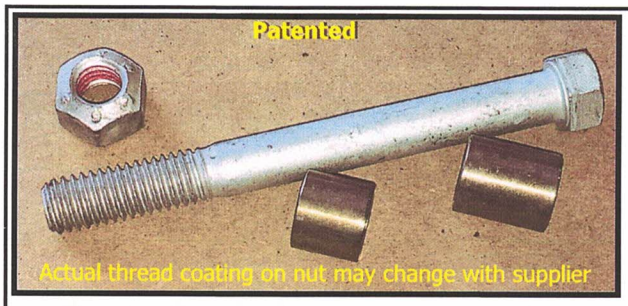


For each row you will need the parts outlined below:

1 x 0.55" long bushing
1 x 0.75" long bushing
1 x 7/16" grade 9 lock nut (14 threads per inch)
1 x 7/16 x 4 1/4" grade 9 bolt (14 threads per inch)

NEEDHAM
Ag Technologies, LLC.

90 Series Stainless Steel Bushing Installation Instructions

These specific bushings are designed to fit standard wear and extended wear versions of the 90 series seed boot, on John Deere 60 and 90 series drills and air-seeders.

For Additional Information, Please Contact
Needham Ag Technologies, LLC.
(270) 785 - 0999
or visit our website at **www.needhamag.com**

Drilling Holes In John Deere 90 Series Seed Boots

0.635" holes need to be drilled in both seed boot lugs for the Needham Ag 5/8" OD hardened stainless steel bushings. This is best accomplished with a heavy drill press, or ideally a milling machine and **we have two different drill bits available**.

1. Needham Ag Carbide Tipped Drill Bits.

These carbide tipped drill bits are a cost effective option for drilling out standard wear 90 series or smaller numbers of John Deere 90 series extended wear seed boots. Most growers or machine shops typically drill between 6 and 12 extended wear seed boots with each drill bit (especially if the carbide tip can be touched up in a grinder every +/- 6 boots). The QR code to the right provides a YouTube video, which shows how to drill out an extended wear John Deere 90 series seed boot. You can also go to YouTube and enter "**Needham Ag - Drilling Out John Deere Seed Boots**". Turn these drill bits around 200 RPM if you are drilling out standard wear John Deere seed boots (part numbers N284044 or N284045), and use lubrication. **If you are drilling out John Deere extended wear seed boots (part numbers N284024 or N284025) make sure you turn the drill bit around 500-600 RPM without lubrication.**

2. Needham Ag Solid Carbide Drill Bits.

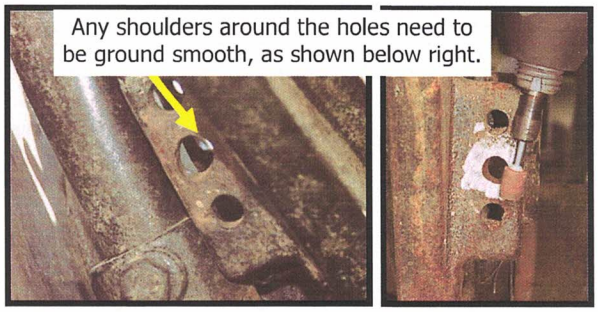
The solid carbide drill bits are the best choice for drilling out larger numbers of the John Deere extended wear seed boots (part numbers N284024 or N284025) as long as a heavy drill press is used (one that weighs at least 500-600 lb), or ideally a milling machine. These drill bits need to be turned around 200 RPM with lubrication or coolant. The QR code to the right provides a YouTube video, which shows how to drill out the seed boots. You can also go to YouTube and enter "**Needham Ag - Seed Boots on John Deere".** Specific information on drilling out the seed boots begins around 5 minutes into the video.

Fixture To Hold The Seed Boots.

