

Motor vehicles and equipment	\$21.50
Aircraft and parts	17.00
Electronic components and accessories	11.55
Miscellaneous plastics products, not elsewhere classified	11.24
Personnel supply services	8.25

Related Occupations

Other inspectors include construction and building inspectors, who examine buildings and other structures to ensure compliance with building codes, zoning regulations, and contract specifications.

Sources of Additional Information

For general information about inspectors, testers, sorters, samplers, and weighers, contact:

► The American Society for Quality, 600 North Plankinton Ave., Milwaukee, WI 53203. Internet: <http://www.asq.org>

Jewelers and Precious Stone and Metal Workers

(O*NET 51-9071.01, 51-9071.02, 51-9071.03, 51-9071.04, 51-9071.05, 51-9071.06)

Significant Points

- About 30 percent of all jewelers are self-employed.
- Jewelers usually learn their trade in vocational or technical schools, through correspondence courses, or on the job.
- Although employment is expected to experience little or no change, prospects should be excellent; as more jewelers retire, many employers have difficulty finding and retaining workers with the right skills.

Nature of the Work

Jewelers use a variety of common and specialized handtools to design and manufacture new pieces of jewelry; cut, set, and polish stones; and repair or adjust rings, necklaces, bracelets, earrings, and other jewelry. Jewelers usually specialize in one or more of these areas, and may work for large jewelry manufacturing firms or small retail jewelry shops, or may open their own business. Regardless of the type of work done or the work setting, jewelers require a high degree of skill, precision, and attention to detail.

Some jewelers design or make their own jewelry. Following their own designs, or those created by designers or customers, they begin by shaping the metal or by carving wax to make a model for casting the metal. The individual parts then are soldered together, and the jeweler may mount a diamond or other gem, or engrave a design into the metal. Others do finishing work, such as setting stones, polishing, or engraving. Typical repairwork includes enlarging or reducing ring sizes, resetting stones, and replacing broken clasps and mountings. In manufacturing, jewelers usually specialize in a single operation. *Mold and model makers* create models or tools for the jewelry that is to be produced. *Assemblers* connect by soldering or fusing the metal and may set stones. *Engravers* may etch designs into the metal, and *polishers* polish the metal and stones to perfect the piece. In small retail stores or repairshops, jewelers may be involved in all aspects of the work. Jewelers who own or manage stores or shops also hire and train employees; order, market, and sell merchandise; and perform other managerial duties.



Jewelers and precious stone and metal workers must have excellent hand-eye coordination.

Jewelers typically do the handiwork required in producing a piece of jewelry, while *gemologists* study the quality, characteristics, and value of gemstones. Gemologists usually sell jewelry and provide appraisal services. A few gemologists are employed by insurance companies that offer their own appraisal services for those customers who wish to insure certain pieces of jewelry. Many jewelers also study gemology in order to become familiar with the physical properties of the gemstones with which they work, so that they do not unknowingly damage stones while setting and polishing them.

Although the quality of a piece of jewelry is the direct reflection of a particular jeweler's skills, and many procedures have been performed the same way for hundreds of years, new technology is helping to produce higher quality pieces of jewelry at a reduced cost and in a shorter amount of time. A growing number of jewelers use lasers for cutting and improving the quality of stones, intricate engraving or design work, and identification (ID) inscription. Jewelers also use lasers to weld metals together in milliseconds with no seams or blemishes, improving the quality and appearance of the jewelry. Some manufacturing firms use computer-aided design and manufacturing (CAD/CAM) to facilitate product design and automate some steps in the mold- and model-making process. CAD allows a jeweler to create a virtual reality model of a piece of jewelry, modify the design, and find mistakes, all on the computer screen. Once a jeweler is satisfied with the model, CAM produces the model in a wax-like material. Once the model is made, it is easier for manufacturing firms to produce numerous pieces of the jewelry, which are distributed to different retail establishments across the country.

Working Conditions

A jeweler's work involves a great deal of concentration and attention to detail. Working on precious stones and metals while trying to satisfy customers' and employers' demands for speed and quality can cause fatigue or stress. However, the use of more ergonomically correct jewelers' benches has eliminated the strain and discomfort formerly caused by spending long periods bending over a workbench in one position. In larger manufacturing plants and some smaller repairshops, chemicals, sharp or pointed tools, and jewelers' torches pose potential safety threats and may cause injury if proper care is not taken; however, most dangerous chemicals have been replaced with synthetic, less toxic products to meet safety requirements.

In repairshops, jewelers usually work alone with little supervision. In retail stores, on the other hand, they may talk with customers about repairs, perform custom design work, and even do some sales

work. Because many of their materials are very valuable, jewelers must observe strict security procedures. These include locked doors that are opened only by a buzzer, barred windows, burglar alarms, and, for large jewelry establishments, the presence of armed guards.

