



AMERICA'S CUP

AC CLASS RULE

INTERPRETATION NO 09

Rule References:

16.2 The use of stored energy and non-manual power is prohibited, except for:

- (a) small springs (or collections thereof), shock cords (or collections thereof), and similar passive devices that deliver less than:
 - (i) 50 J of energy;
 - (ii) 500 N of force; and
 - (iii) 10 Nm of torque.
- (c) low pressure hydraulic or gas accumulators of less than 6 bar which provide back pressure to a hydraulic system to prevent cavitation, but do no significant work themselves;

Question:

By way of example, a single-acting gas spring return hydraulic cylinder is used to control the car on a self-tacking jib track of an AC Class Yacht. The body is attached to the yacht platform, and the rod end is attached to a rope which is led to the jib car.

When oil is supplied to the cylinder, the cylinder retracts and the jib car moves towards the center of the track. When the return valve on the cylinder is opened, the cylinder will extend due mainly to the force from the jib. However, if the jib is not loaded, for example during a pre-start, the rope will be slack but the cylinder will still extend due to the gas pressure in the gas side of the cylinder.

This arrangement allows the cylinder position to be adjusted whether or not the jib is loaded, avoiding the overheads of using a double-acting cylinder, and is typical of systems used in previous America's Cup campaigns.

With reference to Rule 16.2 (a), the energy stored in the gas side of the cylinder, when retracted, would typically be greater than 50J. However, the energy *delivered* to any other part of the yacht is effectively zero, because the rope that the rod end is attached to cannot take compression.

With reference to Rule 16.2 (c), the purpose of the gas spring is *not* to prevent cavitation.

Does Rule 16.2 (a), or any other Rule, allow single-acting gas spring return hydraulic cylinders to be used on an AC Class Yacht if the energy stored in the gas may exceed 50J,

provided that the gas spring is not delivering energy to any part of the yacht outside of the cylinder itself?

Interpretation.

Rule 16.2 (a) (i) prohibits devices that deliver 50J or more of energy. If the gas spring return hydraulic cylinder provides 50J or more of energy then it is not permitted.

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