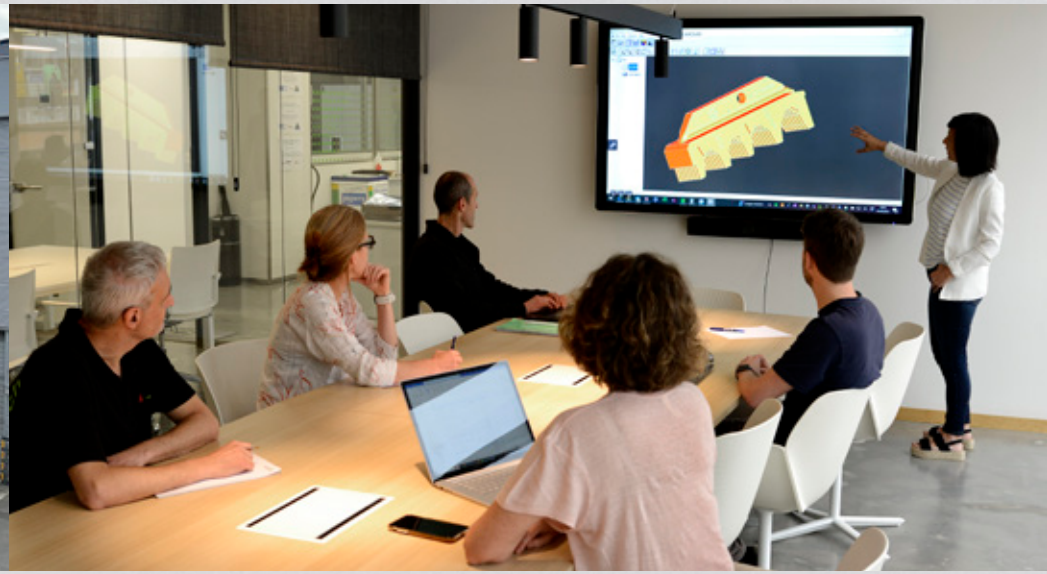
ALFA MIM tech

metal injection moulding technologies

www.alfamimtech.com



ALFA MIMtech

Founded in 2004, the century-old company ALFA incorporated modern and innovative MIM technology, leading to the creation of ALFA MIMtech

ALFA MIMtech integrates all the steps of the manufacturing process for any part that is suitable for MIM technology, starting from concurrent engineering with the customer, design and production of injection moulds, drawing up the MIM process, as well as heat or surface treatments and any machining or assembly that may be required.

ALFA MIMtech provides the complete solution for any MIM project

Our commitment to innovation and continuous improvement entails the constant design of training programmes and investment plans.

Our fully integrated processes allow total control and supervision of the different manufacturing phases.

Wholly focused on customer service, we undertake to provide prompt quality solutions to the needs posed by our clients.

MIM Technology

Technology that adapts to your needs

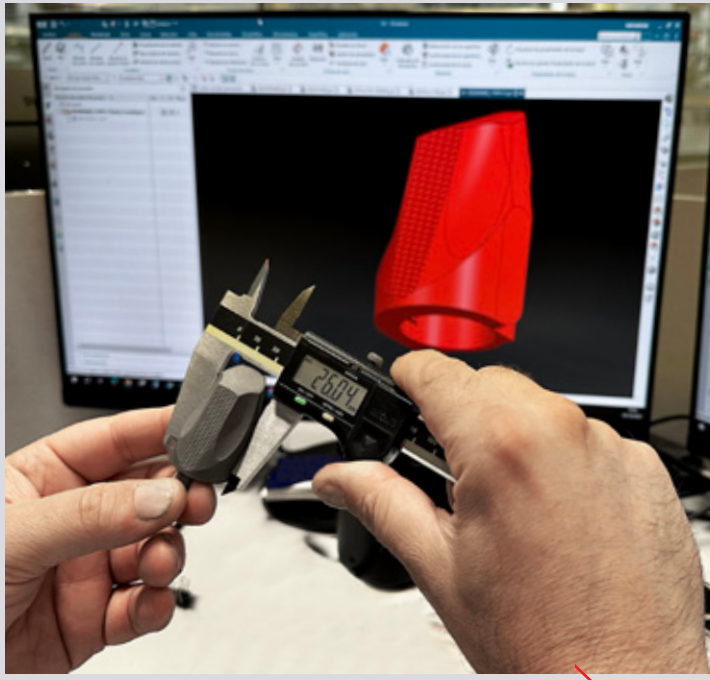
MIM (Metal Injection Moulding) is a manufacturing process for metal parts with superior mechanical and surface properties, with the flexibility of design inherent to thermo-plastic injection.

