

## DROOPY THE WONDER BEAGLE

Whoops, wrong title....although, Droopy was a great dog and is a very missed friend.

The HCP7197 starter clutch drive chain (used on all XJ650-900 engines) is also known as the “primary drive chain”, and is a rugged, high-speed “silent chain”, known by the Borg-Warner brand name “Hy-Vo” in these Yamaha engine applications:

<http://chain-guide.com/applications/1-6-3-inverted-tooth-chain.html>

By the way, HY-VO stands for “High Capacity, High Velocity, and Involute Tooth”, and if you’re bored and want to be dazzled, perplexed, and confused more than you thought was humanly possible, look up the definition of “involute” sometime.....

But I digress.

Although it’s a sturdy, durable beast, it can wear (although it will rarely break .... but if it does, you and your engine will experience a Very Bad Day™) .... and an excessively worn chain can cause a multitude of problems, not limited to chain guide wear (and eventual guide failure, which requires engine splitting to remedy), and excess wear will also cause the chain to “slap” at and “chew away” at the primary chain oil spray nozzle, eventually causing failure of that lubrication supply for the chain, and thus eventual chain wear and failure.

Unfortunately, Yamaha doesn’t give any wear specifications for this important component, merely advising that it should be “checked for wear” and replaced if necessary. So how is one to know if replacement is “necessary”?

