

SCHUMACHER
PRECISION TOOLS SINCE 1918

CATALOGUE NO. 124 G - JIS - THREADING TECHNOLOGY



JIS - Edition
Threading Technology
Products | Applications | Services

Catalogue No. 124 G
Threading Technology
Products | Applications | Services



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Research & Development

Research and Development focuses on two crucial areas: tool know-how and machining technology by **Schumacher Precision Tools (SPT)** and systems for digital process control in small and medium-sized enterprises by **GAP (Gesellschaft für angewandte Prozesslenkung)**.

For the development of new machining technology, **Schumacher** utilizes the standardized product technology database of the module **ToolDesign**, which contains more than 20,000 tool variants. This technology can be used for both new designs and ongoing developments, drawing upon algorithms. CAD-variant construction will be deployed for the respective tool models.

Schumacher can rely on an established network of renowned institutions in research disciplines such as high-speed steel and carbide substrates, heat and surface treatment, or hard material coating.

The management and technology modules developed by **GAP** in cooperation with technical universities ensure a consistent digital networking within the company. Data base-oriented product design with the module **ToolDesign** combined with the digital control system of the module **ToolProduction** fulfill the objectives of the government's initiative 'Industry 4.0'. **ToolProduction** represents digital process structures in production, a know-how advantage that is applied for the internal process optimization of **Schumacher Precision Tools**. Moreover, the cross-departmental nature of **ToolProduction** allows partial or complete synchronization with partner companies in designated sections.

SCHUMACHER
PRECISION TOOLS SINCE 1958

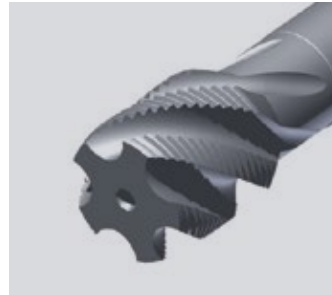
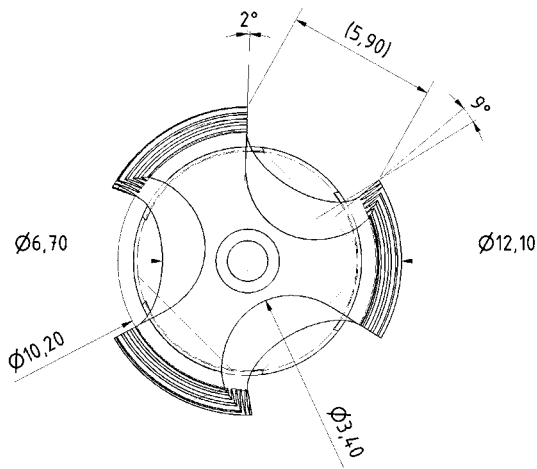
RWTHAACHEN
UNIVERSITY

research cooperation with
various technical universities

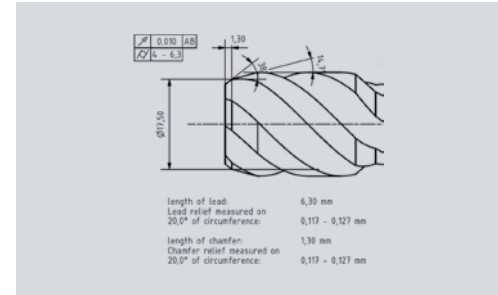


**ToolDesign – FEATURES:**

- › Pricing for Quotation Management
- › Parameterized 3D-volume models
- › Production drawings
- › Data generation and transfer for CNC-production machine tools
- › Providing know-how data for B2B and B2C-Partners



3D model precision tool



Drawing detail

CAD-construction using algorithms and methods of variant construction

Design & Simulation

The ToolDesign Principle

The objective:

The GAP-module **ToolDesign** supports and automatizes the development, construction, production, and administration of rotation-symmetric precision tools.

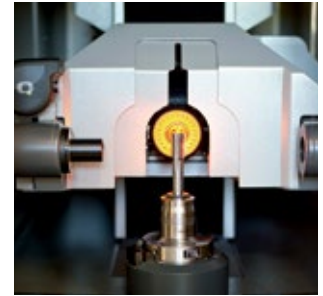
ToolDesign serves as the core of Schumacher's process control in the **ToolProduction** module – as overall technology hub for products and production parameters. The system is founded on the parameter-based item structure with the construction features of all available tool variants. This standardized technology structure allows the automatic generation of constructive, production-technical, and calculative framework conditions for manufacturing rotation-symmetric precision tools.



measurement process



profile inspection



digital measurement process

Simulation-based test runs before start of production increase the quality of new tool variants development

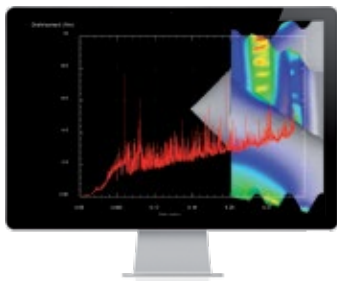
Design & Simulation

The ToolSimulation Principle

The Objective:

The GAP-module **Tool-Simulation** uses the **FEM method** to simulate the cutting performance of precision tools. In this context, 3D tool models from **ToolDesign** can be tested virtually in defined work pieces with their material properties before tool production begins.

The simulation process was realized with high computer processing power through extensive modification of a standard simulation software. At the start, an interactive work piece description for the process is provided to the user of **ToolSimulation**. This digital work piece receives information about all material properties that are necessary for the simulation process from an edited system data base. The geometry variations and material properties of the precision tools are available through the 3D volume models from **ToolDesign**.



torque curve through FEM simulation

ToolSimulation – FEATURES:

- › Digital preparation of 3D volume models for simulation process
- › Data transfer of 3D volume tool models from ToolDesign
- › Development of 3D volume work piece models
- › Material classification of the work piece and tool models
- › Simulation – testing new tool variants
- › Interpretation of results





Production & Digital Process Control

The ToolProduction Principle

The Objective: Introduction of Digital Process Control according to 'Industry 4.0'

The required framework conditions for a successful introduction of digital and decentralized process control at SPT were provided through various modules of computer-aided information processing in all departments. By the early 1990s, SPT had completed connecting all departments related to production with a cross-departmental information system. This was part of the introduction of a CIM strategy (Computer Integrated Manufacturing).

