

## STIX and AVS FAQ

**Q: *What is STIX?***

A: It is the **ST**ability **I**nde**X** derived by the International Standard for the stability and buoyancy of boats, ISO 12217-2. STIX is calculated from the physical characteristics of each boat and is a number generally in the range 5 to 50. In a similar manner to the SSSN system, a higher value suggests greater seaworthiness.

**Q: *How does STIX work?***

A: The International Standard defines 4 Design Categories for boats broadly related to ocean, offshore, coastal and local sailing. These are analogous (but not directly related) to the ISAF Offshore Special Regulations Categories. Each design category has a minimum qualifying STIX value and also a minimum qualifying AVS (see below) which is linked to the minimum sailing weight (m in kg) of the boat:

| Design Category              | A                    | B             | C             | D           |
|------------------------------|----------------------|---------------|---------------|-------------|
| Wave height (metres) up to   | approx 7 significant | 4 significant | 2 significant | 0.5 maximum |
| Typical Beaufort wind force  | up to 10             | up to 8       | up to 6       | up to 4     |
| Calculation wind speed (m/s) | 28                   | 21            | 17            | 13          |
| Minimum STIX Value           | 32                   | 23            | 14            | 5           |
| Minimum AVS (degrees)        | 130-0.002*m          | 130-0.005*m   | 90            | 75          |

**Q: *What is 'AVS'?***

A: **Angle of Vanishing Stability**, also known as **LPS**, **Limit of Positive Stability**. It is the angle beyond which a boat becomes unstable and will capsize to an inverted position.

**Q: *How is STIX calculated?***

A: In a similar manner to the calculation of SSSN, STIX is the product of a number of different safety/stability related features. These are: Length, Dynamic Stability, Inversion Recovery, Knockdown Recovery, Displacement Length, Beam Displacement, Wind Moment, Downflooding, and Reserve Buoyancy.

**Q: *Will the calculation of STIX and AVS involve any additional measurement?***

A: Since 1998, the European Union's Recreational Craft Directive (RCD) has required that all new boats (except pure racing boats) sold in the EU must have been assessed for STIX/AVS by a Notified Body – an officially recognised assessment agency. Many boats pre-dating this have also been assessed. None of these boats will require any further measurement.

Other boats may require some measurement. However, any which have had their stability assessed (either theoretically or by an inclining test) for any purpose or for which a sistership has been assessed and for which a hull file (a computerised lines plan) is available will be assessed by the IRC Rating Authority on receipt of a request by the owner accompanied by the required data. In this case, certificates will use the nomenclature IRC STIX to show that the calculation has been carried out by us rather than a Notified Body.

**Q: *My boat has a 'sistership' which has a different keel. Can I use the same data or will I have to get my boat measured?***

A: 'Sisterships' are boats that are to all intents and purposes identical. So model variants require individual assessment.

**Q: *How do I know if my boat has been officially assessed or if the required data is available?***

A: The RORC Rating Office publishes a list of boats for which STIX and AVS data is available, either assessed by a Notified Body or as IRC STIX. Please see this list on the IRC website [www.ircrating.org](http://www.ircrating.org).

**Q: What happens if some of the data is not available for my boat?**

A: If either of stability data or a hull file are not available, then neither STIX nor Design Category can be calculated and your certificate will show SSSN only.

**Q: There is a hull file available for my boat, but stability has not been assessed. What do I do?**

A: Stability may be assessed either theoretically by a naval architect in accordance with the ISO Standard, or directly measured by an inclining test.

**Q: What are the requirements for theoretical assessment?**

A: ISO 12217-2, Annex C, para C.2.2 Vertical Centre of Gravity, requires that theoretical calculation of Vertical Centre of Gravity (VCG) shall be based on the calculated mass and centres of gravity of individual components, raised by the addition of 5% of (Fm + Tc), where Fm is freeboard amidships and Tc is draught of canoe body, in both cases in minimum operating condition.

**Q: If theoretical assessment is not possible, how do I get my boat inclined and what does this cost?**

A: The RORC Rating Office and other National Authorities have measurers trained to carry out inclinings. A paper is available from the IRC website ([www.ircrating.org](http://www.ircrating.org)) detailing how the inclining is carried out and specifying the required condition of the boat. The Rating Office charges a fee for the inclining itself. The owner will then need to consult the boat's designer or other qualified person to calculate the stability at the required angles of heel and supply the other required data.

**Q: Will STIX and AVS be automatically calculated for my boat?**

A: Yes, provided that the Rating Office holds all the necessary data and the owner has completed and returned the appropriate form available from [www.rorcrating.com](http://www.rorcrating.com).

**Q: What happens if I modify my boat?**

A: Modifications to sails will not generally require any additional re-measurement for STIX/AVS. Modifications to rig and/or ballasting may require that the boat's stability is re-assessed. Modifications to the hull, keel or rudder may require a new hull file. Please contact the Rating Office with specific detail.

**Q: How do I use the STIX number and AVS value on my IRC certificate?**

A: Exactly as with SSSN, the Race Committee will set minimum qualifying values for each parameter depending on the nature of the race.

**Q: If my boat does not qualify for a race under STIX/AVS, can I still qualify under SSSN? And vice versa?**

A: Qualification for RORC organised races will depend on the ISAF Offshore Special Regulations (SR) Category of the particular race and also the age of the boat as follows:

SR Cat 1 and 2 races: Boats with series date of 1995 and later will be categorised under STIX only.

Boats with series date before 1995 may use either STIX or SSSN.

SR Cat 3 races: Boats with series date of 2000 and later will be categorised under STIX only.

Boats with series date before 2000 may use either STIX or SSSN.

SR Cat 4 races: Boats may use either STIX or SSSN.

Organising Authorities for other races will set their own criteria.

**Q: Are STIX and SSSN values directly related?**

A: No. Although the two methods are aimed at answering the same general question, they use different data and functions to arrive at the answer. So while the two values will be broadly compatible, they are not in any way linked.

**Q: *Why do we need STIX/AVS when we already have SSSN?***

A: SSSN was developed in the 1980s before computerised stability analysis was readily available for all boats. STIX/AVS makes much greater use of this analysis and is technically more rigorous than SSSN. Now that the International Standard has been formalised, owners and race organisers alike ignore it at their peril.

**Q: *I have more questions. What do I do?***

A: Please contact the Rating Office.

**Q: *Where can I find out more about the International Standard and how it is applied?***

A: A more detailed paper is available on the IRC website ([www.ircrating.org](http://www.ircrating.org)). Alternatively, please contact the International Standards Organisation ([www.iso.ch](http://www.iso.ch)) for a copy of the Standard, ISO 12217-2.