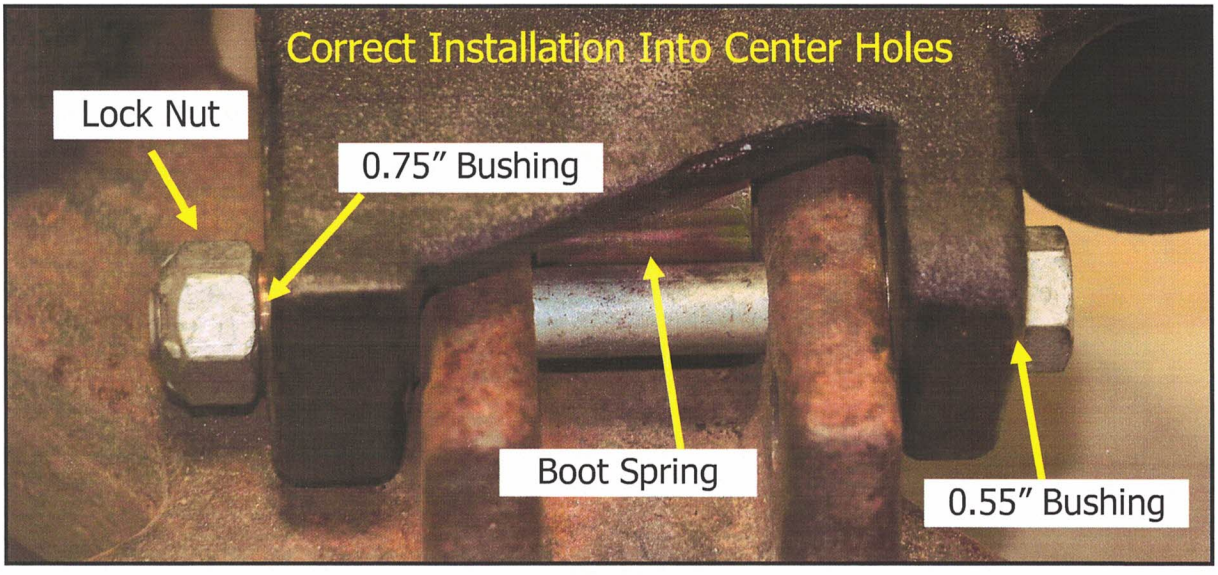
The video link above for the solid carbide drill bits shows a number of different fixtures, starting around 5 minutes into the video. **Whichever method you utilize to hold the seed boot, its critical to hold it securely, to eliminate vibration.** The fixture also needs to align both holes with the drill bit to allow both holes to be drilled parallel. This process is often aided by using a 29/64" drill bit (which is the starting size of the holes in the seed boots), then adjust the fixture until the 29/64" bit passes through both holes. Once aligned you can switch to one of the 0.635" drill bits illustrated above.

See page 4 of these instructions for more about fixtures.

