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GEWINDEWIRBLER – *THREAD WHIRL CUTTERS*

DC SWISS SA

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**THREADING
TECHNOLOGY**

www.dcswiss.com

DE-EN-ID-0709



**THREADING
TECHNOLOGY**

TECHNICAL QUESTIONNAIRE

THREAD MILLING

Inquiry

Test result

Complaint

Agency : _____

Contact : _____

Customer : _____

E-mail : _____

Phone or fax : _____

Date : _____

1. Tool type : _____

Tool Ø : _____

Pitch : _____

Serie : _____

Coating : _____

2. Material group : _____

Material N° : _____

Hardness : _____ N/mm² /HB/HRC

Norm : _____

Elongation : _____ %

3. Thread : internal external

Hole : blind through

Threaded length : _____ mm

Core hole Ø : _____

Depth : _____ mm

Counter-bore Ø : _____

Depth : _____ mm

4. Cutting speed (V_c) : _____ m/min _____ l/min

Feed (f) : _____ mm/rev.

Feed (f_z) : _____ mm/tooth

5. Machine : _____

internal coolant

Working position : horizontal

Tool attachment : collet Weldon / Whistle Notch

vertical

hydraulic chuck hot / cold shrunk

6. Lubricant : emulsion oil

air mist

Product : _____

7. Tool change reason : tool wear

tool breakage

incorrect threading (inspected with gauge) programme error

8. Efficiency comparison

Tool under test : _____

Performance and observations : _____

Remarks : _____

Warnung

Gewindewerkzeuge können durch technisches Versagen oder durch Fahrlässigkeit brechen oder zersplittern und die Gesundheit des Mitarbeitenden gefährden. Befolgen Sie daher die gesetzlichen Sicherheits- und Gesundheitsvorschriften. Zudem ist das Tragen der Schutzbrille unerlässlich.

Das Schleifen von Gewindewerkzeugen verursacht gefährlichen Staub und darf nur unter gewissenhaftesten Sicherheitsrichtlinien verrichtet werden.

Warning

Thread tools can break or shatter either through technical failure or negligence, and can endanger the health of the operator. Always obey the safety and health regulations, also the wearing of safety glasses is compulsory.

The grinding of threading tools causes hazardous particles, and must be performed only under most rigorous safety standards.

Eventuelle Druckfehler technischer Daten oder zwischenzeitlich eintretende Änderungen jeder Art berechtigen nicht zu Ansprüchen.

Nachdruck von Text und Bildern, auch auszugsweise, ist nicht gestattet.

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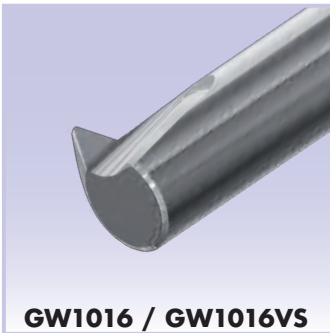


Anwendungsbereich

Gewindewirbler sind ideal zum Realisieren von Mikrogewinden und kleinen Gewindeabmessungen in schwer zu bearbeitenden Werkstoffen. Sie garantieren eine hohe Prozesssicherheit in Sacklöchern bis $4xD_1$.

Application Fields

Thread whirl cutters are ideal for producing micro, small sized threads in difficult to machine materials. These tools guarantee a high production process and safety in blind holes up to $4xD_1$.



GW1016 / GW1016VS

Mikro-Gewinde

Einzahn-VHM-Gewindewirbler ermöglichen einen leichten Schmiermittelzufluss. Sie sind konzipiert für die universelle Herstellung von Mikrogewinden mit einer Tiefe von bis zu $2.5xD_1$.

Micro Threads

Solid carbide single tooth thread whirl cutters allow an easy access for lubricant. These tools are designed specifically for micro threads up to $2.5xD_1$ thread depth in general application.



GW2016 / GW2016VS

Reduzierte Flexion

Mehrzahl-Einzelprofil-VHM-Gewindewirbler sind so konzipiert, dass sie im Gleichlauf einen möglichst geringen Schnittdruck generieren. Bestimmt für universellen Einsatz bis $2.5xD_1$.

Reduced Deflection

Solid carbide, single profile, multi-toothed thread whirl cutters are designed to reduce radial pressure whilst climb milling, in standard applications, and in holes up to $2.5xD_1$ thread depth.



GW3016 / GW3016VS
GW3019 / GW3019VS

Garantierte Gewindesteigung

Mehrzahl-Doppelprofil-VHM-Gewindewirbler garantieren eine komplette Steigung. Empfohlen für die Bearbeitung von Titan und rostfreien Stählen, für Gewindetiefen bis $4xD_1$.

Pitch Guaranteed

Solid carbide double pitch thread whirl cutters with multi flutes, ensure a complete thread profile, recommended for titanium and stainless steel applications for thread depth up to $4xD_1$.



GW4016 / GW4016VS
GW4019 / GW4019VS

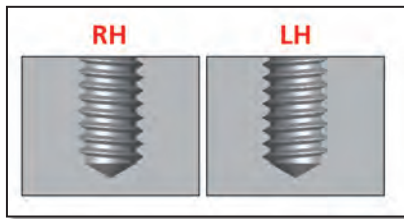
Gratfreies Gewinde

Mehrzahl-Vollprofil-VHM-Gewindewirbler garantieren ein gratfreies Gewinde, empfohlen für den Medizinalbereich, für Gewindetiefen bis $4xD_1$.

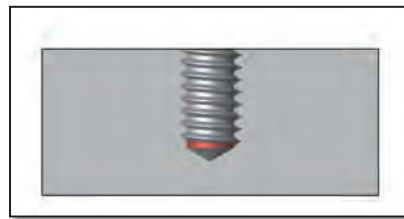
Burr-Free Thread Forms

Solid carbide thread whirl cutters, multi fluted with full profile form, ensure a burr-free thread, specifically for medical implant component applications with thread depth of up to $4xD_1$.