Smart services for customers through data generated during production



Robot-loaded grinding center



Examination of test results



Performance tests

Location-independent digital description of entire processing

GAP

Gesellschaft für angewandte Prozesslenkung

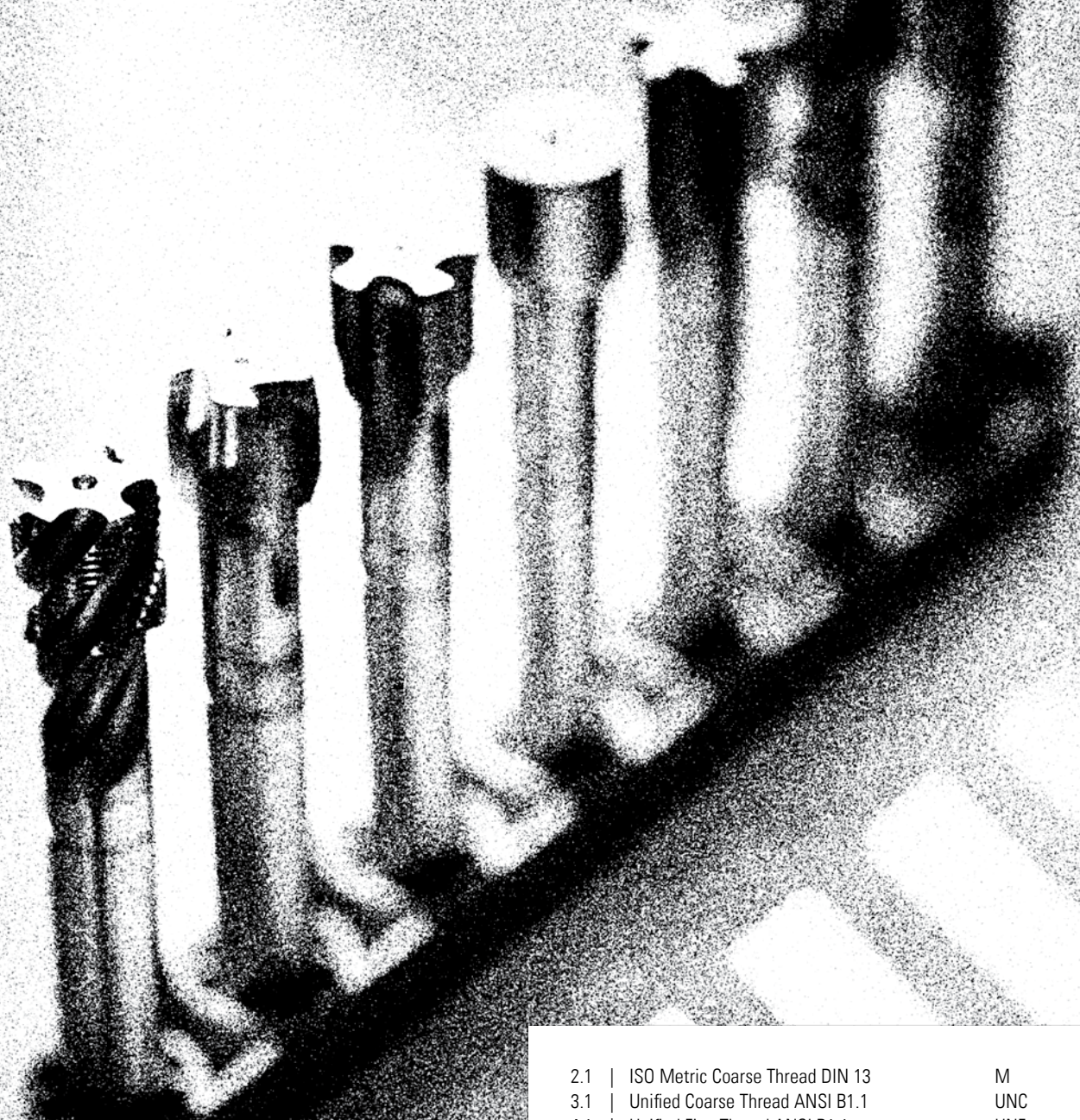


As of Today, use of IT comprises the following technical-organizational sections:

- › stock management
- › sales
- › development and design
- › production scheduling
- › production planning and control
- › manufacturing
- › logistics and quality control
- › finance

Production & Digital Process Control

The current GAP-initiative **ToolProduction** with many features from 'Industry 4.0' considers the change in the industry's framework conditions and leads to the digital transformation of all processes. This is related to the introduction of **Smart Services**, a platform making any relevant process and technology data generated during production available in real-time.



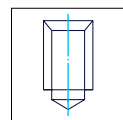
- | | | |
|-----|--|-----------|
| 2.1 | ISO Metric Coarse Thread DIN 13 | M |
| 3.1 | Unified Coarse Thread ANSI B1.1 | UNC |
| 4.1 | Unified Fine Thread ANSI B1.1 | UNF |
| 5.1 | Whitworth Pipe Thread DIN ISO 228 | PF (G) |
| 6.1 | Whitworth Tapered Pipe thread | Rc (BSPT) |
| 7.1 | American Tapered Pipe Thread ANSI B 1.20.1 | NPT |
| 8.1 | Technology | |

Machine Taps

JIS HSS-E

RH spiral flutes 40°
for general construction steel

Group C306
for blind holes



2xd₁



Cutting Data



Art.-No.

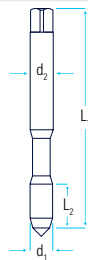
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Cutting Data **i** Page 8.5



C3060/2689

C / 2-3 x P

VAP

S2

P1 general construction steel K2+K3 spheroidal and malleable cast iron

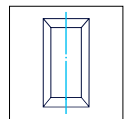
Ø d ₁	P _{mm}	L ₁	L ₂	d ₂	□	▨													
M 2	0.4	40	7	3	2.5	1.6													
M 2,5	0.45	44	8	3	2.5	2.05													
M 3	0.5	46	9	4	3.2	2.5		■											
M 4	0.7	52	11	5	4	3.3		■											
M 5	0.8	60	13	5.5	4.5	4.2		■											
M 6	1	62	15	6	4.5	5		■											
M 8	1.25	70	22	6.2	5	6.8		■											
M 10	1.5	75	24	7	5.5	8.5		■											
M 12	1.75	82	29	8.5	6.5	10.2		■											
M 14	2	88	30	10.5	8	12													
M 16	2	95	32	12.5	10	14													
M 18	2.5	100	37	14	11	15.5													
M 20	2.5	105	37	15	12	17.5													

Machine Taps

JIS HSS-E

spiral point
for general construction steel

Group C110
for through holes



2xd₁

Art.-No.

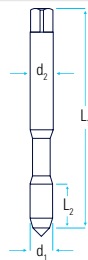
Technology Page 8.1

Chamfer Length Page 8.2

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Tolerance Page 8.4

Cutting Data Page 8.5



Cutting Data



C1100/89	C1100/89	C1100/89
	B / 3.5-5 x P	
bright	bright	bright
S2	S3	S4
P1 general construction steel	K2+K3 spheroidal and malleable cast iron	

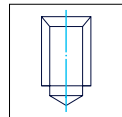
Ø d ₁	P _{mm}	L ₁	L ₂	d ₂	□	▨				
M 2	0.4	40	9.5	3	2.5	1.6				
M 2,5	0.45	44	9.5	3	2.5	2.05				
M 3	0.5	46	11	4	3.2	2.5	■			
M 4	0.7	52	13	5	4	3.3	■			
M 5	0.8	60	16	5.5	4.5	4.2	■			
M 6	1	62	19	6	4.5	5	■			
M 8	1.25	70	22	6.2	5	6.8		■		
M 10	1.5	75	24	7	5.5	8.5		■		
M 12	1.75	82	29	8.5	6.5	10.2			■	
M 14	2	88	30	10.5	8	12				
M 16	2	95	32	12.5	10	14				
M 18	2.5	100	37	14	11	15.5				
M 20	2.5	105	37	15	12	17.5				

Machine Taps Black Ring - BLACK POWER

JIS HSS-E

RH spiral flutes 40°
for universal use

Group C330
for blind holes



2xd₁

Art.-No.

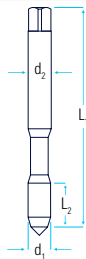
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Cutting Data



C3300/2689	C3300/2689	C3300/2689
Black Ring	Black Ring	Black Ring
	C / 2-3 x P	
VAP	VAP	VAP
S1	S2	S3
P1 general construction steel	M1 chemical resistant steel	N1 aluminium alloys N3 copper alloys

Ø d ₁	P _{mm}	L ₁	L ₂	d ₂	□	▨				
M 2	0.4	40	7	3	2.5	1.6	■			
M 2,5	0.45	44	8	3	2.5	2.05	■			
M 3	0.5	46	7	4	3.2	2.5		■		
M 4	0.7	52	8.5	5	4	3.3		■		
M 5	0.8	60	10	5.5	4.5	4.2		■		
M 6	1	62	13	6	4.5	5		■		
M 8	1.25	70	15	6.2	5	6.8		■		
M 10	1.5	75	18	7	5.5	8.5		■		
M 12	1.75	82	19	8.5	6.5	10.2		■		
M 14	2	88	30	10.5	8	12				
M 16	2	95	32	12.5	10	14		■		
M 18	2.5	100	37	14	11	15.5				
M 20	2.5	105	37	15	12	17.5				■

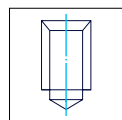
Machine Taps Black Ring - BLACK POWER



JIS HSS-E

RH spiral flutes 40°
for universal use

Group C330
for blind holes



2xd₁



Art.-No.

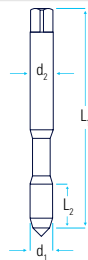
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Tolerance Page 8.4

Cutting Data Page 8.5



C3300/2589

C3300/2589

Black Ring

Black Ring

C / 2-3 x P

TiN

TiN

S2

S3

P1 general construction steel M1 chemical resistant steel N1 aluminium alloys N3 copper alloys

Ø d ₁	P _{mm}	L ₁	L ₂	d ₂	□	▨												
M 2	0.4	40	7	3	2.5	1.6												
M 2,5	0.45	44	8	3	2.5	2.05												
M 3	0.5	46	7	4	3.2	2.5	■											
M 4	0.7	52	8.5	5	4	3.3	■											
M 5	0.8	60	10	5.5	4.5	4.2	■											
M 6	1	62	13	6	4.5	5	■											
M 8	1.25	70	15	6.2	5	6.8												■
M 10	1.5	75	18	7	5.5	8.5												■
M 12	1.75	82	19	8.5	6.5	10.2												■
M 14	2	88	30	10.5	8	12												
M 16	2	95	32	12.5	10	14												
M 18	2.5	100	37	14	11	15.5												
M 20	2.5	105	37	15	12	17.5												

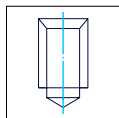
Machine Taps Black Ring - BLACK POWER



JIS HSS-E

LH spiral flutes 40°
for universal use

Group C330
for blind holes



2x d₁



Art.-No.

