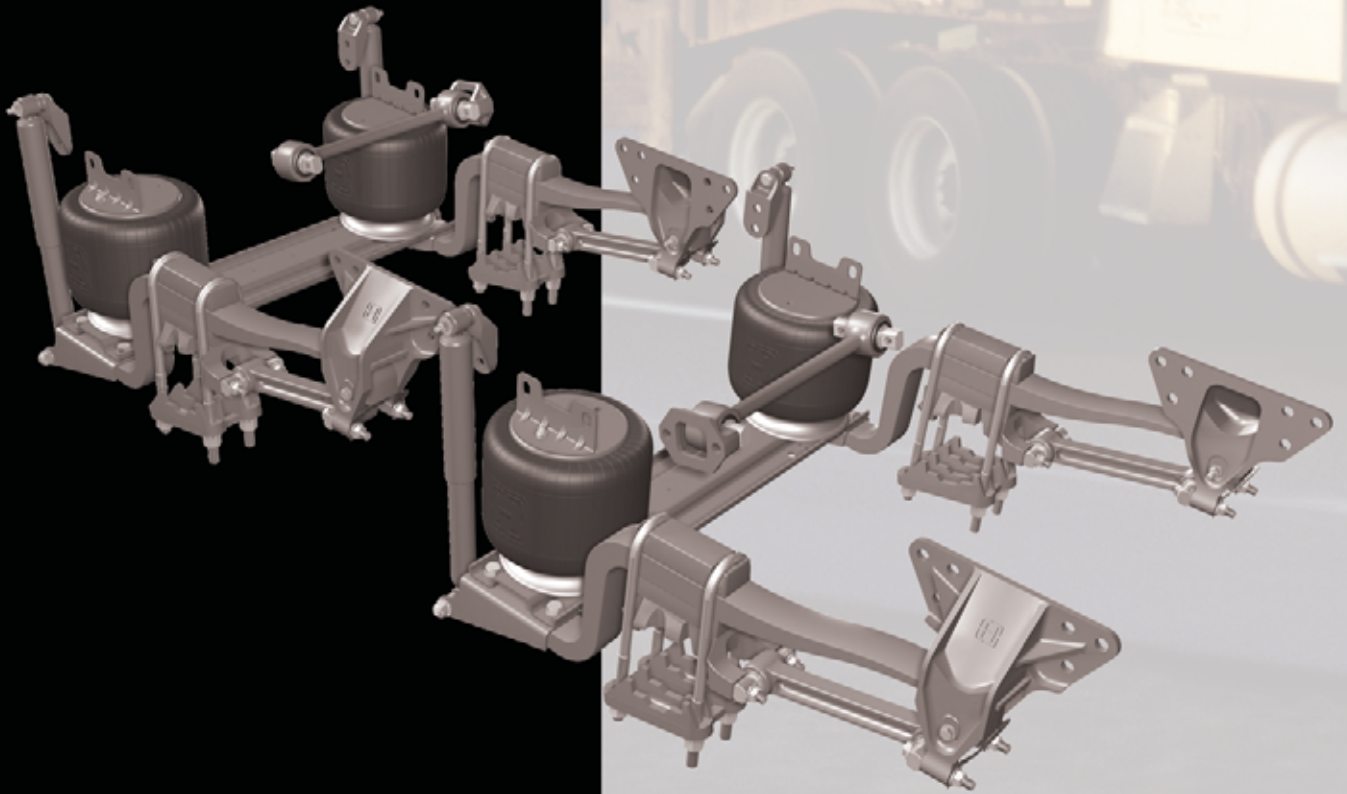


SUPERIOR DRIVER  
COMFORT

GREATER PAYLOADS

ON- AND OFF-ROAD  
APPLICATIONS



**HAS SERIES**

Air Suspensions

*For The Road Ahead™*

**HENDRICKSON**

## HAS SERIES: CHOOSE THE RIGHT SUSPENSION FOR YOUR APPLICATION.

Hendrickson has the air suspension to fit your specific needs. All HAS air suspensions provide superior driver comfort, plus optimum cargo and equipment protection. State-of-the-art design and manufacturing technology enable Hendrickson to deliver air suspension systems for on- and on/off-highway applications that are lightweight, yet durable.

