



**BorgWarner
Morse TEC**

The Vital Link





A Preferred Partner

BorgWarner Morse TEC is a world leader in automotive chain and oil pump systems, and our products set the global benchmarks for power transmission, valve timing, and oil pumping performance. But our products are not BorgWarner Morse TEC's most important contribution to our customers' success.

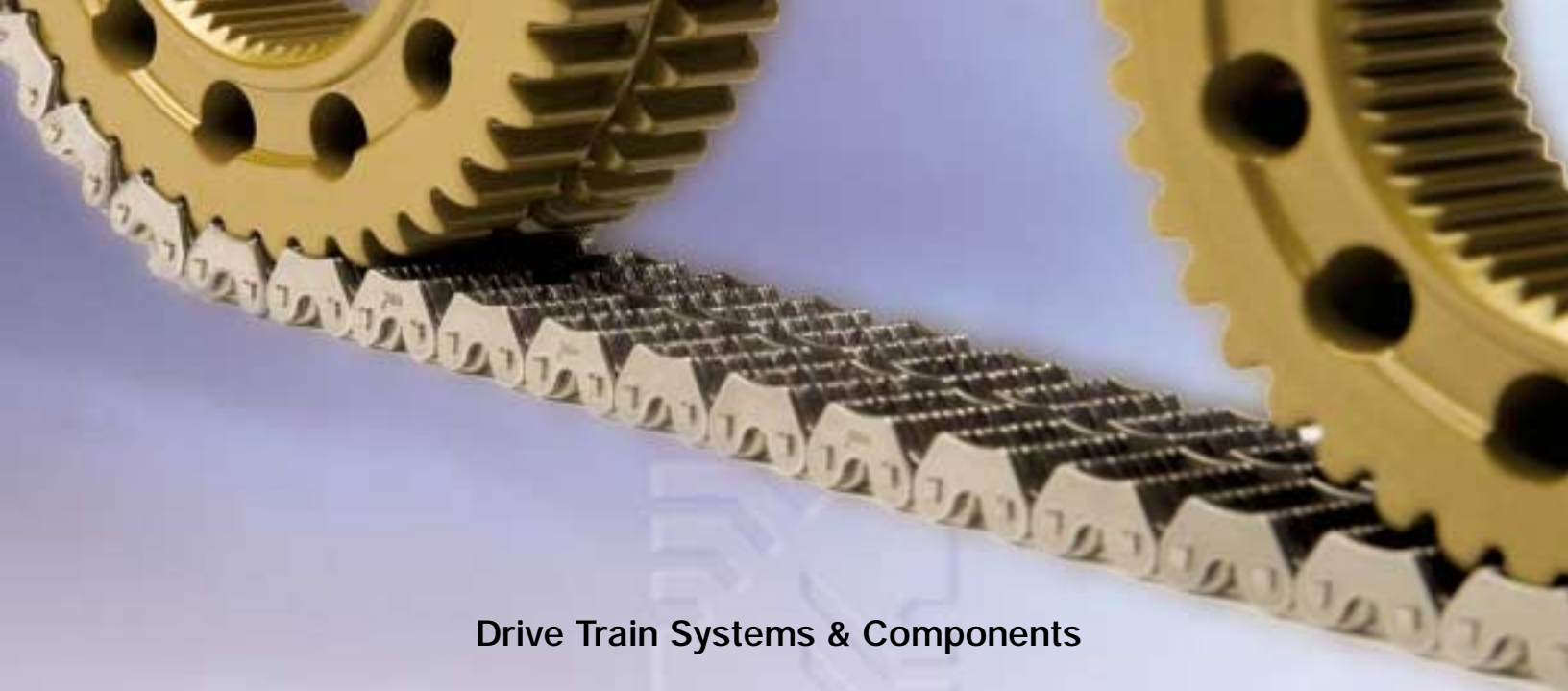
We believe their continued success depends on the development of ever more sophisticated technologies to produce, manage, and deliver power. Thus, when you visit one of the global Morse TEC manufacturing facilities or one of our three technical centers of excellence, you will find much more than a center of manufacturing.

For example, BorgWarner Morse TEC is one of the only chain and timing systems producers with in-house dynamometers, NVH and Emissions laboratories. We also produce our own sprockets, tensioners, and variable cam timing systems plus many of the advanced assembly systems that help keep us globally competitive.



By keeping the whole process under our control, we are able to meet our customers' quality requirements at a cost that represents solid value in the world market. We are also able to develop the technologies and products necessary to meet the next generation of customer challenges in a timely and cost-efficient manner.

