

# MOTORS AND BLOWERS FOR:

HOUSEHOLD & COMMERCIAL FLOORCARE PRODUCTS

COMMERCIAL PRODUCTS

OUTDOOR POWER EQUIPMENT

COMMERCIAL BRUSHLESS PRODUCTS

MIL-AERO PRODUCTS

REGENERATIVE BLOWER PRODUCTS

BIOFILTRATION PRODUCTS



**AMETEK**<sup>®</sup>  
ELECTROMECHANICAL GROUP

# WELCOME TO THE ELECTROMECHANICAL GROUP OF AMETEK, Inc.

*AMETEK EMG is the world's leading manufacturer of small electric motors and motor-blowers for a wide variety of applications. If you own or have used such diverse products as a vacuum cleaner, photocopier, blender or food processor, leaf blower or weed trimmer, or even a medical air bed, the chances are very good that the device is powered by an AMETEK EMG motor.*

AMETEK EMG produces more than 23 million motors every year from its 15 manufacturing facilities in North America, Europe, and Asia. That's nearly one motor every second of every day of the year.

Market reach and size, however, are not the only areas of world leadership held by AMETEK EMG. Our engineers, designers, and technical staffs are the best in the business, constantly introducing electric motor innovations that are adopted immediately by the rest of the industry as the standard of excellence.

In a very similar manner, the sales and marketing colleagues at AMETEK EMG also are coming up with innovative ways of partnering with their customers, working with them to find the exact motor or motor-blower to meet their needs.

AMETEK EMG is one of the two groups that comprise the billion-dollar AMETEK, Inc., a leading manufacturer of electrical and electromechanical products for worldwide markets. The Electronic Instruments Group (AMETEK EIG) specializes in advanced monitoring sensing, calibrating, and display devices for the aerospace, heavy-vehicle, and process industries.

## **AMETEK is focused on four key growth strategies:**

- **New Product Development that takes advantage of the company's position as the world's leader in electric motor technology.**
- **Strategic Acquisitions and Alliances of and with companies and product lines that capitalize on existing strengths and synergies.**
- **Global and Market Expansion with a focus on geographic growth into Europe and Asia and sales growth into related product areas.**
- **Operational Excellence, a method of continuous improvement in manufacturing and other areas that facilitates and supports the other strategies.**

By partnering with our customers to help them meet their needs and the needs of the marketplace, and by growing internally using our four key strategies, AMETEK EMG remains committed to maintaining and expanding its world leadership in electric motor design, production, and sales.

Albert J. Neupaver  
President, AMETEK Electromechanical Group

WELCOME

# EMG TECHNOLOGY

**AMETEK EMG** maintains its worldwide leadership in electric motor technology by continually setting the industry standard for engineering, design, testing, and production excellence. AMETEK EMG engineers and technicians use the latest tools to provide the highest level of quality in every motor that is designed and built.

**3-D MODELING** allows AMETEK EMG engineers to develop products and components more quickly than by conventional methods. Prototypes can be produced in either plastic or aluminum in less than a week.

**FINITE ANALYSIS PROGRAM** measures stress due to vibration on either AMETEK EMG motors or on customer final products. Such capability provides the ability to study material fatigue and to project product lifespan.

**RF INTERFERENCE MEASUREMENT** permits AMETEK EMG to perform modifications during design and production to ensure that motors meet customer specifications.

**MODEL SHOP CAPABILITY** enables AMETEK EMG to manufacture all components for prototype motors, which then can be subjected to a variety of performance tests that determine design viability and meet the timely fulfillment of customer requirements.

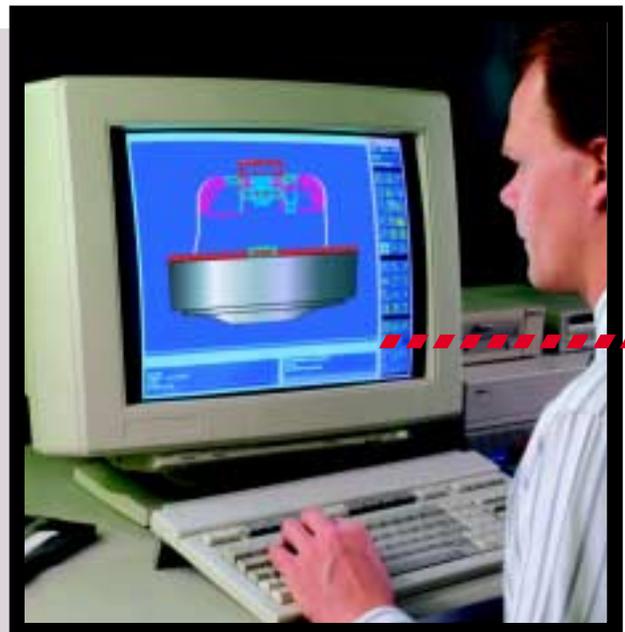
**LIFE TESTING LABORATORIES** at AMETEK EMG are the largest in the motor manufacturing industry. These test labs can replicate on/off cycling

and other functions for both AMETEK motors and customer products under a variety of conditions.

