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# Occupational Employment in Manufacturing Industries



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U.S. Department of Labor  
William E. Brock, Secretary

Bureau of Labor Statistics  
Janet L. Norwood, Commissioner  
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# Preface

This bulletin provides data from a 1983 survey of occupational employment in manufacturing industries. Earlier surveys of manufacturing industries were conducted in 1971, 1974, 1977, and 1980. These surveys were supplemented with the financial assistance of the National Science Foundation. Results of the 1980 survey were published in Bulletin 2133, *Occupational Employment in Manufacturing Industries*.

The nonmanufacturing sector was surveyed in 1981 and 1982. Results of the 1981 survey were published in Bulletin 2186, *Occupational Employment in Mining Construction, Finance, and Services*. Data for the 1982 survey were published in Bulletin 2220, *Occupational Employment in Transportation, Communications, Utilities, and Trade*.

These periodic surveys are part of a Federal-State cooperative program of occupational employment statistics (OES). The OES program provides information

for many data users, including individuals and organizations engaged in planning vocational education programs, training programs supported by the Job Partnership Training Act, and higher education. OES data are also used to prepare information for career counseling, for job placement activities performed at State employment security offices, and for personnel planning and market research conducted by private enterprises.

This bulletin was prepared in the Office of Employment and Unemployment Statistics, Division of Occupational and Administrative Statistics, by Thomas P. Williams and Barbara L. Keitt under the direction of Glyn Finley. Kevin Tidemann provided data processing support.

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# Introduction

The Occupational Employment Statistics (OES) Survey is designed to collect data on occupational employment of wage and salary workers by industry in nonagricultural establishments. The Bureau of Labor Statistics provides the procedures and technical assistance for the survey, and State employment security agencies collect the data.

In 1983, 50 States, the District of Columbia, and Puerto Rico participated in the survey, compared with 49 States in 1980, 43 States in 1977, and 29 States in 1974. Data for Puerto Rico are not included in the estimates in this publication. They are available, as are data for each State, from employment security agencies listed on the inside back cover of this bulletin.

## Data presented

This bulletin presents national data on occupational employment for 2-digit SIC industries.<sup>1</sup> Data are

<sup>1</sup> Occupational employment data at the more detailed 3-digit level are available upon request from the Office of Employment and Unemployment Statistics, Bureau of Labor Statistics. Definitions for all occupations surveyed are also available upon request.

presented for each industry under the following headings: Employment, percent of total employment, relative error, and percent of establishments reporting the occupation.

Employment is based upon survey results adjusted to reflect total industry employment. The percent of total employment refers to total employment in a particular industry. Relative error measures the level of confidence to be placed in each estimate. The percentage of establishments reporting a particular occupation indicates the frequency of occurrence of the occupation.

Occupations with fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 percent are not shown separately but are included in the appropriate residual categories. Employment is rounded to the nearest ten. The relative error and percent of respondents reporting the occupation are rounded to the nearest whole percent. The percent of total employment was computed from rounded employment data.

# Summary

In 1983, manufacturing employment covered by this survey totaled 18.4 million, or about 20 percent<sup>1</sup> of all nonagricultural wage and salary workers in the Nation.

As shown in table 1, three-fifths of these workers were employed in the durable goods segment of manufacturing. Representing more than half of durable goods employment were the machinery, electrical and electronic equipment, and transportation equipment industries. The nondurable goods industries constituted 40 percent of manufacturing employment. Among these, the largest were food and kindred products, apparel and other textile products, and the printing and publishing industry, together accounting for over half of nondurable goods employment.

## Major occupational groups

A new occupational classification system, designed to better suit the needs of both data users and data producers, was used for the first time in this survey. First, it emphasizes occupations of special interest, such as technology-related occupations, and those requiring substantial training. Additionally, it is more compatible with the Standard Occupational Classification System used for a variety of other occupational data. Also, to aid data collectors and respondents, the new structure is more concise. A detailed explanation of the new classification system is given in appendix B.

Under the new classification system, workers are classified by occupation into seven major occupational groups: Managerial and administrative workers; professional, paraprofessional, and technical workers; sales and related workers; clerical and administrative support workers; service workers; agriculture, forestry, fishing, and related workers; and production, construction, operating, maintenance, and material handling workers. Tables 2 and 3 present the distribution of employment in the various industries surveyed.

The following sections discuss each of these occupational groups and their distribution among the surveyed industries. Subsequent sections deal with the industry segments within manufacturing and discuss employ-

ment in each by major occupational group. Throughout, changes in occupational employment arising from changes in classification since the last survey, rather than actual changes in establishment staffing patterns, are noted. These sections also present detailed occupational employment data by industry segment (2-digit SIC).

## Managerial and administrative workers

Persons holding positions as managerial and administrative workers are primarily concerned with policymaking, planning, organizing, staffing, directing, and controlling activities common to many types of organizations. Occupations included in this group are plant, office, and sales managers and corporate officers such as president, secretary, and treasurer. First-line supervisors, such as blue-collar worker and clerical supervisors, however, are included in the same occupational division as the workers they supervise. The new coding structure incorporates a new classification: First-line supervisor—sales. These supervisory workers are now included in the sales rather than in the managers/administrators group. (See appendix B.)

In 1983, managerial and administrative workers numbered more than 1 million, representing nearly 6 percent of total employment in the manufacturing sector. The durable goods segment employed three-fifths of the workers in this occupational group. The largest concentrations of managerial and administrative workers were found in the machinery and electrical and electronic equipment industries.

## Professional, paraprofessional, and technical workers

Persons employed in professional positions usually deal with the theoretical or practical aspects of such fields as science, engineering, art, education, medicine, law, and business relations. Most of these occupations require substantial educational preparation, usually at the university level. Paraprofessionals work under the direction of professionals. These occupations usually require some postsecondary education or, in some instances, a baccalaureate degree. Technical occupations require knowledge of fundamental scientific, engineering, mathematical, computer programming, or draft

<sup>1</sup> Total employment for nonagricultural establishments averaged 90.1 million in 1983. See *Supplement to Employment and Earnings*, U.S. Department of Labor, Bureau of Labor Statistics, July 1984.

design principles. This knowledge is acquired through study at technical schools and junior colleges, through other formal postsecondary training less extensive than a 4-year college course, or through equivalent on-the-job training or experience.

In 1983, professional, paraprofessional, and technical workers numbered 2 million, representing 11 percent of total employment in the manufacturing sector. The durable goods segment employed 72 percent of the workers in this occupational group. The largest concentrations of professional, paraprofessional, and technical workers were found in the electrical and electronic equipment and transportation equipment industries.

### **Sales workers**

In the manufacturing sector, sales workers primarily include persons who are required to have specific knowledge of the commodity or service being sold, in contrast to retail trade, in which sales workers sell any of a large variety of goods or services and usually are only required to have familiarity with the pricing of those goods and services.

Sales representatives include those who sell commodities on a wholesale basis to wholesale, retail, industrial, professional, or other establishments. They solicit orders from established clientele and attempt to secure new customers; show samples or catalog illustrations of products to prospective buyers and explain their merit; quote prices and credit and discount terms; arrange delivery schedules; process orders to offices or warehouses; resolve customer complaints; and keep informed of the latest market conditions, product innovations, and price changes. Sales engineers include occupations primarily concerned with selling to businesses goods and services where a technical background equivalent to a degree in engineering is required.

In 1983, sales workers numbered approximately 540,000, representing 3 percent of total employment in the manufacturing sector. The nondurable goods segment employed 56 percent of the workers in this occupational group. The largest concentrations of sales workers were found in the printing and publishing and food and kindred products industries.

Unlike other major occupational groups within the manufacturing sector, the number of sales workers increased between 1980 and 1983. Employment of sales workers in manufacturing increased by over 20,000 despite a drop of 1.8 million in total manufacturing employment.<sup>2</sup>

<sup>2</sup> This increase was derived by adjusting the 1983 survey data for changes in the OES coding structure. Specifically, employment totals for "sales engineers" and "first-line supervisors—sales" were deducted from 1983 manufacturing data, as these occupations were not included in the sales group in prior surveys.

### **Clerical and administrative support workers**

Persons employed in this occupational group are concentrated in five categories: First-line supervisors—clerical; selected secretarial and general office occupations; electronic data processing and other office machine occupations; selected communication, mail, and message distributing occupations; and material recording, scheduling, dispatching, and distributing occupations. The last group is comprised of plant clerical workers who plan, coordinate, or expedite production and the flow of work. They are also involved in the clerical aspects of receiving, storing, issuing, or shipping of materials, merchandise, supplies, or equipment. The other (nonsupervisory) groups are primarily comprised of office clerical workers who prepare, systematize, transcribe, transfer, or preserve written communication and records, as well as collect accounts and distribute information.

Clerical workers ranked second among the seven major occupational groups, with 2.2 million workers, or 12 percent of total employment in the manufacturing sector in 1983. The durable goods segment employed 56 percent of the workers in this occupational group. The largest concentrations of clerical workers were found in the machinery and printing and publishing industries.

### **Service workers**

Persons in this occupational group perform services for individuals or establishments. Service workers protect individuals and property, prepare and serve food and beverages, and clean interiors and equipment of buildings, offices, stores, and vehicles, etc.

In 1983, service workers numbered over 325,000, representing almost 2 percent of total employment in the manufacturing sector. The durable goods segment employed 54 percent of the workers in this occupational group. The largest concentrations of service workers were found in the food and kindred products and transportation equipment industries.

### **Agriculture, forestry, fishing, and related workers**

Persons employed in this occupational group were concentrated in lumber and wood products (SIC 24) and, to a lesser degree, in food and kindred products (SIC 20). This category includes forestry workers such as choke setters, log handling equipment operators, nursery workers, and conservation workers. Agricultural workers include persons in occupations such as graders and sorters of agricultural products; groundskeepers and gardeners, except farm; and farm equipment operators. In 1983, fewer than 100,000 persons were employed in agriculture, forestry, fishing, and related occupations, representing about one-half of 1 percent of total employment in the manufacturing sector.

**Production, construction, operating, maintenance, and material handling occupations**

This occupational group, referred to hereafter in the text as production and related workers, includes all skilled, semiskilled, and unskilled workers performing machine and manual tasks. This was by far the largest of the seven major occupational groups, accounting for

over 12.1 million workers, or 66.3 percent of total manufacturing employment in 1983. Nearly three-fifths of the workers in this group were in durable goods industries. The largest concentrations of production and related workers were found in the electrical and electronic equipment industries and the food and kindred products industries.

**Table 1. Employment in manufacturing industries, 1983**

Industry	Employment	Percent of total manufacturing employment
Total .....	18,369,380	100.0
Durable goods industries, total .....	10,700,830	58.3
Lumber and wood products, except furniture .....	645,130	3.5
Furniture and fixtures .....	439,250	2.4
Stone, clay, glass, and concrete products .....	570,300	3.1
Primary metal products .....	827,560	4.5
Fabricated metal products .....	1,369,000	7.5
Machinery, except electrical and transportation equipment .....	2,026,830	11.0
Electrical and electronic machinery .....	2,017,110	11.0
Transportation equipment .....	1,747,670	9.5
Instruments and related products .....	688,150	3.7
Miscellaneous manufacturing industries .....	369,830	2.0
Nondurable goods industries, total .....	7,668,550	41.7
Food and kindred products .....	1,618,130	8.8
Tobacco products .....	62,060	.3
Textile mill products .....	731,690	4.0
Apparel and other textile products .....	1,141,020	6.2
Paper and allied products .....	653,480	3.6
Printing and publishing .....	1,286,710	7.0
Chemicals and allied products .....	1,053,520	5.7
Petroleum refining and related industries .....	196,960	1.1
Rubber and miscellaneous plastics products .....	719,440	3.9
Leather and leather products .....	205,540	1.1

**Table 2. Employment in manufacturing industries by major occupational group, 1983**

Industry	Managers and administrative workers	Professional, paraprofessional, and technical workers	Sales and related workers	Clerical and administrative support workers	Agriculture, forestry, fishing, and related workers	Production, construction, operating, maintenance, and material handling workers	Service workers
Total .....	1,062,330	2,012,940	540,560	2,150,890	92,300	12,184,580	325,790
Food and kindred products .....	77,720	58,200	68,300	152,320	16,100	1,192,260	53,240
Tobacco products .....	2,470	4,220	3,020	4,500	40	45,870	1,930
Textile mill products .....	25,460	19,940	7,700	58,940	430	605,450	13,780
Apparel and other textile products .....	35,430	17,410	19,100	98,130	130	957,550	13,280
Lumber and wood products, except furniture .....	30,240	13,360	12,270	42,540	66,240	469,820	10,660
Furniture and fixtures .....	19,690	11,090	12,430	39,600	120	350,090	6,230
Paper and allied products .....	31,490	41,250	20,450	63,120	2,960	484,860	9,350
Printing and publishing .....	91,520	147,490	123,570	302,560	230	602,150	19,200
Chemicals and allied products .....	86,400	202,040	38,270	153,900	2,520	546,840	23,560
Petroleum refining and related industries .....	10,770	37,420	4,810	24,770	40	117,050	2,110
Rubber and miscellaneous plastics products .....	40,800	36,000	14,620	63,640	260	553,380	10,740
Leather and leather products .....	8,130	3,820	4,680	19,780	40	166,650	2,440
Stone, clay, glass, and concrete products .....	33,880	26,740	15,110	53,680	270	433,220	7,400
Primary metal products .....	36,630	54,920	12,370	74,110	260	632,910	16,360
Fabricated metal products .....	82,190	92,580	35,840	127,560	410	1,010,290	20,130
Machinery, except electrical and transportation equipment .....	149,820	340,620	63,060	287,560	780	1,153,170	31,830
Electrical and electronic machinery .....	123,420	401,800	34,460	243,560	440	1,183,940	29,500
Transportation equipment .....	94,310	352,670	11,190	179,220	700	1,072,720	36,860
Instruments and related products .....	56,980	132,570	25,670	109,590	250	351,250	11,830
Miscellaneous manufacturing industries .....	24,970	18,830	13,660	51,810	90	255,110	5,370

**Table 3. Percent distribution of employment in manufacturing industries by major occupational group, 1983**

Industry	All occupations	Managers and administrative workers	Professional, paraprofessional, and technical workers	Sales and related workers	Clerical and administrative support workers	Agriculture, forestry, fishing, and related workers	Production, construction, operating, maintenance, and material handling workers	Service workers
Total .....	100.0	5.8	11.0	2.9	11.7	0.5	66.3	1.8
Food and kindred products .....	100.0	4.8	3.6	4.2	9.4	1.0	73.7	3.3
Tobacco products .....	100.0	4.0	6.8	4.9	7.2	.1	73.9	3.1
Textile mill products .....	100.0	3.5	2.7	1.1	8.1	.1	82.7	1.9
Apparel and other textile products .....	100.0	3.1	1.5	1.7	8.6	.0	83.9	1.2
Lumber and wood products, except furniture .....	100.0	4.7	2.1	1.9	6.6	10.3	72.8	1.7
Furniture and fixtures .....	100.0	4.5	2.5	2.8	9.0	.0	79.7	1.4
Paper and allied products .....	100.0	4.8	6.3	3.1	9.7	.5	74.2	1.4
Printing and publishing .....	100.0	7.1	11.5	9.6	23.5	.0	46.8	1.5
Chemicals and allied products .....	100.0	8.2	19.2	3.6	14.6	.2	51.9	2.2
Petroleum refining and related industries .....	100.0	5.5	19.0	2.4	12.6	.0	59.4	1.1
Rubber and miscellaneous plastics products .....	100.0	5.7	5.0	2.0	8.8	.0	76.9	1.5
Leather and leather products .....	100.0	4.0	1.9	2.3	9.6	.0	81.1	1.2
Stone, clay, glass, and concrete products .....	100.0	5.9	4.7	2.6	9.4	.0	76.0	1.3
Primary metal products .....	100.0	4.4	6.6	1.5	9.0	.0	76.5	2.0
Fabricated metal products .....	100.0	6.0	6.8	2.6	9.3	.0	73.8	1.5
Machinery, except electrical and transportation equipment .....	100.0	7.4	16.8	3.1	14.2	.0	56.9	1.6
Electrical and electronic machinery .....	100.0	6.1	19.9	1.7	12.1	.0	58.7	1.5
Transportation equipment .....	100.0	5.4	20.2	.6	10.3	.0	61.4	2.1
Instruments and related products .....	100.0	8.3	19.3	3.7	15.9	.0	51.0	1.7
Miscellaneous manufacturing industries .....	100.0	6.8	5.1	3.7	14.0	.0	69.0	1.5

# Food and Kindred Products

Establishments which manufacture or process foods, beverages, and certain related items for human consumption employed 1.6 million workers, accounting for 9 percent of manufacturing and one-fifth of nondurable goods employment in 1983. The three largest employers of these workers were: Establishments processing and packing meat, pork, poultry, and eggs, with 21 percent of industry employment; establishments manufacturing beverages, 14 percent; and establishments canning and preserving fruits and vegetables, also with 14 percent.

Total employment in the food and kindred products industry declined by 4.5 percent between 1980 and 1983. Employment since 1977 by major occupational group is given in text table 1.

As shown in table 4, the 1.2 million production and related workers in the food and kindred products industry accounted for nearly three-fourths of total industry employment. Clerical workers ranked second with 9 percent. The remaining employment was

distributed as follows: Managerial and administrative workers, 5 percent; professional, paraprofessional, and technical workers, 4 percent; sales workers, 4 percent; and service workers, 3 percent.

The five most populous occupations in food and kindred products manufacturing are listed in the tabulation below. These jobs, all of which are in the production category, made up over one-quarter of total industry employment.

	<i>Employment</i>	<i>Percent of industry employment</i>
Packaging and filling machine operators and tenders .....	120,630	7.4
Meat, poultry, and fish cutters and trimmers, hand .....	94,240	5.8
Driver/sales workers .....	76,650	4.7
Cannery workers .....	74,950	4.6
Hand packers and packagers .....	74,280	4.6

**Text table 1. Food and kindred products: Employment by major occupational group, selected years, 1977-83**

Major occupational group	1977	1980	1983	Percent change 1977-83
Total .....	1,710,910	1,695,830	1,618,130	-5.4
Managerial and administrative workers .....	108,480	107,750	177,720	-28.4
Professional, paraprofessional, and technical workers .....	41,950	57,360	58,200	38.7
Sales workers .....	62,880	66,910	68,300	8.6
Clerical workers .....	170,470	169,730	152,320	-10.6
Production and related workers .....	1,259,250	1,241,080	<sup>2</sup> 1,208,360	-4.0
Service workers .....	67,880	52,000	53,240	-21.6

<sup>1</sup> A significant portion of the decline may be due to changes in the coding structure rather than to actual changes in establishment staffing patterns. The addition of five first-line supervisor occupations to the production group suggests that respondents may have shifted some managerial employment into the production category. Additionally, employment for "first-line super-

visor—sales would previously have been included with the managerial group.  
<sup>2</sup> Includes 16,000 agriculture, forestry, fishing, and related workers who would have been classified as production and related workers in previous surveys.

**Table 4. Food and kindred products: Employment, relative error, and percent of establishments reporting selected occupations, June 1983**

(SIC 20)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Total .....	1,618,150	100.00	--	--
Managerial and administrative occupations .....	77,730	4.80	n.a.	n.a.
Financial managers .....	5,370	.33	3	17
Personnel, training, and labor relations managers .....	3,380	.21	2	14
Purchasing managers .....	2,210	.14	2	10
Marketing, advertising, and public relations managers .....	7,420	.46	3	13
Administrative services managers .....	2,400	.15	6	7
Industrial production managers .....	9,700	.60	3	19
General managers and top executives .....	37,580	2.32	1	78
All other managers and administrators .....	9,670	.60	5	11
Professional, paraprofessional, and technical occupations .....	58,200	3.60	n.a.	n.a.
Management support workers .....	21,760	1.34	n.a.	n.a.
Accountants, auditors, and other financial specialists .....	10,490	.65	n.a.	n.a.
Accountants and auditors .....	9,040	.56	2	25
Budget analysts .....	620	.04	6	2
All other financial specialists .....	830	.05	9	1
Purchasing agents and buyers, farm products .....	2,470	.15	4	7
Purchasing agents, except wholesale and retail trade, and farm products .....	2,610	.16	3	10
Personnel, training, and labor relations specialists .....	1,880	.12	4	6
Cost estimators .....	400	.02	5	2
Compliance officers and enforcement inspectors, except construction .....	730	.05	9	2
All other management support workers .....	3,180	.20	7	4
Engineers .....	7,720	.48	n.a.	n.a.
Chemical engineers .....	560	.03	11	1
Agricultural engineers .....	200	.01	14	1
Industrial engineers, except safety .....	2,060	.13	6	6
Safety engineers, except mining .....	350	.02	8	2
Mechanical engineers .....	3,300	.20	8	7
All other engineers .....	1,250	.08	8	2
Engineering and related technicians and technologists .....	2,010	.12	n.a.	n.a.
Industrial engineering technicians and technologists .....	300	.02	11	1
Mechanical engineering technicians and technologists .....	220	.01	11	1
Drafters .....	740	.05	7	3
All other engineering and related technicians and technologists .....	750	.05	11	1
Physical scientists .....	4,120	.25	n.a.	n.a.
Chemists, except biochemists .....	3,850	.24	4	8
All other physical scientists .....	270	.02	12	1
Life scientists .....	2,240	.14	n.a.	n.a.
Agricultural and food scientists .....	1,100	.07	10	2
Biological scientists .....	850	.05	8	2
All other life scientists .....	290	.02	14	( <sup>3</sup> )
Physical and life science technicians and technologists .....	10,400	.64	n.a.	n.a.
Biological, agricultural, and food technicians and technologists, except health .....	4,320	.27	6	4
Chemical technicians and technologists, except health .....	4,540	.28	4	5
All other physical and life science technicians and technologists .....	1,540	.10	10	1
Computer scientists and related workers .....	5,520	.34	n.a.	n.a.

See footnotes at end of table.

**Table 4. Food and kindred products: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued**

(SIC 20)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Systems analysts, electronic data processing .....	1,890	0.12	6	4
Computer programmers .....	2,630	.16	6	6
All other computer systems analysts, programmers, and programmer aides .....	1,000	.06	n.a.	n.a.
Health practitioners, technologists, technicians, and related health workers .....	1,080	.07	n.a.	n.a.
Public relations specialists and publicity writers .....	600	.04	11	1
All other professional, paraprofessional, and technical workers .....	2,750	.17	n.a.	n.a.
<b>Sales and related occupations .....</b>	<b>68,300</b>	<b>4.22</b>	<b>n.a.</b>	<b>n.a.</b>
First-line supervisors and manager/supervisors, sales and related workers .....	10,990	.68	3	11
Sales representatives, scientific and related products and services, except retail .....	6,580	.41	5	8
Sales representatives, except scientific and related products or services and retail .....	29,590	1.83	3	29
Salespersons, retail .....	13,340	.82	4	7
Cashiers .....	4,110	.25	6	5
All other sales and related workers .....	3,690	.23	6	4
<b>Clerical and administrative support occupations .....</b>	<b>152,310</b>	<b>9.41</b>	<b>n.a.</b>	<b>n.a.</b>
First-line supervisors and manager/supervisors, clerical and administrative support workers .....	6,170	.38	4	15
Secretaries .....	20,700	1.28	3	41
Stenographers .....	790	.05	18	1
Receptionists and information clerks .....	1,760	.11	2	9
Typists .....	2,240	.14	5	5
Typists, word processing equipment .....	860	.05	7	2
Personnel clerks, except payroll and timekeeping .....	2,120	.13	2	9
File clerks .....	790	.05	5	3
Order clerks, materials, merchandise, and service .....	5,390	.33	2	14
Procurement clerks .....	1,150	.07	3	5
Bookkeeping, accounting, and auditing clerks .....	23,740	1.47	2	51
Payroll and timekeeping clerks .....	3,760	.23	2	16
Billing, cost and rate clerks .....	5,050	.31	3	12
General office clerks .....	23,880	1.48	2	45
Electronic data processing and other office machine operators .....	8,840	.55	n.a.	n.a.
Billing, posting, and calculating machine operators .....	1,370	.08	6	3
Computer operators, except peripheral equipment .....	2,430	.15	3	8
Data entry keyers, except composing .....	4,620	.29	3	10
All other office machine operators .....	420	.03	9	1
Switchboard operators .....	1,930	.12	2	11
Material recording, scheduling, dispatching, and distributing workers .....	40,940	2.53	n.a.	n.a.
Production, planning, and expediting clerks .....	3,360	.21	3	8
Weighers, measurers, checkers, and samplers, recordkeeping .....	5,780	.36	3	11
Stock clerks, stockroom, warehouse or storage yard .....	8,750	.54	3	17
Traffic, shipping, and receiving clerks .....	21,210	1.31	2	36
All other material recording, scheduling, and distributing workers .....	1,840	.11	7	2
All other clerical and administrative support workers .....	2,200	.14	7	3
<b>Service occupations .....</b>	<b>53,250</b>	<b>3.29</b>	<b>n.a.</b>	<b>n.a.</b>

See footnotes at end of table.

**Table 4. Food and kindred products: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued**

(SIC 20)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
First-line supervisors and manager/supervisors, service .....	3,610	0.22	4	7
Guards and watch guards .....	4,770	.29	3	7
Food and beverage preparation and service workers .....	4,150	.26	9	3
Cleaning and building service workers, except private households .....	39,180	2.42	n.a.	n.a.
Janitors and cleaners, except maids and housekeeping cleaners .....	36,490	2.26	1	41
Elevator operators .....	240	.01	11	( <sup>9</sup> )
All other cleaning and building service workers, except private households .....	2,450	.15	9	3
All other service workers .....	1,540	.10	11	1
Agriculture, forestry, fishing, and related occupations .....	16,100	.99	n.a.	n.a.
First-line supervisors-agricultural, forestry, fishing, and related workers .....	1,380	.09	7	2
Graders and sorters, agricultural products .....	7,190	.44	6	5
Gardeners and groundskeepers, except farm .....	730	.05	8	2
Farm equipment operators .....	2,780	.17	8	2
All other agriculture, forestry, fishing, and related workers .....	4,020	.25	10	1
Production, construction, operating, maintenance, and material handling occupations .....	1,192,260	73.68	n.a.	n.a.
First-line supervisors, manager/supervisors - production, construction, maintenance, and related workers .....	65,960	4.08	n.a.	n.a.
First-line supervisors and manager/supervisors - mechanics, installers and repairers .....	6,860	.42	3	13
First-line supervisors and manager/supervisors - construction trades and extractive workers .....	690	.04	12	1
First-line supervisors and manager/supervisors - production and operating workers .....	48,990	3.03	1	58
First-line supervisors and manager/superv-transp and material moving machine and vehicle workers .....	4,470	.28	3	10
First-line supervisors and manager/supervisors - helpers, laborers, and material movers, hand .....	4,950	.31	4	6
Precision inspectors, testers, and graders .....	1,610	.10	8	2
Production inspectors, testers, graders, sorters, samplers, and weighers .....	18,260	1.13	4	17
Mechanics, installers, and repairers .....	97,640	6.03	n.a.	n.a.
Machinery maintenance mechanics .....	32,370	2.00	2	27
Millwrights .....	2,210	.14	8	2
Machinery maintenance workers .....	4,610	.28	4	6
Maintenance repairers, general utility .....	35,880	2.22	2	39
Automotive mechanics .....	5,360	.33	3	11
Bus and truck mechanics and diesel engine specialists .....	5,270	.33	3	8
Farm equipment mechanics .....	960	.06	13	1
Heating, air conditioning, and refrigeration mechanics and installers .....	1,940	.12	4	4
Precision instrument repairers .....	950	.06	8	1
Mechanical control and valve installers and repairers .....	300	.02	13	( <sup>9</sup> )
Coin and vending machine servicers and repairers .....	5,760	.36	3	7
All other mechanics, installers, and repairers .....	2,030	.13	8	2
Construction trades workers, except material moving .....	11,390	.70	n.a.	n.a.

See footnotes at end of table.

**Table 4. Food and kindred products: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued**

(SIC 20)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Carpenters .....	1,180	0.07	5	3
Electricians .....	5,770	.36	4	8
Painters and paperhangers, construction and maintenance .....	1,320	.08	6	4
Plumbers, pipefitters, and steamfitters .....	1,840	.11	8	2
All other construction trades workers .....	1,280	.08	19	1
Precision metal workers .....	5,180	.32	n.a.	n.a.
Machinists .....	3,660	-.23	8	4
Sheet-metal workers .....	880	.05	9	1
Boilermakers .....	470	.03	9	1
All other precision metal workers .....	170	.01	19	( <sup>3</sup> )
Precision food workers .....	109,850	6.79	n.a.	n.a.
Slaughterers and butchers .....	56,390	3.48	2	8
Bakers, manufacturing .....	27,780	1.72	3	9
Food batchmakers .....	19,050	1.18	3	14
All other precision food and tobacco workers .....	6,630	.41	9	2
Precision workers, nec .....	500	.03	26	( <sup>3</sup> )
Machine setters, set-up operators, and tenders, except metal and plastic .....	250,130	15.46	n.a.	n.a.
Cooking machine operators and tenders, food and tobacco .....	13,370	.83	3	14
Roasting, baking, and drying machine operators and tenders, food and tobacco .....	11,830	.73	4	9
Boiler operators and tenders, low pressure .....	2,350	.15	4	4
Cooling and freezing equipment operators and tenders .....	5,330	.33	5	5
Dairy processing equipment operators, including setters .....	16,700	1.03	3	8
Cutting and slicing machine setters and set-up operators .....	920	.06	11	1
Cutting and slicing machine operators and tenders .....	8,980	.55	4	8
Coating, painting, and spraying machine operators and tenders .....	930	.06	11	1
Cleaning, washing, and pickling equipment operators and tenders .....	3,410	.21	5	3
Separating, filtering, clarifying, precipitating, and still machine operators and tenders .....	10,630	.66	4	8
Crushing, grinding, mixing, and blending machine operators and tenders .....	27,090	1.67	2	25
Extruding, forming, pressing, and compacting machine setters and set-up operators .....	2,960	.18	14	1
Extruding, forming, pressing, and compacting machine operators and tenders .....	9,300	.57	4	9
Packaging and filling machine operators and tenders .....	120,630	7.45	2	42
All other machine setters and set-up operators, except metal and plastic .....	3,840	.24	n.a.	n.a.
All other machine operators and tenders, except metal and plastic .....	11,860	.73	9	4
Other hand workers, nec .....	188,360	11.64	n.a.	n.a.
Cannery workers .....	74,950	4.63	2	9
Meat, poultry, and fish cutters and trimmers, hand .....	94,240	5.82	1	10
Molders and casters, hand .....	1,160	.07	15	1
All other hand workers, nec .....	18,010	1.11	7	3
Plant and system workers .....	3,710	.23	n.a.	n.a.
Stationary engineers .....	2,110	.13	5	3
All other plant and system operators .....	1,600	.10	10	2
Motor vehicle operators .....	145,390	8.98	n.a.	n.a.
Truck drivers, heavy or tractor trailer .....	43,820	2.71	2	36

See footnotes at end of table.

**Table 4. Food and kindred products: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued**

(SIC 20)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Truck drivers, light, include delivery and route workers .....	24,080	1.49	3	23
Driver/sales workers .....	76,650	4.74	2	24
All other motor vehicle operators .....	840	.05	8	1
All other transportation and motor vehicle operators .....	1,170	.07	9	1
Material moving equipment operators .....	46,370	2.87	n.a.	n.a.
Hoist and winch operators .....	310	.02	11	1
Industrial truck and tractor operators .....	37,390	2.31	2	28
Conveyor operators and tenders .....	4,440	.27	6	3
Pump operators .....	1,390	.09	10	1
All other material moving equipment operators .....	2,840	.18	8	2
Helpers - mechanics and repairers .....	3,000	.19	5	4
Construction trades and extractive worker helpers .....	660	.04	14	1
Machine feeders and offbearers .....	18,010	1.11	4	10
Freight, stock, and material movers, hand .....	34,500	2.13	2	22
Hand packers and packagers .....	74,280	4.59	2	23
Vehicle washers and equipment cleaners .....	12,420	.77	3	11
All other helpers, laborers, and material movers, hand .....	103,870	6.42	2	18

<sup>1</sup> Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

<sup>2</sup> Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors

are estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

<sup>3</sup> Less than 0.5 percent.

n.a. = not available.

NOTE: Detail may not add to totals due to rounding. Estimated employment is rounded to the nearest 10.

# Tobacco Products

The manufacture of tobacco products employed 62,060 workers in 1983, or only 0.3 percent of manufacturing and 1 percent of nondurable goods employment. Most workers were employed within establishments manufacturing cigarettes, which accounted for 76 percent of industry employment. Establishments primarily engaged in the stemming and redrying of tobacco accounted for 9 percent of industry employment.

While total employment levels remained constant for the tobacco products industry between 1980 and 1983, clerical and managerial and administrative jobs declined by close to 35 percent. Conversely, professional, paraprofessional, and technical jobs increased by 17 percent. Shifts in employment since 1977 can be seen in text table 2.

The industry's 45,870 production and related workers accounted for 74 percent of total industry employment (table 5). Clerical workers ranked second with over 7 percent. The remaining employment was distributed as follows: Professional, paraprofessional, and technical

workers, 7 percent; sales workers, 5 percent; managerial and administrative workers, 4 percent; and service workers, 3 percent.

The five most populous occupations in manufacturing tobacco products are listed below. These production occupations made up more than one-fourth of total industry employment.

	<i>Employment</i>	<i>Percent of industry employment</i>
Packaging and filling machine operators and tenders . . . . .	6,680	10.8
Machinery maintenance mechanics . . . . .	3,780	6.1
First-line supervisors, production . . . . .	2,730	4.4
Production inspectors, testers, graders, sorters, samplers, and weighers . . . . .	2,510	4.0
Industrial truck and tractor operators . . . . .	1,590	2.6

**Text table 2. Tobacco products: Employment by major occupational group, selected years, 1977-83**

Major occupational group	1977	1980	1983	Percent change 1977-83
Total . . . . .	70,940	63,600	62,060	-12.5
Managerial and administrative workers . . . . .	3,360	3,780	2,470	-26.5
Professional, paraprofessional, and technical workers . . . . .	4,680	3,600	4,220	-9.8
Sales workers . . . . .	490	760	3,020	516.3
Clerical workers . . . . .	6,550	6,960	4,500	-31.3
Production and related workers . . . . .	52,450	46,270	45,870	-12.5
Service workers . . . . .	3,410	2,230	1,930	-43.4

<sup>1</sup> A significant portion of the decline may be due to changes in the coding structure rather than to actual changes in establishment staffing patterns. See

footnote 1 to text table 1.

**Table 5. Tobacco products: Employment, relative error, and percent of establishments reporting selected occupations, June 1983**

(SIC 21)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Total .....	62,060	100.00	--	--
Managerial and administrative occupations .....	2,470	3.98	n.a.	n.a.
Financial managers .....	150	.24	6	19
Personnel, training, and labor relations managers .....	90	.15	9	17
Purchasing managers .....	80	.13	14	11
Administrative services managers .....	50	.08	11	8
Industrial production managers .....	430	.69	8	22
General managers and top executives .....	650	1.05	5	80
All other managers and administrators .....	1,020	1.64	n.a.	n.a.
Professional, paraprofessional, and technical occupations .....	4,230	6.82	n.a.	n.a.
Management support workers .....	1,470	2.37	n.a.	n.a.
Accountants, auditors, and other financial specialists .....	390	.63	n.a.	n.a.
Accountants and auditors .....	270	.44	12	26
All other financial specialists .....	120	.19	n.a.	n.a.
Purchasing agents and buyers, farm products .....	510	.82	11	24
Purchasing agents, except wholesale and retail trade, and farm products .....	110	.18	8	14
Personnel, training, and labor relations specialists .....	240	.39	20	15
All other management support workers .....	220	.35	n.a.	n.a.
Engineers .....	780	1.26	n.a.	n.a.
Industrial engineers, except safety .....	80	.13	11	12
Mechanical engineers .....	240	.39	16	12
All other engineers .....	460	.74	n.a.	n.a.
Engineering and related technicians and technologists .....	370	.60	n.a.	n.a.
Drafters .....	80	.13	13	9
All other engineering and related technicians and technologists .....	290	.47	n.a.	n.a.
Physical scientists .....	240	.39	n.a.	n.a.
Physical and life science technicians and technologists .....	550	.89	n.a.	n.a.
Computer scientists and related workers .....	360	.58	n.a.	n.a.
Health practitioners, technologists, technicians, and related health workers .....	110	.18	12	16
All other professional, paraprofessional, and technical workers .....	350	.56	n.a.	n.a.
Sales and related occupations .....	3,020	4.87	n.a.	n.a.
Sales representatives, except scientific and related products or services and retail .....	310	.50	13	16
All other sales and related workers .....	2,710	4.37	n.a.	n.a.
Clerical and administrative support occupations .....	4,510	7.27	n.a.	n.a.
First-line supervisors and manager/supervisors, clerical and administrative support workers .....	360	.58	19	27
Secretaries .....	880	1.42	15	54
Typists .....	120	.19	11	16
Personnel clerks, except payroll and timekeeping .....	90	.15	14	13
Order clerks, materials, merchandise, and service .....	130	.21	8	13
Procurement clerks .....	70	.11	11	8
Bookkeeping, accounting, and auditing clerks .....	420	.68	8	44
Payroll and timekeeping clerks .....	210	.34	10	32
Billing, cost and rate clerks .....	80	.13	15	11
General office clerks .....	850	1.37	18	44

See footnotes at end of table.

**Table 5. Tobacco products: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued**

(SIC 21)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Electronic data processing and other office machine operators .....	270	0.44	n.a.	n.a.
Computer operators, except peripheral equipment .....	90	.15	10	13
Data entry keyers, except composing .....	120	.19	11	16
All other office machine operators .....	60	.10	n.a.	n.a.
Material recording, scheduling, dispatching, and distributing workers .....	610	.98	n.a.	n.a.
Production, planning, and expediting clerks .....	100	.16	12	12
Stock clerks, stockroom, warehouse or storage yard .....	240	.39	8	29
Traffic, shipping, and receiving clerks .....	190	.31	7	31
All other material recording, scheduling, and distributing workers .....	80	.13	n.a.	n.a.
All other clerical and administrative support workers .....	420	.68	n.a.	n.a.
Service occupations .....	1,930	3.11	n.a.	n.a.
First-line supervisors and manager/supervisors, service .....	90	.15	12	11
Guards and watch guards .....	460	.74	5	24
Cleaning and building service workers, except private households .....	1,280	2.06	n.a.	n.a.
Janitors and cleaners, except maids and housekeeping cleaners .....	1,180	1.90	9	39
All other cleaning and building service workers, except private households .....	100	.16	n.a.	n.a.
All other service workers .....	100	.16	n.a.	n.a.
Agriculture, forestry, fishing, and related occupations .....	40	.06	n.a.	n.a.
Production, construction, operating, maintenance, and material handling occupations .....	45,860	73.90	n.a.	n.a.
First-line supervisors, manager/supervisors - production, construction, maintenance, and related workers .....	3,500	5.64	n.a.	n.a.
First-line supervisors and manager/supervisors - mechanics, installers and repairers .....	620	1.00	11	25
First-line supervisors and manager/supervisors - production and operating workers .....	2,730	4.40	11	51
First-line supervisors and manager/superv-transp and material moving machine and vehicle workers .....	60	.10	19	7
First-line supervisors and manager/supervisors - helpers, laborers, and material movers, hand .....	90	.15	18	8
Precision inspectors, testers, and graders .....	740	1.19	8	6
Production inspectors, testers, graders, sorters, samplers, and weighers .....	2,510	4.04	13	26
Mechanics, installers, and repairers .....	6,060	9.76	n.a.	n.a.
Machinery maintenance mechanics .....	3,780	6.09	13	36
Millwrights .....	280	.45	9	7
Machinery maintenance workers .....	1,000	1.61	15	16
Maintenance repairers, general utility .....	440	.71	8	37
Automotive mechanics .....	50	.08	9	10
Heating, air conditioning, and refrigeration mechanics and installers .....	80	.13	12	6
Precision instrument repairers .....	230	.37	14	6
All other mechanics, installers, and repairers .....	200	.32	n.a.	n.a.
Construction trades workers, except material moving .....	950	1.53	n.a.	n.a.

See footnotes at end of table.

**Table 5. Tobacco products: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued**

(SIC 21)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Carpenters .....	100	0.16	11	8
Electricians .....	540	.87	9	23
Plumbers, pipefitters, and steamfitters .....	250	.40	5	11
All other construction trades workers .....	60	.10	n.a.	n.a.
Precision metal workers .....	960	1.55	n.a.	n.a.
Machinists .....	660	1.06	7	16
Sheet-metal workers .....	190	.31	5	9
All other precision metal workers .....	110	.18	n.a.	n.a.
Precision food workers .....	630	1.02	n.a.	n.a.
Machine setters, set-up operators, and tenders, except metal and plastic .....	16,400	26.43	n.a.	n.a.
Cooking machine operators and tenders, food and tobacco .....	70	.11	19	6
Roasting, baking, and drying machine operators and tenders, food and tobacco .....	250	.40	17	19
Boiler operators and tenders, low pressure .....	150	.24	11	15
Cutting and slicing machine operators and tenders .....	340	.55	12	24
Separating, filtering, clarifying, precipitating, and still machine operators and tenders .....	110	.18	21	7
Crushing, grinding, mixing, and blending machine operators and tenders .....	330	.53	16	21
Packaging and filling machine operators and tenders .....	6,680	10.76	10	33
All other machine setters and set-up operators, except metal and plastic .....	40	.06	n.a.	n.a.
All other machine operators and tenders, except metal and plastic .....	8,430	13.58	n.a.	n.a.
Other hand workers, nec .....	280	.45	19	14
Motor vehicle operators .....	210	.34	n.a.	n.a.
Truck drivers, heavy or tractor trailer .....	210	.34	12	21
All other transportation and motor vehicle operators .....	190	.31	n.a.	n.a.
Material moving equipment operators .....	1,650	2.66	n.a.	n.a.
Industrial truck and tractor operators .....	1,590	2.56	14	34
Conveyor operators and tenders .....	60	.10	22	4
Helpers - mechanics and repairers .....	140	.23	17	7
Machine feeders and offbearers .....	430	.69	13	15
Freight, stock, and material movers, hand .....	1,500	2.42	13	22
Hand packers and packagers .....	320	.52	13	21
All other helpers, laborers, and material movers, hand .....	9,260	14.92	n.a.	n.a.
All other production, construction, operating, maintenance, and material handling occupations .....	130	.21	n.a.	n.a.

<sup>1</sup> Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

<sup>2</sup> Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors

are estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

n.a. = not available.

NOTE: Detail may not add to totals due to rounding. Estimated employment is rounded to the nearest 10.

# Textile Mill Products

Establishments in this industry perform any of the following operations: (1) Preparing fiber and subsequently manufacturing yarn, thread, braid, twine, and cordage; (2) manufacturing broad woven fabric, narrow woven fabric, knit fabric, and carpets and rugs from yarn; (3) dyeing and finishing fiber, yarn, fabric, and knit apparel; (4) coating, waterproofing, or otherwise treating fabric; (5) the integrated manufacturing of knit apparel and other finished articles from yarn; and (6) the manufacturing of felt goods, lace goods, nonwoven fabrics, and miscellaneous textiles. These establishments employed 731,690 workers, accounting for 4 percent of manufacturing and 10 percent of nondurable goods employment in 1983. The three largest employers of these workers were: Knitting mills, with 27 percent of industry employment; cotton broad woven fabric mills, 17 percent; and yarn and thread mills, with 15 percent.

Total employment in the textile industry fell by almost 140,000, or 16 percent, between 1980 and 1983. Employment of service workers fell 28 percent, clerical workers 23 percent, and production workers, 15 percent. Even the more highly skilled occupational groups were not exempt from labor force reductions; employment of managerial and administrative workers declined 20 percent, and the number of professional and technical employees declined by 11 percent. As in other manufacturing industries, the number of sales workers

increased despite the overall employment decline. Changes since 1977 are summarized in text table 3.

As shown in table 6, the 605,450 production and related workers in the textile mill products industry accounted for more than four-fifths of total industry employment. Clerical workers made up 8 percent. The remaining employment was distributed as follows: Managerial and administrative workers, 3.5 percent; professional, paraprofessional, and technical workers, 3 percent; service workers, 2 percent; and sales workers, 1 percent.

The five most populous occupations in the manufacturing of textile mill products are listed in the tabulation below:

	<i>Employment</i>	<i>Percent of industry employment</i>
Textile machine operators and tenders, winding, twisting, weaving, knitting, etc. ....	191,100	26.1
Sewing machine operators, garment .....	51,730	7.1
Textile machine setters and setup operators .....	44,120	6.0
Production inspectors, testers, graders, sorters, samplers, and weighers .....	31,470	4.3
First-line supervisors, production .....	25,880	3.5

**Text table 3. Textile mill products: Employment by major occupational group, selected years, 1977-83**

Major occupational group	1977	1980	1983	Percent change 1977-83
Total .....	913,700	870,780	731,690	-19.9
Managerial and administrative workers .....	28,340	31,980	25,460	-10.2
Professional, paraprofessional, and technical workers .....	22,680	22,460	19,940	-12.1
Sales workers .....	7,550	7,040	7,700	2.0
Clerical workers .....	73,380	76,780	58,940	-19.7
Production and related workers .....	764,090	713,410	605,450	-20.8
Service workers .....	17,660	19,110	13,780	-22.0

<sup>1</sup> Includes 1,270 employees in the occupation "first-line supervisor—sales" which would have been included with managerial employment

in previous surveys.