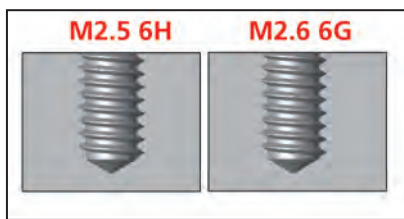
VORTEILE - ADVANTAGES



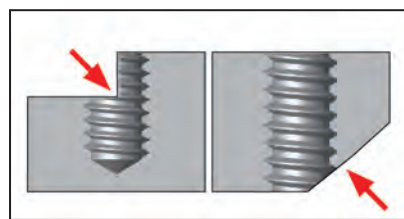
Ein einziger Gewindewirbler für Rechts- und Linksgewinde.
The same thread whirl cutter can be used for right and left hand threads.



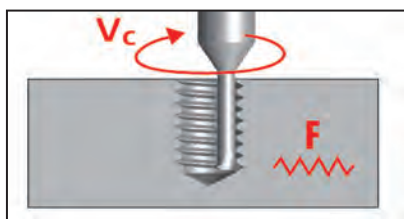
Für Gewinde bis fast auf den Grund der Vorbohrung.
For threads to be cut close to the bottom of blind holes.



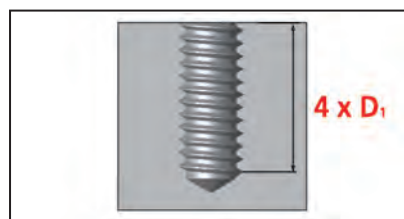
Je nach Wahl, bei gleicher Steigung, gewünschte Toleranz einstellbar.
For the same pitch, required tolerance adjustable as per users choice.



Für Gewinde mit unterbrochenem Schnitt, mit schrägem Anschnitt oder Austritt.
For threads with interrupted cut or with oblique entrance or exit.

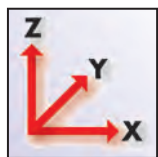


Schnittgeschwindigkeit und Vorschub können dem zu bearbeitenden Werkstoff individuell angepasst werden.
The cutting speed and feed rate can be matched individually to each work-piece material.



Ideal für tiefe Sacklöcher.
Ideal for deep blind holes.

Besondere Anforderungen – Specific requirements



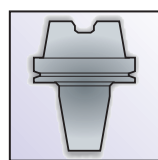
CNC-Bearbeitungsmaschine mit 3-Achsen-Bahnsteuerung

