Industry Wage Survey: Semiconductors September 1977

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Preface

This bulletin summarizes the results of a Bureau of Labor Statistics survey of occupational wages, establishment practices, and supplementary benefits in the semiconductor and related devices manufacturing industry. It was the Bureau's first such study in the electrical equipment sector since the inception of the current Industry Wage Survey program in 1959-60.

Summary 78-10, providing data on occupational earnings from the survey, was issued in September 1978. Copies are available from the Bureau of Labor Statistics, Washington, D.C. 20212, or any of its regional offices.

This study was conducted in the Bureau's Office of Wages and Industrial Relations. Mark Sieling of the Division of Occupational Wage Structures prepared the analysis in this bulletin. Field work for the survey was directed by the Assistant Regional Commissioners for Operations.

Other publications available from the Bureau's industry wage studies program, as well as the addresses of the Bureau's regional offices, are listed at the end of this bulletin.

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Semiconductors, September 1977

Summary

Straight-time earnings of production workers in the semiconductors manufacturing industry[1] averaged $4.52 an hour in September 1977. The middle 50 percent of the 53,000 production workers covered by the survey earned between $3.34 and $5.83 an hour nationwide. In the Northeast, where nearly two-fifths of the industry's work force was located, hourly earnings averaged $5.51; in the South, they averaged $3.91.

Among the 14 plant occupations[2] studied separately, average hourly earnings were highest for maintenance pipefitters ($7.94) and lowest for crystal coaters ($3.38). Three levels of assemblers, accounting for 55 percent of all production workers, averaged $4.08 an hour. Hourly averages of computer operators ($5.97) and engineering technicians ($6.80)–the two nonplant jobs studied separately–exceeded the overall production worker average by 32 percent and 50 percent, respectively.

All of the production workers studied were employed by firms providing paid holidays (usually 9 or 10 annually) and paid vacations (typically 2 weeks after 1 year of service; 3 weeks after 10 years; and 4 weeks after 15 years). All or virtually all workers were provided with life, sickness and accident, hospitalization, surgical, medical, and major medical insurance coverage, at least partially financed by their employers. Long-term disability insurance and retirement plans each applied to about three-fourths of the workers.

Industry characteristics

Products and processes. Semiconductors are extremely small solid-state devices that alter the flow of electricity by using layers of specially treated silicon and other materials, such as aluminum, that are placed on a silicon crystal.[3] Semiconductors and combinations of single semiconductors–known as integrated microcircuits–are used in a wide variety of products ranging from computers, medical diagnostic equipment, and satellites to television sets and wrist watches. Firms within scope of the survey also manufactured an assortment of other solid-state devices, such as diodes, solar cells, and transistors.

The total value of factory shipments of solid-state devices amounted to $3.8 billion in 1976.[4] About two-thirds of this amount represented shipments of integrated microcircuits (semiconductor networks), while diodes and transistors each accounted for about one-tenth. From 1965 to 1972, the total number of integrated microcircuits produced increased three hundredfold–from 2 million to 604 million. During this same period, however, their value increased by a factor of 15–from $41 million to $620 million–indicating that the average cost per unit has declined, primarily due to increased production efficiencies.[5]

Production of semiconductor devices requires both a high degree of precision and an extremely clean working environment. First, large-size drawings are made that trace the pattern of silicon layers that will be placed on the base crystal. These drawings are then reduced and imprinted on the crystal wafers by a photolithic process which allows the different layers to be built up by chemical means. Each device is then tested to insure adherence to performance standards. Since a single dust speck can ruin a semiconductor device, inspecting and testing them is a major part of the manufacturing process. Assembling single devices into more complex ones, preparing them for shipment, and connecting wires and leads are among the various tasks performed by assemblers.

Employment. Of the 53,000 production employees

[1] This survey covered firms employing at least 50 workers and engaged primarily in manufacturing semiconductors and related devices. (Industry 3674 as defined in the *1972 Standard Industrial Classification Manual* prepared by the U.S. Office of Management and Budget.) Personal visits were made to 55 of the 153 plants estimated to be within scope of the survey. Survey coverage nationwide, however, was reduced to 93 percent of the workers classified in the industry because a few large firms could not be adequately represented by others visited. Unavailability of data for several major firms in the West precluded the publication of separate information for that region. For further information on the scope and method of the survey, see appendix A.

[2] For detailed occupational descriptions, see appendix B.

[3] For further technical information on semiconductors and their production, see *Scientific American*, Sept. 1977, Vol. 237, No. 3.

[4] *Electronic Market Data Book, 1978* (Washington, D.C.: Electronic Industries Association), pp. 104-11.

[5] See "New Leaders in Semiconductors", *Business Week*, Mar. 1976, pp. 40-46.

covered by the survey, about two-fifths were located in the Northeast, and one-fifth were located in the South (table 1). Other important centers of semiconductor manufacturing were located in the West, especially in California.[6] Virtually all of the industry's work force was employed by firms located in metropolitan areas. Women, predominant in the assembling and inspecting and testing occupations, accounted for seven-tenths of the industry's production workers. Plant maintenance occupations and the two nonplant jobs studied–computer operators and engineering technicians–were staffed primarily by men.

Establishment size. Nationally, 87 percent of the production workers were employed by firms with at least 250 employees. In the Northeast, such firms accounted for 80 percent of the workers. In the South, the proportion was 96 percent.

Unionization. Establishments having labor-management agreements covering a majority of their production workers employed about one-fifth of the workers nationwide. The vast majority of the industry's unionized firms were located in the Northeast. In that region, half of the workers were employed by unionized firms. The International Brotherhood of Electrical Workers (AFL-CIO) was the predominant union in the industry.

Method of wage payment. Nine-tenths of the production personnel were employed on a time-rated basis (table 4). All of the incentive paid workers were located in the Northeast, where they accounted for one-third of the work force. Formal pay plans, providing for either a range of rates or for a single rate for specified jobs, applied to about three-fourths of the workers nationwide. Individually determined rates, based primarily on each worker's qualifications, applied to about one-eighth of the workers.

Average hourly earnings

Straight-time hourly earnings of the 53,000 semiconductor production workers covered by the survey averaged $4.52 in September 1977 (table 1). The average in the Northeast was $5.51 an hour–22 percent higher than the nationwide average–while in the South, the average was $3.91–13 percent lower.

Pay levels in the semiconductor industry were typically below those in related electric and electronic equipment industries. The following tabulation from the Bureau's September 1977 *Employment and Earnings* series shows that gross hourly earnings for semiconductors are near the bottom of the array:[7]

Electric and electronic equipment	$5.51
Miscellaneous electrical equipment and supplies	6.62
Communications equipment	6.35
Electrical industrial apparatus	5.61
Electrical distributing equipment	5.57
Household appliances	5.44
Electrical lighting and wiring equipment	5.13
Radio and TV receiving equipment	4.97
Electronic components and accessories	4.58
Semiconductors and related devices	5.09

Production personnel in large-sized semiconductor firms (those with 250 workers or more) averaged 24 percent more than their counterparts in smaller plants–$4.64 compared with $3.74. Workers employed by firms where a majority were covered by labor-management agreements (primarily located in the Northeast) held a 61 percent wage advantage over those in nonunionized plants–$6.42 compared with $4.00. Workers in metropolitan areas held a 6 percent advantage over nonmetropolitan workers–$4.53 compared with $4.26. The survey, however, did not isolate the independent impact of wage determinants, since published differentials represent the joint influence of associated variables, such as region and unionization, on wage rates. Looking at the union-to-nonunion wage differential within the Northeast region, the union impact is still overstated by the establishment size variable. When the union-to-nonunion comparison is limited, for example, to large-sized Northeast establishments, the differential is significantly smaller, 31 percent compared with 48 percent.

Earnings of individual production workers varied widely–from under $2.50 an hour to over $8.00 (table 2). Excluding the upper and lower fourths of the earnings array, the middle 50 percent of the workers earned between $3.34 and $5.83 an hour. In the Northeast, the corresponding portion of the array fell between $3.67 and $6.87 an hour. In the South, however, workers were more highly concentrated at lower earnings levels–the middle 50 percent earned between $3.22 and $4.16 an hour.

Overall, the wide spread of individual earnings within the semiconductors industry reflects large wage dif-

[6] See footnote 1.

[7] Straight-time average hourly earnings of production workers in this bulletin differ in concept from the gross average hourly earnings in the monthly *Employment and Earnings* series. The estimates presented in this bulletin for straight-time earnings exclude premium pay for overtime and for work on weekends, holidays, and late shifts. The gross hourly earnings presented in the monthly series include all of these. In this bulletin, average straight-time earnings are calculated by summing individual hourly earnings and dividing by the number of individuals. In the monthly series, the sum of hours reported by firms in the industry is divided into reported payroll totals. In addition, averages in the monthly series reflect data for all firms within an industrial group, whereas only firms with at least 50 workers were included in the semiconductors survey.

ferences between firms rather than wide differences within each firm. When an index of wage dispersion was computed for each firm, for example, the averages of those indexes was 24. By comparison, the index computed for the entire industry was about 2 1/2 times as large–61.[8]

Occupational earnings

Average hourly earnings among the plant jobs studied separately ranged from $3.38 for crystal coaters to $7.94 for maintenance pipefitters (table 3).[9] Three levels of assemblers, accounting for 55 percent of all production workers, averaged $4.08 an hour. Inspectors and testers, numerically the second largest job, averaged $4.84 an hour. Averages for the two nonplant jobs studied separately–computer operators ($5.97) and engineering technicians ($6.80)–exceeded the industry's production worker average by 32 percent and 50 percent, respectively.

