

How We Tested Them

TESTING FOR EFFICIENCY

For purposes of this and past testing, we've defined the most efficient fins as those that allow a diver to swim a measured course at a constant speed with the smallest expenditure of energy.

The test protocol included:

⇒ A standard underwater course (150 feet out, 150 feet back), run at a steady speed of 1 mph, set at a controlled depth indicated by a thin cord marked with ribbons at the start, finish, as well as at nine "milestones" in between. These ribbons were spaced such that a test diver would pass them at 10-second intervals. Each test diver held a two-and-one-half-foot length of PVC pipe, cross-wise like a kayak paddle. A slate and stopwatch were attached to the pipe where they could be easily seen. The end of the pipe was used as a pointer to track along the cord, enabling test divers to control depth to within a few inches.

⇒ The first morning of the test schedule was devoted to practicing running the course. However, test divers reported this system easy to use and were providing

repeatable results after only one hour of practice.

⇒ Each diver wore the same dive gear, swam at the same

speed, over the same distance, at the same depth, for each run. During surface intervals, each diver reported time and amount of air used, switched fins, then rested three to five minutes before embarking on the next run.

⇒ Each of the 11 fins was tested six times by each of six divers over a period of four days (three outbound runs and three return runs per diver per fin. Total: 396 separate efficiency course runs, or 66 per diver).

⇒ Using human testers is difficult because their fitness, energy and accuracy vary from day to day. But by compiling hundreds of test runs, anomalies can be eliminated and clear trends can be established.

TESTING FOR SPEED

Speed is not necessarily a priority while swimming under water, as it costs dearly in energy and air consumption (to double your speed, you have to at least quadruple your effort). Still, it's a good indication of a fin's efficiency. So using underwater

speedometers, six divers wearing full scuba gear each tested 11 fins for top speed at a depth of approximately 15 feet using the primary flutter kick as well as alternative frog and dolphin kicks. Each diver tested each fin three times with each kick, for a total of 594 individual speed tests, or 54 per fin.

REAL-WORLD PERFORMANCE: THE MEAT OF THE MATTER

Efficiency and speed are clearly important indicators for determining how well a fin performs, but this data only paints half the picture.

As test diver CP Parsons puts it, "There's a line you can draw separating fins that offer acceptable efficiency and speed performance from fins that don't. Once you determine this line and discard the fins that don't make the cut, any fin-buying decisions should be based on comfort, fit and real-world performance in actual sport diving conditions, not on an efficiency course or holding a speedometer."

We agree. That is why overall performance rankings are based upon 25 percent efficiency scores, 25 percent speed scores, and 50 percent subjective scores based on real-world diving.

Subjective evaluations were based on

How We Got the Totals

The total score is 25 percent speed, 25 percent efficiency and 50 percent subjective (sizing, fit and comfort, ease of donning and doffing, buckles and straps, attachment and adjustment, surface swimming, changing speeds, changing direction, different kicks, stability, power vs. stress, stiffness, removal, nonskid material, ease of kick, ease of maintaining speed, muscle strain). To get the total score, we added the speed score, the efficiency score and twice the subjective score.

For More Information

For the complete chart, including fin scores on individual subjective elements, go to www.scubadiving.com/072002finchart.

MANUFACTURER & MODEL	SPEED TEST	EFFICIENCY	SUBJECTIVE	TOTAL
ADJUSTABLE FINs				
APOLLO SPORTS Bio-Fin Pro	3.5	3	4.1	14.7
AQUA LUNG Blades II	3.0	2	3.1	11.2
AQUA LUNG V-Tek	2.7	2	3.5	11.7
ATOMIC AQUATICS Splitfin	3.2	3	4.0	14.2
DACOR Panther	1.5	2	2.9	9.3
OCEANIC Vortex V-12	3.2	3	3.5	13.2
SCUBAPRO Twin Jet	2.0	3	3.5	12.0
TUSA SF-8 X-Pert Zoom	3.0	3	3.6	13.2
FULL-FOOT FINs				
AERIS Velocity	4.0	4	4.0	16.0
CRESSI-SUB Pro Star	4.0	4	3.4	14.8
OCEANIC Caribe	4.7	4	3.9	16.5
RATING SYSTEM 5 = Excellent 4 = Very Good 3 = Good 2 = Fair 1 = Poor				

15 subjective criteria, incorporating both numerical scores and written comments. Criteria included:

- ▶ **SIZING, FIT AND COMFORT OF THE FOOT POCKET.** In and out of the water.
- ▶ **EASE OF GETTING IN AND OUT OF.** Prior to the dive, after the dive, while on deck.
- ▶ **BUCKLES AND STRAPS; ATTACHMENT AND ADJUSTMENT.** Ease of operating buckles; ease of attaching, detaching or adjusting straps, both in and out of the water.
- ▶ **SURFACE SWIMMING.** Both face-down and on one's back.
- ▶ **CHANGING SPEEDS.** During an underwater swim, the ease of repeatedly

speeding up and slowing down.

- ▶ **CHANGING DIRECTION.** During an underwater swim, the ease of repeatedly changing direction or quickly reversing direction.
- ▶ **DIFFERENT KICKS.** Ease and effectiveness of flutter, frog, dolphin and sculling kicks.
- ▶ **STABILITY.** How much the fins wobble, slice from side to side or hit each other during the kick cycle.
- ▶ **POWER VS. STRESS.** Perception of power produced vs. effort required.
- ▶ **STIFFNESS.** Perception of fin blade flexibility.
- ▶ **REMOVAL OF FINs.** Ease of removing fins in the water or on a swim step.