**Table 6. Textile mill products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983**

(SIC 22)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Total .....	731,600	100.00	--	--
Managerial and administrative occupations .....	25,450	3.48	n.a.	n.a.
Financial managers .....	1,560	.21	5	18
Personnel, training, and labor relations managers .....	1,530	.21	4	22
Purchasing managers .....	620	.08	4	11
Marketing, advertising, and public relations managers .....	1,110	.15	8	10
Administrative services managers .....	770	.11	11	9
Industrial production managers .....	4,610	.63	4	25
General managers and top executives .....	12,180	1.66	2	83
All other managers and administrators .....	3,070	.42	5	15
Professional, paraprofessional, and technical occupations .....	19,930	2.72	n.a.	n.a.
Management support workers .....	5,670	.78	n.a.	n.a.
Accountants, auditors, and other financial specialists .....	2,590	.35	n.a.	n.a.
Accountants and auditors .....	2,180	.30	5	23
Budget analysts .....	180	.02	12	2
All other financial specialists .....	230	.03	13	2
Purchasing agents, except wholesale and retail trade, and farm products .....	730	.10	5	11
Personnel, training, and labor relations specialists .....	840	.11	5	11
Cost estimators .....	460	.06	15	5
All other management support workers .....	1,050	.14	9	4
Engineers .....	3,740	.51	n.a.	n.a.
Chemical engineers .....	350	.05	12	3
Industrial engineers, except safety .....	2,090	.29	5	18
Safety engineers, except mining .....	140	.02	8	3
Mechanical engineers .....	890	.12	6	10
All other engineers .....	270	.04	13	2
Engineering and related technicians and technologists .....	2,060	.28	n.a.	n.a.
Industrial engineering technicians and technologists .....	1,300	.18	5	11
Mechanical engineering technicians and technologists .....	210	.03	16	2
Drafters .....	180	.02	8	3
All other engineering and related technicians and technologists .....	370	.05	13	2
Physical scientists .....	760	.10	n.a.	n.a.
Physical and life science technicians and technologists .....	2,760	.38	n.a.	n.a.
Chemical technicians and technologists, except health .....	2,480	.34	6	10
All other physical and life science technicians and technologists .....	280	.04	32	1
Computer scientists and related workers .....	2,240	.31	n.a.	n.a.
Systems analysts, electronic data processing .....	880	.12	11	6
Computer programmers .....	970	.13	8	8
All other computer systems analysts, programmers, and programmer aides .....	390	.05	n.a.	n.a.
Teachers and instructors, vocational education and training .....	490	.07	9	3
Health practitioners, technologists, technicians, and related health workers .....	640	.09	4	10
Designers, except interior designers .....	750	.10	10	6
All other professional, paraprofessional, and technical workers .....	820	.11	n.a.	n.a.
Sales and related occupations .....	7,700	1.05	n.a.	n.a.

See footnotes at end of table.

**Table 6. Textile mill products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued**

(SIC 22)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
First-line supervisors and manager/supervisors, sales and related workers .....	1,270	0.17	9	6
Sales representatives, scientific and related products and services, except retail .....	1,230	.17	13	6
Sales representatives, except scientific and related products or services and retail .....	4,480	.61	9	21
All other sales and related workers .....	720	.10	n.a.	n.a.
<b>Clerical and administrative support occupations .....</b>	<b>58,950</b>	<b>8.06</b>	<b>n.a.</b>	<b>n.a.</b>
First-line supervisors and manager/supervisors, clerical and administrative support workers .....	2,920	.40	6	18
Secretaries .....	6,860	.94	3	54
Stenographers .....	230	.03	15	2
Receptionists and information clerks .....	720	.10	5	13
Typists .....	910	.12	8	7
Typists, word processing equipment .....	200	.03	17	2
Personnel clerks, except payroll and timekeeping .....	1,110	.15	4	17
File clerks .....	410	.06	10	4
Order clerks, materials, merchandise, and service .....	2,230	.30	8	12
Procurement clerks .....	560	.08	6	8
Statistical clerks .....	400	.05	11	3
Bookkeeping, accounting, and auditing clerks .....	4,390	.60	4	46
Payroll and timekeeping clerks .....	2,140	.29	4	24
Billing, cost and rate clerks .....	1,720	.24	6	14
General office clerks .....	8,230	1.12	4	46
<b>Electronic data processing and other office machine operators .....</b>	<b>3,690</b>	<b>.50</b>	<b>n.a.</b>	<b>n.a.</b>
Billing, posting, and calculating machine operators .....	570	.08	13	4
Computer operators, except peripheral equipment .....	1,050	.14	7	10
Peripheral EDP equipment operators .....	90	.01	19	1
Data entry keyers, except composing .....	1,820	.25	5	12
All other office machine operators .....	160	.02	25	1
Switchboard operators .....	790	.11	3	15
<b>Material recording, scheduling, dispatching, and distributing workers .....</b>	<b>19,900</b>	<b>2.72</b>	<b>n.a.</b>	<b>n.a.</b>
Production, planning, and expediting clerks .....	3,770	.52	5	21
Weighers, measurers, checkers, and samplers, recordkeeping .....	1,850	.25	7	9
Marking clerks .....	390	.05	17	2
Stock clerks, stockroom, warehouse or storage yard .....	4,140	.57	4	32
Traffic, shipping, and receiving clerks .....	8,490	1.16	3	55
All other material recording, scheduling, and distributing workers .....	1,260	.17	16	5
<b>All other clerical and administrative support workers .....</b>	<b>1,540</b>	<b>.21</b>	<b>12</b>	<b>5</b>
<b>Service occupations .....</b>	<b>13,790</b>	<b>1.88</b>	<b>n.a.</b>	<b>n.a.</b>
First-line supervisors and manager/supervisors, service .....	960	.13	11	5
Guards and watch guards .....	2,420	.33	4	14
Food and beverage preparation and service workers .....	150	.02	16	1
Cleaning and building service workers, except private households .....	8,930	1.22	n.a.	n.a.
Janitors and cleaners, except maids and housekeeping cleaners .....	6,990	.96	3	43
Elevator operators .....	320	.04	14	2
All other cleaning and building service workers, except private households .....	1,620	.22	15	4
All other service workers .....	1,330	.18	16	2

See footnotes at end of table.

**Table 6. Textile mill products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued**

(SIC 22)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Agriculture, forestry, fishing, and related occupations .....	400	0.05	n.a.	n.a.
Gardeners and groundskeepers, except farm .....	400	.05	7	5
Production, construction, operating, maintenance, and material handling occupations .....	605,380	82.75	n.a.	n.a.
First-line supervisors, manager/supervisors - production, construction, maintenance, and related workers .....	29,870	4.08	n.a.	n.a.
First-line supervisors and manager/supervisors - mechanics, installers and repairers .....	1,720	.24	7	14
First-line supervisors and manager/supervisors - construction trades and extractive workers .....	520	.07	23	1
First-line supervisors and manager/supervisors - production and operating workers .....	25,880	3.54	3	64
First-line supervisors and manager/superv-transp and material moving machine and vehicle workers .....	710	.10	18	5
First-line supervisors and manager/supervisors - helpers, laborers, and material movers, hand .....	1,040	.14	10	6
Precision inspectors, testers, and graders .....	2,540	.35	9	7
Production inspectors, testers, graders, sorters, samplers, and weighers .....	31,470	4.30	3	44
Mechanics, installers, and repairers .....	45,780	6.26	n.a.	n.a.
Machinery maintenance mechanics .....	28,330	3.87	n.a.	n.a.
Machinery maintenance mechanics, textile machines .....	24,520	3.35	3	43
Machinery maintenance mechanics, sewing machines .....	1,970	.27	7	12
Machinery maintenance mechanics, water or power generation plant .....	320	.04	13	2
All other machinery maintenance mechanics .....	1,520	.21	10	5
Millwrights .....	1,100	.15	9	4
Machinery maintenance workers .....	2,420	.33	7	10
Maintenance repairers, general utility .....	8,050	1.10	4	35
Automotive mechanics .....	160	.02	11	2
Bus and truck mechanics and diesel engine specialists .....	150	.02	11	2
Heating, air conditioning, and refrigeration mechanics and installers .....	1,140	.16	5	9
Menders - garments, linens, and related .....	3,680	.50	11	5
All other mechanics, installers, and repairers .....	750	.10	24	2
Construction trades workers, except material moving .....	5,670	.78	n.a.	n.a.
Carpenters .....	1,030	.14	8	11
Electricians .....	3,530	.48	3	22
Painters and paperhangers, construction and maintenance .....	380	.05	7	5
Plumbers, pipefitters, and steamfitters .....	530	.07	6	6
All other construction trades workers .....	200	.03	14	2
Precision metal workers .....	1,750	.24	n.a.	n.a.
Machinists .....	1,420	.19	5	10
Tool grinders, filers, sharpeners, and other precision grinders .....	210	.03	19	1
All other precision metal workers .....	120	.02	46	1
Precision textile, apparel, and furnishings workers .....	6,830	.93	n.a.	n.a.
Fabric and apparel patternmakers, and layout workers .....	820	.11	18	5
Custom tailors and sewers .....	160	.02	43	1

See footnotes at end of table.

**Table 6. Textile mill products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued**

(SIC 22)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Pressers, delicate fabrics .....	250	0.03	38	( <sup>3</sup> )
Precision dyers .....	1,770	.24	12	5
All other precision textile, apparel, and furnishings workers .....	3,830	.52	n.a.	n.a.
Precision workers, nec .....	280	.04	n.a.	n.a.
Precision detail design decorators, and painters .....	190	.03	22	1
All other precision workers, nec .....	90	.01	43	( <sup>3</sup> )
Machine setters, set-up operators, and tenders, metal and plastic .....	480	.07	n.a.	n.a.
Machine setters, set-up operators, and tenders, except metal and plastic .....	366,790	50.14	n.a.	n.a.
Specialty materials printing machine setters and set-up operators .....	1,000	.14	16	2
Screen printing machine setters and set-up operators .....	2,290	.31	9	5
All other printing related setters and set-up operators .....	680	.09	21	1
Printing press machine operators and tenders .....	1,340	.18	12	4
All other printing, binding, and related machine operators and tenders .....	760	.10	16	1
Textile machine setters and set-up operators .....	44,120	6.03	4	39
Textile machine operators and tenders - winding, twisting, knitting, weaving, and cutting .....	191,100	26.12	1	61
Extruding and forming machine operators and tenders, synthetic or glass fibers .....	3,460	.47	11	3
Textile draw-out machine operators and tenders .....	13,860	1.89	7	12
Textile bleaching and dyeing machine operators and tenders .....	21,260	2.91	5	22
Sewing machine operators, garment .....	51,730	7.07	3	19
Sewing machine operators, nongarment .....	8,430	1.15	9	13
Laundry and drycleaning machine operators and tenders, except pressing .....	500	.07	15	2
Pressing machine operators and tenders, textile, garment, and related materials .....	2,920	.40	13	6
Furnace, kiln, oven, drier, or kettle operators and tenders .....	1,420	.19	16	3
Boiler operators and tenders, low pressure .....	1,160	.16	6	7
Cutting and slicing machine setters and set-up operators .....	1,040	.14	11	5
Cutting and slicing machine operators and tenders .....	2,050	.28	12	5
Coating, painting, and spraying machine setters and set-up operators .....	740	.10	19	1
Coating, painting, and spraying machine operators and tenders .....	1,230	.17	12	2
Cementing and gluing machine operators and tenders .....	160	.02	22	1
Cleaning, washing, and pickling equipment operators and tenders .....	310	.04	19	1
Crushing, grinding, mixing, and blending machine operators and tenders .....	1,820	.25	8	6
Extruding, forming, pressing, and compacting machine setters and set-up operators .....	120	.02	20	( <sup>3</sup> )
Packaging and filling machine operators and tenders .....	3,510	.48	10	9
All other machine setters and set-up operators, except metal and plastic .....	820	.11	19	1
All other machine operators and tenders, except metal and plastic .....	8,960	1.22	n.a.	n.a.
Other hand workers, nec .....	16,970	2.32	n.a.	n.a.
Pressers, hand .....	1,100	.15	20	3

See footnotes at end of table.

**Table 6. Textile mill products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued**

(SIC 22)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Sewers, hand .....	2,180	0.30	17	5
Cutters and trimmers, hand .....	1,770	.24	13	5
Portable machine cutters .....	2,000	.27	10	9
Carpet cutters, diagrammers, and seamers .....	610	.08	22	1
Assemblers and fabricators, except machine, electrical, electronic, and precision .....	1,590	.22	18	2
All other hand workers, nec .....	7,720	1.06	n.a.	n.a.
Plant and system workers .....	1,560	.21	n.a.	n.a.
Water and liquid waste treatment plant and system operators .....	350	.05	15	3
Stationary engineers .....	170	.02	12	1
All other plant and system operators .....	1,040	.14	30	1
Motor vehicle operators .....	2,790	.38	n.a.	n.a.
Truck drivers, heavy or tractor trailer .....	1,960	.27	8	10
Truck drivers, light, include delivery and route workers .....	720	.10	6	10
All other motor vehicle operators .....	110	.02	14	1
All other transportation and motor vehicle operators .....	80	.01	17	1
Material moving equipment operators .....	10,530	1.44	n.a.	n.a.
Industrial truck and tractor operators .....	9,530	1.30	4	26
Conveyor operators and tenders .....	510	.07	15	2
All other material moving equipment operators .....	490	.07	17	1
Helpers - mechanics and repairers .....	2,110	.29	12	5
Construction trades and extractive worker helpers .....	230	.03	15	1
Machine feeders and offbearers .....	16,640	2.27	5	18
Freight, stock, and material movers, hand .....	15,730	2.15	4	28
Hand packers and packagers .....	13,800	1.89	7	27
All other helpers, laborers, and material movers, hand .....	33,480	4.58	5	22

<sup>1</sup> Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

<sup>2</sup> Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors

are estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

<sup>3</sup> Less than 0.5 percent.

n.a. = not available.

NOTE: Detail may not add to totals due to rounding. Estimated employment is rounded to the nearest 10.

# Apparel and Other Textile Products

Establishments which manufacture apparel and textile house furnishings employed over 1.1 million workers, or 6 percent of manufacturing and 15 percent of nondurable goods employment in 1983. One-third of the industry's employees produced women's, misses', and juniors' outerwear; 28 percent produced men's and boys' furnishings, work clothing, and allied garments; and 15 percent manufactured miscellaneous fabricated textile products.

As shown in table 7, approximately 960,000 production and related workers were employed in the manufacture of apparel and other textile products, accounting for 84 percent of total industry employment. Clerical workers ranked second with 9 percent. Managerial and administrative workers accounted for 3 percent; professional, paraprofessional, and technical workers, 2 percent; sales workers, 2 percent; and service workers, 1 percent of total industry employment. Text table 4

shows the employment change by major group between 1977 and 1983.

The five most populous occupations in the industry are listed below. These production occupations accounted for more than half of total industry employment.

	<i>Employment</i>	<i>Percent of industry employment</i>
Sewing machine operators, garment .....	568,500	49.8
Sewing machine operators, nongarment .....	56,990	5.0
Production inspectors, testers, graders, sorters, samplers, and weighers .....	36,690	3.2
First-line supervisors, production .....	30,800	2.7
Pressing machine operators and tenders—textile, garment, etc. ....	30,560	2.7

**Text table 4. Apparel and other textile products: Employment by major occupational group, selected years, 1977-83**

Major occupational group	1977	1980	1983	Percent change 1977-83
Total .....	1,318,700	1,271,360	1,141,100	-13.5
Managerial and administrative workers .....	45,010	45,820	35,430	-21.3
Professional, paraprofessional, and technical workers .....	15,530	17,750	17,400	12.0
Sales workers .....	18,570	18,420	19,100	2.9
Clerical workers .....	116,890	116,190	98,130	-16.0
Production and related workers .....	1,105,630	1,057,890	957,550	-13.4
Service workers .....	17,070	15,290	13,280	-22.2

<sup>1</sup> A significant portion of the decline may be due to changes in the coding structure rather than to actual changes in establishment staffing patterns.

See footnote 1 to text table 1.

**Table 7. Apparel and other textile products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983**

(SIC 23)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Total .....	1,140,970	100.00	--	--
Managerial and administrative occupations .....	35,440	3.11	n.a.	n.a.
Financial managers .....	1,620	.14	6	9
Personnel, training, and labor relations managers .....	1,080	.09	4	8
Purchasing managers .....	700	.06	5	5
Marketing, advertising, and public relations managers .....	1,120	.10	8	5
Administrative services managers .....	820	.07	6	4
Industrial production managers .....	3,800	.33	4	16
General managers and top executives .....	24,290	2.13	2	75
All other managers and administrators .....	2,010	.18	6	6
Professional, paraprofessional, and technical occupations .....	17,400	1.53	n.a.	n.a.
Management support workers .....	5,730	.50	n.a.	n.a.
Accountants, auditors, and other financial specialists .....	1,750	.15	n.a.	n.a.
Accountants and auditors .....	1,220	.11	7	6
Budget analysts .....	160	.01	14	1
All other financial specialists .....	370	.03	34	1
Purchasing agents, except wholesale and retail trade, and farm products .....	930	.08	6	6
Personnel, training, and labor relations specialists .....	730	.06	12	4
Cost estimators .....	500	.04	6	3
All other management support workers .....	1,820	.16	36	2
Engineers .....	2,090	.18	n.a.	n.a.
Industrial engineers, except safety .....	1,600	.14	5	8
Mechanical engineers .....	270	.02	8	2
All other engineers .....	220	.02	n.a.	n.a.
Engineering and related technicians and technologists .....	950	.08	n.a.	n.a.
Industrial engineering technicians and technologists .....	640	.06	5	4
Drafters .....	130	.01	15	1
All other engineering and related technicians and technologists .....	180	.02	n.a.	n.a.
Computer scientists and related workers .....	1,940	.17	n.a.	n.a.
Systems analysts, electronic data processing .....	680	.06	27	2
Computer programmers .....	860	.08	7	4
All other computer systems analysts, programmers, and programmer aides .....	400	.04	n.a.	n.a.
Teachers and instructors, vocational education and training .....	700	.06	9	2
Designers, except interior designers .....	5,500	.48	5	15
All other professional, paraprofessional, and technical workers .....	490	.04	n.a.	n.a.
Sales and related occupations .....	19,090	1.67	n.a.	n.a.
First-line supervisors and manager/supervisors, sales and related workers .....	1,400	.12	9	4
Sales representatives, scientific and related products and services, except retail .....	2,160	.19	9	5
Sales representatives, except scientific and related products or services and retail .....	12,030	1.05	4	17
All other sales and related workers .....	3,500	.31	n.a.	n.a.
Clerical and administrative support occupations .....	98,130	8.60	n.a.	n.a.
First-line supervisors and manager/supervisors, clerical and administrative support workers .....	3,000	.26	3	13
Secretaries .....	8,790	.77	3	35

See footnotes at end of table.

**Table 7. Apparel and other textile products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued**

(SIC 23)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Stenographers .....	190	0.02	9	1
Receptionists and information clerks .....	1,050	.09	4	7
Typists .....	860	.08	9	3
Typists, word processing equipment .....	240	.02	16	1
Personnel clerks, except payroll and timekeeping .....	790	.07	4	6
File clerks .....	690	.06	6	3
Order clerks, materials, merchandise, and service .....	2,780	.24	6	7
Procurement clerks .....	550	.05	7	3
Statistical clerks .....	180	.02	9	1
Bookkeeping, accounting, and auditing clerks .....	12,310	1.08	3	41
Payroll and timekeeping clerks .....	6,050	.53	2	31
Billing, cost and rate clerks .....	1,660	.15	6	6
General office clerks .....	14,390	1.26	3	37
Electronic data processing and other office machine operators .....	4,360	.38	n.a.	n.a.
Billing, posting, and calculating machine operators .....	730	.06	8	3
Computer operators, except peripheral equipment .....	1,350	.12	7	6
Peripheral EDP equipment operators .....	130	.01	14	1
Data entry keyers, except composing .....	1,990	.17	4	6
All other office machine operators .....	160	.01	11	1
Switchboard operators .....	790	.07	4	7
Material recording, scheduling, dispatching, and distributing workers .....	38,160	3.34	n.a.	n.a.
Production, planning, and expediting clerks .....	3,260	.29	5	9
Weighers, measurers, checkers, and samplers, recordkeeping .....	1,110	.10	11	2
Marking clerks .....	1,430	.13	7	4
Stock clerks, stockroom, warehouse or storage yard .....	7,990	.70	4	21
Traffic, shipping, and receiving clerks .....	22,790	2.00	4	44
All other material recording, scheduling, and distributing workers .....	1,580	.14	8	3
All other clerical and administrative support workers .....	1,290	.11	11	2
Service occupations .....	13,280	1.16	n.a.	n.a.
First-line supervisors and manager/supervisors, service .....	1,480	.13	6	3
Guards and watch guards .....	1,190	.10	6	4
Food and beverage preparation and service workers .....	160	.01	10	1
Cleaning and building service workers, except private households .....	9,930	.87	n.a.	n.a.
Janitors and cleaners, except maids and housekeeping cleaners .....	9,260	.81	2	37
All other cleaning and building service workers, except private households .....	670	.06	n.a.	n.a.
All other service workers .....	520	.05	n.a.	n.a.
Agriculture, forestry, fishing, and related occupations .....	120	.01	n.a.	n.a.
Gardeners and groundskeepers, except farm .....	120	.01	8	1
Production, construction, operating, maintenance, and material handling occupations .....	957,510	83.92	n.a.	n.a.
First-line supervisors, manager/supervisors - production, construction, maintenance, and related workers .....	33,820	2.96	n.a.	n.a.
First-line supervisors and manager/supervisors - mechanics, installers and repairers .....	970	.09	5	6

See footnotes at end of table.

**Table 7. Apparel and other textile products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued**

(SIC 23)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
First-line supervisors and manager/supervisors - construction trades and extractive workers .....	180	0.02	16	( <sup>3</sup> )
First-line supervisors and manager/supervisors - production and operating workers .....	30,800	2.70	2	59
First-line supervisors and manager/superv-transp and material moving machine and vehicle workers .....	410	.04	10	2
First-line supervisors and manager/supervisors - helpers, laborers, and material movers, hand .....	1,460	.13	7	3
Precision inspectors, testers, and graders .....	2,760	.24	7	3
Production inspectors, testers, graders, sorters, samplers, and weighers .....	36,690	3.22	2	37
Mechanics, installers, and repairers .....	17,730	1.55	n.a.	n.a.
Machinery maintenance mechanics .....	11,120	.97	n.a.	n.a.
Machinery maintenance mechanics, textile machines .....	1,080	.09	5	3
Machinery maintenance mechanics, sewing machines .....	9,600	.84	2	32
All other machinery maintenance mechanics .....	440	.04	n.a.	n.a.
Millwrights .....	260	.02	26	( <sup>3</sup> )
Machinery maintenance workers .....	330	.03	12	1
Maintenance repairers, general utility .....	2,630	.23	3	13
Menders - garments, linens, and related .....	2,260	.20	6	5
All other mechanics, installers, and repairers .....	1,130	.10	n.a.	n.a.
Construction trades workers, except material moving .....	1,010	.09	n.a.	n.a.
Carpenters .....	210	.02	9	1
Electricians .....	380	.03	15	1
Plumbers, pipefitters, and steamfitters .....	130	.01	22	( <sup>3</sup> )
All other construction trades workers .....	290	.03	n.a.	n.a.
Precision metal workers .....	710	.06	n.a.	n.a.
Machinists .....	220	.02	11	1
Tool grinders, filers, sharpeners, and other precision grinders .....	140	.01	42	( <sup>3</sup> )
All other precision metal workers .....	350	.03	19	( <sup>3</sup> )
Precision textile, apparel, and furnishings workers .....	27,070	2.37	n.a.	n.a.
Fabric and apparel patternmakers, and layout workers .....	10,870	.95	4	24
Custom tailors and sewers .....	10,160	.89	9	7
Shoe and leather workers and repairers, precision .....	720	.06	30	( <sup>3</sup> )
Pressers, delicate fabrics .....	1,690	.15	10	1
Precision dyers .....	150	.01	25	( <sup>3</sup> )
All other precision textile, apparel, and furnishings workers .....	3,480	.31	11	2
Precision workers, nec .....	310	.03	n.a.	n.a.
Precision detail design decorators, and painters .....	180	.02	19	1
All other precision workers, nec .....	130	.01	23	( <sup>3</sup> )
Machine setters, set-up operators, and tenders, metal and plastic .....	1,280	.11	n.a.	n.a.
Plastic molding and casting machine operators and tenders .....	470	.04	24	( <sup>3</sup> )
All other machine setters and set-up operators, metal and plastic .....	810	.07	n.a.	n.a.
All other machine operators and tenders, metal and plastic .....	680	.06	26	( <sup>3</sup> )
Machine setters, set-up operators, and tenders, except metal and plastic .....	683,750	59.93	n.a.	n.a.
Specialty materials printing machine setters and set-up operators .....	550	.05	14	1
Screen printing machine setters and set-up operators .....	1,810	.16	11	2

See footnotes at end of table.

**Table 7. Apparel and other textile products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued**

(SIC 23)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
All other printing related setters and set-up operators .....	340	0.03	22	1
Printing press machine operators and tenders .....	600	.05	14	1
All other printing, binding, and related machine operators and tenders .....	370	.03	25	( <sup>3</sup> )
Textile machine setters and set-up operators .....	1,200	.11	13	2
Textile machine operators and tenders - winding, twisting, knitting, weaving, and cutting .....	8,400	.74	7	7
Extruding and forming machine operators and tenders, synthetic or glass fibers .....	320	.03	38	( <sup>3</sup> )
Textile draw-out machine operators and tenders .....	150	.01	26	( <sup>3</sup> )
Textile bleaching and dyeing machine operators and tenders .....	770	.07	36	( <sup>3</sup> )
Sewing machine operators, garment .....	568,500	49.83	1	69
Sewing machine operators, nongarment .....	56,990	4.99	3	21
Shoe sewing machine operators and tenders .....	460	.04	40	( <sup>3</sup> )
Laundry and drycleaning machine operators and tenders, except pressing .....	680	.06	16	1
Pressing machine operators and tenders, textile, garment, and related materials .....	30,560	2.68	2	27
Cutting and slicing machine setters and set-up operators .....	2,360	.21	7	5
Cutting and slicing machine operators and tenders .....	2,300	.20	7	4
Coating, painting, and spraying machine setters and set-up operators .....	120	.01	21	( <sup>3</sup> )
Coating, painting, and spraying machine operators and tenders .....	210	.02	28	( <sup>3</sup> )
Cementing and gluing machine operators and tenders .....	630	.06	13	1
Packaging and filling machine operators and tenders .....	1,810	.16	10	2
All other machine setters and set-up operators, except metal and plastic .....	1,280	.11	n.a.	n.a.
All other machine operators and tenders, except metal and plastic .....	2,660	.23	n.a.	n.a.
Other hand workers, nec .....	78,140	6.85	n.a.	n.a.
Pressers, hand .....	14,570	1.28	3	20
Sewers, hand .....	8,680	.76	7	10
Cutters and trimmers, hand .....	22,570	1.98	3	28
Portable machine cutters .....	14,960	1.31	3	28
Painting, coating, and decorating, workers, hand .....	140	.01	23	( <sup>3</sup> )
Assemblers and fabricators, except machine, electrical, electronic, and precision .....	6,980	.61	11	4
All other hand workers, nec .....	10,240	.90	n.a.	n.a.
Plant and system workers .....	610	.05	n.a.	n.a.
Motor vehicle operators .....	1,340	.12	n.a.	n.a.
Truck drivers, light, include delivery and route workers .....	1,340	.12	6	7
All other transportation and motor vehicle operators .....	1,140	.10	n.a.	n.a.
Material moving equipment operators .....	2,230	.20	n.a.	n.a.
Industrial truck and tractor operators .....	1,670	.15	9	3
Conveyor operators and tenders .....	280	.02	12	1
All other material moving equipment operators .....	280	.02	16	( <sup>3</sup> )
Helpers - mechanics and repairers .....	460	.04	9	2
Machine feeders and offbearers .....	3,700	.32	6	5
Freight, stock, and material movers, hand .....	19,730	1.73	3	24
Hand packers and packagers .....	19,430	1.70	3	23
All other helpers, laborers, and material movers, hand .....	25,600	2.24	n.a.	n.a.

<sup>1</sup> Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

<sup>2</sup> Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors

are estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

<sup>3</sup> Less than 0.5 percent.

n.a. = not available.

NOTE: Detail may not add to totals due to rounding. Estimated employment is rounded to the nearest 10.

# Lumber and Wood Products, Except Furniture

Establishments in this industry include logging camps, sawmills, lath mills, shingle mills, cooperage stock mills, planing mills, plywood and veneer mills, and establishments manufacturing certain finished articles made entirely or mainly of wood or wood substitutes. These establishments employed 645,130 workers, or only 4 percent of manufacturing and 6 percent of durable goods employment in 1983. Sawmills and planing mills accounted for 30 percent of industry employment; establishments manufacturing fabricated millwork, veneer, plywood, and structural wood members, 30 percent; and logging camps and logging contractors, 12 percent. Text table 5 shows employment since 1977 for the major occupational groups in the lumber and wood products industry.

The 469,820 production and related workers in the lumber and wood products industry accounted for almost three-quarters of total industry employment (table 8). Clerical workers and managerial and administrative workers accounted for 7 and 5 percent,

respectively. Agriculture, forestry, fishing, and related workers accounted for 10 percent. Each of the following groups accounted for 2 percent of industry employment: Professional, paraprofessional, and technical workers; sales workers; and service workers.

The five most populous occupations in the industry are listed in the tabulation below:

	<i>Employment</i>	<i>Percent of industry employment</i>
Machine feeders and offbearers .....	47,530	7.4
Sawing machine operators and tenders .....	32,690	5.1
Assemblers and fabricators, except machine, electrical, electronic, and precision .....	32,370	5.0
Truckdrivers, heavy or tractor trailer .....	27,040	4.2
Cabinetmakers and bench carpenters .....	25,410	3.9

**Text table 5. Lumber and wood products: Employment by major occupational group, selected years, 1977-83**

Major occupational group	1977	1980	1983	Percent change 1977-83
Total .....	714,360	657,270	645,130	-9.7
Managerial and administrative workers .....	34,630	41,070	30,240	-12.7
Professional, paraprofessional, and technical workers .....	17,060	14,980	13,360	-21.7
Sales workers .....	9,670	11,060	12,270	26.9
Clerical workers .....	42,560	41,920	42,540	-0.1
Production and related workers .....	597,170	534,720	<sup>2</sup> 536,060	-10.2
Service workers .....	13,270	13,520	10,660	-19.7

<sup>1</sup> Includes 915 employees in the occupation "first-line supervisor—sales" which would have been included with managerial employment in previous surveys.

<sup>2</sup> Includes 66,240 agriculture, forestry, and fishing workers who would have been classified as production and related workers in previous surveys.

**Table 8. Lumber and wood products: Employment, relative error, and percent of establishments reporting selected occupations, May 1983**

(SIC 24)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Total .....	645,130	100.00	--	--
<b>Managerial and administrative occupations .....</b>	<b>30,230</b>	<b>4.69</b>	<b>n.a.</b>	<b>n.a.</b>
Financial managers .....	1,060	.16	4	4
Personnel, training, and labor relations managers .....	720	.11	4	3
Purchasing managers .....	700	.11	4	4
Marketing, advertising, and public relations managers .....	950	.15	5	3
Administrative services managers .....	460	.07	7	2
Industrial production managers .....	2,460	.38	4	6
General managers and top executives .....	22,340	3.46	1	64
All other managers and administrators .....	1,540	.24	9	3
<b>Professional, paraprofessional, and technical occupations .....</b>	<b>13,360</b>	<b>2.07</b>	<b>n.a.</b>	<b>n.a.</b>
Management support workers .....	6,380	.99	n.a.	n.a.
Accountants, auditors, and other financial specialists .....	3,560	.55	n.a.	n.a.
Accountants and auditors .....	3,330	.52	3	13
Budget analysts .....	70	.01	12	( <sup>3</sup> )
All other financial specialists .....	160	.02	15	( <sup>3</sup> )
Purchasing agents, except wholesale and retail trade, and farm products .....	1,180	.18	4	5
Personnel, training, and labor relations specialists .....	350	.05	8	1
Cost estimators .....	540	.08	6	2
All other management support workers .....	750	.12	23	1
Engineers .....	1,560	.24	n.a.	n.a.
Industrial engineers, except safety .....	570	.09	14	2
Mechanical engineers .....	470	.07	9	2
All other engineers .....	520	.08	n.a.	n.a.
Engineering and related technicians and technologists .....	2,060	.32	n.a.	n.a.
Industrial engineering technicians and technologists .....	140	.02	11	( <sup>3</sup> )
Drafters .....	1,620	.25	5	4
Surveying and mapping technicians and technologists .....	80	.01	19	( <sup>3</sup> )
All other engineering and related technicians and technologists .....	220	.03	n.a.	n.a.
Life scientists .....	850	.13	n.a.	n.a.
Foresters and conservation scientists .....	760	.12	8	1
All other life scientists .....	90	.01	n.a.	n.a.
Physical and life science technicians and technologists .....	410	.06	n.a.	n.a.
Computer scientists and related workers .....	1,280	.20	n.a.	n.a.
Systems analysts, electronic data processing .....	400	.06	17	1
Computer programmers .....	590	.09	14	1
Computer programmer aides .....	290	.04	20	1
Health practitioners, technologists, technicians, and related health workers .....	80	.01	9	( <sup>3</sup> )
Designers, except interior designers .....	150	.02	16	( <sup>3</sup> )
All other professional, paraprofessional, and technical workers .....	590	.09	n.a.	n.a.
<b>Sales and related occupations .....</b>	<b>12,270</b>	<b>1.90</b>	<b>n.a.</b>	<b>n.a.</b>
First-line supervisors and manager/supervisors, sales and related workers .....	920	.14	6	2
Sales representatives, scientific and related products and services, except retail .....	2,440	.38	4	6
Sales representatives, except scientific and related products or services and retail .....	7,960	1.23	2	18

See footnotes at end of table.

**Table 8. Lumber and wood products: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued**

(SIC 24)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
All other sales and related workers .....	950	0.15	16	2
Clerical and administrative support occupations .....	42,550	6.60	n.a.	n.a.
First-line supervisors and manager/supervisors, clerical and administrative support workers .....	1,050	.16	6	3
Secretaries .....	10,460	1.62	2	36
Stenographers .....	70	.01	19	( <sup>3</sup> )
Receptionists and information clerks .....	460	.07	4	2
Typists .....	210	.03	9	1
Typists, word processing equipment .....	200	.03	20	( <sup>3</sup> )
Personnel clerks, except payroll and timekeeping .....	400	.06	5	2
File clerks .....	260	.04	11	1
Order clerks, materials, merchandise, and service .....	650	.10	6	2
Procurement clerks .....	270	.04	5	1
Bookkeeping, accounting, and auditing clerks .....	9,340	1.45	2	36
Payroll and timekeeping clerks .....	660	.10	3	4
Billing, cost and rate clerks .....	660	.10	4	2
General office clerks .....	7,620	1.18	2	25
Electronic data processing and other office machine operators .....	1,140	.18	n.a.	n.a.
Billing, posting, and calculating machine operators .....	130	.02	10	( <sup>3</sup> )
Computer operators, except peripheral equipment .....	330	.05	6	1
Data entry keyers, except composing .....	570	.09	5	2
All other office machine operators .....	110	.02	26	( <sup>3</sup> )
Switchboard operators .....	420	.07	4	2
Material recording, scheduling, dispatching, and distributing workers .....	8,270	1.28	n.a.	n.a.
Production, planning, and expediting clerks .....	900	.14	5	2
Weighers, measurers, checkers, and samplers, recordkeeping .....	670	.10	6	1
Stock clerks, stockroom, warehouse or storage yard .....	1,140	.18	5	3
Traffic, shipping, and receiving clerks .....	5,310	.82	2	18
All other material recording, scheduling, and distributing workers .....	250	.04	13	1
All other clerical and administrative support workers .....	410	.06	26	1
Service occupations .....	10,670	1.65	n.a.	n.a.
First-line supervisors and manager/supervisors, service .....	320	.05	12	1
Guards and watch guards .....	4,200	.65	2	9
Food and beverage preparation and service workers .....	140	.02	13	( <sup>3</sup> )
Cleaning and building service workers, except private households .....	5,870	.91	n.a.	n.a.
Janitors and cleaners, except maids and housekeeping cleaners .....	5,640	.87	2	18
All other cleaning and building service workers, except private households .....	230	.04	9	1
All other service workers .....	140	.02	14	( <sup>3</sup> )
Agriculture, forestry, fishing, and related occupations .....	66,240	10.27	n.a.	n.a.
First line supervisors-agricultural, forestry, fishing, and related workers .....	4,260	.66	3	10
Fallers and buckers .....	18,270	2.83	2	22
Choke setters .....	5,480	.85	3	6
Log handling equipment operators .....	10,970	1.70	2	23
Logging tractor operators .....	18,920	2.93	2	25
All other timber cutting and related logging workers .....	2,380	.37	6	3

See footnotes at end of table.

**Table 8. Lumber and wood products: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued**

(SIC 24)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Forest and conservation workers .....	1,530	0.24	8	1
Nursery workers .....	250	.04	18	( <sup>3</sup> )
Log graders and scalers .....	3,700	.57	3	12
Gardeners and groundskeepers, except farm .....	200	.03	16	( <sup>3</sup> )
All other agriculture, forestry, fishing, and related workers .....	280	.04	21	( <sup>3</sup> )
Production, construction, operating, maintenance, and material handling occupations .....	469,810	72.82	n.a.	n.a.
First-line supervisors, manager/supervisors - production, construction, maintenance, and related workers .....	23,960	3.71	n.a.	n.a.
First-line supervisors and manager/supervisors - mechanics, installers and repairers .....	1,190	.18	4	3
First-line supervisors and manager/supervisors - construction trades and extractive workers .....	420	.07	11	1
First-line supervisors and manager/supervisors - production and operating workers .....	20,860	3.23	1	40
First-line supervisors and manager/superv-transp and material moving machine and vehicle workers .....	580	.09	5	2
First-line supervisors and manager/supervisors - helpers, laborers, and material movers, hand .....	910	.14	8	2
Precision inspectors, testers, and graders .....	440	.07	10	1
Production inspectors, testers, graders, sorters, samplers, and weighers .....	13,150	2.04	2	17
Mechanics, installers, and repairers .....	31,700	4.91	n.a.	n.a.
Machinery maintenance mechanics .....	6,220	.96	3	12
Millwrights .....	2,410	.37	6	2
Machinery maintenance workers .....	3,140	.49	3	9
Maintenance repairers, general utility .....	11,760	1.82	2	25
Automotive mechanics .....	970	.15	5	3
Bus and truck mechanics and diesel engine specialists .....	910	.14	5	2
Mobile heavy equipment mechanics, except engines .....	1,920	.30	5	4
Installers and repairers, manufactured buildings, mobile homes, and travel trailers .....	3,580	.55	12	1
All other mechanics, installers, and repairers .....	790	.12	8	1
Construction trades workers, except material moving .....	29,010	4.50	n.a.	n.a.
Carpenters .....	21,390	3.32	3	11
Electricians .....	3,420	.53	3	5
Painters and paperhangers, construction and maintenance .....	530	.08	12	1
Plumbers, pipefitters, and steamfitters .....	1,140	.18	6	2
All other construction trades workers .....	2,530	.39	13	1
Precision metal workers .....	3,140	.49	n.a.	n.a.
Tool-and-die makers .....	80	.01	17	( <sup>3</sup> )
Machinists .....	700	.11	5	2
Tool grinders, filers, sharpeners, and other precision grinders .....	1,870	.29	4	4
Sheet-metal workers .....	380	.06	18	( <sup>3</sup> )
All other precision metal workers .....	110	.02	23	( <sup>3</sup> )
Precision woodworkers .....	44,830	6.95	n.a.	n.a.
Pattern and model makers, wood .....	350	.05	17	1
Pattern markers, wood .....	230	.04	15	( <sup>3</sup> )
Wood machinists .....	16,660	2.58	3	14
Cabinetmakers and bench carpenters .....	25,410	3.94	3	15
Furniture finishers .....	740	.11	11	1
All other precision woodworkers .....	1,440	.22	17	1

See footnotes at end of table.

**Table 8. Lumber and wood products: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued**

(SIC 24)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Precision workers, nec .....	740	0.11	n.a.	n.a.
Precision detail design decorators, and painters .....	90	.01	25	( <sup>3</sup> )
All other precision workers, nec .....	650	.10	26	( <sup>3</sup> )
Machine setters, set-up operators, and tenders, metal and plastic .....	2,450	.38	n.a.	n.a.
Drilling and boring machine tool setters and set-up operators, metal and plastic .....	170	.03	14	( <sup>3</sup> )
Machine tool cutting operators and tenders, metal and plastic .....	700	.11	14	( <sup>3</sup> )
Punching machine setters and set-up operators, metal and plastic .....	140	.02	17	( <sup>3</sup> )
Press and press brake machine setters and set-up operators, metal and plastic .....	80	.01	18	( <sup>3</sup> )
Machine forming operators and tenders, metal and plastic .....	540	.08	18	( <sup>3</sup> )
Combination machine tool operators and tenders, metal and plastic .....	120	.02	23	( <sup>3</sup> )
Welding machine setters and set-up operators .....	320	.05	16	( <sup>3</sup> )
Welding machine operators and tenders .....	200	.03	14	( <sup>3</sup> )
All other machine setters and set-up operators, metal and plastic .....	180	.03	n.a.	n.a.
All other machine operators and tenders, metal and plastic .....	390	.06	n.a.	n.a.
Machine setters, set-up operators, and tenders, except metal and plastic .....	114,620	17.77	n.a.	n.a.
Sawing machine setters and set-up operators .....	6,500	1.01	3	13
Head sawyers .....	6,180	.96	2	20
Sawing machine operators and tenders .....	32,690	5.07	1	34
Woodworking machine setters and set-up operators, except sawing .....	12,090	1.87	3	16
Woodworking machine operators and tenders, except sawing .....	22,340	3.46	2	18
Sewing machine operators, nongarment .....	300	.05	30	( <sup>3</sup> )
Furnace, kiln, oven, drier, or kettle operators and tenders .....	4,080	.63	3	8
Boiler operators and tenders, low pressure .....	2,020	.31	4	3
Cutting and slicing machine setters and set-up operators .....	170	.03	16	( <sup>3</sup> )
Cutting and slicing machine operators and tenders .....	920	.14	7	2
Coating, painting, and spraying machine setters and set-up operators .....	2,460	.38	5	5
Coating, painting, and spraying machine operators and tenders .....	5,370	.83	4	7
Cementing and gluing machine operators and tenders .....	7,850	1.22	4	6
Crushing, grinding, mixing, and blending machine operators and tenders .....	850	.13	6	2
Extruding, forming, pressing, and compacting machine setters and set-up operators .....	430	.07	19	( <sup>3</sup> )
Extruding, forming, pressing, and compacting machine operators and tenders .....	1,800	.25	12	1
Packaging and filling machine operators and tenders .....	2,200	.34	5	3
All other machine setters and set-up operators, except metal and plastic .....	780	.12	n.a.	n.a.
All other machine operators and tenders, except metal and plastic .....	5,400	.84	n.a.	n.a.
Other hand workers, nec .....	39,690	6.15	n.a.	n.a.
Glaziers, manufacturing .....	880	.14	13	1
Welders and cutters .....	1,010	.16	6	2
Cutters and trimmers, hand .....	190	.03	16	( <sup>3</sup> )
Carpet cutters, diagrammers, and seamers .....	210	.03	12	( <sup>3</sup> )

See footnotes at end of table.

**Table 8. Lumber and wood products: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued**

(SIC 24)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Painting, coating, and decorating, workers, hand .....	930	0.14	11	1
Grinding and polishing workers, hand .....	1,940	.30	8	1
Assemblers and fabricators, except machine, electrical, electronic, and precision .....	32,370	5.02	4	8
All other hand workers, nec .....	2,160	.33	n.a.	n.a.
Plant and system workers .....	420	.07	22	( <sup>3</sup> )
Motor vehicle operators .....	28,320	4.39	n.a.	n.a.
Truck drivers, heavy or tractor trailer .....	27,040	4.19	1	48
Truck drivers, light, include delivery and route workers .....	1,000	.16	7	2
All other motor vehicle operators .....	280	.04	15	( <sup>3</sup> )
All other transportation and motor vehicle operators .....	230	.04	14	( <sup>3</sup> )
Material moving equipment operators .....	27,970	4.34	n.a.	n.a.
Grader, dozer, and scraper operators .....	740	.11	7	1
Hoist and winch operators .....	2,370	.37	4	4
Industrial truck and tractor operators .....	20,940	3.25	1	31
Conveyor operators and tenders .....	1,400	.22	7	1
Pump operators .....	430	.07	37	( <sup>3</sup> )
Operating engineers .....	370	.06	11	1
All other material moving equipment operators .....	1,720	.27	6	2
Helpers - mechanics and repairers .....	660	.10	7	1
Construction trades and extractive worker helpers .....	5,300	.82	6	4
Machine feeders and offbearers .....	47,530	7.37	2	25
Freight, stock, and material movers, hand .....	16,550	2.57	3	17
Hand packers and packagers .....	8,850	1.37	3	10
All other helpers, laborers, and material movers, hand .....	30,140	4.67	3	9
All other production, construction, operating, maintenance, and material handling occupations .....	110	.02	n.a.	n.a.

