



# CENTRAL NEWS

# CVT Hydraulic Oil

By: Blaine Ballentine

Case New Holland introduced a new tractor fluid specification, MAT 3540, with their CTV transmissions. The Case IH product is named Akcela Hy-Tran Ultraction and the New Holland product is named Mastertran Ultraction. CenPeCo has a new product for CVT tractors called CVT Hydraulic Oil.

The only difference between CenPeCo CVT Hydraulic Oil and CenPeCo Multi-Purpose Hydraulic & Wet Brake Oil is shear stability from an incredibly shear stable viscosity improver. CenPeCo CVT Hydraulic Oil is the superior product and can be used in any application where Multi-Purpose Hydraulic & Wet Brake Oil is recommended, Plus MAT 3540.

## CVT Transmissions

The trend in tractor transmissions is toward CVT, Continuously Variable Transmissions. They come under different names, but they permit a nearly infinite number of drive ratios. The operator sets the ground speed, and the engine and transmission go to work to maintain it, regardless of the load.

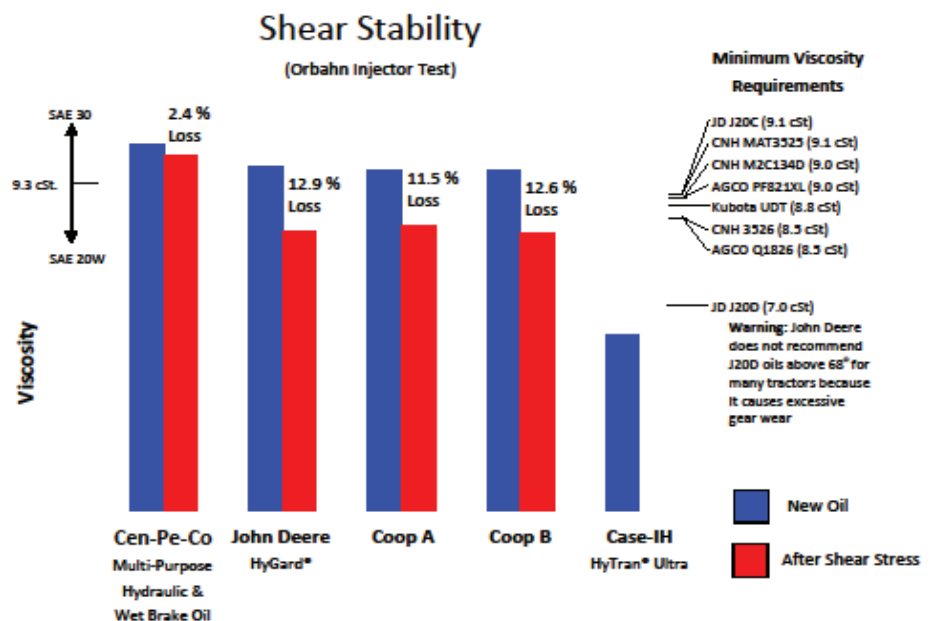
To oversimplify how they work, they use a hydrostatic drive to rotate the planetary unit of a powershift transmission in either direction to speed up or slow down the output shaft. So,

practically any drive ratio is possible. It still has the gears that rely on oil for lubrication, and wet clutches that rely on oil for cooling and smooth engagement, plus a fluid drive component that relies on oil for cooling and lubrication.

A couple of the equipment manufacturers have released new fluid specifications to protect their CVT transmissions.

## Shear Stability Tests

Multi-Purpose Hydraulic & Wet Brake Oil is far more shear stable than most of its competitors. We used fuel injector shear stability tests to verify it, and it was confirmed in the real world. The results are shown in Figure 1.



