Technical Course for Coaches Level 3 – 420 & 470 Tuning and Speed Guide

World Sailing

Tuning Method: A Step-by-step Approach

Core Principles:

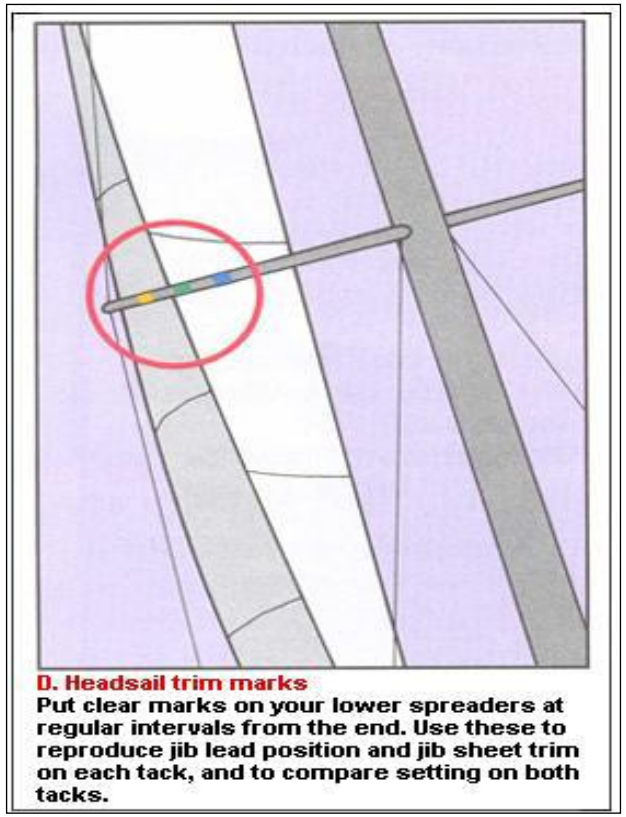
- **Use consistent tools:** Always rely on the same measuring equipment—metallic measuring tapes, rulers, and a calibrated rig tension gauge.
- **Tune in calm conditions:** Perform rig tuning in a wind-sheltered environment. Avoid tuning on windy days as it can lead to inaccurate setup.
- **Standardize crew roles:** Each crew member should follow an identical, well-defined routine during the tuning process.
- **Do not tune with the jib hoisted:** Tension readings and adjustments should always be made with the jib down.
- **Pre-mark your controls:** Add reference marks to your spars, shrouds, and control lines before each session or regatta.

Tuning Method: A Step-by-step Approach

Core Principles Continued:

- **Log everything:** Maintain a **tuning sheet** to record key data points, wind conditions, boat behaviour, and performance outcomes.
- **Check mast alignment:** Use the main halyard as a plumb line to ensure the mast is centred and upright when viewed from the stern.
- **Ensure rig symmetry:** The mast and foils should be aligned along the boat's centreline. This is critical for maintaining balanced helm and optimal boat speed.
- **Maintain precision:** Target minimum amount of variation in measurements.
- **Treat provided tuning numbers as reference points:** They offer a reliable baseline but should always be adapted to your crew weight, sail inventory, and prevailing conditions.

