

*Product Leadership is all of us and all we do.*



**Engine Cooling Technology  
for Heavy-Duty Trucks**



## The people and the processes

of BorgWarner define

product leadership.

Every single day, the innovations continue.

Global product leadership begins with focused research and development at the Technology Centers in Markdorf, Germany (left), Marshall, Michigan, USA (middle), and Ningbo, China (right).



**A**t BorgWarner Thermal Systems, worldwide product leadership begins with the innate ability to recognize and integrate breakthrough ideas focused on exceeding customer expectations.

From fuel-efficiency and emissions issues to enhancing stability and performance, BorgWarner provides superior product solutions for the ever-changing global vehicle market.

Up-to-the-minute awareness of the latest engine technology developments and regulatory mandates is the keystone to BorgWarner's keen market sense. Couple this market sense with tightly aligned processes, manufacturing excellence along with speed to market and product leadership is assured.

Global product leadership is the vision at BorgWarner Thermal Systems.

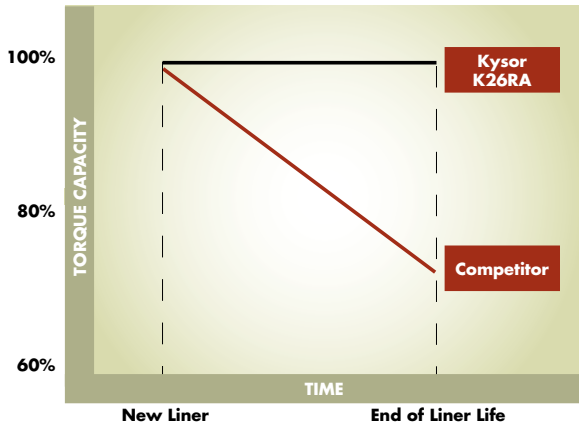
## Kysor™ On/Off Fan Drives

**W**ith Kysor On/Off Fan Drives from BorgWarner Thermal Systems, the fan continues to rotate even if the clutch stops working. In the event of air system pressure failure, the fan remains engaged which prevents the engine from overheating. These drives have fewer moving parts and an innovative design that improves belt life and provides for easier maintenance—and less of it. With proper maintenance, a million miles of trouble-free service under normal operating conditions may be expected. Greater dependability keeps you from worrying about costly breakdowns.

