# I-2 Moratorium Information

**Prepared for**

City of Gainesville
Community Development

**Prepared by**

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# Review of Manufacturing Uses Under the City of Gainesville's I-2 Industrial Zoning

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# Contents

# Review of Manufacturing Uses Under the City of Gainesville's I-2 Industrial Zoning

## General Industrial District (I-2)

The general industrial district (I-2) was established for the purpose of providing areas in appropriate locations where various heavy and extensive industrial operations can be conducted without creating hazards or property devaluation to surrounding land uses. Permitted uses include manufacturing as well as several other uses by right.

Manufacturing includes establishments engaged in the mechanical or chemical transformation of materials or substances into new products. These establishments are usually described as plants, factories, or mills and characteristically use power driven machines and material-handling equipment. Establishments engaged in assembling component parts of manufactured products are also considered manufacturing if the new product is neither a structure nor other fixed improvement. Also included is the blending of materials, such as lubricating oils, plastics resin, or liquors.

The materials processed by manufacturing establishments include products of agriculture, forestry, fishing, mining, and quarrying as well as products of other manufacturing establishments. The new product of a manufacturing establishment may be finished in the sense that it is ready for utilization or consumption, or it may be semi-finished to become a raw material for an establishment engaged in further manufacturing. For example, the product of the copper smelter is the raw material used in electrolytic refineries; refined copper is the raw material used by copper wire mills; and copper wire is the raw material used by certain electrical equipment manufacturers.

The materials used by manufacturing establishments may be purchased directly from producers, obtained through customary trade channels, or secured without recourse to the market by transferring the product from one establishment to another, which is under the same ownership. Manufacturing production is usually carried on for the wholesale market, for interplant transfer, or to order for industrial users, rather than for direct sale to the domestic consumer.

## I-2 in Gainesville

General industrial districts (I-2) are located in seven areas of the city:

- Three along the northeast side of US 441 in the north portion of the city
- North of the airport
- An area west of Waldo Road and north of NE 23rd Avenue
- Around the railroad west of North Main Street between NW 39th Avenue and NW 23rd Avenue
- Around South Main Street south of Depot Road and north of SE 13th Lane

In these areas, the properties zoned I-2 are generally surrounded by land uses such as Limited industrial district (I-1), agricultural, and the airport. However, some of the I-2 zoned property is

adjacent to various residential designations. There are also two relatively small, comparatively isolated parcels that are zoned I-2 in the midst of residential areas.

## Purpose of Study

This brief study reviews the major groups of manufacturing allowed under I-2 zoning. The broad span of activities encompassed by "manufacturing" that are allowed on I-2 property and the potential incompatibilities that could occur may be anticipated by an analysis of these major groups. This study provides indicators that will assist in identifying those manufacturing groups that need further study to determine whether those uses should be prohibited or subject to a special process with special standards. In this analysis we have focused on environmental impacts including nuisance factors such as odor and noise inherent in the process. In order to compare industries with such a wide range of diversity, a series of environmental indicators was developed.

The best source of comparative pollutant release information is the Toxic Release Inventory (TRI). Pursuant to the Emergency Planning and Community Right-to-Know Act, TRI includes self-reported facility release and transfer data for over 600 toxic chemicals. Facilities within SIC Codes 20 through 39 (manufacturing industries) that have more than 10 employees, and that are above weight-based reporting thresholds are required to report TRI on-site releases and off-site transfers. The information presented in this report is derived from the 1998 TRI reporting year, augmented where necessary by data from the 1995 and 1993 reports. TRI data provide the type, amount and media receptor of each chemical released or transferred from a manufacturing facility.

Releases are an on-site discharge of a toxic chemical to the environment. This includes emissions to the air, discharges to bodies of water, releases at the facility to land, as well as contained disposal into underground injection wells.

Transfers refer to a transfer of toxic chemicals in wastes or by-products to a facility that is geographically or physically separate from the facility reporting under TRI. The quantities reported represent a movement of the chemical away from the reporting facility. Except for off-site transfers for disposal, these quantities do not necessarily represent entry of the chemical into the environment. In addition to disposal, transfers may be made to publicly owned treatment works (POTW), recycling, energy recovery, and/or treatment (such as incineration, biological destruction, or neutralization).

Comparing the weight of toxic chemicals released on-site by an industry provides a useful indicator of potential for pollution. It is important to note that TRI "pounds released" data is not equivalent to a "risk" ranking for each industry. Weighting each pound of release equally does not factor in the relative toxicity of each chemical that is released. Additionally, it should be noted that the reported releases are accomplished within the permitting system of the jurisdiction in which each facility is located.

Additional relevant information is available from the Environmental Protection Agency (EPA). The EPA Office of Air Quality Planning and Standards has compiled air pollutant emission factors for determining the total air emissions of priority air pollutants from many manufacturing sources. The EPA database contains a wide range of information related to stationary sources of air pollution, including the emissions of a number of air pollutants that may be of concern within a particular industry. With the exception of volatile organic compounds (VOCs), there is little

overlap with the TRI chemicals reported above. These allow estimates of annual releases of carbon monoxide (CO), nitrogen dioxide ($NO_2$), particulate matter of 10 microns or less ($PM_{10}$), total particulates (PT), sulfur dioxide ($SO_2$), and volatile organic compounds (VOCs) for each industry group. Adding these emission levels together (realizing that $PM_{10}$ is contained in PT) provides a general indicator of impact on air quality As with the TRI data, this indicator does not take into account the differing impacts of each pollutant on human health and welfare.

Another indicator was developed from this data by adding the VOC emissions and the $NO_2$ emissions. These pollutants, together with sunshine, are necessary for the formation of photochemical oxidants or ozone. The Gainesville area has exceeded the ozone standards on occasion in the recent past, indicating this is a special problem for this area. With the implementation of a new ozone standard by EPA, the likelihood of ozone exceedances in Gainesville is increased.

Nuisance factors such as odor and noise were also evaluated based upon the chemicals used and the amount of raw materials and/or products moved through the process. Large volumes generally require more trucks, or other transport, and large machines for material handling, all of which tend to result in higher noise levels.

## Summary of Analysis

Each major industrial group was considered in turn to develop the environmental indicators. The indicators are summarized in Table 1 in an order that puts the most desirable based on these indicators at the bottom and the least desirable at the top.

**TABLE 1**
Summary of Environmental Indicators by Industry Group

| SIC Code | Name | Indicators | | | | |
|---|---|---|---|---|---|---|
| | | Toxic Chemicals | Air Pollution | Ozone Formation | Odor | Noise |
| 26 | Paper | 475,714 | 3,620 | 1,001 | High | High |
| 29 | Petroleum | 154,886 | 3,977 | 949 | High | High |
| 32 | Stone/Clay/Glass | 52,145 | 1,427 | 812 | Medium | High |
| 33 | Primary Metals | 194,567 | 1,241 | 172 | High | High |
| 28 | Chemicals | 183,162 | 367 | 103 | High | High |
| 21 | Tobacco | 156,592 | * | 74 | Medium | Medium |
| 24 | Lumber | 39,993 | 451 | 145 | Medium | Medium |
| 27 | Printing | 99,122 | 464 | 22 | Medium | Medium |
| 22 | Textiles | 41,285 | 413 | 147 | Low | High |
| 37 | Transportation Equipment | 70,285 | 190 | 43 | Medium | Medium |
| 999 | Multiple Codes | 78,678 | * | 31 | | |
| 25 | Furniture | 45,607 | 265 | 24 | Medium | Medium |
| 30 | Plastics | 54,593 | 108 | 24 | High | Medium |
| 38 | Measure/Photo | 42,898 | * | 19 | Low | Low |
| 20 | Food | 43,591 | * | 16 | High | Medium |
| 31 | Leather | 32,860 | * | 16 | Medium | Medium |
| 9999 | No Code | 34,133 | * | 14 | | |
| 39 | Misc. | 31,133 | * | 15 | | |
| 23 | Apparel | 24,290 | * | 12 | Low | Low |
| 34 | Fabricated Metals | 22,093 | 52 | 6 | Medium | High |
| 36 | Electrical Equipment | 15,524 | 76 | 9 | Low | Low |
| 35 | Machinery | 13,331 | * | 7 | Low | Medium |

* = Data not yet found. Ozone indicator is likely 20 to 50 percent low.

By its nature, industry does not always fall into neat categories so that there are multiple category and "no category" responses in the TRI. Additionally, the SIC major groups cover a wide range of facilities of various ages, processes, size, and location producing a variety of products. Each facility is unique and should be evaluated as such.

# Sector Analysis

## 20-Food and Kindred Products

This major group includes establishments manufacturing or processing foods and beverages for human consumption, and certain related products, such as manufactured ice, chewing gum, vegetable and animal fats and oils, and prepared feeds for animals and fowls. Products described as dietetic are classified in the same manner as non-dietetic products (e.g., as candy, canned fruits, and cookies). Chemical sweeteners are classified in Major Group 28.

TRI data for the food industry indicates 1,995 facilities reported 89.3 million pounds of toxic chemicals were released or transferred in 1998. This is an average of 45,000 pounds per facility. About 2.6 percent of this was transferred off-site. About 73 percent of the on-site releases were to the atmosphere.

This industry often has nuisance odors associated with it.

## 21-Tobacco Products

This major group includes establishments engaged in manufacturing cigarettes, cigars, smoking and chewing tobacco, snuff, and reconstituted tobacco and in stemming and redrying tobacco. Also included in this major group is the manufacture of non-tobacco cigarettes. The manufacture of insecticides from tobacco byproducts is included in Major Group 28.

TRI data for the tobacco industry indicates 21 facilities reported 3.6 million pounds of toxic chemicals were released or transferred in 1998. This is an average of 171,000 pounds per facility. About 8.5 percent of this was transferred off-site. About 95 percent of the on-site releases were to the atmosphere.

This industry generally contributes to the local odor levels. The odor of tobacco may disturb nearby residents.

## 22-Textile Mill Products

This major group includes establishments engaged in performing any of the following operations:

1. Preparation of fiber and subsequent manufacturing of yarn, thread, braids, twine, and cordage;
2. Manufacturing broad woven fabrics, narrow woven fabrics, knit fabrics, and carpets and rugs from yarn;
3. Dyeing and finishing fiber, yarn, fabrics, and knit apparel;
4. Coating, waterproofing, or otherwise treating fabrics;
5. The integrated manufacture of knit apparel and other finished articles from yarn; and
6. The manufacture of felt goods, lace goods, non-woven fabrics, and miscellaneous textiles.

According to the 1995 Toxics Release Inventory (TRI) data, 339 textile facilities reporting SIC 22, released (to the air, water, or land) and transferred (shipped off-site or discharged to sewers) a total of 25 million pounds of toxic chemicals during calendar year 1995. This represents approximately 0.4 percent of the 5.7 billion pounds of releases and transfers from all manufacturers (SICs 20-39) reporting to TRI that year.

Large volumes of solvents that are used extensively in coating textile materials with plastic and other synthetic materials dominate the releases and transfers. The top three chemicals released by volume are methyl ethyl ketone (MEK), toluene, and methanol. These three account for about 64 percent (11.4 million pounds) of the industry's total releases.

Evidence of the diversity of processes at textile facilities reporting to TRI is found in the fact that the most frequently reported chemicals, methanol and ammonia, account for only 18 percent of the total number of chemicals reported by all 339 textile facilities that report to TRI. Over half of the chemicals are reported by fewer than ten facilities. The variability in facilities' TRI chemical profiles may be attributed to the variety of processes and products in the industry.

The top five chemicals released by this industry, in terms of volumes, include: MEK, toluene, methanol, ammonia, and xylenes (mixed isomers). The very volatile nature of these chemicals is apparent in the fact that about 98 percent (17.5 million pounds) of the industry's releases are to the air. About 76 percent (13.6 million pounds) of all the chemicals released by the textile industry were released to air in the form of point source emissions. Another 22 percent (3.9 million pounds) were released as fugitive emissions. The remaining two percent (276,000 pounds) were released in the form of water discharges or disposals to land. Because the majority of TRI releases are in the form of air emissions, these data indicate that the large amount of wastewater discharged from textile facilities contain dilute amounts of TRI chemicals.

The total volume of transfers was 7 million pounds or 28 percent of the total volume of chemicals reported to TRI by the textile industry (i.e. releases and transfers). Transfers to POTWs accounted for the largest amount, 40 percent, (2.8 million pounds). About 30 percent (2.1 million pounds) was transferred either for disposal, recycling, or treatment and the remaining 30 percent (2.1 million pounds) was transferred for energy recovery. Three chemicals (MEK, toluene, and ammonia) accounted for about 38 percent of the 7.0 million pounds of total transfers for this industry.

Annual releases of priority air pollutants by the textile industry are estimated for 1995 as follows:

- 8,177 tons per year of carbon monoxide
- 34,523 tons per year of nitrogen dioxide
- 2,028 tons per year of particulate matter of 10 microns or less
- 9,479 tons per year of total particulates
- 43,050 tons per year of sulfur dioxide
- 27,768 tons per year of volatile organic compounds

Noise is a major potential nuisance problem for the industry, particularly when weaving is a part of the process.

# 23-Apparel and Other Finished Products Made from Fabrics and Similar Materials

This major group, known as the cutting-up and needle trades, includes establishments producing clothing and fabricating products by cutting and sewing purchased woven or knit textile fabrics and related materials, such as leather, rubberized fabrics, plastics, and furs. Also included are establishments that manufacture clothing by cutting and joining (for example, by adhesives) materials such as paper and non-woven textiles. Included in the apparel industries are three types of establishments:

1. The regular or inside factories;
2. Contract factories and;
3. Apparel jobbers.

The regular factories perform all of the usual manufacturing functions within their own plant; the contract factories manufacture apparel from materials owned by others; and apparel jobbers perform the entrepreneurial functions of a manufacturing company, such as buying raw materials, designing and preparing samples, arranging for the manufacture of clothing from their materials, and selling of the finished apparel.

TRI data for the apparel industry indicates 19 facilities reported 0.5 million pounds of toxic chemicals were released or transferred in 1998. This is an average of 26,000 pounds per facility. About 8.2 percent of this was transferred off-site. Almost 100 percent of the on-site releases were to the atmosphere.

This industry does not generally generate significant odor or noise.

# 24-Lumber and Wood Products, Except Furniture

This major group includes establishments engaged in cutting timber and pulpwood; merchant sawmills, lath mills, shingle mills, cooperage stock mills, planing mills, and plywood mills and veneer mills engaged in producing lumber and wood basic materials; and establishments engaged in manufacturing finished articles made entirely or mainly of wood or related materials. Certain types of establishments producing wood products are classified elsewhere. For example, furniture and office and store fixtures are classified in Major Group 25; musical instruments, toys and playground equipment, and caskets are classified in Major Group 39. Woodworking in connection with construction, in the nature of reconditioning and repair, or performed to individual order, is classified in non-manufacturing industries. Establishments engaged in integrated operations of logging combined with sawmills, pulp mills, or other converting activity, with the logging not separately reported, are classified according to the primary product shipped.

According to the Toxic Release Inventory (TRI) data from SIC code 24, the lumber and wood products industry released (to the air, water, or land) and transferred (shipped off-site) a total of approximately 34.1 million pounds of toxic chemicals during calendar year 1995. Releases totaled 30.0 million pounds, or about 76,000 pounds per facility, and transfers totaled 4.1 million pounds, or about 10,000 pounds per facility. For the industry as a whole, VOCs (such as formaldehyde, xylene, toluene, and methanol) comprise the largest number of TRI releases. A large amount of VOC releases, both fugitive and point source emissions, result in part from the extensive use of glues and resins in this industry. VOCs are primarily released during

the drying and pressing phases of most wood panel product manufacturing processes. VOC emissions are also associated with solvents used to coat cabinets, decorative panels, and toys. Wood preservation facilities dealing with arsenic, chromium, and copper compounds tend to be smaller and more numerous and contribute waste to landfills.

Annual releases of priority air pollutants by the lumber and wood product industry are estimated for 1995 as follows:

- 122,061 tons per year of carbon monoxide
- 38,042 tons per year of nitrogen dioxide
- 20,456 tons per year of particulate matter of 10 microns or less
- 64,650 tons per year of total particulates
- 9,401 tons per year of sulfur dioxide
- 55,983 tons per year of volatile organic compounds

Nuisance problems in this industry are associated with some solvent odors or creosote odor, and the noise of equipment moving wood stacks.

## 25-Furniture and Fixtures

This major group includes establishments engaged in manufacturing household, office, public building, and restaurant furniture; and office and store fixtures. Establishments primarily engaged in the production of millwork are classified in Industry 2431; those manufacturing wood kitchen cabinets are classified in Industry 2434; those manufacturing cut stone and concrete furniture are classified in Major Group 32; those manufacturing laboratory and hospital furniture, except hospital beds, are classified in Major Group 38; those manufacturing beauty and barber shop furniture are classified in Major Group 39; and those engaged in woodworking to individual order or in the nature of reconditioning and repair are classified in non-manufacturing industries.

According to the Toxic Release Inventory (TRI) database for the year 1995, the TRI releases and transfers for the entire furniture and fixtures industry (SIC 25) totaled 47.5 million pounds, or an average of about 141,000 pounds for 336 facilities. Most of this (37.6 million pounds, or about 112,000 pounds per facility) were releases to the air, water and land. 9,9 million pounds, or about 29,000 pounds per facility were transfers to off-site facilities. For the industry as a whole, solvents (such as toluene, methanol, xylene, methyl ethyl ketone, and acetone) comprise the largest number of TRI releases. The large number of solvent releases, both fugitive and point source emissions, result from the solvent-intensive finishing processes employed by this industry. In addition to being used as vehicle carriers, solvents are also used to clean the coatings application equipment.

