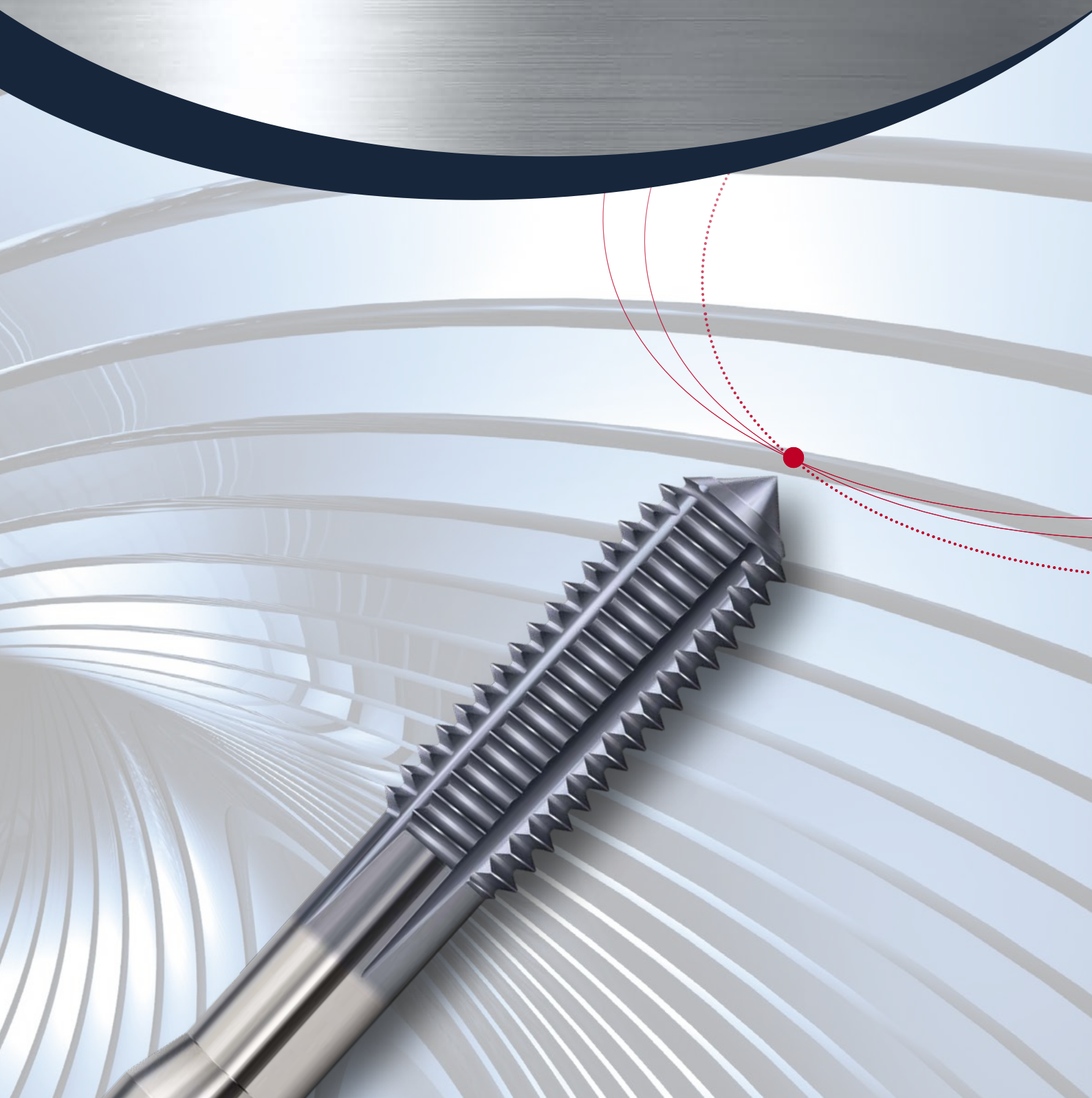


passion
for precision



Lightform Steel Thread-Formers **Reliable threading in steel**



Maximum process reliability with minimal costs

Thread forming is more reliable and more cost-effective than thread cutting. With its redesigned Lightform Steel line, FRAISA is presenting the next generation of thread-formers.

