

# A. Manufacturing

## 1. Aerospace

The aerospace industry produces commercial and military aircraft and parts, military weapons, space rockets, and satellites. The Aerospace Industries Association of America estimates that revenues for the US aerospace industry totaled almost \$200 billion in 2007.

### a) Representative Operation – Aircraft Parts

The membership of the Aerospace Industries Association of America (excluding aircraft assemblers and service providers) comprises approximately 45 percent precision metal component manufacturers, 40 percent electronic assemblers, and 15 percent plastics producers. The representative operation modeled, a manufacturer of aircraft parts, is based on this mix of production.

As outlined in Exhibit 3.2, this type of operation is characterized by:

- Moderate land, building, and equipment requirements
- A workforce consisting primarily of skilled technicians and operators
- Moderate energy requirements

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

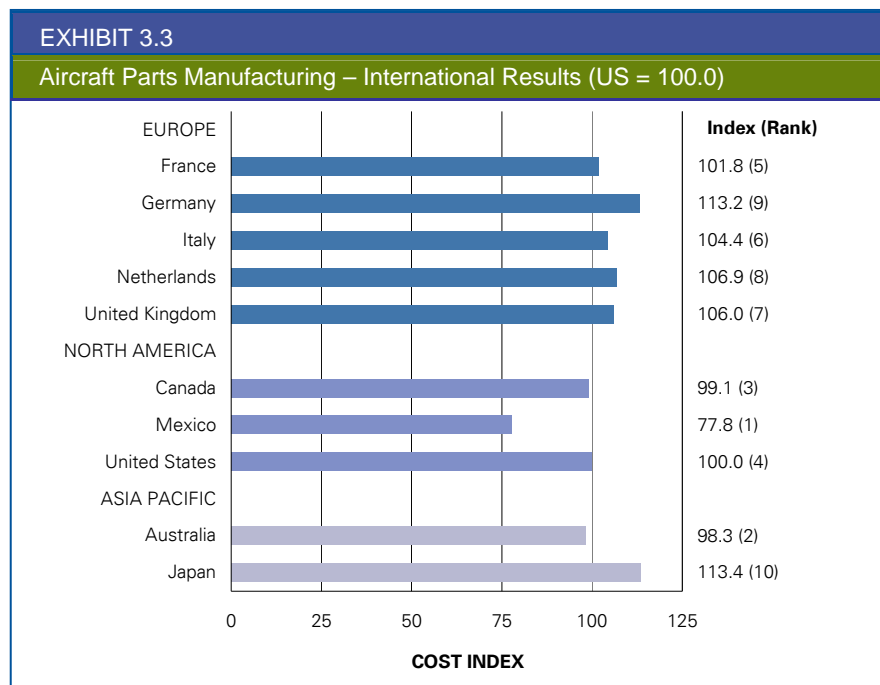
### b) International Results

International results are illustrated in Exhibit 3.3. 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 3.4.

### c) Selected Cities

Exhibit 3.5 profiles results for selected 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 3.2 – AEROSPACE	
Aircraft Parts Manufacturing – Summary of Operating Parameters	
<b>Facilities Requirements</b>	
Industrial site purchased	8 acres (3.2 hectares)
Size of factory built	76,500 ft <sup>2</sup> (7,107 m <sup>2</sup> )
<b>Other Initial Investment Requirements</b>	
Machinery and equipment – US \$'000	\$4,847
Office equipment – US \$'000	\$209
R&D equipment – US \$'000	\$300
Inventory – US \$'000	\$1,585
Equity financing - % of project costs	50.25%
<b>Workforce</b>	
Management	4
Sales and administration	10
Production/non-dedicated product development	
- Professional, technical	23
- Operators	38
- Unskilled laborers	7
Other	3
<b>Total employees</b>	<b>85</b>
<b>Energy Requirements</b>	
Electricity monthly consumption/peak demand	177,000 kWh and 675 kW
Gas monthly consumption	4,250 CCF (12,035 m <sup>3</sup> )
<b>Other Annual Operating Characteristics</b>	
Sales at full production – US \$'000	\$15,500
Materials and other direct costs - % of sales	26%
Other operating costs - % of sales	4%
Investment in tax-eligible R&D - % of sales	1.8%



## EXHIBIT 3.4 – AEROSPACE

## Aircraft Parts 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>	14,900	14,900	14,900	14,900	14,900	14,900	14,900	14,900	14,900	14,900
<b>Costs</b>										
- Salaries & Wages	3,808	5,798	3,779	5,046	4,475	4,431	2,053	4,072	4,299	5,310
- Statutory Plans	1,614	938	1,237	649	537	379	245	419	555	483
- Other Benefits	770	1,154	985	1,511	1,389	944	465	1,135	913	1,762
- Total Labor & Benefits	6,192	7,890	6,001	7,206	6,402	5,755	2,763	5,626	5,766	7,555
- Transportation	454	514	832	499	442	628	969	861	396	673
- Utilities	294	443	569	412	381	245	341	202	352	404
- Interest & Depreciation	1,208	1,508	1,202	1,467	1,548	1,202	21	1,084	1,133	1,541
- Non-income Taxes	324	141	48	38	477	335	33	225	103	361
- Location-insensitive Costs	4,436	4,436	4,436	4,436	4,436	4,436	4,436	4,436	4,436	4,436
<b>Profit Before Income Tax</b>	1,991	(32)	1,812	944	1,214	2,299	6,337	2,472	2,713	(69)
- Income Taxes <sup>1</sup>	589	85	766	125	375	538	1,752	828	856	76
Effective Rate	29.6%	n/a	42.2%	24.0%	30.9%	23.4%	27.6%	33.8%	31.5%	n/a
<b>After-tax Profit</b>	1,402	(117)	1,047	717	839	1,761	4,585	1,636	1,857	(146)
<b>Total Annual Costs</b>	13,498	15,017	13,853	14,183	14,062	13,140	10,315	13,263	13,043	15,046
<b>Index (US=100.0)</b>	<b>101.8</b>	<b>113.2</b>	<b>104.4</b>	<b>106.9</b>	<b>106.0</b>	<b>99.1</b>	<b>77.8</b>	<b>100.0</b>	<b>98.3</b>	<b>113.4</b>
<b>Rank</b>	<b>5</b>	<b>9</b>	<b>6</b>	<b>8</b>	<b>7</b>	<b>3</b>	<b>1</b>	<b>4</b>	<b>2</b>	<b>10</b>

<sup>1</sup> 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 3.5 – AEROSPACE

## Aircraft Parts Manufacturing – Results for Selected Cities, by Country

Country	City	Index	Rank Among 102 Cities	Country	City	Index	Rank Among 102 Cities
France	Toulouse	100.6	51	Canada	Montreal	98.6	39
Italy	Livorno	104.7	80		Toronto	100.8	54
United Kingdom	Manchester	111.2	95		Winnipeg	96.8	24
				Mexico	Monterrey	80.6	4
Australia	Brisbane	97.6	31	United States	Atlanta	97.3	27
	Sydney	101.0	57		Hartford	103.4	73
					Indianapolis	101.9	62
					Oklahoma City	94.5	14
					Phoenix	103.1	70
					Seattle	104.6	79
					St. Louis	101.5	60
					Wichita	99.5	46