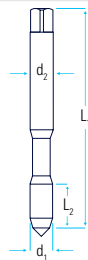
Technology Page 8.1

Chamfer Length Page 8.2

Surface Page 8.3

Tolerance Page 8.4

Cutting Data Page 8.5



C3305/2689

LH

Black Ring

C / 2-3 x P

VAP

S2

P1 general construction steel M1 chemical resistant steel N1 aluminium alloys N3 copper alloys

Ø d ₁	P _{mm}	L ₁	L ₂	d ₂	□	▨													
M 2	0.4	40	7	3	2.5	1.6													
M 2,5	0.45	44	8	3	2.5	2.05													
M 3	0.5	46	7	4	3.2	2.5		■											
M 4	0.7	52	8.5	5	4	3.3		■											
M 5	0.8	60	10	5.5	4.5	4.2		■											
M 6	1	62	13	6	4.5	5		■											
M 8	1.25	70	15	6.2	5	6.8		■											
M 10	1.5	75	18	7	5.5	8.5		■											
M 12	1.75	82	19	8.5	6.5	10.2		■											
M 14	2	88	30	10.5	8	12													
M 16	2	95	32	12.5	10	14													
M 18	2.5	100	37	14	11	15.5													
M 20	2.5	105	37	15	12	17.5													

Machine Taps Black Ring - BLACK POWER

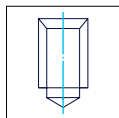
Cutting Data



JIS HSS-E

RH spiral flutes 40°
for universal use

Group C330
for blind holes



2x d₁



Art.-No.

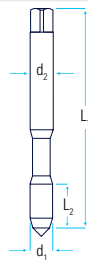
Technology Page 8.1

Chamfer Length Page 8.2

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C3300/4389

2 x L1

Black Ring

C / 2-3 x P

bright

S2

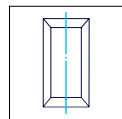
P1 general construction steel M1 chemical resistant steel N1 aluminium alloys N3 copper alloys

Ø d ₁	P _{mm}	L ₁	L ₂	d ₂														
M 2	0.4	40	7	3	2.5	1.6												
M 2,5	0.45	44	8	3	2.5	2.05												
M 3	0.5	46	7	4	3.2	2.5		■										
M 4	0.7	52	8.5	5	4	3.3		■										
M 5	0.8	60	10	5.5	4.5	4.2		■										
M 6	1	62	13	6	4.5	5		■										
M 8	1.25	70	15	6.2	5	6.8		■										
M 10	1.5	75	18	7	5.5	8.5		■										
M 12	1.75	82	19	8.5	6.5	10.2		■										
M 14	2	88	30	10.5	8	12												
M 16	2	95	32	12.5	10	14												
M 18	2.5	100	37	14	11	15.5												
M 20	2.5	105	37	15	12	17.5												

Machine Taps Black Ring - BLACK POWER

JIS HSS-E
spiral point
for universal use

Group C190
for through holes



2xd₁

Art.-No.

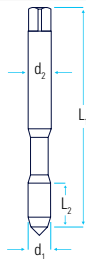
Technology Page 8.1

Chamfer Length Page 8.2

Surface Page 8.3

Tolerance Page 8.4

Cutting Data Page 8.5



Cutting Data



C1900/2689	C1900/2689	C1900/2689
Black Ring	Black Ring	Black Ring
	B / 3.5-5 x P	
VAP	VAP	VAP
S2	S3	S4
P1 general construction steel	M1 chemical resistant steel	N1 aluminium alloys N3 copper alloys

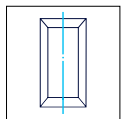
Ø d ₁	P _{mm}	L ₁	L ₂	d ₂	□	▨				
M 2	0.4	40	9.5	3	2.5	1.6		■		
M 2,5	0.45	44	9.5	3	2.5	2.05		■		
M 3	0.5	46	11	4	3.2	2.5		■		
M 4	0.7	52	13	5	4	3.3		■		
M 5	0.8	60	16	5.5	4.5	4.2		■		
M 6	1	62	19	6	4.5	5		■		
M 8	1.25	70	22	6.2	5	6.8		■		
M 10	1.5	75	24	7	5.5	8.5			■	
M 12	1.75	82	29	8.5	6.5	10.2			■	
M 14	2	88	30	10.5	8	12				
M 16	2	95	32	12.5	10	14				■
M 18	2.5	100	37	14	11	15.5				
M 20	2.5	105	37	15	12	17.5				■

Machine Taps Black Ring - BLACK POWER



JIS HSS-E
spiral point
for universal use

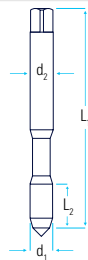
Group C190
for through holes



2xd₁



Art.-No.	
Technology	i Page 8.1
Chamfer Length	i Page 8.2
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C1900/2589	C1900/2589	C1900/2589
Black Ring	Black Ring	Black Ring
	B / 3.5-5 x P	
TiN	TiN	TiN
S2	S3	S4
P1 general construction steel	M1 chemical resistant steel	N1 aluminium alloys N3 copper alloys

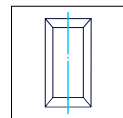
Ø d ₁	P _{mm}	L ₁	L ₂	d ₂	□	▨					
M 2	0.4	40	9.5	3	2.5	1.6					
M 2,5	0.45	44	9.5	3	2.5	2.05					
M 3	0.5	46	11	4	3.2	2.5	■				
M 4	0.7	52	13	5	4	3.3	■				
M 5	0.8	60	16	5.5	4.5	4.2	■				
M 6	1	62	19	6	4.5	5	■				
M 8	1.25	70	22	6.2	5	6.8		■			
M 10	1.5	75	24	7	5.5	8.5		■			
M 12	1.75	82	29	8.5	6.5	10.2			■		
M 14	2	88	30	10.5	8	12					
M 16	2	95	32	12.5	10	14					
M 18	2.5	100	37	14	11	15.5					
M 20	2.5	105	37	15	12	17.5					

Machine Taps Black Ring - BLACK POWER

JIS HSS-E

Left Hand, spiral point
for universal use

Group C190
for through holes



2xd₁

Art.-No.

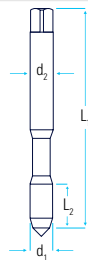
Technology Page 8.1

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Cutting Data



C1905/2689	C1905/2689	C1905/2689
LH	LH	LH
Black Ring	Black Ring	Black Ring
B / 3.5-5 x P		
VAP	VAP	VAP
S2	S3	S4
P1 general construction steel	M1 chemical resistant steel	N1 aluminium alloys N3 copper alloys

Ø d ₁	P _{mm}	L ₁	L ₂	d ₂	□	▨					
M 2	0.4	40	9.5	3	2.5	1.6					
M 2,5	0.45	44	9.5	3	2.5	2.05					
M 3	0.5	46	11	4	3.2	2.5	■				
M 4	0.7	52	13	5	4	3.3	■				
M 5	0.8	60	16	5.5	4.5	4.2	■				
M 6	1	62	19	6	4.5	5	■				
M 8	1.25	70	22	6.2	5	6.8		■			
M 10	1.5	75	24	7	5.5	8.5		■			
M 12	1.75	82	29	8.5	6.5	10.2			■		
M 14	2	88	30	10.5	8	12					
M 16	2	95	32	12.5	10	14					
M 18	2.5	100	37	14	11	15.5					
M 20	2.5	105	37	15	12	17.5					

Machine Taps Black Ring - BLACK POWER

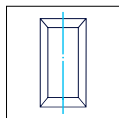
Cutting Data



JIS HSS-E

spiral point
for universal use

Group C190
for through holes



2x d₁



Art.-No.

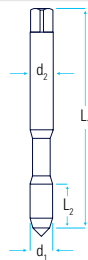
Technology [i](#) Page 8.1

Chamfer Length [i](#) Page 8.2

Surface [i](#) Page 8.3

Tolerance [i](#) Page 8.4

Cutting Data [i](#) Page 8.5



C1900/4389

C1900/4389

Black Ring

Black Ring

B / 3.5-5 x P

bright

bright

S2

S3

P1 general construction steel M1 chemical resistant steel N1 aluminium alloys N3 copper alloys

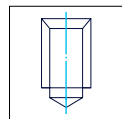
Ø d ₁	P _{mm}	L ₁	L ₂	d ₂	□	▨														
M 2	0.4	40	9.5	3	2.5	1.6														
M 2,5	0.45	44	9.5	3	2.5	2.05														
M 3	0.5	46	11	4	3.2	2.5	■													
M 4	0.7	52	13	5	4	3.3	■													
M 5	0.8	60	16	5.5	4.5	4.2	■													
M 6	1	62	19	6	4.5	5	■													
M 8	1.25	70	22	6.2	5	6.8														■
M 10	1.5	75	24	7	5.5	8.5														■
M 12	1.75	82	29	8.5	6.5	10.2														■
M 14	2	88	30	10.5	8	12														
M 16	2	95	32	12.5	10	14														
M 18	2.5	100	37	14	11	15.5														
M 20	2.5	105	37	15	12	17.5														

Machine Taps Blue Ring

JIS HSS-E

RH spiral flutes 40°
for chemical resistant steel

Group C350
for blind holes



2x d₁

Cutting Data



Art.-No.

