FORÉCREU
Building Critical Partnerships

SOLUTIONS FOR **CUTTING TOOLS**

BUILDING CRITICAL **PARTNERSHIPS**

For decades now we have been making our name as the go-to supplier of semi-finished products aimed at medical, tooling and industrial operators.

Beyond our offering of products that are unique in the marketplace, we strive to understand the needs and limitations of our partners who have developed their businesses in demanding fields that are in constant evolution. We are forming strategic partnerships which are essential for the development of the materials used in the latest technologies.

This relationship of trust is essential as it limits each player's risk and provides bespoke solutions for the delivery of ambitious projects. Each day, our teams are working to solve critical issues with professionalism, agility and energy.

Our slogan «Building Critical Partnerships*» perfectly sums up the value that we can bring to our clients. We are much more than simply a supplier.

François ORY
CEO

FORÉCREU
Building Critical Partnerships

OUR **VOCATION**

We manufacture cannulated and multiple hole bars from steel and titanium alloys. We also supply solid bars made from special steel materials.

Forécreu has a long tradition in the tooling business. Since 1952, our hole bars in special steels and high-speed steels have been used for the manufacture of cutting tools with oil circulation.

Today, this unrivalled industrial know-how gives us a world leadership position in this market. Every day we provide solutions that meet the standards and specifications of demanding customers.