Occupational pay relationships revealed by the survey, however, deviated at times from those found within individual establishments. Such anomalies resulted from the disproportionate impact of a high (or low) paying firm on an occupation's survey average. In the Northeast, for example, the majority of class C inspectors and testers were in relatively high paying firms, while class B workers were about evenly distributed among high and low paying firms. Thus, although class B inspectors averaged more than class C inspectors within each firm employing both groups, their survey average was less ($5.26 compared with $5.69 for class C).

Occupational averages in the Northeast typically exceeded those in the South by about 30 to 40 percent. Regional wage differences, however, were smaller for production workers with higher skill levels. Class C (entry level) assemblers in the Northeast, for example, averaged 54 percent more than their southern counterparts ($4.73 compared with $3.07). The difference between class A assemblers (those with the highest skill levels), however, was only 28 percent ($5.22 compared with $4.08). A similar pattern was found among the three levels of inspectors and testers and between skilled maintenance and unskilled plant jobs. The reverse was true, however, for the five levels of engineering technicians studied in both regions. Class I (entry level) engineering technicians in the Northeast, for example, averaged only 4 percent more than those in the South ($3.94 compared with $3.78). The differential, however, between class V engineering technicians (the highest skill level) was 29 percent ($9.22 in the Northeast compared with $7.15 in the South).

Of the five plant occupations for which separate comparisons were possible, men typically averaged about 10 percent more than women. The wage advantage, however, varied by both occupation and skill level. Class C men assemblers, for example, averaged only 2 percent more than class C women assemblers. The difference, however, between class A men and class A women assemblers amounted to 37 percent. Factors such as minor differences in job duties and the proportion of men and women in relatively high or low paying firms may have influenced wage differences between the sexes.

The wide spread among establishment wage levels results in some workers in relatively low paying jobs, as measured by the industry's average, earning more than others in much higher paying jobs. As the following tabulation shows, for example, some inspectors and testers earned more than maintenance electricians, even though their survey averages differed by $2.87 per hour.

	Inspectors and testers	*Maintenance electricians*
Number of workers:		
Under $5.20	2,360	—
$5.20 to $5.80	119	11
$5.80 to $6.40	476	50
$6.40 to $7.00	686	29
$7.00 to $7.60	48	40
$7.60 to $8.20	14	8
$8.20 and over	22	116
Average hourly earnings	$4.84	$7.71

Establishment practices and supplementary benefits

Data also were obtained for production and office workers on certain establishment practices, including work schedules and on selected supplementary benefits, including paid holidays, paid vacations, and health, insurance, and retirement plans.

Scheduled weekly hours. Virtually all production workers and nine-tenths of the office workers were scheduled to work a 40-hour week (table 5). Weekly work schedules varied somewhat for office workers in the Northeast: three-fifths worked 40 hours, and one-third worked 38 1/2 hours.

Shift differential provisions and practices. About nine-tenths of the production workers were in firms having extra pay provisions for work on second or third shifts (table 6); about two-fifths were actually employed on such shifts at the time of the survey (table 7). In the Northeast, one-fifth of the workers were on second shifts and one-tenth were on third or other late shifts; premium pay for such work was typically 10 percent

[8] The index of dispersion, calculated by dividing the difference between the third quartile and the first quartile by the median, falls between 25 and 35 for most manufacturing industries studied in the Bureau's industry wage program. For the semiconductors industry it was 61.

[9] Workers in plant jobs studied separately accounted for about two-thirds of the total production work force. For detailed job descriptions, see appendix B.

above day-shift rates. The proportion of workers in the South on second shifts was about three-tenths, and on third shifts, one-fourth. Shift premiums there usually amounted to 20 cents an hour. Other things being equal, cents-per-hour premiums tend to compress occupational pay relationships of workers on late shifts while percent differentials maintain those relationships.

Paid holidays. All production workers were in firms providing holidays, usually 9 or 10 annually (table 8). Workers in the Northeast typically received 10 holidays, while those in the South usually received 9. Provisions for office workers were generally the same as for production workers. In the Northeast, however, about three-tenths of the office workers received 11 paid holidays compared with about one-eighth of the production workers.

Paid vacations. Paid vacations, after qualifying periods of service, were provided to all production and office workers (table 9). Typical provisions for both groups were 1 week of pay after 6 months; 2 weeks after 1 year; 3 weeks after 10 years; and 4 weeks after 15 years. Provisions in the South were slightly more liberal than those in the Northeast for workers with shorter periods of service. In the South, for example, 79 percent of the production workers received 3 weeks of vacation after 5 years of service compared with 21 percent in the Northeast. This pattern was reversed, however, for workers with longer tenure.

Health, insurance, and retirement plans. All or virtually all production and office workers were provided with life, hospitalization, medical, major medical, sickness and accident, and surgical insurance coverage, usually financed solely by their employers (table 10). Accidental death and dismemberment insurance applied to about nine-tenths of the production workers and three-fourths of the office workers. Coverage was about 3 times greater in the Northeast, however, than in the South. Long-term disability insurance, however, was slightly more pervasive in the South–where such coverage extended to about 95 percent of the workers compared to 80 percent in the Northeast.

Retirement plans, other than social security, applied to about three-fourths of the production and office workers nationwide. As with long-term disability coverage, retirement plans were slightly more prevalent in the South than in the Northeast.

Other selected benefits. At least nine-tenths of the production and office workers also were covered by some form of paid funeral and jury-duty pay provisions (table 11). Technological severance pay plans applied to two-fifths of the workers in both groups. Such plans were more common in the Northeast, where they applied to half of all production workers, than in the South, where they covered only one-seventh. Provisions for cost-of-living adjustments followed a similar pattern–applying to just over half the production personnel in the Northeast and to less than 5 percent in the South.

Table 1. Average hourly earnings: By selected characteristics

(Number and average straight-time hourly earnings[1] of production workers in semiconductor manufacturing establishments by selected characteristics, United States and selected regions[2], September 1977.)

Item	United States[3]		Northeast		South	
	Number of workers	Average hourly earnings	Number of workers	Average hourly earnings	Number of workers	Average hourly earnings
All production workers. .	52,956	$4.52	20,220	$5.51	9,366	$3.91
Men.	11,861	5.85	6,693	6.77	1,815	4.82
Women.	37,549	4.17	13,527	4.89	7,551	3.69
Size of community:						
Metropolitan areas . .	50,496	4.53	19,372	5.53	9,118	3.88
Nonmetropolitan areas	2,460	4.26	—	—	—	—
Size of establishment:						
100-250 workers . . .	7,086	3.74	4,008	3.61	—	—
250 workers or more .	45,870	4.64	16,212	5.98	8,947	3.89
Labor-management contracts:						
Establishments with—						
Majority of workers covered.	11,412	6.42	11,010	6.47	—	—
None or minority of workers covered. . .	41,544	4.00	9,210	4.36	9,219	3.87

[1] Excludes premium pay for overtime and for work on weekends, holidays, and late shifts.

[2] Regional definitions were as follows: *Northeast*—Connecticut, Delaware, Maine, Maryland, Massachusetts, New Jersey, New Hampshire, New York, Pennsylvania, Rhode Island, and Vermont; *South*—Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia.

[3] Includes data for regions in addition to those shown separately.

NOTE: Dash indicates no data or data that do not meet publication criteria.

Table 2. Earnings distribution: All production workers

(Percent distribution of production workers in semiconductor manufacturing establishments by average straight-time hourly earnings[1], United States and selected regions, September 1977.)

Item	United States	Northeast	South
Number of workers	52,956	20,220	9,366
Average hourly earnings	$4.52	$5.51	$3.91
Total	100.0	100.0	100.0
Under $2.50	.2	.6	([3])
$2.50 and under $2.60	2.1	.2	1.4
$2.50 and under $2.70	5.9	1.0	1.0
$2.70 and under $2.80	1.4	1.5	2.7
$2.80 and under $2.90	2.5	2.0	4.8
$2.90 and under $3.00	2.5	2.0	4.3
$3.00 and under $3.10	3.1	2.4	4.2
$3.10 and under $3.20	3.3	2.8	5.7
$3.20 and under $3.30	2.6	2.4	3.7
$3.30 and under $3.40	3.4	2.3	7.6
$3.40 and under $3.50	5.3	2.3	8.2
$3.50 and under $3.60	2.5	2.0	3.6
$3.60 and under $3.70	2.8	2.5	3.6
$3.70 and under $3.80	2.6	1.6	6.3
$3.80 and under $3.90	7.3	1.5	6.0
$3.90 and under $4.00	2.2	1.4	5.1
$4.00 and under $4.10	4.1	.9	4.7
$4.10 and under $4.20	2.1	.7	5.1
$4.20 and under $4.30	1.9	.7	1.6
$4.30 and under $4.40	1.8	.8	2.8
$4.40 and under $4.50	2.6	1.3	.7
$4.50 and under $4.60	1.1	.6	.7
$4.60 and under $4.70	1.2	.3	1.0
$4.70 and under $4.80	1.6	1.5	1.2
$4.80 and under $4.90	1.8	1.6	1.0
$4.90 and under $5.00	1.1	1.3	1.0
$5.00 and under $5.10	1.0	1.3	.4
$5.10 and under $5.20	1.1	1.1	.4
$5.20 and under $5.30	1.4	1.9	.7
$5.30 and under $5.40	.4	.5	.4
$5.40 and under $5.50	.5	.6	.4
$5.50 and under $5.60	.7	1.4	.3
$5.60 and under $5.70	.2	.2	.4
$5.70 and under $5.80	.6	.7	.5
$5.80 and under $5.90	.6	1.3	.2
$5.90 and under $6.00	2.7	6.6	.6
$6.00 and under $6.20	3.4	7.6	1.8
$6.20 and under $6.40	1.6	3.3	.9
$6.40 and under $6.60	2.6	6.4	.5
$6.60 and under $6.80	1.5	3.4	.5
$6.80 and under $7.00	1.2	2.2	.7
$7.00 and under $7.20	5.1	11.3	.7
$7.20 and under $7.40	.4	.7	.4
$7.40 and under $7.60	1.0	1.6	.4
$7.60 and under $7.80	1.1	1.6	1.0
$7.80 and under $8.00	.6	1.1	.2
$8.00 and over	3.1	7.2	.7

[1] Excludes premium pay for overtime and for work on weekends, holidays, and late shifts.

