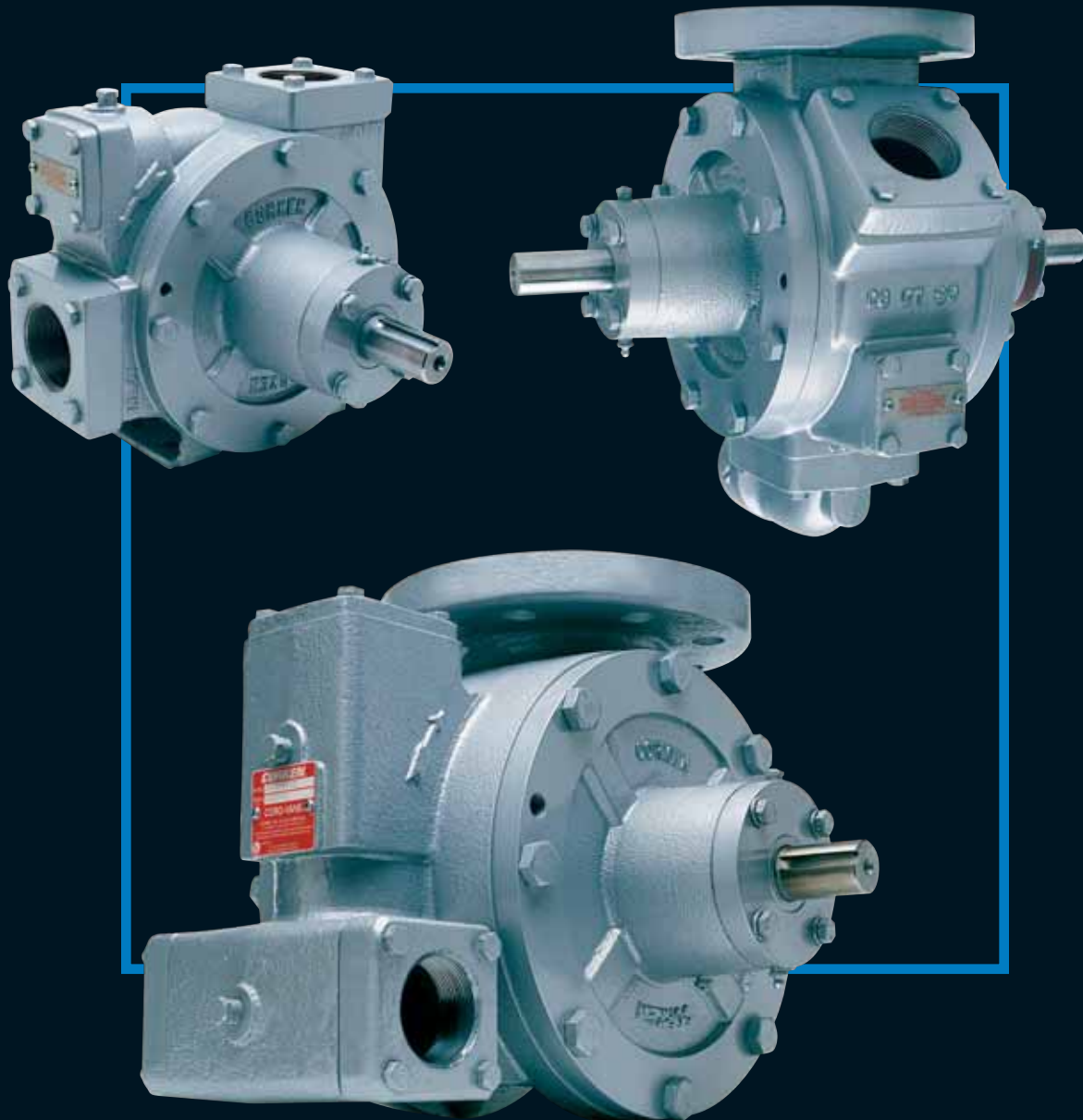


Z-Series

Coro-Vane® Truck Pumps
For LPG, NH₃, and other Applications



Solutions beyond products...

 **CORKEN**[®]
IDEX



A Tradition of Excellence

Corken, Inc. is recognized as a world leader in the manufacture of LPG pumps and compressors. Corken's exceptional reputation in the LPG industry is built upon decades of maintaining the highest quality and customer service standards. This, combined with an absolute dedication to product performance, makes Corken a company recognized worldwide for its manufacturing leadership.

Located in Oklahoma City, Oklahoma, USA, Corken was founded in 1924 and quickly gained a reputation for excellence in customer service. In the early 1950s, the company entered the liquid petroleum gas (LPG) industry, which proved to be a turning point. In the years to follow, Corken quickly gained market recognition for its quality line of compressors and pumps for the propane, butane and anhydrous ammonia industries.

