

Quantum Tuning Guide 2002



A reference guide to the set-up, tuning, and trim for the Beneteau First 36.7 One-Design Class

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While many companies were concentrating their efforts on "Marketing to the class" trying hard to gain acceptance without really proving their value. Quantum focused first and foremost on the development of the sail designs and their

interaction with the rig and rig tune. Quantum was invited by the Farr design team to provide consultation on the development of the sail inventory and sail sizing, this has proven to be highly beneficial allowing Quantum to be involved in the design parameters from the very start.

For the Beneteau First 36.7 we started by building a suit of test sails, built to the class rules and based upon the successful designs of the Beneteau 40.7. This allows us to better understand the sailing characteristics of the boat and the subtleties of the rig/sail interaction. The test sails provided us a great starting point for establishing a design database for the Beneteau First 36.7. This allowed us to narrow down the relationship of luff curve to broad seam shaping for the mainsail and jibs, coordinating the mainsail/mast bend characteristics with the headsail luff sag requirements.

For the down-wind sails we gained significant knowledge of the flying shapes allowing us to optimize the sails girths and girth positioning, luff length and shape profile. With this information we quickly moved toward a refined shape that provides the versatility required, from VMG reaching to broad-angle running. On a somewhat smaller note, the test sails also provide us with a convenient study of the over-all weight of each sail, which allowed us to optimize toward minimum class sail weight and maximum durability.



Our Fusion Composite System utilizes a pre-formed, pre-tensioned, and pre-impregnated scrim of Kevlar fiber developed exclusively for Quantum. The sail restrictions and limitations on additional sail purchases expressed in the Beneteau First 36.7 One-Design Class Rules places a heavy emphasis on strength and durability. Fusion has proven to be a true asset providing high strength, shape retention, lightweight, and durability.

Our approach is no doubt unique to sail making and revolves around the management of information as it flows from designers, sailors, builders, industry professionals, etc. It is so easy to lose track of progress when there are so many varying ideas and opinions. Quantum begins development in a class by assigning a key individual to oversee all aspects of the class developments internal to Quantum. This person manages the constantly flow of information and redistributes as need be. This "Class Administrator" filters all feedback from sailors and Quantum personnel as well as his own experiences from sailing in the class. He is then responsible for establishing and updating tuning guides and trimming notes as well as meeting with sail design personnel to discuss potential sail design updates. The class administrator is also responsible for establishing a Quantum web section dedicated to the class providing sailors with a wealth of current information. Quarterly E-Newsletters are distributed with race results, updated tuning tips, and discussion of current sail shapes. The goal is draw in all data, filter through the data, and extrude relevant information to be distributed among all interested parties.



For the Beneteau 36.7, Bill O'Malley has been working toward establishing a strong Quantum presence in the class. He has spent a great deal of time sailing on the Beneteau 36.7 gathering data and evaluating shapes. Bill has also established a Beneteau 36.7 One-Design Web section <http://www.quantumsails.com/products/onedesign/> as part of the Quantum One-Design web site with information on class sails and updates, race results, tuning information and The Quantum Beneteau First 36.7 Tuning Guide, Technical Tips and Articles. The site will soon incorporate a discussion forum where sailors can publicly discuss sailing issues and trade notes. Currently there are hyperlinks directly to Bill O'Malley on several relevant issues.

Beneteau 36.7 One-Design Rig Set-up

This section will help to guide you through the initial rig set-up of your new Beneteau 36.7. Proper rig set-up provides helm balance and versatility in varying wind conditions. The set-up of your rig will most likely require some adjustment from the stock setting. The following instructions and photos will explain the process of the rig set-up. Rig tuning and adjustments for wind conditions will follow in a later section.

Mast Step Location:

To help achieve the desired rake and pre-bend the mast step will need to be in its forward most position. This will place the front face of the mast roughly $9 \frac{3}{4}$ " or 250mm aft of the bulkhead. In more windy regions set the step at $10 \frac{3}{4}$ " to induce more pre-bend.



Mast Partners at the deck:

There is little or no adjustment available here. The Beneteau 36.7 has a very tight deck partner, which does not allow much adjustment.

Setting the Headstay length:

The headstay length is critical to the mast rake and pre-bend. The correct headstay length will provide sag generating depth and power in light wind and sufficient mast bend & compression in heavier winds. Measurements are taken using the Genoa Halyard set to a height even with the top of the mast "Black Band" at the gooseneck.



