

# **COLD DRAWN SPECIAL STEEL PROFILES**

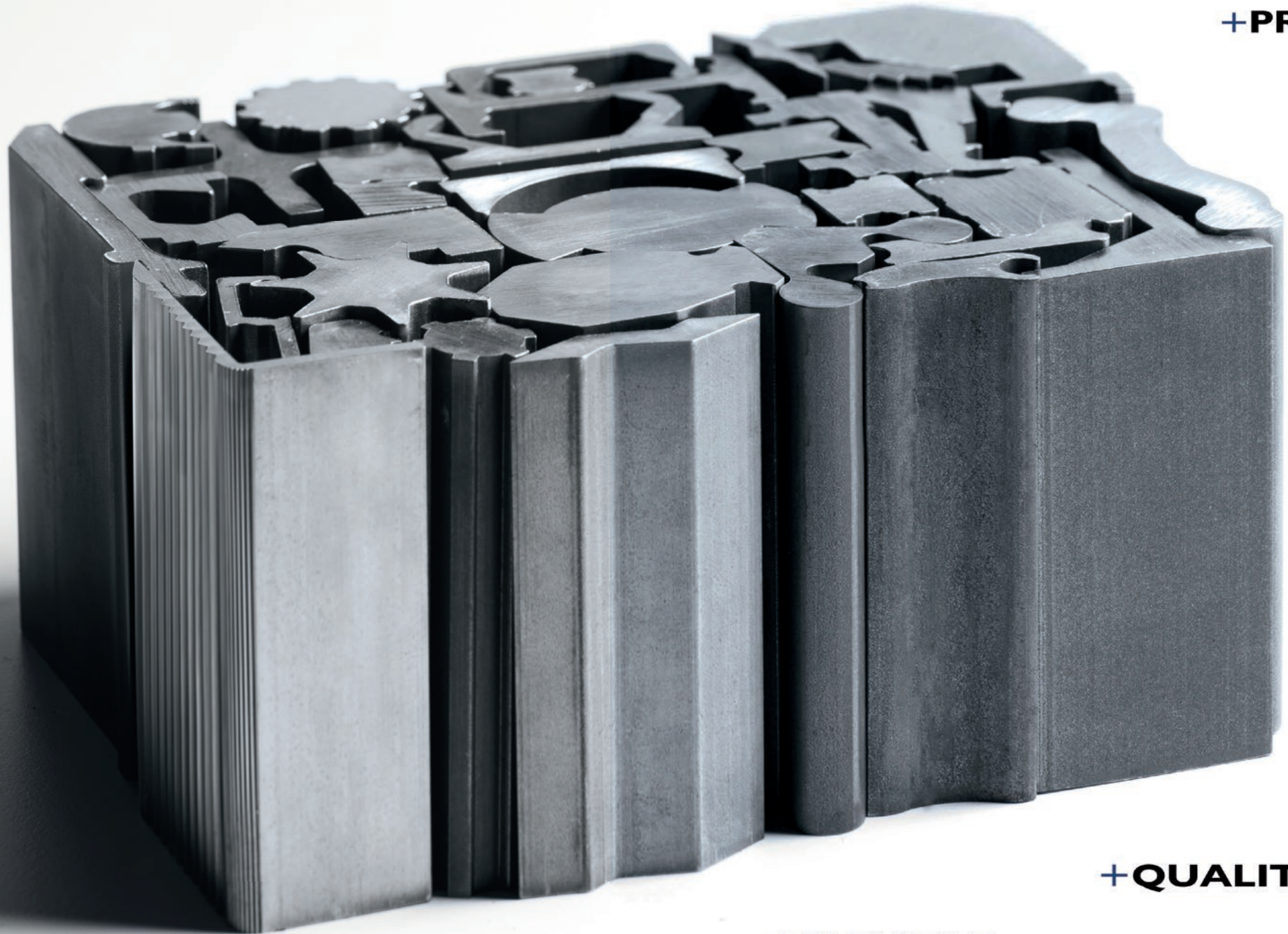
**A GLOBAL LEADER  
AT YOUR SERVICE**

**+ ENGINEERED  
SOLUTIONS**  
WORLDWIDE

**+ RELIABLE**

**+ SKILLED**

**+ PRECISE**



**+ QUALITY**

**+ FLEXIBLE**

# CALVI GROUP

With a proud history at the technological and scientific forefront of the steel and metalworking industry, today the Calvi Group companies look forward with confidence towards a future focused on unlocking the opportunities offered by new materials and new applications and on working together in synergy to respond to global industry challenges.



## BU COLD DRAWING

The three companies of the Calvi Group cold drawing business unit are all highly specialized in the use of cold drawing forming technology to produce special steel profiles. The business unit produces a wide range of special profiles in all the main types of steel: common, carbon, surface hardening, alloy and stainless steel and is able to supply custom solutions of all types and shapes, based on the customers' drawing and specifications for countless applications across all industrial sectors (e.g. linear guides, automotive, transport, firearms, energy, railways, machines).

