

## Roofers

(O\*NET 47-2181.00)

### Significant Points

- Most roofers acquire their skills informally on the job; some roofers train through 3-year apprenticeship programs.
- Jobs for roofers should be plentiful because the work is hot, strenuous, and dirty, resulting in high job turnover.
- Demand for roofers is less susceptible to downturns in the economy than that for other construction trades because most roofing work consists of repair and reroofing.

### Nature of the Work

A leaky roof can damage ceilings, walls, and furnishings. To protect buildings and their contents from water damage, roofers repair and install roofs made of tar or asphalt and gravel; rubber or thermoplastic; metal; or shingles made of asphalt, slate, fiberglass, wood, tile, or other material. Repair and reroofing—replacing old roofs on existing buildings—provide many job opportunities for these workers. Roofers also may waterproof foundation walls and floors.

There are two types of roofs—flat and pitched (sloped). Most commercial, industrial, and apartment buildings have flat or slightly sloping roofs. Most houses have pitched roofs. Some roofers work on both types; others specialize.

Most flat roofs are covered with several layers of materials. Roofers first put a layer of insulation on the roof deck. Over the insulation, they then spread a coat of molten bitumen, a tarlike substance. Next, they install partially overlapping layers of roofing felt—a fabric saturated in bitumen—over the surface. Roofers use a mop to spread hot bitumen over the surface and under the next layer. This seals the seams and makes the surface watertight. Roofers repeat these steps to build up the desired number of layers, called “plies.” The top layer either is glazed to make a smooth finish or has gravel embedded in the hot bitumen to create a rough surface.

An increasing number of flat roofs are covered with a single-ply membrane of waterproof rubber or thermoplastic compounds. Roofers roll these sheets over the roof’s insulation and seal the seams. Adhesive, mechanical fasteners, or stone ballasts hold the sheets in place. The building must be of sufficient strength to hold the ballast.

Most residential roofs are covered with shingles. To apply shingles, roofers first lay, cut, and tack 3-foot strips of roofing felt lengthwise over the entire roof. Then, starting from the bottom edge, they staple or nail overlapping rows of shingles to the roof. Workers measure and cut the felt and shingles to fit intersecting roof surfaces and to fit around vent pipes and chimneys. Wherever two roof surfaces intersect, or shingles reach a vent pipe or chimney, roofers cement or nail flashing-strips of metal or shingle over the joints to make them watertight. Finally, roofers cover exposed nailheads with roofing cement or caulking to prevent water leakage.

Some roofers also waterproof and dampproof masonry and concrete walls and floors. To prepare surfaces for waterproofing, they hammer and chisel away rough spots, or remove them with a rubbing brick, before applying a coat of liquid waterproofing compound. They also may paint or spray surfaces with a waterproofing material, or attach waterproofing membrane to surfaces. When dampproofing, they usually spray a bitumen-based coating on interior or exterior surfaces.



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### Working Conditions

Roofing work is strenuous. It involves heavy lifting, as well as climbing, bending, and kneeling. Roofers work outdoors in all types of weather, particularly when making repairs. These workers risk slips or falls from scaffolds, ladders, or roofs, or burns from hot bitumen. In addition, roofs become extremely hot during the summer.

### Employment

Roofers held about 158,000 jobs in 2000. Almost all wage and salary roofers worked for roofing contractors. About 1 out of every 4 roofers was self-employed. Many self-employed roofers specialized in residential work.

### Training, Other Qualifications, and Advancement

Most roofers acquire their skills informally by working as helpers for experienced roofers. They start by carrying equipment and material, and erecting scaffolds and hoists. Within 2 or 3 months, trainees are taught to measure, cut, and fit roofing materials and, later, to lay asphalt or fiberglass shingles. Because some roofing materials are used infrequently, it can take several years to get experience working on all the various types of roofing applications.

Some roofers train through 3-year apprenticeship programs administered by local union-management committees representing roofing contractors and locals of the United Union of Roofers, Waterproofers, and Allied Workers. The apprenticeship program generally consists of a minimum of 2,000 hours of on-the-job training annually, plus 144 hours of classroom instruction a year in subjects such as tools and their use, arithmetic, and safety. On-the-job training for apprentices is similar to that for helpers, except that the apprenticeship program is more structured. Apprentices also learn to dampproof and waterproof walls.

Good physical condition and good balance are essential for roofers. A high school education, or its equivalent, is helpful, as are courses in mechanical drawing and basic mathematics. Most apprentices are at least 18 years old.

Roofers may advance to supervisor or estimator for a roofing contractor, or become contractors themselves.

