

## Messtechnik GmbH

High resolution foam pressure measurement and dielectric polarization heatable measurement IN test container reveal insight into the gelling and curing process of slabstock foam

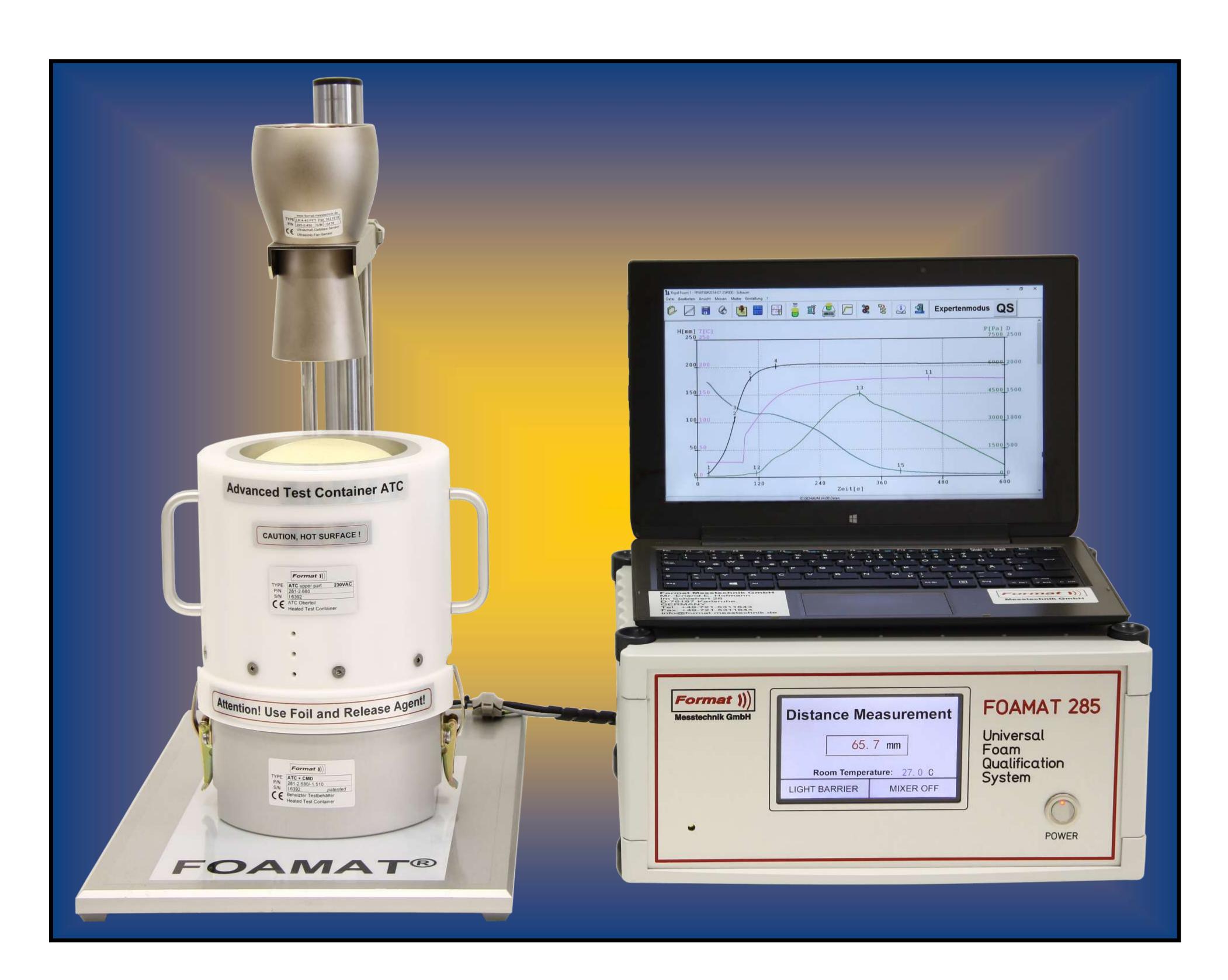
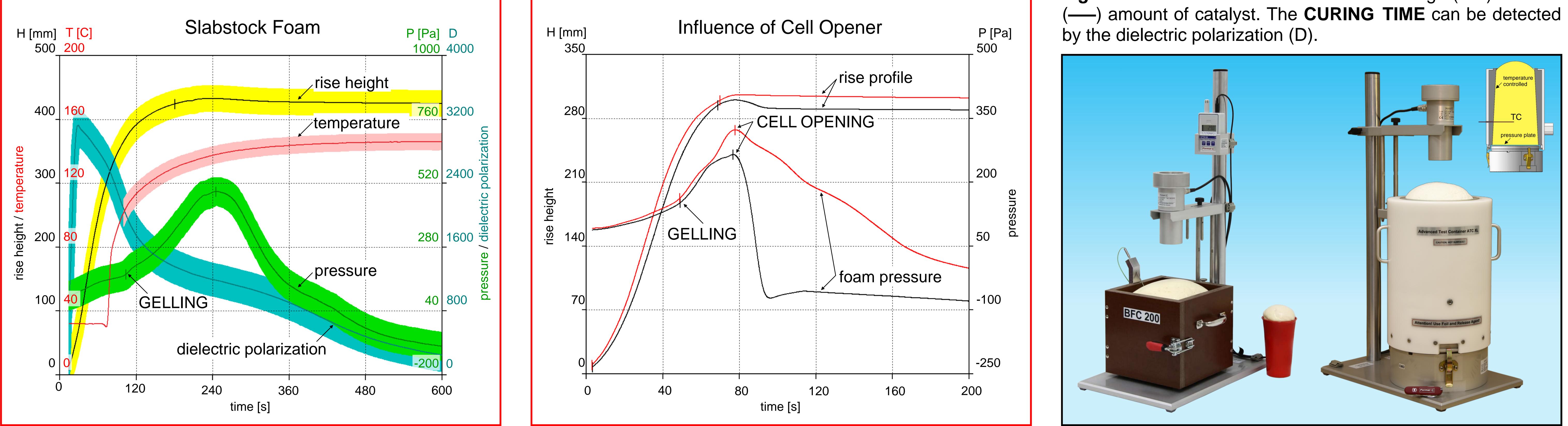


