



Messtechnik GmbH

Lance Test: Measurement of Large Foam Rise Profiles

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- . Production Results on a Laboratory Scale**
- . Direct Rise Height Measurement without Interference**
- . Data Comparable to other Rise Profiles**
- . Proofed Sensors and Standard Software Tools**

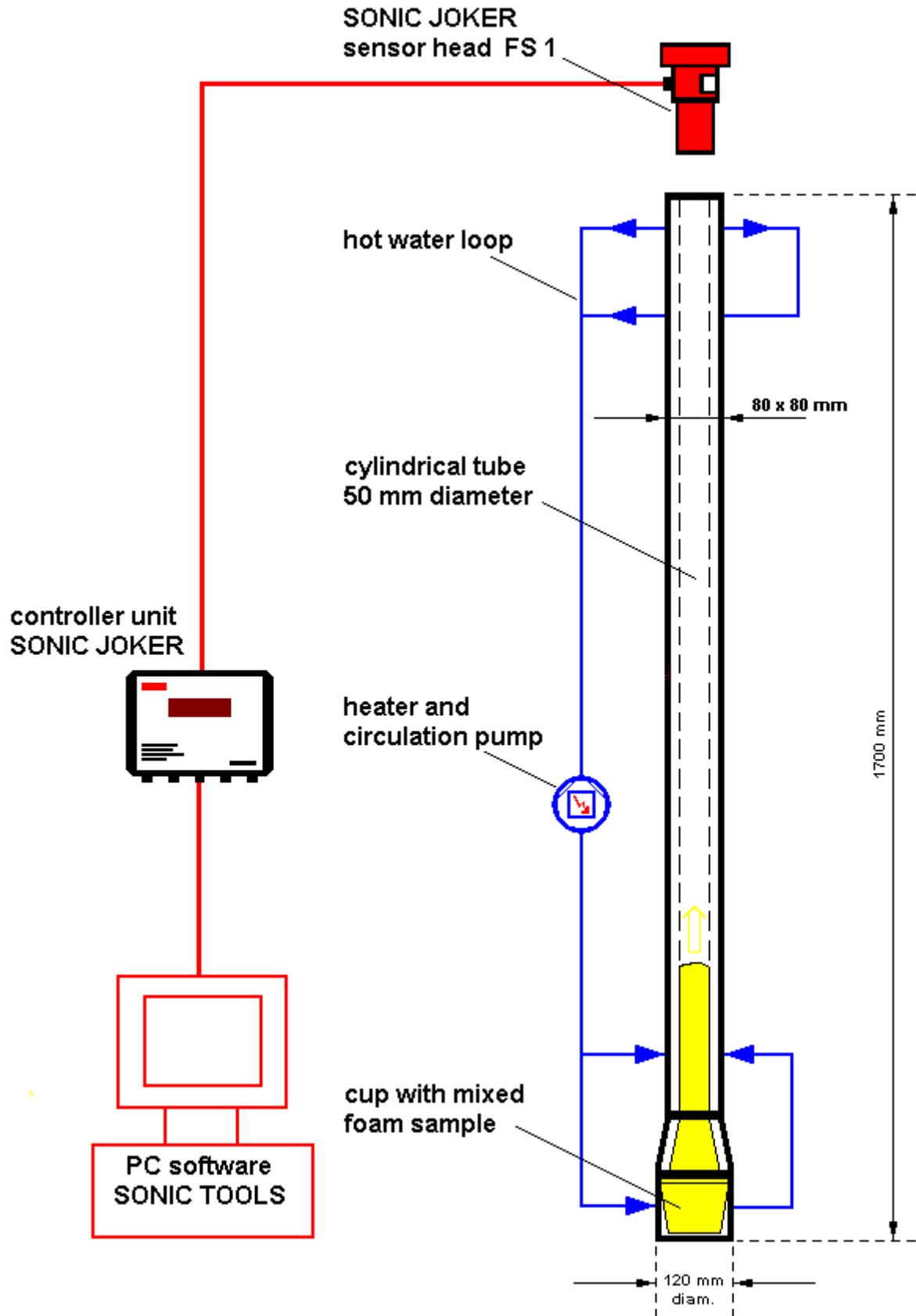
When producing large polyurethane parts such as building insulation or appliance panels, the creep behavior of the foaming mixture is critical. The period of low viscosity should be long enough to allow the foam to completely fill the volume of the structure whereas production requirements dictate fast reacting polyurethane systems that have stable cells after a short rise time.

In seeking a solution for this issue Wacker-Chemie GmbH located in Nuenchritz, Germany has developed special silicone additives like PC STAB[®] to control the foaming process. It is important that customer specific formulations are first tested in a laboratory environment instead of on the production line. This gives the user the opportunity to avoid unnecessary waste and production interruptions.