### COLD DRAWN PROFILES

- // CALVI
- // SIPA
- // RATHBONE  
PRECISION METALS

**THREE COMPANIES SHARING A LONG TRADITION WITH A SINGLE TECHNOLOGICAL EXCELLENCE IN THE COLD DRAWING OF SPECIAL STEEL PROFILES.**



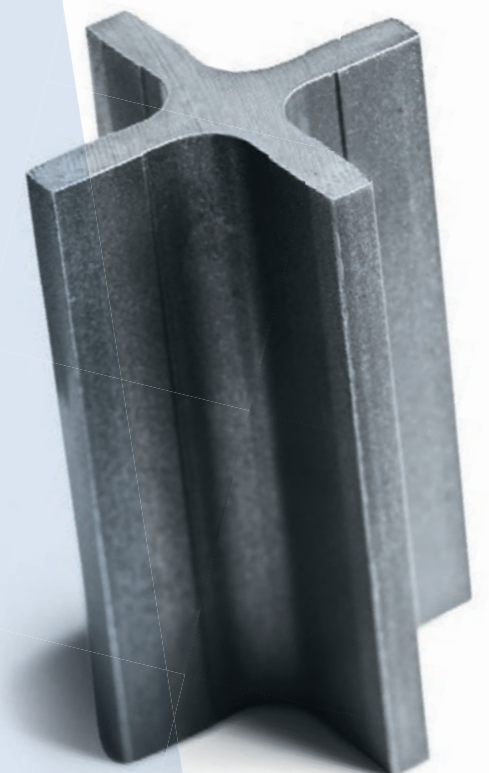
**CALVI, it** has been showing its best profile since 1950, being leader in the cold drawing of special steel profiles and designing the future. After relocating to Merate during the sixties, Calvi Spa became a reference model in the industrial local cluster for the design and manufacturing of steel rolling and drawing profiles. Its ability to deliver effective solutions quickly is reflected in its productivity levels, amounting to over 5,000 projects. A strength that has been built under the hallmark of highly advanced technological processing solutions. Focus on customers' specific needs and technical engineering skills are Calvi Spa's strengths, resulting in an optimised production process which ensures total quality and cost savings.



**SIPA, it** Steel is the temperament of Sipa, which allows them to never leave customers empty-handed. The history of Sipa SpA is a path of constant growth and development, which has always found its main strengths in quality and customer care. Operating since 1981, it is constantly oriented towards improving service and, today, offers high levels of efficiency and flexibility that allow competitive management even for small and extra-small lots. Steel is the world of Sipa, from company activity to the competence of all its resources. Steel Life is the concept that sums up the dedication and passion expressed daily by all the people who work at Sipa SpA: from technicians to employees, from the sales force to management.



**RATHBONE, us** founded in 1905 by Andrew B. Rathbone in Palmer, MA, as a small pinion wire making manufacturer. A pioneer in the manufacturing of cold drawn special shaped bar and wire in the United States. Rathbone grew as a family owned company until after World War II. Rathbone's metal profile shapes helped the U.S. industrial base to produce enormous amounts of a wide variety of material required to win the war: the "Secret Weapon". In 2008, Rathbone became part of Calvi Group. Currently, Rathbone produces hundreds of custom profile shapes for a large number of markets, from water pipe gaskets to high tech, power generation to firearms, automotive to aerospace, medical to general industrial and many others. Over 100 years, Rathbone remains a leading cold drawn and cold rolled metal profiles supplier to American industry.

