

Technical analysis of the Bayco product used for guy ropes for Amateur Radio antennas, based on data provided by the manufacturer.

Bayco monofilament is produced by [www.Perlon.com](http://www.Perlon.com) and presented (<https://www.perlon.com/wp-content/uploads/2019/01/PDF-Bayco-Folder-EN.pdf>) for use in agriculture, breeding and greenhouses for flowers and vegetables. The monofilament is produced in various diameters and the XV 500 type is black in color and suitable for long exposure to UV rays. As correctly indicated by the manufacturer, Bayco is a polyamide, that is, a Nylon, excellent due to its characteristics for use in agriculture, as the manufacturer claims and advertises.

What will be analyzed in this data sheet is instead the improper use of Bayco for guy ropes towers, poles and other supports for antennas, mainly in the field of radio amateurs antennas.

Premise: poles, pylons or towers in general (supports) are 95% guyed in several points and support at their top one or more floors of rotating antennas with an exposure to the wind from about 1/2 to 3 or more m<sup>2</sup>. The system seen as a whole, antennas support, antennas and accessories, such as pointing rotors, must have a minimum of elasticity to absorb part of the energy created by strong gusts of wind, but at the same time, the elasticity of the support must not exceed some limits, even of common sense, which would lead to the breakage and collapse of the support and therefore of the system. It should also be noted that, for purely technical reasons, the guy ropes must be of insulating material.

Common sense and experience, in the field of specialized companies, even the deduction from certain data present on specifications concerning antenna systems for radio amateurs, but not only, also from specifications of large military HF systems, tell us that guy ropes in insulating material must have an **elasticity** between about **6 and 9%** (referring to the maximum breaking load of the insulating rope).

As early analysis, in order to identify the suitable material for this purpose, we examine a general graph that identifies the percentage of progressive extension, up to 100% of the load applied to the insulating ropes, Fig. 1. ( see "The rope selection guide 09", Marlow )

