p>207. Safely and effectively repair and maintain process equipment and related components with apprentice level knowledge of process equipment purpose and function such as:</p> <ul style="list-style-type: none"> •chemical feed systems and effects of delivered chemicals on associated equipment •solids removal systems •conveyance systems •digesters and associated systems •odor control systems •aeration systems •disinfection and de-chlorination •filtration systems •settling basins •storage systems •predictive and preventive maintenance 			
<p>208. Perform shop mathematics and techniques to calculate or determine:</p> <ul style="list-style-type: none"> •efficiency of pumps and motors •horsepower (brake and motor) •flow rates •volumes and area •measurements •drive ratios •pressure 			

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<p>209. Safely and effectively repair and maintain equipment with a knowledge and understanding of electrical principles and practices including:</p> <ul style="list-style-type: none"> • Ohms Law • voltage ratings • motor identification • battery principles 			
<p>210. Repair and maintain mechanical systems while adhering to industry safety standards and regulations pertaining to CCR Title 8 or equivalent state regulations:</p> <ul style="list-style-type: none"> • lock tag verification (LTV) (Lockout/Tagout) and Blocking/Isolation • confined space • slip, trip and fall • proper lifting • trench safety • crane safety • vehicle safety • tool safety • stored energy • NFPA 70E (National Fire Protection Association) • proper use of PPE (Personal Protective Equipment) • chemical safety • fire safety • Safety Data Sheet (MSDS) • gas detection systems • electrical safety • traffic control • rigging safety • wet well safety • IP (Injury Illness Prevention) 			
<p>211. Participate in the lifting and moving of heavy machinery or equipment with knowledge and understanding of:</p> <ul style="list-style-type: none"> • crane operations • rigging and lifting • proper use of forklifts • use of proper hand signals • A-frame use • chain falls/come alongs (cable or chain puller) 			

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<p>212. Repair and maintain mechanical systems with the knowledge of proper use of tools such as:</p> <ul style="list-style-type: none"> •hand tools •power tools •machine/shop tools •hydraulic/pneumatic tools •measurement tools •computers and systems •understanding of ultra-sonic preventative maintenance equipment •alignment and precision measurement tools 			
<p>213. Apply appropriate construction methods and materials with a knowledge of facility maintenance, construction methods and materials, to perform apprentice level maintenance such as:</p> <ul style="list-style-type: none"> •pipe fitting •framing •concrete forming, pouring, and finishing •painting/coating •heating and cooling systems •plumbing and draining systems •lighting and electrical •knowledge of job estimation 			
<p>214. Perform apprentice level maintenance and repair by interpreting and applying information from:</p> <ul style="list-style-type: none"> •designs and sketches •written and verbal design instructions •equipment specifications •operations and maintenance service manuals •diagrams •schematics •pump curve 			
<p>215. Establish and maintain effective working relationships with every person encountered in the workplace to help incorporate the concept of teamwork.</p> <ul style="list-style-type: none"> •planning and scheduling work with other team members •promoting the agencies core values 			
<p>216. Communicate clearly and concisely in English, both verbally and in writing with respect to:</p> <ul style="list-style-type: none"> •completing and accepting work orders •purchase requests •warehouse requisition •accident reporting •radio and telephone communication •written and computerized records 			

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<p>217. Perform maintenance and repair with an apprentice level knowledge and understanding of power transmission equipment such as:</p> <ul style="list-style-type: none"> •types of drives •gear and pulley ratios •machine guards •shafts •alignment techniques •types of couplings •joints •gear reduction systems 			
Total Per Category			
<p>You may want to focus your studying in the areas where you selected "Limited Experience" or "Never Do This". See Mechanical Technologist Candidate Handbook.</p>			

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Mechanical Technologist Grade 3

In the rows below, select "Do It All The Time", "Limited Experience" or "Never Do This" based on your current knowledge and experience. Based on your responses, you can assess your overall preparedness for each Domain.