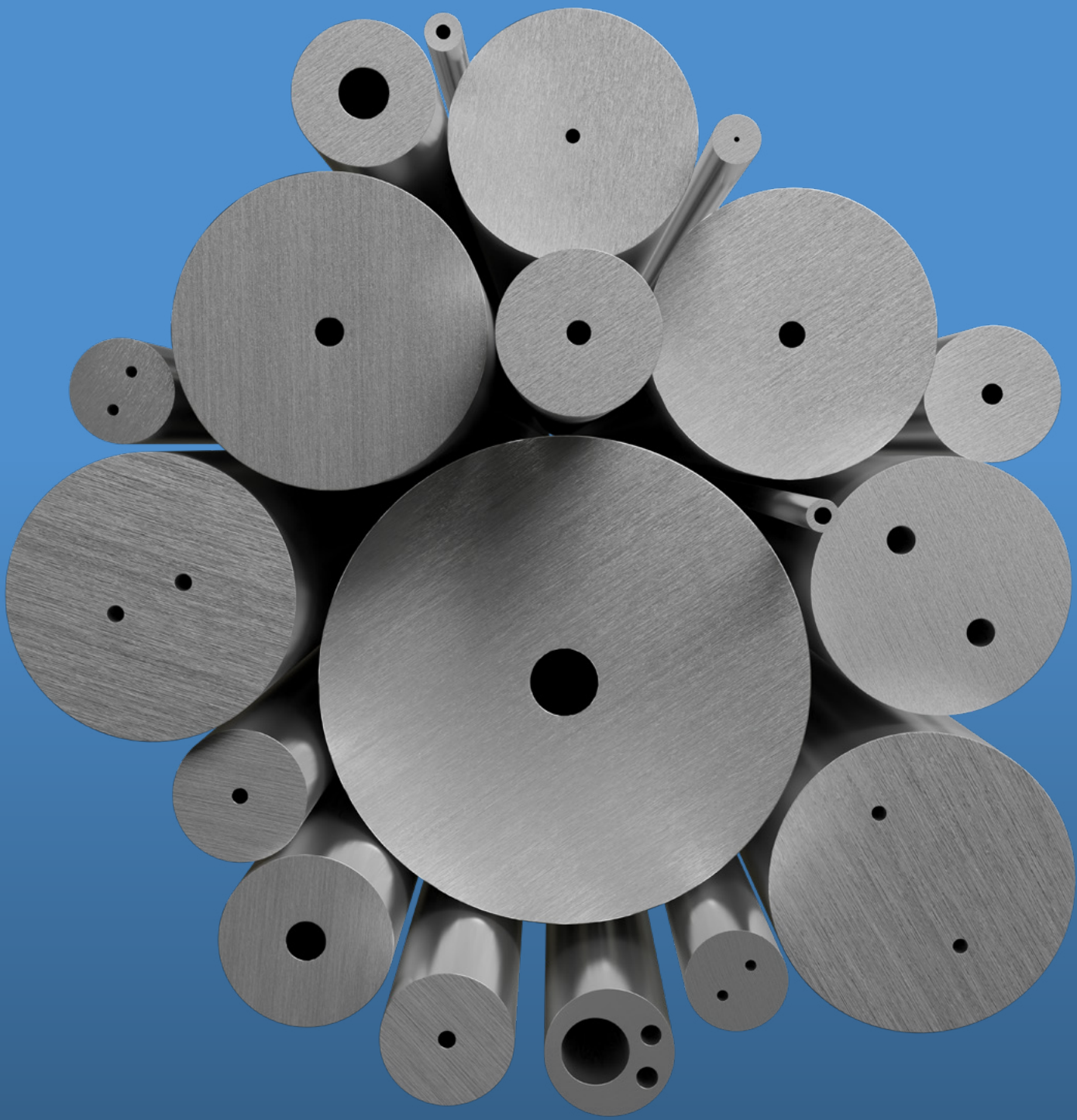
+70
YEAR OF EXPERTISE AND KNOW-HOW

2
MANUFACTURING HUBS BASED IN FRANCE

4
SUBSIDIARIES : USA, CHINA, GERMANY AND JAPAN

+400
MORE THAN 400 CUSTOMERS HAVE PLACED THEIR TRUST IN US.

FORÉCREU
Building Critical Partnerships



FORÉCREU
Building Critical Partnerships

OUR **MARKETS**

We respond to our customers' needs with innovative solutions aimed at the future.

CUTTING TOOLS

- Oil hole bar solutions made of high-speed steel (HSS) or tool steels for the production of coolant fed drills, taps and tool bodies.

MEDICAL ORTHOPAEDICS

- Cannulated bar solutions in stainless steel or titanium alloys for implants or surgical instruments.

- Pre-hardened solid bars solutions in stainless steel (AISI 420B) for the production of surgical or dental instruments.

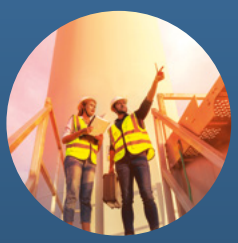
- Stainless steel tube solutions (AISI 304L & 316L) for the production of surgical instruments. Bio-resorbable and non-resorbable orthopedic implant solutions (PEEK/PMMA) for use in trauma and sport medicine.

