

# Methodology

## Manufacturing in San Diego: Local Impact, Global Reach

Analyzing San Diego's Manufacturing Capabilities

SAN DIEGO REGIONAL



## Manufacturing definition

The Manufacturing sector in San Diego is defined using North American Industry Classification System (NAICS) codes. EDC defines Manufacturing using the following NAICS codes:

- 11: Agriculture, Forestry, Fishing and Hunting
- 21: Mining, Quarrying, and Oil and Gas Extraction
- 31-33: Manufacturing

Within these NAICS codes there are industry specific categories that are defined using EDC’s Traded Clusters definition. Namely, innovation specific Manufacturing industries include Life Sciences, Technology, Aerospace & Navigation Technologies, and Cleantech. These industries also have sub-industries. The following table contains the relevant NAICS codes for innovation Manufacturing, the NAICS description, the industry, and the sub-industry.

Table 1 – Innovation Manufacturing: NAICS code, description, industry, and sub-industry

NAICS	Industry (NAICS definition)	Industry (EDC Traded Clusters)	Sub-industries
325120	Industrial Gas Manufacturing	Life Science	Biomedical Devices & Products
325311	Nitrogenous Fertilizer Manufacturing	Life Science	Biomedical Devices & Products
325411	Medicinal and Botanical Manufacturing	Life Science	Biotechnology & Pharmaceuticals
325412	Pharmaceutical Preparation Manufacturing	Life Science	Biotechnology & Pharmaceuticals
325413	In-Vitro Diagnostic Substance Manufacturing	Life Science	Biotechnology & Pharmaceuticals
325414	Biological Product (except Diagnostic) Manufacturing	Life Science	Biotechnology & Pharmaceuticals
333310	Commercial and Service Industry Machinery Manufacturing	Cleantech	Cleantech
333413	Industrial and Commercial Fan and Blower and Air Purification Equipment Manufacturing	Cleantech	Cleantech
334111	Electronic Computer Manufacturing	Technology	Computers
334112	Computer Storage Device Manufacturing	Technology	Computers
334118	Computer Terminal and Other Computer Peripheral Equipment Manufacturing	Technology	Computers

334210	Telephone Apparatus Manufacturing	Technology	Equipment & Comms
334220	Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing	Technology	Wireless Equipment
334290	Other Communications Equipment Manufacturing	Technology	Wireless Equipment
334310	Audio and Video Equipment Manufacturing	Technology	Equipment & Comms
334412	Bare Printed Circuit Board Manufacturing	Technology	Components
334413	Semiconductor and Related Device Manufacturing	Technology	Equipment & Comms
334413	Semiconductor and Related Device Manufacturing	Cleantech	Cleantech
334416	Capacitor, Resistor, Coil, Transformer, and Other Inductor Manufacturing	Aerospace & Navigation Technologies	Aerospace & Navigation Technologies
334417	Electronic Connector Manufacturing	Technology	Components
334418	Printed Circuit Assembly (Electronic Assembly) Manufacturing	Technology	Components
334419	Other Electronic Component Manufacturing	Technology	Components
334510	Electromedical and Electrotherapeutic Apparatus Manufacturing	Life Science	Biomedical Devices & Products
334511	Search, Detection, Navigation, Guidance, Aeronautical, and Nautical System and Instrument Manufacturing	Aerospace & Navigation Technologies	Aerospace & Navigation Technologies
334512	Automatic Environmental Control Manufacturing for Residential, Commercial, and Appliance Use	Technology	Equipment & Comms
334513	Instruments and Related Products Manufacturing for Measuring, Displaying, and Controlling Industrial Process Variables	Technology	Equipment & Comms
334514	Totalizing Fluid Meter and Counting Device Manufacturing	Technology	Equipment & Comms
334515	Instrument Manufacturing for Measuring and Testing Electricity and Electrical Signals	Technology	Equipment & Comms
334516	Analytical Laboratory Instrument Manufacturing	Life Science	Biomedical Devices & Products
334517	Irradiation Apparatus Manufacturing	Life Science	Biomedical Devices & Products

