



- **CUSTOM ENGINEERING**
- **MANUFACTURING EXCELLENCE**
- **QUALITY**
- **RESPONSIVENESS**



MOTION CONTROL | FILTRATION SYSTEMS | BRAKING SYSTEMS | DRIVE TRAIN



Hilliard

A World Leader in Motion Control & Filtration Products

Since 1905



**120+
YEARS**
of
EXCELLENCE

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The Hilliard Corporation solves problems. Based on extensive knowledge of motion control and filtration technologies, we make thousands of unique products, reaching markets globally.

Serving the needs of both small businesses and Fortune 500 companies, Hilliard products are found all over the world. We offer a broad line of motion control products, oil-filtration and reclaiming equipment. We also manufacture starters for industrial gas and diesel engines and gas turbines. Our filtration systems are sold under the trade name of HILCO®.

Our products are designed, manufactured, and sold according to our customer's applications. As a result, we have a large portfolio of custom engineered products that can be modified to meet new applications. At Hilliard, we embrace the challenge of product development.

With over 691,000 square feet and hundreds of highly skilled employees, we are able to meet desired requirements cost-competitively, even for short runs. Our experienced technical staff values craftsmanship, manufacturing efficiency, and responsiveness. In order to meet customer requirements, improve quality, and increase efficiency, Hilliard is continuously investing in new equipment and technologies.

In fact, we measure Hilliard's success based on our customers' ongoing satisfaction with our product and associated services. We are proud of our product reliability and durability. We often collaborate with customers in developing solutions that are integral to their product's profitable niche in the market place.



ENGINEERING DRIVES

PRODUCT DESIGN



PERFORMANCE

Engineering is the essence of Hilliard.

Our experienced engineering staff works directly with customers to meet any challenge in motion control and filtration.

Led by professional engineers, our technical staff includes mechanical, electrical, and environmental engineers, from seasoned professionals and recent graduates working together to create solutions for you.

State of the art CAD/CAM systems couple with a well-equipped factory and tool room allow rapid prototyping. Fast turnaround is always a goal.

Engineers at Hilliard design complete systems, including electromechanical interfaces. We often work with customers to research and test products, acting as a laboratory for specific applications.

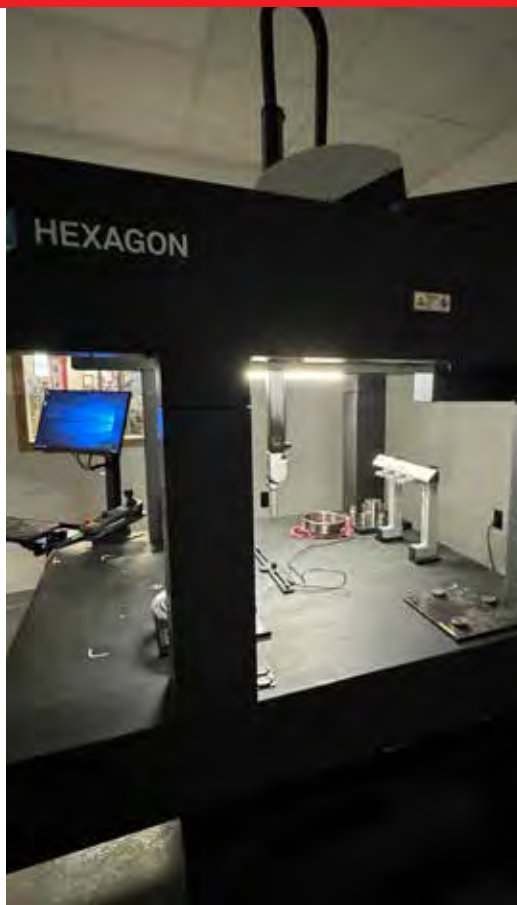


OUR VALUES

Although born at the turn of the previous century, Hilliard came of age during the Great Depression. The company philosophy is a remarkable mixture of innovation, creativity, practicality, and common sense.

Hilliard's corporate values are defined by our people. Hard-working, reliable, and customer-focused. These are the hallmarks of Hilliard.





AN INVESTMENT IN **QUALITY**

At Hilliard, quality is our way of doing business.

At Hilliard, quality is not an add-on. Quality is a way of doing business. Each of our process is documented to regulate operation, even on very short production runs. The result? Products that meet the specifications of our major OEM customers and performance that meets strict quality standards such as MIL-I-45208A or API614. Our products also meet rigorous requirements set by the ASME, the USDA, and the FDA.

Our vendor qualification program ensures superior compliance with raw material specifications. Products are thoroughly tested while under development. Our motion control laboratory builds the test stands needed to simulate operational demands, and our filtration lab offers dynamometer testing if required. Finished products are often evaluated under field conditions.

