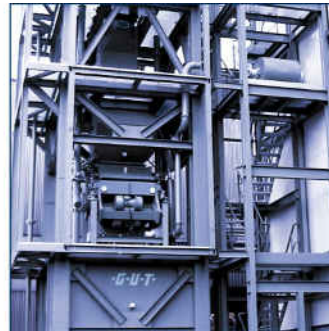




„ECO-FORM a concept for hand moulded no bake castings“

2. Metal Casting Conference, Jo'burg, 16.03.2017



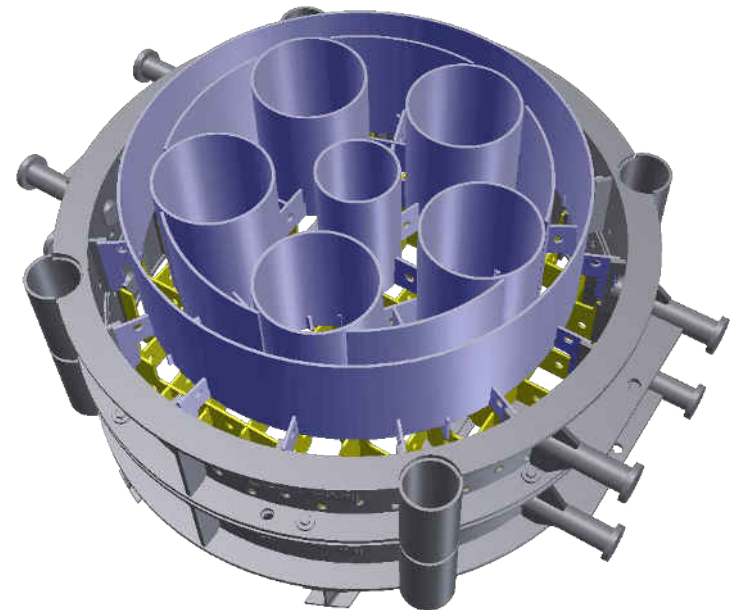
Jens Müller-Späth

- Iron or Steel Foundry with castings > 500 kg per piece
- Jobbing Foundry, but with some parts to be casted regularly in smaller or larger order lot quantities
- Hand molding shop - best
- Nobake binder system like furane, alphaset, or also inorganic waterglass process

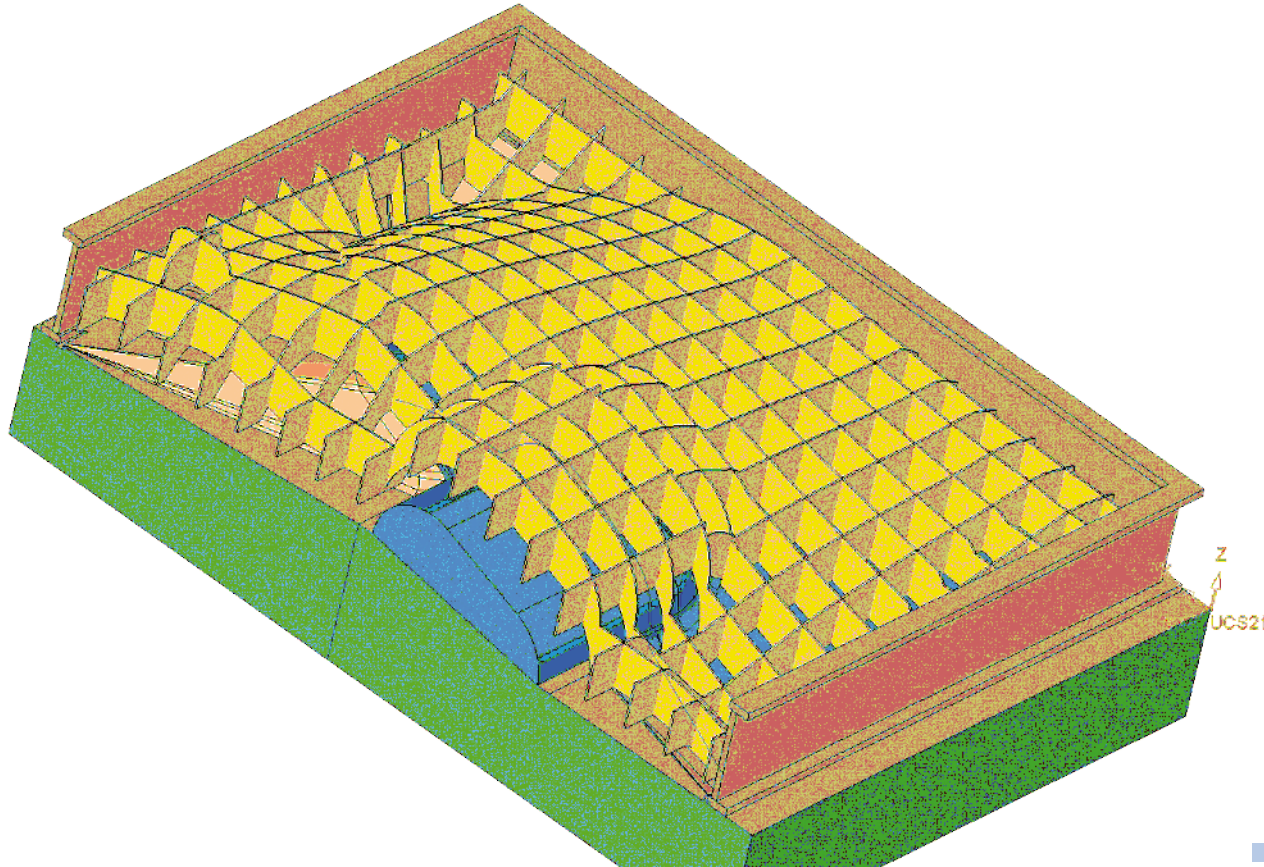


What is ECO-FORM?