Employment

Jewelers and precious stone and metal workers held about 43,000 jobs in 2000. About one-third of all these workers were self-employed; many operated their own store or repairshop, and some specialized in designing and creating custom jewelry.

Over 40 percent of all salaried jewelers worked in retail establishments, while another 40 percent were employed in manufacturing plants. Although jewelry stores and repairshops can be found in every city and in many small towns, most job opportunities are in larger metropolitan areas. Many jewelers employed in manufacturing work in Rhode Island, New York, and California.

Training, Other Qualifications, and Advancement

Jewelers usually learn their trade in vocational or technical schools, through correspondence courses, or on the job. Colleges and art and design schools also offer programs that can lead to a bachelor's or master's degree of fine arts in jewelry design. Formal training in the basic skills of the trade enhances one's employment and advancement opportunities. Many employers prefer jewelers with design, repair, and sales skills.

For those interested in working in a jewelry store or repairshop, vocational and technical training or courses offered by public and private colleges and schools are the best sources of training. In these programs, which can vary in length from 6 months to 1 year, students learn the use and care of jewelers' tools and machines and basic jewelry-making and -repairing skills, such as design, casting, stone setting, and polishing. Technical school courses also cover topics including blueprint reading, math, and shop theory. To enter some technical school and most college programs, a high school diploma or its equivalent is required. However, some schools specializing in jewelry training do not require a high school diploma. Because computer-aided design is used increasingly in the jewelry field, it is recommended that students—especially those interested in design and manufacturing—obtain training in CAD.

The Gemological Institute of America (GIA) offers programs lasting about 6 months and self-paced correspondence courses that may last longer. The GIA offers the graduate gemologist (G.G.) and graduate jeweler (G.J.) diplomas, along with a variety of courses in gemology and jewelry manufacturing and design. Advanced programs cover a wide range of topics, including the identification and grading of diamonds and gemstones.

Most employers feel that vocational and technical school graduates need several more years of supervised, on-the-job training, or apprenticeship, to refine their repair skills and learn more about the operation of the store or shop. In addition, some employers encourage workers to improve their skills by enrolling in short-term technical school courses such as samplemaking, wax carving, or gemology. Many employers pay all or part of the cost of this additional training.

In jewelry manufacturing plants, workers traditionally develop their skills through informal apprenticeships and on-the-job training. This training lasts 3 to 4 years, depending on the difficulty of the specialty. Training usually focuses on casting, stonemaking, modelmaking, or engraving. In recent years, a growing number of technical schools and colleges have begun to offer training designed for jewelers working in manufacturing. Like employers in retail trade, though, those in manufacturing now prefer graduates of these programs because they are familiar with the production process, requiring less on-the-job training.

The precise and delicate nature of jewelry work requires finger and hand dexterity, good hand-eye coordination, patience, and concentration. Artistic ability and fashion consciousness are major assets because jewelry must be stylish and attractive. Those who work in jewelry stores have frequent contact with customers and should be neat, personable, and knowledgeable about the merchandise. In addition, employers require workers of good character because jewelers work with very valuable materials.

Advancement opportunities are limited and depend greatly on an individual's skill and initiative. In manufacturing, some jewelers advance to supervisory jobs, such as master jeweler or head jeweler but, for most, advancement takes the form of higher pay for doing the same job. Jewelers who work in jewelry stores or repairshops may become managers; some open their own businesses.

Those interested in starting their own business should first establish themselves and build a reputation for their work within the jewelry trade. Then, they can obtain sufficient credit from jewelry suppliers and wholesalers to acquire the necessary inventory. Also, because the jewelry business is highly competitive, jewelers who plan to open their own store should have experience in selling, as well as knowledge of marketing and business management. Courses in these areas often are available from technical schools and community colleges.

Job Outlook

Employment of jewelers and precious stone and metal workers is expected to experience little or no change through 2010. Employment opportunities, however, should be excellent, because while jewelers are retiring, jewelry sales are increasing at rates that exceed the number of new jewelers entering the profession. When master jewelers retire, they take with them years of experience that require substantial time and financial resources to replace, in the form of training new jewelers. As a result, many employers have difficulty finding and retaining jewelers with the right skills. Those who devote the time and effort to mastering their trade should have excellent job prospects. Even though some technological advances have made jewelry making more efficient, many of the skills require excellent handiwork and cannot be fully automated.

The demand for jewelry depends largely on the amount of disposable income people have. Therefore, the increasing numbers of affluent individuals, working women, double-income households, and fashion-conscious men are expected to keep jewelry sales strong. The population aged 45 and older, which accounts for a major portion of jewelry sales, also is on the rise.

