HIGH PRESSURE DIE CASTING
TECHNICAL SPECIFICATION

NovaFlow&Solid 6.0 can simulate both cold- and hot chamber method. It is possible to simulate more or less all commercial materials used for high pressure die casting like aluminum alloys, magnesium alloys, zinc alloys and copper based alloys.

MODULES INCLUDED IN BASE SYSTEM

NovaShot

- Calculate gating system
- Select machine and casting pressure
- Select chamber diameter and length
- Calculate 1st; 2nd and 3rd phase
- Export parameters file to Filling parameters in Flow&Solid

3D Import

- Import of binary and ASCII STL files and STEP files
- Import of cooling channels
- Import of inserts like cores or mold halves
- Built in STL fixing including re-triangulation
- Built in accuracy setting of STEP
- Boolean functions for taking into account the interactions between solids
- Extension function – for closing of gaps between solids
- Positioning functions

Simulation Setup (Pre-processor)

- Meshing with Control Volume method
- Material parameters setting
- Piston movement function – First filling simulation with moving piston
- 3rd phase prediction = compression phase
- Cooling channels settings
- Setting of vents for use with GAS calculation
- Cycling simulation settings
- Filling parameter settings
- Preheating simulation settings
- Setting of porosity parameters
- Sensors for measuring temperature, velocity and pressure at a certain point

Browser (Post-processor)

- Powerful browsing and slicing in x, y and z directions of the simulated results
- Built-in animation functions for presentation of results, creation of movies and real time movie files
- Two or more simulations can be viewed simultaneously in the browser
- Printing facility in all modules
- Possibility to save simulations in BMP or JPEG formats in each module
- Automatic report generator in doc-format

OPTIONAL MODULES/VARIANTS

NovaSolid (Solidification module enabled)

With the NovaSolid configuration you can run solidification starting with a filled mold. No filling is possible in this module. The module includes the following:

- Simulation of the solidification with the fields Temperature, Liquid phase and Solidification time
- Porosity predictions depending on solidification
- Cycling simulations with cooling channels for thermal balancing of the tool
- Calculation of Hardness and SDAS (Secondary dendrite arm spacing)
- Shrinkage by solids – possibility to evaluate the shrinkages in every part of the gating, venting and casting if they are separated solids
- Autosimulate – Batch simulation system for automatic queuing of simulations

NovaFlow (Flow module enabled)

With the NovaFlow configuration you can run mold filling simulations. NovaFlow simulations run until the mold is filled but cannot solidify the casting. The module includes the following:

- Simulation of velocity, air entrapment, temperature and liquid phase during the mold filling
- Filling of the filling chamber with gravity casting
- Use of piston movement for simulation of first phase. Temperature drop, velocity and waves are used in the continued filling of the gating system and the part which is coupled to this simulation
- Velocity vectors in both 2D and 3D for turbulence tracking
- Particle tracers with size and density
- Flow color for investigation of balancing of the gating system. The color can be converted to volume and kilograms
- GAS calculation – for simulation of backpressure or vacuum
- Autosimulate – batch simulation system for

automatic queuing of simulations

NovaFlow&Solid

With the NovaFlow&Solid configuration you combine the capability of NovaFlow and NovaSolid. NovaFlow&Solid simulations run until the casting is solidified or down to a set maximum temperature.

- With this configuration one can simulate both the Macro and microshrinkages and also the porosities caused by entrapped air
- Dual mesh calculations where you have different mesh for filling and solidification

NovaStress

NovaStress CV is fully integrated into the NovaFlow&Solid CV package and works as a post-processing calculation. The program uses the same technology as NovaFlow & Solid CV, CVM mesh, which exactly describes the original solid geometry. The calculation speed is very fast, much faster than a Flow&Solid simulation. It has been improved further by approximately 10 times in the CV version. NovaStress is calculating the stresses and geometry deformations due to the thermal conditions during filling, solidification and cooling.

- Calculates the deformation of the casting during solidification. These values can be used to compensate the mold so that deformation can be avoided
- Extremely easy to use (startup time 1 minute).
- The stresses in the casting will indicate where the risk for cracks during solidification might occur
- The stresses can also be used to dimension the casting so that the pay loads on the casting components do not end up in the same place as the highest stresses
- Criterion for cold tear as well as hot tear prediction
- Measuring tool for measuring the deformation of different parts of the casting in mm

Hardware recommendations

- PC with QUAD Core (4) or 6 or 8 core processors (Multiple processor support)
- Highly recommended: Intel Xeon or Intel Core i7, 3.3 GHz and higher
- Microsoft Windows 7 or 10, 64-bit
- Recommended: 16 GB RAM
- 200 GB free hard disk space
- Highly recommended: Solid state drive 128GB as primary disc where simulation should run and be stored during simulation,
  normal HDD 1TB for storage after simulation as secondary disc
- Graphics card: NVidia 2GB and higher
- 3D mouse for rotation, move and zoom. System supports 3D connexion Space navigator.
- High clock frequency is more important than number of cores.