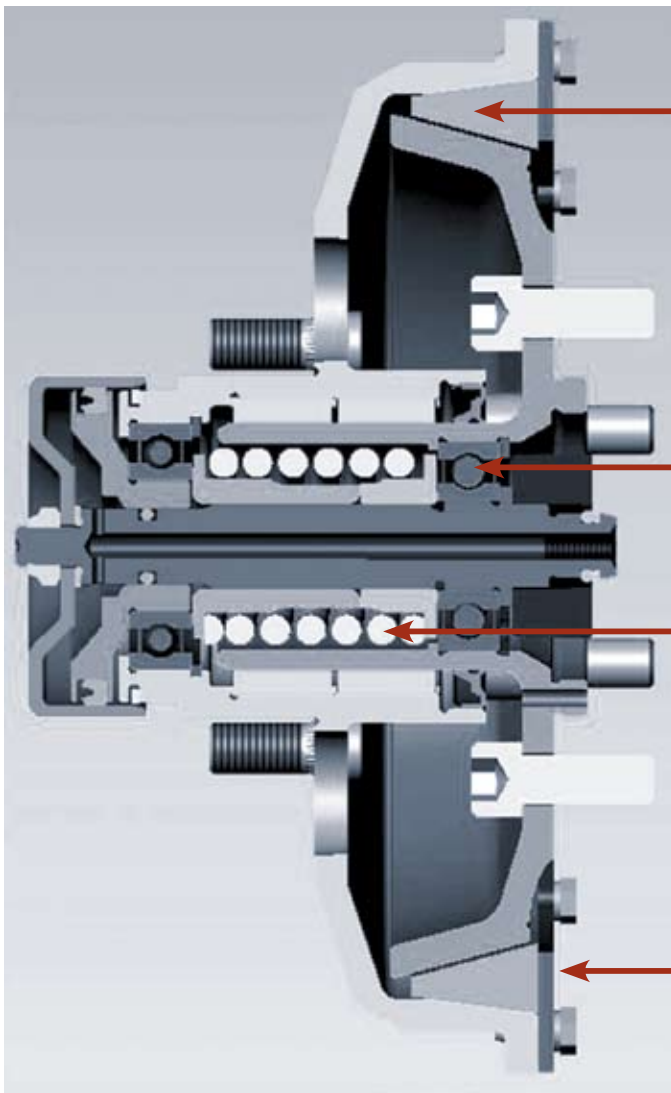


Features	Advantages	Benefits
Powerwedge™ clutch liner	Consistent performance & dependability	Longer time between liner change
Dynamic torque capacity	Improved cooling capability	Meets requirements for all new engines since 2002 as under hood temperatures continue to rise
Hub bearing design	Product durability & reliability provides better overall performance	No unnecessary & costly service issues
Modular clutch design	One clutch for all applications	Easier to service, saving time & reducing maintenance & inventory costs
Fail Safe™ design	Provides continuous cooling	Assures reliable operation preventing costly breakdowns

## Kysor™ On/Off Fan Drives



**T**he Kysor K26RA by BorgWarner maintains its dynamic torque capacity throughout its liner life, assuring consistent product and cooling system performance. The Powerwedge™ liner allows the K26RA to maintain its dynamic torque capacity while the competition's product loses up to 20% capacity by the end of liner life, which increases the risk of overheating the engine and product failure.



Powerwedge liner provides consistent performance throughout the life of the product, and provides for smoother engagement, reducing stress in belts and other components.

Robust bearing system designed to enhance durability and reliability.

Simplistic spring design utilizes the fan's thrust force to provide best in class torque capacity.

The retaining plate design allows the K26RA liner replacement to be performed without removing the clutch from the vehicle.

## CoolLogic™ Fan Drives

**C**ool Logic heavy-duty, multi-speed fan drives are a breakthrough in engine cooling technology. Not only are they electronically controlled and maintenance-free, they provide improved fuel economy while meeting the needs of the stringent North American heavy duty truck emissions requirements.

Cool Logic drives feature electronic modulating speed control. This means precise temperature control all the time, extending the life of the entire cooling system including the radiator and charge air cooler. Couple that feature with the fuel saving fan speed control scheme and the maintenance-free design, and you're well on your way to cool savings. What's happening in the cab is just as important as what's under the hood. Cool Logic's actuation logic system means quiet operation for a more comfortable ride.



Features	Advantages	Benefits
Electronically managed through ECM	Precise temperature control & reduced cooling system stress	Extends the life of the entire cooling system, including the radiator and charge air cooler, thus reducing operation costs
	Simplified vehicle interface	Eliminates air system components & their associated failure costs
Self-contained device	Maintenance free	Eliminates the costs associated with routine & preventive service
Fan speed control	Fuel economy	Provides fuel cost savings, positively impacting the bottom line
	Quiet operation	Increases driver comfort, which is a key factor in driver retention

## High-Efficiency X Series Fans



**B**orgWarner Thermal Systems fans set the standard for heavy-duty cooling. Now we've raised the bar again with the X Series Fans that meet today's need for more efficient heavy-duty truck engine cooling performance.

The X Series Fans comply with the North American emissions standard requirements while at the same time optimizing cooling performance. New features include improved aerodynamics and durability while keeping the same light-weight package size design.

Features	Advantages	Benefits
Aerodynamic and hubless blade design	8% increase in airflow, with a 7% increase in efficiency	Engine temperature decrease by 4°F
	Meets EPA US07 cooling performance requirements	Assures reliability and durability for demanding cooling requirements
Axial length	Easy-to-fit geometry with no increase in axial length from previous design	Increased cooling performance for same package size
Light weight	No increase in weight from previous design	Increased cooling performance for same light-weight construction

The technology.

The know-how.

The logical choice.



Creating the next generation of cooling system solutions.



To be the leader in technology takes the right tools and the talent to use them. BorgWarner Thermal Systems has the best of both.

**B**orgWarner Thermal System's unique structure puts technology and science together with product design to create innovative products through concurrent engineering. That means better results, faster results, and more efficient operations. At BorgWarner, it's the people that make technology work. Our ability to attract and retain the best in the world is why BorgWarner Thermal Systems is the logical choice as a partner in creating the next generation of system solutions.

We continue to invest heavily in the kind of cutting-edge technology required of a leader in the global vehicle industry. Testing facilities simulate real-world environments in astonishing detail. Robotics automate assembly to insure consistent quality and computer-driven systems manage the flow of information to improve efficiency and cost-competitiveness.

As a supplier solely dedicated to the vehicle industry, we work in partnership with manufacturers around the world and in concert with BorgWarner's other divisions to find solutions to today's cost and time pressures and technical demands.



BorgWarner Thermal Systems serves the  
global vehicle industry with strategic locations  
in emerging markets throughout the world.



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