[2] Includes data for regions in addition to those shown separately.

[3] Less than 0.05 percent.

NOTE: Because of rounding, sums of individual items may not equal 100.

Table 3. Occupational earnings

(Number and average straight-time hourly earnings[1] of workers in selected occupations in semiconductor manufacturing establishments, United States and selected regions, September 1977.)

Selected occupations	United States[2]				Northeast				South			
	Number of workers	Average hourly earnings[3]	Median earnings[3]	Middle range of[3] earnings	Number of workers	Average hourly earnings[3]	Median earnings[3]	Middle range of earnings[3]	Number of workers	Average hourly earnings[3]	Median earnings[3]	Middle range of earnings
ASSEMBLING												
Assemblers	29,182	$4.08	$3.86	$3.28-$4.53	10,409	$4.80	$4.88	$3.32-$6.10	6,054	$3.52	$3.43	$3.09-$3.87
Men	2,223	4.52	3.81	3.30- 6.11	1,003	5.91	6.13	5.17- 6.84	366	3.26	2.94	2.88- 3.56
Women	26,843	4.04	3.87	3.27- 4.45	9,406	4.68	4.79	3.25- 6.02	5,688	3.53	3.46	3.13- 3.90
Class A	3,975	4.53	4.23	3.85- 4.99	784	5.22	4.99	3.66- 7.08	1,485	4.08	3.96	3.80- 4.13
Men	315	6.02	6.20	4.35- 7.59	197	6.98	7.54	6.85- 7.81	—	—	—	—
Women	3,626	4.39	4.21	3.82- 4.88	587	4.63	4.17	3.60- 4.99	1,441	4.08	3.96	3.75- 4.13
Class B	10,502	4.16	3.91	3.39- 4.49	3,943	4.81	4.50	3.30- 6.42	2,059	3.65	3.67	3.40- 3.94
Men	731	4.78	4.25	3.60- 6.42	481	5.38	5.54	4.15- 6.80	—	—	—	—
Women	9,733	4.12	3.90	3.38- 4.40	3,462	4.73	4.40	3.25- 6.42	1,976	3.65	3.68	3.40- 3.94
Class C	14,705	3.90	3.50	3.09- 3.87	5,682	4.73	4.99	3.25- 5.98	2,510	3.07	3.04	2.86- 3.28
Men	1,177	3.97	3.41	2.94- 5.91	—	—	—	—	—	—	—	—
Women	13,484	3.90	3.56	3.10- 3.87	5,357	4.65	4.84	3.25- 5.98	2,271	3.08	3.09	2.86- 3.34
PROCESSING												
Crystal processors	1,345	4.18	4.00	3.49- 4.44	590	4.38	3.75	3.15- 5.24	—	—	—	—
Men	343	4.57	4.01	3.65- 5.18	145	5.36	5.18	3.75- 7.17	—	—	—	—
Women	984	4.05	3.95	3.32- 4.40	445	4.06	3.50	3.06- 5.18	—	—	—	—
Crystal coaters	202	3.38	3.32	3.04- 3.50	126	3.10	3.06	2.90- 3.31	—	—	—	—
Men	18	3.44	3.40	3.40- 3.50	—	—	—	—	—	—	—	—
Women	184	3.37	3.31	2.98- 3.74	124	3.10	3.06	2.90- 3.31	—	—	—	—
Crystal cutters	394	4.34	3.75	3.30- 4.50	287	4.58	3.85	3.18- 6.04	—	—	—	—
Men	125	4.70	4.00	3.50- 6.04	66	5.70	6.04	4.00- 7.17	—	—	—	—
Women	261	4.18	3.69	3.15- 4.40	221	4.25	3.60	3.15- 4.50	—	—	—	—
Crystal finishers	375	4.01	4.03	3.83- 4.40	42	3.48	3.53	3.25- 3.75	—	—	—	—
Men	45	3.75	3.71	3.56- 3.84	—	—	—	—	—	—	—	—
Women	330	4.05	4.03	3.90- 4.40	31	3.35	3.50	3.08- 3.53	—	—	—	—
Crystal growers	182	4.87	4.42	4.00- 5.30	59	5.85	5.93	4.00- 7.76	—	—	—	—
Men	118	4.89	4.42	4.06- 5.30	41	5.64	5.60	4.00- 7.60	—	—	—	—
Women	54	4.90	4.47	3.71- 4.96	—	—	—	—	—	—	—	—
MAINTENANCE												
Electricians, maintenance	254	7.71	7.50	6.58- 8.94	—	—	—	—	15	6.26	6.38	5.92- 6.61
Machinists, maintenance	177	7.03	6.50	6.00- 8.25	90	7.70	8.25	6.50- 8.94	23	5.88	6.03	5.34- 6.23
Maintenance workers, general utility	501	6.57	6.59	5.50- 7.89	237	7.11	7.93	5.90- 8.48	42	5.53	5.15	4.74- 7.17
Pipefitters, maintenance	106	7.94	8.48	7.38- 8.48	80	8.19	8.48	8.48- 8.48	—	—	—	—
INSPECTING AND TESTING												
Inspectors and testers	3,725	4.84	4.60	3.70- 6.11	1,902	5.58	6.10	4.62- 6.48	455	4.17	4.24	3.57- 4.73
Men	424	5.32	5.22	3.82- 6.48	291	5.84	5.98	4.86- 6.75	41	4.40	4.27	3.65- 4.92
Women	3,283	4.77	4.50	3.68- 6.10	1,611	5.53	6.10	4.50- 6.48	414	4.15	4.24	3.56- 4.73
Class A	470	5.11	4.80	4.17- 5.50	160	6.03	5.54	4.31- 7.51	35	5.05	5.26	4.18- 5.65
Men	123	6.36	6.20	4.98- 7.61	100	6.63	7.00	5.29- 7.91	—	—	—	—
Women	341	4.63	4.54	4.00- 4.98	60	5.03	4.76	3.64- 6.20	26	4.95	5.28	3.80- 5.58
Class B	1,609	4.58	4.35	3.70- 5.04	614	5.26	5.35	3.90- 6.48	365	4.24	4.31	3.66- 4.73
Men	190	4.72	4.07	3.68- 5.54	103	5.16	5.00	3.75- 6.51	23	4.31	4.27	3.51- 4.83
Women	1,413	4.55	4.35	3.70- 4.90	511	5.28	5.42	4.00- 6.48	342	4.24	4.31	3.71- 4.73
Class C	1,646	5.02	5.90	3.50- 6.41	1,128	5.69	6.26	5.90- 6.48	—	—	—	—
Men	111	5.21	5.98	3.70- 6.11	88	5.72	5.98	5.91- 6.41	—	—	—	—
Women	1,529	5.01	5.90	3.49- 6.41	1,040	5.69	6.26	5.87- 6.48	—	—	—	—

See footnotes at end of table.

Table 3. Continued — Occupational earnings

(Number and average straight-time hourly earnings[1] of workers in selected occupations in semiconductor manufacturing establishments, United States and selected regions, September 1977.)

Selected occupations	United States[2]				Northeast				South			
	Number of workers	Average hourly earnings[1]	Median earnings[3]	Middle range of earnings[3]	Number of workers	Average hourly earnings[1]	Median earnings[3]	Middle range of earnings[3]	Number of workers	Average hourly earnings[1]	Median earnings[3]	Middle range of earnings[3]
CUSTODIAL AND MATERIAL MOVEMENT												
Janitors, porters, and cleaners	499	4.34	4.23	3.76- 5.19	234	4.87	5.24	4.59- 5.24	55	3.13	3.15	2.69- 3.51
Men	431	4.34	4.23	3.79- 5.19	203	4.84	5.19	4.43- 5.24	—	—	—	—
Women	68	4.32	4.23	3.70- 5.24	—	—	—	—	46	3.02	2.78	2.60- 3.44
Laborers, material handling	283	4.14	4.09	3.81- 4.38	44	4.96	5.18	4.25- 5.45	—	—	—	—
Men	222	4.14	4.09	3.81- 4.32	44	4.96	5.18	4.25- 5.45	—	—	—	—
Women	53	4.12	4.18	3.94- 4.47	—	—	—	—	—	—	—	—
OFFICE AND TECHNICAL												
Computer operators	224	$5.97	$5.75	4.85-$7.03	128	6.68	$6.84	$5.81-$7.71	32	$4.86	$4.71	$4.51-$5.13
Men	113	6.13	6.15	4.90- 7.21	85	6.52	6.45	5.55- 7.69	—	—	—	—
Women	111	5.80	5.63	4.72- 7.03	—	—	—	—	—	—	—	—
Class A	94	5.98	6.05	5.19- 6.49	—	—	—	—	—	—	—	—
Class B	91	6.47	7.03	5.28- 7.71	74	6.88	7.47	5.63- 7.73	—	—	—	—
Men	47	6.24	5.07	4.93- 7.69	37	6.68	7.41	5.45- 7.71	—	—	—	—
Class C	17	4.93	4.95	4.85- 4.85	—	—	—	—	25	4.81	4.71	4.51- 5.06
Engineering technicians	3,590	6.80	6.64	5.50- 7.94	1,509	7.80	7.98	6.50- 9.18	737	5.93	5.92	5.00- 6.71
Men	3,103	7.01	6.90	5.71- 8.14	1,409	7.88	8.13	6.57- 9.23	686	6.00	6.00	5.02- 6.72
Women	441	5.56	5.45	4.73- 6.49	100	6.66	6.71	5.88- 7.48	51	4.98	4.81	3.86- 5.85
Class I	144	4.62	4.59	4.17- 5.27	8	3.94	—	—	16	3.78	3.67	3.56- 3.77
Men	90	4.58	4.59	4.15- 5.31	—	—	—	—	—	—	—	—
Women	46	4.89	4.73	4.31- 5.45	—	—	—	—	—	—	—	—
Class II	424	4.92	4.99	4.27- 5.55	141	5.06	5.00	4.50- 5.50	67	4.45	4.51	4.13- 4.83
Men	256	5.14	5.00	4.51- 5.88	127	5.09	5.00	4.50- 5.65	48	4.61	4.70	4.33- 4.92
Women	160	4.66	4.85	3.90- 5.27	14	4.79	—	—	19	4.03	4.06	3.50- 4.52
Class III	802	4.73	5.61	4.91- 6.55	283	6.16	6.38	5.56- 6.79	185	4.91	4.91	4.72- 5.15
Men	674	5.73	5.62	4.92- 6.54	242	6.12	6.33	5.55- 6.75	178	4.91	4.91	4.72- 5.15
Women	116	5.76	5.61	4.93- 6.64	—	—	—	—	—	—	—	—
Class IV	962	6.73	6.65	5.95- 7.58	—	—	—	—	232	6.06	6.01	5.63- 6.35
Men	883	6.77	6.73	6.00- 7.61	—	—	—	—	220	6.07	6.03	5.66- 6.35
Women	69	6.44	6.40	5.88- 7.08	—	—	—	—	—	—	—	—
Class V	1,258	8.41	8.47	7.38- 9.40	725	9.22	9.20	8.71- 9.83	237	7.15	7.64	6.41- 7.70