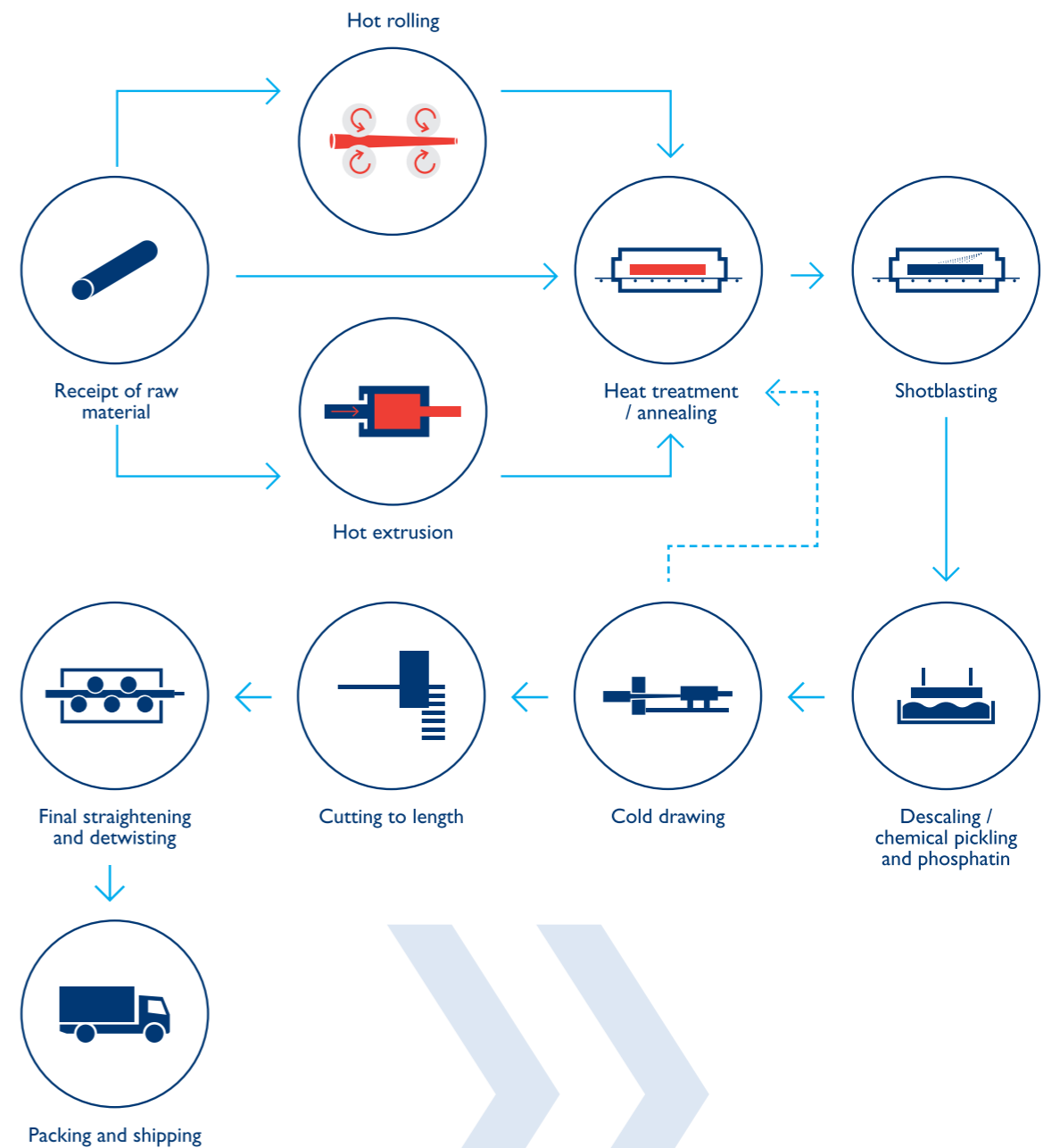
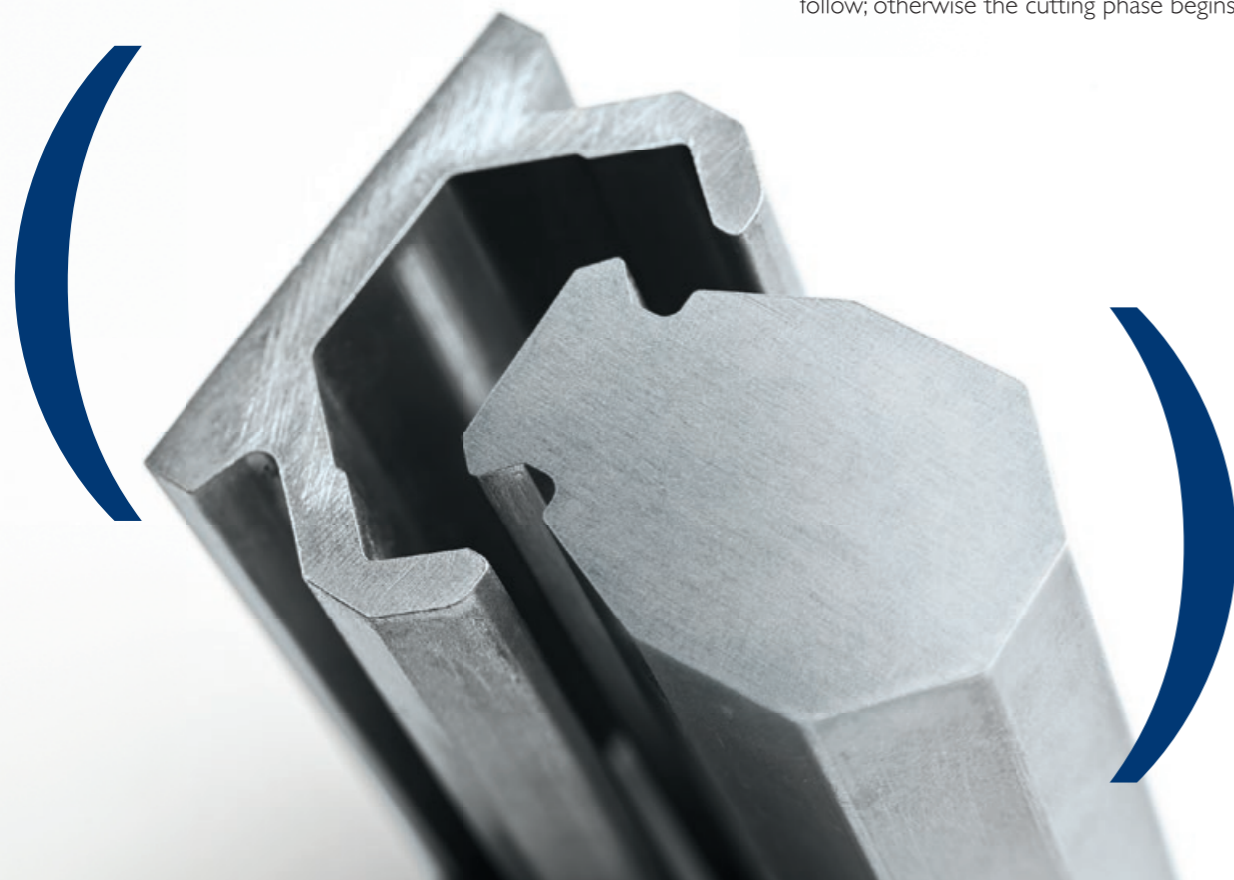


# COLD DRAWING TECHNOLOGY

WE ARE PROVIDED WITH STATE-OF-THE-ART MACHINERY AND EQUIPMENT WHICH, COMBINED WITH THE EXPERIENCE OF ITS TECHNICAL STAFF, ENSURE THE HIGHLY COMPETITIVE ENGINEERING OF ITS MANUFACTURING PROCESS ACROSS A WIDE RANGE OF PRODUCTS.