Thanks to a AX, ultra-smooth coating and continued development of all performance-relevant features, Lightform Steel tools enjoy a life span that is unprecedented, while offering great torque levels.

[2] These capacity reserves let you select very high forming speeds. The performance reserves are especially important in the case of deep threads (up to 3xd) and small dimensions (from M1).

Unlike thread cutting, thread forming does not produce any chips and is therefore more reliable and the superior solution for all automated production steps. Thanks to the cold work hardening with static and dynamic loading, formed threads possess greater tear-out strength than cut threads.

With Lightform Steel, there's no need to make any distinction between blind holes and through holes. Unlike with thread cutting, one tool is equally suitable for both types of hole.

Lightform Steel tools make switching over from thread cutting to thread forming even easier and even more cost-effective. FRAISA's applications engineers will gladly help you realize a switchover.

Even if you require special shapes, FRAISA is more than willing to implement that for you.



The advantages:

- **Maximum process reliability:** Non-cutting or non-chip threading minimizes risks in automated production processes
- **Minimal costs** – the Longcut coating, optimum surface treatment and the best HSS PM/F currently available enable Lightform Steel to achieve maximum tool lifetimes and thus minimal costs per thread
- **Maximum productivity** – thanks to the performance reserves, Lightform Steel can be used with high infeed rates
- **Better components** – thanks to cold work hardening, the tear-out strength of the threads formed is greater than that of cut threads
- **Application area** – for blind and through holes in steels with a tensile strength of up to Rm 1,100 N/mm² and in high-alloy (stainless) steels

Lightform Steel Thread-Formers



Geometry, substrate and coating – all elements of the thread-former are tuned to provide maximum performance. It's the effort put into coordinating the various technologies to create a complete product that ensures the great performance capability of Lightform Steel.

The combination of the individual features, such as the ideally harmonized HSS PM/F, the optimized polygon shape, special surface treatment, large oil grooves, infeed taper form C, and the innovative Longcut hard coating results in a unique type of tool.



Optimized polygon shape with large oil grooves

- Optimized polygon shape reduces forces acting on the tool and extends tool life
- Low spindle load and low energy consumption despite high productivity
- Versions with modified oil grooves to improve the supply of cooling lubricant to the working area
- Facilitates more efficient cooling lubrication, when forming deep threads, too



Infeed taper/form C

- Infeed geometry form C for good infeed and centering characteristics, resulting in more uniform wear with a significant improvement in tool life and process reliability

[3]



Cylindrical version with square

- In acc. with tool standard DIN 371



Suitable for blind and through holes

- More universal application and better automation



Longcut heavy-duty coating

- Special surface treatment in conjunction with an innovative, very smooth hard coating – wide application range with very good tribological characteristics in all steels
- High thermal and mechanical resistance and consequently high degree of process reliability
- Optimum coating adhesion for steady wear and longer tool life



High-performance HSS PM/F forming material

- High-performance HSS PM/F for use in all formable steels
- Special balance of hardness and ductility for Lightform Steel
- Homogeneous structure for maximum process reliability

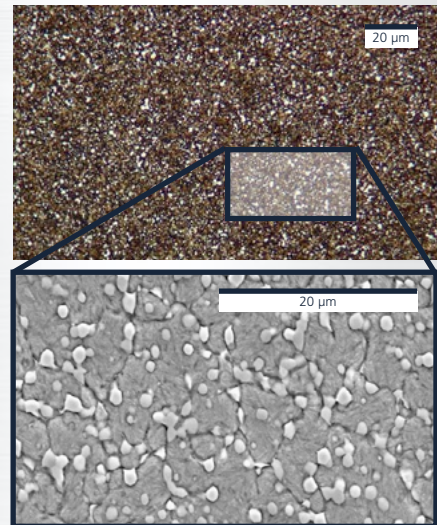
Rm < 850	Rm 850-1100							Inox Stainless		
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Quality standards thanks to innovative surface treatment

