

WIRE GAUGE PARAMETER:

The required value for Wire Gauge is, ideally, the total diameter of the sum of diameters of the wire itself and the isolation thickness in microns.

The first difficulty we normally face is that we get the value of the wire thickness, so the metal (cooper, silver, aluminum), but this value has not included the thickness of the isolation coating, so we may have to guess what the isolation thickness is. Normally 10% to 15% increment.

Then we have to deal also with the different units used to describe wire thickness, even though the most common standard when we are talking about guitar pickups is **AWG** (American Wire Gauge), but we can also find SWG (Standard Wire Gauge) or the value of the diameter itself in millimeters or inches. (See tables below).



Label of a “brocott” spool 0,063 mm that is AWG 42

So we recommend to check the manufacturer wire description, choose the **Diameter** value in **microns** from the tables, add the estimated (or given) value for the isolation thickness (i.e AWG 42 , 63µm plus 10% would be **69 µm**)

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

When we set the correct diameter value plus the isolation, we will get a bobbin with a precise wire disposition. See below an example of an AWG 42 (0,063mm) wire where we have estimated the isolation thickness as 10% so we have set the Wire Gauge value as 69 μm , (filling rate is 100% as we do not care about sound here, but just testing the winding performance).

The wire is perfectly seated in the bobbin:



If we just type in Wire Gauge the value of the wire thickness without the isolation as we did in the example below, we will get overlapping of the wire every now and then.



Another example of first layer winding with 20% of filling factor:

