

Stationary Engineers and Boiler Operators

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Significant Points

- Applicants may face competition for jobs; opportunities will be best for workers with training in computerized controls and instrumentation.
- Stationary engineers and boiler operators usually acquire their skills through a formal apprenticeship program, or on-the-job training supplemented by courses at a trade or technical school.
- Most States and cities have licensing requirements.

Nature of the Work

Heating, air-conditioning, refrigeration, and ventilation systems keep large buildings and other commercial facilities comfortable all year long. Industrial plants often have facilities to provide electrical power, steam, or other services. Stationary engineers and boiler operators operate and maintain these systems, which include boilers, air-conditioning and refrigeration equipment, diesel engines, turbines, generators, pumps, condensers, and compressors. The equipment that stationary engineers and boiler operators control is similar to equipment operated by locomotive or marine engineers, except that it is not in a moving vehicle.

Stationary engineers and boiler operators start up, regulate, repair, and shut down equipment. They ensure that the equipment operates safely, economically, and within established limits by monitoring meters, gauges, and computerized controls. Stationary engineers and boiler operators control equipment manually and, if necessary, make adjustments. They also record relevant events and facts concerning the operation and maintenance of the equipment in a log. With regard to steam boilers, for example, they observe, control, and record the steam pressure, temperature, water level, chemistry, power output, fuel consumption, and emissions from the vessel. They watch and listen to machinery and routinely check safety devices, identifying and correcting any trouble that develops. They use hand and power tools to perform repairs and maintenance ranging from a complete overhaul to replacing defective valves, gaskets, or bearings. Service, troubleshooting, repair, and monitoring of modern systems require the use of sophisticated electrical and electronic test equipment.

Stationary engineers typically use computers to operate the mechanical, electrical, and fire safety systems of new buildings and plants. Engineers monitor, adjust, and diagnose these systems from a central location, using a computer linked into the buildings' communications network.

Routine maintenance, such as lubricating moving parts, replacing filters, and removing soot and corrosion that can reduce the boiler's operating efficiency, is a regular part of the work of stationary engineers and boiler operators. They test the water in the boiler and add chemicals to prevent corrosion and harmful deposits. In most facilities, stationary engineers are responsible for the maintenance and balancing of air systems, as well as hydronic systems that heat or cool buildings by circulating fluid (as water or vapor) in a closed system of pipes. They also may check the air quality of the ventilation system and make adjustments to keep the operation of the boiler within mandated guidelines.

In a large building or industrial plant, a stationary engineer may be in charge of all mechanical systems in the building. Engineers may supervise the work of assistant stationary engineers, turbine

operators, boiler tenders, and air-conditioning and refrigeration operators and mechanics. Most stationary engineers perform other maintenance duties, such as carpentry, plumbing, locksmithing, and electrical repairs. In a small building or industrial plant, there may be only one stationary engineer.

Working Conditions

Stationary engineers and boiler operators generally have steady, year-round employment. The average workweek is 40 hours. In facilities that operate around the clock, engineers and operators usually work one of three daily 8-hour shifts on a rotating basis. Weekend and holiday work often is required.

Engine rooms, power plants, boiler rooms, mechanical rooms, and electrical rooms usually are clean and well lighted. Even under the most favorable conditions, however, some stationary engineers and boiler operators are exposed to high temperatures, dust, dirt, and high noise levels from the equipment. General maintenance duties also may require contact with oil, grease, or smoke. Workers spend much of the time on their feet. They may also have to crawl inside boilers and work in crouching or kneeling positions to inspect, clean, or repair equipment.

Stationary engineers and boiler operators work around hazardous machinery, such as low and high pressure boilers and electrical equipment. They must follow procedures to guard against burns, electric shock, noise, moving parts, and exposure to hazardous materials, such as asbestos or certain chemicals.

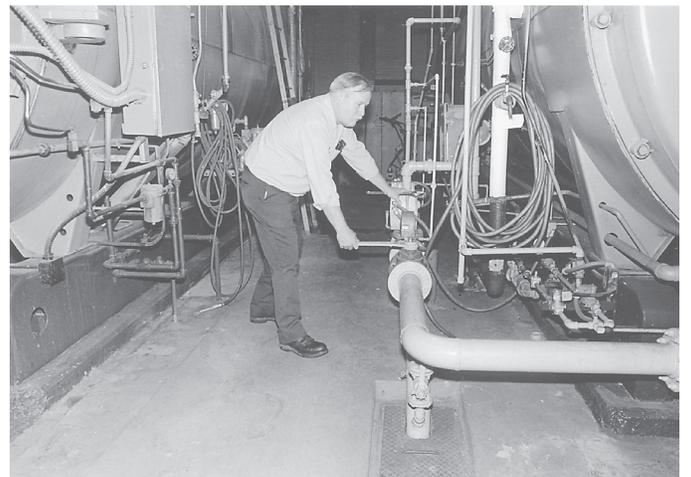
Employment

Stationary engineers and boiler operators held about 55,000 jobs in 2002. Jobs were dispersed throughout a variety of industries. The majority of jobs were in State and local government facilities; hospitals; educational services; manufacturing firms, such as pulp, paper, and paperboard mills; and electric power generation, transmission and distribution facilities. Other jobs were in architectural, engineering, and related services; traveler accommodation (hotels); and lessors of real estate (apartment and commercial buildings). Some were employed as contractors to a building or plant.