[1] Excludes premium pay for overtime and for work on weekends, holidays, and late shifts.

[2] Includes data for regions in addition to those shown separately.

[3] For specific definition, see appendix A.

NOTE: Dash indicates no data reported or data that do not meet publication criteria.

Table 4. Method of wage payment

(Percent of production and office workers in semiconductor manufacturing establishments by method of wage payment,[1] United States and selected regions, September 1977)

Method of wage payment	United States[2]	Northeast	South
	Production workers		
All workers	100	100	100
Time-rated workers	88	68	100
Formal plans	86	64	99
Single rate	3	7	-
Range of rates	84	57	99
Individual rates	2	4	1
Incentive workers	12	32	-
Group piecework	12	32	-
	Office workers		
All workers	100	100	100
Time-rated workers	100	100	100
Formal plans	86	78	98
Single rate	1	3	-
Range of rates	85	75	98
Merit review	37	31	93
Length of service	14	34	-
Combination	33	10	6
Individual rates	14	22	2

[1] For definition of method of wage payment, see appendix A.
[2] Includes data for regions in addition to those shown separately.

NOTE: Because of rounding, sums of individual items may not equal totals.

Table 5. Scheduled weekly hours

(Percent of production and office workers in semiconductor manufacturing establishments by scheduled weekly hours,[1] United States and selected regions, September 1977)

Weekly hours	United States[2]	Northeast	South	United States[2]	Northeast	South
	Production workers			Office workers		
All workers	100	100	100	100	100	100
35 hours	-	-	-	1	2	-
37.5 hours	1	2	-	1	4	-
38.75 hours	-	-	-	9	32	-
40 hours	99	98	100	90	62	100

[1] Data relate to the predominant schedule for full-time day-shift workers in each establishment.
[2] Includes data for regions in addition to those shown separately.

NOTE: Because of rounding, sums of individual items may not equal 100.

Table 6. Shift differential provisions

(Percent of production workers in semiconductor manufacturing establishments by shift differential provisions,[1] United States and selected regions, September 1977)

Shift differential	United States[2]	Northeast	South
Second shift			
Workers in establishments with second-shift provisions	97.3	96.1	98.2
With shift differential	93.2	87.7	98.2
Uniform cents per hour	39.9	7.0	82.1
7 cents	11.4	-	-
10 cents	6.3	3.9	12.2
12.5 cents	1.5	-	-
15 cents	6.8	1.7	-
20 cents	13.7	1.5	68.4
25 cents	.3	-	1.6
Uniform percentage	51.9	79.5	16.1
5 percent	2.0	-	-
6 percent	2.8	-	16.1
7 percent	.4	-	-
8 percent	9.1	2.2	-
10 percent	36.6	74.9	-
15 percent	.9	2.4	-
Other formal paid differential	1.4	1.2	-
Third shift			
Workers in establishments with third-shift provisions	87.9	79.8	86.0
With shift differential	87.9	79.8	86.0
Uniform cents per hour	22.7	3.9	69.9
10 cents	.5	-	-
15 cents	3.7	3.9	-
20 cents	18.2	-	68.4
25 cents	.3	-	1.6
Uniform percentage	49.7	74.8	16.1
5 percent	2.0	-	-
6 percent	2.8	-	16.1
7 percent	.4	-	-
10 percent	31.0	57.0	-
12 percent	2.1	-	-
12.5 percent	4.0	10.4	-
15 percent	6.1	3.7	-
20 percent	1.4	3.7	-
Other formal paid differential	15.5	1.2	-

[1] Refers to policies of establishments currently operating late shifts or having provisions covering late shifts.

[2] Includes data for regions in addition to those shown separately.

NOTE: Because of rounding, sums of individual items may not equal totals.

Table 7. Shift differential practices

(Percent of production workers in semiconductor manufacturing establishments employed on late shifts by amount of shift differential, United States and selected regions, September 1977)

Shift differential	United States[1]	Northeast	South
Second shift			
Workers employed on second shift	27.0	21.8	29.8
Receiving differential	26.4	20.8	29.8
Uniform cents per hour	11.0	1.3	24.4
7 cents	3.9	–	–
10 cents	.9	.3	1.9
12.5 cents	.5	–	–
15 cents	1.3	.7	–
20 cents	4.3	.3	22.5
25 cents	–	–	–
Uniform percentage	15.0	19.3	5.3
5 percent	.6	–	–
6 percent	.9	–	5.3
7 percent	(2)	–	–
8 percent	3.6	.7	–
10 percent	9.6	17.8	–
15 percent	.3	.7	–
Other formal paid differential	.4	.2	–
Third shift			
Workers employed on third shift	14.2	9.3	25.3
Receiving differential	14.2	9.3	25.3
Uniform cents per hour	4.1	.1	22.1
10 cents	–	–	–
15 cents	.1	.1	–
20 cents	4.0	–	22.1
25 cents	–	–	–
Uniform percentage	7.5	9.2	3.2
5 percent	.2	–	–
6 percent	.6	–	3.2
7 percent	(2)	–	–
10 percent	5.3	8.5	–
12 percent	.2	–	–
12.5 percent	.2	.6	–
15 percent	1.0	.1	–
Other formal paid differential	2.6	.1	–

[1] Includes data for regions in addition to those shown separately.
[2] Less than 0.05 percent.

NOTE: Because of rounding, sums of individual items may not equal totals.

Table 8. Paid holidays

(Percent of production and office workers in semiconductor manufacturing establishments with formal provisions for paid holidays, United States and selected regions, September 1977)

Number of paid holidays	United States[1]	Northeast	South	United States[1]	Northeast	South
	Production workers			Office workers		
All workers	100	100	100	100	100	100
Workers in establishments providing paid holidays	100	100	100	100	100	100
7 days	1	([2])	–	1	([2])	–
8 days	3	–	14	4	–	6
8 days plus 1 or 2 half days	3	8	–	([2])	2	–
9 days	30	8	68	46	8	80
9 days plus 1 or 2 half days	2	5	–	4	14	–
10 days	47	61	16	30	46	13
10 days plus 1 or 2 half days	2	4	–	1	2	–
11 days	5	12	–	8	28	–
12 days	1	2	2	1	–	2
13 days	7	–	–	5	–	–

[1] Includes data for regions in addition to those shown separately.

[2] Less than 0.5 percent.

NOTE: Because of rounding, sums of individual items may not equal totals.

Table 9. Paid vacations

(Percent of production and office workers in semiconductor manufacturing establishments with formal provisions for paid vacations after selected periods of service, United States and selected regions, September 1977)

Vacation policy	United States[1]	North-east	South	United States[1]	North-east	South
	Production workers			Office workers		
All workers	100	100	100	100	100	100
Method of payment						
Workers in establishments providing paid vacations	100	100	100	100	100	100
Length-of-time payment	98	100	100	99	100	100
Percentage payment	2	–	–	1	–	–
Amount of vacation pay[2]						
After 6 months of service:						
Under 1 week	7	6	28	5	2	17
1 week	57	71	1	38	67	[3]
Over 1 and under 2 weeks	[3]	1	–	[3]	1	–
After 1 year of service:						
1 week	21	16	79	25	8	82
Over 1 and under 2 weeks	2	2	1	1	–	–
2 weeks	77	82	21	74	92	18
After 2 years of service:						
1 week	1	[3]	–	[3]	–	–
2 weeks	79	97	84	75	100	87
Over 2 and under 3 weeks	20	2	16	25	–	13
After 3 years of service:						
1 week	[3]	[3]	–	–	–	–
2 weeks	77	97	72	74	100	83
Over 2 and under 3 weeks	20	2	16	25	–	13
3 weeks	2	–	12	1	–	4
After 5 years of service:						
1 week	[3]	[3]	–	–	–	–
2 weeks	40	65	4	25	41	5
Over 2 and under 3 weeks	25	14	16	29	17	13
3 weeks	35	21	79	46	42	82
After 10 years of service:						
1 week	[3]	[3]	–	–	–	–
2 weeks	5	8	–	1	2	–