-Figure 1-

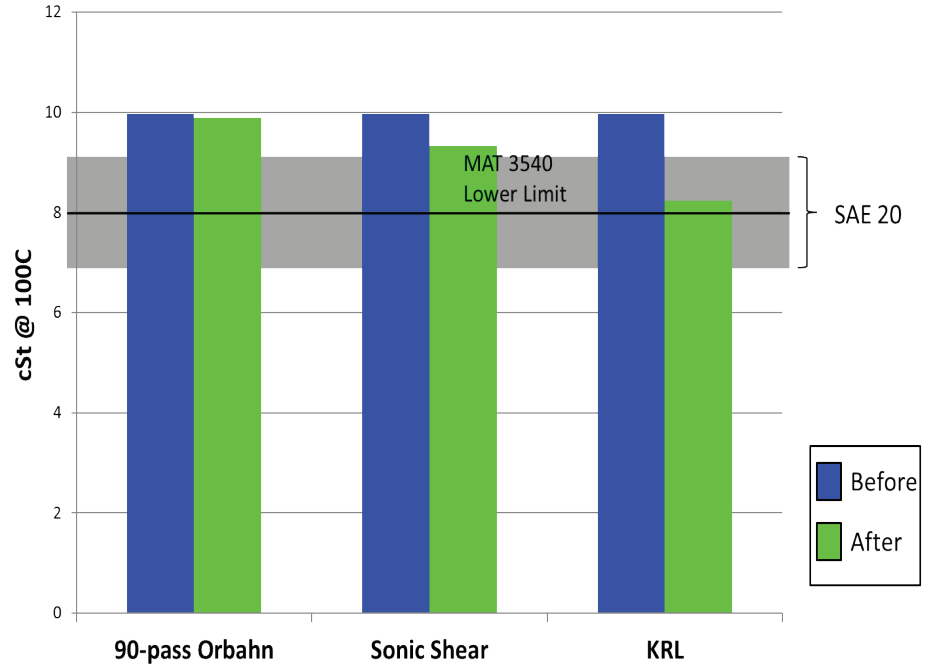
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Realize that fuel injector shear stability tests are used primarily to evaluate engine oils, and CenPeCo uses the most shear stable crankcase viscosity improver available. However, drivetrains and CVT tractors tear up crankcase polymers and require a much higher level of shear stability, and different tests to measure shear stability.

The Sonic Shear Stability test is far more rigorous than an injector test. A sonic oscillator is used to blast the sample with high-frequency sound waves that literally vibrate the molecules apart.

The most rigorous shear stability test is the KRL Tapered Roller Bearing test. In this test, 40 mil (1.35 oz.) are placed in a tapered roller bearing rotated at 1450 RPM under 5,000 N (1,124 lbs) of load for 4, 8, or 20 hrs. Temperature is controlled at 60°C (140°F).

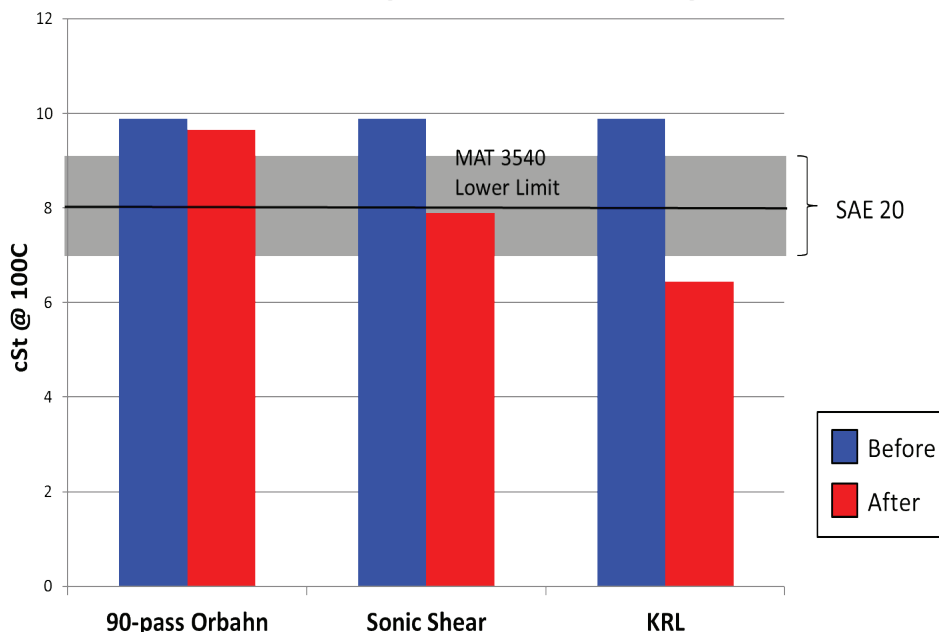
## CVT Shear Stability



-Figure 3-

Figure 2 compares Multi-Purpose Hydraulic & Wet Brake Oil's performance in the three shear stability tests we discussed. As you can see, the KRL test is brutal.

