

Application-Report - Spray drying



Task:

Determining the pulsation rate of sprays when using an “effervescent atomizer” for the atomization of fluids for spray drying.

“Effervescent atomization” is a special form of internally mixed pneumatic atomization in which gas is introduced in the liquid phase prior to the output from the atomizer, thus creating a two-phase flow. This type of atomization results in the pulsation of the spray, depending on the fluid viscosity and the mass flow ratio (Air-Liquid Mass Ratio).



Image source: Karlsruhe Institut für Technologie

Solution:

Analogously to the determination of the rotational speed of a turbine, it is possible to use for example a stroboscope to determine the pulsation rate. In the ongoing experiments, the pulsation rate of the spray was roughly determined (± 0.5 Hz) by means of the [RT STROBE pocketLED](#) (A4-3000).

The reason for the relatively rough determination was due to the irregularity of the pulsation. However, the previously measured frequency range was confirmed by means of other measuring methods used to record the chronological development of pulsation-dependent measured quantities, followed by computer-assisted evaluation.

Due to the existing difficulties, the frequency cannot be determined with certainty with the [RT STROBE pocketLED](#) alone in this application, but it can be used for a more cost-effective and significantly more flexible validation.

The crucial factors were a broad frequency range as well as the possibility to set the phase displacement and the duration of the light impulse. Because the stroboscope can be positioned close to the relevant process range, high luminous intensity was of minor importance. Compared to other products, the [RT STROBE pocketLED](#) provides these properties at a relatively low cost which is the reason why we selected this product.



RT STROBE pocketLED



YouTube Tutorial



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