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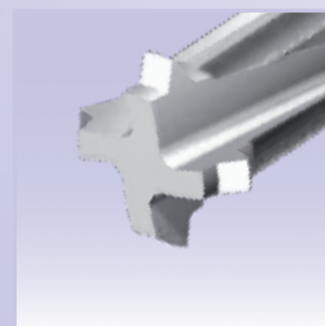
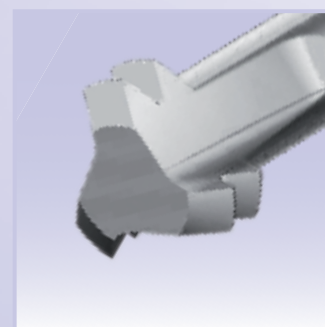
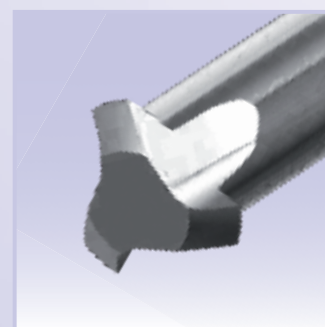
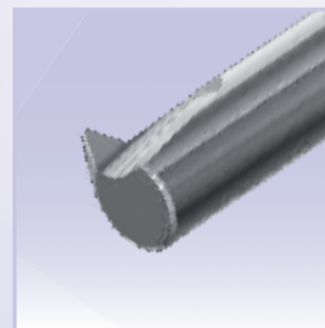
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GW



GEWINDEWIRBLER – THREAD WHIRL CUTTERS



[®]

**THREADING
TECHNOLOGY**

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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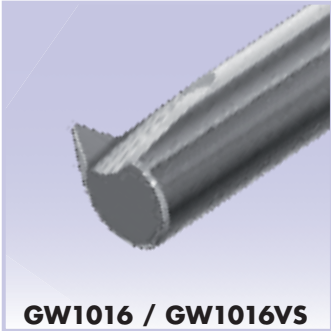


Anwendungsbereich

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-Einzelpprofil-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

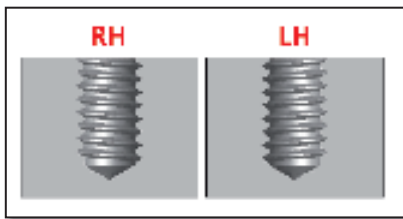
Gratfreies Gewinde

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

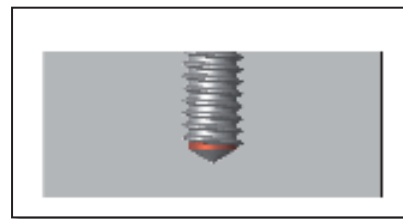
Burr-Free Thread Forms

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 $4xD_1$.

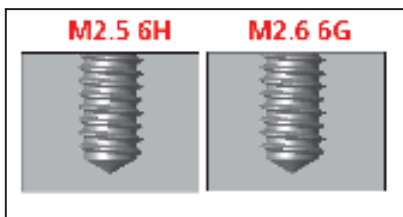
VORTEILE - ADVANTAGES



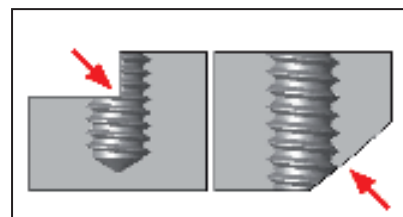
Ein einziger Gewindewirbler für Rechts- und Linksgewinde.
The same thread whirler cutter can be used for right and left hand threads.



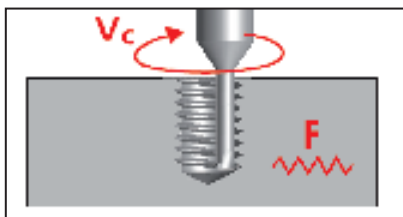
Für Gewinde bis fast auf den Grund der Vorbohrung.
For threads to be cut close to the bottom of blind holes.