**SOUND-TESTING FACILITIES** give technicians at AMETEK EMG the capability of performing a variety of sound level tests both on motors and on final end-use products.

**FAN SYSTEM DESIGN CAPABILITY** enables AMETEK EMG engineers to optimize the overall efficiencies of air-moving products and provide improved performance at lower cost. Our customers benefit by receiving better value for their air function dollar.

**MOTOR TEST LABORATORIES** support AMETEK EMG personnel in determining optimum motors for each customer's application requirements. They are located strategically throughout the world and are capable of performing a wide range of standard motor tests.



# FLOORCARE

The AMETEK Electromechanical Group is one of the world's largest, independent manufacturer of fractional horsepower motors and motor-blowers for floorcare products. As mentioned earlier, the vacuum cleaner in your house and the one that cleans your office at work, the carpet scrubber for rent in your supermarket, and the large riding vacuum cleaner at work on the floor in your factory all probably contain AMETEK electric motors.

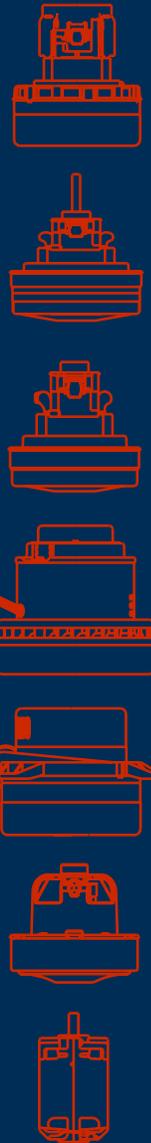
AMETEK EMG has active relationships with every international corporation currently doing business in its key markets of household and commercial vacuum cleaners and related floorcare products. This world leadership, however, spreads far beyond size and market reach and into product design, engineering, and development.

AMETEK customers are able to say that they are getting tomorrow's technology today. This is because the Electromechanical Group constantly is on the leading edge of product development and product features that are years ahead of the competition. Many advancements introduced by AMETEK in one model year are found in competing motors two or three years down the line.

AMETEK EMG's global reach also is evident by its manufacturing presence in the world's major economic markets. With more than a dozen plants, covering more than 1.6 million square feet (more than 150,000 square meters), AMETEK has the ability to partner locally with any customer in any geographic location.

These plants in North America, Europe, and Asia are among the most technologically advanced in the world not only in high-speed automated manufacturing machinery but also in the state-of-the-art testing and quality labs. This helps ensure zero-defect shipping for most of the company's larger volume product lines.

All AMETEK products meet U.S., Canadian, and European quality standards and all





AMETEK manufacturing facilities either have achieved or are working toward some level of internationally recognized quality certification.

The list of products that use AMETEK EMG motors and motor-blowers includes but in no way is limited to such floorcare products as commercial canisters, commercial dry canisters, and full-size and compact household canisters; commercial uprights, dual-motor commercial uprights, and full-size and compact household uprights; commercial and residential backpack cleaners; commercial and residential hand vacuums, and commercial hand-held vacuums for photocopiers and other business machines; stick vacuums, wet pickup brooms and wet pickup hand vacuums; household carpet extractors, rental carpet extractors, and light-weight commercial extractors and household utility vacuums and household central vac systems.

The AMETEK Electromechanical Group motor product line includes both bypass and through-flow motors with either open-bracket or cup-style housings. Motor lamination sizes include 1.95-inch (50 mm), 2-inch (51 mm), 2.43-inch (60 mm), 2.5-inch (64 mm), 2.93-inch (75 mm), and 3.0-inch (93 mm). Fan diameter sizes include 4.0-inch (100 mm), 4.8-inch (122 mm), 5.1-inch (130 mm), 5.3-inch (135 mm), 5.7-inch (145 mm), 7.2-inch (184 mm), and 7.5-inch (190 mm).