It combines the best of each technology

The flexibility of design and high productivity of thermo-plastic injection, combined with the high density sintering process, enable us to create parts with exceptional mechanical and surface properties, which can then be enhanced by heat and surface treatments to obtain the final part ready for use.

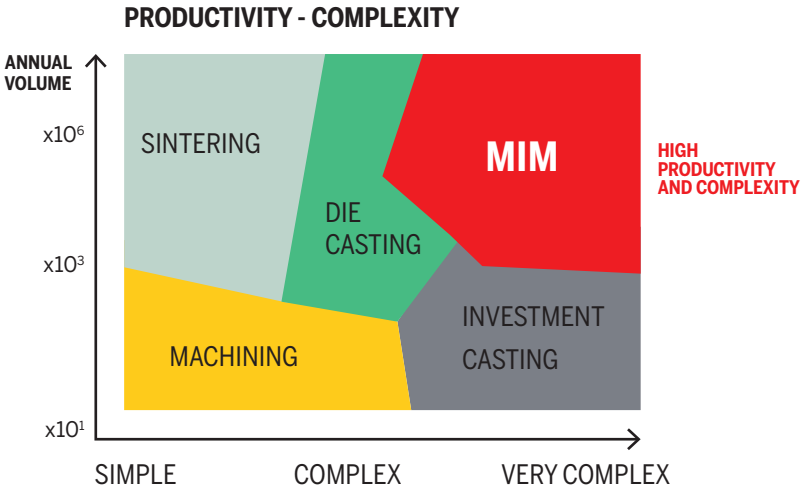
... and offers total precision

Highly complex, accurate and reliable products can be created, with properties similar to those of any machined, precision cast or laminated material etc...



Comparison with other technologies

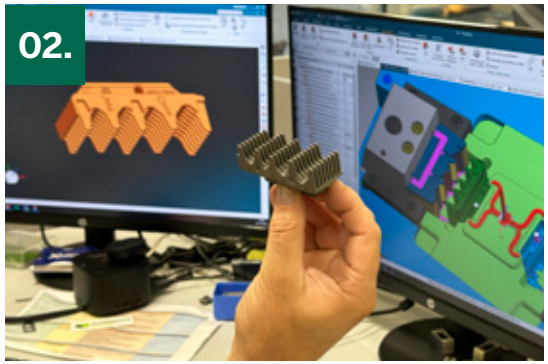
Metal Injection Moulding (MIM) technology has no competition in the production of large series of small parts with high geometrical complexity and superior mechanical properties.



Process

RAW MATERIAL

Homogeneous mixture of metal powder and polymer, plasticisers and lubricants that makes it possible to inject the mixture into moulds to obtain the shape of the part

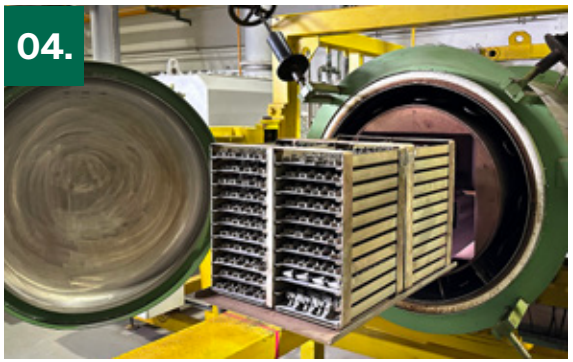


MOULD DESIGN

A mould is designed based on the requirements of the customer

INJECTION

Injection of the mixture to produce the so-called “green part”