Quality standards thanks to innovative surface treatment



HSS
PM/F



HSS PM/F forming

Longcut surface treatment

- Lightform Steel sets a new standard thanks to its hard and ultra-smooth Longcut coating
- The perfected pretreatment of the forming edges before coating plays a key part in the overall performance
- Outstanding surface quality is crucial to obtaining smooth coatings
- Greater process reliability for greater productivity and cost efficiency in thread forming

PM/F substrate forming

- Lightform Steel is based on the proven HSS PM/F
- However, for Lightform Steel it's made with a special balance of hardness and ductility
- The advantages of HSS PM/F are to be found in the more uniform and finer distribution of carbide compared with conventional HSS
- HSS PM/F is very hard-wearing and has good red hardness
- The resulting resistance to wear of the tool facilitates great productivity when thread forming

Top productivity

The main factors when it comes to thread forming are thread quality, process reliability and productivity.

The great performance capability of the thread-former is the result of a whole set of technological features.

Coating

FRAISA-Longcut – the revolutionary, smooth coating – ensures excellent production quality.

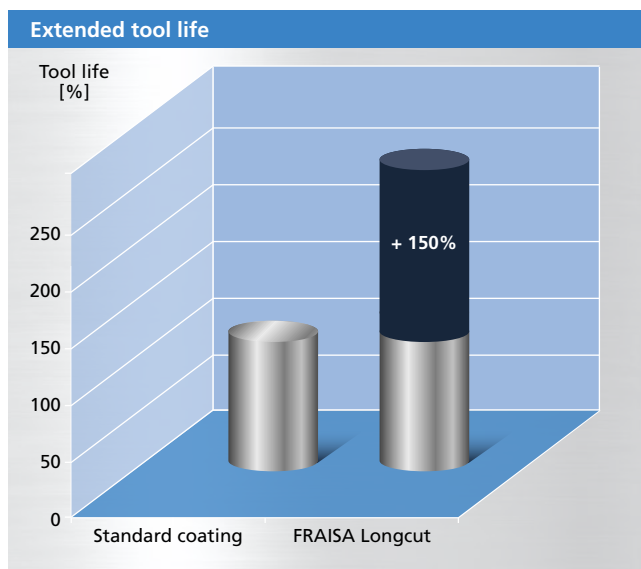
When thread forming in high-quality components, the Longcut coating ensures a much longer tool life than conventional coatings offer. The very smooth surface finish and the excellent adhesion of Longcut provide for ideal wear resistance.

The perceptible degree of efficiency is reflected in the improved tool life and reduced tool costs. Its universal utility and suitability for machining the majority of steels increases productivity.

The **Longcut coating**, with its outstanding properties, features the following benefits:

- Reliable machining
- Reduced tool costs
- Longer tool life

Typical application for Lightform Steel	
Lightform M 8	EL10080.160
Machining	Thread forming
Material, Rm	42CrMo4/1.7225, 950 N/mm ²
Thread	M 8
Depth	3xd (24 mm)
Cutting speed v_c	10 m/min
Speed n	400 min ⁻¹
Infeed rate v_f	500 mm/min
Cooling lubricant	6% emulsion



[5]

The concept of the **Lightform Steel thread-former**

- Robust tool with sufficient reserves to compensate for process fluctuations
- Reliable even under unfavorable conditions
- Tough but flexible substrate for maximum wear resistance
- Surface treatment for perfect coating adhesion and optimum coating surface qualities
- Innovative Longcut carbide coating for steels

Tips for optimum performance

Application-related tips regarding thread forming in steel

Tips and influencing factors

FRAISA recommends that a number of related pieces of information and tips are taken into account, so that the concept of the thread-former can develop its full potential.