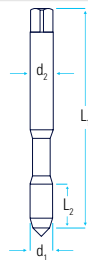
Technology [i](#) Page 8.1

Chamfer Length [i](#) Page 8.2

Surface [i](#) Page 8.3

Tolerance [i](#) Page 8.4

Cutting Data [i](#) Page 8.5



C3500/2689

C3500/2689

Blue Ring

Blue Ring

C / 2-3 x P

VAP

VAP

S2

S3

P2 high strength steel M1 chemical resistant steel S1 titanium alloys

Ø d ₁	P _{mm}	L ₁	L ₂	d ₂	□	▨				
M 2	0.4	40	7	3	2.5	1.6	■			
M 2,5	0.45	44	8	3	2.5	2.05	■			
M 3	0.5	46	9	4	3.2	2.5			■	
M 4	0.7	52	11	5	4	3.3			■	
M 5	0.8	60	13	5.5	4.5	4.2			■	
M 6	1	62	15	6	4.5	5			■	
M 8	1.25	70	22	6.2	5	6.8			■	
M 10	1.5	75	24	7	5.5	8.5			■	
M 12	1.75	82	29	8.5	6.5	10.2			■	
M 14	2	88	30	10.5	8	12				
M 16	2	95	32	12.5	10	14				
M 18	2.5	100	37	14	11	15.5				
M 20	2.5	105	37	15	12	17.5				

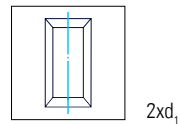
Machine Taps Blue Ring

JIS HSS-E

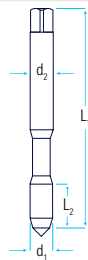
spiral point
for chemical resistant steel

Group C120
for through holes

INOX
Stainless



- Art.-No.
- Technology i Page 8.1
- Chamfer Length i Page 8.2
- Surface i Page 8.3
- Tolerance i Page 8.4
- Cutting Data i Page 8.5



C1200/2689	C1200/2689	C1200/2689
Blue Ring	Blue Ring	Blue Ring
	B / 3.5-5 x P	
VAP	VAP	VAP
S3	S4	S5
P2 high strength steel	M1 chemical resistant steel	S1 titanium alloys

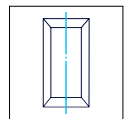
Ø d ₁	P _{mm}	L ₁	L ₂	d ₂	□	▨				
M 2	0.4	40	9.5	3	2.5	1.6	■			
M 2,5	0.45	44	9.5	3	2.5	2.05	■			
M 3	0.5	46	11	4	3.2	2.5	■			
M 4	0.7	52	13	5	4	3.3	■			
M 5	0.8	60	16	5.5	4.5	4.2	■			
M 6	1	62	19	6	4.5	5	■			
M 8	1.25	70	22	6.2	5	6.8		■		
M 10	1.5	75	24	7	5.5	8.5		■		
M 12	1.75	82	29	8.5	6.5	10.2			■	
M 14	2	88	30	10.5	8	12				
M 16	2	95	32	12.5	10	14				
M 18	2.5	100	37	14	11	15.5				
M 20	2.5	105	37	15	12	17.5				

Machine Taps Red Ring

JIS HSS-E

spiral point
for high strength steel

Group C170
for through holes



2xd₁

Art.-No.

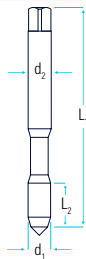
Technology Page 8.1

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Tolerance Page 8.4

Cutting Data Page 8.5



Cutting Data



C1700/89	C1700/89	C1700/89
Red Ring	Red Ring	Red Ring
	B / 3.5-5 x P	
bright	bright	bright
S3	S4	S5
P2 high strength steel		

Ø d ₁	P _{mm}	L ₁	L ₂	d ₂	□	▨
M 2	0.4	40	9.5	3	2.5	1.6
M 2,5	0.45	44	9.5	3	2.5	2.05
M 3	0.5	46	11	4	3.2	2.5
M 4	0.7	52	13	5	4	3.3
M 5	0.8	60	16	5.5	4.5	4.2
M 6	1	62	19	6	4.5	5
M 8	1.25	70	22	6.2	5	6.8
M 10	1.5	75	24	7	5.5	8.5
M 12	1.75	82	29	8.5	6.5	10.2
M 14	2	88	30	10.5	8	12
M 16	2	95	32	12.5	10	14
M 18	2.5	100	37	14	11	15.5
M 20	2.5	105	37	15	12	17.5

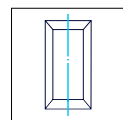
Machine Taps Red Ring - TYPHOON B

JIS HSS-E PM

spiral point
for high strength steel

Group C130
for through holes

Cutting Data



2x d₁



Art.-No.

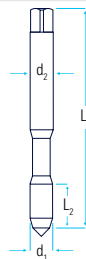
Technology Page 8.1

Chamfer Length Page 8.2

Surface Page 8.3

Tolerance Page 8.4

Cutting Data Page 8.5



C1300/4889

PM-Line

Red Ring

B / 3.5-5 x P

TiCN

S2

P2 high strength steel M1 chemical resistant steel N1 aluminium alloys

Ø d ₁	P _{mm}	L ₁	L ₂	d ₂							
M 2	0.4	40	9.5	3	2.5	1.6					
M 2,5	0.45	44	9.5	3	2.5	2.05					
M 3	0.5	46	11	4	3.2	2.5		■			
M 4	0.7	52	13	5	4	3.3		■			
M 5	0.8	60	16	5.5	4.5	4.2		■			
M 6	1	62	19	6	4.5	5		■			
M 8	1.25	70	22	6.2	5	6.8		■			
M 10	1.5	75	24	7	5.5	8.5		■			
M 12	1.75	82	29	8.5	6.5	10.2		■			
M 14	2	88	30	10.5	8	12					
M 16	2	95	32	12.5	10	14					
M 18	2.5	100	37	14	11	15.5					
M 20	2.5	105	37	15	12	17.5					

Machine Taps Yellow Ring

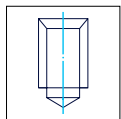
Cutting Data



JIS HSS-E PM

RH spiral flutes 15°
for titanium alloys

Group C280
for blind holes



2x d₁



Art.-No.

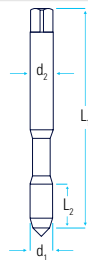
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C2800/2689

PM-Line
Yellow Ring

C2800/2689

PM-Line
Yellow Ring

3-4 x P

VAP

S3

P1 high strength steel

VAP

S4

S1 titanium alloys

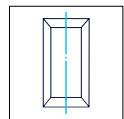
Ø d ₁	P _{mm}	L ₁	L ₂	d ₂	□	▨												
M 2	0.4	40	7	3	2.5	1.6												
M 2,5	0.45	44	8	3	2.5	2.05												
M 3	0.5	46	9	4	3.2	2.5	■											
M 4	0.7	52	11	5	4	3.3	■											
M 5	0.8	60	13	5.5	4.5	4.2	■											
M 6	1	62	15	6	4.5	5	■											
M 8	1.25	70	22	6.2	5	6.8	■											
M 10	1.5	75	24	7	5.5	8.5	■											
M 12	1.75	82	29	8.5	6.5	10.2												
M 14	2	88	30	10.5	8	12												
M 16	2	95	32	12.5	10	14												
M 18	2.5	100	37	14	11	15.5												
M 20	2.5	105	37	15	12	17.5												

Machine Taps Yellow Ring

JIS HSS-E PM

spiral point
for titanium alloys

Group C180
for through holes



2x d₁

Art.-No.

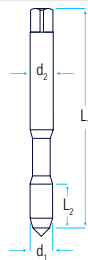
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Chamfer Length Page 8.2

Surface Page 8.3

Tolerance Page 8.4

Cutting Data Page 8.5



Cutting Data



C1800/2689

PM-Line

Yellow Ring

C1800/2689

PM-Line

Yellow Ring

B / 3.5-5 x P

VAP

VAP

S3

S4

P1 high strength steel S1 titanium alloys

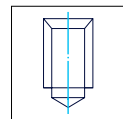
Ø d ₁	P _{mm}	L ₁	L ₂	d ₂						
M 2	0.4	40	9.5	3	2.5	1.6				
M 2,5	0.45	44	9.5	3	2.5	2.05				
M 3	0.5	46	11	4	3.2	2.5	■			
M 4	0.7	52	13	5	4	3.3	■			
M 5	0.8	60	16	5.5	4.5	4.2	■			
M 6	1	62	19	6	4.5	5	■			
M 8	1.25	70	22	6.2	5	6.8			■	
M 10	1.5	75	24	7	5.5	8.5			■	
M 12	1.75	82	29	8.5	6.5	10.2			■	
M 14	2	88	30	10.5	8	12				
M 16	2	95	32	12.5	10	14				
M 18	2.5	100	37	14	11	15.5				
M 20	2.5	105	37	15	12	17.5				

Machine Taps - MISTRAL

JIS HSS-E

RH spiral flutes 45°
for aluminium and bronze alloys

Group C360
for blind holes



2xd₁

Art.-No.