Recently, nontraditional jewelry marketers, such as discount stores, mail-order catalogue companies, television shopping networks, and Internet retailers have limited the growth of sales by traditional jewelers. Because these establishments require fewer sales and marketing staff, employment opportunities for jewelers and precious stone and metal workers who work mainly in sales will be limited. As these marketers enjoy increases in sales, however, they will need highly skilled jewelers to make the jewelry.

Opportunities in jewelry stores and repairshops will be best for graduates from a jeweler or gemologist training program. Despite an increase in sales by nontraditional jewelry marketers, traditional jewelers should not be greatly affected. Traditional jewelers have the advantage of being able to build client relationships based on trust. Many clients prefer to work directly with a jeweler to ensure that the product is of the highest quality and meets their specifications. Many traditional jewelers expand their business as clients recommend their services to friends and relatives.

The jewelry industry can be cyclical. During economic downturns, demand for jewelry products, and jewelers, tends to decrease. However, demand for repair workers should remain strong, even

during economic slowdowns, because maintaining and repairing jewelry is an ongoing process. In fact, demand for jewelry repair may increase during recessions, as people repair or restore existing pieces rather than purchase new ones. Also, many nontraditional vendors typically do not offer repair services.

Within manufacturing, increasing automation will adversely affect employment of low-skilled occupations, such as assembler and polisher. Automation will have a lesser impact on more creative, highly skilled positions, such as mold- and modelmaker. Furthermore, small manufacturers, which typify the industry, will have an increasingly difficult time competing with the larger manufacturers when it comes to supplying large retailers. Because of recent international trade agreements, exports are increasing modestly as manufacturers become more competitive in foreign markets. However, imports from foreign manufacturers are increasing more rapidly than exports due to these same agreements.

Earnings

Median annual earnings for jewelers and precious stone and metal workers were \$26,330 in 2000. The middle 50 percent earned between \$19,140 and \$35,150. The lowest 10 percent earned less than \$14,550, and the highest 10 percent earned more than \$44,120. In 2000, median annual earnings in the industries employing the largest numbers of jewelers and precious stone and metal workers were:

Miscellaneous shopping goods stores	\$32,290
Jewelry, silverware, and plated ware	22,920

Most jewelers start out with a base salary but, once they become more proficient, they might begin charging by the number of pieces completed. Jewelers who work in retail stores may earn a commission for each piece of jewelry sold, in addition to their base salary. Many jewelers also enjoy a variety of benefits, including reimbursement from their employers for work-related courses and discounts on jewelry purchases.

Related Occupations

Jewelers and precious stone and metal workers do precision handwork. Other skilled workers who do similar jobs include precision instrument and equipment repairers; welding, soldering, and brazing workers; and woodworkers. Some jewelers and precious stone and metal workers create their own jewelry designs. Other visually artistic occupations include artists and related workers, and designers. And, some jewelers and precious stone and metal workers are involved in the buying and selling of stones and metals or of the finished piece of jewelry. Similar occupations include retail salespersons and sales representatives in wholesale trade.

Sources of Additional Information

Information on job opportunities and training programs for jewelers is available from:

- Gemological Institute of America, 5345 Armada Dr., Carlsbad, CA 92008. Internet: <http://www.gia.org>
- California Institute of Jewelry Training, 5800 Winding Way, Carmichael, CA 95608. Internet: <http://www.jewelrytraining.com>

General career information is available from:

- Manufacturing Jewelers and Suppliers of America, 45 Royal Little Dr., Providence, RI 02904. Internet: <http://mjsa.polygon.net>

To receive a list of technical schools which have programs in jewelry design, accredited by the Accrediting Commission of Career Schools and Colleges of Technology, contact:

- Accrediting Commission of Career Schools and Colleges of Technology, 2101 Wilson Blvd., Suite 302, Arlington, VA 22201. Internet: <http://www.accsct.org>

Ophthalmic Laboratory Technicians

(O*NET 51-9083.01, 51-9083.02)

Significant Points

- Nearly all ophthalmic laboratory technicians learn their skills on the job.
- Increasing use of automated equipment will result in relatively slow job growth.
- Only a small number of job openings will be created each year because the occupation is small and slower-than-average growth is expected.

Nature of the Work

Ophthalmic laboratory technicians—also known as *manufacturing opticians*, *optical mechanics*, or *optical goods workers*—make prescription eyeglass or contact lenses. Prescription lenses are curved in such a way that light is correctly focused onto the retina of the patient's eye, improving vision. Some ophthalmic laboratory technicians manufacture lenses for other optical instruments, such as telescopes and binoculars. Ophthalmic laboratory technicians cut, grind, edge, and finish lenses according to specifications provided by dispensing opticians, optometrists, or ophthalmologists, and may insert lenses into frames to produce finished glasses. Although some



A contact lens manufacturing worker grinds lenses according to prescription.