

Some of the causes for which the wire can break during winding are described below, and recommendations to avoid these breaks:

1. WIRE LOOPS FROM THE SPOOL TO TONEWINDER:

If unwanted wire loops are generated at the exit of the spool where the wire is stored, when they reach the wire retention points (felts), an increase in wire retention in the felts may occur, depending on the winding tension, which can cause unwanted wire breakage.



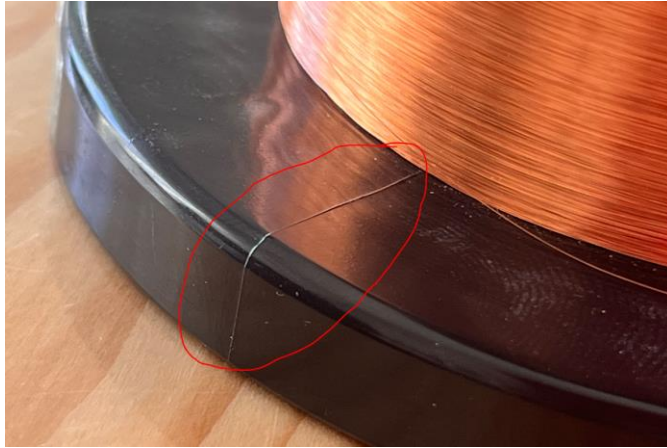
These loops are often caused by a misguided line (line completely loose) from the spool to the Tonewinder. In this case, it is recommended to try to guide the wire from the exit of the spool to the winder (for example, with the use of an inverted funnel and a tube). In unusual occasions, due to the manufacturing process, the wire is twisted on the spool, in such a way that when it is released, it only twists on its axis, inevitably generating these loops.



The recommendation, in case the generation of these loops cannot be avoided, is to reduce the winding speed (for example, if it breaks at 800 rpm, try 400 or 500 rpm), and reduce the wire tension, loosening the tension screw.

2. IMPERFECTIONS ON THE SPOOL OF WIRE:

On some occasions, the spools where the wire is stored, being manufactured by injection, small burrs are generated on the edges of the spool.



These burrs, due to the small diameter of the wire and the speed at which it circulates at the exit of the reel, erode the wire, possibly cutting it completely, or causing it to get caught there, generating a high tension, which causes it to seize break.

A good practice is, when starting to work with a new spool, to check the edges of the spool, removing any imperfections with a sandpaper or abrasive file.

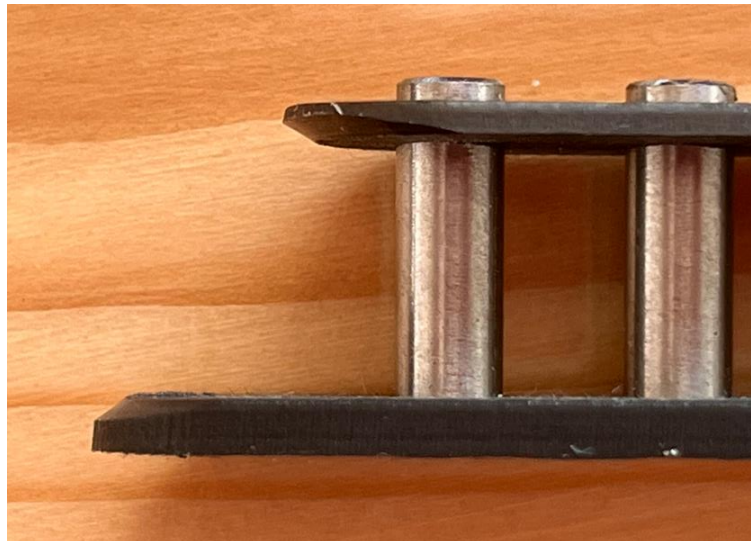


3. USE COILS WITH SHARP EDGES:

Normally, the bases that are used to make pickups, generally singles (stratocaster, telecaster, P90, etc.) are usually made of vulcanized cardboard, which is cut with a laser, although sometimes you can find bases made with fiberglass. In both cases, attention must be paid to the inside edges of the pickup, where the wire will come into contact with it, during winding, to avoid sharp edges on these bases that could damage or break the wire during winding.