### HAS 40LH

One of the lightest 40,000 pound capacity air suspensions available, the 40LH helps to maximize payloads in line-haul applications.

### HAS 400

Designed for on-highway applications that require up to 10 percent off-highway travel, the lightweight HAS 400 air suspension is rated at 40,000 pounds.

### HAS 402

The 40,000 pound capacity HAS 402 air suspension, approved for use with one or more lift axles, is built to handle both on-highway and up to 25 percent off-highway operation.



### HAS 460

The 46,000 pound capacity HAS 460 air suspension is built to operate under off-highway conditions up to 25 percent of the time and is approved for use with one or more lift axles.

### HAS 210/230

For single drive axle tractors and trucks, the HAS 210 and 230 air suspensions offer superior ride and durability in 21,000 and 23,000 pound capacities.



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#### CHOOSE THE BEST AIR SUSPENSION FOR THE LONG HAUL.

Hendrickson offers a wide range of air suspension models, each tailored to a variety of applications. That means you select the suspension with the optimum capacity and performance characteristics for your application. Whether you run strictly line-haul or up to 25 percent off-highway, count on HAS Series air suspensions for superior performance. For more information about HAS air suspensions, call 1-800-973-0360 or visit us on the web at [www.hendrickson-intl.com](http://www.hendrickson-intl.com).

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# HAS SERIES DELIVERS THE PERFORMANCE YOU NEED.

HAS air suspensions prove themselves time and again to meet the performance requirements the industry demands. Hendrickson's advanced engineering produces air suspensions that are smooth riding and lightweight, yet remarkably durable and stable. Take a look at the benefits:

## SUPERIOR RIDE FOR DRIVER COMFORT AND EQUIPMENT PROTECTION

Top-mount, trailing arm air suspensions, such as the HAS Series, offer superior ride by design. Hendrickson has gone even further by using air springs and shock absorbers that are tuned to provide a smooth ride – fully loaded or empty. HAS suspensions use large volume air springs because they produce a lower frequency spring rate for superior ride. The “rolling lobe” design enables the air springs to constantly adjust to changing road conditions, resulting in outstanding driver comfort, cargo protection and extended equipment life.



## LIGHTWEIGHT FOR INCREASED PAYLOADS



Every pound of vehicle weight saved adds a pound of cargo capacity. So all HAS air suspensions are designed to conform to Hendrickson's rigid standards for weight and durability. For example, the main support members at the heart of all HAS suspensions use advanced metallurgy and finite element analysis to significantly reduce weight without affecting tensile strength or fatigue life. Frame hangers help reduce system weight.

## DURABILITY MEANS LESS DOWNTIME

HAS air suspensions deliver all the durability the industry demands. Precision manufacturing processes produce fine grain steel main support members with high tensile strength and superior fatigue life. Available HI-TORQUE™ shocks reduce driveline vibration. Frame hangers feature an integral slipper pad for quiet operation and improved reliability. In extensive component, system and vehicle fleet testing, Hendrickson air suspensions demonstrate their durability. All of this means HAS air suspensions deliver outstanding toughness under rugged conditions helping to reduce downtime and operating costs.

## STABILITY IS BUILT IN

HAS air suspensions deliver the stability drivers demand for the utmost confidence in their trucks. The higher-capacity HAS suspensions build in added stability with increased main support member thicknesses and heavy-duty longitudinal torque rods. Transverse rods ensure maximum lateral suspension stability, while wide air spring centers provide outstanding roll stability. Five inch wide axle seats distribute forces over a greater area, providing a secure connection between the main support member and the axle.