In 1991, Corken became part of the IDEX Corporation, a manufacturer of proprietary fluid handling and industrial products that are recognized as market leaders. Through the years, a total commitment to customer service, product integrity and strong dedication to technological innovation have made Corken a recognized world leader in the compressor and pump markets.



Corken designs and manufactures products meeting industry standards, including Underwriters' Laboratories (UL), Canadian Standards Association (CSA), High Pressure Gas Safety Institute of Japan (KHK), Bureau Veritas of France, European Union's Pressure Equipment Directive (PED) and ATEX Directive for Machinery and many others. Corken is very proud to join the elite group of companies that have achieved registration with the International Quality Standard ISO 9001 and the Environmental Management Standard ISO 14001.

Today, Corken is a diversified company that serves a worldwide customer base. Corken truck pumps, stationary pumps, compressors and engineered packages are used by a wide range of companies throughout the world, including the Far East, Asia, Africa, Europe, the Middle East, South America and North America. Corken serves each of its customers through an extensive network of distributors—each sharing the same commitment to customer service that Corken has demonstrated for more than 80 years.



**QUALITY
ISO 9001
SYSTEM**

**ENVIRONMENTAL
ISO 14001
MANAGEMENT
SYSTEM**

Z-Series Coro-Vane® Truck Pumps Are Meeting The Demands

A new generation of truck pumps...

The Z-Series Coro-Vane® truck pumps are a new generation of truck pumps specifically designed to comply with the pumping requirements demanded by the LPG industry. Bulk delivery of LPG requires the use of heavy duty, reliable equipment and is an important part of every LPG marketer. The equipment used in modern bulk trucks must be designed and constructed to perform in a broad spectrum of operating conditions.

Meeting the demands of today's pumping conditions...

The operating conditions of a truck pump are very demanding, and only a pump designed to perform under these extreme conditions can successfully do the job day in and day out. The Z-Series truck pumps are specifically designed to perform in such severe operating conditions as high differential pressure, pump overspeeding, poor suction conditions and heavy thrust loads associated with a power take-off (PTO) drive system.

Many of the environmental and safety regulations require the bulk truck's unloading point to be located at a considerable distance away from the field tanks, and in many instances, the field tanks are located at higher elevations than the bulk truck unloading point. This type of installation creates additional head requirements that the truck pump must overcome. In addition, many fill valves in tanks have restricted openings. The Z-Series truck pumps were designed to operate under these restrictive and high head piping arrangements. Furthermore, the internal relief valve is designed to fully open only at the factory preset pressure of 150 psi to maintain optimum capacity at high differential pressures.

Designed for your application...

The Z2000 is a foot-mounted, sliding vane, two inch NPT pump designed for bulk delivery trucks requiring 41 to 85 gpm (155 to 323 L/min) flow capacity. The pump is securely mounted on a steel frame fixed to the truck's chassis and is piped from the internal valve on the truck's barrel. The Z2000 pump is typically installed close to the power take-off box between the front of the truck's barrel and the cab of the truck to limit the length of the power take-off drive line. The line strainer is normally installed in the suction piping ten pipe diameters from the pump inlet. Due to the limited space, it is not uncommon to find pressure drops at the pump suction port in excess of 5 psi which will make any pump cavitate—contributing to premature damage to

the pump. The unique and innovative cam design of the Z-Series truck pumps replenishes any loss of liquid at the suction port, diverting the swept volume inside the pump through engineered channels making the Z-Series virtually cavitation-proof for typical operations.

The Z3200 is a three inch flanged truck pump that is typically used on delivery trucks requiring capacities of 63 to 121 gpm (238 to 460 L/min) while the Z4200 is a four inch flanged truck pump used on transports requiring capacities of 200 to 400 gpm (756 to 1,511 L/min). They are designed with 300# ANSI flanges for maximum strength and are mounted to the belly of the truck's barrel. The belly-mount flange design minimizes cavitation and increases pumping efficiency.

Maintenance procedures made simple...

The Z-Series truck pumps not only maintain Corken's tradition of excellence but also its commitment to simplicity when the equipment requires service. The Z-Series truck pumps are designed with a preset, no-adjust internal relief valve which assures the proper setting. The mechanical seals are easily replaced by simply removing the head assembly. Corken's mechanical seal is compatible with propane, butane and ammonia so you can pump either without changing seals.



Solutions beyond products...

 **CORKEN**®

Z-Series Coro-Vane® Truck Pumps

Controlling thrust loads and cavitation are critical for extended pump life.

The Z-Series Coro-Vane® truck pumps are a new generation of vane pumps for LPG transfer which control heavy thrust loads better than any other truck pump on the market.

A state-of-the-art cam design and new cam material control cavitation—even while pumping at low tank levels. By controlling cavitation, the vanes, cam and sideplates remain lubricated and experience less wear. The Z-Series also has vanes and vane drivers made of advanced materials that last longer than ordinary vanes and vane drivers.