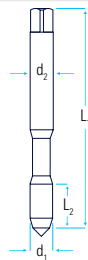
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Chamfer Length [i](#) Page 8.2

Surface [i](#) Page 8.3

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Cutting Data [i](#) Page 8.5



Cutting Data



C3600/89	C3600/89
C / 2-3 x P	
bright	bright
S2	S3
N1 aluminium alloys	N6 thermoplastics

Ø d ₁	P _{mm}	L ₁	L ₂	d ₂	□	▨				
M 2	0.4	40	7	3	2.5	1.6				
M 2,5	0.45	44	8	3	2.5	2.05				
M 3	0.5	46	9	4	3.2	2.5	■			
M 4	0.7	52	11	5	4	3.3	■			
M 5	0.8	60	13	5.5	4.5	4.2	■			
M 6	1	62	15	6	4.5	5	■			
M 8	1.25	70	22	6.2	5	6.8		■		
M 10	1.5	75	24	7	5.5	8.5		■		
M 12	1.75	82	29	8.5	6.5	10.2		■		
M 14	2	88	30	10.5	8	12				
M 16	2	95	32	12.5	10	14				
M 18	2.5	100	37	14	11	15.5				
M 20	2.5	105	37	15	12	17.5				

Machine Taps White Ring

Cutting Data

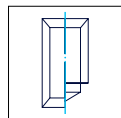


JIS HSS-E

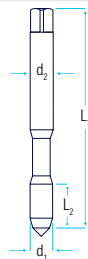
straight flutes
for cast iron

Group C030
for blind and through holes

CAST
IRON



2xd₁



Art.-No.

Technology Page 8.1

Chamfer Length Page 8.2

Surface Page 8.3

Tolerance Page 8.4

Cutting Data Page 8.5

C0300/0189

C0300/0189

White Ring

White Ring

C / 2-3 x P

nitrided

nitrided

S3

S4

K1 grey cast iron N7 duroplastics

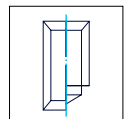
Ø d ₁	P _{mm}	L ₁	L ₂	d ₂	□	▨														
M 2	0.4	40	9.5	3	2.5	1.6														
M 2,5	0.45	44	9.5	3	2.5	2.05														
M 3	0.5	46	11	4	3.2	2.5	■													
M 4	0.7	52	13	5	4	3.3	■													
M 5	0.8	60	16	5.5	4.5	4.2	■													
M 6	1	62	19	6	4.5	5	■													
M 8	1.25	70	22	6.2	5	6.8	■													
M 10	1.5	75	24	7	5.5	8.5														■
M 12	1.75	82	29	8.5	6.5	10.2														■
M 14	2	88	30	10.5	8	12														
M 16	2	95	32	12.5	10	14														
M 18	2.5	100	37	14	11	15.5														
M 20	2.5	105	37	15	12	17.5														

Forming Taps

JIS HSS-E

straight oil grooves for steel, non-ferrous steel and heat treatable steel

Group C060
for blind and through holes



2xd₁

Cutting Data



Art.-No.

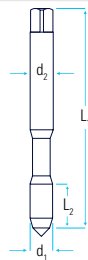
Technology Page 8.1

Chamfer Length Page 8.2

Surface Page 8.3

Tolerance Page 8.4

Cutting Data Page 8.5



C0600/265389	C0600/265389	C0600/265389	C0600/265389
--------------	--------------	--------------	--------------

C / 2-3 x P

VAP	VAP	VAP	VAP
-----	-----	-----	-----

SF4	SF5	SF6	SF7
-----	-----	-----	-----

P1 general construction steel P2 high strength steel N3 copper alloys

Ø d ₁	P _{mm}	L ₁	L ₂	d ₂	□	▨				
M 2	0.4	40	9.5	3	2.5	1.6	■			
M 2,5	0.45	44	9.5	3	2.5	2.05				
M 3	0.5	46	11	4	3.2	2.5		■		
M 4	0.7	52	13	5	4	3.3			■	
M 5	0.8	60	16	5.5	4.5	4.2			■	
M 6	1	62	19	6	4.5	5				■
M 8	1.25	70	22	6.2	5	6.8				■
M 10	1.5	75	24	7	5.5	8.5				■
M 12	1.75	82	29	8.5	6.5	10.2				
M 14	2	88	30	10.5	8	12				
M 16	2	95	32	12.5	10	14				
M 18	2.5	100	37	14	11	15.5				
M 20	2.5	105	37	15	12	17.5				

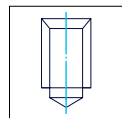
Machine Taps Black Ring - BLACK POWER



JIS HSS-E

RH spiral flutes 40°
for universal use

Group C330
for blind holes



2xd₁



Art.-No.

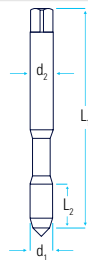
Technology Page 8.1

Chamfer Length Page 8.2

Surface Page 8.3

Tolerance Page 8.4

Cutting Data Page 8.5



C3300/89	C3300/89	C3300/89
Black Ring	Black Ring	Black Ring
bright	C / 2-3 x P bright	bright
S1	S2	S3
P1 general construction steel	M1 chemical resistant steel	N1 aluminium alloys N3 copper alloys

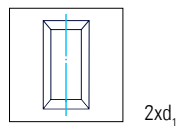
Ø d ₁	P _{tpi}	L ₁	L ₂	d ₂	□	▧				
No. 2	56	42	9.5	3	2.5	1.8	■			
No. 3	48	44	9.5	3	2.5	2.1				
No. 4	40	44	9.5	3	2.5	2.35	■			
No. 5	40	46	9	4	3.2	2.65				
No. 6	32	52	11	5	4	2.85		■		
No. 8	32	52	11	5	4	3.5		■		
No. 10	24	60	13	5.5	4.5	3.9		■		
No. 12	24	60	13	5.5	4.5	4.5				
1/4"	20	62	15	6	4.5	5.2		■		
5/16"	18	70	22	6.1	5	6.6		■		
3/8"	16	75	24	7	5.5	8.0		■		
7/16"	14	80	25	8	6	9.4				
1/2"	13	85	29	9	7	10.8				■

Machine Taps Black Ring - BLACK POWER

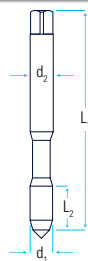


JIS HSS-E
spiral point
for universal use

Group C190
for through holes



- Art.-No.
- Technology i Page 8.1
- Chamfer Length i Page 8.2
- Surface i Page 8.3
- Tolerance i Page 8.4
- Cutting Data i Page 8.5



C1900/89	C1900/89	C1900/89
Black Ring	Black Ring	Black Ring
	B / 3.5-5 x P	
bright	bright	bright
S1	S2	S3
P1 general construction steel	M1 chemical resistant steel	N1 aluminium alloys N3 copper alloys

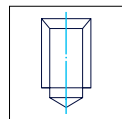
Ø d ₁	P _{tpi}	L ₁	L ₂	d ₂	□	▧			
No. 2	56	42	9.5	3	2.5	1.8	■		
No. 3	48	44	9.5	3	2.5	2.1			
No. 4	40	44	9.5	3	2.5	2.35		■	
No. 5	40	46	9	4	3.2	2.65			
No. 6	32	52	11	5	4	2.85		■	
No. 8	32	52	11	5	4	3.5		■	
No. 10	24	60	13	5.5	4.5	3.9		■	
No. 12	24	60	13	5.5	4.5	4.5			
1/4"	20	62	15	6	4.5	5.2		■	
5/16"	18	70	22	6.1	5	6.6			■
3/8"	16	75	24	7	5.5	8.0			■
7/16"	14	80	25	8	6	9.4			
1/2"	13	85	29	9	7	10.8			■

Machine Taps Blue Ring

JIS HSS-E

RH spiral flutes 40°
for chemical resistant steel

Group C350
for blind holes



2xd₁



Art.-No.