Drawing is the main step of **profile manufacturing**. It involves the preparation of complex geometries with rigorous precision and provides the product with a final section according to the dimensions required by the customer. The feasibility analyses of drawn profiles are processed using **sophisticated calculation tools (FEM)** that ensure optimisation of the drawing activities during and after the project study phase.

All the equipment and the many tools for bars and coils are designed in-house. Once the drawing phase has been completed, other heat, chemical or mechanical treatment or new cold drawing steps may follow; otherwise the cutting phase begins.

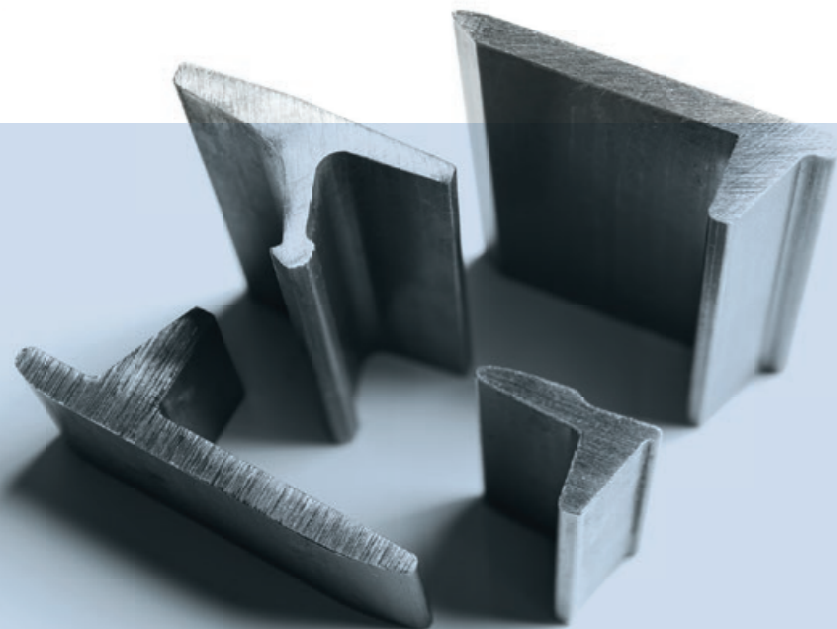


# THE COLD DRAWING BU

## CAPABILITIES

\* Indicative data only, contact us in order to get specific technical information to your question.

COMPANY			CALVI			SIPA			RATHBONE		
LOT			≥ 3000kg			200–5000 kg			200–5000 kg		
kg/m			>0,5 kg/m, ≤50 kg/m			>1,5 kg/m, ≤15 kg/m			>0,12 kg/m, ≤8,5 kg/m		
COMPLEXITY			1–6 pass			da 1 a 3 pass			1– 5 pass		
LOT	KG/M	PASS	LOT	KG/M	PASS	LOT	KG/M	PASS	LOT	KG/M	PASS
>50.000	60	6									
50.000	50										
40.000	40	5									
30.000	30										
20.000	20	4									
10.000	10										
5.000	5	3									
4.000	3										
1.000	1	2									
500	0,5	1									
200	0,1										



## SPECIALTIES

	CALVI	SIPA	RATHBONE
Application fields	Linear guides; Telescopic guides; Mini guides; Firearms.	Firearms; Automotive; Splined Shafts	Water Pipe Gaskets; Medical; Power Generation; Firearms
Technical	Carbon restoration; Streightening.	Flexible equipment especially for small quantities.	Small to Mid-size profiles; Heat Treat and Temper; Adiabatic Shear and precision cut pieces

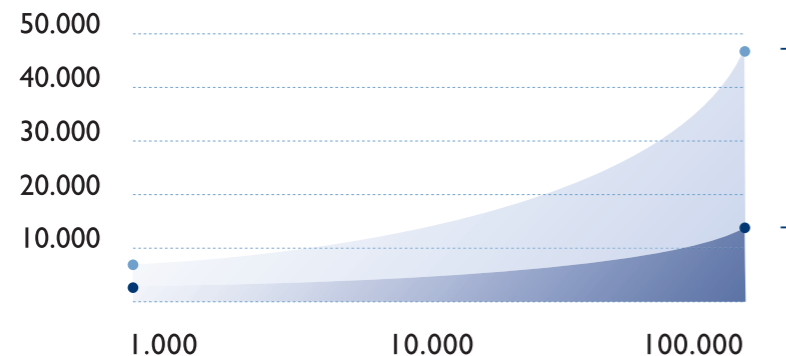
# BENEFITS

## THE COMPETITIVE BENEFITS OF SPECIAL COLD-DRAWN PROFILES BASED ON CUSTOMERS' DRAWING

### + COST-EFFICIENT SOLUTIONS

Comparison of total production costs: Profile machined from a round section vs. profile cold drawn by the Bu cold drawing companies.

Costs in Euro



Number of machined profiles

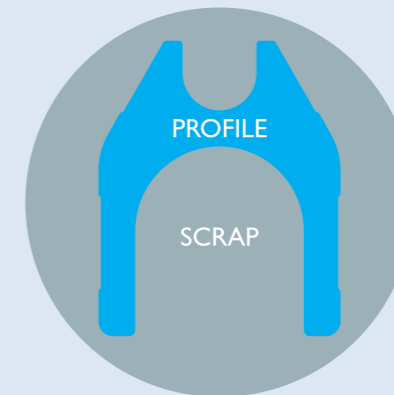
● From round section ● From profile

Saving with special profiles

Data and information purely indicative, used as an example.