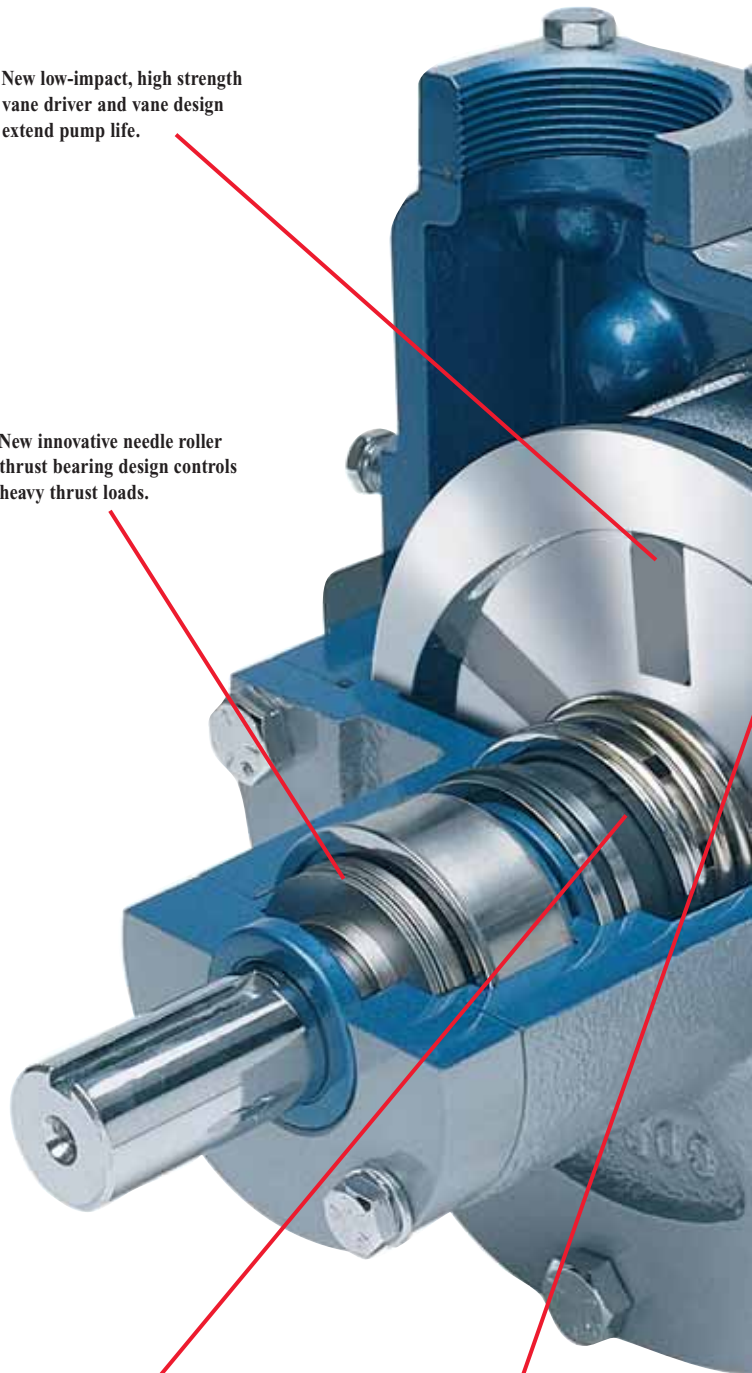
This combination of innovative cam and thrust bearing design makes the Z-Series a smart choice for anyone wanting improved performance and longer service life with exceptional reliability.

New thrust bearing design is rated for up to 4,000 lb of thrust.

The thrust absorbing system of the Z-Series truck pump is comprised of two needle roller thrust bearings at each shaft extension and are rated for up to 4,000 lb of thrust. This patented design protects the pump from dynamic and impact loads often imposed on the pump by the drive system. Premature failures due to axial thrust loads are minimized with these thrust absorbing bearings.

Why this pump lasts longer, needs service less often.

Besides its new cam design and longer-lasting advanced materials, the Z-Series Coro-Vane® pump has other features to extend pump life and reduce maintenance. Unlike pumps with conventional steel vane drivers that eventually penetrate the vane, the Z-Series pump has large diameter, non-metallic, light weight vane drivers that are extremely durable. They will not damage the vanes, even at high RPM. Precision-machined sideplates are reversible to provide twice the service life.