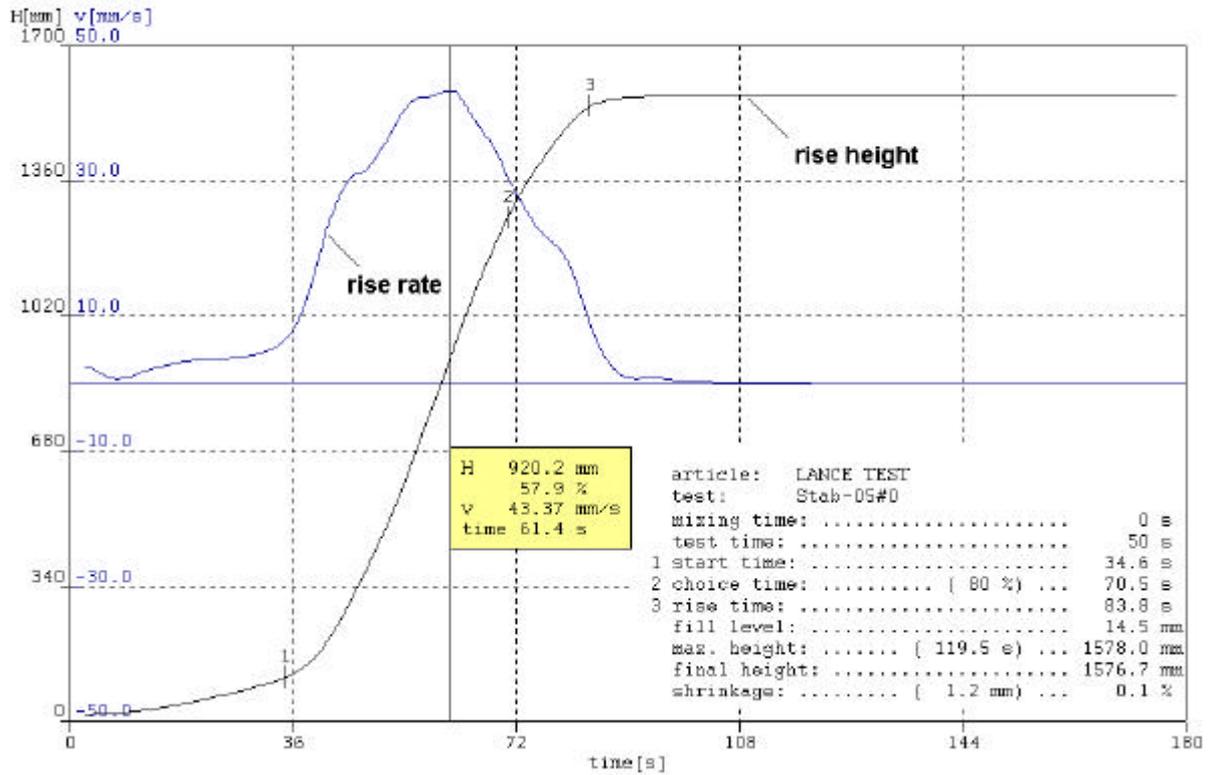
Traditional testing procedures utilizing cups or boxes provide key information such as start time and rise time but, they do not realistically provide production results because of the reduced rise height and large diameter to expansion length ratio of the foam sample.

In cooperation with Format Messtechnik GmbH, based in Karlsruhe, Germany the R&D department of Wacker-Chemie has developed a kinetic tool known as the "Lance Test" which provides a solution to this problem. The test is comprised of a long split metal tube 1.7m in length with a diameter of 50mm that can be heated by a hot water loop at a controlled temperature. A quick release mechanism is used to place the mixture directly at the bottom of the rise tube. The expanding foam then produces a rapidly rising plug that is continuously measured by a highly precise ultrasonic sensor called the SONIC JOKER[®] manufactured exclusively by Format Messtechnik GmbH. The sensor is capable of completing up to 5000 measurements during the test providing you with an extremely accurate rise profile. Rise curves up to 1.6m in height have been successfully recorded. The test results are evaluated and displayed with a windows based software referred to as SONIC TOOLS.

The data recorded by the SONIC TOOLS software can also be imported into the software FOAM that is supplied with the foam qualification system FOMAT[®]. This software is typically used for evaluating rise profiles with respect to start time, rise time and shrinkage. It can also be used for measuring the temperature and the pressure of a polyurethane sample.



Drawing of the Lance Test Setup



Rise Height and Rise Rate of a Lance Test Evaluated by the Software FOAM

® PC STAB is a brand of Nitroil Europe Handels-GmbH.
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