Swing the halyard forward and measure down to the forestay stem/shear intersection. $6' 10 \frac{5}{8}"$ or 2.10m is what your base setting should be.



Centering the Mast:

It is critical that the mast be positioned in the boat with the mast tip centered over the mast step. This is best done using a tape measure attached to the Mainsail Halyard and hoisted to the top of the mast. This method is very accurate if done in calm conditions. Measure down to the same location at the chain plates on each side. Hand-tighten the upper shrouds and then the lowers as you center the rig. Site up the rig to make sure it is straight in column.



Tuning to the Base Setting:

Now it's time to tighten down the shrouds. As a good base setting you will put 12 – 13 turns on the upper shrouds, beyond hand tight. The lower shrouds will need 6 – 8 turns beyond hand tight. And diagonals will require 4 – 5 turns beyond hand tight. This will get you into a medium wind speed base setting of 8 – 12/15 knots of true wind speed.

Rod Rigging Loos Gauge:

Using a Loos gauge designed for measuring load on rod rigging provides much more accurate and reproducible results. There are 2 sizes required for the Beneteau 36.7. The Upper shrouds utilize the RT 11 gauge while the D1 & D2 diagonals are smaller requiring the RT 10 gauge.



The Goal of Mast Tuning

Today's swept-spreader rigs are far more simple and user friendly than the spindly spars of old with their running backstays and checkstays. However this is not without some compromises. This simplified rig configuration is more dependent upon tuning and adjustment throughout the wind range. The lack of running backstays and checkstays compromises the ability to control the headstay sag especially as the breeze increases. On this rig the headstay is essentially controlled through the lower shrouds (D^1) and diagonals (D^2). The D^1 and D^2 restrict the mast bend and mast compression as the backstay load and mainsheet are applied. The more initial bend or pre-bend that is set-up in the rig the more "spring-like" the rig becomes through compression.



Quantum's approach has proven successful in many classes with similar rig configurations. Less pre-bend in the initial set-up and mast bend controlled through the diagonal shroud tension. A straight rig will not compress as easily, especially if the diagonals are tight, transferring backstay and mainsheet loads directly into headstay tension.

Deck Layout & Set-up Tips

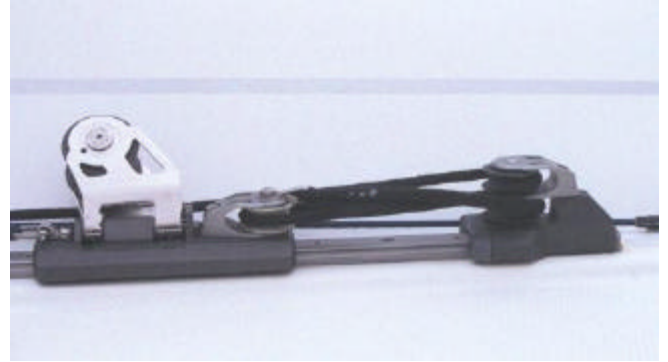


The backstay is an essential control for power, speed, and point. It needs to be played constantly and with each puff. Moving the backstay controls so that the mainsail trimmer can play it constantly is the single biggest improvement you can make to your boat.

