

*Blackmer*<sup>®</sup>

Experts in  
Mission  
Critical  
Vapor Recovery  
Solutions

VAPOR RECOVERY



Where Innovation Flows

  
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# Vapor Recovery is Good Business

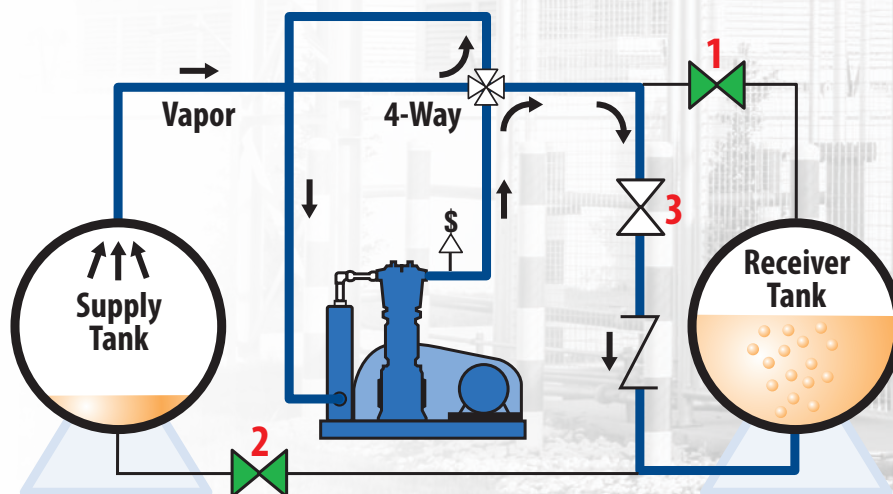
Across the world where LPG or NH<sub>3</sub> is stored, transferred or transported, billions of cubic feet of fugitive emissions are vented or flared into the atmosphere every year. This is not only damaging to the environment but represents lost business income. Cost-effective recovery technology is available to improve your company's environmental compliance and your bottom line.

Blackmer is the industry leader in the application of compressor technology for product and vapor recovery. Its oil-free, reciprocating compressors are designed for specific applications in LPG and NH<sub>3</sub> gas handling, product transfer and vapor recovery.

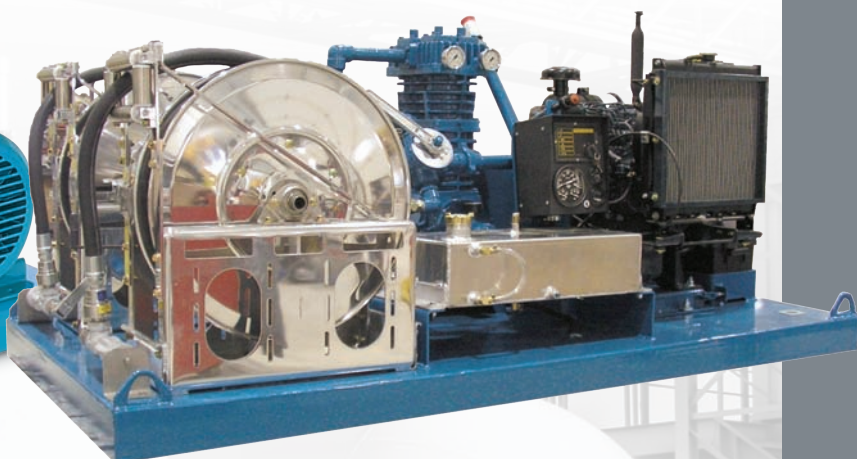
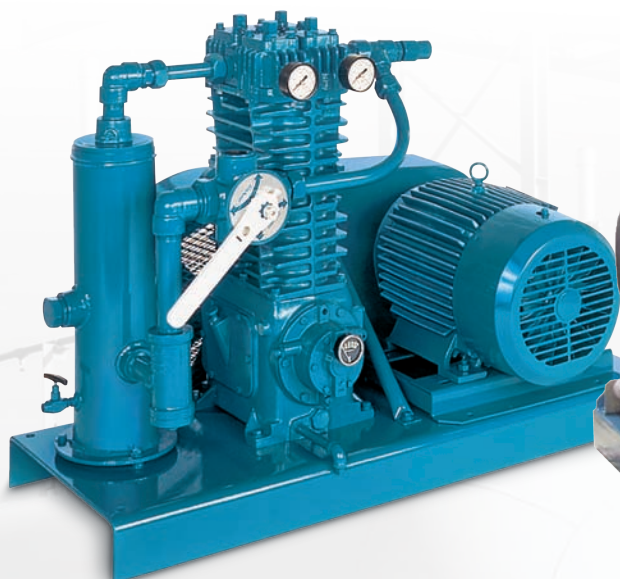
And unlike conventional compressors that can leak vapor due to inefficient crankcase sealing and containment, Blackmer's patented isolation chamber design and piston seals prevent oil contamination and cylinder blow-by.