	Do It All The Time	Limited Experience	Never Do This
301. Perform fabrication and design to maintain facilities and equipment using the following methods: <ul style="list-style-type: none"> •multi-position welding with acetylene and arc welders •heating, cutting and bending materials •proficient use of materials and tools •material estimation 			
302. Oversee engine repair and maintenance program including: <ul style="list-style-type: none"> •verifying troubleshooting and corrections techniques •ensuring compliance of air quality regulations •proficient in the knowledge of engines 			
303. Manage routine operations of the maintenance management program including oversight of: <ul style="list-style-type: none"> •planning and scheduling •maintenance management system and related documentation •outside contractors •management of vendors, purchasing, and inventory •work and project management 			
304. Manage maintenance records with an understanding of: <ul style="list-style-type: none"> •documentation requirements and record retention •knowledge base of equipment and product research •state and local regulations safety training compliance record keeping requirements 			
305. Train and mentor staff and assess learning outcomes using the following techniques: <ul style="list-style-type: none"> •on the job and hands on training •tailgate training •document training •teaching principles of the operation and maintenance of equipment such as pumps, engines, and electrical systems •related to mechanical systems •independent study •application of internal training program 			

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<p>306. Apply journey level pumping principles and techniques in the repair and maintenance of centrifugal, positive displacement, and vacuum pumps such as:</p> <ul style="list-style-type: none"> •servicing, lubricating, adjusting, maintaining and rebuilding pumps •reading and interpreting pump curves and efficiencies •performing alignment techniques •applying in-depth understanding of predictive maintenance techniques such as thermography, vibration analysis, oil analysis (tribology) and equipment trending •troubleshooting and applying corrections •repairing and maintaining pump hydraulics •installation and removal techniques •root cause analysis 			
<p>307. Perform journey level maintenance and repair on pipelines and valves such as:</p> <ul style="list-style-type: none"> •proficiency in pipe layout •piping systems •cutting and threading pipes •pipe inspection and repair •modification to existing piping systems •proficiency in applications of valve, actuators types and associated repairs •piping support systems •expansion systems 			
<p>308. Maintain and repair compressors, turbines and blowers with journey level knowledge and skill of:</p> <ul style="list-style-type: none"> •lubrication •air receivers and tanks •types of valves •principles of cooling systems •troubleshooting and corrections •purpose of control systems •filtration systems 			
<p>309. Journey level ability to maintain and repair processing equipment such as:</p> <ul style="list-style-type: none"> •chemical feed systems and effects on treatment process and associated equipment •solids removal systems •conveyance systems •digesters and associated systems •odor control systems •aeration systems •disinfection and de-chlorination •filtration systems •settling basins •storage systems 			

<p>310. Utilize routine shop mathematics and techniques to calculate or determine the following:</p> <ul style="list-style-type: none"> •efficiency of pumps and motors •horsepower (brake and motor) •flow rates •volumes and area •precision measurements (using calipers, micrometers, etc.) •drive ratios •estimating staffing levels and scheduling •materials estimation •pressure 			
<p>311. Safely and effectively repair and maintain equipment with a journey level knowledge and understanding of electrical principles and practices including:</p> <ul style="list-style-type: none"> •Ohms Law •voltage rating •motor identification •battery principles 			
<p>312. Repair and maintain mechanical systems while adhering to industry safety standards and regulations with a journey level knowledge and practical application pertaining to CCR Title 8 or equivalent state regulations:</p> <ul style="list-style-type: none"> •lock tag verification (LTV) •confined space •slip, trip and fall •proper lifting •trench safety •crane safety •forklift safety •vehicle safety •tool safety •stored energy •electrical safety •chemical safety •fire safety •Safety Data Sheet (MSDS) •gas detection systems •proper use of PPE (Personal Protective Equipment) •traffic control •rigging safety •NFPA 70E (National Fire Protection Association) •IIP (Injury Illness Prevention) 			

