

6. Medical Devices

The medical devices industry produces a wide range of medium- and high-technology products, such as prosthetics, artificial joints, stents, and braces. In the United States alone, the medical equipment, technology, and supplies industries, of which medical device manufacturing is one component, provided over 350,000 jobs, and the value of shipments totaled approximately \$100 billion.

a) Representative Operation – Medical Device Manufacturing

The representative operation modeled is a manufacturer of mechanical medical devices such as prosthetics. As illustrated in Exhibit 3.22, this operation is characterized by:

- Moderate facility and equipment requirements
- A workforce strongly weighted toward professional/technical staff and skilled operators
- Modest energy requirements
- Modest in-house R&D activities

The business is assumed to operate as a stand-alone profit center.

b) International Results

International results are illustrated in Exhibit 3.23. These results reflect the combined impact of 27 location-sensitive cost components applied to the modeled operation. Detailed results, by key cost component, are presented in Exhibit 3.24.

c) Leading Cities

Exhibit 3.25 profiles results for the leading (lower-cost) cities, by country, from among the 102 cities featured in this report. Results for all other featured cities can be found in Chapter 4, Exhibit 4.10.

EXHIBIT 3.22 – MEDICAL DEVICES	
Medical Device Manufacturing – Summary of Operating Parameters	
Facilities Requirements	
Industrial site purchased	6 acres (2.4 hectares)
Size of factory built	70,000 ft ² / (6,503 m ²)
Other Initial Investment Requirements	
Machinery and equipment – US \$'000	\$2,700
Office equipment – US \$'000	\$200
R&D equipment – US \$'000	\$300
Inventory – US \$'000	\$2,500
Equity financing - % of project costs	55%
Workforce	
Management	6
Sales and administration	15
Production/non-dedicated product development	
- Professional, technical	29
- Operators	34
- Unskilled laborers	13
Other	3
Total employees	100
Energy Requirements	
Electricity monthly consumption/peak demand	160,000 kWh and 540 kW
Gas monthly consumption	800 CCF (2,266 m ³)
Other Annual Operating Characteristics	
Sales at full production – US \$'000	\$19,500
Materials and other direct costs - % of sales	30%
Other operating costs - % of sales	9%
Investment in tax-eligible R&D - % of sales	3.5%