Blackmer's on-site experience crosses terminal storage, bulk cylinder filling operations and retail distribution. Whether your needs include tank evacuation, vapor recovery or environmental compliance, Blackmer compressors get the job done, and pay for themselves in the process.

## The Process of Vapor Recovery



1. Valves 1 and 2 are closed. Valve 3 is open.
2. The 4-way valve handle is turned 90° to reverse the flow direction through the compressor.
3. Vapors are withdrawn off the top of the supply tank.
4. The vapor passes through the 4-way valve and the liquid trap into the compressor inlet.
5. The vapors are compressed and pushed into the liquid section of the receiver tank.
6. The vapor bubbles are condensed by the liquid in the tank.



## LB Series Liquid Transfer and Vapor Recovery Compressors

These high efficiency stationary compressors handle a wide range of liquefied gases - propane, butane and anhydrous ammonia. They are well-suited to unloading rail cars, pressure vessels, transports and tanks that present poor suction conditions for pumps, where system piping restricts flow and installations require an initial lift to the liquid. The LB Series is ideal for vapor recovery.

### Features and Benefits

- Oil-free design is perfect for liquefied gas applications
- High-efficiency valves move more volume
- Multiple seal options provide maximum leakage control and oil contamination prevention



## Mobile LPG Evacuation Unit

The Mobile Evacuation Unit provides liquid evacuation and vapor recovery wherever needed for storage tanks and transports or transferring liquids from tank to tank. Its mobility makes it indispensable for refineries, bulk tank facilities and field service calls.

### Features and Benefits

- Base has forklift slots and/or lifting eye-bolts allowing easy mounting on a truck or trailer, or placement on the ground
- Wheel-mounted model permits excellent mobility to any location around confined areas of a refinery or storage tank complex
- Mobile compressor design delivers cost-effective and profitable product recovery of liquid heel of tanks and vapor recovery



## Blackmer Liquid and Vapor Recovery Solutions

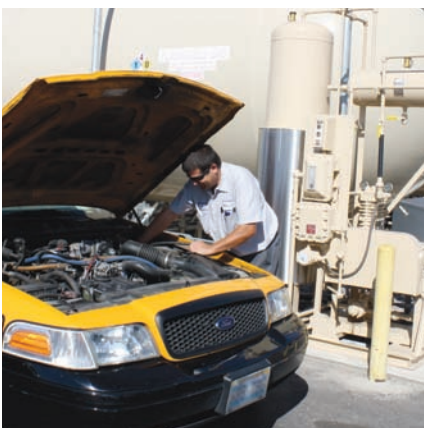


### Liquid Terminals and Bulk Storage Facilities

The opportunity for product recovery starts with unloading ships, barges and railcars where it is important to the bottom line to extract every possible gallon from every delivery you handle. And, after product recovery, hundreds of gallons of vapors remain to be recovered from the tanks of barges, railcars, trucks and transports. Blackmer compressors are designed for these specific situations, especially in poor suction conditions that challenge pumps.

### Bulk Cylinder Filling Plants and Bulk Cylinder Distributors

Product recovery from the heel of railcars and transports, and the purging of storage tanks and cylinders adds up to thousands of gallons of reclaimable product and vapor. Blackmer compressors are designed to quickly and effectively evacuate tanks and recover valuable vapor for return to inventory and customer sale.