Stationary engineers and boiler operators worked throughout the country, generally in the more heavily populated areas in which large industrial and commercial establishments are located.

Training, Other Qualifications, and Advancement

Stationary engineers and boiler operators usually acquire their skills through a formal apprenticeship program, or on-the-job training supplemented by courses at a trade or technical school. In addition,



A stationary engineer adjusts a boiler's fuel pressure.

valuable experience can be obtained in the Navy or the merchant marine, because marine engineering plants are similar to many stationary power and heating plants. Most employers prefer to hire persons with at least a high school diploma or the equivalent, due to the increasing complexity of the equipment with which engineers and operators now work. Many stationary engineers and boiler operators have some form of continuing education including college. Mechanical aptitude, manual dexterity, and good physical condition also are important.

The International Union of Operating Engineers sponsors apprenticeship programs and is the principal union for stationary engineers and boiler operators. In selecting apprentices, most local labor-management apprenticeship committees prefer applicants with education or training in mathematics, computers, mechanical drawing, machine shop practice, physics, and chemistry. An apprenticeship usually lasts 4 years and includes 8,000 hours of on-the-job training. In addition, apprentices receive 600 hours of classroom instruction in subjects such as boiler design and operation, elementary physics, pneumatics, refrigeration, air-conditioning, electricity, and electronics.

Those who acquire their skills on the job usually start as boiler tenders or helpers to experienced stationary engineers and boiler operators. This practical experience may be supplemented by postsecondary vocational training in computerized controls and instrumentation. However, becoming an engineer or operator without completing a formal apprenticeship program usually requires many years of work experience.

Most large and some small employers encourage and pay for skill-improvement training for their employees. Training almost always is provided when new equipment is introduced or when regulations concerning some aspect of the workers' duties change.

Most States and cities have licensing requirements for stationary engineers and boiler operators. Applicants usually must be at least 18 years of age, reside for a specified period in the State or locality, meet experience requirements, and pass a written examination. A stationary engineer or boiler operator who moves from one State or city to another may have to pass an examination for a new license due to regional differences in licensing requirements.

There are several classes of stationary engineer licenses. Each class specifies the type and size of equipment the engineer can operate without supervision. A licensed first-class stationary engineer is qualified to run a large facility, supervise others, and operate equipment of all types and capacities. An applicant for this license may be required to have a high school education, apprenticeship or on-the-job training, and several years of experience. Licenses below first class limit the types or capacities of equipment the engineer may operate without supervision.

Stationary engineers and boiler operators advance by being placed in charge of larger, more powerful, or more varied equipment. Generally, engineers advance to these jobs as they obtain higher class licenses. Some stationary engineers and boiler operators advance to boiler inspectors, chief plant engineers, building and plant superintendents, or building managers. A few obtain jobs as examining engineers or technical instructors.

Job Outlook

Applicants may face competition for jobs as stationary engineers and boiler operators. Employment opportunities will be best for those with apprenticeship training or vocational school courses covering systems that are operated by computerized controls and instrumentation.

Employment of stationary engineers and boiler operators is expected to show little or no growth through the year 2012. Continuing commercial and industrial development will increase the amount of equipment to be operated and maintained. However, automated systems and computerized controls are making newly installed equipment more efficient, thus reducing the number of jobs needed for its operation. Furthermore, relatively few job openings will arise from the need to replace experienced workers who transfer to other occupations or leave the labor force. The low replacement rate in this occupation reflects its high wages.

Earnings

Median annual earnings of stationary engineers and boiler operators were \$43,240 in 2002. The middle 50 percent earned between \$33,860 and \$54,550. The lowest 10 percent earned less than \$26,340, and the highest 10 percent earned more than \$65,290. Median annual earnings of stationary engineers and boiler operators in 2002 were \$48,450 in local government and \$40,800 in general medical and surgical hospitals.

Related Occupations

Workers who monitor and operate stationary machinery include chemical plant and system operators; gas plant operators; petroleum pump system operators, refinery operators, and gaugers; power plant operators, distributors, and dispatchers; and water and liquid waste treatment plant and system operators. Other workers who maintain the equipment and machinery in a building or plant are industrial machinery installation, repair, and maintenance workers, as well as millwrights.

Sources of Additional Information

Information about apprenticeships, vocational training, and work opportunities is available from State employment service offices, locals of the International Union of Operating Engineers, vocational schools, and State and local licensing agencies.

Specific questions about this occupation should be addressed to:

- International Union of Operating Engineers, 1125 17th St. NW., Washington, DC 20036. Internet: <http://www.iuoe.org>
- National Association of Power Engineers, Inc., 1 Springfield St., Chicopee, MA 01013.
- Building Owners and Managers Institute International, 1521 Ritchie Hwy., Arnold, MD 21012. Internet: <http://www.bomi-edu.org>