

AIR SUSPENSION HITCHES-----ARE THEY ALL ALIKE ???

I feel that anytime one is going to spend in excess of \$2000.00 on anything some research should be done to make sure that you get the best value for your dollar. If more than one company manufactures a product, you can be assured that there are some differences in the same product even though they both are intended to do the same task. The same is true with air suspension hitches. There are currently three designs on the market; vertical lift, angle beam and level beam.

In a vertical lift design, the action of the hitch head is in a vertical movement only, which is the only way you want the head to move. There are a couple of ways to allow the head to move in a vertical movement. One is to design the hitch so the mechanism, which captures the head, rides up and down on ball/roller bearings. At first glance this may sound like a good idea. But, with this kind of design the framework must be extremely rigid and probably have several gussets (braces) attached to it. But more importantly, the purpose of a bearing is to reduce friction. It does this by rolling on case hardened rollers or balls in a lubricant. A bearing is not designed for rapid changes of direction. When this happens, the rollers will start to skid instead of roll. It will not be long before the bearing action is no longer operating as it was designed to do. The proper way to design a vertical lift hitch is to use high strength 80,000 lb. bronze bushings and install them over chrome shafts. The bronze bushing does not know which direction they are traveling and as long as there is grease in them they should last several years. A personal note on this design; when I designed our first vertical lift hitch we used the bronze bushing design and a customer purchased the one I was using from me while it was on my truck. Before I gave him delivery of it I removed the pillow blocks containing the bushings and measured them for wear. I had in excess of 10,000 towing miles on the hitch at the time. There was less than .001" of wear on the bushings and the chrome shafts. The reason we designed the vertical hitch was because we had a very small "foot print" to fit into some of the really small "wells" that are in a few of the trucks. The reason we stopped making it was because there was a lot of machining of parts and was very labor intensive to manufacture. During the time we were selling them I did reserve patent rights for them so I can continue to manufacture them in the future if need be.

The next design is one called the "angle beam". A beam design is very simple and has been around since there has been wood. One end of the beam is attached to the air springs, the other end is attached to the frame of the hitch with some sort of attachment, which allows the beam to rotate when the air springs are inflated and deflated. The hitch head is secured some place between the two points of attachment. The amount of pin weight that is transferred to the hinge end of the beam is in direct relation to the distance from the hitch head to the hinge point. The closer the head is to the hinge point, the more weight that is transferred. This is true on any kind of beam design. An angle beam design talks of the location of the hinge point in relation to the hitch head. Two things need to be taken into consideration here. The greater the distance the hitch head is above the hinge point and the closer the head is to the hinge point will result in the head having more forward travel when the air springs are inflated or when the hitch moves upward. We know from experience that when the head is elevated to a point approximately 8" above the hinge point and there is a distance of 23" between the hitch head and the hinge point the head will travel forward 2". When the head travels forward the 2" on the upward movement of the hitch, it must also travel backward the 2" when the hitch returns to its running height. What is actually happening is the hitch is pulling your trailer forward 2" on the upward movement of the hitch and then pushing your trailer backward 2" on the down travel of the hitch which causes a surging sensation in your tow vehicle. This action takes place when the hitch is

fastened solid to the bed of your truck. There is another angle beam design hitch on the market where the hitch head actually moves to try to compensate for the forward and aft travel of this kind of design. That will be another article, as room does not permit at this time.

The other design of hitch is the “level beam” design. The attachment points of the hitch head, pivot points and air springs are the same as for the angle beam design. The end goal is to have a “beam” design hitch work the same way as a vertical lift hitch works; have the hitch head go **only** straight up and down. When the head goes straight up and down it is impossible to get any surging in your tow vehicle. We knew with the angle beam design that was impossible to achieve, so we set out to solve that problem and the result was the level beam design. In a nutshell what that means is when the hitch head is in its operating position, it is level with the axis point of the beam. This design allows for the head to move upward 4” while traveling forward only 1/8”. This very small forward travel cannot be felt in the tow vehicle. Because this design has never been used on an air suspension hitch, I have applied for a US Patent for its design.

Hopefully you have an understanding of the different designs available and how they work. There is another point that I think is important when it comes to getting your monies worth when purchasing an air suspension hitch. That is knowing that the hitch you purchase will do what you were told it would do, also known as the Gross Trailer Weight Rating. As of this writing, all the companies manufacturing RV 5th wheel air suspension hitches have **NOT** had their hitch framework tested by an independent testing facility with one exception. However, all of the companies are rating their hitch framework the same as the hitch head they are using is rated. The current companies supplying hitch heads are Pull-Rite 25,500 lbs, Reese 22,000 lbs, and Holland 32,000 lbs. To get a hitch tested by an independent testing facility takes a lot of time and money. However, it is the only way to know that the hitch will withstand the rating that is put on it. The one exception to having the testing done is the TrailerSaver Air Suspension Hitch. On October 4, 1999 General Testing Laboratories, Inc. performed the testing on the TrailerSaver Air Suspension Hitch according to Wisconsin Department of Transportation guidelines. One of the guidelines is that the hitch must be tested in a compression and tension mode at 30% over its intended rating. This meant that in order for the hitch to be rated at 32,000 lbs. it had to pass the test in both modes at 41,600 lbs. It did pass with out any breakage and the results of that test are published on the Internet at www.trailersaver.com/ if you wish to read them. There are several other topics to be discussed regarding air suspension hitches such as movement dampening, construction procedures, fabrication techniques, etc, which will have to be covered in another article.

Information contained in this article is not only of my own beliefs but that of professional engineers and metal workers.