Fig. 1: The Universal Foam Qualification System **FOAMAT® 285** with the Advanced Test Container **ATC** shows detailed cell formation data using a high resolution pressure sensor. The software FOAM V4.0 has new features, including density and specific volume curves.

## Gel Time and Curing Determination of Slabstock Foam

The generation of slabstock foam is traditionally tested in large boxes been tested with the ATC XL at different wall temperatures. Due to or big cups. The rise profile is measured with contactless distance consistent elevated temperatures, the measurement results are much sensors, the reaction temperature by temperature probes. The gel time more reproducible and comparable to the production situation than and the curing process are commonly determined manually using those measured in non-thermostatted test containers. Due to the high wooden sticks. Format Messtechnik GmbH, Karlsruhe, Germany, has resolution of the FOAMAT® 285 pressure input, the pressure curves of introduced the Universal Foam Qualification System FOAMAT® 285 slabstock foam are smooth and show details. Though the pressure (Fig. 1) which features a high resolution pressure sensor in the readings are low, a pronounced increase of the pressure signal innovative Advanced Test Container ATC XL (Fig. 4). The ATC XL indicates the start of the gelling reaction. From this the gel time can be forms a cylinder of approx. 10 liters volume and it is equipped with two determined analytically. The blow off, as well as the cell opening can be closed loop electrical heaters. The top of the cylinder is open, enabling seen clearly (Fig. 3). The decrease of the dielectric polarization shows free rise of the foam and height measurement by an ultrasonic distance the curing process (Fig. 5). As soon as the dielectric polarization reaches a low and constant value, the main curing of the foam has sensor. The foam core temperature is detected by a thermocouple (TC) finished. Curing goes faster at higher temperatures and if more catalyst being inserted into the hot spot of the reaction zone. Besides the Foam Pressure Measurement (FPM) the ATC XL has a built in Curing Monitor is added. Upon test completion, the upper part of the test container can Device (CMD) measuring the dielectric polarization of the foam. The be removed from the lower part. The special shape of the ATC XL and additional coating with release agent facilitate the removal of the foam pressure and the polarization data is simultaneously measured together with the foam rise height and the core temperature. The sample. The new and improved measurement technology of FOAMAT® 285 gives detailed insight into the gelling and curing process of slabstock foam. Its easy handling makes it suitable for quality control testing.

software FOAM processes all data and enables the user to display all four physical values superimposed in one graph (Fig. 2). For engineering purposes, several slabstock foam formulations have



*Fig. 2:* Rise height (H), reaction temperature (T), rise pressure Fig. 3: Comparison of two slabstock foam formulations with high (-----) and low (-----) amount of cell opener. The (P), and dielectric polarization (D) are simultaneously **CELL OPENING** can especially be seen in the decrease of the recorded by the software FOAM. The curves show the reaction of a slabstock foam measured with the ATC XL. The colored rise pressure (P). The pressure curve also reveals information about the **GEL TIME**. areas are master curves for quality control.

