

cator presses for the manufacture of structural kevlar composite parts and aircraft interiors. Numerically controlled equipment consist of drafting and digitizing machines, several multi-spindle profile mills which include a pair of dual gantry 3-spindle 5-axis vertical profilers, a wire marking machine and a pipe bender complete with a tube data center.

The company uses the CADAM system of Interactive Computer Graphics in support of both CAD and CAM functions. Availability of this system has permitted an integration of the design/manufacturing function.

de Havilland also maintains an Engineering Library, Metallurgical Laboratory, an Aerodynamics Laboratory, a Structural Testing Department, a Materials Research Laboratory, Environmental Chambers, and an Engineering Computer Center. In addition, an Engineering Development Shop, housed in a separate 11,000 sq ft building, consists of 100 skilled tradesmen experienced in working directly with the Engineering staff. The Data Center is equipped with an IBM 3031AP and an IBM 4341/12. The 4341/12 is dedicated to Engineering. In addition, the Engineering Department has a VAX 11/780 Computer used primarily for structural analysis.

**EXPERIENCE:** Contracts for both aircraft purchases, and research & development programs have been negotiated with the USAF, NASA, US Department of Interior, USAF Academy, Alaska National Guard, Canadian Forces, Canadian National Research Council, and the Canadian Department of Transport. In addition to the above, the deHavilland product line is presently being operated in over 70 countries worldwide and on all seven continents. Previous DOD contracts include:

- 981 L20 DHC-2 Mkl Beaver aircraft to the USAF/US Army.
- 165 DHC-4 Caribou aircraft to the US Army.
- CV7A Buffalo aircraft development.
- SC8A Air Cushion Landing System.
- 6 UV18A DHC-6 Twin Otter aircraft to Alaska Army National Guard.
- 2 UV18B DHC-6 Twin Otter aircraft to USAF.
- 2 E9-A Dash 8 platforms to USAF (through Sierra Research)

**KEYWORDS:** Air Delivery Systems; Aircraft; Aircraft Control; Airframe Components; Airframe Structures; Augmentor Wing; Cargo Handling Equipment; Cockpit Displays; Composite/Fiberglass Components; Engine Components; Engine Controls; Engine Systems; Environmental Control; Extended Length Machining; Fuel Research; Fuel Systems; Hydraulics; Instruments; Landing Gears; Machining; Navigation; Performance Measuring Devices; Personnel Survival/Restraint; R&O (Aircraft); Simulators; STOL Aircraft Manufacture; Training; Tubing; Wiring.

**REVISED:** June 88

## **BOEING OF CANADA Ltd (Winnipeg Division)**

**ADDRESS:** 99 Murray Park Road  
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**CONTACT:** Mr E M Sloane, Director, Marketing - (204) 888-2300

**HISTORY:** The Boeing Winnipeg plant was established in 1971 and is a wholly owned subsidiary of The Boeing Company of Seattle. There are two other Canadian divisions, one located in Arnpprior, Ontario, and one in Toronto, Ontario.

**CAPABILITY:** Boeing of Canada Winnipeg is a Canadian leader in the design and manufacture of space high-strength/weight ratio fiber composite plastic components for aircraft, space, and other advanced technology applications. The company has the engineering, manufacturing and development expertise to design and build solid laminate or sandwich panel components. Glass, high-modulus graphite and organic fibers, and thermosetting resin systems, including epoxies, polyesters, phenolics or polyimides, bismaleimides, are used with state-of-the-art capability. Structural and non-structural glass fiber,

and advanced fiber composite components are currently produced for a diversified range of products covering a technological spectrum from aircraft to satellite components.

A stated objective of the company's management team is to establish Boeing of Canada as a center of excellence for composites manufactured within the Boeing Company, and as the Canadian leader in the composite industry. To achieve this objective, an expanded research and development program and increased engineering tool design and fabrication capabilities have been initiated.

Diversification into aerial and surface target systems, including their design, development, test and supply has resulted in the assembly of a Boeing of Canada target family which is available internationally.

The Winnipeg Division's Quality Assurance Program operates to one standard of quality which is in conformance with the requirements of the Ministry of Transport Engineering and Inspection Manual (FAR Part 21, Subpart G), NATO Quality Control Systems Requirements for Industry AQAP-1 (equivalent to MIL-Q-9858A), and with the Boeing Company Corporate Document DI-8000A. Quality is maintained throughout the manufacturing process by inspectors appointed by the Manager of Quality Assurance who in turn is approved by the Ministry of Transport. Complete laboratory tests are carried out on process test panels as required by customers and/or pertinent authorities. All raw materials are purchased from qualified suppliers and incoming shipments are subject to Quality Control receiving inspection to ensure that all requirements are met.

**AVERAGE WORK FORCE:** Engineering Design - 54  
Quality Assurance - 75  
Production - 746  
Admin - 263

**GROSS SALES:** 1986 - \$50M  
1987 - \$69M

**PLANT SIZE:** 228,000 Sq Ft (Manufacturing Space)

**EQUIPMENT:** Boeing's major equipment includes:

- An autoclave 15 ft in dia, 35 ft long, capable of 95 psi pressure and 625°F ambient temperature.
- An autoclave 10 ft in dia, 30 ft long, capable of 95 psi and 625°F ambient temperature.
- An autoclave 4 ft in dia, 10 ft long, capable of 95 psi pressure and 625°F ambient temperature.
- Air-heated oven with two compartments 8 ft wide, 13 ft long and 8 ft high, with a maximum ambient temperature of 800°F.
- An air-heated oven with compartments 7 ft wide, 9 ft long, 7 ft high, with maximum ambient temperature of 800°F.
- 44 inch vertical and horizontal core cutting bandsaw.
- Traverse saw capable of cutting up to 16 ft wide material with variable cutting speed.
- Core milling machine capable of handling core sheets 10 ft long, 6 ft wide and up to 6 inches thick, and capable of milling from 0 to 15 degrees ± a tenth of a degree.
- Special taper core milling machine capable of handling sheets 6 ft long, 1.5 ft wide and 2 inches thick, and capable of milling from 0 to 15 degrees.
- Hydraulic core forming press with 4 ft x 4 ft platen.
- One 8 ft x 22 ft and one 8 ft x 15 ft waterfall spray painting booth.
- An 8 ft x 20 ft flame spray booth and apparatus capable of hard and soft ferrous and non-ferrous metal spraying.
- Assorted saws, routers' drills, punches, shears, finishing equipment, etc, equipped with tungsten carbide and diamond cutters.