Vacation policy	United States[1]	North-east	South	United States[1]	North-east	South
	Production workers			Office workers		
Amount of vacation pay[2]						
After 10 years of service:—Continued						
3 weeks	72	73	100	77	62	100
Over 3 and under 4 weeks	13	2	–	8	2	–
4 weeks	10	17	–	14	34	–
After 12 years of service:						
1 week	[3]	[3]	–	–	–	–
2 weeks	3	8	–	[3]	2	–
3 weeks	72	69	100	74	60	100
Over 3 and under 4 weeks	3	5	–	4	4	–
Over 4 and under 5 weeks	21	17	–	21	34	–
After 15 years of service:	1	–	–	[3]	–	–
1 week	[3]	[3]	–	–	–	–
2 weeks	3	8	–	[3]	2	–
3 weeks	25	10	34	21	19	22
Over 3 and under 4 weeks	10	6	–	9	4	–
4 weeks	62	75	66	69	75	78
Over 4 and under 5 weeks	1	–	–	[3]	–	–
After 20 years of service:						
1 week	[3]	[3]	–	–	–	–
2 weeks	3	8	–	[3]	2	–
3 weeks	18	3	16	13	3	7
Over 3 and under 4 weeks	1	2	–	–	–	–
4 weeks	62	76	84	72	71	93
5 weeks	16	10	–	14	24	–
After 25 years of service:[4]						
1 week	[3]	[3]	–	–	–	–
2 weeks	3	8	–	[3]	2	–
3 weeks	16	3	16	12	3	7
Over 3 and under 4 weeks	1	2	–	–	–	–
4 weeks	40	19	84	62	31	93
Over 4 and under 5 weeks	2	4	–	1	2	–
5 weeks	38	64	–	25	62	–

[1] Includes data for regions in addition to those shown separately.

[2] Vacation payments, such as percent of annual earnings, were converted to an equivalent time basis. Periods of service were chosen arbitrarily and do not necessarily reflect individual establishment provisions for progression. For example, changes indicated at 10 years may include changes that occurred between 5 and 10 years.

[3] Less than 0.5 percent.

[4] Vacation provisions were virtually the same after longer periods of service.

NOTE: Because of rounding, sums of individual items may not equal totals.

Table 10. Health, insurance, and retirement plans

(Percent of production and office workers in semiconductor manufacturing establishments with specified health, insurance, and retirement plans,[1] United States and selected regions, September 1977)

Type of plan	United States[2]	Northeast	South	United States[2]	Northeast	South
	Production workers			Office workers		
All workers	100	100	100	100	100	100
Workers in establishments providing:						
Life insurance	100	100	100	100	100	100
Noncontributory plans	85	87	86	91	93	95
Accidental death and dismemberment insurance	87	97	34	77	96	22
Noncontributory plans	70	84	19	67	88	17
Sickness and accident insurance or sick leave or both[3]	97	94	99	99	98	100
Sickness and accident insurance	65	72	99	72	62	100
Noncontributory plans	58	62	85	69	59	94
Sick leave (full pay, no waiting period)	84	77	85	92	85	97
Sick leave (partial pay or waiting period)	2	1	3	1	–	3
Long-term disability insurance	75	75	95	82	86	95
Noncontributory plans	55	66	16	56	77	13
Hospitalization insurance	100	100	100	100	100	100
Noncontributory plans	73	76	70	80	75	82
Surgical insurance	100	100	100	100	100	100
Noncontributory plans	73	76	70	80	75	82
Medical insurance	100	100	100	100	100	100
Noncontributory plans	73	76	70	80	75	82
Major medical insurance	99	98	100	100	100	100
Noncontributory plans	72	74	70	80	73	82
Retirement plans[4]	77	78	84	74	82	93
Pensions	76	75	84	73	79	93
Noncontributory plans	58	73	68	60	79	80
Severance pay	19	49	–	10	35	–

[1] Includes those plans for which the employer pays at least part of the cost and excludes legally required plans such as workers' compensation and social security; however, plans required by State temporary disability laws are included if the employer contributes more than is legally required or the employees receive benefits in excess of legal requirements. "Noncontributory plans" include only those plans financed entirely by the employer.

[2] Includes data for regions in addition to those shown separately.

[3] Unduplicated total of workers receiving sickness and accident insurance and sick leave shown separately.

[4] Unduplicated total of workers covered by pension plans and severance pay shown separately.

NOTE: Because of rounding, sums of individual items may not equal totals.

Table 11. Other selected benefits

(Percent of production and office workers in semiconductor manufacturing establishments with formal provisions for funeral leave pay, jury duty pay, technological severance pay, and cost-of-living adjustments,[1] United States and selected regions, September 1977)

Item	United States[2]	Northeast	South	United States[2]	Northeast	South
	Production workers			Office workers		
Workers in establishments with provisions for:						
Funeral leave	90	85	100	91	74	100
Jury duty leave	96	96	100	99	98	100
Technological severance pay	39	51	16	37	36	13
Cost-of-living adjustments	23	53	2	3	6	2
Based on BLS consumer price index	23	53	2	3	6	2

[1] For definition of items, see appendix A.

[2] Includes data for regions in addition to those shown separately.

NOTE: Because of rounding, sums of individual items may not equal totals.

Appendix A. Scope and Method of Survey

Scope of survey

The survey included establishments engaged primarily in manufacturing semiconductors and related devices (SIC 3674) as defined in the 1972 edition of the *Standard Industrial Classification Manual* prepared by the U.S. Office of Management and Budget. Separate auxiliary units such as central offices were excluded.

Establishments studied were selected from those employing 50 workers or more at the time of reference of the data used in compiling the universe lists. Table A-1 shows the number of establishments and workers estimated to be within the scope of the survey, as well as the number actually studied by the Bureau.

Method of study

Data were obtained by personal visits of the Bureau's field representatives from a probability sample of firms within the scope of the survey. To obtain appropriate accuracy at minimum cost, a greater proportion of large than of small establishments was studied. All estimates are presented, therefore, as relating to all establishments in the industry, excluding only those below the minimum size at the time of reference of the universe data.

Establishment definition

An establishment is defined for this study as a single physical location where manufacturing operations are performed. An establishment is not necessarily identical with a company, which may consist of one establishment or more.

Employment

Estimates of the number of workers within the scope of the study are intended as a general guide to the size and composition of the industry's labor force, rather than as precise measurements of employment.

Production workers

Production workers include working supervisors and all nonsupervisory workers engaged in nonoffice activities. Administrative, executive, professional, and technical personnel, and force-account construction employees, who are used as a separate work force on the firm's own properties, are excluded.

Office workers

Office workers include nonsupervisory employees such as general office clerks, secretaries, computer personnel, and all other workers engaged in office functions. Administrative and executive employees and those engaged in nonoffice functions were excluded.

Occupational classification

Occupational classification was based on a uniform set of job descriptions designed to take account of interestablishment and interarea variations in duties within the same job. (See appendix B for these descriptions.) The criteria for selection of the occupations were: The number of workers in the occupation; the usefulness of the data in collective bargaining; and the appropriate representation of the entire job scale in the industry.

Table A-1. Number of establishments and workers within scope of survey and number studied, semiconductor manufacturing, September 1977

Region[1]	Number of establishments[2]		Workers in establishments			
	Within scope of study	Actually studied	Within scope of study			Actually studied
			Total[3]	Production workers	Office workers	
United States[4]	153	55	90,698	52,956	12,812	57,036
Northeast	61	22	33,870	20,220	3,503	23,283
South	21	11	15,924	9,366	3,610	12,949

[1] See table 1, footnote 1, for definitions of the selected regions.

[2] Includes only those establishments with 50 workers or more at the time of reference of the universe data.

[3] Includes executive, professional, and other workers in addition to the production and office worker categories shown separately.

[4] Includes data for regions in addition to those shown separately. Alaska and Hawaii were not included in the study.

NOTE: Because of rounding, sums of individual items may not equal totals.

Working supervisors, apprentices, learners, beginners, trainees, and handicapped, part-time, temporary, and probationary workers were not reported in the data for selected occupations but were included in the data for all production workers.

Wage data

Information on wages relates to straight-time hourly earnings, excluding premium pay for overtime and for work on weekends, holidays, and late shifts. Incentive payments, such as those resulting from piecework or production bonus systems, and cost-of-living bonuses were included as part of the worker's regular pay. Nonproduction bonus payments, such as Christmas or year-end bonuses, were excluded.

Average (mean) hourly rates or earnings for each occupation or category of workers, such as production workers, were calculated by weighting each rate (or hourly earnings) by the number of workers receiving the rate, totaling, and dividing by the number of individuals. The hourly earnings of salaried workers were obtained by dividing straight-time salary by normal (or standard) hours to which the salary corresponds.

The median designates position; that is one-half of the employees surveyed received more than this rate and one-half received less. The middle range is defined by two rates of pay such that one-fourth of the employees earned less than the lower of these rates and one-fourth earned more than the higher rate.

Size of community

Tabulations by size of community pertain to metropolitan and nonmetropolitan areas. The term "metropolitan areas," as used in this bulletin, refers to the Standard Metropolitan Statistical Areas as defined by the U.S. Office of Management and Budget through February 1974. Except in New England, a Standard Metropolitan Statistical Area is defined as a county or a group of contiguous counties which contains at least one city of 50,000 inhabitants or more. Counties contiguous to the one containing such a city are included in a Standard Metropolitan Statistical Area if, according to certain criteria, they are essentially metropolitan in character and are socially and economically integrated with the central city. In New England, where the city and town are administratively more important than the county, they are the units used in defining Standard Metropolitan Statistical Areas.