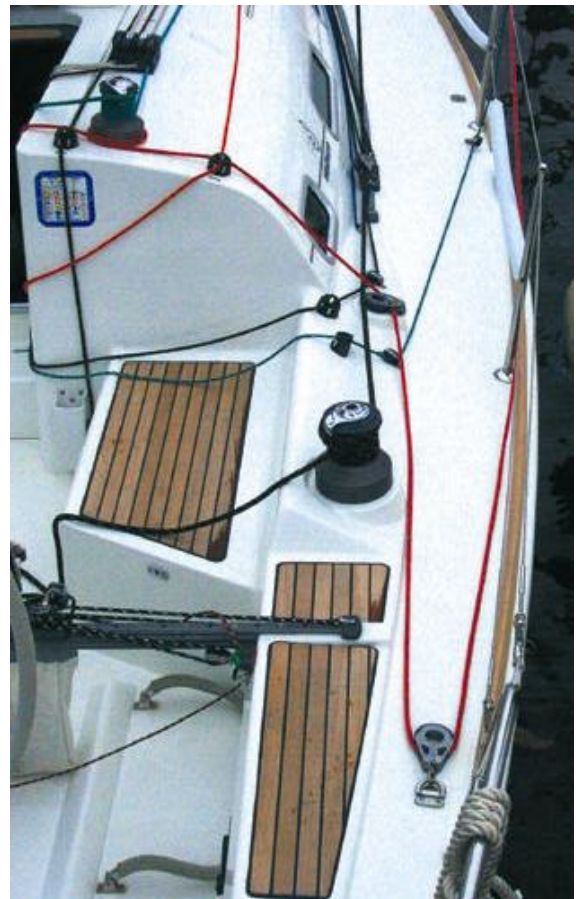


For the mainsail trimmer the standard traveler control is a bit of a rough ride. The trimmer is forced to sit with a double block in his bum; this makes for some interesting bruises. We recommend removing the double block at the end of the track and installing 2 single blocks as shown in the photo. This will please your mainsail trimmer and clean up the deck nicely, it also aids in line management. Note the backstay control line and cleat set next to the traveler.

What to do with that double traveler block you removed? Switch it with the genoa lead pullers! The lead pullers from the factory are under purchased and difficult to move under load, this simple switch will brighten the day of your jib trimmer. Now he has no reason not to trim aggressively. Note the line dead ends on the car, not the end of the track.



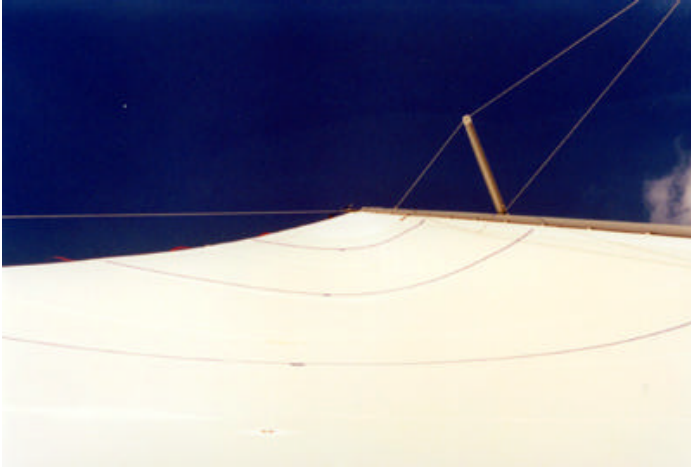
Line management is a real issue on the Beneteau 36.7. Thinking outside the factory intended sheeting arrangement helps to alleviate the mess.



We recommend not using the turning block for the genoa sheets; they will only get in the way and cause bad tacks. Use these blocks to run the spinnaker sheets forward to the cabin top winches. This helps dramatically with space in the cockpit and keeps your trimmers from becoming tangled with each other. It will also keep the sheets out of the water and put them where you can find them when you need them.

Sail Shapes and Trimming Techniques

The mainsail shape is easily controlled through outhaul, halyard tension, Cunningham and backstay. Above is a fully powered up mainsail sheet for upwind point. Note the generous depth to create a powerful shape in light to moderate winds



The very same mainsail is quickly flattened to be an ideal heavy-air shape. See how the draft remains forward with the influence of a small amount of Cunningham.



The flat exit achieved through the Quantum sail designs allows for very tight sheeting and much better upwind point without the sacrifice of speed.



Close sheeting of the genoa is essential due to the long top spreaders of this rig. Once you are at top speed trim until the sail just touches the top spreader. Note the very close rig confirmation of this sail it nearly touches each spreader and the shroud base.



Since the genoa is often pushed up in the wind range to cover 0 – 17 knots of wind it is essential to adjust the lead position and trim of the sail as the wind increases. Here you can see the effects of twist. The lead is back and the sheet eased a bit to allow the upper leech to open as the genoa is used at its open-end wind range.



The Blade Jib is designed to be very close sheeting and will trim 6" –8" inside the spreader tips.

