

Why use Casting Process Simulation?

This is why

- Detect and correct possible errors in crucial phases – reduce your scrap rate and secure your quality
- Develop thin walled parts
- Optimize feeders
- Reduce needs for pattern changes – optimize patterns from the start
- Save time, money and reduce your environmental footprint
- Every casting counts

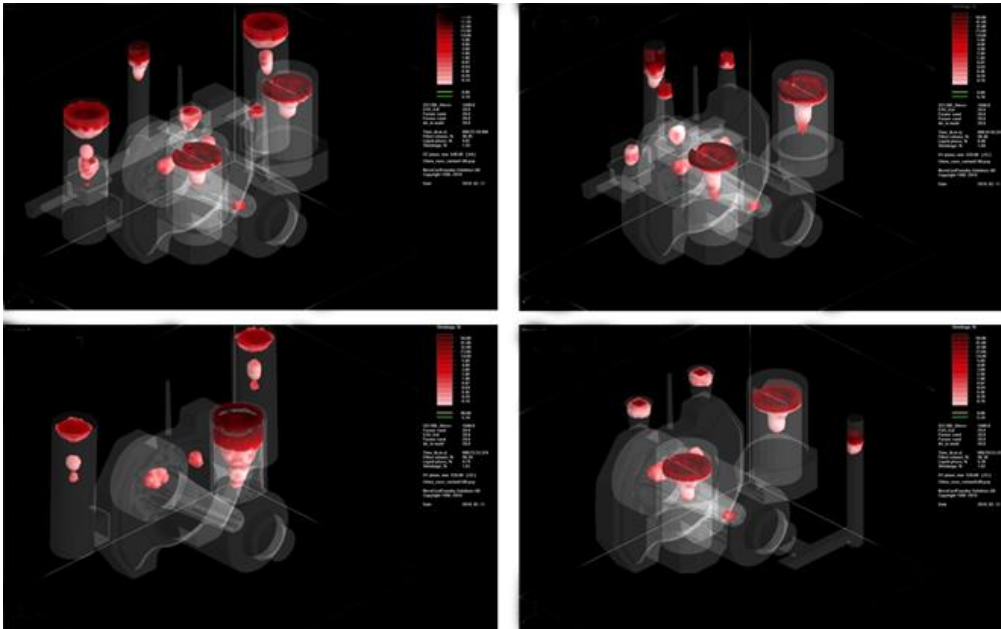
Detect and correct possible errors in crucial phases



* NovaStress is a fully integrated module to NovaFlow&Solid that predicts how the part will contract, possible residual stresses and risk areas for cracks.

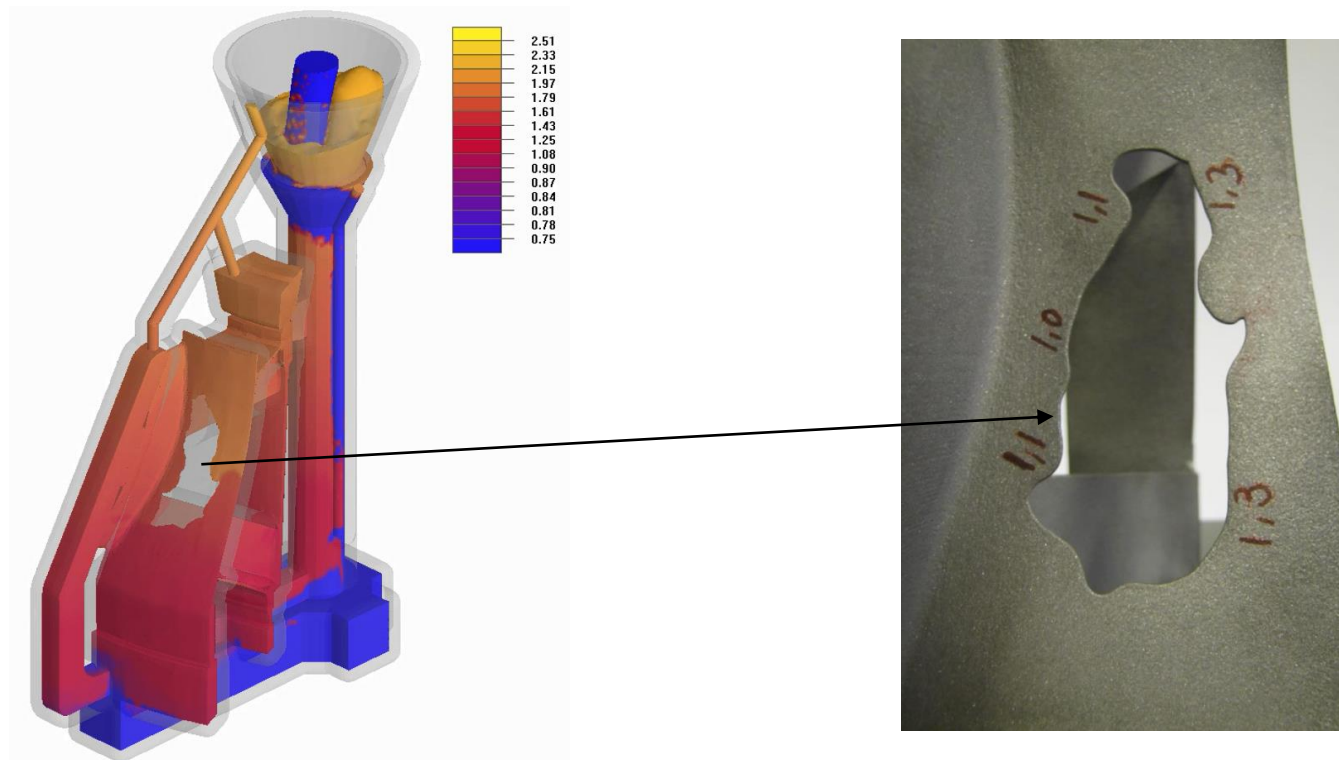
Develop defect free castings

- Lower scrap rate = saves material and energy
- Lower temperatures = saves energy
- Improved yield = saves material and energy