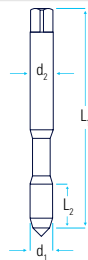
Technology [i](#) Page 8.1

Chamfer Length [i](#) Page 8.2

Surface [i](#) Page 8.3

Tolerance [i](#) Page 8.4

Cutting Data [i](#) Page 8.5



C350Q/2689	C350Q/2689	C350Q/2689
Blue Ring	Blue Ring	Blue Ring
	C / 2-3 x P	
VAP	VAP	VAP
S1	S2	S3
P2 high strength steel	M1 chemical resistant steel	S1 titanium alloys

Ø d ₁	P _{tpi}	L ₁	L ₂	d ₂	□	▧
No. 2	56	42	9.5	3	2.5	1.8
No. 3	48	44	9.5	3	2.5	2.1
No. 4	40	44	9.5	3	2.5	2.35
No. 5	40	46	9	4	3.2	2.65
No. 6	32	52	11	5	4	2.85
No. 8	32	52	11	5	4	3.5
No. 10	24	60	13	5.5	4.5	3.9
No. 12	24	60	13	5.5	4.5	4.5
1/4"	20	62	15	6	4.5	5.2
5/16"	18	70	22	6.1	5	6.6
3/8"	16	75	24	7	5.5	8.0
7/16"	14	80	25	8	6	9.4
1/2"	13	85	29	9	7	10.8

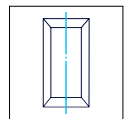
Machine Taps Blue Ring

JIS HSS-E

spiral point
for chemical resistant steel

Group C120
for through holes

INOX
Stainless



2x d₁

Cutting Data



Art.-No.

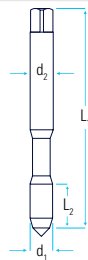
Technology **i** Page 8.1

Chamfer Length **i** Page 8.2

Surface **i** Page 8.3

Tolerance **i** Page 8.4

Cutting Data **i** Page 8.5



C120Q/2689

C120Q/2689

Blue Ring

Blue Ring

B / 3.5-5 x P

VAP

VAP

S2

S3

P2 high strength steel M1 chemical resistant steel S1 titanium alloys

Ø d ₁	P _{tpi}	L ₁	L ₂	d ₂	□	▨				
No. 2	56	42	9.5	3	2.5	1.8				
No. 3	48	44	9.5	3	2.5	2.1				
No. 4	40	44	9.5	3	2.5	2.35	■			
No. 5	40	46	9	4	3.2	2.65				
No. 6	32	52	11	5	4	2.85	■			
No. 8	32	52	11	5	4	3.5	■			
No. 10	24	60	13	5.5	4.5	3.9	■			
No. 12	24	60	13	5.5	4.5	4.5				
1/4"	20	62	15	6	4.5	5.2	■			
5/16"	18	70	22	6.1	5	6.6			■	
3/8"	16	75	24	7	5.5	8.0			■	
7/16"	14	80	25	8	6	9.4				
1/2"	13	85	29	9	7	10.8			■	

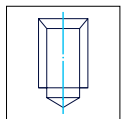
Machine Taps Black Ring - BLACK POWER



JIS HSS-E

RH spiral flutes 40°
for universal use

Group C330
for blind holes



2xd₁



Art.-No.

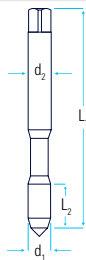
Technology Page 8.1

Chamfer Length Page 8.2

Surface Page 8.3

Tolerance Page 8.4

Cutting Data Page 8.5



C3300/89

Black Ring

C / 2-3 x P

bright

S2

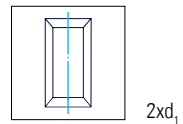
P1 general construction steel M1 chemical resistant steel N1 aluminium alloys N3 copper alloys

Ø d ₁	P _{tpi}	L ₁	L ₂	d ₂	□	▨												
No. 2	64	42	9.5	3	2.5	1.8												
No. 3	56	44	9.5	3	2.5	2.1												
No. 4	48	44	9.5	3	2.5	2.35												
No. 5	44	46	9	4	3.2	2.65												
No. 6	40	52	11	5	4	2.85												
No. 8	36	52	11	5	4	3.5												
No. 10	32	60	13	5.5	4.5	3.9		■										
No. 12	28	60	13	5.5	4.5	4.5												
1/4"	28	62	15	6	4.5	5.2		■										
5/16"	24	70	22	6.1	5	6.6		■										
3/8"	24	75	24	7	5.5	8.0		■										
7/16"	20	80	25	8	6	9.4												
1/2"	20	85	29	9	7	10.8		■										

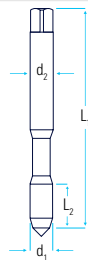
Machine Taps Black Ring - BLACK POWER

JIS HSS-E
spiral point
for universal use

Group C190
for through holes



- Art.-No.
- Technology i Page 8.1
- Chamfer Length i Page 8.2
- Surface i Page 8.3
- Tolerance i Page 8.4
- Cutting Data i Page 8.5



C1900/89	C1900/89
Black Ring	Black Ring
B / 3.5-5 x P	
bright	bright
S2	S3
P1 general construction steel	M1 chemical resistant steel N1 aluminium alloys N3 copper alloys

Ø d ₁	P _{tpi}	L ₁	L ₂	d ₂	□	▨				
No. 2	64	42	9.5	3	2.5	1.8				
No. 3	56	44	9.5	3	2.5	2.1				
No. 4	48	44	9.5	3	2.5	2.35				
No. 5	44	46	9	4	3.2	2.65				
No. 6	40	52	11	5	4	2.85				
No. 8	36	52	11	5	4	3.5				
No. 10	32	60	13	5.5	4.5	3.9	■			
No. 12	28	60	13	5.5	4.5	4.5				
1/4"	28	62	15	6	4.5	5.2	■			
5/16"	24	70	22	6.1	5	6.6		■		
3/8"	24	75	24	7	5.5	8.0		■		
7/16"	20	80	25	8	6	9.4				
1/2"	20	85	29	9	7	10.8		■		

Color Ring Series

The color ring line comprises machine taps from five different product groups which meet the requirements of highly sophisticated industries such as automotive, aerospace or chemicals. By their color marking, the appropriate use of these taps is facilitated. Selected hard material coatings increase the range of employment.



White Ring

Product line for grey cast iron



Red Ring

Product line for high strength heat treatable steel and nickel alloys



Blue Ring

Product line for use in INOX/stainless steel



Black Ring

Product line for general purpose »Black Power«


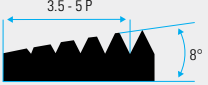
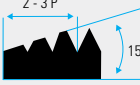
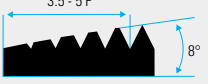
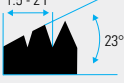



Yellow Ring

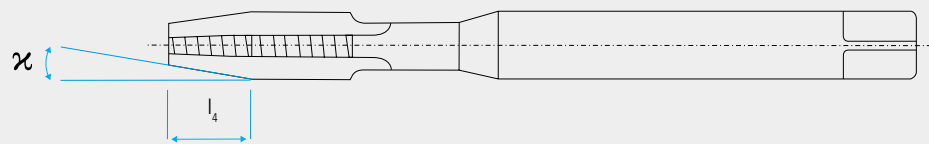
Product line for use in titanium alloys



Chamfer Types

Form	Chamfer length l_4 ¹⁾ [x pitch]	Chamfer angle α [°]	Main field of application:	
A	6 to 8	5°	short through holes	
B	3.5 to 5	8°	through holes in mid and long chipping materials	
C	2 to 3	15°	blind holes and through holes in short chipping materials	
D	3.5 to 5	8°	blind holes with long thread run-out and through holes	
E	1.5 to 2	23°	blind holes with very short thread run-out	
F	1 to 1.5	> 28°	blind holes with very short thread run-out	

¹⁾ The number of pitches is a simple, practice-oriented criterion for defining the chamfer length of taps



Coatings

Technologies for hard material coatings of HSS and solid carbide tools are increasingly important since they bring about advantages such as:

- › an increase in tool life
- › a reduction of set-up times

and a substantial

- › increase of working speeds

These factors justify the extra expenditures compared to tools without hard material coatings.

TiN Coating

Allround coating designed to improve tool life and optimize cutting speed. With a surface hardness of 2600 HV 0.05 and a frictional coefficient of 0.40 this coating can be applied in working temperatures of up to 450°C. The thickness of the layer ranges between 2 - 4 µm. TiN coatings have a internal compressive stress of approx. 3.1 GPa.



TiCN Coating

Improved tribological characteristics compared to TiN. Micro hardness at 3000 HV 0.05; frictional coefficient reduced to 0.35 compared to steel. Temperature stability of TiCN layers (thickness of 2 - 4 µm) extends up to 350°C. Internal compressive stress is at 3.5 GPa.



TiAlN Coating

Optimized PVD layer system, for hard materials of up to 50 HRC. Enhanced range of employment due to temperature stability up to 800°C and micro hardness of 3000 HV 0,05. This layer system features an oxidizing protection layer which provides the tool with a 'renewal effect.' Internal compressive stress of 1.9 GPa. The coating system is applied with a layer thickness of 2-4 µm.



SG4 Coating

Special coating made of super hard coating layer and solid state lubrication layer. Sectors of use comprise dry cutting and minimum lubrication. Wide range of applications due to optimum friction results and reduced tendency of adhesion.