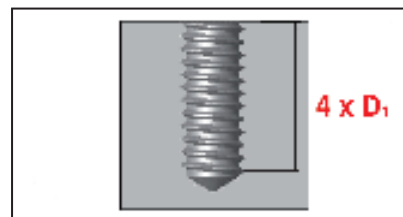
Je nach Wahl, bei gleicher Steigung, gewünschte Toleranz einstellbar.
For the same pitch, required tolerance adjustable as per users choice.



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

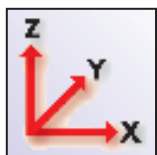


Schnittgeschwindigkeit und Vorschub können dem zu bearbeitenden Werkstoff individuell angepasst werden.
The cutting speed and feed rate can be matched individually to each work-piece material.



Ideal für tiefe Sacklöcher.
Ideal for deep blind holes.

Besondere Anforderungen – Specific requirements



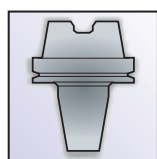
CNC-Bearbeitungsmaschine mit 3-Achsen-Bahnsteuerung

CNC machine with 3-D continuous path control



HSC-Bearbeitung

High speed cutting



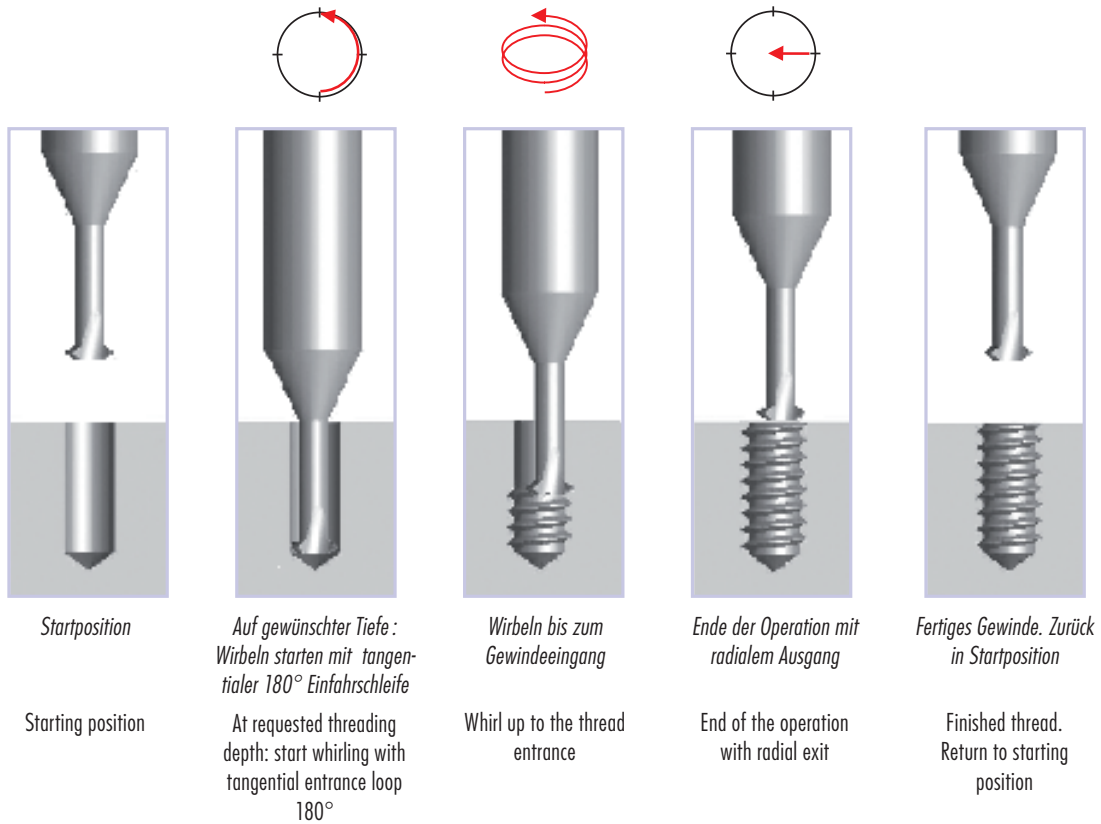
Absoluter Rundlauf des Aufspannfutters

Perfect concentricity of fixture

PROGRAMMIERZYKLUS - PROGRAMMING CYCLE

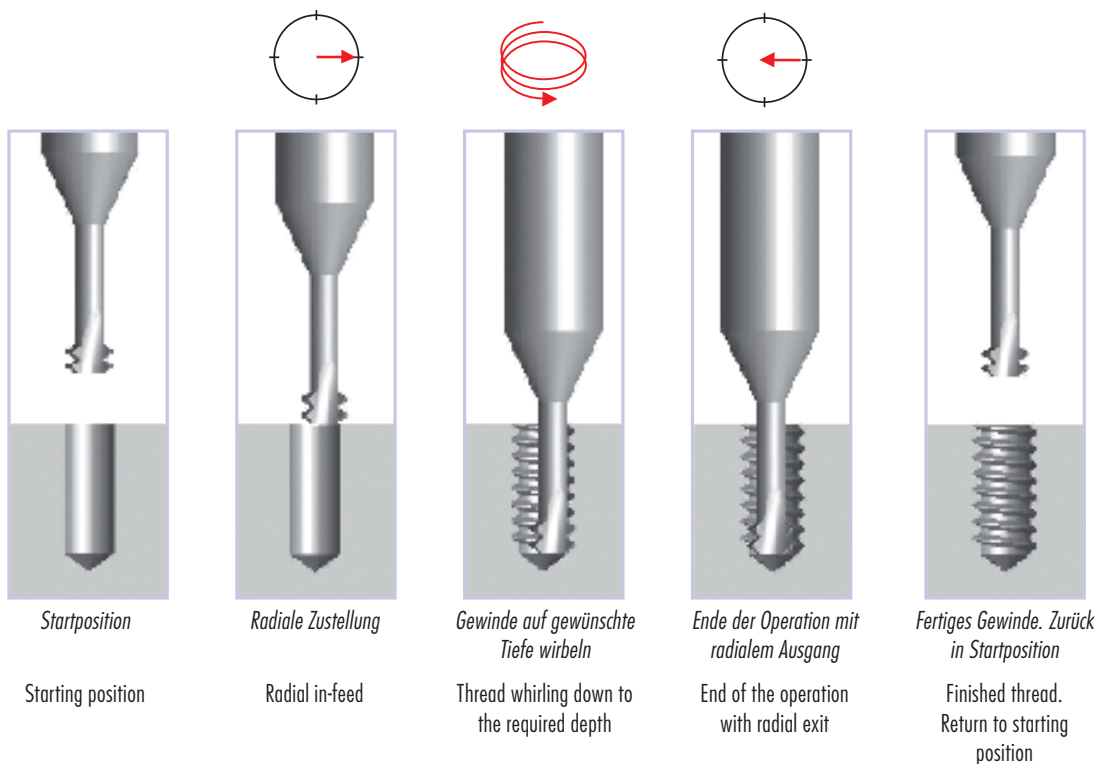
Rechtsgewinde im Gleichlauf – Right hand thread climb milling