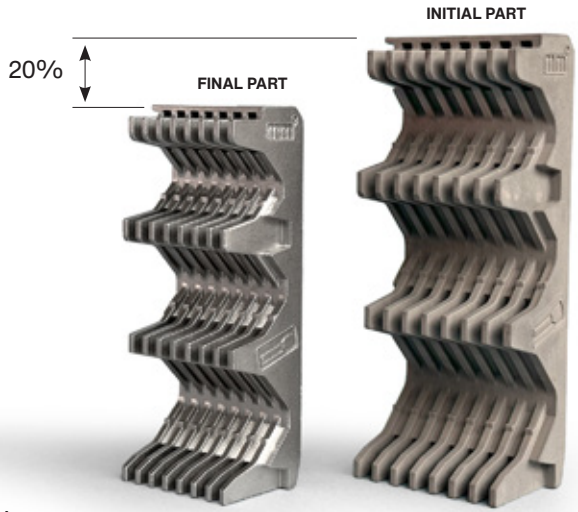


DEBINDING

All the components of the part that do not make up the composition of the final product are eliminated (polymers, plasticisers, lubricants...)

SINTERING

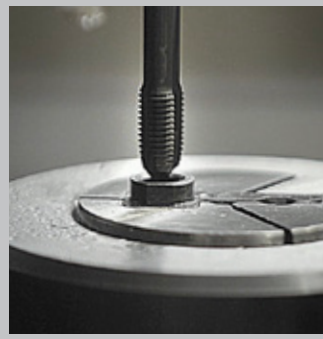
A thermal process in which the porous solid of metal particles is transformed into a dense solid (density>95%) with the microstructure of the alloyed metal of which it is composed



ALFA MIMtech undertakes to supply the finished part integrating the processes necessary to obtain all dimensional, mechanical, surface, aesthetic or functional requirements

MIM technology allows for the subsequent application of a wide range of treatments to endow the part with different properties.

An extensive network of collaborators allows ALFA MIMtech to deliver the finished part, whatever final treatment may be required.



SURFACE TREATMENT

- BALINIT
- BICOAT
- CERAKOTE
- ZINC COATING
- CHROME COATING
- PHOSPHATED
- SHOT BLASTING
- ULTRASOUND CLEANING
- NIQUEL PLATING
- BLACKENING
- PAINTING
- POLISHING
- SUR SULF
- TUMBLING

THERMAL TREATMENT

- HARDENING AND TEMPERING
- CASE HARDENING
- CARBONITRIDING
- ANNEALING
- HIP (Hot Isostatic Pressing)
- NORMALIZING
- IONIT-OX
- GAS NITRIDING
- PRECIPITATION HARDENING
- NITROCARBURIZING
- TENIFER
- PASSIVATION

