Form of Written Discussion at the 26th ITTC Conference

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Name of Technical Committee or Group to be discussed	**Propulsion Committee**

Written Discussion: With respect to nuclei measurements, the results of the two techniques were presented. There seems to be a large difference in the concentrations that were found. What are the possible reasons for these differences?

Answer:

First of all, the two techniques investigated are based on two different measurements:

1) The Venturi technique is measuring the critical pressure of the nuclei present in the sampled flow and detects when cavitation occurs when passing through the Venturi nozzle,
2) The Interferometric Laser Imaging (ILI) technique is directly measuring the size of the nuclei passing through the Laser sheet that illuminates the flow.

The first reason that could explain the differences comes from the method we have used to make a comparison between two techniques. The Rayleigh Plesset equation is used to transform the critical pressure measured into the size of the nuclei. This transformation is not very accurate for high values of the critical pressure, i.e. close to the vapor pressure, as shown in the following graph.

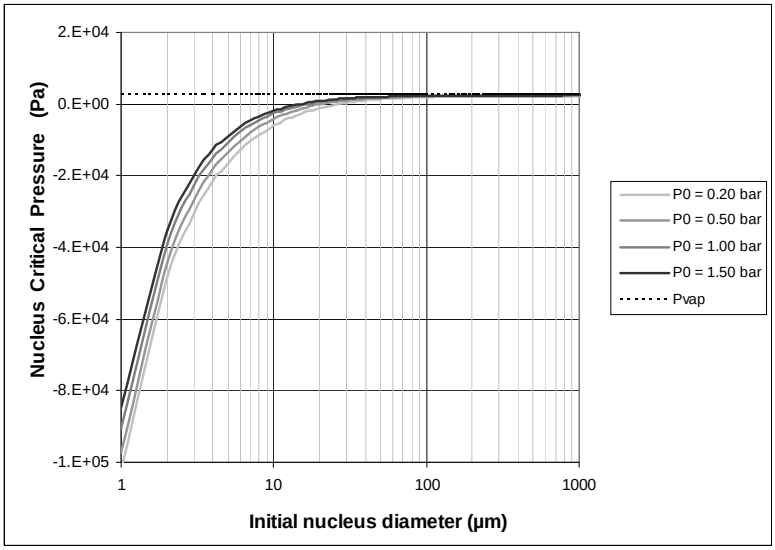

Figure 1 Relationship between size and critical pressure of nuclei based on Rayleigh Plesset equation [Loic Mees, Denis Lebrun, Daniel Allano, Francoise Walle,Yves Lecoffre, Romuald Boucheron and Didier Frechou, 2010, "Development of interferometric techniques for nuclei size measurement in cavitation tunnel", 28th Symposium on Naval Hydrodynamics, Pasadena, California]

As a matter of fact, a small error on the measured critical pressure leads to a large error on the size of the nuclei, for positive critical pressures. The second reason that could explain the differences is that the concentration is calculated from the measuring volume which is directly related to the thickness of the Laser sheet in the ILI Technique. This thickness, which needs to be taken into account, is not known accurately because it also depends on the size of the particles crossing the laser sheet.