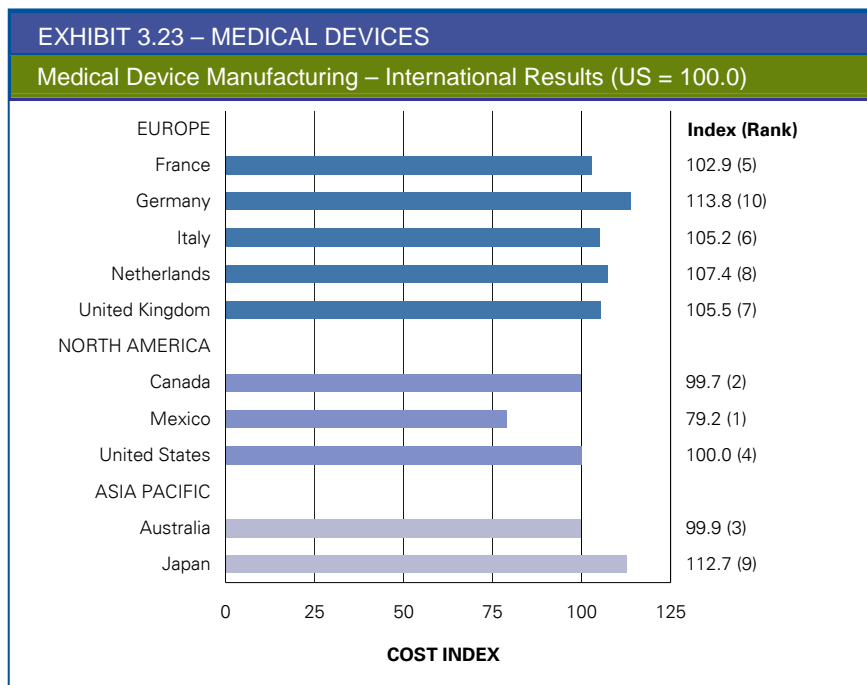


EXHIBIT 3.24 – MEDICAL DEVICES

Medical Device Manufacturing – Costs, by Major Component, US \$'000

	Europe					North America			Asia Pacific	
	France	Germany	Italy	Netherlands	UK	Canada	Mexico	US	Australia	Japan
Revenues	18,500	18,500	18,500	18,500	18,500	18,500	18,500	18,500	18,500	18,500
Costs										
- Salaries & Wages	4,513	6,855	4,543	5,956	5,260	5,206	2,468	4,802	5,048	6,272
- Statutory Plans	1,919	1,098	1,479	750	633	427	302	435	658	577
- Other Benefits	906	1,377	1,218	1,807	1,629	1,109	546	1,339	1,096	2,001
- Total Labor & Benefits	7,338	9,331	7,240	8,513	7,522	6,742	3,317	6,577	6,801	8,849
- Transportation	384	419	527	401	397	548	512	500	405	429
- Utilities	233	329	494	310	283	186	332	145	287	372
- Interest & Depreciation	766	1,122	793	1,014	1,023	728	(576)	630	641	1,119
- Non-income Taxes	249	131	47	35	433	333	36	247	89	316
- Location-insensitive Costs	7,215	7,215	7,215	7,215	7,215	7,215	7,215	7,215	7,215	7,215
Profit Before Income Tax	2,316	(47)	2,184	1,194	1,629	2,749	7,664	3,197	3,061	200
- Income Taxes ¹	662	91	908	110	404	577	2,138	1,065	917	157
Effective Rate	28.6%	n/a	41.6%	24.6%	24.8%	21.0%	27.9%	33.7%	30.0%	n/a
After-tax Profit	1,654	(139)	1,276	900	1,224	2,172	5,526	2,121	2,144	43
Total Annual Costs	16,847	18,638	17,223	17,598	17,277	16,328	12,974	16,379	16,356	18,458
Index (US=100.0)	102.9	113.8	105.2	107.4	105.5	99.7	79.2	100.0	99.9	112.7
Rank	5	10	6	8	7	2	1	4	3	9

¹ Income taxes may be either positive or negative, irrespective of whether profit before income tax is positive or negative, due to the impact of specific expense deduction rules, minimum taxes, and refundable income tax credits. Effective tax rates are not shown where results are not meaningful because of low profitability.

EXHIBIT 3.25 – MEDICAL DEVICES

Medical Device Manufacturing – Results for Leading Cities, by Country

Country	City	Index	Rank Among 102 Cities	Country	City	Index	Rank Among 102 Cities
France	Toulouse	101.4	58	Canada	Sherbrooke	94.8	9
	Mulhouse	102.2	63		Moncton	95.3	11
Germany	Halle	110.5	95	Fredericton	95.9	15	
	Erlangen	114.3	100	Charlottetown	96.1	16	
Italy	Vicenza	104.1	80	Mexico	Reynosa	76.9	1
	Livorno	105.5	85		Aguascalientes	79.1	2
Netherlands	Utrecht	107.4	90	United States	San Juan	87.1	6
United Kingdom	Barnsley	102.8	71		Shreveport	93.3	7
	Plymouth	103.3	74		McAllen	93.8	8
Australia	Adelaide	98.2	33		Little Rock	95.2	10
	Brisbane	99.2	38		Oklahoma City	95.5	12
Japan	Fukuoka	111.9	97		Greenville-Spartanburg	95.6	13
	Yokohama	113.0	98		Montgomery	95.8	14
					Jackson	96.5	17
				Lexington	96.6	18	