Application

The FRAISA thread-former is suitable for machining steels with a tensile strength of up to 1,100 N/mm² and an elongation at fracture of at least 10%.

Infeed form C

The infeed taper leads to great cost effectiveness. Infeed form C is suitable for machining not only threads for blind holes but also for through holes. Thread-formers with shorter infeed forms can also be used for special requirements.

Tool clamping

Thread forming with length adjustment or rigid tapping. Make sure that the tool runs smoothly and use good-quality chucks. Good clamping of the tool increases its service life and produces ideal thread qualities.

Oil grooves

Versions with oil grooves for thread depths of up to 3xd. Perfect alignment of the cooling lubricant jet with the tool or the oil grooves extends tool life and process reliability.

Cooling lubrication

The choice of cooling lubricant demands special attention. Owing to the high level of friction involved in the forming process, the better the quality of the lubricant, the better the level of performance that can be expected. High-quality emulsions should be used in order to obtain a long tool life and clean thread surfaces. Oils or minimum lubrication systems can also be used. When machining using a minimum lubrication system, FRAISA recommends that you observe the recommendations of the respective equipment manufacturer.

Core hole diameter

To rule out negative effects, FRAISA recommends you choose the specified hole diameter (see product pages). If the predrilled hole diameter is too small, the process forces will be very high. If the predrilled hole diameter is too large, the thread core area will be insufficiently formed.

Cutting data

The cutting speed is the most influential parameter in the thread forming process and care must be taken to ensure that the rate selected is not too high with respect to the surface roughness to be achieved for the thread. Please act in accordance with the cutting data.

Dimensional range

Metric M 1 – M 16
The comprehensive range for a broad spectrum of workpieces and applications.



[7]

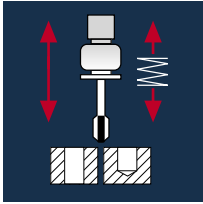
Where is it possible to ask questions concerning the product?

If you have any question, please send an email to mail.ch@fraisa.com. You may also directly contact our local customer consultant.

The FRAISA application engineers will be happy to advise you.

For further information, please refer to fraisa.com.

Application



Material

Steel
< 850 N/mm²
A₅ > 10%

Steel
< 850 N/mm²
A₅ > 10%

Steel
850 - 1100 N/mm²
A₅ > 10%



Steel
850 - 1100 N/mm²
A₅ > 10%



M	ø [mm]	P [mm]	V _c 1.5 x d			V _c 2.0 x d			V _c 3.0 x d		
			n [min ⁻¹]	v _f [100%]	n [min ⁻¹]	v _f [100%]	n [min ⁻¹]	v _f [100%]			
M 1	1.0	0.25	20	6365	1591	15	4775	1194	10	3185	796
M 1.2	1.2	0.25	20	5305	1326	15	3980	995	10	2655	664
M 1.4	1.4	0.30	20	4545	1364	15	3410	1023	10	2275	683
M 1.6	1.6	0.35	20	3980	1393	15	2985	1045	10	1990	697
M 1.8	1.8	0.35	20	3535	1237	15	2655	929	10	1770	620
M 2	2.0	0.40	20	3185	1274	15	2385	954	10	1590	636
M 2.2	2.2	0.45	20	2895	1303	15	2170	977	10	1445	650
M 2.5	2.5	0.45	20	2545	1145	15	1910	860	10	1275	574
M 3	3.0	0.50	20	2120	1060	15	1590	795	10	1060	530
M 4	4.0	0.70	20	1590	1113	15	1195	837	10	795	557
M 5	5.0	0.80	20	1275	1020	15	955	764	10	635	508
M 6	6.0	1.00	20	1060	1060	15	795	795	10	530	530
M 8	8.0	1.25	20	795	994	15	595	744	10	400	500
M 10	10.0	1.50	20	635	953	15	475	713	10	320	480
M 1	1.0	0.25	15	4775	1194	10	3185	796			
M 1.2	1.2	0.25	15	3980	995	10	2655	664			
M 1.4	1.4	0.30	15	3410	1023	10	2275	683			
M 1.6	1.6	0.35	15	2985	1045	10	1990	697			
M 1.8	1.8	0.35	15	2655	929	10	1770	620			
M 2	2.0	0.40	15	2385	954	10	1590	636			
M 2.2	2.2	0.45	15	2170	977	10	1445	650			
M 2.5	2.5	0.45	15	1910	860	10	1275	574			
M 3	3.0	0.50	15	1590	795	10	1060	530			
M 4	4.0	0.70	15	1195	837	10	795	557			
M 5	5.0	0.80	15	955	764	10	635	508			
M 6	6.0	1.00	15	795	795	10	530	530			
M 8	8.0	1.25	15	595	744	10	400	500			
M 10	10.0	1.50	15	475	713	10	320	480			