QUALITY

- LIQUID PENETRANT INSPECTION
- X - RAYS
- METALLOGRAPHY TEST

MACHINING

- THREAD MACHINING
- LAPPING
- GRINDING
- COUNTERSINK
- BURNISHING
- REAMING

OTHERS

- COINING
- SHAPING
- ASSEMBLING
- DEBURRING
- PAINTING

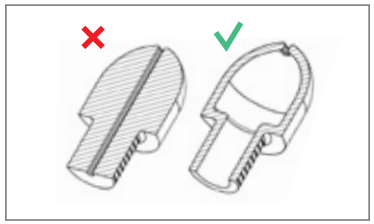
Table of materials

	Material	Equivalent			Characteristics	Mechanical Properties									
						MIM					MIM incl. Heat Treatment				
						Elastic limit	Tensile resistance	Elongation	Hardness	Corrosion (h@ sal)	Elastic limit	Tensile resistance	Elongation	Hardness	Density
		ISO	DIN	SAE / AISI		Rp 0,2 (Mpa)	Rm (Mpa)	A (%)	HV, HRc	h	Rp 0,2 (Mpa)	Rm (Mpa)	A (%)	H	(gr/cm3)
Carbon steel	**FN02**	-	-	MIM 2200	Case hardening	≥150	≥260	≥25	≥80HV10	-	-	-	-	≥710HV10	≥7,5
	FN0205	-	-	-	Hardening and tempering	≥170	≥380	≥3	≥125 HV10	-	≥1000	≥1200	≥2	≥55HRC	≥7,5
	FN08	-	-	-	Case hardening	≥210	≥380	≥15	≥130 HV10	-	-	-	-	≥600HV10	≥7,5
					Hardening and tempering	≥400	≥700	≥3	≥250 HV10	-	≥1100	≥1250	≥3	40HRC	≥7,5
	4605	-	-	MIM 4605	Hardening and tempering	≥400	≥600	≥5	≥150 HV10	-	≥1500	≥1900	≥2	≥50HRC	≥7,5
	8620	21NiCrMo2	1.6523	SAE 8620	Case hardening	≥400	≥650	≥3	≥220 HV10	-	-	-	-	≥800HV10	≥7,4
	42CrMo4	42CrMo4	1.7225	SAE 4140	Hardening and tempering	≥400	≥650	≥3	≥200 HV10	-	≥2150	≥1450	≥2	≥47HRC	≥7,45
	8740	40NiCrMo 2-2	1.6546	AISI 8740	Hardening and tempering	≥530	≥860	≥8	≥200 HV10	-	≥1400	≥1600	≥5	≥510HV10	≥7,5
	100Cr6	100Cr6	1.3505	AISI E 52100	Hardening and tempering, wear resistant	≥500	≥900	≥5	≥290 HV10	-	-	-	-	≥60HRC	≥7,5
Stainless steel	**316L***	X2CrNiMo 17 13 2	1.4404	AISI 316L	Non-magnetic	≥180	≥510	≥51	≥120 HV10	96	-	-	-	-	≥7,9
	304	-	-	-	Non-magnetic	≥170	≥630	≥60	≥130 HV10	72	-	-	-	-	≥7,9
	17-4PH*	X5CrNiCuNb 17 4	1.4542	AISI J467	Ferromagnetic, martensitic (hardenable)	≥660	≥950	≥3	≥30HRC	8	≥950	≥1100	≥5	≥39HRC	≥7,6
	420	X20Cr 13	1.4021	AISI 420	Ferromagnetic, martensitic (hardenable)	≥1200	≥1400	≥0,85	≥600 HV1	2	≥1300	≥1600	≥2	≥45HRC	≥7,4
	310	G-X40CrNiSi 25 20	1.4841	AISI HK30	Refractary, resistant to high termperatures	≥450	≥600	≥16	≥235 HV10	-	-	-	-	-	≥7,72
	PANACEA	X15 CrMnMoN 17 11 3	-	-	Non-magnetic, without Nickel	≥600	≥900	≥35	≥300 HV10	96	-	-	-	-	≥7,55
Softmagnetic	**FeSi3**	-	1.0884	-	Alloy Softmagnetic	≥300	≥500	≥20	≥120 HV10	-	-	-	-	-	≥7,4
	FN50	-	1.3926	-	Alloy Softmagnetic	≥150	≥400	≥20	≥100 HV10	-	-	-	-	-	≥7,85
Special alignment	**Ti**		3.7065	ASTM Ti grade 4	Titanium	≥480	≥550	≥5	≥190 HV1	-	-	-	-	-	≥4,2
	N90	NiCr20 Co 18 Ti	2.4632	SAE J775	Nimonic® 90, Heat resistant	-	-	-	-	-	≥790	≥1270	≥33	≥38 HRC	≥8,18
	GHS-4	PL Ni40 Cr12 Mo6	-	-	Heat and wear resistant	-	-	-	-	-	≥600	≥800	≥2	≥37 HRC	≥7,90
	THOR	-	-	-	Ultra-strong steel, Hardening and tempering	-	-	-	-	24	≥1500	≥1850	≥5	≥50 HRC	≥7,75