Installing The Seed Boot Bushings

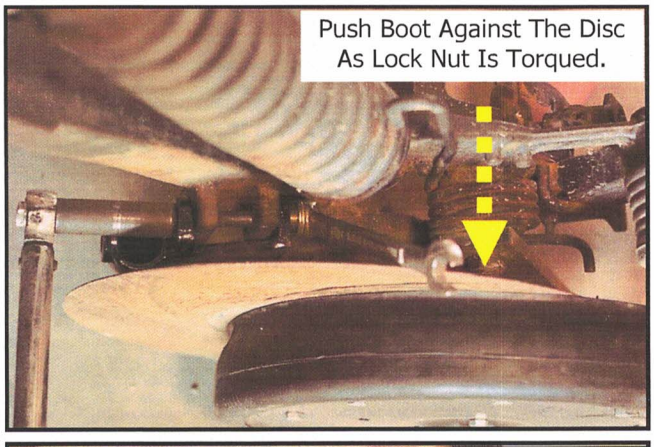


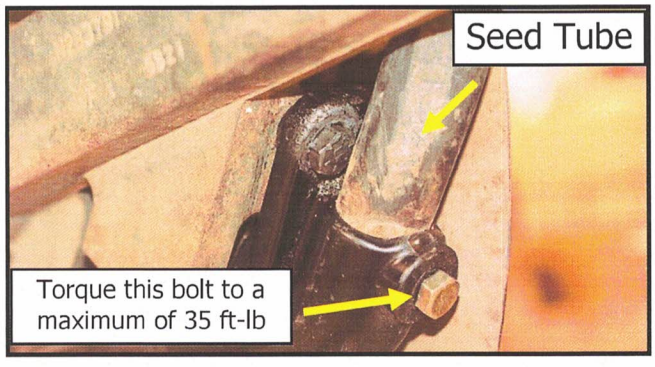
1. <u>IMPORTANT !!</u> If there are any shoulders around the holes within the seed boot mounting lugs, these need to be ground smooth as shown within the images to the right. This is important, because these shoulders can cause the seed boot bushings to tip sideways and not allow the seed boot to pivot side to side. A Dremmel tool or small hand grinder makes this easy as illustrated to the right.



2. Place the shorter (0.55") bushing, next to the head of the 4 1/4" x 7/16" bolt as shown above. Next push the bolt (with bushing) into the seed boot and through the cast lugs. A pry bar between the disc and the boot will help align the holes and bushings. Also, be sure the boot spring is installed <u>under the bolt</u> as illustrated above.

3. Once the bolt is through both holes of the seed boot, install the 0.75" bushing over the threads and into the other side of the boot. Again, the pry bar makes aligning the bushing within the boot much easier.





4. **Add the lock nut and torque to 60 ft lb.** As the nut is tightened, have a second person push the boot against the disc blade (as shown left) to make sure it sits flush against the disc.

5. If the holes within the cast opener arm are egg shaped, we recommend aligning all the seed boots in the same position. To do this, lower all of the openers down onto a level surface, then place a spacer (such as a piece of 1" thick wood) under the bottom of the boot. As the nut is torqued, the spacer will ensure a consistent boot height above the bottom of each disc.

6. Replace and secure the steel seed tube as illustrated below left. **Do not torque the 3/8" seed tube bolt over 35 ft-lb.**

Note: Even after you followed the instructions above and the lock nut is tightened to 60 ft lb, there may still be some resistance when the boot is moved towards and away from the disc. As long as the boot pivots without significant force, we have found after a few acres it will pivot freely. If the boot cannot be moved sideways, even with force, either the holes are not drilled parallel, or the shoulders around the holes were not smoothed off well enough.

Any questions please contact us !
(contact info on the top of the 1st page)

Trouble-Shooting Drilling 90 Series John Deere Extended Wear Seed Boots

NEEDHAM Ag Technologies, LLC.

When we received support regarding drilling out 90 series extended wear seed boots, these are the most common questions and our responses.

1) I broke the carbide tip off the Relton 0.635" drill bit you supplied.

This can happen if the seed boot is not held tight within the drill press and its often a result of vibration, which breaks the carbide tip. If you can't hold the seed boot tight, then you will have to find a heavier drill press, heavier vice or make a stronger fixture. Carbide tip breakage may also be caused by a worn chuck within the drill press. To determine if this is the case, extend the drill bit downwards and try to wiggle the tip. If the tip of the drill bit wiggles side to side, this is likely causing the tip damage and a heavier/tighter drill press will have to be used.

2) While drilling the seed boot, the tip fell out of the Relton 0.635" carbide tipped drill bit you supplied.

If the carbide tipped drill bit gets too hot, the brazing which holds the tip in place can melt, causing the tip to fall out. In most examples when this happens, we have found either the RPM is too fast and/or too much down pressure is being applied. Either reduce the down pressure or drop the RPM down to around 500. Keeping the cutting tip sharp also helps keep the heat down, so every +/- 6 boots touch up the carbide tip on a grinding wheel (see page 4).

