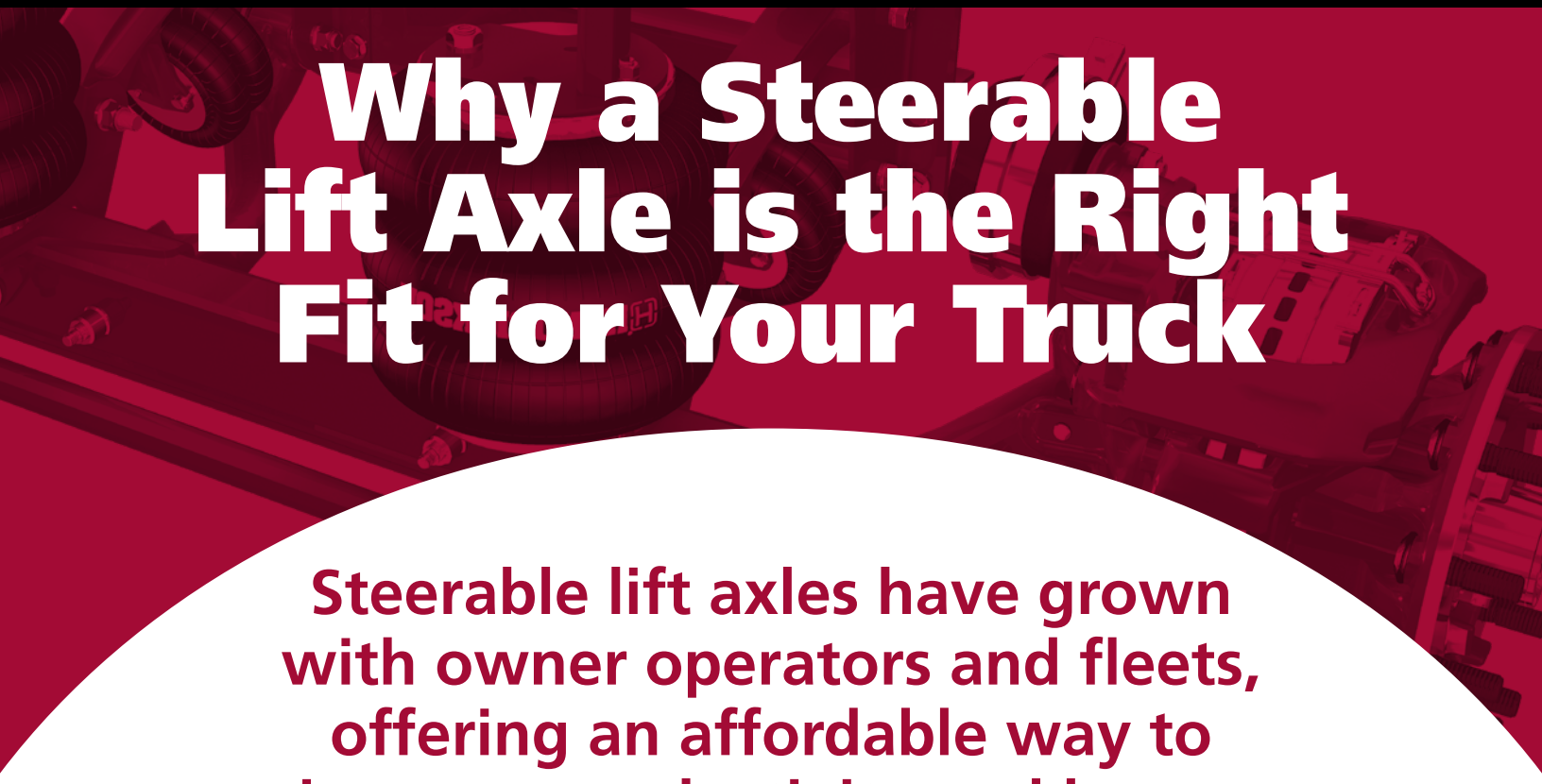

Why a Steerable Lift Axle is the Right Fit for Your Truck

Steerable lift axles have grown with owner operators and fleets, offering an affordable way to increase productivity and lessen truck and tire wear.

One of the growing trends for Vocational Class 8 trucks and trailers has been the use of steerable lift axles to enhance payload capabilities and help improve tire life.