- a visionary concept to do no-bake hand molds
- an idea to use individual flasks for individual patterns
- an environmental friendly production method
- ideally to combine with G U T
moulding lines



reinforced ECO-FORM flasks „fit to pattern“



- near net shape reinforced flask

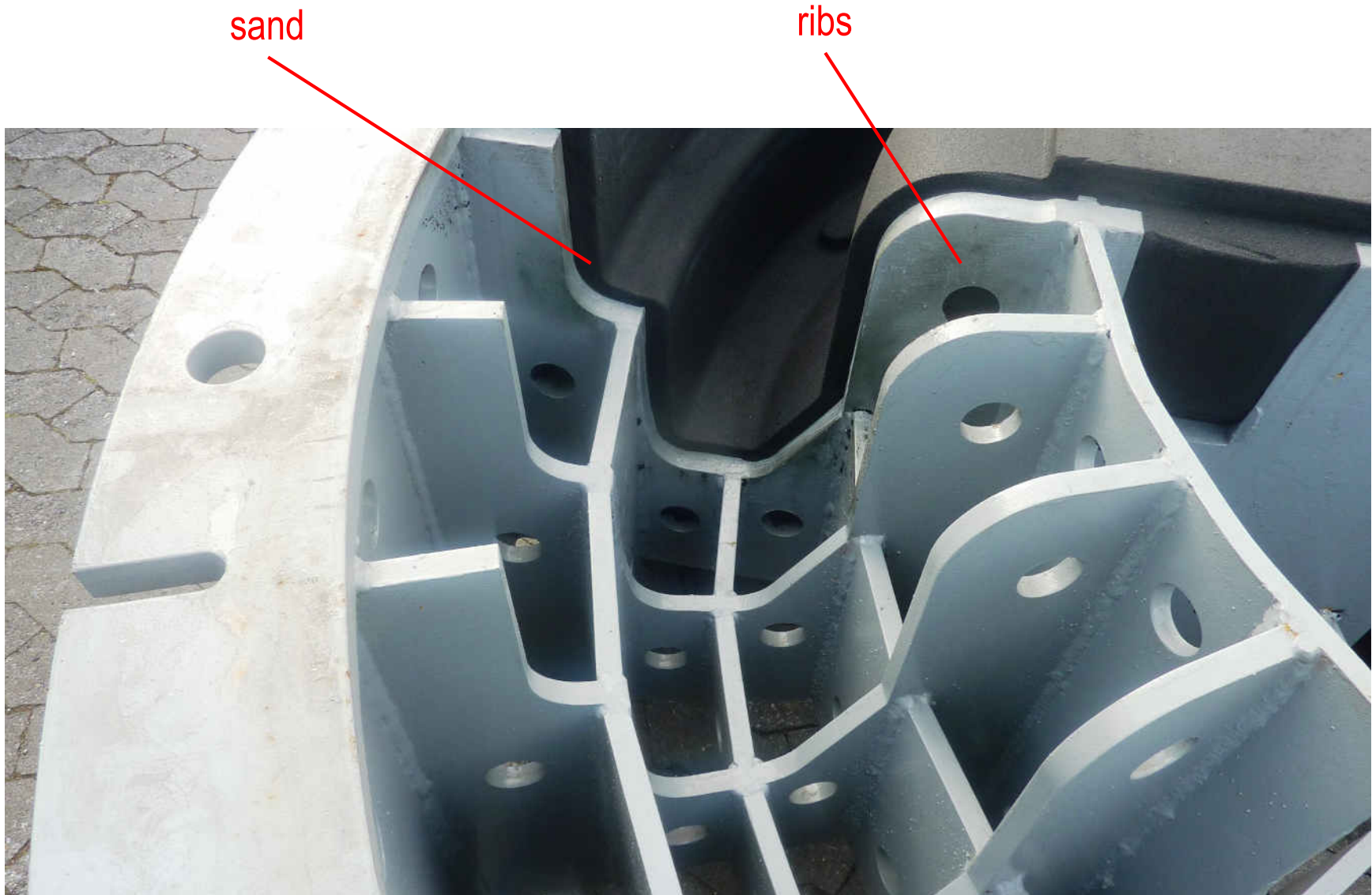
ECO-Form flask – shown at GIFA 2015



with furan
bonded sand

empty

ECO-Form flask – shown at GIFA 2015



Mill Shell Liner (in Sodium Silicate – CO₂)

ECO-Form project in the Middle East at
Tabarestan Steel Foundry, Iran-Tehran,
© Mr. Mahan Firoozbakht, R+D-Manager



