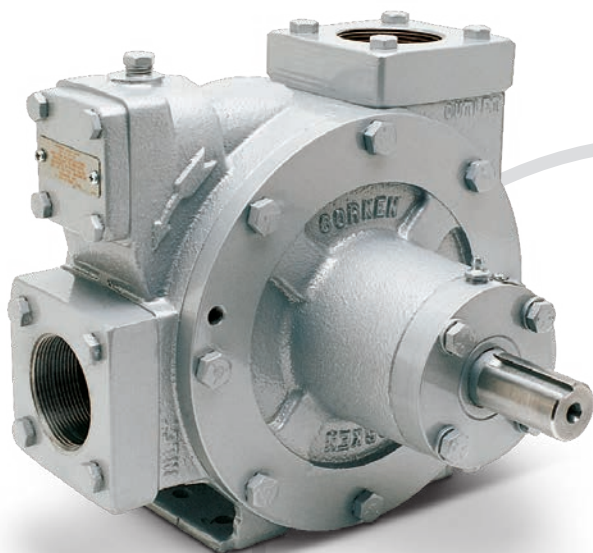


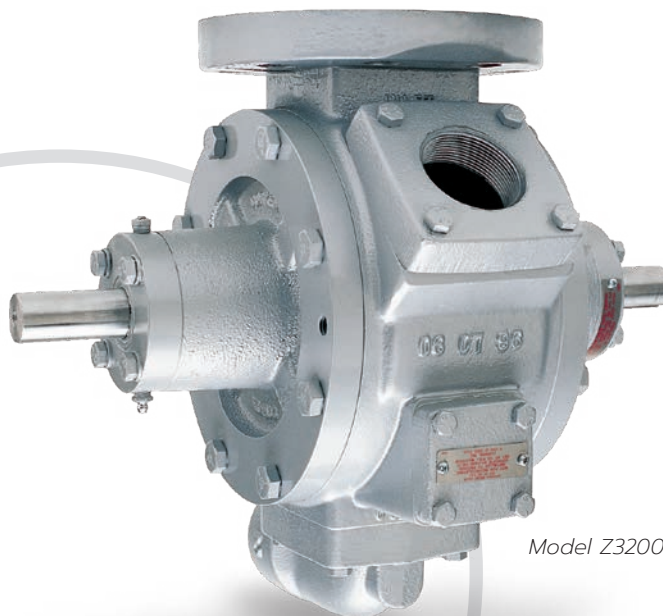
# Z-Series

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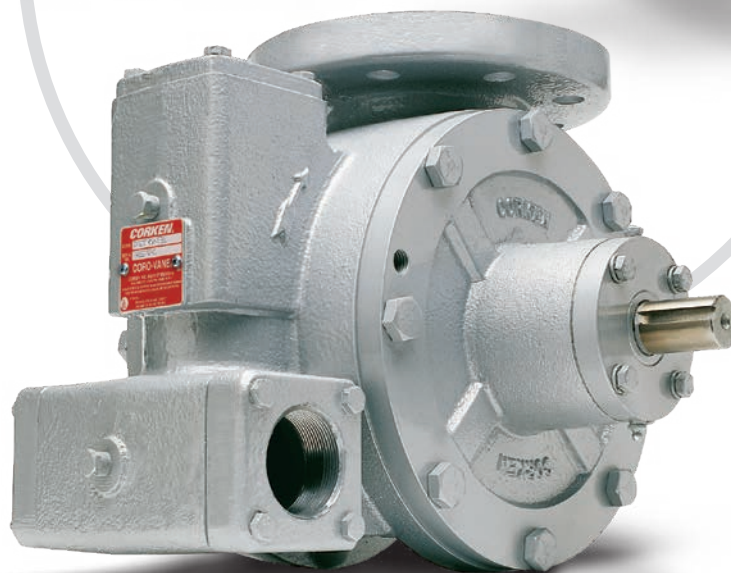
Sliding Vane Pumps for Mobile Applications  
LPG, NH<sub>3</sub>, and Other Light Liquids



*Model Z2000*



*Model Z3200*



*Model Z4200*

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**CORKEN**<sup>®</sup>  
A Unit of IDEX Corporation

# A Tradition of Excellence

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Corken is a leading manufacturer of industrial compressors, pumps, bypass valves, and accessories designed for liquefied petroleum gas (LPG), anhydrous ammonia, and many other flammable, volatile, and toxic liquids and gases.