## MultiPurpose Shear Stability

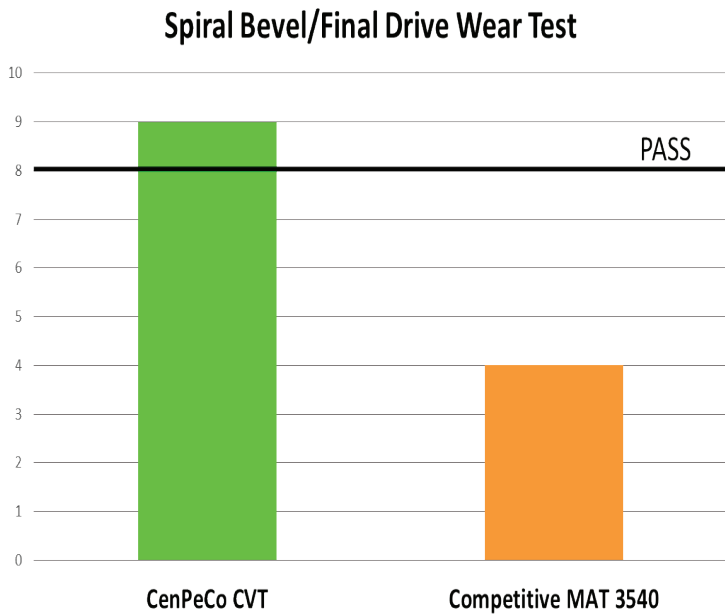


-Figure 2-

The Case New Holland MAT3540 requires a minimum viscosity of 8 cSt. after a 20 hour KRL test. Even though our Multi-Purpose out-performs most tractor fluids, it falls short on the MAT 3540 shear stability requirement.

So, we pulled the viscosity improver out of Multi-Purpose Hydraulic Oil and replaced it with an extremely shear stable drivetrain viscosity improver to make CenPeCo CVT Hydraulic Oil. As you can see in Figure 3, our new CVT Hydraulic Oil holds up in the grueling KRL Tapered Roller Bearing test.

(Continued on page 3)



-Figure 4-

### Other Testing

There is a lot more to making a high quality tractor fluid than shear stability. There is a whole battery of tests to assure proper hydraulic, gear, and frictional (wet brakes and clutches) performance.

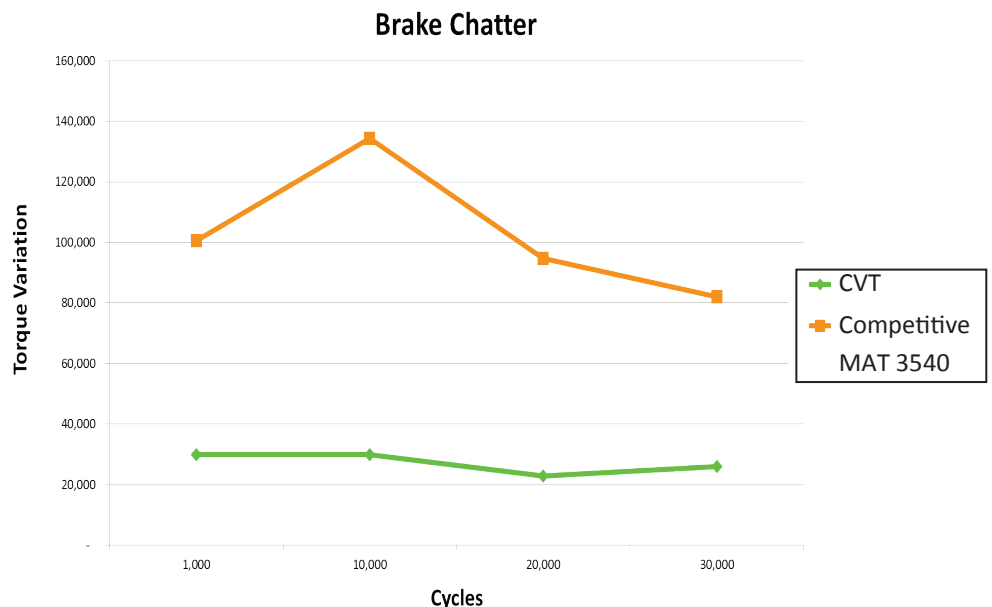
There are several tests required to meet John Deere J20 C/D. Among them is the JDQ95 Spiral Bevel/Final Drive Wear Test. This 50 hour test using a John Deere Powershift transmission powered by a John Deere engine uses merits to evaluate gear wear, with ten being the highest. The minimum for a pass is eight merits. Cen-Pe-Co’s CVT Hydraulic Oil passes comfortably with nine merits. See Figure 4.

