Foil test
Function testing of an ultrasonic bath

A foil test\(^1\) is recommended for testing ultrasonic baths. This should be conducted upon initial startup and at regular intervals thereafter (e.g. every 3 months). The frequency of testing is the responsibility of the user.

The foil test is a simple procedure for demonstrating the intensity and distribution of cavitation in an ultrasonic bath. It involves stretching aluminium foil over a foil testing frame, which will be perforated or destroyed to a certain degree by cavitation, depending on sonication time.

For purposes of reproducibility, it is **important that the test conditions remain constant:**

- Filling the oscillation tank to the filling level mark
- Temperature of the sonication fluid
- Degassing time
- Positioning of frame
- Foil type (brand, thickness)
- Sonication time
- Type and concentration of ultrasonic agent

**Fluid for the foil test:**
In order to obtain a sufficiently strong cavitation effect, the foil test also requires the surface tension of the water used to be reduced using surfactant preparations.
We recommend the following ultrasonic agents:

STAMMOPUR DR 8, STAMMOPUR R, TICKOMED 1, TICKOPUR R 33, TICKOPUR R 30, TICKOPUR TR 7

If none of these products are available, a neutral or mildly alkaline product that does not destroy aluminium may be used. The product must be approved by the manufacturer for use in ultrasonic baths.

**Test results and documentation:**
Assuming constant test conditions, the test result is determined from the perforated surface of the foils. The perforated areas of all foils should have approximately the same extent and distribution – the results are never identical. Consistency of process validation, e.g. for treatment of medical devices, can only be ensured by regular foil tests.

As documentation of the test results, the following document templates can be used. A PDF for downloading and a usage video are available at http://bandelin.com/folientest/.

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\(^1\) Investigations on test procedures for ultrasonic cleaners. IEC/TR 60886 (1987-03)
Conducting the foil test

1. Fill oscillating tank to the filling level mark with water and an appropriate ultrasonic agent, in the concentration specified by the manufacturer.

2. Degas the liquid (see user instructions)

3. Stretch aluminium foil (household foil, 10 μm to 25 μm thick) over the foil testing frame. Depending on the tank size, it is possible that the frame will protrude outside the tank. It is sufficient to cover the submerged portion of the frame with foil.

4. With the ultrasound switched off, position or fix the foil-wrapped frame at an angle across the middle of the oscillating tank (see video).

5. Switch on the ultrasound and sonicate the foil for at least one minute until visible perforations or holes are produced. With sturdier foils (thicker or coated ones), the sonication time may be up to 3 minutes.

6. Switch off the ultrasound, take the foil out and let it dry.

7. The foil must be perforated, see photo. Otherwise, we recommend having the device checked by the service department at BANDELIN electronic GmbH & Co. KG.

8. Archiving of foil with test date and serial number of the ultrasonic bath. The foil test document template can also be completed and archived.

9. After the test, the oscillating tank must be thoroughly rinsed out to remove any loose foil particles.

Suitable foil testing frames can be ordered from BANDELIN electronic GmbH & Co. KG.

The foil testing frames are suitable for a wide range of tank dimensions. Aluminium foil is also required for conducting the test, but this is not included in the delivery.