Tuning & Trimming Reference Marks

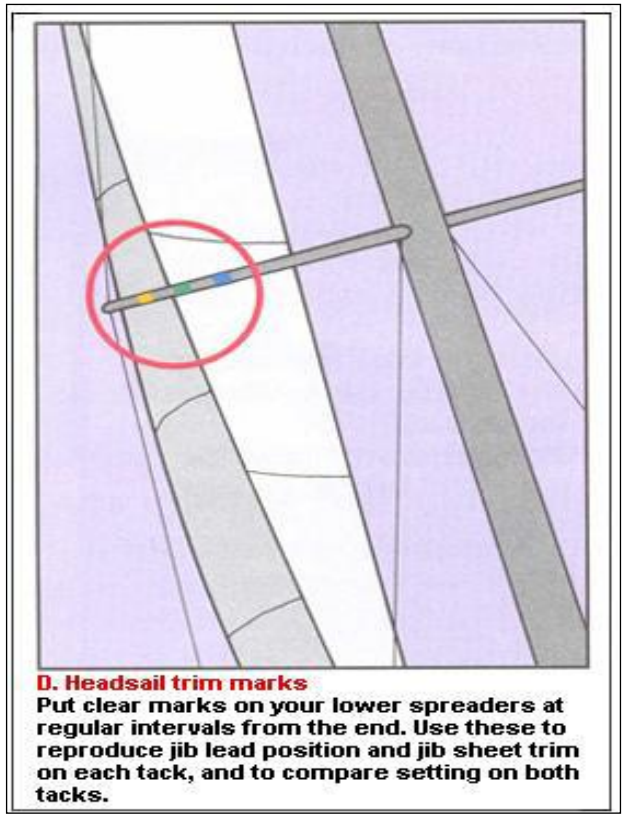


D. Headsail trim marks
Put clear marks on your lower spreaders at regular intervals from the end. Use these to reproduce jib lead position and jib sheet trim on each tack, and to compare setting on both tacks.

Key Marking Areas:

- **Spreaders:** Mark to monitor and adjust jib leech tension and position.
- **Shroud Pins:** Use numbered pin positions for consistent setup and quick rigging on the water.
- **Rig Tension & Rake:** Record standard rig tension and mast rake values at each pin setting on the mast or inside the boat.
- **Deck Marks:** Note jib foot position to track fore/aft jib lead placement.
- **Chocks:** Identify and mark the *neutral chock* position for each shroud pin setting directly on the deck.

Tuning & Trimming Reference Marks



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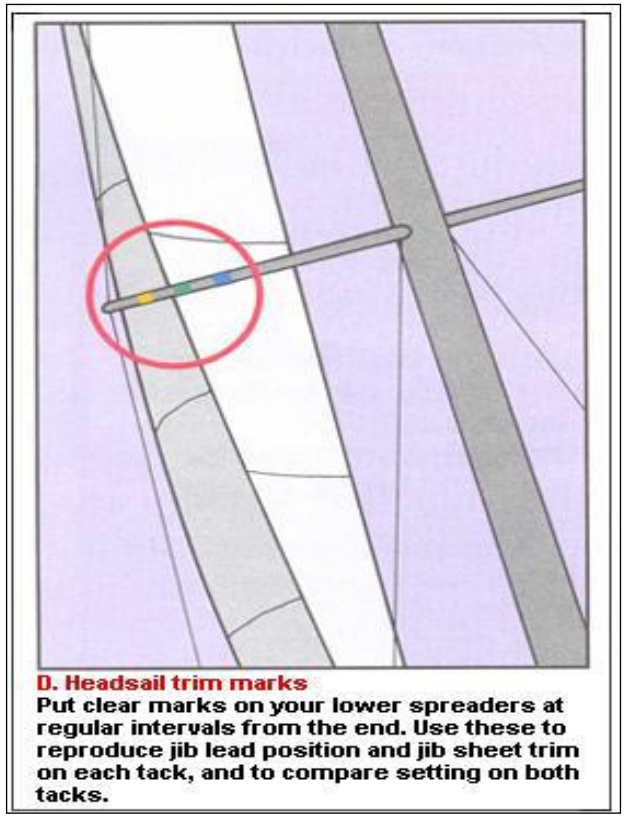
- **Jib Sheets & Side Tank:** Mark jib sheets where they align with the tank edge to measure sheet tension repeatability.
- **Jib Traveller Track:** Use reference points to fine-tune jib fullness and leech twist.
- **Boom Vang:** Apply 3–4 calibrated marks to gauge vang tension adjustments.
- **Main Traveller Track:** Track boom angle relative to centreline for upwind and downwind balance.
- **Outhaul (on Boom):** Mark positions to adjust lower-third sail fullness and draft control.

