

## Glaziers

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### Significant Points

- Glaziers may be injured by broken glass or cutting tools, falls from scaffolds, or from improperly lifting heavy glass panels.
- Many glaziers learn the trade by working as helpers to experienced glaziers; however, employers recommend a 3- to 4-year apprenticeship program.
- Job opportunities are expected to be excellent.

### Nature of the Work

Glass serves many uses in modern buildings. Insulated and specially treated glass keeps in warmed or cooled air and provides good condensation and sound control qualities; tempered and laminated glass makes doors and windows more secure. In large commercial buildings, glass panels give office buildings a distinctive look while reducing the need for artificial lighting. The creative use of large windows, glass doors, skylights, and sun-room additions makes homes bright, airy, and inviting.

Glaziers are responsible for selecting, cutting, installing, replacing, and removing all types of glass. They generally work on one of several types of projects. Residential glazing involves work such as replacing glass in home windows; installing glass mirrors, shower doors, and bathtub enclosures; and fitting glass for table tops and display cases. On commercial interior projects, glaziers install items such as heavy, often etched, decorative room dividers or security windows. Glazing projects also may involve replacement of storefront windows for establishments such as supermarkets, auto dealerships, or banks. In the construction of large commercial buildings, glaziers build metal framework extrusions and install glass panels or curtain walls.

Besides working with glass, glaziers also may work with plastics, granite, marble, and similar materials used as glass substitutes. They may mount steel and aluminum sashes or frames and attach locks and hinges to glass doors. For most jobs, the glass is precut and mounted in frames at a factory or a contractor's shop. It arrives at the jobsite ready for glaziers to position and secure in place. They may use a crane or hoist with suction cups to lift large, heavy pieces of glass. They then gently guide the glass into position by hand.

Once glaziers have the glass in place, they secure it with mastic, putty, or other pastelike cement, or with bolts, rubber gaskets, glazing compound, metal clips, or metal or wood moldings. When they secure glass using a rubber gasket—a thick, molded rubber half-tube with a split running its length—they first secure the gasket around the perimeter within the opening, then set the glass into the split side of the gasket, causing it to clamp to the edges and hold the glass firmly in place.

When they use metal clips and wood moldings, glaziers first secure the molding to the opening, place the glass in the molding, and then force springlike metal clips between the glass and the molding. The clips exert pressure and keep the glass firmly in place.

When a glazing compound is used, glaziers first spread it neatly against and around the edges of the molding on the inside of the opening. Next, they install the glass. Pressing it against the compound on the inside molding, workers screw or nail outside molding that loosely holds the glass in place. To hold it firmly, they pack the space between the molding and the glass with glazing compound and then trim any excess material with a glazing knife.



*Many glaziers learn the trade by working as helpers to experienced workers.*

For some jobs, the glazier must cut the glass manually at the jobsite. To prepare the glass for cutting, glaziers rest it either on edge on a rack, or “A-frame,” or flat against a cutting table. They then measure and mark the glass for the cut.

Glaziers cut glass with a special tool that has a small, very hard metal wheel. Using a straightedge as a guide, the glazier presses the cutter's wheel firmly on the glass, guiding and rolling it carefully to make a score just below the surface. To help the cutting tool move smoothly across the glass, workers brush a thin layer of oil along the line of the intended cut or dip the cutting tool in oil. Immediately after cutting, the glazier presses on the shorter end of the glass to break it cleanly along the cut.

Glaziers also replace or repair broken or pitted windshields and window glass on automobiles and other vehicles. They first remove the broken glass, which may involve cutting it free from the adhesive holding it down. They then install the glass in the vehicle, often using a special adhesive. They also may weatherproof the window or windshield and prevent it from rattling by installing rubber strips around the sides of the glass.

In addition to handtools such as glass cutters, suction cups, and glazing knives, glaziers use power tools such as saws, drills, cutters, and grinders. An increasing number of glaziers use computers in the shop or at the jobsite to improve their layout work and reduce the amount of glass that is wasted.

### Working Conditions

Glaziers often work outdoors, sometimes in inclement weather. At times, they work on scaffolds at great heights. They do a considerable amount of bending, kneeling, lifting, and standing. Glaziers may be injured by broken glass or cutting tools, by falls from scaffolds, or by improperly lifting heavy glass panels.

### Employment

Glaziers held about 49,000 jobs in 2000. About 3 out of every 5 glaziers worked for glazing contractors engaged in new construction, alteration, and repair. About 1 out of 5 worked in retail glass shops that install or replace glass and for wholesale distributors of products containing glass. Others worked in automotive repair shops.

### Training, Other Qualifications, and Advancement

Many glaziers learn the trade informally on the job. They usually start as helpers, carrying glass and cleaning up debris in glass shops.

They often practice cutting on discarded glass. After a while, they are given an opportunity to cut glass for a job. Eventually, helpers assist experienced workers on simple installation jobs. By working with experienced glaziers, they eventually acquire the skills of a fully qualified glazier.