Method of wage payment

Tabulations by method of wage payment relate to the number of workers paid under the various time and incentive wage systems. Formal rate structures for time-rated workers provide single rates or a range of rates for individual job categories. In the absence of a formal rate structure, pay rates are determined primarily by the qualifications of the individual worker. A single rate structure is one in which the same rate is paid to all experienced workers in the same job classification. (Learners, apprentices, or probationary workers may be paid according to rate structures which start below the single rate and permit workers to achieve the full job rate over a period of time). An experienced worker occasionally may be paid below the standard rate for special reasons, but such payments are exceptions. Range-of-rate plans are those in which the maximum, minimum, or both of these rates paid experienced workers for the same job are specified. Specific rates of individual workers within the range may be determined by merit, length of service, or a combination of these. Incentive workers are classified under piecework or bonus plans. Piecework is work for which a predetermined rate is paid for each unit of output. Production bonuses are for production in excess of a quota or for completion of a task in less than standard time.

Scheduled weekly hours

Data on weekly hours refer to the predominant work schedule for full-time (production) (office) workers employed on the day shift.

Shift provisions and practices

Shift provisions relate to the policies of establishments either currently operating late shifts or having provisions covering late-shift work. Practices relate to workers employed on late shifts at the time of the survey.

Establishment practices and supplementary wage provisions

Supplementary benefits in an establishment were considered applicable to all (production) (office) workers if they applied to half or more of such workers in the firm. Similarly, if fewer than half of the workers were covered, the benefit was considered nonexistent in the establishment. Because of length of service and other eligibility requirements, the proportion of workers receiving the benefits may be smaller than estimated.

Paid holidays. Paid holiday provisions relate to full-day and half-day holidays provided annually.

Paid vacations. The summaries of vacation plans are limited to formal arrangements and exclude informal plans whereby time off with pay is granted at the discretion of the employer or supervisor. Payments not on a time basis were converted; for example, a payment of 2 percent of annual earnings was considered the equivalent of 1 week's pay. The periods of service for which data are presented represent the most common practices, but they do not necessarily reflect inidividual establishment provisions for progression. For example, changes in proportions indicated at 10 years of service may include changes which occurred between 5 and 10 years.

Health, insurance, and retirement plans. Data are presented for health, insurance, pension, and retirement severance plans for which the employer pays all or a part of the cost, excluding programs required by law such as workers' compensation and social security. Among plans included are those underwritten by a commercial insurance company and those paid directly by the employer from current operating funds or from a fund set aside for this purpose.

Death benefits are included as a form of life insurance. Sickness and accident insurance is limited to that type of insurance under which predetermined cash payments are made directly to the insured on a weekly or monthly basis during illness or accident disability. Information is presented for all such plans to which the employer contributes at least part of the cost. However, in New York and New Jersey, where temporary disability insurance laws require employer contributions, plans are included only if the employer (1) contributes more than is legally required, or (2) provides the employees with benefits which exceed the requirements of the law.

Tabulations of paid sick leave plans are limited to formal plans which provide full pay or a proportion of the worker's pay during absence from work because of illness; informal arrangements have been omitted. Separate tabulations are provided for (1) plans which provide full pay and no waiting period, and (2) plans providing for either partial pay or a waiting period.

Long-term disability insurance plans provide payments to totally disabled employees upon the expiration of sick leave, sickness and accident insurance, or both, or after a specified period of disability (typically 6 months). Payments are made until the end of disability, a maximum age, or eligibility for retirement benefits. Payments may be full or partial, but are almost always reduced by social security, workers' compensation, and private pension benefits payable to the disabled employee.

Medical insurance refers to plans providing for complete or partial payment of doctors' fees. Such plans may be underwritten by a commercial insurance company or a nonprofit organization, or they may be a form of self-insurance.

Major medical insurance, sometimes referred to as extended medical or catastrophe insurance, includes plans designed to cover employees for sickness or injury involving an expense which exceeds the normal coverage of hospitalization, medical, and surgical plans.

Tabulations of retirement pensions are limited to plans which provide regular payments for the remainder of the retiree's life. Data are presented separately for retirement severance pay (one payment or several over a specified period of time) made to employees on retirement. Establishments providing both retirement severance payments and retirement pensions to employees were considered as having both retirement pensions and retirement severance plans; however, establishments having optional plans providing employees a choice of either retirement severance payments or pensions were considered as having only retirement pension benefits.

Paid funeral and jury-duty leave. Data for paid funeral and jury-duty leave relate to formal plans which provide at least partial payment for time lost as a result of attending funerals of specified family members or serving as a juror.

Technological severance pay. Data relate to formal plans providing for payments to employees permanently separated from the company because of a technological change or plant closing.

Cost-of-living adjustments. Data relate to formal plans providing for adjustments to employee pay based on changes in the Consumer Price Index or other measurement of living costs.

Appendix B. Occupational Descriptions

The primary purpose of preparing job descriptions for the Bureau's wage surveys is to assist its field representatives in classifying into appropriate occupations workers who are employed under a variety of payroll titles and different work arrangements from establishment and from area to area. This permits the grouping of occupational wage rates representing comparable job content. Because of this emphasis on interestablishment and interarea comparability of occupational content, the Bureau's job descriptions may differ significantly from those in use in individual establishments or those prepared for other purposes. In applying these job descriptions, the Bureau's field representatives are instructed to exclude working supervisory, apprentices, learners, beginners, trainees, and handicapped, part-time, temporary, and probationary workers.

Production workers

Assembler

(Production operator; electronic assembler; bonding operator; wire fuse/tab operator; encapsulators; etchers; firers; performing machine operators)

Assembles and/or fits together parts to form complete units or subassemblies in the manufacture of semiconductor devices and related component materials. Work may include processing and simple in-line testing operations requiring the use of instruments and hand-tools, such as microscopes; oscilloscopes, flow meters, calipers, soldering equipment, tweezers, bonding machines, and bake ovens.

Class A

Performs intricate assembling operations of parts into units or subassemblies, requiring judgment to make decisions concerning sequence of diversified operations, processes, quality, etc., within prescribed procedures. Work involves most of the following: Assembling from drawings, blueprints, or other written specifications, using high degree of independent judgment; loading, operating, and cleaning of assembling machines and use of instruments, gauges, etc., requiring interpretation; inspecting own work and others, occasionally, for visual defects compared to product specifications; maintaining accurate production records; and training other operators, as required.

Class B

Assembles parts into units or subassemblies in accordance with well-defined sequences and prescribed procedures. Some independent judgment regarding machine and material adjustment is required. Work involves most of the following: Using simple machines and/or hand tools to assemble parts into semiconductor components; inspecting own work for visual defects compared to product specifications; assisting in the packaging and symbolizing of units; maintaining accurate production records; and assisting in the training of new operators.

Class C

Performs short-cycle simple assembling operations, under direct supervision of others. Work does not ordinarily involve making decisions regarding assembling procedures but some judgment is required in following well-defined routines.

Crystal processor

Grows or processes crystals into wafers, chips, and other forms used in making semiconductors and related solid-state devices.

Crystal coater

Tends a machine that coats silicon wafers or chips with ceramic materials. Work involves most of the following: Placing workpiece on rack, starting rack re-

volving and initiating coating cycle; monitoring progress of coating; and monitoring supply of ceramic material and gas to machine.

Crystal cutter

Cuts crystalline materials, such as germanium, quartz, and silicon into wafers, blanks, or dice for use in oscillators and semiconductor devices. Work involves most of the following: Preparing crystals for cutting by mounting them on jig plate; aligning cutting blades; adjusting cutting blades; adjusting automatic feed devices; starting machine and monitoring operation; removing jig plate and stripping off cut crystals by using hot water or a solvent; drying crystals; and verifying dimensions of crystals using micrometer. May also operate ultrasonic vibration machine.

Crystal finisher

Stabilizes oscillating frequencies of quartz crystals within specified tolerances using electroplating or etching equipment. Work involves most of the following: Preparing crystals of washing and drying them; measuring crystals and calculating size of crystal required; plating or etching crystals to achieve desired thickness; monitoring plating or etching process; and testing finished crystals to assure they meet specifications.

Crystal grower

Forms crystals from materials, such as germanium and silicon, using either a gas reduction, electric refining, or electric draw crystalization furnace. Work involves most of the following: Preparing raw materials for insertion into the furnaces; adjusting and controlling furnace temperature; observing crystal growth and removing crystals at the appropriate time; recording weight, growing time, and other pertinent information. May also perform standard cleanup and low-level maintenance on furnaces.

Electrician, maintenance

Performs a variety of electrical trade functions in the installation, maintenance, or repair of equipment for the generating, distributing, and/or utilization of electric energy in an establishment. Work involves most of the following: Installing or repairing any of a variety of electrical equipment such as generators, transformers, switchboards, controllers, circuit breakers, motors, heating units, conduit systems, or other transmission equipment; working from blueprints, drawings, layouts, or other specifications; locating and diagnosing trouble in the electrical system or equipment; working standard computations relating to work requirements of wiring or electrical equipment; and using a variety of electrician's handtools and measuring and testing instruments. In general, the work of the maintenance electrician requires rounded training and experience usually acquired through a formal apprenticeship or equivalent training and experience.

Janitor

(Cleaner, porter, sweeper, charworker)

Cleans and keeps in an orderly condition factory working areas and washrooms or premises of an establishment. Duties involve a combination of the following: Sweeping, mopping, or scrubbing, and polishing floors; removing chips, trash, and other refuse; dusting equipment, furniture, or fixtures; polishing metal fixtures or trimmings; providing supplies and minor maintenance services; cleaning lavatories, showers, and restrooms. Workers who specialize in window washing are excluded.