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

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

Anwendungsgruppen – Material classification

Werkstoff-Gruppen Material groups		Werkstoffbezeichnung	Material designation	Härte Hardness (HB)	Festigkeit Tensile strength Rm (N/mm ²)
10 Stahl Steels	11	Automatenstahl	Free-cutting steels	< 200	< 700
	12	Baustahl, Einsatzstahl	Structural / cementation steels	< 200	< 700
	13	Kohlenstoffstahl	Carbon steels	< 300	< 1000
	14	Stahl legiert <850 N/mm ²	Alloy steels <850 N/mm ²	< 250	< 850
	15	Stahl legiert / vergütet >850 - <1150 N/mm ²	Alloy steels hard. / temp. >850 - <1150 N/mm ²	> 250	> 850
	16	Hochfester Stahl <55 HRC	High tensile alloy steels <55 HRC	> 250	> 850
20 Rostfreier Stahl Stainless Steels	21	Rostfreier Stahl / geschwefelt	Free machining stainless steels	< 250	< 850
	22	Austenitisch	Austenitic stainless steels	< 250	< 850
	23	Ferritisch, martensitisch <850 N/mm ²	Ferritic and martensitic <850 N/mm ²	< 250	< 850
	24	Ferritisch, martensitisch >850 - <1150 N/mm ²	Ferritic and martens. >850 - <1150 N/mm ²	> 250	> 850
30 Guss Cast iron	31	Grauguss	Cast iron	< 250	< 850
	32	Kugelgraphitguss	Spheroidal graphite + malleable cast iron	< 250	< 850
40 Titan Titanium	41	Reintitan	Pure titanium	< 250	< 850
	42	Titanlegierung	Titanium alloys	> 250	> 850
50 Nickel Nickel	51	Nickellegierung 1 <850 N/mm ²	Nickel alloys 1 <850 N/mm ²	< 250	< 850
	52	Nickellegierung 2 >850 - <1150 N/mm ²	Nickel alloys 2 >850 - <1150 N/mm ²	> 250	> 850
	53	Nickellegierung 3 >1150 - ≤1600 N/mm ²	Nickel alloys 3 >1150 - ≤1600 N/mm ²	> 340	> 1150
60 Kupfer Copper	61	Reinkupfer (Elektrolytkupfer)	Pure copper (electrolytic copper)	< 120	< 400
	62	Messing, Bronze, Rotguss (kurzspanend)	Short chip brass, phosphor bronze, gun metal	< 200	< 700
	63	Messing (langspanend)	Long chip brass	< 200	< 700
70 Aluminium Magnesium Aluminium Magnesium	71	Al unlegiert	Al unalloyed	< 100	< 350
	72	Al legiert Si < 1.5 %	Al alloyed Si < 1.5 %	< 150	< 500
	73	Al legiert Si > 1.5 % - < 10 %	Al alloyed Si > 1.5 % - < 10 %	< 120	< 400
	74	Al legiert Si > 10 %, Mg-Legierung	Al alloyed Si > 10 %, Mg-Alloys	< 120	< 400
80 Kunststoff Plastic compounds	81	Thermoplaste	Thermoplastics	-	-
	82	Duroplaste	Duroplastics	-	-
	83	Faserverstärkte Kunststoffe	Glass fibre reinforced plastics	-	-
90 Edelm. - M. Prec.	91	Gelbgold	Yellow gold	-	-
	92	Rotgold	Red gold	-	-
	93	Weissgold	White gold	-	-
	94	Silber	Silver	-	-

Piktogramme – Pictographs



Vollhartmetall
Solid carbide



Kernlochdurchmesser
Core hole diameter



Schweizerische Uhrenindustrie-Norm
Norm of Swiss Watch Industry



Anzahl Spannnuten (Z)
Number of flutes (Z)

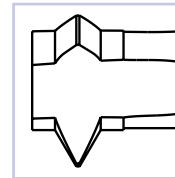
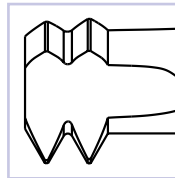
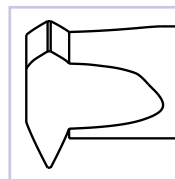
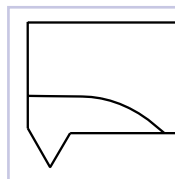
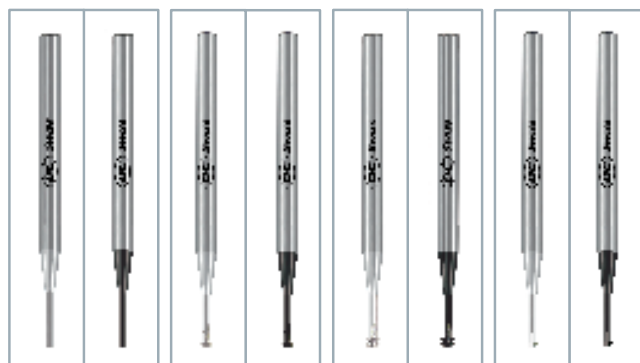