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<p>313. Participate in the lifting and moving of heavy machinery or equipment with a journey level knowledge and understanding of:</p> <ul style="list-style-type: none"> •directing a qualified crane operator •rigging and lifting •proper operation of forklifts •coordinate communications and personnel involved in the lift •proper use of chain falls/come along (cable or chain puller) 			
<p>314. Proficiently apply and train personnel on the use of tools such as:</p> <ul style="list-style-type: none"> •hand tools •power tools •machine/shop tools and equipment •hydraulic/pneumatic tools •measurement tools •computers and systems •ultra sonic preventative maintenance equipment 			
<p>315. Apply appropriate knowledge of facility maintenance, construction methods and materials, to perform journey-level maintenance such as:</p> <ul style="list-style-type: none"> •pipe fitting •framing •concrete forming, pouring, grouting, and finishing •painting/coating •heating and cooling systems •plumbing and drain •lighting and electrical •job and materials estimation •paving 			
<p>316. Perform journey level maintenance and repair by interpreting, applying, or developing:</p> <ul style="list-style-type: none"> •designs and sketches •written and verbal design instructions •equipment specifications •operation and maintenance service manuals •diagrams •schematics •pump curves 			
<p>317. Establish and maintain effective working relationships with every person encountered in the workplace to help incorporate the concept of teamwork.</p> <ul style="list-style-type: none"> •effectively build and lead a team •positively promote the concept of teamwork •plan, schedule, implement work with other teams, departments, and contractors •promote and enforce the agency's core values 			

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<p>318. Communicate clearly and concisely in English, both verbally and in writing with respect to:</p> <ul style="list-style-type: none"> •completing and accepting work orders •purchase requests •warehouse requisition •accident reporting •radio and telephone communication •maintaining written and computerized records •handling public contacts with tact and diplomacy 			
<p>319. Perform maintenance and repair with a journey level understanding of power transmission equipment and techniques such as:</p> <ul style="list-style-type: none"> •various types of drives •gear and pulley ratios •machine guards •shafts •alignment •vibration analysis •infrared thermography •types of couplings •joints •gear reduction systems 			
<p>320. Assist in the development of, and execution of existing response plans for contingencies and emergency conditions such as natural disasters and catastrophic equipment failures including:</p> <ul style="list-style-type: none"> •supervising equipment roll-out and personnel activation •training staff in emergency response plans procedures •amending plans to address any deficiencies discovered during training evolutions 			
<p>Total Per Category</p>			
<p>You may want to focus your studying in the areas where you selected "Limited Experience" or "Never Do This". See Mechanical Technologist Candidate Handbook.</p>			

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Mechanical Technologist Grade 4

In the rows below, select "Do It All The Time", "Limited Experience" or "Never Do This" based on your current knowledge and experience. Based on your responses, you can assess your overall preparedness for each Domain.

	Do It All The Time	Limited Experience	Never Do This
401. Advanced knowledge of repair and construction of various types of equipment and facilities such as: <ul style="list-style-type: none"> •mechanical, hydraulic, pneumatic, chemical, and electrical/instrumentation components •complex principles of pumping stations •potable water and reclaimed water facilities •proper procedures for chemical handling 			
402. Manage the safe operation of the maintenance department and maintain appropriate levels of staff safety training with respect to: <ul style="list-style-type: none"> •OSHA requirements (Occupational Safety & Health Administration) •agency policies and procedures •federal and state regulations 			
403. Responsible for budget preparation and control such as: <ul style="list-style-type: none"> •staffing requirements •Capital Improvement Plans (CIP) •equipment replacement programs •overseeing service contract •general funding •technical training of staff •vehicle replacement program •power fuel, oil and chemical replacement/funding •grant funding efforts •obtaining and reviewing bid submittals 			
404. Direct staff involved in the maintenance and repair of an organization's assets such as: <ul style="list-style-type: none"> •mechanical components •hydraulic components •pneumatic components •electrical and instrumentation components •chemical handling systems •oxygen injection systems •central power generation systems •civil asset management (buildings, pavement, sidewalks, roofs, etc.) 			

