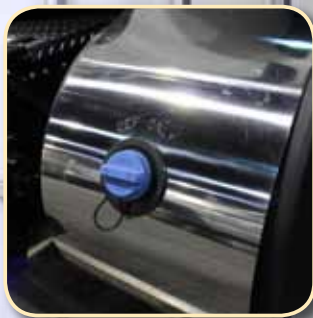




Experts in
**MISSION
CRITICAL**
DEF Transfer Solutions



Diesel Exhaust Fluid

North American
End-User Brochure

Pump Solutions for DEF Applications

Blackmer®, the global leader in positive displacement sliding-vane pump technology for use in liquid-handling operations, recognizes the potential in the North American Diesel Exhaust Fluid (DEF) market. To help its distributors and end-users realize that potential, Blackmer has developed a series of transfer pumps – the STX-DEF Series – specially designed for use in DEF-handling applications – from production to packaging to tank and container filling.

Diesel Exhaust Fluid (DEF) is made by dissolving high-purity urea in de-ionized water at a ratio of 32.5% urea to 67.5% de-ionized water. Although it is non-toxic, DEF's composition gives it a number of characteristics that must be taken into consideration when using or storing it. DEF:

- Freezes below 12°F (-11°C)
- Has no intermediate “slushiness” stage when freezing
- Is stable at storage temperatures to 84°F (29°C)
- Will evaporate and form crystallized urea when exposed to air, which can harm pump components.
- Is slippery, which increases spill-safety concerns

The components in DEF also make it incompatible with a number of materials that may be used in the automobile-fluid supply chain. The chart below lists materials that are compatible with DEF:

DEF-Compatible

- Stainless Steel
- Fluorocarbon
- PTFE
- Composite Plastics (Polyurethane or PVC)

Non-DEF-Compatible

- Aluminum
- Bronze
- Carbon Steel
- Copper
- Iron
- Nickel
- Zinc

Blackmer has taken all of these characteristics into consideration when developing its DEF-specific family of pumps and accessories. This makes them the obvious choice for optimizing flow performance, reducing costs, and increasing profitability in all DEF-handling applications.

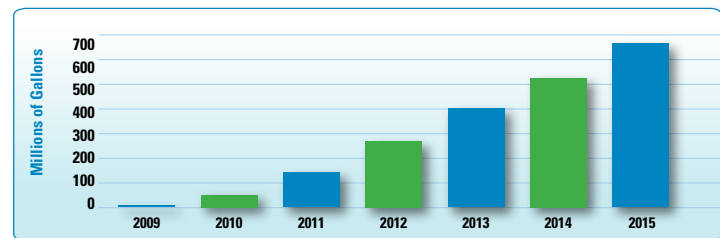
DEF Market in North America

In 2000 and 2001, the United States Environmental Protection Agency (EPA) announced tougher emission-control standards for all on-highway vehicles. The standards were phased in over a three-year period from 2007 to 2010.

Effective Jan. 1, 2010, all new on-road vehicles were required to meet a tailpipe emission standard of 0.2 grams of nitrogen oxide (NO_x) per brake horsepower-hour (g/bhp-hr). This marked a huge reduction in the amount of NO_x and particulate matter that vehicles could now legally emit into the atmosphere in the United States.

Faced with these strict, new emission regulations, vehicle manufacturers, especially producers of diesel-powered vehicles, developed engines to meet the new standards while retaining maximum engine performance and fuel efficiency. Most diesel-engine manufacturers are now using a method called Selective Catalytic Reduction (SCR) to ensure their engines meet the stricter EPA regulations. The catalyst in SCR is Diesel Exhaust Fluid (DEF), a urea-based chemical reactant that, when introduced to the diesel-exhaust stream, turns potentially harmful nitrogen oxide (NO_x) emissions into harmless nitrogen and water vapor.

DEF has created a new niche market in the nation's motor-vehicle liquids marketplace. Though volume estimates vary, there is no question the demand for DEF will grow in future years, with some estimates putting total DEF consumption in the U.S. at more than 600 million gallons by 2015 (see chart).



