

**SAMPLE OF THE 2010 INTERNATIONAL HI-TECH  
MANUFACTURING  
FACILITIES ESTIMATING YEARBOOK**

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**Sample of Data from Section 1 page 5, 22 and 27 (some values have been removed intentionally)**

The following table lists some of the major activities that need to be considered in the CAPEX (i.e. estimating process).

#	Activity	Estimating Input
1	New needs or demand, for new product / new or expanded or re-vamped building, manufacturing facility or production unit.	Refer to Section 1, 2 and 3 for appropriate estimating method to be utilized.
2	Definition of project goals, scope and mission statement.	
3	Conceptual engineering, planning and Front End / feasibility study including possible Front End estimate.	Refer to Section 1, 2 and 3 for appropriate estimating method to be utilized.
4	Submittal of Approval of Expenditure – AFE. Package.	
5	Commencement of detailed engineering effort if project is approved.	
6	(Optional) Possible milestone to compile CAPEX estimate.	Refer to Section 1, 2 and 3 for appropriate estimating method to be utilized
7	Production of engineering deliverables	
8	(Optional) Possible milestone to compile CAPEX estimate.	Refer to Section 1, 2 and 3 for appropriate estimating method to be utilized
9	Start of Procurement effort.	
10	Start of Construction effort.	
11	(Optional) Possible milestone to compile CAPEX estimate.	Refer to Section 1, 2 and 3 for appropriate estimating method to be utilized
12	Completion of Construction effort.	
13	Validation activities.	
14	Stat up / handover of completed project.	
15	Close out report.	
16	Collection of historical data for future CAPEX estimating / benchmarks	

## **NEW INDUSTRIAL / COMMERCIAL SF / M2 BUILDING COSTS 2010 COST BASIS**

The general approach is to determine the number of floors, footprint of building / facility, calculate usable square foot / M2 area of facility / building, select building type / specification from list below and multiply by calculated square footage / M2 by the appropriate SF/ M2 cost value. Modify for location by selecting city location factor indicated in Section 2.

Facility Type	Total Installed \$ Cost per Gross SF - Low Value	Total Installed \$ Cost per gross SF - High Value	Total Installed \$ Cost per Gross M2 - Low Value	Total Installed \$ Cost per Gross M2 - High Value
300 mm water facility (ISO 3, 4 & 5 with some non classified areas)				

Administration / Support Areas - Non - classified GMP areas for a pharmaceutical facility (Offices, Write up area, Changing / Gowning areas, Corridors, Mechanical space)				
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**This table contains 50 + additional type facilities including:**

- **Marine / Ocean R & D Center**
- **Satellite Manufacturing Facility**
- **Food and Beverage Production Facility**
- **Medical Devices**
- **Tonner / Ink Production Facility**
- **Micro – Electronics Manufacturing Facilities**
- **Oncology R&D Center**
- **Computer Chip Manufacturing Facility**

**Location Factors (Calibration Values) – Example: Laboratory Project costs \$10 Million in Washington DC, Similar project in Singapore would be \$10 million x XXX from below = \$XXX million**

USA	Location Factors
Washington DC - Base Case	1.00
New Jersey / Pennsylvania	
New England (MA, CT, RI)	
Mid West - Chicago Illinois	
Mid West – Indiana	
South East (NC / GA / TX)	
Western (CA / AZ )	
Puerto Rico	
Other Countries	
Canada - Oakville / Toronto	
Brazil	
Mexico	
Ireland	
Belgium	
UK – Edinburgh	
UK – Midlands	
UK – London	
Netherlands	
France	
Sweden	
Switzerland	
Germany	
Italy	
Spain	

Finland	
Denmark	
Czech Republic	
India	
Singapore	
Vietnam	
China	
Japan	
Malaysia	
Thailand	
South Korea	
Australia	

**Sample of data from Section 2 page 14**

**Basic differences between Electronics / Semi-Conductor Construction and Pharmaceutical Methods and Practices:**

The following are some of the main differences between the above; the basic differences revolve primarily around facility internal finishes, i.e. Walls, ceilings and floors, together with some piping and mechanical systems, i.e. air handlers and filters:

The following tables discuss the specific difference between the two different types of facilities:

**Sample of data from Section 3 page 10 (Values have been purposely removed)**

**Pharmaceutical Production Equipment (Budget Costs) Equipment only:**

- Add XX % for freight.
- Add XXXX for labor / construction equipment to install equipment.
- Multiply Production Equipment by a factor of XXX - XXX, for a completely installed system, this allows for a foundation (excavation, stone, backfill), equipment rigging and setting, piping, electrical service, instrumentation, insulation and painting.
- Add XXXXX for I/C integration costs.