CNC machine with 3-D continuous path control



HSC-Bearbeitung

High speed cutting



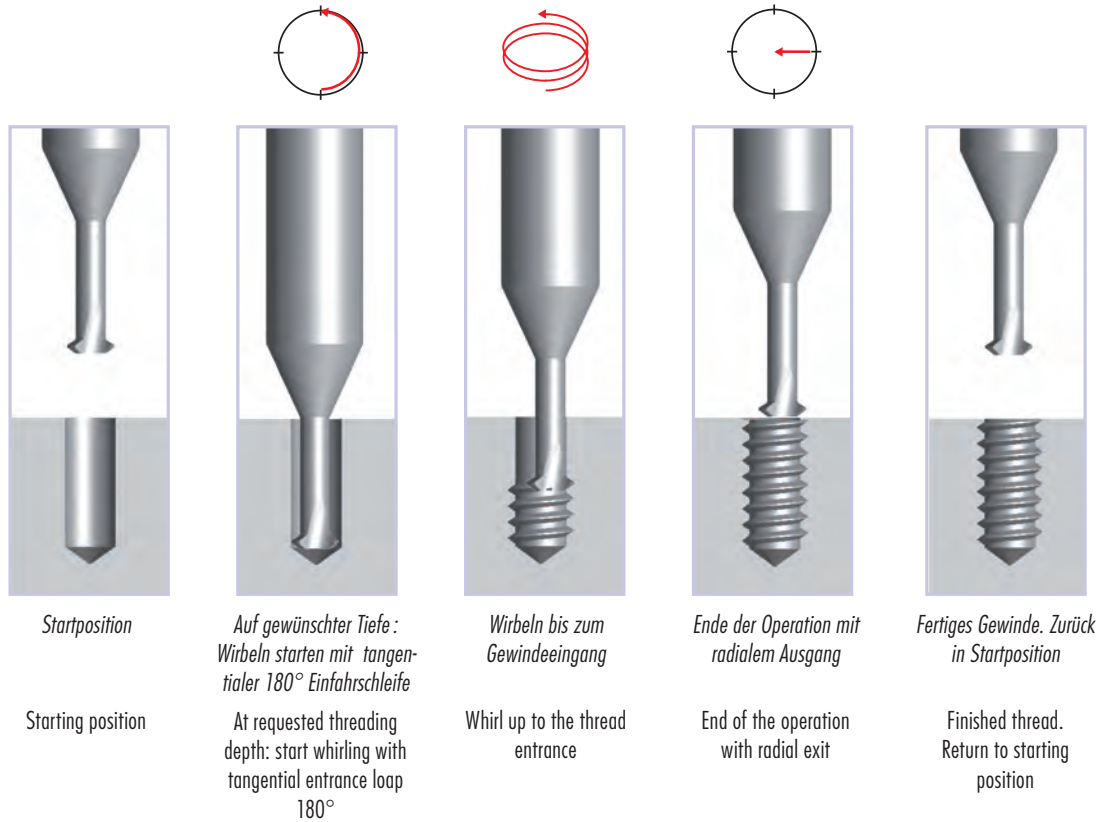
Absoluter Rundlauf des Aufspannfutters

Perfect concentricity of fixture

PROGRAMMIERZYKLUS - PROGRAMMING CYCLE

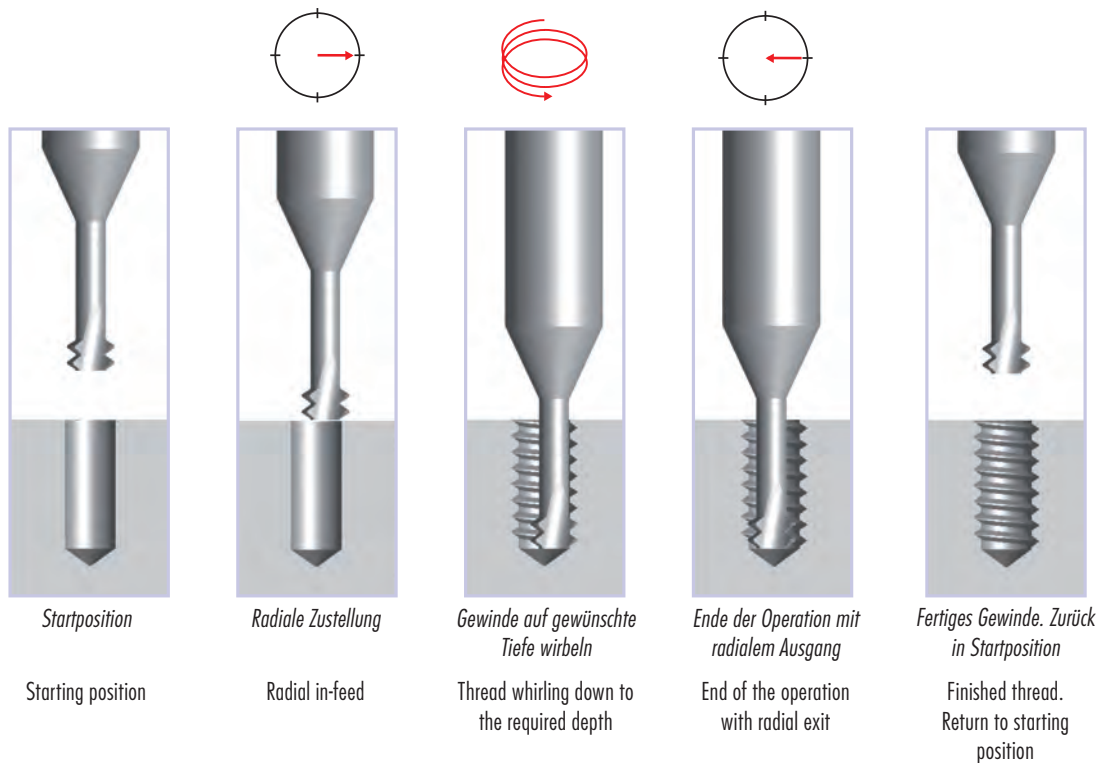
Rechtsgewinde im Gleichlauf – Right hand thread climb milling

GW1016
GW1016VS
GW2016
GW2016VS



Rechtsgewinde im Gegenlauf – Conventional right hand thread milling

GW3016
GW3016VS
GW3019
GW3019VS
GW4016
GW4016VS
GW4019
GW4019VS



ANWENDUNGSTABELLE – APPLICATION CHART

Einsatz – Use

- | | |
|---------------------------------|------------------------------------|
| S Optimal mit Schneidöl | S Optimal with cutting oil |
| S Geeignet mit Schneidöl | S Suitable with cutting oil |
| B Optimal mit Emulsion | B Optimal with emulsion |
| E Geeignet mit Emulsion | E Suitable with emulsion |

Anwendungsgruppen – Material classification

Werkstoff-Gruppen Material groups	Werkstoffbezeichnung	Material designation	Härte Hardness (HB)	Festigkeit Tensile strength Rm (N/mm ²)	Dehnung Elongation A (%)
10 Stahl Steels	11 Automatenstahl	Free-cutting steels	< 200	< 700	< 10
	12 Baustahl, Einsatzstahl	Structural / cementation steels	< 200	< 700	< 30
	13 Kohlenstoffstahl	Carbon steels	< 300	<1000	< 20
	14 Stahl legiert <850 N/mm ²	Alloy steels <850 N/mm ²	< 250	< 850	< 30
	15 Stahl legiert / vergütet >850 - <1150 N/mm ²	Alloy steels hard. / temp. >850 - <1150 N/mm ²	> 250	> 850	< 30
	16 Hochfester Stahl	High tensile alloy steels	> 250	> 850	< 12
20 Rostfreier Stahl Stainless Steels	21 Rostfreier Stahl / geschwefelt	Free machining stainless steels	< 250	< 850	< 25
	22 Austenitisch	Austenitic stainless steels	< 250	< 850	> 20
	23 Ferritisch, martensitisch <850 N/mm ²	Ferritic and martensitic <850 N/mm ²	< 250	< 850	> 20
	24 Ferritisch, martensitisch >850 - <1150 N/mm ²	Ferritic and martens. >850 - <1150 N/mm ²	> 250	> 850	> 15
30 Guss Cast iron	31 Grauguss	Cast iron	< 250	< 850	< 10
	32 Kugelgraphitguss	Spheroidal graphite + malleable cast iron	< 250	< 850	> 10
40 Titan Titanium	41 Reintitan	Pure titanium	< 250	< 850	> 20
	42 Titanlegierung	Titanium alloys	> 250	> 850	< 20
50 Nickel Nickel	51 Nickellegierung 1 <850 N/mm ²	Nickel alloys 1 <850 N/mm ²	< 250	< 850	> 25
	52 Nickellegierung 2 >850 - <1150 N/mm ²	Nickel alloys 2 >850 - <1150 N/mm ²	> 250	> 850	< 25
	53 Nickellegierung 3 >1150 - ≤1600 N/mm ²	Nickel alloys 3 >1150 - ≤1600 N/mm ²	> 340	> 1150	< 20
60 Kupfer Copper	61 Reinkupfer (Elektrolytkupfer)	Pure copper (electrolytic copper)	< 120	< 400	> 12
	62 Messing, Bronze, Rotguss (kurzspanend)	Short chip brass, phosphor bronze, gun metal	< 200	< 700	< 12
	63 Messing (langspanend)	Long chip brass	< 200	< 700	> 12
70 Aluminium Magnesium Aluminium Magnesium	71 Al unlegiert	Al unalloyed	< 100	< 350	> 15
	72 Al legiert Si < 1.5 %	Al alloyed Si < 1.5 %	< 150	< 500	> 15
	73 Al legiert Si > 1.5 % - < 10 %	Al alloyed Si > 1.5 % - < 10 %	< 120	< 400	< 15
	74 Al legiert Si > 10 %, Mg-Legierung	Al alloyed Si > 10 %, Mg-Alloys	< 120	< 400	< 10
80 Kunststoff Plastic compounds	81 Thermoplaste	Thermoplastics	-	-	-
	82 Duroplaste	Duroplastics	-	-	-
	83 Faserverstärkte Kunststoffe	Glass fibre reinforced plastics	-	-	-
90 Edelm. - M. Prec.	91 Silber / Gold	Silver / Gold	-	-	-

