

CHALLENGER OF RECORD & DEFENDER

AMERICA'S CUP 36

Interpretation 044 of AC75 Class Rule Version 1.9 issued 20th March 2020

Rules References:

15.3 For the purposes of Rule 15:

- (a) a “cross-section” is defined locally at any spanwise location along the **rondure** of the **foil wing** as a section through a **foil wing** and **foil flap**, on a plane perpendicular to the **rondure** at that spanwise location; and
- (b) the “chord length” at a given cross-section and a given **foil flap** rotation angle is the distance between the most forward point and the most aft point on the cross-section, when **projected** on to the **foil wing** projection plane shown in Figure 13.1.

15.4 At any cross-section, the only permitted movement of a **foil flap** relative to a **foil wing** is a rotation about an axis that remains approximately stationary with respect to the **foil wing** at that cross-section. This axis must be designed to be stationary, but is permitted to have some movement resulting from:

- (a) play in a mechanical bearing; or
- (b) a flexure or soft hinge, such as a thin flexible material joining the **foil flap** to the **foil wing**.

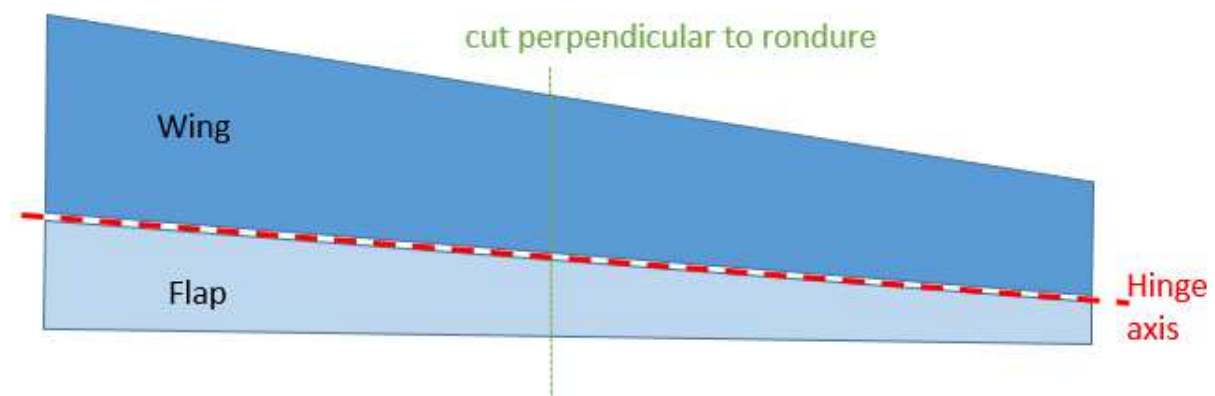
15.5 Through a **foil flap's** range of rotation angles and twists, a **foil flap** cross-section shall not significantly deform except as permitted in Rules 15.4, 15.8 and 15.9, or as a result of **external forces**.

35.94 **Rondure**

A line formed by the leading edge of an appendage **projected** on to TRP.

Background:

Consider the wing shown in below.



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It should be assumed that;

- a. the flap only rotates about the hinge as drawn,
- b. the hinge line remains stationary with respect to the wing,
- c. the hinge is straight, and the flap moves freely causing no stress in either the flap or the wing in the absence of external forces.

Questions:

This question concerns the legality of a hinge line that is swept forwards or aft, rather than being parallel to TRP.

- I. Does the configuration satisfy rules 15.4 and 15.5? If not, why?

Interpretation:

Rule 15.4 does not place any restriction on the angle of the hinge line or axis relative to the **rondure**.

As a **foil flap** rotates around a hinge axis that is not parallel to the **rondure**, the shape of the **foil flap** in the rule-defined cross-section changes. This creates “apparent” deformation (change in shape) of the cross-section, despite not being a structural deformation of the **foil flap** itself.

Answer:

Yes. Rule 15.4 permits “*rotation about an axis that remains approximately stationary with respect to the **foil wing** at that cross-section*”. The reference to rule 15.4 included in rule 15.5 permits an “apparent” deformation at a rule-defined cross-section due to a rigid body rotation of a **foil flap** about an axis that is not parallel to the **rondure**.

END