FLEXIBILITY BENEFITS CUSTOMERS

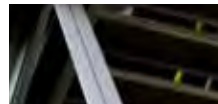
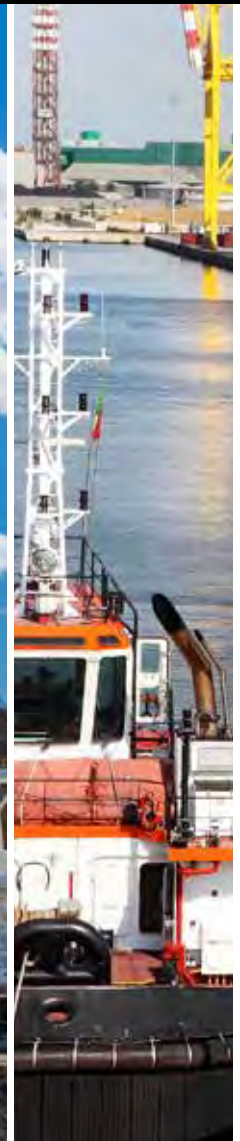
We have one goal: manufacturing products that solve customer problems. Over the years, we have found that the only way to reach that goal is to be flexible.

Flexibility is what defines our engineering and manufacturing expertise. We are willing to modify existing products or develop new ones, respond quickly to requests, and take on complicated projects for sophisticated applications: we will work for you to get the job done and we will do it in an affordable fashion. We welcome your inquiries, challenges, and business.



At Hilliard, we have built a reputation on solving motion control problems. We are structured so that you receive direct contact with our engineers for important consultations.

Special designs that fall outside standard product lines are met economically and efficiently. Since 1905, we have been working with our customers to solve their motion control challenges. We are confident that together we can arrive at a solution to your problem.



MOTION CONTROL PRODUCTS

- Centrifugal Clutches
- Specialty Products
 - Bi-Directional Overrunning Clutch
 - Front Drive System
 - Auto-Lok Differential
- Electric and Magnetic Brakes
- Caliper Disc Brake Systems





FILTRATION PRODUCTS

Hilliard is an engineering company. Every one of our products has been developed and fine tuned by our exceptional staff of engineers. We bring fluid contamination problems under control, cost-effectively, with our full range of HILCO® filters and cartridges.

You will find under the HILCO® brands:

- Filter Cartridges
- Filter Vessels
- Portable Filters
- Oil Mist Eliminators
- Coalescer Separators



Filter Cartridges



Hilco® Portable Filter

CRAFTSMANSHIP PRODUCES RELIABLE "CODE" VESSELS

Hilliard, under the trade name HILCO®, produces more "code" than anyone else in the Northeast. This means that the fabrication and welding of our filtration devices and transfer valves have passed the most stringent code requirements of the American Society of Mechanical Engineers (ASME).

One "code" vessel of which we are particularly proud is used in the system that controls the filtration of seal oils used in compressors and turbines. Designed to withstand operating pressures as high as 4,300 PSI, these vessels must conform to the exact specifications of compressors and turbine manufacturers including API 614 codes. These vessels are placed in operating environments ranging from corrosive salt air to earthquake zones. Trouble-free operation is essential for the safety and reliability of the compressor and turbine systems that our products protect.



HILLIARD BRAKE PRODUCTS



The Hilliard Corporation is a world leader in industrial braking technology. Hilliard braking systems has a proven track record of performance, reliability and value to our customers. Hilliard Corporation offers an entire range of industrial modular brakes, caliper brakes, rail and disk brakes, electric brakes and products such as power units, mounting brackets, and discs and hubs. Choose from our complete line of fail-safe and active braking systems to meet the needs of your specific application.

With more than 120 years of experience, put Hilliard's industrial brakes to work for your specific application or industry.

Designed for maximum flexibility and long, dependable service, our electric brake is electromagnetically released when voltage is applied and spring-engaged when current is interrupted.



Electric Brakes



Modular Brakes



Caliper Brakes

The patented Hilliard MK Guide Rail Brake is designed for use on elevators, conveyors, cranes, or other devices requiring a spring-applied, electromagnetically released brake. The patented MK brake can be applied to a guide rail or a brake disc.



MK Guide Rail Brake



MK Brakes



MK Disc Brake

Hilliard has developed a line of power units capable of controlling braking systems for a multitude of scenarios and applications. Hilliard's power units are designed and assembled in Elmira, N.Y. with only top quality components to ensure the integrity and longevity of each braking system.

Brakes are no longer straightforward on or off mechanical devices. Sophisticated Smart Brake deceleration controls with system status monitoring, fault acknowledgement, and feedback are required to maintain system integrity under all stopping conditions. This is particularly crucial on belt conveyor systems, where tension management and personnel safety are of paramount importance.