Located in Oklahoma City, Oklahoma, USA, Corken was founded in 1924 as a water and boiler feed pump distributor and quickly gained a reputation for excellence in customer service. In the mid-1940s, the company entered the LPG industry which proved to be a turning point. In the years to follow, Corken was recognized for its quality line of compressors, pumps, bypass valves, and accessories.

Many products meet multiple industry standards, including Underwriters Laboratories (UL), Canadian Standards Association (CSA), High Pressure Gas Safety Institute of Japan (KHK), Bureau Veritas of France, European Union Pressure Equipment Directive (PED), ATEX Equipment Directive, European Union Machinery Directive, International Quality Standard (ISO 9001), and Environmental Management Standard (ISO 14001).

Today, Corken is a diversified company serving a worldwide customer base in Far East Asia, Africa, Europe, Middle East, South America, and North America. Each customer is served through an extensive network of distributors sharing the same commitment to customer service demonstrated by Corken for more than 90 years.

This exceptional reputation for customer service and quality products, combined with a strong commitment to technological innovation, has positioned Corken as a global leader in compression and pumping solutions.

# **CORKEN**

# Meeting the Demands of a Mobile Application

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## Designed for tough operating conditions...

Bulk deliveries are an important part of every LPG marketer so the pumping equipment must perform in a broad spectrum of operating conditions.

All Z-Series pumps are designed for severe conditions such as high differential pressure, pump overspeeding, poor suction conditions, and heavy thrust loads associated with a power take-off (PTO) drive system. On bobtail trucks 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 causing cavitation and premature wear. To minimize cavitation, the Z-Series cam design replenishes any loss of liquid at the suction port by diverting the swept volume inside the pump through uniquely engineered channels.

In addition to difficult operating conditions, environmental and safety regulations require the unloading point to be a considerable distance from the field tanks. Many times they are located at higher elevations than the unloading point causing additional head requirements.

Another common challenge is the restricted opening found on many fill valves causing higher differential pressures. To maintain optimum capacity, the Z-Series relief valve fully opens at the factory preset pressure of 150 psi.

The Z-Series Coro-Vane® pumps are designed to perform in all of these challenging circumstances.

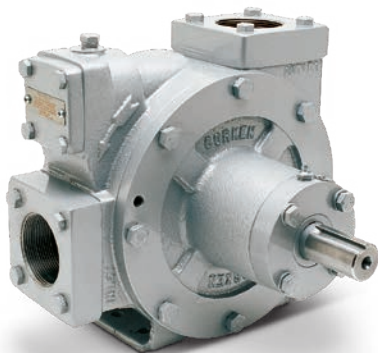
## Multiple sizes and flow rates...

**Z2000:** A two inch foot-mounted pump with NPT flanges designed for bulk deliveries ranging from 41 to 76 gpm (155 to 287 L/min). The pump is securely mounted on a steel frame fixed to the truck's chassis and piped from the internal valve on the truck's tank. To limit the length of the power take-off drive line, the Z2000 is typically installed close to the power take-off box between the front of the truck's tank and the cab of the truck.

**Z3200:** A three inch belly mount pump designed for bobtail deliveries ranging from 63 to 110 gpm (238 to 416 L/min) and is mounted to the belly of tank using a Class 300 RF flange offering maximum strength.

**Z4200:** A four inch belly mount pump designed for transport deliveries ranging from 200 to 360 gpm (757 to 1,362 L/min) and is mounted to the belly of the tank using a Class 300 RF flange for maximum strength.

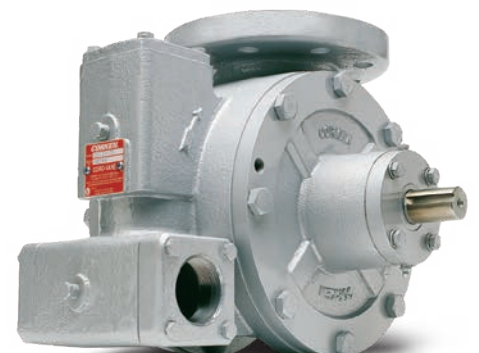
Both belly-mount flange designs minimize cavitation and increase pumping efficiency.