FROM A ROUND SECTION



**FINISHED PROFILE MACHINED FROM ROUND**

Round bar weight 19,9 kg/m

FROM A PROFILE



**COLD DRAWN FINISHED PROFILE BASED ON CUSTOMER DRAWING**

Shaped bar weight 2,9 kg/m

## STANDARD SPECIFICATIONS

### CROSS SECTION

From 50 to 10.000 mm<sup>2</sup>

### MINIMUM QUANTITY

4,000 kg or less according to the size

### MATERIAL

Mild steels, alloyed, stainless and carbon, steels to UNI, DIN, AISI (SAE), AFNOR, BS standards

### FORMS OF DELIVERY

Cold drawn or annealed (stress relieving, soft annealing, spheroidizing), in coiled or bars 3000–4000 mm long according to required fix lengths

### SURFACE ROUGHNESS

Ra 3,2 µm max

### DEDECARBURISATION

From 0,1 mm max to 0 mm on request

### DIMENSIONAL TOLERANCES

From +/- 0.11 (standard) to +/- 0.02 mm on request

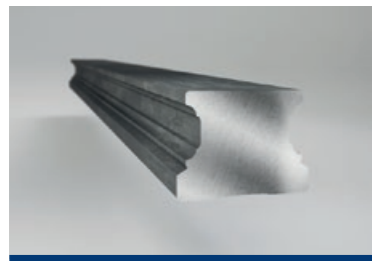
### STRAIGHTENING TOLERANCES

From 1 mm/m (standard) to 0,3 mm/m (special)

Guideline values. Tolerances below the reported values can be agreed upon on request.

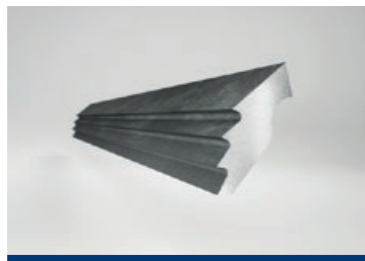
# APPLICATION FIELDS

MEETING THE TECHNICAL AND CONSTRUCTION REQUIREMENTS OF EVERY INDUSTRIAL SECTOR IS OUR PRIMARY GOAL



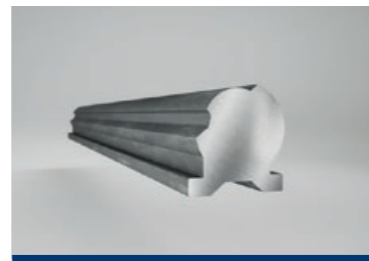
## » LINEAR GUIDES

The profiles are used for manufacturing both linear guide rails and carriages. They are generally produced in carbon steels or induction hardening alloy steels and in case hardening steels.



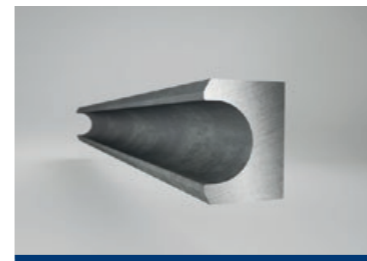
## » GASKET INSERT

The profiles for the inserts in the seal rings are made in martensitic stainless steels. These profiles have a special feature: their sharp-edges.



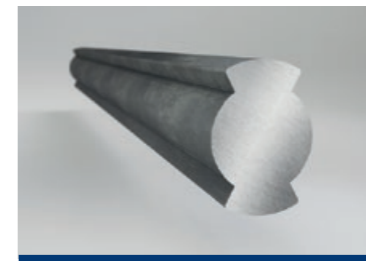
## » FIREARMS

Special profiles for components in rifles and guns, such as for example, slides, breeches, levers, monoblocks, gas cylinder extractors. Steels with Cr-Mo or Cr-Mo-Ni are used, or other steels on the specific request of the customer.



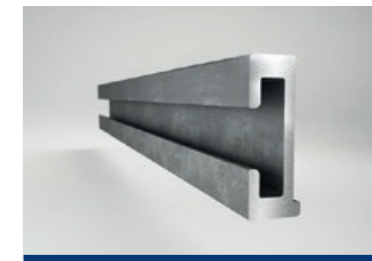
## » AUTOMOTIVE

Components for high pressure injection pumps found in diesel engines, clutch hubs, hinges, pole shoes in starter motors, by using steels for automatic bearings or according to industry-specific requirements.



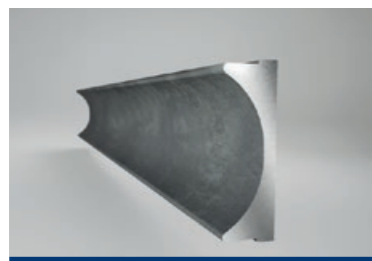
## » GENERAL MECHANICS

Special profiles for components used in various sectors, including packaging, food, woodworking machinery, locks and construction, using carbon steel alloys or on specific request.