Finally, Morse TEC is part of the BorgWarner organization. With more than 43 locations in 14 different countries, BorgWarner is a major force in the worldwide automotive market. Manufacturing muscle backed by the resources and experience necessary to deliver on the promise of tomorrow's technology makes Morse TEC a solid partner to our customers around the world.



Drive Train Systems & Components

While it is true that BorgWarner Morse TEC is about much more than chain today, chain is still the foundation of our business. In a typical production day we process over 170 tons of steel into enough links and pins to produce approximately 73 km (73 miles)



of drive train and timing chain in more than 100 different styles using more than 150 different link specifications and over 140 different pins and rockers. More than 60 high-speed precision presses produce links from steel strip custom formulated to our specifications. Automation, robotic technologies, and

computer vision systems optimize quality while minimizing cost. In all of these areas, our global technical centers play a central role in the development of both hardware and software solutions for precision manufacturing.

Available on-site are several dynamometer test cells, including a state-of-the-art emissions dyno system and a fully instrumented anechoic chamber for NVH testing of chain products under end-use conditions. In many cases, the information developed in our dyno and NVH cells has prompted design recommendations to improve quality and enhance consumer satisfaction in our customers' products.



Solving customer problems before they occur is part of the Morse TEC commitment to our customers' progress. It is one of the attributes that makes us more than a chain producer – and a solid partner to our customers around the world.

Engine Timing Systems & Components

Chain-based engine timing systems are clearly the trend of the future, and BorgWarner Morse TEC Engine Timing Systems and Components are at the forefront of this accelerating trend. Chain, sprockets, tensioners, and most other components used in our modular Engine Timing



systems are produced in-house on specially designed equipment.

In most cases, our engine timing systems are supplied to customers pre-assembled and pre-timed ready for installation during the engine build. Our engineers work closely with customers to develop packaging and assembly aids to support this modular approach to timing systems,

which results in reduced installation cost and warranty exposure.

As part of our commitment to advanced technology, Morse TEC is a leading center of development of variable cam timing systems. Our emphasis is on systems actuated by the forces already available in an automotive valve train, a technology that provides the best value solution over the entire engine life cycle.

Today's chain-based engine timing systems are quiet, durable, and precise as well as economical and cost-effective. Tomorrow's will be even better as

variable cam timing technology is incorporated into more and more

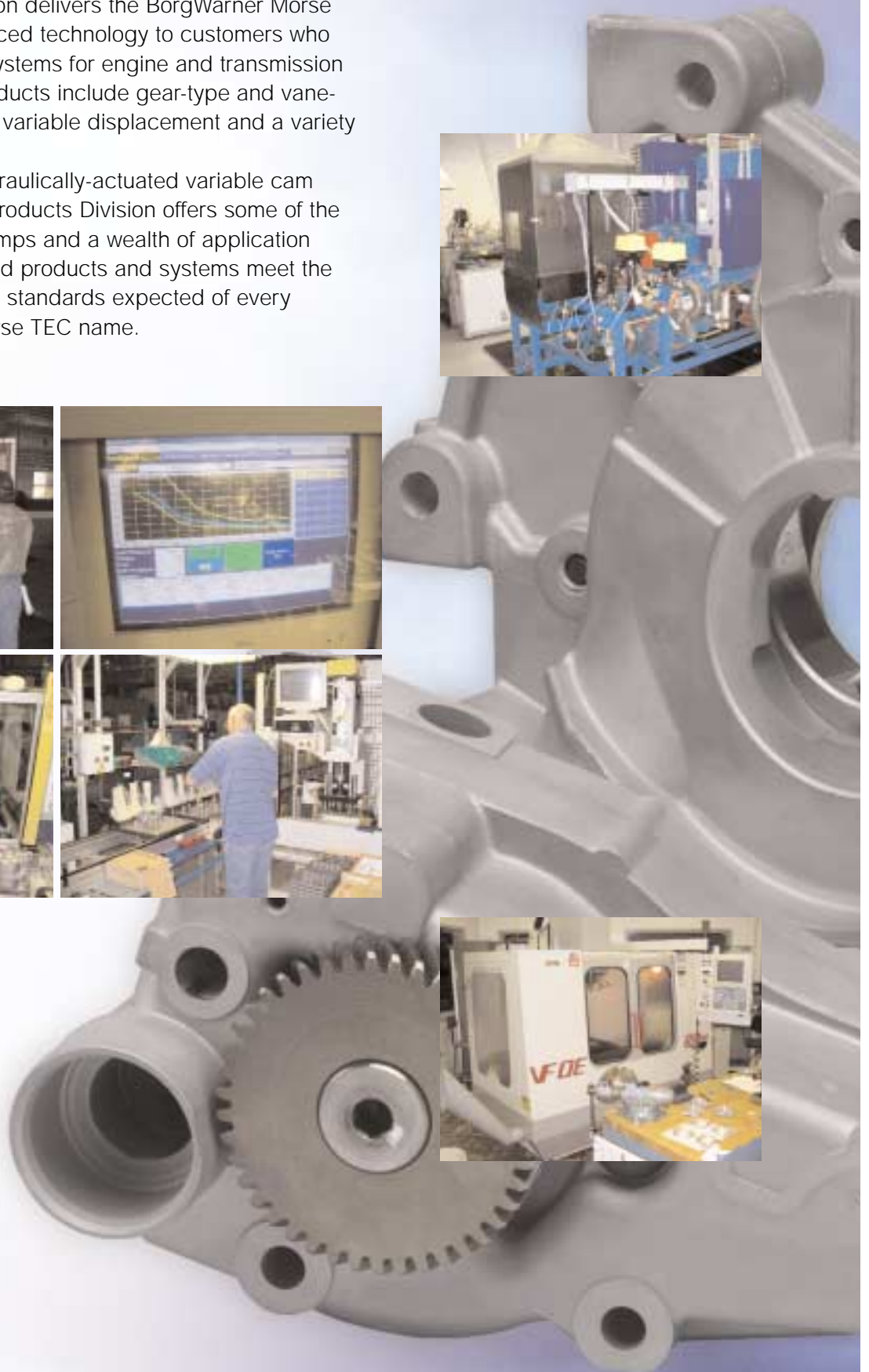
engines. As an industry leader in timing systems, Morse TEC will continue to be a solid partner to our customers around the world.



