Spectra Coils

The Spectra series detectors were designed to run with V rated coils. V rated coils are coils that are nulled to a higher tolerance then non V rated Whites coils and aftermarket coils. These coils allow the V detectors to operate at the highest possible efficiency.

There are 3 nulls measured in a Whites "V" coil:
X null = Inductive null measured @ 25 microseconds after drive transition
R Null = Resistive null measured @ 20 microseconds after drive transition
V Null = High frequency null measured @ 8 microseconds after drive transition.

(Don’t ask, I don’t know but it sounds complicated. I'll let Whites provide any further information on the validation and production process if they care to.)
A V coil is identified by the number on the mounting ear of the coil. It should start with a V with the exception that some 12” coils started with an SS. This number is not a serial number; it is a 2-character ID and a date code.

So the degree of null is important to V rated coils. The NULL allows the search coil to "not see" the metal the coil is made of and balances the transmit and receive fields to "not see" each other when there is no metal within the detection field. Metal entering the detection field shifts the null and is used to both signal metal and identify metal based on the resulting phase shift. Again, null must be within specification or performance suffers. An "out of specification" null can limit the ground balance range, flaw the discrimination and calibration, as well as reduce detection depth. (Howard)

Historically coils have been the highest wear part as well as the most common component in need of service. Frequency and null can shift over time, with or without use. As much range as possible is designed into the coils to account for these natural and expected shifts. (Howard)

Since coils are the most common part to go bad it is important to be able to test the coils. The best way to check your coil is to set your gain to RX 15, and set TX Boost off. Now with the coil in the air waist high (not on the ground or around other metal), if you don't get an overload, your coil is good.

The best coil to run on a V3I is a Whites V rated coil. Aftermarket loops not specifically made for V3 will struggle a bit, especially at 22.5 kHz, both with gain setting and with VDI accuracy. Even so, I've found the aftermarket loops I've tried -- Bigfoot, SEF, and Sunray -- to be very usable- (Carl)

I get questions concerning the no longer produced Bigfoot coil. The problem isn't a lack of demand, or even a lack of manufacturing capacity. The problem is, because of the way Bigfoot is designed, it can't be simply extended to V3's specs. It would have to be completely redesigned. Even then, it might require a design change on V3I itself to get around certain limiting issues. Begging Jimmy to produce a V3I Bigfoot isn't going to make it happen, because it can't happen. Sorry. (CARL)

Some Coil Weights
Whites V rated coils
801-3239 - 4X6 (elliptical DD) (12.5 oz)
801-3240 - 5.3 (13 oz)
801-3228-1 - 9.5 (16 oz)
801-3241 - 6X10 (elliptical DD). (16.5 oz)
801-3238-1 - 10 inch DD (17.5 oz)
801-3235-1 - 12 inch (22 oz) 8X14

Whites non V rated coil
Elliptical 10x14 DD (28 oz)
White 10x12 SEF (18oz)
15x12 SEF (30 oz)
SunRay X8 8” coil (15.5oz)

Coil Types
Concentric loops like the 5.3 have the following advantages:

Can get good targets under bad targets because of their cone shaped field
They are 10% quieter regarding magnetic interference from power lines
They have 10% better trash discrimination on iron - steel bottle caps and foil
They can shape the target without walking around it
They pin point accurately

Wide Scan Loops (DD) like the 6x10 have the following advantages:

They have better side by side target separation.
They are more sensitive to smaller than coin size targets.
They are more sensitive off the tip area of the coil.
They smooth out the ground reactivity noise by 10%
The 10x12 SEF coil is a little quieter on the ground noise, 2 more inches in coverage and a little deeper than the D2. (Larry)

There is a misconception about DD coils and it emanates from a definition of "wide scan". Because of this 'wide scan' term, the illusion is that it'll see a 'wider' amount of ground. This is a misnomer! A DD coil should be called a 'narrow wedge' footprint! You can pass targets underneath the DD coil towards the outboard edges and if it's a good DD design the detector will NOT pick up the target until it crosses underneath the center beam.

A good DD coil is MUCH more 'focused'. All of its electromagnetic field energy is condensed into a 'narrow beam' maybe an inch or two wide.....by 8" from heel to toe (fore to aft).....assuming it’s an 8" coil. When a small target is passed through this condensed higher-energy field intensity 'narrow beam'.....it's more easily detected.

A concentric coil is not focused at all. All of its energy is bi-directional with a 'cone shape' footprint above the coil.....and the exact same 'cone shape' footprint underneath the coil. Actually it’s more in the shape of a doughnut instead of 'cone shaped'. The concentric coil actually covers (and sees) more ground.

This is where things get interesting and MUST utilize real-world testing to prove/validate actual functionality and 'useable' application. -- IN THE REAL WORLD.....in the wet salt; the answer is:

A DD coil has a slight advantage over a concentric coil on finding small targets. A concentric coil has a few 'useable' percent advantage of finding medium & large sized targets at greater depths compared to a DD coil. The DD coils 'condensed' energy field becomes quite weak at depth whereas, the concentric coil still has a more powerful 'wide angle wrap-around' effect at the deeper depths.

In mineralized ground 'Fringe depth' non-ferrous items have a strong propensity to ID as 'iron'. This is dangerous with the Minelabs (unless you are in all-metal) as the ML's will 'null' over deep 'iron' when in actuality, it may be a deep gold ring that is ID'ing as 'iron'. The higher the mineralization, the shallower targets start to ID as 'iron'. It is my strongest recommendation to hunt the wet salt beaches in all-metal. Yes, you even want to dig the iron. This applies to all detectors. If iron is Discriminated out, deeper targets (ferrous or non-ferrous) will not be audible.

In the Sensitivity screen V3I reports a signal%. This is the residual signal. Residual signal can either be loop null, ground signal, or both. Sometimes the addition of ground can cancel loop null for a lower overall residual signal. Sometimes it adds for an overall worse residual signal. EMI can also affect the residual signal.

On the V3 we were told to keep the signal% total residual signal at 10% so it recommended a preamp gain (RX) to do that. However, 10% is a rather arbitrary level. They could have made it 20%, or 30%. I almost always run my V3 at several notches above the recommended preamp gain, because there is no real harm in doing so as long as there is sufficient headroom left to detect. What is sufficient? Realistically, I would back off to no more than 30-40%. You can run the preamp gain as high as you can as long as it remains stable and doesn’t overload.

Rob (IL) Find’s Treasure Forum