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<p>405. Manage the planning, scheduling and oversight of complex jobs using effective management principles, processes, and techniques with respect to:</p> <ul style="list-style-type: none"> •utilization of personnel, materials, and equipment •reviewing preliminary design and work specifications •making recommendations involving modifications to facilities •coordinating with planning/engineering department •work done by outside services such as contracting and consulting •develop scope of work 			
<p>406. Overseeing the implementation and management of computer software and hardware systems such as:</p> <ul style="list-style-type: none"> •computer maintenance management system •SCADA (Supervisory Control and Data Acquisition) •software selection •hardware replacement •new technologies •security systems 			
<p>407. Responsible for the dissemination and adherence of pertinent federal, state and local laws, codes and regulations established by agencies such as:</p> <ul style="list-style-type: none"> •DPH (Department of Public Health) •SWRCB (State Water Resource Control Board) •NPDES (National Pollutant Discharge Elimination System) •CAL OSHA (California Occupational Safety & Health Administration) •FED OSHA (Federal Occupational Safety & Health Administration) •EPA (Environmental Protection Agency) •AQMD (Air Quality Management District) •CARB (California Air Resource Board) 			
<p>408. Responsible for the maintenance of operating permits and compliance with regulatory requirements such as:</p> <ul style="list-style-type: none"> •pressure vessel permits •discharge permits •boiler certifications •underground fuel and oil storage tanks •hazardous waste management •emissions permit (such as Air Quality Management District, California Air Resource Board) •Emergency Response Plan 			
<p>409. Oversee management and execution of policies relevant to the maintenance department with respect to:</p> <ul style="list-style-type: none"> •implementation of goals, objectives, policies and priorities •establishment and implementation of policies and procedures •enforcement of policies and procedures •interpret and communicate applicable policies and procedures to staff, customers, the public, or elected officials. 			

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<p>410. Review and provide feedback on blueprints, specifications and maps such as:</p> <ul style="list-style-type: none"> •symbols •sketches •legends •blocks •dimensions 			
<p>411. Establish and maintain effective working relationships with those contacted through the course of work such as:</p> <ul style="list-style-type: none"> •government officials •the general public •internal customer service •outside agencies •regulatory bodies •public safety agencies •upper management 			
<p>412. Communicate effectively to audiences with respect to:</p> <ul style="list-style-type: none"> •board presentations •safety presentations •public speaking obligations •multi agency meetings •drafting memo presentations •bid proposals/purchase justification •pre-construction job walks •staffing justifications •job descriptions •staff reports 			
<p>413. Supervise, direct and coordinate maintenance department staff including:</p> <ul style="list-style-type: none"> •equipment and labor charges •assigning work priorities •monitoring workflow •resolving staffing issues •designing and administering safety programs •administration of disciplinary actions •planning succession management •completing staff performance evaluation •select, train, motivate and evaluate •discipline and terminate •review and evaluate work product, methods and procedures used to complete work •handle labor relations •assist in staff scheduling 			

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<p>414. Maintain and manage organizational structure such as:</p> <ul style="list-style-type: none"> •chain of command accountability •grievance flow •labor relations 			
<p>415. Oversee the development and implementation of response plans for contingencies and emergency conditions such as natural disasters and catastrophic equipment failures including:</p> <ul style="list-style-type: none"> •managing the implementation and execution of emergency response plans and personnel •developing and implementing requirements for emergency response equipment and facilities •determining conditions that will warrant activation of emergency response plans •provide assistance to neighboring agencies where Mutual Aid Agreements exist 			
Total Per Category			
<p>You may want to focus your studying in the areas where you selected "Limited Experience" or "Never Do This". See Mechanical Technologist Candidate Handbook.</p>			