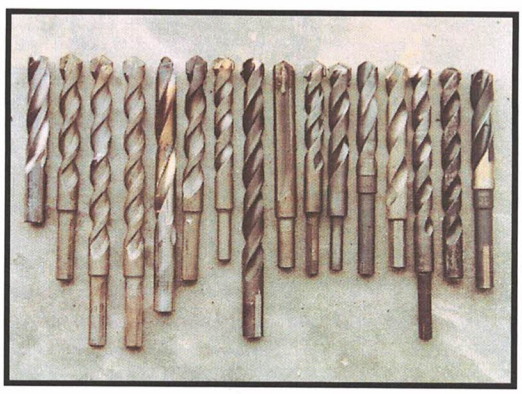
3) How many RPM should I use with your Relton 0.635" carbide tipped drill bit?

We have experimented with different speeds when drilling extended wear John Deere seed boots and we have found that around 500 RPM is the best compromise between quick drilling and the longest drill bit life.

4) Should I use a cutting oil or coolant when drilling the extended wear seed boots with the Relton 0.635" carbide tipped drill bits?

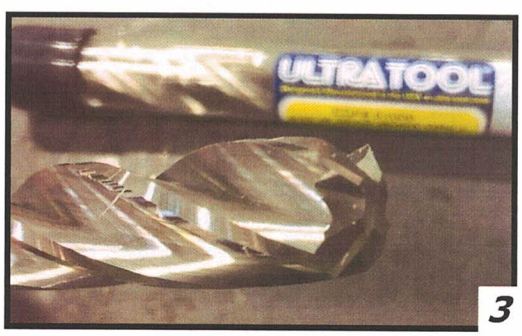
When drilling the extended wear seed boots with the carbide tipped drill bits, we don't recommend any cutting oils or coolants. Coolants and cutting oils will prevent the material reaching the temperature at which it becomes softer and easier to drill.

5) Why did you send me drill bits that look like masonry bits?



Since the introduction of our seed boot bushing kits, we have tested at least 16 different types and brands of 0.635" drill bits, which were recommended by machine shops, farmers and manufacturer representatives. Based on extensive testing across many locations, we found the solid carbide drill bits are the best for drilling extended wear seed boots (see number 6, below) however, they are also quite expensive. So, for smaller numbers of seed boots we recommend the Relton 0.635" carbide tipped drill bits. If your drilling higher numbers of extended wear seed boots, then the solid carbide drill bits (discussed below) become the most cost effective as long as you have a heavy drill press or mill.

6) Solid Carbide 0.635" Drill Bits

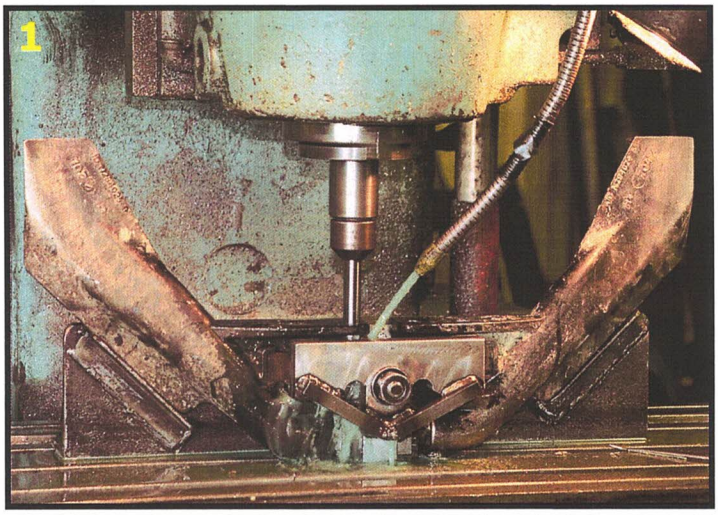


The 4 flute 0.635" x 7" long solid carbide drill bits are custom made for Needham Ag by Ultra-Tool. Development of these drill bits has been based on at least 10 years of extensive testing and experience within numerous extended wear seed boots. These 4 flute drill bits should ideally be operated at a speed of **around 200 RPM, with water based lubrication, or cutting oil**. Be careful with these drill bits however, as the solid carbide material is fragile **and any vibration can cause the cutting teeth to break or become dull. Therefore its critical to hold the seed boots tight.** The cutting teeth of the drill bit can be sharpened and more information is contained on the bottom of the page 4.