Annual releases of priority air pollutants by the furniture and fixtures industry are estimated for 1995 as follows:

- 2,754 tons per year of carbon monoxide
- 1,872 tons per year of nitrogen dioxide
- 2,502 tons per year of particulate matter of 10 microns or less
- 4,827 tons per year of total particulates
- 1,538 tons per year of sulfur dioxide
- 67,604 tons per year of volatile organic compounds

This industry has some solvent odor associated with it. It is not generally considered a major noise source.

## 26-Paper and Allied Products

This major group includes establishments primarily engaged in the manufacture of pulps from wood and other cellulose fibers and from rags; the manufacture of paper and paperboard; and the manufacture of paper and paperboard into converted products, such as paper coated off the paper machine, paper bags, paper boxes, and envelopes. Also included are establishments primarily engaged in manufacturing bags of plastic film and sheet. Certain types of converted paper products are classified elsewhere, such as abrasive paper, which is in Industry 3291; carbon paper in Industry 39555; and photo sensitized and blueprint paper in Industry 3861.

According to Toxic Release Inventory (TRI) data from SIC codes 261-265, the pulp and paper industry released (to the air, water, or land) and transferred (shipped off-site) a total of approximately 289.1 million pounds of toxic chemicals during calendar year 1995. This represents less than 4 percent of the total pounds of TRI chemicals released and transferred by all manufacturers that year. The mean amount of toxic chemical releases per facility was approximately 948,000 pounds for the industry. The mean amount transferred by pulp and paper facilities was 56.5 million pounds, or about 185,000 pounds per facility, while the releases were reported at 232.6 million pounds, or about 763,000 pounds per facility.

The pulp and paper industry releases 87 percent of its total TRI poundage to the air, approximately 10 percent to water and POTWs, and 2 percent is transferred off-site or disposed on land. This release profile differs from other TRI industries that average approximately 93 percent to air 6 percent to land, and 1 percent to water. A larger proportion of water releases correlates with the water intensive processes of the pulp and paper industry. An average mill requires 10 million gallons of influent water per day and will produce the corresponding amount of effluent waters. Examining the pulp and paper industry's TRI reported toxic chemicals by chemical, highlights the likely origins of industry releases.

Air releases can be traced to a variety of sources. Approximately 50 percent are methanol, a by-product of the pulp making process. The other major air toxic chemicals: chlorinated compounds, sulfuric acid, and the chelator methyl ethyl ketone, originate in the bleaching stage. Methanol also accounts for approximately 40 percent of the water releases by pulp and paper facilities. Overall, methanol represents over 49 percent of the pulp and paper industry's TRI releases and transfers.

The diversity of processes in the pulp and paper industry can be seen in the diversity of chemicals found in the TRI report. The TRI chemical used by the greatest number of mills is sulfuric acid. In addition, some TRI chemicals are each only used by a few mills, suggesting process specific needs such as paper finishing or use in wet additives.

Annual releases of priority air pollutants by the pulp and paper industry are estimated for 1995 as follows:

- 566,883 tons per year of carbon monoxide
- 358,675 tons per year of nitrogen dioxide
- 35,030 tons per year of particulate matter of 10 microns or less
- 111,210 tons per year of total particulates

- 493,313 tons per year of sulfur dioxide
- 127,809 tons per year of volatile organic compounds

This industry is well known in the South for its characteristic odors. There is also a high level of noise associated with the processes.

## 27-Printing, Publishing, and Allied Industries

This major group includes establishments engaged in printing by one or more common processes, such as letterpress; lithography (including offset), gravure, or screen; and those establishments that perform services for the printing trade, such as bookbinding and platemaking. This major group also includes establishments engaged in publishing newspapers, books, and periodicals, regardless of whether or not they do their own printing. News syndicates are classified in Services, Industry 7383. Establishments primarily engaged in textile printing and finishing fabrics are classified in Major Group 22, and those engaged in printing and stamping on fabric articles are classified in Industry 2396. Establishments manufacturing products that contain incidental printing, such as advertising or instructions, are classified according to the nature of the products; for example, as cartons, bags, plastics film, or paper.

TRI data for the printing industry indicates 44.3 million pounds of toxic chemicals were released or transferred in 1995. This is an average of 169,000 pounds per facility. About 23 percent of this were transferred off-site, primarily as discharge to POTWs and treatment. Releases totaled 33.9 million pounds in 1995, or 129,000 pounds per facility. The printing industry releases 99 percent of its total TRI poundage to the air, while the remaining one percent of releases are split between water and land disposal. This release profile differs significantly from other TRI industries, which average approximately 60 percent to air, 30 percent to land, and 10 percent to water release respectively. Of the top ten toxic chemicals in the list, the prevalence of volatile chemicals explains the air intensive toxic chemical loading of the printing industry. Of these ten toxic chemicals, seven are highly volatile. The four top toxic chemicals released, toluene, methyl ethyl ketone, xylene, and 1,l, 1-trichloroethane, are all solvents of high volatility. By far the single largest toxic chemical used (released/transferred) by the printing industry is the solvent toluene, toluene comprises roughly 70 percent of the total chemicals released and transferred by the industry. Toluene is used heavily in the gravure printing process as an ink solvent, but is also used throughout printing for cleaning purposes. Metals on the other hand are typically transferred off-site, as a component of hazardous wastes or discharged to the sewer.

Annual releases of priority air pollutants by the printing, publishing, and allied industries are estimated for 1995 as follows:

- 8,755 tons per year of carbon monoxide
- 3,542 tons per year of nitrogen dioxide
- 405 tons per year of particulate matter of 10 microns or less
- 1,198 tons per year of total particulates
- 1,684 tons per year of sulfur dioxide
- 103,018 tons per year of volatile organic compounds

This industry has some odor associated with solvents.

# 28-Chemicals and Allied Products

This major group includes establishments producing basic chemicals and establishments manufacturing products by predominantly chemical processes. Establishments classified in this major group manufacture three general classes of products:

1. Basic chemicals, such as acids, alkalis, salts, and organic chemicals;
2. Chemical products to be used in further manufacture, such as synthetic fibers, plastics materials, dry colors, and pigments; and
3. Finished chemical products to be used for ultimate consumption, such as drugs, cosmetics, and soaps; or to be used as materials or supplies in other industries, such as paints, fertilizers, and explosives.

The mining of natural alkalis and other natural chemicals and fertilizers are classified in Mining, Industry Group 147. Establishments primarily engaged in manufacturing nonferrous metals and high-percentage ferroalloys are classified in Major Group 33; those manufacturing silicon carbide are classified in Major Group 32; those manufacturing baking powder, other leavening compounds, and starches are classified in Major Group 20; and those manufacturing artists' colors are classified in Major Group 39. Establishments primarily engaged in packaging, repackaging, and bottling of purchased chemical products, but not engaged in manufacturing chemicals and allied products, are classified in Wholesale or Retail Trade industries.

## Inorganic Chemical Industry

The TRI data for 555 inorganic chemicals manufacturing facilities indicates they released (discharged to the air, water, or land without treatment) and transferred (shipped off-site) a total of 250 million pounds of 112 different chemical toxic chemicals. This represents about 10 percent of the TRI releases and transfers of the chemical manufacturing industry and about three percent of the total releases and transfers of all manufacturers that year. In comparison, the organic chemical industry (SIC 286) produced 438 million pounds that year, almost twice that of the inorganic chemical industry. It should be noted that the Bureau of Census identified 1,429 facilities manufacturing inorganic chemicals. More than half of these facilities, however, have fewer than 20 employees, many of which are likely to be below the TRI reporting thresholds of employment (TRI reporting threshold is greater than 10 employees) and/or chemical use and, therefore, are not required to report to TRI.

The chemical industry's releases have been declining in recent years. Between 1988 and 1993 emissions from chemical companies (all those categorized within SIC 28, not just inorganic chemical manufacturers) to air, land, and water were reduced 44 percent, which is slightly above the average for all manufacturing sectors reporting to TRI.

The inorganic chemical manufacturing industry released 60.7 million pounds of toxic chemicals to the environment and 21.7 million pounds were transferred. The frequency with which chemicals are reported by facilities within a sector is one indication of the diversity of operations and processes. Many of the TRI chemicals are released or transferred by only a small number of facilities which indicates a wide diversity of production processes, particularly for specialty inorganics over 70 percent of the 110 chemicals reported are released or transferred by fewer than 10 facilities.

The inorganic chemical industry releases 69 percent of its total TRI poundage to the water (including 67 percent to underground injection and two percent to surface waters), 14 percent to the air, and 17 percent to the land. This release profile differs from other TRI industries that average approximately 30 percent to the water, 59 percent to air, and 10 percent to land. Examining the inorganic chemical industry's TRI reported toxic chemical releases highlights the likely origins of the large water releases for the industry. On-site underground injection of essentially one chemical, hydrochloric acid, accounts for the largest portion, 55 percent, of the inorganic chemical industry's total releases and transfers as reported in TRI. Only five facilities of the 555 identified facilities reported releasing hydrochloric acid through underground injection. Two of these facilities accounted for over 85 percent of the total hydrochloric acid injected to the subsurface, or 42 percent of the inorganic chemical industry's total releases and transfers. Land disposal accounted for the next largest amount, 17 percent, of the industry's total releases. The largest single chemical released to the air by the inorganic chemical industry, carbonyl sulfide, is only emitted by eleven facilities manufacturing certain inorganic pigments.

Discharges to POTWs accounted for 43 percent of the industry's total transfers of TRI chemicals. Ammonia, hydrochloric acid, and sulfuric acid account for over 66 percent of chemicals transferred off-site. Finally, approximately 31 percent of the total is transferred off-site for treatment.

Annual releases of priority air pollutants by the inorganic chemical industry are estimated for 1995 as follows:

- 153,294 tons per year of carbon monoxide
- 106,522 tons per year of nitrogen dioxide
- 6,703 tons per year of particulate matter of 10 microns or less
- 34,664 tons per year of total particulates
- 194,153 tons per year of sulfur dioxide
- 65,427 tons per year of volatile organic compounds

Nuisance problems in this industry may be as noise and/or odorous compounds depending upon the process (es) used.

## Organic Chemical Industry

According to the Toxics Release Inventory (TRI) data, 417 organic chemical facilities released (to the air, water or land) and transferred (shipped off-site or discharged to sewers) a total of 438 million pounds of toxic chemicals during calendar year 1993. That represents approximately 18 percent of the 2.5 billion pounds of releases and transfers from the chemical industry as a whole (SIC 28) and about six percent of the releases and transfers for all manufacturers reporting to TRI that year. By comparison, the inorganic chemical industry's releases and transfers in 1993 totaled 249.7 million pounds, or sixty percent of the releases and transfers of the industrial organic chemical sector.

The quantity of the basic feedstocks released by organic chemical facilities reflects their volume of usage. The inorganic chemicals among the top ten released (ammonia, nitric acid, ammonium sulfate, and sulfuric acid) are also large volume reaction feedstocks. Inorganic chemicals contained in wastes injected underground on-site account for 58 percent of the industry's releases; ammonia makes up the vast majority of TRI chemicals disposed of via underground injection. Air releases account for 40 percent (61 million pounds), and the

remaining approximately 1.5 percent (2.4 million pounds) is discharged directly to water or land disposed.

Off-site transfers by organic chemical facilities account for the largest amount, 65 percent, of the organic chemical industry's total releases and transfers as reported in TRI. Three chemicals (sulfuric acid, methanol and tert-butyl alcohol) account for over one-half of the 287 million pounds transferred off-site The 49 million pounds of POTW discharges (primarily methanol and ammonia) account for 17 percent of releases and transfers.

The frequency with which chemicals are reported by facilities within a sector is one indication of the diversity of operations and processes Many chemicals are released or transferred by a small number of facilities, which indicates a wide diversity of production processes, particularly for specialty organic chemicals. Over one half of the 204 chemicals reported are released by fewer than 10 facilities, however, the organic chemical industry is also characterized by one of the largest numbers of chemicals reported by any manufacturing sector. Of the over 300 chemicals currently listed on TRI, 204 are reported as released or transferred by at least one organic chemical facility.

Annual releases of priority air pollutants by the organic chemical industry are estimated for 1995 as follows:

- 112,410 tons per year of carbon monoxide
- 187,400 tons per year of nitrogen dioxide
- 14,596 tons per year of particulate matter of 10 microns or less
- 16,053 tons per year of total particulates
- 176,115 tons per year of sulfur dioxide
- 180,350 tons per year of volatile organic compounds

Nuisance problems in this industry are odorous compounds and commonly noisy equipment is used.

## Resin and Manmade Fiber Manufacturing

According to the 1995 Toxics Release Inventory (TRI) data, 444 plastic resin and manmade fiber manufacturing facilities reporting SIC 2821, 2823, or 2824 released (to the air, water, or land) and transferred (shipped off-site or discharged to sewers) a total of 399 million pounds of toxic chemicals during calendar year 1995. This represents approximately seven percent of the 5.7 billion pounds of releases and transfers from all manufacturers (SICs 20-39) reporting to TRI that year. The top three chemicals released by volume are carbon disulfide, nitrate compounds, and ethylene. These three account for about 51 percent (82 million pounds) of the industries' total releases. Ethylene glycol, used in making polyester, accounts for 45 percent (107 million pounds) of the total TRI chemicals transferred by the industries. The variability in facilities' TRI chemical profiles may be attributed to the variety of processes and products in the industries. It should be noted that over half of the chemicals were reported by fewer than ten facilities.

**Plastic Resin.** About 410 plastic resin facilities reported TRI emissions for 184 chemicals in 1995. The total volume of releases was 64.1 million pounds or 25 percent of the total volume of chemicals reported to TRI by the plastic resin industry (i.e. releases and transfers). The top five chemicals released by this industry, in terms of volumes, include: ethylene, methanol, acetonitrile, propylene, and ammonia. The very volatile nature of these chemicals is apparent in

the fact that about 74 percent (48 million pounds) of the industry's releases are to the air. About 49 percent (31.4 million pounds) of all the TRI chemicals released by the plastic resin industry were released to air in the form of point source emissions, and 25 percent (16.3 million pounds) were released as fugitive air emissions. Roughly 21 percent (13.3 million pounds) of releases were by underground injection. The remaining five percent were released as water discharges and disposals to land.

The total volume of transfers was 192 million pounds or 75 percent of the total volume of chemicals reported to TRI by the plastic resin industry (i.e. releases and transfers). Transfers to recycling and energy recovery accounted for the largest amount, 46 percent (88.5 million pounds) and 31 percent (60.2 million pounds), respectively. About 16 percent (30.5 million pounds) was transferred off-site for treatment, with the remaining seven percent (13.2 million pounds) transferred for either disposal or POTW treatment. Four chemicals (ethylene glycol, N-hexane, xylene (mixed isomers), and vinyl acetate) accounted for about 59 percent of the 192 million pounds of total transfers for this industry. Ethylene glycol alone accounted for about 34 percent (65.0 million pounds) of the total transfers and was primarily recycled.

**Manmade Fibers.** Thirty-four manmade fiber facilities reported TRI emissions for 116 chemicals in 1995. The total volume of releases was 95.9 million pounds or 67 percent of the total volume of TRI chemicals reported by the manmade fiber industry (i.e. releases and transfers). The top five chemicals released by this industry, in terms of volumes, include: carbon disulfide, nitrate compounds, hydrochloric acid, formic acid, and methanol.

A typical manmade fiber facility averaged 2.8 million pounds of releases and 1.4 million pounds of transfers. The high release average is attributed largely to the release of carbon disulfide by four facilities. Carbon disulfide, used in making rayon, accounted for about 62 percent (59.5 million pounds) of TRI releases for the industry. Even eliminating carbon disulfide from the average release calculation reveals that manmade fiber facilities still average about 1.1 million pounds of releases per facility. These relatively high releases and transfers per facility may reflect the large volumes of material processed at a relatively small number of facilities.

About 72 percent (69.5 million pounds) of all the chemicals released by the manmade fiber industry were released to air in the form of point source emissions, and six percent (6.3 million pounds) were released as fugitive air emissions. Roughly 19 percent (17.9 million pounds) of releases were by underground injection. The remaining three percent were released as water discharges and disposals to land.

The total volume of transfers off-site was 47.3 million pounds or 33 percent of the total volume of chemicals reported to TRI by the manmade fiber industry (i.e. releases and transfers). Transfers to recycling accounted for 90 percent of all transfers (42.5 million pounds). The remaining 10 percent (4.8 million pounds) was transferred for disposal, treatment, energy recovery, or to a POTW. Ethylene glycol accounted for about 90 percent of the industry's transfers (42.5 million pounds), and was primarily recycled.

For the plastic resin and manmade fiber industry as a whole, annual releases to the air, water, and land accounted for 64.1 million pounds, or an average of 156,000 pounds per facility. Transfers amounted to 192.4 million pounds, or 469,000 pounds per facility.

Annual releases of priority air pollutants by the resin and manmade fiber industry are estimated for 1995 as follows:

- 16,388 tons per year of carbon monoxide
- 41,771 tons per year of nitrogen dioxide
- 2,218 tons per year of particulate matter of 10 microns or less
- 7,546 tons per year of total particulates
- 67,546 tons per year of sulfur dioxide
- 74,138 tons per year of volatile organic compounds

Nuisance problems are primarily in the form of odorous compounds in this industry.