INDUSTRY

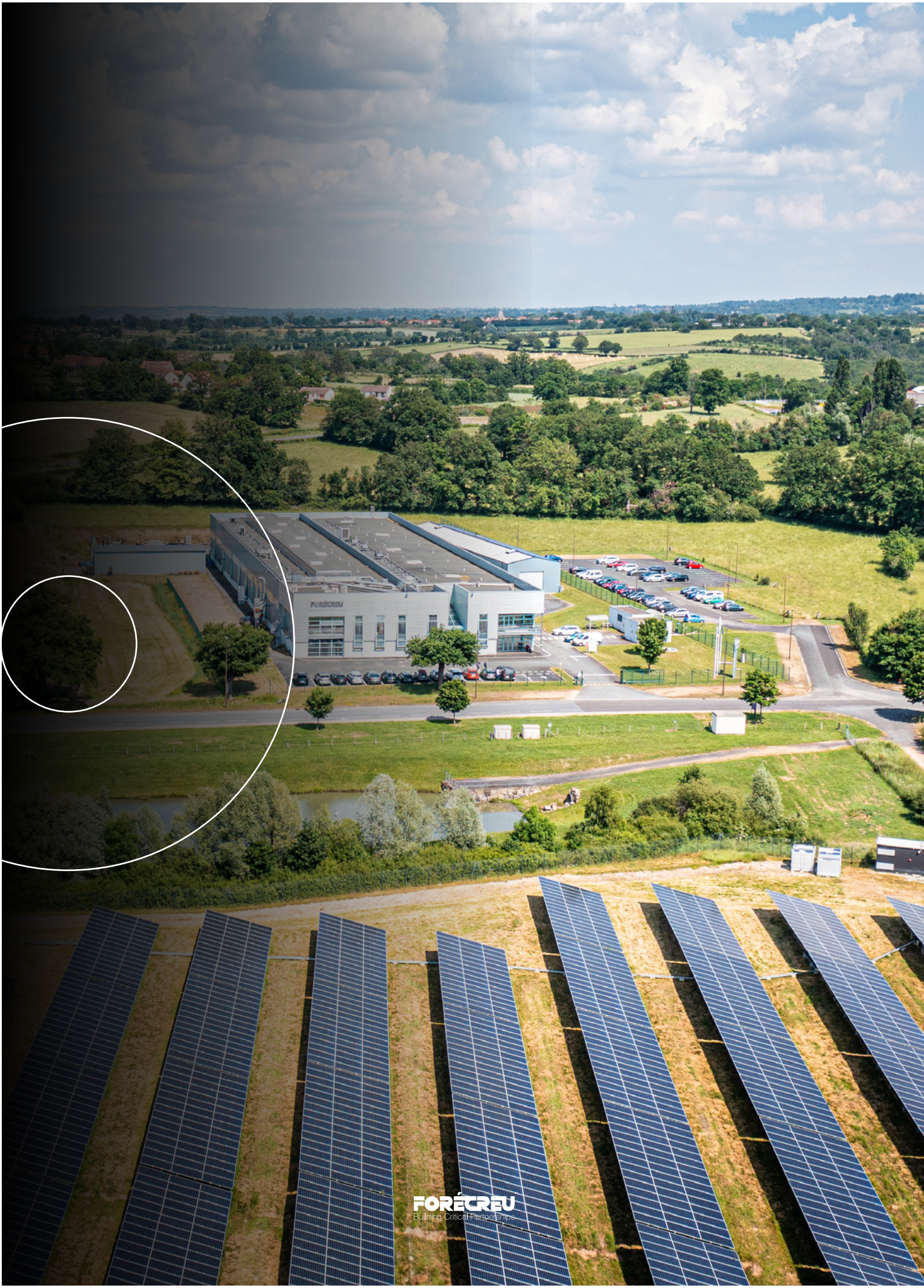
- Hollow bar and multi-hole solutions in stainless steel, structural steels, special steels and specialty alloys for applications use in the agri-food, energy sectors, etc.

- Solid bar solutions made of specialty steel and alloys for use in the nuclear, energy sectors, etc.



FORÉCREU
Building Critical Partnerships


FORÉCREU
Building Critical Partnerships

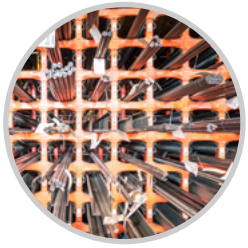
OUR **STRENGTHS**

- We created a unique industrial process over **70 years ago**.
- **We are the world leader** in the cannulated and multiple hole bar marketplace.
- **Long-term relationships** built with our customers and quality suppliers.
- **Compliance with customer technical specifications.**
- **Technical and sales support** to assist you throughout the life of your project.
- Fast delivery thanks to high availability of **standard stock items, worldwide**, with online updated inventories.
- **Our subsidiaries in the USA, China and Germany** provide you with service which is near to you wherever you are in the world.
- **Quality control testing** carried out in our laboratory: tensile strength and metallurgy testing.
- **Technical expertise** provided by our metallurgy experts.
- **Two dedicated production and product development sites:** design, testing, extrusion, rolling, drawing, thermal treatment, twisting, grinding, etc.
- Our organization and products are certified **ISO9001, ISO14001 & ISO13485**.

At FORÉCREU, you will find a range of bar products which meet market requirements and a team of specialists who will assist you in the successful delivery of your projects.

bsi. ISO 9001:2015 Quality Management

bsi. ISO 13485 Medical Devices Quality Management

FORÉCREU
Building Critical Partnerships


FORÉCREU
Building Critical Partnerships

HOLE BAR SOLUTIONS FOR CUTTING TOOL MANUFACTURING

Since 1952, oil hole bar for cutting tools application have been the historical activity of Forécreu. Our expertise in this market has allowed us to become a reference in this field over the years.