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# LIGHTWEIGHT FOR LINE-HAUL, RUGGED DURABILITY FOR ON- AND OFF-HIGHWAY APPLICATIONS.

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## HI-TORQUE™ SHOCK ABSORBERS

- Heavy-duty shocks incorporate rebound spring which limits rapid shock extension during acceleration
- Control torque-induced frame rise and help to reduce driveline vibration

## CROSS CHANNEL

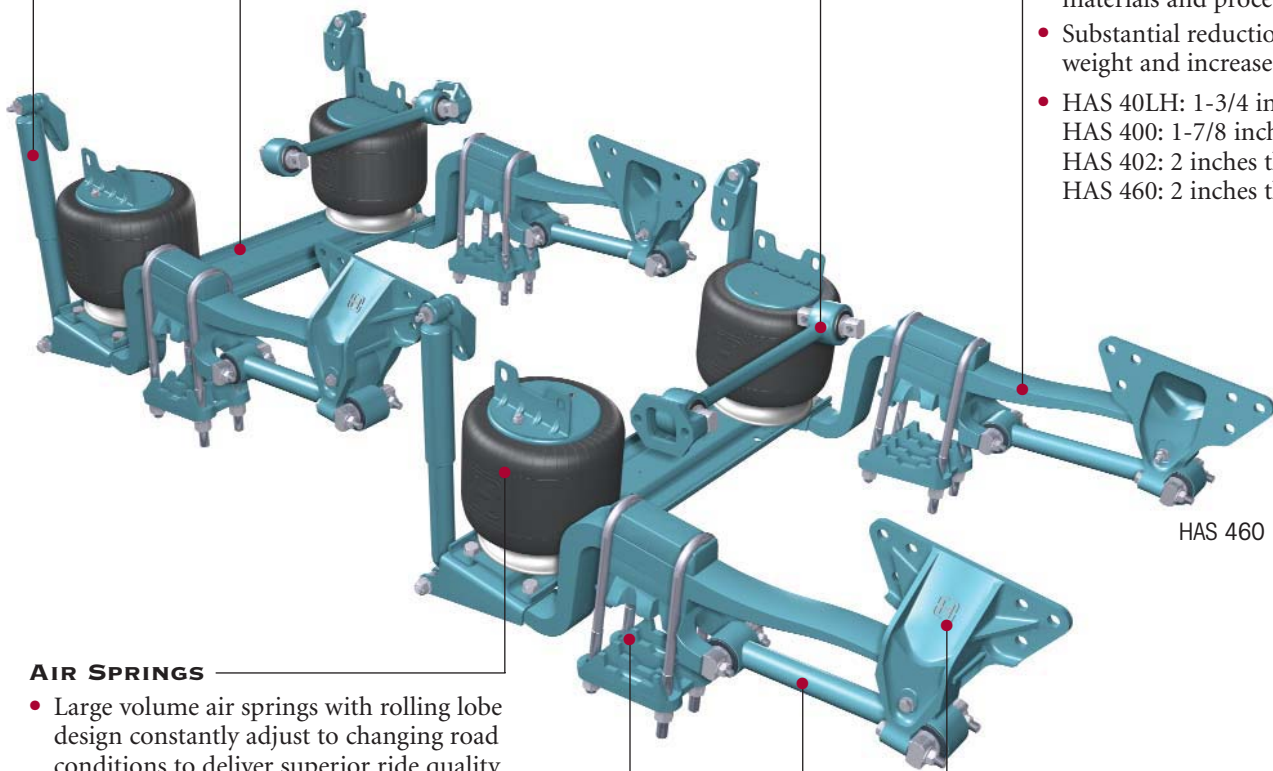
- HAS 400, 402, 460: cross channels are formed from stamped steel
- HAS 40LH: extruded aluminum alloy reduces weight while maintaining strength

