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A METHOD TO MEASURE DROP SIZES IN GAS CIRCULATION PIPELINES OF MANNED SPACECRAFT

Abstract

Environmental control and life support system is a very complicated and important sub-system of manned spacecraft, which is an significant symbol for manned spacecraft. This system is directly related to astronauts health and life safety, but also related to completing space mission. The basic task of the system is to create a basic living conditions and suitable working environment in the sealed cabin for astronauts. Especially, the water drops in the gas circulation pipelines need to be condensed and recycled. Also, it is necessary to detect the effect of recycling and monitor the operating status of the equipment. This article introduces a method to measure the drop sizes in the gas circulation system based on optical theory. as we know, the accuracy of optical measurement is very high, and can be conducted without contacting. In this method, laser illuminating is employed and the shape of the beam is changed to be as a sheet. When the drops go vertically through the illuminating aero, the strength of light is changed. Then, the power change of the light is detected on the opposite place. Drop sizes are calculated from the power attenuation. This method is easy to conducted and the algorithm is simple and stable, which is suitable for aerospace application.