# Intratec Plant Location Factors Methodology

## Introduction

### What Are Intratec Plant Location Factors?

Intratec Plant Location Factors (IL Factors) are factors, published monthly by Intratec, for converting the capital cost of Industrial processing plants from one country to the country of your interest. The factors are calculated based on high volumes of local data of different countries, relating to productivity, labor costs, steel and energy prices, equipment import needs, freight, taxes and duties on imported and domestic materials and regional business environment, among others.

Intratec Plant Location Factors are suitable for industrial plants from several sectors, spanning the fields of oil & energy, olefins & derivatives; aromatics & derivatives; alcohols & organic acids; polymers; inorganic chemicals; fertilizers & gases; metals & mining; food & nutrition; pharmaceuticals; and water & utilities. The countries covered can be checked at https://intrat.ec/iplf-brochure.

These factors are monthly series of dimensionless multiplying factors calculated in a comparative manner, taking a United States-based plant as the reference location (USA = 1). All available factors series start in January 2000.

Intratec Plant Location Factors are updated in the beginning of every month following the schedule presented at https://intrat.ec/release-schedule.

### How to Use Intratec Plant Location Factors

These Location Factors are useful tools that can be used for capital costs estimation in a range of assignments by a variety of companies including commodity's producers, engineering firms, consulting firms, construction companies, and investors. Some of the key uses of include:

* Calculate local capital costs using data from other countries;

* Perform multi-regional cost analysis;

* Pre-evaluate regional economic attractiveness for new industrial ventures;

* Develop feasibility studies and investment analyses;

* Evaluate project feasibility;

* Benchmark for evaluating the performance of construction projects.

Some examples of how to use IL Factors can be found in Intratec Plant Location Factors User Guide.

## Intratec Plant Location Factors Limitations

Intratec Plant Location Factors are a valuable tool that can be useful for various activities as mentioned before. However, it is important to highlight that every factor has its limitations and knowing such limitations is crucial to use it correctly.

* Location factors only take into account the relative cost of replicating an industrial plant in another location. They do not consider additional costs caused by unique site conditions such as climate, geological factors, or natural disasters. Moreover, if the design of the industrial plant is not identical in both locations, the cost differences may not be accurately reflected by location factors alone.

* There are various factors that can affect the construction costs of industrial plants. These factors include but are not limited to: availability and quality of local materials, labor and equipment; labor productivity; import duties, licenses, and customs; local taxes; workweek length and holidays; inflation; religious customs; laws promoting local procurement; shipping schedules; weather and climate conditions; education level of the workforce; communication and logistics; workforce housing and training. It is important to note that these factors can also vary within a country, and being located in remote or distant areas from major cities or supply centers can worsen the above-mentioned issues.

* Since the location factor is a statistically weighted composite average, it suffers from the same drawbacks as any other average. While it may be possible to determine an average factor for converting the costs of industrial plants for the production of commodities from a country to another, it is not a guarantee that the cost of a specific industrial plant will be precisely estimated by using this average factor.

* The factor converts the costs of a plant in the same time period. To convert plant construction cost estimates over time, Intratec offers Intratec Plant Construction Indexes.

# Concepts

## Data Point Status

Within an index series presented in the Intratec Plant Location Factors, each data point is indicated with one of the following statuses:

* Final – A historical value is displayed as final when every component of the factor is obtained from consolidated data of official statistics (released by national governments, international organizations or any other sources used by Intratec). It is not reviewed unless a major change is needed.

* Preliminary – The preliminary status is employed for historical values obtained through mathematical models or preliminary data from official statistics when the consolidated data for a country are delayed. Preliminary values are replaced by final values as soon as they become available.

# Methodology

## How Intratec Plant Location Factors Are Compiled

The Intratec Plant Location Factors are compiled based on a structured methodology developed by a team of cost engineers, computer and data scientists. In order to build a useful factor, it is crucial for the Intratec team to have a clear understanding of conditions present in the selected countries that impact in the construction costs of industrial plants. As a result, Intratec identifies, gathers and processes a huge amount of economic parameters that are categorized into four major components, as follows:

* Labor cost. It includes wage rates, directly paid benefits, and other expenditures incurred by the employer to employ a worker, as well as the difference in local productivity data.