ریخته گری فولاد طبرستان
TABARESTAN STEEL FOUNDRY

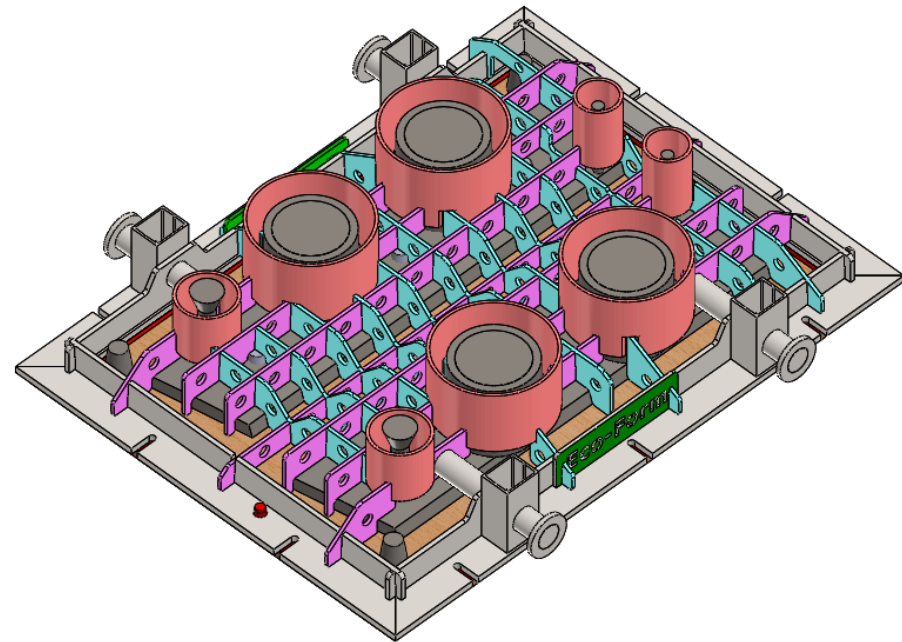
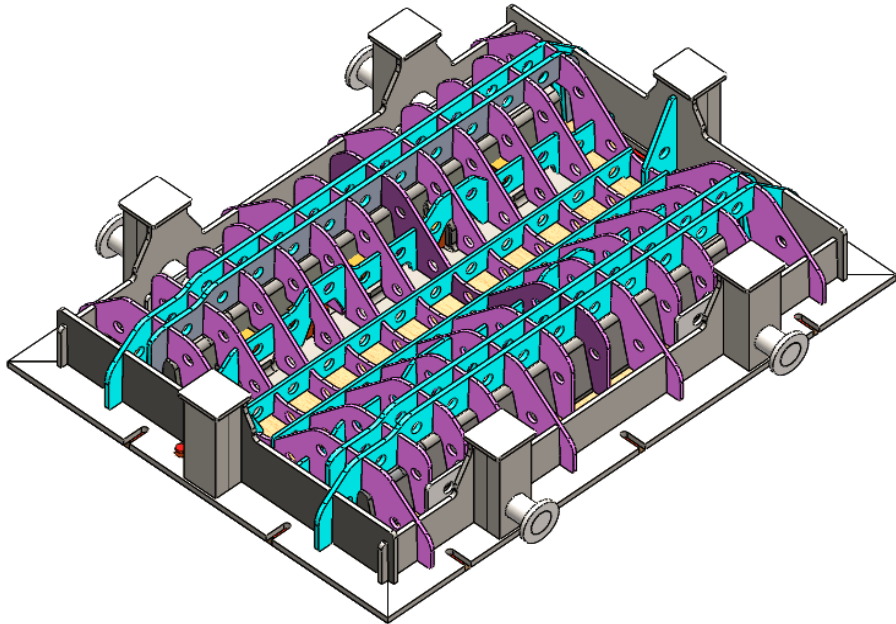
Mill Shell Liner (in Sodium Silicate / CO₂ - process)

- aluminium pattern on machined iron plate
- special design of CO₂ blowing from pattern and plate