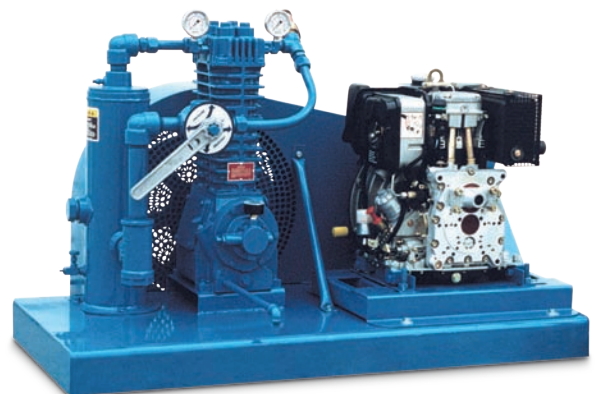


### Auto Fuel Dispensing

Fleet operators and retailers storing and dispensing autogas benefit from efficient tank evacuation and vapor recovery, too. You'll find Blackmer at these locations emptying storage tanks and reclaiming profitable product and vapor for resale while helping preserve the environment.

### Mobile LPG Evacuation

The Mobile Evacuation Unit is a valuable, profitable piece of equipment at liquid terminals, bulk storage facilities and any remote location where a stationary storage tank or transport tank needs to be evacuated and vapors captured, including emergency transfers from mobile tanks or tank cars due to accidents or derailments.





## What the Professionals Say:

*"Algeria is the world's second largest exporter of LPG and the government recently installed Blackmer compressors in 20 of their terminals nationwide handling railcars and large transport trucks. Officials really liked the transfer speed of the compressors and the fact they add the equivalent of 3% capacity to every load through vapor recovery."*

**Al Buhler, Blackmer Sales Manager**

*"We used to manually flip propane tanks to empty them and burn off the pressure. It was hard, messy and dangerous work. So we did the math on a Blackmer compressor and pump and it was a no-brainer. We've since put 40-45,000 gal. (151-170 m<sup>3</sup>) of gas back in our storage tanks. This is the best investment we've made in a long time."*

**Greg Smith, Operations Manager,  
Bluhms Gas Sales, Laceyville, PA**

*"We use Blackmer pumps for our 800-unit Yellow Cab fleet requiring about 9,000 gal. (34 m<sup>3</sup>) of propane a day. Now we move fast, these pumps filling 6 or 7 cars at a time at 16 to 17 gal. (60-64 L) per minute. Blackmer compressors run our tank evacuation and vapor recovery, too, returning thousands of gallons of fuel and vapor to our twin 60,000 gal. (227 m<sup>3</sup>) storage tanks. And it's working out great for us."*

**Aaron Cohen, Yellow Cab Company,  
Las Vegas, NV**





# The ROI of Vapor Recovery

Operators can no longer afford not to recover every possible gallon of product from transports, storage tanks and cylinders, or allow routine venting of vapor to the environment. What once was not worth the effort to capture is now not only cost-effective, but very profitable.

Blackmer compressors cost-effectively reclaim both the liquid heel of railcars and tanks and elusive gas vapors.

Vapor recovery is like adding 3% capacity or more to every load you handle. Product recovery is a simple operation and the compressor will quickly pay for itself, again and again.

## How Much Could Vapor Recovery Mean to You?

The following illustrates an example of the gallons that could be recovered under one realistic scenario. This is a one-time savings illustration, so your savings would increase based upon the number of deliveries, tank evacuations per week, month, etc.

Your Blackmer distributor can assess your product and vapor recovery needs and recommend the compressor configuration to meet your specific situation.

Tank Type	Tank Size	Liquid Heel	Recovered from Vapor*	Total Recovered*	One-time Recovered Value for Amortizing Investment**
Tank	30,000 gal. (113 m <sup>3</sup> )	150 gal. (568 L)	1,110 gal. (4.2 m <sup>3</sup> )	1,260 gal. (4.7 m <sup>3</sup> )	\$2,079.00
Tank	18,000 gal. (68 m <sup>3</sup> )	90 gal. (340 L)	666 gal. (2.5 m <sup>3</sup> )	756 gal. (2.8 m <sup>3</sup> )	\$1,247.40
Transport	11,200 gal. (42 m <sup>3</sup> )	56 gal. (212 L)	414 gal. (1.5 m <sup>3</sup> )	470 gal. (1.7 m <sup>3</sup> )	\$775.50
Bobtail	3,000 gal. (11 m <sup>3</sup> )	15 gal. (57 L)	111 gal. (420 L)	126 gal. (477 L)	\$207.90

\* Product and vapor recovery results may vary depending on several factors, including tank size, air temperature and price per gallon of product. Assumptions used include 80° F ambient air temperature, 160 psig and recovery based upon final stopping point of 15% of original vapor pressure beyond which it is not cost-effective based upon time and effort required for continued recovery.