CrN Coating

PVD layer system for non-ferrous materials and thermoplastics. It can be applied in working temperatures up to 600°C and has a low frictional coefficient of 0.3 compared to steel. The layer system has a thickness of 6 µm and a micro hardness of 1750 HV 0.05.



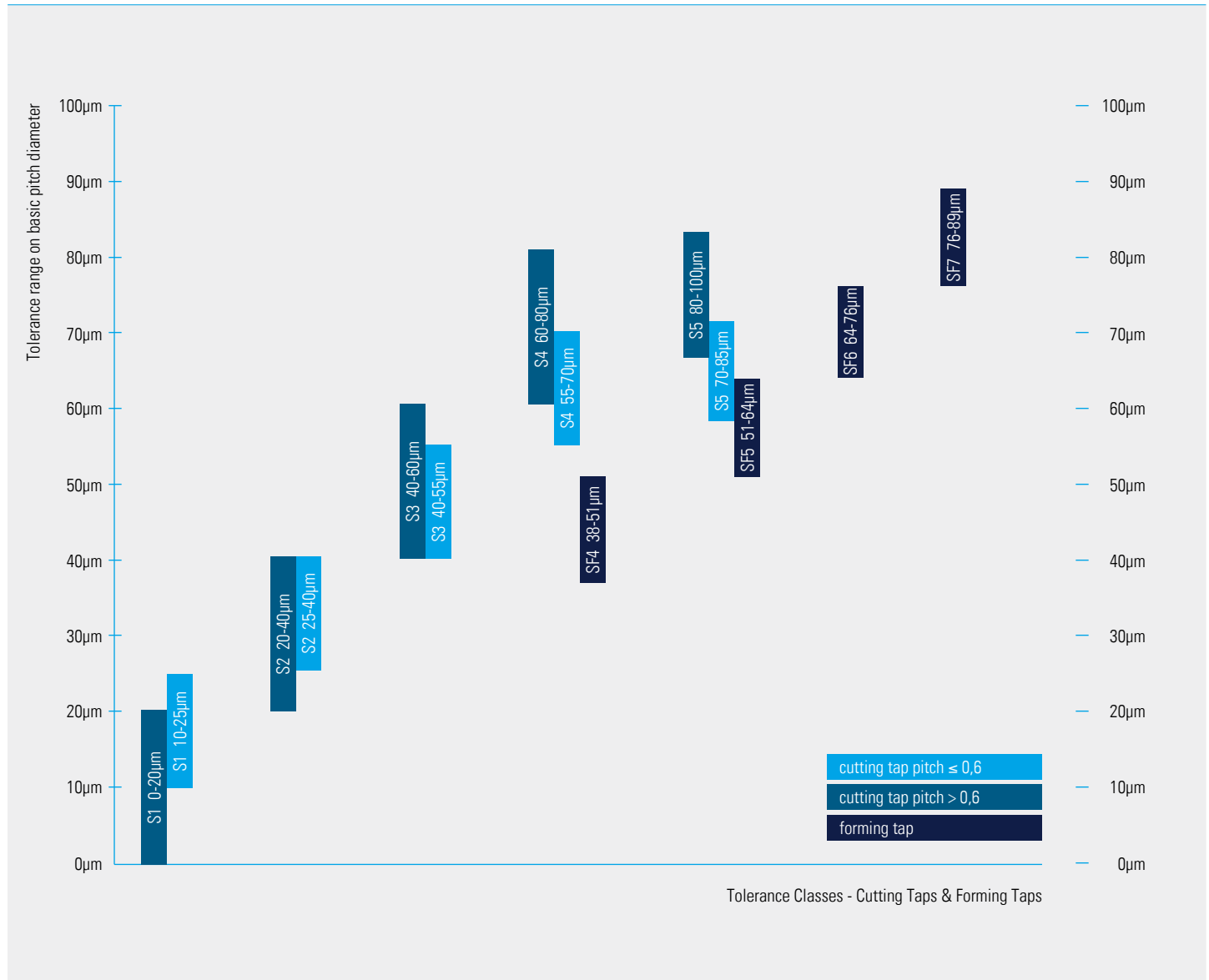
DLC Coating

The diamond like carbon layer ist the best solution for non-ferrous materials. The high surface hardness of 5000 HV 0,05 is combined with a very low friction coefficient of 0.1 compared to steel. The characteristics are completed by the reduced layer thickness of 0.8-1.2 µm and a high temperature stability up to 500°C. Because of this the material adhesion is significantly reduced.



Tolerance Levels

Schematic description of production tolerances applicable for metric internal thread – in addition please also find below the specific tolerance fields for tap production.



Cutting Data

Definition of rotation and cutting speeds for threading tools.

The table below contains the calculated values of rotation and cutting speeds for threading tools between M 3 and M 42. In most cases these calculations will serve for workshop use in practice. If interim values should be required, these can be calculated by drawing upon the formulas listed below.

nominal/diameter	round per minute [1/min]												
	4	5	6	8	10	12	15	20	22	25	28	30	32
M3	425	530	635	850	1060	1270	1590	2120	2330	2650	2965	3180	3390
M4	319	398	480	635	795	955	1190	1590	1750	1990	2230	2390	2550
M5	255	318	382	510	635	765	955	1270	1400	1590	1785	1910	2040
M6	212	265	318	425	530	635	795	1060	1170	1325	1485	1590	1700
M8	159	198	238	318	398	478	598	795	875	995	1115	1195	1275
M10	127	159	191	255	318	382	478	636	700	795	892	955	1020
M12	106	133	159	212	265	318	398	531	584	664	744	795	850
M14	91	114	136	182	228	273	342	455	500	568	636	682	728
M16	80	100	119	159	199	239	299	398	438	497	557	597	637
M18	71	88	106	142	177	212	265	354	388	442	495	530	565
M20	64	80	95	127	159	192	239	318	350	398	446	478	510
M22	58	72	87	116	145	174	217	290	318	362	405	435	463
M24	53	66	80	106	133	159	200	266	292	332	372	398	425
M27	47	59	71	95	118	142	177	236	260	295	330	355	378
M30	42	53	64	85	106	127	159	212	234	265	297	318	340
M33	39	48	58	77	96	116	145	193	212	242	270	290	309
M36	35	44	53	71	88	106	133	177	195	221	248	265	283
M39	33	41	49	65	82	98	122	163	180	205	228	245	262
M42	30	38	45	61	76	91	114	152	167	190	212	228	243
	4	5	6	8	10	12	15	20	22	25	28	30	32
	Cutting speed v [m/min]												

legend:

v = Cutting speed [m/min]
 d = Nominal tap diameter [m]
 n = Tool spindle rotation [1/min]
 $\pi = 3.14$

$$v = d \times \pi \times n$$

$$n = \frac{v}{d \times \pi}$$

Work Piece Material Groups/Cutting Data

Material Groups		Description	DIN Description	DIN 17 007 Material-No.	Strength [N/mm ²]	Cutting Speed v_c [m/min]	
						v_c forming taps = $v_c + 30-50\%$ HSS-E / VHM	
DIN ISO 513	Schumacher					bright	coated
P	P1	Carbon steels	St 33	1.0035	290	10 - 15	15 - 25
	P1	Carbon steels	St 37	1.0120	340 - 370	10 - 15	15 - 25
	P1	Carbon steels	St 50	1.0531	470 - 610	10 - 15	15 - 25
	P1	Carbon steels	St 60 - 2	1.0060	570 - 710	10 - 15	15 - 25
	P1	Carbon steels	St 70 - 2	1.0070	670 - 830	10 - 15	15 - 25
	P1	Heat-treatable steels	C 45	1.0503	650 - 800	10 - 15	15 - 25
	P1	Tool steels	21 MnCr 5	1.2162	720	8 - 10	10 - 15
	P1	Free-cutting steels	9 S 20 K	1.0711	360	10 - 15	15 - 25
	P1	Free-cutting steels	9 SMnPb 28	1.0718	380	10 - 15	15 - 25
	P1	Free-cutting steels	35 SMn 20	1.0726	490 - 610	10 - 15	15 - 25
	P1	Hot-Work steels	X 10 CrSi 13	1.4722	690	3 - 5	5 - 8
	P1	Cast Steels	GS 45	1.0443	440	10 - 15	15 - 25
	P1	Cast Steels	GS 60	1.0553	590	10 - 15	15 - 25
	P1	Cast Steels	GS 70	1.0554	685	10 - 15	15 - 25
	P1	Case-hardened steels	C 15	1.0401	600 - 800	10 - 15	15 - 25
	P1	Case-hardened steels	Ck 15	1.1141	500 - 800	10 - 15	15 - 25
	P2	Case-hardened steels	20 MnCr 5	1.7147	1000 - 1300	10 - 15	15 - 25
	P2	Case-hardened steels	17 CrNiMo 6	1.6587	1050 - 1350	2 - 5	5 - 10
	P2	Heat-treatable steels	C 60	1.0601	800 - 850	10 - 15	15 - 25
	P2	Heat-treatable steels	46 Cr 2	1.7003	700 - 850	2 - 5	5 - 10
	P2	Heat-treatable steels	25 CrMo 4	1.7218	800 - 950	2 - 5	5 - 10
	P2	Tool steels	105 WCr 6	1.2419		8 - 10	10 - 15
	P2	Tool steels	X 45 NiCrMo 4	1.2767	850	8 - 10	10 - 15
	P2	Tool steels	55 Ni Cr Mo V 6	1.2713	810	8 - 10	10 - 15
	P2	Nitriding Steels	31 CrMo 12	1.8515	1000 - 1200	3 - 5	5 - 8
	P2	Nitriding Steels	34 CrAlMo 5	1.8505	800 - 950	3 - 5	5 - 8
	P2	Nitriding Steels	34 CrAlNi 7	1.8550	850 - 1050	3 - 5	5 - 8