## Pharmaceuticals

According to 1995 TRI data, pharmaceutical facilities released (discharged to the air, water, or land without treatment) and transferred (shipped off-site) a total of 177 million pounds of pollutants, made up of 104 different chemicals. This represents about 3 percent of the 5.7 billion pounds of TRI chemicals released and transferred by all manufacturers that year. In comparison, the chemical industry (SIC 28) as a whole produced 1.7 billion pounds that year, accounting for about 30 percent of all releases and transfers.

Of the pharmaceutical industry's TRI releases, 57 percent go to the air, 25 percent to underground injection, 17 percent to surface waters, and 1 percent to the land. This release profile differs from other TRI industries that average approximately 59 percent to air, 30 percent to water, and 10 percent to land.

Of the pharmaceutical industry's transfers, about 55 percent are transferred for energy recovery off-site, 19 percent for treatment off-site, 13 percent are transferred to POTWs, 12 percent for recycling off-site, and about 1 percent for disposal off-site.

Of the top ten most frequently reported toxic chemicals on the TRI list, the prevalence of volatile chemicals explains the air intensive toxic chemical loading of the pharmaceutical industry. Seven of the ten most commonly reported toxic chemicals are highly volatile. Six of the ten are volatile organic compounds (methanol, dichioromethane, toluene, ethylene glycol, N,N-Dimethylformamide, and acetonitrile). These are primarily solvents used to extract active ingredients and for cleaning equipment. The primary means of release to the environment are from fugitive air and point air sources. Large quantities of methanol, N,N-Dimethylformamide, and acetonitrile, however, are released via underground injection. Other commonly reported chemicals released and transferred are acids (hydrochloric, sulfuric, and phosphoric), which can be used for pH control or as catalysts.

Annual releases of priority air pollutants by the pharmaceuticals industry are estimated for 1995 as follows:

- 6,586 tons per year of carbon monoxide
- 19,088 tons per year of nitrogen dioxide
- 1,576 tons per year of particulate matter of 10 microns or less
- 4,425 tons per year of total particulates
- 21,311 tons per year of sulfur dioxide
- 37,214 tons per year of volatile organic compounds

Nuisance problems in this industry are primarily in the form of odorous compounds.

# 29-Petroleum Refining and Related Industries

This major group includes establishments primarily engaged in petroleum refining, manufacturing paving and roofing materials, and compounding lubricating oils and greases from purchased materials. Establishments manufacturing and distributing gas to consumers are classified in public utilities industries, and those primarily engaged in producing coke and byproducts are classified in Major Group 33.

The amount of TRI chemicals generated by the petroleum refining industry provides a gross profile of the types and relative amounts of toxic chemical outputs from refining processes. Additional information, which can be related back to possible compliance requirements, is available from the distribution of chemical releases across specific media within the environment. The TRI data requires filers to list releases to air, water, and land separately. The distribution across media can also be compared to the profile of other industry sectors.

The petroleum refining industry releases 75 percent of its total TRI poundage to the air, 24 percent to the water (including 20 percent to underground injection and 4 percent to surface waters), and 1 percent to the land. This release profile differs from other TRI industries that average approximately 59 percent to air, 30 percent to water, and 10 percent to land. Examining the petroleum refining industry's TRI reported toxic chemical releases highlights the likely origins of the large air releases for the industry.

According to TRI data, in 1993 the petroleum refining industry released (discharged to the air, water, or land without treatment) and transferred (shipped off-site) a total of 482 million pounds of pollutants, made up of 103 different chemicals. This represents about 11 percent of the total pounds of TRI chemicals released and transferred by all manufacturers that year. In comparison, the chemical industry (SIC 28) produced 2.5 billion pounds that year, accounting for 33 percent of all releases and transfers.

Overall, the petroleum refining industry's releases declined between 1988 and 1993. Between 1991 and 1993 the decrease in releases was 6.7 percent compared to the average for all industries of 18 percent. In the same period, however, transfers were reported to increase 65 percent which is higher than the average increase in transfers of 25 percent for all manufacturing industries. A large portion of the increases was in the form of transfers to recycling. Spent sulfuric acid generated in the alkylation process makes up about half of all transfers of TRI listed chemicals off-site. At the facility level, the industry reported a level of pollution prevention activities of 42 percent of all refineries, which is slightly higher than the overall average of about 35 percent of TRI reporting facilities.

Comparisons of the reported pounds released or transferred per facility demonstrate that the petroleum refining industry is far above average in its pollutant releases and transfers per facility when compared to other TRI industries. Of the twenty manufacturing SIC codes listed in the TRI database, the mean amount of pollutant release per facility (including petroleum refining) was approximately 120,000 pounds. The TRI releases of the average petroleum refining facility (SIC 2911) were 404,000 pounds, making the industry 3.4 times higher in per facility releases than for other industries. For transfers, the mean of petroleum refining facilities was about 13 times as much that of all TRI manufacturing facilities (202,000 pounds transferred off-site per facility compared to 2,626,000 per refinery). These high releases and transfers per facility reflect the large volumes of material processed at a relatively small number of facilities.

Of the top ten most frequently reported toxic chemicals on the TRI list, the prevalence of volatile chemicals explains the air intensive toxic chemical loading of the refining industry. Nine of the ten most commonly reported toxic chemicals are highly volatile. Seven of the ten are aromatic hydrocarbons (benzene, toluene, ethylbenzene, xylene, cyclohexane, 1,2,4-trimethylbenzene and ethylbenzene). Aromatic hydrocarbons are highly volatile compounds and make up a portion of both crude oil and many finished petroleum products. Ammonia, the ninth most commonly reported toxic chemical, is also released and transferred from petroleum refineries in large quantities. Ammonia may be found in high concentrations in process water streams from steam distillation processes and in refinery sour gas. The primary means of release to the environment is through underground injection of wastewater and emissions to air. Gasoline blending additives (i.e., methanol, ethanol, and MTBE) and chemical feedstocks (propylene, ethylene and naphthalene) are also commonly reported to TRI. Additives and chemical feedstocks are, for the most part, released as air emissions due to their high volatility. A significant portion of the remaining chemicals of the reported TRI toxic chemicals are metals compounds, which are typically transferred off-site for recovery or as a component of hazardous wastes. Although it is not the most frequently reported toxic chemical released or transferred, sulfuric acid is, by far, generated in the largest quantities. Spent sulfuric acid is primarily generated during the alkylation process. The acid is typically transferred off-site for regeneration.

Annual releases of priority air pollutants by the petroleum refining industry are estimated for 1995 as follows:

- 734,630 tons per year of carbon monoxide
- 355,852 tons per year of nitrogen dioxide
- 27,497 tons per year of particulate matter of 10 microns or less
- 36,141 tons per year of total particulates
- 619,775 tons per year of sulfur dioxide
- 313,982 tons per year of volatile organic compounds

Nuisance problems in this industry are odorous compounds and noisy equipment.

## 30-Rubber and Miscellaneous Plastics Products

This major group includes establishments manufacturing products, not elsewhere classified, from plastic resins and from natural, synthetic, or reclaimed rubber, gutta percha, balata, or gutta siak. Numerous products made from these materials are included in other major groups, such as boats in Major Group 37, and toys, buckles, and buttons in Major Group 39. This group includes establishments primarily manufacturing tires, but establishments primarily recapping and retreading automobile tires are classified in Services, Industry 7534. Establishments primarily engaged in manufacturing synthetic rubber and synthetic plastics resins are classified in Industry Group 282.

According to the TRI data, the manufacture of rubber and miscellaneous plastic products results primarily in the release of solvents. The commonly released solvents include acetone, toluene, methyl ethyl ketone, 1,1,1-trichloroethane, and dichloromethane. According to the Toxic Release Inventory (TRI) Public Release Data for 1993, the rubber and miscellaneous plastics products industry released over 118 million pounds of pollutants and transferred over 44 million pounds of pollutants. Of pollutants released, approximately 69 percent were released as point source air emissions, approximately 30.5 percent were released as fugitive air emissions,

approximately 0.2 percent were released to water, and approximately 0.3 percent were disposed of on land.

The rubber and miscellaneous plastics products industry air releases can be traced primarily to the mixing component preparation and building/assembly stages of the rubber manufacturing process and to the solvent cleaning and finishing stages of the plastics products manufacturing process. Major pollutants released to air include toluene, dichloromethane, methylene chloride, and carbon disulfide. Releases of pollutants to water and transfers of pollutants to POTWs arise primarily from the cleaning and cooling of machinery in both the rubber and plastic manufacturing processes and from the cooling and heating of rubber during the rubber products manufacturing process. Major pollutants released to water include zinc compounds, sulfuric acid, ammonia, and ammonium sulfate. Major pollutants transferred to POTWs include acetone, methanol, and zinc compounds, and ammonium sulfate. Releases of pollutants to land arise from the use of various chemicals in the rubber and plastic mixing processes. Major releases of pollutants to land include barium compounds, antimony compounds, zinc compounds, and styrene.

The rubber and miscellaneous plastics products industry releases and transfers a number of metals in large quantities (i.e., transfers as high as millions of pounds and releases as high as hundreds of thousands of pounds). These metals include zinc compounds, copper, lead, and lead compounds. Both zinc and lead are used in the rubber mixing process as vulcanizing agents, accelerator activators, and processing aids (zinc only). Lead and zinc can be released during mixing operation as spills, leaks, and fugitive emissions in the form of dust and particulates (which can and often are captured by filters).

Annual releases of priority air pollutants by the rubber and miscellaneous plastics industry are estimated for 1995 as follows:

- 2,200 tons per year of carbon monoxide
- 9,955 tons per year of nitrogen dioxide
- 2,618 tons per year of particulate matter of 10 microns or less
- 5,182 tons per year of total particulates
- 21,720 tons per year of sulfur dioxide
- 132,945 tons per year of volatile organic compounds

Nuisance problems in this industry are odorous compounds and noisy equipment.

# 31-Leather and Leather Products

This major group includes establishments engaged in tanning, currying, and finishing hides and skins, leather converters, and establishments manufacturing finished leather and artificial leather products and some similar products made of other materials.

This industry makes use of toxic chemicals in the tanning process. TRI data for the leather industry indicates 80 facilities reported 4.8 million pounds of toxic chemicals were released or transferred in 1998. This is an average of 60,311 pounds per facility. About 45.5 percent of this was transferred off-site. About 97 percent of the on-site releases were to the atmosphere.

The industry does generate odors that may be a nuisance to nearby residents.

# 32-Stone, Clay, Glass, and Concrete Products

This major group includes establishments engaged in manufacturing flat glass and other glass products, cement, structural clay products, pottery, concrete and gypsum products, cut stone, abrasive and asbestos products, and other products from materials taken principally from the earth in the form of stone, clay, and sand. When separate reports are available for mines and quarries operated by manufacturing establishments, they are classified in division B, mining. When separate reports are not available, the mining and quarrying activities, other than those of Industry 3295, are classified herein with the manufacturing operations.

623 facilities within SIC 32 reported releases of over 100 toxic chemicals, including solvents, acids, heavy metals, and other compounds. The concrete and cement industries reported high volumes of solvent releases. Trichloroethylene and 1,1,1-trichloroethane together accounted for more than a third of total releases from the concrete industry. The flat glass industry reported a relatively low level of releases, with sulfuric acid accounting for more than two-thirds of the industry total. Releases from the fiberglass industry included significant amounts of acids, heavy metals, and solvents.

The TRI database contains 623 reporting facilities. In 1995, they reported release or transfer of 75.7 million pounds, for an average of 121,000 pounds per facility. 43.9 million pounds were released to the environment, for an average of 70,000 pounds per facility. The remaining 31.8 million pounds were transferred to other facilities, or an average of 51,000 pounds per facility.

Annual releases of priority air pollutants by the stone, clay, glass, and concrete industry are estimated for 1995 as follows:

- 105,059 tons per year of carbon monoxide
- 340,639 tons per year of nitrogen dioxide
- 192,962 tons per year of particulate matter of 10 microns or less
- 662,233 tons per year of total particulates
- 308,534 tons per year of sulfur dioxide
- 34,337 tons per year of volatile organic compounds

Nuisance problems in this industry are related to generally noisy equipment and some odors.

# 33-Primary Metal Industries

This major group includes establishments engaged in smelting and refining ferrous and nonferrous metals from ore, pig, or scrap; in rolling, drawing, and alloying metals; in manufacturing castings and other basic metal products; and in manufacturing nails, spikes, and insulated wire and cable. This major group includes the production of coke. Establishments primarily engaged in manufacturing metal forgings or stampings are classified in Industry Group 346.

## Iron and Steel

TRI reports in 1995 that 705 reporting facilities in this SIC consist of 331 in iron and steel manufacture and 282 in nonferrous metals manufacture. The major sources of toxic chemicals are blast furnaces and steel mills and primary smelting and refining. Of the TRI data for the iron

and steel industry, blast furnaces and steel mills are responsible for over 75 percent of reported releases and transfers. Almost half of the reported releases and transfers in the nonferrous metals manufacturing industry are from smelting and refining facilities. Facilities not part of these two major groups have significantly different TRI profiles.

According to TRI data, the iron and steel industry released and transferred a total of approximately 604.6 million pounds of pollutants during calendar year 1995. Large volumes of metal-bearing wastes dominate these releases and transfers. The majority of these wastes (70 percent or 423 million pounds) are transferred off-site for recycling, typically for recovery of the metal content. Transfers of TRI chemicals account for 85 percent of the iron and steel industry's total TRI-reportable chemicals (513.9 million pounds) while releases make up 15 percent (90.7 million pounds). Metal-bearing wastes account for approximately 80 percent of the industry's transfers and over fifty percent of the releases.

Releases from the industry continue to decrease, while transfers increased from 1992 to 1995. The increase in transfers is likely due to increased off-site shipments for recovery of metals from wastes. This shift may also have contributed to the decrease in releases. Another factor influencing an overall downward trend since 1988 in releases and transfers is the steel mill production decrease during the 1988 to 1995 period. In addition, pollution control equipment and a shift to new technologies, such as continuous casting, are responsible for significant changes in the amount and type of pollutants released during steelmaking. Finally, the industry's efforts in pollution preventing also play a role in driving pollutant release reductions.

Evidence of the diversity of processes at facilities reporting to TRI is found in the fact that the most frequently reported chemical (sulfuric acid) is reported by only 41 percent of the facilities; the sixth most frequently reported chemical was used by just one-fourth of TRI facilities. The variability in facilities' pollutant profile may be attributable to a number of factors. Fewer than 30 of the facilities in the TRI database are fully integrated plants making coke, iron, and steel products. The non-integrated facilities do not perform one or more of the production steps and, therefore, may have considerably different emissions profiles. Furthermore, steel making operations with electric arc furnaces have significantly different pollutant profiles than those making steel with basic oxygen furnaces.

The iron and steel industry releases just 15 percent of its TRI total poundage. Of these releases, over half go to on-site land disposal and one quarter of releases are fugitive or point source air emissions. Manganese, zinc, chromium, and lead account for over 90 percent of the on-site land disposal. The industry's air releases are associated with volatilization, fume or aerosol formation in the high temperature furnaces and byproduct processing. Ammonia, lighter weight organics, such as methanol, acids and metal contaminants found in the iron ore are the principal types of chemicals released to the air. In addition to air releases of chemicals reported in TRI, the iron and steel industry is a significant source of particulates, carbon monoxide, nitrogen oxides and sulfur compounds due to combustion. Ammonia releases account for the largest part of the fugitive releases (approximately 42 percent) and 1,1,1-trichioroethane, hydrochloric acid, zinc compounds, and trichloroethylene each contribute another 4 - 5 percent. Underground injection (principally of hydrochloric acid) makes up about 14 percent of the releases reported by the industry.

Eighty percent of transfers reported by the iron and steel industry are sent off-site for recycling. Zinc, manganese, chromium, copper, nickel, and lead are the six metals transferred by the greatest number of facilities.

Acids used during steel finishing, such as hydrochloric, sulfuric, nitric, and phosphoric acids, account for another 17 percent of transfers. These acids are most often sent off-site for recycling or for treatment. Hydrochloric acids are also managed by on-site underground injection. The next classes of chemicals of significant volume in TRI are solvents and lightweight carbon byproducts, including: 1,1,1-trichioroethane, trichloroethylene, phenol, xylene, methanol, and toluene. These solvents are primarily released as fugitive air emissions, but also from point sources. A small percentage of these solvents are transferred off-site for recycling.

Chemicals sent off-site for disposal (primarily zinc, sulfuric acid, manganese, and ammonium sulfate) account for another 10 percent of transfers. Only approximately 7 percent of chemicals transferred off-site go to treatment. These chemicals are primarily hydrochloric acid, sulfuric acid, and nitric acid. Only about one percent of transfers by weight are POTW discharges (mainly sulfuric acid). Another one percent of transfers are sent for energy recovery (with hydrochloric acid as the most significant contributor).

Annual releases of priority air pollutants by the iron and steel industry are estimated for 1995 as follows:

- 1,386,461 tons per year of carbon monoxide
- 153,607 tons per year of nitrogen dioxide
- 83,939 tons per year of particulate matter of 10 microns or less
- 87,938 tons per year of total particulates
- 232,347 tons per year of sulfur dioxide
- 83,882 tons per year of volatile organic compounds

These industries have distinctive odors associated with them and use noisy, heavy machinery to handle large quantities of raw and finished materials.

## Nonferrous Metals

In the nonferrous metals industry, the 1995 TRI data indicates 365.7 million pounds of releases and transfers of toxic chemicals. 45 percent (164 million pounds were transferred to off-site facilities for recycle or disposal. The average facility released 715,000 pounds and transferred 582,000 pounds in 1995. Chlorine comprised the largest number of TRI releases. This is reflected in the fact that chlorine is a by-product of the magnesium industry and the largest reporter is a magnesium facility. The other top releases are copper compounds, zinc compounds, lead compounds, and sulfuric acid, all of which are by-products of the various processes used in this industry.