334519	Other Measuring and Controlling Device Manufacturing	Technology	Equipment & Comms
334610	Manufacturing and Reproducing Magnetic and Optical Media	Technology	Computers
335314	Relay and Industrial Control Manufacturing	Cleantech	Cleantech
335910	Battery Manufacturing	Technology	Components
335921	Fiber Optic Cable Manufacturing	Technology	Equipment & Comms
335929	Other Communication and Energy Wire Manufacturing	Technology	Equipment & Comms
335931	Current-Carrying Wiring Device Manufacturing	Technology	Equipment & Comms
335991	Carbon and Graphite Product Manufacturing	Technology	Components
335999	All Other Miscellaneous Electrical Equipment and Component Manufacturing	Technology	Computers
336411	Aircraft Manufacturing	Aerospace & Navigation Technologies	Aerospace & Navigation Technologies
336412	Aircraft Engine and Engine Parts Manufacturing	Aerospace & Navigation Technologies	Aerospace & Navigation Technologies
336413	Other Aircraft Parts and Auxiliary Equipment Manufacturing	Aerospace & Navigation Technologies	Aerospace & Navigation Technologies
336414	Guided Missile and Space Vehicle Manufacturing	Aerospace & Navigation Technologies	Aerospace & Navigation Technologies
336419	Other Guided Missile and Space Vehicle Parts and Auxiliary Equipment Manufacturing	Aerospace & Navigation Technologies	Aerospace & Navigation Technologies
339112	Surgical and Medical Instrument Manufacturing	Life Science	Biomedical Devices & Products
339113	Surgical Appliance and Supplies Manufacturing	Life Science	Biomedical Devices & Products
339114	Dental Equipment and Supplies Manufacturing	Life Science	Biomedical Devices & Products
339115	Ophthalmic Goods Manufacturing	Life Science	Biomedical Devices & Products
339116	Dental Laboratories	Life Science	Biomedical Devices & Products

## Manufacturing employment, establishments, and wages

Total employment, establishments, and wages for Manufacturing in San Diego County were obtained through the Bureau of Labor Statistics' Quarterly Census of Employment and Wages (BLS QCEW), using the latest data available which

is 2023. These figures were pulled using the NAICS code definition described in the *Definition* section. Historical employment and establishments also came from BLS QCEW. Comparisons to California and the U.S. were sourced from Lightcast’s industry table report. In some instances, wage figures are adjusted to cost-of-living (COL). These COL-adjusted wages were sourced from Lightcast, using C2ER COL Index.

### ***Suppression of employment numbers***

Employment numbers were pulled at the six digit level to allow EDC to categorize employment into industries and sub-industries. However, BLS can suppress employment at certain NAICS codes at the six-digit level for privacy reasons. Therefore, summing up employment at that level will yield an undercount. As the NAICS code digit level becomes less specific, there is less suppression, with the two digit level having no suppression. To obtain a higher degree of accuracy, EDC looked at the difference between the six-digit level all the way up to the two digit level to understand where employment needs to be allocated. While in some cases it was a direct allocation given that only one NAICS code was suppressed, there were some cases where this approach wasn’t possible. In the case of multiple NAICS codes being suppressed, EDC allocated the residual jobs according to the number of establishments. For example, if two codes were suppressed and one had two businesses and the other three, EDC would allocate 40 percent of the residual to the first and 60 percent to the second.

### **Economic impact**

The economic impact of the Manufacturing sector on San Diego County’s economy was estimated using software from [IMPLAN](#). The software requires employment counts as inputs using IMPLAN codes to estimate economic activity. IMPLAN codes are similar to NAICS codes but are not exactly the same. The NAICS to IMPLAN code crosswalk EDC used for this analysis can be found [here](#) labeled “2022 NAICS to IMPLAN 546 Industries”.

The results include Manufacturing-specific employment, labor income, value added, and output (sales) along with the direct, indirect, and induced effects in San Diego County.