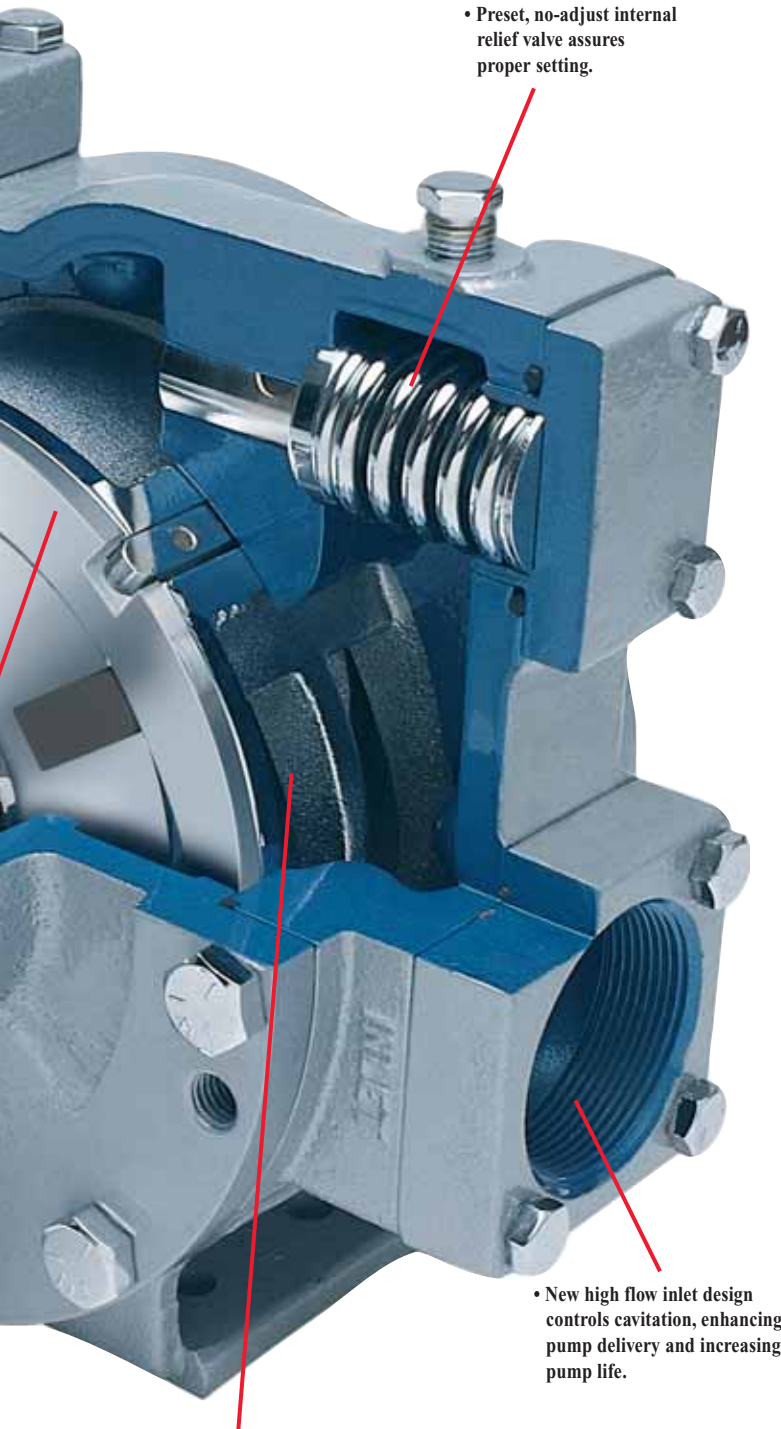
- New low-impact, high strength vane driver and vane design extend pump life.

- New innovative needle roller thrust bearing design controls heavy thrust loads.

- Highly reliable mechanical seals are easily replaced.

- New precision-machined sideplates are reversible for extended life.

Features & Benefits



• Preset, no-adjust internal relief valve assures proper setting.

• New high flow inlet design controls cavitation, enhancing pump delivery and increasing pump life.

• New replaceable, anti-cavitation cam design maximizes pumping capacity and extends pump life.

You can hear the superiority of the Z-Series pump.

The innovative cam design of the Z-Series Coro-Vane® pump controls noisy cavitation that often occurs with highly volatile liquids pumped from low tank levels. The high-flow inlet and direct flow outlet minimize cavitation even more. Because cavitation is minimized, you'll find the Z-Series amazingly quiet as it pumps. And a quiet pump is a better pump, because quiet means there is less wear and tear on internal parts.

Switching to the Z-Series is easier than you think.

So that you can install the pump without re-piping the inlet and outlet piping, the Z-Series is interchangeable with other truck pumps. You can adapt the pump to either right or left-hand PTO rotation.

Another convenient innovation is the preset, no-adjust internal relief valve. It ends guessing and repeated field adjustments. The reliable, easy-to-replace mechanical seal for the Z-Series is compatible with propane, butane and ammonia, so you can pump either without changing seals.

Z-Series is backed by the strongest warranty in the industry.

Because the Z-Series pumps are designed to perform under abusive conditions typical of truck pump applications and still provide reliable performance, it is backed by the industry's leading truck pump warranty. Ask your distributor for details.

