
Boilermakers

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Significant Points

- A formal apprenticeship is the best way to learn this trade.
- Little or no employment growth is expected, but many openings will be created by the need to replace experienced workers who leave this occupation.

Nature of the Work

Boilermakers and *boilermaker mechanics* make, install, and repair boilers, vats, and other large vessels that hold liquids and gases. Boilers supply steam to drive huge turbines in electric powerplants and to provide heat and power in buildings, factories, and ships. Tanks and vats are used to process and store chemicals, oil, beer, and hundreds of other products.

Boilers and other high-pressure vessels usually are made in sections, by casting each piece out of molten iron or steel. Manufacturers are increasingly automating this process to increase the quality of these vessels. Boiler sections are then welded together, often using automated orbital welding machines, which make more consistent welds than are possible by hand. Small boilers may be assembled in the manufacturing plant; larger boilers usually are assembled on site.

Following blueprints, boilermakers locate and mark reference points on the boiler foundation, using straightedges, squares, transits, and tape measures. Boilermakers attach rigging and signal crane operators to lift heavy frame and plate sections and other parts into place. They align sections, using plumb bobs, levels, wedges, and turnbuckles. Boilermakers use hammers, files, grinders, and cutting torches to remove irregular edges, so that edges fit properly. They then bolt or weld edges together. Boilermakers align and attach water tubes, stacks, valves, gauges, and other parts and test complete vessels for leaks or other defects. They also install refractory brick and other heat-resistant materials in fireboxes or pressure vessels. Usually, they assemble large vessels temporarily in a fabrication shop to ensure a proper fit before final assembly on the permanent site.

Because boilers last a long time—35 years or more—boilermakers regularly maintain them and update components, such as burners and boiler tubes, to increase efficiency. Boilermaker mechanics maintain and repair boilers and similar vessels. They inspect tubes, fittings, valves, controls, and auxiliary machinery and clean or supervise the cleaning of boilers using scrapers, wire brushes, and cleaning solvents. They repair or replace defective parts, using hand and power tools, gas torches, and welding equipment, and may operate metalworking machinery to repair or make parts. They also dismantle leaky boilers, patch weak spots with metal stock, replace defective sections, and strengthen joints.

Working Conditions

Boilermakers often use potentially dangerous equipment, such as acetylene torches and power grinders, handle heavy parts, and work on ladders or on top of large vessels. Work is physically demanding and may be done in cramped quarters inside boilers, vats, or tanks that are often damp and poorly ventilated. In some instances, work may be done at high elevations for an extended period. To reduce the chance of injuries, boilermakers may wear hardhats, har-

nesses, protective clothing, safety glasses and shoes, and respirators. Boilermakers may experience extended periods of overtime when equipment is shut down for maintenance. Overtime work also may be necessary to meet construction or production deadlines.

Employment

Boilermakers held about 25,000 jobs in 2002. Nearly 7 out of 10 worked in the construction industry, assembling and erecting boilers and other vessels. More than 1 in 10 worked in manufacturing, primarily in boiler manufacturing shops, iron and steel plants, petroleum refineries, chemical plants, and shipyards. Some also worked for boiler repair firms or railroads.

Training, Other Qualifications, and Advancement

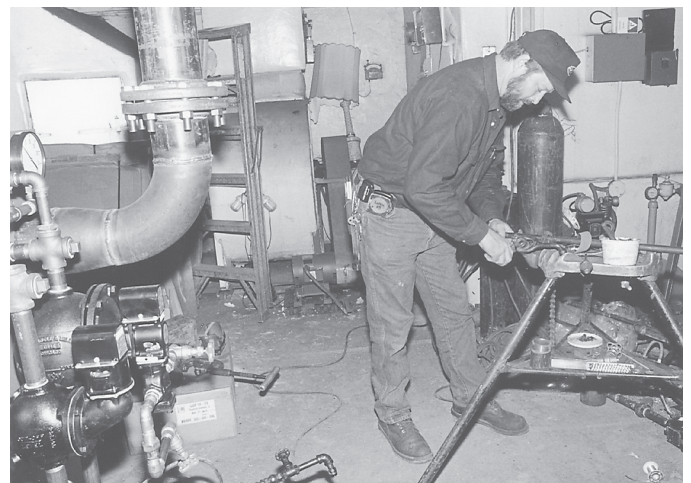
Many boilermakers learn this trade through a formal apprenticeship. Others become boilermakers through a combination of trade or technical school training and employer-provided training. Apprenticeship programs usually consist of 4 years of on-the-job training, supplemented by a minimum of 144 hours of classroom instruction each year in subjects such as set-up and assembly rigging, welding of all types, blueprint reading, and layout. Experienced boilermakers often attend apprenticeship classes or seminars to learn about new equipment, procedures, and technology. When an apprenticeship becomes available, the local union publicizes the opportunity by notifying local vocational schools and high school vocational programs.

Some boilermakers advance to supervisory positions. Because of their broader training, apprentices usually have an advantage in promotion.

Job Outlook

Little or no growth in employment of boilermakers is expected through the year 2012, but many openings will be created by the need to replace experienced workers who leave this occupation; boilermakers tend to retire early, partly due to the physically demanding nature of the work. Because the number of persons seeking entry to the occupation is relatively low, some areas currently are experiencing a shortage of applicants for apprenticeship programs.

Growth may be limited by the trend toward repairing and retrofitting, rather than replacing, existing boilers; the use of small boilers, which require less onsite assembly; and automation of produc-



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tion technologies. However, demand for more boilermakers may stem from environmental upgrades required by Federal regulations such as the Clean Air Act.

Most industries that purchase boilers are sensitive to economic conditions. Therefore, during economic downturns, boilermakers in the construction industry may be laid off. However, because maintenance and repairs of boilers must continue even during economic downturns, boilermaker mechanics in manufacturing and other industries generally have stable employment.

Earnings

In 2002, the median hourly earnings of boilermakers were about \$20.17. The middle 50 percent earned between \$16.24 and \$25.09. The lowest 10 percent earned less than \$12.24, and the highest 10 percent earned more than \$28.96. Apprentices generally start at about half of journey wages, with wages gradually increasing to the journey wage as progress is made in the apprenticeship.

About two-thirds of boilermakers belong to labor unions. The principal union is the International Brotherhood of Boilermakers. Other boilermakers are members of the International Association of Machinists, the United Automobile Workers, or the United Steelworkers of America.

Related Occupations

Workers in a number of other occupations assemble, install, or repair metal equipment or machines. These occupations include assemblers and fabricators; machinists; industrial machinery installation, repair, and maintenance workers, except millwrights; millwrights; pipelayers, plumbers, pipefitters, and steamfitters; sheet metal workers; tool-and-die makers; and welding, soldering, and brazing workers.

Sources of Additional Information

For further information regarding boilermaking apprenticeships or other training opportunities, contact local offices of the unions previously mentioned, local construction companies and boiler manufacturers, or the local office of your State employment service.

For information on apprenticeships and the boilermaking occupation, contact:

► International Brotherhood of Boilermakers, Iron Ship Builders, Blacksmiths, Forgers, and Helpers, 753 State Ave., Suite 570, Kansas City, KS 66101.

There are more than 500 occupations registered by the U.S. Department of Labor's National Apprenticeship system. For more information on the Labor Department's registered apprenticeship system and links to State apprenticeship programs, check their website:

<http://www.doleta.gov>