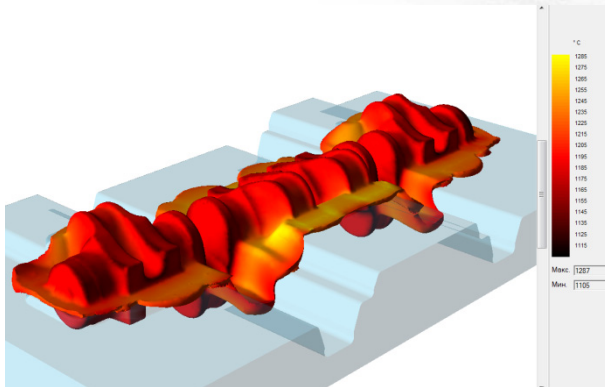


# Quantor Form

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# QFORM3D

Newsletter  
 October, 2009



The simulated temperature distribution and the product shape in finish blow of a crankshaft forging

## New opportunities for forgers

Recent development of our forging simulation software QForm2D/3D has considerably increased its performance and extended its capabilities to solve problems in new areas such as product properties prediction after plastic workout and heat treatment. These developments have boosted the benefits of simulation use and made the software an indispensable tool during these difficult trading times.

To make this powerful tool affordable for all forging companies MICAS SIMULATIONS Ltd. offers free test simulations and trial licensing as well as the possibility to order a simulation project on a consulting basis at very competitive price.

## Fitting the highest demands of advanced forging practice

New version 5.1 of QForm2D/3D includes many features that are essential for the forging process quality control:

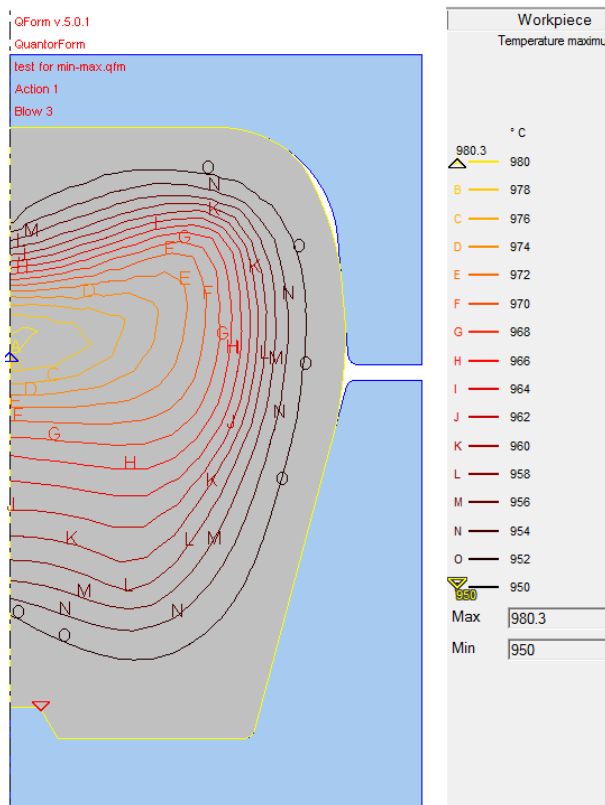
- Advanced control of the temperature and the strain through the whole technological processes as required by industry including aerospace suppliers.
- Simulation of recrystallisation and grain size evolution during deformation stages and reheats.
- Heat treatment simulation of finish products.

## Formation of texture and anisotropy

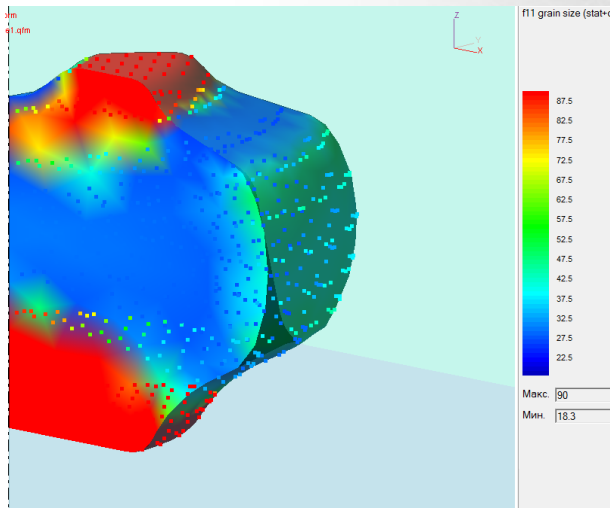
The program calculates the large plastic strain tensor which is important for detecting the main directions of deformation. Together with the flow lines the strain tensor components predict an anisotropy development that may have a big impact on the quality of the forged part made of some structurally sensitive alloys.

## Precise control of the process temperature

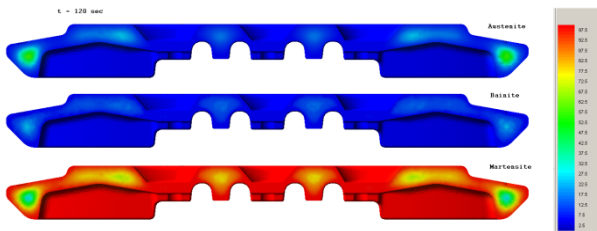
The program calculates maximum and minimum temperatures in every point of the forged workpiece during the whole deformation process. At any moment



The contours showing the zone where the temperature in the billet exceeds its initial value due to intensive deformation heating



Variation of the grain size after deformation and cooling of the forged part made of Inconel 718



Resulting phase composition: residual austenite, bainite and martensite distribution in the cross section of steel forged part after quenching

of the process it is possible to display the distribution of the maximum or minimum temperature that was ever reached in every point of the deformed workpiece. The maximum/minimum temperatures at every moment are recorded in a special file that helps to analyse the history of the temperature development through the whole process.

### QForm - Micro Structural Module

The module allows the prediction of grain size and the fraction of recrystallised grains in the forged part made of superalloys. It works for the processes even when the billet is subject to many blows with short pauses between them such as in a hammer forging. The process chain may also include several re-heats.

### QForm - Heat Treatment Module

The new HT Simulation Module, which has used the well proven system of phase transformation during quenching of steels developed by GMT Berlin mbH, and integrated this with the simulation of cooling in QForm3D. By these means the program can predict the phase constitution in the product as well as its Hardness and Ultimate Tensile Stress and show the distributions of these parameters over the surface and in cross cuts. The module can be used in conjunction with the QForm simulation package or as a standalone module.

### Don't miss an opportunity

On the 3<sup>rd</sup> December we are running a QForm User Group and Presentation session at the CBM at which, with the help of Dr. Alexander Borowikow from GMT Berlin mbH, we will introduce these new modules and the material they cover in some detail. If any company is interested in joining us for this day please contact Trevor Slater.

### Contact us

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