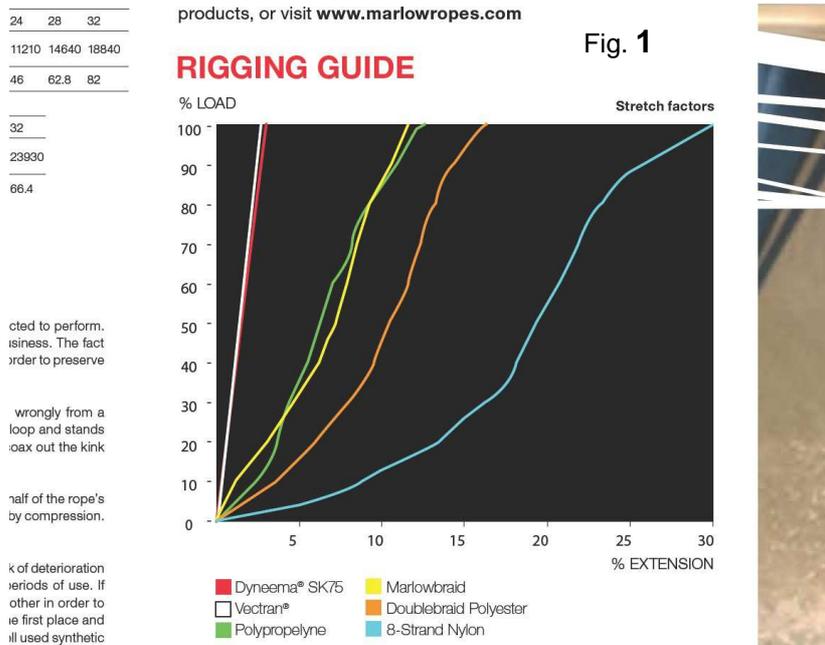


Fig. 1

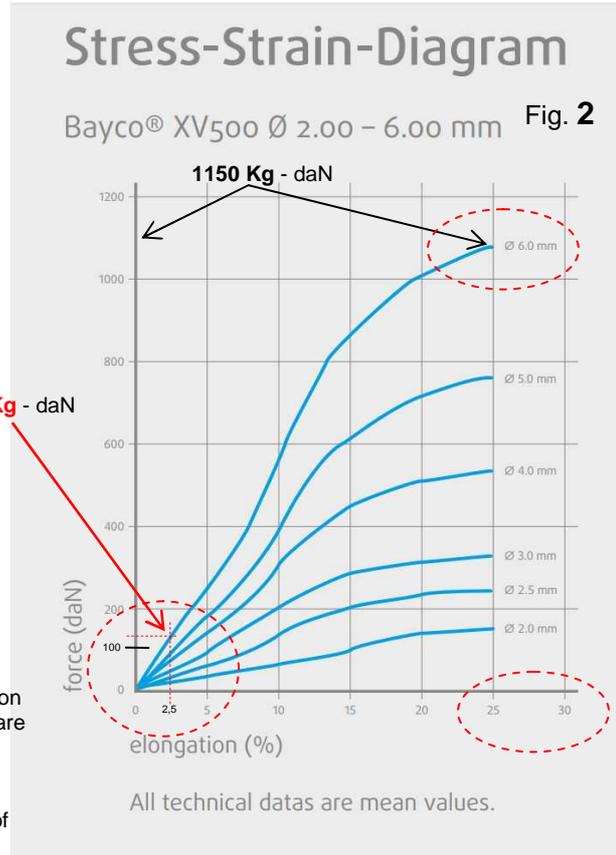


Fig. 2

Figure 1 highlights the **strong percentage of extension** of Nylon at 100% of the applied load, that is, **extension of 30% !!!!!** (blu line). We also notice the extremely low percentage of extension of Dyneema and Vectran, also similar to Kevlar 29 and 49. The polyester and two more fibers are positioned around 10% of extension with respect to the maximum breaking load of the ropes. The Nylon diagram is also confirmed by the Bayco manufacturer on the product data sheet, <https://www.perlon.com/wp-content/uploads/2019/01/PDF-Bayco-Folder-EN.pdf>, in Fig. 2 we have a zoom in of the declared graph, in which we see the 6 mm Bayco with a breaking load of 1150 Kg (1150 daN), widely used for cable-stayed radio amateur antenna systems.

Taking a practical example, on a guy rope about 10 m long, length necessary for 7-8 meters high supports, we have an elongation of **2.5 meters(!)** at the breaking load of 1150 kg, according to what the Bayco manufacturer claims. If such an elongation occurred, the support with all the antennas would have **broken and collapsed**. So the technique and, above all common sense, tell us to find a suitable point useful to maintain elasticity, **but in total safety**. Basically it is necessary to go down between 0 and 200 Kg (200 daN), practically around 130 Kg (130 daN), in fact around 130 Kg **the manufacturer declares an elongation percentage of 2.5%**.

This, referring to the previous example, of a guy rope length of 10m, entails an elongation of 25 cm (against **2.5 meters (!)** considering a load of 1150Kg), i.e. essentially if a wind, insisting on the entire antenna system, as a whole produces a pressure, a thrust, at the fixing point of the Bayco to the support, of 130 Kg (130 daN), the Bayco would extend by 25 cm and allow the support and the whole antenna system to move from its own axis of 25 cm. Displacement that could be acceptable **even if still too high**, referring to the height of the hypothesized support, i.e. 7-8 meters.

So to **start talking about safety** on the use of Bayco, we must start around a consideration of 130 Kg of project data (**therefore not 1150 Kg**), to also consider the problem of fixing, the passage on a thimble and the use clamps (n ° 3) or suitable sleeves (pressed only with suitable pliers) **further reduce** the capacity by 20 or 30% and this on any type of steel or insulating cable.

In conclusion, the Bayco, a 6 mm diameter monofilament, used for guy ropes antenna systems, is **ABSOLUTELY NOT TO BE USED** with loads, foreseen on the whole antenna system, greater than about **90-100 Kg (90 - 100 daN)**, **therefore not 1150 Kg (1150 daN)**. **Furthermore**, the monofilament must be put in a minimum pretension of 20% with respect to the maximum load foreseen in the project, therefore pretension of 18-20 kg.

Rif. Tec/20/S	Qty. 0	Name,Code, Technical analysis			Materiale PA6	Art.Mod.
 Florence Italy WWW.ANTENNA.IT		Progettato da: BC	Controllato da: GV	Approvato da: MS	Scala: NO	Tolleranze: NO
		11/2020	12/2020	12/2020	Quote: NO	
	Titolo: TECHNICAL ANALYSIS ON BLACK NYLON POLYAMIDE MONOFILAMENT, UV RESISTANT, external diameter Ø 6					
WWW.ANTENNA.IT		<b>DRAWING N°: 2236</b>	Modifica: Rev. 1.0 Data: 26/12/2020		Foglio n°: 1	