BrakeBoss®



DRIVE TRAIN PRODUCTS

CVT Systems with Engine Braking and Belt Protection Technology

Hilliard's Continuously Variable Transmission

The Hilliard Corporation has designed a CVT system that is more advanced than any other belt drive system currently available on the market. The Hilliard clutch system utilizes a tight belt which allows for seamless engine braking and belt protection at start up and during overload situations, to extend belt life. The Hilliard Continuously Variable Transmission system is designed to fit a wide variety of clutch envelopes so no expensive modifications are required for new vehicles or on replacements for vehicles currently in the field.



CVT



CVT (side view)



Hilliard
MOTION CONTROL DIVISION
DRIVETRAIN PRODUCTS

Extreme Duty Centrifugal Clutches

The Extreme Duty family of centrifugal clutches are designed to hold up to the rider's toughest demands, from the veteran racers to the beginners in a yard kart. These clutches are engineered to take the heat and keep on going. The quick-change spring design makes it easy to adjust engagement speeds without a lot of time or hassle.

They are available in three different series:

The Extreme Duty for fun karts, The Inferno Kart Racing series, and the Inferno Snowmobile Racing series. Each series is specifically designed for peak performance in their sport.



Go-Kart Clutch



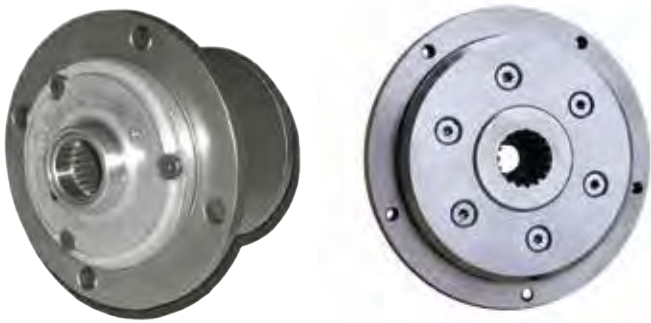
Auto-Lok™

The Hilliard Auto-Lok™ Differential offers equal power transferred to both wheels regardless of traction, allowing positive back drive through both wheels.

- Locks and unlocks automatically
- Self-contained
- Easy operation and steering

Applications

- snowthrowers
- lawnmowers
- trenchers
- self-propelled and walk-behind equipment
- golf carts
- utility vehicles



Front Drive System (Differential)

Our patented design consists of a dual bi-directional overrunning clutch for use as a secondary front drive for 4-wheel drive applications.

- Acts like a locking differential when engaged, but like an open differential when cornering
- Offers positive engagement of both front wheels in forward and reverse as a differential package
- Automatic engagement on the fly -- no shift linkages required
- Electric on/off engagement



Applications

- utility vehicles
- commercial mowers
- all-terrain vehicles

STARTERS FOR GAS TURBINES

The Hilliard Corporation is a producer of Starter Clutch Drives, Electric Starter Assemblies, Hydraulic Starter Assemblies and Pneumatic Starters for use in aero derivative industrial turbine and reciprocating engine applications.

Hilliard starter designs and equipment are operating worldwide in pipeline, power generation and marine propulsion markets. Major starter-fleet experience has been achieved on engines and auxiliary gear boxes for Solar, General Electric, MAN Diesel & Turbo, Howden Turbo, Rolls Royce, Pratt & Whitney, and Siemens. New application designs can be engineered through the combination of available motor-starter structures and overrunning clutch modules.

Starter Overrunning Clutch Drive

The Hilliard High-Speed Starter Overrunning Clutch Drive provides positive engagement and high torque on demand. Featuring a unique roller-ramp design, the clutch when engaged transmits power via the precision-machined cam and roller assembly connected to the input shaft. A ball bearing at each end of the roll cage supports and aligns the cam in relation to the drive (output) shaft.



FITTED TO STARTER TYPES:

- Pneumatic
- Hydraulic
- Electric



Hilliard Engine Starter



Hydraulic Starter Motor and Clutch Assembly

Variable and fixed displacement types. SAE mounting, spline shafts. Typical operating pressures up to 5000 psig (350 bar). High-speed operation. High starting torque efficiency. Different sizes for different applications. Suitable for open and closed loop circuits. Supply includes overrunning clutch.



Electric Start Assembly

24 volt DC power. Solenoid actuated Positork drive. Output torque up to 80 ft lb. Splined output for gas turbine applications. SAE 3 mounting flange, multi-position. CW and CCW direction of rotation.