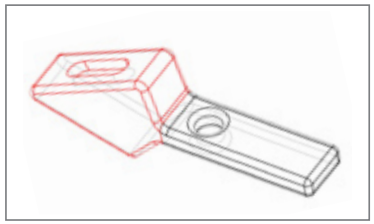
* Various degrees available

Design Recommendations

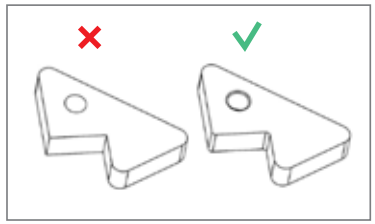
To design a MIM part, the following factors should be taken into account



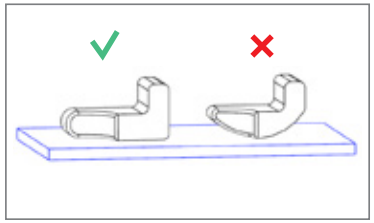
Avoid sudden changes in thickness



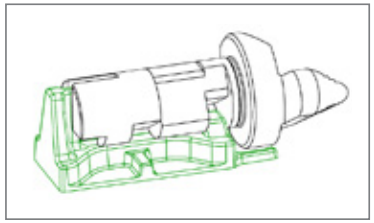
Avoid areas with accumulation of material



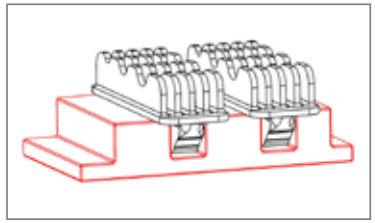
Apply radii on inside edges



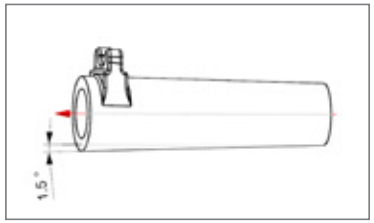
Preferably provide a flat surface to support the part



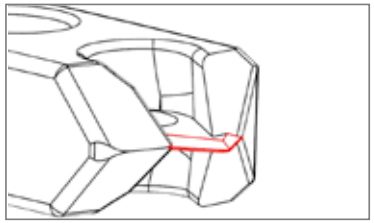
Option to use printed/injected part for support



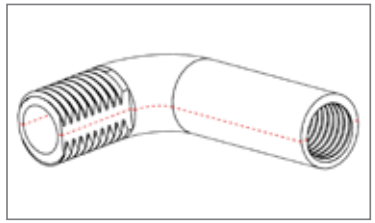
Option to use ceramic supports



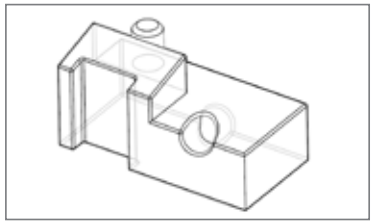
Allow for adequate draft angles for certain surfaces



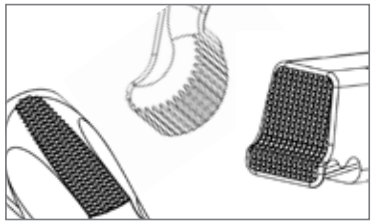
Sharp edges on external areas allowed



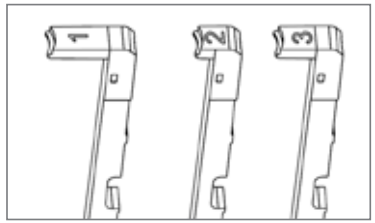
Advisable to apply flat face for external thread



Holes / clearances / grooves



Possibility to generate knurling / marking / text



Possible use of interchangeable inserts for production of different models in the same mould

