Evaluating process suitability of cleaners through foam testing

Product: SITA FoamTester
Industry: Metalworking industry
Measuring principle: Structured light (Foam Surface Scanner)

In metalworking industries, selecting a suitable cleaner is crucial for maintaining both the efficiency and stability of production processes. In addition to cleaning performance, material compatibility, and environmental considerations, foam behavior is a key factor – especially in automated or closed systems.

Foaming of cleaning agents is strongly temperature-dependent. At lower temperatures, cleaners typically generate more foam than at higher ones – often due to the cloud point of the surfactants involved. To ensure that a cleaner is suitable for a specific process, it must be assessed whether it still tends to foam excessively under real operating conditions (e.g., at 50 °C).

Figure 1: Cleaning process

Since foam is difficult to measure directly, a reproducible test method is essential. The SITA FoamTester offers an ideal solution: it allows precise control of parameters such as temperature, stirring speed, and water quality, while objectively measuring the resulting foam volume.

The goal of this investigation is to compare different cleaners in terms of their foaming behaviour at various temperatures and thus evaluate their process suitability.

Figure 2: SITA FoamTester

Test setup and parameters

Two commercial cleaning agents were tested under identical preparation conditions:

- Cleaner concentration: 2% in deionized water
- Mixing time: 30 minutes homogenized
- Temperature control: External thermostat connected directly to the SITA FoamTester
- Temperature levels: 20 °C and 50 °C

To provoke maximum foam formation and reveal clear differences, deliberately critical test conditions were selected:

- Stirring speed: 2000 rpm (maximum energy input)
- Stirring cycles: 30 cycles of 10 seconds each
- Rest time between cycles: 5 seconds
- Foam enhancement ring: Used to increase turbulence and foam generation

These conditions enable maximum foam stress testing, allowing a clear evaluation of foaming behaviour under demanding but realistic scenarios.

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Results

Figure 3 illustrates foam volume development over the stirring cycles:

- At 20 °C, both cleaners show significant foaming. Maximum foam volume is reached within the first few cycles. Cleaner 1 achieves a slightly higher final volume than Cleaner 2.
- At 50 °C, the two samples behave very differently:
  - Cleaner 1 still produces a significant, though reduced, amount of foam.
  - Cleaner 2 shows virtually no foam formation, indicating a lower cloud point and less stable foaming behaviour at elevated temperatures.

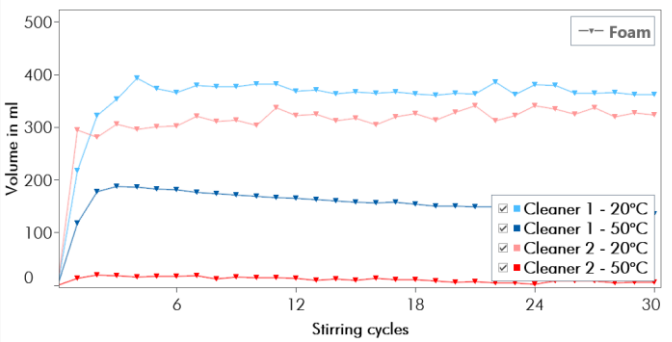

Figure 3: Foam formation over 30 stirring cycles of 10 s each at 2000 rpm

Conclusion

The SITA FoamTester provides a practical, reproducible, and comparative method for evaluating the foam behaviour of cleaning agents under process-relevant conditions. The temperature dependency of foaming can be clearly observed and correlated with real-world performance.

This testing approach is particularly useful for:

- Cleaner development and selection
- Validation of process suitability
- Identification of critical application temperatures
- Assessment of cloud point and thermal foam behaviour

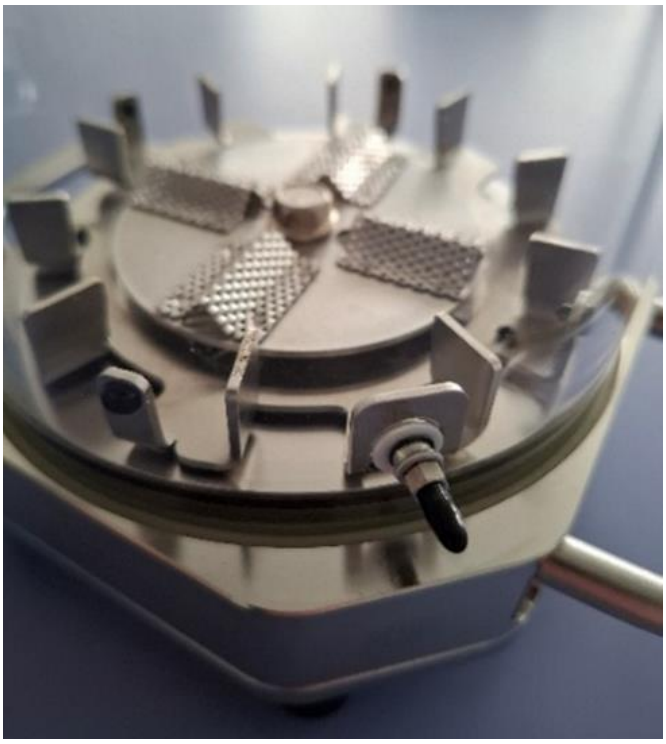

Figure 4: Measuring vessel with foam enhancement ring