And, as with every Corken product, a world-wide network of trained Corken distributors are ready to provide expert advice and service.

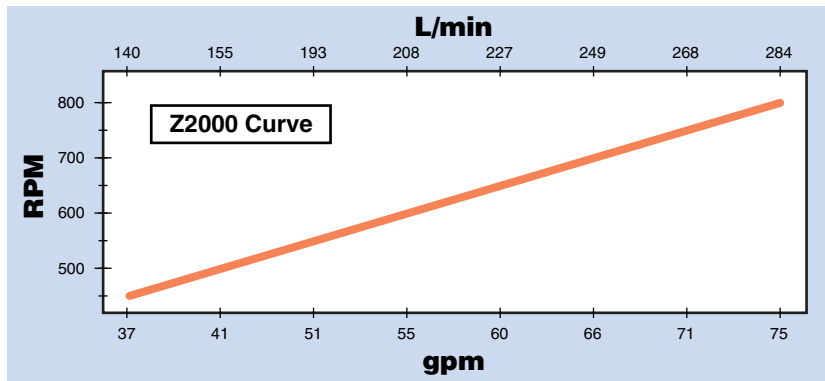
Solutions beyond products...

**CORKEN**®

Z-Series Truck Pumps Performance Curves

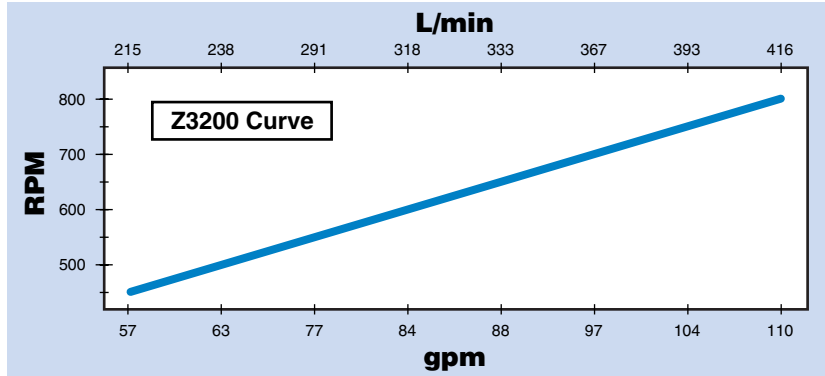
Z2000—2" Delivery Truck Applications

41-76 gpm (155-287 L/min) at 100 psid (6.9 bar), 500-800 RPM



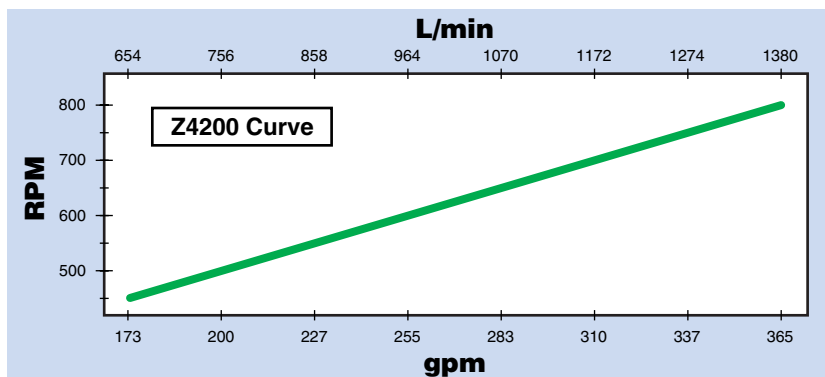
Z3200—3" Delivery Truck Applications

63-110 gpm (238-460 L/min) at 100 psid (6.9 bar), 500-800 RPM



Z4200—4" Delivery Truck Applications

200-360 gpm (756-1,360 L/min) at 100 psid (6.9 bar), 500-800 RPM



Z-Series Truck Pumps Performance & Specifications

Z2000 Performance Chart

| Pump Speed | Differential Pressure | | Approximate Delivery on Propane ¹ | | Brake hp Required | | Pump Torque Required | |
|------------|-----------------------|-----------|--|----------|-------------------|-------|----------------------|--------|
| | RPM | psi (kPa) | gpm (L/min) | bhp (kW) | ft·lb (N·M) | | | |
| 750 | 50 | (345) | 80 | (303) | 2.9 | (2.2) | 20.4 | (27.7) |
| | 100 | (689) | 70 | (265) | 5.8 | (4.3) | 40.8 | (55.3) |
| 650 | 50 | (345) | 69 | (261) | 2.5 | (1.9) | 20.4 | (27.7) |
| | 100 | (689) | 61 | (231) | 5.1 | (3.8) | 40.8 | (55.3) |
| 600 | 50 | (345) | 63 | (238) | 2.3 | (1.7) | 20.4 | (27.7) |
| | 100 | (689) | 55 | (208) | 4.6 | (3.5) | 40.8 | (55.3) |
| 500 | 50 | (345) | 52 | (197) | 1.9 | (1.4) | 20.4 | (27.7) |
| | 100 | (689) | 46 | (174) | 3.9 | (2.9) | 40.8 | (55.3) |