Develop thin walled parts

Save material, energy and fuel consumption, simulate the limit for your products and optimize the process parameters



Simulation performed by Swerea with NovaCast software within the Cleansky LEAN project

Optimize feeders

Calculate modulus and feeder size
Test various feeders and optimize yield

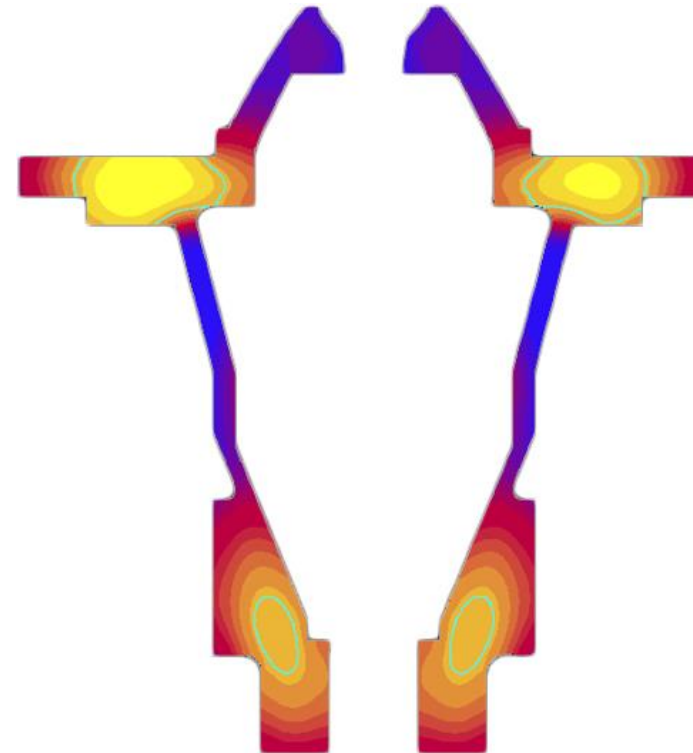
Feeder size calculation

Use (Shift+Mouse) on section to input a casting modulus

Input data		Result	
Alloy name	G20Mn5 (S)	Minimum Feeder modulus, cm	2.176
Alloy density, kg/m ³	7002.981	Actual modulus ratio Feeder/Casting	1.582
Casting modulus, cm		Feed metal requirement, cm ³	451.821
Geometric modulus	1.376	Feeder weight, kg	12.898
Casting weight to be fed, kg	49.916	Modulus Feeder neck, cm	1.514
Pouring temperature, °C	1610.000	Feeder neck dimension square, mm	60.542
Minimum Feed metal requirement, %	4.528	Minimum Feeder diameter, mm	116.061
Minimum Modulus ratio Feeder/Casting	1.200	Minimum Feeder height, mm	174.092
Feeder ratio Height/Diameter	1.500		
Modulus ratio Neck/Casting	1.100		
Feeder type	Cylinder		
Mould hardness	80.000		
Location	Top		

N	Casting modulus, cm	[X,Y,Z], mm
1	1.376	[278.33, 277.30, 81.89]

Add to list Delete Save to file
Save ratio Cancel





Reduce need for pattern changes

- NovaStress – integrated add-on module to NovaFlow&Solid
- Simulate residual stresses
- Simulate dimensional changes and distortion
- Saves lead time and need for changes
- Optimize patterns from the beginning

Good Guy's index

NOVACAST

Test 01

Material Cost: 3 €/kg, Melting Cost: 0.5 €/kg, Energy Consumption: 625 kWh/ton, Energy Price: 0.15 €/kWh

Buttons: Save Product, Open Product, New Product

		Iterations			
		Base	1	2	
Weight	Casting	Kg	40	40	40
	Feeder	Kg	40	38	32
	Ingate	Kg	8	8	7
	Total	Kg	88	86	79
Weight	Mould	Kg	400	400	400
Liquidus temp		°C	1510	1510	1510
Weight savings		Kg		2	9
Casting yield			45.5 %	46.5 %	50.6 %
Yield improvement				2.3 %	10.2 %
Casting/mould ratio			22.0 %	21.5 %	19.8 %
Volume shrinkage			3.2 %	3.2 %	3.2 %
Init. casting temp		°C	1620	1620	1620
Solidification time		s	1637	1637	1637
Max. geometrical modulus		cm	2.3	2.3	2.3
Minimum time to shake-out		min	185.2	185.2	185.2
Material cost savings		€		6.00	27.00
Energy savings		€		1.00	4.50
Total cost savings		€		7.00	31.50
CO2 emission		Kg	158.4	154.8	142.2
Energy consumption		KWh	55	53.75	49.375
Electrical cost		€	8.25	8.06	7.41
Good Guy's index			17.7	18.3	20.3

Add iteration

Good Guys' Index

- Yield comparison
- Energy consumption/cost comparison
- CO₂ emissions
- Good Guys' Index

Good Guys' Index (GGI)

- The best resource is the one that is not used
- Every casting counts
- Compare effects of choosing EXO feeders
- See effect of reduced pouring weight

The GGI is easy;

You get score 100 if you have a yield of 100% and zero degrees pouring temperature over the liquids!

Impossible? No. Hard? Yes!

**So, let's reduce the
environmental footprint.**