Motor and motor-blower system optimization is met by matching motor



lamination and fan sizes. When such additional variables as lamination stack height, coil winding pattern and gauge, brush style and quality, and other features are combined, there is a virtually limitless number of individual motor and motor-blower styles that can be produced to best meet customer needs.

These benefits give AMETEK EMG customers advantages over their competition and allow AMETEK to maintain its world leadership in electric motor technology.

# OUTDOOR POWER EQUIPMENT/ HOME APPLIANCES

The size and strength of the AMETEK Electromechanical Group not only allows it to dominate the world floorcare market, but also helps bring this technology and manufacturing leadership to a number of related markets.

Throughout the past decade, AMETEK EMG has taken its worldwide franchise in electric motor technology into such markets as outdoor power equipment and household appliances. You now can add your weed trimmer, food processor, paint sprayer, and hair dryer to the list of items in and around your home in which you can find AMETEK motors.

As might be expected, AMETEK EMG is working with every major international manufacturer of outdoor power equipment and with most household appliance companies on projects ranging from full-scale production to exploratory test motors and blowers.

Most customers want a motor or motor-blower that has been built especially for its needs. Because of the extensive design experience found within AMETEK, customization always has been the Company's specialty—providing customers with the exact motor they are looking for.

In the outdoor power equipment markets, AMETEK motors and motor-blowers are found in such products as leaf blowers, chain saws, edgers, power washers, paint sprayers, string trimmers, snow blowers, lawn mowers, mulchers, and hedge trimmers.

Small appliance motors include those for box and window cooling fans; such kitchen appliances as blenders, food processors, and hand mixers; and personal care items such as hair dryers.

Growth in these areas, as also is the case in floorcare, often comes in the form of deintegration. This is the practice by which customers stop producing electric motors for their products and begin buying those motors from AMETEK—and in the process choosing to become partners with the technology leader.



# SPECIALTY MOTORS & PRODUCTS



AMETEK Electromechanical Group holds world leadership positions in the development and manufacture of specialty products such as brushless DC motors and both AC- and DC-motor-driven fans for applications in pumps and compressors, business machines, medical devices, and for military, aerospace, and mass transit vehicles.

Despite the wide range of uses and the difference in appearance—contrast a 1.7-inch diameter motor for a critical machining application with a 12-inch fan and motor assembly designed for heating and cooling a subway car—all of these AMETEK specialty motors and products share the same advantages—superior performance in demanding applications.

In markets served by brushless DC motors, these features include:

- speed sensing and control that offer variable speed options;
- compact size and reliable, long-life operation;
- high torque-to-inertia ratio for superior start/stop capabilities.

For air-moving applications, brushless DC motors are combined with precision-designed fan systems to offer maximum performance for the size and weight of the specific motor-blower system.

Nearly all of the brushless DC motors use Hall effect electronics and rare earth Neodymium magnets. These design features help minimize the common brushless DC problems of torque ripple, cogging effects, and



demagnetization by high currents. Motor speed can be controlled with the use of data output signals and feedback signal input ports—or with an external AMETEK low-voltage controller.

The markets in which these specialty motors are found are as varied as the products themselves. The largest market is the mass transit industry, which uses motors, pumps, and blowers. These devices are found on a wide variety of commuter buses, railway and subway cars, and locomotives and are used both as part of a vehicle's operating system and in its environmental system to heat and cool riders.

The military and aerospace markets offer related applications for

# SPECIALTY MOTORS & PRODUCTS

motors, blowers and fans. Once again, AC and brushless DC fans, blower systems, and heat exchangers are used to regulate the internal environment for passengers and crew. In this case, though, the passengers and crew are in either airborne planes or combat-ready tanks. This market also is served with fault detection devices and electronic power conversion devices.

The WINDJAMMER® and MINIJAMMER® motor-blower systems combine AMETEK brushless DC motors with high-efficiency fan systems. With overall diameter sizes of 5.7-inches (144 mm) for the WINDJAMMER and 5.0-inches (127 mm) for the MINIJAMMER, these two motor-blower systems can meet a number of such air moving applications as computers, business machines, medical devices, pumps and compressors, food processing applications, and industrial machinery.