## ULTRA RODS®

- Maintain axle position and ensure maximum lateral stability

## MAIN SUPPORT MEMBERS

- Designed and manufactured by Hendrickson with advanced materials and process technology
- Substantial reductions in spring weight and increased strength
- HAS 40LH: 1-3/4 inches thick  
HAS 400: 1-7/8 inches thick  
HAS 402: 2 inches thick  
HAS 460: 2 inches thick



HAS 460

## AIR SPRINGS

- Large volume air springs with rolling lobe design constantly adjust to changing road conditions to deliver superior ride quality

## AXLE CONNECTION

- Wide seats provide a secure axle connection and axle integrity

## TORQUE RODS

- Engineered to optimize stability during acceleration and braking
- Drop-in shims make axle alignment fast and easy for increased tire life

## FRAME HANGER

- Low-mount hanger design eliminates fifth-wheel notching
  - Provides a durable, low-friction surface for quiet main support member horizontal travel
  - Enlarged rebound roller limits vertical travel of main support member for enhanced control during braking
-

# REDUCE SUSPENSION RELATED DRIVELINE VIBRATION WITH THE EDGE.

Hendrickson offers you a way to help reduce suspension related driveline vibration with Efficient Driveline GEometry (EDGE). By maintaining constant vehicle ride height, controlling frame rise and defining optimum vehicle set-up parameters, EDGE aids in maintaining proper driveline angles and U-joint cancellation, in order to reduce potentially harmful driveline vibration. The EDGE System is an option for many HAS air suspension applications, but is required for certain vehicle configurations, as explained in the application guidelines below. The EDGE System consists of three elements.

## 1 HI-TORQUE™ SHOCKS

Heavy-duty shock absorbers incorporate a composite rebound spring that limits rapid shock extension during acceleration, controlling torque-induced frame rise. This promotes consistent ride height and proper U-joint cancellation for reduced driveline vibration. HI-TORQUE shocks provide increased carrying capacity and longer life, and they function as traditional shock absorbers to deliver a smooth, high-quality ride.



HI-TORQUE™ shocks  
with internal rebound spring

## 2 HEIGHT CONTROL VALVE



Height Control Valve

A zero delay minimum dead band height control valve offers consistent, repeatable operation for precise ride height control. The valve reacts quickly to changes in suspension ride height due to load changes and uneven road surfaces, helping to maintain proper driveline angles. 3/8-inch air lines provide maximum air flow and volume at the valve allowing the air springs to react quickly. A tight tolerance linkage between the frame and axle offers more precise control over ride height. An integral dump valve eliminates external valve and plumbing. The forward drive axle valve location is less affected by frame slope. This position also discourages adjustments that could contribute to improper ride height settings.

## 3 PRECISE VEHICLE SETUP PARAMETERS

EDGE requires adherence to proper vehicle setup parameters to help ensure correct ride height, frame slope and driveline angles. These are consistent with Technology and Maintenance Council (TMC) specifications: a maximum U-joint operating angle of six degrees with less than two degrees cancellation; a properly installed ride height control system with ride height setting at  $4\text{-}1/4" \pm 1/8"$  at rated load ( $4\text{-}3/8" \pm 1/8"$  unladen).



Proper vehicle ride height and level frame

## HAS EDGE APPLICATION GUIDELINES

The HAS EDGE is required on tandem-axle vehicles that have 1,550 ft./lb. engine peak torque or greater or a drive axle ratio of 4.11 up to and including 4.6. Axle ratios greater than 4.6 require Hendrickson application review and approval. For HAS 210/230 single axle tractor applications, the HI-TORQUE shock absorbers are required on vehicles that have 1,100 ft./lb. engine peak torque or greater with a maximum of 2,100 RPM.