Z3200 Performance Chart

| Pump Speed | Differential Pressure | | Approximate Delivery on Propane ¹ | | Brake hp Required | | Pump Torque Required | |
|------------|-----------------------|-----------|--|----------|-------------------|-------|----------------------|--------|
| | RPM | psi (kPa) | gpm (L/min) | bhp (kW) | ft·lb (N·M) | | | |
| 750 | 50 | (345) | 112 | (424) | 6.2 | (4.6) | 43.4 | (58.9) |
| | 100 | (689) | 99 | (375) | 9.9 | (7.4) | 69.3 | (94.0) |
| 650 | 50 | (345) | 95 | (360) | 5.2 | (3.9) | 42.0 | (57.0) |
| | 100 | (689) | 84 | (318) | 8.2 | (6.1) | 66.3 | (89.9) |
| 600 | 50 | (345) | 86 | (326) | 5.0 | (3.7) | 41.3 | (56.0) |
| | 100 | (689) | 76 | (288) | 7.8 | (5.9) | 64.8 | (87.9) |
| 500 | 50 | (345) | 70 | (265) | 3.8 | (2.8) | 39.9 | (54.1) |
| | 100 | (689) | 62 | (235) | 5.8 | (4.3) | 60.9 | (82.6) |

Z4200 Performance Chart

| Pump Speed | Differential Pressure | | Approximate Delivery on Propane ¹ | | Brake hp Required | | Pump Torque Required | |
|------------|-----------------------|-----------|--|----------|-------------------|--------|----------------------|---------|
| | RPM | psi (kPa) | gpm (L/min) | bhp (kW) | ft·lb (N·M) | | | |
| 750 | 50 | (345) | 369 | (1,397) | 12.5 | (9.3) | 87 | (118.0) |
| | 100 | (689) | 325 | (1,230) | 25.1 | (18.6) | 175 | (237.3) |
| 650 | 50 | (345) | 316 | (1,196) | 10.8 | (8.0) | 87 | (118.0) |
| | 100 | (689) | 278 | (1,052) | 21.7 | (16.1) | 175 | (237.3) |
| 600 | 50 | (345) | 289 | (1,094) | 9.9 | (7.3) | 87 | (118.0) |
| | 100 | (689) | 254 | (961) | 20.0 | (14.8) | 175 | (237.3) |
| 500 | 50 | (345) | 236 | (893) | 8.3 | (6.2) | 87 | (118.0) |
| | 100 | (689) | 208 | (787) | 16.7 | (12.4) | 175 | (237.3) |

¹ The chart shows approximate delivery rates as seen in vapor equalized propane systems at 70°F (21°C) with no pressure loss in pump suction piping. The following will cause increased vaporization of the liquid in the pump suction, adversely affecting the delivery.

- 1) Restrictions in the suction piping such as internal valves, excess flow valves, elbows, etc.
- 2) Restriction or lack of a vapor return line.
- 3) Temperatures below 70°F (21°C).

This loss of delivery is not caused by the pump but is a result of the natural thermodynamic properties of liquefied petroleum gases. See the "GUIDE TO CORKEN LIQUEFIED GAS TRANSFER EQUIPMENT" (CP226) for a complete description of these phenomena.

Z-Series Operating Specifications

| Specifications | Models | | |
|-------------------------------|---------------------|--------------|--------------|
| | Z2000 | Z3200 | Z4200 |
| Suction flange | 2" NPT | 3" 300# ANSI | 4" 300# ANSI |
| Discharge flange | 2" NPT | 2" NPT Ell | 2" Dual NPT |
| Maximum RPM | 800 | | |
| Minimum temperature | -25°F (-32°C) | | |
| Maximum temperature | 225°F (107°C) | | |
| Maximum working pressure | 400 psig (28.6 bar) | | |
| Maximum differential pressure | 125 psid (8.6 bar) | | |
| Discharge flange option | No | Yes | No |
| Internal relief valve | Yes | Yes | Yes |
| Steel slip-on flange option | Yes | Yes | Yes |

Z-Series Material Specifications

| Part | Material |
|---|---|
| Case, head, flange, rotor & bearing cap | Ductile iron ASTM A536 |
| Sideplate | Gray iron ASTM A48, Class 30 |
| Cam | Gray iron ASTM A48, Class 50 |
| Welding flange | Steel |
| Seal seat | Gray iron (standard) Stainless steel & Ni-Resist (opt.) |
| Seal metal parts | Steel |
| Shaft | 8620 steel |
| Vanes & vane drivers | Advanced polymer |
| Relief valve | Steel (Z3200) Stainless steel (Z2000 & Z4200) |
| Relief valve spring | Steel, cadmium plated (Z3200) Stainless steel (Z2000 & Z4200) |
| Bearing | Steel |
| Thrust bearing | Steel |
| O-rings | Buna N (standard) Teflon®, Viton®, Neoprene® (opt.) ² |
| Retainer rings | Steel |

² Teflon®, Viton® and Neoprene® are registered trademarks of DuPont.