Piktogramme – Pictographs



Vollhartmetall
Solid carbide



Kernlochdurchmesser
Core hole diameter



Schweizerische Uhrenindustrie-Norm
Norm of Swiss Watch Industry



Anzahl Spannuten (Z)
Number of flutes (Z)



Toleranzklasse h5
Tolerance class h5

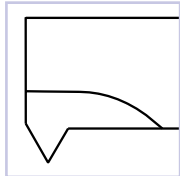


DC -Verschleisschutzschicht
DC wear-protective coating

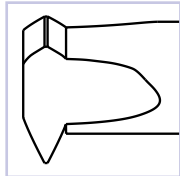
GW



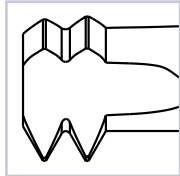
GW1016/VS



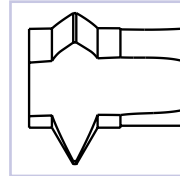
GW2016/VS



**GW3016/VS
GW3019/VS**



**GW4016/VS
GW4019/VS**



		Vc (m/min)		Vorschub fz (mm/Zahn)									
		Standard	Beschichtet Coated	ϕ 0.3 - 1.0	ϕ 1.01 - 3.0	Milling fz (mm/tooth) ϕ 3.01 - 6.0							
E	E	E	E	E	E	E	E	60 - 80	80 - 100	0.004 - 0.01	0.01 - 0.05	0.04 - 0.1	11
E	E	E	E	E	E	E	E	60 - 80	80 - 100	0.004 - 0.01	0.01 - 0.05	0.04 - 0.1	12
E	E	E	E	E	E	E	E	50 - 70	70 - 90	0.004 - 0.01	0.01 - 0.05	0.04 - 0.1	13
E	E	E	E	E	E	E	E	50 - 70	70 - 90	0.004 - 0.01	0.01 - 0.05	0.04 - 0.1	14
E	E	E	E	E	E	E	E	15 - 35	30 - 50	0.004 - 0.01	0.01 - 0.05	0.03 - 0.08	15
E	E	E	E	E	E	E	E	10 - 30	20 - 40	0.004 - 0.01	0.005 - 0.015	0.01 - 0.05	16
	E		E		E		E		40 - 60	0.004 - 0.01	0.01 - 0.03	0.03 - 0.08	21
	E		E		E		E		30 - 50	0.004 - 0.01	0.01 - 0.03	0.03 - 0.08	22
	E		E		E		E		30 - 50	0.004 - 0.01	0.01 - 0.03	0.03 - 0.08	23
	E		E		E		E		30 - 50	0.004 - 0.01	0.01 - 0.03	0.03 - 0.08	24
E	E	E	E	E	E	E	E	60 - 90	90 - 120	0.004 - 0.01	0.01 - 0.05	0.04 - 0.15	31
E	E	E	E	E	E	E	E	50 - 70	70 - 90	0.004 - 0.01	0.01 - 0.04	0.03 - 0.08	32
E	E	E	E	E	E	E	E	15 - 35	20 - 40	0.004 - 0.01	0.01 - 0.03	0.03 - 0.08	41
E	E	E	E	E	E	E	E	10 - 30	15 - 35	0.004 - 0.01	0.01 - 0.03	0.03 - 0.08	42
	E		E		E		E		20 - 40	0.004 - 0.01	0.01 - 0.03	0.03 - 0.08	51
	E		E		E		E		20 - 40	0.004 - 0.01	0.01 - 0.03	0.03 - 0.08	52
	E		E		E		E		20 - 30	0.004 - 0.01	0.005 - 0.015	0.01 - 0.05	53
E	E	E	E	E	E	E	E	150 - 200	200 - 250	0.004 - 0.01	0.01 - 0.05	0.04 - 0.15	61
E	E	E	E	E	E	E	E	100 - 150	150 - 200	0.004 - 0.01	0.01 - 0.05	0.04 - 0.15	62
E	E	E	E	E	E	E	E	100 - 150	150 - 200	0.004 - 0.01	0.01 - 0.05	0.04 - 0.15	63
E	E	E	E	E	E	E	E	150 - 250	200 - 300	0.004 - 0.01	0.01 - 0.05	0.04 - 0.15	71
E	E	E	E	E	E	E	E	150 - 250	200 - 300	0.004 - 0.01	0.01 - 0.05	0.04 - 0.15	72
E	E	E	E	E	E	E	E	150 - 250	200 - 300	0.004 - 0.01	0.01 - 0.05	0.04 - 0.15	73
E	E	E	E	E	E	E	E	150 - 250	200 - 300	0.004 - 0.01	0.01 - 0.05	0.04 - 0.15	74
E	E	E	E	E	E	E	E	150 - 250	200 - 300	0.004 - 0.01	0.01 - 0.05	0.04 - 0.15	81
E	E	E	E	E	E	E	E	80 - 250	100 - 200	0.004 - 0.01	0.01 - 0.05	0.04 - 0.15	82
	E		E		E		E		80 - 100	0.004 - 0.01	0.01 - 0.05	0.04 - 0.15	83
E	E	E	E	E	E	E	E	100 - 150	150 - 250	0.004 - 0.01	0.01 - 0.05	0.04 - 0.15	91