<sup>1</sup> Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

<sup>2</sup> Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors

are estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

<sup>3</sup> Less than 0.5 percent.

n.a. = not available.

NOTE: Detail may not add to totals due to rounding. Estimated employment is rounded to the nearest 10.

# Furniture and Fixtures

Establishments which manufacture household, office, public building, and restaurant furniture, and office and store fixtures employed 439,250 workers in 1983, accounting for 2 percent of manufacturing and 4 percent of durable goods employment. Establishments manufacturing household furniture employed 63 percent of the industry's workers; those manufacturing partitions, shelving, lockers, and office and store fixtures, 13 percent; and those manufacturing office furniture, 12 percent. Employment since 1977 by occupational group is given in text table 6.

As shown in table 9, the 350,090 production and related workers accounted for more than three-fourths of total industry employment. Clerical workers ranked second with 9 percent. Managerial and administrative workers accounted for 4 percent; sales workers, 3 percent; professional, paraprofessional, and technical

workers, 3 percent; and service workers, 1 percent of total industry employment.

The five most populous occupations in the manufacturing of furniture and fixtures are listed below:

	<i>Employment</i>	<i>Percent of industry employment</i>
Assemblers and fabricators, except machine, electrical, electronic, and precision . . . . .	56,680	12.9
Upholsterers . . . . .	22,450	5.1
Sewing machine operators, nongarment . . . . .	19,300	4.4
Cabinetmakers and bench carpenters . . . . .	19,150	4.4
First-line supervisors, production . . . . .	16,980	3.9

**Text table 6. Furniture and fixtures: Employment by major occupational group, selected years, 1977-83**

Major occupational group	1977	1980	1983	Percent change 1977-83
Total . . . . .	462,660	455,830	439,250	-5.1
Managerial and administrative workers . . . . .	19,500	24,300	19,690	1.0
Professional, paraprofessional, and technical workers . . . . .	12,200	13,810	11,090	-9.1
Sales workers . . . . .	10,060	10,470	12,430	23.6
Clerical workers . . . . .	43,190	50,490	39,600	-8.3
Production and related workers . . . . .	369,780	348,250	350,090	-5.3
Service workers . . . . .	7,930	8,510	6,230	-21.4

<sup>1</sup> Includes 906 employees in the occupation "first-line supervisor—sales" which would have been included with managerial employment in previous

surveys.

**Table 9. Furniture and fixtures: Employment, relative error, and percent of establishments reporting selected occupations, May 1983**

(SIC 25)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Total .....	439,230	100.00	--	--
Managerial and administrative occupations .....	19,700	4.49	n.a.	n.a.
Financial managers .....	1,060	.24	4	12
Personnel, training, and labor relations managers .....	690	.16	4	10
Purchasing managers .....	640	.15	4	10
Marketing, advertising, and public relations managers .....	1,150	.26	5	9
Administrative services managers .....	410	.09	7	5
Industrial production managers .....	1,750	.40	5	13
General managers and top executives .....	12,540	2.85	2	82
All other managers and administrators .....	1,460	.33	9	7
Professional, paraprofessional, and technical occupations .....	11,080	2.52	n.a.	n.a.
Management support workers .....	4,110	.94	n.a.	n.a.
Accountants, auditors, and other financial specialists .....	1,890	.43	n.a.	n.a.
Accountants and auditors .....	1,670	.38	4	19
Budget analysts .....	60	.01	12	1
All other financial specialists .....	160	.04	10	2
Purchasing agents, except wholesale and retail trade, and farm products .....	980	.22	3	13
Personnel, training, and labor relations specialists .....	380	.09	8	4
Cost estimators .....	460	.10	5	6
All other management support workers .....	400	.09	12	2
Engineers .....	2,120	.48	n.a.	n.a.
Industrial engineers, except safety .....	1,120	.25	7	8
Safety engineers, except mining .....	70	.02	10	1
Mechanical engineers .....	590	.13	6	5
All other engineers .....	340	.08	12	2
Engineering and related technicians and technologists .....	2,510	.57	n.a.	n.a.
Industrial engineering technicians and technologists .....	330	.08	8	3
Mechanical engineering technicians and technologists .....	80	.02	16	1
Drafters .....	1,870	.43	4	12
All other engineering and related technicians and technologists .....	230	.05	n.a.	n.a.
Computer scientists and related workers .....	1,250	.28	n.a.	n.a.
Systems analysts, electronic data processing .....	440	.10	9	4
Computer programmers .....	580	.13	7	6
Computer programmer aides .....	230	.05	8	3
Health practitioners, technologists, technicians, and related health workers .....	180	.04	9	2
Designers, except interior designers .....	570	.13	12	4
Interior designers .....	110	.03	15	1
All other professional, paraprofessional, and technical workers .....	230	.05	n.a.	n.a.
Sales and related occupations .....	12,440	2.83	n.a.	n.a.
First-line supervisors and manager/supervisors, sales and related workers .....	910	.21	14	5
Sales representatives, scientific and related products and services, except retail .....	2,300	.52	8	10
Sales representatives, except scientific and related products or services and retail .....	8,250	1.88	4	29
All other sales and related workers .....	980	.22	12	3

See footnotes at end of table.

**Table 9. Furniture and fixtures: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued**

(SIC 25)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Clerical and administrative support occupations .....	39,590	9.01	n.a.	n.a.
First-line supervisors and manager/supervisors, clerical and administrative support workers .....	1,080	.25	8	8
Secretaries .....	6,180	1.41	2	52
Stenographers .....	290	.07	22	2
Receptionists and information clerks .....	480	.11	5	7
Typists .....	530	.12	9	4
Typists, word processing equipment .....	100	.02	13	1
Personnel clerks, except payroll and timekeeping .....	490	.11	5	7
File clerks .....	300	.07	6	4
Order clerks, materials, merchandise, and service .....	1,750	.40	6	9
Procurement clerks .....	470	.11	5	6
Bookkeeping, accounting, and auditing clerks .....	4,920	1.12	2	49
Payroll and timekeeping clerks .....	980	.22	3	11
Billing, cost and rate clerks .....	910	.21	5	8
General office clerks .....	6,340	1.44	4	39
Electronic data processing and other office machine operators .....	1,870	.43	n.a.	n.a.
Billing, posting, and calculating machine operators .....	120	.03	12	2
Computer operators, except peripheral equipment .....	690	.16	6	6
Data entry keyers, except composing .....	980	.22	6	7
All other office machine operators .....	80	.02	18	1
Switchboard operators .....	560	.13	4	9
Material recording, scheduling, dispatching, and distributing workers .....	11,960	2.72	n.a.	n.a.
Production, planning, and expediting clerks .....	2,190	.50	10	10
Weighers, measurers, checkers, and samplers, recordkeeping .....	160	.04	12	1
Stock clerks, stockroom, warehouse or storage yard .....	1,930	.44	8	9
Traffic, shipping, and receiving clerks .....	7,330	1.67	4	45
All other material recording, scheduling, and distributing workers .....	350	.08	13	2
All other clerical and administrative support workers .....	380	.09	14	2
Service occupations .....	6,230	1.42	n.a.	n.a.
First-line supervisors and manager/supervisors, service .....	200	.05	20	1
Guards and watch guards .....	1,530	.35	6	6
Food and beverage preparation and service workers .....	130	.03	19	1
Cleaning and building service workers, except private households .....	4,290	.98	n.a.	n.a.
Janitors and cleaners, except maids and housekeeping cleaners .....	4,120	.94	3	34
All other cleaning and building service workers, except private households .....	170	.04	12	1
All other service workers .....	80	.02	23	( <sup>9</sup> )
Agriculture, forestry, fishing, and related occupations .....	120	.03	n.a.	n.a.
Production, construction, operating, maintenance, and material handling occupations .....	350,070	79.70	n.a.	n.a.
First-line supervisors, manager/supervisors - production, construction, maintenance, and related workers .....	19,040	4.33	n.a.	n.a.

See footnotes at end of table.

**Table 9. Furniture and fixtures: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued**

(SIC 25)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
First-line supervisors and manager/supervisors - mechanics, installers and repairers .....	850	0.19	15	5
First-line supervisors and manager/supervisors - construction trades and extractive workers .....	140	.03	32	( <sup>3</sup> )
First-line supervisors and manager/supervisors - production and operating workers .....	16,980	3.87	2	65
First-line supervisors and manager/superv-transp and material moving machine and vehicle workers .....	340	.08	7	4
First-line supervisors and manager/supervisors - helpers, laborers, and material movers, hand .....	730	.17	10	3
Precision inspectors, testers, and graders .....	530	.12	14	2
Production inspectors, testers, graders, sorters, samplers, and weighers .....	6,070	1.38	4	21
Mechanics, installers, and repairers .....	7,510	1.71	n.a.	n.a.
Machinery maintenance mechanics .....	1,430	.33	7	6
Millwrights .....	210	.05	20	1
Machinery maintenance workers .....	400	.09	10	3
Maintenance repairers, general utility .....	4,660	1.06	3	32
Automotive mechanics .....	120	.03	13	1
Bus and truck mechanics and diesel engine specialists .....	220	.05	17	1
All other mechanics, installers, and repairers .....	470	.11	n.a.	n.a.
Construction trades workers, except material moving .....	3,700	.84	n.a.	n.a.
Carpenters .....	2,560	.58	7	9
Electricians .....	660	.15	8	5
Painters and paperhangers, construction and maintenance .....	200	.05	18	1
Plumbers, pipefitters, and steamfitters .....	130	.03	15	1
All other construction trades workers .....	150	.03	39	1
Precision metal workers .....	4,250	.97	n.a.	n.a.
Tool-and-die makers .....	1,270	.29	12	5
Machinists .....	750	.17	8	3
Tool grinders, filers, sharpeners, and other precision grinders .....	440	.10	20	3
Sheet-metal workers .....	1,650	.38	19	2
All other precision metal workers .....	140	.03	25	1
Precision woodworkers .....	45,570	10.37	n.a.	n.a.
Pattern and model makers, wood .....	590	.13	9	3
Pattern markers, wood .....	490	.11	13	3
Wood machinists .....	14,690	3.34	7	25
Cabinetmakers and bench carpenters .....	19,140	4.36	3	34
Furniture finishers .....	8,680	1.98	7	7
All other precision woodworkers .....	1,980	.45	17	2
Precision textile, apparel, and furnishings workers .....	25,720	5.86	n.a.	n.a.
Fabric and apparel patternmakers, and layout workers .....	1,380	.31	11	3
Upholsterers .....	22,450	5.11	4	25
All other precision textile, apparel, and furnishings workers .....	1,890	.43	16	1
Precision workers, nec .....	650	.15	n.a.	n.a.
Precision detail design decorators, and painters .....	190	.04	21	1
All other precision workers, nec .....	460	.10	20	1
Machine setters, set-up operators, and tenders, metal and plastic .....	24,030	5.47	n.a.	n.a.
Drilling and boring machine tool setters and set-up operators, metal and plastic .....	1,080	.25	13	2
Machine tool cutting operators and tenders, metal and plastic .....	1,490	.34	11	2

See footnotes at end of table.

**Table 9. Furniture and fixtures: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued**

(SIC 25)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Punching machine setters and set-up operators, metal and plastic .....	3,080	0.70	11	11
Press and press brake machine setters and set-up operators, metal and plastic .....	3,720	.85	8	11
Shear and slitter machine setters and set-up operators, metal and plastic .....	660	.15	8	3
Machine forming operators and tenders, metal and plastic .....	7,410	1.69	5	13
Numerical control machine tool operators and tenders, metal and plastic .....	160	.04	11	1
Combination machine tool setters and set-up operators, metal and plastic .....	550	.13	19	1
Combination machine tool operators and tenders, metal and plastic .....	460	.10	17	1
Welding machine setters and set-up operators .....	2,220	.51	12	4
Welding machine operators and tenders .....	2,320	.53	13	2
Soldering and brazing machine setters and set-up operators .....	280	.06	12	1
Soldering and brazing machine operators and tenders .....	210	.05	15	1
All other machine setters and set-up operators, metal and plastic .....	390	.09	19	1
All other machine operators and tenders, metal and plastic .....	880	.20	19	1
Machine setters, set-up operators, and tenders, except metal and plastic .....	79,220	18.04	n.a.	n.a.
Sawing machine setters and set-up operators .....	1,610	.37	10	5
Head sawyers .....	280	.06	28	1
Sawing machine operators and tenders .....	11,840	2.70	4	26
Woodworking machine setters and set-up operators, except sawing .....	7,860	1.79	6	17
Woodworking machine operators and tenders, except sawing .....	14,070	3.20	5	20
Textile machine setters and set-up operators .....	230	.05	23	1
Textile machine operators and tenders - winding, twisting, knitting, weaving, and cutting .....	1,590	.36	9	6
Sewing machine operators, nongarment .....	19,300	4.39	4	29
Furnace, kiln, oven, drier, or kettle operators and tenders .....	320	.07	13	2
Boiler operators and tenders, low pressure .....	580	.13	9	3
Cutting and slicing machine setters and set-up operators .....	210	.05	37	1
Cutting and slicing machine operators and tenders .....	430	.10	19	1
Coating, painting, and spraying machine setters and set-up operators .....	3,870	.88	7	17
Coating, painting, and spraying machine operators and tenders .....	6,400	1.46	5	22
Cementing and gluing machine operators and tenders .....	3,110	.71	6	15
Crushing, grinding, mixing, and blending machine operators and tenders .....	130	.03	19	1
Extruding, forming, pressing, and compacting machine setters and set-up operators .....	110	.03	31	( <sup>3</sup> )
Extruding, forming, pressing, and compacting machine operators and tenders .....	480	.11	22	1
Packaging and filling machine operators and tenders .....	3,640	.83	5	13
All other machine setters and set-up operators, except metal and plastic .....	400	.09	25	1
All other machine operators and tenders, except metal and plastic .....	1,880	.43	14	2
Other hand workers, nec .....	82,110	18.69	n.a.	n.a.

See footnotes at end of table.

**Table 9. Furniture and fixtures: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued**

(SIC 25)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Glaziers, manufacturing .....	260	0.06	19	1
Welders and cutters .....	2,830	.64	7	5
Solderers and brazers .....	160	.04	27	1
Cutters and trimmers, hand .....	4,950	1.13	5	17
Painting, coating, and decorating, workers, hand .....	4,390	1.00	9	9
Grinding and polishing workers, hand .....	6,800	1.55	7	12
Assemblers and fabricators, except machine, electrical, electronic, and precision .....	56,680	12.90	3	51
All other hand workers, nec .....	6,040	1.38	n.a.	n.a.
Plant and system workers .....	50	.01	19	1
Motor vehicle operators .....	7,330	1.67	n.a.	n.a.
Truck drivers, heavy or tractor trailer .....	6,150	1.40	4	30
Truck drivers, light, include delivery and route workers .....	1,070	.24	9	8
All other motor vehicle operators .....	110	.03	16	1
All other transportation and motor vehicle operators .....	190	.04	19	1
Material moving equipment operators .....	5,540	1.26	n.a.	n.a.
Hoist and winch operators .....	100	.02	19	1
Industrial truck and tractor operators .....	4,710	1.07	6	19
Conveyor operators and tenders .....	280	.06	18	1
All other material moving equipment operators .....	450	.10	n.a.	n.a.
Helpers - mechanics and repairers .....	480	.11	11	2
Construction trades and extractive worker helpers .....	210	.05	17	1
Machine feeders and offbearers .....	7,080	1.61	8	11
Freight, stock, and material movers, hand .....	10,240	2.33	4	28
Hand packers and packagers .....	6,860	1.56	8	10
All other helpers, laborers, and material movers, hand .....	13,690	3.12	7	10

<sup>1</sup> Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

<sup>2</sup> Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors

are estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

<sup>3</sup> Less than 0.5 percent.

n.a. = not available.

NOTE: Detail may not add to totals due to rounding. Estimated employment is rounded to the nearest 10.

# Paper and Allied Products

Establishments which manufacture paper and allied products employed 653,480 workers, accounting for nearly 4 percent of manufacturing and 9 percent of non-durable goods employment in 1983. Establishments manufacturing paper and paperboard into converted products (except containers and boxes) employed nearly one-third of the industry's workers; those producing paperboard containers and boxes, 29 percent; and paper mills (except building paper mills), 26 percent.

The industry's 484,860 production and related workers accounted for nearly three-fourths of total industry employment (table 10). Clerical workers ranked second with 10 percent.

Professional, paraprofessional, and technical workers constituted 6 percent; managerial and administrative workers, 5 percent; sales workers, over 3

percent; and service workers, just under 1.5 percent. Total employment in this industry declined 6 percent between 1980 and 1983, as shown in text table 7.

The following tabulation lists the five most populous occupations in the manufacturing of paper and allied products:

	<i>Employment</i>	<i>Percent of industry employment</i>
Paper goods machine setters and setup operators . . . . .	54,820	8.4
First-line supervisors, production . . . . .	27,380	4.2
Machine feeders and offbearers . . . . .	24,890	3.8
Hand packers and packagers . . . . .	21,100	3.2
Industrial truck and tractor operators . . . . .	20,920	3.2

**Text table 7. Paper and allied products: Employment by major occupational group, selected years, 1977-83**

Major occupational group	1977	1980	1983	Percent change 1977-83
Total . . . . .	686,140	698,910	653,480	-4.8
Managerial and administrative workers . . . . .	33,000	37,340	31,480	-4.6
Professional, paraprofessional, and technical workers . . . . .	28,660	40,690	41,250	43.9
Sales workers . . . . .	15,480	16,540	20,450	32.1
Clerical workers . . . . .	65,730	73,240	63,120	-4.0
Production and related workers . . . . .	531,640	519,530	484,860	-8.8
Service workers . . . . .	11,630	11,570	9,350	-19.6

<sup>1</sup> Includes 1,850 employees in the occupation "first-line supervisor—sales" which would have been included with managerial employment

in previous surveys.

**Table 10. Paper and allied products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983**

(SIC 26)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Total .....	653,490	100.00	--	--
Managerial and administrative occupations .....	31,500	4.82	n.a.	n.a.
Financial managers .....	2,180	.33	5	26
Personnel, training, and labor relations managers .....	1,750	.27	7	23
Purchasing managers .....	910	.14	4	15
Marketing, advertising, and public relations managers .....	2,520	.39	6	19
Administrative services managers .....	960	.15	8	10
Industrial production managers .....	4,880	.75	4	30
General managers and top executives .....	13,800	2.11	3	88
All other managers and administrators .....	4,500	.69	6	15
Professional, paraprofessional, and technical occupations .....	41,230	6.31	n.a.	n.a.
Management support workers .....	12,110	1.85	n.a.	n.a.
Accountants, auditors, and other financial specialists .....	5,030	.77	n.a.	n.a.
Accountants and auditors .....	4,180	.64	6	36
Budget analysts .....	330	.05	13	4
All other financial specialists .....	520	.08	17	3
Purchasing agents, except wholesale and retail trade, and farm products .....	2,540	.39	4	31
Personnel, training, and labor relations specialists .....	1,360	.21	8	12
Cost estimators .....	980	.15	4	13
All other management support workers .....	2,200	.34	19	7
Engineers .....	9,180	1.40	n.a.	n.a.
Chemical engineers .....	1,870	.29	8	8
Industrial engineers, except safety .....	1,420	.22	6	12
Mechanical engineers .....	2,130	.33	5	13
All other engineers .....	3,760	.58	n.a.	n.a.
Engineering and related technicians and technologists .....	3,710	.57	n.a.	n.a.
Electrical and electronic engineering technicians and technologists .....	710	.11	16	4
Industrial engineering technicians and technologists .....	220	.03	19	2
Mechanical engineering technicians and technologists .....	280	.04	10	2
Drafters .....	920	.14	13	8
All other engineering and related technicians and technologists .....	1,580	.24	18	3
Physical scientists .....	2,190	.34	n.a.	n.a.
Chemists, except biochemists .....	1,890	.29	19	6
All other physical scientists .....	300	.05	22	2
Life scientists .....	170	.03	30	1
Physical and life science technicians and technologists .....	4,130	.63	n.a.	n.a.
Chemical technicians and technologists, except health .....	2,950	.45	17	6
All other physical and life science technicians and technologists .....	1,180	.18	32	1
Computer scientists and related workers .....	2,550	.39	n.a.	n.a.
Systems analysts, electronic data processing .....	1,130	.17	13	8
Computer programmers .....	980	.15	6	9
Computer programmer aides .....	440	.07	7	5
Health practitioners, technologists, technicians, and related health workers .....	610	.09	8	7
Designers, except interior designers .....	1,500	.23	10	11
All other professional, paraprofessional, and technical workers .....	5,080	.78	n.a.	n.a.

See footnotes at end of table.

**Table 10. Paper and allied products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued**

(SIC 26)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Sales and related occupations .....	20,450	3.13	n.a.	n.a.
First-line supervisors and manager/supervisors, sales and related workers .....	1,850	.28	6	14
Sales representatives, scientific and related products and services, except retail .....	2,990	.46	7	14
Sales representatives, except scientific and related products or services and retail .....	13,530	2.07	2	52
All other sales and related workers .....	2,080	.32	8	10
Clerical and administrative support occupations .....	63,140	9.66	n.a.	n.a.
First-line supervisors and manager/supervisors, clerical and administrative support workers .....	2,490	.38	7	19
Secretaries .....	11,630	1.78	9	66
Stenographers .....	750	.11	16	4
Receptionists and information clerks .....	760	.12	5	13
Typists .....	1,250	.19	7	8
Typists, word processing equipment .....	410	.06	14	3
Personnel clerks, except payroll and timekeeping .....	910	.14	5	14
File clerks .....	470	.07	9	5
Order clerks, materials, merchandise, and service .....	2,730	.42	4	18
Procurement clerks .....	710	.11	4	11
Bookkeeping, accounting, and auditing clerks .....	7,420	1.14	4	57
Payroll and timekeeping clerks .....	1,680	.26	2	26
Billing, cost and rate clerks .....	2,370	.36	7	21
General office clerks .....	6,820	1.04	3	45
Electronic data processing and other office machine operators .....	3,430	.52	n.a.	n.a.
Billing, posting, and calculating machine operators .....	350	.05	7	4
Computer operators, except peripheral equipment .....	1,120	.17	6	12
Data entry keyers, except composing .....	1,580	.24	11	12
All other office machine operators .....	380	.06	22	2
Switchboard operators .....	1,020	.16	3	20
Material recording, scheduling, dispatching, and distributing workers .....	16,610	2.54	n.a.	n.a.
Production, planning, and expediting clerks .....	3,780	.58	4	27
Weighers, measurers, checkers, and samplers, recordkeeping .....	890	.14	8	5
Stock clerks, stockroom, warehouse or storage yard .....	3,060	.47	5	18
Traffic, shipping, and receiving clerks .....	8,080	1.24	2	60
All other material recording, scheduling, and distributing workers .....	800	.12	12	4
All other clerical and administrative support workers .....	1,680	.26	21	6
Service occupations .....	9,340	1.43	n.a.	n.a.
First-line supervisors and manager/supervisors, service .....	650	.10	9	4
Guards and watch guards .....	1,800	.28	7	7
Cleaning and building service workers, except private households .....	6,180	.95	n.a.	n.a.
Janitors and cleaners, except maids and housekeeping cleaners .....	5,760	.88	4	44
All other cleaning and building service workers, except private households .....	420	.06	11	3
All other service workers .....	710	.11	n.a.	n.a.
Agriculture, forestry, fishing, and related occupations .....	2,970	.45	n.a.	n.a.
Log handling equipment operators .....	1,540	.24	15	2

See footnotes at end of table.

**Table 10. Paper and allied products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued**

(SIC 26)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Logging tractor operators .....	270	0.04	22	1
Gardeners and groundskeepers, except farm .....	290	.04	18	2
All other agriculture, forestry, fishing, and related workers .....	870	.13	20	1
Production, construction, operating, maintenance, and material handling occupations .....	484,860	74.20	n.a.	n.a.
First-line supervisors, manager/supervisors - production, construction, maintenance, and related workers .....	34,920	5.34	n.a.	n.a.
First-line supervisors and manager/supervisors - mechanics, installers and repairers .....	4,050	.62	4	21
First-line supervisors and manager/supervisors - construction trades and extractive workers .....	590	.09	36	2
First-line supervisors and manager/supervisors - production and operating workers .....	27,380	4.19	2	80
First-line supervisors and manager/superv-transp and material moving machine and vehicle workers .....	1,310	.20	4	14
First-line supervisors and manager/supervisors - helpers, laborers, and material movers, hand .....	1,590	.24	9	9
Precision inspectors, testers, and graders .....	1,220	.19	9	4
Production inspectors, testers, graders, sorters, samplers, and weighers .....	11,570	1.77	4	29
Mechanics, installers, and repairers .....	43,430	6.65	n.a.	n.a.
Machinery maintenance mechanics .....	13,280	2.03	n.a.	n.a.
Machinery maintenance mechanics, water or power generation plant .....	3,660	.56	10	11
All other machinery maintenance mechanics .....	9,620	1.47	6	17
Millwrights .....	6,550	1.00	5	7
Machinery maintenance workers .....	2,900	.44	5	11
Maintenance repairers, general utility .....	15,550	2.38	5	47
Automotive mechanics .....	640	.10	8	4
Bus and truck mechanics and diesel engine specialists .....	520	.08	10	4
Precision instrument repairers .....	2,440	.37	8	6
Mechanical control and valve installers and repairers .....	100	.02	40	( <sup>3</sup> )
Riggers .....	230	.04	25	1
All other mechanics, installers, and repairers .....	1,220	.19	18	3
Construction trades workers, except material moving .....	13,480	2.06	n.a.	n.a.
Carpenters .....	940	.14	6	6
Electricians .....	6,490	.99	4	18
Painters and paperhangers, construction and maintenance .....	840	.13	6	5
Plumbers, pipefitters, and steamfitters .....	3,900	.60	6	6
All other construction trades workers .....	1,310	.20	13	2
Precision metal workers .....	4,970	.76	n.a.	n.a.
Tool-and-die makers .....	1,090	.17	6	8
Machinists .....	2,900	.44	8	10
Tool grinders, filers, sharpeners, and other precision grinders .....	380	.06	8	3
Boilermakers .....	350	.05	15	1
All other precision metal workers .....	250	.04	17	1
Precision printing workers .....	750	.11	n.a.	n.a.
Precision compositors, typesetters, and arrangers .....	380	.06	10	3
All other precision printing workers .....	370	.06	14	2
Precision workers, nec .....	370	.06	n.a.	n.a.

See footnotes at end of table.

**Table 10. Paper and allied products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued**

(SIC 26)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Precision detail design decorators, and painters .....	100	0.02	19	1
All other precision workers, nec .....	270	.04	17	2
Machine setters, set-up operators, and tenders, metal and plastic .....	3,430	.52	n.a.	n.a.
Punching machine setters and set-up operators, metal and plastic .....	380	.06	20	1
Press and press brake machine setters and set-up operators, metal and plastic .....	260	.04	22	1
Machine forming operators and tenders, metal and plastic .....	2,100	.32	12	3
Combination machine tool operators and tenders, metal and plastic .....	340	.05	38	( <sup>3</sup> )
All other machine setters and set-up operators, metal and plastic .....	350	.05	n.a.	n.a.
All other machine operators and tenders, metal and plastic .....	780	.12	n.a.	n.a.
Machine setters, set-up operators, and tenders, except metal and plastic .....	208,480	31.90	n.a.	n.a.
Printing press machine setters and set-up operators .....	5,150	.79	5	12
Photoengraving and lithographing photographers .....	520	.08	14	3
Specialty materials printing machine setters and set-up operators .....	4,960	.76	6	11
Screen printing machine setters and set-up operators .....	680	.10	20	2
All other printing related setters and set-up operators .....	1,060	.16	10	3
Printing press machine operators and tenders .....	16,660	2.55	3	35
Photoengraving and lithographing machine operators and tenders .....	460	.07	11	3
Bindery machine operators .....	780	.12	13	3
All other printing, binding, and related machine operators and tenders .....	1,410	.22	11	3
Paper goods machine setters and set-up operators .....	54,820	8.39	3	53
Boiler operators and tenders, low pressure .....	3,060	.47	6	8
Chemical equipment controllers and operators .....	2,650	.41	7	5
Chemical equipment tenders .....	2,320	.36	10	4
Cutting and slicing machine setters and set-up operators .....	5,350	.82	5	21
Cutting and slicing machine operators and tenders .....	18,230	2.79	4	41
Coating, painting, and spraying machine setters and set-up operators .....	2,190	.34	10	4
Coating, painting, and spraying machine operators and tenders .....	5,480	.84	6	12
Cementing and gluing machine operators and tenders .....	9,840	1.51	5	25
Cleaning, washing, and pickling equipment operators and tenders .....	1,970	.30	10	3
Separating, filtering, clarifying, precipitating, and still machine operators and tenders .....	1,690	.26	9	3
Crushing, grinding, mixing, and blending machine operators and tenders .....	7,960	1.22	5	9
Extruding, forming, pressing, and compacting machine setters and set-up operators .....	3,270	.50	12	5
Extruding, forming, pressing, and compacting machine operators and tenders .....	6,690	1.02	7	16
Packaging and filling machine operators and tenders .....	11,780	1.80	6	18
All other machine setters and set-up operators, except metal and plastic .....	3,080	.47	10	4

See footnotes at end of table.

**Table 10. Paper and allied products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued**

(SIC 26)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
All other machine operators and tenders, except metal and plastic .....	35,640	5.45	4	19
Other hand workers, nec .....	19,710	3.02	n.a.	n.a.
Welders and cutters .....	1,580	.24	7	5
Solderers and brazers .....	80	.01	30	( <sup>3</sup> )
Cutters and trimmers, hand .....	1,550	.24	9	5
Assemblers and fabricators, except machine, electrical, electronic, and precision .....	11,160	1.71	6	14
All other hand workers, nec .....	5,340	.82	9	6
Plant and system workers .....	6,770	1.04	n.a.	n.a.
Water and liquid waste treatment plant and system operators .....	1,060	.16	7	4
Chemical plant and system operators .....	550	.08	14	1
Power distributors and dispatchers .....	1,360	.21	10	3
Stationary engineers .....	1,780	.27	7	5
All other plant and system operators .....	2,020	.31	15	2
Motor vehicle operators .....	9,990	1.53	n.a.	n.a.
Truck drivers, heavy or tractor trailer .....	7,330	1.12	3	37
Truck drivers, light, include delivery and route workers .....	2,260	.35	8	19
All other motor vehicle operators .....	400	.06	17	1
Rail yard engineers, dinkey operators, and hostlers .....	110	.02	14	1
Railroad brake, signal, and switch operators .....	180	.03	17	1
All other transportation and motor vehicle operators .....	140	.02	17	1
Material moving equipment operators .....	25,610	3.92	n.a.	n.a.
Hoist and winch operators .....	270	.04	25	1
Crane and tower operators .....	1,200	.18	8	4
Industrial truck and tractor operators .....	20,920	3.20	2	49
Conveyor operators and tenders .....	1,820	.28	8	6
Pump operators .....	300	.05	24	1
All other material moving equipment operators .....	1,100	.17	10	3
Helpers - mechanics and repairers .....	1,160	.18	9	5
Construction trades and extractive worker helpers .....	450	.07	15	1
Machine feeders and offbearers .....	24,890	3.81	3	35
Freight, stock, and material movers, hand .....	10,390	1.59	4	30
Hand packers and packagers .....	21,100	3.23	4	27
All other helpers, laborers, and material movers, hand .....	41,740	6.39	4	23

<sup>1</sup> Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

<sup>2</sup> Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors

are estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

<sup>3</sup> Less than 0.5 percent.

n.a. = not available.

NOTE: Detail may not add to totals due to rounding. Estimated employment is rounded to the nearest 10.

# Printing and Publishing

Establishments in this industry perform any of the following operations: (1) Letterpress, lithography, gravure, or screen printing; (2) bookbinding, typesetting, engraving, photoengraving, and electrotyping; and (3) publishing newspapers, books, and periodicals, whether or not they do their own printing. These establishments employed nearly 1.3 million workers, or 7 percent of manufacturing and 17 percent of non-durable goods employment in 1983. One-third of the workers were in establishments publishing (or publishing and printing) newspapers; another one-third worked in establishments engaged in commercial printing; and less than one-tenth worked in establishments which publish (or publish and print) books and pamphlets.

Unlike most other industries surveyed in the manufacturing sector of the economy, employment in the printing and publishing industry increased by 2 percent between 1980 and 1983.

Managerial and administrative workers decreased from 10 percent of total employment in 1980 to 7 percent in 1983. Sales workers and clerical and administrative support workers, however, both increased as a percentage of total industry employment. Text table

8 shows employment by major occupational group since 1977.

Although still the largest occupational group in the printing and publishing industry, the 602,150 production and related workers accounted for only about half of total industry employment (table 11), a smaller proportion than in any other manufacturing industry surveyed. Clerical workers accounted for 24 percent. Professional, paraprofessional, and technical workers made up 11 percent of industry employment; sales workers, 10 percent; managerial and administrative workers, 7 percent; and service workers, 1 percent.

The five most populous occupations in printing and publishing are listed below:

	<i>Employment</i>	<i>Percent of industry employment</i>
General managers and top executives .....	63,060	4.9
Sales representatives .....	62,530	4.9
Printing press machine operators and tenders .....	60,390	4.7
Offset lithographic press setters and setup operators .....	55,690	4.3
Writers and editors .....	50,710	3.9

**Text table 8. Printing and publishing: Employment by major occupational group, selected years, 1977-83**

Major occupational group	1977	1980	1983	Percent change 1977-83
Total .....	1,132,880	1,254,300	1,286,710	13.6
Managerial and administrative workers .....	97,070	126,830	191,520	-5.7
Professional, paraprofessional, and technical workers .....	121,430	136,890	147,490	21.5
Sales workers .....	73,050	92,890	<sup>2</sup> 123,560	69.1
Clerical workers .....	239,570	264,290	302,560	26.3
Production and related workers .....	582,510	612,420	602,150	3.4
Service workers .....	19,250	20,980	19,200	-0.3

<sup>1</sup> A significant portion of the decline may be due to changes in the coding structure rather than to actual changes in establishment staffing patterns. See footnote 1 to text table 1.

<sup>2</sup> Includes 7,722 employees in the occupation "first-line supervisor—sales" which would have been included with managerial employment in previous surveys.

**Table 11. Printing and publishing: Employment, relative error, and percent of establishments reporting selected occupations, May 1983**

(SIC 27)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Total .....	1,286,710	100.00	--	--
Managerial and administrative occupations .....	91,520	7.11	n.a.	n.a.
Financial managers .....	3,350	.26	2	9
Personnel, training, and labor relations managers .....	1,750	.14	2	6
Purchasing managers .....	1,020	.08	3	4
Marketing, advertising, and public relations managers .....	6,050	.47	3	8
Administrative services managers .....	2,940	.23	8	4
Industrial production managers .....	5,180	.40	3	8
General managers and top executives .....	63,060	4.90	1	79
All other managers and administrators .....	8,170	.63	7	5
Professional, paraprofessional, and technical occupations .....	147,490	11.46	n.a.	n.a.
Management support workers .....	11,260	.88	n.a.	n.a.
Accountants, auditors, and other financial specialists .....	4,100	.32	n.a.	n.a.
Accountants and auditors .....	3,040	.24	4	6
Budget analysts .....	380	.03	7	1
All other financial specialists .....	680	.05	10	1
Purchasing agents, except wholesale and retail trade, and farm products .....	1,330	.10	3	4
Personnel, training, and labor relations specialists .....	890	.07	4	2
Cost estimators .....	2,820	.22	4	5
All other management support workers .....	2,120	.16	6	2
Engineers .....	1,260	.10	n.a.	n.a.
Industrial engineers, except safety .....	500	.04	6	1
Mechanical engineers .....	530	.04	9	1
All other engineers .....	230	.02	12	( <sup>3</sup> )
Engineering and related technicians and technologists .....	3,930	.31	n.a.	n.a.
Industrial engineering technicians and technologists .....	150	.01	13	( <sup>3</sup> )
Drafters .....	3,100	.24	7	4
All other engineering and related technicians and technologists .....	680	.05	13	1
Computer scientists and related workers .....	8,850	.69	n.a.	n.a.
Systems analysts, electronic data processing .....	2,970	.23	5	5
Computer programmers .....	4,670	.36	4	8
All other computer systems analysts, programmers, and programmer aides .....	1,210	.09	n.a.	n.a.
Mathematical scientists and related workers .....	320	.02	n.a.	n.a.
Librarians, professional .....	1,360	.11	9	3
Health practitioners, technologists, technicians, and related health workers .....	180	.01	11	1
Writers and editors .....	50,710	3.94	2	27
Technical writers .....	1,380	.11	12	1
Public relations specialists and publicity writers .....	1,160	.09	10	1
Reporters and correspondents .....	41,670	3.24	2	15
Photographers .....	5,480	.43	3	6
Artists and related workers .....	11,140	.87	3	11
Designers, except interior designers .....	3,160	.25	6	3
All other professional, paraprofessional, and technical workers .....	5,630	.44	n.a.	n.a.
Sales and related occupations .....	123,570	9.60	n.a.	n.a.
First-line supervisors and manager/supervisors, sales and related workers .....	7,720	.60	5	6
Sales agents, advertising .....	20,290	1.58	3	7

See footnotes at end of table.

**Table 11. Printing and publishing: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued**

(SIC 27)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Sales representatives, scientific and related products and services, except retail .....	9,940	0.77	4	9
Sales representatives, except scientific and related products or services and retail .....	62,530	4.86	2	42
Cashiers .....	1,380	.11	7	2
News and street vendors, telephone solicitors, door-to-door sales workers, and other related workers .....	16,600	1.29	15	2
All other sales and related workers .....	5,110	.40	9	3
Clerical and administrative support occupations .....	302,520	23.51	n.a.	n.a.
First-line supervisors and manager/supervisors, clerical and administrative support workers .....	7,840	.61	3	8
Library assistants and bookmobile drivers .....	680	.05	7	1
Advertising clerks .....	10,490	.82	4	5
Proofreaders and copy markers .....	18,640	1.45	2	24
Secretaries .....	42,180	3.28	2	52
Stenographers .....	970	.08	13	1
Receptionists and information clerks .....	2,750	.21	6	6
Typists .....	10,840	.84	3	13
Typists, word processing equipment .....	7,520	.58	4	10
Personnel clerks, except payroll and timekeeping .....	1,070	.08	3	4
File clerks .....	2,690	.21	6	3
Order clerks, materials, merchandise, and service .....	9,060	.70	4	5
Procurement clerks .....	760	.06	5	2
Statistical clerks .....	820	.06	9	1
Interviewing clerks, except personnel and social welfare .....	950	.07	18	( <sup>3</sup> )
Bookkeeping, accounting, and auditing clerks .....	35,170	2.73	1	55
Payroll and timekeeping clerks .....	2,060	.16	3	6
Billing, cost and rate clerks .....	4,100	.32	3	6
General office clerks .....	44,330	3.45	3	40
Electronic data processing and other office machine operators .....	45,180	3.51	n.a.	n.a.
Billing, posting, and calculating machine operators .....	1,330	.10	6	2
Duplicating machine operators .....	810	.06	13	2
Mail machine operators, preparation and handling .....	12,800	.99	5	9
Computer operators, except peripheral equipment .....	3,650	.28	6	5
Peripheral EDP equipment operators .....	510	.04	9	1
Data entry keyers, except composing .....	5,160	.40	5	5
Data keyers, composing .....	20,130	1.56	3	18
All other office machine operators .....	790	.06	14	1
Switchboard operators .....	3,040	.24	2	8
Mail clerks, except mail machine operators and postal service .....	7,100	.55	5	9
Messengers .....	4,470	.35	4	5
Material recording, scheduling, dispatching, and distributing workers .....	31,770	2.47	n.a.	n.a.
Dispatchers, except police, fire, and ambulance .....	720	.06	8	1
Production, planning, and expediting clerks .....	5,770	.45	3	6
Weighers, measurers, checkers, and samplers, recordkeeping .....	290	.02	12	( <sup>3</sup> )
Stock clerks, stockroom, warehouse or storage yard .....	6,950	.54	4	11
Traffic, shipping, and receiving clerks .....	16,680	1.30	2	22
All other material recording, scheduling, and distributing workers .....	1,360	.11	11	1
All other clerical and administrative support workers .....	8,040	.62	10	3

See footnotes at end of table.

**Table 11. Printing and publishing: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued**

(SIC 27)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Service occupations .....	19,200	1.49	n.a.	n.a.
First-line supervisors and manager/supervisors, service .....	960	.07	6	2
Guards and watch guards .....	1,870	.15	6	2
Food and beverage preparation and service workers .....	410	.03	11	( <sup>3</sup> )
Cleaning and building service workers, except private households .....	15,260	1.19	n.a.	n.a.
Janitors and cleaners, except maids and housekeeping cleaners .....	14,470	1.12	2	24
All other cleaning and building service workers, except private households .....	790	.06	n.a.	n.a.
All other service workers .....	700	.05	n.a.	n.a.
Agriculture, forestry, fishing, and related occupations .....	230	.02	n.a.	n.a.
Gardeners and groundskeepers, except farm .....	230	.02	12	1
Production, construction, operating, maintenance, and material handling occupations .....	602,180	46.80	n.a.	n.a.
First-line supervisors, manager/supervisors - production, construction, maintenance, and related workers .....	39,460	3.07	n.a.	n.a.
First-line supervisors and manager/supervisors - mechanics, installers and repairers .....	820	.06	5	2
First-line supervisors and manager/supervisors - production and operating workers .....	36,000	2.80	1	44
First-line supervisors and manager/superv-transp and material moving machine and vehicle workers .....	1,310	.10	6	2
First-line supervisors and manager/supervisors - helpers, laborers, and material movers, hand .....	1,330	.10	8	2
Precision inspectors, testers, and graders .....	640	.05	14	1
Production inspectors, testers, graders, sorters, samplers, and weighers .....	4,680	.36	6	3
Mechanics, installers, and repairers .....	11,910	.93	n.a.	n.a.
Machinery maintenance mechanics .....	3,060	.24	6	3
Machinery maintenance workers .....	740	.06	16	1
Maintenance repairers, general utility .....	6,660	.52	3	12
Automotive mechanics .....	340	.03	14	1
Bus and truck mechanics and diesel engine specialists .....	270	.02	18	( <sup>3</sup> )
All other mechanics, installers, and repairers .....	840	.07	n.a.	n.a.
Construction trades workers, except material moving .....	2,310	.18	n.a.	n.a.
Carpenters .....	350	.03	7	1
Electricians .....	1,560	.12	5	2
Plumbers, pipefitters, and steamfitters .....	180	.01	12	( <sup>3</sup> )
All other construction trades workers .....	220	.02	n.a.	n.a.
Precision metal workers .....	2,520	.20	n.a.	n.a.
Machinists .....	1,620	.13	10	1
Precision etchers and engravers, hand or machine .....	650	.05	20	1
All other precision metal workers .....	250	.02	n.a.	n.a.
Precision printing workers .....	88,330	6.86	n.a.	n.a.
Precision compositors, typesetters, and arrangers .....	20,960	1.63	3	19
Job printers .....	15,690	1.22	4	15
Precision lithography and photoengraving workers .....	40,310	3.13	2	30
Bookbinders .....	9,310	.72	6	6

See footnotes at end of table.

**Table 11. Printing and publishing: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued**

(SIC 27)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
All other precision printing workers .....	2,060	0.16	11	1
Precision workers, nec .....	18,170	1.41	n.a.	n.a.
Precision detail design decorators, and painters .....	4,720	.37	7	5
Precision photographic process workers .....	2,030	.16	9	2
All other precision workers, nec .....	11,420	.89	4	7
Machine setters, set-up operators, and tenders, except metal and plastic .....	289,830	22.52	n.a.	n.a.
Offset lithographic press setters and set-up operators .....	55,690	4.33	2	30
Letterpress setters and set-up operators .....	19,300	1.50	4	13
All other printing press setters and set-up operators .....	6,020	.47	9	2
Photoengraving and lithographing photographers .....	17,510	1.36	2	26
Specialty materials printing machine setters and set-up operators .....	1,680	.13	18	( <sup>3</sup> )
Screen printing machine setters and set-up operators .....	2,220	.17	13	1
Bindery machine setters and set-up operators .....	23,670	1.84	3	20
All other printing related setters and set-up operators .....	3,570	.28	12	1
Typesetting and composing machine operators and tenders .....	32,340	2.51	3	31
Printing press machine operators and tenders .....	60,390	4.69	2	31
Photoengraving and lithographing machine operators and tenders .....	3,000	.23	9	2
Bindery machine operators .....	31,040	2.41	3	18
All other printing, binding, and related machine operators and tenders .....	11,000	.85	9	3
Paper goods machine setters and set-up operators .....	2,350	.18	12	1
Cutting and slicing machine setters and set-up operators .....	960	.07	10	1
Cutting and slicing machine operators and tenders .....	2,750	.21	6	2
Cementing and gluing machine operators and tenders .....	1,730	.13	11	1
Packaging and filling machine operators and tenders .....	9,220	.72	10	4
All other machine setters and set-up operators, except metal and plastic .....	2,050	.16	14	1
All other machine operators and tenders, except metal and plastic .....	3,340	.26	12	1
Other hand workers, nec .....	18,740	1.46	n.a.	n.a.
Cutters and trimmers, hand .....	660	.05	15	1
Painting, coating, and decorating, workers, hand .....	150	.01	37	( <sup>3</sup> )
Engraving and printing workers, hand .....	790	.06	19	1
All other hand workers, nec .....	17,140	1.33	5	4
Motor vehicle operators .....	35,210	2.74	n.a.	n.a.
Truck drivers, heavy or tractor trailer .....	1,920	.15	12	1
Truck drivers, light, include delivery and route workers .....	18,510	1.44	4	26
Driver/sales workers .....	14,100	1.10	7	3
All other motor vehicle operators .....	680	.05	18	1
All other transportation and motor vehicle operators .....	250	.02	14	( <sup>3</sup> )
Material moving equipment operators .....	6,620	.51	n.a.	n.a.
Industrial truck and tractor operators .....	5,420	.42	6	3
All other material moving equipment operators .....	1,200	.09	20	( <sup>3</sup> )
Helpers - mechanics and repairers .....	580	.05	8	1
Machine feeders and offbearers .....	33,460	2.60	3	12
Freight, stock, and material movers, hand .....	18,560	1.44	3	15

See footnotes at end of table.

