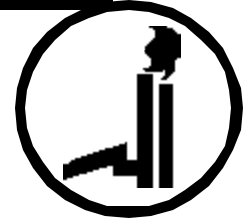


# Plastics Products Manufacturing Workers



## Occupational Brief Title Codes:

- D.O.T.: 55, 75
- G.O.E.: 06.02, 06.04
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## Occupational Subtitles:

- Blow Molding Machine Operators
- Calender Operators
- Compression Molding Machine Operators
- Extruding Machine Operators
- Fabricators
- Injection Molders
- Laminating Machine Operators
- Preforms Laminators

## Work Classification Based Related

### D.O.T. Occupations:

- Casting-Room Operators
- Combining Machine Operators
- Cosmetics Pressers
- Masking Machine Operators
- Mold Setters
- Plastics-Spreading-Machine Operators
- Press Tenders
- Rubber Molders

## Interests Based Related

### G.O.E. Occupations:

- Batch and Furnace Operators
- Drawing Kiln Operators
- Fiberglass Machine Operators
- Forming Machine Operators
- Glass Ribbon Machine Operators
- Mixing Machine Operators
- Pulverizer Mill Operators
- Shredding Floor Equipment Operators

## Skills Based Related

### O\*NET Occupations:

- Casting Machine Set-Up Operators
- Coating, Painting, and Spraying Machine Operators and Tenders
- Coil Winders, Tapers, and Finishers
- Design Printing Machine Setters and Set-Up Operators
- Grinding, Honing, Lapping, and Deburring Machine Set-Up Operators

*Plastics products manufacturing workers* ('plas-tics 'prod-u'cts man-u' fac-tur-ing 'work-ers) mold, cast, and assemble products made of plastics materials.

Plastics are one of the most used products in the United States. Appliances, toys, dishes, luggage, and furniture are only a few of the products made of plastics. The medical field uses plastic items such as syringes, tubing, and plastic bags because they are sanitary and disposable. The housing and building industry uses plastics for plumbing, insulation, flooring, and counter tops. Plastics go into the making of rocket nozzles, reentry heat shields, and the clothing of the astronauts. Ships, boats, aircraft, satellites, automobiles, and motorcycles all contain plastic parts. As researchers find still more plastics and further uses for them the list continues to grow.

The plastics industry in the United States is in its second century. It began in the 1860's when John Wesley Hyatt experimented with cellulose nitrate, and developed a method for producing billiard balls using materials other than ivory. Around 1897, casein plastics (a mixture of casein and formaldehyde) were developed. The most important developments in the industry, however, have occurred during the past ninety years.

Broadly speaking, plastics are classified in two major groups. Thermosets are plastics, that once heated and molded, keep that shape. In contrast, thermoplastics can be heated, shaped, and molded repeatedly into different shapes. About 20 percent of the output of the plastics industry is thermosets. The other 80 percent is thermoplastics.

Plastics materials manufacturers use chemical reactions to transform naturally found substances into basic synthetic plastics materials such as powder, pellets,



*Plastic products manufacturing workers mold, cast, and assemble products made of plastics materials.*  
Photo by Darron Murphy

flakes, or liquids. Dyes can color them, or modifiers can make them flexible, improve impact, or modify some performance property.

Processors turn basic plastics materials into secondary or finished products such as rods, pipes, tubes, sheeting, and component parts. Processors use several methods to do this. Among them are injection molding, compression molding, blow molding, lamination, extrusion, and calendaring.

### **Work Performed**

**Injection molders** run machines that liquefy plastic powders or pellets and inject the liquid plastic into a mold. After the part cools and hardens, the mold opens and releases the part. Molders examine the finished objects. Injection molding produces objects such as kitchen products and keys for computer keyboards.

**Compression molding machine operators** run equipment that molds thermosetting plastics into hard plastic objects. Workers place a resin compound in a mold. They set heat and pressure gauges, which cause the compound to melt and then to harden into solid plastic objects shaped by the mold.