The increased use of steerable axle lifts, which allows more payload, can have significant bottom-line benefits for owner operators and fleets. This allows for vehicles to handle bigger loads resulting in fewer trips per job — a benefit in today's ELD era (Electronic Logging Devices).

While steerable lifts are popular, research is needed before determining the configuration on your chassis. There are Federal and state regulations on which lift axle types and how many can be allowed on your vehicle. Federal regulations control NHS (National Highway System) and state regulations as a subset that controls secondary roads. The states determine laws and regulations affecting truck size and weight on non-interstate highways.

To help you to stay compliant with state specific regulations, refer to J.J. Keller's regulation website at www.REGSENSE.com.

HENDRICKSON
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Bridge Formula

$$W = 500\left[\frac{LN}{N-1} + 12N + 36\right]$$

W - refers to the maximum weight (in pounds) that can be carried on a group of two or more axles to the nearest 500 pounds.

L - is the length (distance in feet) between the outer axles of any two or more consecutive axles.

N - is the number of axles being considered.

Above is the Federal Bridge Formula calculation for adding lift axles to your vocational truck.

State Regulations or Configuration Examples	
OH (3) 13.2K self-steer	39.6K additional gross load
VA (3) 13.2K self-steer	39.6K additional gross load
WV (2) 13.2K self-steer	26.4K additional gross load
KY (1) 20K fixed non-steer	20K additional gross load
NY (1) 20K self-steer	20K additional gross load
AZ (2) 8K or 10K self-steer	16K or 20K additional gross load

For more information on the Federal Bridge Formula Laws, visit www.hendrickson-intl.com/Bridge-Laws