**Table 11. Printing and publishing: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued**

(SIC 27)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Hand packers and packagers .....	12,040	0.94	6	3
All other helpers, laborers, and material movers, hand .....	18,280	1.42	n.a.	n.a.
All other production, construction, operating, maintenance, and material handling occupations .....	590	.05	n.a.	n.a.

<sup>1</sup> Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

<sup>2</sup> Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors

are estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

<sup>3</sup> Less than 0.5 percent.

n.a. = not available.

NOTE: Detail may not add to totals due to rounding. Estimated employment is rounded to the nearest 10.

# Chemicals and Allied Products

Establishments which produce basic chemicals and manufacture products by predominantly chemical processes employed 1.1 million workers, accounting for 6 percent of manufacturing and 14 percent of nondurable goods employment in 1983. Of these workers, 19 percent worked in establishments manufacturing, fabricating, or processing medicinal chemicals and pharmaceutical products; 16 percent worked in establishments producing plastics materials and synthetic resins, synthetic rubber, and synthetic and other manmade fibers, except glass; and 16 percent worked in establishments manufacturing industrial organic chemicals.

As shown in table 12, the 546,840 production and related workers in the chemical and allied products industry accounted for over half (52 percent) of total industry employment. Professional, paraprofessional, and technical workers ranked second with 19 percent. The remaining employment was distributed as follows:

Clerical workers, 15 percent; managerial and administrative workers, 8 percent; sales workers, 4 percent; and service workers, 2 percent. The change in occupational employment between 1977 and 1983 is shown in text table 9.

The five most populous occupations in manufacturing chemicals and allied products are listed in the tabulation below:

	<i>Employment</i>	<i>Percent of industry employment</i>
Packaging and filling machine operators and tenders . . . . .	51,480	4.9
Chemical equipment controllers and operators . . . . .	44,180	4.2
First-line supervisors, production . . . . .	41,980	4.0
Secretaries . . . . .	39,650	3.8
Chemical technicians and technologists, except health . . . . .	37,640	3.6

**Text table 9. Chemicals and allied products: Employment by major occupational group, selected years, 1977-83**

Major occupational group	1977	1980	1983	Percent change 1977-83
Total . . . . .	1,081,980	1,116,820	1,053,520	- 2.6
Managerial and administrative workers . . . . .	96,960	110,000	86,400	-10.9
Professional, paraprofessional, and technical workers . . . . .	179,290	196,640	202,040	12.7
Sales workers . . . . .	55,360	35,290	38,270	-30.9
Clerical workers . . . . .	160,600	162,670	153,900	- 4.2
Production and related workers . . . . .	564,030	587,520	546,840	- 3.0
Service workers . . . . .	25,740	24,700	23,560	- 8.5

**Table 12. Chemical and allied products: Employment, relative error, and percent of establishments reporting selected occupations, June 1983**

(SIC 28)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Total .....	1,053,570	100.00	--	--
Managerial and administrative occupations .....	86,400	8.20	n.a.	n.a.
Financial managers .....	5,490	.52	6	18
Personnel, training, and labor relations managers .....	3,700	.35	5	19
Purchasing managers .....	1,860	.18	3	15
Marketing, advertising, and public relations managers .....	6,700	.64	7	11
Administrative services managers .....	2,810	.27	12	9
Industrial production managers .....	9,570	.91	5	21
General managers and top executives .....	32,300	3.07	4	86
All other managers and administrators .....	23,970	2.28	7	19
Professional, paraprofessional, and technical occupations .....	202,050	19.18	n.a.	n.a.
Management support workers .....	33,710	3.20	n.a.	n.a.
Accountants, auditors, and other financial specialists .....	14,540	1.38	n.a.	n.a.
Accountants and auditors .....	10,940	1.04	4	36
Budget analysts .....	1,190	.11	6	6
All other financial specialists .....	2,410	.23	11	4
Purchasing agents, except wholesale and retail trade, and farm products .....	4,050	.38	3	20
Personnel, training, and labor relations specialists .....	3,920	.37	5	13
Cost estimators .....	790	.07	8	3
Compliance officers and enforcement inspectors, except construction .....	1,170	.11	13	4
All other management support workers .....	9,240	.88	10	8
Engineers .....	40,910	3.88	n.a.	n.a.
Metallurgists, and metallurgical, ceramic, and materials engineers .....	560	.05	12	1
Chemical engineers .....	17,660	1.68	4	24
Civil engineers, including traffic .....	1,570	.15	14	3
Agricultural engineers .....	120	.01	35	( <sup>3</sup> )
Electrical and electronic engineers .....	3,520	.33	9	8
Industrial engineers, except safety .....	3,360	.32	9	7
Safety engineers, except mining .....	1,540	.15	6	9
Mechanical engineers .....	8,290	.79	6	19
All other engineers .....	4,290	.41	10	6
Engineering and related technicians and technologists .....	12,450	1.18	n.a.	n.a.
Civil engineering technicians and technologists .....	320	.03	13	1
Electrical and electronic engineering technicians and technologists .....	2,500	.24	13	4
Industrial engineering technicians and technologists .....	1,150	.11	18	2
Mechanical engineering technicians and technologists .....	1,370	.13	14	2
Drafters .....	3,470	.33	11	10
All other engineering and related technicians and technologists .....	3,640	.35	10	4
Physical scientists .....	31,750	3.01	n.a.	n.a.
Physicists and astronomers .....	240	.02	16	1
Chemists, except biochemists .....	30,110	2.86	4	46
All other physical scientists .....	1,400	.13	12	3
Life scientists .....	11,470	1.09	n.a.	n.a.
Agricultural and food scientists .....	480	.05	17	1
Biological scientists .....	7,650	.73	10	7
Medical scientists .....	2,120	.20	19	1
All other life scientists .....	1,220	.12	18	1
Physical and life science technicians and technologists .....	44,440	4.22	n.a.	n.a.

See footnotes at end of table.

**Table 12. Chemical and allied products: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued**

(SIC 28)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Biological, agricultural, and food technicians and technologists, except health .....	4,180	0.40	12	3
Chemical technicians and technologists, except health .....	37,640	3.57	4	40
All other physical and life science technicians and technologists .....	2,620	.25	10	3
Computer scientists and related workers .....	11,650	1.11	n.a.	n.a.
Systems analysts, electronic data processing .....	6,160	.58	8	10
Computer programmers .....	4,180	.40	6	11
Computer programmer aides .....	1,190	.11	7	5
Programmers - numerical, tool, and process control .....	120	.01	19	( <sup>3</sup> )
Mathematical scientists and related workers .....	1,810	.17	n.a.	n.a.
Operations and systems researchers and analysts, except computer .....	840	.08	12	2
Statisticians .....	790	.07	14	2
All other mathematical scientists .....	180	.02	29	( <sup>3</sup> )
Lawyers .....	1,830	.17	11	3
Physicians and surgeons .....	360	.03	10	3
Veterinarians and veterinary inspectors .....	290	.03	15	1
Registered nurses .....	1,360	.13	4	9
Pharmacists .....	300	.03	27	( <sup>3</sup> )
All other health professionals, paraprofessional and technicians .....	930	.09	14	3
Writers and editors .....	720	.07	17	2
Technical writers .....	530	.05	18	2
Public relations specialists and publicity writers .....	520	.05	17	2
Designers, except interior designers .....	1,210	.11	12	3
All other professional, paraprofessional, and technical workers .....	5,810	.55	n.a.	n.a.
Sales and related occupations .....	38,270	3.63	n.a.	n.a.
First-line supervisors and manager/supervisors, sales and related workers .....	4,440	.42	9	7
Sales engineers .....	3,770	.36	8	9
Sales representatives, scientific and related products and services, except retail .....	21,040	2.00	4	35
Sales representatives, except scientific and related products or services and retail .....	5,850	.56	8	7
All other sales and related workers .....	3,170	.30	9	5
Clerical and administrative support occupations .....	153,910	14.61	n.a.	n.a.
First-line supervisors and manager/supervisors, clerical and administrative support workers .....	5,940	.56	7	16
Secretaries .....	39,650	3.76	4	70
Stenographers .....	3,020	.29	10	4
Receptionists and information clerks .....	1,230	.12	5	9
Typists .....	5,190	.49	6	16
Typists, word processing equipment .....	2,820	.27	7	9
Personnel clerks, except payroll and timekeeping .....	2,310	.22	5	12
File clerks .....	1,410	.13	7	5
Order clerks, materials, merchandise, and service .....	4,890	.46	7	13
Procurement clerks .....	1,920	.18	4	12
Statistical clerks .....	960	.09	13	3
Bookkeeping, accounting, and auditing clerks .....	14,640	1.39	3	53
Payroll and timekeeping clerks .....	2,240	.21	2	17
Billing, cost and rate clerks .....	4,220	.40	5	13
General office clerks .....	18,510	1.76	4	46
Electronic data processing and other office machine operators .....	8,520	.81	n.a.	n.a.

See footnotes at end of table.

**Table 12. Chemical and allied products: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued**

(SIC 28)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Billing, posting, and calculating machine operators .....	510	0.05	9	2
Computer operators, except peripheral equipment .....	2,750	.26	5	11
Peripheral EDP equipment operators .....	660	.06	10	2
Data entry keyers, except composing .....	3,730	.35	4	13
All other office machine operators .....	870	.08	9	2
Switchboard operators .....	1,640	.16	2	16
Material recording, scheduling, dispatching, and distributing workers .....	30,130	2.86	n.a.	n.a.
Production, planning, and expediting clerks .....	5,470	.52	4	14
Weighers, measurers, checkers, and samplers, recordkeeping .....	1,350	.13	10	3
Stock clerks, stockroom, warehouse or storage yard .....	8,250	.78	3	30
Traffic, shipping, and receiving clerks .....	13,450	1.28	2	51
All other material recording, scheduling, and distributing workers .....	1,610	.15	10	4
All other clerical and administrative support workers .....	4,670	.44	8	7
Service occupations .....	23,570	2.24	n.a.	n.a.
First-line supervisors and manager/supervisors, service .....	1,860	.18	7	6
Guards and watch guards .....	6,380	.61	5	11
Food and beverage preparation and service workers .....	1,000	.09	12	2
Cleaning and building service workers, except private households .....	13,420	1.27	n.a.	n.a.
Janitors and cleaners, except maids and housekeeping cleaners .....	12,740	1.21	3	31
All other cleaning and building service workers, except private households .....	680	.06	n.a.	n.a.
All other service workers .....	910	.09	n.a.	n.a.
Agriculture, forestry, fishing, and related occupations .....	2,520	.24	n.a.	n.a.
Gardeners and groundskeepers, except farm .....	960	.09	9	3
Animal caretakers, except farm .....	1,340	.13	13	1
All other agriculture, forestry, fishing, and related workers .....	220	.02	40	( <sup>3</sup> )
Production, construction, operating, maintenance, and material handling occupations .....	546,850	51.90	n.a.	n.a.
First-line supervisors, manager/supervisors - production, construction, maintenance, and related workers .....	57,290	5.44	n.a.	n.a.
First-line supervisors and manager/supervisors - mechanics, installers and repairers .....	9,250	.88	3	17
First-line supervisors and manager/supervisors - construction trades and extractive workers .....	1,430	.14	10	3
First-line supervisors and manager/supervisors - production and operating workers .....	41,980	3.98	2	71
First-line supervisors and manager/superv-transp and material moving machine and vehicle workers .....	2,100	.20	4	10
First-line supervisors and manager/supervisors - helpers, laborers, and material movers, hand .....	2,530	.24	6	7
Precision inspectors, testers, and graders .....	3,200	.30	10	3

See footnotes at end of table.

**Table 12. Chemical and allied products: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued**

(SIC 28)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Production inspectors, testers, graders, sorters, samplers, and weighers .....	14,210	1.35	7	18
Mechanics, installers, and repairers .....	69,370	6.58	n.a.	n.a.
Machinery maintenance mechanics .....	21,070	2.00	n.a.	n.a.
Machinery maintenance mechanics, water or power generation plant .....	5,810	.55	9	8
All other machinery maintenance mechanics .....	15,260	1.45	5	10
Millwrights .....	4,650	.44	8	3
Machinery maintenance workers .....	2,260	.21	8	4
Maintenance repairers, general utility .....	27,070	2.57	3	46
Automotive mechanics .....	820	.08	8	3
Bus and truck mechanics and diesel engine specialists .....	640	.06	10	2
Heating, air conditioning, and refrigeration mechanics and installers .....	1,150	.11	8	3
Precision instrument repairers .....	7,360	.70	5	8
Mechanical control and valve installers and repairers .....	820	.08	10	2
Riggers .....	930	.09	9	2
All other mechanics, installers, and repairers .....	2,600	.25	16	2
Construction trades workers, except material moving .....	26,650	2.53	n.a.	n.a.
Carpenters .....	2,500	.24	5	6
Electricians .....	10,800	1.03	5	18
Painters and paperhangers, construction and maintenance .....	1,830	.17	5	6
Plumbers, pipefitters, and steamfitters .....	8,510	.81	5	7
Insulation workers .....	1,450	.14	8	3
All other construction trades workers .....	1,560	.15	25	2
Extractive and related workers, including blasters .....	160	.02	25	( <sup>3</sup> )
Precision metal workers .....	9,290	.88	n.a.	n.a.
Machinists .....	6,520	.62	9	9
Sheet-metal workers .....	1,220	.12	8	3
Boilermakers .....	1,310	.12	13	2
All other precision metal workers .....	240	.02	33	( <sup>3</sup> )
Precision workers, nec .....	840	.08	13	1
Machine setters, set-up operators, and tenders, except metal and plastic .....	209,850	19.92	n.a.	n.a.
Textile machine setters and set-up operators .....	5,640	.54	17	( <sup>3</sup> )
Textile machine operators and tenders - winding, twisting, knitting, weaving, and cutting .....	10,960	1.04	11	1
Extruding and forming machine operators and tenders, synthetic or glass fibers .....	10,730	1.02	9	1
Textile draw-out machine operators and tenders .....	880	.08	23	( <sup>3</sup> )
Furnace, kiln, oven, drier, or kettle operators and tenders .....	3,400	.32	8	3
Boiler operators and tenders, low pressure .....	2,860	.27	4	5
Cooling and freezing equipment operators and tenders .....	480	.05	21	1
Chemical equipment controllers and operators .....	44,180	4.19	3	24
Chemical equipment tenders .....	14,810	1.41	8	9
Cutting and slicing machine setters and set-up operators .....	570	.06	17	1
Cutting and slicing machine operators and tenders .....	1,070	.10	15	1
Coating, painting, and spraying machine setters and set-up operators .....	530	.05	16	1
Coating, painting, and spraying machine operators and tenders .....	2,960	.28	10	3
Cleaning, washing, and pickling equipment operators and tenders .....	1,360	.13	10	2

See footnotes at end of table.

**Table 12. Chemical and allied products: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued**

(SIC 28)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Separating, filtering, clarifying, precipitating, and still machine operators and tenders .....	4,100	0.39	9	3
Crushing, grinding, mixing, and blending machine operators and tenders .....	29,910	2.84	2	39
Extruding, forming, pressing, and compacting machine setters and set-up operators .....	2,760	.26	10	4
Extruding, forming, pressing, and compacting machine operators and tenders .....	5,890	.56	8	5
Packaging and filling machine operators and tenders .....	51,480	4.89	3	38
All other machine setters and set-up operators, except metal and plastic .....	3,340	.32	12	3
All other machine operators and tenders, except metal and plastic .....	11,840	1.12	8	6
Other hand workers, nec .....	10,640	1.01	n.a.	n.a.
Welders and cutters .....	2,900	.28	6	5
Solderers and brazers .....	110	.01	23	( <sup>3</sup> )
All other hand workers, nec .....	7,630	.72	10	3
Plant and system workers .....	42,830	4.07	n.a.	n.a.
Water and liquid waste treatment plant and system operators .....	3,040	.29	25	4
Gas plant operators .....	410	.04	18	( <sup>3</sup> )
Chemical plant and system operators .....	31,930	3.03	4	13
Power distributors and dispatchers .....	1,260	.12	15	1
Stationary engineers .....	2,130	.20	8	3
All other plant and system operators .....	4,060	.39	12	2
Motor vehicle operators .....	13,180	1.25	n.a.	n.a.
Truck drivers, heavy or tractor trailer .....	8,180	.78	3	23
Truck drivers, light, include delivery and route workers .....	4,430	.42	6	19
All other motor vehicle operators .....	570	.05	14	2
Rail yard engineers, dinky operators, and hostlers .....	310	.03	11	1
Railroad brake, signal, and switch operators .....	320	.03	11	1
All other transportation and motor vehicle operators .....	180	.02	23	( <sup>3</sup> )
Material moving equipment operators .....	23,330	2.21	n.a.	n.a.
Tank car and truck loaders .....	2,680	.25	5	5
Hoist and winch operators .....	130	.01	16	( <sup>3</sup> )
Crane and tower operators .....	580	.06	8	2
Industrial truck and tractor operators .....	15,640	1.48	3	25
Conveyor operators and tenders .....	1,200	.11	12	2
Pump operators .....	2,030	.19	6	5
All other material moving equipment operators .....	1,070	.10	n.a.	n.a.
Helpers - mechanics and repairers .....	1,880	.18	8	4
Construction trades and extractive worker helpers .....	540	.05	13	1
Machine feeders and offbearers .....	3,870	.37	9	2
Freight, stock, and material movers, hand .....	10,620	1.01	5	9
Hand packers and packagers .....	21,890	2.08	15	6
All other helpers, laborers, and material movers, hand .....	26,400	2.51	5	15

<sup>1</sup> Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

<sup>2</sup> Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors

are estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

<sup>3</sup> Less than 0.5 percent.

n.a. = not available.

NOTE: Detail may not add to totals due to rounding. Estimated employment is rounded to the nearest 10.

# Petroleum Refining and Related Industries

Establishments which refine petroleum, manufacture paving and roofing materials, and compound lubricating oils and greases from purchased materials employed 196,960 workers in 1983, or only 1 percent of manufacturing and 3 percent of nondurable goods employment. Over four-fifths of these workers were engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, and other products from crude petroleum and its fractionation products.

The 117,050 production and related workers in this industry (table 13), accounted for 59 percent of total industry employment. Professional, paraprofessional, and technical workers ranked second with 19 percent. Clerical workers accounted for 13 percent; managerial and administrative workers, 5 percent; sales workers, 2

percent; and service workers, 1 percent.

The five most populous occupations in the manufacture of refined petroleum and related products are listed in the tabulation below:

	<i>Employment</i>	<i>Percent of industry employment</i>
Petroleum refinery and control panel operators .....	15,340	7.8
First-line supervisors, production .....	8,480	4.3
Chemical equipment controllers and operators .....	7,540	3.8
Maintenance repairers, general utility .....	5,410	2.7
Chemical technicians and technologists .....	4,970	2.5

**Table 13. Petroleum refining and related industries: Employment, relative error, and percent of establishments reporting selected occupations, May 1983**

(SIC 29)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Total .....	196,940	100.00	--	--
Managerial and administrative occupations .....	10,760	5.46	n.a.	n.a.
Financial managers .....	800	.41	16	13
Personnel, training, and labor relations managers .....	630	.32	11	18
Purchasing managers .....	240	.12	13	11
Marketing, advertising, and public relations managers .....	470	.24	18	9
Administrative services managers .....	430	.22	13	9
Industrial production managers .....	1,340	.68	10	16
Mining, quarrying, and oil and gas well drilling managers .....	140	.07	33	1
General managers and top executives .....	3,780	1.92	5	78
All other managers and administrators .....	2,930	1.49	11	15
Professional, paraprofessional, and technical occupations .....	37,420	19.00	n.a.	n.a.
Management support workers .....	9,070	4.61	n.a.	n.a.
Accountants, auditors, and other financial specialists .....	4,350	2.21	n.a.	n.a.
Accountants and auditors .....	3,330	1.69	16	31
Budget analysts .....	240	.12	13	5
All other financial specialists .....	780	.40	21	4
Purchasing agents, except wholesale and retail trade, and farm products .....	860	.44	6	26
Personnel, training, and labor relations specialists .....	1,040	.53	11	11
Cost estimators .....	220	.11	20	4
All other management support workers .....	2,600	1.32	22	7
Engineers .....	10,610	5.39	n.a.	n.a.
Petroleum engineers .....	380	.19	21	3
Chemical engineers .....	4,530	2.30	9	14
Civil engineers, including traffic .....	560	.28	13	6
Electrical and electronic engineers .....	840	.43	13	8
Industrial engineers, except safety .....	820	.42	22	6
Safety engineers, except mining .....	410	.21	9	10
Mechanical engineers .....	2,420	1.23	9	15
All other engineers .....	650	.33	16	5
Engineering and related technicians and technologists .....	2,830	1.44	n.a.	n.a.
Civil engineering technicians and technologists .....	170	.09	26	2
Electrical and electronic engineering technicians and technologists .....	440	.22	16	5
Industrial engineering technicians and technologists .....	210	.11	28	2
Mechanical engineering technicians and technologists .....	440	.22	19	4
Drafters .....	950	.48	11	11
All other engineering and related technicians and technologists .....	620	.31	24	4
Physical scientists .....	3,370	1.71	n.a.	n.a.
Chemists, except biochemists .....	2,500	1.27	10	29
Geologists, geophysicists, and oceanographers .....	780	.40	26	1
All other physical scientists .....	90	.05	17	2
Physical and life science technicians and technologists .....	6,230	3.16	n.a.	n.a.
Chemical technicians and technologists, except health .....	4,970	2.52	10	25
Petroleum technicians and technologists .....	760	.39	19	7
All other physical and life science technicians and technologists .....	500	.25	42	2
Computer scientists and related workers .....	3,390	1.72	n.a.	n.a.

See footnotes at end of table.

**Table 13. Petroleum refining and related industries: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued**

(SIC 29)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Systems analysts, electronic data processing .....	1,760	0.89	19	7
Computer programmers .....	1,420	.72	21	10
Computer programmer aides .....	210	.11	26	4
Mathematical scientists and related workers .....	130	.07	n.a.	n.a.
Health practitioners, technologists, technicians, and related health workers .....	380	.19	22	7
Public relations specialists and publicity writers .....	100	.05	17	3
All other professional, paraprofessional, and technical workers .....	1,310	.67	n.a.	n.a.
Sales and related occupations .....	4,800	2.44	n.a.	n.a.
First-line supervisors and manager/supervisors, sales and related workers .....	550	.28	27	5
Sales representatives, scientific and related products and services, except retail .....	680	.35	9	13
Sales representatives, except scientific and related products or services and retail .....	2,200	1.12	7	30
All other sales and related workers .....	1,370	.70	44	3
Clerical and administrative support occupations .....	24,770	12.58	n.a.	n.a.
First-line supervisors and manager/supervisors, clerical and administrative support workers .....	1,490	.76	16	15
Secretaries .....	4,720	2.40	8	60
Stenographers .....	930	.47	28	5
Receptionists and information clerks .....	170	.09	10	8
Typists .....	330	.17	14	6
Typists, word processing equipment .....	230	.12	12	4
Personnel clerks, except payroll and timekeeping .....	430	.22	10	10
File clerks .....	230	.12	18	4
Order clerks, materials, merchandise, and service .....	970	.49	11	25
Procurement clerks .....	290	.15	12	9
Bookkeeping, accounting, and auditing clerks .....	3,700	1.88	10	49
Payroll and timekeeping clerks .....	450	.23	9	15
Billing, cost and rate clerks .....	420	.21	10	10
General office clerks .....	3,960	2.01	11	43
Electronic data processing and other office machine operators .....	1,710	.87	n.a.	n.a.
Billing, posting, and calculating machine operators .....	90	.05	30	2
Computer operators, except peripheral equipment .....	710	.36	17	7
Data entry keyers, except composing .....	600	.30	18	8
All other office machine operators .....	310	.16	24	3
Switchboard operators .....	280	.14	7	13
Material recording, scheduling, dispatching, and distributing workers .....	3,400	1.73	n.a.	n.a.
Production, planning, and expediting clerks .....	1,160	.59	10	12
Weighers, measurers, checkers, and samplers, recordkeeping .....	240	.12	23	3
Stock clerks, stockroom, warehouse or storage yard .....	1,300	.66	7	23
Traffic, shipping, and receiving clerks .....	620	.31	13	11
All other material recording, scheduling, and distributing workers .....	80	.04	20	3
All other clerical and administrative support workers .....	1,060	.54	25	6
Service occupations .....	2,120	1.08	n.a.	n.a.
First-line supervisors and manager/supervisors, service .....	160	.08	14	4

See footnotes at end of table.

**Table 13. Petroleum refining and related industries: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued**

(SIC 29)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Guards and watch guards .....	830	0.42	10	8
Food and beverage preparation and service workers .....	110	.06	33	1
Cleaning and building service workers, except private households .....	860	.44	n.a.	n.a.
All other service workers .....	160	.08	n.a.	n.a.
Agriculture, forestry, fishing, and related occupations .....	40	.02	n.a.	n.a.
Production, construction, operating, maintenance, and material handling occupations .....	117,030	59.42	n.a.	n.a.
First-line supervisors, manager/supervisors - production, construction, maintenance, and related workers .....	13,250	6.73	n.a.	n.a.
First-line supervisors and manager/supervisors - mechanics, installers and repairers .....	3,060	1.55	8	15
First-line supervisors and manager/supervisors - construction trades and extractive workers .....	810	.41	13	7
First-line supervisors and manager/supervisors - production and operating workers .....	8,480	4.31	4	69
First-line supervisors and manager/superv-transp and material moving machine and vehicle workers .....	460	.23	9	10
First-line supervisors and manager/supervisors - helpers, laborers, and material movers, hand .....	440	.22	13	7
Precision inspectors, testers, and graders .....	880	.45	14	7
Production inspectors, testers, graders, sorters, samplers, and weighers .....	1,620	.82	9	11
Mechanics, installers, and repairers .....	14,050	7.13	n.a.	n.a.
Machinery maintenance mechanics .....	4,240	2.15	7	29
Machinery maintenance workers .....	210	.11	19	3
Maintenance repairers, general utility .....	5,410	2.75	9	39
Automotive mechanics .....	470	.24	9	12
Bus and truck mechanics and diesel engine specialists .....	230	.12	14	5
Precision instrument repairers .....	2,400	1.22	8	10
Mechanical control and valve installers and repairers .....	380	.19	21	2
Riggers .....	350	.18	15	3
All other mechanics, installers, and repairers .....	360	.18	22	3
Construction trades workers, except material moving .....	9,290	4.72	n.a.	n.a.
Carpenters .....	1,000	.51	10	10
Electricians .....	2,410	1.22	7	15
Painters and paperhangers, construction and maintenance .....	410	.21	14	6
Plumbers, pipefitters, and steamfitters .....	3,880	1.97	10	10
Pipelayers .....	150	.08	30	1
Insulation workers .....	760	.39	10	7
All other construction trades workers .....	680	.35	n.a.	n.a.
Extractive and related workers, including blasters .....	180	.09	29	1
Precision metal workers .....	4,720	2.40	n.a.	n.a.
Machinists .....	3,060	1.55	12	9
Boilermakers .....	1,560	.79	12	5
All other precision metal workers .....	100	.05	23	2
Precision workers, nec .....	100	.05	34	1
Machine setters, set-up operators, and tenders, except metal and plastic .....	20,440	10.38	n.a.	n.a.

See footnotes at end of table.

**Table 13. Petroleum refining and related industries: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued**

(SIC 29)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Furnace, kiln, oven, drier, or kettle operators and tenders .....	910	0.46	14	5
Boiler operators and tenders, low pressure .....	650	.33	12	6
Chemical equipment controllers and operators .....	7,540	3.83	13	10
Chemical equipment tenders .....	930	.47	21	4
Cutting and slicing machine setters and set-up operators .....	60	.03	27	1
Cutting and slicing machine operators and tenders .....	170	.09	21	2
Coating, painting, and spraying machine setters and set-up operators .....	510	.26	20	2
Coating, painting, and spraying machine operators and tenders .....	940	.48	14	6
Separating, filtering, clarifying, precipitating, and still machine operators and tenders .....	1,470	.75	26	3
Crushing, grinding, mixing, and blending machine operators and tenders .....	3,410	1.73	7	41
Packaging and filling machine operators and tenders .....	3,020	1.53	7	21
All other machine setters and set-up operators, except metal and plastic .....	350	.18	21	1
All other machine operators and tenders, except metal and plastic .....	480	.24	17	3
Other hand workers, nec .....	2,200	1.12	n.a.	n.a.
Welders and cutters .....	2,000	1.02	8	18
All other hand workers, nec .....	200	.10	n.a.	n.a.
Plant and system workers .....	26,550	13.48	n.a.	n.a.
Gas plant operators .....	1,190	.60	26	2
Chemical plant and system operators .....	1,810	.92	13	8
Petroleum pump system operators .....	3,380	1.72	11	12
Petroleum refinery and control panel operators .....	15,340	7.79	8	17
Gaugers .....	1,580	.80	11	8
Power distributors and dispatchers .....	720	.37	21	2
Stationary engineers .....	630	.32	16	3
All other plant and system operators .....	1,900	.96	16	7
Motor vehicle operators .....	5,210	2.65	n.a.	n.a.
Truck drivers, heavy or tractor trailer .....	4,160	2.11	7	36
Truck drivers, light, include delivery and route workers .....	850	.43	9	15
All other motor vehicle operators .....	200	.10	19	3
All other transportation and motor vehicle operators .....	100	.05	n.a.	n.a.
Material moving equipment operators .....	6,230	3.16	n.a.	n.a.
Tank car and truck loaders .....	1,250	.63	9	16
Oil pumpers, except well head .....	260	.13	32	1
Crane and tower operators .....	310	.16	15	5
Industrial truck and tractor operators .....	2,630	1.34	4	35
Conveyor operators and tenders .....	280	.14	26	2
Pump operators .....	1,150	.58	12	10
All other material moving equipment operators .....	350	.18	n.a.	n.a.
Helpers - mechanics and repairers .....	1,820	.92	12	7
Construction trades and extractive worker helpers .....	740	.38	16	4
Machine feeders and offbearers .....	840	.43	13	8
Freight, stock, and material movers, hand .....	1,640	.83	9	19
All other helpers, laborers, and material movers, hand .....	7,170	3.64	13	20

<sup>1</sup> Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

<sup>2</sup> Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors

are estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

n.a. = not available.

NOTE: Detail may not add to totals due to rounding. Estimated employment is rounded to the nearest 10.

# Rubber and Miscellaneous Plastics Products

This industry includes establishments which manufacture tires, rubber footwear, mechanical rubber goods, heels and soles, flooring, and rubber sundries; establishments which engage in molding primary plastics for the trade; and those manufacturing miscellaneous finished plastics products. The industry employed 719,440 workers in 1983, or 4 percent of manufacturing and 9 percent of nondurable goods workers. Of the industry's employees, 68 percent worked in establishments molding primary plastics or fabricating miscellaneous finished plastics products. Establishments manufacturing tires and inner tubes employed 13 percent; establishments manufacturing industrial and mechanical rubber goods, together with rubberized fabric sundries employed 14 percent.

Unlike the majority of industries surveyed in 1983, aggregate employment in the rubber and miscellaneous plastics industry increased since 1980, growing by more than 18,000 (or 1 percent).

Staffing patterns changed markedly between surveys. The number of managerial and administrative workers declined by 11 percent between 1980 and 1983, while clerical staff declined by 6 percent. In line with other manufacturing industries, however, the employment of sales workers increased. Sales worker employment in the rubber and miscellaneous plastics industry increased by 3,600, or 33 percent. Employment since 1977 by occupational group is summarized in text table 10.

As shown in table 14, the industry's 553,380 production and related workers accounted for over three-fourths of total industry employment. Clerical workers, mostly office workers, ranked second with 9 percent. The remaining employment was distributed as follows: Managerial and administrative workers, 6 percent; professional, paraprofessional, and technical workers, 5 percent; sales workers about 2 percent; and service workers, about 1 percent.

The five most populous occupations in manufacturing rubber and miscellaneous plastics products are listed in the tabulation below. These jobs, all of which are in the production category, made up over one-fourth of total industry employment.

	<i>Employment</i>	<i>Percent of industry employment</i>
Plastic molding and casting machine operators and tenders .....	78,700	10.9
Assemblers and fabricators, except machine, electrical, electronic, and precision .....	53,130	7.4
First-line supervisors, production .....	35,140	4.9
Extruding, forming, pressing, and compacting machine operators and tenders .....	23,810	3.3
Plastic molding and casting machine setters and setup operators .....	21,810	3.0

**Text table 10. Rubber and miscellaneous plastics products: Employment by major occupational group, selected years, 1977-83**

Major occupational group	1977	1980	1983	Percent change 1977-83
Total .....	721,530	710,990	719,440	-0.3
Managerial and administrative workers .....	37,090	45,860	40,800	10.0
Professional, paraprofessional, and technical workers .....	33,330	41,070	36,000	8.0
Sales workers .....	10,870	11,020	14,620	34.5
Clerical workers .....	60,890	67,470	63,640	4.5
Production and related workers .....	568,200	534,150	553,380	-2.6
Service workers .....	11,150	11,420	10,740	-3.7

<sup>1</sup> Includes 1,540 employees in the occupation "first-line supervisor—sales" and 720 employees in the sales engineer category; in previous

surveys these workers would have been included in the managerial and professional categories.

**Table 14. Rubber and miscellaneous plastics products: Employment, relative error, and percent of establishments reporting selected occupations, June 1983**

(SIC 30)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Total .....	719,450	100.00	--	--
Managerial and administrative occupations .....	40,800	5.67	n.a.	n.a.
Financial managers .....	2,670	.37	14	20
Personnel, training, and labor relations managers .....	1,750	.24	8	18
Purchasing managers .....	1,230	.17	11	15
Marketing, advertising, and public relations managers .....	3,010	.42	15	14
Administrative services managers .....	1,260	.18	21	6
Industrial production managers .....	4,870	.68	7	23
General managers and top executives .....	20,820	2.89	2	87
All other managers and administrators .....	5,190	.72	11	15
Professional, paraprofessional, and technical occupations .....	36,030	5.01	n.a.	n.a.
Management support workers .....	10,110	1.41	n.a.	n.a.
Accountants, auditors, and other financial specialists .....	5,180	.72	n.a.	n.a.
Accountants and auditors .....	4,590	.64	9	31
Budget analysts .....	240	.03	14	2
All other financial specialists .....	350	.05	12	3
Purchasing agents, except wholesale and retail trade, and farm products .....	1,560	.22	4	17
Personnel, training, and labor relations specialists .....	980	.14	5	9
Cost estimators .....	710	.10	6	7
All other management support workers .....	1,680	.23	11	6
Engineers .....	11,280	1.57	n.a.	n.a.
Chemical engineers .....	2,610	.36	18	11
Electrical and electronic engineers .....	970	.13	20	5
Industrial engineers, except safety .....	2,040	.28	7	13
Safety engineers, except mining .....	390	.05	28	3
Mechanical engineers .....	4,020	.56	15	15
All other engineers .....	1,250	.17	15	4
Engineering and related technicians and technologists .....	5,100	.71	n.a.	n.a.
Electrical and electronic engineering technicians and technologists .....	570	.08	13	3
Industrial engineering technicians and technologists .....	550	.08	9	4
Mechanical engineering technicians and technologists .....	1,100	.15	14	4
Drafters .....	1,480	.21	6	11
All other engineering and related technicians and technologists .....	1,400	.19	9	4
Physical scientists .....	1,300	.18	n.a.	n.a.
Chemists, except biochemists .....	1,170	.16	12	6
All other physical scientists .....	130	.02	36	1
Physical and life science technicians and technologists .....	3,540	.49	n.a.	n.a.
Chemical technicians and technologists, except health .....	3,140	.44	6	10
All other physical and life science technicians and technologists .....	400	.06	15	1
Computer scientists and related workers .....	2,770	.39	n.a.	n.a.
Systems analysts, electronic data processing .....	1,000	.14	14	6
Computer programmers .....	1,400	.19	14	9
Computer programmer aides .....	370	.05	7	4
Health practitioners, technologists, technicians, and related health workers .....	360	.05	5	4
Designers, except interior designers .....	430	.06	10	3
All other professional, paraprofessional, and technical workers .....	1,140	.16	n.a.	n.a.

See footnotes at end of table.

**Table 14. Rubber and miscellaneous plastics products: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued**

(SIC 30)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Sales and related occupations .....	14,610	2.03	n.a.	n.a.
First-line supervisors and manager/supervisors, sales and related workers .....	1,540	.21	12	8
Sales engineers .....	720	.10	9	4
Sales representatives, scientific and related products and services, except retail .....	3,160	.44	6	12
Sales representatives, except scientific and related products or services and retail .....	8,050	1.12	4	31
All other sales and related workers .....	1,140	.16	8	5
Clerical and administrative support occupations .....	63,610	8.84	n.a.	n.a.
First-line supervisors and manager/supervisors, clerical and administrative support workers .....	1,920	.27	6	13
Secretaries .....	12,190	1.69	3	64
Stenographers .....	1,150	.16	44	2
Receptionists and information clerks .....	870	.12	6	11
Typists .....	840	.12	8	5
Typists, word processing equipment .....	260	.04	13	2
Personnel clerks, except payroll and timekeeping .....	890	.12	4	11
File clerks .....	300	.04	9	3
Order clerks, materials, merchandise, and service .....	2,080	.29	5	11
Procurement clerks .....	670	.09	5	8
Bookkeeping, accounting, and auditing clerks .....	7,920	1.10	2	52
Payroll and timekeeping clerks .....	1,380	.19	3	16
Billing, cost and rate clerks .....	1,560	.22	6	12
General office clerks .....	7,840	1.09	3	42
Electronic data processing and other office machine operators .....	2,780	.39	n.a.	n.a.
Billing, posting, and calculating machine operators .....	240	.03	9	2
Computer operators, except peripheral equipment .....	850	.12	5	8
Data entry keyers, except composing .....	1,530	.21	6	10
All other office machine operators .....	160	.02	19	1
Switchboard operators .....	900	.13	3	13
Material recording, scheduling, dispatching, and distributing workers .....	19,110	2.66	n.a.	n.a.
Production, planning, and expediting clerks .....	3,400	.47	3	18
Weighers, measurers, checkers, and samplers, recordkeeping .....	660	.09	10	3
Stock clerks, stockroom, warehouse or storage yard .....	2,550	.35	4	14
Traffic, shipping, and receiving clerks .....	11,930	1.66	2	60
All other material recording, scheduling, and distributing workers .....	570	.08	10	3
All other clerical and administrative support workers .....	950	.13	22	3
Service occupations .....	10,740	1.49	n.a.	n.a.
First-line supervisors and manager/supervisors, service .....	640	.09	11	3
Guards and watch guards .....	1,400	.19	6	5
Food and beverage preparation and service workers .....	190	.03	31	1
Cleaning and building service workers, except private households .....	8,090	1.12	n.a.	n.a.
Janitors and cleaners, except maids and housekeeping cleaners .....	7,810	1.09	4	40
All other cleaning and building service workers, except private households .....	280	.04	n.a.	n.a.
All other service workers .....	420	.06	n.a.	n.a.

See footnotes at end of table.

**Table 14. Rubber and miscellaneous plastics products: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued**

(SIC 30)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Agriculture, forestry, fishing, and related occupations .....	260	0.04	n.a.	n.a.
Gardeners and groundskeepers, except farm .....	260	.04	16	2
Production, construction, operating, maintenance, and material handling occupations .....	553,400	76.92	n.a.	n.a.
First-line supervisors, manager/supervisors - production, construction, maintenance, and related workers .....	40,260	5.60	n.a.	n.a.
First-line supervisors and manager/supervisors - mechanics, installers and repairers .....	2,500	.35	4	14
First-line supervisors and manager/supervisors - construction trades and extractive workers .....	340	.05	41	1
First-line supervisors and manager/supervisors - production and operating workers .....	35,140	4.88	2	79
First-line supervisors and manager/superv-transp and material moving machine and vehicle workers .....	970	.13	5	7
First-line supervisors and manager/supervisors - helpers, laborers, and material movers, hand .....	1,310	.18	8	6
Precision inspectors, testers, and graders .....	8,220	1.14	4	23
Production inspectors, testers, graders, sorters, samplers, and weighers .....	21,030	2.92	5	32
Mechanics, installers, and repairers .....	30,550	4.25	n.a.	n.a.
Machinery maintenance mechanics .....	11,670	1.62	4	27
Millwrights .....	1,460	.20	14	2
Machinery maintenance workers .....	1,730	.24	7	6
Maintenance repairers, general utility .....	13,360	1.86	3	45
Automotive mechanics .....	210	.03	14	1
Bus and truck mechanics and diesel engine specialists .....	250	.03	12	1
Precision instrument repairers .....	910	.13	15	2
Mechanical control and valve installers and repairers .....	220	.03	31	( <sup>3</sup> )
All other mechanics, installers, and repairers .....	740	.10	17	2
Construction trades workers, except material moving .....	5,880	.82	n.a.	n.a.
Carpenters .....	420	.06	13	3
Electricians .....	3,580	.50	7	10
Painters and paperhangers, construction and maintenance .....	240	.03	12	2
Plumbers, pipefitters, and steamfitters .....	1,480	.21	11	2
All other construction trades workers .....	160	.02	30	1
Precision metal workers .....	15,720	2.19	n.a.	n.a.
Tool-and-die makers .....	4,340	.60	6	12
Machinists .....	10,020	1.39	5	28
Tool grinders, filers, sharpeners, and other precision grinders .....	380	.05	12	2
Sheet-metal workers .....	590	.08	19	1
All other precision metal workers .....	390	.05	24	1
Precision woodworkers .....	210	.03	32	1
Precision workers, nec .....	1,400	.19	n.a.	n.a.
Precision patternmakers, model makers, layout workers, and cutters .....	530	.07	29	1
All other precision workers, nec .....	870	.12	23	1
Machine setters, set-up operators, and tenders, metal and plastic .....	127,610	17.74	n.a.	n.a.
Punching machine setters and set-up operators, metal and plastic .....	1,460	.20	12	3

See footnotes at end of table.

**Table 14. Rubber and miscellaneous plastics products: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued**

(SIC 30)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Press and press brake machine setters and set-up operators, metal and plastic .....	1,520	0.21	16	2
Shear and slitter machine setters and set-up operators, metal and plastic .....	1,580	.22	12	3
Extruding and drawing machine setters and set-up operators, metal and plastic .....	5,770	.80	9	5
Rolling machine setters and set-up operators, metal and plastic .....	1,490	.21	21	1
Machine forming operators and tenders, metal and plastic .....	8,090	1.12	8	5
Numerical control machine tool operators and tenders, metal and plastic .....	440	.06	21	1
Combination machine tool setters and set-up operators, metal and plastic .....	890	.12	15	2
Combination machine tool operators and tenders, metal and plastic .....	1,210	.17	18	1
Plastic molding and casting machine setters and set-up operators .....	21,810	3.03	5	32
Plastic molding and casting machine operators and tenders .....	78,700	10.94	3	37
Electrolytic plating and coating machine setters and set-up operators, metal and plastic .....	130	.02	27	( <sup>3</sup> )
Electrolytic plating and coating machine operators and tenders, metal and plastic .....	240	.03	25	( <sup>3</sup> )
Nonelectrolytic plating and coating machine setters and set-up operators, metal and plastic .....	120	.02	25	( <sup>3</sup> )
Nonelectrolytic plating and coating machine operators and tenders, metal and plastic .....	340	.05	39	( <sup>3</sup> )
Heating equipment setters and set-up operators, metal and plastic .....	120	.02	23	( <sup>3</sup> )
Heat treating, annealing, and tempering machine operators and tenders, metal and plastic .....	230	.03	37	( <sup>3</sup> )
Heaters, metal and plastic .....	650	.09	22	1
All other machine setters and set-up operators, metal and plastic .....	2,820	.39	13	3
All other machine operators and tenders, metal and plastic .....	6,570	.91	11	4
Machine setters, set-up operators, and tenders, except metal and plastic .....	136,940	19.03	n.a.	n.a.
Printing press machine setters and set-up operators .....	780	.11	15	2
Specialty materials printing machine setters and set-up operators .....	420	.06	31	1
Printing press machine operators and tenders .....	2,020	.28	12	2
All other printing, binding, and related machine operators and tenders .....	660	.09	23	1
Textile machine setters and set-up operators .....	480	.07	20	1
Textile machine operators and tenders - winding, twisting, knitting, weaving, and cutting .....	1,140	.16	18	2
Sewing machine operators, garment .....	1,000	.14	29	( <sup>3</sup> )
Sewing machine operators, nongarment .....	3,820	.53	14	5
Shoe sewing machine operators and tenders .....	5,160	.72	18	( <sup>3</sup> )
Tire building machine operators .....	13,570	1.89	9	2
Furnace, kiln, oven, drier, or kettle operators and tenders .....	4,420	.61	11	3
Boiler operators and tenders, low pressure .....	710	.10	11	3
Chemical equipment controllers and operators .....	930	.13	19	1
Chemical equipment tenders .....	430	.06	19	1

See footnotes at end of table.