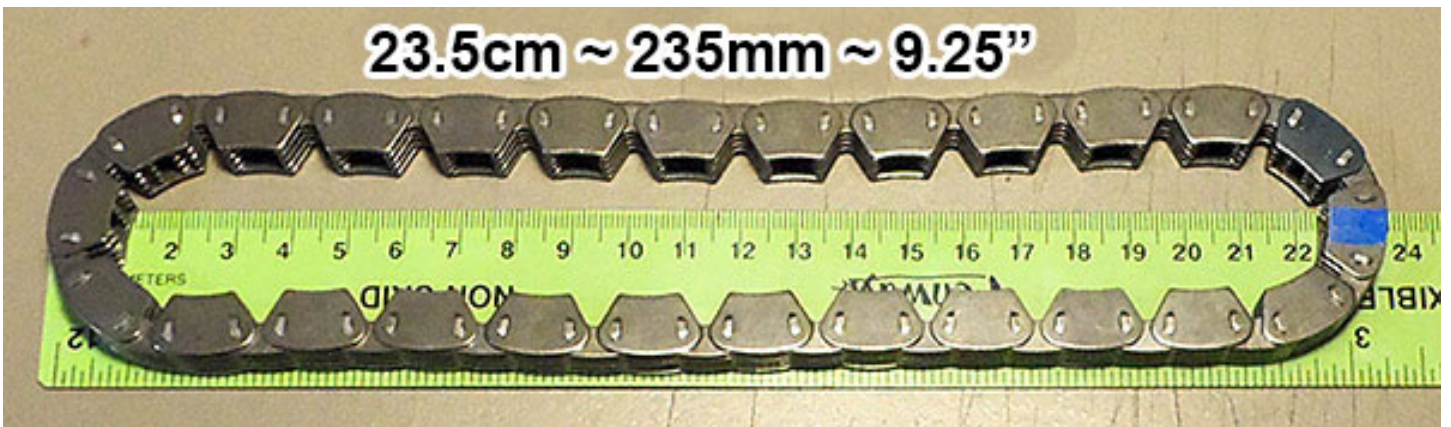
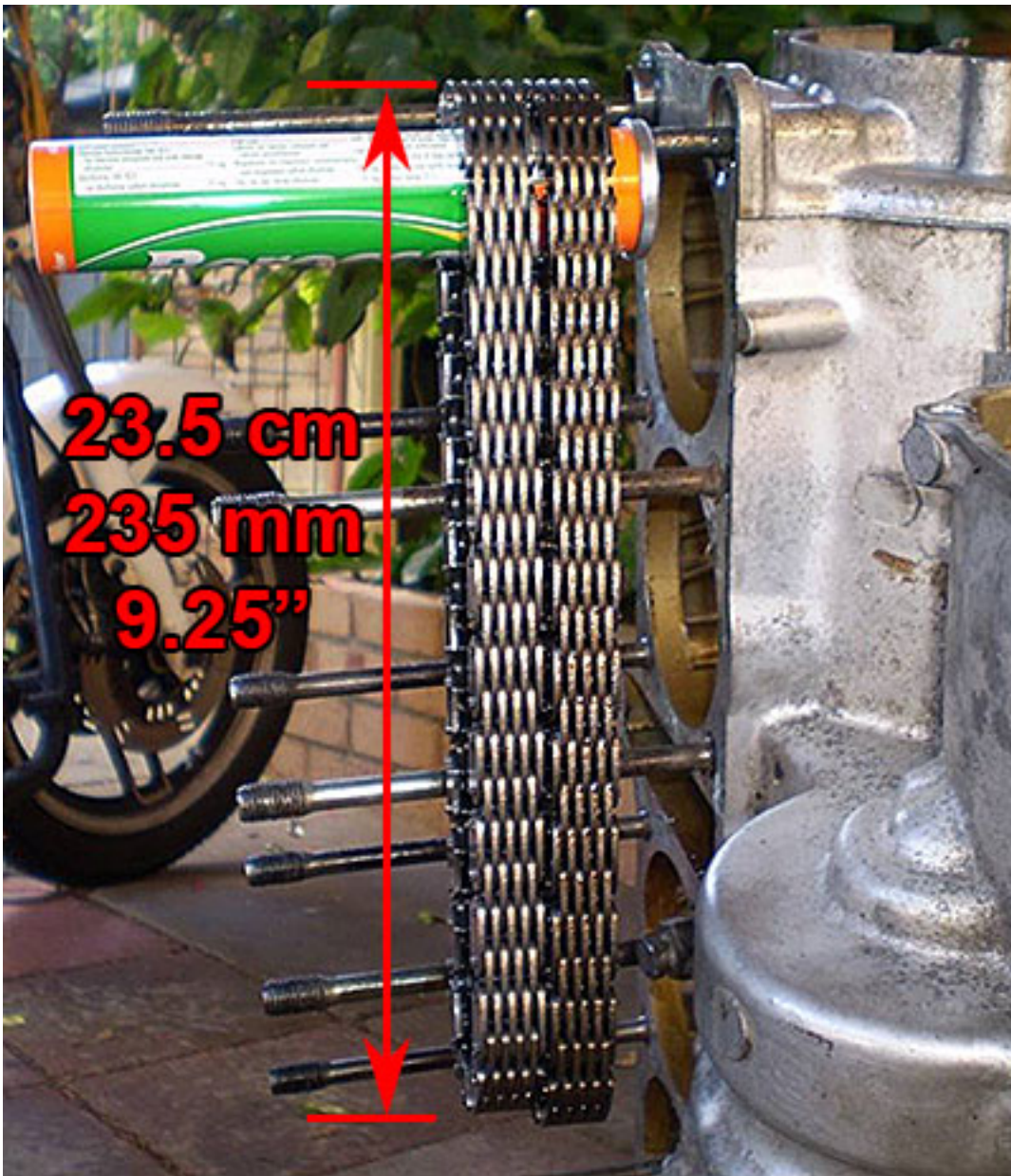
Good question. And although we don’t have any wear specifications or tolerances, either, what we can show you is what an NEW chain looks like, and give you some measurements to compare your used chain against, to assist you in reaching a re-use or replace decision.

Chain wear is primarily determined by **STRETCH** and **DROOP (sag)**.