Tolerances

The MIM process has a tolerance of ±0,5%, although tighter tolerances can be discussed depending on factors such as material, location of the injection point, thermal treatment and the shape of the part, as well as any additional operations (straightening, machining, special controls on process or high precision adjustment of tooling). In any case, it is recommended:

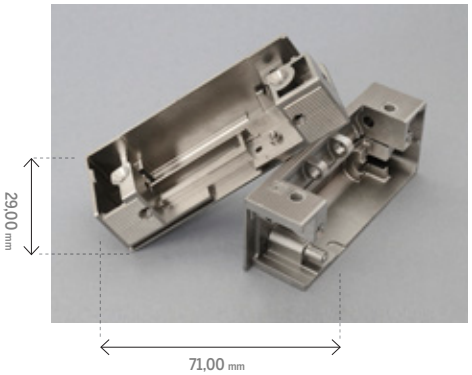
- To specify tight tolerances only on functional dimensions
- To avoid tight tolerances on dimensions affected by parting lines, ejectors and injection points
- To allow for greater tolerance on position dimensions

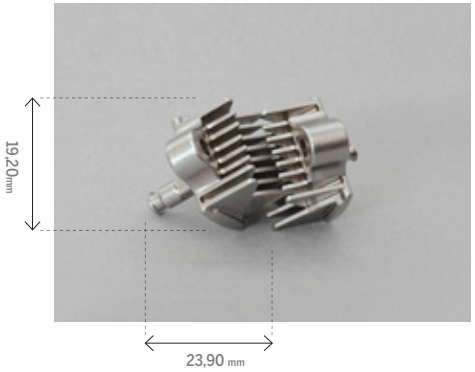
SIZE	TOLERANCE	FIELD
Up to 6 mm	0,05	0,10
6 - 12 mm.	0,08	0,16
12 - 20 mm.	0,12	0,24
20 - 35 mm.	0,19	0,38
35 - 50 mm.	0,26	0,52
Más de 50 mm.	0,05 %	
SHAPE AND POSITION TOLERANCES		
Alignment and concentricity		±0,5 %
Flatness		±0,5 %
Perpendicularity		±0,5 %

Sectors

ALFA MIMtech produces MIM parts for a wide range of sectors:

Locksmiths, tools, arms, sport and leisure, luxury, medical, automobile, robotics, sensors, ...





Quality and Responsibility

Quality and Responsibility

To guarantee the quality and reliability of its products, ALFA MIMtech processes incorporate:

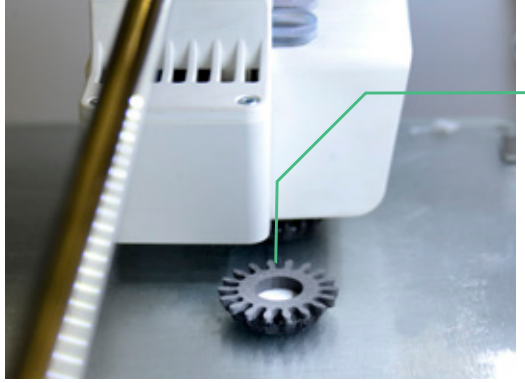
- Analysis of carbon and sulphur content
- 3-D measurement, optical and conventional
- Destructive tests: hardness, tensile, resilience ...
- Non-destructive tests: magnaflux, liquid penetrant inspections ...
- Metallographic tests
- X rays
- Gauges
- Callipers and assembly tools

ALFA MIMtech is always willing to carry out any kind of test requested by the customer

ALFA MIMtech recognises its responsibility with regard to the protection of the environment as an integral part of its commitment to quality.