PLANT #1

155,000 sq. ft. Manufacturing
18,500 sq. ft. Office Space
9,000 sq. ft. Outdoor Storage Area

PLANT #2

55,000 sq. ft. Manufacturing
19,500 sq. ft. Office Space
68,000 sq. ft. Storage

CARTRIDGE MANUFACTURING PLANT

49,000 sq. ft. Manufacturing
5,000 sq. ft. Office Space
30,000 sq. ft. Storage

DRIVE TRAIN FACILITY

207,000 sq. ft. Manufacturing
42,000 sq. ft. Office Space
34,000 sq. ft. Warehouse



MANUFACTURING AND DESIGN



FACILITIES

PRODUCTION CAPABILITIES

Machining Capabilities

- Saws
- CNC Turning (up to 52" Diameter)
- CNC Mill/Turn
- CNC Milling (with 4th Axis)
 - Horizontal
 - Vertical
- Gear Shaping
- Broaching
- Spline Rolling

Grinding

- CNC ID & Cylindrical Grinding
- Manual ID Grinding
- Manual Cylindrical Grinding
- Flat Grinding
- Surface Grinding
- Honing

Finishing

- Abrasive Surface Blasting
 - Steel and Stainless-Steel Blasting
- Steam Clean
- Passivation
- High Pressure Wash
- Painting

Fabrication and Welding Capabilities

- Brake Press (180 Ton x 8' length)
- Metal Shears
 - 10' x ½" Thick (Mild Steel)
 - 10' x 3/8" Thick (Stainless Steel)
- Metal Rolls
 - Up to 56" Diameter
- CNC Flamecut Table
 - 10' x 12' Bed
 - 4" Thick Steel
 - 3" Thick Stainless Steel
- CNC Plasma Pipe Cutting Machine
 - 6 Axis 24" Diameter Max
- ASME Code and CE Certified Welding
 - MIG Welding
 - TIG Welding
 - Sub-Arc Welding
 - Robotic Welding
 - Seam Welding
 - Spot Welding

Toolroom

- Tool and Die Processes
- Fixture Design and Build
- Prototype Manufacturing
- Additive Manufacturing

Laboratory and Test Capabilities

- Vibration Analysis Equipment
- Filtration Efficiency Equipment
- Water Removal Test Stand
- Particle Counter with Laser for Sub-Micron Range
- Chemical Analysis Laboratory
- Air Flow Test Equipment
- Media Specification and Test Equipment
- Liquid Penetrant Testing
- Hydrostatic Testing





Assembly

- Low Volume Manual Assembly Stations
- High Volume Assembly Lines
- Integrated Test Equipment and Robotics
- Laser Engraving

Quality

- Hardness Testers
- Optical Comparators
- Coordinate Measuring Machines
 - Laser Scanner
- Vision Measurement System
- Optical Micrometer
- Universal Super Micrometer
- Spring Force Gage
- Vernier Calipers (0-60" Range)
- Micrometers
 - Inside (0-32")
 - Outside (0-36")
 - Depth (0-9")

Cartridge Manufacturing

- Pleating Lines with Gas Ovens
- Rotary Assembly Line with Robotic Operations
- Rotary Assembly Lines
- 60 Ton Stamping Press
- Bag and Box Stations
- Filled Cartridge Assembly Station
- Paper Slitter
- Spiral Filter Core and Liner Machines
- Laser Engraving Stations

Special R & D Equipment

Hilliard has the lab equipment to permit complete performance testing for motion control, liquid and air filtration products.



MAJOR EQUIPMENT LIST

DESCRIPTION
Hardness Tester
Optical Comparator
Coordinate Measuring Machines
Vision Measurement System
Optical Micrometer
Universal Super Micrometer
Spring Force Gauge
Vernier's 0-60" Range
Micrometers Inside 0-32" Depth 0-9" Outside 0-36"

PORTABLE COORDINATE MEASURING MACHINE (CMM)

This machine has many benefits and is crucial for industries where precision is paramount, such as elevator modernization.

Precise: high accuracy/precise measurements

Versatile: reverse engineering or alignment

Portable: use in the shop or in the field

Hands-on: immediate data for instant insights

Efficient: portable data translates to swift, accurate part ordering and delivery

APPLICATIONS

- Shafts & Bearings
- Control Systems
- Motor & Drive Systems





CARTRIDGE MANUFACTURING EQUIPMENT

- Pleating Lines with Gas Ovens
- Rotary Assembly Line with Robotic Operations
- Rotary Assembly Lines
- 60 Ton Stamping Press
- Bag and Box Stations
- Filled Cartridge Assembly Station
- Paper Slitter
- Spiral Filter Core and Liner Machines
- Laser Engraving Stations









Founded in 1905, **The Hilliard Corporation** has evolved from a single product business into a special applications engineering company serving customers worldwide.

Located in Elmira, New York, and independently owned for more than four generations, the company has grown and prospered for more than a century.

Today, the Hilliard Corporation comprises four facilities, totaling:

- More than 466,000 square feet of manufacturing area
- More than 85,000 square feet of office space
- More than 140,000 square feet of storage area



**Hilliard Products are
Made in the USA.**



CUSTOM ENGINEERING • MANUFACTURING EXCELLENCE • QUALITY • RESPONSIVENESS



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