

Antenna Wire


Serge Stroobandt, ON4AA

Copyright 2002–2019, licensed under [Creative Commons BY-NC-SA](#)

Wire myths

There happens to be a lot of fuss out there about antenna wire. Most amateur radio shops sell “*special*” antenna wire at unreasonably high price, whilst most of the claims made about these wires are untrue. The situation reminds me a bit of the many loudspeaker cable myths. However, for those living in Europe, a less expensive and even better alternative exists.

What I use

 For all my wire antenna projects I always use extremely flexible and comparatively cheap black-coloured 4mm²-sized [tinned HO7 V-K 4 wire](#). As a comparison, 4mm² corresponds to about [AWG 11](#). *HO7 V-K 4* is the European harmonisation code for this wire. Rather unfortunately, this harmonisation code did not foresee a means of specifying the property of being *tinned*. So, [make sure to specify *tinned* when ordering this wire!](#) In Belgium, the country of its original manufacturer, tinned HO7 V-K 4 is more commonly known as [“VOBst 4 carré.”](#)

Tinned HO7 V-K x specs

[Tinned HO7 V-K 4](#) is a 4mm² wire made out of 51 tinned-copper braided strands and insulated with a 0.8mm thick layer of soft PVC. Tinned HO7 V-K wire is also available in other cross-sections, the last figure in the wire code indicating the conductor area in mm². Table 1 lists all available wire sizes. However, at least for permanent installations, I would stick to the 4mm² size. Keep in mind that at radio frequencies the skin effect greatly reduces the current carrying capacity of any wire. Additional benefits of this wire gauge are its greater breaking strength and a slightly broader VSWR bandwidth.

- [HO7 V-K spec sheet](#)
- [VOBst spec sheet](#)

Table 1: Tinned HO7 V-K x dimensions

$x = A_{\text{conductor}}$	$\varnothing_{\text{conductor}}$	$t_{\text{insulation}}$	$\varnothing_{\text{total}}$
1.5 mm ²	1.38 mm	0.7 mm	2.08 mm
2.5 mm ²	1.78 mm	0.8 mm	2.58 mm
4 mm ²	2.26 mm	0.8 mm	3.06 mm
6 mm ²	2.76 mm	0.8 mm	3.56 mm

The tinned-copper braided strands are what make the wire so extremely flexible. The tin around each of the copper strands makes soldering the wire a breeze and, moreover, prevents the copper from oxidizing, especially in salty coastal environments. After all, VOBst wire is designed for use in bathrooms and on board of ships. Nevertheless, I always make sure to cap the wire ends with a dot of solder and clear glue to prevent moisture from entering through capillary action. It is better to be safe than sorry!

Modelling PVC insulation

The 0.8mm thick black-coloured soft polyvinyl chloride (soft-PVC) insulating sheet is perfectly UV-resistant; it will withstand exposure to sun rays. For those who would like to model wire antennas with NEC, the only data I have found for the relative permittivity ϵ_r of soft PVC is the wide range of 4.0 to 8.0.¹ The [4nec2 internal manual](#) mentions a range of 4.0 to 5.0 for soft-PVC without quoting any reference. The actual value for a particular sample will depend on the amount of softener used in it; more softener will result in a higher permittivity. However, a value of $\epsilon_r = 5$ would be a plausible estimate for most PVC-insulated wires.

Most of NEC-2-based antenna modelling programs (e.g. [4nec2](#) and [EZNEC](#)) will model insulated wires. Please, refer to their respective user manuals for more information. L. B. Cebik, W4RNL (SK), also wrote about [modelling insulated wires with NEC-2](#).

Leave some sag!

I have been operating my antennas for many years now without any issues despite some severe weather, salt and strain exposure. Of course, be sure to leave some sag when hanging up wire antennas.

Electrical supply store

I am not selling this wire! If you are living in Europe, the good news is this wire can be ordered from your local electrical supply store. It is normally deliverable without much delay. To give you an indication of its price; in November 2006, I bought from a wholesaler 100m VOBst 4mm² for €66.33 (incl. VAT) and 100m of the lighter 2.5mm² VOBst for €40.35 (incl. VAT).

References

1. The American Radio Relay League, Inc. The ARRL handbook for radio amateurs. In: 69th ed.; 1992:35-34. <http://www.arrl.org/shop/>



This work is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-nc-sa/4.0/).

Other licensing available on request.

Unattended CSS typesetting with . The Prince logo features the word 'Prince' in a stylized purple font with 'Print with CSS' written in smaller text above it.

This work is published at <https://hamwaves.com/wire/en/>.

Last update: Monday, March 1, 2021.