**Table 14. Rubber and miscellaneous plastics products: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued**

(SIC 30)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Cutting and slicing machine setters and set-up operators .....	2,220	0.31	13	3
Cutting and slicing machine operators and tenders .....	7,560	1.05	5	14
Coating, painting, and spraying machine setters and set-up operators .....	3,420	.48	10	7
Coating, painting, and spraying machine operators and tenders .....	4,910	.68	8	8
Cementing and gluing machine operators and tenders .....	1,250	.17	14	2
Cleaning, washing, and pickling equipment operators and tenders .....	490	.07	19	1
Crushing, grinding, mixing, and blending machine operators and tenders .....	12,650	1.76	4	24
Extruding, forming, pressing, and compacting machine setters and set-up operators .....	11,270	1.57	6	15
Extruding, forming, pressing, and compacting machine operators and tenders .....	23,810	3.31	4	17
Packaging and filling machine operators and tenders .....	10,930	1.52	7	11
All other machine setters and set-up operators, except metal and plastic .....	3,390	.47	13	3
All other machine operators and tenders, except metal and plastic .....	12,930	1.80	7	7
Other hand workers, nec .....	78,030	10.85	n.a.	n.a.
Welders and cutters .....	850	.12	11	4
Solderers and brazers .....	140	.02	30	( <sup>3</sup> )
Cutters and trimmers, hand .....	6,670	.93	8	6
Molders and casters, hand .....	1,900	.26	12	2
Painting, coating, and decorating, workers, hand .....	3,600	.50	10	5
Assemblers and fabricators, except machine, electrical, electronic, and precision .....	53,130	7.38	3	33
All other hand workers, nec .....	11,740	1.63	8	7
Plant and system workers .....	2,330	.32	n.a.	n.a.
Chemical plant and system operators .....	1,010	.14	22	1
Stationary engineers .....	400	.06	10	1
All other plant and system operators .....	920	.13	23	1
Motor vehicle operators .....	3,750	.52	n.a.	n.a.
Truck drivers, heavy or tractor trailer .....	2,680	.37	6	10
Truck drivers, light, include delivery and route workers .....	1,070	.15	9	8
All other transportation and motor vehicle operators .....	950	.13	n.a.	n.a.
Material moving equipment operators .....	15,900	2.21	n.a.	n.a.
Industrial truck and tractor operators .....	14,430	2.01	4	25
Conveyor operators and tenders .....	820	.11	19	1
All other material moving equipment operators .....	650	.09	12	2
Helpers - mechanics and repairers .....	570	.08	13	2
Construction trades and extractive worker helpers .....	170	.02	23	( <sup>3</sup> )
Machine feeders and offbearers .....	14,310	1.99	6	13
Freight, stock, and material movers, hand .....	14,890	2.07	5	28
Hand packers and packagers .....	18,700	2.60	5	11
All other helpers, laborers, and material movers, hand .....	15,980	2.22	6	10

<sup>1</sup> Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

<sup>2</sup> Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors

are estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

<sup>3</sup> Less than 0.5 percent.

n.a. = not available.

NOTE: Detail may not add to totals due to rounding. Estimated employment is rounded to the nearest 10.

# Leather and Leather Products

Establishments which tan, curry, and finish hides and skins or manufacture finished leather and artificial leather products employed 205,540 workers in 1983, or only 1 percent of manufacturing and 3 percent of non-durable goods employment. Establishments manufacturing footwear (except rubber) employed 62 percent of industry workers, compared with 12 percent for establishments manufacturing handbags and other personal leather goods, and 9 percent for establishments engaged in tanning, currying, and finishing leather.

Total employment in the leather manufacturing industry declined by 13 percent between 1980 and 1983. The 166,650 production and related workers in the industry (table 15) accounted for over four-fifths of total industry employment. Clerical workers accounted for 10 percent. The remaining employment was distributed as follows: Managerial and administrative workers, 4 percent; sales workers, 2 percent; professional,

paraprofessional, and technical workers, 2 percent; and service workers, 1 percent.

The five most populous occupations in the industry, all production jobs, are listed in the tabulation below. These occupations made up more than one-third of total industry employment.

	<i>Employment</i>	<i>Percent of industry employment</i>
Shoe sewing machine operators and tenders .....	30,060	14.6
Shoe and leather workers and repairers, precision .....	25,910	12.6
Sewing machine operators, nongarment .....	10,410	5.1
Cementing and gluing machine operators and tenders .....	8,530	4.1
Assemblers and fabricators, except machine, electrical, electronic, and precision .....	8,140	4.0

**Table 15. Leather and leather products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983**

(SIC 31)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Total .....	205,550	100.00	--	--
Managerial and administrative occupations .....	8,130	3.96	n.a.	n.a.
Financial managers .....	520	.25	8	14
Personnel, training, and labor relations managers .....	310	.15	8	11
Purchasing managers .....	280	.14	7	11
Marketing, advertising, and public relations managers .....	480	.23	9	10
Administrative services managers .....	300	.15	16	6
Industrial production managers .....	1,250	.61	7	18
General managers and top executives .....	4,290	2.09	4	78
All other managers and administrators .....	700	.34	15	7
Professional, paraprofessional, and technical occupations .....	3,820	1.86	n.a.	n.a.
Management support workers .....	1,710	.83	n.a.	n.a.
Accountants, auditors, and other financial specialists .....	780	.38	n.a.	n.a.
Purchasing agents, except wholesale and retail trade, and farm products .....	360	.18	8	12
Personnel, training, and labor relations specialists .....	130	.06	11	4
Cost estimators .....	140	.07	10	4
All other management support workers .....	300	.15	19	3
Engineers .....	530	.26	n.a.	n.a.
Industrial engineers, except safety .....	300	.15	9	9
Mechanical engineers .....	80	.04	12	2
All other engineers .....	150	.07	n.a.	n.a.
Engineering and related technicians and technologists .....	260	.13	n.a.	n.a.
Industrial engineering technicians and technologists .....	130	.06	12	4
All other engineering and related technicians and technologists .....	130	.06	n.a.	n.a.
Physical and life science technicians and technologists .....	60	.03	n.a.	n.a.
Computer scientists and related workers .....	630	.31	n.a.	n.a.
Systems analysts, electronic data processing .....	190	.09	18	4
Computer programmers .....	300	.15	12	6
All other computer systems analysts, programmers, and programmer aides .....	140	.07	n.a.	n.a.
Designers, except interior designers .....	420	.20	12	7
All other professional, paraprofessional, and technical workers .....	210	.10	n.a.	n.a.
Sales and related occupations .....	4,680	2.28	n.a.	n.a.
First-line supervisors and manager/supervisors, sales and related workers .....	480	.23	17	7
Sales representatives, scientific and related products and services, except retail .....	540	.26	15	6
Sales representatives, except scientific and related products or services and retail .....	2,960	1.44	11	25
All other sales and related workers .....	700	.34	n.a.	n.a.
Clerical and administrative support occupations .....	19,780	9.62	n.a.	n.a.
First-line supervisors and manager/supervisors, clerical and administrative support workers .....	1,050	.51	13	15
Secretaries .....	2,080	1.01	6	44
Stenographers .....	140	.07	37	2
Receptionists and information clerks .....	230	.11	6	10
Typists .....	310	.15	26	5
Typists, word processing equipment .....	130	.06	25	1

See footnotes at end of table.

**Table 15. Leather and leather products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued**

(SIC 31)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Personnel clerks, except payroll and timekeeping .....	210	0.10	7	8
File clerks .....	190	.09	14	4
Order clerks, materials, merchandise, and service .....	840	.41	12	10
Procurement clerks .....	220	.11	11	6
Statistical clerks .....	60	.03	15	2
Bookkeeping, accounting, and auditing clerks .....	1,990	.97	5	49
Payroll and timekeeping clerks .....	850	.41	4	19
Billing, cost and rate clerks .....	550	.27	12	10
General office clerks .....	2,950	1.44	9	39
Electronic data processing and other office machine operators .....	1,200	.58	n.a.	n.a.
Billing, posting, and calculating machine operators .....	140	.07	17	3
Computer operators, except peripheral equipment .....	330	.16	12	6
Data entry keyers, except composing .....	570	.28	16	7
All other office machine operators .....	160	.08	n.a.	n.a.
Switchboard operators .....	260	.13	5	11
Material recording, scheduling, dispatching, and distributing workers .....	6,240	3.04	n.a.	n.a.
Production, planning, and expediting clerks .....	580	.28	8	11
Weighers, measurers, checkers, and samplers, recordkeeping .....	110	.05	18	2
Marking clerks .....	100	.05	19	2
Stock clerks, stockroom, warehouse or storage yard .....	1,320	.64	19	12
Traffic, shipping, and receiving clerks .....	3,640	1.77	4	56
All other material recording, scheduling, and distributing workers .....	490	.24	25	3
All other clerical and administrative support workers .....	280	.14	n.a.	n.a.
Service occupations .....	2,440	1.19	n.a.	n.a.
First-line supervisors and manager/supervisors, service .....	220	.11	16	3
Guards and watch guards .....	370	.18	8	6
Cleaning and building service workers, except private households .....	1,760	.86	n.a.	n.a.
Janitors and cleaners, except maids and housekeeping cleaners .....	1,580	.77	3	38
Elevator operators .....	70	.03	13	2
All other cleaning and building service workers, except private households .....	110	.05	15	2
All other service workers .....	90	.04	n.a.	n.a.
Agriculture, forestry, fishing, and related occupations .....	40	.02	n.a.	n.a.
Production, construction, operating, maintenance, and material handling occupations .....	166,660	81.08	n.a.	n.a.
First-line supervisors, manager/supervisors - production, construction, maintenance, and related workers .....	6,380	3.10	n.a.	n.a.
First-line supervisors and manager/supervisors - mechanics, installers and repairers .....	190	.09	8	7
First-line supervisors and manager/supervisors - production and operating workers .....	5,600	2.72	3	64
First-line supervisors and manager/superv-transp and material moving machine and vehicle workers .....	100	.05	16	2

See footnotes at end of table.

**Table 15. Leather and leather products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued**

(SIC 31)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
First-line supervisors and manager/supervisors - helpers, laborers, and material movers, hand .....	490	0.24	13	5
Precision inspectors, testers, and graders .....	260	.13	21	2
Production inspectors, testers, graders, sorters, samplers, and weighers .....	4,100	1.99	4	33
Mechanics, installers, and repairers .....	3,490	1.70	n.a.	n.a.
Machinery maintenance mechanics .....	1,220	.59	n.a.	n.a.
Machinery maintenance mechanics, textile machines .....	140	.07	20	2
Machinery maintenance mechanics, sewing machines .....	700	.34	4	15
All other machinery maintenance mechanics .....	380	.18	n.a.	n.a.
Millwrights .....	60	.03	31	1
Machinery maintenance workers .....	160	.08	14	3
Maintenance repairers, general utility .....	1,820	.89	4	33
Menders - garments, linens, and related .....	90	.04	23	1
All other mechanics, installers, and repairers .....	140	.07	n.a.	n.a.
Construction trades workers, except material moving .....	310	.15	n.a.	n.a.
Carpenters .....	120	.06	13	3
Electricians .....	120	.06	8	4
All other construction trades workers .....	70	.03	n.a.	n.a.
Precision metal workers .....	490	.24	n.a.	n.a.
Tool grinders, filers, sharpeners, and other precision grinders .....	60	.03	28	1
All other precision metal workers .....	430	.21	n.a.	n.a.
Precision woodworkers .....	100	.05	26	1
Precision textile, apparel, and furnishings workers .....	26,950	13.11	n.a.	n.a.
Fabric and apparel patternmakers, and layout workers .....	340	.17	16	5
Custom tailors and sewers .....	90	.04	47	1
Shoe and leather workers and repairers, precision .....	25,910	12.61	6	36
Precision dyers .....	200	.10	28	2
All other precision textile, apparel, and furnishings workers .....	410	.20	n.a.	n.a.
Precision workers, nec .....	500	.24	n.a.	n.a.
Machine setters, set-up operators, and tenders, metal and plastic .....	1,600	.78	n.a.	n.a.
Plastic molding and casting machine operators and tenders .....	510	.25	20	2
All other machine setters and set-up operators, metal and plastic .....	1,090	.53	n.a.	n.a.
All other machine operators and tenders, metal and plastic .....	320	.16	24	1
Machine setters, set-up operators, and tenders, except metal and plastic .....	73,390	35.70	n.a.	n.a.
Specialty materials printing machine setters and set-up operators .....	60	.03	19	1
Screen printing machine setters and set-up operators .....	70	.03	25	1
All other printing related setters and set-up operators .....	60	.03	20	1
Printing press machine operators and tenders .....	170	.08	30	2
Textile machine setters and set-up operators .....	80	.04	27	1
Textile machine operators and tenders - winding, twisting, knitting, weaving, and cutting .....	710	.35	18	2
Extruding and forming machine operators and tenders, synthetic or glass fibers .....	70	.03	31	1
Textile bleaching and dyeing machine operators and tenders .....	110	.05	30	1
Sewing machine operators, garment .....	2,860	1.39	16	4
Sewing machine operators, nongarment .....	10,410	5.06	4	32

See footnotes at end of table.

**Table 15. Leather and leather products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued**

(SIC 31)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Shoe sewing machine operators and tenders .....	30,060	14.62	3	29
Laundry and drycleaning machine operators and tenders, except pressing .....	100	.05	45	( <sup>3</sup> )
Pressing machine operators and tenders, textile, garment, and related materials .....	1,470	.72	23	5
Furnace, kiln, oven, drier, or kettle operators and tenders .....	160	.08	32	1
Boiler operators and tenders, low pressure .....	60	.03	17	1
Cutting and slicing machine setters and set-up operators .....	3,590	1.75	6	24
Cutting and slicing machine operators and tenders .....	3,380	1.64	7	20
Coating, painting, and spraying machine setters and set-up operators .....	380	.18	14	3
Coating, painting, and spraying machine operators and tenders .....	930	.45	10	6
Cementing and gluing machine operators and tenders .....	8,530	4.15	6	34
Cleaning, washing, and pickling equipment operators and tenders .....	370	.18	21	2
Crushing, grinding, mixing, and blending machine operators and tenders .....	550	.27	14	3
Extruding, forming, pressing, and compacting machine setters and set-up operators .....	100	.05	37	1
Extruding, forming, pressing, and compacting machine operators and tenders .....	590	.29	20	2
Packaging and filling machine operators and tenders .....	1,690	.82	8	13
All other machine setters and set-up operators, except metal and plastic .....	1,450	.71	16	3
All other machine operators and tenders, except metal and plastic .....	5,060	2.46	n.a.	n.a.
Other hand workers, nec .....	25,980	12.64	n.a.	n.a.
Pressers, hand .....	160	.08	18	2
Sewers, hand .....	3,960	1.93	11	12
Cutters and trimmers, hand .....	4,550	2.21	5	33
Portable machine cutters .....	500	.24	15	3
Painting, coating, and decorating, workers, hand .....	350	.17	14	4
Assemblers and fabricators, except machine, electrical, electronic, and precision .....	8,140	3.96	7	15
All other hand workers, nec .....	8,320	4.05	7	15
Motor vehicle operators .....	270	.13	n.a.	n.a.
Truck drivers, heavy or tractor trailer .....	270	.13	11	5
All other transportation and motor vehicle operators .....	290	.14	n.a.	n.a.
Material moving equipment operators .....	910	.44	n.a.	n.a.
Industrial truck and tractor operators .....	440	.21	10	6
Conveyor operators and tenders .....	250	.12	12	4
All other material moving equipment operators .....	220	.11	41	1
Helpers - mechanics and repairers .....	140	.07	15	2
Machine feeders and offbearers .....	3,110	1.51	7	15
Freight, stock, and material movers, hand .....	3,830	1.86	6	29
Hand packers and packagers .....	3,390	1.65	8	15
All other helpers, laborers, and material movers, hand .....	11,110	5.41	n.a.	n.a.
All other production, construction, operating, maintenance, and material handling occupations .....	60	.03	n.a.	n.a.

<sup>1</sup> Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

<sup>2</sup> Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors are estimated at the level of 2 chances out of 3. For further

information on sampling variability and other types of errors, see appendix A.

<sup>3</sup> Less than 0.5 percent.  
n.a. = not available.

NOTE: Detail may not add to totals due to rounding. Estimated employment is rounded to the nearest 10.

# Stone, Clay, Glass, and Concrete Products

Establishments manufacturing products of glass, cement, structural clay, pottery, concrete and gypsum, cut stone, abrasives, asbestos, and miscellaneous nonmetallic minerals employed 570,300 workers, accounting for 3 percent of manufacturing and 5 percent of durable goods employment in 1983. Establishments producing concrete, gypsum, and plaster products employed 33 percent; establishments manufacturing abrasive, asbestos, and miscellaneous nonmetallic mineral products employed 19 percent; and establishments producing pressed or blown glass and glassware employed 18 percent.

Total employment in the stone, clay, glass, and concrete products industry declined by 14 percent from the 1980 level. As shown in table 16, the 433,220 production and related workers in this industry accounted for three-fourths of total industry employment. Clerical workers ranked second with 9 percent. Most of these were office clerical workers. The remaining employment was

distributed as follows: Managerial and administrative workers, 6 percent; professional, paraprofessional, and technical workers, 5 percent; sales workers, 3 percent; and service workers, 1 percent.

The five most populous occupations in the manufacture of stone, clay, glass, and concrete products are listed in the tabulation below:

	<i>Employment</i>	<i>Percent of industry employment</i>
Truckdrivers, heavy or tractor trailer .....	56,200	9.8
First-line supervisors, production .....	23,200	4.1
General managers and top executives .....	19,280	3.4
Industrial truck and tractor operators .....	18,420	3.2
Maintenance repairers, general utility .....	15,370	2.7

**Table 16. Stone, clay, glass, and concrete products: Employment, relative error, and percent of establishments reporting selected occupations, May 1983**

(SIC 32)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Total .....	570,270	100.00	--	--
Managerial and administrative occupations .....	33,880	5.94	n.a.	n.a.
Financial managers .....	1,880	.33	9	9
Personnel, training, and labor relations managers .....	1,280	.22	6	8
Purchasing managers .....	670	.12	4	6
Marketing, advertising, and public relations managers .....	1,770	.31	14	5
Administrative services managers .....	710	.12	8	3
Industrial production managers .....	3,480	.61	6	10
Mining, quarrying, and oil and gas well drilling managers .....	250	.04	8	2
General managers and top executives .....	19,280	3.38	1	77
All other managers and administrators .....	4,560	.80	15	6
Professional, paraprofessional, and technical occupations .....	26,750	4.69	n.a.	n.a.
Management support workers .....	7,960	1.40	n.a.	n.a.
Accountants, auditors, and other financial specialists .....	4,110	.72	n.a.	n.a.
Accountants and auditors .....	3,480	.61	5	18
Budget analysts .....	280	.05	15	1
All other financial specialists .....	350	.06	19	1
Purchasing agents, except wholesale and retail trade, and farm products .....	1,160	.20	4	8
Personnel, training, and labor relations specialists .....	850	.15	6	5
Cost estimators .....	440	.08	6	2
All other management support workers .....	1,400	.25	16	2
Engineers .....	6,950	1.22	n.a.	n.a.
Metallurgists, and metallurgical, ceramic, and materials engineers .....	570	.10	6	2
Chemical engineers .....	720	.13	14	2
Civil engineers, including traffic .....	480	.08	9	2
Electrical and electronic engineers .....	740	.13	9	3
Industrial engineers, except safety .....	1,440	.25	7	6
Mechanical engineers .....	1,940	.34	8	6
All other engineers .....	1,060	.19	12	2
Engineering and related technicians and technologists .....	4,730	.83	n.a.	n.a.
Civil engineering technicians and technologists .....	80	.01	14	1
Electrical and electronic engineering technicians and technologists .....	520	.09	9	2
Industrial engineering technicians and technologists .....	360	.06	10	2
Mechanical engineering technicians and technologists .....	510	.09	10	1
Drafters .....	2,350	.41	4	9
All other engineering and related technicians and technologists .....	910	.16	12	2
Physical scientists .....	1,050	.18	n.a.	n.a.
Chemists, except biochemists .....	930	.16	7	4
All other physical scientists .....	120	.02	28	( <sup>3</sup> )
Physical and life science technicians and technologists .....	2,090	.37	n.a.	n.a.
Chemical technicians and technologists, except health .....	1,630	.29	5	3
All other physical and life science technicians and technologists .....	460	.08	28	1
Computer scientists and related workers .....	2,230	.39	n.a.	n.a.
Systems analysts, electronic data processing .....	1,020	.18	17	3
Computer programmers .....	900	.16	10	4
Computer programmer aides .....	230	.04	8	1

See footnotes at end of table.

**Table 16. Stone, clay, glass, and concrete products: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued**

(SIC 32)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Programmers - numerical, tool, and process control .....	80	0.01	12	( <sup>3</sup> )
Health practitioners, technologists, technicians, and related health workers .....	360	.06	5	3
Designers, except interior designers .....	500	.09	8	2
All other professional, paraprofessional, and technical workers .....	880	.15	n.a.	n.a.
Sales and related occupations .....	15,110	2.65	n.a.	n.a.
First-line supervisors and manager/supervisors, sales and related workers .....	1,010	.18	7	4
Sales engineers .....	480	.08	10	1
Sales representatives, scientific and related products and services, except retail .....	4,020	.70	8	11
Sales representatives, except scientific and related products or services and retail .....	8,500	1.49	2	28
All other sales and related workers .....	1,100	.19	8	3
Clerical and administrative support occupations .....	53,690	9.41	n.a.	n.a.
First-line supervisors and manager/supervisors, clerical and administrative support workers .....	1,820	.32	9	6
Secretaries .....	10,960	1.92	5	45
Stenographers .....	290	.05	17	1
Receptionists and information clerks .....	390	.07	4	4
Typists .....	650	.11	6	3
Typists, word processing equipment .....	250	.04	13	1
Personnel clerks, except payroll and timekeeping .....	660	.12	7	5
File clerks .....	290	.05	11	1
Order clerks, materials, merchandise, and service .....	1,300	.23	6	5
Procurement clerks .....	460	.08	6	3
Bookkeeping, accounting, and auditing clerks .....	9,180	1.61	2	48
Payroll and timekeeping clerks .....	1,560	.27	5	10
Billing, cost and rate clerks .....	1,340	.23	6	6
General office clerks .....	7,350	1.29	2	34
Electronic data processing and other office machine operators .....	2,040	.36	n.a.	n.a.
Billing, posting, and calculating machine operators .....	240	.04	12	1
Computer operators, except peripheral equipment .....	760	.13	8	4
Data entry keyers, except composing .....	920	.16	6	4
All other office machine operators .....	120	.02	26	( <sup>3</sup> )
Switchboard operators .....	720	.13	3	7
Material recording, scheduling, dispatching, and distributing workers .....	13,770	2.41	n.a.	n.a.
Dispatchers, except police, fire, and ambulance .....	4,580	.80	2	24
Production, planning, and expediting clerks .....	1,940	.34	4	7
Weighers, measurers, checkers, and samplers, recordkeeping .....	560	.10	7	2
Stock clerks, stockroom, warehouse or storage yard .....	1,940	.34	4	8
Traffic, shipping, and receiving clerks .....	4,400	.77	3	18
All other material recording, scheduling, and distributing workers .....	350	.06	13	1
All other clerical and administrative support workers .....	660	.12	17	1
Service occupations .....	7,400	1.30	n.a.	n.a.
First-line supervisors and manager/supervisors, service .....	500	.09	11	1
Guards and watch guards .....	1,360	.24	4	4

See footnotes at end of table.

**Table 16. Stone, clay, glass, and concrete products: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued**

(SIC 32)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Food and beverage preparation and service workers .....	90	0.02	19	( <sup>3</sup> )
Cleaning and building service workers, except private households .....	5,270	.92	n.a.	n.a.
Janitors and cleaners, except maids and housekeeping cleaners .....	4,930	.86	3	20
All other cleaning and building service workers, except private households .....	340	.06	12	1
All other service workers .....	180	.03	18	( <sup>3</sup> )
Agriculture, forestry, fishing, and related occupations .....	220	.04	n.a.	n.a.
Gardeners and groundskeepers, except farm .....	220	.04	12	1
Production, construction, operating, maintenance, and material handling occupations .....	433,220	75.97	n.a.	n.a.
First-line supervisors, manager/supervisors - production, construction, maintenance, and related workers .....	28,650	5.02	n.a.	n.a.
First-line supervisors and manager/supervisors - mechanics, installers and repairers .....	2,000	.35	3	7
First-line supervisors and manager/supervisors - construction trades and extractive workers .....	520	.09	17	1
First-line supervisors and manager/supervisors - production and operating workers .....	23,200	4.07	1	58
First-line supervisors and manager/superv-transp and material moving machine and vehicle workers .....	1,470	.26	5	5
First-line supervisors and manager/supervisors - helpers, laborers, and material movers, hand .....	1,460	.26	6	4
Precision inspectors, testers, and graders .....	3,630	.64	9	4
Production inspectors, testers, graders, sorters, samplers, and weighers .....	22,580	3.96	4	14
Mechanics, installers, and repairers .....	37,860	6.64	n.a.	n.a.
Machinery maintenance mechanics .....	10,290	1.80	3	18
Millwrights .....	1,580	.28	9	1
Refractory materials repairers, except brick masons .....	400	.07	9	2
Machinery maintenance workers .....	1,760	.31	6	5
Maintenance repairers, general utility .....	15,370	2.70	2	33
Automotive mechanics .....	3,390	.59	3	15
Bus and truck mechanics and diesel engine specialists .....	2,430	.43	5	6
Mobile heavy equipment mechanics, except engines .....	770	.14	7	2
Precision instrument repairers .....	870	.15	7	2
Riggers .....	210	.04	15	1
All other mechanics, installers, and repairers .....	790	.14	9	2
Construction trades workers, except material moving .....	12,430	2.18	n.a.	n.a.
Carpenters .....	940	.16	7	3
Electricians .....	3,660	.64	3	8
Brickmasons .....	290	.05	14	1
Concrete and terrazzo finishers .....	4,210	.74	7	7
Painters and paperhangers, construction and maintenance .....	400	.07	14	2
Plumbers, pipefitters, and steamfitters .....	640	.11	9	1
Paving, surfacing, and tamping equipment operators .....	240	.04	37	( <sup>3</sup> )
All other construction trades workers .....	2,050	.36	13	2

See footnotes at end of table.

**Table 16. Stone, clay, glass, and concrete products: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued**

(SIC 32)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Extractive and related workers, including				
blasters .....	1,070	0.19	10	2
Precision metal workers .....	6,340	1.11	n.a.	n.a.
Tool-and-die makers .....	1,460	.26	8	2
Machinists .....	3,640	.64	5	8
Tool grinders, filers, sharpeners, and other				
precision grinders .....	470	.08	15	1
Sheet-metal workers .....	350	.06	15	1
All other precision metal workers .....	420	.07	23	( <sup>3</sup> )
Precision workers, nec .....	12,580	2.21	n.a.	n.a.
Precision molders, shapers, casters, and				
carvers, except jewelry and foundry .....	8,950	1.57	5	9
Precision patternmakers, model makers, layout				
workers, and cutters .....	1,050	.18	9	2
Precision detail design decorators,				
and painters .....	990	.17	13	1
All other precision workers, nec .....	1,590	.28	21	1
Machine setters, set-up operators, and tenders,				
metal and plastic .....	12,230	2.14	n.a.	n.a.
Sawing machine tool setters and set-up				
operators, metal and plastic .....	330	.06	13	1
Lathe and turning machine tool setters and				
set-up operators, metal and plastic .....	1,040	.18	9	2
Drilling and boring machine tool setters and				
set-up operators, metal and plastic .....	970	.17	16	1
Milling and planing machine setters and				
set-up operators, metal and plastic .....	240	.04	21	( <sup>3</sup> )
Grinding, lapping, and buffing machine tool				
setters and set-up operators, metal and				
plastic .....	1,400	.25	11	2
Machine tool cutting operators and tenders,				
metal and plastic .....	2,180	.38	9	3
Punching machine setters and set-up				
operators, metal and plastic .....	1,200	.21	16	1
Press and press brake machine setters and				
set-up operators, metal and plastic .....	850	.15	26	1
Machine forming operators and tenders,				
metal and plastic .....	2,130	.37	10	1
Combination machine tool setters and set-up				
operators, metal and plastic .....	930	.16	13	1
Combination machine tool operators and				
tenders, metal and plastic .....	540	.09	18	1
All other machine setters and set-up				
operators, metal and plastic .....	420	.07	23	( <sup>3</sup> )
All other machine operators and tenders,				
metal and plastic .....	950	.17	n.a.	n.a.
Machine setters, set-up operators, and tenders,				
except metal and plastic .....	78,520	13.77	n.a.	n.a.
Screen printing machine setters and				
set-up operators .....	960	.17	10	2
All other printing related setters and				
set-up operators .....	60	.01	25	( <sup>3</sup> )
Printing press machine operators and				
tenders .....	310	.05	24	( <sup>3</sup> )
All other printing, binding, and related				
machine operators and tenders .....	70	.01	24	( <sup>3</sup> )
Textile machine operators and tenders -				
winding, twisting, knitting, weaving,				
and cutting .....	1,760	.31	22	( <sup>3</sup> )
Extruding and forming machine operators and				
tenders, synthetic or glass fibers .....	4,080	.72	20	( <sup>3</sup> )
Furnace, kiln, oven, drier, or kettle				
operators and tenders .....	12,550	2.20	3	17
Cutting and slicing machine setters				
and set-up operators .....	3,130	.55	5	5
Cutting and slicing machine operators and				
tenders .....	3,920	.69	6	6
Coating, painting, and spraying machine				
setters and set-up operators .....	1,920	.34	8	4

See footnotes at end of table.

**Table 16. Stone, clay, glass, and concrete products: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued**

(SIC 32)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Coating, painting, and spraying machine operators and tenders .....	1,800	0.32	8	3
Cleaning, washing, and pickling equipment operators and tenders .....	620	.11	11	1
Separating, filtering, clarifying, precipitating, and still machine operators and tenders .....	370	.06	11	1
Crushing, grinding, mixing, and blending machine operators and tenders .....	11,560	2.03	3	19
Extruding, forming, pressing, and compacting machine setters and set-up operators .....	8,760	1.54	4	8
Extruding, forming, pressing, and compacting machine operators and tenders .....	9,440	1.66	4	10
Packaging and filling machine operators and tenders .....	8,130	1.43	5	8
All other machine setters and set-up operators, except metal and plastic .....	2,330	.41	n.a.	n.a.
All other machine operators and tenders, except metal and plastic .....	5,800	1.02	7	3
Other hand workers, nec .....	37,820	6.63	n.a.	n.a.
Glaziers, manufacturing .....	500	.09	19	1
Welders and cutters .....	5,220	.92	5	13
Solderers and brazers .....	780	.14	13	1
Cutters and trimmers, hand .....	2,890	.51	5	5
Molders and casters, hand .....	7,540	1.32	5	9
Painting, coating, and decorating, workers, hand .....	2,650	.46	7	4
Grinding and polishing workers, hand .....	5,130	.90	5	7
Assemblers and fabricators, except machine, electrical, electronic, and precision .....	10,600	1.86	6	5
All other hand workers, nec .....	2,510	.44	8	3
Plant and system workers .....	3,420	.60	n.a.	n.a.
Stationary engineers .....	430	.08	10	1
All other plant and system operators .....	2,990	.52	13	5
Motor vehicle operators .....	62,130	10.89	n.a.	n.a.
Truck drivers, heavy or tractor trailer .....	56,200	9.85	2	55
Truck drivers, light, include delivery and route workers .....	5,270	.92	6	12
All other motor vehicle operators .....	660	.12	19	1
All other transportation and motor vehicle operators .....	280	.05	16	( <sup>3</sup> )
Material moving equipment operators .....	30,070	5.27	n.a.	n.a.
Dragline operators .....	240	.04	14	1
Dredge operators and dipper tenders .....	70	.01	19	( <sup>3</sup> )
Grader, dozer, and scraper operators .....	1,360	.24	6	4
Hoist and winch operators .....	750	.13	8	3
Crane and tower operators .....	2,130	.37	4	8
Industrial truck and tractor operators .....	18,420	3.23	2	35
Conveyor operators and tenders .....	3,250	.57	6	10
Pump operators .....	230	.04	11	1
Operating engineers .....	2,770	.49	7	6
All other material moving equipment operators .....	850	.15	20	1
Helpers - mechanics and repairers .....	1,570	.28	11	2
Construction trades and extractive worker helpers .....	760	.13	15	1
Machine feeders and offbearers .....	15,130	2.65	4	15
Freight, stock, and material movers, hand .....	12,330	2.16	3	20
Hand packers and packagers .....	15,360	2.69	6	5
All other helpers, laborers, and material movers, hand .....	38,460	6.74	3	17

<sup>1</sup> Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

<sup>2</sup> Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors

are estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

<sup>3</sup> Less than 0.5 percent.

n.a. = not available.

NOTE: Detail may not add to totals due to rounding. Estimated employment is rounded to the nearest 10.

# Primary Metal Products

Establishments which manufacture primary metal products employed 828,000 workers in 1983, or 4.5 percent of manufacturing and 8 percent of durable goods employment. Of these workers, blast furnaces, steel works, and rolling and finishing mills employed 41 percent; establishments engaged in rolling, drawing, and extruding nonferrous metals employed 22 percent; and iron and steel foundries, 17 percent.

The primary metal products industry suffered the largest absolute and relative decreases in employment of any manufacturing industry between 1980 and 1983. Total employment fell from 1.2 million in 1980 to 828,000 in 1983, a decline of 31 percent.

The occupational staffing mix also changed somewhat between 1980 and 1983. The proportion of production jobs fell from 79 to 76 percent, and managerial and professional jobs increased as a percentage of total employment. Changes since 1977 are summarized in text table 11.

As shown in table 17, the primary metal products industry employed 633,000 production and related

workers, who accounted for 76 percent of total industry employment. Clerical workers ranked second with 9 percent. The remaining employment was distributed as follows: Professional, paraprofessional, and technical workers, 7 percent; managerial and administrative workers, 4 percent; service workers, 2 percent; and sales workers, 1 percent.

The five most populous occupations in manufacturing primary metal products are listed below:

	<i>Employment</i>	<i>Percent of industry employment</i>
First-line supervisors, production .....	38,160	4.6
Machinery maintenance mechanics .....	20,040	2.4
Industrial truck and tractor operators .....	19,550	2.4
Crane and tower operators .....	19,150	2.3
Production inspectors, testers, graders, sorters, samplers, and weighers .....	18,250	2.2

**Text table 11. Primary metal products: Employment by major occupational group, selected years, 1977-83**

Major occupational group	1977	1980	1983	Percent change 1977-83
Total .....	1,180,940	1,205,100	827,560	-29.9
Managerial and administrative workers .....	43,460	47,550	36,630	-15.7
Professional, paraprofessional, and technical workers .....	61,390	68,670	54,920	-10.5
Sales workers .....	8,540	10,680	12,370	44.9
Clerical workers .....	98,660	98,230	74,110	-24.9
Production and related workers .....	945,010	956,430	632,910	-33.0
Service workers .....	23,880	23,540	16,360	-31.5

<sup>1</sup> Includes 1,570 employees in the occupation "first-line supervisor—sales" and 1,050 employees in the sales engineer category; in

previous surveys these workers would have been included in the managerial and professional categories.

**Table 17. Primary metal products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983**

(SIC 33)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Total .....	827,540	100.00	--	--
Managerial and administrative occupations .....	36,630	4.43	n.a.	n.a.
Financial managers .....	2,960	.36	5	24
Personnel, training, and labor relations managers .....	2,270	.27	4	23
Purchasing managers .....	1,210	.15	3	17
Marketing, advertising, and public relations managers .....	2,540	.31	5	17
Administrative services managers .....	1,040	.13	9	7
Industrial production managers .....	6,620	.80	6	26
General managers and top executives .....	13,710	1.66	2	84
All other managers and administrators .....	6,280	.76	10	18
Professional, paraprofessional, and technical occupations .....	54,930	6.64	n.a.	n.a.
Management support workers .....	14,790	1.79	n.a.	n.a.
Accountants, auditors, and other financial specialists .....	6,240	.75	n.a.	n.a.
Accountants and auditors .....	4,860	.59	5	29
Budget analysts .....	730	.09	18	5
All other financial specialists .....	650	.08	12	3
Purchasing agents, except wholesale and retail trade, and farm products .....	2,860	.35	3	32
Personnel, training, and labor relations specialists .....	1,960	.24	8	12
Cost estimators .....	1,060	.13	7	8
All other management support workers .....	2,670	.32	25	7
Engineers .....	17,450	2.11	n.a.	n.a.
Metallurgists, and metallurgical, ceramic, and materials engineers .....	4,180	.51	8	23
Chemical engineers .....	490	.06	12	3
Civil engineers, including traffic .....	460	.06	12	3
Electrical and electronic engineers .....	1,810	.22	7	9
Industrial engineers, except safety .....	3,120	.38	6	16
Safety engineers, except mining .....	650	.08	9	6
Mechanical engineers .....	3,900	.47	5	18
All other engineers .....	2,840	.34	n.a.	n.a.
Engineering and related technicians and technologists .....	9,570	1.16	n.a.	n.a.
Civil engineering technicians and technologists .....	150	.02	45	1
Electrical and electronic engineering technicians and technologists .....	1,320	.16	9	6
Industrial engineering technicians and technologists .....	960	.12	10	5
Mechanical engineering technicians and technologists .....	660	.08	8	4
Drafters .....	2,770	.33	6	15
All other engineering and related technicians and technologists .....	3,710	.45	7	9
Physical scientists .....	1,710	.21	n.a.	n.a.
Chemists, except biochemists .....	1,400	.17	6	9
All other physical scientists .....	310	.04	15	2
Physical and life science technicians and technologists .....	3,220	.39	n.a.	n.a.
Chemical technicians and technologists, except health .....	2,740	.33	7	8
All other physical and life science technicians and technologists .....	480	.06	21	2
Computer scientists and related workers .....	4,490	.54	n.a.	n.a.
Systems analysts, electronic data processing .....	2,090	.25	10	9
Computer programmers .....	1,770	.21	10	11
Computer programmer aides .....	430	.05	8	4

See footnotes at end of table.

**Table 17. Primary metal products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued**

(SIC 33)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Programmers - numerical, tool, and process control .....	200	0.02	15	2
Mathematical scientists and related workers .....	320	.04	n.a.	n.a.
Operations and systems researchers and analysts, except computer .....	320	.04	25	1
Health practitioners, technologists, technicians, and related health workers .....	1,360	.16	6	10
All other professional, paraprofessional, and technical workers .....	2,020	.24	n.a.	n.a.
<b>Sales and related occupations .....</b>	<b>12,360</b>	<b>1.49</b>	<b>n.a.</b>	<b>n.a.</b>
First-line supervisors and manager/supervisors, sales and related workers .....	1,570	.19	7	9
Sales engineers .....	1,050	.13	8	5
Sales representatives, scientific and related products and services, except retail .....	4,100	.50	10	19
Sales representatives, except scientific and related products or services and retail .....	4,630	.56	4	22
All other sales and related workers .....	1,010	.12	13	5
<b>Clerical and administrative support occupations .....</b>	<b>74,090</b>	<b>8.95</b>	<b>n.a.</b>	<b>n.a.</b>
First-line supervisors and manager/supervisors, clerical and administrative support workers .....	3,270	.40	6	15
Secretaries .....	11,130	1.34	4	62
Stenographers .....	1,170	.14	10	4
Receptionists and information clerks .....	710	.09	5	10
Typists .....	1,980	.24	6	11
Typists, word processing equipment .....	620	.07	10	4
Personnel clerks, except payroll and timekeeping .....	1,400	.17	7	13
File clerks .....	640	.08	13	4
Order clerks, materials, merchandise, and service .....	1,960	.24	8	10
Procurement clerks .....	950	.11	5	10
Statistical clerks .....	960	.12	13	3
Bookkeeping, accounting, and auditing clerks .....	6,980	.84	4	50
Payroll and timekeeping clerks .....	2,460	.30	4	20
Billing, cost and rate clerks .....	1,960	.24	5	14
General office clerks .....	7,330	.89	5	38
Electronic data processing and other office machine operators .....	4,150	.50	n.a.	n.a.
Billing, posting, and calculating machine operators .....	410	.05	11	3
Computer operators, except peripheral equipment .....	1,340	.16	7	10
Peripheral EDP equipment operators .....	170	.02	17	1
Data entry keyers, except composing .....	1,830	.22	6	11
All other office machine operators .....	400	.05	21	2
Switchboard operators .....	1,000	.12	5	14
Material recording, scheduling, dispatching, and distributing workers .....	22,840	2.76	n.a.	n.a.
Production, planning, and expediting clerks .....	6,890	.83	6	22
Weighers, measurers, checkers, and samplers, recordkeeping .....	2,830	.34	9	9
Stock clerks, stockroom, warehouse or storage yard .....	4,060	.49	4	18
Traffic, shipping, and receiving clerks .....	8,100	.98	4	48
All other material recording, scheduling, and distributing workers .....	960	.12	9	4
All other clerical and administrative support workers .....	2,580	.31	12	5
<b>Service occupations .....</b>	<b>16,350</b>	<b>1.98</b>	<b>n.a.</b>	<b>n.a.</b>

See footnotes at end of table.

**Table 17. Primary metal products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued**

(SIC 33)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
First-line supervisors and manager/supervisors, service .....	1,240	0.15	8	7
Guards and watch guards .....	5,300	.64	6	13
Food and beverage preparation and service workers .....	240	.03	17	1
Cleaning and building service workers, except private households .....	9,130	1.10	n.a.	n.a.
Janitors and cleaners, except maids and housekeeping cleaners .....	8,350	1.01	5	39
All other cleaning and building service workers, except private households .....	780	.09	21	2
All other service workers .....	440	.05	22	2
Agriculture, forestry, fishing, and related occupations .....	250	.03	n.a.	n.a.
Gardeners and groundskeepers, except farm .....	250	.03	9	2
Production, construction, operating, maintenance, and material handling occupations .....	632,930	76.48	n.a.	n.a.
First-line supervisors, manager/supervisors - production, construction, maintenance, and related workers .....	55,720	6.73	n.a.	n.a.
First-line supervisors and manager/supervisors - mechanics, installers and repairers .....	9,280	1.12	10	20
First-line supervisors and manager/supervisors - construction trades and extractive workers .....	1,720	.21	12	4
First-line supervisors and manager/supervisors - production and operating workers .....	38,160	4.61	3	74
First-line supervisors and manager/superv-transp and material moving machine and vehicle workers .....	3,170	.38	16	9
First-line supervisors and manager/supervisors - helpers, laborers, and material movers, hand .....	3,390	.41	13	8
Precision inspectors, testers, and graders .....	9,690	1.17	8	25
Production inspectors, testers, graders, sorters, samplers, and weighers .....	18,250	2.21	6	31
Mechanics, installers, and repairers .....	72,790	8.80	n.a.	n.a.
Machinery maintenance mechanics .....	20,040	2.42	10	22
Millwrights .....	16,630	2.01	13	7
Refractory materials repairers, except brick masons .....	2,650	.32	11	6
Machinery maintenance workers .....	3,750	.45	10	12
Maintenance repairers, general utility .....	16,630	2.01	4	49
Automotive mechanics .....	1,440	.17	14	4
Bus and truck mechanics and diesel engine specialists .....	2,280	.28	13	5
Precision instrument repairers .....	3,150	.38	13	5
Riggers .....	2,490	.30	20	1
All other mechanics, installers, and repairers .....	3,730	.45	18	4
Construction trades workers, except material moving .....	29,390	3.55	n.a.	n.a.
Carpenters .....	2,220	.27	8	9
Electricians .....	15,830	1.91	6	23
Brickmasons .....	2,320	.28	11	4
Painters and paperhangers, construction and maintenance .....	1,100	.13	8	6
Plumbers, pipefitters, and steamfitters .....	6,680	.81	9	6
All other construction trades workers .....	1,240	.15	20	2
Extractive and related workers, including blasters .....	170	.02	24	1
Precision metal workers .....	30,560	3.69	n.a.	n.a.

See footnotes at end of table.

**Table 17. Primary metal products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued**

(SIC 33)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Tool-and-die makers .....	5,630	0.68	8	15
Machinists .....	12,920	1.56	6	23
Tool grinders, filers, sharpeners, and other precision grinders .....	3,940	.48	6	12
Pattern and model makers, metal .....	2,540	.31	7	11
Precision layout workers, metal .....	980	.12	16	3
Sheet-metal workers .....	1,470	.18	17	3
Boilermakers .....	2,220	.27	18	1
All other precision metal workers .....	860	.10	34	1
Precision woodworkers .....	1,500	.18	n.a.	n.a.
Pattern and model makers, wood .....	1,280	.15	9	5
All other precision woodworkers .....	220	.03	26	1
Precision workers, nec .....	14,090	1.70	n.a.	n.a.
Precision foundry mold and core makers .....	13,210	1.60	3	26
All other precision workers, nec .....	880	.11	15	2
Machine setters, set-up operators, and tenders, metal and plastic .....	153,200	18.51	n.a.	n.a.
Sawing machine tool setters and set-up operators, metal and plastic .....	2,320	.28	8	5
Lathe and turning machine tool setters and set-up operators, metal and plastic .....	2,820	.34	11	7
Drilling and boring machine tool setters and set-up operators, metal and plastic .....	1,480	.18	7	6
Milling and planing machine setters and set-up operators, metal and plastic .....	680	.08	15	2
Grinding, lapping, and buffing machine tool setters and set-up operators, metal and plastic .....	7,340	.89	5	17
Machine tool cutting operators and tenders, metal and plastic .....	9,470	1.14	9	11
Punching machine setters and set-up operators, metal and plastic .....	2,400	.29	7	8
Press and press brake machine setters and set-up operators, metal and plastic .....	2,660	.32	7	7
Shear and slitter machine setters and set-up operators, metal and plastic .....	4,880	.59	8	6
Extruding and drawing machine setters and set-up operators, metal and plastic .....	17,590	2.13	5	16
Rolling machine setters and set-up operators, metal and plastic .....	9,450	1.14	8	10
Forging machine setters and set-up operators, metal and plastic .....	1,200	.15	17	2
Machine forming operators and tenders, metal and plastic .....	16,090	1.94	8	8
Numerical control machine tool operators and tenders, metal and plastic .....	1,000	.12	15	2
Combination machine tool setters and set-up operators, metal and plastic .....	1,410	.17	12	3
Combination machine tool operators and tenders, metal and plastic .....	2,010	.24	10	3
Welding machine setters and set-up operators .....	1,730	.21	17	3
Welding machine operators and tenders .....	930	.11	18	2
Soldering and brazing machine setters and set-up operators .....	200	.02	27	( <sup>3</sup> )
Soldering and brazing machine operators and tenders .....	170	.02	41	( <sup>3</sup> )
Metal molding, coremaking, and casting machine setters and set-up operators .....	8,560	1.03	4	18
Metal molding, coremaking, and casting machine operators and tenders .....	11,740	1.42	7	13
Foundry mold assembly and shakeout workers .....	5,630	.68	6	8
Electrolytic plating and coating machine setters and set-up operators, metal and plastic .....	880	.11	14	2
Electrolytic plating and coating machine operators and tenders, metal and plastic .....	1,190	.14	13	2

See footnotes at end of table.

**Table 17. Primary metal products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued**

(SIC 33)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Nonelectrolytic plating and coating machine setters and set-up operators, metal and plastic .....	1,010	0.12	17	1
Nonelectrolytic plating and coating machine operators and tenders, metal and plastic .....	380	.05	20	1
Heating equipment setters and set-up operators, metal and plastic .....	2,890	.35	7	10
Heat treating, annealing, and tempering machine operators and tenders, metal and plastic .....	9,630	1.16	4	20
Furnace operators and tenders .....	17,250	2.08	5	42
Heaters, metal and plastic .....	3,060	.37	10	4
All other machine setters and set-up operators, metal and plastic .....	5,150	.62	11	4
All other machine operators and tenders, metal and plastic .....	11,170	1.35	9	7
Machine setters, set-up operators, and tenders, except metal and plastic .....	41,880	5.06	n.a.	n.a.
Boiler operators and tenders, low pressure .....	1,380	.17	14	3
Coating, painting, and spraying machine setters and set-up operators .....	1,540	.19	12	3
Coating, painting, and spraying machine operators and tenders .....	1,750	.21	17	3
Cleaning, washing, and pickling equipment operators and tenders .....	1,830	.22	12	5
Separating, filtering, clarifying, precipitating, and still machine operators and tenders .....	1,520	.18	11	3
Crushing, grinding, mixing, and blending machine operators and tenders .....	4,890	.59	6	14
Packaging and filling machine operators and tenders .....	4,700	.57	9	7
All other machine setters and set-up operators, except metal and plastic .....	2,210	.27	11	2
All other machine operators and tenders, except metal and plastic .....	10,890	1.32	11	7
Other hand workers, nec .....	56,820	6.87	n.a.	n.a.
Welders and cutters .....	13,510	1.63	9	21
Solderers and brazers .....	510	.06	19	2
Metal pourers and casters, basic shapes .....	11,610	1.40	4	29
Grinding and polishing workers, hand .....	9,030	1.09	4	11
Assemblers and fabricators, except machine, electrical, electronic, and precision .....	16,120	1.95	5	13
All other hand workers, nec .....	6,040	.73	14	5
Plant and system workers .....	3,940	.48	n.a.	n.a.
Power distributors and dispatchers .....	780	.09	19	2
Stationary engineers .....	1,480	.18	13	3
All other plant and system operators .....	1,680	.20	14	2
Motor vehicle operators .....	9,470	1.14	n.a.	n.a.
Truck drivers, heavy or tractor trailer .....	6,450	.78	8	25
Truck drivers, light, include delivery and route workers .....	1,990	.24	7	15
All other motor vehicle operators .....	1,030	.12	18	3
Rail yard engineers, dinkey operators, and hostlers .....	1,740	.21	15	3
Railroad brake, signal, and switch operators .....	1,580	.19	15	3
All other transportation and motor vehicle operators .....	710	.09	19	1
Material moving equipment operators .....	46,680	5.64	n.a.	n.a.
Grader, dozer, and scraper operators .....	440	.05	13	2
Hoist and winch operators .....	880	.11	21	2
Crane and tower operators .....	19,150	2.31	9	15
Industrial truck and tractor operators .....	19,550	2.36	4	33
Conveyor operators and tenders .....	3,020	.36	18	3
Pump operators .....	1,010	.12	16	2

See footnotes at end of table.

**Table 17. Primary metal products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued**

(SIC 33)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
All other material moving equipment operators .....	2,630	0.32	n.a.	n.a.
Helpers - mechanics and repairers .....	2,760	.33	10	6
Construction trades and extractive worker helpers .....	2,140	.26	12	3
Machine feeders and offbearers .....	10,590	1.28	7	13
Freight, stock, and material movers, hand .....	13,110	1.58	8	24
All other helpers, laborers, and material movers, hand .....	56,150	6.79	6	24

<sup>1</sup> Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

<sup>2</sup> Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors

are estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

<sup>3</sup> Less than 0.5 percent.

n.a. = not available.

NOTE: Detail may not add to totals due to rounding. Estimated employment is rounded to the nearest 10.

# Fabricated Metal Products, Except Machinery and Transportation Equipment

This industry, which includes establishments which fabricate ferrous and nonferrous metal products, except machinery and transportation equipment, employed nearly 1.4 million workers, or 7 percent of manufacturing and 13 percent of durable goods employment in 1983. The three largest employers of these workers were: Establishments fabricating structural metal products, with 31 percent of industry employment; those manufacturing metal forgings or metal stampings, 16 percent; and those fabricating miscellaneous metal products, also with 16 percent.

Total employment in the fabricated metal products industry declined 13 percent between 1980 and 1983. Employment fell in all major occupational groups with the exception of sales workers. Changes since 1977 are summarized in text table 12.

The fabricated metal products industry employed just over 1.0 million production and related workers, who accounted for 74 percent of total industry employment (table 18). Clerical workers accounted for 9 percent.

Most of these were office clerical workers. The remaining employment was distributed as follows: Professional, paraprofessional, and technical workers, 7 percent; managerial and administrative workers, 6 percent; sales workers, 3 percent; and service workers, about 1 percent.

The tabulation below lists the five most populous occupations in the industry:

	<i>Employment</i>	<i>Percent of industry employment</i>
Assemblers and fabricators, except machine, electrical, electronic, and precision . . . . .	103,970	7.6
Machine forming operators and tenders, metal and plastic . . .	65,280	4.8
First-line supervisors, production . . . . .	58,350	4.3
General managers and top executives . . . . .	47,180	3.4
Sheet-metal workers . . . . .	33,180	2.4

**Text table 12. Fabricated metal products, except machinery and transportation equipment: Employment by major occupational group, selected years, 1977-83**

Major occupational group	1977	1980	1983	Percent change 1977-83
Total . . . . .	1,588,640	1,579,960	1,369,000	-13.8
Managerial and administrative workers . . . . .	90,880	103,670	82,180	-9.6
Professional, paraprofessional, and technical workers . . . . .	99,200	100,760	92,580	-6.7
Sales workers . . . . .	29,420	30,800	35,840	21.8
Clerical workers . . . . .	150,040	154,800	127,560	-15.0
Production and related workers . . . . .	1,191,810	1,164,180	1,010,290	-15.2
Service workers . . . . .	27,290	25,750	20,130	-26.2

<sup>1</sup> Includes 3,010 employees in the occupation "first-line supervisor—sales" and 2,230 employees in the sales engineer category; in

previous surveys these workers would have been included in the managerial and professional categories.

**Table 18. Fabricated metal products, except machinery and transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1983**

(SIC 34)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Total .....	1,368,930	100.00	--	--
Managerial and administrative occupations .....	82,180	6.00	n.a.	n.a.
Financial managers .....	4,480	.33	3	14
Personnel, training, and labor relations managers .....	3,160	.23	4	12
Purchasing managers .....	2,230	.16	2	11
Marketing, advertising, and public relations managers .....	4,670	.34	3	11
Administrative services managers .....	2,220	.16	7	6
Industrial production managers .....	7,360	.54	4	15
General managers and top executives .....	47,180	3.45	2	84
All other managers and administrators .....	10,880	.79	11	11
Professional, paraprofessional, and technical occupations .....	92,580	6.76	n.a.	n.a.
Management support workers .....	24,640	1.80	n.a.	n.a.
Accountants, auditors, and other financial specialists .....	11,740	.86	n.a.	n.a.
Accountants and auditors .....	9,380	.69	2	26
Budget analysts .....	800	.06	13	2
All other financial specialists .....	1,560	.11	37	2
Purchasing agents, except wholesale and retail trade, and farm products .....	4,460	.33	3	15
Personnel, training, and labor relations specialists .....	1,680	.12	4	5
Cost estimators .....	4,260	.31	4	10
All other management support workers .....	2,500	.18	8	4
Engineers .....	30,680	2.24	n.a.	n.a.
Metallurgists, and metallurgical, ceramic, and materials engineers .....	780	.06	8	2
Chemical engineers .....	380	.03	15	1
Civil engineers, including traffic .....	1,320	.10	11	2
Electrical and electronic engineers .....	1,980	.14	17	2
Industrial engineers, except safety .....	3,930	.29	4	8
Safety engineers, except mining .....	580	.04	14	2
Mechanical engineers .....	15,130	1.11	5	24
All other engineers .....	6,580	.48	n.a.	n.a.
Engineering and related technicians and technologists .....	24,950	1.82	n.a.	n.a.
Civil engineering technicians and technologists .....	340	.02	21	( <sup>3</sup> )
Electrical and electronic engineering technicians and technologists .....	1,010	.07	11	2
Industrial engineering technicians and technologists .....	1,080	.08	7	3
Mechanical engineering technicians and technologists .....	1,980	.14	10	3
Drafters .....	17,850	1.30	3	26
All other engineering and related technicians and technologists .....	2,690	.20	10	3
Physical scientists .....	910	.07	n.a.	n.a.
Physical and life science technicians and technologists .....	910	.07	n.a.	n.a.
Chemical technicians and technologists, except health .....	760	.06	12	1
All other physical and life science technicians and technologists .....	150	.01	20	( <sup>3</sup> )
Computer scientists and related workers .....	5,700	.42	n.a.	n.a.
Systems analysts, electronic data processing .....	1,890	.14	7	5
Computer programmers .....	2,510	.18	4	7
Computer programmer aides .....	740	.05	6	3
Programmers - numerical, tool, and process control .....	560	.04	6	2
Mathematical scientists and related workers .....	340	.02	n.a.	n.a.

See footnotes at end of table.

**Table 18. Fabricated metal products, except machinery and transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued**

(SIC 34)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Operations and systems researchers and analysts, except computer .....	340	0.02	19	1
Health practitioners, technologists, technicians, and related health workers .....	750	.05	4	3
Public relations specialists and publicity writers .....	270	.02	17	1
Designers, except interior designers .....	720	.05	12	1
All other professional, paraprofessional, and technical workers .....	2,710	.20	n.a.	n.a.
<b>Sales and related occupations .....</b>	<b>35,840</b>	<b>2.62</b>	<b>n.a.</b>	<b>n.a.</b>
First-line supervisors and manager/supervisors, sales and related workers .....	3,010	.22	4	6
Sales engineers .....	2,230	.16	6	3
Sales representatives, scientific and related products and services, except retail .....	10,320	.75	4	16
Sales representatives, except scientific and related products or services and retail .....	17,980	1.31	3	27
All other sales and related workers .....	2,300	.17	8	3
<b>Clerical and administrative support occupations .....</b>	<b>127,550</b>	<b>9.32</b>	<b>n.a.</b>	<b>n.a.</b>
First-line supervisors and manager/supervisors, clerical and administrative support workers .....	3,750	.27	3	9
Secretaries .....	27,980	2.04	2	58
Stenographers .....	1,200	.09	10	2
Receptionists and information clerks .....	1,430	.10	3	7
Typists .....	2,320	.17	4	4
Typists, word processing equipment .....	560	.04	8	2
Personnel clerks, except payroll and timekeeping .....	1,480	.11	3	7
File clerks .....	1,200	.09	5	4
Order clerks, materials, merchandise, and service .....	3,240	.24	3	7
Procurement clerks .....	1,660	.12	3	7
Bookkeeping, accounting, and auditing clerks .....	19,580	1.43	2	51
Payroll and timekeeping clerks .....	3,220	.24	2	12
Billing, cost and rate clerks .....	3,070	.22	3	9
General office clerks .....	19,960	1.46	2	42
Electronic data processing and other office machine operators .....	6,230	.46	n.a.	n.a.
Billing, posting, and calculating machine operators .....	580	.04	5	2
Computer operators, except peripheral equipment .....	2,310	.17	4	7
Peripheral EDP equipment operators .....	250	.02	11	1
Data entry keyers, except composing .....	2,700	.20	3	7
All other office machine operators .....	390	.03	11	1
Switchboard operators .....	1,670	.12	2	9
<b>Material recording, scheduling, dispatching, and distributing workers .....</b>	<b>25,810</b>	<b>1.89</b>	<b>n.a.</b>	<b>n.a.</b>
Production, planning, and expediting clerks .....	7,620	.56	2	13
Weighers, measurers, checkers, and samplers, recordkeeping .....	1,300	.09	8	2
Stock clerks, stockroom, warehouse or storage yard .....	7,050	.52	3	12
Traffic, shipping, and receiving clerks .....	8,340	.61	2	16
All other material recording, scheduling, and distributing workers .....	1,500	.11	7	3
All other clerical and administrative support workers .....	3,190	.23	19	3
<b>Service occupations .....</b>	<b>20,120</b>	<b>1.47</b>	<b>n.a.</b>	<b>n.a.</b>
First-line supervisors and manager/supervisors, service .....	1,300	.09	7	2

See footnotes at end of table.

**Table 18. Fabricated metal products, except machinery and transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued**

(SIC 34)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Guards and watch guards .....	3,730	0.27	6	4
Food and beverage preparation and service workers .....	370	.03	14	( <sup>3</sup> )
Cleaning and building service workers, except private households .....	14,120	1.03	n.a.	n.a.
Janitors and cleaners, except maids and housekeeping cleaners .....	13,520	.99	2	33
All other cleaning and building service workers, except private households .....	600	.04	10	1
All other service workers .....	600	.04	15	1
Agriculture, forestry, fishing, and related occupations .....	400	.03	n.a.	n.a.
Gardeners and groundskeepers, except farm .....	400	.03	10	1
Production, construction, operating, maintenance, and material handling occupations .....	1,010,260	73.80	n.a.	n.a.
First-line supervisors, manager/supervisors - production, construction, maintenance, and related workers .....	67,460	4.93	n.a.	n.a.
First-line supervisors and manager/supervisors - mechanics, installers and repairers .....	3,590	.26	4	8
First-line supervisors and manager/supervisors - construction trades and extractive workers .....	930	.07	13	1
First-line supervisors and manager/supervisors - production and operating workers .....	58,350	4.26	1	71
First-line supervisors and manager/superv-transp and material moving machine and vehicle workers .....	1,820	.13	6	5
First-line supervisors and manager/supervisors - helpers, laborers, and material movers, hand .....	2,770	.20	6	4
Precision inspectors, testers, and graders .....	13,260	.97	3	18
Production inspectors, testers, graders, sorters, samplers, and weighers .....	26,800	1.96	2	25
Mechanics, installers, and repairers .....	53,770	3.93	n.a.	n.a.
Machinery maintenance mechanics .....	18,660	1.36	4	17
Millwrights .....	5,350	.39	6	4
Machinery maintenance workers .....	4,230	.31	8	6
Maintenance repairers, general utility .....	17,490	1.28	2	31
Automotive mechanics .....	820	.06	12	2
Bus and truck mechanics and diesel engine specialists .....	820	.06	8	2
Heating, air conditioning, and refrigeration mechanics and installers .....	810	.06	24	1
Riggers .....	530	.04	24	( <sup>3</sup> )
All other mechanics, installers, and repairers .....	5,060	.37	8	2
Construction trades workers, except material moving .....	14,820	1.08	n.a.	n.a.
Carpenters .....	1,680	.12	10	3
Electricians .....	6,940	.51	4	9
Painters and paperhangers, construction and maintenance .....	1,600	.12	16	2
Plumbers, pipefitters, and steamfitters .....	2,550	.19	8	2
All other construction trades workers .....	2,050	.15	15	1
Precision metal workers .....	116,180	8.49	n.a.	n.a.
Tool-and-die makers .....	30,380	2.22	5	24
Machinists .....	31,970	2.34	3	28
Tool grinders, filers, sharpeners, and other precision grinders .....	7,540	.55	4	10
Pattern and model makers, metal .....	2,460	.18	8	4
Precision layout workers, metal .....	6,790	.50	5	9

See footnotes at end of table.

**Table 18. Fabricated metal products, except machinery and transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued**

(SIC 34)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Sheet-metal workers .....	33,180	2.42	5	13
Boilermakers .....	2,560	.19	33	( <sup>3</sup> )
All other precision metal workers .....	1,300	.09	18	1
Precision woodworkers .....	360	.03	15	1
Precision workers, nec .....	1,850	.14	n.a.	n.a.
Precision foundry mold and core makers .....	1,080	.08	18	1
All other precision workers, nec .....	770	.06	15	1
Machine setters, set-up operators, and tenders, metal and plastic .....	346,630	25.32	n.a.	n.a.
Sawing machine tool setters and set-up operators, metal and plastic .....	4,550	.33	5	8
Lathe and turning machine tool setters and set-up operators, metal and plastic .....	20,460	1.49	3	13
Drilling and boring machine tool setters and set-up operators, metal and plastic .....	10,140	.74	4	11
Milling and planing machine setters and set-up operators, metal and plastic .....	2,780	.20	9	3
Grinding, lapping, and buffing machine tool setters and set-up operators, metal and plastic .....	12,660	.92	4	12
Machine tool cutting operators and tenders, metal and plastic .....	31,310	2.29	5	14
Punching machine setters and set-up operators, metal and plastic .....	21,720	1.59	4	17
Press and press brake machine setters and set-up operators, metal and plastic .....	19,510	1.43	3	17
Shear and slitter machine setters and set-up operators, metal and plastic .....	8,260	.60	4	14
Extruding and drawing machine setters and set-up operators, metal and plastic .....	2,800	.20	8	2
Rolling machine setters and set-up operators, metal and plastic .....	2,670	.20	7	2
Forging machine setters and set-up operators, metal and plastic .....	5,170	.38	7	2
Machine forming operators and tenders, metal and plastic .....	65,280	4.77	4	20
Numerical control machine tool operators and tenders, metal and plastic .....	3,820	.28	6	3
Combination machine tool setters and set-up operators, metal and plastic .....	9,580	.70	5	8
Combination machine tool operators and tenders, metal and plastic .....	12,910	.94	6	6
Welding machine setters and set-up operators .....	22,510	1.64	4	17
Welding machine operators and tenders .....	19,910	1.45	5	10
Soldering and brazing machine setters and set-up operators .....	1,680	.12	9	2
Soldering and brazing machine operators and tenders .....	1,570	.11	12	2
Metal fabricators, structural metal products .....	23,060	1.68	5	11
Metal molding, coremaking, and casting machine setters and set-up operators .....	1,440	.11	12	1
Metal molding, coremaking, and casting machine operators and tenders .....	1,930	.14	15	1
Electrolytic plating and coating machine setters and set-up operators, metal and plastic .....	9,740	.71	5	7
Electrolytic plating and coating machine operators and tenders, metal and plastic .....	13,390	.98	4	8
Nonelectrolytic plating and coating machine setters and set-up operators, metal and plastic .....	2,600	.19	9	3
Nonelectrolytic plating and coating machine operators and tenders, metal and plastic .....	2,630	.19	10	2
Heating equipment setters and set-up operators, metal and plastic .....	880	.06	9	1

See footnotes at end of table.

**Table 18. Fabricated metal products, except machinery and transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued**

(SIC 34)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Heat treating, annealing, and tempering machine operators and tenders, metal and plastic .....	2,650	0.19	6	3
Furnace operators and tenders .....	1,460	.11	8	2
Heaters, metal and plastic .....	700	.05	12	1
All other machine setters and set-up operators, metal and plastic .....	6,860	.50	8	3
All other machine operators and tenders, metal and plastic .....	11,220	.82	6	3
Machine setters, set-up operators, and tenders, except metal and plastic .....	55,850	4.08	n.a.	n.a.
Sawing machine operators and tenders .....	450	.03	14	1
Woodworking machine setters and set-up operators, except sawing .....	160	.01	16	( <sup>3</sup> )
Woodworking machine operators and tenders, except sawing .....	530	.04	18	( <sup>3</sup> )
Printing press machine setters and set-up operators .....	750	.05	12	1
Specialty materials printing machine setters and set-up operators .....	460	.03	14	( <sup>3</sup> )
All other printing related setters and set-up operators .....	480	.04	25	( <sup>3</sup> )
Printing and related machine operators and tenders .....	730	.05	n.a.	n.a.
Boiler operators and tenders, low pressure .....	470	.03	8	1
Coating, painting, and spraying machine setters and set-up operators .....	10,160	.74	4	13
Coating, painting, and spraying machine operators and tenders .....	9,800	.72	4	11
Cleaning, washing, and pickling equipment operators and tenders .....	1,650	.12	7	3
Crushing, grinding, mixing, and blending machine operators and tenders .....	1,170	.09	12	1
Packaging and filling machine operators and tenders .....	6,170	.45	7	5
All other machine setters and set-up operators, except metal and plastic .....	2,620	.19	10	1
All other machine operators and tenders, except metal and plastic .....	9,030	.66	7	2
Precision assemblers, metal .....	17,440	1.27	n.a.	n.a.
Fitters, structural metal, precision .....	13,790	1.01	5	7
All other precision assemblers, metal .....	3,650	.27	15	1
Other hand workers, nec .....	152,050	11.11	n.a.	n.a.
Glaziers, manufacturing .....	2,600	.19	12	1
Welders and cutters .....	20,310	1.48	4	8
Solderers and brazers .....	840	.06	13	1
Grinding and polishing workers, hand .....	17,300	1.26	4	13
Assemblers and fabricators, except machine, electrical, electronic, and precision .....	103,970	7.59	2	27
All other hand workers, nec .....	7,030	.51	8	3
Plant and system workers .....	850	.06	n.a.	n.a.
Stationary engineers .....	340	.02	11	1
All other plant and system operators .....	510	.04	11	1
Motor vehicle operators .....	9,520	.70	n.a.	n.a.
Truck drivers, heavy or tractor trailer .....	5,870	.43	4	9
Truck drivers, light, include delivery and route workers .....	3,320	.24	4	9
All other motor vehicle operators .....	330	.02	12	1
All other transportation and motor vehicle operators .....	590	.04	13	1
Material moving equipment operators .....	30,010	2.19	n.a.	n.a.
Hoist and winch operators .....	650	.05	11	1
Crane and tower operators .....	3,410	.25	6	4
Industrial truck and tractor operators .....	23,790	1.74	3	27
Conveyor operators and tenders .....	1,200	.09	12	1
All other material moving equipment operators .....	960	.07	11	1

See footnotes at end of table.

**Table 18. Fabricated metal products, except machinery and transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued**

(SIC 34)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Helpers - mechanics and repairers .....	1,520	0.11	10	2
Construction trades and extractive worker helpers .....	1,300	.09	19	1
Machine feeders and offbearers .....	18,000	1.31	4	8
Freight, stock, and material movers, hand .....	25,080	1.83	2	28
Hand packers and packagers .....	24,440	1.79	3	21
All other helpers, laborers, and material movers, hand .....	32,480	2.37	3	11

<sup>1</sup> Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

<sup>2</sup> Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors

are estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

<sup>3</sup> Less than 0.5 percent.

n.a. = not available.

NOTE: Detail may not add to totals due to rounding. Estimated employment is rounded to the nearest 10.

# Machinery, Except Electrical and Transportation Equipment

Manufacturers of machinery and equipment, other than electrical or transportation equipment, employed just over 2 million workers in 1983, or 11 percent of manufacturing and 19 percent of durable goods employment. The three largest employers of these workers were: Establishments manufacturing office, computing, and accounting machines, with 24 percent of industry employment; establishments manufacturing metal working machinery and equipment, 14 percent; and establishments manufacturing construction, mining, and materials handling equipment, 13 percent.

As shown in table 19, the 1.2 million production and related workers accounted for 57 percent of total industry employment. Professional, paraprofessional, and technical workers ranked second with 17 percent. The remaining employment was distributed as follows: Clerical and administrative support workers, 14 per-

cent; managerial and administrative workers, 7 percent; and sales and service workers, 3 percent and 2 percent, respectively. Text table 13 provides data since 1977 by occupational group.

The five most populous occupations in the industry are listed in the tabulation below:

	<i>Employment</i>	<i>Percent of industry employment</i>
Machinists .....	118,020	5.8
Assemblers and fabricators, except machine, electrical, electronic, and precision .....	102,750	5.1
First-line supervisors, production .....	70,710	3.5
General managers and top executives .....	62,720	3.1
Secretaries .....	57,790	2.8

**Text table 13. Machinery, except electrical and transportation equipment: Employment by major occupational group, selected years, 1977-83**

Major occupational group	1977	1980	1983	Percent change 1977-83
Total .....	2,174,070	2,497,290	2,026,830	-6.8
Managerial and administrative workers .....	156,480	195,830	149,820	-4.3
Professional, paraprofessional, and technical workers .....	292,680	369,290	340,620	16.4
Sales workers .....	39,800	44,140	63,060	58.4
Clerical workers .....	279,890	332,490	287,560	2.7
Production and related workers .....	1,368,450	1,515,640	1,153,170	-15.7
Service workers .....	36,770	39,900	31,830	-13.4

<sup>1</sup> Includes 5,980 employees in the occupation "first-line supervisor—sales" and 7,570 employees in the sales engineer category; in

previous surveys these workers would have been included in the managerial and professional categories.

**Table 19. Machinery, except electrical and transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1983**

(SIC 35)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Total .....	2,026,770	100.00	--	--
Managerial and administrative occupations .....	149,810	7.39	n.a.	n.a.
Financial managers .....	9,030	.45	3	14
Personnel, training, and labor relations managers .....	5,410	.27	3	12
Purchasing managers .....	3,910	.19	3	12
Marketing, advertising, and public relations managers .....	11,240	.55	4	11
Administrative services managers .....	4,400	.22	5	6
Industrial production managers .....	14,150	.70	4	14
General managers and top executives .....	62,720	3.09	1	79
All other managers and administrators .....	38,950	1.92	7	12
Professional, paraprofessional, and technical occupations .....	340,620	16.81	n.a.	n.a.
Management support workers .....	61,640	3.04	n.a.	n.a.
Accountants, auditors, and other financial specialists .....	22,550	1.11	n.a.	n.a.
Accountants and auditors .....	16,320	.81	3	25
Budget analysts .....	2,230	.11	7	3
All other financial specialists .....	4,000	.20	11	3
Purchasing agents, except wholesale and retail trade, and farm products .....	11,330	.56	3	17
Personnel, training, and labor relations specialists .....	5,990	.30	5	7
Cost estimators .....	4,330	.21	4	8
All other management support workers .....	17,440	.86	13	5
Engineers .....	122,700	6.05	n.a.	n.a.
Metallurgists, and metallurgical, ceramic, and materials engineers .....	1,490	.07	7	2
Chemical engineers .....	1,730	.09	19	1
Civil engineers, including traffic .....	830	.04	17	1
Agricultural engineers .....	1,430	.07	33	( <sup>3</sup> )
Electrical and electronic engineers .....	43,420	2.14	8	13
Industrial engineers, except safety .....	20,910	1.03	7	15
Safety engineers, except mining .....	600	.03	6	2
Mechanical engineers .....	38,220	1.89	3	28
All other engineers .....	14,070	.69	10	4
Engineering and related technicians and technologists .....	83,830	4.14	n.a.	n.a.
Electrical and electronic engineering technicians and technologists .....	29,350	1.45	5	10
Industrial engineering technicians and technologists .....	4,520	.22	7	4
Mechanical engineering technicians and technologists .....	7,640	.38	6	5
Drafters .....	31,010	1.53	2	31
All other engineering and related technicians and technologists .....	11,310	.56	n.a.	n.a.
Physical scientists .....	1,590	.08	n.a.	n.a.
Physicists and astronomers .....	260	.01	46	( <sup>3</sup> )
Chemists, except biochemists .....	1,000	.05	20	1
All other physical scientists .....	330	.02	19	( <sup>3</sup> )
Physical and life science technicians and technologists .....	1,980	.10	n.a.	n.a.
Chemical technicians and technologists, except health .....	1,620	.08	13	1
All other physical and life science technicians and technologists .....	360	.02	17	( <sup>3</sup> )
Computer scientists and related workers .....	41,500	2.05	n.a.	n.a.
Systems analysts, electronic data processing .....	12,120	.60	7	7
Computer programmers .....	23,740	1.17	13	9
Computer programmer aides .....	2,340	.12	9	3

See footnotes at end of table.

**Table 19. Machinery, except electrical and transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued**

(SIC 35)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Programmers - numerical, tool, and process control .....	3,300	0.16	8	6
Mathematical scientists and related workers .....	3,560	.18	n.a.	n.a.
Operations and systems researchers and analysts, except computer .....	2,560	.13	18	1
All other mathematical scientists .....	1,000	.05	n.a.	n.a.
Lawyers .....	740	.04	9	1
Health practitioners, technologists, technicians, and related health workers .....	1,330	.07	5	3
Writers and editors .....	1,240	.06	11	1
Technical writers .....	3,670	.18	6	4
Public relations specialists and publicity writers .....	640	.03	11	1
Designers, except interior designers .....	4,680	.23	8	3
All other professional, paraprofessional, and technical workers .....	11,520	.57	n.a.	n.a.
Sales and related occupations .....	63,060	3.11	n.a.	n.a.
First-line supervisors and manager/supervisors, sales and related workers .....	5,980	.30	5	6
Sales engineers .....	7,570	.37	5	5
Sales representatives, scientific and related products and services, except retail .....	23,710	1.17	5	17
Sales representatives, except scientific and related products or services and retail .....	19,980	.99	4	20
All other sales and related workers .....	5,820	.29	11	4
Clerical and administrative support occupations .....	287,540	14.19	n.a.	n.a.
First-line supervisors and manager/supervisors, clerical and administrative support workers .....	11,690	.58	7	9
Secretaries .....	57,790	2.85	2	58
Stenographers .....	3,020	.15	11	3
Receptionists and information clerks .....	2,270	.11	4	6
Typists .....	4,860	.24	4	6
Typists, word processing equipment .....	2,400	.12	7	3
Personnel clerks, except payroll and timekeeping .....	2,760	.14	4	7
File clerks .....	2,400	.12	5	4
Order clerks, materials, merchandise, and service .....	7,210	.36	5	8
Procurement clerks .....	3,460	.17	4	8
Statistical clerks .....	1,230	.06	9	2
Bookkeeping, accounting, and auditing clerks .....	28,210	1.39	2	47
Payroll and timekeeping clerks .....	4,310	.21	3	10
Billing, cost and rate clerks .....	5,460	.27	4	8
General office clerks .....	38,200	1.88	6	38
Electronic data processing and other office machine operators .....	16,810	.83	n.a.	n.a.
Billing, posting, and calculating machine operators .....	770	.04	15	1
Computer operators, except peripheral equipment .....	7,030	.35	6	8
Peripheral EDP equipment operators .....	1,210	.06	11	1
Data entry keyers, except composing .....	5,850	.29	3	9
All other office machine operators .....	1,950	.10	13	2
Switchboard operators .....	2,790	.14	3	9
Material recording, scheduling, dispatching, and distributing workers .....	80,780	3.99	n.a.	n.a.
Production, planning, and expediting clerks .....	25,640	1.27	5	13
Weighers, measurers, checkers, and samplers, recordkeeping .....	1,200	.06	11	1
Stock clerks, stockroom, warehouse or storage yard .....	27,190	1.34	3	26
Traffic, shipping, and receiving clerks .....	23,740	1.17	2	35

See footnotes at end of table.

**Table 19. Machinery, except electrical and transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued**

(SIC 35)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
All other material recording, scheduling, and distributing workers .....	3,010	0.15	7	3
All other clerical and administrative support workers .....	11,890	.59	17	3
Service occupations .....	31,810	1.57	n.a.	n.a.
First-line supervisors and manager/supervisors, service .....	2,100	.10	6	3
Guards and watch guards .....	5,300	.26	5	4
Food and beverage preparation and service workers .....	1,080	.05	14	1
Cleaning and building service workers, except private households .....	22,470	1.11	n.a.	n.a.
Janitors and cleaners, except maids and housekeeping cleaners .....	21,610	1.07	3	33
All other cleaning and building service workers, except private households .....	860	.04	14	1
All other service workers .....	860	.04	15	1
Agriculture, forestry, fishing, and related occupations .....	780	.04	n.a.	n.a.
Gardeners and groundskeepers, except farm .....	570	.03	8	1
All other agriculture, forestry, fishing, and related workers .....	210	.01	30	( <sup>3</sup> )
Production, construction, operating, maintenance, and material handling occupations .....	1,153,150	56.90	n.a.	n.a.
First-line supervisors, manager/supervisors - production, construction, maintenance, and related workers .....	80,730	3.98	n.a.	n.a.
First-line supervisors and manager/supervisors - mechanics, installers and repairers .....	4,550	.22	5	7
First-line supervisors and manager/supervisors - construction trades and extractive workers .....	1,000	.05	12	1
First-line supervisors and manager/supervisors - production and operating workers .....	70,710	3.49	2	60
First-line supervisors and manager/superv-transp and material moving machine and vehicle workers .....	2,030	.10	6	4
First-line supervisors and manager/supervisors - helpers, laborers, and material movers, hand .....	2,440	.12	6	4
Precision inspectors, testers, and graders .....	36,720	1.81	4	22
Production inspectors, testers, graders, sorters, samplers, and weighers .....	24,880	1.23	4	12
Mechanics, installers, and repairers .....	60,100	2.97	n.a.	n.a.
Machinery maintenance mechanics .....	11,510	.57	4	7
Millwrights .....	4,230	.21	8	3
Machinery maintenance workers .....	2,780	.14	11	3
Maintenance repairers, general utility .....	21,520	1.06	3	27
Automotive mechanics .....	860	.04	12	1
Bus and truck mechanics and diesel engine specialists .....	920	.05	18	1
Farm equipment mechanics .....	390	.02	28	( <sup>3</sup> )
Data processing equipment repairers .....	7,750	.38	32	1
Heating, air conditioning, and refrigeration mechanics and installers .....	1,720	.08	9	2
Precision instrument repairers .....	1,600	.08	15	1
Riggers .....	320	.02	18	( <sup>3</sup> )
All other mechanics, installers, and repairers .....	6,500	.32	n.a.	n.a.
Construction trades workers, except material moving .....	18,420	.91	n.a.	n.a.
Carpenters .....	1,930	.10	11	3

See footnotes at end of table.

**Table 19. Machinery, except electrical and transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued**

(SIC 35)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Electricians .....	9,240	0.46	5	7
Painters and paperhangers, construction and maintenance .....	2,050	.10	5	3
Plumbers, pipefitters, and steamfitters .....	3,960	.20	9	2
All other construction trades workers .....	1,240	.06	33	1
Precision metal workers .....	208,870	10.31	n.a.	n.a.
Tool-and-die makers .....	52,080	2.57	3	29
Machinists .....	118,020	5.82	2	57
Tool grinders, filers, sharpeners, and other precision grinders .....	9,330	.46	6	6
Precision layout workers, metal .....	2,710	.13	7	3
Sheet-metal workers .....	22,800	1.12	4	13
All other precision metal workers .....	3,930	.19	n.a.	n.a.
Precision woodworkers .....	4,380	.22	n.a.	n.a.
Pattern and model makers, wood .....	3,700	.18	10	2
All other precision woodworkers .....	680	.03	25	( <sup>3</sup> )
Precision workers, nec .....	4,870	.24	n.a.	n.a.
Precision foundry mold and core makers .....	2,190	.11	11	1
All other precision workers, nec .....	2,680	.13	19	1
Machine setters, set-up operators, and tenders, metal and plastic .....	318,230	15.70	n.a.	n.a.
Sawing machine tool setters and set-up operators, metal and plastic .....	5,420	.27	4	10
Lathe and turning machine tool setters and set-up operators, metal and plastic .....	36,640	1.81	2	24
Drilling and boring machine tool setters and set-up operators, metal and plastic .....	25,640	1.27	3	18
Milling and planing machine setters and set-up operators, metal and plastic .....	15,850	.78	4	12
Grinding, lapping, and buffing machine tool setters and set-up operators, metal and plastic .....	33,530	1.65	4	18
Machine tool cutting operators and tenders, metal and plastic .....	47,170	2.33	4	14
Punching machine setters and set-up operators, metal and plastic .....	9,340	.46	5	8
Press and press brake machine setters and set-up operators, metal and plastic .....	6,240	.31	5	4
Shear and slitter machine setters and set-up operators, metal and plastic .....	2,720	.13	5	3
Forging machine setters and set-up operators, metal and plastic .....	1,550	.08	15	1
Machine forming operators and tenders, metal and plastic .....	19,570	.97	5	9
Numerical control machine tool operators and tenders, metal and plastic .....	29,180	1.44	3	17
Combination machine tool setters and set-up operators, metal and plastic .....	13,870	.68	5	8
Combination machine tool operators and tenders, metal and plastic .....	11,150	.55	6	6
Welding machine setters and set-up operators .....	25,800	1.27	3	19
Welding machine operators and tenders .....	14,170	.70	5	10
Soldering and brazing machine setters and set-up operators .....	2,730	.13	8	3
Soldering and brazing machine operators and tenders .....	2,120	.10	9	2
Metal molding, coremaking, and casting machine setters and set-up operators .....	1,960	.10	15	1
Metal molding, coremaking, and casting machine operators and tenders .....	1,640	.08	12	1
Electrolytic plating and coating machine setters and set-up operators, metal and plastic .....	820	.04	12	1
Electrolytic plating and coating machine operators and tenders, metal and plastic .....	980	.05	11	1

See footnotes at end of table.

**Table 19. Machinery, except electrical and transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued**

(SIC 35)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Nonelectrolytic plating and coating machine setters and set-up operators, metal and plastic .....	220	0.01	19	( <sup>3</sup> )
Nonelectrolytic plating and coating machine operators and tenders, metal and plastic .....	260	.01	27	( <sup>3</sup> )
Heating equipment setters and set-up operators, metal and plastic .....	1,370	.07	8	1
Heat treating, annealing, and tempering machine operators and tenders, metal and plastic .....	2,720	.13	6	3
Furnace operators and tenders .....	1,130	.06	8	1
Heaters, metal and plastic .....	340	.02	13	( <sup>3</sup> )
All other machine setters and set-up operators, metal and plastic .....	4,100	.20	9	1
All other machine operators and tenders, metal and plastic .....	5,220	.26	9	2
Machine setters, set-up operators, and tenders, except metal and plastic .....	33,720	1.66	n.a.	n.a.
Sawing machine operators and tenders .....	470	.02	11	1
Electronic semiconductor processors .....	1,080	.05	34	( <sup>3</sup> )
Boiler operators and tenders, low pressure .....	540	.03	18	1
Coating, painting, and spraying machine setters and set-up operators .....	5,810	.29	4	9
Coating, painting, and spraying machine operators and tenders .....	4,920	.24	5	7
Cleaning, washing, and pickling equipment operators and tenders .....	1,520	.07	8	2
Crushing, grinding, mixing, and blending machine operators and tenders .....	1,180	.06	12	1
Packaging and filling machine operators and tenders .....	4,800	.24	21	1
All other machine setters and set-up operators, except metal and plastic .....	2,420	.12	n.a.	n.a.
All other machine operators and tenders, except metal and plastic .....	5,760	.28	n.a.	n.a.
Precision assemblers, metal .....	93,180	4.60	n.a.	n.a.
Machine builders and other precision machine assemblers .....	35,520	1.75	4	13
Electromechanical equipment assemblers, precision .....	20,100	.99	14	3
Electrical and electronic equipment assemblers, precision .....	32,570	1.61	7	6
All other precision assemblers, metal .....	4,990	.25	9	1
Other hand workers, nec .....	194,310	9.59	n.a.	n.a.
Machine assemblers .....	21,000	1.04	5	7
Electrical and electronic assemblers .....	26,870	1.33	8	5
Coil winders, tapers, and finishers .....	1,500	.07	16	1
Welders and cutters .....	26,230	1.29	4	9
Solderers and brazers .....	3,040	.15	11	1
Grinding and polishing workers, hand .....	6,960	.34	7	4
Assemblers and fabricators, except machine, electrical, electronic, and precision .....	102,750	5.07	3	21
All other hand workers, nec .....	5,960	.29	8	2
Plant and system workers .....	2,050	.10	n.a.	n.a.
Stationary engineers .....	800	.04	11	1
All other plant and system operators .....	1,250	.06	36	1
Motor vehicle operators .....	6,170	.30	n.a.	n.a.
Truck drivers, heavy or tractor trailer .....	3,260	.16	9	5
Truck drivers, light, include delivery and route workers .....	2,540	.13	4	7
All other motor vehicle operators .....	370	.02	11	1
All other transportation and motor vehicle operators .....	620	.03	21	( <sup>3</sup> )
Material moving equipment operators .....	22,600	1.12	n.a.	n.a.
Hoist and winch operators .....	420	.02	19	( <sup>3</sup> )
Crane and tower operators .....	2,600	.13	8	2

See footnotes at end of table.

**Table 19. Machinery, except electrical and transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued**

(SIC 35)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Industrial truck and tractor operators .....	17,560	0.87	3	14
Conveyor operators and tenders .....	800	.04	21	( <sup>3</sup> )
All other material moving equipment operators .....	1,220	.06	10	1
Helpers - mechanics and repairers .....	2,560	.13	8	2
Construction trades and extractive worker helpers .....	710	.04	14	( <sup>3</sup> )
Machine feeders and offbearers .....	4,090	.20	7	3
Freight, stock, and material movers, hand .....	18,220	.90	4	13
All other helpers, laborers, and material movers, hand .....	17,720	.87	6	6

<sup>1</sup> Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

<sup>2</sup> Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors

are estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

<sup>3</sup> Less than 0.5 percent.

n.a. = not available.

NOTE: Detail may not add to totals due to rounding. Estimated employment is rounded to the nearest 10.

# Electrical and Electronic Machinery, Equipment, and Supplies

Manufacturers of electrical and electronic machinery, equipment, and supplies employed just under 2.0 million workers, or 11 percent of manufacturing and 19 percent of durable goods employment in 1983. Establishments manufacturing electronic components and accessories employed 29 percent of the industry's workers; establishments manufacturing communications equipment, 28 percent; and those manufacturing electrical industrial apparatus, 10 percent.

The industry employed nearly 1.2 million production and related workers, accounting for almost three-fifths of total industry employment (table 20). Professional, paraprofessional, and technical workers accounted for 20 percent. Clerical and administrative support workers, primarily office clerical workers, accounted for 12 percent. The remaining employment was distributed as follows: Managerial and administrative workers, 6 percent; and sales and service workers, 2 and

1 percent, respectively. Text table 14 shows employment by major occupational group since 1977.

The five most populous occupations in manufacturing electrical and electronic machinery, equipment, and supplies are listed in the tabulation below:

	<i>Employment</i>	<i>Percent of industry employment</i>
Assemblers and fabricators, except machine, electrical, electronic, and precision .....	184,210	9.1
Electrical and electronic assemblers .....	174,440	8.6
Electrical and electronic engineers .....	106,110	5.3
Electrical and electronic engineering technicians and technologists .....	60,500	3.0
First-line supervisors, production .....	59,310	2.9

**Text table 14. Electrical and electronic machinery, equipment, and supplies: Employment by major occupational group, selected years, 1977-83**

Major occupational group	1977	1980	1983	Percent change 1977-83
Total .....	1,882,730	2,079,640	2,017,110	7.1
Managerial and administrative workers .....	105,240	133,520	123,420	17.3
Professional, paraprofessional, and technical workers .....	305,090	385,600	401,800	31.7
Sales workers .....	20,140	20,390	34,460	71.1
Clerical workers .....	222,600	255,900	243,560	9.4
Production and related workers .....	1,201,160	1,254,920	1,183,940	-1.4
Service workers .....	28,500	29,310	29,500	3.5

<sup>1</sup> Includes 4,480 employees in the occupation "first-line supervisor—sales" and 6,080 employees in the sales engineer category; in

previous surveys these workers would have been included in the managerial and professional categories.

**Table 20. Electrical and electronic machinery, equipment, and supplies: Employment, relative error, and percent of establishments reporting selected occupations, June 1983**

(SIC 36)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Total .....	2,017,120	100.00	--	--
<b>Managerial and administrative occupations .....</b>	<b>123,420</b>	<b>6.12</b>	<b>n.a.</b>	<b>n.a.</b>
Financial managers .....	9,880	.49	7	31
Personnel, training, and labor relations managers .....	5,640	.28	5	29
Purchasing managers .....	4,060	.20	5	26
Marketing, advertising, and public relations managers .....	9,390	.47	6	24
Administrative services managers .....	5,760	.29	8	14
Industrial production managers .....	16,970	.84	8	32
General managers and top executives .....	33,540	1.66	3	86
All other managers and administrators .....	38,180	1.89	9	27
<b>Professional, paraprofessional, and technical occupations .....</b>	<b>401,810</b>	<b>19.92</b>	<b>n.a.</b>	<b>n.a.</b>
Management support workers .....	70,600	3.50	n.a.	n.a.
Accountants, auditors, and other financial specialists .....	20,410	1.01	n.a.	n.a.
Accountants and auditors .....	14,440	.72	5	41
Budget analysts .....	2,320	.12	8	8
All other financial specialists .....	3,650	.18	11	6
Purchasing agents, except wholesale and retail trade, and farm products .....	13,930	.69	3	52
Personnel, training, and labor relations specialists .....	5,910	.29	6	18
Cost estimators .....	3,500	.17	7	11
All other management support workers .....	26,850	1.33	8	11
Engineers .....	167,520	8.30	n.a.	n.a.
Metallurgists, and metallurgical, ceramic, and materials engineers .....	1,610	.08	11	4
Chemical engineers .....	3,320	.16	10	5
Civil engineers, including traffic .....	1,240	.06	38	1
Electrical and electronic engineers .....	106,110	5.26	2	49
Industrial engineers, except safety .....	18,690	.93	8	30
Safety engineers, except mining .....	830	.04	11	5
Mechanical engineers .....	19,380	.96	8	29
All other engineers .....	16,340	.81	13	9
Engineering and related technicians and technologists .....	108,420	5.37	n.a.	n.a.
Electrical and electronic engineering technicians and technologists .....	60,500	3.00	7	39
Industrial engineering technicians and technologists .....	4,380	.22	25	9
Mechanical engineering technicians and technologists .....	8,050	.40	24	8
Drafters .....	23,270	1.15	6	43
All other engineering and related technicians and technologists .....	12,220	.61	n.a.	n.a.
Physical scientists .....	3,120	.15	n.a.	n.a.
Physicists and astronomers .....	1,820	.09	44	1
Chemists, except biochemists .....	1,060	.05	11	4
All other physical scientists .....	240	.01	18	1
Physical and life science technicians and technologists .....	2,540	.13	n.a.	n.a.
Chemical technicians and technologists, except health .....	2,080	.10	12	4
All other physical and life science technicians and technologists .....	460	.02	20	1
Computer scientists and related workers .....	28,580	1.42	n.a.	n.a.
Systems analysts, electronic data processing .....	10,460	.52	19	15
Computer programmers .....	13,830	.69	13	19
Computer programmer aides .....	2,720	.13	14	8
Programmers - numerical, tool, and process control .....	1,570	.08	13	4

See footnotes at end of table.

**Table 20. Electrical and electronic machinery, equipment, and supplies: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued**

(SIC 36)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Mathematical scientists and related workers .....	1,730	0.09	n.a.	n.a.
Operations and systems researchers and analysts, except computer .....	1,140	.06	18	3
All other mathematical scientists .....	380	.02	n.a.	n.a.
Mathematical technicians .....	210	.01	37	( <sup>3</sup> )
Lawyers .....	940	.05	12	3
Health practitioners, technologists, technicians, and related health workers .....	1,640	.08	6	9
Writers and editors .....	1,130	.06	12	4
Technical writers .....	3,530	.18	11	7
Public relations specialists and publicity writers .....	810	.04	10	4
Designers, except interior designers .....	3,570	.18	12	6
All other professional, paraprofessional, and technical workers .....	7,680	.38	n.a.	n.a.
<b>Sales and related occupations .....</b>	<b>34,460</b>	<b>1.71</b>	<b>n.a.</b>	<b>n.a.</b>
First-line supervisors and manager/supervisors, sales and related workers .....	4,480	.22	6	13
Sales engineers .....	6,080	.30	7	10
Sales representatives, scientific and related products and services, except retail .....	12,210	.61	7	25
Sales representatives, except scientific and related products or services and retail .....	8,700	.43	7	16
All other sales and related workers .....	2,990	.15	8	7
<b>Clerical and administrative support occupations .....</b>	<b>243,570</b>	<b>12.08</b>	<b>n.a.</b>	<b>n.a.</b>
First-line supervisors and manager/supervisors, clerical and administrative support workers .....	9,590	.48	8	20
Secretaries .....	44,270	2.19	5	70
Stenographers .....	3,200	.16	14	5
Receptionists and information clerks .....	1,920	.10	4	15
Typists .....	8,800	.44	5	21
Typists, word processing equipment .....	3,000	.15	11	7
Personnel clerks, except payroll and timekeeping .....	3,580	.18	4	20
File clerks .....	2,220	.11	6	9
Order clerks, materials, merchandise, and service .....	9,060	.45	4	28
Procurement clerks .....	4,280	.21	9	18
Statistical clerks .....	1,470	.07	13	4
Bookkeeping, accounting, and auditing clerks .....	17,730	.88	6	51
Payroll and timekeeping clerks .....	5,150	.26	3	31
Billing, cost and rate clerks .....	4,980	.25	4	18
General office clerks .....	23,220	1.15	9	39
Electronic data processing and other office machine operators .....	16,140	.80	n.a.	n.a.
Billing, posting, and calculating machine operators .....	680	.03	11	2
Computer operators, except peripheral equipment .....	6,170	.31	11	17
Peripheral EDP equipment operators .....	860	.04	9	3
Data entry keyers, except composing .....	6,560	.33	4	19
All other office machine operators .....	1,870	.09	10	3
Switchboard operators .....	2,730	.14	4	21
<b>Material recording, scheduling, dispatching, and distributing workers .....</b>	<b>71,510</b>	<b>3.55</b>	<b>n.a.</b>	<b>n.a.</b>
Production, planning, and expediting clerks .....	26,010	1.29	10	31
Weighers, measurers, checkers, and samplers, recordkeeping .....	2,640	.13	25	4
Stock clerks, stockroom, warehouse or storage yard .....	21,790	1.08	4	43
Traffic, shipping, and receiving clerks .....	17,870	.89	3	54

See footnotes at end of table.

**Table 20. Electrical and electronic machinery, equipment, and supplies: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued**

(SIC 36)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
All other material recording, scheduling, and distributing workers .....	3,200	0.16	8	6
All other clerical and administrative support workers .....	10,720	.53	43	7
Service occupations .....	29,510	1.46	n.a.	n.a.
First-line supervisors and manager/supervisors, service .....	2,260	.11	13	8
Guards and watch guards .....	6,530	.32	8	9
Food and beverage preparation and service workers .....	860	.04	15	1
Cleaning and building service workers, except private households .....	18,320	.91	n.a.	n.a.
Janitors and cleaners, except maids and housekeeping cleaners .....	17,710	.88	5	41
All other cleaning and building service workers, except private households .....	610	.03	11	3
All other service workers .....	1,540	.08	33	1
Agriculture, forestry, fishing, and related occupations .....	430	.02	n.a.	n.a.
Gardeners and groundskeepers, except farm .....	430	.02	11	2
Production, construction, operating, maintenance, and material handling occupations .....	1,183,920	58.69	n.a.	n.a.
First-line supervisors, manager/supervisors - production, construction, maintenance, and related workers .....	68,290	3.39	n.a.	n.a.
First-line supervisors and manager/supervisors - mechanics, installers and repairers .....	4,320	.21	8	15
First-line supervisors and manager/supervisors - construction trades and extractive workers .....	590	.03	12	2
First-line supervisors and manager/supervisors - production and operating workers .....	59,310	2.94	4	70
First-line supervisors and manager/superv-transp and material moving machine and vehicle workers .....	1,490	.07	5	8
First-line supervisors and manager/supervisors - helpers, laborers, and material movers, hand .....	2,580	.13	8	8
Precision inspectors, testers, and graders .....	48,220	2.39	6	35
Production inspectors, testers, graders, sorters, samplers, and weighers .....	56,600	2.81	4	37
Mechanics, installers, and repairers .....	54,220	2.69	n.a.	n.a.
Machinery maintenance mechanics .....	14,570	.72	5	14
Millwrights .....	3,010	.15	9	4
Machinery maintenance workers .....	1,940	.10	10	5
Maintenance repairers, general utility .....	17,450	.87	4	36
Bus and truck mechanics and diesel engine specialists .....	470	.02	8	2
Data processing equipment repairers .....	1,710	.08	35	1
Electronic home entertainment equipment repairers .....	1,390	.07	36	1
Electric motor, transformer, and related repairers .....	1,040	.05	13	2
Electronics repairers, commercial and industrial equipment .....	5,230	.26	18	4
Heating, air conditioning, and refrigeration mechanics and installers .....	1,000	.05	12	3
Precision instrument repairers .....	2,920	.14	12	4
Electromedical and biomedical equipment repairers .....	240	.01	24	( <sup>3</sup> )
All other mechanics, installers, and repairers .....	3,250	.16	n.a.	n.a.

See footnotes at end of table.

**Table 20. Electrical and electronic machinery, equipment, and supplies: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued**

(SIC 36)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Construction trades workers, except material moving .....	14,860	0.74	n.a.	n.a.
Carpenters .....	1,490	.07	7	5
Electricians .....	8,780	.44	6	15
Painters and paperhangers, construction and maintenance .....	1,200	.06	7	4
Plumbers, pipefitters, and steamfitters .....	2,510	.12	11	4
All other construction trades workers .....	880	.04	17	1
Precision metal workers .....	52,270	2.59	n.a.	n.a.
Tool-and-die makers .....	17,230	.85	5	24
Machinists .....	21,550	1.07	8	30
Tool grinders, filers, sharpeners, and other precision grinders .....	2,140	.11	15	6
Precision layout workers, metal .....	1,020	.05	9	3
Sheet-metal workers .....	8,510	.42	6	13
All other precision metal workers .....	1,820	.09	16	2
Precision woodworkers .....	590	.03	17	1
Precision workers, nec .....	2,390	.12	n.a.	n.a.
Precision foundry mold and core makers .....	480	.02	17	1
All other precision workers, nec .....	1,910	.09	22	2
Machine setters, set-up operators, and tenders, metal and plastic .....	130,990	6.49	n.a.	n.a.
Lathe and turning machine tool setters and set-up operators, metal and plastic .....	7,950	.39	6	11
Drilling and boring machine tool setters and set-up operators, metal and plastic .....	5,680	.28	7	9
Milling and planing machine setters and set-up operators, metal and plastic .....	2,510	.12	14	4
Grinding, lapping, and buffing machine tool setters and set-up operators, metal and plastic .....	3,350	.17	8	5
Machine tool cutting operators and tenders, metal and plastic .....	15,760	.78	8	10
Punching machine setters and set-up operators, metal and plastic .....	8,690	.43	11	13
Press and press brake machine setters and set-up operators, metal and plastic .....	3,930	.19	7	6
Shear and slitter machine setters and set-up operators, metal and plastic .....	1,470	.07	7	5
Forging machine setters and set-up operators, metal and plastic .....	1,220	.06	17	1
Machine forming operators and tenders, metal and plastic .....	11,840	.59	7	8
Numerical control machine tool operators and tenders, metal and plastic .....	5,670	.28	10	8
Combination machine tool setters and set-up operators, metal and plastic .....	5,260	.26	10	6
Combination machine tool operators and tenders, metal and plastic .....	4,540	.23	12	5
Welding machine setters and set-up operators .....	3,360	.17	6	8
Welding machine operators and tenders .....	4,610	.23	13	5
Soldering and brazing machine setters and set-up operators .....	1,870	.09	14	5
Soldering and brazing machine operators and tenders .....	3,090	.15	16	5
Plastic molding and casting machine setters and set-up operators .....	4,960	.25	13	5
Plastic molding and casting machine operators and tenders .....	9,860	.49	8	5
Metal molding, coremaking, and casting machine setters and set-up operators .....	1,750	.09	10	2
Metal molding, coremaking, and casting machine operators and tenders .....	1,670	.08	11	2
Electrolytic plating and coating machine setters and set-up operators, metal and plastic .....	5,070	.25	16	6

See footnotes at end of table.

**Table 20. Electrical and electronic machinery, equipment, and supplies: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued**

(SIC 36)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Electrolytic plating and coating machine operators and tenders, metal and plastic .....	5,320	0.26	13	6
Nonelectrolytic plating and coating machine setters and set-up operators, metal and plastic .....	940	.05	20	1
Nonelectrolytic plating and coating machine operators and tenders, metal and plastic .....	1,010	.05	15	1
Heating equipment setters and set-up operators, metal and plastic .....	400	.02	17	1
Heat treating, annealing, and tempering machine operators and tenders, metal and plastic .....	1,270	.06	14	2
Furnace operators and tenders .....	1,110	.06	14	2
Heaters, metal and plastic .....	480	.02	15	1
All other machine setters and set-up operators, metal and plastic .....	6,350	.31	n.a.	n.a.
All other machine operators and tenders, metal and plastic .....	5,190	.26	15	3
Machine setters, set-up operators, and tenders, except metal and plastic .....	90,630	4.49	n.a.	n.a.
Printing press machine setters and set-up operators .....	1,060	.05	24	3
Specialty materials printing machine setters and set-up operators .....	490	.02	28	1
Screen printing machine setters and set-up operators .....	2,460	.12	14	4
All other printing related setters and set-up operators .....	770	.04	27	1
Printing press machine operators and tenders .....	730	.04	15	2
All other printing, binding, and related machine operators and tenders .....	820	.04	25	2
Electronic semiconductor processors .....	24,390	1.21	15	4
Coating, painting, and spraying machine setters and set-up operators .....	4,900	.24	9	12
Coating, painting, and spraying machine operators and tenders .....	6,460	.32	6	11
Cleaning, washing, and pickling equipment operators and tenders .....	1,050	.05	8	3
Crushing, grinding, mixing, and blending machine operators and tenders .....	2,760	.14	11	4
Packaging and filling machine operators and tenders .....	7,730	.38	10	7
All other machine setters and set-up operators, except metal and plastic .....	11,100	.55	21	3
All other machine operators and tenders, except metal and plastic .....	20,720	1.03	10	5
Precision assemblers, metal .....	132,190	6.55	n.a.	n.a.
Machine builders and other precision machine assemblers .....	4,060	.20	11	4
Electromechanical equipment assemblers, precision .....	23,790	1.18	9	8
Electrical and electronic equipment assemblers, precision .....	98,810	4.90	5	28
Watch, clock, and chronometer assemblers, adjusters, and calibrators, precision .....	880	.04	25	1
All other precision assemblers, metal .....	4,650	.23	23	1
Other hand workers, nec .....	437,000	21.66	n.a.	n.a.
Machine assemblers .....	13,840	.69	9	4
Electrical and electronic assemblers .....	174,440	8.65	3	31
Coil winders, tapers, and finishers .....	31,300	1.55	6	16
Welders and cutters .....	6,130	.30	8	7
Solderers and brazers .....	8,980	.45	9	6
Grinding and polishing workers, hand .....	2,950	.15	10	4
Assemblers and fabricators, except machine, electrical, electronic, and precision .....	184,210	9.13	4	33
All other hand workers, nec .....	15,150	.75	12	6

See footnotes at end of table.

**Table 20. Electrical and electronic machinery, equipment, and supplies: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued**

(SIC 36)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Plant and system workers .....	1,660	0.08	n.a.	n.a.
Stationary engineers .....	1,040	.05	12	2
All other plant and system operators .....	620	.03	17	2
Motor vehicle operators .....	6,050	.30	n.a.	n.a.
Truck drivers, heavy or tractor trailer .....	3,240	.16	10	9
Truck drivers, light, include delivery and route workers .....	2,810	.14	7	15
All other transportation and motor vehicle operators .....	510	.03	n.a.	n.a.
Material moving equipment operators .....	18,690	.93	n.a.	n.a.
Hoist and winch operators .....	350	.02	21	1
Crane and tower operators .....	970	.05	12	2
Industrial truck and tractor operators .....	13,000	.64	5	15
Conveyor operators and tenders .....	2,830	.14	19	2
All other material moving equipment operators .....	1,540	.08	15	2
Helpers - mechanics and repairers .....	1,670	.08	8	4
Construction trades and extractive worker helpers .....	920	.05	35	1
Machine feeders and offbearers .....	10,150	.50	17	5
Freight, stock, and material movers, hand .....	22,290	1.11	7	22
All other helpers, laborers, and material movers, hand .....	33,730	1.67	8	11

<sup>1</sup> Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

<sup>2</sup> Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors

are estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

<sup>3</sup> Less than 0.5 percent.

n.a. = not available.

NOTE: Detail may not add to totals due to rounding. Estimated employment is rounded to the nearest 10.

# Transportation Equipment

Establishments which manufacture transportation equipment employed 1.7 million workers, or 10 percent of manufacturing and 16 percent of durable goods employment in 1983. Employers of these workers included establishments manufacturing motor vehicles and motor vehicle equipment, with 43 percent of industry employment; those manufacturing aircraft and parts, 33 percent; and those engaged in ship and boat building and repairing, 11 percent.

Overall, total employment in the transportation equipment industry declined by 87,400, or 5 percent, between 1980 and 1983. Subsectors within the industry, however, had widely different employment trends, as the following tabulation shows.

	1972 SIC Code	Employment		Percent change
		1980	1983	
Motor vehicles and equipment .....	371	731,680	753,650	3.0
Aircraft and parts ..	372	653,090	575,700	-11.8
Ship and boat building .....	373	213,880	186,900	-12.6
Railroad equipment	374	72,290	29,800	-58.7
Motorcycles, bicycles, and parts	375	19,900	15,300	-23.1
Guided missile and space vehicles .....	376	109,860	138,800	26.0
Miscellaneous transportation equipment .....	379	34,330	47,600	38.7

Employment among motor vehicle and equipment producers increased by 3 percent, while employment in

establishments that produced railroad equipment declined by 59 percent and aircraft parts, by 12 percent. The increase in military spending strongly affected the guided missile and space vehicle industry. Employment in this industry expanded by almost 29,000, an increase of 26 percent over 1980.

As shown in table 21, the transportation equipment industry employed nearly 1.1 million production and related workers, who accounted for 61 percent of total industry employment. Professional, paraprofessional, and technical workers ranked second with 20 percent. The remaining employment was distributed as follows: Clerical workers, 10 percent; managerial and administrative workers, 5 percent; service workers, 2 percent; and sales workers, less than 1 percent of total industry employment. Employment since 1977 by occupational group is given in text table 15.

The five most populous occupations in manufacturing transportation equipment are listed below:

	Employment	Percent of industry employment
Assemblers and fabricators, except machine, electrical, electronic, and precision .....	173,050	9.9
Welders and cutters .....	45,760	2.6
First-line supervisors, production .....	45,500	2.6
Production inspectors, testers, graders, sorters, samplers, and weighers .....	44,450	2.5
Machine tool cutting operators and tenders, metal and plastic ...	38,500	2.2

Text table 15. Transportation equipment: Employment by major occupational group, selected years, 1977-83

Major occupational group	1977	1980	1983	Percent change 1977-83
Total .....	1,889,390	1,835,070	1,747,670	- 7.5
Managerial and administrative workers .....	86,900	106,320	94,310	8.5
Professional, paraprofessional, and technical workers .....	250,920	312,510	352,670	40.6
Sales workers .....	11,040	9,470	11,190	1.4
Clerical workers .....	165,870	178,180	179,220	8.0
Production and related workers .....	1,330,380	1,188,110	1,072,720	-19.4
Service workers .....	44,280	40,480	36,860	-16.8

**Table 21. Transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1983**

(SIC 37)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Total .....	1,747,590	100.00	--	--
<b>Managerial and administrative occupations .....</b>	<b>94,320</b>	<b>5.40</b>	<b>n.a.</b>	<b>n.a.</b>
Financial managers .....	6,390	.37	9	24
Personnel, training, and labor relations managers .....	3,820	.22	10	22
Purchasing managers .....	2,810	.16	10	18
Marketing, advertising, and public relations managers .....	5,270	.30	11	15
Administrative services managers .....	4,360	.25	9	11
Industrial production managers .....	13,920	.80	7	24
General managers and top executives .....	18,520	1.06	5	81
All other managers and administrators .....	39,230	2.24	8	19
<b>Professional, paraprofessional, and technical occupations .....</b>	<b>352,660</b>	<b>20.18</b>	<b>n.a.</b>	<b>n.a.</b>
Management support workers .....	75,810	4.34	n.a.	n.a.
Accountants, auditors, and other financial specialists .....	19,010	1.09	n.a.	n.a.
Accountants and auditors .....	12,460	.71	11	20
Budget analysts .....	2,150	.12	13	6
All other financial specialists .....	4,400	.25	19	5
Purchasing agents, except wholesale and retail trade, and farm products .....	14,270	.82	8	45
Personnel, training, and labor relations specialists .....	6,360	.36	8	13
Cost estimators .....	7,040	.40	9	13
All other management support workers .....	29,130	1.67	10	9
<b>Engineers .....</b>	<b>156,960</b>	<b>8.98</b>	<b>n.a.</b>	<b>n.a.</b>
Aeronautical and astronautical engineers .....	29,120	1.67	2	4
Metallurgists, and metallurgical, ceramic, and materials engineers .....	3,210	.18	19	5
Chemical engineers .....	1,250	.07	19	2
Civil engineers, including traffic .....	2,830	.16	23	3
Electrical and electronic engineers .....	21,060	1.21	14	7
Industrial engineers, except safety .....	19,300	1.10	10	17
Safety engineers, except mining .....	1,900	.11	15	7
Mechanical engineers .....	24,440	1.40	11	27
Marine engineers .....	2,030	.12	44	2
All other engineers .....	51,820	2.97	8	8
Marine architects .....	320	.02	15	1
<b>Engineering and related technicians and technologists .....</b>	<b>62,820</b>	<b>3.59</b>	<b>n.a.</b>	<b>n.a.</b>
Civil engineering technicians and technologists .....	1,990	.11	37	1
Electrical and electronic engineering technicians and technologists .....	10,680	.61	16	6
Industrial engineering technicians and technologists .....	3,700	.21	22	6
Mechanical engineering technicians and technologists .....	8,440	.48	13	7
Drafters .....	17,750	1.02	9	26
All other engineering and related technicians and technologists .....	20,260	1.16	13	9
<b>Physical scientists .....</b>	<b>2,060</b>	<b>.12</b>	<b>n.a.</b>	<b>n.a.</b>
Chemists, except biochemists .....	680	.04	14	2
All other physical scientists .....	1,380	.08	18	1
<b>Physical and life science technicians and technologists .....</b>	<b>2,040</b>	<b>.12</b>	<b>n.a.</b>	<b>n.a.</b>
Chemical technicians and technologists, except health .....	1,300	.07	24	2
All other physical and life science technicians and technologists .....	740	.04	24	1
<b>Computer scientists and related workers .....</b>	<b>20,880</b>	<b>1.19</b>	<b>n.a.</b>	<b>n.a.</b>

See footnotes at end of table.

**Table 21. Transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued**

(SIC 37)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Systems analysts, electronic data processing .....	9,870	0.56	16	10
Computer programmers .....	7,680	.44	12	14
Computer programmer aides .....	1,780	.10	18	6
Programmers - numerical, tool, and process control .....	1,550	.09	12	5
Mathematical scientists and related workers .....	5,580	.32	n.a.	n.a.
Operations and systems researchers and analysts, except computer .....	1,540	.09	22	3
Statisticians .....	2,540	.15	15	3
All other mathematical scientists .....	660	.04	29	( <sup>3</sup> )
Mathematical technicians .....	840	.05	37	1
Lawyers .....	480	.03	11	3
Health practitioners, technologists, technicians, and related health workers .....	1,930	.11	7	10
Writers and editors .....	960	.05	14	2
Technical writers .....	5,020	.29	14	5
Public relations specialists and publicity writers .....	480	.03	16	2
Designers, except interior designers .....	5,040	.29	26	4
All other professional, paraprofessional, and technical workers .....	12,280	.70	n.a.	n.a.
Sales and related occupations .....	11,180	.64	n.a.	n.a.
Sales engineers .....	1,740	.10	11	3
Sales representatives, scientific and related products and services, except retail .....	2,860	.16	6	14
Sales representatives, except scientific and related products or services and retail .....	4,750	.27	5	22
All other sales and related workers .....	1,830	.10	13	5
Clerical and administrative support occupations .....	179,220	10.26	n.a.	n.a.
First-line supervisors and manager/supervisors, clerical and administrative support workers .....	6,280	.36	5	15
Secretaries .....	26,630	1.52	7	60
Stenographers .....	3,110	.18	13	4
Receptionists and information clerks .....	820	.05	7	10
Typists .....	4,340	.25	10	10
Typists, word processing equipment .....	2,540	.15	15	5
Personnel clerks, except payroll and timekeeping .....	2,230	.13	11	12
File clerks .....	1,230	.07	13	4
Order clerks, materials, merchandise, and service .....	2,130	.12	9	8
Procurement clerks .....	2,060	.12	8	11
Statistical clerks .....	4,490	.26	14	4
Bookkeeping, accounting, and auditing clerks .....	9,660	.55	4	53
Payroll and timekeeping clerks .....	3,220	.18	6	19
Billing, cost and rate clerks .....	2,360	.14	8	12
General office clerks .....	19,700	1.13	9	41
Electronic data processing and other office machine operators .....	11,540	.66	n.a.	n.a.
Billing, posting, and calculating machine operators .....	400	.02	11	2
Computer operators, except peripheral equipment .....	3,540	.20	9	12
Peripheral EDP equipment operators .....	1,300	.07	27	3
Data entry keyers, except composing .....	4,620	.26	7	13
All other office machine operators .....	1,680	.10	14	3
Switchboard operators .....	1,340	.08	5	15
Material recording, scheduling, dispatching, and distributing workers .....	64,250	3.68	n.a.	n.a.
Dispatchers, except police, fire, and ambulance .....	1,740	.10	21	4
Production, planning, and expediting clerks .....	25,990	1.49	8	31

See footnotes at end of table.

**Table 21. Transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued**

(SIC 37)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Weighers, measurers, checkers, and samplers, recordkeeping .....	3,560	0.20	16	3
Stock clerks, stockroom, warehouse or storage yard .....	18,830	1.08	6	22
Traffic, shipping, and receiving clerks .....	11,150	.64	5	41
All other material recording, scheduling, and distributing workers .....	2,980	.17	12	4
All other clerical and administrative support workers .....	11,290	.65	17	6
Service occupations .....	36,880	2.11	n.a.	n.a.
First-line supervisors and manager/supervisors, service .....	2,500	.14	8	7
Guards and watch guards .....	11,880	.68	7	12
Food and beverage preparation and service workers .....	760	.04	22	1
Cleaning and building service workers, except private households .....	20,280	1.16	n.a.	n.a.
Janitors and cleaners, except maids and housekeeping cleaners .....	19,840	1.14	5	39
All other cleaning and building service workers, except private households .....	440	.03	15	2
All other service workers .....	1,460	.08	16	3
Agriculture, forestry, fishing, and related occupations .....	600	.03	n.a.	n.a.
Gardeners and groundskeepers, except farm .....	600	.03	14	3
Production, construction, operating, maintenance, and material handling occupations .....	1,072,730	61.38	n.a.	n.a.
First-line supervisors, manager/supervisors - production, construction, maintenance, and related workers .....	65,380	3.74	n.a.	n.a.
First-line supervisors and manager/supervisors - mechanics, installers and repairers .....	7,340	.42	7	14
First-line supervisors and manager/supervisors - construction trades and extractive workers .....	4,260	.24	19	3
First-line supervisors and manager/supervisors - production and operating workers .....	45,500	2.60	4	63
First-line supervisors and manager/superv-transp and material moving machine and vehicle workers .....	3,570	.20	7	10
First-line supervisors and manager/supervisors - helpers, laborers, and material movers, hand .....	4,710	.27	11	9
Precision inspectors, testers, and graders .....	29,500	1.69	6	23
Production inspectors, testers, graders, sorters, samplers, and weighers .....	44,450	2.54	3	24
Transportation inspectors .....	960	.05	26	1
Mechanics, installers, and repairers .....	106,090	6.07	n.a.	n.a.
Machinery maintenance mechanics .....	16,150	.92	7	12
Millwrights .....	11,780	.67	8	7
Machinery maintenance workers .....	4,730	.27	8	12
Maintenance repairers, general utility .....	9,040	.52	5	31
Automotive mechanics .....	4,200	.24	12	10
Automotive body and related repairers .....	1,720	.10	18	2
Bus and truck mechanics and diesel engine specialists .....	3,140	.18	13	4
Rail car repairers .....	1,050	.06	19	1
Aircraft mechanics .....	11,280	.65	15	3
Aircraft engine specialists .....	1,280	.07	24	2

See footnotes at end of table.

**Table 21. Transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued**

(SIC 37)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Electronics repairers, commercial and industrial equipment .....	3,610	0.21	12	4
Electrical installers and repairers, transportation equipment .....	5,300	.30	14	6
Heating, air conditioning, and refrigeration mechanics and installers .....	1,610	.09	8	4
Precision instrument repairers .....	2,060	.12	12	3
Riggers .....	3,820	.22	10	5
All other mechanics, installers, and repairers .....	25,320	1.45	10	8
Construction trades workers, except material moving .....	57,560	3.29	n.a.	n.a.
Carpenters .....	9,250	.53	5	19
Electricians .....	22,740	1.30	6	21
Painters and paperhangers, construction and maintenance .....	5,790	.33	7	9
Plumbers, pipefitters, and steamfitters .....	16,210	.93	6	12
Insulation workers .....	1,650	.09	30	1
All other construction trades workers .....	1,920	.11	17	3
Precision metal workers .....	103,460	5.92	n.a.	n.a.
Tool-and-die makers .....	24,880	1.42	7	16
Machinists .....	31,210	1.79	6	32
Tool grinders, filers, sharpeners, and other precision grinders .....	4,980	.28	7	9
Precision layout workers, metal .....	2,360	.14	11	5
Shipfitters .....	9,890	.57	10	6
Sheet- metal workers .....	21,840	1.25	7	17
Boilermakers .....	2,180	.12	17	1
All other precision metal workers .....	6,120	.35	15	3
Precision woodworkers .....	4,380	.25	n.a.	n.a.
Pattern and model makers, wood .....	3,570	.20	20	4
All other precision woodworkers .....	810	.05	18	1
Precision workers, nec .....	4,010	.23	20	2
Machine setters, set-up operators, and tenders, metal and plastic .....	188,730	10.80	n.a.	n.a.
Sawing machine tool setters and set-up operators, metal and plastic .....	2,480	.14	15	8
Lathe and turning machine tool setters and set-up operators, metal and plastic .....	15,850	.91	9	14
Drilling and boring machine tool setters and set-up operators, metal and plastic .....	10,980	.63	10	12
Milling and planing machine setters and set-up operators, metal and plastic .....	9,250	.53	9	9
Grinding, lapping, and buffing machine tool setters and set-up operators, metal and plastic .....	13,040	.75	11	15
Machine tool cutting operators and tenders, metal and plastic .....	38,500	2.20	3	13
Punching machine setters and set-up operators, metal and plastic .....	3,840	.22	8	8
Press and press brake machine setters and set-up operators, metal and plastic .....	5,090	.29	9	7
Forging machine setters and set-up operators, metal and plastic .....	6,820	.39	16	3
Machine forming operators and tenders, metal and plastic .....	17,540	1.00	8	11
Numerical control machine tool operators and tenders, metal and plastic .....	9,370	.54	9	6
Combination machine tool setters and set-up operators, metal and plastic .....	8,990	.51	11	8
Combination machine tool operators and tenders, metal and plastic .....	3,990	.23	11	5
Welding machine setters and set-up operators .....	7,050	.40	7	14
Welding machine operators and tenders .....	16,080	.92	9	10
Soldering and brazing machine setters and set-up operators .....	870	.05	13	3
Soldering and brazing machine operators and tenders .....	590	.03	16	1

See footnotes at end of table.

**Table 21. Transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued**

(SIC 37)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Plastic molding and casting machine setters and set-up operators .....	1,420	0.08	15	2
Plastic molding and casting machine operators and tenders .....	2,650	.15	16	1
Metal molding, coremaking, and casting machine setters and set-up operators .....	990	.06	23	1
Metal molding, coremaking, and casting machine operators and tenders .....	520	.03	15	1
Electrolytic plating and coating machine setters and set-up operators, metal and plastic .....	730	.04	16	2
Electrolytic plating and coating machine operators and tenders, metal and plastic .....	1,440	.08	11	2
Nonelectrolytic plating and coating machine setters and set-up operators, metal and plastic .....	430	.02	21	1
Nonelectrolytic plating and coating machine operators and tenders, metal and plastic .....	230	.01	20	1
Heating equipment setters and set-up operators, metal and plastic .....	1,110	.06	13	3
Heat treating, annealing, and tempering machine operators and tenders, metal and plastic .....	2,680	.15	9	5
All other machine setters and set-up operators, metal and plastic .....	6,200	.35	14	3
All other machine operators and tenders, metal and plastic .....	6,780	.39	11	4
Machine setters, set-up operators, and tenders, except metal and plastic .....	60,700	3.47	n.a.	n.a.
Sawing machine operators and tenders .....	750	.04	13	2
Woodworking machine setters and set-up operators, except sawing .....	500	.03	20	2
Woodworking machine operators and tenders, except sawing .....	970	.06	13	3
Painters, transportation equipment .....	9,370	.54	10	8
Coating, painting, and spraying machine setters and set-up operators .....	3,210	.18	7	14
Coating, painting, and spraying machine operators and tenders .....	3,960	.23	8	13
Cleaning, washing, and pickling equipment operators and tenders .....	990	.06	9	4
All other machine setters and set-up operators, except metal and plastic .....	3,010	.17	12	3
All other machine operators and tenders, except metal and plastic .....	31,160	1.78	2	7
Precision assemblers, metal .....	47,710	2.73	n.a.	n.a.
Aircraft structure, surfaces, rigging, and systems assemblers, precision .....	20,210	1.16	13	3
Machine builders and other precision machine assemblers .....	7,570	.43	15	4
Electromechanical equipment assemblers, precision .....	3,150	.18	13	2
Electrical and electronic equipment assemblers, precision .....	9,600	.55	13	3
All other precision assemblers, metal .....	7,180	.41	19	2
Other hand workers, nec .....	266,280	15.24	n.a.	n.a.
Machine assemblers .....	8,730	.50	6	4
Electrical and electronic assemblers .....	9,470	.54	13	4
Welders and cutters .....	45,760	2.62	5	33
Solders and brazers .....	1,900	.11	15	3
Grinding and polishing workers, hand .....	13,210	.76	9	8
Assemblers and fabricators, except machine, electrical, electronic, and precision .....	173,050	9.90	1	41
All other hand workers, nec .....	14,160	.81	7	7
Plant and system workers .....	3,070	.18	n.a.	n.a.
Stationary engineers .....	1,130	.06	10	3
All other plant and system operators .....	1,940	.11	15	4

See footnotes at end of table.

**Table 21. Transportation equipment: Employment, relative error, and percent of establishments reporting selected occupations, June 1983—Continued**

(SIC 37)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Motor vehicle operators .....	10,440	0.60	n.a.	n.a.
Truck drivers, heavy or tractor trailer .....	5,020	.29	6	20
Truck drivers, light, include delivery and route workers .....	2,040	.12	6	11
All other motor vehicle operators .....	3,380	.19	11	3
All other transportation and motor vehicle operators .....	2,180	.12	33	3
Material moving equipment operators .....	29,260	1.67	n.a.	n.a.
Hoist and winch operators .....	500	.03	18	2
Crane and tower operators .....	3,560	.20	8	8
Industrial truck and tractor operators .....	20,930	1.20	6	22
Conveyor operators and tenders .....	3,230	.18	15	1
All other material moving equipment operators .....	1,040	.06	11	2
Helpers - mechanics and repairers .....	2,090	.12	13	5
Construction trades and extractive worker helpers .....	1,270	.07	11	2
Machine feeders and offbearers .....	7,670	.44	19	4
Freight, stock, and material movers, hand .....	10,400	.60	5	21
All other helpers, laborers, and material movers, hand .....	27,140	1.55	7	14

<sup>1</sup> Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

<sup>2</sup> Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors

are estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

<sup>3</sup> Less than 0.5 percent.

n.a. = not available.

NOTE: Detail may not add to totals due to rounding. Estimated employment is rounded to the nearest 10.

# Instruments and Related Products

In 1983, establishments manufacturing instruments, ophthalmic goods, photographic equipment and supplies, and watches and clocks employed 688,150 workers, accounting for 4 percent of manufacturing and 6 percent of durable goods employment. Workers in establishments producing measuring and controlling instruments constituted 34 percent of industry employment; establishments manufacturing surgical, medical, and dental instruments and supplies accounted for 24 percent; and those manufacturing photographic equipment and supplies, 19 percent.

The industry's 351,250 production and related workers accounted for 51 percent of total industry employment (table 22). Professional, paraprofessional, and technical workers ranked second with 19 percent.

Clerical workers accounted for 16 percent; managerial and administrative workers, 8 percent; sales and service workers, 4 and 2 percent, respectively.

The tabulation below lists the five most populous occupations in the industry:

	<i>Employment</i>	<i>Percent of industry employment</i>
Assemblers and fabricators, except machine, electrical, electronic, and precision .....	59,620	8.7
Electrical and electronic assemblers .....	24,820	3.6
Electrical and electronic engineers .....	24,800	3.6
Secretaries .....	23,840	3.5
First-line supervisors, production .....	22,510	3.3

**Table 22. Instruments and related products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983**

(SIC 38)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Total .....	688,120	100.00	--	--
Managerial and administrative occupations .....	56,990	8.28	n.a.	n.a.
Financial managers .....	4,050	.59	11	23
Personnel, training, and labor relations managers .....	2,320	.34	6	21
Purchasing managers .....	1,690	.25	6	19
Marketing, advertising, and public relations managers .....	5,690	.83	8	21
Administrative services managers .....	2,000	.29	8	11
Industrial production managers .....	6,050	.88	7	22
General managers and top executives .....	19,900	2.89	3	84
All other managers and administrators .....	15,290	2.22	11	20
Professional, paraprofessional, and technical occupations .....	132,560	19.26	n.a.	n.a.
Management support workers .....	21,600	3.14	n.a.	n.a.
Accountants, auditors, and other financial specialists .....	6,270	.91	n.a.	n.a.
Accountants and auditors .....	4,040	.59	5	20
Budget analysts .....	1,140	.17	20	6
All other financial specialists .....	1,090	.16	10	6
Purchasing agents, except wholesale and retail trade, and farm products .....	6,110	.89	3	45
Personnel, training, and labor relations specialists .....	2,210	.32	11	12
Cost estimators .....	1,060	.15	8	7
All other management support workers .....	5,950	.86	19	9
Engineers .....	46,700	6.79	n.a.	n.a.
Metallurgists, and metallurgical, ceramic, and materials engineers .....	320	.05	12	2
Chemical engineers .....	1,320	.19	15	4
Electrical and electronic engineers .....	24,800	3.60	8	35
Industrial engineers, except safety .....	5,480	.80	16	15
Mechanical engineers .....	7,420	1.08	6	19
All other engineers .....	7,360	1.07	n.a.	n.a.
Engineering and related technicians and technologists .....	38,650	5.62	n.a.	n.a.
Electrical and electronic engineering technicians and technologists .....	18,930	2.75	4	32
Industrial engineering technicians and technologists .....	1,170	.17	11	5
Mechanical engineering technicians and technologists .....	5,420	.79	26	8
Drafters .....	8,530	1.24	5	37
All other engineering and related technicians and technologists .....	4,600	.67	11	7
Physical scientists .....	3,000	.44	n.a.	n.a.
Physicists and astronomers .....	280	.04	17	2
Chemists, except biochemists .....	1,790	.26	14	5
All other physical scientists .....	930	.14	41	1
Life scientists .....	770	.11	20	2
Physical and life science technicians and technologists .....	3,510	.51	n.a.	n.a.
Chemical technicians and technologists, except health .....	2,730	.40	14	5
All other physical and life science technicians and technologists .....	780	.11	19	2
Computer scientists and related workers .....	8,160	1.19	n.a.	n.a.
Systems analysts, electronic data processing .....	3,010	.44	10	12
Computer programmers .....	3,910	.57	16	15
Computer programmer aides .....	910	.13	8	7
Programmers - numerical, tool, and process control .....	330	.05	9	3
Mathematical scientists and related workers .....	390	.06	n.a.	n.a.

See footnotes at end of table.

**Table 22. Instruments and related products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued**

(SIC 38)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Operations and systems researchers and analysts, except computer .....	390	0.06	19	2
Opticians, dispensing and measuring .....	1,490	.22	13	3
All other health professionals, paraprofessional and technicians .....	1,200	.17	15	6
Writers and editors .....	640	.09	20	4
Technical writers .....	1,390	.20	10	8
Designers, except interior designers .....	1,850	.27	13	6
All other professional, paraprofessional, and technical workers .....	3,210	.47	n.a.	n.a.
<b>Sales and related occupations .....</b>	<b>25,680</b>	<b>3.73</b>	<b>n.a.</b>	<b>n.a.</b>
First-line supervisors and manager/supervisors, sales and related workers .....	3,300	.48	8	10
Sales engineers .....	3,040	.44	9	7
Sales representatives, scientific and related products and services, except retail .....	12,730	1.85	6	28
Sales representatives, except scientific and related products or services and retail .....	4,970	.72	8	16
All other sales and related workers .....	1,640	.24	10	5
<b>Clerical and administrative support occupations .....</b>	<b>109,590</b>	<b>15.93</b>	<b>n.a.</b>	<b>n.a.</b>
First-line supervisors and manager/supervisors, clerical and administrative support workers .....	3,930	.57	6	15
Secretaries .....	23,840	3.46	5	70
Stenographers .....	720	.10	16	2
Receptionists and information clerks .....	960	.14	6	11
Typists .....	3,500	.51	9	16
Typists, word processing equipment .....	1,600	.23	6	12
Personnel clerks, except payroll and timekeeping .....	1,220	.18	5	13
File clerks .....	1,690	.25	14	8
Order clerks, materials, merchandise, and service .....	5,160	.75	6	16
Procurement clerks .....	1,520	.22	7	13
Bookkeeping, accounting, and auditing clerks .....	9,920	1.44	3	57
Payroll and timekeeping clerks .....	1,370	.20	3	16
Billing, cost and rate clerks .....	2,100	.31	4	14
General office clerks .....	10,040	1.46	6	40
Electronic data processing and other office machine operators .....	5,940	.86	n.a.	n.a.
Billing, posting, and calculating machine operators .....	350	.05	21	2
Computer operators, except peripheral equipment .....	2,210	.32	7	13
Peripheral EDP equipment operators .....	330	.05	10	2
Data entry keyers, except composing .....	2,680	.39	5	13
All other office machine operators .....	370	.05	16	2
Switchboard operators .....	2,080	.30	3	26
<b>Material recording, scheduling, dispatching, and distributing workers .....</b>	<b>29,030</b>	<b>4.22</b>	<b>n.a.</b>	<b>n.a.</b>
Production, planning, and expediting clerks .....	8,310	1.21	6	21
Weighers, measurers, checkers, and samplers, recordkeeping .....	520	.08	15	2
Stock clerks, stockroom, warehouse or storage yard .....	10,550	1.53	7	37
Traffic, shipping, and receiving clerks .....	8,860	1.29	3	48
All other material recording, scheduling, and distributing workers .....	790	.11	11	4
All other clerical and administrative support workers .....	4,970	.72	44	5
<b>Service occupations .....</b>	<b>11,840</b>	<b>1.72</b>	<b>n.a.</b>	<b>n.a.</b>
First-line supervisors and manager/supervisors, service .....	1,200	.17	10	6

See footnotes at end of table.