**Blow molding machine operators** tend machines that force hot air into a tube within a mold. As the air moves into the tube, the tube inflates and takes the shape of the mold. This process produces hollow plastic containers such as two-liter soda bottles and bleach bottles.

**Laminating machine operators** monitor equipment that presses layers of resin-soaked goods between steel plates to make the layers fuse and set. This process produces items such as table tops and electrical insulation.

**Preforms laminators** press fiberglass and resin-coated fabrics over plaster, steel, or wooden forms to make plastic parts for boats, cars, and planes.

**Extruding machine operators** tend machines that force the plastic compound through a die that has an opening shaped like the desired object. The process is something like toothpaste coming out of a tube. It produces long continuous shapes such as rods, pipes, and tubing.

**Calender operators** adjust the temperature, speed, and roller positions of machines that draw plastic between rollers to produce flexible vinyl sheeting of specified thickness. They can make either plain or embossed sheeting.

In all these processes machine operators check the feed of the materials. They monitor the temperature and pressure of the machines, and the rate at which the products harden. Machine operators may make minor adjustments to the machinery. They may change the dies and machine screws through which the hot plastic is drawn or forced. They may weigh and mix plastics materials, load the machines, set the temperature and speed of the machines, and turn them off and on. They may remove the

finished products from the machines and inspect them. They remove clogged materials from molds or dies.

In computer controlled systems, plastics products operators have little to do with direct control of the machines. They monitor the computers that control the loading, forming, and unloading processes.

Many products undergo further processes to finish them. **Finishers** and **buffers** trim and smooth products. **Fabricators** assemble pieces by welding or adhesive bonding to form finished products. They also shape plastics on a lathe or use a drill press to cut holes in the product. They may also use silk screening and photographic processes to print words or designs on the finished product.

### **Working Conditions**

Plastics products machine operators work in clean, well-lighted departments. They operate high-speed machines that can be dangerous. Workers must be careful of hot dies and plastics products coming off the machines. Most operators wear safety glasses and earplugs. If they work with materials that give off fumes, they may wear face masks or self-contained breathing apparatus. These workers stand during most of their working hours. They may lift moderately heavy materials such as dies and molds and compounds that go into the machines. Hoists and other equipment assist workers in these tasks.

Most production jobs in this industry are repetitive. That is, workers do the same tasks over and over.

### **Hours and Earnings**

Those in the plastics products manufacturing industry usually work eight hours a day, five days a week. Workers may work on weekends, depending on where they are employed.

Wages vary with the manufacturing processes, the size of the plant, and the geographic location. According to the Bureau of Labor Statistics, in 2000, plastic and metal workers earned an average between \$10.40 and \$16.07 an hour.

Workers in some plants get time and a half for overtime. They also typically receive seven paid holidays a year and sick time. They may get one week of vacation the first year, two weeks after three years, and three weeks after seven years. They also get medical and life insurance.

Plastics products manufacturing workers may get yearly raises or merit raises. Some companies have a profit-sharing plan.

### **Education and Training**

Workers in the plastics industry must have a high school education or its equivalent. A knowledge of

physics, chemistry, drafting, and blueprint reading will prove helpful. The current trend toward automation makes knowledge of mathematics and computer operations an asset.

Most plastics manufacturing industry workers learn their skills on the job. Trainees begin by watching and helping experienced workers. They may check the feed of materials, start and stop the machine, and remove finished products from the machine. Later they learn to do more difficult tasks. Most operators learn basic machine operations in a few weeks. Skills such as changing molds and dies, and machine setup take longer to learn.

### **Licensing, Certification, Unions and Professional Societies**

The Society of the Plastics Industry (SPI), Inc., is a trade association of over 2,000 members representing all segments of the plastics industry in the United States. SPI is composed of plastics processors, raw material suppliers, machinery manufacturers, mold makers, and other industry-related groups and individuals. Founded in 1937, SPI serves as the voice of the plastics industry. SPI represents the plastics industry before government bodies, the public, and industry groups with which the plastics industry has marketplace relationships.