Toleranzklasse h5
Tolerance class h5



 -Verschleisschutzschicht
 wear-protective coating

GW



GW1016		GW1016VS		GW2016		GW2016VS		GW3016		GW3019		GW3016VS		GW3019VS		GW4016		GW4019		GW4016VS		GW4019VS		Vc (m/min)		Vorschub fz (mm/Zahn)		Milling fz (mm/tooth)		
																Standard Standard	Beschichtet Coated	Ø 0.3 - 1.0	Ø 1.01 - 3.0	Ø 3.01 - 6.0	Ø 6.01 - 12.0									
SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	60 – 80	80 – 100	0.004 – 0.01	0.01 – 0.05	0.04 – 0.10	0.08 – 0.15	11								
SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	60 – 80	80 – 100	0.004 – 0.01	0.01 – 0.05	0.04 – 0.10	0.08 – 0.15	12								
SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	50 – 70	70 – 90	0.004 – 0.01	0.01 – 0.05	0.02 – 0.10	0.05 – 0.15	13								
SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	50 – 70	70 – 90	0.004 – 0.01	0.01 – 0.05	0.02 – 0.10	0.05 – 0.15	14								
SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	15 – 35	30 – 50	0.004 – 0.01	0.01 – 0.05	0.02 – 0.08	0.04 – 0.15	15								
	SE		SE		SE		SE		SE		SE		SE		SE		15 – 40	0.003 – 0.01	0.006 – 0.03	0.008 – 0.05	0.01 – 0.08	16								
	SE		SE		SE		SE		SE		SE		SE		SE		40 – 60	0.004 – 0.01	0.01 – 0.05	0.02 – 0.10	0.05 – 0.15	21								
	SE		SE		SE		SE		SE		SE		SE		SE		30 – 50	0.004 – 0.01	0.01 – 0.03	0.02 – 0.05	0.03 – 0.08	22								
	SE		SE		SE		SE		SE		SE		SE		SE		30 – 50	0.004 – 0.01	0.01 – 0.03	0.02 – 0.05	0.03 – 0.08	23								
	SE		SE		SE		SE		SE		SE		SE		SE		30 – 50	0.004 – 0.01	0.01 – 0.03	0.02 – 0.05	0.03 – 0.08	24								
SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	60 – 90	90 – 120	0.004 – 0.01	0.01 – 0.05	0.04 – 0.10	0.08 – 0.15	31								
SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	50 – 70	70 – 90	0.004 – 0.01	0.01 – 0.05	0.02 – 0.10	0.05 – 0.15	32								
SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	15 – 35	20 – 40	0.004 – 0.01	0.01 – 0.03	0.02 – 0.05	0.03 – 0.08	41								
SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	10 – 30	15 – 35	0.004 – 0.01	0.01 – 0.03	0.02 – 0.05	0.03 – 0.08	42								
	SE		SE		SE		SE		SE		SE		SE		SE		20 – 40	0.004 – 0.01	0.01 – 0.03	0.02 – 0.05	0.03 – 0.08	51								
	SE		SE		SE		SE		SE		SE		SE		SE		20 – 40	0.004 – 0.01	0.01 – 0.03	0.02 – 0.05	0.03 – 0.08	52								
	SE		SE		SE		SE		SE		SE		SE		SE		20 – 30	0.003 – 0.01	0.006 – 0.03	0.008 – 0.05	0.01 – 0.08	53								
SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	150 – 200	200 – 250	0.004 – 0.01	0.01 – 0.05	0.02 – 0.10	0.05 – 0.15	61								
SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	100 – 150	150 – 200	0.004 – 0.01	0.01 – 0.05	0.04 – 0.10	0.08 – 0.15	62								
SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	100 – 150	150 – 200	0.004 – 0.01	0.01 – 0.05	0.02 – 0.10	0.05 – 0.15	63								
SE		SE		SE		SE		SE		SE		SE		SE		150 – 250		0.004 – 0.01	0.01 – 0.05	0.05 – 0.10	0.10 – 0.20	71								
SE		SE		SE		SE		SE		SE		SE		SE		150 – 250		0.004 – 0.01	0.01 – 0.05	0.05 – 0.10	0.10 – 0.20	72								
SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	150 – 250	200 – 300	0.004 – 0.01	0.01 – 0.05	0.05 – 0.10	0.10 – 0.20	73								
SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	150 – 250	200 – 300	0.004 – 0.01	0.01 – 0.05	0.04 – 0.10	0.08 – 0.15	74								
E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	150 – 250	200 – 300	0.004 – 0.01	0.01 – 0.05	0.05 – 0.10	0.10 – 0.20	81								
E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	80 – 150	100 – 200	0.004 – 0.01	0.01 – 0.05	0.04 – 0.10	0.08 – 0.15	82								
	E		E		E		E		E		E		E		E		80 – 100	0.004 – 0.01	0.01 – 0.05	0.04 – 0.10	0.08 – 0.15	83								
SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	100 – 150	150 – 200	0.004 – 0.01	0.01 – 0.05	0.04 – 0.10	0.08 – 0.15	91								
SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	60 – 90	90 – 120	0.004 – 0.01	0.01 – 0.05	0.02 – 0.10	0.04 – 0.15	92								
	SE		SE		SE		SE		SE		SE		SE		SE		30 – 50	0.004 – 0.01	0.01 – 0.03	0.02 – 0.05	0.03 – 0.08	93								
SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	60 – 90	90 – 120	0.004 – 0.01	0.01 – 0.05	0.02 – 0.10	0.04 – 0.15	94								