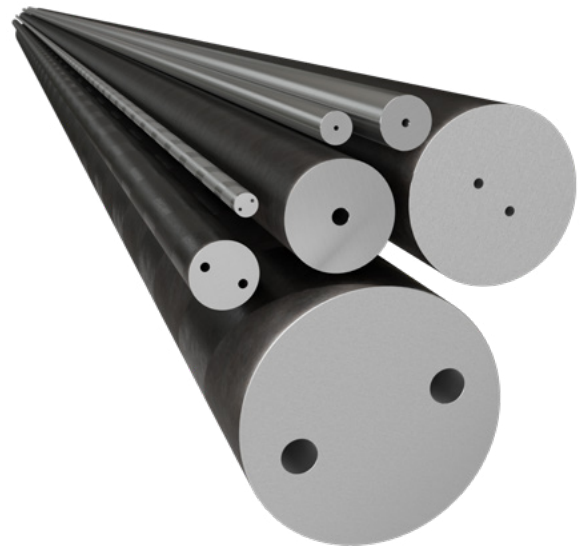
Advantages of Forécreu hole bar solutions

- **Proven technology** based on an industrial process which is unique in the world.

- **Optimized production costs:** our cannulated bar products are delivered ready for machining. By eliminating the drilling stage, you will optimize your per-item production costs. You can therefore focus directly on your core business objectives and gain in efficiency and time to market.

- **Rationalized timescales and throughput:** you will better be able to control risks and increase your organization's performance by simplifying your industrial process. You will gain in agility.

Forécreu cutting tools solutions



- **Bars with two holes, straight or twisted, for the manufacturing of oil hole & MQL cutting tools :** drills, step drills...

- **Central hole hollow bars for the manufacturing of oil hole & MQL cutting tools taps.**

FORÉCREU
Building Critical Partnerships

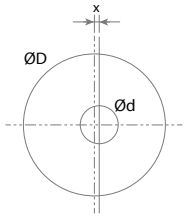
GENERAL **SPECIFICATIONS** AND TOLERANCES

Surface condition	Outside diameter (mm)	Tolerance on outside diameter	Max. decarburation	Recommended minimum oversize	Straightness
Ground	2.2 - 30.0	ISO k9 bars with two holes	none	depending on customer	1 mm/m
		ISO h9 bars with central hole			
Black for drawing or extrusion	2.9 - 13.9	+0.30 / -0.10	0.30	0.70 mm	2 mm/m
	14.0 - 17.9	+0.50 / -0.15	0.40	1.00 mm	
	18.0 - 45.0	+0.60 / -0.20	0.40	1.50 mm	
	46.0 - 65.0	+0.70 / -0.30	0.65	3.00 mm	

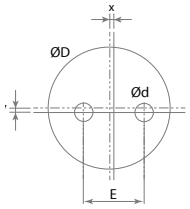
Bar length

Standard specification: delivery in bars : from 1.8 to 3.9 meters
from 2 to 3.2m for taps (GT).

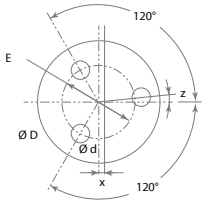
Geometrical tolerances



Bars with central hole (fig. 1) :
D : see table above.
d : +/- 7 % of nominal.
Excentration x : 2.5% of D.
Roundness of hole: within tolerance of d.



Bars with two holes (fig. 2) :
D : see table above.
d : +/- 7 % of nominal.
Center hole distance E: +/- 5% of nominal.
Excentration x : 3 % of D.
Excentration y : 3 % of D



Bars with three (or more) holes (fig. 3) :
D: see table above.
d: +/- 7 % of nominal.
Excentration x: 5 % of D
Circle E: +/- 5% of nominal
Angular position z: +/- 3% of D.

Twist tolerance:
The twist tolerance: 15° per meter.
Technical detail about twisting, helix and tolerance: see following page.

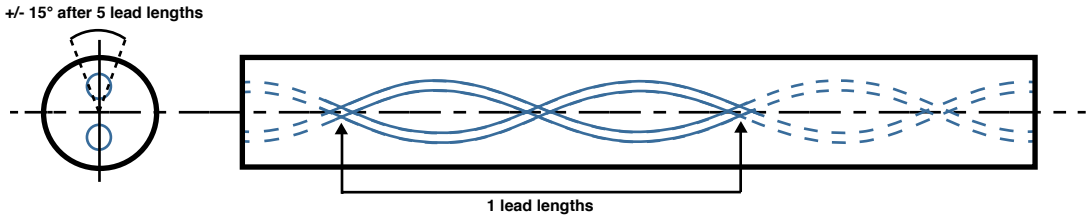
Delivery conditions

Unless mentioned specifically, all our bars are supplied in annealed condition.