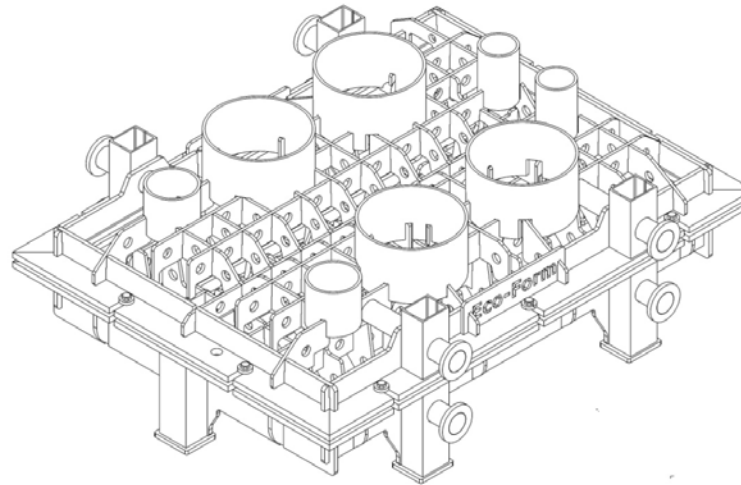
©



- ECO-FORM 3D CAD molding box design
- near net shaped ribs
- sand saving design

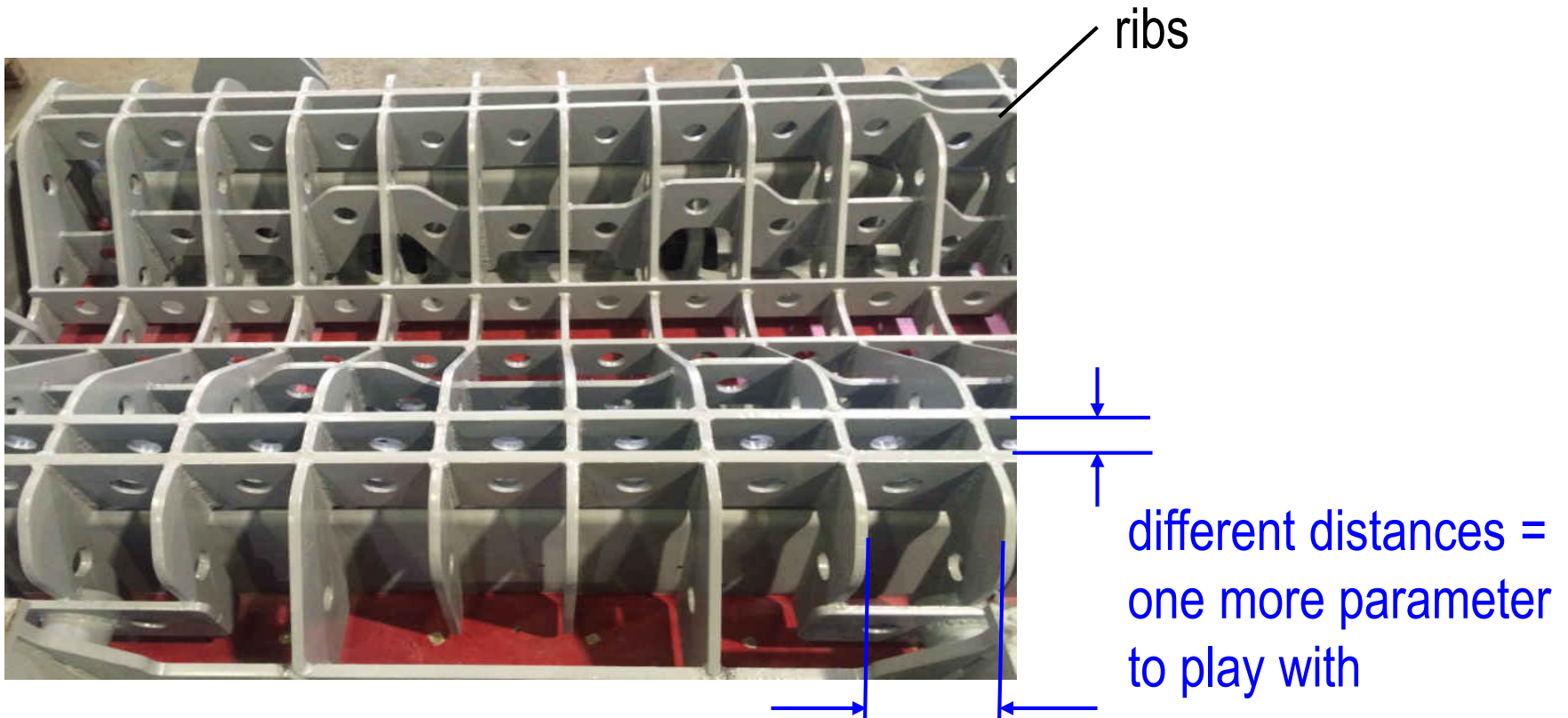


- ECO-FORM molding box fabrication
- laser cutting and welding



Mill Shell Liner (in Sodium Silicate / CO₂ - process)

- ribs substitute chills
- design (shape + size) of ribs and distance in between = engineering of cooling rate = solidification design



Mill Shell Liner (in Sodium Silicate / CO₂ - process)



- ☺ less sand
- ☺ less binder (here: water-glass)
- ☺ less CO₂
- ☺ less mold fabrication time
(no chills, no sand nails and
similar = easy job !)



Mill Shell Liner (in Sodium Silicate / CO₂ - process)



- ☺ controlled solidification parameters
- ☺ less internal stress
- ☺ due to good heat dissipation through the ribs and less sand much faster cooling of the casting ⇒ higher productivity ⇒ increased competitiveness

Mill Shell Liner (in Sodium Silicate / CO₂ - process)



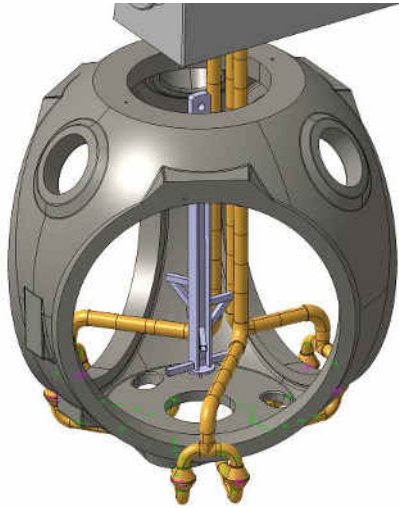
- ☺ good sand to metal ratio
- ☺ less amount of lumps at shake out

Mill Shell Liner (in Sodium Silicate / CO₂ - process)

	ECOFORM powered by -G-U-T-	Conventional Method	
new custom made molding box	2900 kg	---	☹
Sand volume of drag (theoretical)	870 dm ³	1500 dm ³	😊
Sand volume of cope (theoretical)	670 dm ³	1110 dm ³	😊
Total sand consumption	approx. 2300 kg	approx. 3900 kg	😊
Total resin consumption	approx. 120 kg	approx. 200 kg	😊
CO ₂ blowing time	average 5 min	average 30 min	😊
Preparing chills for molding	---	average 15 min	😊
Preparing reinforcing bars for molding	---	average 15 min	😊
Mold repairing	---	average 10 min	😊
Cooling time inside the mold (after pouring)	22 hours	36 hours	😊
Shake out time (after pouring)	24 hours	40 hours	😊

approx. - 40%

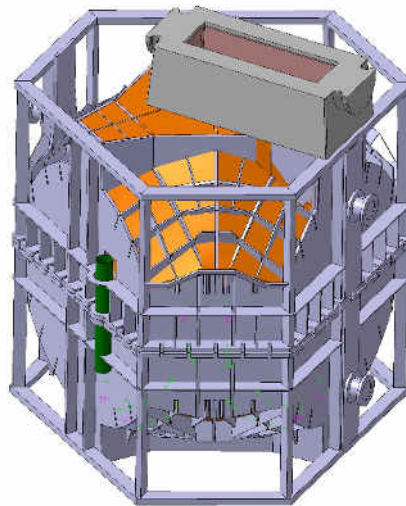
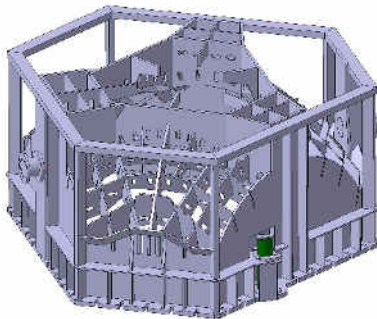
Hub for Wind Turbine