Fluid Systems

The Fluid Products operation delivers the BorgWarner Morse TEC commitment to advanced technology to customers who need hydraulic pumping systems for engine and transmission actuation applications. Products include gear-type and vane-type pumps with fixed and variable displacement and a variety of regulation technologies.

For customers using hydraulically-actuated variable cam timing systems, the Fluid Products Division offers some of the world's most advanced pumps and a wealth of application experience. Morse TEC fluid products and systems meet the same quality and durability standards expected of every product that wears the Morse TEC name.



Today's Global Benchmarks...

BorgWarner Morse TEC products set the benchmarks in the worldwide automotive industry. From driveline chain systems to engine timing and fluid pumping, Morse TEC is the recognized global leader for performance, technology, and value.

Transmission Chains

- Hy-Vo® Chain for FWD transmissions, 4WD & AWD transfer cases, pump drives, and recreational applications
- Power Take-Off Units (PTU)
- Gemini Torque Transfer System

Engine Timing Systems

- Supplier for complete systems including chain, sprockets, tensioners, and timing system control arms and guides plus comprehensive engineering support
- Variable Cam Timing systems that operate independent of oil pressure to deliver more horsepower, better performance and improved fuel economy
- Roller & Bushing Chain for reduced cost and weight in severe environments
- Silent Chain for improved NVH performance

Fluid Systems

- Single & Binary gear-type and variable displacement vane-type pumps
- Mechanical and electrical drive models
- Ability to specify and design the oil pump as an integral part of the timing, VCT and balance shaft system

...And Tomorrow's

The products and systems our customers will demand for advanced air management, variable combustion timing, lower emissions, higher power density, and greater reliability in their next generation of engines (transmissions and 4WD/AWD systems) are being tested and developed today at BorgWarner Morse TEC. They are taking shape in the laboratories of the Ithaca Technical Center and the engineering centers of Morse TEC facilities around the world. They are being created, developed, tested, and perfected today so they will be ready to address tomorrow's requirements.



Total Program Support

We at BorgWarner Morse TEC take our commitment to stay on the leading edge of each of our core technologies very seriously. It shows in the investments we make, the products we develop, the components and systems we build, and the relationships we maintain with our customers around the world.

We work very hard at being a valuable partner to each customer. A partner who anticipates the future and develops solutions for emerging needs while supporting today's requirements with durable, value-added products and systems. A partner with the resources to handle global programs and the local presence to implement them smoothly, efficiently and with world-class quality standards. A solid partner our customers can count on as their vital link for automotive chain systems and components for engine timing, automatic transmission and four-wheel drive applications.



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