A competitor’s product was also tested in the JDQ95. It is a premium brand available internationally

meeting the Case New Holland MAT 3540. It scored a four. In fact, it was calculated that it failed, falling below eight merits, only two hours into the 50-hour test.

Wet brakes and clutches engage with a slip-stick action. The engaging surfaces stick or grab momentarily, then slip and stick again. Stick slip stick slip stick slip again and again. When there is too much variation in the amount of power being transferred during sticking and slipping, you can hear and/or feel the variation called “chatter.” Of course, more brake or clutch wear occurs with chatter, so think of it as wear that you can hear.

John Deere developed a test to measure chatter, the JDQ96B. The test uses a John Deere 1400 series industrial axel equipped with annular wet disc brakes. After 1,000, 10,000, 20,000, and 30,000 brake engagements, a series of brake chatter tests are performed at different wheel speeds, brake pressures, and temperatures. Chatter is detected by the variation in torque, measured in inch-pounds, between when the brakes are sticking and slipping. Less variation means a smoother transfer and less chatter. Totals from the four measurements are totaled, and John Deere’s limit is 584,000.



-Figure 5-

(Continued from page 3)

One of the requirements of Case New Holland's MAT 3540 is an FZG Gear Wear Test, which is a modified ASTM D4998. A-profile gears are run under a constant load at 50 RPM for 120 hours. Upon completion, the tooth surfaces are rated visually and weight loss is measured.

Again, CenPeCo's formulation was compared with that of the same international brand of MAT 3540 oil. As you can see in Figure 6, both passed Case New Holland's requirement of 50 mg max, but the international brand with 44 mg and CenPeCo CVT

Hydraulic Oil with 33—Cen-Pe-Co has fully one-third less gear wear.

### AGCO 821XL

AGCO recommends AGCO 821XL Plus, which is a 15W-40, in some of their CVT transmissions. However, regular AGCO 821XL, which is a 10W-30, can also be used, although a shorter drain interval is recommended. Since viscosity is important to AGCO, if you are going to use an 821XL fluid, it just makes sense to choose one that does not

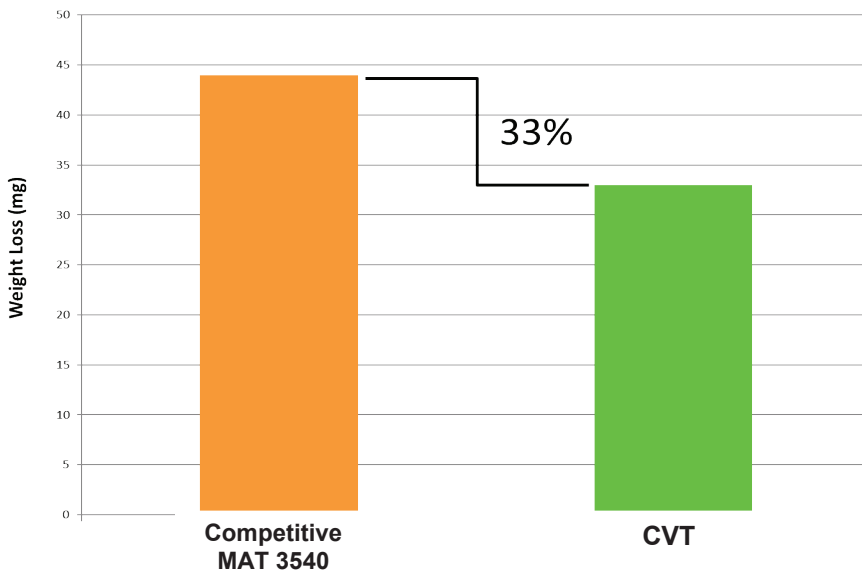
lose much viscosity with use—Cen-Pe-Co CVT Hydraulic Oil.

### Conclusion

The Case New Holland MAT3540 is a more stringent specification than its predecessors. CenPeCo CVT Hydraulic Oil goes above and beyond it. Our CVT Hydraulic Oil is the superior fluid and can be used in any application where CenPeCo Multi-Purpose Hydraulic & Wet Brake Oil is used.

We always like to recommend the best oil for the job and the new best tractor hydraulic oil is CenPeCo CVT Hydraulic Oil.

### FZG Gear Wear Test



-Figure 6-



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- ◆ You can also tell your customers to like our Facebook page as well for additional tips about our products.