Inspector (Tester)

(Incoming material inspector; process controller; chip inspector; test operator; pre-cap inspector, mask inspector; crystal evaluator)

Inspects, tests, and/or evaluates various components and products manufactured within the establishment or purchased parts from other firms for conformance to performance and engineering specifications. Performs such operations as examining parts or products for flaws and defects and suggesting or making needed repairs.

Class A

Responsible for decisions regarding the quality of the product and/or operations. Work involves any combination of the following: Thorough knowledge of the processing operations in the branch of work to which assigned, including the use of a variety of precision measuring instruments; interpreting drawings and specifications in inspection work on units composed of a large number of component parts; examining a variety of products or processes and suggesting necessary changes to correct work methods; devising inspection procedures for new products.

Class B

Work involves any combination of the following: Knowledge of processing operations in the branch of work to which assigned, limited to familiar products and processes or where performance is dependent on past experience; performing inspection operations on products and/or processes having rigid specifications, but where the inspection procedures involve a sequence of inspection operations, including decisions regarding

proper fit or performance of some parts; using precision measuring instruments.

Class C

Work involves any combination of the following: Short-cycle repetitive inspection operations; using standard special-purpose measuring instruments repetitively, visual examination of parts rejecting units having obvious deformities or flaws.

Laborer, material handling

(Loader and unloader; handler and stacker; shelver; trucker; stocker or stock helper)

A worker employed in an establishment whose duties involve one or more of the following: Loading and unloading various materials and merchandise on or from freight cars, trucks, or other transporting devices; unpacking, shelving, or placing materials or merchandise by hand truck, car, or wheelbarrow to proper location.

Machinist, maintenance

Produces replacement parts and new parts in making repairs of metal parts of mechanical equipment operated in an establishment. Work involves most of the following: Interpreting written instructions and specifications; planning and laying out of work; using a variety of machinist's handtools and precision measuring instruments; setting up and operating standard machine tools; shaping of metal parts to close tolerances; making standard shop computations relating to dimensions of work, tooling, feeds and speeds of machining; knowledge of the working properties of the common metals; selecting standard materials, parts, and equipment required for work; and fitting and assembling parts into mechanical equipment. In general, the machinist's work normally requires a rounded training in machine-shop practice usually acquired through a formal apprenticeship or equivalent training and experience.

Maintenance workers, general utility

Keeps the machines, mechanical equipment and/or structure of an establishment (usually a small plant where specialization in maintenance work is impracti cal) in repair. Duties involve the performance of operations and the use of tools and equipment of several trades, rather than specialization in one trade or one type of maintenance work only. Work involves a combination of the following: Planning and laying out of work relating to repair of buildings, machines, mechanical and/or electrical equipment; installing, aligning, and balancing new equipment; repairing buildings, floors, stairs, as well as making and repairing bins, cribs, and partitions.

Pipefitter, maintenance

Installs or repairs water, steam, gas, or other types of pipe and pipefittings in an establishment. Work involves most of the following: Laying out of work and measuring to locate position of pipe from drawings or other written specifications; cutting various sizes of pipe to correct lengths with chisel and hammer or oxyacetylene torch or pipe-cutting machine; threading pipe with stocks and dies; bending pipe by hand-driven or power-driven machines; assembling pipe with couplings and fastening pipe to hangers; making standard shop computations relating to pressures, flow, and size of pipe required; and making standard tests to determine whether finished pipes meet specifications. In general the work of the maintenance pipefitter requires rounded training and experience usually acquired through a formal apprenticeship or equivalent training and experience. Workers primarily engaged in installing and repairing building sanitation or heating and cooling systems are excluded.

Nonplant workers

Computer operator

Monitors and operates the control or remote control console of a digital computer to process data according to operating instructions, usually prepared by a programmer. Work involves most of the following: Studies instructions to determine equipment setup and operations; loads equipment with required items (tape reels, cards, etc.); switches necessary auxiliary equipment into circuit, and starts and operates computer; makes adjustments to computer to correct operating problems and meet special conditions; reviews errors made during operation and determines cause or refers problem to supervisor or programmer; and maintains operating records. May test and assist in correcting programs.

Class A

Operates independently, or under only general direction, a computer running programs with most of the following characteristics: New programs are frequently tested and introduced; scheduling requirements are of critical importance to minimize downtime; the programs are of complex design so that identification of error source often requires a working knowledge of the total program, and alternate programs may not be available. May give direction and guidance to lower level operators.

Class B

Operates independently, or under only general direc-

tion, a computer running programs with most of the following characteristics: Most of the programs are established production runs, typically run on a regularly recurring basis; there is little or no testing of new programs required; alternate programs are provided in case original program needs major change or cannot be corrected within a reasonably short time. In common error situations, diagnoses cause and takes corrective steps, using standard correction techniques.

Class C

Works on routine programs under close supervision. Is expected to develop working knowledge of the computer equipment used and ability to detect problems involved in running routine programs. Usually has received some formal training in computer operation. May assist higher level operator on complex problems.

Engineering technician

Provides semiprofessional technical support for engineers working in such areas as research, design, development, testing, or manufacturing process improvement of semiconductors and related devices.

(Production or maintenance workers, quality control testers, craftsmen, drafters, designers, and engineers are excluded.)

Engineering technician I

Performs simple routine tasks under close supervision or from detailed procedures. Work is checked in progress or on completion. Performs at this one level or combination of such typical duties as: Assembles or installs equipment or parts requiring simple wiring, soldering, or connecting; performs simple or routine tasks or tests; operates and adjusts simple test equipment; records test data; gathers and maintains specified records or engineering data such as tests, drawings, etc.; performs computations by substituting numbers in specified formulas; plots data and draws simple curves and graphs.

Engineering technician II

Performs standardized or prescribed assignments, involving a sequence of related operations. Follows standard work methods or explicit instructions; technical adequacy of routine work is reviewed on completion; nonroutine work may also be reviewed in progress. Performs at this level one or a combination of such typical duties as: Assembles or constructs simple or standard equipment or parts; may also service or repair simple instruments or equipment; conducts a variety of standardized tests; sets up and operates standard test equipment; records test data; extracts engineering data from various prescribed sources; processes the data following well-defined methods; presents the data in prescribed form.

Engineering technician III

Performs assignments that are not completely standardized or prescribed. Selects or adapts standard procedures or equipment. Receives initial instructions, equipment requirements, and advice from supervisor or engineer; technical adequacy of completed work is checked. Performs at this level one or a combination of such tasks as: Constructs components, sub-units, or simple models or adapts standard equipment; may troubleshoot and correct malfunctions; conducts various tests or experiments which may require minor modifications in test setups or procedures; selects, sets up, and operates standard test equipment and records test data; extracts and compiles a variety of engineering data; processes or computes data using specified formulas and procedures; performs routine analysis to check applicability, accuracy, and reasonableness of data.

Engineering technician IV

Performs nonroutine assignments of substantial variety and complexity. Receives objectives and technical advice from supervisor or engineer; work is reviewed for technical adequacy. May be assisted by lower level technicians. Performs at this level one or a combination of typical duties as: Works on limited segment of development project; constructs experimental or prototype models to meet engineering requirements; conducts tests or experiments; records and evaluates data and reports findings; conducts tests or experiments requiring selection and adaptation or modification of test equipment and test procedures; sets up and operates equipment; records data; analyzes data and prepares test reports; compiles and computes a variety of engineering data; may analyze test and design equipment; develops or prepares schematics, designs, specifications, parts, lists or makes recommendations regarding these items; may review designs or specifications for adequacy.

Engineering technician V

Performs nonroutine and complex assignments involving responsibility for planning and conducting a complete project of relatively limited scope or a portion of a larger and more deverse project. Selects and adapts plans, techniques, designs, or layouts. May coordinate proportions of overall assignment; reviews, analyzes, and integrates the technical work of others. Supervisor or professional engineer outlines objectives, requirements, and design approaches; completed work

is reviewed for technical adequacy and satisfaction requirements; may be assisted by lower level technicians. Performs at this level one or a combination of such typical duties as: Designs, develops, and constructs major units, devices or equipment; conducts tests or experiments; analyzes results and redesigns or modifies equipment to improve performance; reports results; plans or assists in planning tests to evaluate equipment performance; determines test requirements, equipment modifications, and test procedures; conducts tests, analyzes and evaluates data, and prepares reports on findings and recommendations; reviews and analyzes a variety of engineering data to determine requirements to meet engineering objectives; may calculate design data; prepares layouts, detailed specifications, parts lists, estimates, procedures, etc.; may check out and analyze drawings or equipment to determine adequacy of drawings and designs.

Industry Wage Studies

The most recent bulletins providing occupational wage data for industries included in the Bureau's program of industry wage surveys since 1960 are listed below. Copies are for sale from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, or from any of its regional sales offices, and from the regional offices of the Bureau of Labor Statistics shown on the inside back cover. Copies that are out of stock are available for reference purposes at leading public, college, or university libraries, or at the Bureau's Washington or regional offices.