Model Z2000



Model Z3200

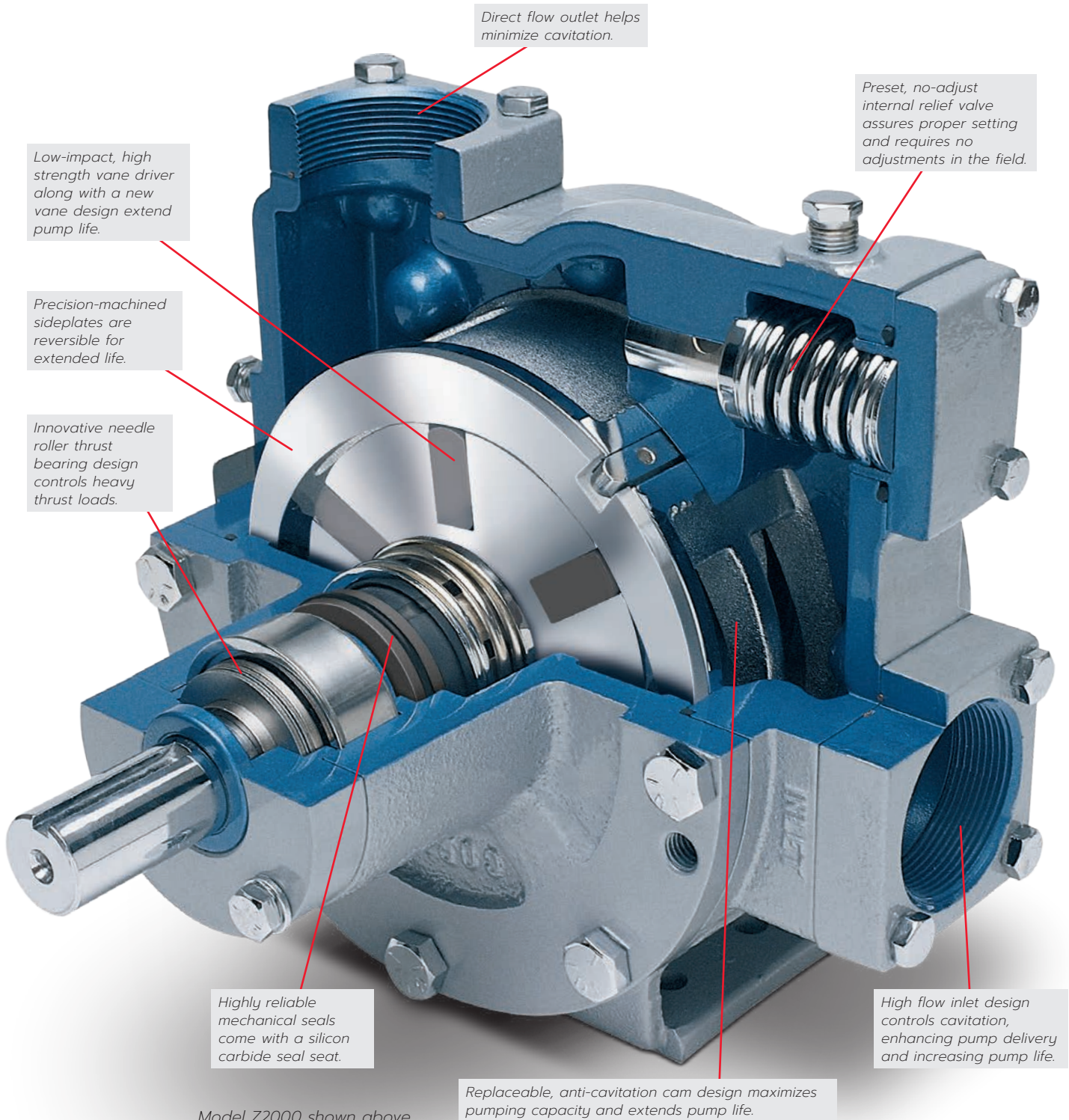


Model Z4200



# Z-Series Sliding Vane Truck Pumps

The sliding vane Z-Series is a new generation of Coro-Vane® pumps with several design improvements. This makes the Z-Series a smart choice for greater performance and longer service life.



# Features & Benefits

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## Improved mechanical seal design...

The Z-Series mechanical seal features a silicon carbide seal seat that lowers leakage rates, minimizes maintenance, and extends the durability and run times of the pump. Silicon carbide is widely accepted as the best seal face material in the industry and comes with no additional charge.

## Controlling cavitation is critical to the longevity of the pump...

Excessive cavitation reduces the efficiency and life of the pump. The Z-Series cam design has a high flow inlet and a direct flow outlet that minimizes cavitation while pumping at low tank levels. Minimizing cavitation ensures the cam and sideplates remain lubricated throughout the pumping process. This coupled with a longer lasting cam material helps eliminate premature wear.