- ▶ **EFFECTIVENESS OF NONSKID MATERIALS.** Sense of security on a wet boat deck fully geared up while wearing fins.
- ▶ **EASE OF KICK.** Whether or not fins are conducive to an easy fin kick.
- ▶ **EASE OF MAINTAINING SPEED.** Whether or not fins make it easy to hold a certain speed.
- ▶ **MUSCLE STRAIN.** Whether or not fins create a marked strain on leg muscles when trying to maintain a reasonable kicking motion.

Correction

Our March 2002 review of the Suunto Dive Manager interface for downloading dive data to your PC contained an error. We reported that it does not indicate violations, but in fact it does display icons indicating rapid ascents and ascents above mandatory safety stops and deco ceilings. *RSD* regrets the error.

SECTION ONE: Adjustable Fins

1



1 APOLLO BIO-FIN PRO

A top performer in speed, efficiency and real-world diving, Apollo's Bio-Fin Pro earns the title of best overall adjustable fin in this test go-round. The fin is made of all-natural rubber, which not only gives the somewhat smaller fin blade its snap, but also makes it comfortable. The flexible propeller blade can seem somewhat flimsy until you get used to it. But after a little practice, it proves to be an extremely stable, maneuverable fin that moves you through the water with minimal muscle strain. One of the fastest adjustable fins in the flutter kick, the Bio-Fin Pro also generated good speeds using frog and dolphin kicks and ranked among the top fins for towing a diver on the surface.

Test divers found the Bio-Fin Pro to have an excellent foot pocket. The fin is very easy to don and doff, especially in

the water, helped by a handy open loop on the strap. Its buckles also earned high marks.

PRICE \$190, original black; \$200, metallic blue. **FIN STYLE** Split. **BUOYANCY IN SALT WATER** Negative. **FOOT POCKETS** Open toe. **RELATIVE STIFFNESS** Less stiff than average. **BLADE SIZE** Smaller than average. **AVAILABLE SIZES** 5. **COLORS** 2. **MADE IN** Japan. **STRENGTHS** Good range of sizes. Comfortable foot pocket. Ease of kick. Minimal muscle strain. High power vs. stress ratio. Highly maneuverable. Easy to don and doff. **WEAKNESSES** None.

2 AQUA LUNG BLADES II

Aqua Lung's Blades II is a total redesign of its popular and highly rated Blades fin. Unfortunately, the new combination of polymer plastic and rubber construction found in the Blades II results in what is described as a too-stiff fin with a too-soft foot pocket. Based



2

July 2002 Issue: Subjective Fin Test Chart

Manufacturer & Model	Size, fit comfort	Ease to get in and out of	Buckle/ strap Attach/ adjust	Surface swim	Changing speeds	Changing directions	Different kicks	Stability	Power vs. Stress	Removal in water	Non-skid	Ease of kick	Maintaining speed	Muscle strain	Totals	Averages
Adjustable Fins																
Apollo Bio Fin Pro	3.8	4.2	4.0	4.0	4.3	4.1	4.1	4.1	4.3	4.2	3.6	4.6	4.1	4.5	57.9	4.1
Aqua Lung Blades II	3.5	3.7	3.7	3.1	3.0	3.1	3.2	3.6	2.7	3.6	3.3	2.4	3.1	2.5	44.5	3.1
Aqua Lung V-Tek	3.1	4.0	3.8	2.8	4.0	3.5	3.5	3.4	3.5	3.3	3.5	3.7	3.6	3.4	49.1	3.5
Atomic Splitfins	4.4	4.1	4.0	4.1	4.0	3.8	4.2	4.3	4.0	4.2	3.5	4.3	4.1	4.2	57.2	4.0
Dacor Panther	3.4	3.3	2.6	2.5	2.7	3.1	2.7	3.3	2.3	2.8	3.1	3.3	2.8	3.1	41.0	2.9
Oceanic Vortex V-12	3.3	3.7	3.5	3.4	3.5	3.1	3.1	3.0	3.5	3.8	3.7	3.7	4.0	3.7	49.0	3.5
Scubapro Twin Jet	3.3	3.6	3.5	3.2	3.5	3.3	3.3	3.5	3.7	3.3	3.2	4.2	3.6	4.1	49.3	3.5
Tusa X-pert Zoom	3.5	3.8	3.6	3.6	3.7	3.7	3.5	3.8	3.7	3.7	3.1	3.6	3.7	3.8	50.8	3.6
Full-Foot Fins																
Aeris Velocity	3.8	3.8	N/A	4.1	4.2	4.1	4.1	4.0	4.2	3.6	3.8	4.7	4.3	4.2	52.9	4.0
Cressi-Sub Pro Star	3.2	3.3	N/A	3.3	3.7	3.6	3.6	3.5	3.5	3.2	3.2	3.3	3.6	3.2	44.2	3.4
Oceanic Caribe	3.5	3.4	N/A	3.7	4.3	4.3	4.0	4.3	4.3	3.2	3.1	4.5	4.4	4.5	51.5	3.9

Rating System

5 = Excellent 4 = Very Good 3 = Good 2 = Fair 1 = Poor