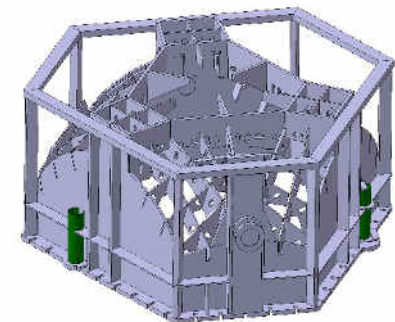
hub



cope



drag

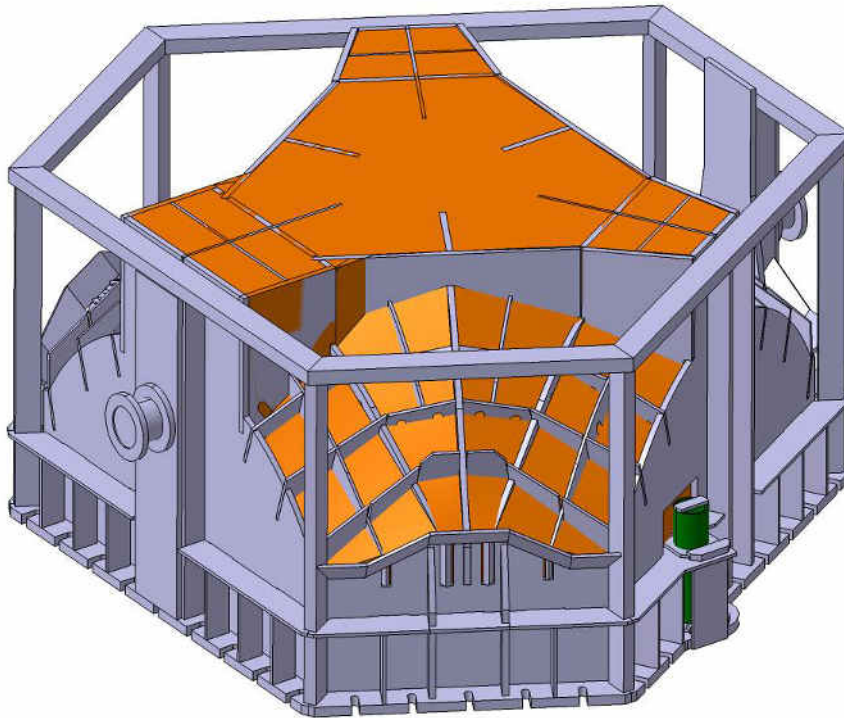


Hub for Wind Turbine – cope

ECOFORM

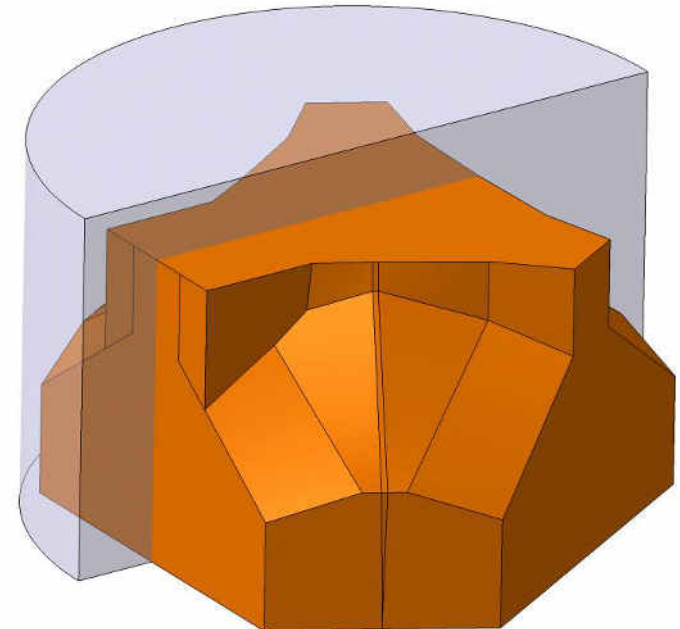
powered by **-G-U-T-**

sand weight: 15 tons



box weight: 17,6 tons

sand weight: 51 tons

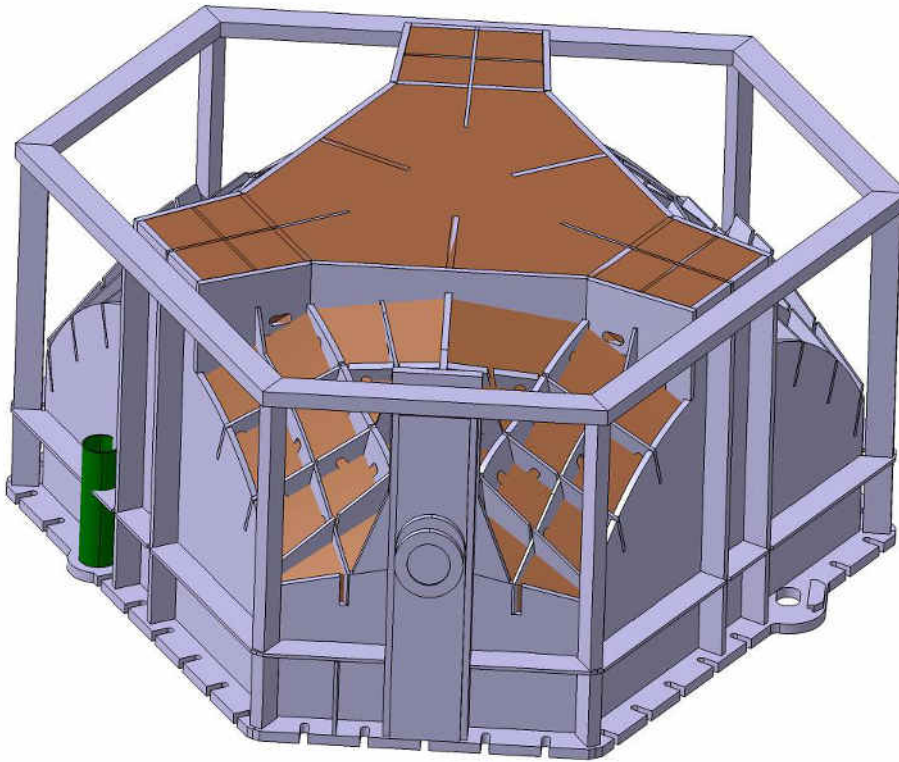


Hub for Wind Turbine – drag

ECOFORM

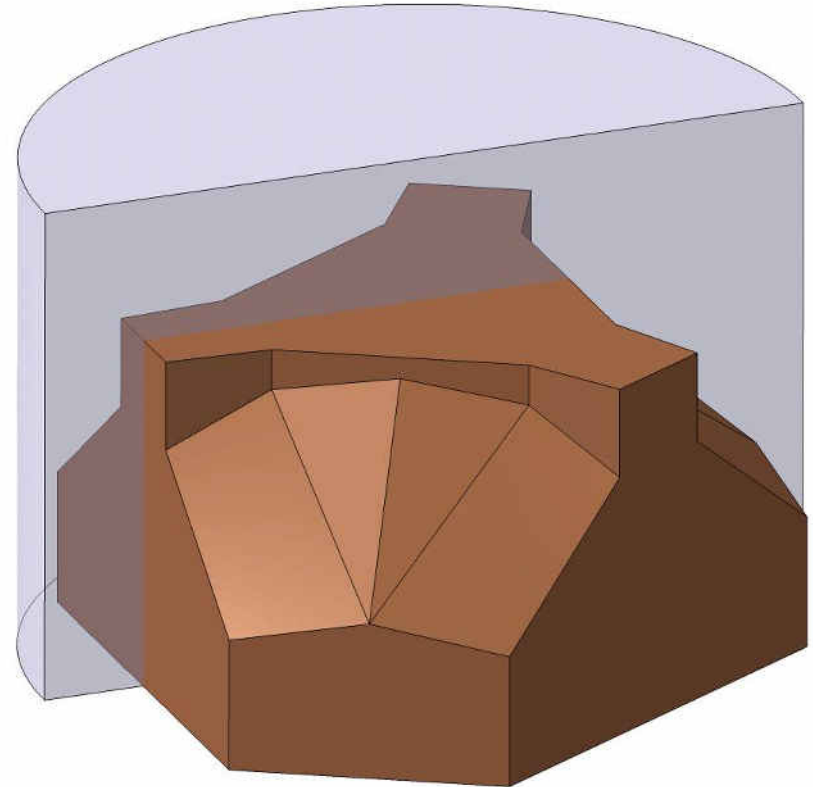
powered by **-G-U-T-**

sand weight: 14 tons



box weight: 17,0 tons

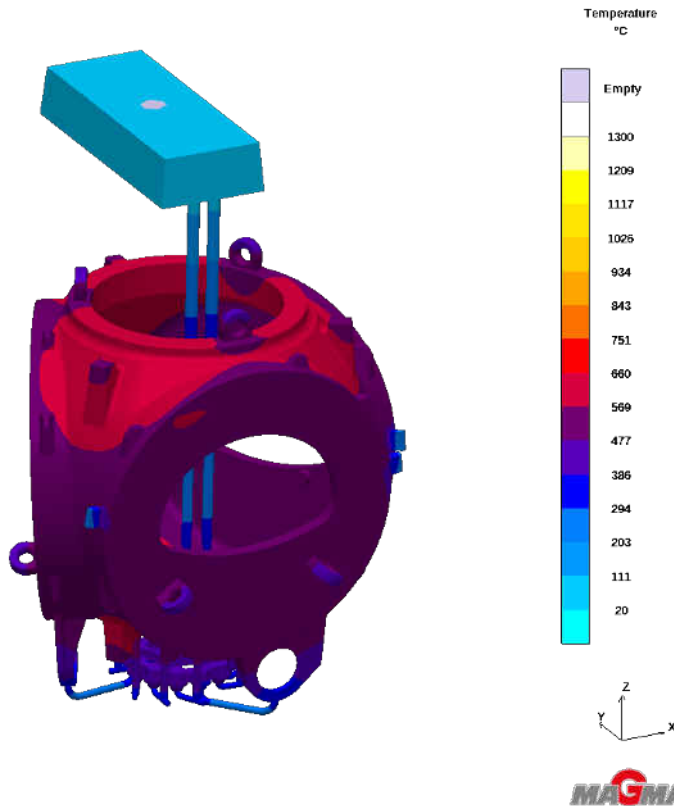
sand weight: 67 tons



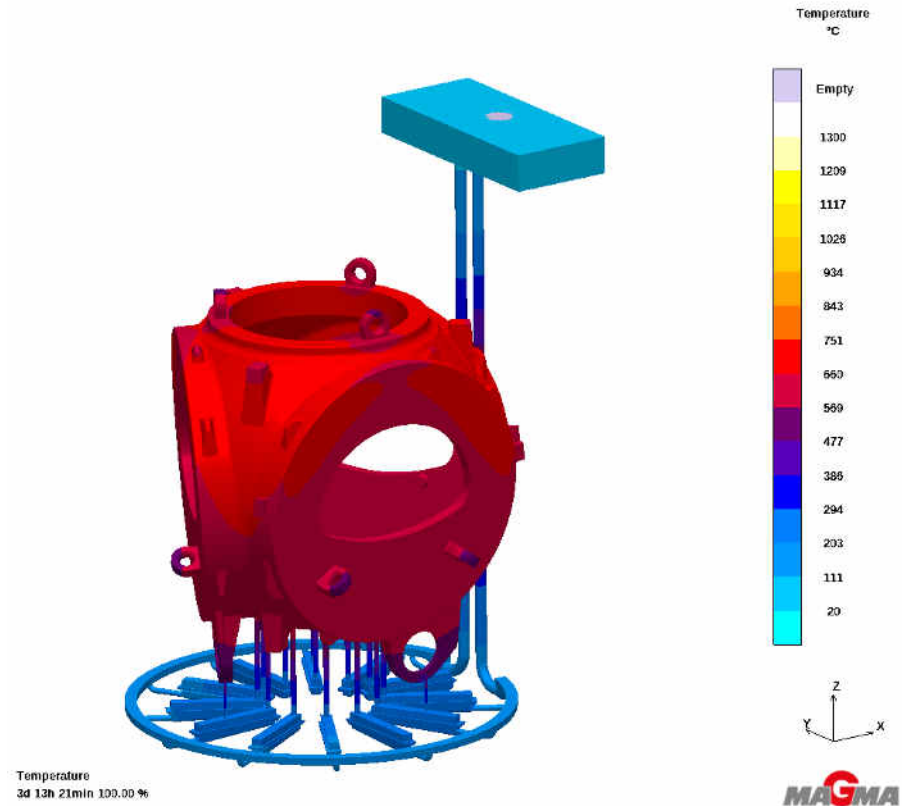
left: ECO-FORM right: standard



Simulation results – 6M hub