ZH-Series Coro-Vane® Truck Pumps Hydraulic Drive Option

Hydraulic-drive adapter available...

The trend in the LPG industry is to use hydraulic driven truck pumps as a way to eliminate the inconveniences of a power take-off (PTO) drive line system. A hydraulic system is not only easier and faster to install, but it also better controls the pump speed, requires less maintenance, has a longer service life, and eliminates thrust loads to the pump. The ZH-Series truck pumps, shown here with optional hydraulic motor, are available with a hydraulic adapter ready to accept commonly used hydraulic motors. Listed below are just a few of the hydraulic drive advantages.

Improved safety...

The use of hydraulics eliminates the exposed PTO drive which allows the truck driver to operate the unloading system in a safer environment. The driver can operate the hydraulic system from outside the cab which provides clear visibility to the surrounding area of the truck.

Less maintenance on pumps...

Hydraulic drives provide a smoother transmission of power. The soft start of the pump results in less shock on the bearings and seals which prolongs the life of the pump. The variable motor speed allows the truck driver to have more control over cavitation and dry running of the pump when approaching the end of the load.

Hydraulic drives require less maintenance than PTO's...

A hydraulic system is sized well within its working parameters, and the components in the drive system are working in a clean, well lubricated, self contained system. Filter and oil changes are the only regular maintenance required.

Faster unloading rates...

The variable directional and manual speed control provide optimum LPG unloading rates. By adjusting the speed, the hydraulic system allows you to control product flow, discharge pressure and cavitation.



ZH2000

Note: Motor shown above not included on ZH-Series



ZH3200

Note: Motor shown above not included on ZH-Series



ZH4200

Note: Motor shown above not included on ZH-Series

Additional Mobile Equipment & Accessories

1022 truck pump...

The Coro-Vane® 1022 Truck Pump is a three inch sliding-vane design commonly found in the LPG and NH₃ industry. The pump contains the same features found in the Corken stationary pumps including replaceable cam, reversible sideplates and new longer lasting vane materials. The three inch foot-mounted design fits applications with 60 to 121 gpm (227 to 458 L/min) at 100 psid (6.9 bar) and where threaded flanges are utilized.



Flo-Chek valve...

The Flo-Chek visually indicates flow in the liquid lines and also functions as a back check valve. Flow-indicating and back-check valves feature all ductile iron construction and are available in 1-1/4" through 4", NPT or welded flanges with a 400 psig (27.6 bar) rating. Standard O-rings are Buna-N while Teflon®, Viton® and Neoprene® are optional.¹



ZV200 bypass valve

Typical Application: Used for both truck and stationary applications for loading and unloading.

A low-pressure build-up bypass valve designed for applications requiring protection for positive displacement pumps. Specifically designed for protecting pumps with capacities up to 250 gpm (56.8 m³/hr). The continuous internal bleed will assist in the operation of systems with “air” or “electric” operated internal valves.

ZV200 Performance

| Differential Pressure psi (bar) | Maximum Rated Flow for Propane gpm (L/min) |
|------------------------------------|--|
| 70 (4.82) | 120 (8.27) |
| 180 (681) | 250 (946) |



¹ Teflon®, Viton® and Neoprene® are registered trademarks of DuPont.

Solutions beyond products...

 **CORKEN**®

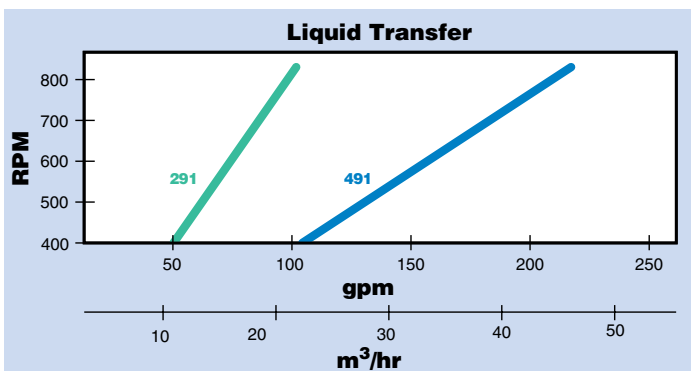
Vertical LPG Compressors For Mobile Applications

Corken introduced the non-lubricated gas compressor in the mid 1950s, setting the standard in the LPG industry. In the years to follow, Corken continues to introduce state-of-the-art materials and manufacturing processes and is recognized as the world leader in the design and manufacture of LPG gas compressors.