Gewindelänge 2.5 x D₁
Thread length 2.5 x D₁

Gewindelänge 4 x D₁
Thread length 4 x D₁

Innengewinde
Internal thread

Drallwinkel
Helix angle

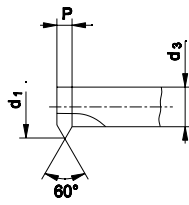
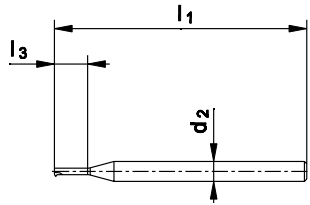
Rundlaufgenauigkeit
Shape accuracy

GW

GW1016



GW1016VS



GW1016

GW1016VS



$\varnothing D_1$ S	P mm	d_1 mm	l_1 mm	l_3 mm	d_2 h5 mm	d_3 mm		
0.3	0.08	0.21	39	0.9	3	0.10	1	0.23 *
0.4	0.10	0.29	39	1.2	3	0.15	1	0.32 *
0.5	0.125	0.36	39	1.5	3	0.18	1	0.40 *
0.6	0.15	0.43	39	1.7	3	0.22	1	0.48 *
0.7	0.175	0.50	39	2.0	3	0.25	1	0.56 *
0.8	0.20	0.57	39	2.3	3	0.29	1	0.64 *
0.9	0.225	0.64	39	2.6	3	0.33	1	0.72 *
1.0	0.25	0.71	39	2.9	3	0.36	1	0.80 *
1.2	0.25	0.91	39	3.4	3	0.56	1	1.00 *
1.4	0.30	1.06	39	3.9	3	0.64	1	1.15 *

ID

ID

*Tol. $\begin{matrix} +0.02 \text{ mm} \\ 0 \end{matrix}$

GW

GW2016

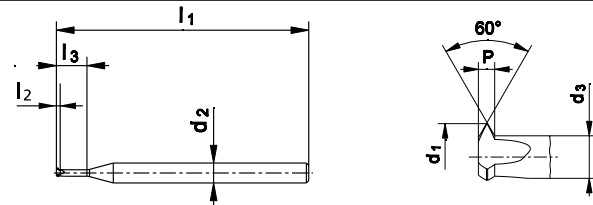


GW2016VS



GW2016

GW2016VS



∅ D ₁	P	d ₁	l ₁	l ₂	l ₃	d ₂ h5	d ₃	齿数	螺距
S	mm	mm	mm	mm	mm	mm	mm		mm
0.8	0.20	0.57	39	0.20	2.3	3	0.29	3	0.64 *
0.9	0.225	0.64	39	0.225	2.6	3	0.33	3	0.72 *
1.0	0.25	0.71	39	0.25	2.9	3	0.36	3	0.80 *
1.2	0.25	0.91	39	0.25	3.4	3	0.56	3	1.00 *
1.4	0.30	1.06	39	0.30	3.9	3	0.64	3	1.15 *

ID

ID

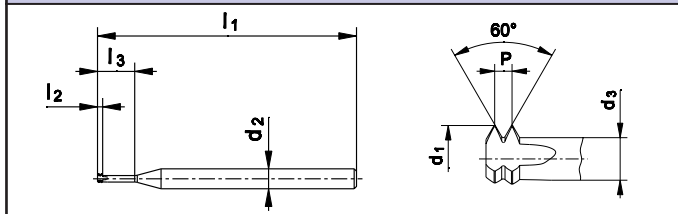
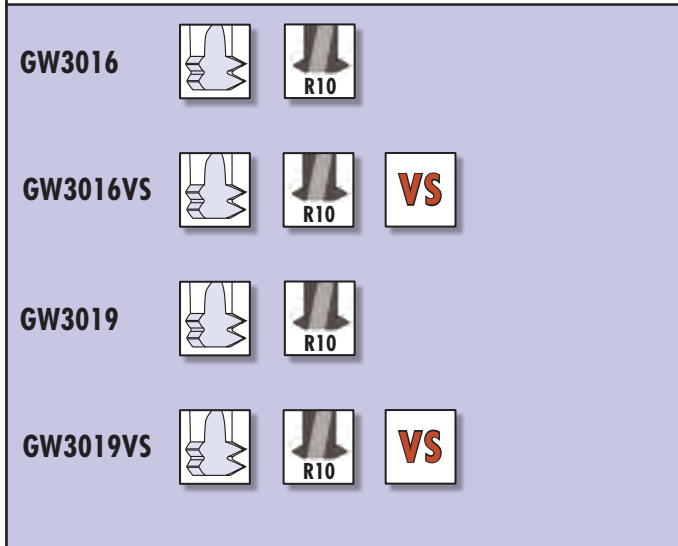
∅ D ₁	P	d ₁	l ₁	l ₂	l ₃	d ₂ h5	d ₃	齿数	螺距
M	mm	mm	mm	mm	mm	mm	mm		mm
0.8	0.20	0.57	39	0.20	2.3	3	0.29	3	0.62
0.9	0.225	0.64	39	0.225	2.6	3	0.33	3	0.70
1.0	0.25	0.71	39	0.25	2.9	3	0.36	3	0.75
1.2	0.25	0.91	39	0.25	3.4	3	0.56	3	0.95
1.4	0.30	1.06	39	0.30	3.9	3	0.64	3	1.10
1.6	0.35	1.20	39	0.35	4.5	3	0.71	3	1.25
1.8	0.35	1.40	39	0.35	5.0	3	0.91	3	1.45
2.0	0.40	1.54	39	0.40	5.6	3	0.98	3	1.60
2.5	0.45	1.98	39	0.45	6.9	3	1.35	3	2.05
3.0	0.50	2.43	51	0.50	8.4	5	1.73	4	2.50
3.5	0.60	2.81	51	0.60	9.9	5	1.97	4	2.90
4.0	0.70	3.20	51	0.70	11.3	5	2.22	4	3.30
5.0	0.80	4.08	51	0.80	14.0	5	2.96	4	4.20
6.0	1.00	4.90	51	1.00	16.8	5	3.50	4	5.00