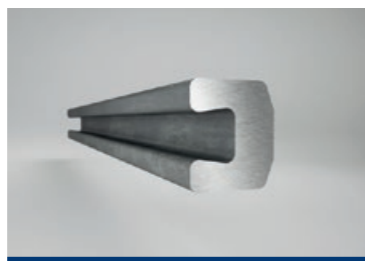
## » RAIL TRANSPORT INDUSTRY

Profiles for structural stringers, various components. Carbon or austenitic stainless steel. Special profiles in long bars up to 8 m for seat fastening systems, or profiles that are custom cut and used in braking systems. Generally made in carbon steel. Profiles for securing overhead lines in carbon steel.



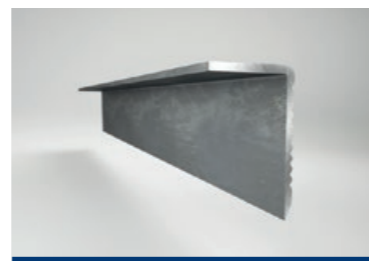
## » POWER GENERATION

Special profiles for hydroelectric power stators, with use of steels and carbon steels, or stainless steels for particular applications in nuclear power plants.



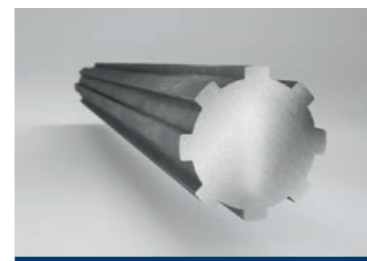
## » MEDICAL INDUSTRY

Our expertise with cold working a variety of alloys led us being awarded a contract to produce this Orthopedic Rod for use in a demanding medical application. We devised a single tool set that permitted us to cold draw either 455 or 304 Stainless to the customer's tensile and yield strength requirements necessary for this medical application.



## » BUILDING

Special stainless steel profiles with step protection and anti-skid properties. Structural profiles in carbon steel.



## » SPLINED SHAFTS

Standard or special profiles for splined shafts and universal joints, using quenched steels and carbon steels.



# TECHNICAL TABLES

## STRUCTURAL STEELS

1/2

STEELS	CORRESPONDENCES									
	UNI	EURONORM	DIN	WNr	AFNOR	BS	AISI/SAE/ASTM	JIS/SUS	Others	
Non alloyed structural uses	S235JRG1	S235JRG1	S235JRG1	1.0036	S235JRG1	S235JRG1	A 570	STB 35		
	(Fe 37)	(Fe 37-3 FN)	(St 37-2)	1.0038						
	S275JR	S275JR	S275JR	1.0044	S275JR	S275JR	A 510	SN 400 B		
	Fe 42 (Fe410)	(Fe 42-3 FN)	St 42.8							
	E295	E295	E295	1.0572	E295	E295		SS 50		
	(Fe 490)		(St50-2)							
Case hardening	C10	(C10D)	C10	1.0301	XC10	En 2 A	1010	S 10 C		
				1.0310						
	C15	C15D	C15	1.0401	XC18	En 32 C	1015	S 15 C		
	18CrMo4	18CrMo4	18CrMo4	1.7243	18CD4	18CrMo4				
	16MnCr5	16MnCr5	16MnCr5	1.7131	16MCS	16MnCr5	5115			
	16CrNi4									
	16NiCr11		14NiCr10	1.5732	16NCD11		3415	SNC 21		
	20NiCrMo2	20NiCrMo2-2	20NiCrMo2-2	1.6523	20NCD2	805 M 20	8620	SNCM 21		
		18Cr Ni Mo7-6	18Cr Ni Mo7-6	1.6587	18NCD6	18CrNi Mo7-6				
			16NiCrMo12-6	1.6782	16NCD13					
Tempered	(C18)	-	-	-	-	-	1018	-	-	
	C30	C30	C30	1.0528	C30	C30	1030			
	C40	C40	C40	1.0511	C40	C40	1040			
	C45	C45	C45	1.0503	C45	C45	1043	S 45 C		
	C50	C50	C50	1.0540	C50	C50	1050			
	C60	C60	C60	1.0601	C60	C60	1060	S 60 CM		
	41Cr4	41Cr4	41Cr4	1.7035	42C4	530 M 40	5140	SCr 4		
	25CrMo4	25CrMo4	25CrMo4	1.7218	25CD4	25CrMo4	4130	SCM 2		
	42CrMo4	42CrMo4	42CrMo4	1.7225	42CrMo4	708 M 40	4140	SCM 4		
	40NiCrMo2	40NiCrMo2 KD	40NiCrMo2-2	1.6546	40NCD2	7	8640	SNCM 6		
					40NCD16					
	Quenched	C43	C46	Cf45	1.1193				S 45 CM	
		C53	C53	Cf53	1.1213	XC 48 TS	C53		S 50 CM	
41CrMo4		41CrMo4	41CrMo4	1.7223		5/1	4142	SNB 22-1		
51CrMoV4		51CrMoV4	51CrMoV4	1.7701	51CDV4	-	-	-		
For bearings	100Cr6	100Cr6	100Cr6	1.3505	100C6	2S. 135	A29 (A295)	SUJ2		
	100CrMo7	100CrMo7	100CrMo7	1.3537	100CD7		A485			
Nitriding	41CrAlMo7	41CrAlMo7	41CrAlMo7	1.8509		En 41 B	6431	SACM 1		
For springs	55Si7	55Si7	55Si7	1.5026	55S7	En 45 A	9255			
	50CrV4	51CrV4	51CrV4	1.8159	50CV4	En 47	6150	SUP 10		
Automatic	9SMn28	11SMn30	9SMn28	1.0715	S 250 Pb	230 M 07	1213	SUM 22		
	9SMnPb28	11SMnPb30	9SMnPb28	1.0718	S 250 Pb	11SMnPb30	12L13	SUM 23 L		
	-	-	-	-	-	-	1117	-	-	
	-	-	-	-	-	-	1215	-	-	