Material

Stainless steel
ferritic/martensitic
A₅ > 10%



Stainless steel
ferritic/martensitic
A₅ > 10%



Stainless steel
[Cr-Ni/1.4301]



Stainless steel
[Cr-Ni/1.4301]

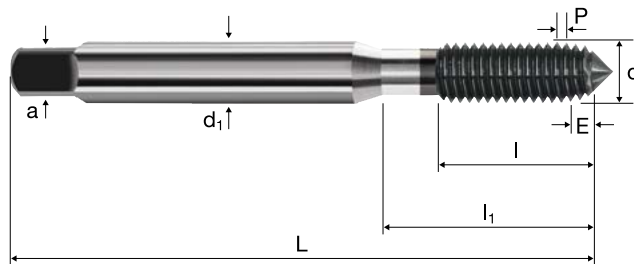


M	ø [mm]	P [mm]	V _c 1.5 x d			V _c 2.0 x d			V _c 3.0 x d		
			n [min ⁻¹]	v _f [100%]	n [min ⁻¹]	v _f [100%]	n [min ⁻¹]	v _f [100%]			
M 1	1.0	0.25	15	4775	1194	10	3185	796			
M 1.2	1.2	0.25	15	3980	995	10	2655	664			
M 1.4	1.4	0.30	15	3410	1023	10	2275	683			
M 1.6	1.6	0.35	15	2985	1045	10	1990	697			
M 1.8	1.8	0.35	15	2655	929	10	1770	620			
M 2	2.0	0.40	15	2385	954	10	1590	636			
M 2.2	2.2	0.45	15	2170	977	10	1445	650			
M 2.5	2.5	0.45	15	1910	860	10	1275	574			
M 3	3.0	0.50	15	1590	795	10	1060	530			
M 4	4.0	0.70	15	1195	837	10	795	557			
M 5	5.0	0.80	15	955	764	10	635	508			
M 6	6.0	1.00	15	795	795	10	530	530			
M 8	8.0	1.25	15	595	744	10	400	500			
M 10	10.0	1.50	15	475	713	10	320	480			
M 1	1.0	0.25	15	4775	1194	10	3185	796			
M 1.2	1.2	0.25	15	3980	995	10	2655	664			
M 1.4	1.4	0.30	15	3410	1023	10	2275	683			
M 1.6	1.6	0.35	15	2985	1045	10	1990	697			
M 1.8	1.8	0.35	15	2655	929	10	1770	620			
M 2	2.0	0.40	15	2385	954	10	1590	636			
M 2.2	2.2	0.45	15	2170	977	10	1445	650			
M 2.5	2.5	0.45	15	1910	860	10	1275	574			
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M 6	6.0	1.00	15	795	795	10	530	530			
M 8	8.0	1.25	15	595	744	10	400	500			
M 10	10.0	1.50	15	475	713	10	320	480			