ID

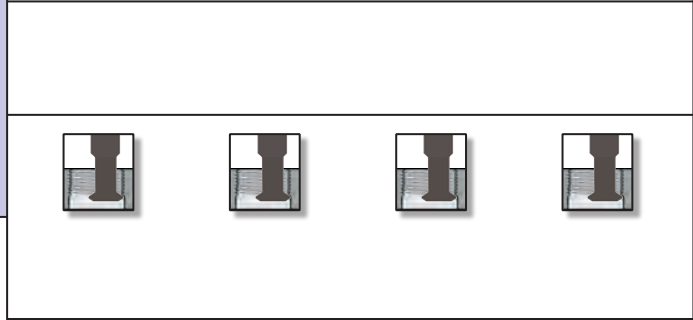
ID

*Tol. +0.02 mm
0

GW



GW3016	GW3016VS	GW3019	GW3019VS
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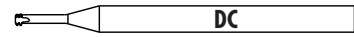
∅ D ₁ M	P mm	d ₁ mm	l ₁ mm	l ₂ mm	l ₃ mm	d ₂ h5 mm	d ₃ mm		
0.8	0.20	0.57	39	0.40	2.3	3	0.29	3	0.62
0.9	0.225	0.64	39	0.45	2.6	3	0.33	3	0.70
1.0	0.25	0.71	39	0.50	2.9	3	0.36	3	0.75
1.2	0.25	0.91	39	0.50	3.4	3	0.56	3	0.95
1.4	0.30	1.06	39	0.60	3.9	3	0.64	3	1.10
1.6	0.35	1.20	39	0.70	4.5	3	0.71	3	1.25
1.8	0.35	1.40	39	0.70	5.0	3	0.91	3	1.45
2.0	0.40	1.54	39	0.80	5.6	3	0.98	3	1.60
2.5	0.45	1.98	39	0.90	6.9	3	1.35	3	2.05
3.0	0.50	2.43	51	1.00	8.4	5	1.73	4	2.50
3.5	0.60	2.81	51	1.20	9.9	5	1.97	4	2.90
4.0	0.70	3.20	51	1.40	11.3	5	2.22	4	3.30
5.0	0.80	4.08	51	1.60	14.0	5	2.96	4	4.20
6.0	1.00	4.85	51	2.00	16.8	5	3.45	4	5.00

ID	ID
167021	167035
167022	167036
167023	167037
167024	167038
167025	167039
167026	167040
167027	167041
167028	167042
167029	167043
167030	167044
167031	167045
167032	167046
167033	167047
167034	167048

∅ D ₁ M	P mm	d ₁ mm	l ₁ mm	l ₂ mm	l ₃ mm	d ₂ h5 mm	d ₃ mm		
0.8	0.20	0.57	39	0.40	3.5	3	0.29	3	0.62
0.9	0.225	0.64	39	0.45	3.9	3	0.33	3	0.70
1.0	0.25	0.71	39	0.50	4.4	3	0.36	3	0.75
1.2	0.25	0.91	39	0.50	5.2	3	0.56	3	0.95
1.4	0.30	1.06	39	0.60	6.0	3	0.64	3	1.10
1.6	0.35	1.20	39	0.70	6.9	3	0.71	3	1.25
1.8	0.35	1.40	39	0.70	7.7	3	0.91	3	1.45
2.0	0.40	1.54	39	0.80	8.6	3	0.98	3	1.60
2.5	0.45	1.98	39	0.90	10.6	3	1.35	3	2.05
3.0	0.50	2.43	51	1.00	12.9	5	1.73	4	2.50
3.5	0.60	2.81	51	1.20	15.1	5	1.97	4	2.90
4.0	0.70	3.20	51	1.40	17.3	5	2.22	4	3.30
5.0	0.80	4.08	51	1.60	21.5	5	2.96	4	4.20
6.0	1.00	4.85	51	2.00	25.8	5	3.45	4	5.00

ID	ID
167063	167077
167064	167078
167065	167079
167066	167080
167067	167081
167068	167082
167069	167083
167070	167084
167071	167085
167072	167086
167073	167087
167074	167088
167075	167089
167076	167090