Tuning & Trimming Reference Marks



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- **Cunningham (on Mast):** Mark to monitor luff tension and fine-tune sail draft.
- **Centerboard:** Define maximum, minimum, and intermediate positions for various modes (upwind, downwind, high mode).
- **Main Halyard:** Apply a black band at 575 cm to ensure maximum hoist and class rule compliance.

Key Guidelines

- Keep your **crew weight** within the ideal **470 range: 130–140 kg**.
- Train to **change shroud pin positions** within 2 minutes on the water.
- Use **sailmaker tuning guides** as your initial setup reference.
- Observe sail shape from both the **water (coach boat)** and **onboard**.

Key Guidelines

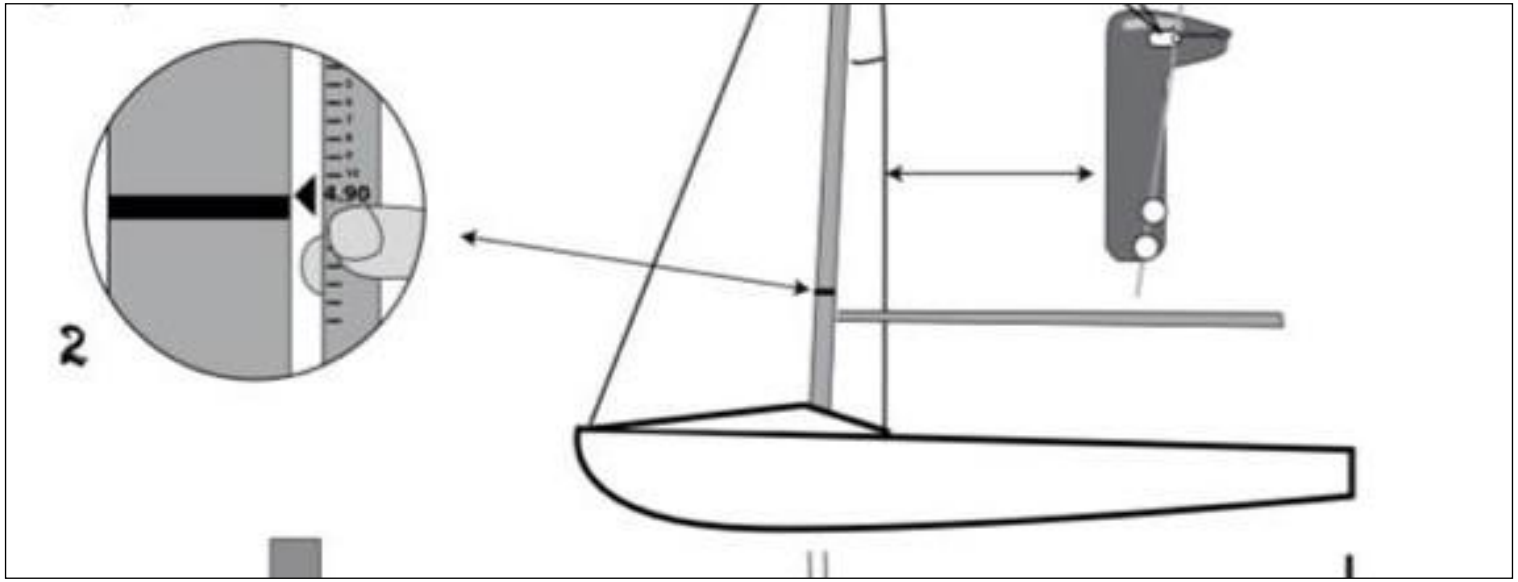
- **Photograph sail trim** for post-training analysis and comparison.
- Record settings even in “slow” conditions—valuable for troubleshooting.
- Be aware that **extreme weather** may distort tuning measurements.
- During **two-boat tuning**, change **only one variable at a time**