near net shape box
final cooling time: 6 days



standard box
final cooling time: 11 days

ECO-FORM – reference parts

ware part (chain) for large construction vehicles

steel

hubs for wind turbines

ductile iron

torque converters for wind mills

ductile iron

pinion cages for wind mills

ductile iron

main frame for wind mills

ductile iron

Kaplan turbine blades

steel

Francis turbine blades

steel

Impellers

steel

pump housings

steel

drive gears

steel

turbine casings

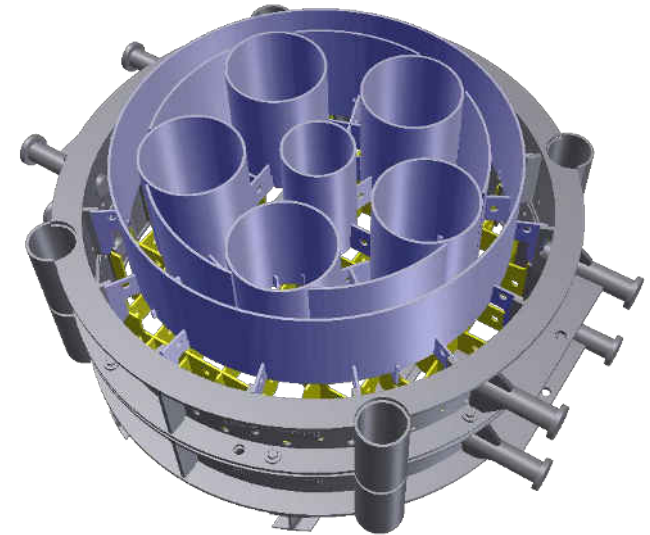
ductile iron

... more than 50 different patterns
... hundreds of „ECO-FORM“ castings



ECO-FORM benefits