Other organizations that promote interests within the plastics industry include the American Plastics Council, the American Society for Plasticiculture, the Plastic Metal Products Manufacturers Association, the Society for Women in Plastics, and the Society of Plastics Engineers.

Plastics products manufacturing workers may belong to any of several unions. Some examples are the International Association of Machinists and Aerospace Workers; the International Union of Electronic, Electrical, Salaried Machine, and Furniture Workers; or the United Rubber, Cork, Linoleum and Plastic Workers of America.

### **Personal Qualifications**

Plastics products manufacturing workers should have the patience to do the same tasks over and over. They should be able to accept and follow orders, and they should be able to work with others in a team effort.

Occupations can be adapted for workers with disabilities. Persons should contact their school or employment counselors, their state office of vocational rehabilitation, or their state department of labor to explore fully their individual needs and requirements as well as the requirements of the occupation.

### **Where Employed**

The Bureau of Labor Statistics classifies plastics products manufacturing workers with metal and plastic machine setters, operators, and tenders. The total number

of these workers employed in the United States in the year 2000 was about 1.6 million. About 30% of these employees work in plastics manufacturing. Much of the plastics industry consists of small plastics processing firms that make specific items. These small plants operate nationwide.

### **Employment Outlook**

The demand for plastics is linked to the economy. The rate of employment for plastics products manufacturing workers is expected to decline through the year 2010. Competition from foreign firms has forced manufacturers in the United States to lay off workers. Many companies in the United States have moved their operations overseas. To remain competitive, some plastics firms are changing over to numerically controlled machine tools, robots, and automated material handling systems. With this equipment, operators can tend several machines at the same time. Therefore, employment of NC machine operators, plastics molding machine operators, and a number of other machine operators will see employment growth. Employment of more traditional operator occupations, however, is expected to decline.

Workers with a thorough background in machine operations, exposure to many machines, and a good working knowledge of the properties of plastics will have the best job prospects. In addition, new shop floor arrangements will reward workers with good mathematics and reading skills, good communications skills, and the ability and willingness to learn new tasks.

### **Entry Methods**

High school graduates looking for work in the plastics industry should call at any plastics plant and ask for an interview with the personnel manager. The industry prefers job seekers with experience. A background of mechanical, chemical, or electrical and electronics work serves as a base for a career in plastics.

Still better, of course, is a formal knowledge of plastics technology. A number of colleges offer full-time or part-time programs of study. Serious, ambitious workers can enroll in classes that will meet their needs. These measures increase an applicant's chances of landing a job in plastics manufacturing.

### **Advancement**

The plastics industry tends to promote workers from within the plant because skilled workers in the job market are few. Plastics plants like to teach their workers their own methods. Thus those who do their work well and who increase their skills and education are likely to advance.

Education is the key to advancement. The workers who have an associate degree in plastics technology are in a good position to advance to technical and supervisory work.

To advance to more skilled and well-paid work in production, workers may sign on as apprentices to become tool and die makers. These experts make the dies and molds for shaping plastics products. An apprenticeship lasts four or five years. It consists of on-the-job training and class instruction. In choosing apprentices most employers prefer high school or technical school graduates. Some employers test apprentice applicants to assess their mechanical aptitude and mathematical skills.

#### **For Further Research**

**Cain Communications, Inc.**, 1725 Merriman Road, Akron, OH 44313-5251.

*Plastics News*. Weekly. Subscription \$25.00.  
\$1.00 for single issue.

**McGraw-Hill, Inc.**, 1221 Avenue of the Americas, New York, NY 10020.

*Modern Plastics*. Monthly. Subscription \$41.75.

**Society of the Plastics Industry, Inc.**, 1801 K Street, N.W., Suite 600K, Washington, DC 20006-1301.

*Careers in Plastics*. Brochure.  
*Directory of Plastics Education and Training Programs in the U.S. and Canada*.

#### **Acknowledgments**

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