## Thrust bearing design is rated for 4,000 lb...

The thrust absorbing system for the Z-Series truck pumps is comprised of two needle-roller-thrust bearings on each shaft extension. The patented design is rated for 4,000 lb. of thrust and protects the pump from both dynamic and impact loads often imposed by power-take-off (PTO) drive systems.

## Why Z-Series pumps require less service...

In addition to the cam minimizing cavitation, the design of the vane driver minimizes impact. Unlike other sliding vane pumps with steel vane drivers that penetrate the vanes, the Z-Series vane drivers are a light weight, large diameter, and non-metallic design that minimizes impact to the vanes extending the service life.

The precision-machined sideplates are reversible and offer twice the service life.

## Switching to a Z-Series is easy...

The Z-Series truck pumps are suitable for both right- or left-hand power-take-off (PTO) systems and interchangeable with some competitive pumps. Generally no changes to the inlet and outlet piping are required.

## Easy to use internal relief valve...

Since the internal relief valve is preset at the factory, the guess work and repeated field adjustments are eliminated allowing the operator to begin pumping immediately after installation.

## Backed by a strong warranty and distribution network...

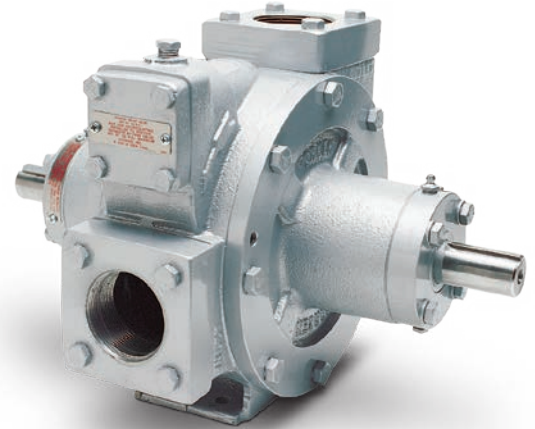
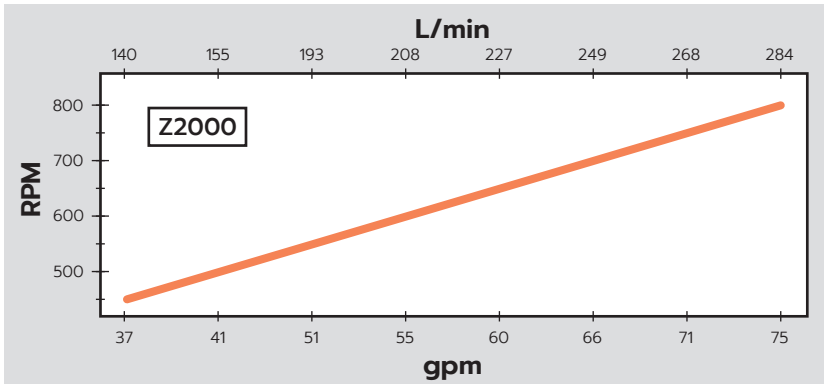
Since the Z-Series pumps are designed to perform under the abusive pumping conditions typical of truck pump applications, they are backed by one of the strongest warranties in the industry. See distributor for details.

And, as with every Corken product, a world-wide distribution network is ready to provide product support and service.

# Performance Curves Z-Series

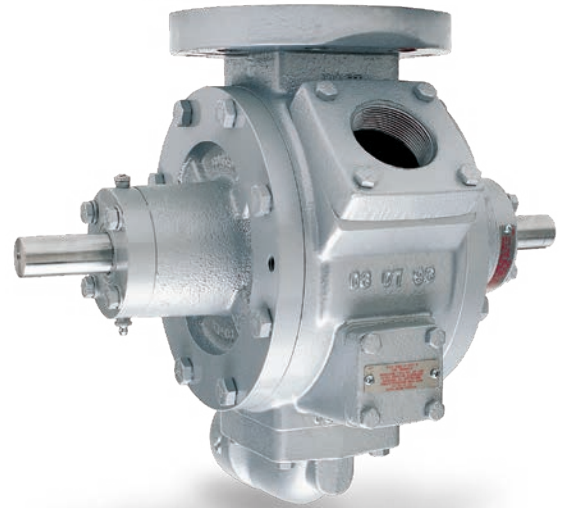
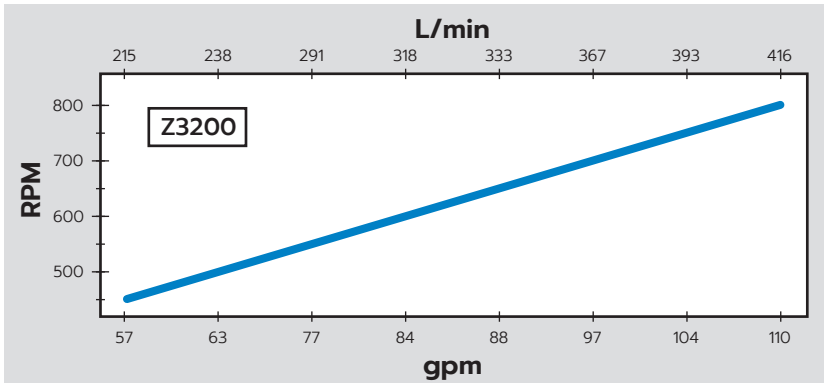
## Z2000—2" Delivery Truck Applications