## STRUCTURAL STEELS

2/2

STEELS	CORRESPONDENCES								
	UNI	EURONORM	DIN	WNr	AFNOR	BS	AISI/SAE/ASTM	JIS/SUS	Others
For tools	55WCrV8KU	55WCrV8	60WCrV8	1.2550					
	90MnCrV8 KU	90MnCrV8	90MnCrV8	1.2842	90 MV 8	BO 2	O 2		
	107CrV3 KU	107CrV3	115CrV3	1.2210			L 2		
Iron-base superalloy	-	-	-	-	-	-	-	-	A286 (UNS S66286)
Copper, Brass, Bronze	-	-	-	-	-	-	102	-	-
	-	-	-	-	-	-	110	-	-
	-	-	-	-	-	-	360	-	-
Nickel - Copper	-	-	-	-	-	-	400	-	-

## STAINLESS STEELS

STEELS	CORRESPONDENCES									
	UNI	EURONORM	DIN	WNr	AFNOR	BS	AISI/SAE/ASTM	JIS/SUS	Others	
Austenitic STAINLESS STEELS	X8CrNiS18-9	X8CrNiS18-9	X8CrNiS18-9	1.4305	Z 8 CNF 18-09	303 S 31	303	SUS 303		
	X5CrNi18-10	X5CrNi18-10	X5CrNi18-10	1.4301	Z 6 CN 18-09	304 S 15	304	SUS 304		
	X2CrNi19-11	X2CrNi19-11	X2CrNi19-11	1.4306	Z 3 CN 18-10	304 S 11	304 L	SUS 304 L		
	X4CrNi18-12	X4CrNi18-12	X4CrNi18-12	1.4303	Z 5 CN 18-11 FF	305 S 19	305	SUS 305		
	X16CrNi23-14	X15CrNiS20-12	X15CrNiS20-12	1.4828	Z 17 CNS 20-12	309 S 24	309	SUH 309		
	X6CrNi25-20	X15CrNiS25-21	X15CrNiS25-20	1.4841	Z 15 CNS 25-20	314 S 25	310	SUH 310		
	X6CrNi25-20	X8CrNi25-21	X8CrNi25-21	1.4845	Z 8 CN 25-20	310 S 24	310S	SUS 310S		
	X3CrNiMo17-13-3	X5CrNiMo17-12-3	X5CrNiMo17-12-2	1.4401	Z 6 CND 17-11	316 S 31	316	SUS 316		
	X2CrNiMo17-12	X2CrNiMo17-12-2	X2CrNiMo17-12-2	1.4404	3 CND 17-12-02	316 S 11	316L	SUS 316L		
	X6CrNiTi18-11	X6CrNiTi18-10	X6CrNiTi18-10	1.4541	Z 6 CNT 18-10	321 S 31	321	SUS 321		
Ferritic STAINLESS STEELS	X6CrNiNb18-11	X6CrNiNb18-10	X6CrNiNb18-10	1.4550	Z 6 CNNb 18-10	347 S 31	347	SUS 347		
	-	-	-	-	-	-	302	-	-	
	X6Cr17	X6Cr17	X6Cr17	1.4016	Z 8 C 17	430 S 17	430	SUS 430		
	X14CrMoS17	X14CrMoS17	X14CrMoS17	1.4104	Z 13 CF 17	X14 CrMoS17	430F	SUS 430F		
	X6CrMo17-1	X6CrMo17-1	X6CrMo17-1	1.4113	Z 8 CD 17-01	434 S 17	434	SUS 434		
	X6Cr13	X6Cr13	X6Cr13	1.4000	Z 8 C 12	403 S 17	403	SUS 403		
	X6CrAl13	X6CrAl13	X6CrAl13	1.4002	Z 8 CA 12	405 S 17	405	SUS 405		
	Martensitic STAINLESS STEELS	X12Cr13	X12Cr13	X12Cr13	1.4006	Z 13 C 13	410 S 21	410	SUS 410	
		X12CrS13	X12CrS13	X12CrS13	1.4005	Z 11 CF 13	416 S 21	416	SUS 416	
		X20Cr13	X20Cr13	X20Cr13	1.4021	Z 20 C 13	420 S 37	420	SUS 420J1	
X30Cr13		X30Cr13	X30Cr13	1.4028	Z 33 C 13	420 S 45		SUS 420J2		
X39Cr13		X39Cr13	X39Cr13	1.4031	Z 40 C 14	X39Cr13				
DUPLEX	X17CrNi16-2	X17CrNi16-2	X17CrNi16-2	1.4057	Z 15 CN 16-02	431 S 29	431	SUS 431		
	X2CrNiMoN22-5-3	X2CrNiMoN22-5-3	X2CrNiMoN22-5-3	1.4462	Z3 CND 22-05 Az	318 S 13	(22-05)	SUS 329J3L		
PH	X5CrNiCuNb16-4	X5CrNiCuNb16-4	X5CrNiCuNb16-4	1.4542	Z7 CNU 17-04	X5CrNiCuNb16-4	630	SUS 630		
							(17-04 PH)			
OTHERS							UNS n° S 42010 (TrimRite)			

This table represents only some application. Many other steel alloys can be used on request.