Annual releases of priority air pollutants by the nonferrous metals industry are estimated for 1995 as follows:

- 214,243 tons per year of carbon monoxide
- 31,136 tons per year of nitrogen dioxide
- 10,403 tons per year of particulate matter of 10 microns or less
- 24,654 tons per year of total particulates
- 253,538 tons per year of sulfur dioxide
- 11,058 tons per year of volatile organic compounds

These industries have distinctive odors associated with them and use noisy, heavy machinery to handle large quantities of raw and finished materials.

## Metal Casting

According to the 1995 TRI data, the reporting ferrous and nonferrous foundries released and transferred a total of approximately 109 million pounds of pollutants during calendar year 1995. Large volumes of metallic wastes dominate these releases and transfers. Evidence of the diversity of processes at foundries reporting to TRI is found in the fact that the most frequently reported chemical (copper) is reported by only 45 percent of the facilities and over half of the TRI chemicals were reported by fewer than ten facilities. The variability in facilities' pollutant profiles may be attributable to the large number of different types of foundry processes and products. For example, foundries casting only ferrous parts will have different pollutant profiles than those foundries casting both ferrous and nonferrous products.

Releases to the air, water, and land accounted for 33 percent (36 million pounds) of foundries' total reportable chemicals. Of these releases, 70 percent go to onsite land disposal, and about 75 percent are fugitive or point source air emissions. Metallic wastes accounted for over 95 percent of the industry's releases. Manganese, zinc, chromium, and lead account for over 95 percent of the on-site land disposal. The industry's air releases are associated with volatilization, fume or aerosol formation in the furnaces and byproduct processing. Lighter weight organics, such as methanol, acids and metal contaminants found in scrap metal are the principal types of TRI chemicals released to the air. In addition to air releases of chemicals reported to TRI, foundries are often a source of particulate s, carbon monoxide, nitrogen oxides and sulfur compounds due to sand handling operations, curing of chemical binders, and combustion of fossil fuels. Methanol, trichloroethylene and other solvent releases account for most of the fugitive releases (approximately 61 percent).

Off-site transfers of TRI chemicals account for 69 percent of foundries' total TRI-reportable chemicals (74 million pounds). Almost 57 percent of the industry's total TRI wastes (42 million pounds) are metallic wastes that were transferred off-site for recycling, typically for recovery of the metal content. Metallic wastes account for approximately 95 percent of the industry's transfers. About 61 percent of off-site transfers reported by foundries are sent off-site for recycling. Copper, manganese, zinc, chromium, nickel, and lead are the six metals transferred in the greatest amounts and number of facilities (See Table 8). TRI chemicals sent off-site for disposal (primarily manganese, zinc, chromium, and copper) account for 31 percent of transfers. Less than three percent of the remaining transfers from foundries go to treatment off-site, discharge to POT Ws, and energy recovery.

After metals, the next largest volume of chemicals transferred are acids including: sulfuric acid, nitric acid, phosphoric acid, and hydrochloric acid. Spent acids can be generated in wet scrubber systems. In addition, acids are often used to clean and finish the surfaces of the metal castings before plating or coating. The spent acids are often sent off-site for recycling or for treatment. Solvents and other lightweight organic compounds are frequently reported but account for a relatively small amount of total transfers. Solvents are used frequently for cleaning equipment and cast parts. The primary solvents and lightweight organics include: phenol, xylene, 1,2,4-trimethylbenzene, 1,1,1-trichloroethane, trichloroethylene, methanol, and toluene. Transferred solvents are most often sent off-site for disposal or recycling. Phenols and phenoisocyanates are frequently reported but amount to less than 1 percent of the total

TRI pounds transferred. Phenols are often found in chemical binding systems and may be present in waste sand containing chemical binders.

Annual releases of priority air pollutants by the metal casting industry are estimated for 1995 as follows:

- 116,538 tons per year of carbon monoxide
- 11,911 tons per year of nitrogen dioxide
- 10,995 tons per year of particulate matter of 10 microns or less
- 20,973 tons per year of total particulates
- 6,513 tons per year of sulfur dioxide
- 19,031 tons per year of volatile organic compounds

Noise and to a lesser extent odor are potential nuisance problem for the industry.

## 34-Fabricated Metal Products, Except Machinery and Transportation Equipment

This major group includes establishments engaged in fabricating ferrous and nonferrous metal products, such as metal cans, tinware, handtools, cutlery, general hardware, nonelectric heating apparatus, fabricated structural metal products, metal forgings, metal stampings ordnance (except vehicles and guided missiles), and a variety of metal and wire products, not elsewhere classified in other major groups, such as machinery in Major Groups 35 and 36: transportation equipment, including tanks, in Major Group 37; professional scientific and controlling instruments, watches, and clocks in Major Group 38; and jewelry and silverware in Major Group 39. Establishments primarily engaged in producing ferrous and nonferrous metals and their alloys are classified in Major Group 33.

TRI releases and transfers for the Fabricated Metal Products industry (SIC 34) were reported at 434 million pounds in 1995. The number of reporting facilities was 2,676, giving an average of about 162,000 pounds for each facility. Almost 81 percent (350.5 million pounds) were transferred off-site. About 60 percent was sent for recycling, reflecting the reuse of metal scrap. Most of the remainder of the transfers goes to treatment (15 percent) and disposal (16 percent). 83.5 million pounds, or 31,000 pounds per facility was released to the environment on site. Solvents comprise the largest number of TRI releases. This reflects the fact that solvents are used during numerous metal shaping, surface preparation, and surface finishing operations. For example, during metal shaping and surface preparation operations, solvents are used primarily to degrease metal. Solvents are also used during painting operations. All of the processes that use solvents generally result in air emissions, contaminated wastewater, and solid wastes.

Annual releases of priority air pollutants by the fabricated metal products industry are estimated for 1995 as follows:

- 4,925 tons per year of carbon monoxide
- 11,104 tons per year of nitrogen dioxide
- 1,019 tons per year of particulate matter of 10 microns or less
- 2,790 tons per year of total particulates
- 3,169 tons per year of sulfur dioxide
- 86,472 tons per year of volatile organic compounds

These industries have some odor associated with solvents. They may be noisy depending on how they shape the metal and the type of metal they use for raw materials.

## 35-Industrial and Commercial Machinery

This major group includes establishments engaged in manufacturing industrial and commercial machinery and equipment. Included are the manufacture of engines and turbines; farm and garden machinery; construction, mining, and oil field machinery; elevators and conveying equipment; hoists, cranes, monorails, and industrial trucks and tractors; metalworking machinery; special industry machinery; general industrial machinery; and refrigeration and service industry machinery. Machines powered by built-in or detachable motors ordinarily are included in this major group, with the exception of electrical household appliances. Power-driven handtools are included in this major group, whether electric or otherwise driven. Establishments primarily engaged in manufacturing electrical equipment are classified in Major Group 36, and those manufacturing handtools, except powered, are classified in Major Group 34.

TRI data for the machinery industry indicates 1,117 facilities reported 19.4 million pounds of toxic chemicals were released or transferred in 1998. This is an average of 17,000 pounds per facility. About 23.4 percent of this was transferred off-site. About 98 percent of the on-site releases were to the atmosphere.

Depending on the precise nature of the operations, a facility may be a source of odor and noise.

## 36-Electronic and Other Electrical Equipment and Components, Including Computer Equipment

This major group includes establishments engaged in manufacturing machinery, apparatus, and supplies for the generation, storage, transmission, transformation, and utilization of electrical energy. Included are the manufacturing of computers, electricity distribution equipment; electrical industrial apparatus; household appliances; electrical lighting and wiring equipment; radio and television receiving equipment; communications equipment; electronic components and accessories; and other electrical equipment and supplies. The manufacture of household appliances is included in this group, but industrial machinery and equipment powered by built-in or detachable electric motors is classified in Major Group 35. Establishments primarily engaged in manufacturing instruments are classified in Major Group 38.

According to the 1995 TRI data for the semiconductor, printed wiring board (PWB) and cathode ray tube (CRT) industries, the manufacture of these products results in the release of similar substances, including solvents, acids, and heavy metals. The commonly released solvents include acetone, xylene, and methanol. Commonly released acids include sulfuric, hydrochloric, and nitric. A significant amount of ammonia is also released by the electronics/computer industry.

TRI data pertaining to semiconductor manufacturing shows that sulfuric acid and hydrochloric acid, two of the most commonly released chemicals, are used during etching and cleaning processes. Solvents such as acetone, glycol ethers, xylene, and Freon 113 are used during photolithography and cleaning processes. 1,1,1-trichloroethane is used during oxidation and ammonia is used during photolithography and cleaning. A significant amount of methyl ethyl

ketone is released during the degreasing and cleaning processes. Most of these solvents are released into the air.

Data relating to printed wiring board (PWB) manufacturing shows the top releases of acids from PWB facilities include sulfuric acid, hydrochloric acid, and nitric acid, all of which are used during cleaning, electrolyses plating and electroplating operations. Hydrochloric acid is also used during etching. The acids are primarily released to the air or recycled. Glycol ethers are released during image application and cleaning; most of the releases are emitted into the air. Freon 113 is used primarily for flux removal and is released into the air. Nearly all Freon 113 transfers are recycled. Acetone, a solvent used to clean the board before imaging, is released primarily into the air. Ammonium sulfate solution is used during electroplating, imaging, and etching processes and is released to the water or transferred to POTWs. Metals such as lead and copper are commonly used during electroplating, etching, and soldering (i.e., lead) processes. These metals and their compounds are primarily recycled.

In the manufacture of cathode ray tubes (CRT) a significant amount of lead (used during the frit sealing process) is released, much of which is transferred off-site for disposal and recycling. Zinc compounds are used during the phosphor stripe process and are transferred for recycling. Nitric acid, which is used during tube salvaging, is released into the air. Freon 113 is used as a cleaning agent during panel shadow mask preparation and is also released into the air. Solvents (i.e., acetone, methyl ethyl ketone, toluene, and methanol) are used for cleaning and degreasing and are released primarily into the air or transferred for recycling.

For the industry as a whole, annual release to the air, water, and land accounted for 4.3 million pounds, or an average of 11,000 pounds per facility. Transfers amounted to 68.8 million pounds, or 169,000 pounds per facility.

Annual releases of priority air pollutants by the electronics and computer industry are estimated for 1995 as follows:

- 356 tons per year of carbon monoxide
- 1,501 tons per year of nitrogen dioxide
- 224 tons per year of particulate matter of 10 microns or less
- 385 tons per year of total particulates
- 741 tons per year of sulfur dioxide
- 4,866 tons per year of volatile organic compounds

Nuisance problems are generally not encountered in this industry.

# 37-Transportation Equipment

This major group includes establishments engaged in manufacturing equipment for transportation of passengers and cargo by land, air, and water. Important products produced by establishments classified in this major group include motor vehicles, aircraft, guided missiles and space vehicles, ships, boats, railroad equipment, and miscellaneous transportation equipment, such as motorcycles, bicycles, and snowmobiles. Establishments primarily engaged in manufacturing mobile homes are classified in Industry 2451. Establishments primarily engaged in manufacturing equipment used for moving materials on farms; in mines and on construction sites; in individual plants; in airports; or on other locations off the highway are classified in Major Group 35.

In this analysis, we assume that Gainesville is not likely to attract shipbuilding and repair industry. Therefore this segment has been omitted, leaving motor vehicles and aerospace in the transportation equipment industry.

## Motor Vehicles

TRI releases and transfers for the motor vehicles and motor vehicle equipment industry totaled 273.3 million pounds over 754 facilities in 1995 (SIC 371). The majority of TRI reporting facilities were located in Michigan, Ohio, Indiana, Illinois, and Tennessee. These States, with the exception of Tennessee, have historically been the focal point of automobile manufacturing.

TRI transfers total 194 million pounds, or 257,000 pounds per facility. Almost 80 percent of this go off-site for recycling. Another 9 percent go to energy recovery. Most of the remainder goes to disposal sites.

TRI releases totaled 79.3 million pounds per year, or 105,000 pounds per facility. 98 percent of these releases are to the air. Solvents such as toluene, xylene, methyl ethyl ketone, and acetone, comprise the largest number of TRI releases. The large of quantity of solvent release, both fugitive and point source can be attributed to the solvent-intensive finishing processes employed by the industry. In addition to being used to clean equipment and metal parts, solvents are a component found in many of the coating and finishes applied to automobile during the assembly and painting/finishing operations.

Annual releases of priority air pollutants by the manufacture of motor vehicles, bodies, parts, and accessories are estimated for 1995 as follows:

- 15,109 tons per year of carbon monoxide
- 27,355 tons per year of nitrogen dioxide
- 1,048 tons per year of particulate matter of 10 microns or less
- 3,699 tons per year of total particulates
- 20,378 tons per year of sulfur dioxide
- 96,338 tons per year of volatile organic compounds

These industries have some odor associated with solvents. It is generally housed in large factories and has little noise impact upon surrounding properties. Manufacturers of components may have noisy operations.

## Aerospace

According to the 1996 Toxics Release Inventory (TRI) data, 199 aerospace facilities released (to the air, water, or land) and transferred (shipped off-site or discharged to sewers) a total of approximately 27 million pounds of 65 different toxic chemicals during calendar year 1996. This represents approximately 0.5 percent of the 5.6 billion pounds of releases and transfers from all manufacturers (SICs 20-39) reporting to TRI that year. Facilities released an average of 43,862 pounds per facility and transferred an average of 93,503 pounds per facility. The top four chemicals released by weight are solvents. They were methyl ethyl ketone, 1,1,1-trichloroethane, trichloroethylene, and toluene. They accounted for about 66 percent (5.8 million pounds) of the industry's total releases. Nickel, chromium, sulfuric acid, and methyl ethyl ketone were the four top chemicals transferred by weight. These four account for 55 percent (10.2 million pounds) of the total TRI chemicals transferred by the aerospace industry. Only 22 percent of the 65 chemicals reported to the TRI as releases or transfers were

reported by more than 10 facilities, evidence of the many different materials used by the industry and the variance between facilities on choice of these materials.

Transfers to recycling facilities accounted for the largest percentage, 70 percent, of transfers. The next greatest was 17 percent to treatment facilities. The majority of transfers consisted of metals, spent acids, and solvents. 66 percent (12.3 million pounds) of the total transfers were metals. Nickel represented the largest quantity of transfers, 5.3 million pounds or 29 percent of the total. Chromium composed the second largest quantity of transfers with 12 percent of the total. The chemical with the largest quantity of releases, methyl ethyl ketone, accounted for about 6 percent of the total transfers.

Annual releases of priority air pollutants by the aerospace industry are estimated for 1995 as follows:

- 4,261 tons per year of carbon monoxide
- 5,705 tons per year of nitrogen dioxide
- 890 tons per year of particulate matter of 10 microns or less
- 757 tons per year of total particulates
- 3,705 tons per year of sulfur dioxide
- 10,804 tons per year of volatile organic compounds

Noise and odor are potential nuisance problem for the industry, particularly when composite materials are used in the construction.

## 38-Measuring, Analyzing, and Controlling Instruments; Photographic, Medical and Optical Goods; Watches and Clocks

This major group includes establishments engaged in manufacturing instruments (including professional and scientific) for measuring, testing, analyzing, and controlling, and their associated sensors and accessories; optical instruments and lenses; surveying and drafting instruments; hydrological, hydrographic, meteorological, and geophysical equipment; search, detection, navigation, and guidance systems and equipment; surgical, medical, and dental instruments, equipment, and supplies; ophthalmic goods; photographic equipment and supplies; and watches and clocks.

TRI data for the measurement/photography equipment industry indicates 253 facilities reported 12.2 million pounds of toxic chemicals were released or transferred in 1998. This is an average of 48,000 pounds per facility. About 10.8 percent of this was transferred off-site. About 88 percent of the on-site releases were to the atmosphere, with most of the remainder released to surface waters.

This industry is generally not considered a source of odor or noise, although each facility must be investigated.

## 39-Miscellaneous Manufacturing Industries

This major group includes establishments primarily engaged in manufacturing products not classified in any other manufacturing major group. Industries in this group fall into the following

categories: jewelry, silverware, and plated ware; musical instruments; dolls, toys, games, and sporting and athletic goods; pens, pencils, and artists' materials; buttons, costume novelties, miscellaneous notions; brooms and brushes; caskets; and other miscellaneous manufacturing industries.

TRI data for the miscellaneous category of industry indicates 316 facilities reported 10.6 million pounds of toxic chemicals were released or transferred in 1998. This is an average of 33,000 pounds per facility. About 7 percent of this was transferred off-site. About 98 percent of the on-site releases were to the atmosphere, with most of the remainder released to surface waters. Each facility must be independently analyzed for noise and odor potential.

# Additional Detail in the Review of Manufacturing Uses Under the City of Gainesville's I-2 Industrial Zoning

## Introduction

Merging Manufacturing Census data with Environment Protection Agency data on air, water, and solid waste emissions created a database that allowed more detailed analysis of pollution potential for industry categories. This database was designed to allow deployment of indicators of air, water, or solid waste releases from the facilities normalized by the number of employees at the facilities. Because of the difficulty in obtaining permission to use the latest census information, 1990 vintage information was used. This information, while dated, can still be useful as a guide to probable pollution problems, even if exact estimates are not possible. Given more time and resources, this approach could be updated to include the latest available data and incorporate a range of risk factors for human toxic and ecotoxic effects. Such an analysis would provide planners with a tool to estimate comprehensive profiles of industrial pollution for proposed new projects involving manufacturing plants.

