

September 9, 2013

RAM Trus-T-Lift ACME Thread Screw vs. Ball Screws

The heart of a lift is the drive system and not all drive systems are the same. Although there are some linear hydraulic systems in the market today the majority of accessibility lifts or Vertical Platform Lifts (VPLs) utilize a rotating screw shaft of some kind that is attached to an electric motor in some way.

The two most common options for this type of arrangement are to use an ACME thread screw or a Ball Screw. Images of each option are below in figures 1 and 2 to show the difference of the internal workings.

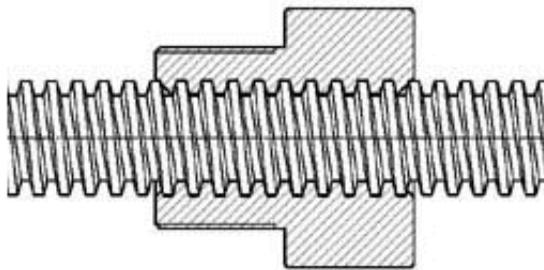


Figure 1: ACME Screw and Nut

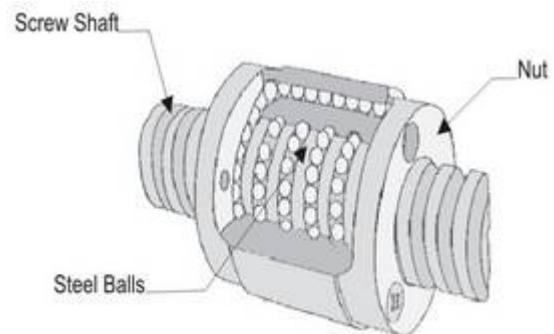


Figure 2: Ball Screw and Nut

Depending on the application each type of screw can have advantages but typically ball screws are used in cases where efficiency and speed are critical and ACME screws are used in applications where simplicity, cost and halting motion when power is removed are the motivating factors. When considering the choice of a screw technology for a VPL RAM has opted for an ACME screw for the last 25 years.

Although the ACME screw is less efficient it has a number advantages in a lift application that include the following:

1. Simplicity of design – simple means less trouble over the life of the product
2. Lower cost
3. An inherently safe design that does not rely on any external break (more on this lower down)
4. Constant speed of motion without acceleration based on load



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The RAM ACME Screw Design = Inherently Safe

What does inherently safe mean exactly? Consider this, the way the RAM ACME screw is designed means that, if you don't apply any rotational force to the end of the shaft, the platform of the lift will stay in the same position. This is because the friction between the nut and the screw shaft is high enough that it will not move unless outside energy is added to the system. In contrast, a ball screw is designed to have low friction to get higher efficiency and will not stop in place unless an additional brake device is added to the system.

When engineers look at systems, adding extra items means adding extra potential points of failure and in the case of a ball screw it would mean adding a potential point of failure (the brake) that can actually have a significant safety impact.

In addition, the RAM ACME screw system will move at a constant speed where many ball screws can actually accelerate in the downward direction when the brake is released. At RAM we feel this can cause people anxiety during use (especially when the lift they are using is taller in nature) and as such we subscribe to the slow and steady philosophy that is inherently safe.

A Note on Efficiency:

Although the ACME screw used in the RAM Trus-T-Lift less efficient than most ball screws we have spent a great deal of time perfecting the design so that we can still offer a full 750lb lift capacity while still only requiring a 15amp, 110V electrical circuit (this is a standard household circuit). This means that there is no additional electrical work to take on if you are putting this lift in your home but you still get the 750lb capacity and the safety of an ACME screw.

If you have any other questions about how RAM ensures safety in the lift devices please don't hesitate to get in touch with our team and we'd be happy to talk with you about it.