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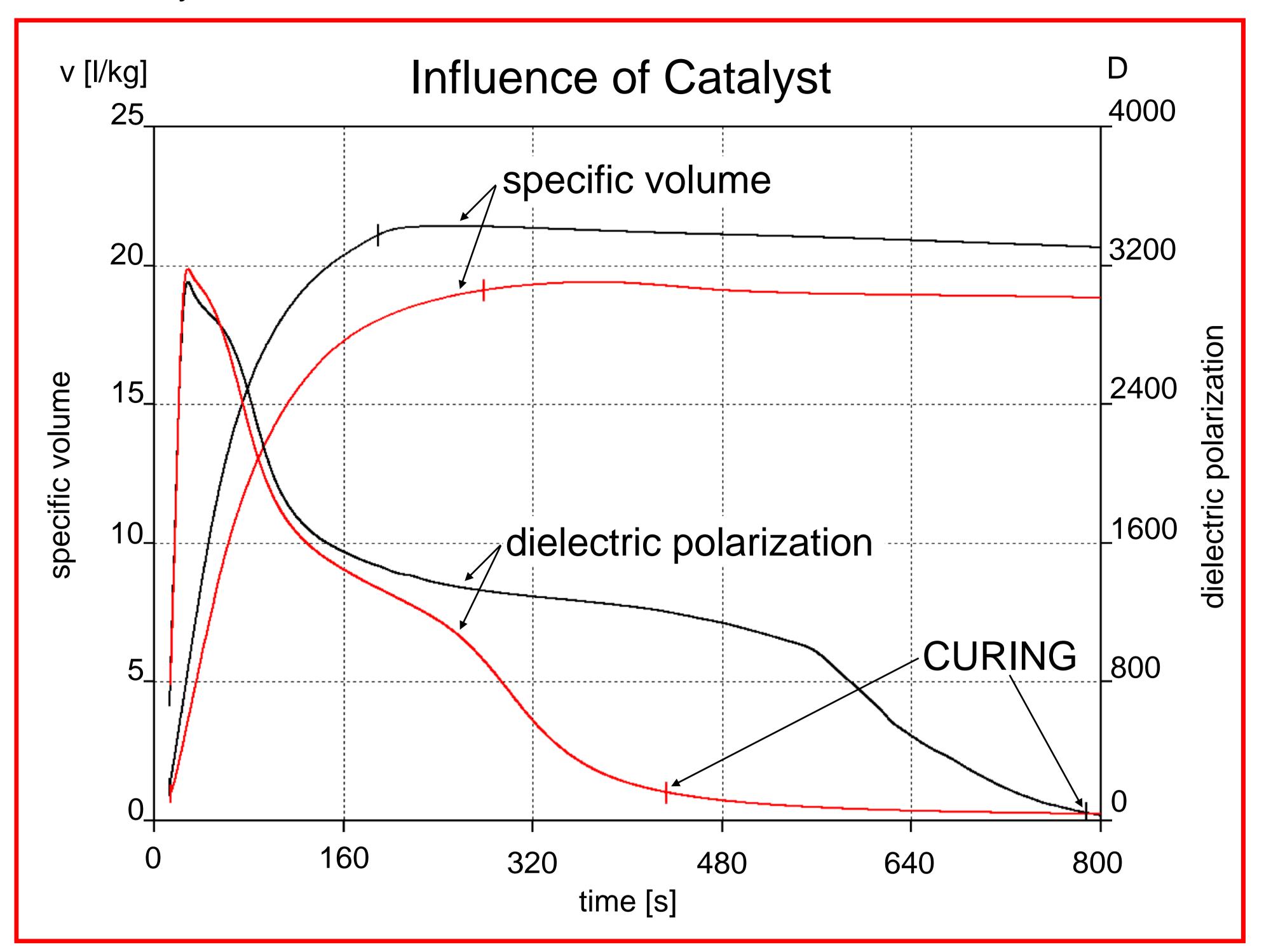


Fig. 5: Two flexible foam formulations with high (——) and low

Fig. 4: The test containers BFC 200 and ATC XL. Whereas the BFC 200 is limited to rise height and temperature measurement, the ATC XL can also measure the rise pressure and the dielectric polarization of slabstock foam formulations under temperature controlled conditions.