Rig Tuning Adjustment Chart for Counting Turns

| True Wind Speed | Headstay Length | Upper Shrouds V ¹ 's | Lower Shrouds D ¹ 's | Diagonals D ² 's |
|-----------------|---|------------------------------------|------------------------------------|--------------------------------|
| 0 – 8 Knots | 2.100m | - 3 turns | - 3 turns | - 2 turns |
| 8 – 12 Knots | Base Setting (adjust shrouds by counting the number of turns off and on) | | | |
| 12 – 17 Knots | 2.085m | + 2 turns | + 3 turns | + 2 turns |
| 17 – 25 Knots | 2.075m | + 2 turns | + 3 turns | + 2 ½ turns |

The Headstay measurement is measured from the top of the “black band” at the gooseneck using the genoa halyard. The halyard is the swung forward parallel to the forestay and measured down to the intersection of the shear and the stem at the tack bail. (see previous photo)

Rig Tuning Adjustment Chart for Rod Loos Gauge

| True Wind Speed | Headstay Length | Upper Shrouds V ¹ 's (RT 11 guage) | Lower Shrouds D ¹ 's (RT 10 guage) | Diagonals D ² 's |
|-----------------|-----------------|--|--|--------------------------------|
| 0 – 8 Knots | 2.100m | 35 units | 20 units | 5 units |
| 8 – 12 Knots | 2.100m | 42 units | 35 units | 10 units |
| 12 – 17 Knots | 2.085m | 48 units | 40 units | 15 units |
| 17 – 25 Knots | 2.075m | 50 units | 45 units | 20 units |

This tuning guide is just that; a guide to helping you achieve appropriate tune & trim. It is not intended as an absolute but a mere reference tool. Boats will often vary in basic dimensions. If you are having difficulty making these settings work for your boat experiment with modified settings on call Quantum for assistance.



Beneteau First 36.7 Target Boat Speeds and Angles

| UPWIND TARGETS | | | | | DOWNWIND TARGETS | | | |
|----------------|------|------------|------|--|------------------|-----|------------|------|
| TWS | TWA | Boat Speed | Heel | | TWS | TWA | Boat Speed | Heel |
| 4 | 46.8 | 3.44 | 2.7 | | 4 | 141 | 3.18 | .5 |
| 6 | 45.0 | 4.74 | 5.8 | | 6 | 144 | 4.52 | .8 |
| 8 | 43.1 | 5.57 | 9.9 | | 8 | 147 | 5.54 | 1.1 |
| 10 | 41.8 | 6.05 | 15.6 | | 10 | 151 | 6.28 | 1.2 |
| 12 | 40.8 | 6.27 | 18.4 | | 12 | 159 | 6.58 | .9 |
| 14 | 40.0 | 6.37 | 20.3 | | 14 | 167 | 6.87 | .7 |
| 16 | 39.6 | 6.42 | 21.8 | | 16 | 169 | 7.27 | .7 |
| 20 | 40.4 | 6.49 | 22.7 | | 20 | 171 | 8.01 | 1.0 |
| 25 | 42.5 | 6.53 | 23.0 | | 25 | 169 | 9.01 | 2.2 |
| 30 | 45.6 | 6.55 | 23.4 | | 30 | 159 | 10.98 | 7.3 |

Beneteau First 36.7 Target Boat Speeds and Angles

| UPWIND TARGETS | | | | | DOWNWIND TARGETS | | | |
|----------------|------|------------|------|--|------------------|-------|------------|------|
| AWS | AWA | Boat Speed | Heel | | AWS | AWA | Boat Speed | Heel |
| 6.8 | 25.2 | 3.44 | 2.7 | | 6.8 | 88.8 | 3.18 | .5 |
| 9.9 | 25.2 | 4.74 | 5.8 | | 9.9 | 95.4 | 4.52 | .8 |
| 12.6 | 25.3 | 5.57 | 9.9 | | 12.6 | 105.4 | 5.54 | 1.1 |
| 14.9 | 25.5 | 6.05 | 15.6 | | 14.9 | 117 | 6.28 | 1.2 |
| 17.1 | 25.9 | 6.27 | 18.4 | | 17.1 | 137 | 6.58 | .9 |
| 19.1 | 26.3 | 6.37 | 20.3 | | 19.1 | 155 | 6.87 | .7 |
| 21.0 | 26.8 | 6.42 | 21.8 | | 21.0 | 161 | 7.27 | .7 |
| 24.8 | 28.8 | 6.49 | 22.7 | | 24.8 | 165 | 8.01 | 1.0 |
| 29.4 | 31.9 | 6.53 | 23.0 | | 29.4 | 163 | 9.01 | 2.2 |
| 33.8 | 35.5 | 6.55 | 23.4 | | 33.8 | 147 | 10.98 | 7.3 |