Bei den oben aufgeführten Daten handelt es sich um Richtwerte. The indicated values are a guideline.



Gewindelänge $2.5 \times D_1$
Thread length $2.5 \times D_1$



Innengewinde
Internal thread



Rundlaufgenauigkeit
Shape accuracy



Gewindelänge $4 \times D_1$
Thread length $4 \times D_1$



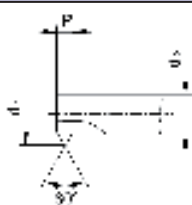
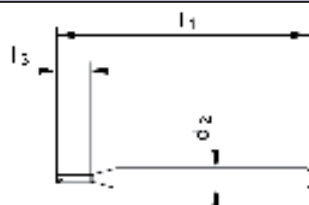
Drallwinkel
Helix angle

GW

GW1016



GW1016VS



GW1016

GW1016VS



∅ 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

166930

166940

166931

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*Tol. +0.02 mm
0

GW

GW2016

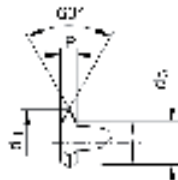
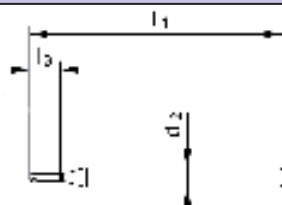


GW2016VS



GW2016

GW2016VS



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

ID

ID

166969	166988
166970	166989
166971	166990
166972	166991
166973	166992

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

ID

ID

166974	166993
166975	166994
166976	166995
166977	166996
166978	166997
166979	166998
166980	166999
166981	167000
166982	167001
166983	167002
166984	167003
166985	167004
166986	167005
166987	167006

*Tol. +0.02 mm
0

GW

GW3016



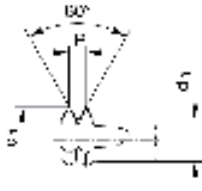
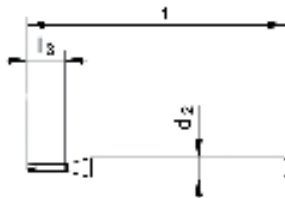
GW3016VS



GW3019



GW3019VS



GW3016

GW3016VS

GW3019

GW3019VS



Ø D ₁ M, MF	P mm	d ₁ mm	l ₁ mm	l ₃ mm	d ₂ h5 mm	d ₃ mm		
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0.8	0.20	0.57	39	2.3	3	0.29	3	0.62
0.9	0.225	0.64	39	2.6	3	0.33	3	0.70
1.0	0.25	0.71	39	2.9	3	0.36	3	0.75
1.2	0.25	0.91	39	3.4	3	0.56	3	0.95
1.4	0.30	1.06	39	3.9	3	0.64	3	1.10
1.6	0.35	1.20	39	4.5	3	0.71	3	1.25
1.8	0.35	1.40	39	5.0	3	0.91	3	1.45
2.0	0.20	1.77	39	5.3	3	1.49	3	1.80
2.0	0.40	1.54	39	5.6	3	0.98	3	1.60
2.5	0.20	2.27	39	6.6	3	1.99	3	2.30
2.5	0.25	2.21	39	6.6	3	1.86	3	2.25
2.5	0.45	1.98	39	6.9	3	1.35	3	2.05