Manufacturing

Basic Iron and Steel, 1972. BLS Bulletin 1839
Candy and Other Confectionery Products, 1975. BLS Bulletin 1939
Cigar Manufacturing, 1972. BLS Bulletin 1976
Cigarette Manufacturing, 1976. BLS Bulletin 1944
Corrugated and Solid Fiber Boxes, 1976. BLS Bulletin 1921
Fabricated Structural Steel, 1974. BLS Bulletin 1935
Fertilizer Manufacturing, 1971. BLS Bulletin 1763
Flour and Other Grain Mill Products, 1972. BLS Bulletin 1803
Fluid Milk Industry, 1973. BLS Bulletin 1871
Footwear, 1975. BLS Bulletin 1946
Hosiery, 1976. BLS Bulletin 1987
Industrial Chemicals, 1976. BLS Bulletin 1978
Iron and Steel Foundries, 1973. BLS Bulletin 1894
Leather Tanning and Finishing, 1973. BLS Bulletin 1835
Machinery Manufacturing 1978. BLS Bulletin 2022
Meat Products, 1974, BLS Bulletin 1896
Men's and Boys' Separate Trousers, 1974. BLS Bulletin 1906
Men's and Boy's Shirts (Except Work Shirts) and Nightwear. 1974. BLS Bulletin 1901
Men's and Boy's Suits and Coats, 1976. BLS Bulletin 1962
Miscellandous Plastics Products, 1974. BLS Bulletin 1914
Motor Vehicles and Parts, 1973-74. BLS Bulletin 1912
Nonferrous Foundries, 1975. BLS Bulletin 1952
Paints and Varnishes, 1976. BLS Bulletin 1973
Paperboard Containers and Boxes, 1970. BLS Bulletin 1719
Petroleum Refining, 1976. BLS Bulletin 1948
Pressed or Blown Glass and Glassware, 1975. BLS Bulletin 1923
Pulp, Paper and Paperboard Mills, 1977. BLS Bulletin 2008
Semiconductors, 1977. BLS Bulletin 2021
Shipbuilding and Repairing, 1976. BLS Bulletin 1968
Southern Sawmills and Planing Mills, 1969. BLS Bulletin 1964
Structural Clay Products, 1975. BLS Bulletin 1942
Synthetic Fibers, 1976. BLS Bulletin 1975
Textile Dyeing and Finishing, 1976. BLS Bulletin 1967
Textiles, 1975. BLS Bulletin 1945
Wages and Demographic Characteristics in Work Clothing Manufacturing, 1972. BLS Bulletin 1858
West Coast Sawmilling, 1969. BLS Bulletin 1704
Women's and Misses' Coats and Suits, 1970. BLS Bulletin 1728
Women's and Misses' Dresses, 1976. BLS Bulletin 2007
Wood Household Furniture, Except Upholstered, 1974. BLS Bulletin 1930

Nonmanufacturing

Appliance Repair Shops, 1975. BLS Bulletin 1936
Auto Dealer Repair Shops, 1973. BLS Bulletin 1876
Banking and Life Insurance, 1976. BLS Bulletin 1988
Bituminous Coal Mining, 1976. BLS Bulletin 1999
Communications, 1976. BLS Bulletin 1991
Contract Cleaning Services, 1977. BLS Bulletin 2009
Contract Construction, 1973. BLS Bulletin 1911
Department Stores, 1977. BLS Bulletin 2006
Educational Institutions: Nonteaching Employees, 1968-69. BLS Bulletin 1971
Electric and Gas Utilities, 1972. BLS Bulletin 1834
Hospitals, 1975-76. BLS Bulletin 1949
Hotels and Motels, 1973. BLS Bulletin 1883
Laundry and Cleaning Services, 1968. BLS Bulletin 1945[1]
Metal Mining, 1977. BLS Bulletin 2017
Motion Picture Theatres, 1966. BLS Bulletin 1542[1]
Nursing Homes and Related Facilities, 1976. BLS Bulletin 1974
Oil and Gas Extraction 1977 BLS Bulletin 2014
Scheduled Airlines, 1975. BLS Bulletin 1951
Wages and Tips in Restaurants and Hotels, 1970. BLS Bulletin 1712

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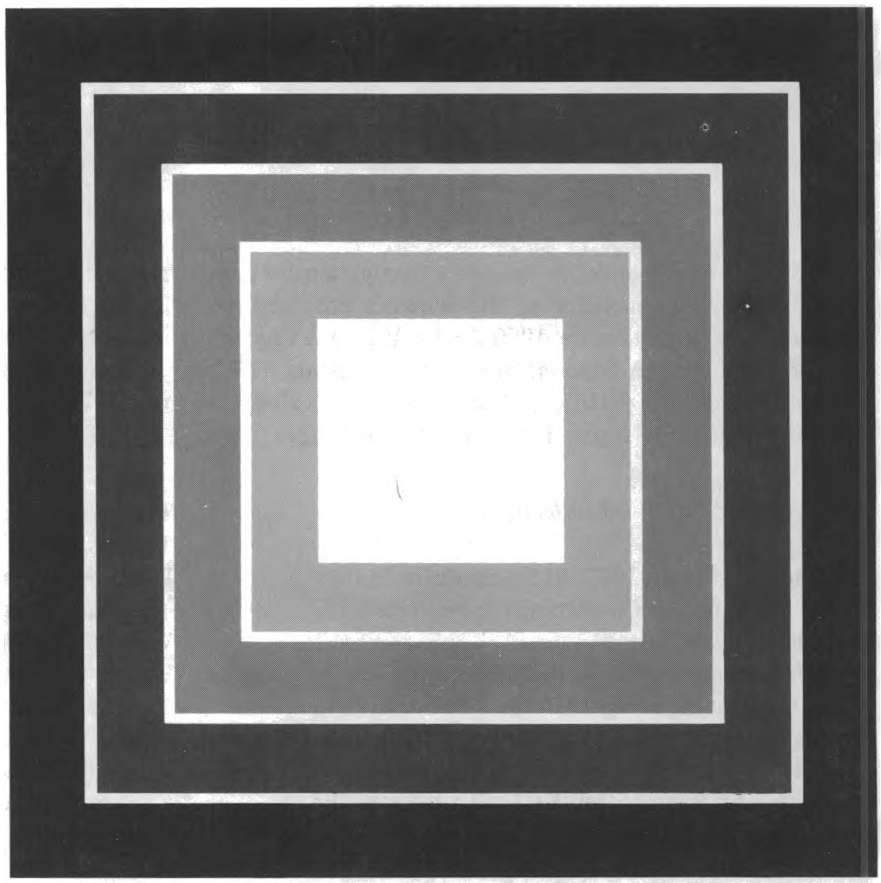

This bulletin updates through 1977 indexes of output per employee for the industries currently included in the United States' government program of productivity measurement. Data are presented for these industries:

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- Concrete Products
- Ready-mixed Concrete
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- Steel Foundries
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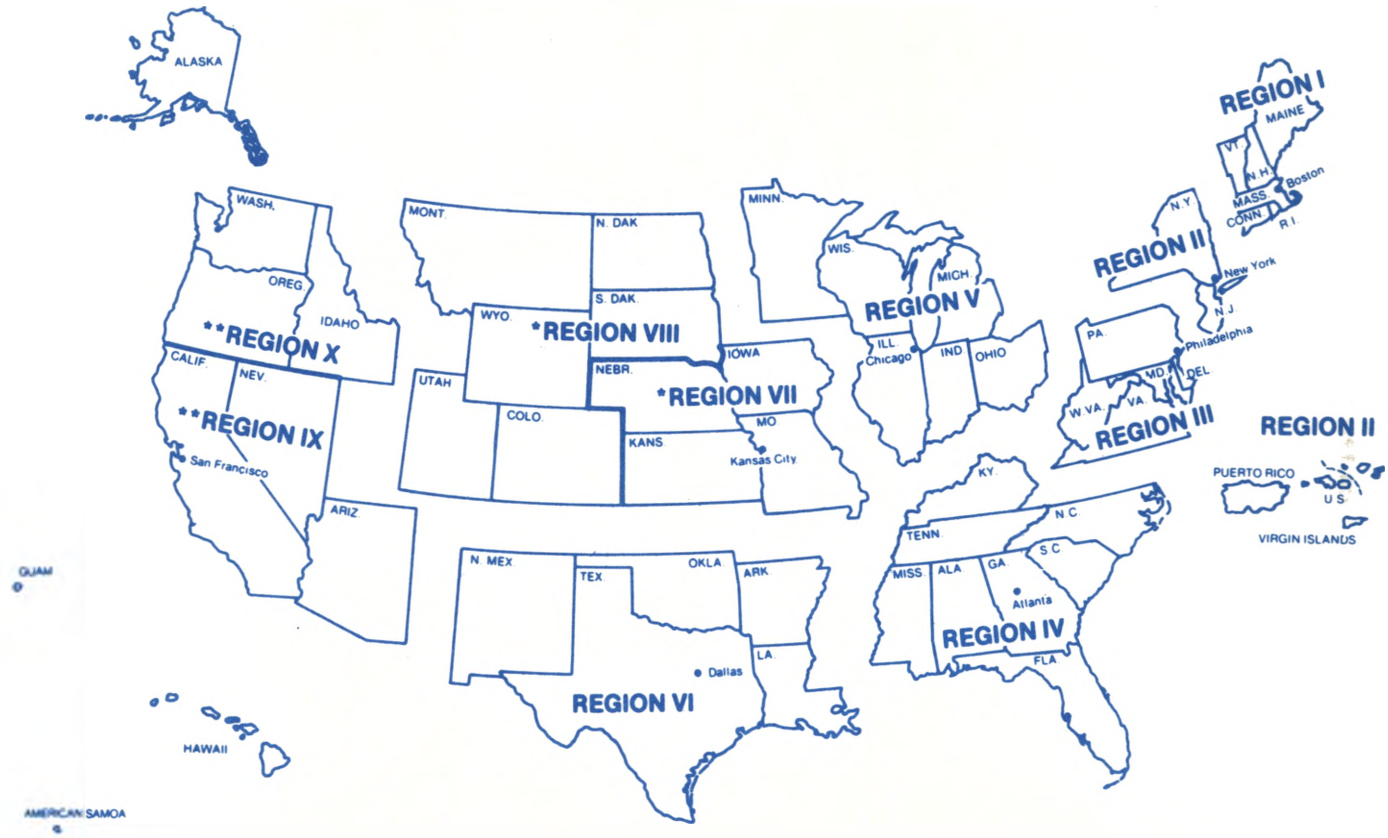

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