Databases used were the Environmental Protection Agency (EPA) Toxic Release Inventory (TRI), EPA Aerometric Information Retrieval System (AIRS), and the Census Bureau Logitudinal Research Database (LRD). The pollution profile was obtained by obtaining the media-specific releases of toxic chemicals in the TRI, the AIRS estimates of releases of the six criteria pollutants (sulfur dioxide, nitrogen oxides, carbon monoxide, total particulates, particulates below 10 microns, and volatile organic compounds), and the employment from the LRD. Employment was chosen as the base for normalizing the data because it is generally available to planners for a proposed project and is available in the LRD. The TRI data only cover facilities releasing pollutants in quantities over a threshold level of emissions. Consequently, pollution profiles based on these data may be upwardly biased, since cleaner facilities are not included in the totals. Thus facilities that were reported in the LRD but not reported in the TRI were assumed to emit zero pollutants. To the extent that these facilities have some emissions, the pollution profiles presented are biased downward.

## Results

In accordance with the request of City staff, the top five industrial groups presented in Table 1 of our earlier report were given a more detailed analysis by taking them to a four digit Standard Industrial Classification (SIC) Code. The results are presented in a table labeled Table 2 to avoid confusion with Table 1 in our first report. Table 3 presents similar data for the other SIC Groups taken to a three digit SIC Code. Both these tables are presented ranked according to an equal weighting of each indicator within the industries with largest pollution potential presented first. Table 4 presents the same data listed according to SIC Code.

**TABLE 2**
Pollution Indicators by 4-Digit SIC Code (lb/yr/employee)

| SIC Code | Name | Toxic Releases | Air Emissions | Ozone Precursors |
|---|---|---|---|---|
| 2873 | Nitrogenous Fertilizers | 36,595 | 35,415 | 20,039 |
| 2999 | Products of Petroleum and Coal, Not Elsewhere Classified | 2,547 | 93,649 | 15,110 |
| 3331 | Primary Smelting and Refining of Copper | 62,896 | 0 | 0 |
| 2911 | Petroleum Refining | 5,113 | 54,410 | 22,159 |
| 2611 | Pulp Mills | 8,425 | 62,668 | 13,151 |
| 2874 | Phosphatic Fertilizers | 42,200 | 11,173 | 1,952 |
| 2861 | Gum and Wood Chemicals | 1,638 | 44,782 | 18,861 |
| 3241 | Cement, Hydraulic | 39 | 57,641 | 13,948 |
| 2812 | Alkalies and Chlorine | 17,904 | 20,510 | 9,133 |
| 2816 | Inorganic Pigments | 26,840 | 25,647 | 1,196 |
| 2821 | Plastics Materials and Synthetic Resins, and Nonvulcanizable Elastomers | 3,348 | 15,612 | 13,188 |
| 3334 | Primary Production of Aluminum | 998 | 60,841 | 1,758 |
| 2951 | Asphalt Paving Mixtures and Blocks | 2 | 31,417 | 10,202 |
| 2869 | Industrial Organic Chemicals, Not Elsewhere Classified | 10,157 | 12,088 | 6,832 |
| 3274 | Lime | 5 | 36,310 | 6,638 |
| 3339 | Primary Smelting and Refining of Nonferrous Metals, Except Copper and Aluminum | 17,506 | 3,558 | 526 |
| 3313 | Electrometallurgical Products, Except Steel | 3,749 | 20,851 | 2,441 |
| 3312 | Steel Works, Blast Furnaces, and Rolling Mills | 1,833 | 17,680 | 3,119 |
| 2865 | Cyclic Organic Crudes and Intermediates, and Organic Dyes and Pigments | 10,271 | 4,002 | 1,066 |
| 2819 | Industrial Inorganic Chemicals, Not Elsewhere Classified | 3,116 | 11,092 | 3,546 |
| 2631 | Paperboard Mills | 1,172 | 16,632 | 3,162 |
| 3251 | Brick and Structural Clay Tile | 29 | 10,387 | 5,405 |
| 2621 | Paper Mills | 969 | 14,477 | 3,603 |
| 3341 | Secondary Smelting and Refining of Nonferrous Metals | 2,277 | 19,272 | 1,297 |
| 3295 | Minerals and Earths, Ground or Otherwise Treated | 957 | 17,691 | 2,376 |
| 2822 | Synthetic Rubber | 11,055 | 0 | 0 |
| 2833 | Medicinal Chemicals and Botanical Products | 5,451 | 5,487 | 1,653 |
| 2823 | Cellulosic Manmade Fibers | 10,134 | 0 | 0 |
| 2824 | Manmade Organic Fibers, Except Cellulosic | 1,362 | 5,540 | 2,486 |
| 2813 | Industrial Gases | 1,305 | 3,755 | 2,572 |
| 2892 | Explosives | 944 | 4,364 | 2,569 |
| 2895 | Carbon Black | 6,592 | 0 | 0 |
| 2899 | Chemicals and Chemical Preparations, Not | 1,567 | 3,533 | 1,845 |

**TABLE 2**
Pollution Indicators by 4-Digit SIC Code (lb/yr/employee)

| SIC Code | Name | Toxic Releases | Air Emissions | Ozone Precursors |
|---|---|---|---|---|
| | Elsewhere Classified | | | |
| 2879 | Pesticides and Agricultural Chemicals, Not Elsewhere Classified | 2,752 | 1,855 | 1,054 |
| 3292 | Asbestos Products | 3,174 | 1,460 | 715 |
| 3353 | Aluminum Sheet, Plate, and Foil | 489 | 2,050 | 1,851 |
| 3275 | Gypsum Products | 2 | 6,755 | 864 |
| 3211 | Flat Glass | 37 | 2,901 | 1,886 |
| 3221 | Glass Containers | 39 | 3,247 | 1,614 |
| 3355 | Aluminum Rolling and Drawing, Not Elsewhere Classified | 177 | 5,287 | 591 |
| 2952 | Asphalt Felts and Coatings | 31 | 3,345 | 1,191 |
| 2891 | Adhesives and Sealants | 688 | 3,415 | 673 |
| 2843 | Surface Active Agents, Finishing Agents, Sulfonated Oils, and Assistants | 2,392 | 189 | 101 |
| 3229 | Pressed and Blown Glass and Glassware, Not Elsewhere Classified | 155 | 1,687 | 1,120 |
| 3316 | Cold-Rolled Steel Sheet, Strip, and Bars | 2,083 | 456 | 187 |
| 3321 | Gray and Ductile Iron Foundries | 240 | 4,179 | 363 |
| 2851 | Paint, Varnishes, Lacquers, Enamels, and Allied Products | 1,293 | 576 | 477 |
| 3315 | Steel Wiredrawing and Steel Nails and Spikes | 839 | 2,162 | 286 |
| 3369 | Nonferrous Foundries, Except Aluminum and Copper | 529 | 979 | 712 |
| 3281 | Cut Stone and Stone Products | 7 | 3,741 | 256 |
| 2672 | Coated and Laminated Paper, Not Elsewhere Classified | 1,097 | 354 | 343 |
| 3259 | Structural Clay Products, Not Elsewhere Classified | 4 | 1,499 | 648 |
| 2992 | Lubricating Oils and Greases | 151 | 844 | 718 |
| 2834 | Pharmaceutical Preparations | 635 | 744 | 373 |
| 2671 | Packaging Paper and Plastic Film, Coated and Laminated | 423 | 556 | 555 |
| 3296 | Mineral Wool | 291 | 1,469 | 393 |
| 3351 | Rolling, Drawing, and Extruding of Copper | 889 | 1,179 | 38 |
| 3255 | Clay Refractories | 39 | 2,033 | 238 |
| 2893 | Printing Ink | 265 | 962 | 378 |
| 2653 | Corrugated and Solid Fiber Boxes | 6 | 644 | 495 |
| 2841 | Soap and Other Detergents, Except Specialty Cleaners | 162 | 933 | 301 |
| 3297 | Nonclay Refractories | 85 | 932 | 346 |
| 2679 | Converted Paper and Paperboard Products, | 450 | 636 | 174 |

**TABLE 2**
Pollution Indicators by 4-Digit SIC Code (lb/yr/employee)

| SIC Code | Name | Toxic Releases | Air Emissions | Ozone Precursors |
|---|---|---|---|---|
| | Not Elsewhere Classified | | | |
| 3322 | Malleable Iron Foundries | 19 | 1,773 | 126 |
| 3317 | Steel Pipe and Tubes | 702 | 116 | 110 |
| 3325 | Steel Foundries, Not Elsewhere Classified | 296 | 500 | 236 |
| 3399 | Primary Metal Products, Not Elsewhere Classified | 454 | 489 | 95 |
| 3356 | Rolling, Drawing, and Extruding of Nonferrous Metals, Except Copper and Aluminum | 632 | 110 | 64 |
| 3291 | Abrasive Products | 187 | 506 | 229 |
| 3264 | Porcelain Electrical Supplies | 180 | 315 | 199 |
| 3299 | Nonmetallic Mineral Products, Not Elsewhere Classified | 265 | 462 | 71 |
| 2844 | Perfumes, Cosmetics, and Other Toilet Preparations | 40 | 335 | 209 |
| 3354 | Aluminum Extruded Products | 191 | 135 | 109 |
| 2842 | Specialty Cleaning, Polishing, and Sanitation Preparations | 75 | 174 | 167 |
| 3253 | Ceramic Wall and Floor Tile | 342 | 76 | 4 |
| 2875 | Fertilizers, Mixing Only | 313 | 67 | 7 |
| 2652 | Setup Paperboard Boxes | 8 | 267 | 152 |
| 2836 | Biological Products, Except Diagnostic Substances | 322 | 0 | 0 |
| 3272 | Concrete Products, Except Block and Brick | 6 | 352 | 106 |
| 3324 | Steel Investment Foundries | 153 | 293 | 22 |
| 3261 | Vitreous China Plumbing Fixtures and China Earthenware Fittings and Bathroom Accessories | 73 | 116 | 91 |
| 3273 | Ready-Mixed Concrete | 1 | 418 | 56 |
| 3357 | Drawing and Insulating of Nonferrous Wire | 165 | 59 | 43 |
| 2657 | Folding Paperboard Boxes, Including Sanitary | 226 | 7 | 7 |
| 3398 | Metal Heat Treating | 196 | 57 | 11 |
| 2656 | Sanitary Food Containers, Except Folding | 103 | 64 | 64 |
| 3366 | Copper Foundries | 196 | 5 | 4 |
| 3363 | Aluminum Die-Castings | 202 | 0 | 0 |
| 2675 | Die-Cut Paper and Paperboard and Cardboard | 152 | 22 | 14 |
| 2673 | Plastics, Foil, and Coated Paper Bags | 115 | 15 | 15 |
| 2655 | Fiber Cans, Tubes, Drums, and Similar Products | 62 | 57 | 30 |

**TABLE 2**
Pollution Indicators by 4-Digit SIC Code (lb/yr/employee)

| SIC Code | Name | Toxic Releases | Air Emissions | Ozone Precursors |
|---|---|---|---|---|
| 3231 | Glass Products, Made of Purchased Glass | 50 | 44 | 35 |
| 3364 | Nonferrous Die-Castings, Except Aluminum | 77 | 0 | 0 |
| 2676 | Sanitary Paper Products | 72 | 2 | 2 |
| 3271 | Concrete Block and Brick | 8 | 118 | 6 |
| 3365 | Aluminum Foundries | 48 | 15 | 5 |
| 3262 | Vitreous China Table and Kitchen Articles | 48 | 0 | 0 |
| 2677 | Envelopes | 35 | 5 | 5 |
| 3269 | Pottery Products, Not Elsewhere Classified | 2 | 48 | 14 |
| 2674 | Uncoated Paper and Multiwall Bags | 22 | 0 | 0 |
| 2835 | In Vitro and In Vivo Diagnostic Substances | 13 | 0 | 0 |
| 2678 | Stationary, Tablets, and Related Products | 9 | 0 | 0 |
| 3263 | Fine Earthenware Table and Kitchen Articles | 0 | 0 | 0 |

**TABLE 3**
Pollution Indicators by 3-Digit SIC Code (lb/yr/employee)

| SIC Code | Name | Toxic Releases | Air Emissions | Ozone Precursors |
|---|---|---|---|---|
| 311 | Leather Tanning and Finishing | 2,774 | 903 | 654 |
| 207 | Fats and Oils | 357 | 4,794 | 2,021 |
| 204 | Grain Mill Products | 172 | 7,048 | 1,104 |
| 341 | Metal Cans and Shipping Containers | 845 | 1,291 | 1,235 |
| 386 | Photographic Equipment and Supplies | 766 | 1,887 | 752 |
| 208 | Beverages | 41 | 2,140 | 1,420 |
| 275 | Commercial Printing | 619 | 926 | 903 |
| 226 | Dying and Finishing Textiles, Except Wool Fabrics and Knit Goods | 334 | 1,652 | 813 |
| 206 | Sugar and Confectionary Products | 41 | 2,436 | 815 |
| 362 | Electrical Industrial Apparatus | 98 | 2,262 | 652 |
| 375 | Motorcycles, Bicycles, and Parts | 76 | 1,219 | 1,149 |
| 347 | Coating, Engraving, and Allied Services | 640 | 472 | 431 |
| 301 | Tires and Inner Tubes | 60 | 1,523 | 823 |
| 229 | Miscellaneous Textile Goods | 451 | 702 | 543 |
| 221 | Broadwoven Fabric Mills, Cotton | 22 | 1,365 | 861 |
| 349 | Miscellaneous Fabricated Metal Products | 169 | 2,320 | 148 |
| 306 | Fabricated Rubber Products, Not Elsewhere Classified | 354 | 683 | 587 |
| 242 | Sawmills and Planing Mills | 9 | 2,012 | 418 |
| 374 | Railroad Equipment | 72 | 1,554 | 523 |
| 214 | Tobacco Stemming and Redrying | 209 | 900 | 572 |
| 361 | Electric Transmission and Distribution Equipment | 67 | 1,587 | 242 |
| 243 | Millwork, Veneer, Plywood, and Structural Wood Members | 51 | 1,086 | 460 |
| 249 | Miscellaneous Wood Products | 182 | 646 | 287 |
| 202 | Dairy Products | 162 | 530 | 345 |
| 201 | Meat Products | 25 | 671 | 488 |
| 371 | Motor Vehicles and Motor Vehicle Equipment | 186 | 421 | 324 |
| 308 | Miscellaneous Plastics Products | 455 | 60 | 48 |
| 251 | Household Furniture | 85 | 443 | 402 |
| 252 | Office Furniture | 107 | 390 | 360 |
| 352 | Farm and Garden Machinery and Equipment | 55 | 673 | 252 |
| 363 | Houshold Appliances | 135 | 321 | 247 |
| 373 | Ship and Boat Building and Repairing | 258 | 151 | 123 |
| 228 | Yarn and Thread Mills | 154 | 301 | 180 |
| 395 | Pens, Pencils, and Other Artists' Material | 161 | 224 | 201 |
| 351 | Engines and Turbines | 129 | 378 | 181 |
| 379 | Miscellaneous Transportation Equipment | 47 | 782 | 105 |
| 399 | Miscellaneous Manufacturing Industries | 225 | 120 | 89 |
| 305 | Gaskets, Packing, and Sealing Devices and Rubber | 287 | 3 | 2 |

**TABLE 3**
Pollution Indicators by 3-Digit SIC Code (lb/yr/employee)

| SIC Code | Name | Toxic Releases | Air Emissions | Ozone Precursors |
|---|---|---|---|---|
| | and Plastics Hose and Belting | | | |
| 254 | Partitions, Shelving, Lockers, and Office and Store Fixtures | 32 | 276 | 268 |
| 369 | Micellaneous Electrical Machinery, Equipment, and Supplies | 216 | 116 | 37 |
| 393 | Musical Instruments | 94 | 193 | 169 |
| 223 | Broadwoven Fabric Mills, Wool | 148 | 261 | 50 |
| 346 | Metal Forgings and Stampings | 127 | 211 | 72 |
| 367 | Electronic Components and Accessories | 194 | 29 | 20 |
| 372 | Aircraft and Parts | 138 | 110 | 61 |
| 364 | Electric Lighting and Wiring Equipment | 115 | 93 | 69 |
| 348 | Ordnance and Accessories, Except Vehicles and Guided Missiles | 89 | 216 | 42 |
| 376 | Guided Missiles and Space Vehicles and Parts | 151 | 45 | 16 |
| 345 | Screw Machine Products, and Bolts, Nuts, Screws, Rivits, and Washers | 153 | 24 | 22 |
| 385 | Ophthalmic Goods | 140 | 46 | 31 |
| 344 | Fabricated Structural Metal Products | 82 | 102 | 89 |
| 209 | Miscellaneous Food Preparations and Kindred Products | 25 | 267 | 103 |
| 203 | Canned, Frozen, and Preserved Fruits, Vegetables, and Food Specialties | 45 | 230 | 88 |
| 359 | Miscellaneous Industrial and Commercial Machinery and Equipment | 60 | 307 | 24 |
| 343 | Heating Equipment, Except Electric and Warm Air; and Plumbing Fixtures | 111 | 101 | 30 |
| 302 | Rubber and Plastic Footwear | 62 | 107 | 104 |
| 342 | Cutlery, Handtools, and General Hardware | 138 | 37 | 14 |
| 211 | Cigarettes | 150 | 0 | 0 |
| 396 | Costume Jewelry, Costume Novelties, Buttons, and Miscellaneous Notions, Except Precious Metal | 136 | 0 | 0 |
| 358 | Refrigeration and Service Industry Machinery | 56 | 114 | 76 |
| 277 | Greeting Cards | 30 | 119 | 107 |
| 366 | Communications Equipment | 66 | 77 | 65 |
| 356 | General Industrial Machinery and Equipment | 40 | 116 | 83 |
| 253 | Public Building and Related Furniture | 25 | 145 | 87 |
| 365 | Household Audio and Video Equipment, and Audio Recordings | 96 | 28 | 28 |
| 313 | Boot and Shoe Cut Stock and Findings | 44 | 79 | 79 |
| 227 | Carpets and Rugs | 109 | 0 | 0 |
| 353 | Construction, Mining, and Materials Handling | 25 | 109 | 70 |