Some suppliers already supply these chamfered parts to avoid this problem.



The recommendation is to check the coil before winding it and remove this sharp edge using sandpaper or an abrasive file. Likewise, if there are other imperfections, for example, in the screw holes, that may affect the coil, they must be removed.

4. USE BOBBINS WITH PROTRUDING EYELETS:

If coils with pre-inserted metal eyelets are used, check them to verify that they do not protrude into the interior of the coil, since the thread can get caught there, generating turns outside the contour of the pickup, or cutting it.

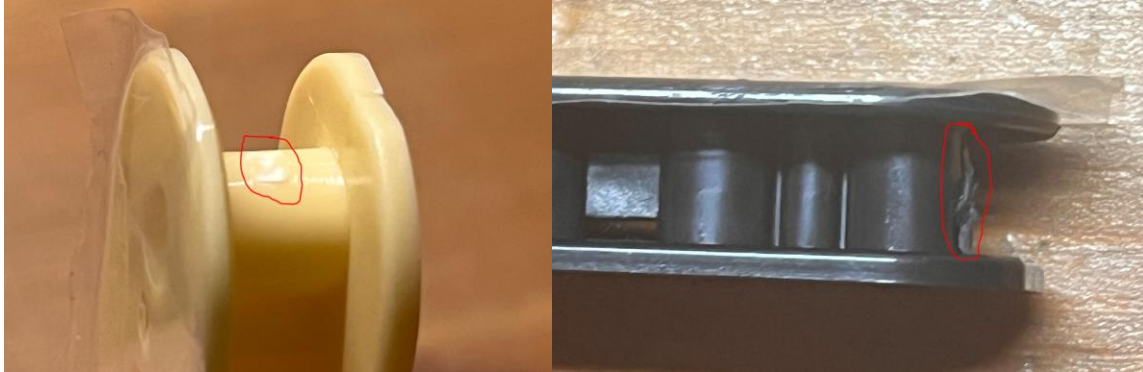


It is advisable to remove the excess eyelets towards the inside of the pad with a file, and check that there is no burr that could damage the thread.



5. USE COILS WITH BURRS:

If coils made of plastic materials are used (for example humbucker coils), they are usually manufactured by injection processes, which can generate small burrs at the joint of the molds. These burrs can damage or cut the wire during winding.



It is recommended to check the inside of these coils before use them, removing any imperfections or burrs using sandpaper or an abrasive file.

6. PRESENCE OF GLUE/TAPE ON WIRE SPOOL:

Sometimes thread manufacturers fix the end of the wire to the body of the spool (wound wire) by using an adhesive tape, which leaves traces of glue on many of the turns of thread on the spool:



The problem with this glue is that, when the section of wire that is attached to it reaches the thread holding felts in Tonewinder, an extra grip is generated in it that makes the wire tension rise very quickly, breaking it instantly.

To avoid this problem, you can try to clean the area of the spool where the glue is with a cloth soaked in lubricating oil (3in1 or similar). If the problem cannot be solved in this way, the necessary turns of wire must be removed from the spool until the traces of glue on the thread disappear.

7. HIGH TENSION DURING WINDING:

Due to the fact that the coils of the pickups have an elongated shape, the tension of the thread is not uniform during a whole turn of the wire to it, generating maximum and minimum tensions. Tonewinder averages these measurements, and it is the value displayed on the screen during winding. The breaking tension of the wire depends fundamentally on the material of the wire (usually copper) and its section. The theoretical breaking stresses of the most commonly used copper wires are:

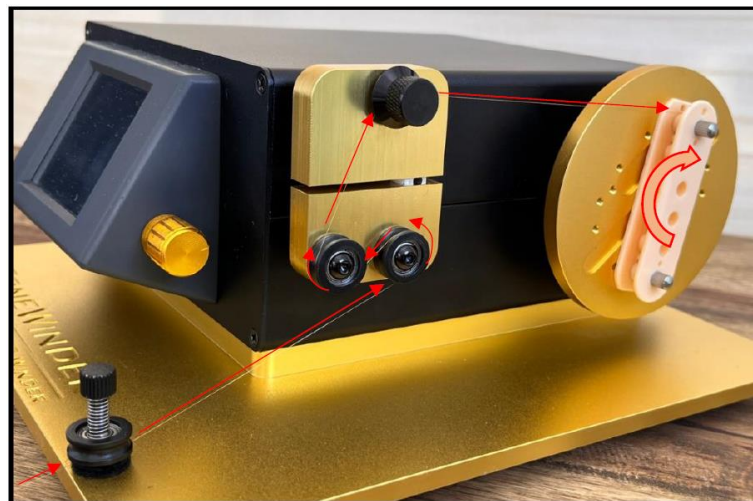
AWG	41 AWG	42 AWG	43 AWG	44 AWG	45 AWG	46 AWG
Diameter (µm)	71 µm	63 µm	56 µm	50 µm	45 µm	40 µm
Diameter (mm)	0,071 mm	0,063 mm	0,056 mm	0,05 mm	0,045 mm	0,04 mm
Diameter (m)	0,000071 m	0,000063 m	0,000056 m	0,00005 m	0,000045 m	0,00004 m
Area (m2)	3,96E-09 m2	3,12E-09 m2	2,46E-09 m2	1,96E-09 m2	1,59E-09 m2	1,26E-09 m2
Young Modulus (N/mm2)	1,2E+11 N/m2	1,2E+11 N/m2	1,2E+11 N/m2	1,2E+11 N/m2	1,2E+11 N/m2	1,2E+11 N/m2
Elastic Limit (N)	475,1 N	374,1 N	295,6 N	235,6 N	190,9 N	150,8 N
Elastic Limit (gr)	47,5 gr	37,4 gr	29,6 gr	23,6 gr	19,1 gr	15,1 gr
Break Limit (+15%) (gr)	54,6 gr	43,0 gr	34,0 gr	27,1 gr	21,9 gr	17,3 gr
Equivalent SWG	45 SWG	46 SWG	46 SWG	47 SWG	- SWG	48 SWG
Inches	0,0028 inches	0,0025 inches	0,0022 inches	0,002 inches	0,0018 inches	0,0016 inches

For an optimal compactness of the wire, it is recommended to wind the tablet around 50% of the breaking tension of the wire. If the tension is increased more, over-tension problems begin to be generated in the wings of the coil, which can cause them to deform.

If it is decided to work close to the breaking point, due to this variation, the wire may break. In which case the recommendation is to decrease the winding tension.

8. INCORRECT POSITION OF THE wire:

For Tonewinder to function correctly, it is recommended to position the wire in accordance with the provisions of section “6.4.2.- Adjust the position of the wire” of the operation manual. The summary scheme for the placement of the thread is this:



Any other arrangement of the wire in Tonewinder can cause breakage problems during winding.

9. THE WIRE CATCHES SOMEWHERE BETWEEN THE WIRE SPOOL AND THE TONEWINDER:

Before starting to wind a pickup, check that there is no element between the wire spool (usually located on the floor) and the Tonewinder, such as knobs or drawer handles, etc.

If the thread gets caught in these elements, the wire will break.

10. THE SPOOL OF WIRE IS ENDING UP AND THE WIRE DOES NOT FLOW EASILY:

On some occasions, when using a spool of wire that is running out, the wire may not flow easily, so it can generate an over-tension in it, causing it to break.

In this case, it is recommended to reduce the winding speed and/or wire tension, in order to make full use of the wire on that spool.

11. CONTAMINATION OF PULLEYS AND/OR FELTS:

On rare occasions, if the wire that is being used is very old or of poor quality, the insulating material that covers the wire can become rubbery and ductile, and it can contaminate the road where it travels, generating an increase in adhesion of the wire to the surfaces. guiding elements (pulleys and felts), which cause the tension measurement to increase considerably, until the wire breaks. One cause of this is that the wire tension increases by itself, without actuating the tension screw, or when it is completely loose.

In this case, it is recommended to stop using this wire and clean the pulleys with a cotton swab soaked in lubricating oil (3 in 1 or similar), until any remaining lacquer remains are removed. If with this, you still have problems, it is recommended to replace the felts with new ones. These would be the areas to clean:

