

## 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 300,000 jobs in 2007, with shipments valued at approximately \$75 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
- Relatively low energy requirements
- Modest in-house R&D activities.

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

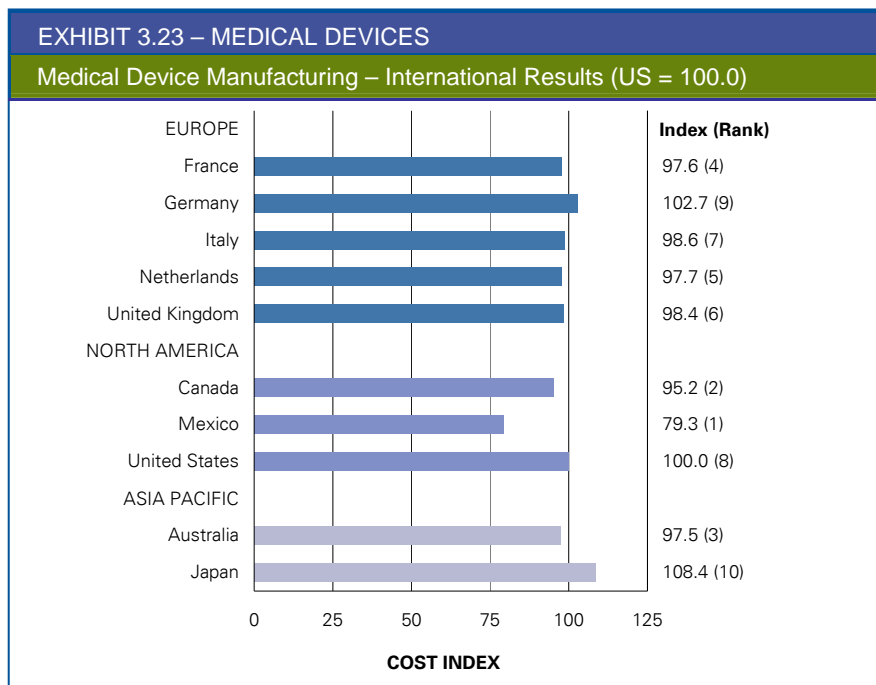
### b) International Results

International results are illustrated in Exhibit 3.23. These results reflect the combined impact of 26 location-sensitive cost components applied to the modeled operation. Detailed results, by key cost component, are presented in Exhibit 3.24.

### c) Selected Cities

Exhibit 3.25 profiles results for selected cities, by country, from among the 95 cities featured in this report. Results for all other featured cities can be found in Chapter 4, Exhibit 4.7.

EXHIBIT 3.22 – MEDICAL DEVICES	
Medical Device Manufacturing – Summary of Operating Parameters	
<b>Facilities Requirements</b>	
Leased industrial facility	4 acres (16,187 m <sup>2</sup> )
Size of factory built	70,000 ft <sup>2</sup> (6,503 m <sup>2</sup> )
<b>Other Initial Investment Requirements</b>	
Machinery and equipment – US \$'000	\$14,500
Office equipment – US \$'000	\$200
R&D equipment – US \$'000	\$300
Inventory – US \$'000	\$3,400
Equity financing – % of project costs	55%
<b>Workforce</b>	
Management	6
Sales and administration	15
Production/non-dedicated product development	
- Professional, technical	29
- Operators	34
- Unskilled laborers	13
Other	3
Total employees	100
<b>Energy Requirements</b>	
Electricity monthly consumption/peak demand	140,000 kWh and 475 kW
Gas monthly consumption	2,400 CCF (6,799 m <sup>3</sup> )
<b>Other Annual Operating Characteristics</b>	
Sales at full production – US \$'000	\$24,000
Materials and other direct costs – % of sales	30%
Other operating costs – % of sales	5%
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
<b>Revenues</b>	22,800	22,800	22,800	22,800	22,800	22,800	22,800	22,800	22,800	22,800
<b>Costs</b>										
- Salaries & Wages	4,620	6,401	5,038	5,579	5,050	5,353	2,145	5,450	5,600	6,997
- Statutory Plans	2,097	1,091	1,080	724	479	509	152	489	729	680
- Other Benefits	969	1,370	1,459	1,510	1,698	1,368	631	2,118	1,269	1,771
- Total Labor & Benefits	7,686	8,863	7,577	7,813	7,227	7,230	2,928	8,058	7,599	9,448
- Facility Lease	478	597	574	637	975	372	338	354	503	1,109
- Transportation	1,047	1,056	1,156	1,248	1,002	1,466	1,515	1,304	1,529	889
- Utilities	188	266	409	253	257	176	184	161	291	255
- Interest & Depreciation	2,354	2,461	2,376	2,379	2,432	2,358	1,678	2,382	2,173	2,519
- Non-Income Taxes	470	181	41	38	554	313	52	488	140	792
- Location-Insensitive Costs	7,866	7,866	7,866	7,866	7,866	7,866	7,866	7,866	7,866	7,866
<b>Profit Before Income Tax</b>	2,713	1,512	2,801	2,568	2,488	3,021	8,241	2,187	2,700	(79)
- Income Taxes <sup>1</sup>	575	450	869	451	532	376	2,236	560	533	67
Effective Rate	21.2%	29.7%	31.0%	17.6%	21.4%	12.4%	27.1%	25.6%	19.7%	n/a
<b>After-Tax Profit</b>	2,138	1,062	1,932	2,117	1,956	2,645	6,005	1,627	2,167	(145)
<b>Total Annual Costs</b>	20,663	21,738	20,867	20,684	20,844	20,155	16,797	21,173	20,634	22,944
<b>Index (US=100.0)</b>	<b>97.6</b>	<b>102.7</b>	<b>98.6</b>	<b>97.7</b>	<b>98.4</b>	<b>95.2</b>	<b>79.3</b>	<b>100.0</b>	<b>97.5</b>	<b>108.4</b>
<b>Rank</b>	<b>4</b>	<b>9</b>	<b>7</b>	<b>5</b>	<b>6</b>	<b>2</b>	<b>1</b>	<b>8</b>	<b>3</b>	<b>10</b>

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 Selected Cities, by Country

Country and City	Index	Rank <sup>1</sup>	Country and City	Index	Rank <sup>1</sup>	Country and City	Index	Rank <sup>1</sup>
<b>International Locations – All Cities</b>						<b>North America – Lowest Cost Cities</b>		
<b>AU</b> Adelaide	96.9	46	<b>JP</b> Osaka	107.1	94	<b>CA</b> Moncton, NB	91.5	3
Brisbane	97.0	47	Tokyo	109.6	95	Fredericton, NB	92.0	4
Melbourne	96.4	39			Sherbrooke, QC	92.2	5	
Sydney	98.5	71	<b>MX</b> Mexico City	79.5	2	St. John's, NL	92.6	6
			Monterrey	79.2	1			
<b>FR</b> Lyon	96.8	42			<b>US</b> Shreveport, LA	93.7	11	
Paris	98.4	67	<b>NL</b> Amsterdam	97.6	54	McAllen, TX	94.6	14
			Brabant Stad	97.4	50	Cheyenne, WY	95.1	18
<b>GE</b> Berlin	101.7	87	The Hague	97.8	60	Oklahoma City, OK	95.1	19
Frankfurt	103.7	90	Utrecht	97.7	58	Bangor, ME	95.3	20
					Sioux Falls, SD	95.3	21	
<b>IT</b> Milan	97.7	57	<b>UK</b> London	102.2	88	Charleston, WV	95.3	22
Rome	99.4	77	Manchester	94.7	15	Tampa, FL	95.3	23

1 Rank among 95 cities.