Source: Integer Research, KOST USA, www.DEFendal.com

The increased use of DEF creates new opportunities for producers, suppliers, transporters, packagers and retailers of DEF, as well as for the companies that can offer pumping equipment to this new supply chain. That leaves Blackmer – with its array of DEF-specific flow solutions – well positioned to meet the demands of its distributors and end-users in the growing DEF marketplace.



 Sliding Vane Pump Locations

Blackmer® Pumps Used in DEF-Handling Applications

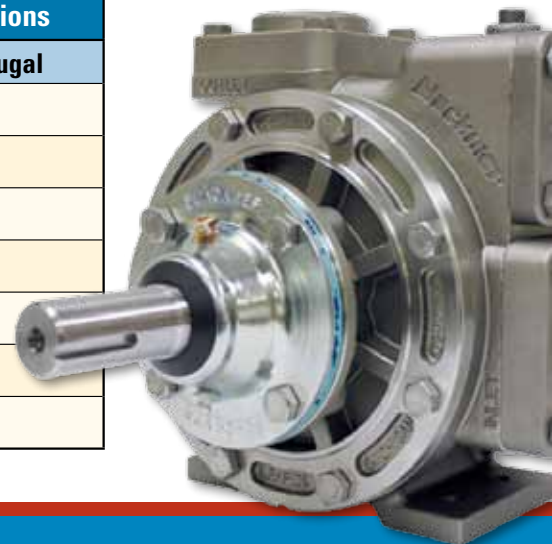
STX3-DEF Series Sliding Vane Pumps

The STX 3-inch pumps are designed for high-volume transfer to or from storage tanks, railcars, barges, or transports. They accommodate flow rates up to 250 gpm (946 L/min) with differential pressures up to 125 psi (8.6 bar) and maximum speeds of 800 rpm.

STX1220A-DEF Series Sliding Vane Pumps

This series is similar to the STX3-DEF series, but offers the lower flow rates some DEF handlers require – from 49 to 88 gpm (185 to 333 L/min). Some DEF handlers require the pumps meet all ISO 22241 material standards and cleanliness specifications required for DEF-handling applications.

Sliding Vane vs. Centrifugal Pump Technology In DEF-Handling Applications		
	Sliding Vane	Centrifugal
Initial Cost		•
Self-Priming Capabilities	•	
Optimized Energy Efficiency	•	
Durable and Long Lasting	•	
Reliability and Improved Uptime	•	
Constant Flow Rates at Varying Pressures	•	
Lowest Life Cycle Cost	•	



Every Blackmer Product Comes With A Value-Added Extra: Applications Engineering/Technical Support/Customer Care

When it comes to flow solutions, uptime, output, reliability and profitability are critical to every operation's mission. To this end, Blackmer knows that reliable, proven flow technologies are critically important, but we also know that they represent only one part of the overall equation. The other, equally important part involves having trained, knowledgeable and customer-focused staff, which is why the company makes substantial investments in its people. It is through their collaborative efforts with customers that Blackmer realizes its greatest achievements.



- **Applications Engineers** – experts in peace-of-mind assurance, making sure your equipment is always right for the job
- **Market & Product Specialists** – unparalleled technical knowledge, on-site product training, troubleshooting, installation and product-selection consultation, and total life cycle support
- **Regional Sales Management** – proven technicians with an “above and beyond” commitment to every customer’s mission
- **Customer Care Specialists** – results-driven specialists committed to making sure every order receives immediate attention, is accurately processed and followed up, and to helping keep your process flowing smoothly

When you put it all together, for mission critical flow solutions, it's easy to see why leading companies around the world have one common demand ... **Better Get Blackmer.**

Total Life Cycle Support

From the moment of initial contact and equipment selection through every point of the product and application life cycle, Blackmer specializes in helping customers get the maximum value from their flow technology assets by providing total life cycle support.

Application Engineer



Design Engineering



Manufacturing



Market & Product Specialist



Customer Care



Regional Sales Manager



Process | Energy | Military & Marine