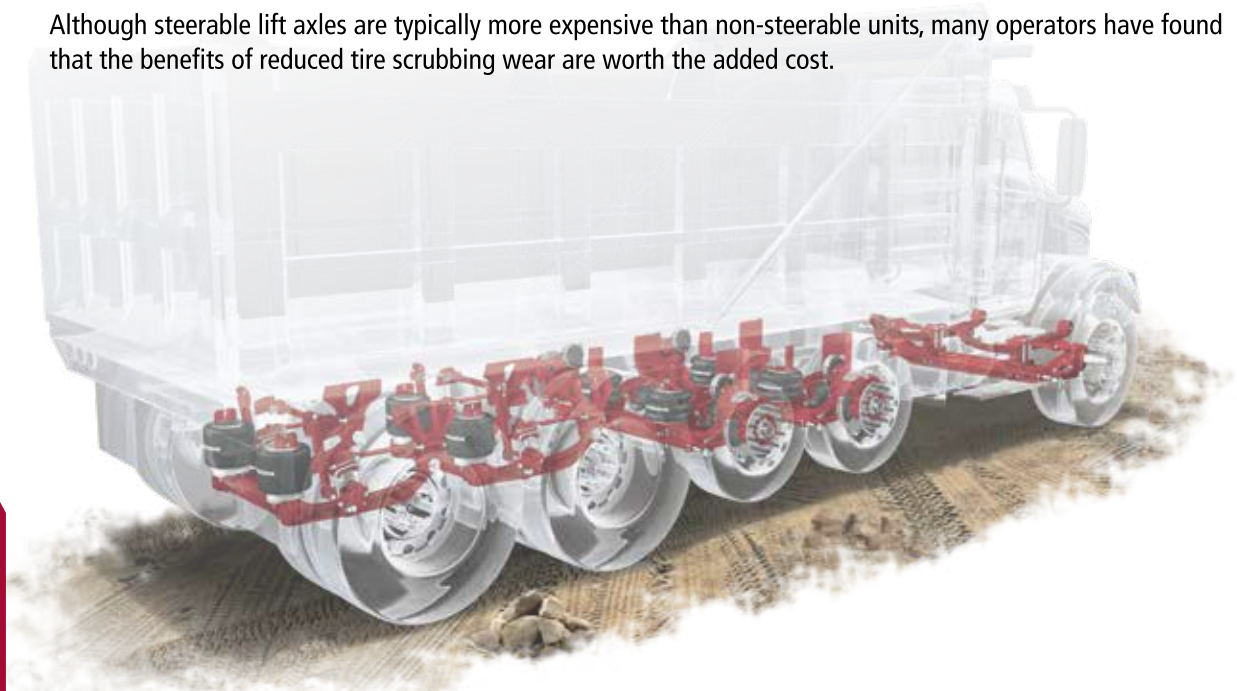
A Reliable Track Record

Over the past 30 years, the fixed or rigid lift axle has been very reliable and more than capable of handling general loads from 13,000 to 25,000 pounds. The non-steerable lift axle is restricted to one lift per chassis, which the Department of Transportation suggests be lifted when turning, to reduce tire scrub or damage and save unnecessary road repairs. Even today, the non-steerable lift axle still works well when used in the correct application.

Approximately 15 years ago, there was a shift and increasing demand for passive steerable lift axles. Steerable lift axles help fleet managers and owner operators comply with the rules of the road, but they also bring a number of additional benefits:

1. **Increased payload**
2. **Reduced tire wear**
3. **Improved vehicle maneuverability**
4. **Reduced workload on driver when turning**

Although steerable lift axles are typically more expensive than non-steerable units, many operators have found that the benefits of reduced tire scrubbing wear are worth the added cost.



Installation Considerations

Toe-in is when the front of the tires are closer together than the rear of the tires. Toe-in is generally referred to as a positive angle and toe-out is referred to as a negative angle. An incorrect toe setting will cause premature tire wear. If there is too much toe-in, the outside edge of the tire wears; If there is excessive toe-out, the inside edge of the tire wears. Keep in mind that on steerable lift axles, it is important that your lift axle supplier is presetting the toe correctly. For example, Hendrickson uses a Hunter Alignment system to preset the total toe to less than 0.08 degrees (1/16-inch for standard 22.-inch tires) in compliance with TMC RP 642B.

The approximate installation time for a typical steerable lift axle, including plumbing, tire and rim installation, ranges from 7 to 12 hours depending on the mechanic's general knowledge and lift axle experience. If the axle is spec'd and installed correctly, the owner-operator or fleet should realize a ROI in less than a year thanks to the advantages of increased / payload and improved tire wear.

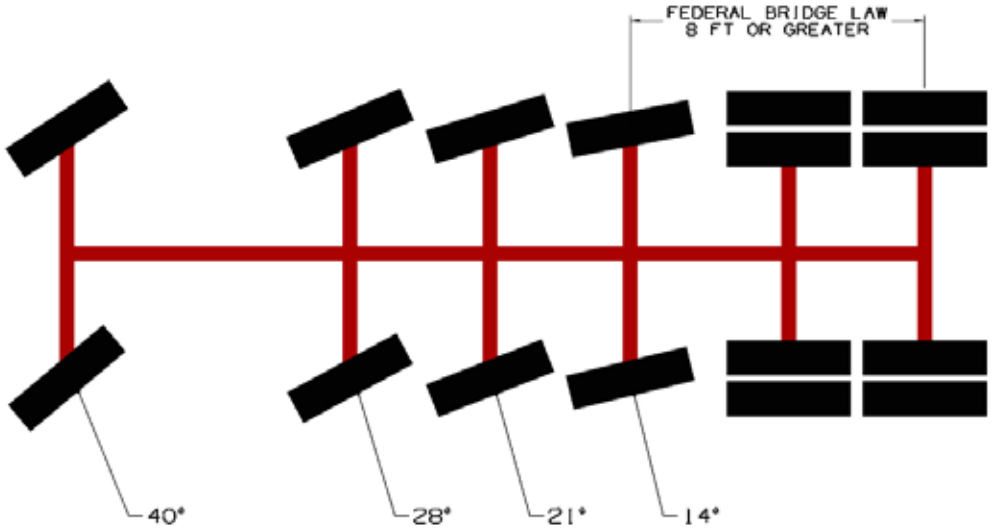
Looking ahead, axle lift technology is expected to continue to be improved and refined for the vocational truck / trailer market. Technology that could be available in the next decade may include global auto deployment systems — not just for air-ride primaries, but specifically designed for reading deflection on mechanical drives. This will allow the vehicle to automatically raise or lower the lift axle based on reduced or increased weight.

