

# Submission: GER 1

Reporting committee: ITC

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## VISCOUS RESISTANCE

### PROPOSAL

In the ITC Minutes from 2019 and 2020 Viscous Resistance has been recognized by the ITC and studied but has not been assessed yet due to lack of racing. Now that there has been more racing, a new revision should be implemented. It may have an impact on sportsboat fleets, a sector where growth should be encouraged to engage the interest of the younger generation of racing sailors.

1. Change the present tabled (Table 6.1 VPP Documentation) flat plate  $C_f$  to, for example, the ITTC friction line, as was discussed under point 6.5 in the ITC minutes October 2019.
2. Introduce a form factor for bulb  $C_f$  based on thickness/chord, and it is suggested to approximate this ratio as

$$t/c = k \cdot \sqrt{(\text{Vol bulb}/\text{Chord bulb})}$$

and selecting a suitable  $k$  to avoid point measurements.

### RATIONALE

1. The present tabled  $C_f$  values for appendages, and particularly reflected as a flat line in for typical yacht keels relevant area between  $Re\ 1.000e6$  and  $Re\ 6.310e6$ , are possibly not correct for real life appendages under sailing conditions. The present formulation favors long chord appendages, particularly in the smaller boat sizes and may be one explanation for some boats changing to "ORC keels" in the smaller classes and why larger boats with keels with relatively short chords (e.g. TP52) are very competitive whereas smaller boats of similar concept are struggling in ORC racing.
2. The present lack of a form factor for bulbs is not accurate since it just takes the wetted area into account, and thus unduly favors slender high wetted area bulbs.