ID

ID

167021	167035
167022	167036
167023	167037
167024	167038
167025	167039
167026	167040
167027	167041
175225	171442
167028	167042
175226	175241
175227	167299
167029	167043

Ø D ₁ M, MF	P mm	d ₁ mm	l ₁ mm	l ₃ mm	d ₂ h5 mm	d ₃ mm		
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0.8	0.20	0.57	39	3.5	3	0.29	3	0.62
0.9	0.225	0.64	39	3.9	3	0.33	3	0.70
1.0	0.25	0.71	39	4.4	3	0.36	3	0.75
1.2	0.25	0.91	39	5.2	3	0.56	3	0.95
1.4	0.30	1.06	39	6.0	3	0.64	3	1.10
1.6	0.35	1.20	39	6.9	3	0.71	3	1.25
1.8	0.35	1.40	39	7.7	3	0.91	3	1.45
2.0	0.20	1.77	39	8.3	3	1.49	3	1.80
2.0	0.40	1.54	39	8.6	3	0.98	3	1.60
2.5	0.20	2.27	39	10.3	3	1.99	3	2.30
2.5	0.25	2.21	39	10.4	3	1.86	3	2.25
2.5	0.45	1.98	39	10.6	3	1.35	3	2.05

ID

ID

167063	167077
167064	167078
167065	167079
167066	167080
167067	167081
167068	167082
167069	167083
175254	175270
167070	167084
175255	175271
175256	175272
167071	167085

GW

GW3016



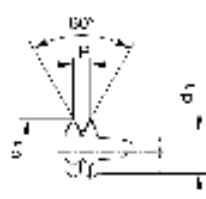
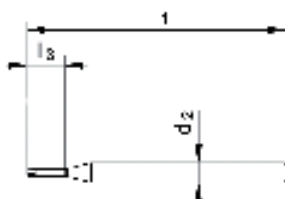
GW3016VS



GW3019



GW3019VS



GW3016

GW3016VS

GW3019

GW3019VS



Ø D ₁ M, MF	P mm	d ₁ mm	l ₁ mm	l ₃ mm	d ₂ h5 mm	d ₃ mm		
3.0	0.35	2.60	51	8.2	5	2.11	4	2.65
3.0	0.50	2.43	51	8.4	5	1.73	4	2.50
3.5	0.60	2.81	51	9.9	5	1.97	4	2.90
4.0	0.70	3.20	51	11.3	5	2.22	4	3.30
5.0	0.80	4.08	51	14.0	5	2.96	4	4.20
6.0	1.00	4.85	51	16.8	5	3.45	4	5.00
8.0	1.25	5.95	63	23.0	6	4.20	5	6.80
10.0	1.50	7.95	67	28.0	8	5.85	5	8.50
12.0	1.75	9.95	76	34.0	10	7.50	5	10.20

ID

ID

175228

175242

167030

167044

167031

167045

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167033

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175229

175243

175230

175244

175231

175245

Ø D ₁ M, MF	P mm	d ₁ mm	l ₁ mm	l ₃ mm	d ₂ h5 mm	d ₃ mm		
3.0	0.35	2.60	51	12.7	5	2.11	4	2.65
3.0	0.50	2.43	51	12.9	5	1.73	4	2.50
3.5	0.60	2.81	51	15.1	5	1.97	4	2.90
4.0	0.70	3.20	51	17.3	5	2.22	4	3.30
5.0	0.80	4.08	51	21.5	5	2.96	4	4.20
6.0	1.00	4.85	51	25.8	5	3.45	4	5.00
8.0	1.25	5.95	75	35.0	6	4.20	5	6.80
10.0	1.50	7.95	83	43.0	8	5.85	5	8.50
12.0	1.75	9.95	95	52.0	10	7.50	5	10.20

ID

ID

175257

175273

167072

167086

167073

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GW

GW3016



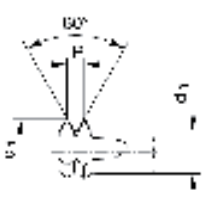
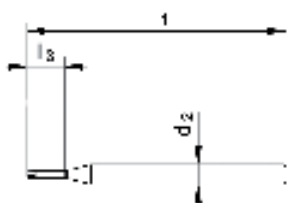
GW3016VS



