

OPTIMIST SPAR STIFFNESS COMPARISONS

The stiffness of a tube is determined by the diameter, wall thickness and tensile strength of the tube.

Masts:

Blackgold, Optimax MKIV MKIII and MKII are both made of 7075T6 aluminum. 7075T6 is an aluminum alloy widely used in the aircraft industry with a tensile strength between 470 and 570 N/mm, With our supplier we specify that the tensile strength has to be at least above 540N/mm².

Optiparts Blackgold masts and Optimax MKIV use 45 x 2.2 mm tube. Optimax MK3 and MK2 are made of 45 x 2.1 mm tube and should, in theory and in practice, be softer than Blackgold and MKIV masts.

We have been doing several bend tests on all spars which showed Blackgold are significantly stiffer than MK3 and MK2.

Optiparts School and silver masts are made of Ø45 x 2 mm, 6082T6 material, tensile strength ± 280 N/MM² and are significantly soft than MK2, MK3 and Blackgold masts.

Blackgold weights are ± 2.10 kg MK2 and MK 3 weights are ± 1.98 kg Guiletti also uses 7075T6 for his Blacktop rig; the size is 45 x 2.1 mm In general you could say Blackgold and MKIV is the stiffest, followed by Guiletti and MKIII. The Guiletti Blacktop rig is more heavy and not made to the maximum length compared to Optiparts Blackgold and Optimax spars.

Blackgold and MKIV will be about 5 % stiffer than MKIII .
For heavier kids (over 45 kg) we suggest them to use a Blackgold or MKIV mast.

Booms:

The 32 mm Blacklight boom weights ± 0.94 kg is more bendy and could be of an advantage for sailors under 35 KG. The 40 mm MK3 or Blackgold booms weigh ± 0.85 kg and are made from the same material and used by 80 % of the racing sailors. The 45 mm Optimax or Blackgold booms weigh ± 0.92 kg and are made from the same material.

The New 45 mm booms use a smaller bridle to provide more room for the sailor to tack and is significantly stiffer than the 40 mm booms. This could be an advantage for sailors over 45 kg. The 55 mm Blackmax boom weighs ±1.06 kg is very stiff, and especially suitable for very tall sailors. This boom has no bridle so tall sailors can tack without having to shift their weight to the back of the boat to avoid the bridle. This prevents the stern to be pushed in the water and slow the

boat down.

Sprits :

Blackgold and MKIV and MKIII sprits are the stiffest we have and both are made of $\text{Ø}27 \times 1.5$ mm, 7075T6 material.

MK2 sprits are less stiff, $\text{Ø}27 \times 1.5$ mm, 6082T6 material.

Softest are the optiparts silver and school sprits, made of $\text{Ø}25.4 \times 1.6$ mm, 6082T6 material.

Of course due to the manufacturing process there are tolerances on outside diameter, wall thickness and tensile strength.