**TABLE 3**
Pollution Indicators by 3-Digit SIC Code (lb/yr/employee)

| SIC Code | Name | Toxic Releases | Air Emissions | Ozone Precursors |
|---|---|---|---|---|
| | Machinery and Equipment | | | |
| 278 | Blankbooks, Looseleaf Binders, and Bookbinding and Related Work | 22 | 96 | 76 |
| 354 | Metalworking Machinery and Equipment | 85 | 12 | 2 |
| 387 | Watches, Clocks, Clockwork Operated Devices, and Parts | 85 | 0 | 0 |
| 355 | Special Industry Machinery, Except Metalworking Machinery | 64 | 13 | 12 |
| 391 | Jewelry, Silverware, and Plated Ware | 47 | 50 | 13 |
| 384 | Surgical, Medical, and Dental Instruments and Supplies | 66 | 4 | 2 |
| 273 | Books | 10 | 66 | 58 |
| 222 | Broadwoven Fabric Mills, Manmade Fiber and Silk | 21 | 92 | 27 |
| 259 | Miscellaneous Funiture and Fixtures | 39 | 25 | 25 |
| 394 | Dolls, Toys, Games and Sporting and Athletic Goods | 44 | 21 | 18 |
| 319 | Leather Goods, Not Elsewhere Classified | 0 | 67 | 66 |
| 382 | Laboratory Apparatus and Analytical, Optical, Measuring, and Controlling Instruments | 46 | 16 | 13 |
| 225 | Knitting Mills | 29 | 48 | 23 |
| 276 | Manifold Business Forms | 55 | 1 | 1 |
| 357 | Computer and Office Equipment | 36 | 24 | 21 |
| 213 | Chewing and Smoking Tobacco and Snuff | 0 | 118 | 21 |
| 314 | Footwear, Except Rubber | 32 | 3 | 2 |
| 272 | Periodicals: Publishing, or Publishing and Printing | 3 | 33 | 32 |
| 271 | Newspapers: Publishing, or Publishing and Printing | 0 | 31 | 27 |
| 381 | Search, Detection, Navigation, Guidance, Aeronautical, and Nautical Systems, Insruments, and Equipment | 25 | 0 | 0 |
| 205 | Bakery Products | 6 | 23 | 19 |
| 239 | Miscellaneous Fabricated Textile Products | 16 | 9 | 7 |
| 317 | Handbags and Other Personal Leather Goods | 5 | 17 | 17 |
| 224 | Narrow Fabric and Other Smallwares Mills | 5 | 17 | 17 |
| 279 | Service Industries for the Printing Trade | 7 | 13 | 13 |
| 238 | Miscellaneous Apparel and Accessories | 10 | 7 | 7 |
| 316 | Luggage | 11 | 5 | 3 |
| 244 | Wood Containers | 1 | 35 | 5 |
| 245 | Wood Buildings and Mobile Homes | 0 | 14 | 8 |
| 232 | Men's and Boy's Furnishings, Work Clothing, and Allied Garments | 0 | 15 | 5 |
| 235 | Hats, Caps, and Millinery | 6 | 0 | 0 |
| 274 | Miscellaneus Publishing | 1 | 3 | 3 |

**TABLE 3**
Pollution Indicators by 3-Digit SIC Code (lb/yr/employee)

| SIC Code | Name | Toxic Releases | Air Emissions | Ozone Precursors |
|---|---|---|---|---|
| 212 | Cigars | 3 | 0 | 0 |
| 231 | Men's and Boy's Suits, Coats, and Overcoats | 3 | 0 | 0 |
| 236 | Girls', Children's, and Infants' Outerwear | 2 | 0 | 0 |
| 234 | Women's, Misses', Children's, and Infants' Undergarments | 1 | 2 | 0 |
| 241 | Logging | 0 | 2 | 0 |
| 233 | Women's. Misses', and Juniors' Outerwear | 0 | 1 | 0 |
| 237 | Fur Goods | 0 | 0 | 0 |
| 315 | Leather Gloves and Mittens | 0 | 0 | 0 |

**TABLE 4**
Pollution Indicators by SIC Code (lb/yr/employee)

| SIC Code | Name | Toxic Releases | Air Emissions | Ozone Precursors | Odor Potential | Noise Potential |
|---|---|---|---|---|---|---|
| 20 | Food and Kindred Products | | | | High | Medium |
| 201 | Meat Products | 25 | 671 | 488 | | |
| 202 | Dairy Products | 162 | 530 | 345 | | |
| 203 | Canned, Frozen, and Preserved Fruits, Vegetables, and Food Specialties | 45 | 230 | 88 | | |
| 204 | Grain Mill Products | 172 | 7,048 | 1,104 | | |
| 205 | Bakery Products | 6 | 23 | 19 | | |
| 206 | Sugar and Confectionery Products | 41 | 2,436 | 815 | | |
| 207 | Fats and Oils | 357 | 4,794 | 2,021 | | |
| 208 | Beverages | 41 | 2,140 | 1,420 | | |
| 209 | Miscellaneous Food Preparations and Kindred Products | 25 | 267 | 103 | | |
| 21 | Tobacco Products | | | | Medium | Medium |
| 211 | Cigarettes | 150 | 0 | 0 | | |
| 212 | Cigars | 3 | 0 | 0 | | |
| 213 | Chewing and Smoking Tobacco and Snuff | 0 | 118 | 21 | | |
| 214 | Tobacco Stemming and Redrying | 209 | 900 | 572 | | |
| 22 | Textile Mill Products | | | | Low | High |
| 221 | Broadwoven Fabric Mills, Cotton | 22 | 1,365 | 861 | | |
| 222 | Broadwoven Fabric Mills, Manmade Fiber and Silk | 21 | 92 | 27 | | |
| 223 | Broadwoven Fabric Mills, Wool | 148 | 261 | 50 | | |
| 224 | Narrow Fabric and Other Smallwares Mills | 5 | 17 | 17 | | |
| 225 | Knitting Mills | 29 | 48 | 23 | | |
| 226 | Dying and Finishing Textiles, Except Wool Fabrics and Knit Goods | 334 | 1,652 | 813 | | |
| 227 | Carpets and Rugs | 109 | 0 | 0 | | |
| 228 | Yarn and Thread Mills | 154 | 301 | 180 | | |
| 229 | Miscellaneous Textile Goods | 451 | 702 | 543 | | |
| 230 | Apparel and Other Finished Products Made From Fabrics and Similar Materials | | | | Low | Low |
| 231 | Men's and Boy's Suits, Coats, and Overcoats | 3 | 0 | 0 | | |

**TABLE 4**
Pollution Indicators by SIC Code (lb/yr/employee)

| SIC Code | Name | Toxic Releases | Air Emissions | Ozone Precursors | Odor Potential | Noise Potential |
|---|---|---|---|---|---|---|
| 232 | Men's and Boy's Furnishings, Work Clothing, and Allied Garments | 0 | 15 | 5 | | |
| 233 | Women's. Misses', and Juniors' Outerwear | 0 | 1 | 0 | | |
| 234 | Women's, Misses', Children's, and Infants' Undergarments | 1 | 2 | 0 | | |
| 235 | Hats, Caps, and Millinery | 6 | 0 | 0 | | |
| 236 | Girls', Children's, and Infants' Outerwear | 2 | 0 | 0 | | |
| 237 | Fur Goods | 0 | 0 | 0 | | |
| 238 | Miscellaneous Apparel and Accessories | 10 | 7 | 7 | | |
| 239 | Miscellaneous Fabricated Textile Products | 16 | 9 | 7 | | |
| 240 | Lumber and Wood Products, Except Furniture | | | | Medium | Medium |
| 241 | Logging | 0 | 2 | 0 | | |
| 242 | Sawmills and Planing Mills | 9 | 2,012 | 418 | | |
| 243 | Millwork, Veneer, Plywood, and Structural Wood Members | 51 | 1,086 | 460 | | |
| 244 | Wood Containers | 1 | 35 | 5 | | |
| 245 | Wood Buildings and Mobile Homes | 0 | 14 | 8 | | |
| 249 | Miscellaneous Wood Products | 182 | 646 | 287 | | |
| 250 | Furniture and Fixtures | | | | Medium | Medium |
| 251 | Household Furniture | 85 | 443 | 402 | | |
| 252 | Office Furniture | 107 | 390 | 360 | | |
| 253 | Public Building and Related Furniture | 25 | 145 | 87 | | |
| 254 | Partitions, Shelving, Lockers, and Office and Store Fixtures | 32 | 276 | 268 | | |
| 259 | Miscellaneous Furniture and Fixtures | 39 | 25 | 25 | | |
| 260 | Paper and Allied Products | | | | High | High |
| 2611 | Pulp Mills | 8,425 | 62,668 | 13,151 | | |
| 2621 | Paper Mills | 969 | 14,477 | 3,603 | | |
| 2631 | Paperboard Mills | 1,172 | 16,632 | 3,162 | | |
| 2652 | Setup Paperboard Boxes | 8 | 267 | 152 | | |
| 2653 | Corrugated and Solid Fiber Boxes | 6 | 644 | 495 | | |
| 2655 | Fiber Cans, Tubes, Drums, and Similar Products | 62 | 57 | 30 | | |

**TABLE 4**
Pollution Indicators by SIC Code (lb/yr/employee)

| SIC Code | Name | Toxic Releases | Air Emissions | Ozone Precursors | Odor Potential | Noise Potential |
|---|---|---|---|---|---|---|
| 2656 | Sanitary Food Containers, Except Folding | 103 | 64 | 64 | | |
| 2657 | Folding Paperboard Boxes, Including Sanitary | 226 | 7 | 7 | | |
| 2671 | Packaging Paper and Plastic Film, Coated and Laminated | 423 | 556 | 555 | | |
| 2672 | Coated and Laminated Paper, Not Elsewhere Classified | 1,097 | 354 | 343 | | |
| 2673 | Plastics, Foil, and Coated Paper Bags | 115 | 15 | 15 | | |
| 2674 | Uncoated Paper and Multiwall Bags | 22 | 0 | 0 | | |
| 2675 | Die-Cut Paper and Paperboard and Cardboard | 152 | 22 | 14 | | |
| 2676 | Sanitary Paper Products | 72 | 2 | 2 | | |
| 2677 | Envelopes | 35 | 5 | 5 | | |
| 2678 | Stationary, Tablets, and Related Products | 9 | 0 | 0 | | |
| 2679 | Converted Paper and Paperboard Products, Not Elsewhere Classified | 450 | 636 | 174 | | |
| 27 | Printing, Publishing, and Allied Industries | | | | Medium | Medium |
| 271 | Newspapers: Publishing, or Publishing and Printing | 0 | 31 | 27 | | |
| 272 | Periodicals: Publishing, or Publishing and Printing | 3 | 33 | 32 | | |
| 273 | Books | 10 | 66 | 58 | | |
| 274 | Miscellaneous Publishing | 1 | 3 | 3 | | |
| 275 | Commercial Printing | 619 | 926 | 903 | | |
| 276 | Manifold Business Forms | 55 | 1 | 1 | | |
| 277 | Greeting Cards | 30 | 119 | 107 | | |
| 278 | Blankbooks, Loose-leaf Binders, and Bookbinding and Related Work | 22 | 96 | 76 | | |
| 279 | Service Industries for the Printing Trade | 7 | 13 | 13 | | |
| 28 | Chemicals and Allied Products | | | | High | High |
| 2812 | Alkalies and Chlorine | 17,904 | 20,510 | 9,133 | | |
| 2813 | Industrial Gases | 1,305 | 3,755 | 2,572 | | |
| 2816 | Inorganic Pigments | 26,840 | 25,647 | 1,196 | | |

**TABLE 4**
Pollution Indicators by SIC Code (lb/yr/employee)

| SIC Code | Name | Toxic Releases | Air Emissions | Ozone Precursors | Odor Potential | Noise Potential |
|---|---|---|---|---|---|---|
| 2819 | Industrial Inorganic Chemicals, Not Elsewhere Classified | 3,116 | 11,092 | 3,546 | | |
| 2821 | Plastics Materials and Synthetic Resins, and Nonvulcanizable Elastomers | 3,348 | 15,612 | 13,188 | | |
| 2822 | Synthetic Rubber | 11,055 | 0 | 0 | | |
| 2823 | Cellulosic Manmade Fibers | 10,134 | 0 | 0 | | |
| 2824 | Manmade Organic Fibers, Except Cellulosic | 1,362 | 5,540 | 2,486 | | |
| 2833 | Medicinal Chemicals and Botanical Products | 5,451 | 5,487 | 1,653 | | |
| 2834 | Pharmaceutical Preparations | 635 | 744 | 373 | | |
| 2835 | In Vitro and In Vivo Diagnostic Substances | 13 | 0 | 0 | | |
| 2836 | Biological Products, Except Diagnostic Substances | 322 | 0 | 0 | | |
| 2841 | Soap and Other Detergents, Except Specialty Cleaners | 162 | 933 | 301 | | |
| 2842 | Specialty Cleaning, Polishing, and Sanitation Preparations | 75 | 174 | 167 | | |
| 2843 | Surface Active Agents, Finishing Agents, Sulfonated Oils, and Assistants | 2,392 | 189 | 101 | | |
| 2844 | Perfumes, Cosmetics, and Other Toilet Preparations | 40 | 335 | 209 | | |
| 2851 | Paint, Varnishes, Lacquers, Enamels, and Allied Products | 1,293 | 576 | 477 | | |
| 2861 | Gum and Wood Chemicals | 1,638 | 44,782 | 18,861 | | |
| 2865 | Cyclic Organic Crudes and Intermediates, and Organic Dyes and Pigments | 10,271 | 4,002 | 1,066 | | |
| 2869 | Industrial Organic Chemicals, Not Elsewhere Classified | 10,157 | 12,088 | 6,832 | | |
| 2873 | Nitrogenous Fertilizers | 36,595 | 35,415 | 20,039 | | |
| 2874 | Phosphatic Fertilizers | 42,200 | 11,173 | 1,952 | | |
| 2875 | Fertilizers, Mixing Only | 313 | 67 | 7 | | |
| 2879 | Pesticides and Agricultural Chemicals, Not Elsewhere Classified | 2,752 | 1,855 | 1,054 | | |
| 2891 | Adhesives and Sealants | 688 | 3,415 | 673 | | |
| 2892 | Explosives | 944 | 4,364 | 2,569 | | |

**TABLE 4**
Pollution Indicators by SIC Code (lb/yr/employee)

| SIC Code | Name | Toxic Releases | Air Emissions | Ozone Precursors | Odor Potential | Noise Potential |
|---|---|---|---|---|---|---|
| 2893 | Printing Ink | 265 | 962 | 378 | | |
| 2895 | Carbon Black | 6,592 | 0 | 0 | | |
| 2899 | Chemicals and Chemical Preparations, Not Elsewhere Classified | 1,567 | 3,533 | 1,845 | | |
| 29 | Petroleum Refining and Related Industries | | | | High | High |
| 2911 | Petroleum Refining | 5,113 | 54,410 | 22,159 | | |
| 2951 | Asphalt Paving Mixtures and Blocks | 2 | 31,417 | 10,202 | | |
| 2952 | Asphalt Felts and Coatings | 31 | 3,345 | 1,191 | | |
| 2992 | Lubricating Oils and Greases | 151 | 844 | 718 | | |
| 2999 | Products of Petroleum and Coal, Not Elsewhere Classified | 2,547 | 93,649 | 15,110 | | |
| 30 | Rubber and Miscellaneous Plastics Products | | | | High | Medium |
| 301 | Tires and Inner Tubes | 60 | 1,523 | 823 | | |
| 302 | Rubber and Plastic Footwear | 62 | 107 | 104 | | |
| 305 | Gaskets, Packing, and Sealing Devices and Rubber and Plastics Hose and Belting | 287 | 3 | 2 | | |
| 306 | Fabricated Rubber Products, Not Elsewhere Classified | 354 | 683 | 587 | | |
| 308 | Miscellaneous Plastics Products | 455 | 60 | 48 | | |
| 31 | Leather and Leather Products | | | | Medium | Medium |
| 311 | Leather Tanning and Finishing | 2,774 | 903 | 654 | | |
| 313 | Boot and Shoe Cut Stock and Findings | 44 | 79 | 79 | | |
| 314 | Footwear, Except Rubber | 32 | 3 | 2 | | |
| 315 | Leather Gloves and Mittens | 0 | 0 | 0 | | |
| 316 | Luggage | 11 | 5 | 3 | | |
| 317 | Handbags and Other Personal Leather Goods | 5 | 17 | 17 | | |
| 319 | Leather Goods, Not Elsewhere Classified | 0 | 67 | 66 | | |
| 32 | Stone, Clay, Glass, and Concrete Products | | | | Medium | High |
| 3211 | Flat Glass | 37 | 2,901 | 1,886 | | |
| 3221 | Glass Containers | 39 | 3,247 | 1,614 | | |