- very strong and stable moulds
- high quality castings, accurate in dimension and shape, very little internal stress
- environmently friendly because of less sand, less chemicals, less waste and less energy
- no more labour intensive work during molding (no or very little manual reinforcements necessary)
- quicker molding process
- lot faster cooling of the casting inside the mould
- no more counter weight on top of the moulds (ECO-FORM cope and drag are usually bolted or clamped together)



-G-U-T-
Giesserei Umwelt Technik GmbH



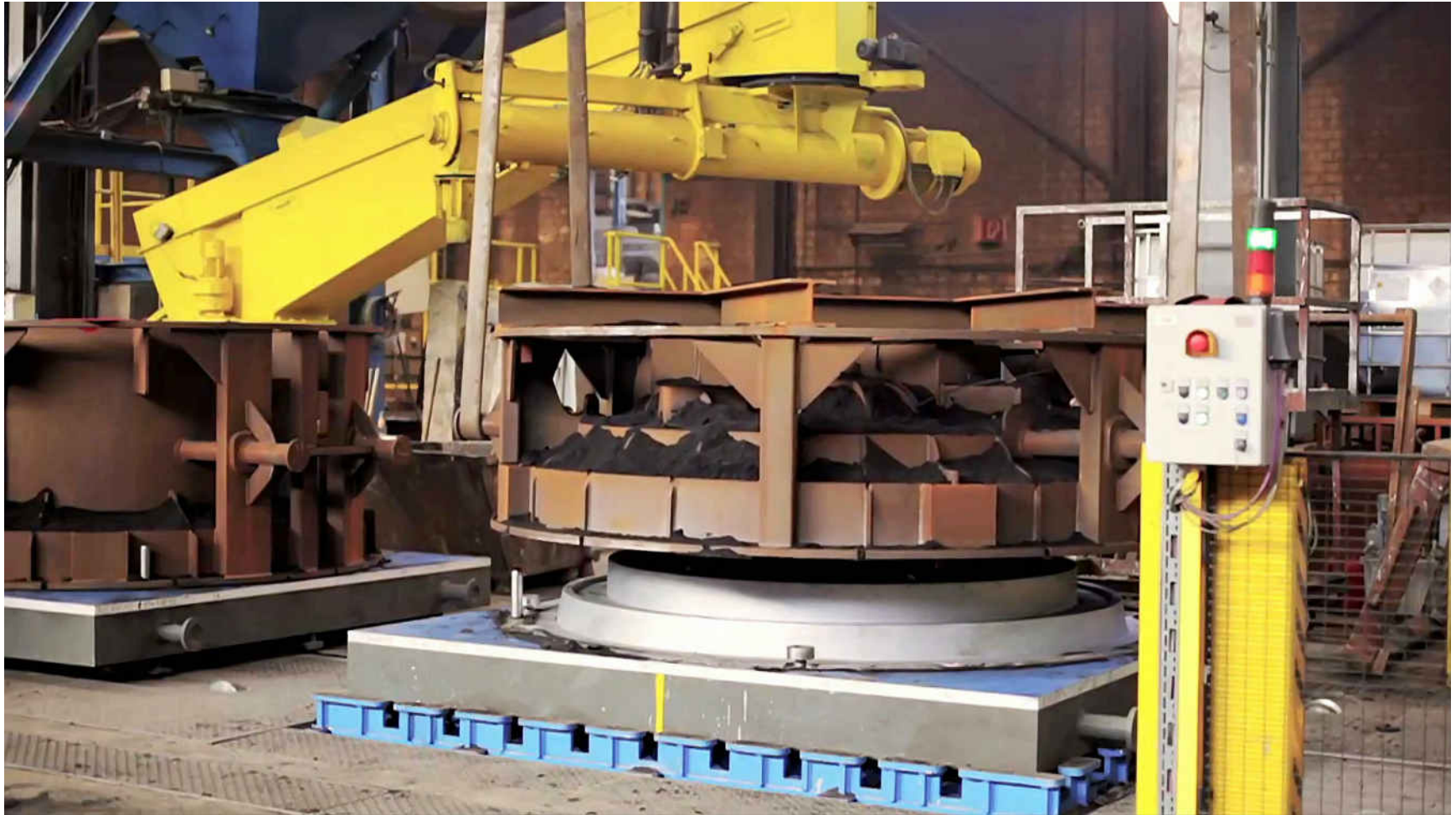
Molding Line for ECO-Form - made by G U T