Steerable Demand

Improvements in steerable lift axles and their durability have made this lift axle option popular among owner operators and fleets. Today steerable lift axles make up approximately 75 percent of the total lift axle demand. Approximately 15 years ago, this split was an even 50-50 between steerable vs. non-steerable lift axles.

The capacity ratings range from 8,000 to 25,000 pounds, with the most popular being the 13,500 pound capacity lift axle. The wheel-cut is about 31 degrees on 8,000, 10,000 and 13,500 pound steer lift axles. On the wheel-cut illustration below, you can see that the lead axle will always require a greater wheel-cut than the lifts closest to the driver.

In addition, when lift axles are provided to original equipment manufacturers (OEMs), dealers or body builders for installation, they often are dressed or even pre-plumbed. The install time is equivalent to the time it takes to install a non-steerable or fixed lift axle. In fact, the install time for a steerable lift axle could be less than non-steerable or fixed lift axles since you don't have to worry about setting the alignment on a steerable lift axle — because the toe is or should be factory set prior to leaving the factory.



WHEEL CUTS

State Regulations - Lift Axles

STATE	AIR CONTROLS OUTSIDE OR INSIDE?	STEER VS. NON-STEER	NOTES
Alabama	Inside the cab	20K Non-Steer only	Industry standard for inside cab; no regulating controls, only weights of lift axles
Alaska	Outside the cab	Allow both steer and non-steer	AK refers to lift axles as supplemental suspensions
Arizona	Outside the cab	Steerable only	
Arkansas	Can be Inside or Outside the cab	Allow both steer and non-steer	
California	Outside and must have same suspension system	Steerable only	
Colorado	Inside the cab	Allow both steer and non-steer but bridge axles need to be licensed as a trailer	Most trucks in CO use a trailer – they are allowed to carry more weight
Connecticut	Can be Inside or Outside cab	Allow both steer and non-steer	
Delaware	Separated	Allow both steer and non-steer	Lift axles under 20K are not popular in any of the Northeast states.
Florida	Inside or Outside the Cab	13K Steerables only on dump trucks	However, according Reg Enforcement can be both steer & non-steer
Georgia	Outside the cab in a locked control box	Allow both steer and non-steer	Controls inside switch outside
Hawaii	Inside the cab	Allow both steer and non-steer	
Idaho	Can be Inside or Outside the cab	Allow both steer and non-steer	Adopted Federal compliance
Illinois	Can be Inside or Outside the cab	Allow both steer and non-steer	
Indiana	Can be Inside or Outside the cab	Allow both steer and non-steer	Adopted Federal compliance
Iowa	Separated	Allow both steer and non-steer	
Kansas	Can be Inside or Outside the cab	Allow both steer and fixed - but if load weight to heavy capacity, then lift axles must be steerable	
Kentucky	Can be Inside or Outside the cab	Allow both steer and non-steer	
Louisiana	Separated (up down switch inside / pressure gauges outside)	Allow both steer and non-steer	
Maine	Can be Inside or Outside the cab	Allow both steer and non-steer	Lift axles under 20K are not popular in any of the Northeast states.
Maryland	Separated (up down switch inside / pressure gauges outside on passenger side)	Allow both steer and non-steer	
Massachusetts	Can be Inside or Outside cab	Allow both steer and non-steer	Adopted Federal compliance
Michigan	Can be Inside or Outside the cab	Allow both steer and non-steer	
Minnesota	Separated (up down switch inside / pressure gauges outside or in locked box out of driver's reach inside the cab)	Allow both steer and non-steer but if 3 or more lift axles then they must be steer	
Mississippi	Outside the cab	Allow both steer and non-steer	
Missouri	Outside the cab	Allow both steer and non-steer	
Montana	Can be Inside or Outside the cab	Allow both steer and non-steer	Tags must carry proportionate share of load, cannot exceed weight limit of tires themselves - must be equipped with brakes
Nebraska	Outside the cab	Allow both steer and non-steer	
Nevada	Can be Inside or Outside the cab	Steerable only (Las Vegas)	
New Hampshire	Can be Inside or Outside the cab	Allow both steer and non-steer	Lift axles under 20K are not popular in any of the Northeast states.
New Jersey	Can be Inside or Outside the cab	Allow both steer and non-steer	Lift axles under 20K are not popular in any of the Northeast states.