TECHNICAL INFORMATION ABOUT **TWISTING**

Twisting/lead tolerance:

The average lead tolerance for twisted bars: +/- 0.8% of nominal lead length, and for a total of 5 lead units (no cumulative effect). In other words, this tolerance represents a maximum deviation of +/- 15° for a total of 5 lead lengths. It is compatible with the production of helical tools. For particularly long tools (more than 5 accumulated lead lengths), it is nevertheless important to accurately index the flute grinding of the blanks from the tool tip.



N.B.: We can twist the bars clockwise or counterclockwise to your requirement. The standard twist is clockwise and will be applied by default to all received orders.

Guide in twist / angle / lead (helix):

By convention, a lead refers to a length in millimetres, corresponding to the total length for one complete revolution of the lubrication channel (see illustration above).The helix, on the other hand, corresponds to an angle given in degrees with reference to the finished tool helix.

The lead, by convention, measures the length, in mm of a complete revolution of 360° of coolant holes along the bar. Its value does not depend on the diameter of the bar. The helix, on the other hand, has to be associated with a specific diameter, as its value varies with it. Hence, the lead length is a fixed and unequivocal data. You will find this value on all our technical documents and certificates. The following formula is used to convert a lead into a helix according to the diameter

$$\text{Tan } \alpha = \frac{\pi \times Ød}{L}$$

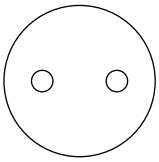
α is the angle in degrees (°),
Ød the outside diameter of the cutting part in mm,
L is the length of the lead in mm

This is an important issue because it may influence the products you order. Do not order an oversized coolant fed bar with the same helix as your finished tool. For that reason, when placing an order, please indicate the lead length in mm that corresponds to the helix of your finished tool.

E.g.: to produce a 30° drill, the cutting part of which has a diameter of 12 mm, the lead needed will be 65.3 mm. Therefore, this 65.3 mm lead should be ordered for material delivered at 12.3 mm from which the tool will be produced.

BARS WITH 2 HOLES IN **HIGH SPEED STEELS (HSS)**

Bars with 2 holes straight or twisted in high speed steels for the production of coolant FED and MQL drills.



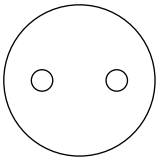
Standard ST Geometry 100%

Grades : M2 / M35

Ground bars (ISO k9)			
Outside Ø (mm)	Internal Ø (mm)	Center hole distance	kg / m
2.7	0.45	1.30	0.044
3.2	0.50	1.50	0.062
3.7	0.55	1.70	0.084
4.2	0.65	1.90	0.108
4.7	0.70	2.10	0.135
5.2	0.75	2.30	0.166
5.7	0.85	2.50	0.199
6.3	0.95	3.20	0.243
7.3	1.10	3.70	0.326
8.3	1.20	4.10	0.423
9.3	1.35	4.60	0.531
10.3	1.50	5.00	0.651
11.3	1.60	5.50	0.786
12.3	1.75	6.00	0.930
13.3	1.90	6.40	1.090
Black bars			
Outside Ø (mm)	Internal Ø (mm)	Center hole distance	kg / m
14	1.90	6.40	1.21
15	2.00	6.90	1.39
16	2.20	7.30	1.58
17	2.30	7.80	1.78
18	2.40	8.30	2.00
19	2.60	8.70	2.23
20	2.70	9.30	2.47
22	3.00	10.20	2.99
24	3.30	11.10	3.55
26	3.50	12.10	4.18
28	3.80	13.00	4.84
30	4.10	13.90	5.55
32	4.30	14.80	6.33
34	4.60	15.70	7.14
36	4.90	16.60	7.69
38	5.20	17.60	8.91
40	5.40	18.50	9.88
42	5.70	19.40	10.89
44	6.00	20.30	11.95

BARS WITH 2 HOLES IN **HIGH SPEED STEELS (HSS)**

Bars with 2 holes straight or twisted in high speed steels for the production of coolant FED and MQL drills.



