

# BRACKLESHAM BOARDRIDERS

The UK's Largest North Spares Retailer



W: [www.northkites.co.uk](http://www.northkites.co.uk) E: [info@northkites.co.uk](mailto:info@northkites.co.uk) T: 01243 671777

Interview with Ken Winner – Designer of the North Rhino 09

## REBEL 08 VS. REBEL 09

### Profile

The profile of the '08 Rebels varies somewhat from size to size. Sizes 6 and 7 sported one profile; sizes 9, 10 and 12 another; sizes 14 and 16 yet another. In general we used a powerful, fairly draft-back profile shape with subtle tweaks that seemed to work best in their own size ranges.

For '09 we kept this size grouping – (6,7,8) (9, 10, 11, 12) (14, 16) – and the related profile shapes, while at the same time tweaking the profile shapes to be slightly rounder in the front. A profile which is rounder in the front is generally less prone to stalling, so this was one step toward improving stall resistance.

### Overall Geometry

The overall geometry of a kite comprises features like arc, sweep, taper and leading edge curve. The '08 Rebel has moderate sweep, low taper, a curvey leading edge and a fairly flat arc.

By way of explanation we can point to the '08 Vegas as having little sweep while the '08 Rhino has a lot. The '08 Rebel lies between. The '08 Vegas and Rhino are similar in taper (the ratio of center rib to tip rib) to each other, and both have quite straight leading edge tubes (from center to front pigtail as viewed from the side). The '08 Rebel has a lower taper and curvier leading edge. As for arc, the '08 Vegas has more than the '08 Rebel and the '08 Rhino has less.

### Sweep

With the '09 Rebel we went for approximately the same amount of sweep as in '08. More sweep doesn't work in a basic 5-line design and less sweep results in unacceptably high bar loads. Interestingly, sweep has been fine-tuned to work with the desired profile, as a more draft-back profile requires more sweep. We worked hard on sweep, profile position and front pigtail position so as to get the right bar pressure – enough so that you know where the kite is without looking, but not so much as to tire your arms.

### Taper and Leading Edge Curve

Building on knowledge gained with the development of the '08 Rhino we went for slightly more taper and quite a bit less leading edge curve. The straighter leading edge leads to greater shape stability and less distortion under high loads.

One little tweak we made to the '09 Rebel was to move the nose line attachment points farther from center. This results in the nose line distorting the leading edge less when the kite is sheeted in. We also doubled the nose line attachment points so as to ensure their strength and to distribute their load on the leading edge cloth.

To further reduce leading edge distortion, we positioned the nose line attachment points near the middle ribs.



Free UK Delivery  
Worldwide Delivery Service

All Spares Available  
After-Sail Service

[www.northkites.co.uk](http://www.northkites.co.uk)



# Bracklesham Boardriders



The UK's Largest North Spares Retailer

W: [www.northkites.co.uk](http://www.northkites.co.uk) E: [info@northkites.co.uk](mailto:info@northkites.co.uk) T: 01243 671777

Since the ribs provide support to the leading edge, the overall rib-leading edge-nose line structure is now more solid and resistant to distortion.

One more tweak we made on the leading edge was to increase the intersegment arc angle at the seam where the middle ribs attach and where the nose line attaches. This is the point where the nose line tends to pull the leading edge into a straight line, so increasing the angle here is like putting pre-stress into the structure. There's more angle at rest, but less under load.

## Arc

The arc of the '09 Rebel in sizes 9 to 16 is a bit more round than that of the '08 Rebel. We went this way because big kites naturally tend to feel more mushy and less precise than small kites and by having a bit more arc we knew we could get handling a little more like that of a C kite – a bit more precise.

However, small kites tend to feel harsh, overly quick and erratic. One thing we were pleased to achieve with the '08 Rebel 7 was a fairly soft, comfortable feel. Not gutless, but not intimidating. To keep that comfortable feel in the '09 Rebel we had to go with a somewhat flatter arc than in the other sizes, which left us with an arc similar to that of the '08 sizes 6 and 7.

## Ribs

One of the things a kite designer looks for in a kite is good agreement between the arc taken by the leading edge and the arc taken by the trailing edge. For example, most designers don't like it if a kite flies with a more "U" shaped arc in the trailing edge than in the leading edge. Of course, depending on rider weight, sheeting angle and wind strength even a good kite can take on a "U" shaped or even an "A" shaped trailing edge, particularly in very light wind. When this happens the kite can lose power and sometimes fly backward. Something we learned from our work on the '07 and '08 Rhinos is that having single center rib can contribute to this problem of an "A" shaped trailing edge arc. Setting two middle ribs fairly far apart, however, can minimize the problem and help keep the trailing edge in a smooth arc, even when over-sheeted in light winds.

This is one of the reasons we decided to go with four rather than five ribs on the '09 Rebel.

## Cloth Mix

With the '09 Rebel we wanted to gain more shape stability and hence less drag in the tips. This meant having to choose between going with more battens, or more ribs, or with a stronger, more stable cloth in the tips of the kite. The stronger cloth promised to be the simple solution, but was also expensive and heavy. Favorable results in tests with four-rib kites settled the issue for us. We were able to eliminate a rib and get better low-end performance, then use the saved weight to add more stable cloth in the tips and get better high-end performance. The net effect on performance is all good; the effect on weight is about neutral (it varies with kite size); the effect on price is brutal, but what hell, North customers are rich (designer's perspective).

## Construction Details

The '08 Rebel has held together well, so we didn't want to make too many changes to construction. Aside from Kevlar leading edge scuff pads being reshaped near the tips and the addition of two extra nose line



Free Uk Delivery  
Worldwide Delivery Service

All Spares Available  
After-Sail Service

[www.northkites.co.uk](http://www.northkites.co.uk)



# Bracklesham Boardriders



The UK's Largest North Spares Retailer

W: [www.northkites.co.uk](http://www.northkites.co.uk) E: [info@northkites.co.uk](mailto:info@northkites.co.uk) T: 01243 671777

attachment points, the area that got the most attention was the rib. We went back to our old "Fusion" rib joint between leading edge and rib. There's not much difference in strength, but it looks a little nicer. We also went to a five-segment pentagonal rib construction. This works just like the six-segment HexRib construction but eliminates the bottom rib seam which is the one most vulnerable to damage and stress.

## Bottom Line

When we started working on the '09 Rebel we had real doubts about whether we were going to be able to make major improvements. After a few false starts, however, we hit on a 10-meter four-rib model that had no back-stall, smoother power development, smoother high end, more linear bar feel and quicker turning. It made the '08 Rebel 10 feel to us like . . . well, like last year's kite. That's when we knew we were on the right track. After many more misteps we whipped the bigger and smaller sizes into shape. The only thing left to say is try one.

## Tuning Tip

As the wind increases, the bar will start to feel heavy. Correct this by pulling the depower rope. The Rebel feels best when it's set to totally depower when the bar is sheeted out halfway to the cleat.



Free Uk Delivery  
Worldwide Delivery Service

All Spares Available  
After-Sail Service

[www.northkites.co.uk](http://www.northkites.co.uk)

