

NovaFlow&Solid CV for Heavy Machinery

Optimize Machinery System Performance

NovaFlow&Solid CV (NFS), from NovaCast, is a casting process simulation system that can simulate virtually any type of casting. NFS simulates casting components used in the heavy machinery industry, regardless of if they are small or big, simple or complex.



Solution Highlights

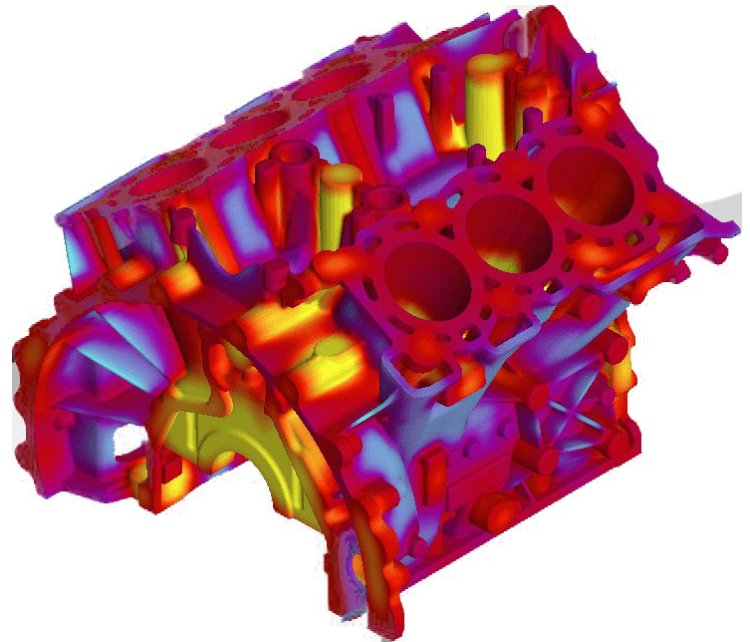
- NovaFlow&Solid CV works well for components of trucks, earth movers, mining machinery or any other heavy industry equipment.
- The software simulates hydrodynamics tasks, heat tasks and the residual stresses caused by the process.
- All types of materials, including steel, ductile and grey irons, aluminium, etc. are readily available for simulation, as well as the most common casting methods.
- After completing a simulation, NFS can export the stress tensors to any node based FEM system for further load calculations. It is also possible to export the geometry of the casting with the simulation dimensional changes and distortion.
- The system includes an automatic meshing, based on Finite Volume Method, resulting in completed meshes within seconds, fast calculations and accurate results.

CAD Interfaces

- STL files in binary or ASCII format
- STEP files in single or assembly format

Heavy Machinery Capabilities

- Standardized pouring methods for bottom pouring ladles, ladle pouring over lip and multiple ladles.
- Shrinkage percentage of solids, enabling optimization of the casted parts.
- Design directional solidification and feeder placement.
- Investigate casting of thinwalled parts, resulting in weight reduction.
- Verify designs produced by OptiStruct, for example, to measure castability.
- Analyze casting temperatures to reduce energy and identify the optimal process window that provides good quality at the lowest cost.



General Functionalities

- Simulation: visualize the consequences of a design (gating systems, feeder and molds). Casting defects, (oxide inclusions due to excessive turbulence, cold-shuts, shrinkage cavities and slag inclusions), can be avoided by optimizing the gating and venting systems. Improve the strength of the casting with a better casting design or method with fewer defects and better stress distribution. Calculate the dimensional changes during the casting process.
- The Control Volume Method (CVM) technology allows the surface of 3D model to control the shape of the mesh elements on the border of the casting. This creates cubic elements inside the casting and border cells on the boundary. Some advantages of CVM compared to FDM/FEM methods:
 - Reduce simulation time by ~10 % with the same or improved accuracy.
 - More accurate, due to perfect description of the 3D model. All sections are correct in size.
 - Fewer cells necessary to define the casting geometry, ensuring faster simulations and smaller results files.
 - Meshing process is completely automatic and only takes seconds
 - Includes advanced calculations, such as gas flow, contact task (stress) and full mold process.
- The ATAS thermal analysis system updates the NFS alloy database with actual data based on poured samples. The effect of graphite expansion can be accurately modelled.
- Formula function enables the user to define criteria, (i.e. shrinkage prediction), Dendrite Arm Spacing (DAS) and matrix calculation.
- Modulus calculation with feeder design, including size of feeder and feeder neck.
- Gating and gas calculation, enabling backpressure and vacuum permeability