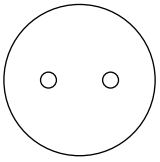
Standard ST Geometry 100%

Grade : PM30

Ground bars (ISO k9)			
Outside Ø (mm)	**Internal Ø (mm)**	**Center hole distance**	**kg / m**
6.3	0.95	3.20	0.243
7.3	1.10	3.70	0.326
8.3	1.20	4.10	0.423
9.3	1.35	4.60	0.531
10.3	1.50	5.00	0.651
11.3	1.60	5.50	0.786
12.3	1.75	6.00	0.930
13.3	1.90	6.40	1.090
Black bars			
Outside Ø (mm)	**Internal Ø (mm)**	**Center hole distance**	**kg / m**
14	1.90	6.40	1.21
15	2.00	6.90	1.39
16	2.20	7.30	1.58
17	2.30	7.80	1.78
18	2.40	8.30	2.00
19	2.60	8.70	2.23
20	2.70	9.30	2.47
22	3.00	10.20	2.99
24	3.30	11.10	3.55
26	3.50	12.10	4.18
28	3.80	13.00	4.84
30	4.10	13.90	5.55
32	4.30	14.80	6.33
34	4.60	15.70	7.14

BARS WITH 2 HOLES IN **HIGH SPEED STEELS (HSS)**

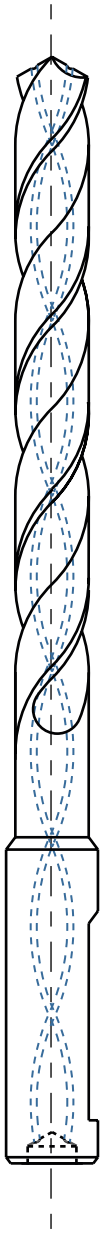
Bars with 2 holes straight or twisted in high speed steel, for the production of coolant FED and MQL drills as per DIN 6535 with oversized straight shank.



Geometry 80% - FE3

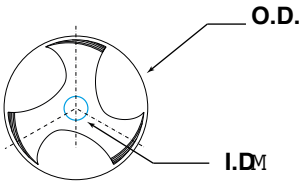
Grade : M35

Ground bars (ISO k9)			
Outside Ø (mm)	**Internal Ø (mm)**	**Center hole distance**	**kg / m**
6.3	0.60	2.60	0.250
8.3	0.80	3.40	0.433
10.3	1.10	4.10	0.664
12.3	1.30	4.90	0.948
Black bars			
Outside Ø (mm)	**Internal Ø (mm)**	**Center hole distance**	**kg / m**
16	1.60	6.00	1.61
18	1.80	6.80	2.03
20	2.00	7.60	2.51
22	2.20	8.40	3.04
27	2.70	10.20	4.58
34	3.40	12.90	7.14



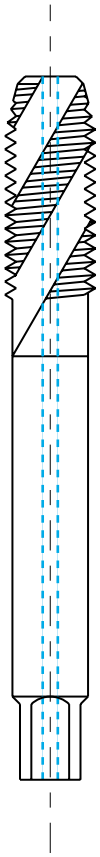
HOLE BARS IN HIGH SPEED STEEL (HSS) FOR TAPS

Our range of powder metallurgy high speed steel (HSS) hole bars for the production of oil hole taps. This range is optimized in terms of ID/OD to enable the production of taps to any geometry.



Grade : M35

Ground bars (ISO h9)			
Outside Ø (mm)	**Internal Ø (mm)**	**kg / m**	**Code**
6.4	0.90	0.247	GTS
6.4	1.05	0.255	GT
8.4	1.35	0.441	GT
10.4	1.65	0.676	GT
12.4	2.00	0.960	GT
14.4	2.30	1.250	GT
16.4	2.60	1.680	GT
Black bars			
Outside Ø (mm)	**Internal Ø (mm)**	**kg / m**	**Code**
20	3.10	2.50	GT
22	3.40	3.03	GT

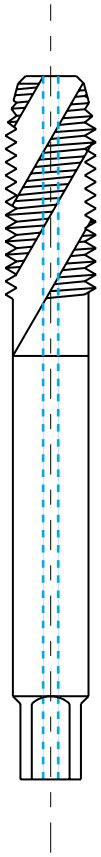


HOLE BARS IN HIGH SPEED STEEL (HSS) FOR TAPS

Our range of powder metallurgy high speed steel (HSS) hole bars for the production of oil hole taps. This range is optimized in terms of ID/OD to enable the production of taps to any geometry.