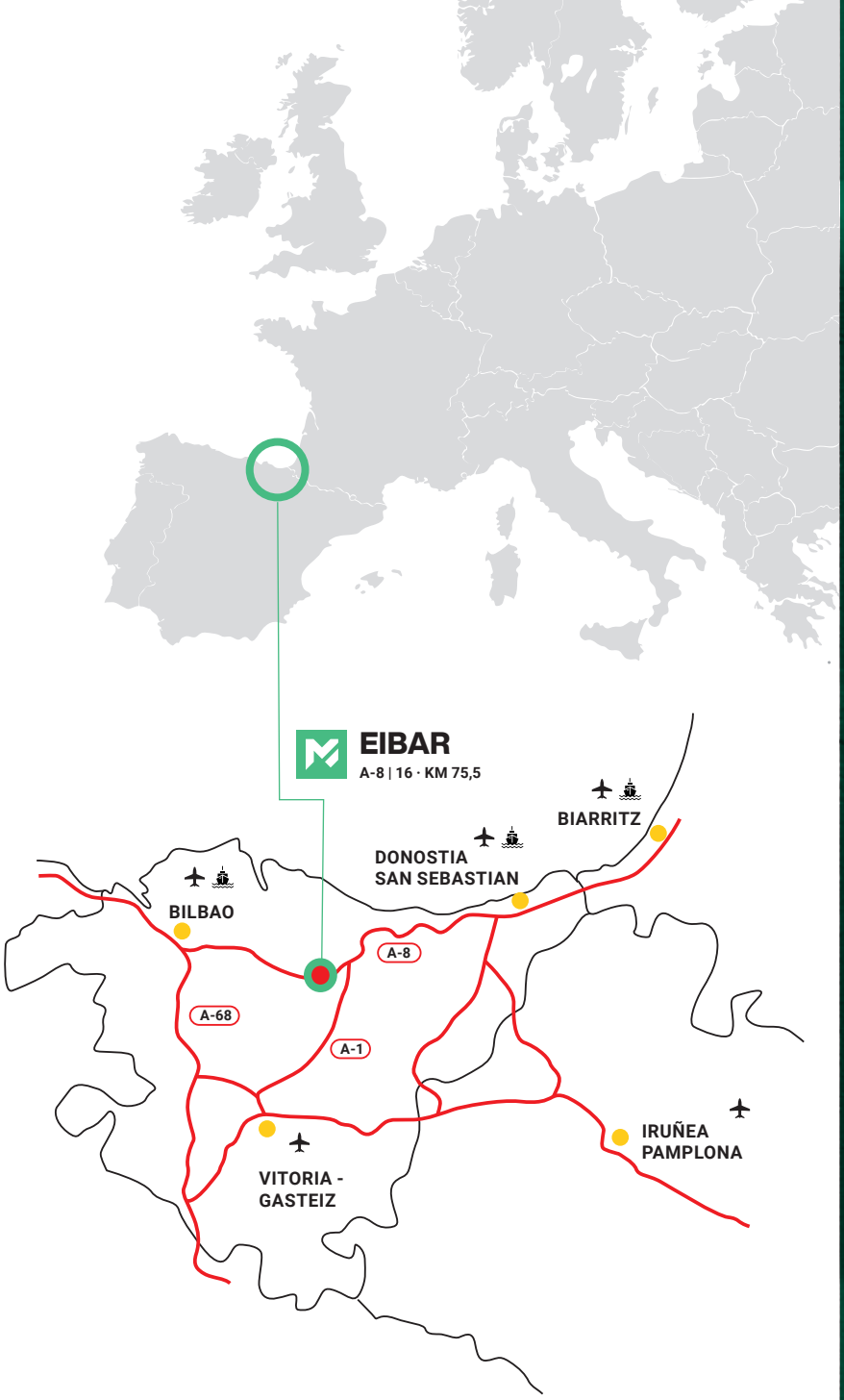
Certifications:

ISO 9001 · ISO 14001 · OHSAS 18001



R+D+i

ALFA MIMtech actively participates in R + D and innovation projects, collaborating with technological centres, universities, and other enterprises. The company works with cutting edge technology in the field of the development of new components, digitalization, automation or additive manufacturing, all placed at the disposal of our customers. Furthermore, ALFA MIMtech is a member of INNOBASQUE, the Basque Innovation Agency, and has been granted the Innovative SME award.



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