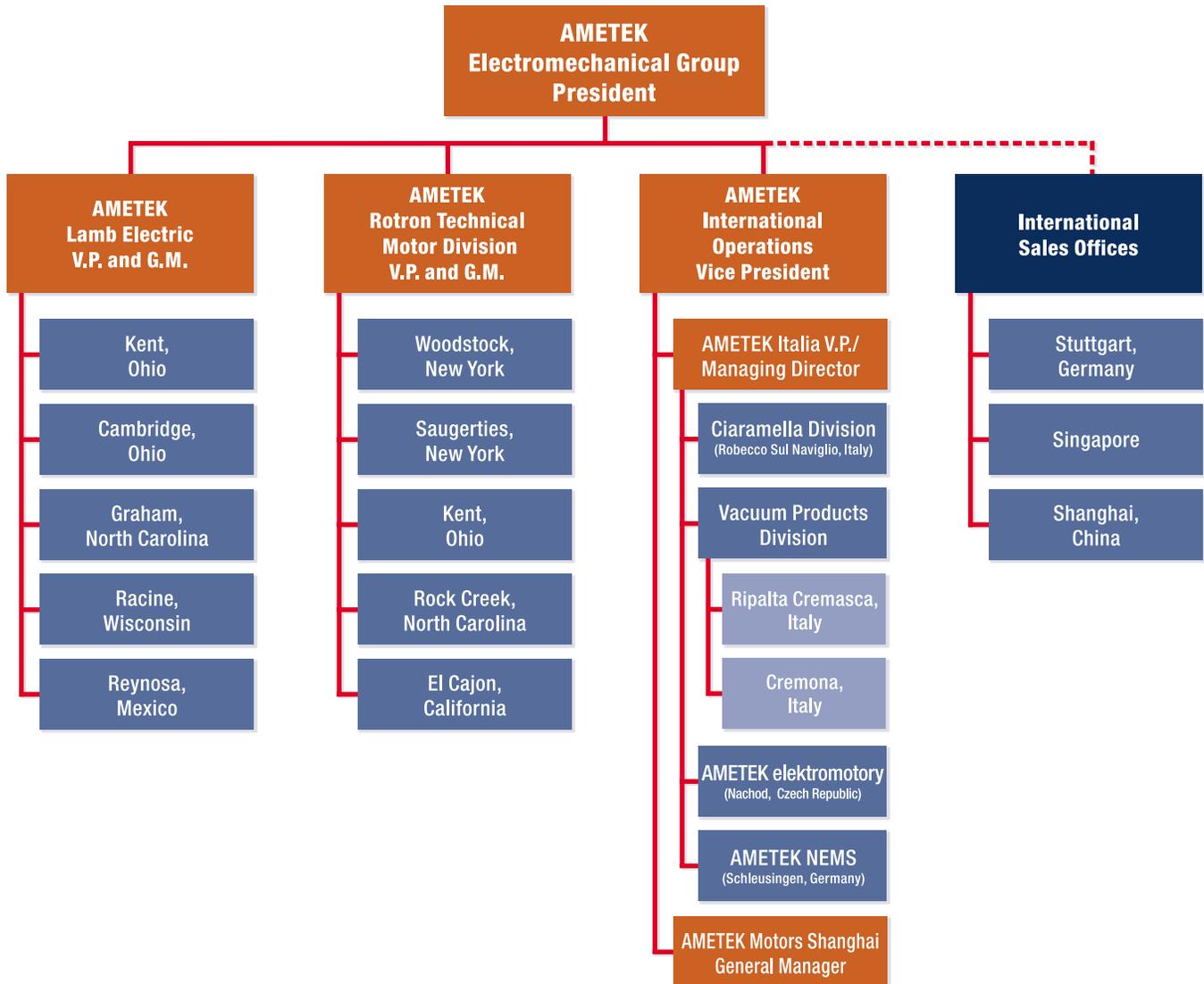
AMETEK also is a market leader in large regenerative blowers for use in heavy-duty industrial applications. Regenerative blowers provide powerful air movement for pressure and vacuum applications, including solution and media agitation, pneumatic conveying of solid bulk materials, vacuum hold-down and pick-up, air blow off, and process gas handling.

Serving a market related to regenerative blowers, AMETEK manufactures patented modular biofiltration systems that remove noxious odors and vapors from gaseous exhaust and air supply systems in commercial, municipal, and industrial applications.

Regardless of their size or application, all of these specialty products offer customers unique design and material options as well as a chance to partner with a world leader in electric motor technology — AMETEK Electromechanical Group.



# EMG ORGANIZATION AND PLANTS



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AMETEK is a leading global manufacturer of electrical and electromechanical products for niche markets. Listed on the New York Stock Exchange (AME) since 1930, AMETEK's annual sales are \$1 billion. Operations are in North America, Europe, and Asia, with about one-third of sales to markets outside of the U.S. AMETEK is serving its customers with investments in new products, global expansion, strategic acquisitions and joint ventures, and operational excellence.



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