Cold forming taps Lightform Steel



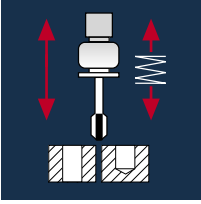
M	ISO 2 (6H)
	HSS PM/F
	Form C



Rm < 850	Rm 850-1100						Inox Stainless		
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Example: Order-Nº. EL10080 010											LONGCUT EL10080	
Ø Code	d	P	L	l	l ₁	d ₁	a					
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012*	M 1.2	0.25	40	5.5	–	2.5	2.1	3	1.07		●	
020*	M 1.4	0.30	40	7.0	–	2.5	2.1	3	1.25		●	
022*	M 1.6	0.35	40	8.0	–	2.5	2.1	3	1.42		●	
026*	M 1.8	0.35	40	8.0	–	2.5	2.1	3	1.62		●	
034	M 2	0.40	45	8.0	–	2.8	2.1	3	1.80		●	
036	M 2.2	0.45	45	9.0	–	2.8	2.1	3	2.00		●	
040	M 2.5	0.45	50	9.0	–	2.8	2.1	3	2.30		●	
044	M 3	0.50	56	12.0	18.0	3.5	2.7	3	2.80		●	
058	M 4	0.70	63	13.0	21.0	4.5	3.4	3	3.70		●	
084	M 5	0.80	70	15.0	25.0	6.0	4.9	4	4.60		●	
088	M 6	1.00	80	17.0	30.0	6.0	4.9	4	5.50		●	
160	M 8	1.25	90	20.0	35.0	8.0	6.2	4	7.40		●	
174	M10	1.50	100	22.0	39.0	10.0	8.0	4	9.30		●	
≤ M 1.4 Tolerance ISO1 (4H)												
* without oil grooves												


Application




Material

Steel
 < 850 N/mm²
 A₅ > 10%


Steel
 850 - 1100 N/mm²
 A₅ > 10%



Stainless steel
 ferritic/martensitic
 A₅ > 10%



Stainless steel
 [Cr-Ni/1.4301]

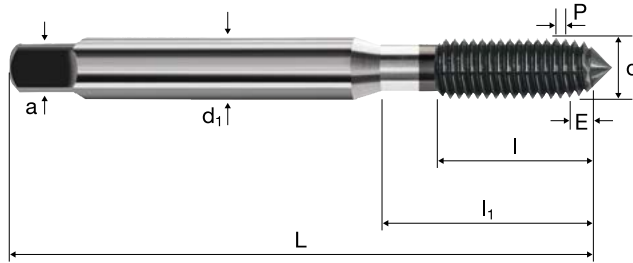


M	ø [mm]	P [mm]	1.5 x d			2.0 x d			3.0 x d		
			v _c [min ⁻¹]	n [min ⁻¹]	v _f [100%]	v _c [min ⁻¹]	n [min ⁻¹]	v _f [100%]	v _c [min ⁻¹]	n [min ⁻¹]	v _f [100%]
M 12	12.0	1.75	20	530	928	15	400	700	10	265	464
M 14	14.0	2.00	20	455	910	15	340	680	10	225	450
M 16	16.0	2.00	20	400	800	15	300	600	10	200	400
M 12	12.0	1.75	15	400	700	10	265	464			
M 14	14.0	2.00	15	340	680	10	225	450			
M 16	16.0	2.00	15	300	600	10	200	400			
M 12	12.0	1.75	15	400	700	10	265	464			
M 14	14.0	2.00	15	340	680	10	225	450			
M 16	16.0	2.00	15	300	600	10	200	400			

Cold forming taps Lightform Steel



M	ISO 2 (6H)
	HSS PM/F
	Form C



Rm < 850	Rm 850-1100							Inox Stainless		
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										LONGCUT	
Example: Order-N°.		Article-N°.		ø-Code						EL10081 240	
Ø Code	d	P	L	l	l ₁	d ₁	a				
240	M12	1.75	110	24	40	9	7	5	11.20	●	
244	M14	2.00	110	26	40	11	9	5	13.10	●	
246	M16	2.00	110	27	40	12	9	5	15.10	●	



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passion
for precision