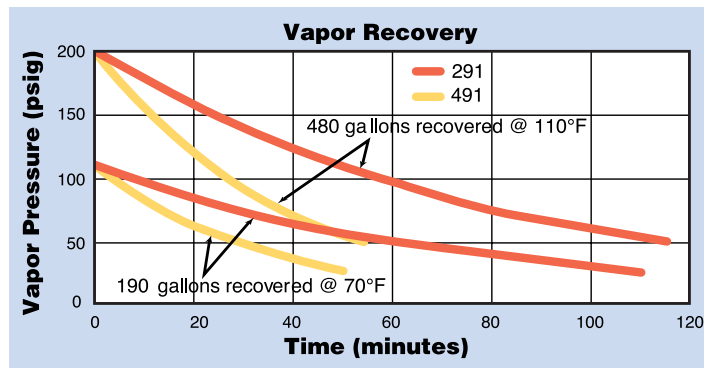
Utilizing compressors on transport trailers...

Many transport trailers are not fitted with a truck pump; instead, they utilize an LPG compressor unit for loading and unloading product. Gas compressors are quite versatile for they can be used for liquid transfer, vapor recovery and for scavenger applications. After the liquid transfer operation is complete, a liquid heel and vapor remains in the transport trailer. The liquid-equivalent is generally 3 to 4% of the volume of the transport trailer. In many cases, the recovery of this residual liquid is economically justifiable, and can only be done with a gas compressor. A gas compressor is not sensitive to low NPSH conditions. With proper liquid slugging protection, a gas compressor can provide years of trouble-free service. Also, a compressor offers much flexibility for it can be used to load the transport, unload the transport and to evacuate stationary tanks prior to relocation.

Corken's gas compressors for mobile applications are available with an extended crankshaft (-102 mounting) and are direct driven by a power take-off drive line or with a hydraulic motor. The extended shaft compressors are designed for transport trailers and are used for loading, unloading and vapor recovery from field tanks.



Capacities shown are based on 100°F (37.8°C) and will vary depending upon piping, fittings, product being transferred, and temperature. The factory will supply a detailed compressor analysis if required.

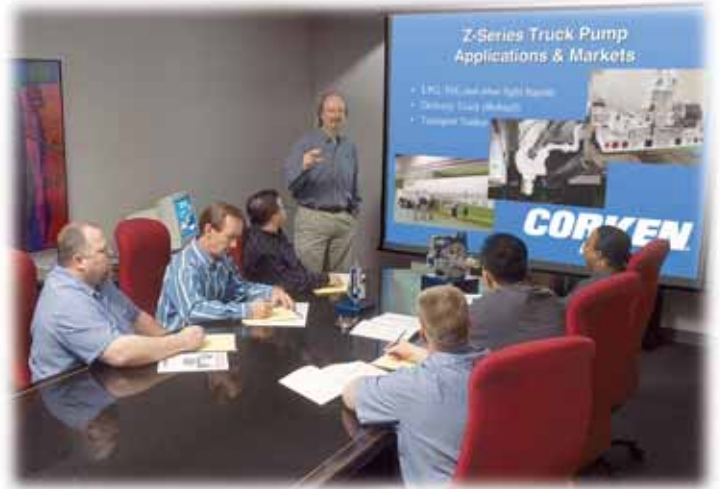


Services Tailored To Your Needs

Corken provides complete training programs.

The key to Corken's success is continued dedication to providing customers with exceptional product training. Corken offers a complete training program on the Z-Series truck pumps. The first half of the training includes an in-depth discussion of the features and benefits, pump sizes available and the applications handled by each of the Z-Series truck pumps.

The second half covers the installation requirements, performance curves and maintenance procedures for each of the Z-Series truck pumps. Corken believes product training is a key factor in meeting the customer's needs.



On-site training...

With every new truck pump installation, a complete analysis of your truck pumping system is recommended. Corken's personnel can provide on-site training for your new Z-Series truck pump. The system analysis includes the following:

- Bypass system
- Metering system
- Analysis of piping & system valves
- Hose & hose fittings

Testing...

All Z-Series truck pumps are thoroughly tested to ensure they meet performance specifications. Each truck pump is subjected to performance testing which monitors the capacity of the pump throughout the range of differential pressures. Because of the great demands placed on truck pumps, Corken performs thrust-end load tests which are capable of axial end loads up to 4,000 lb. Other tests included are net positive suction head required (NPSH_R) and endurance/accelerated wear.

Corken sales engineers are always available for technical assistance throughout the life of your Z-Series truck pump. Our ultimate goal at Corken is total customer satisfaction, and Corken provides the services to back it up.





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