### Job Outlook

Jobs for roofers should be plentiful through the year 2010, primarily because of the need to replace workers who transfer to other occupations or leave the labor force. Turnover is high—roofing

work is hot, strenuous, and dirty, and a significant number of workers treat roofing as a temporary job until something better comes along. Some roofers leave the occupation to go into other construction trades.

Employment of roofers is expected to grow about as fast as the average for all occupations through the year 2010. Roofs deteriorate faster than most other parts of buildings and periodically need to be repaired or replaced. About three-fourths of roofing work is repair and replacement, a higher proportion than in most other construction work. As a result, demand for roofers is less susceptible to downturns in the economy than that for other construction trades. In addition to repair and reroofing work on the growing stock of buildings, new construction of industrial, commercial, and residential buildings will add to the demand for roofers. Jobs should be easiest to find during spring and summer, when most roofing is done.

### Earnings

In 2000, median hourly earnings of roofers were \$13.95. The middle 50 percent earned between \$10.72 and \$18.86. The lowest 10 percent earned less than \$8.68, and the highest 10 percent earned more than \$24.47. The median hourly earnings in 2000 of roofers in the roofing, siding, and sheet metal work industry were \$14.00.

Some roofers are members of the United Union of Roofers, Waterproofers, and Allied Workers.

Apprentices usually start at about 40 percent of the rate paid to experienced roofers and receive periodic raises as they acquire the skills of the trade. Earnings for roofers are reduced on occasion because poor weather often limits the time they can work.

### Related Occupations

Roofers use shingles, bitumen and gravel, single-ply plastic or rubber sheets, or other materials to waterproof building surfaces. Workers in other occupations who cover surfaces with special materials for protection and decoration include carpenters; carpet, floor, and tile installers and finishers; cement masons, concrete finishers, segmental pavers, and terrazzo workers; drywall installers, ceiling tile installers, and tapers; and plasterers and stucco masons.

### Sources of Additional Information

For information about apprenticeships or job opportunities in roofing, contact local roofing contractors, a local chapter of the roofers union, a local joint union-management apprenticeship committee, or the nearest office of your State employment service or apprenticeship agency.

For information about the work of roofers, contact:

- National Roofing Contractors Association, 10255 W. Higgins Rd., Rosemont, IL 60018-5607. Internet: <http://www.nrca.net>
- United Union of Roofers, Waterproofers, and Allied Workers, 1660 L St. NW., Suite 800, Washington, DC 20036.

## Sheet Metal Workers

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### Significant Points

- Two out of 3 jobs are found in the construction industry; about 1 out of 3 is in manufacturing.
- Apprenticeship programs lasting 4 or 5 years are considered the best training.
- Job opportunities should be excellent in construction.

### Nature of the Work

Sheet metal workers make, install, and maintain air-conditioning, heating, ventilation, and pollution control duct systems; roofs; siding; rain gutters; downspouts; skylights; restaurant equipment; outdoor signs; and many other products made from metal sheets. They also may work with fiberglass and plastic materials. Although some workers specialize in fabrication, installation, or maintenance, most do all three jobs. In addition to construction-related sheet metal work, some sheet metal workers are employed in the mass production of sheet metal products in manufacturing.

Sheet metal workers first study plans and specifications to determine the kind and quantity of materials they will need. They then measure, cut, bend, shape, and fasten pieces of sheet metal to make ductwork, counter tops, and other custom products. In an increasing number of shops, sheet metal workers use computerized metalworking equipment. This enables them to experiment with different layouts and to select the one that results in the least waste of material. They cut or form parts with computer-controlled saws, lasers, shears, and presses.

In shops without computerized equipment, and for products that cannot be made on such equipment, sheet metal workers use hand calculators to make the required calculations and use tapes, rulers, and other measuring devices for layout work. They then cut or stamp the parts on machine tools.

Before assembling pieces, sheet metal workers check each part for accuracy using measuring instruments such as calipers and micrometers and, if necessary, finish it by using hand, rotary, or squaring shears and hacksaws. After the parts have been inspected, workers fasten seams and joints together with welds, bolts, cement, rivets, solder, specially formed sheet metal drive clips, or other connecting devices. They then take the parts to the construction site where they further assemble the pieces as they install them. These workers install ducts, pipes, and tubes by joining them end to end and hanging them with metal hangers secured to a ceiling or a wall. They also use shears, hammers, punches, and drills to make parts at the worksite or to alter parts made in the shop.

Some jobs are done completely at the jobsite. When installing a metal roof, for example, sheet metal workers measure and cut the roofing panels that are needed to complete the job. They secure the first panel in place and interlock and fasten the grooved edge of the next panel into the grooved edge of the first. Then, they nail or weld the free edge of the panel to the structure. This two-step process is repeated for each additional panel. Finally, the workers



*Sheet metal workers usually fabricate their products at a shop away from the construction site.*