State Regulations - Lift Axles *(continued)*

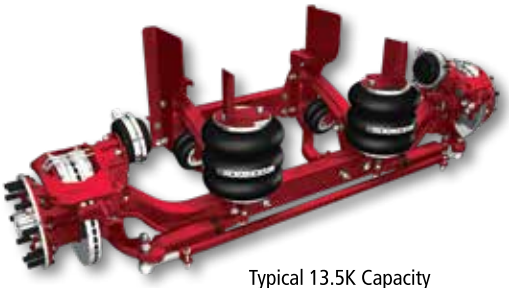
STATE	AIR CONTROLS OUTSIDE OR INSIDE?	STEER VS. NON-STEER	NOTES
New Mexico	Can be Inside or Outside the cab	Steerable only	
New York	Separated (Pressure gauge outside the cab)	20K Steerables only	
North Carolina	Can be Inside or Outside the cab	Allow both steer and non-steer	
North Dakota	Separated (for trucks manufactured after 2005 controls must be separated (up down switch inside / pressure gauges outside)	Allow both steer and non-steer (but trucks w/ 4 or more axles must be steerable only)	
Ohio	Outside the cab if over legal limit w/permit; if under legal limit it can be inside the cab	Allow both steer and non-steer	
Oklahoma	Trucks carrying 6,000 lbs or less can have controls mounted Inside; 6,000 lbs - 20,000 lbs controls must be mounted on outside	Allow both steer and non-steer	
Oregon	Separated (up down switch inside / pressure gauges outside or entire control unit outside the cab)	Allow both steer and non-steer	
Pennsylvania	Can be Inside or Outside the cab	Allow both steer and non-steer	Adopted Federal Compliance on lift axles
Rhode Island	Can be Inside or Outside the cab	Allow both steer and non-steer	
South Carolina	Can be Inside or Outside the cab	Allow both steer and non-steer	Adopted Federal Compliance on lift axles
South Dakota	Outside the cab	Allow both steer and non-steer	
Tennessee	Can be Inside or Outside the cab	Allow both steer and non-steer	Adopted Federal Compliance on lift axles
Texas	Can be Inside or Outside the cab	Allow both steer and non-steer	Adopted Federal Compliance on lift axles
Utah	Can be Inside or Outside the cab	Allow both steer and non-steer	
Vermont	Can be Inside or Outside the cab	Allow both steer and non-steer	Lift axles under 20K not popular in any of Northeast states.
Virginia	Can be Inside or Outside the cab	Allow both steer and non-steer	
Washington	Separated (up down switch inside / pressure gauges outside or in locked box out of driver's reach inside the cab)	10K Steerable only	
West Virginia	Can be Inside or Outside the cab	Allow both steer and non-steer	
Wisconsin	Separated (Wisconsin has one exception to their rule; rear loaded refuse vehicles are exempt from the requirement for separate controls)	Allow both steer and non-steer	
Wyoming	Can be Inside or Outside the cab	Allow both steer and non-steer	

Conclusion

Today, steerable lift axles give owner operators and fleets a way to improve productivity at an affordable price. Industry growth and change should always come with improvements in technology and overall design capabilities. In order to give your customer the best products and support possible, make sure you choose your steerable or non-steer lift axle vendor wisely - and one that will always satisfy your needs!

Typical 13.5K Capacity
Trailer Steerable Lift Axle

Typical 20K Capacity
Truck Steerable Lift Axle



Typical 13.5K Capacity
Truck Steerable Lift Axle

25K Capacity Truck Dual Tire
Steerable Lift Axle

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Specialty Products - Auxiliary Axle Systems

ABOUT HENDRICKSON

Hendrickson, a Boler company, is a leading global manufacturer and supplier of medium- and heavy-duty mechanical, elastomeric and air suspensions; integrated and non-integrated axle and brakes systems; tire pressure control systems; auxiliary lift axles systems; parabolic and multi-leaf springs; stabilizers; bumper; and components to the global commercial transportation industry. Hendrickson, based in Itasca, Ill., USA, continues to meet the needs of the transportation industry for more than 100 years. Visit Hendrickson at www.hendrickson-intl.com.

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