

FERRY-CAPTAIN

Leading by INNOVATION

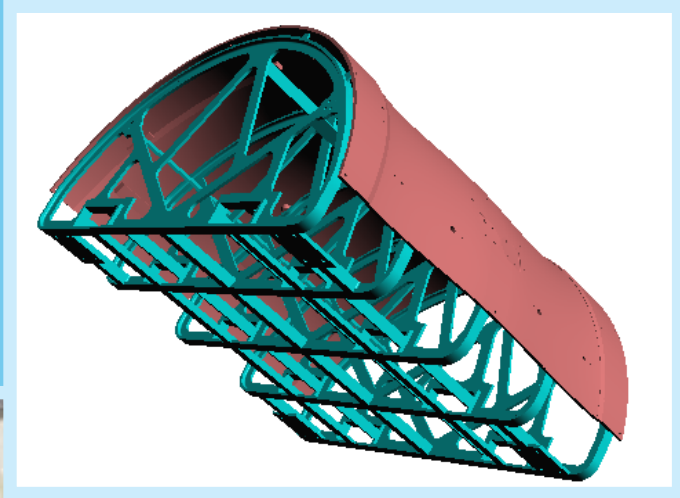


FC AEROSPACE

INVAR & HEAT RESISTANT STEEL TOOLING

RESEARCH & DEVELOPMENT

«FC FRAME»

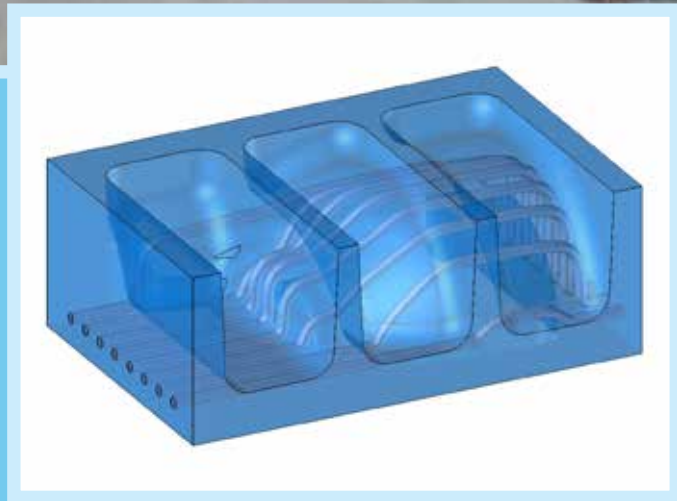


OUR «FC FRAME» DESIGN CUSTOMIZED FOR YOUR NEEDS

- Co-Designed with our customers
- Topological optimization
- Extended lifetime
- High dimensional stability through autoclave cycle (low CTE)



Flap fairing tooling
Invar Ferrynox N36 - 1 500 kg
Dimension : 5 000 mm length



OUT OF AUTOCLAVE TOOLS

- One piece casting
- No welding construction
- Cast passages following the shape
- Thermal homogeneity

WEIGHT SAVINGS

- Up to 60% weight savings compared to fabricated egg-crate
- Up to 40% price savings
- Less energy in your autoclave
- Improve your cycle times

MATERIAL AS PER YOUR NEEDS

HEAT RESISTANT STEEL

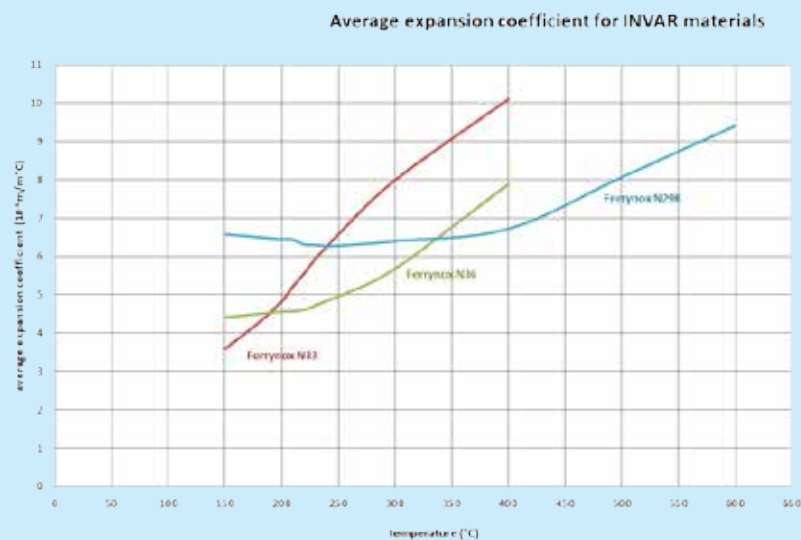
Hot Forming & Super Plastic Forming application

- Creep strength
- Tensile strength

	Working temperature	Creep strength			
		Rupture (MPa)		1% elongation (MPa)	
		100 h	1 000 h	1 000 h	10 000 h
Ferrynox 25 HF die applications	700°C (1 290°F)	100	80	/	65
Ferrynox 37 SPF & DB processes	925°C (1 700°F)	32	24	19	/
Ferrynox 52S SPF & DB processes	950/980°C (1 740/1 800°F)	33	24	19	/

INVAR

Low CTE materials



- Thinness : as cast section as thin as 12 mm (1/2 inches)
- Composite curing
- Low CTE at 400°C (750°F) for thermoplastic applications

	At room temperature			At high temperature			
	UTS (MPa)	0.2 % YS (MPa)	E (%)	Temp.	UTS (MPa)	0.2 % YS (MPa)	E (%)
Ferrynox A36 Composite curing processes up to 180°C (350°F)	390	220	45	200°C (390°F)	290	120	28
Ferrynox N33 Composite curing processes between 180°C (350°F) to 250°C (480°F)	430	270	17	200°C (390°F)	340	140	20
Ferrynox N36 Composite curing processes between 180°C (350°F) to 250°C (480°F)	420	260	18	250°C (480°F)	330	110	24
Ferrynox N29K (patented) High temperature polyamide curing processes up to 450°C (840°F)	450	280	20	400°C (750°F)	320	140	25

SOLUTIONS PROVIDER



- Higher Hardness material : FerrySteel 38NCD7
- High conductivity : Ferrynox N95

Bring your problems, provides solutions !

MANUFACTURING STRENGTHS



PATTERNLESS MOLDING TECHNIQUE



- Near net surface finish
- Precise mold geometry
- No pattern required
- Unlimited size range
- Near net shape
- Cut lead times

OVERSIZE CAPABILITIES

RTM mold for rotor blade
Invar Ferrynox A36
Dimension : 9 000 mm length

- Up to 30 000 kg cast weight
- Up to 10 000 mm length in one part

AOD CONVERTER



Invar Ferrynox N36 - 13 000 kg
Diameter : 3 500 mm

- 16 tonnes liquid metal
- Superior mechanical properties
- Low level of residual elements

FINISH MACHINING CAPABILITY

- More than 200 modern machines
- As-cast, rough-machined and finish-machined tooling
- Large finish-machining capability
- 5-axis CNC milling machines



SPF Ferrynox 37 - 6 000 kg
Dimensions : 2 500 x 1 500 x 230 mm

IN-HOUSE TESTING

- Vacuum testing
 - No porosity
 - Material integrity
- Dilatometer/CTE test





FERRY-CAPITAIN

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