Sail Area/Displacement ratio

The Sail Area/Displacement ratio gives an indication of sail power to mass of the craft and thus its agility. A boat with a high SA/disp will generally compete well in light winds but will need early reefing of the sail. The formula has no dimensions since the displacement has been reduced by raising it to the power of 0.6667. (=2/3).

This formula stems from the days when Imperial numbers dominated.
Since one cubic foot of salt water happens to be very close to 64 lbs, one could simply write..,

$$Sail\ Area/Displacement = \frac{SA[sqft]}{Disp.[cubic\ ft_{salt\ water}]^{\ 2/3}} = \frac{SA[sqft]}{(Disp.[lbs] : 64)^{2/3}}$$

However, if the formula is to be used with metric numbers, it goes like this:

$$Sail\ Area/Displacement = \frac{SA[m^2]}{Disp.[m^3 of\ salt\ water]^{\ 2/3}} = \frac{SA[m^2]}{(Disp.[metric\ tons]: 1.025)^{2:3}}$$

Note that both the Imperial and the metric formula will end up with the same result - as long as we have converted the yacht's SA and displacement correctly.

So what value on the SA/disp should we aim for?

- A value of 15, or below, is quite low; "Motor Sailor"
- A value of 20 isn't bad, OK for light cruisers
- A value of 25 is very hot. Fine for small junk-rigged boats – easy to reef you know...

Example:
Junk-rigged Marieholm IF, *Ingeborg*; SA=35m^2 and displacement = 2150kg:

For Ingeborg: $\boldsymbol{SA/Disp.} = \frac{35}{(2.15:1.025)^{2:3}} = \mathbf{21.4}$

Junk-rigged schooner Samson; SA=107sqm and displacement = 23 metric tons (roughly).

For Samson: $\boldsymbol{SA/Disp.} = \frac{107}{(23:1.025)^{2:3}} = \mathbf{13.4}$

Comment
Personally, I like to check the sail area directly against the displacement.

The real SA/disp would then be:

For Ingeborg: $\boldsymbol{Real\ SA/Disp.} = \frac{SA[m^2]}{Disp.[metric\ tons]} = \frac{35}{2.15} = \mathbf{16.3 m^2/tonn}$

For Samson: $\boldsymbol{Real\ SA/Disp.} = \frac{SA[m^2]}{Disp.[metric\ tons]} = \frac{107}{23} = \mathbf{4.7 m^2/tonn}$

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