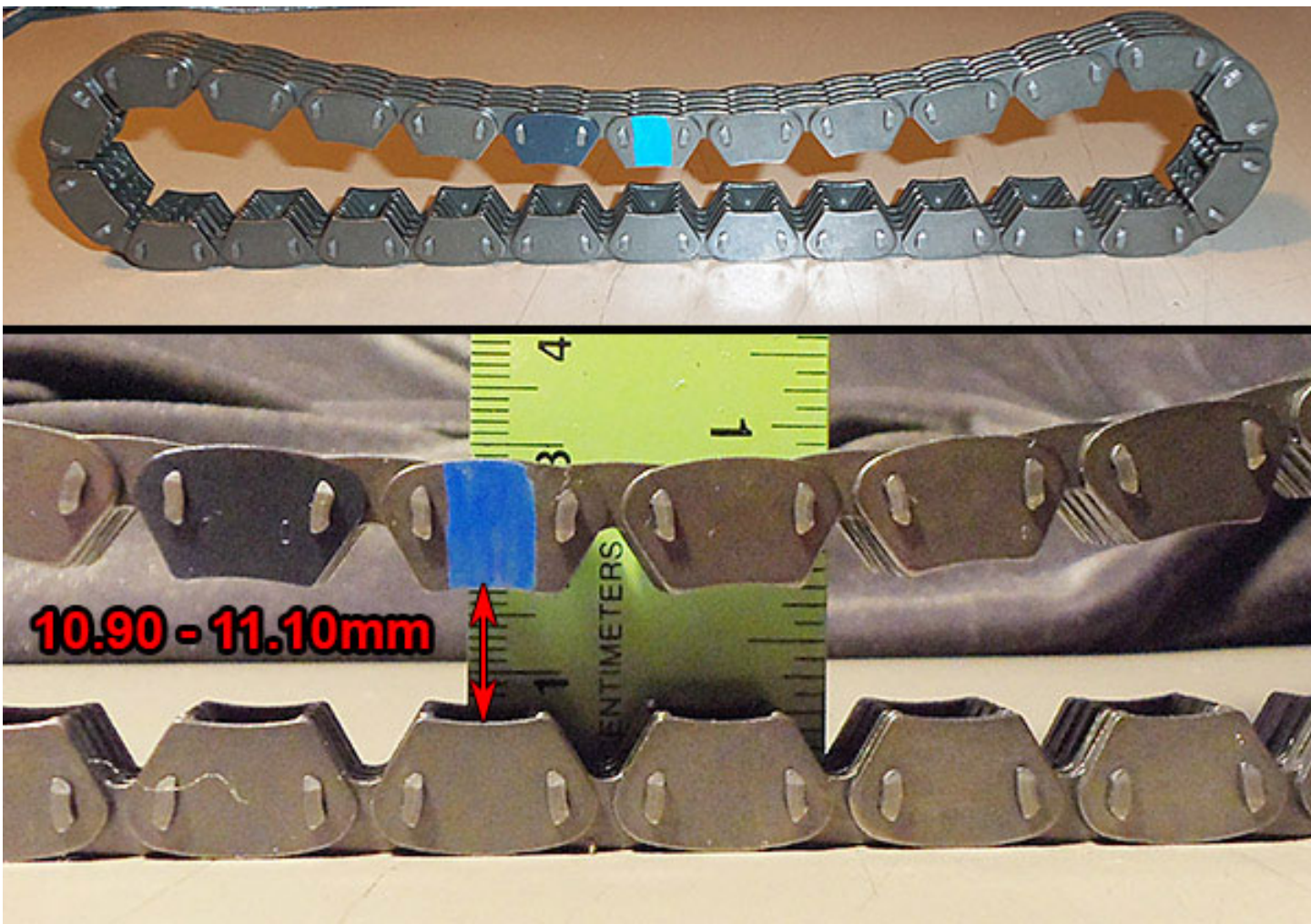
How much is too much stretch or droop/sag? We don’t know. But I would guess that about 5-10% is a logical maximum wear limit.

Shown in the image below is a new chain (on the left) hanging next to a worn chain. A new chain has a total overall “length” (greatest measurement possible) of about 23.5cm (235mm or 9-1/4”). This measurement is taken with the chain supported, at the very top, via a standard BIC ball-point pen, or laid out flat as shown in the 2<sup>nd</sup> image below.

As the chain wears, the links stretch slightly (and/or the pins wear) and thus the overall length of the chain increases, as shown in the chain on the right.



The following set of images shows the chain **DROOP** (or “sag”) ..... note that the base of the chain is laying flat against a hard flat surface, and the chain is allowed to droop “naturally”, **without any pressure applied to the center of the chain to manually push it together** (which **CAN** be done, to the point that the links will almost touch together in the center.....but, in its new, “tight” state, this is how much it will naturally sag). The actual gap between the top of the lower, central link and the bottom of the upper, central link (with the blue mark) is about 10.90 – 11.10mm. Also note that this measurement is done at the very center point of curved link plate(s). This is a somewhat tough measurement to make, but it is what it is.....



Hopefully this gives you the information that you need to make a comparison and decision.