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



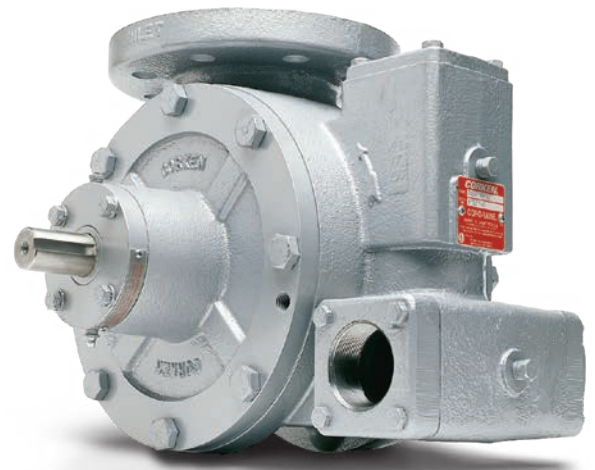
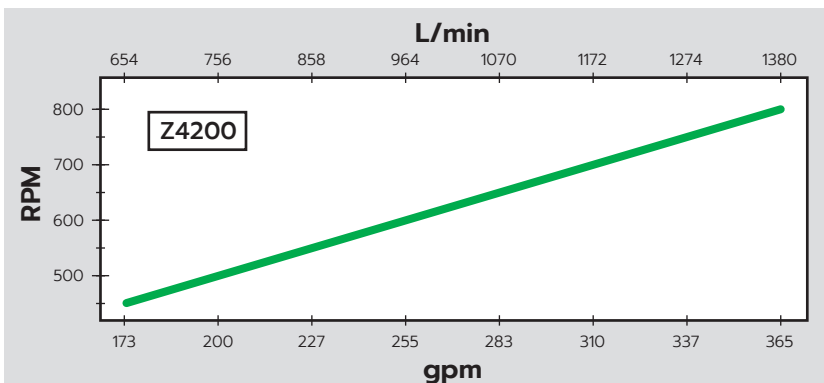
## Z3200—3" Delivery Truck Applications

63–110 gpm (238–416 L/min) at 100 psid (6.9 bar),  
500–800 RPM



## Z4200—4" Delivery Truck Applications

200–365 gpm (757–1,362 L/min) at 100 psid (6.9 bar),  
500–800 RPM





# Performance & Specifications

## Z-Series

### Z2000 Performance Chart

Pump Speed RPM	Differential Pressure		Approximate Delivery on Propane <sup>1</sup>		Brake hp Required		Pump Torque Required	
	psi	(kPa)	gpm	(L/min)	bhp	(kW)	ft-lb	(Nm)
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 RPM	Differential Pressure		Approximate Delivery on Propane <sup>1</sup>		Brake hp Required		Pump Torque Required	
	psi	(kPa)	gpm	(L/min)	bhp	(kW)	ft-lb	(Nm)
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 RPM	Differential Pressure		Approximate Delivery on Propane <sup>1</sup>		Brake hp Required		Pump Torque Required	
	psi	(kPa)	gpm	(L/min)	bhp	(kW)	ft-lb	(Nm)
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)

<sup>1</sup> 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.

