

## The Importance of the Internal Air Seal on Spring Brake Actuators

Many of today's fleets with heavy-duty air-braked vehicles are quite familiar with the modern spring brake actuator and how it's designed to operate. The double-diaphragm brake actuator has changed very little in functionality over the last 60 years since its invention. The brake actuator, as designed, is to serve as a service brake, a parking brake, and most importantly, an emergency brake. These three functions are accomplished by a unique design.



The modern spring brake actuators design consist of two main sections, the parking spring chamber, which houses the power spring providing the functions for parking and for emergency brake actuation, and the service chamber, which provides the function to stop the vehicle during normal road operation. These two sections work as a unit to comprise the total function of the spring brake actuator.

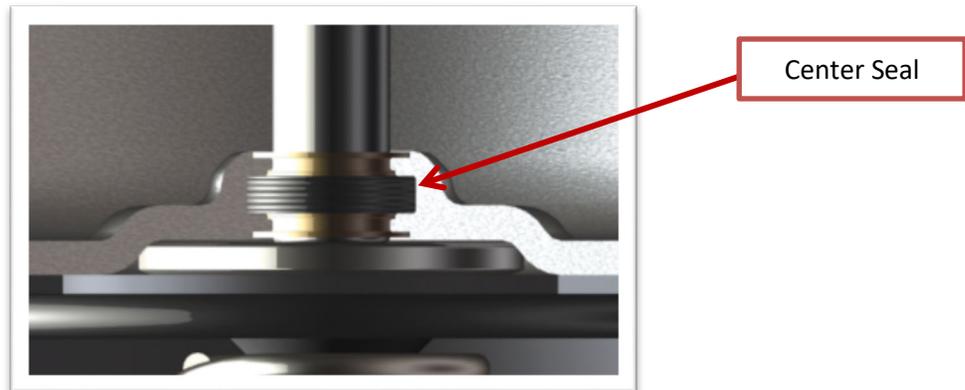
When a truck or trailer's parking brakes are released, the spring side chamber is filled with compressed air, 75 psi or higher. This fully cages the parking spring which fully retracts the chamber's push-rod and releases the parking brakes of the vehicle. During vehicle operation, the spring chamber remains held back or released by compressed air. Whenever the driver makes a brake application, the brake pedal is applied which provides air pressure to enter the actuator service chamber. This allows the actuator's push-rod to extend and actuate the brakes for normal driving conditions.

So what's so important about the internal air seal? During vehicle operation, the spring and service chambers work independently; one with compressed air releasing the parking spring, the other without air present unless a service brake application is made. Operating between the two sections is a piston rod which transmits force from the power spring to the service chamber which provides the actuation of the

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parking/emergency brake function when no air in the spring side is present. It is critical to properly seal the piston rod passageway in between the spring and service chambers to isolate pressures between these chambers. Parking brake release pressure must not be allowed to actuate the service brakes. Air pressure lost in this manner would create an unintended parking/emergency action, a dragging brake condition that could result in vehicle instability; overheated brakes, or worse, a thermal event. Therefore, the center seal is an important internal component within the actuator assembly, and the type of center seal utilized is critical to assure consistent, safe, reliable braking operation at all times.

Typical center seal designs utilized by many competitive spring brake actuator manufacturers consist of employing a single or double O-ring inserted within plastic or nylon guides. O-ring seals are round in profile and only provide a single sealing point. The sealing surface can wear over time due to long-term use or inadequate lubrication resulting in a leak. Noting the importance of the center seal function, the design team at MGM Brakes provides a specifically engineered alternative to this typical O-ring design. MGM Brakes incorporates an exclusive, triple-lipped center seal between two nylon guides. This unique center seal provides a larger sealing surface than a typical O-ring and can hold lubrication within the folds of the triple-lipped seal. This means grease remains in place much longer than typical O-ring designs, reducing the possibility of washing away lubrication. Also because of the wider single piece design, the seal will not rollover, maintaining a consistently tight air seal. The benefit from this advanced design greatly increases the durability of the seal and brake actuator.



As you can see, the center seal is a crucial component to consider in helping to determine the cause of early brake component failures, such as brake shoes, drums and chambers. MGM Brakes developed and perfected this center seal technology and it is standard on all TR double diaphragm actuators, both disc and drum brake platforms.