

Bubble-free filling of cooling circuits

When filling cooling circuits, e.g. in complex systems in the EUVL environment, it is very important to reduce filling times, since machine unavailability causes high production downtime costs. During filling, the time until the system is bubble-free is particularly relevant.



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In order to evaluate different filling strategies, parts of the cooling circuit were made of transparent materials. By means of high-resolution video time-lapse recording and specially developed image evaluation software, we were able to display the amount of air bubbles over time in a diagram. Sensors are used to record also the pressure at various points, the flow rate and the temperature.

Depending on the pipe layout and heat exchangers used, bubble-free filling is not possible with standard filling. It may take weeks for the residual air to dissolve in the coolant.

By optimizing the pump level / filling strategy it is possible to reduce the residual bubble quantity by more than 95% compared to a standard filling and this in the shortest possible time.