**TABLE 4**
Pollution Indicators by SIC Code (lb/yr/employee)

| SIC Code | Name | Toxic Releases | Air Emissions | Ozone Precursors | Odor Potential | Noise Potential |
|---|---|---|---|---|---|---|
| 3229 | Pressed and Blown Glass and Glassware, Not Elsewhere Classified | 155 | 1,687 | 1,120 | | |
| 3231 | Glass Products, Made of Purchased Glass | 50 | 44 | 35 | | |
| 3241 | Cement, Hydraulic | 39 | 57,641 | 13,948 | | |
| 3251 | Brick and Structural Clay Tile | 29 | 10,387 | 5,405 | | |
| 3253 | Ceramic Wall and Floor Tile | 342 | 76 | 4 | | |
| 3255 | Clay Refractories | 39 | 2,033 | 238 | | |
| 3259 | Structural Clay Products, Not Elsewhere Classified | 4 | 1,499 | 648 | | |
| 3261 | Vitreous China Plumbing Fixtures and China Earthenware Fittings and Bathroom Accessories | 73 | 116 | 91 | | |
| 3262 | Vitreous China Table and Kitchen Articles | 48 | 0 | 0 | | |
| 3263 | Fine Earthenware Table and Kitchen Articles | 0 | 0 | 0 | | |
| 3264 | Porcelain Electrical Supplies | 180 | 315 | 199 | | |
| 3269 | Pottery Products, Not Elsewhere Classified | 2 | 48 | 14 | | |
| 3271 | Concrete Block and Brick | 8 | 118 | 6 | | |
| 3272 | Concrete Products, Except Block and Brick | 6 | 352 | 106 | | |
| 3273 | Ready-Mixed Concrete | 1 | 418 | 56 | | |
| 3274 | Lime | 5 | 36,310 | 6,638 | | |
| 3275 | Gypsum Products | 2 | 6,755 | 864 | | |
| 3281 | Cut Stone and Stone Products | 7 | 3,741 | 256 | | |
| 3291 | Abrasive Products | 187 | 506 | 229 | | |
| 3292 | Asbestos Products | 3,174 | 1,460 | 715 | | |
| 3295 | Minerals and Earths, Ground or Otherwise Treated | 957 | 17,691 | 2,376 | | |
| 3296 | Mineral Wool | 291 | 1,469 | 393 | | |
| 3297 | Nonclay Refractories | 85 | 932 | 346 | | |
| 3299 | Nonmetallic Mineral Products, Not Elsewhere Classified | 265 | 462 | 71 | | |
| 33 | Primary Metal Industries | | | | High | High |
| 3312 | Steel Works, Blast Furnaces, and Rolling Mills | 1,833 | 17,680 | 3,119 | | |
| 3313 | Electrometallurgical Products, Except Steel | 3,749 | 20,851 | 2,441 | | |

**TABLE 4**
Pollution Indicators by SIC Code (lb/yr/employee)

| SIC Code | Name | Toxic Releases | Air Emissions | Ozone Precursors | Odor Potential | Noise Potential |
|---|---|---|---|---|---|---|
| 3315 | Steel Wiredrawing and Steel Nails and Spikes | 839 | 2,162 | 286 | | |
| 3316 | Cold-Rolled Steel Sheet, Strip, and Bars | 2,083 | 456 | 187 | | |
| 3317 | Steel Pipe and Tubes | 702 | 116 | 110 | | |
| 3321 | Gray and Ductile Iron Foundries | 240 | 4,179 | 363 | | |
| 3322 | Malleable Iron Foundries | 19 | 1,773 | 126 | | |
| 3324 | Steel Investment Foundries | 153 | 293 | 22 | | |
| 3325 | Steel Foundries, Not Elsewhere Classified | 296 | 500 | 236 | | |
| 3331 | Primary Smelting and Refining of Copper | 62,896 | 0 | 0 | | |
| 3334 | Primary Production of Aluminum | 998 | 60,841 | 1,758 | | |
| 3339 | Primary Smelting and Refining of Nonferrous Metals, Except Copper and Aluminum | 17,506 | 3,558 | 526 | | |
| 3341 | Secondary Smelting and Refining of Nonferrous Metals | 2,277 | 19,272 | 1,297 | | |
| 3351 | Rolling, Drawing, and Extruding of Copper | 889 | 1,179 | 38 | | |
| 3353 | Aluminum Sheet, Plate, and Foil | 489 | 2,050 | 1,851 | | |
| 3354 | Aluminum Extruded Products | 191 | 135 | 109 | | |
| 3355 | Aluminum Rolling and Drawing, Not Elsewhere Classified | 177 | 5,287 | 591 | | |
| 3356 | Rolling, Drawing, and Extruding of Nonferrous Metals, Except Copper and Aluminum | 632 | 110 | 64 | | |
| 3357 | Drawing and Insulating of Nonferrous Wire | 165 | 59 | 43 | | |
| 3363 | Aluminum Die-Castings | 202 | 0 | 0 | | |
| 3364 | Nonferrous Die-Castings, Except Aluminum | 77 | 0 | 0 | | |
| 3365 | Aluminum Foundries | 48 | 15 | 5 | | |
| 3366 | Copper Foundries | 196 | 5 | 4 | | |
| 3369 | Nonferrous Foundries, Except Aluminum and Copper | 529 | 979 | 712 | | |
| 3398 | Metal Heat Treating | 196 | 57 | 11 | | |
| 3399 | Primary Metal Products, Not Elsewhere Classified | 454 | 489 | 95 | | |

**TABLE 4**
Pollution Indicators by SIC Code (lb/yr/employee)

| SIC Code | Name | Toxic Releases | Air Emissions | Ozone Precursors | Odor Potential | Noise Potential |
|---|---|---|---|---|---|---|
| 34 | Fabricated Metal Products, Except Machinery and Transportation Equipment | | | | Medium | High |
| 341 | Metal Cans and Shipping Containers | 845 | 1,291 | 1,235 | | |
| 342 | Cutlery, Handtools, and General Hardware | 138 | 37 | 14 | | |
| 343 | Heating Equipment, Except Electric and Warm Air; and Plumbing Fixtures | 111 | 101 | 30 | | |
| 344 | Fabricated Structural Metal Products | 82 | 102 | 89 | | |
| 345 | Screw Machine Products, and Bolts, Nuts, Screws, Rivets, and Washers | 153 | 24 | 22 | | |
| 346 | Metal Forgings and Stampings | 127 | 211 | 72 | | |
| 347 | Coating, Engraving, and Allied Services | 640 | 472 | 431 | | |
| 348 | Ordnance and Accessories, Except Vehicles and Guided Missiles | 89 | 216 | 42 | | |
| 349 | Miscellaneous Fabricated Metal Products | 169 | 2,320 | 148 | | |
| 35 | Industrial and Commercial Machinery and Computer Equipment | | | | Low | Medium |
| 351 | Engines and Turbines | 129 | 378 | 181 | | |
| 352 | Farm and Garden Machinery and Equipment | 55 | 673 | 252 | | |
| 353 | Construction, Mining, and Materials Handling Machinery and Equipment | 25 | 109 | 70 | | |
| 354 | Metalworking Machinery and Equipment | 85 | 12 | 2 | | |
| 355 | Special Industry Machinery, Except Metalworking Machinery | 64 | 13 | 12 | | |
| 356 | General Industrial Machinery and Equipment | 40 | 116 | 83 | | |
| 357 | Computer and Office Equipment | 36 | 24 | 21 | | |
| 358 | Refrigeration and Service Industry Machinery | 56 | 114 | 76 | | |

**TABLE 4**
Pollution Indicators by SIC Code (lb/yr/employee)

| SIC Code | Name | Toxic Releases | Air Emissions | Ozone Precursors | Odor Potential | Noise Potential |
|---|---|---|---|---|---|---|
| 359 | Miscellaneous Industrial and Commercial Machinery and Equipment | 60 | 307 | 24 | | |
| 36 | Electronic and Other Electrical Equipment and Components, Except Computer Equipment | | | | Low | Low |
| 361 | Electric Transmission and Distribution Equipment | 67 | 1,587 | 242 | | |
| 362 | Electrical Industrial Apparatus | 98 | 2,262 | 652 | | |
| 363 | Household Appliances | 135 | 321 | 247 | | |
| 364 | Electric Lighting and Wiring Equipment | 115 | 93 | 69 | | |
| 365 | Household Audio and Video Equipment, and Audio Recordings | 96 | 28 | 28 | | |
| 366 | Communications Equipment | 66 | 77 | 65 | | |
| 367 | Electronic Components and Accessories | 194 | 29 | 20 | | |
| 369 | Miscellaneous Electrical Machinery, Equipment, and Supplies | 216 | 116 | 37 | | |
| 37 | Transportation Equipment | | | | Medium | Medium |
| 371 | Motor Vehicles and Motor Vehicle Equipment | 186 | 421 | 324 | | |
| 372 | Aircraft and Parts | 138 | 110 | 61 | | |
| 373 | Ship and Boat Building and Repairing | 258 | 151 | 123 | | |
| 374 | Railroad Equipment | 72 | 1,554 | 523 | | |
| 375 | Motorcycles, Bicycles, and Parts | 76 | 1,219 | 1,149 | | |
| 376 | Guided Missiles and Space Vehicles and Parts | 151 | 45 | 16 | | |
| 379 | Miscellaneous Transportation Equipment | 47 | 782 | 105 | | |
| 38 | Measuring, Analyzing, and Controlling Instruments; Photographic, Medical and Optical Goods; Watches and Clocks | | | | Low | Low |
| 381 | Search, Detection, Navigation, Guidance, Aeronautical, and Nautical Systems, Instruments, | 25 | 0 | 0 | | |

**TABLE 4**
Pollution Indicators by SIC Code (lb/yr/employee)

| SIC Code | Name | Toxic Releases | Air Emissions | Ozone Precursors | Odor Potential | Noise Potential |
|---|---|---|---|---|---|---|
| | and Equipment | | | | | |
| 382 | Laboratory Apparatus and Analytical, Optical, Measuring, and Controlling Instruments | 46 | 16 | 13 | | |
| 384 | Surgical, Medical, and Dental Instruments and Supplies | 66 | 4 | 2 | | |
| 385 | Ophthalmic Goods | 140 | 46 | 31 | | |
| 386 | Photographic Equipment and Supplies | 766 | 1,887 | 752 | | |
| 387 | Watches, Clocks, Clockwork Operated Devices, and Parts | 85 | 0 | 0 | | |
| 39 | Miscellaneous Manufacturing Industries | | | | | |
| 391 | Jewelry, Silverware, and Plated Ware | 47 | 50 | 13 | | |
| 393 | Musical Instruments | 94 | 193 | 169 | | |
| 394 | Dolls, Toys, Games and Sporting and Athletic Goods | 44 | 21 | 18 | | |
| 395 | Pens, Pencils, and Other Artists' Material | 161 | 224 | 201 | | |
| 396 | Costume Jewelry, Costume Novelties, Buttons, and Miscellaneous Notions, Except Precious Metal | 136 | 0 | 0 | | |
| 399 | Miscellaneous Manufacturing Industries | 225 | 120 | 89 | | |

**Table 2- Pollution Indicators by 4-Digit SIC Code (lb/yr/employee)**

| SIC Code | Name | Toxics Releases | Air Emissions | Ozone Precursors | Combined Indicators |
|---|---|---|---|---|---|
| 2873 | Nitrogenous Fertilizers | 36,595 | 35,415 | 20,039 | 83.99 |
| 2999 | Products of Petroleum and Coal, Not Elsewhere | 2,547 | 93,649 | 15,110 | 66.04 |
| 3331 | Primary Smelting and Refining of Copper | 62,896 | 0 | 0 | 64.61 |
| 2911 | Petroleum Refining | 5,113 | 54,410 | 22,159 | 63.03 |
| 2611 | Pulp Mills | 8,425 | 62,668 | 13,151 | 55.85 |
| 2874 | Phosphatic Fertilizers | 42,200 | 11,173 | 1,952 | 51.15 |
| 2861 | Gum and Wood Chemicals | 1,638 | 44,782 | 18,861 | 50.21 |
| 3241 | Cement, Hydraulic | 39 | 57,641 | 13,948 | 46.35 |
| 2812 | Alkalies and Chlorine | 17,904 | 20,510 | 9,133 | 41.39 |
| 2816 | Inorganic Pigments | 26,840 | 25,647 | 1,196 | 40.34 |
| 2821 | Plastics Materials and Synthetic Resins, and | 3,348 | 15,612 | 13,188 | 30.70 |
| 3334 | Primary Production of Aluminum | 998 | 60,841 | 1,758 | 29.62 |
| 2951 | Asphalt Paving Mixtures and Blocks | 2 | 31,417 | 10,202 | 29.31 |
| 2869 | Industrial Organic Chemicals, Not Elsewhere | 10,157 | 12,088 | 6,832 | 26.26 |
| 3274 | Lime | 5 | 36,310 | 6,638 | 25.82 |
| 3339 | Primary Smelting and Refining of Nonferrous | 17,506 | 3,558 | 526 | 20.32 |
| 3313 | Electrometallurgical Products, Except Steel | 3,749 | 20,851 | 2,441 | 16.53 |
| 3312 | Steel Works, Blast Furnaces, and Rolling Mills | 1,833 | 17,680 | 3,119 | 14.27 |
| 2865 | Cyclic Organic Crudes and Intermediates, and Organic | 10,271 | 4,002 | 1,066 | 13.92 |
| 2819 | Industrial Inorganic Chemicals, Not Elsewhere | 3,116 | 11,092 | 3,546 | 13.46 |
| 2631 | Paperboard Mills | 1,172 | 16,632 | 3,162 | 13.22 |
| 3251 | Brick and Structural Clay Tile | 29 | 10,387 | 5,405 | 12.90 |
| 2621 | Paper Mills | 969 | 14,477 | 3,603 | 12.78 |
| 3341 | Secondary Smelting and Refining of Nonferrous | 2,277 | 19,272 | 1,297 | 12.56 |
| 3295 | Minerals and Earths, Ground or Otherwise Treated | 957 | 17,691 | 2,376 | 12.22 |
| 2822 | Synthetic Rubber | 11,055 | 0 | 0 | 11.36 |
| 2833 | Medicinal Chemicals and Botanical Products | 5,451 | 5,487 | 1,653 | 10.52 |
| 2823 | Cellulosic Manmade Fibers | 10,134 | 0 | 0 | 10.41 |
| 2824 | Manmade Organic Fibers, Except Cellulosic | 1,362 | 5,540 | 2,486 | 7.64 |
| 2813 | Industrial Gases | 1,305 | 3,755 | 2,572 | 6.96 |
| 2892 | Explosives | 944 | 4,364 | 2,569 | 6.84 |
| 2895 | Carbon Black | 6,592 | 0 | 0 | 6.77 |

**Table 2- Pollution Indicators by 4-Digit SIC Code (lb/yr/employee)**

| SIC Code | Name | Toxics Releases | Air Emissions | Ozone Precursors | Combined Indicators |
|---|---|---|---|---|---|
| 2899 | Chemicals and Chemical Preparations, Not Elsewhere | 1,567 | 3,533 | 1,845 | 6.00 |
| 2879 | Pesticides and Agricultural Chemicals, Not Elsewhere | 2,752 | 1,855 | 1,054 | 5.26 |
| 3292 | Asbestos Products | 3,174 | 1,460 | 715 | 5.00 |
| 3353 | Aluminum Sheet, Plate, and Foil | 489 | 2,050 | 1,851 | 4.27 |
| 3275 | Gypsum Products | 2 | 6,755 | 864 | 4.22 |
| 3211 | Flat Glass | 37 | 2,901 | 1,886 | 4.22 |
| 3221 | Glass Containers | 39 | 3,247 | 1,614 | 3.95 |
| 3355 | Aluminum Rolling and Drawing, Not Elsewhere | 177 | 5,287 | 591 | 3.35 |
| 2952 | Asphalt Felts and Coatings | 31 | 3,345 | 1,191 | 3.32 |
| 2891 | Adhesives and Sealants | 688 | 3,415 | 673 | 3.21 |
| 2843 | Surface Active Agents, Finishing Agents, Sulfonated | 2,392 | 189 | 101 | 2.70 |
| 3229 | Pressed and Blown Glass and Glassware, Not | 155 | 1,687 | 1,120 | 2.63 |
| 3316 | Cold-Rolled Steel Sheet, Strip, and Bars | 2,083 | 456 | 187 | 2.63 |
| 3321 | Gray and Ductile Iron Foundries | 240 | 4,179 | 363 | 2.59 |
| 2851 | Paint, Varnishes, Lacquers, Enamels, and Allied | 1,293 | 576 | 477 | 2.32 |
| 3315 | Steel Wiredrawing and Steel Nails and Spikes | 839 | 2,162 | 286 | 2.23 |
| 3369 | Nonferrous Foundries, Except Aluminum and | 529 | 979 | 712 | 2.07 |
| 3281 | Cut Stone and Stone Products | 7 | 3,741 | 256 | 2.00 |
| 2672 | Coated and Laminated Paper, Not Elsewhere | 1,097 | 354 | 343 | 1.81 |
| 3259 | Structural Clay Products, Not Elsewhere Classified | 4 | 1,499 | 648 | 1.65 |
| 2992 | Lubricating Oils and Greases | 151 | 844 | 718 | 1.64 |
| 2834 | Pharmaceutical Preparations | 635 | 744 | 373 | 1.55 |
| 2671 | Packaging Paper and Plastic Film, Coated and Laminated | 423 | 556 | 555 | 1.54 |
| 3296 | Mineral Wool | 291 | 1,469 | 393 | 1.54 |
| 3351 | Rolling, Drawing, and Extruding of Copper | 889 | 1,179 | 38 | 1.47 |
| 3255 | Clay Refractories | 39 | 2,033 | 238 | 1.28 |
| 2893 | Printing Ink | 265 | 962 | 378 | 1.27 |
| 2653 | Corrugated and Solid Fiber Boxes | 6 | 644 | 495 | 1.05 |
| 2841 | Soap and Other Detergents, Except Specialty Cleaners | 162 | 933 | 301 | 1.03 |
| 3297 | Nonclay Refractories | 85 | 932 | 346 | 1.03 |