**+ PRODUCT CERTIFICATION**

The Companies of the Cold Drawing Business Unit ensures the physical and mechanical characteristics of its special profiles thanks to the prompt action of internal laboratories, which are able to verify the performance levels by means of:

TECHNOLOGICAL TESTS  
CHEMICAL ANALYSIS  
METALLOGRAPHIC TESTS  
NON-DESTRUCTIVE TESTS  
SURFACE TESTS

**+ IATF 16949\***

\*Calvi

**+ ISO 14001\***

\*Calvi

**+ ISO 45001\***

\*Calvi

**+ ISO 9001\***

\*Calvi, Sipa, Rathbone

**RATHBONE PRECISION METALS, INC.**

1241 PARK STREET  
PALMER, MA 01069  
USA  
PH. 1-413-283-8961  
FAX: 413-283-9722  
INFO@RATHBONEPROFILES.COM  
RATHBONEPROFILES.COM



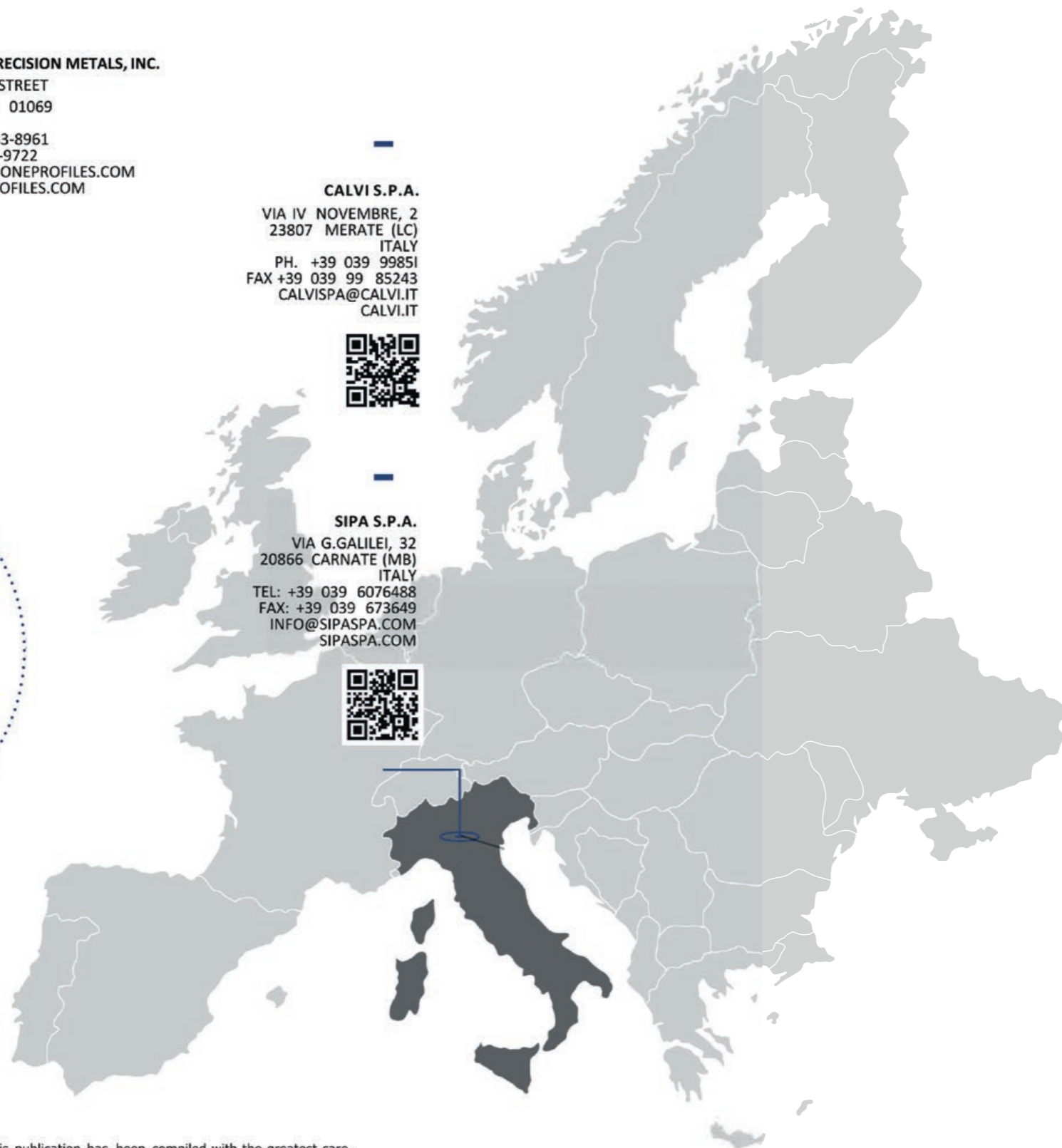
**CALVI S.P.A.**

VIA IV NOVEMBRE, 2  
23807 MERATE (LC)  
ITALY  
PH. +39 039 99851  
FAX +39 039 99 85243  
CALVISPA@CALVI.IT  
CALVI.IT



**SIPA S.P.A.**

VIA G.GALILEI, 32  
20866 CARNATE (MB)  
ITALY  
TEL: +39 039 6076488  
FAX: +39 039 673649  
INFO@SIPASPA.COM  
SIPASPA.COM



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