Table 2 – IMPLAN results of Manufacturing employment

Impact	Employment	Labor Income	Value Added	Output
Direct	120,945.51	\$14,492,028,912.71	\$28,319,967,198.79	\$64,088,768,116.70
Indirect	66,654.92	\$6,012,391,104.24	\$9,528,255,705.53	\$16,990,546,470.33
Induced	78,852.93	\$4,834,064,330.95	\$9,166,024,499.69	\$14,662,844,407.58
Total	266,453.36	\$25,338,484,347.89	\$47,014,247,404.02	\$95,742,158,994.61

Direct effects refer to the activity resulting directly from the Manufacturing industry. Indirect effects refer to the business-to-business purchases (supply chain) that arise from the Manufacturing establishments in the region. Induced effects refer to spending of labor income by the Manufacturing industry and its supply chain on personal items such as healthcare, food, or housing.

To learn more about direct, indirect, and induced effects, click [here](#).

### Establishments by size

Manufacturing establishments by size data was sourced from California Employment Development Department (CA EDD). CA EDD's Size of Business Data set contains number of businesses, employees, and payroll by firm size. Data is available by metropolitan statistical area (MSA) and by industry group.

The CA EDD data is reported for every third quarter of a year, while data used in this report is end of year, or the fourth quarter. Thus, any differences between the CA EDD data and data from the BLS QCEW is due to this difference in the time period.

### Occupational trends

Occupational data was sourced from Lightcast's staffing patterns report. The staffing patterns report show the occupational makeup of an industry in percentages.

To learn more about Lightcast's staffing patterns report, click [here](#).

### Job postings

Job postings was sourced from Lightcast's job postings analytics report, which uses their advanced scraping technology. The technology identifies sites that are a valid source of employment opportunities and scrapes that site for job postings and related information. Currently, more than 65,000 sites are

scraped for postings by Lightcast. A deduplication process is used to identify unique job postings from total postings.

To learn more about Lightcast's job posting analytics report, click [here](#).

## Peer metros

The geographic boundaries used for the peer metro analysis are Metropolitan Statistical Areas (MSAs). Twelve metros were identified to investigate San Diego's Manufacturing industry and how it compares to other markets across the United States. The metros that were used for comparison were the following:

- Raleigh-Cary-Durham-Chapel Hill, NC
- Denver-Aurora-Lakewood, CO
- Dallas-Fort Worth-Arlington, TX
- Austin-Round Rock-Georgetown, TX
- Phoenix-Mesa-Chandler, AZ
- Minneapolis-St. Paul-Bloomington, MN-WI
- Seattle-Tacoma-Bellevue, WA
- Boston-Cambridge-Newton, MA-NH
- San Jose-Sunnyvale-Santa Clara, CA
- San Francisco-Oakland-Berkeley, CA
- Los Angeles-Long Beach- Anaheim, CA
- Phoenix-Mesa-Chandler, AZ

## Ease of doing business

Ease of doing business indexes are from Arizona State University's Doing Business in North America report (2022). This report provides objective measures of business regulations across major cities in the U.S. The report collects data on 93 variables organized into categories:

- Starting a Business
- Employing Worker
- Getting Electricity
- Land and Space Use
- Paying Taxes
- Resolving Insolvency

The report combines these categories into one score: Ease of Doing Business.

Learn more about Doing Business in North America report and it's methodology [here](#).

## **Employment concentration**

Also known as location quotient (LQ), this metric compares the concentration of an industry in a region relative to the U.S.. LQs for Manufacturing sub-industries for San Diego and its peer metros were sourced from Lightcast.

## **Company interviews**

Manufacturing companies and related organizations throughout the region were interviewed by EDC to gain insight into the sector and inform the report.

Companies interviewed:

- Aptera
- Argonaut
- ASML
- Biolinq
- CMTC
- Dr. Bronner's
- East County EDC
- Element
- Eversun
- GKN Aerospace
- Gridwrap
- Illumina
- Maravai (TriLink)
- North County EDC
- SMK
- Solar Turbines
- South County EDC
- Stone Brewing
- Taylor Guitars
- Tijuana EDC

*For questions, contact EDC Research at [research@sandiegobusiness.org](mailto:research@sandiegobusiness.org).*