### Operating Specifications

Specifications	Model		
	Z2000	Z3200	Z4200
Suction flange	2" NPT	3" Class 300 RF flange	4" Class 300 RF flange
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	350 psig (24.1 bar)		
Maximum differential pressure	125 psid (8.6 bar)		
Discharge flange option	Yes		
Internal relief valve	Yes		
Steel slip-on flange option	Yes		

### 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	Silicon carbide
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)
	PTFE/Kalrez <sup>®2</sup> , Viton <sup>®2</sup> , Neoprene <sup>®2</sup> (optional)
Retainer rings	Steel

<sup>2</sup>Registered trademark of the DuPont Company.

# Hydraulic Drive Option ZH-Series

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## Available with a hydraulic-drive adapter...

A hydraulic system gives the operator more control over the pump speed and eliminates the inconveniences of a power take-off (PTO) drive system. The ZH-Series truck pumps come with a hydraulic adapter ready to accept commonly used hydraulic motors. Hydraulic motors are not included with any of the ZH-Series pumps and must be purchased by a local provider.

## Improved safety...

A hydraulic drive eliminates the need for a power-take-off (PTO) system so the truck operator is no longer exposed to a rotating shaft. Unlike a PTO drive, a hydraulic drive system can be operated from outside the cab allowing clear visibility of the area surrounding the truck and pumping application.

## Smooth transmission of power reduces maintenance...

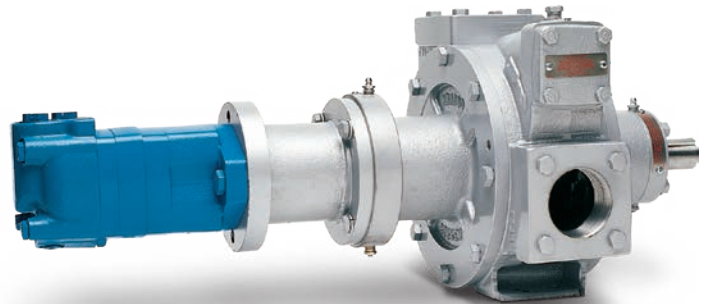
Hydraulic drives provide a smoother transmission of power. The soft start minimizes shock on the bearings prolonging the life of the pump. The variable motor speed gives the truck operator more control over cavitation and dry running when approaching the end of the load.

## Less maintenance than PTO's...

A hydraulic system is sized well within its working parameters and the components within the drive system are working in a clean, well lubricated, and self-contained system. The only maintenance required is a filter and oil change.

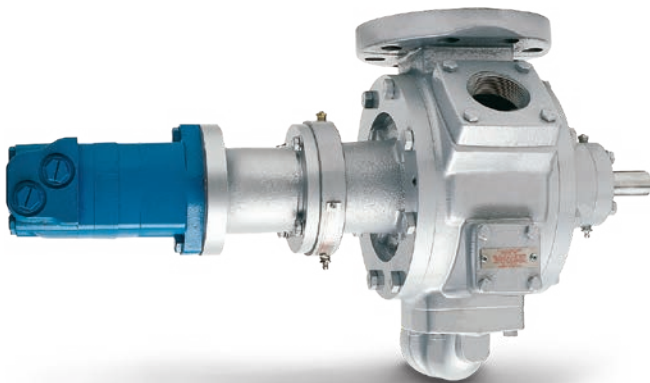
## Faster unloading rates...

The directional and manual speed controls provide optimum unloading rates. By adjusting the speed, the operator can control the flow, discharge pressure, and cavitation.



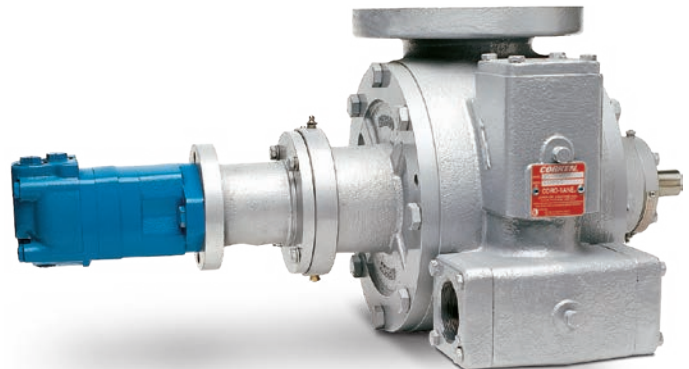
**Model ZH2000**

**Note:** Motor shown above not included.



**Model ZH3200**

**Note:** Motor shown above not included.



**Model ZH4200**

**Note:** Motor shown above not included.



# Additional Mobile Equipment & Accessories

## Z3500 truck and stationary pump...

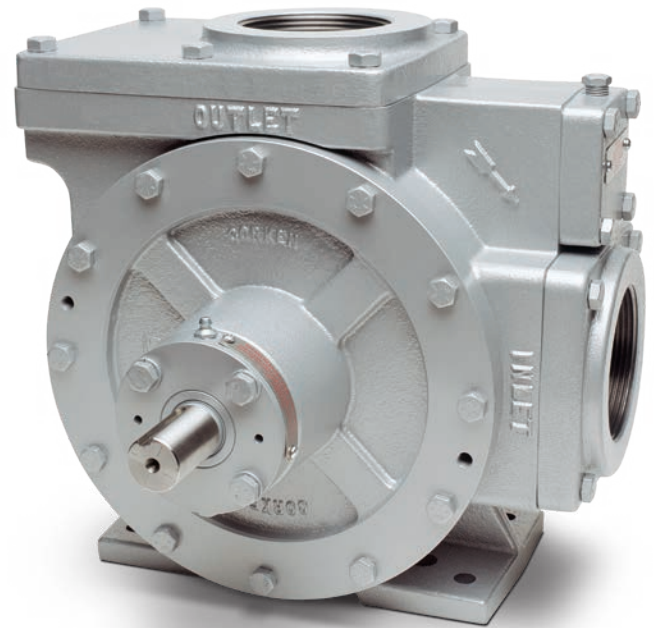
The three-inch Z3500 is a foot mount design used in both stationary and truck applications and has the same lock rotor design used in the Z-Series truck pumps. With higher flow rates than other three-inch competitive pumps, it is ideal for loading and unloading single or dual bobtail trucks.

The elongated flange retrofits the Corken model 1021 pump and other competitive three-inch pumps with little to no change in piping making the installation process quick and easy.

## Capacity Comparison<sup>1</sup>

Pump RPM	Corken gpm (L/min)	Competitor gpm (L/min)
420	86 (326)	80 (303)
520	116 (439)	108 (409)
640	143 (541)	133 (503)
780	177 (670)	—

<sup>1</sup> All capacities are rated at 50 psid and system and condition dependent.



Model Z3500 pump



Model ZV200 bypass valve

## ZV200 bypass valve...

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

The ZV200 is a low-pressure build-up bypass valve. Ideal for applications requiring protection for positive displacement pumps. The continuous internal bleed works well on systems with "air" or "electric" operated internal valves.

## ZV200 Performance

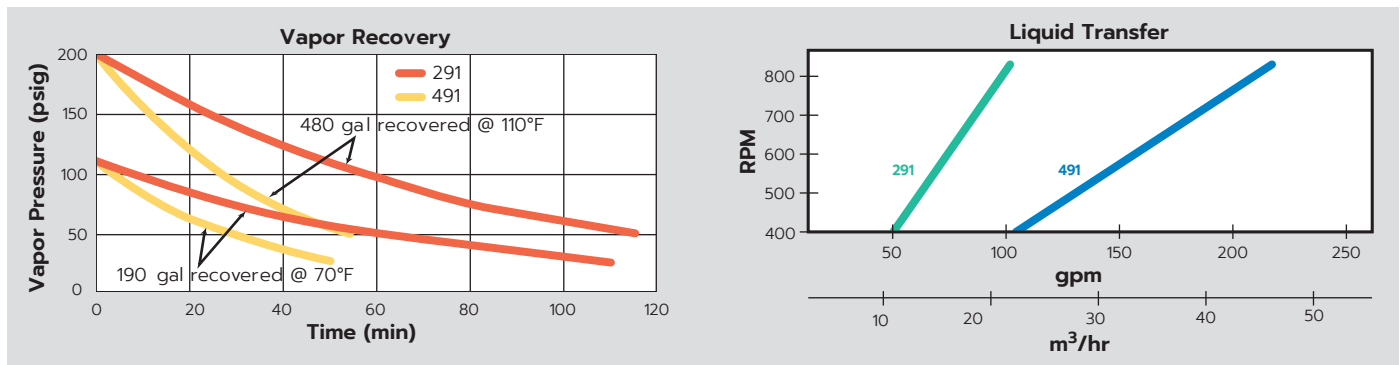
Differential Pressure psi (bar)	Maximum Rated Flow for Propane gpm (L/min)
70 (4.82)	180 (681)
120 (8.27)	250 (946)