**Table 2- Pollution Indicators by 4-Digit SIC Code (lb/yr/employee)**

| SIC Code | Name | Toxics Releases | Air Emissions | Ozone Precursors | Combined Indicators |
|---|---|---|---|---|---|
| 2679 | Converted Paper and Paperboard Products, Not | 450 | 636 | 174 | 1.00 |
| 3322 | Malleable Iron Foundries | 19 | 1,773 | 126 | 0.97 |
| 3317 | Steel Pipe and Tubes | 702 | 116 | 110 | 0.94 |
| 3325 | Steel Foundries, Not Elsewhere Classified | 296 | 500 | 236 | 0.89 |
| 3399 | Primary Metal Products, Not Elsewhere Classified | 454 | 489 | 95 | 0.82 |
| 3356 | Rolling, Drawing, and Extruding of Nonferrous | 632 | 110 | 64 | 0.80 |
| 3291 | Abrasive Products | 187 | 506 | 229 | 0.76 |
| 3264 | Porcelain Electrical Supplies | 180 | 315 | 199 | 0.63 |
| 3299 | Nonmetallic Mineral Products, Not Elsewhere | 265 | 462 | 71 | 0.58 |
| 2844 | Perfumes, Cosmetics, and Other Toilet Preparations | 40 | 335 | 209 | 0.51 |
| 3354 | Aluminum Extruded Products | 191 | 135 | 109 | 0.42 |
| 2842 | Specialty Cleaning, Polishing, and Sanitation | 75 | 174 | 167 | 0.41 |
| 3253 | Ceramic Wall and Floor Tile | 342 | 76 | 4 | 0.39 |
| 2875 | Fertilizers, Mixing Only | 313 | 67 | 7 | 0.36 |
| 2652 | Setup Paperboard Boxes | 8 | 267 | 152 | 0.36 |
| 2836 | Biological Products, Except Diagnostic Substances | 322 | 0 | 0 | 0.33 |
| 3272 | Concrete Products, Except Block and Brick | 6 | 352 | 106 | 0.32 |
| 3324 | Steel Investment Foundries | 153 | 293 | 22 | 0.32 |
| 3261 | Vitreous China Plumbing Fixtures and China | 73 | 116 | 91 | 0.27 |
| 3273 | Ready-Mixed Concrete | 1 | 418 | 56 | 0.27 |
| 3357 | Drawing and Insulating of Nonferrous Wire | 165 | 59 | 43 | 0.26 |
| 2657 | Folding Paperboard Boxes, Including Sanitary | 226 | 7 | 7 | 0.25 |
| 3398 | Metal Heat Treating | 196 | 57 | 11 | 0.24 |
| 2656 | Sanitary Food Containers, Except Folding | 103 | 64 | 64 | 0.23 |
| 3366 | Copper Foundries | 196 | 5 | 4 | 0.21 |
| 3363 | Aluminum Die-Castings | 202 | 0 | 0 | 0.21 |
| 2675 | Die-Cut Paper and Paperboard and Cardboard | 152 | 22 | 14 | 0.19 |
| 2673 | Plastics, Foil, and Coated Paper Bags | 115 | 15 | 15 | 0.15 |
| 2655 | Fiber Cans, Tubes, Drums, and Similar Products | 62 | 57 | 30 | 0.13 |
| 3231 | Glass Products, Made of Purchased Glass | 50 | 44 | 35 | 0.12 |

**Table 2- Pollution Indicators by 4-Digit SIC Code (lb/yr/employee)**

| SIC Code | Name | Toxics Releases | Air Emissions | Ozone Precursors | Combined Indicators |
|---|---|---|---|---|---|
| 3364 | Nonferrous Die-Castings, Except Aluminum | 77 | 0 | 0 | 0.08 |
| 2676 | Sanitary Paper Products | 72 | 2 | 2 | 0.08 |
| 3271 | Concrete Block and Brick | 8 | 118 | 6 | 0.07 |
| 3365 | Aluminum Foundries | 48 | 15 | 5 | 0.06 |
| 3262 | Vitreous China Table and Kitchen Articles | 48 | 0 | 0 | 0.05 |
| 2677 | Envelopes | 35 | 5 | 5 | 0.04 |
| 3269 | Pottery Products, Not Elsewhere Classified | 2 | 48 | 14 | 0.04 |
| 2674 | Uncoated Paper and Multiwall Bags | 22 | 0 | 0 | 0.02 |
| 2835 | In Vitro and In Vivo Diagnostic Substances | 13 | 0 | 0 | 0.01 |
| 2678 | Stationary, Tablets, and Related Products | 9 | 0 | 0 | 0.01 |
| 3263 | Fine Earthenware Table and Kitchen Articles | 0 | 0 | 0 | 0.00 |
| | Total | 324,479 | 784,574 | 213,081 | 1,000 |

**Table 3- Pollution Indicators by 3-Digit SIC Code (lb/yr/employee)**

| SIC Code | Name | Toxics Releases | Air Emissions | Ozone Precursors | Combined Indicators |
|---|---|---|---|---|---|
| 311 | Leather Tanning and Finishing | 2,774 | 903 | 654 | 78.76 |
| 207 | Fats and Oils | 357 | 4,794 | 2,021 | 68.34 |
| 204 | Grain Mill Products | 172 | 7,048 | 1,104 | 65.58 |
| 341 | Metal Cans and Shipping Containers | 845 | 1,291 | 1,235 | 45.48 |
| 386 | Photographic Equipment and Supplies | 766 | 1,887 | 752 | 40.59 |
| 208 | Beverages | 41 | 2,140 | 1,420 | 35.23 |
| 275 | Commercial Printing | 619 | 926 | 903 | 33.16 |
| 226 | Dying and Finishing Textiles, Except Wool Fabrics and Knit Goods | 334 | 1,652 | 813 | 30.05 |
| 206 | Sugar and Confectionary Products | 41 | 2,436 | 815 | 28.46 |
| 362 | Electrical Industrial Apparatus | 98 | 2,262 | 652 | 26.29 |
| 375 | Motorcycles, Bicycles, and Parts | 76 | 1,219 | 1,149 | 26.16 |
| 347 | Coating, Engraving, and Allied Services | 640 | 472 | 431 | 23.91 |
| 301 | Tires and Inner Tubes | 60 | 1,523 | 823 | 23.10 |
| 229 | Miscellaneous Textile Goods | 451 | 702 | 543 | 22.67 |
| 221 | Broadwoven Fabric Mills, Cotton | 22 | 1,365 | 861 | 21.74 |
| 349 | Miscellaneous Fabricated Metal Products | 169 | 2,320 | 148 | 21.06 |
| 306 | Fabricated Rubber Products, Not Elsewhere Classified | 354 | 683 | 587 | 20.97 |
| 242 | Sawmills and Planing Mills | 9 | 2,012 | 418 | 19.27 |
| 374 | Railroad Equipment | 72 | 1,554 | 523 | 19.26 |
| 214 | Tobacco Stemming and Redrying | 209 | 900 | 572 | 18.86 |
| 361 | Electric Transmission and Distribution Equipment | 67 | 1,587 | 242 | 15.31 |
| 243 | Millwork, Veneer, Plywood, and Structural Wood Members | 51 | 1,086 | 460 | 14.82 |
| 249 | Miscellaneous Wood Products | 182 | 646 | 287 | 12.50 |
| 202 | Dairy Products | 162 | 530 | 345 | 12.11 |
| 201 | Meat Products | 25 | 671 | 488 | 11.93 |
| 371 | Motor Vehicles and Motor Vehicle Equipment | 186 | 421 | 324 | 11.63 |
| 308 | Miscellaneous Plastics Products | 455 | 60 | 48 | 11.50 |
| 251 | Household Furniture | 85 | 443 | 402 | 10.60 |
| 252 | Office Furniture | 107 | 390 | 360 | 10.14 |
| 352 | Farm and Garden Machinery and Equipment | 55 | 673 | 252 | 9.24 |
| 363 | Houshold Appliances | 135 | 321 | 247 | 8.72 |

**Table 3- Pollution Indicators by 3-Digit SIC Code (lb/yr/employee)**

| SIC Code | Name | Toxics Releases | Air Emissions | Ozone Precursors | Combined Indicators |
|---|---|---|---|---|---|
| 373 | Ship and Boat Building and Repairing | 258 | 151 | 123 | 8.66 |
| 228 | Yarn and Thread Mills | 154 | 301 | 180 | 8.06 |
| 395 | Pens, Pencils, and Other Artists' Material | 161 | 224 | 201 | 8.02 |
| 351 | Engines and Turbines | 129 | 378 | 181 | 8.01 |
| 379 | Miscellaneous Transportation Equipment | 47 | 782 | 105 | 7.67 |
| 399 | Miscellaneous Manufacturing Industries | 225 | 120 | 89 | 7.21 |
| 305 | Gaskets, Packing, and Sealing Devices and Rubber and Plastics Hose and Belting | 287 | 3 | 2 | 6.62 |
| 254 | Partitions, Shelving, Lockers, and Office and Store Fixtures | 32 | 276 | 268 | 6.37 |
| 369 | Micellaneous Electrical Machinery, Equipment, and Supplies | 216 | 116 | 37 | 6.23 |
| 393 | Musical Instruments | 94 | 193 | 169 | 5.82 |
| 223 | Broadwoven Fabric Mills, Wool | 148 | 261 | 50 | 5.80 |
| 346 | Metal Forgings and Stampings | 127 | 211 | 72 | 5.31 |
| 367 | Electronic Components and Accessories | 194 | 29 | 20 | 4.91 |
| 372 | Aircraft and Parts | 138 | 110 | 61 | 4.75 |
| 364 | Electric Lighting and Wiring Equipment | 115 | 93 | 69 | 4.22 |
| 348 | Ordnance and Accessories, Except Vehicles and Guided Missiles | 89 | 216 | 42 | 4.06 |
| 376 | Guided Missiles and Space Vehicles and Parts | 151 | 45 | 16 | 3.98 |
| 345 | Screw Machine Products, and Bolts, Nuts, Screws, Rivits, and Washers | 153 | 24 | 22 | 3.97 |
| 385 | Ophthalmic Goods | 140 | 46 | 31 | 3.93 |
| 344 | Fabricated Structural Metal Products | 82 | 102 | 89 | 3.81 |
| 209 | Miscellaneous Food Preparations and Kindred Products | 25 | 267 | 103 | 3.79 |
| 203 | Canned, Frozen, and Preserved Fruits, Vegetables, and Food Specialties | 45 | 230 | 88 | 3.78 |

**Table 3- Pollution Indicators by 3-Digit SIC Code (lb/yr/employee)**

| SIC Code | Name | Toxics Releases | Air Emissions | Ozone Precursors | Combined Indicators |
|---|---|---|---|---|---|
| 359 | Miscellaneous Industrial and Commercial Machinery and Equipment | 60 | 307 | 24 | 3.71 |
| 343 | Heating Equipment, Except Electric and Warm Air; and Plumbing Fixtures | 111 | 101 | 30 | 3.62 |
| 302 | Rubber and Plastic Footwear | 62 | 107 | 104 | 3.60 |
| 342 | Cutlery, Handtools, and General Hardware | 138 | 37 | 14 | 3.59 |
| 211 | Cigarettes | 150 | 0 | 0 | 3.44 |
| 396 | Costume Jewelry, Costume Novelties, Buttons, and Miscellaneous Notions, Except Precious Metal | 136 | 0 | 0 | 3.11 |
| 358 | Refrigeration and Service Industry Machinery | 56 | 114 | 76 | 3.10 |
| 277 | Greeting Cards | 30 | 119 | 107 | 3.00 |
| 366 | Communications Equipment | 66 | 77 | 65 | 2.95 |
| 356 | General Industrial Machinery and Equipment | 40 | 116 | 83 | 2.87 |
| 253 | Public Building and Related Furniture | 25 | 145 | 87 | 2.77 |
| 365 | Household Audio and Video Equipment, and Audio Recordings | 96 | 28 | 28 | 2.77 |
| 313 | Boot and Shoe Cut Stock and Findings | 44 | 79 | 79 | 2.67 |
| 227 | Carpets and Rugs | 109 | 0 | 0 | 2.49 |
| 353 | Construction, Mining, and Materials Handling Machinery and Equipment | 25 | 109 | 70 | 2.28 |
| 278 | Blankbooks, Looseleaf Binders, and Bookbinding and Related Work | 22 | 96 | 76 | 2.21 |
| 354 | Metalworking Machinery and Equipment | 85 | 12 | 2 | 2.05 |
| 387 | Watches, Clocks, Clockwork Operated Devices, and Parts | 85 | 0 | 0 | 1.95 |
| 355 | Special Industry Machinery, Except Metalworking Machinery | 64 | 13 | 12 | 1.73 |
| 391 | Jewelry, Silverware, and Plated Ware | 47 | 50 | 13 | 1.59 |
| 384 | Surgical, Medical, and Dental Instruments and Supplies | 66 | 4 | 2 | 1.56 |
| 273 | Books | 10 | 66 | 58 | 1.49 |

**Table 3- Pollution Indicators by 3-Digit SIC Code (lb/yr/employee)**

| SIC Code | Name | Toxics Releases | Air Emissions | Ozone Precursors | Combined Indicators |
|---|---|---|---|---|---|
| 222 | Broadwoven Fabric Mills, Manmade Fiber and Silk | 21 | 92 | 27 | 1.47 |
| 259 | Miscellaneous Funiture and Fixtures | 39 | 25 | 25 | 1.42 |
| 394 | Dolls, Toys, Games and Sporting and Athletic Goods | 44 | 21 | 18 | 1.41 |
| 319 | Leather Goods, Not Elsewhere Classified | 0 | 67 | 66 | 1.39 |
| 382 | Laboratory Apparatus and Analytical, Optical, Measuring, and Controlling Instruments | 46 | 16 | 13 | 1.34 |
| 225 | Knitting Mills | 29 | 48 | 23 | 1.31 |
| 276 | Manifold Business Forms | 55 | 1 | 1 | 1.27 |
| 357 | Computer and Office Equipment | 36 | 24 | 21 | 1.27 |
| 213 | Chewing and Smoking Tobacco and Snuff | 0 | 118 | 21 | 1.07 |
| 314 | Footwear, Except Rubber | 32 | 3 | 2 | 0.78 |
| 272 | Periodicals: Publishing, or Publishing and Printing | 3 | 33 | 32 | 0.75 |
| 271 | Newspapers: Publishing, or Publishing and Printing | 0 | 31 | 27 | 0.59 |
| 381 | Search, Detection, Navigation, Guidance, Aeronautical, and Nautical Systems, Insruments, and Equipment | 25 | 0 | 0 | 0.58 |
| 205 | Bakery Products | 6 | 23 | 19 | 0.55 |
| 239 | Miscellaneous Fabricated Textile Products | 16 | 9 | 7 | 0.52 |
| 317 | Handbags and Other Personal Leather Goods | 5 | 17 | 17 | 0.47 |
| 224 | Narrow Fabric and Other Smallwares Mills | 5 | 17 | 17 | 0.46 |
| 279 | Service Industries for the Printing Trade | 7 | 13 | 13 | 0.44 |
| 238 | Miscellaneous Apparel and Accessories | 10 | 7 | 7 | 0.37 |
| 316 | Luggage | 11 | 5 | 3 | 0.34 |
| 244 | Wood Containers | 1 | 35 | 5 | 0.33 |
| 245 | Wood Buildings and Mobile Homes | 0 | 14 | 8 | 0.21 |
| 232 | Men's and Boy's Furnishings, Work Clothing, and Allied Garments | 0 | 15 | 5 | 0.17 |
| 235 | Hats, Caps, and Millinery | 6 | 0 | 0 | 0.13 |
| 274 | Miscellaneus Publishing | 1 | 3 | 3 | 0.08 |

**Table 3- Pollution Indicators by 3-Digit SIC Code (lb/yr/employee)**

| SIC Code | Name | Toxics Releases | Air Emissions | Ozone Precursors | Combined Indicators |
|---|---|---|---|---|---|
| 212 | Cigars | 3 | 0 | 0 | 0.07 |
| 231 | Men's and Boy's Suits, Coats, and Overcoats | 3 | 0 | 0 | 0.06 |
| 236 | Girls', Children's, and Infants' Outerwear | 2 | 0 | 0 | 0.05 |
| 234 | Women's, Misses', Children's, and Infants' Undergarments | 1 | 2 | 0 | 0.03 |
| 241 | Logging | 0 | 2 | 0 | 0.02 |
| 233 | Women's. Misses', and Juniors' Outerwear | 0 | 1 | 0 | 0.01 |
| 237 | Fur Goods | 0 | 0 | 0 | 0.00 |
| 315 | Leather Gloves and Mittens | 0 | 0 | 0 | 0.00 |
| | Total | 14,561 | 51,317 | 23,209 | 1,000 |