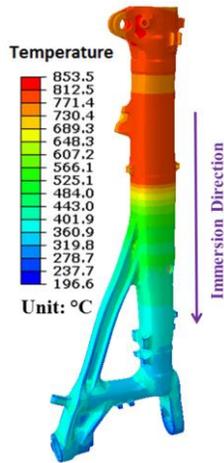


HEAT TREATMENT DESIGN TOOL

DANTE[®] is the State-of-the-Art in simulation software, promoting improved component and process design in heat treatment.

DANTE is a set of user subroutines used in conjunction with Ansys or Abaqus finite element software for simulating heat treatment of steel parts, including heating, carburizing, liquid immersion quenching, high pressure gas quenching, spray quenching, press or fixtured quenching, induction hardening, and tempering.

DANTE couples a multiphase constitutive model directly with diffusive and martensitic phase transformation kinetics models. With DANTE, metallurgists, process engineers, heat treaters and designers can predict the residual stress state in a part after heat treatment, the evolution and final volume fractions of metallurgical phases, hardness, and part distortion.



Benefits of DANTE

Troubleshoot Heat Treatment Problems and Lower Manufacturing Costs

- Reduce Rework
- Reduce / Eliminate Post Heat Treatment Operations, i.e. straightening, grinding

Improve Quality

- Control Distortion, Residual Stress and Hardness

Enhance Design Capability

- Predict the Impact of New Designs or Design Modifications on Manufacturing

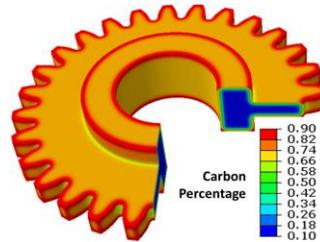
- Conduct Less Costly “Virtual” Experiments

Practical Applications

DANTE has been verified for a wide variety of complex real-life heat treatment applications. A powerful and versatile design tool, DANTE provides valuable insight to your heat treating process.

Optimize Carburizing Schedules

DANTE provides accurate predictions of carbon profiles and has been applied to not only simulating but actually optimizing steel carburization processes. DANTE has been used to simulate conventional gas, plasma, and vacuum carburizing processes.

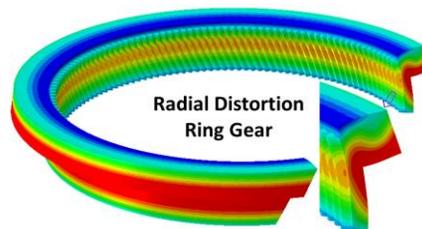


Improve Part Performance by Controlling Residual Stress

The capability of DANTE to provide accurate prediction of residual stress resulting from the heat treating operation makes DANTE an important design tool to help improve part performance! For example, a quenching process has been modified to achieve deeper and higher residual compression for improved fatigue life in precision gears.

Evaluate Effect of Process / Design Changes on Heat Treat Distortion

The effect of geometric and processing modifications on the resulting heat treat response can be assessed rapidly. In particular, quench hardening processes can be modified to reduce distortion while achieving required hardness.



Technical Features

DANTE is a unique, validated technology incorporating advanced material models, fully-coupled mechanics, and highly efficient solution algorithms that can bring heat treat simulation to your engineering team.

Thermal-Diffusion-Mechanical Simulation

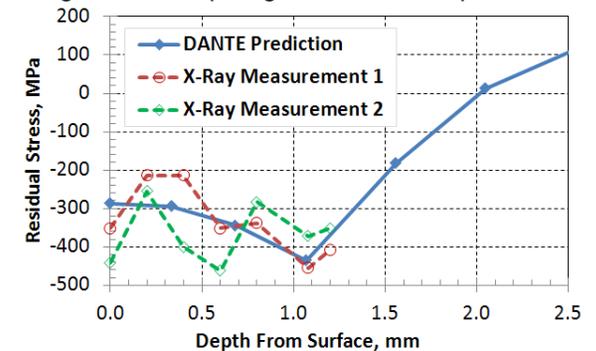
DANTE provides flexible, efficient analysis of a variety of thermal-stress problems, including austenitization, carburization, quenching and tempering.

Customize and Expand the Material Database

DANTE includes comprehensive material data for mechanical and phase transformation behavior of plain carbon, low and medium alloy steels, and most carburizing grades of steel. Mechanical data are generated using conventional tension and compression tests. Phase transformation model parameters are determined from ASTM Standard dilatometry experiments. Software utilities have been developed to expand and customize the material and process databases by the user.

Validated Technology

The capabilities of DANTE have been validated using experiments and plant trials. Verifications of model accuracy include comparisons of predicted and measured residual stress, hardness, dimensional changes and phase fractions for a range of steels, part geometries, and processes.



Rapid Solutions / Analytical Efficiency

- Two and Three Dimensional Models
- Available for Windows and Linux platforms