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GW

GW3016



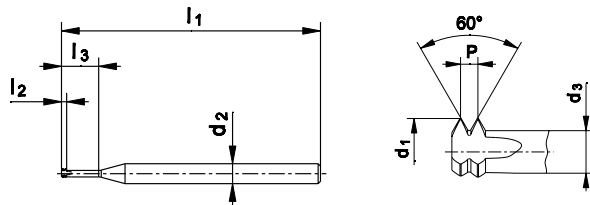
GW3016VS



GW3019



GW3019VS



GW3016

GW3016VS

GW3019

GW3019VS



$\varnothing D_1$	P	d_1	l_1	l_2	l_3	d_2	h5	d_3		
UNC	TPI	mm	mm	mm	mm	mm	mm	mm		
2	56	1.66	39	0.91	6.1	3	1.02	3	1.75	
4	40	2.11	39	1.27	8.0	3	1.22	3	2.25	
6	32	2.59	51	1.59	10.2	5	1.48	4	2.75	
1/4	20	4.89	51	2.54	18.2	5	3.11	4	5.10	

ID	ID
167472	167500
167473	167501
167474	167502
167476	167504

$\varnothing D_1$	P	d_1	l_1	l_2	l_3	d_2	h5	d_3		
UNF	TPI	mm	mm	mm	mm	mm	mm	mm		
10	32	3.91	51	1.58	13.5	5	2.80	4	4.05	
1/4	28	4.95	51	1.81	17.6	5	3.68	4	5.50	

ID	ID
167477	167505
167478	167506

$\varnothing D_1$	P	d_1	l_1	l_2	l_3	d_2	h5	d_3		
UNC	TPI	mm	mm	mm	mm	mm	mm	mm		
2	56	1.66	39	0.91	9.4	3	1.02	3	1.75	
4	40	2.11	39	1.27	12.2	3	1.22	3	2.25	
6	32	2.59	51	1.59	15.5	5	1.48	4	2.75	
1/4	20	4.89	51	2.54	27.7	5	3.11	4	5.10	

ID	ID
	167479
	167480
	167481
	167483
	167507
	167508
	167509
	167511

$\varnothing D_1$	P	d_1	l_1	l_2	l_3	d_2	h5	d_3		
UNF	TPI	mm	mm	mm	mm	mm	mm	mm		
10	32	3.91	51	1.59	20.8	5	2.80	4	4.05	
1/4	28	4.95	51	1.81	27.1	5	3.68	4	5.50	

ID	ID
	167484
	167485
	167512
	167513

GW

GW4016



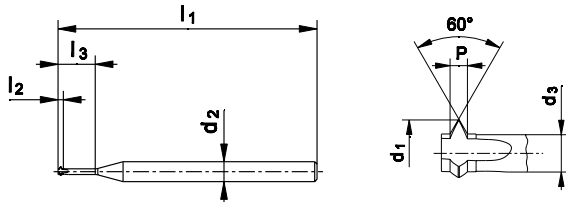
GW4016VS



GW4019



GW4019VS



GW4016

GW4016VS

GW4019

GW4019VS

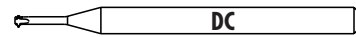


$\varnothing D_1$ M	P mm	d_1 mm	l_1 mm	l_2 mm	l_3 mm	d_2 h5 mm	d_3 mm			ID	ID	
0.8	0.20	0.51	39	0.40	2.3	3	0.23	3	0.55*	167105	167119	
0.9	0.225	0.57	39	0.45	2.6	3	0.26	3	0.60*	167106	167120	
1.0	0.25	0.64	39	0.50	2.9	3	0.29	3	0.70*	167107	167121	
1.2	0.25	0.84	39	0.50	3.4	3	0.49	3	0.90*	167108	167122	
1.4	0.30	0.97	39	0.60	4.0	3	0.55	3	1.00*	167109	167123	
1.6	0.35	1.09	39	0.70	4.6	3	0.60	3	1.15*	167110	167124	
1.8	0.35	1.29	39	0.70	5.1	3	0.80	3	1.35*	167111	167125	
2.0	0.40	1.42	39	0.80	5.6	3	0.86	3	1.50*	167112	167126	
2.5	0.45	1.85	39	0.90	7.0	3	1.22	3	1.95*	167113	167127	
3.0	0.50	2.28	51	1.00	8.5	5	1.58	4	2.40*	167114	167128	
3.5	0.60	2.63	51	1.20	10.0	5	1.79	4	2.80*	167115	167129	
4.0	0.70	2.99	51	1.40	11.4	5	2.01	4	3.20*	167116	167130	
5.0	0.80	3.84	51	1.60	14.1	5	2.72	4	4.10*	167117	167131	
6.0	1.00	4.55	51	2.00	17.0	5	3.15	4	4.90*	167118	167132	
											ID	ID
$\varnothing D_1$ M	P mm	d_1 mm	l_1 mm	l_2 mm	l_3 mm	d_2 h5 mm	d_3 mm			ID	ID	
0.8	0.2	0.51	39	0.40	3.5	3	0.23	3	0.55*	167147	167161	
0.9	0.225	0.57	39	0.45	4.0	3	0.26	3	0.60*	167148	167162	
1.0	0.25	0.64	39	0.50	4.4	3	0.29	3	0.70*	167149	167163	
1.2	0.25	0.84	39	0.50	5.2	3	0.49	3	0.90*	167150	167164	
1.4	0.30	0.97	39	0.60	6.1	3	0.55	3	1.00*	167151	167165	
1.6	0.35	1.09	39	0.70	7.0	3	0.60	3	1.15*	167152	167166	
1.8	0.35	1.29	39	0.70	7.8	3	0.80	3	1.35*	167153	167167	
2.0	0.40	1.42	39	0.80	8.6	3	0.86	3	1.50*	167154	167168	
2.5	0.45	1.85	39	0.90	10.7	3	1.22	3	1.95*	167155	167169	
3.0	0.50	2.28	51	1.00	13.0	5	1.58	4	2.40*	167156	167170	
3.5	0.60	2.63	51	1.20	15.2	5	1.79	4	2.80*	167157	167171	
4.0	0.70	2.99	51	1.40	17.4	5	2.01	4	3.20*	167158	167172	
5.0	0.80	3.84	51	1.60	21.6	5	2.72	4	4.10*	167159	167173	
6.0	1.00	4.55	51	2.00	26.0	5	3.15	4	4.90*	167160	167174	

