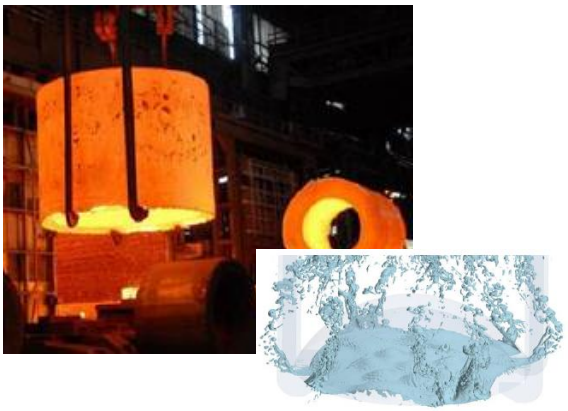
framatome

Modeling of immersion quenching

Industrial process simulation

Simulate immersion quenching to optimize your processes and improve the quality of your product



Two-phase CFD simulation of non-condensable gas evacuation during quenching

Challenge

Quenching is one of the most important step of steel heat treatment

- You need to know mechanical properties of forged components after quenching ?
- You need to master quenching process without using sacrificial parts ?
- You have difficulties to access direct temperature measurement to judge the quality of your quenching process?
- The quality of the quenching process is done thru indirect data/measurement

Customers benefits

- Better understanding of your installation
- Optimize quenching operations: tank agitation, manutentions...
- Optimize heating operations: save energy and money
- Justify incident during quenching operations: help to decide to keep/reject pieces and avoid expensive sacrificial pieces

Solution

Our immersion quenching modeling solution addresses these challenges:

- A numerical simulation study : a powerful tool to help to understand what happens during quenching
- Numerical twin of Multiphysics phenomena with CFD code STAR-CCM+® of the whole heat treatment process process taking into account complex coupled physics: Transient thermal, mechanical, metallurgical phases, phase transformation and boiling phenomena
- Access to several Output data: Temperatures, heating and cooling rate and mechanical properties at the end of the process

Key figures

> 10 years of development at Framatome

References

Solution was developed in-house to support Framatome forge's industrial needs. The methods are now being rolled-out to external clients.

Your performance
is **our** everyday **commitment**

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