Work Piece Material Groups/Cutting Data

Material Groups DIN ISO 513	Schumacher	Description	DIN Description	DIN 17 007 Material-No.	Strength [N/mm ²]	Cutting Speed v_c [m/min] v_c forming taps = $v_c + 30-50\%$ HSS-E / VHM		
						bright	l	coated
M	M1	Stainless steels ferritic	X 6 Cr 13	1.4000	400 - 600	3 - 5		5 - 8
	M1	Stainless steels ferritic	X 4 CrMoS 18	1.4105	450 - 650	3 - 5		5 - 8
	M1	Stainless steels martensitic	X 30Cr 13	1.4028	800 - 1000	3 - 5		5 - 8
	M1	Stainless steels martensitic	X 12 CrMoS 17	1.4104	600 - 840	3 - 5		5 - 8
	M1	Stainless steels austenitic	X 5 CrNi 18 10	1.4301	500 - 700	3 - 5		5 - 8
	M1	Stainless steels austenitic	X 6 CrNiMoTi 17 12 2	1.4571	500 - 730	3 - 5		5 - 8
	M1	Stainless steels austenitic	X 2 CrNiMo 18 14 3	1.4435	490 - 690	3 - 5		5 - 8
	M1	Cast Steels	G X 6 CrNiMo 18 10	1.4408	440 - 640	3 - 5		5 - 8
	M1	Cast Steels	G X 2 CrNiMoN 17 13 5	1.4439	490 - 690	3 - 5		5 - 8
	M2	Duplex steels	X 2 CrNiMoN22-5-3	1.4462	880	3 - 5		5 - 8
K	K1	Grey cast iron	EN-GJL-100 (GG 10)	0.6010	88	8 - 12 25 - 30		12 - 20
	K1	Grey cast iron	EN-GJL-200 (GG 20)	0.6020	195	8 - 12 25 - 30		12 - 20
	K1	Grey cast iron	EN-GJL-300 (GG 30)	0.6030	295	8 - 12 25 - 30		12 - 20
	K1	Grey cast iron	EN-GJL-400 (GG 40)	0.6040	390	8 - 12 25 - 30		12 - 20
	K2	Nodular cast iron	EN-GJS-400-15 (GGG 40)	0.7040	400		5 - 8	10 - 20
	K2	Nodular cast iron	EN-GJS-500-7 (GGG 50)	0.7045	500		5 - 8	10 - 20
	K2	Nodular cast iron	EN-GJS-600-3 (GGG 60)	0.7060	600		5 - 8	10 - 20
	K3	Malleable cast iron	EN-GJMW-400-5 (GTW-40)	0.8040	400		10 - 15	15 - 20
	K3	Malleable cast iron	EN-GJMW-450-7 (GTW-45)	0.8045	450		10 - 15	15 - 20
	K3	Malleable cast iron	EN-GJMW-550-4 (GTW-55)	0.8055	550		10 - 15	15 - 20
	K3	Malleable cast iron	EN-GJMB-350-10 (GTS-35)	0.8135	350		10 - 15	15 - 20
	K3	Malleable cast iron	EN-GJMB-450-6 (GTS-45)	0.8145	450		10 - 15	15 - 20
	K3	Malleable cast iron	EN-GJMB-550-4 (GTS-55)	0.8155	550		10 - 15	15 - 20
N	N1	Aluminium wrought alloys	AlMn 1	3.0515	150 - 200		20 - 25	25 - 35
	N1	Aluminium wrought alloys	AlMg 3	3.3535	200 - 300		20 - 25	25 - 35
	N1	Aluminium wrought alloys	AlMgSiPb	3.0615	200 - 270		20 - 25	25 - 35
	N1	Aluminium wrought alloys	AlZn 4.5 Mg 1	3.4335			20 - 25	25 - 35
	N2	Aluminium cast alloys	G-Al Mg 3	3.3541	140 - 200		20 - 30	30 - 40
	N2	Aluminium cast alloys	G-Al Cu 4	3.1841	280 - 400		20 - 30	30 - 40
	N2	Aluminium cast alloys	G-Al Si 10 Mg	3.2381	250 - 320		20 - 30	30 - 40
	N3	Copper alloys	E-Cu	2.0060	250		10 - 15	15 - 20
	N3	Copper alloys	SE-Cu	2.0070	300		10 - 15	15 - 20
	N3	Special copper alloys	Ampco 18		159 - 183		2 - 4	4 - 6
	N3	Special copper alloys	Ampco 21		285 - 311		2 - 4	4 - 6
	N3	Special copper alloys	Ampco 25		356 - 394		2 - 4	4 - 6

Work Piece Material Groups/Cutting Data

Material Groups DIN ISO 513 Schumacher		Werkstoffart	DIN Beschreibung	DIN 17 007 Material-No.	Strength [N/mm ²]	Cutting Speed v_c [m/min]	
						v_c forming taps = $v_c + 30\text{-}50\%$ HSS-E / VHM	
						bright	coated
N	N4	Brass long chipping	Cu Zn 30 (Ms 70)	2.0265		20 - 25 30 - 50	25 - 35
	N4	Brass short chipping	CuZn 39 Pb 2 (Ms 58)	2.0380		20 - 25 30 - 50	25 - 35
	N4	Brass short chipping	Cu Zn 40 Al 2	2.0550		20 - 25 30 - 50	25 - 35
	N5	Bronze short chipping	CuPb 5 Sn 5	2.1170	250	10 - 15	15 - 20
	N5	Bronze long chipping	Cu Sn 6	2.1030	400 - 550	10 - 15	15 - 20
	N5	Bronze	G-CuPb 10 Sn	2.1176	230	10 - 15	15 - 20
	N6	Thermoplastics long chipping	Hostalen			20 - 30	30 - 40
	N6	Thermoplastics long chipping	Makrolon			20 - 30	30 - 40
	N6	Thermoplastics long chipping	PS Polystyrol			20 - 30	30 - 40
	N6	Thermoplastics long chipping	POM Polymethylen			20 - 30	30 - 40
	N6	Thermoplastics long chipping	PVC Ployvinylchlorid			20 - 30	30 - 40
	N6	Thermoplastics long chipping	PA Polyamid			20 - 30	30 - 40
	N7	Duroplastics short chipping	Bakelit			3 - 5	5 - 8
	N7	Duroplastics short chipping	Pertinax			3 - 5	5 - 8
	N7	Duroplastics short chipping	Ferrozell			3 - 5	5 - 8
	N7	Duroplastics short chipping	Resopal			3 - 5	5 - 8
	N8	Magnesium alloys	AZ 91			-	15 - 20
S	S1	Pure titanium	Ti 99.5	3.7024.1	290 - 410	2 - 4	4 - 6
	S1	Pure titanium	Ti 99.4	3.7055	450 - 550	2 - 4	4 - 6
	S1	Titanium alloys	TiAl 5 Sn 2	3.7114	840 - 990	2 - 4	4 - 6
	S1	Titanium alloys	Ti Al 6V4	3.7165	910 - 1100	2 - 4	4 - 6
	S2	Pure nickel	Ni 99.6	2.4060	370 - 590	2 - 4	4 - 6
	S2	Pure nickel	Ni 99.2	2.4068	340 - 540	2 - 4	4 - 6
	S2	Nickel alloys	Monel 400	2.4360	800	2 - 4	4 - 6
	S2	Nickel alloys	Hastelloy C	2.4812	900	2 - 4	4 - 6
	S2	Nickel alloys	Inconel 600	2.4816	700	2 - 4	4 - 6
	S2	Nickel alloys	Nimonic 90	2.4632	1200	2 - 4	4 - 6
H	H1	Hardened steels	up to 50 HRC			6 - 8	2 - 4
	H2	Hardened steels	up to 55 HRC			1 - 3	1 - 3
	H2	Hardened steels	up to 60 HRC			1 - 3	-

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Concept, Design und Production

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