# Mobile Applications Vertical LPG Compressors

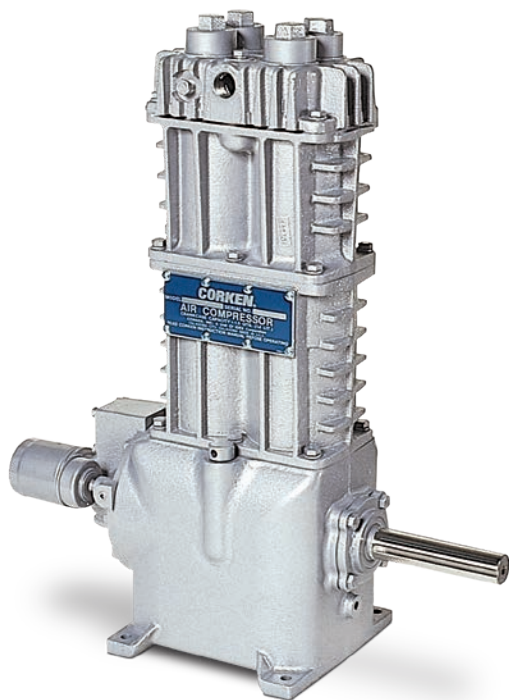
## Utilizing compressors on transport trailers...

Gas compressors are quite versatile and often used for liquid transfer, vapor recovery, and scavenger applications. Many times transport trailers utilize a compressor for loading and unloading. After completing the liquid transfer process, a liquid heel with vapor remains in the transport trailer. The liquid equivalent is generally three to four percent of the volume. In many cases the recovery of residual liquid is economically justifiable. Since a gas compressor is not sensitive to low NPSH conditions, it is ideal for this type of application. With proper liquid slugging protection, a gas compressor provides years of trouble-free service.

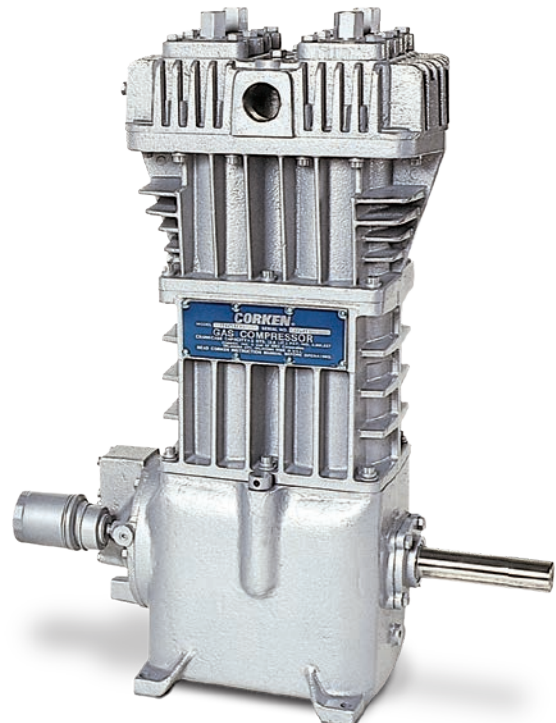
In mobile applications the gas compressor is equipped with an extended crankshaft allowing room for mounting both the flywheel and a direct drive system to the shaft. The flywheel is still used to cool the compressor's crankcase. The extension on the outside of the flywheel is mounted directly to a power take-off (PTO) or hydraulic drive system.



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.



Model 291 with extended crankshaft



Model 491 with extended crankshaft

# A Commitment to Product Training & Technical Support

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## Product training...

One of the keys to Corken's success is a strong dedication to product training. Factory training for all of the Z-Series truck pumps is offered annually. The first half of the training includes an in-depth discussion of the features and benefits, available pump sizes, and suitable applications. The second half covers the installation requirements, performance curves, and maintenance procedures. Training sessions are typically held in the spring and fall. Visit Corken's website for dates and times.



## On-site/field training...

With a new installation, a complete analysis of the truck's pumping system is recommended. Corken service personnel provide on-site system analysis for the following equipment:

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

## Technical Support...

Corken's application engineers are available for technical assistance throughout the life of the Z-Series truck pump.



*Solutions beyond products...*

**CORKEN**<sup>®</sup>

CORKEN, INC. • A Unit of IDEX Corporation  
9201 North I-35 Service Road, Oklahoma City, OK. 73131 U.S.A.  
Phone (405) 946-5576 • FAX (405) 948-7343  
Visit our website at [www.corken.com](http://www.corken.com) • E-mail us at [cocsalesdept@idexcorp.com](mailto:cocsalesdept@idexcorp.com)



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