Employers recommend that glaziers learn the trade through a formal apprenticeship program that lasts 3 to 4 years. Apprenticeship programs, which are administered by the National Glass Association and local union-management committees or local contractors' associations, consist of on-the-job training, as well as 144 hours of classroom instruction or home study each year. On the job, apprentices learn to use the tools and equipment of the trade; handle, measure, cut, and install glass and metal framing; cut and fit moldings; and install and balance glass doors. In the classroom, they are taught basic mathematics, blueprint reading and sketching, general construction techniques, safety practices, and first aid. Learning the trade through an apprenticeship program usually takes less time and provides more complete training than acquiring skills informally on the job, but opportunities for apprenticeships are declining.

Local apprenticeship administrators determine the physical, age, and educational requirements needed by applicants for apprenticeships and for helper positions. In general, applicants must be in good physical condition and be at least 17 years old. High school or vocational school graduates are preferred. In some areas, applicants must take mechanical-aptitude tests. Courses in general mathematics, blueprint reading or mechanical drawing, general construction, and shop provide a good background.

Standards for acceptance into apprenticeship programs are rising to reflect changing requirements associated with new products and equipment. In addition, the growing use of computers in glass layout requires that glaziers be familiar with personal computers.

Because many glaziers do not learn the trade through a formal apprenticeship program, the National Glass Association (NGA) offers a series of written examinations that certify an individual's competency to perform glazier work at three progressively more difficult levels of proficiency. These levels include Level I, Glazier; Level II, Commercial Interior/Residential Glazier or Storefront/Curtainwall Glazier; and Level III, Master Glazier. Recently, the NGA has added a new certification program for auto-glass repair.

Advancement generally consists of increases in pay for most glaziers; some advance to supervisory jobs or become contractors or estimators.

### Job Outlook

Job opportunities are expected to be excellent for glaziers, largely due to the numerous openings arising each year as experienced glaziers leave the occupation. In addition, many potential workers may prefer work that is less strenuous and has more comfortable working conditions. Well-trained workers will have especially favorable opportunities.

Employment of glaziers is expected to increase about as fast as the average for all occupations through the year 2010, as a result of growth in residential and nonresidential construction. Demand for glaziers will be spurred by the continuing need to modernize and repair existing structures and the popularity of glass in bathroom and kitchen design. Improved glass performance in the areas of insulation, privacy, safety, condensation control, and noise reduction also are expected to contribute to the demand for glaziers in both residential and nonresidential remodeling. A continuing emphasis on energy management, which encourages people to replace their old windows and doors with high-efficiency products, also will spur the demand for glaziers.

Similar to other construction-trades workers, construction glaziers should expect to experience periods of unemployment resulting from

the limited duration of construction projects and the cyclical nature of the construction industry. During bad economic times, job openings for glaziers are reduced as the level of construction declines. Because construction activity varies from area to area, job openings, as well as apprenticeship opportunities, fluctuate with local economic conditions. Employment and apprenticeship opportunities should be greatest in metropolitan areas, where most glazing contractors and glass shops are located.

### Earnings

In 2000, median hourly earnings of glaziers were \$14.32. The middle 50 percent earned between \$10.88 and \$19.35. The lowest 10 percent earned less than \$8.50, and the highest 10 percent earned more than \$25.78. Median hourly earnings in the industries employing the largest numbers of glaziers in 2000 are shown below:

Miscellaneous special trade contractors .....	\$15.39
Paint, glass, and wallpaper stores .....	12.60

Glaziers covered by union contracts generally earn more than their nonunion counterparts. Apprentice wage rates usually start at 50 to 60 percent of the rate paid to experienced glaziers and increase every 6 months. Because glaziers can lose time due to weather conditions and fluctuations in construction activity, their overall earnings may be lower than their hourly wages suggest.

Many glaziers employed in construction are members of the International Brotherhood of Painters and Allied Trades.

### Related Occupations

Glaziers use their knowledge of construction materials and techniques to install glass. Other construction workers whose jobs also involve skilled, custom work are brickmasons, blockmasons, and stonemasons; carpenters; carpet, floor, and tile installers and finishers; cement masons, concrete finishers, segmental pavers, and terrazzo workers; and painters and paperhangers.

### Sources of Additional Information

For more information about glazier apprenticeships or work opportunities, contact local glazing or general contractors, a local of the International Brotherhood of Painters and Allied Trades, a local joint union-management apprenticeship agency, or the nearest office of the State employment service or State apprenticeship agency.

For general information about the work of glaziers, contact:

► International Brotherhood of Painters and Allied Trades, 1750 New York Ave. NW., Washington, DC 20006.

For information concerning training for glaziers, contact:

► National Glass Association, Education and Training Department, 8200 Greensboro Dr., Suite 302, McLean, VA 22102-3881. Internet: <http://www.glass.org>

## Hazardous Materials Removal Workers

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### Significant Points

- Working conditions can be difficult, and the use of protective clothing is often required.
- Formal education beyond high school is not required, but a training program leading to a Federal license is mandatory.
- Excellent job opportunities are expected.