\*\* At \$1.65/gallon liquid product cost.



# Single and Multi-Stage Compressors

## High efficiency valves move more gas volume

The heart of any compressor is its valve assembly. Blackmer valves are specifically designed for non-lubricated gas applications. With precisely engineered clearances, spring tension, and a special finish, these valves seat more positively so more gas is moved with each piston stroke. Blackmer valves offer greater strength, quiet operation, and long life.



## O-ring seals: head and cylinder

The head and cylinder are sealed with O-rings to ensure positive sealing under all operating conditions.

## Pressure-assisted piston rings for positive seating

Constructed of self-lubricating PTFE, Blackmer's special ring design provides maximum sealing efficiency with minimal friction wear. The result: peak performance and extended compressor service life.



## Heavy-duty crankshaft

The ductile iron crankshaft is precision ground with integral counterweights for smooth, quiet operation. Rifle drilling ensures positive oil distribution to the wrist pin and connecting rod bearings.

## Pressure lubricated bearings

A rotary oil pump provides positive oil distribution to all running gear components for long life and minimal wear.



## Ductile iron pistons

Heavy-duty ductile iron pistons are connected with a single positive locking nut which eliminates potential problems associated with more complex designs.

## Self-adjusting piston rod seals

Crankcase oil contamination and cylinder blow-by are prevented with loaded glass-filled PTFE seals which maintain a constant sealing pressure around the piston rods.



## Ductile iron construction

All pressure parts are of ductile iron for greater resistance to both thermal and mechanical shock.

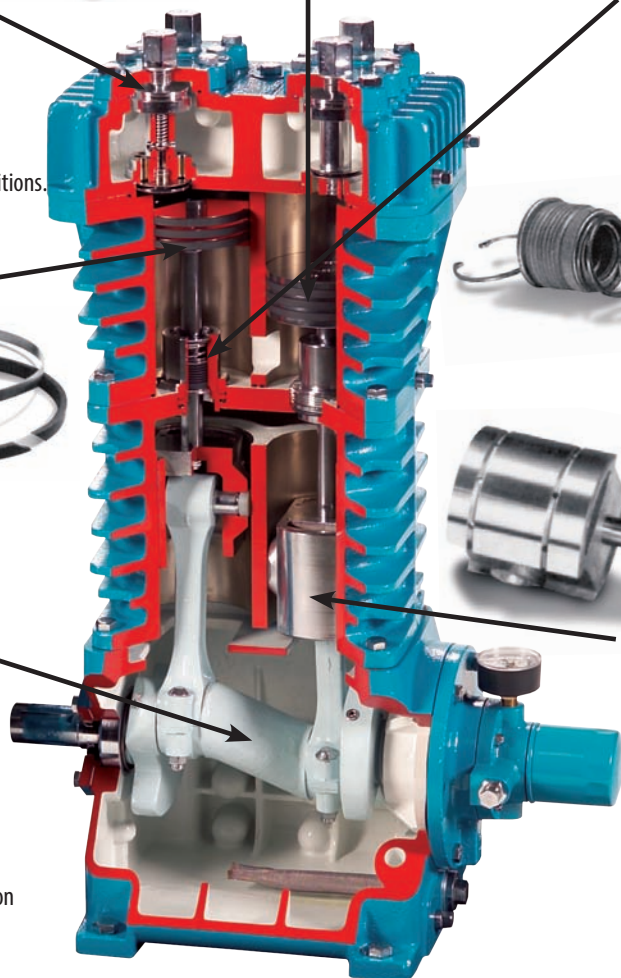


## Wear-resistant crosshead assemblies

Designed for maximum lubrication and wear resistance.

## Multiple seal options

For applications that require maximum leakage control, double piston rod seals and a distance piece chamber are available for all Blackmer LB compressors.



LB361 cutaway



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