Basic Tuning Guide

470					
Wind Strength	**Crew Position**	**Rig Rake (cm)**	**Tension**	**Pin**	**Notes**
Light (< 7 kn)	Leeward, forward	676–673	Loose	1–2	Open leech, minimal vang, soft sails, minimal pre-bend
Medium (7–12 kn)	Sidetank or half-trapeze	673–670	Medium	2–3	Wrinkle-free sails, balanced helm, slight vang, moderate Cunningham
Medium+ (12–15 kn)	Full hiking	670–667	Higher	3–4	Tight jib, vang on, Cunningham engaged, flatter sails
Waves + Medium+	Full hike, active trim	670–667	Higher	3–4	More twist in sails for control, boat flatter, faster mode
Strong (> 15 kn)	Leeward, trapeze max aft	665–655	Very tight	5–6	Flat sails, max Cunningham/vang, board slightly raised

420					
Wind Strength	**Crew Position**	**Rig Rake (cm)**	**Tension**	**Pin**	**Notes**
0–6	Leeward, forward	612 (212)	Loose	1–2	Open leech, minimal vang, soft sails, minimal pre-bend
6–12	Sidetank or half-trapeze	609 (209)	Medium	2–3	Wrinkle-free sails, balanced helm, slight vang, moderate Cunningham
12–17	Full hiking	606 (206)	Higher	3–4	Tight jib, vang on, Cunningham engaged, flatter sails
17–22	Full hike, active trim	603 (203)	Higher	3–4	More twist in sails for control, boat flatter, faster mode
22+	Leeward, trapeze max aft	600 (200)	Very tight	5–6	Flat sails, max Cunningham/vang, board slightly raised

Basic Tuning Guide



Kinetics & Manoeuvres

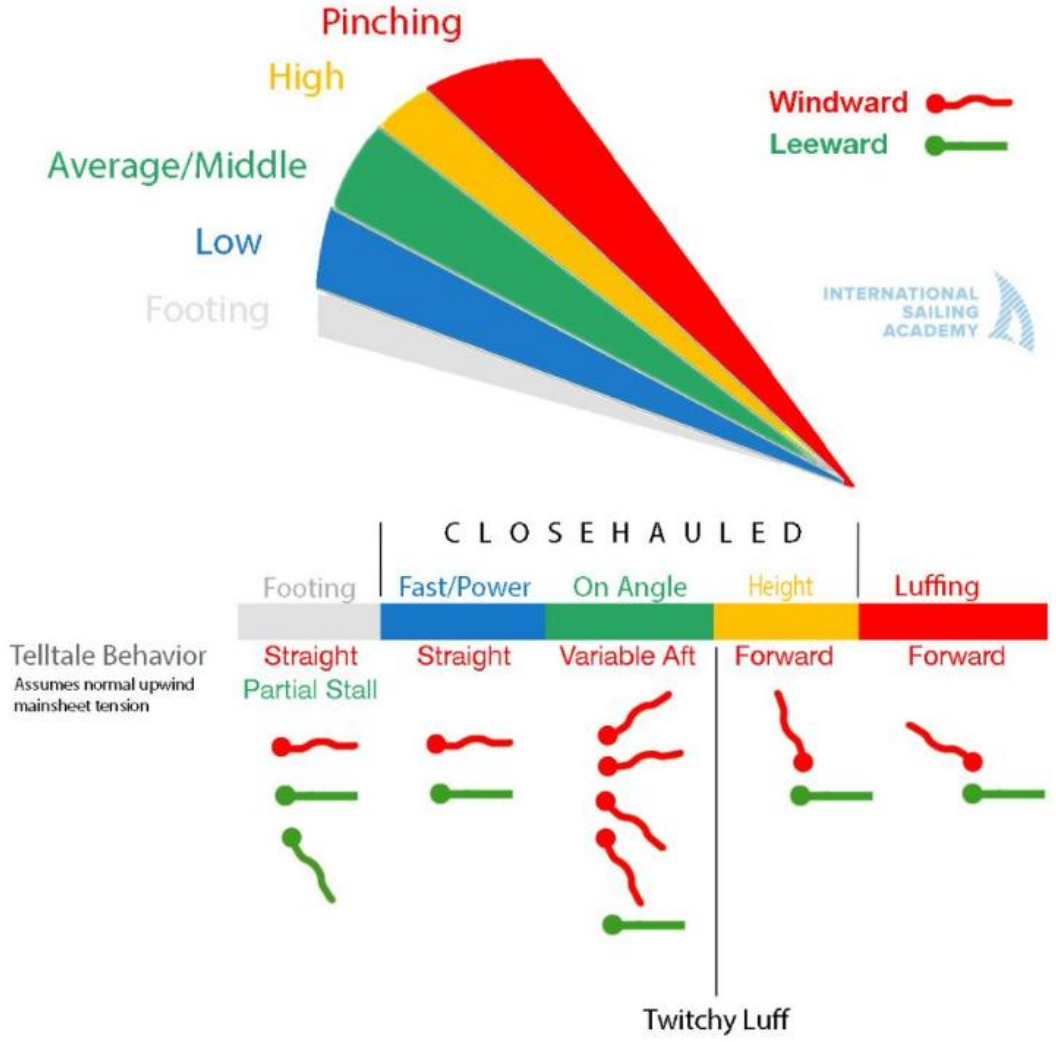
Kinetics is the use of the body to influence boat movement. It is one of the most crucial factors for maximizing speed and pointing in dinghy sailing. The effectiveness of kinetics depends on:

- **Timing:** Precise execution during manoeuvres and transitions
- **Technique:** Correct body movements and sail trim combinations
- **Force:** Optimal application of power, direction, and coordination
- **Communication:** Seamless synchronization between skipper and crew

Kinetics & Manoeuvres

Condition / Action	Skipper	Crew	Sails	Steering
Tack - 1st Stage	Luff / weight out	Stay on until boat turns to you	Trim main in	High
Tack - 2nd Stage	Change side in sync with crew	Change side while watching bow/jib	Ease main	Straight
Tack - 3rd Stage	Hike flat / forward weight / pump	Take trapeze, go to tank, pump	Smooth sail trim while flattening	Straight
Gybe - 1st Stage	Weight to windward, legs push, pump	Weight to windward (back/roll)	Spinnaker to windward, sync with rudder	Bear away
Gybe - 2nd Stage	Change side & pump	Change side, look at spinnaker, pump	Trim spinnaker for new angle	Up & Straight
Bear Away	Weight to leeward	Weight to leeward	Ease main	Down
Luff	Hike out / aft	Hike down / aft, pump	Trim sails in	Up
Gust – Upwind	Weight forward, push/pump with core	Legs push forward, pump	Ease main / adjust trim	Sail high
Gust – Downwind	Weight back, core engaged	Weight back (legs)	Ease leeward spi sheet, manage pole	Sail low
Wave – Down	Weight forward / in	Weight forward / leeward	Pump & drive, trim in	Down
Wave – Up	Weight back	Weight back	Pump spi to direction	Up
Lull – Upwind	Weight leeward	Weight leeward	Ease sails	Straight
Lull – Downwind	Stand & pump, vang on, centerboard down	Pump & hike	Ease windward spi sheet, trim main	Up up
Pump & Drive – Upwind	Pump body in, trim	Pump & move in, push	Main in, pump to direction	Up
Pump & Drive – Down	Pump body out, ease	Pump & move in, push	Pump spi to direction	Up

Steering Angles



Improve Yourself, Improve Speed

Finding better boat speed takes time—be patient and stay committed. You may not win every race, but you can learn from each one. This “no-lose approach” helps you improve continuously.

As you figure out how to go fast in specific conditions, you’ll build the ability to adjust in any situation. Every race is different, so focus on learning, not just results.