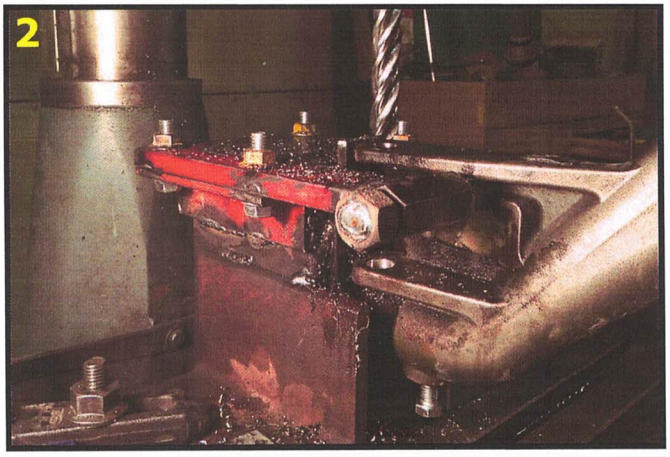
7) Why does the drill bit you supplied drill a bigger hole than the bushing?

The Needham Ag seed boot bushings measure around 0.625" in diameter. Both the 0.635" Relton carbide tipped drill bits and the UltraTool solid carbide drill bits drill holes around 0.635" in diameter (around 10/1000" bigger than the bushings). This is intentional because prototype seed boot bushings had holes drilled to 0.625" and if dust entered the space around the bushings, some of the boots locked up tight. When we increased the hole size to around 0.635" it allowed any dust entering the space around the bushings dust to exit, and it eliminated the locking up problems without significantly increasing the up/down travel of the seed boot. This is accomplished by greatly increasing the distance between the seed boot pivot points, compared to the factory boot mounting configuration and this leverage helps eliminate the up/down play long term.

8) How can I make a fixture to hold the seed boots when I'm drilling 48, 64 or 96 of them?



There are many different methods of holding the seed boots tight within a heavy drill press or milling machine. The machine shop closest to our location has drilled out thousands of extended wear seed boots and they have it down to a fine art. They use a heavy mill and our solid carbide drill bit and their setup is illustrated right in image 1. They mount a RH and LH boot in a custom fixture using a single bolt and nut in the center which securely holds both seed boots in place. They use water based lubricant and turn our solid carbide drill bit around 200 RPM, with a power feed system which drills down around 1/2" per minute. Once they complete drilling the first boot, they can side shift over and drill the second seed boot, before removing both boots and starting over.

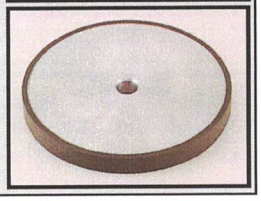


Another good fixture design was sent in from a grower in Montana and it is shown to the right in image 2. This fixture utilized a custom clamp which holds a single boot in place. In addition to the clamp, he utilized the top threaded section of the seed boot (the one which holds the seed tube in place), to secure the boot around a solid round piece of steel, to stop it twisting. To swap sides for drilling RH and LH boots, the 4 bolts holding the red fixture down are removed and the plate can be turned upside down. This grower turned our drill bit around 200 RPM and lubricated the drill bit regularly with an oil can.

Image 3 to the right illustrates a milling machine used in in Kentucky to drill extended wear seed boots. In this example they built a clamp which holds both sides of the seed boot tight and turned our solid carbide drill bit at around 200 RPM. They didn't have a lubrication system, so they oiled the drill bit regularly with an oil can as shown.

9) What stone will sharpen a carbide tipped drill bit or solid carbide drill bit?

Most farmers use a fine green silicon carbide grinding wheel, (illustrated right) to touch up the cutting teeth. As long as they are smooth and dressed, they can do a good job.



The best option is a diamond grinding wheel (illustrated right). Diamond wheels are more expensive, but they make a smoother cut, which helps keep the bit sharper for longer.