*Tol. +0.03 mm
0

UNC-UNF

ANSI B1.1



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GW

GW4016



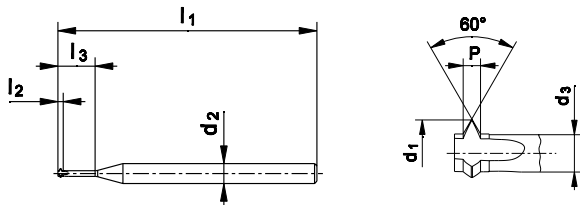
GW4016VS



GW4019



GW4019VS



GW4016

GW4016VS

GW4019

GW4019VS



$\varnothing D_1$	P	d_1	l_1	l_2	l_3	d_2 h5	d_3		
UNC	TPI	mm	mm	mm	mm	mm	mm		
2	56	1.52	39	0.91	6.2	3	0.89	3	1.65*
4	40	1.92	39	1.27	8.1	3	1.03	3	2.15*
6	32	2.35	51	1.59	10.4	5	1.24	4	2.65*
1/4	20	4.51	51	2.54	18.5	5	2.73	4	5.00*

ID

ID

167486	167514
167487	167515
167488	167516
167490	167518

$\varnothing D_1$	P	d_1	l_1	l_2	l_3	d_2 h5	d_3		
UNF	TPI	mm	mm	mm	mm	mm	mm		
10	32	3.67	51	1.59	13.7	5	2.56	4	3.95*
1/4	28	4.95	51	1.81	17.7	5	3.68	4	5.35*

ID

ID

167491	167519
167492	167520

$\varnothing D_1$	P	d_1	l_1	l_2	l_3	d_2 h5	d_3		
UNC	TPI	mm	mm	mm	mm	mm	mm		
2	56	1.52	39	0.90	9.5	3	0.89	3	1.65*
4	40	1.92	39	1.27	12.4	3	1.03	3	2.15*
6	32	2.35	51	1.59	15.6	5	1.24	4	2.65*
1/4	20	4.51	51	2.54	28.0	5	2.73	4	5.00*

ID

ID

	167493	167521
	167494	167522
	167495	167523
	167497	167525

$\varnothing D_1$	P	d_1	l_1	l_2	l_3	d_2 h5	d_3		
UNF	TPI	mm	mm	mm	mm	mm	mm		
10	32	3.67	51	1.59	20.9	5	2.56	4	3.95*
1/4	28	4.95	51	1.81	27.3	5	3.68	4	5.35*

ID

ID

	167498	167526
	167499	167527

*Tol. $\begin{matrix} +0.03 \text{ mm} \\ 0 \end{matrix}$

TECHNISCHER FRAGEBOGEN

GEWINDEFRÄSEN

Angebotsanfrage <input type="checkbox"/>	Versuchsergebnis <input type="checkbox"/>	Beanstandung <input type="checkbox"/>
Vertretung : _____		Kontaktperson : _____
Kunde : _____		E-Mail : _____
Tel.- /Fax-Nr : _____		Datum : _____
<hr/>		
1. Werkzeug-Typ : _____		
Nenn-Ø : _____		Steigung : _____
Serie : _____		Beschichtung : _____
<hr/>		
2. Werkstoffgruppe : _____		
Werkstoff-Nr : _____		Härte : _____ N/mm ² /HB/HRC
Norm : _____		Bruchdehnung : _____ %
<hr/>		
3. Gewinde : <input type="checkbox"/> Innen <input type="checkbox"/> Aussen Lochart : <input type="checkbox"/> Sackloch <input type="checkbox"/> Durchgangsloch		
Gewindelänge : _____ mm		
Kernloch-Ø : _____		Tiefe : _____ mm
Aufbohrungs-Ø : _____		Tiefe : _____ mm
<hr/>		
4. Schnittgeschwindigkeit (V_c) : _____ m/min _____ 1/min		
Vorschub (f) : _____ mm/U		Vorschub (f_z) : _____ mm/Zahn
<hr/>		
5. Maschine : _____ <input type="checkbox"/> Innenkühlung		
Arbeitsrichtung : <input type="checkbox"/> horizontal Werkzeugaufnahme : <input type="checkbox"/> Spannzange <input type="checkbox"/> Weldon / Whistle Notch		
<input type="checkbox"/> vertikal		<input type="checkbox"/> Hydrodehnspannfutter <input type="checkbox"/> Schrumpffutter
<hr/>		
6. Schmierung : <input type="checkbox"/> Emulsion <input type="checkbox"/> Schneidöl <input type="checkbox"/> Luft <input type="checkbox"/> MMS		
Produkt : _____		
<hr/>		
7. Grund des Werkzeugwechsels <input type="checkbox"/> Werkzeugverschleiss <input type="checkbox"/> Werkzeugbruch		
<input type="checkbox"/> Gewinde nicht korrekt (kontrolliert mit Lehre) <input type="checkbox"/> Maschinenfehler		
<hr/>		
8. Standzeitvergleich		
Vergleichswerkzeug : _____		
Resultat und Befund : _____		

<hr/>		
Bemerkungen : _____		

Kopie senden an : DC SWISS SA - CH-2735 Malleray Fax +41 32 491 64 64