**Table 22. Instruments and related products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued**

(SIC 38)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Guards and watch guards .....	1,690	0.25	13	4
Food and beverage preparation and service workers .....	420	.06	29	1
Cleaning and building service workers, except private households .....	7,590	1.10	n.a.	n.a.
Janitors and cleaners, except maids and housekeeping cleaners .....	6,710	.98	4	33
All other cleaning and building service workers, except private households .....	880	.13	25	2
All other service workers .....	940	.14	29	2
Agriculture, forestry, fishing, and related occupations .....	240	.03	n.a.	n.a.
Gardeners and groundskeepers, except farm .....	240	.03	15	2
Production, construction, operating, maintenance, and material handling occupations .....	351,220	51.04	n.a.	n.a.
First-line supervisors, manager/supervisors - production, construction, maintenance, and related workers .....	25,550	3.71	n.a.	n.a.
First-line supervisors and manager/supervisors - mechanics, installers and repairers .....	1,180	.17	7	7
First-line supervisors and manager/supervisors - construction trades and extractive workers .....	200	.03	15	1
First-line supervisors and manager/supervisors - production and operating workers .....	22,510	3.27	4	64
All other first-line supervisors and manager/supervisors - production, construction, maintenance and related .....	1,660	.24	10	6
Precision inspectors, testers, and graders .....	12,450	1.81	5	30
Production inspectors, testers, graders, sorters, samplers, and weighers .....	15,820	2.30	9	23
Mechanics, installers, and repairers .....	16,320	2.37	n.a.	n.a.
Machinery maintenance mechanics .....	4,030	.59	12	11
Machinery maintenance workers .....	790	.11	23	2
Maintenance repairers, general utility .....	5,640	.82	14	23
Precision instrument repairers .....	4,340	.63	15	10
Camera and photographic equipment repairers .....	300	.04	42	( <sup>3</sup> )
Watchmakers .....	160	.02	30	( <sup>3</sup> )
All other mechanics, installers, and repairers .....	1,060	.15	n.a.	n.a.
Construction trades workers, except material moving .....	3,820	.56	n.a.	n.a.
Carpenters .....	530	.08	11	4
Electricians .....	1,710	.25	18	7
Painters and paperhangers, construction and maintenance .....	430	.06	15	3
Plumbers, pipefitters, and steamfitters .....	680	.10	19	2
All other construction trades workers .....	470	.07	25	1
Precision metal workers .....	24,940	3.62	n.a.	n.a.
Tool-and-die makers .....	3,920	.57	7	12
Precision instrument makers .....	4,160	.60	10	7
Machinists .....	12,130	1.76	4	34
Tool grinders, filers, sharpeners, and other precision grinders .....	1,550	.23	11	7
Sheet-metal workers .....	2,650	.39	11	8
All other precision metal workers .....	530	.08	17	1
Precision woodworkers .....	390	.06	46	1
Precision workers, nec .....	14,820	2.15	n.a.	n.a.
Precision detail design decorators, and painters .....	120	.02	23	1
Precision optical goods workers .....	10,600	1.54	6	13
Medical appliance makers .....	2,190	.32	23	4
All other precision workers, nec .....	1,910	.28	24	3

See footnotes at end of table.

**Table 22. Instruments and related products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued**

(SIC 38)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Machine setters, set-up operators, and tenders, metal and plastic .....	30,840	4.48	n.a.	n.a.
Sawing machine tool setters and set-up operators, metal and plastic .....	190	.03	14	2
Lathe and turning machine tool setters and set-up operators, metal and plastic .....	3,740	.54	7	11
Drilling and boring machine tool setters and set-up operators, metal and plastic .....	2,200	.32	8	8
Milling and planing machine setters and set-up operators, metal and plastic .....	1,150	.17	12	5
Grinding, lapping, and buffing machine tool setters and set-up operators, metal and plastic .....	1,450	.21	17	3
Machine tool cutting operators and tenders, metal and plastic .....	3,930	.57	12	7
Punching machine setters and set-up operators, metal and plastic .....	1,930	.28	11	7
Press and press brake machine setters and set-up operators, metal and plastic .....	540	.08	13	2
Shear and slitter machine setters and set-up operators, metal and plastic .....	760	.11	27	2
Machine forming operators and tenders, metal and plastic .....	4,870	.71	11	7
Numerical control machine tool operators and tenders, metal and plastic .....	2,130	.31	8	7
Combination machine tool setters and set-up operators, metal and plastic .....	1,670	.24	9	6
Combination machine tool operators and tenders, metal and plastic .....	1,980	.29	11	4
Soldering and brazing machine setters and set-up operators .....	210	.03	19	1
Soldering and brazing machine operators and tenders .....	330	.05	19	1
Metal molding, coremaking, and casting machine setters and set-up operators .....	570	.08	18	1
Metal molding, coremaking, and casting machine operators and tenders .....	350	.05	19	1
Electrolytic plating and coating machine setters and set-up operators, metal and plastic .....	400	.06	17	2
Electrolytic plating and coating machine operators and tenders, metal and plastic .....	390	.06	13	2
Nonelectrolytic plating and coating machine setters and set-up operators, metal and plastic .....	130	.02	36	( <sup>3</sup> )
Nonelectrolytic plating and coating machine operators and tenders, metal and plastic .....	290	.04	26	1
Heating equipment setters and set-up operators, metal and plastic .....	160	.02	46	1
Heat treating, annealing, and tempering machine operators and tenders, metal and plastic .....	140	.02	21	1
All other machine setters and set-up operators, metal and plastic .....	1,330	.19	21	2
All other machine operators and tenders, metal and plastic .....	3,330	.48	17	2
Machine setters, set-up operators, and tenders, except metal and plastic .....	40,530	5.89	n.a.	n.a.
Sewing machine operators, nongarment .....	3,400	.49	12	5
Electronic semiconductor processors .....	1,050	.15	41	1
Chemical equipment controllers and operators .....	2,550	.37	36	1
Coating, painting, and spraying machine setters and set-up operators .....	1,150	.17	19	3
Coating, painting, and spraying machine operators and tenders .....	2,130	.31	19	3

See footnotes at end of table.

**Table 22. Instruments and related products: Employment, relative error, and percent of establishments reporting selected occupations, April 1983—Continued**

(SIC 38)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Cleaning, washing, and pickling equipment operators and tenders .....	380	0.06	12	2
Crushing, grinding, mixing, and blending machine operators and tenders .....	2,440	.35	13	5
Packaging and filling machine operators and tenders .....	5,450	.79	12	6
All other machine setters and set-up operators, except metal and plastic .....	2,140	.31	22	2
All other machine operators and tenders, except metal and plastic .....	16,510	2.40	n.a.	n.a.
Precision assemblers, metal .....	35,030	5.09	n.a.	n.a.
Machine builders and other precision machine assemblers .....	1,460	.21	29	2
Electromechanical equipment assemblers, precision .....	9,530	1.38	21	4
Electrical and electronic equipment assemblers, precision .....	18,850	2.74	8	18
Watch, clock, and chronometer assemblers, adjusters, and calibrators, precision .....	3,170	.46	30	2
All other precision assemblers, metal .....	2,020	.29	22	1
Other hand workers, nec .....	104,110	15.13	n.a.	n.a.
Machine assemblers .....	3,990	.58	17	3
Electrical and electronic assemblers .....	24,820	3.61	7	18
Welders and cutters .....	2,640	.38	9	11
Solderers and brazers .....	2,530	.37	9	7
Painting, coating, and decorating, workers, hand .....	1,280	.19	11	8
Grinding and polishing workers, hand .....	3,390	.49	9	8
Assemblers and fabricators, except machine, electrical, electronic, and precision .....	59,620	8.66	5	31
All other hand workers, nec .....	5,840	.85	18	3
Plant and system workers .....	790	.11	n.a.	n.a.
Stationary engineers .....	470	.07	31	1
All other plant and system operators .....	320	.05	n.a.	n.a.
Motor vehicle operators .....	970	.14	n.a.	n.a.
Truck drivers, heavy or tractor trailer .....	200	.03	17	2
Truck drivers, light, include delivery and route workers .....	770	.11	7	8
All other transportation and motor vehicle operators .....	140	.02	n.a.	n.a.
Material moving equipment operators .....	2,480	.36	n.a.	n.a.
Industrial truck and tractor operators .....	1,820	.26	11	4
Conveyor operators and tenders .....	140	.02	31	( <sup>3</sup> )
All other material moving equipment operators .....	520	.08	30	1
Helpers - mechanics and repairers .....	430	.06	18	2
Construction trades and extractive worker helpers .....	160	.02	29	( <sup>3</sup> )
Machine feeders and offbearers .....	2,080	.30	17	3
Freight, stock, and material movers, hand .....	8,060	.88	6	15
Hand packers and packagers .....	7,440	1.08	17	8
All other helpers, laborers, and material movers, hand .....	6,050	.88	11	5

<sup>1</sup> Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

<sup>2</sup> Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors

are estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

<sup>3</sup> Less than 0.5 percent.

n.a. = not available.

NOTE: Detail may not add to totals due to rounding. Estimated employment is rounded to the nearest 10.

# Miscellaneous Manufacturing Industries

Establishments which manufacture products other than those previously discussed employed 369,830 workers in 1983, or 2 percent of manufacturing and 3 percent of durable goods employment. Of these workers, 33 percent worked in establishments manufacturing brooms and brushes, signs and advertising displays, burial caskets, and other miscellaneous products; 29 percent worked in establishments manufacturing toys and amusement, sporting, and athletic goods; and 14 percent worked in establishments producing jewelry, silverware, and plated ware.

As shown in table 23, the largest occupational group in miscellaneous manufacturing industries, consisting of 255,110 production and related workers, accounted for 69 percent of total industry employment. Clerical workers ranked second with 14 percent. The remaining employment was distributed as follows: Managerial and

administrative workers, 7 percent; professional, paraprofessional, and technical workers, 5 percent; sales workers, 4 percent; and service workers, 1 percent.

The five most populous occupations in miscellaneous manufacturing industries are listed in the tabulation below:

	<i>Employment</i>	<i>Percent of industry employment</i>
Assemblers and fabricators, except machine, electrical, electronic, and precision .....	40,750	11.0
Hand packers and packagers .....	18,020	4.9
General managers and top executives .....	17,260	4.7
First-line supervisors, production .	14,470	3.9
Secretaries .....	9,380	2.5

**Table 23. Miscellaneous manufacturing industries: Employment, relative error, and percent of establishments reporting selected occupations, May 1983**

(SIC 39)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Total .....	368,770	100.00	--	--
Managerial and administrative occupations .....	24,970	6.75	n.a.	n.a.
Financial managers .....	1,210	.33	4	8
Personnel, training, and labor relations managers .....	580	.16	4	6
Purchasing managers .....	520	.14	3	6
Marketing, advertising, and public relations managers .....	1,550	.42	6	7
Administrative services managers .....	390	.11	7	3
Industrial production managers .....	1,730	.47	6	9
General managers and top executives .....	17,260	4.67	2	81
All other managers and administrators .....	1,730	.47	5	6
Professional, paraprofessional, and technical occupations .....	18,820	5.09	n.a.	n.a.
Management support workers .....	6,960	1.88	n.a.	n.a.
Accountants, auditors, and other financial specialists .....	3,260	.88	n.a.	n.a.
Accountants and auditors .....	2,670	.72	5	17
Budget analysts .....	210	.06	10	2
All other financial specialists .....	380	.10	13	2
Purchasing agents, except wholesale and retail trade, and farm products .....	2,210	.60	3	20
Personnel, training, and labor relations specialists .....	340	.09	10	3
Cost estimators .....	430	.12	6	3
All other management support workers .....	720	.19	11	2
Engineers .....	2,220	.60	n.a.	n.a.
Industrial engineers, except safety .....	750	.20	5	5
Mechanical engineers .....	950	.26	8	5
All other engineers .....	520	.14	12	2
Engineering and related technicians and technologists .....	2,620	.71	n.a.	n.a.
Industrial engineering technicians and technologists .....	240	.06	7	2
Mechanical engineering technicians and technologists .....	240	.06	12	1
Drafters .....	1,560	.42	4	10
All other engineering and related technicians and technologists .....	580	.16	12	2
Physical scientists .....	200	.05	n.a.	n.a.
Physical and life science technicians and technologists .....	370	.10	n.a.	n.a.
Chemical technicians and technologists, except health .....	250	.07	10	1
All other physical and life science technicians and technologists .....	120	.03	27	( <sup>3</sup> )
Computer scientists and related workers .....	1,610	.44	n.a.	n.a.
Systems analysts, electronic data processing .....	620	.17	10	3
Computer programmers .....	710	.19	5	5
All other computer systems analysts, programmers, and programmer aides .....	280	.08	n.a.	n.a.
Health practitioners, technologists, technicians, and related health workers .....	130	.04	9	1
Designers, except interior designers .....	4,070	1.10	4	20
All other professional, paraprofessional, and technical workers .....	640	.17	n.a.	n.a.
Sales and related occupations .....	13,660	3.69	n.a.	n.a.
First-line supervisors and manager/supervisors, sales and related workers .....	990	.27	7	4

See footnotes at end of table.

**Table 23. Miscellaneous manufacturing industries: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued**

(SIC 39)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Sales representatives, scientific and related products and services, except retail .....	3,110	0.84	5	13
Sales representatives, except scientific and related products or services and retail .....	7,880	2.13	3	26
All other sales and related workers .....	1,680	.45	10	4
Clerical and administrative support occupations .....	51,800	14.01	n.a.	n.a.
First-line supervisors and manager/supervisors, clerical and administrative support workers .....	1,440	.39	5	7
Secretaries .....	9,380	2.54	2	53
Stenographers .....	170	.05	11	1
Receptionists and information clerks .....	520	.14	7	5
Typists .....	1,780	.48	4	11
Typists, word processing equipment .....	570	.15	7	4
Personnel clerks, except payroll and timekeeping .....	450	.12	4	4
File clerks .....	540	.15	6	4
Order clerks, materials, merchandise, and service .....	4,110	1.11	3	18
Procurement clerks .....	480	.13	5	5
Bookkeeping, accounting, and auditing clerks .....	7,100	1.92	2	46
Payroll and timekeeping clerks .....	920	.25	5	7
Billing, cost and rate clerks .....	1,020	.28	4	6
General office clerks .....	6,570	1.78	3	34
Electronic data processing and other office machine operators .....	2,310	.62	n.a.	n.a.
Billing, posting, and calculating machine operators .....	330	.09	11	1
Computer operators, except peripheral equipment .....	670	.18	5	5
Data entry keyers, except composing .....	1,180	.32	5	6
All other office machine operators .....	130	.04	17	1
Switchboard operators .....	520	.14	3	6
Material recording, scheduling, dispatching, and distributing workers .....	13,290	3.59	n.a.	n.a.
Production, planning, and expediting clerks .....	1,760	.48	4	7
Weighers, measurers, checkers, and samplers, recordkeeping .....	340	.09	9	2
Stock clerks, stockroom, warehouse or storage yard .....	1,880	.51	7	7
Traffic, shipping, and receiving clerks .....	8,930	2.42	2	41
All other material recording, scheduling, and distributing workers .....	380	.10	14	1
All other clerical and administrative support workers .....	630	.17	10	2
Service occupations .....	5,370	1.45	n.a.	n.a.
First-line supervisors and manager/supervisors, service .....	340	.09	16	2
Guards and watch guards .....	610	.16	7	3
Food and beverage preparation and service workers .....	70	.02	16	( <sup>3</sup> )
Cleaning and building service workers, except private households .....	3,630	.98	n.a.	n.a.
Janitors and cleaners, except maids and housekeeping cleaners .....	3,460	.94	2	25
All other cleaning and building service workers, except private households .....	170	.05	10	1
All other service workers .....	720	.19	37	( <sup>3</sup> )
Agriculture, forestry, fishing, and related occupations .....	80	.02	n.a.	n.a.
Gardeners and groundskeepers, except farm .....	80	.02	14	1

See footnotes at end of table.

**Table 23. Miscellaneous manufacturing industries: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued**

(SIC 39)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Production, construction, operating, maintenance, and material handling occupations .....	255,070	68.98	n.a.	n.a.
First-line supervisors, manager/supervisors - production, construction, maintenance, and related workers .....	15,500	4.19	n.a.	n.a.
First-line supervisors and manager/supervisors - mechanics, installers and repairers .....	400	.11	8	3
First-line supervisors and manager/supervisors - production and operating workers .....	14,470	3.91	2	55
First-line supervisors and manager/superv-transp and material moving machine and vehicle workers .....	240	.06	9	2
First-line supervisors and manager/supervisors - helpers, laborers, and material movers, hand .....	390	.11	9	2
Precision inspectors, testers, and graders .....	2,150	.58	5	8
Production inspectors, testers, graders, sorters, samplers, and weighers .....	5,150	1.39	4	11
Mechanics, installers, and repairers .....	8,300	2.24	n.a.	n.a.
Machinery maintenance mechanics .....	1,600	.43	8	4
Machinery maintenance workers .....	410	.11	16	2
Maintenance repairers, general utility .....	4,760	1.29	3	24
Musical instrument repairers and tuners .....	260	.07	15	1
All other mechanics, installers, and repairers .....	1,270	.34	9	4
Construction trades workers, except material moving .....	4,860	1.31	n.a.	n.a.
Carpenters .....	1,750	.47	9	5
Electricians .....	2,440	.66	6	10
Painters and paperhangers, construction and maintenance .....	260	.07	15	1
Plumbers, pipefitters, and steamfitters .....	160	.04	13	1
All other construction trades workers .....	250	.07	24	1
Precision metal workers .....	25,750	6.96	n.a.	n.a.
Tool-and-die makers .....	2,490	.67	5	7
Machinists .....	1,800	.49	7	5
Tool grinders, filers, sharpeners, and other precision grinders .....	1,430	.39	8	4
Jewelers and silversmiths .....	5,440	1.47	5	11
Precision hand workers, jewelry and related products .....	7,370	1.99	5	12
Precision etchers and engravers, hand or machine .....	1,890	.51	6	7
Sheet-metal workers .....	4,940	1.34	5	13
All other precision metal workers .....	390	.11	15	1
Precision woodworkers .....	4,960	1.34	n.a.	n.a.
Pattern and model makers, wood .....	240	.06	17	1
Wood machinists .....	460	.12	20	1
Cabinetmakers and bench carpenters .....	3,820	1.03	6	7
All other precision woodworkers .....	440	.12	n.a.	n.a.
Precision printing workers .....	440	.12	n.a.	n.a.
Precision compositors, typesetters, and arrangers .....	320	.09	14	2
All other precision printing workers .....	120	.03	22	( <sup>3</sup> )
Precision workers, nec .....	4,660	1.26	n.a.	n.a.
Precision molders, shapers, casters, and carvers, except jewelry and foundry .....	430	.12	16	1
Precision patternmakers, model makers, layout workers, and cutters .....	310	.08	14	1
Precision detail design decorators, and painters .....	2,300	.62	7	9
Gem and diamond workers .....	610	.16	13	2
All other precision workers, nec .....	1,010	.27	13	2

See footnotes at end of table.

**Table 23. Miscellaneous manufacturing industries: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued**

(SIC 39)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Machine setters, set-up operators, and tenders, metal and plastic .....	33,130	8.96	n.a.	n.a.
Sawing machine tool setters and set-up operators, metal and plastic .....	260	.07	16	1
Lathe and turning machine tool setters and set-up operators, metal and plastic .....	480	.13	17	1
Drilling and boring machine tool setters and set-up operators, metal and plastic .....	580	.16	14	1
Milling and planing machine setters and set-up operators, metal and plastic .....	150	.04	16	1
Grinding, lapping, and buffing machine tool setters and set-up operators, metal and plastic .....	3,810	1.03	5	10
Machine tool cutting operators and tenders, metal and plastic .....	5,160	1.40	6	12
Punching machine setters and set-up operators, metal and plastic .....	4,480	1.21	5	11
Rolling machine setters and set-up operators, metal and plastic .....	250	.07	20	1
Machine forming operators and tenders, metal and plastic .....	2,850	.77	10	2
Numerical control machine tool operators and tenders, metal and plastic .....	100	.03	20	1
Combination machine tool setters and set-up operators, metal and plastic .....	490	.13	20	1
Combination machine tool operators and tenders, metal and plastic .....	460	.12	17	1
Soldering and brazing machine setters and set-up operators .....	150	.04	18	1
Soldering and brazing machine operators and tenders .....	330	.09	19	1
Plastic molding and casting machine setters and set-up operators .....	2,310	.62	8	7
Plastic molding and casting machine operators and tenders .....	6,490	1.76	9	7
Metal molding, coremaking, and casting machine setters and set-up operators .....	400	.11	22	1
Metal molding, coremaking, and casting machine operators and tenders .....	640	.17	9	2
Electrolytic plating and coating machine setters and set-up operators, metal and plastic .....	550	.15	9	2
Electrolytic plating and coating machine operators and tenders, metal and plastic .....	530	.14	10	2
Nonelectrolytic plating and coating machine setters and set-up operators, metal and plastic .....	100	.03	25	( <sup>3</sup> )
Nonelectrolytic plating and coating machine operators and tenders, metal and plastic .....	500	.14	15	1
Heating equipment setters and set-up operators, metal and plastic .....	120	.03	24	( <sup>3</sup> )
Heat treating, annealing, and tempering machine operators and tenders, metal and plastic .....	110	.03	14	1
Heaters, metal and plastic .....	90	.02	22	( <sup>3</sup> )
All other machine setters and set-up operators, metal and plastic .....	1,740	.47	12	1
All other machine operators and tenders, metal and plastic .....	1,670	.45	15	2
Machine setters, set-up operators, and tenders, except metal and plastic .....	39,620	10.71	n.a.	n.a.
Sawing machine setters and set-up operators .....	140	.04	21	( <sup>3</sup> )
Sawing machine operators and tenders .....	430	.12	15	1
Woodworking machine setters and set-up operators, except sawing .....	560	.15	15	1

See footnotes at end of table.

**Table 23. Miscellaneous manufacturing industries: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued**

(SIC 39)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
Woodworking machine operators and tenders, except sawing .....	1,070	0.29	14	1
Printing press machine setters and set-up operators .....	340	.09	13	1
Specialty materials printing machine setters and set-up operators .....	550	.15	17	1
Screen printing machine setters and set-up operators .....	3,120	.84	6	9
All other printing related setters and set-up operators .....	230	.06	19	1
Printing press machine operators and tenders .....	680	.18	15	1
All other printing, binding, and related machine operators and tenders .....	440	.12	14	1
Sewing machine operators, garment .....	1,370	.37	23	1
Sewing machine operators, nongarment .....	9,200	2.49	7	10
Cutting and slicing machine setters and set-up operators .....	350	.09	18	1
Cutting and slicing machine operators and tenders .....	1,000	.27	14	1
Coating, painting, and spraying machine setters and set-up operators .....	880	.24	11	2
Coating, painting, and spraying machine operators and tenders .....	1,360	.37	8	3
Cleaning, washing, and pickling equipment operators and tenders .....	360	.10	12	1
Crushing, grinding, mixing, and blending machine operators and tenders .....	540	.15	18	2
Extruding, forming, pressing, and compacting machine setters and set-up operators .....	450	.12	20	1
Extruding, forming, pressing, and compacting machine operators and tenders .....	1,290	.35	28	1
Packaging and filling machine operators and tenders .....	7,230	1.96	6	9
All other machine setters and set-up operators, except metal and plastic .....	1,360	.37	17	2
All other machine operators and tenders, except metal and plastic .....	5,000	1.35	8	4
Precision assemblers, metal .....	1,110	.30	n.a.	n.a.
Electrical and electronic equipment assemblers, precision .....	1,110	.30	19	1
Other hand workers, nec .....	65,640	17.75	n.a.	n.a.
Electrical and electronic assemblers .....	1,290	.35	14	1
Welders and cutters .....	2,720	.74	7	9
Solderers and brazers .....	2,390	.65	7	5
Sewers, hand .....	400	.11	20	1
Cutters and trimmers, hand .....	870	.24	11	2
Molders and casters, hand .....	720	.19	14	1
Painting, coating, and decorating, workers, hand .....	6,030	1.63	5	19
Engraving and printing workers, hand .....	580	.16	11	2
Grinding and polishing workers, hand .....	5,580	1.51	5	10
Assemblers and fabricators, except machine, electrical, electronic, and precision .....	40,750	11.02	4	21
All other hand workers, nec .....	4,310	1.17	8	6
Plant and system workers .....	110	.03	39	( <sup>3</sup> )
Motor vehicle operators .....	1,490	.40	n.a.	n.a.
Truck drivers, heavy or tractor trailer .....	700	.19	9	3
Truck drivers, light, include delivery and route workers .....	720	.19	7	6
All other motor vehicle operators .....	70	.02	16	1
All other transportation and motor vehicle operators .....	70	.02	25	( <sup>3</sup> )
Material moving equipment operators .....	2,350	.64	n.a.	n.a.
Hoist and winch operators .....	160	.04	27	( <sup>3</sup> )
Industrial truck and tractor operators .....	1,660	.45	7	4
Conveyor operators and tenders .....	220	.06	18	1

See footnotes at end of table.

**Table 23. Miscellaneous manufacturing industries: Employment, relative error, and percent of establishments reporting selected occupations, May 1983—Continued**

(SIC 39)

Occupation	Employment <sup>1</sup>	Percent of total employment	Relative error (in percentage) <sup>2</sup>	Percent of establishments reporting the occupation
All other material moving equipment operators .....	310	0.08	20	1
Helpers - mechanics and repairers .....	340	.09	13	2
Construction trades and extractive worker helpers .....	220	.06	26	( <sup>3</sup> )
Machine feeders and offbearers .....	6,500	1.76	6	9
Freight, stock, and material movers, hand .....	5,720	1.55	4	17
Hand packers and packagers .....	18,020	4.87	4	24
All other helpers, laborers, and material movers, hand .....	8,930	2.42	8	7
All other production, construction, operating, maintenance, and material handling occupations .....	50	.01	n.a.	n.a.

<sup>1</sup> Estimates of fewer than 50 workers, or with less than 0.01 percent of industry employment, or with a relative error greater than 50 are generally not shown separately since such estimates are considered unreliable. Estimates that are not shown have been counted in the appropriate "All other" categories.

<sup>2</sup> Relative standard errors apply equally to data on estimated employment and percent of total employment; relative standard errors

are estimated at the level of 2 chances out of 3. For further information on sampling variability and other types of errors, see appendix A.

<sup>3</sup> Less than 0.5 percent.

n.a. = not available.

NOTE: Detail may not add to totals due to rounding. Estimated employment is rounded to the nearest 10.

# Appendix A. Survey Methods and Reliability of Estimates

## Scope of survey

The survey covered private manufacturing establishments in Standard Industrial Classification (SIC) codes 20-39. The reference date of the survey was the week that included April 12, May 12, or June 12, 1983, depending on the SIC of the sampled unit as shown below:

SIC	Reference date
20.....	June 12
21.....	June 12
22.....	April 12
23.....	April 12
24.....	May 12
25.....	May 12
26.....	April 12
27.....	May 12
28.....	June 12
29.....	May 12
30.....	June 12
31.....	April 12
32.....	May 12
33.....	April 12
34.....	June 12
35.....	June 12
36.....	June 12
37.....	June 12
38.....	April 12
39.....	May 12

The survey covered all 50 States, the District of Columbia, and Puerto Rico. (Puerto Rico data are not included in the national estimates in this publication.)

## Occupational and industrial classification

The OES classification system is based primarily on the Dictionary of Occupational Titles (DOT), Fourth edition, and is compatible with the 1980 Standard Occupational Classification (SOC) system. The DOT was used to develop the definitions of OES occupations because it is the most comprehensive system for classifying occupations. In addition, each OES occupation is directly related to a 1980 census occupation, except in those cases where a census occupation is not within the scope of the OES survey. "Crosswalks" have been developed between the two systems so that users may integrate OES

data with data from sources using the Census classification. (See appendix B.)

The industrial classification system is that described in the 1972 edition of the *Standard Industrial Classification Manual*,<sup>1</sup> whereby reporting establishments are classified into industries on the basis of major product or activity.

## Concepts

An *establishment* is an economic unit which produces goods or services. Generally, it is at a single physical location and is engaged predominantly in one type of economic activity. Where a single physical location encompasses two or more distinct activities, these are treated as separate establishments if separate payroll records are available and certain other criteria are met.

*Employment* includes full- and part-time workers; workers on paid vacations or other types of leave; workers on unpaid short-term absences (i.e., illness, bad weather, temporary layoff, jury duty); salaried officers, executives, and staff of incorporated firms; employees temporarily assigned to other units; and employees for whom that unit is their permanent (home) duty station, regardless of whether the unit prepares their paycheck. Excluded from coverage are proprietors (owners and partners of unincorporated firms), self-employed, unpaid family workers, and workers on extended leave (i.e., pensioners and members of the Armed Forces).

*Occupation* refers to the occupation in which employees are working rather than the occupation for which they may have been trained. For example, an employee trained as an engineer but working as a drafter is reported as a drafter.

*Working supervisors* (those spending 20 percent or more of their time at work similar to that done by workers under their supervision) are reported in the occupation most closely related to their work.

*Part-time workers, learners, and apprentices* are reported in the occupation in which they ordinarily work.

*Multiple jobholders* (employees who perform the duties of two or more occupations in an establishment)

<sup>1</sup> *Standard Industrial Classification Manual* (Office of Management and Budget, Executive Office of the President, 1972), as amended in *Supplement*, 1977.

are reported in the occupation that requires the highest level of skill or in the occupation where the most time is spent if there is no measurable difference in skill requirements.

### Survey procedures

The survey is conducted over a 3-year cycle; manufacturing industries are surveyed in one year and non-manufacturing industries in the other two years. Data are collected from a sample of establishments primarily by mail; telephone followups and personal visits are made when an establishment response is critical to the survey. The survey is based on a probability sample, stratified by industry and size of employment, designed to represent the total or "universe" of establishments covered by the survey. Data are requested for the pay period including the 12th of the reference month, which is standard for all Federal agencies collecting employment data.

### Method of collection

Survey schedules were mailed to most sample establishments; personal visits were made to some larger companies. Two additional mailings were sent to nonrespondents at approximately 6-week intervals. Nonrespondents considered critical to the survey (due to size) were followed up by telephone or personal visit.

### Sampling procedure

The sampling frame for this survey was the list of units in the specified SIC's as reported to State Unemployment Insurance (UI) agencies. The reference date of the sampling frame was the second quarter of 1983.

The universe was stratified into SIC and size classes. The size classes were determined by employment as follows:

Size class	Employees
1	1-3
2	4-9
3	10-19
4	20-49
5	50-99
6	100-249
7	250-249
8	500-999
9	1,000 and over

UI reporting units with 1-3 employees were not sampled in all States, but units with 4-9 employees were given larger weights to represent the employment in the smaller size class. UI reporting units with 250 or more employees were included in the sample with certainty. Sample sizes intended to produce State estimates with

target relative errors of 10, 15, and 20 percent at one standard deviation were developed for the noncertainty size classes. This was done for groups of SIC's based on averages of occupational rates and coefficients of variation (CV's) from the previous survey of those SIC's for a set of typical occupations. This SIC sample size was allocated to the size classes proportionally to size class employment. The sample was selected systematically with equal probability within each State/SIC/area/size class cell.

The States were given the option of three target relative errors in designing their samples. Some States varied the target relative error by SIC. This was done to decrease the cost by reducing the sample size. The above allocations resulted in a total initial sample size of 158,023 UI reporting units.

### Response

Of those selected, 149,213 were final eligible units (i.e., excluding establishments that were out of business or out of scope, etc.). Usable responses were obtained from 110,305 units, producing a response rate of 73.9 percent based on units and 68.0 percent based on weighted employment. Subsequent to the closeout date for national estimates, additional data were received by States and used in preparing State estimates. Response rates in most States were much higher than the response rate used to develop national estimates.

### Estimation

A weight was determined for each sample unit from which a usable response was received. Each weight was composed of two factors. The first factor was the inverse of the probability of selection. The second was the nonresponse adjustment factor, used to correct for questionnaires that were not returned or not usable. For each of the three-digit SIC/State/size class sampling cells, a nonresponse factor was calculated that was equal to:

$$\frac{\text{Weighted sample employment of all eligible units in sample}}{\text{Weighted sample employment of all responding eligible units}}$$

Sample employment was taken from the sampling frame. If the factor in a cell was greater than a predetermined maximum factor, which increased as the number of respondents in a cell increased, the cell was collapsed with other homogeneous cells within the SIC until the factor for the combined cells was not greater than the appropriate maximum factor. If the collapsing procedure terminated (i.e., no more cells were available for collapse) before satisfying the above constraint, then the appropriate maximum factor was used. For size classes 1-6, homogeneous cells were determined to be other size cells within the SIC and State. For size classes 7-9,

homogeneous cells were determined to be other *State* cells within the SIC and size class. The weight for each establishment was the product of the two factors.

A combined ratio estimate of occupational employment was used to develop the national estimates. The auxiliary variable used was total employment. The estimating formula is:

$$\hat{p} = \sum_i \left[ \frac{\sum_j \sum_k w_{ijk} P_{ijk}}{\sum_j \sum_k w_{ijk} e_{ijk}} \cdot M_i \right]$$

Where:  $\hat{p}$  = 2-digit industry occupational employment estimate  
*i* = 3-digit industry within a 2-digit industry  
*j* = size class  
*k* = establishment  
 $w_{ijk}$  = weight after nonresponse adjustment in *i*-th industry, *j*-th size class and *k*-th establishment  
 $P_{ijk}$  = occupational employment in *i*-th industry, *j*-th size class and *k*-th establishment  
 $e_{ijk}$  = total employment in *i*-th industry, *j*-th size class and *k*-th establishment  
 $M_i$  = population total employment in *i*-th industry

The population value of total employment ( $M_i$ ) was obtained from the BLS Current Employment Statistics program, a monthly employment survey of non-agricultural establishments.

The standard form for the sampling variance for a combined ratio estimate is:

$$V(\hat{p}) = \sum_i \sum_j \frac{N_{ij}^2 (1 - f_{ij})}{n_{ij}} \cdot A_{ij}$$

Where:  $V(\hat{p})$  = variance of  $\hat{p}$   
*i* = 3-digit industry within a 2-digit industry  
*j* = size class  
 $N_{ij}$  = total number of units in the *i*-th industry and *j*-th size class  
 $f_{ij}$  = sampling fraction in the *i*-th industry and *j*-th size class  
 $n_{ij}$  = number of sample units in the *i*-th industry and *j*-th size class  
 $S_{pij}$  = standard deviation of  $p$  within the *i*-th industry and *j*-th size class  
 $S_{eij}$  = standard deviation of  $e$  within the *i*-th industry and *j*-th size class  
 $K_{ij}$  = correlation coefficient between  $p$  and  $e$  within the *i*-th industry and *j*-th size class.

The variances for the occupational estimates were estimated from the following formula:

$$\text{Var}(\hat{P}) = \sum_i \sum_j T_{ij} V_{ij}^2$$

$$T_{ij} = [B_{ij}] \cdot [D_{ij}] \cdot [F_{ij}]^2$$

$$B_{ij} = (M_{ij} - e_{ij}) / (M_{ij})$$

$$D_{ij} = (G_{ij}) / (H_{ij})$$

$$G_{ij} = \left( \sum_k w_{ijk}^2 \right) \left( \sum_k w_{ijk} \right)$$

$$H_{ij} = \left( \sum_k w_{ijk} \right)^2 - \left( \sum_k w_{ijk}^2 \right)$$

$$F_{ij} = (M_i) / \left( \sum_j \sum_k w_{ijk} e_{ijk} \right)$$

$$V_{ij}^2 = \sum_k w_{ijk} \cdot L_{ijk}^2$$

$$L_{ijk} = (P_{ijk} - R_i e_{ijk}) - (\bar{P}_{ij} - R_i \bar{e}_{ij})$$

Where:

$M_{ij}$  = benchmark total employment in the *i*-th industry and *j*-th size class

$$R_i = \left( \sum_j \sum_k w_{ijk} P_{ijk} \right) / \left( \sum_j \sum_k w_{ijk} e_{ijk} \right)$$

$$e_{ij} = \sum_k e_{ijk}$$

All other terms are as defined above. This formula is almost a computational form of the standard formula given above. One simplifying assumption has been made:

$$W_{ijk} = C_{ij} \text{ for all } k \text{ in a given } ij \text{ cell}$$

That is, the weights are equal to a constant  $C$  within a given three-digit industry/size class cell. At this time, the total effect of this assumption on the variance estimates has not been measured.

### Reliability of estimates

Estimates developed from the sample may differ from the results of a complete survey of all the establishments in the sampled lists. Two types of errors, sampling and nonsampling, are possible in an estimate based on a sample survey. Sampling error occurs because observations are made only on a sample, not on the entire population. Nonsampling error can be attributed to many sources, e.g., inability to obtain information about all cases in the sample; differences in the respondents' interpretation of questions; inability of respondents to provide correct information; errors in recording, coding, or processing the data; errors in estimating values for missing data; and failure to represent all units in the population.

The particular sample used in this survey is one of a large number of all possible samples of the same size that could have been selected using the same sample design. Estimates derived from the different samples

would differ from each other; the difference between a sample estimate and the average of all possible sample estimates is called the sampling deviation. The standard or sampling error of a survey estimate is a measure of the variation among the estimates from all possible samples. The relative standard error is defined as the standard error of the estimate divided by the value being estimated; the variance is defined as the standard error squared.

The sample estimate and an estimate of its standard error enable one to construct interval estimates with prescribed confidence that the interval includes the average result of all possible samples that could be obtained from the sample design for the survey.

To illustrate, if all possible samples were selected, and if each of these were surveyed under essentially the same conditions and an estimate and its estimated sample error were calculated from each sample, then:

1. Approximately 68 percent of the intervals from one standard error below to one standard error above the derived estimate would include the average value of all possible samples. This interval is called a 68-percent confidence interval.
2. Approximately 90 percent of the intervals from 1.6 standard errors below to 1.6 standard errors above the derived estimate would include the average of all possible samples. This interval is called a 90-percent confidence interval.
3. Approximately 95 percent of the intervals from two standard errors below to two standard er-

rors above the derived estimate would include the average of all possible samples. This interval is called a 95-percent confidence interval.

4. Almost all intervals from three standard errors below to three standard errors above the derived estimate would include the average of all possible samples.

An inference that the complete coverage value would be within the indicated ranges would be correct in approximately the relative frequencies shown.

For example, suppose an estimated total is shown as 5,000 with an associated relative error of 2 percent. Then the standard error is 100 (2 percent of 5,000) and there is a 68-percent chance that the average of all possible sample totals would be between 4,900 and 5,100, and it is almost certain that the average of all possible sample totals would be between 4,700 and 5,300.

The relative errors provided primarily indicate the magnitude of the sampling error, but do not measure biases in the data due to nonsampling error. Efforts were made to reduce the biases due to errors in recording, coding, and processing the data. The adjustment made for nonrespondents assumed that the characteristics of the nonrespondents were the same as those of the respondents at a given level. To the extent this is not true, bias is introduced in the data. The magnitude of these biases is not known.

Particular care should be exercised in the interpretation of small estimates, estimates based on a small number of cases, or small differences between estimates because the sampling errors are relatively large and the magnitude of the biases is unknown.

# Appendix B. The OES Classification System

The new OES system (with an entirely new 5-digit coding system) organizes all occupations into four levels: Division, major group, minor group, and detail. The following sections discuss the first three levels, and also explain the new coding structure.

## Division level

There are seven divisions in the new OES system:

1. Managerial and administrative occupations
2. Professional, paraprofessional, and technical occupations
3. Sales and related occupations
4. Clerical and administrative support occupations
5. Service occupations
6. Agriculture, forestry, fishing, and related occupations
7. Production, construction, operating, maintenance, and material handling occupations

Some of the more significant changes made at the division level are:

- The exclusion of first-line managers/supervisors from the managerial and administrative division. These workers are classified in separate and specific categories in the other divisions. For example, in the second division, first-line managers/supervisors are classified with the workers they supervise.

- The combination of professional and technical workers into a single integrated division in order to lessen the growing ambiguity between the two categories.

- The creation of a new agriculture division which allows supplementation of data from non-OES survey sources.

- The significant organizational and occupational revision of the production division.

## Major and minor group levels

A significant amount of change has taken place at the major and minor group levels, particularly in restructuring. Since it would be impossible to describe every change in this appendix, some of the highlights of the

major and minor group structure of each division are given below:

*Managerial and administrative occupations.* This division is organized into three major groups. The first contains specialized occupations by function, and the second contains specialized occupations by industry. Both of these categories are generally at the middle management level. When function and industry overlap, function takes precedence and is listed first. The third and final group includes the division residual as well as workers, usually in upper management, whose duties are more general in nature.

*Professional, paraprofessional, and technical occupations.* This division is organized into 9 major groups and a residual category. These major groups were created by combining those professional, paraprofessional, and technical occupations requiring common bodies of knowledge and expertise. Unlike the Standard Occupational Classification (SOC) system, distinctions between technical and professional workers, if made, are found at the minor group level rather than at the major group or division level.

The first major group is management support. This group was placed in the professional division rather than the managerial division, as in the SOC, for it was felt that respondents consider individual management support occupations functionally closer to the professional specialties of the division than to the upper and middle management occupations of the first division. The management support group also includes a residual allowing the combination of this major group with the management division, if SOC compatibility is required.

The remaining major groups primarily follow SOC order: "Hard" sciences, including engineering; the social sciences and related disciplines, such as law and teaching; health fields; and, writing, art, and related fields. The two exceptions to the SOC order, the technician and computer groups, were moved so that these occupations would appear in closer proximity to the occupations they most commonly support.

*Sales and related occupations.* The SOC arranges the sales division into four segments:

Supervisory; sale of most services; sale of retail products; and sales-related occupations. In both the new OES system and the SOC, retail sales is not an industry designation but rather an occupational designation for sales activities which are directed towards individuals rather than organizations or businesses.

Unlike the SOC, the new OES system includes all service sales occupations in the major groups as "sales occupations, service."

In addition, a new major group was created by combining the last three SOC categories because they involve the sale of products rather than services. A few sales-related occupations such as demonstrators have also been included in this new group.

The new OES sales division is somewhat larger in scope than the previous OES category because of the addition of occupations such as sales engineers and cashiers. These additions to the sales group in the new OES structure do not, however, diminish the magnitude of the increase in sales personnel in manufacturing industries between 1980 and 1983.

*Clerical and administrative support occupations.* This division is organized into six major groups and a residual category. As with the other divisions, the supervisory category is first. The next major group includes industry-specific clerical occupations. This group is placed near the top of the clerical division so that respondents can more easily locate these occupations. These two major groups are followed by the general secretarial and related group, an office machine group, a communications group, and a material recording group.

*Service occupations.* The previous OES system included protective services, food service, and cleaning service occupations as summary occupational groups. The new system includes these as major groups and adds health and personal service occupations, while expanding the cleaning group to encompass building service organizations.

*Agriculture, forestry, fishing, and related occupations.* Because many of the occupations related to this division are found in industries outside the scope of the OES survey, the previous OES system coding structure had no comparable category. At present, the division covers only those occupations needed for the OES survey as defined by its current nonagricultural scope. In the 1983

manufacturing survey, for example, only the lumber and wood products industry (SIC 24) and, to a lesser degree, food and kindred products (SIC 20) had significant employment in this category.

*Production, construction, operating, maintenance, and material handling occupations.* As in the previous OES system, this is the largest and most diverse of all the OES divisions. The major groups are listed below:

- Supervisory
- Inspecting
- Repair
- Construction and extraction
- Precision production
- Machine setting and operating
- Assembling and handworking
- Plant and system operation
- Transportation and material handling
- Helpers and laborers

To understand the organization of this division, it is important to be familiar with SOC principles. The first basic principle of organization is that occupations are grouped by function (e.g. inspecting, repairing, producing). An equally important principle is organization by skill requirements (e.g. precision, setup, operating, helping).

A third organizing principle in many of these groups is the distinction made between machine and hand operations. In this case, hand operations include the use of hand-held power tools. The hand and machine categories are not exhaustive, however, since both precision hand work and precision machine work are placed in the same category. For OES purposes, an exception to the SOC placement was made, and precision assembling occupations were placed in the handworking category, allowing for proximity to the other assembling occupations.

The SOC and the new OES systems also distinguish between "manual" occupations, such as material handling, and "hand" occupations, such as grinding. Here, the distinction is made according to whether or not the worker is directly working on the manufacture of a product.

Within the large production and precision and machine groups, distinctions are made on the basis of materials worked (e.g. metal/plastic, wood, textile, assorted/other). The assorted/other category includes working with combined materials as well as working with single materials, such as stone, which have not previously been specified.

# Appendix C. OES Survey Data Available from State Agencies

State data on occupational employment in manufacturing are available as indicated below. These reports

may be obtained from the State employment security agencies listed on the inside back cover of this publication.

**Table C-1. OES survey data available by State and year**

State	1971	1974	1977	1980	1983	State	1971	1974	1977	1980	1983
Alabama		x	x	x	x	Montana				x	x
Alaska	x	x	x	x	x	Nevada	x	x	x	x	x
Arizona			x	x	x	New Hampshire			x	x	x
Arkansas			x	x	x	New Jersey	x	x	x	x	x
California			x	x	x	New Mexico			x	x	x
Colorado	x	x	x	x	x	New York		x	x	x	x
Connecticut			x	x	x	North Carolina		x	x	x	x
Delaware		x	x	x	x	North Dakota			x	x	x
District of Columbia		x	x	x	x	Nebraska				x	x
Florida	x	x	x	x	x	Ohio				x	x
Georgia		x	x	x	x	Oklahoma	x	x	x	x	x
Hawaii			x	x	x	Oregon	x	x	x	x	x
Idaho		x	x	x	x	Pennsylvania		x	x	x	x
Illinois			x	x	x	Puerto Rico					x
Indiana	x	x	x	x	x	Rhode Island			x	x	x
Iowa			x	x	x	South Carolina	x	x	x	x	x
Kansas				x	x	South Dakota				x	x
Kentucky		x	x	x	x	Tennessee		x	x	x	x
Louisiana			x	x	x	Texas		x	x	x	x
Maine		x	x	x	x	Utah	x	x	x	x	x
Maryland		x	x	x	x	Vermont				x	x
Massachusetts	x	x	x	x	x	Virginia	x	x	x	x	x
Michigan			x	x	x	Washington				x	x
Minnesota	x	x	x	x	x	West Virginia	x	x	x	x	x
Mississippi		x	x	x	x	Wisconsin	x	x	x	x	x
Missouri	x	x	x	x	x	Wyoming			x	x	x

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