* Material cost. It considers steel prices, import needs, availability of local equipment, need of spare equipment, and freight, taxes, and duties on imported and domestic materials.

* Logistic costs. It refers to all costs associated with a country's infrastructure, such as: availability and quality of ports, roads, airports, and rails; communication technologies; warehouse infrastructure; border clearance; and local incentives.

* Business environment. It takes into account the costs associated with doing business in the country, such as: readiness of bureaucratic procedures; legal protection of investors; enforcing contracts; and getting credit.

All components that make-ups the previous major components are then weighted according to their relative importance based on a survey of companies, engineering firms, index publishers, and technical organizations. Finally, the factors are calculated in a comparative manner, taking the United States as the reference location.

## How Data Are Gathered

Intratec largely gathers useful data for calculations from public sources, including national governments' statistics bureaus and international organizations. The data gathered include information that can make a material contribution to factor calculations.

The automated extraction relies on Application Programming Interfaces (APIs) either provided by the data sources or developed by Intratec. Requests are automatically according to the sources' update schedule and the data retrieved by the API enter an automated workflow for data integrity check.

Some specific data sources demand manual collection. In such cases, to prevent errors derived from human mistakes, the same collection process is performed by two independent professionals and the result is cross-checked through computer algorithms. If any differences are found in the data collected, a third professional reviews the data and checks the original source to attest which are the correct data. Once the manually collected data pass cross-checking step, they are sent to automated workflows for further testing and validation to confirm that they are correct.

A second layer to certify data integrity consists of collecting the same data set from various sources. The data points are cross-checked across several sources. Once again, if any inconsistencies are found, the system automatically generates alerts that demand human verification. An Intratec analyst must then check the inconsistency and confirm the correct data.

Once raw data integrity is attested, the data are transformed through automated workflows, which convert units and currencies to the ones usually employed as industry standard or defined as default by Intratec.

Finally, data are formatted according to the database standards and loaded to our databases. At this moment, data are ready to be used within calculation models.

When dealing with critical data for decision-making, as Intratec does, it is obvious that sources reliability is key. Therefore, Intratec continuously works to assure the quality of our data in the following ways:

* To increase the number of sources evaluated.

* To increase the usage national governments' statistics bureaus, foreign trade agencies, international organizations, as well as other recognized institutions.

* To improve data validation.

* To ensure the quick replacement of any discontinued source.

# Important Considerations

## Data Corrections

Intratec is committed to accurately presenting reliable and representative index data; thus, occasionally, following online publication of information, final data might be corrected due to (i) changes in official statistics released by countries/organizations; (ii) changes in Intratec data methodology; (iii) errors during data collection and processing. Whenever such rare data reviews are made, they will be reported in the release notes, available at https://medium.com/intratec-release-notes.

## Ethics and Compliance

Independence and impartiality are central to Intratec and what we do. Intratec has no financial interest in the factors of the countries on which it reports; our goal is to reflect the actual market level of those commodities.

All Intratec employees are required to annually confirm the absence of any personal relationships or financial interests that may serve to influence or even be perceived to impact their ability to perform their jobs as objective, impartial and effective individuals.

## Review of Methodology

The publication of reliable, distortion-free factors that are representative indicators of market values is any methodology's overriding goal. To achieve that goal, Intratec employees perform regular examinations of our methodologies and frequently speak with those in the industry. In addition to this ongoing review of methodology, Intratec undertakes at least an annual review of all of its methodologies and methodology documents.

If merited, an internal discussion will take place which will address changes in or terminations of the components of IL Factors, as well as the initiation of new data. If necessary, formal procedures for conducting such changes or terminations will ensue.

Transparency is a non-negotiable value at Intratec. Thus, as important as a solid and reliable methodology, is a clear redaction that ensures that database users can understand both the kind of data we provide and how we produce such data. Therefore, based on the feedback of database users, the redaction of our methodology is regularly reviewed regarding clarity and simplicity.

Intratec methodology is continuously tested and proven accurate by those who are reliant on our IL Factors, e.g., chemical and oil corporations, R&D centers, EPC companies, biotech startups, local manufacturers and consultants, financial institutions and government agencies.