Grade : PM30

Ground bars (ISO h9)			
Outside Ø (mm)	**Internal Ø (mm)**	**kg / m**	**Code**
6.4	0.90	0.247	GTS
6.4	1.05	0.255	GT
8.4	1.35	0.441	GT
10.4	1.65	0.676	GT
12.4	2.00	0.960	GT
14.4	2.30	1.250	GT
16.4	2.60	1.680	GT
Black bars			
Outside Ø (mm)	**Internal Ø (mm)**	**kg / m**	**Code**
20	3.10	2.50	GT
22	3.40	3.03	GT



Grade : PM15

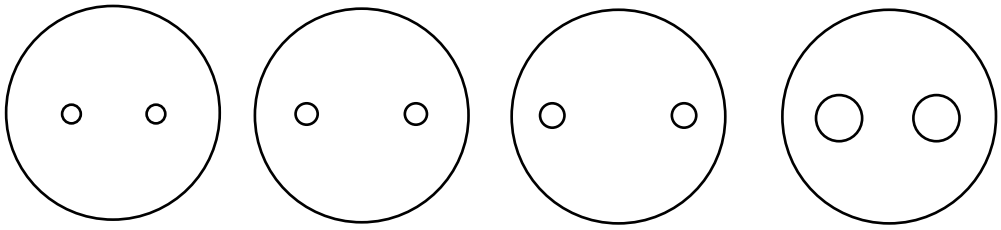
Ground bars (ISO h9)			
Outside Ø (mm)	**Internal Ø (mm)**	**kg / m**	**Code**
6.4	1.00	0.255	GTJ
8.4	1.30	0.441	GTJ
10.4	1.60	0.676	GTJ
12.4	1.90	0.960	GTJ
14.4	2.20	1.250	GTJ
16.4	2.40	1.680	GTJ

Grade : PM52

Ground bars (ISO h9)			
Outside Ø (mm)	**Internal Ø (mm)**	**kg / m**	**Code**
6.4	1.05	0.255	GT
8.4	1.35	0.441	GT
10.4	1.65	0.676	GT
12.4	2.00	0.960	GT

OIL HOLE BAR FOR CARBIDE TIP DRILLS

Geometry - SCH1 SCH2 SCH3



Grade : H11

			Black Bars				
	SCH1		SCH2		SCH3		Kg/meter
O.D.	I.D.	Center hole distance	I.D.	Center hole distance	I.D.	Center hole distance	
11.5	1.25	5.3					0.81
12.5	1.35	5.7					0.95
13.5	1.45	6.2					1.11
14.5	1.55	6.6	0.95	4.3	1.1	5.1	1.28
15.5	1.65	7.1	1	4.6	1.2	5.4	1.47
16.5	1.75	7.6	1.1	4.9	1.3	5.8	1.66
17	1.80	7.8	1.15	5.1	1.35	6	1.76
19	1.90	8.8	1.3	5.7	1.5	6.7	2.21
20	2.00	9.3	1.35	6	1.55	6.9	2.44
22	2.20	10	1.5	6.6	1.7	7.5	2.96
24	2.40	11	1.65	7.2	1.85	8.2	3.52
27	2.70	12.4	1.85	8.1	2.05	9.2	4.46
30	3.00	13.8	2.05	9	2.3	10.2	5.50
31	3.10	14.2	2.10	9.3	2.35	10.6	5.87
33	3.30	15.1	2.25	9.9	2.5	11.2	6.66
Up to 44mm							

Supplied with straight or twisted holes.

