

Repair and overhaul of jet engine components:

- VAC-AERO is approved by Transport Canada and various aerospace companies for a variety of repairs using plasma spray, vacuum brazing, tungsten arc and electron beam welding.
- Specific components repaired include: compressor stators, turbine vanes and nozzles, combustion chambers, shafts and miscellaneous components.

Manufacture of new parts to print:

- VAC-AERO can also manufacture brazed and electron beam welded assemblies to customer specifications and drawings. They specialize in components such as aluminum vacuum brazed heat sinks and cold wall assemblies for radar and avionics equipment. VAC-AERO offers a complete line of cold wall vacuum furnaces ranging from small laboratory models to large bottom loading production units. They have supplied these furnaces to a wide variety of customers in the aerospace, nuclear and other high technology industries.
- In addition, they can supply ancillary furnace equipment such as high temperature molybdenum fixtures, water recirculating units, and work handling systems. They also offer complete turnkey installation services, extensive operator training programs and post sale preventive maintenance service.

AVERAGE WORK FORCE: Engineers - 11
Others - 92

GROSS SALES: 1986 - \$8.5M
1987 - \$8.7M

PLANT SIZE: 40,780 Sq Ft (Oakville Division)
9,250 Sq Ft (Montreal Division)

EQUIPMENT: VAC-AERO employs the following equipment:

- Vacuum oil quenching furnaces capable of hardening part sizes to 72 in. dia. x 84 in. high, vacuum brazing and heat treating furnaces suitable for temperatures to 2700sF and ultra high vacuum levels to 1x10-6 torr.
- CNC machining centers, a fin forming machine, and a computer controlled co-ordinate measuring machine, combined with an electron beam welder (chamber size 36"L x 36"H x 52"W, extendible to accommodate shafts to 72"L) provide full in-house capabilities for the manufacture of parts to print.
- Plasma coating equipment including Metco 3M, 45kW and Metco 7M, 80kW plasma guns, and a METCO AR-1000 Robot.
- In-house facilities for repair and overhaul including lathes, vertical mills, grinders, and EDM equipment for machining.
- Complete metallurgical laboratory in addition to normal dimensional checking equipment, complements quality control capabilities.

EXPERIENCE: Present customers include numerous companies in the aircraft, avionics, electronics and nuclear power generation industries. VAC-AERO holds current processing approvals from the following companies: Canadian Forces; Boeing Aircraft Co; Canadair; The deHavilland Aircraft of Canada Ltd; McDonnell Douglas Aircraft Co; General Dynamics; Grumman Aircraft; Pratt & Whitney Aircraft, Hartford, CT; Pratt & Whitney Canada; General Electric, Burlington, VT and Lynn, MA; Garrett Airsearch Mfg; Litton Systems (Canada); Litton Systems (USA); Hawker Siddeley Canada, Orenda Division; Menasco Canada Ltee; Menasco, Burbank, CA; Spar Aerospace; Bristol Aerospace Ltd; McDonnell Douglas; Cleveland Pneumatic; Bell Aerospace, Fort Worth, TX; Sikorsky Aircraft, Stratford, CT; DAF Indal Ltd; Fleet Industries; Kaman Aerospace, Bloomfield, CT; and Avco Lycoming, Stratford, CT.

KEYWORDS: Brazed Aluminum Heat Sinks; Electron Beam Welding; Machining; Plasma Spray Coating; R&O (Engine Components);

Vacuum Brazing; Vacuum Furnaces; Vacuum Heat Treating; Heat Treating; Metal Coatings; Brazing; Build-To-Print; Coatings (Plasma Spray); Coatings (CODEP); Diffusion Coatings (CODEP).

REVISED: January 88

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HISTORY: Established in 1981 by key players from the Canadarm program, this wholly Canadian owned systems engineering company has grown to encompass a broad spectrum of advanced technologies, including large scale robotics, electro-optics, math modeling, simulation and thin film deposition. Agra Industries of Saskatoon acquired 50% of Vadeko shares in 1987.

CAPABILITY: Vadeko is recognized as an aerospace industry leader in the development and manufacture of large scale robotic systems. Vadeko's systems utilize off-line programming and math modeling.

Staff capabilities and experience permit Vadeko to lead a project through the initial stages of requirements definition, system conception and design to development, manufacture, assembly, integration and test.

AVERAGE WORK FORCE: 120 (Professional Staff)

GROSS SALES: 1987 - \$20.5M
1988 - \$26.0M (Est'd)

PLANT SIZE: 45,000 Sq Ft (Office & Plant)

EQUIPMENT: CAD system, electrical/electronics laboratory, mechanical laboratory, machine shop, assembly/integration/test area with 20 ft clear ceilings.

EXPERIENCE: Vadeko's experience includes:

- Solid Rocket Motor Manufacturing - Major rocket motor manufacturers and the US Navy use Vadeko Robotic Systems for coating application, propellant inspection and repair of solid rocket motors. The Vadeko Bore Inspection Tool Systems (BITS) assists Morton Thiokol in maintaining the performance and reliability of Shuttle Rocket Boosters (SRB's). Hercules Aerospace uses the Vadeko Automated Robotic Painting systems (ARPS) to apply specialized coatings to the inside and outside of Titan and Delta rocket boosters. A smaller system, the Automated Case Bondliner (ARPS) performs coating application to a variety of strategic rocket motors for the US Navy.
- Robotic Aircraft Painting - Vadeko's fully automatic, robot painting systems solve the major problems of aircraft painting; expensive downtime, consistency and uniformity of coating application, and the hazard to human workers from increasingly toxic paint formulations. An extensive background in spray coating technology ensures that Vadeko systems are ideally suited to a variety of coatings, including "stealth" and other low-observability materials. Vadeko is currently involved in the development of the Canadian Automated Aircraft Painting Center, and is a major bidder on the Robins AFB aircraft painting system for F-15 fighters.
- Related Technologies - Vadeko has extensive experience in large scale robotics systems for a variety of applications, including the CN Railcar Painting system, the Robotic Undercar Cleaning system, the Ontario Hydro Nuclear repair system, and the Tridon automated assembly system. As a leader in Thin Film Deposition technology, Vadeko is currently involved in a variety of related applications, including document security devices, superconductivity, optical inspection and monitoring and special coating application. Thin film and robotics