Molding Line for ECO-Form - made by G U T



Molding Line for ECO-Form - made by G U T



Molding Line for ECO-Form - made by G U T



Molding Line for ECO-Form - made by G U T

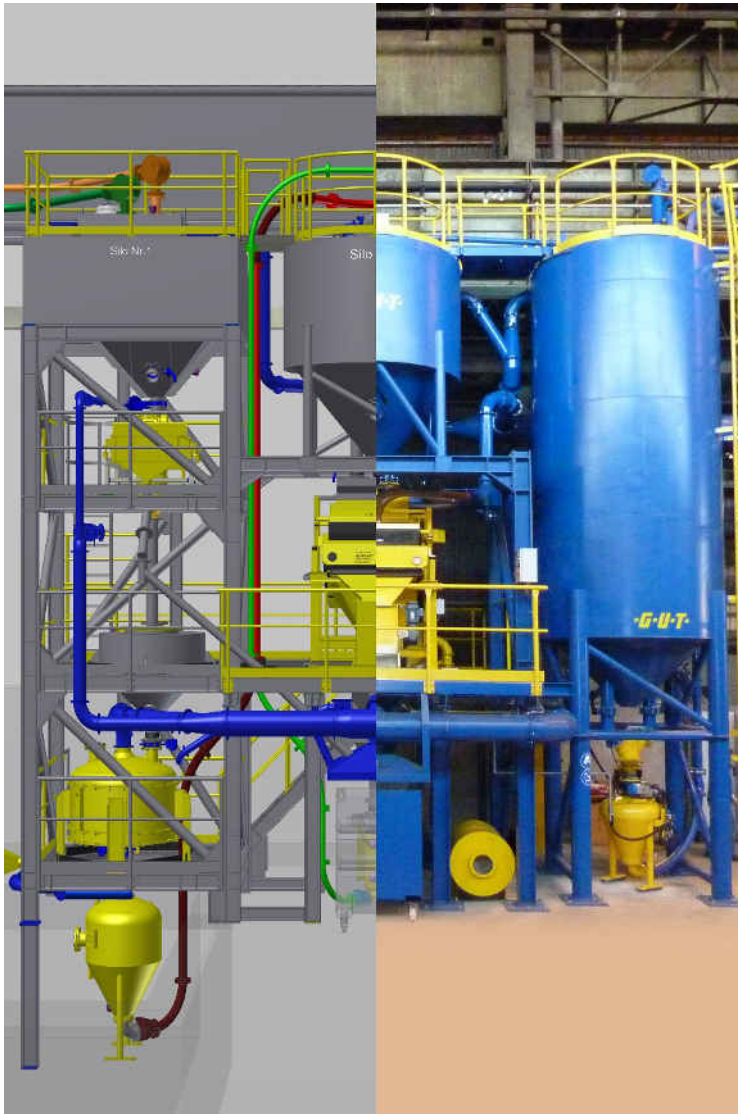


Molding Line for ECO-Form - made by G U T



Shake out for ECO-Form - made by G U T

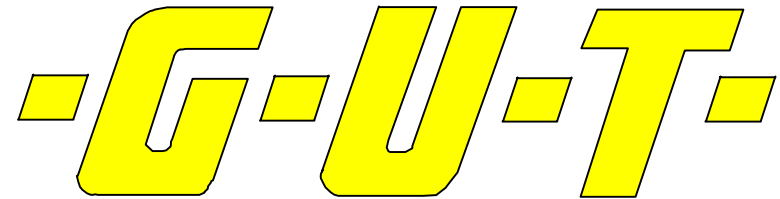




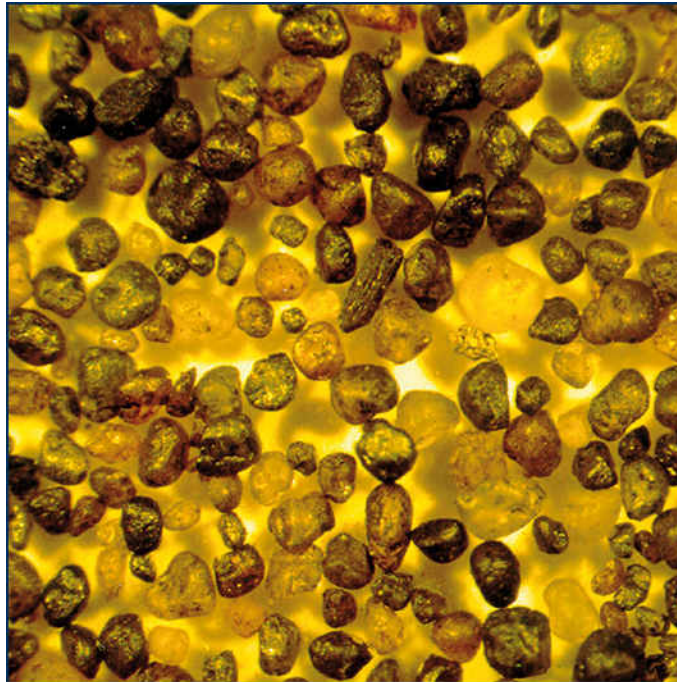
G U T... from consulting and engineering to a turn-key plant ... we design your success



Thank you very much for your kind attention!



... specialist for nobake foundry plants!



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