#	Equipment Type	Outline Specification	Low	High	Cost per Unit of Measure
1	Agglomeration / Briquette / Compactor Stainless Steel 40 Ton Compactor	10" diameter 25 HP motor with screw feeders and associated equipment			
2	Blister machine – Stainless Steel 20' long x 3'6" wide x 5' high with 15" x 15" seal area	20 blister packs / cycles per minute 460 V			
3	Bio-Reactor SS	3,000 Liters (4' 6" diameter)			
4	Ditto	15,000 Liters			
5	Buffer Prep Tank SS	15,000 Liters (9' diameter)			
6	Buffer Hold Tank SS	600 Liter			
7	Capsule filler 100,000 capsules per minute	Stainless Steel / Plexi-Glass surround 72" x 50" x 60 ' high, includes control panel			

8	Capsule polisher	Stainless steel 200 v 40" x 24" x 40" 5,000 – 10,000 tablets per minute			
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**This table contains 44 items of production equipment.**

**Sample of data from Section 3 page 12**

**UNIT PRICE ESTIMATING DATA / INFORMATION**

The following nine listings of unit prices are focused on hi-tech / manufacturing capital projects ranging in cost from \$0.50 to \$100 + million. These unit costs are for new construction, it should be noted that alteration / revamp / major renovation construction work could cost between 10% and 50% more than the values indicated the nine listings indicated. These unit prices are 2010 values (calibrated to mid point of year) they are based on historical data of projects completed in North America and have been adjusted to reflect pricing within the Washington DC beltway (20 – 40 miles radius). Hybrids of Union / Non-union pay scales have been used in determining labor / installation values. (The labor cost value includes a value for construction / rental equipment, i.e., 6.50%, this is for cranes, welding machines and similar types of equipment required to complete each individual task) The units include supervision, plus a profit margin of 10%. (A percentage of between 7 % – 11% - suggest 8.5% should be added to the values indicated to capture site establishment (Division 1 / Preliminaries) costs for such items as scaffolding, trailers, testing, temporary warehousing and testing etc:

**Metric Conversion Values:**

- 1 Acre = 4,047 M2
- 1 Foot = 30.48 Centimeters
- 1 Foot = 0.3048 Meters
- 1 Meter = 39.37 inches
- 1 Meter = 1.094 Yards
- 1 Cubic Yard = 0.765 M3:
- 1 M3 = 1.31 Cubic Yards:
- 1 M = 3.28 Lineal Feet:
- 1 M2 = 10.76 Square Feet:
- 1 Hectare = 2.471 Acres
- 1 Kilogram = 2.205 Pounds
- 1 Gallon = 3,785 Cubic Centimeters
- 1 Imperial Gallon = 1.20095 US Gallons
- 1 Liter = 0.264 Gallons
- 1 Square Foot = 0.0929 M2
- 1 Mile = 1.609 Kilometers
- 1 Square Kilometer = 247 Acres
- 1 Square Yard = 0.836 M2
- 1 Yard = 0.9144 M

#	Description	Unit	Material	Labor	Total
(1)					

	<b>CSI DIVISION 1 / GENERAL CONDITIONS &amp; DEMOLITION WORK</b>				
1	Project / Construction Manager	Month	-	10,579.40	10,579.40
2	Superintendent	Month	-	7,442.38	7,442.38
3	Assistant Superintendent	Month	-	6,079.00	6,079.00
4	Field Engineer	Month	-	6,567.37	6,567.37

**This section includes 44 pages of detailed unit prices**

### **Sample of data from Section 3 page 67**

The following list includes numerous topics / items / questions. The list is not intended to be complete. Consider it a “work in progress”, that should be added to on a regular basis, or every couple of years.

### **The Manufacturing / Chemical Process**

- Types of chemicals / drugs / materials produced (hazardous, toxic etc).
- Storage capacity of plant, warehouse, storage tanks, JIT considerations.
- Means of transportation of raw / finished product, railroad car, truck, ships, barge, pipeline, conveyors.
- What are the new plant production capacity / future expansions?
- What are the project’s products?
- Are there any problematic by-products?
- What level of completeness are the P. F. D. ’s / P. & I. D. ’ s, utility flow sheets / equipment arrangements / layouts, equipment, and material specifications.
- Continuous process / batch process 24 / 7 / 365

### **Specifications / Codes**

- Which specification standards will be used Owner’s specifications, CSI or EPC Contractor’s.
- U.S Codes or international i.e. German (D.I.N) or British (B. S.) etc.
- Metric / Imperial measurement system.

### **Procurement – Contracting Issues**

- What is available locally / experience with local vendors and sub contractors.
- QA / QC / validation requirements. Can these requirements be achieved by the local vendors / suppliers?
- Any owner involvement / owner provided services / equipment items?
- What are the owners warranty needs and requirements / is there any unusual warranty requirements / performance guarantees?
- Any long lead delivery items, what is the status of this, are we responsible for inspections, payments and eventual receiving?
- What are the storage / protection requirements specific to the long lead equipment items and locally produced equipment / materials?
- Terms and conditions, warranties. What spare parts are required?

### **End of Samples**