GRADE SELECTION GUIDE

	Type of grades	Reference	AFNOR or EURONORM	DIN 17350	ISO ou EN/DIN	Hardness	Machinability (annealed)	Grindability
High-Speed Steels (HSS)	Métallurgie conventionnelle	**M2**	Z85WDCV 06-05-04-02	1.3343	HS 6-5-2 C	60 to 65 HRc		
		M35	Z85WDKCV 06-05-05-04-02	1.3243	HS 6-5-2-5	60 to 66 HRc		
		GV3	Z120 WDCV 07-05-04-03	-	HS 7-5-3	65 to 66 HRc		
	Métallurgie des poudres (Aciers PM)	**PM15**	X155WCoV12-5-5	1.3202	HS 12-0-5-5	65 to 68 HRc		
		PM30	Z130KWDCV 09-06-05-04-03	1.3244	HS 6-5-3-8	65 to 68 HRc		
		PM52	Z160WKVCD 10-08-05-04-02	1.3253	HS 10-2-5-8	65 to 68 HRc		
	Aciers spéciaux	**H11**	Z38CDV5 X38CrMoV5-1	1.2343	-	48 to 52 HRc		

	Toughness	Hot hardness	Wear resistance	Definition
	▮▮▮▮▮▮▮	▮▮▮▮	▮▮▮▮▮	Basic high-speed steel offering excellent properties of toughness with good hardness.
	▮▮▮▮▮▮	▮▮▮▮▮▮▮	▮▮▮▮▮▮	Cobalt grade (5%) derived from M2. Its composition enables it to better resist heat generated by cutting. Therefore, maintains hardness longer up to 66 HRc. Excellent general-purpose grade.
	▮▮▮▮▮▮	▮▮▮▮▮▮▮	▮▮▮▮▮▮▮	Grade (3% vanadium) for taps. This steel enables to significantly reduce the grinding costs and contributes to increase the tool life.
	▮▮▮▮	▮▮▮▮▮▮▮▮	▮▮▮▮▮▮▮	« Powder » grade with high tungsten content (12%) for high performance cutting tools.
	▮▮▮▮▮▮▮	▮▮▮▮▮▮▮▮	▮▮▮▮▮▮▮▮	Powder grade with extraordinary consistent and highly pure structure. This grade combines great hardness with excellent toughness. Tool life is increased and reliability improved. Contains 8.5% of Cobalt. Ideal choice for the production of high performance cutting tools.
	▮▮▮▮▮▮	▮▮▮▮▮▮▮▮	▮▮▮▮▮▮▮▮▮	« Powder »grade with high tungsten content (10.5%) and cobalt (8%), offering wear resistance, particularly suited for manufacturing taps.
	▮▮▮▮▮▮▮▮	▮▮▮	▮▮▮	High impact and high thermal fatigue strength grade; ideal for hot forming tooling; and for insert tool bodies.

OUR **LOCATIONS**

A geographical coverage in 5 countries to serve our customers all over the world.

FORÉCREU
Building Critical Partnerships

France - Head Office

FORÉCREU SAS
ZI de la Brande,
6 chemin de Saint-Amand,
03600 Malicorne,
FRANCE
Mail. : contact@forecreu.com
Tél. : +33(0)4 70 64 43 37

USA

FORÉCREU America Inc.
2518W.
Maypole Avenue,
Chicago, IL 60612,
USA
Mail. : contact@forecreuamerica.com
Tél. : +1 (773) 539-8501

Germany

FORÉCREU Deutschland GmbH
Lebacher Straße 4
D-66113 Saarbrücken
DEUTSCHLAND
Mail. : mnaumann@forecreu.com
Tél. : +49 (0)174 – 19 03 014

China

FORÉCREU Materials Co., Ltd.
B406/B407, 16B, N8 Xihu Road,
Wujin District,
Changzhou City, Jiangsu,
CHINA
Mail. : china@forecreu.com.cn
Tél. : 0086-(0)519-86225260

Japan

FORÉCREU Japan KK
c/o Maxis Corporation
5F, Shiba Daimon Center Bldg,
1-10-11, Shiba Daimon, Minato-ku
TOKYO,105-0012 Japan
Mail. : japan@forecreu.com
Tél:+(81)3-5403-7060, 7900

FORÉCREU
Building Critical Partnerships

NOTES

NOTES

FORÉCREU SAS
ZI de la Brande,
6 chemin de Saint-Amand,
03600 Malicorne,
FRANCE
Tel +33 (0)4 70 64 43 37
contact@forecreu.com

Discover our solutions at
www.forecreu.com

Conception : Forécreu - Service Communication - Novembre 2023

FORÉCREU
Building Critical Partnerships