## HAS SERIES: SUSPENSION SPECIFICATIONS

SUSPENSION MODEL	SUSPENSION CAPACITY (LBS.)	GCW APPROVAL (LBS.)	GVW APPROVAL (LBS.)	SERVICE: ON/OFF-HIGHWAY	TRACTOR <sup>1</sup>	TRUCK <sup>1</sup>	SUSPENSION WEIGHT* (LBS.)	SITE RATING (LBS.)
HAS 210/230	21,000/23,000	60,000/100,000	33,000/35,000	On/Off	Yes <sup>2</sup>	Yes	454/470	N/A
HAS 40LH	40,000	80,000	N/A	On	Yes <sup>3,4</sup>	No	797	N/A
HAS 400	40,000	120,000	55,000	On/Off	Yes <sup>2</sup>	Yes <sup>3</sup>	905	N/A
HAS 402	40,000	138,000	66,000	On/Off	Yes <sup>2</sup>	Yes <sup>4</sup>	920	50,000
HAS 460	46,000	150,000	76,000	On/Off	Yes <sup>2</sup>	Yes <sup>4</sup>	937	50,000

1. Contact Hendrickson or your local dealer for approved applications.
2. Not approved with trailer belly lift axles.
3. No add-on lift axles.
4. One or more lift axles. Maximum 50,000-lb. load on suspension for site travel.

NOTE: All suspension capacities rated at ground.

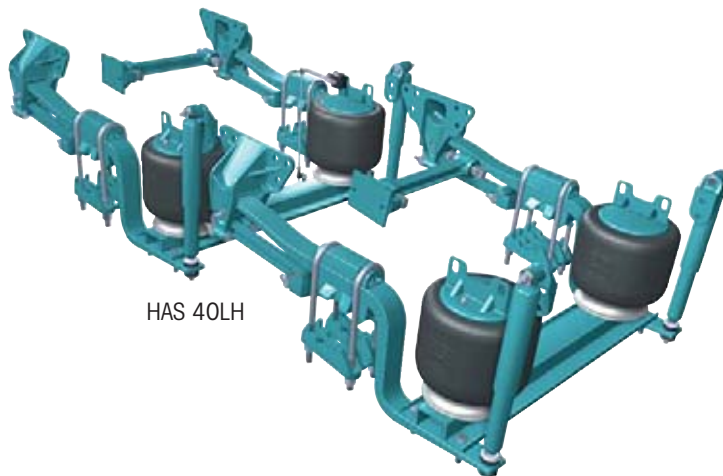
\* Includes complete suspension, torque rods, axle and frame brackets, and all hardware.

Contact Hendrickson if you have questions regarding an air suspension application not listed.

## HAS SERIES: SUSPENSION COMPONENT SPECIFICATIONS

HAS 40LH	HAS 400/210	HAS 402	HAS 460/230
Cast Longitudinal Torque Rod			Heavy-duty, Longitudinal Torque Rod
Cross Channel Aluminum	Cross Channel 1/4" Steel		
Lower Shock Bracket, Not Required	Lower Shock Bracket, Stamped		
Standard 1-3/8" Shock Eye/Stem Mount 1-5/8" HI-TORQUE Optional	Standard 1-3/8" Shock Eye/Eye Mount 1-5/8" HI-TORQUE Optional (Optional inboard shocks available)		
Lightweight Top Pad	Solid Top Pad		
Main Support Member Thickness 1-3/4"	Main Support Member Thickness 1-7/8"	Main Support Member Thickness 2"	
3/4" U-bolt	7/8" U-bolt		
Approved* Axle Housing Wall Thickness 3/8"	Approved* Axle Housing Wall Thickness 7/16"	Approved* Axle Housing Wall Thickness 1/2"	

\* Dana or Meritor axles



**H HENDRICKSON**  
Genuine Parts

*Hendrickson Genuine Parts are the same quality components installed in Hendrickson original equipment suspensions - consisting of the same design, construction, performance and durability. There's only one way to maintain and protect your suspension's original performance. Ask for the name that is synonymous with the finest manufactured suspensions in the world — Hendrickson.*

**H HENDRICKSON**

Information contained in this literature was accurate at the time of publication. Product changes may have been made after the copyright date that are not reflected.

www.hendrickson-intl.com