GW3019



GW3019VS



GW3016

GW3016VS

GW3019

GW3019VS



Ø D ₁ UNC	P TPI	d ₁ mm	l ₁ mm	l ₃ mm	d ₂ h5 mm	d ₃ mm		
2	56	1.66	39	6.1	3	1.02	3	1.75
4	40	2.11	39	8.0	3	1.22	3	2.25
6	32	2.59	51	10.2	5	1.48	4	2.75
8	32	3.25	51	11.9	5	2.14	4	3.40
10	24	3.60	51	14.0	5	2.12	4	3.80
1/4	20	4.89	51	18.2	5	3.11	4	5.10
5/16	18	5.95	63	23.0	6	3.97	5	6.50
3/8	16	7.10	67	27.0	8	4.87	5	8.00
1/2	13	9.95	76	36.0	10	7.21	5	10.80

ID

ID

167472 167500
167473 167501
167474 167502
167475 167503
173983 173986
167476 167504
175232 175246
175233 173546
175234 175247

Ø D ₁ UNC	P TPI	d ₁ mm	l ₁ mm	l ₃ mm	d ₂ h5 mm	d ₃ mm		
2	56	1.66	39	9.4	3	1.02	3	1.75
4	40	2.11	39	12.2	3	1.22	3	2.25
6	32	2.59	51	15.5	5	1.48	4	2.75
8	32	3.25	51	18.1	5	2.14	4	3.40
10	24	3.60	51	21.3	5	2.12	4	3.80
1/4	20	4.89	51	27.7	5	3.11	4	5.10
5/16	18	5.95	75	35.0	6	3.97	5	6.50
3/8	16	7.10	83	41.0	8	4.87	5	8.00
1/2	13	9.95	95	55.0	10	7.21	5	10.80

ID

ID

167479 167507
167480 167508
167481 167509
167482 167510
173982 173979
167483 167511
175261 175277
175262 175278
175263 175279

GW

GW3016



GW3016VS



VS

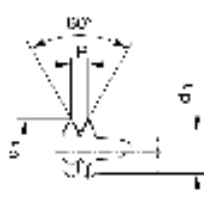
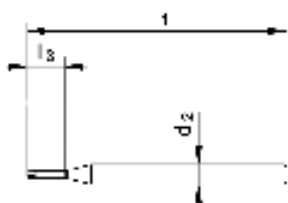
GW3019



GW3019VS



VS



GW3016

GW3016VS

GW3019

GW3019VS



ID

ID

Ø D ₁ UNF	P TPI	d ₁ mm	l ₁ mm	l ₃ mm	d ₂ h5 mm	d ₃ mm		
0	80	1.15	39	4.3	3	0.71	3	1.20
1	72	1.44	39	5.1	3	0.95	3	1.50
4	48	2.23	39	7.9	3	1.49	3	2.35
8	36	3.35	51	11.7	5	2.36	4	3.50
10	32	3.91	51	13.5	5	2.80	4	4.05
1/4	28	4.95	51	17.6	5	3.68	4	5.50
5/16	24	5.95	63	22.0	6	4.47	5	6.90
3/8	24	7.10	67	26.0	8	5.62	5	8.50

175235

175248

175236

175249

175237

175250

175238

175251

167477

167505

167478

167506

175239

175252

175240

175253

Ø D ₁ UNF	P TPI	d ₁ mm	l ₁ mm	l ₃ mm	d ₂ h5 mm	d ₃ mm		
0	80	1.15	39	6.6	3	0.71	3	1.20
1	72	1.44	39	7.9	3	0.95	3	1.50
4	48	2.23	39	12.1	3	1.49	3	2.35
8	36	3.35	51	18.0	5	2.36	4	3.50
10	32	3.91	51	20.8	5	2.80	4	4.05
1/4	28	4.95	51	27.1	5	3.68	4	5.50
5/16	24	5.95	75	34.0	6	4.47	5	6.90
3/8	24	7.10	83	40.0	8	5.62	5	8.50

ID

ID

175264

175280

175265

175281

175266

175282

175267

175283

167484

167512

167485

167513

175268

175284

175269

175285

GW

GW4016



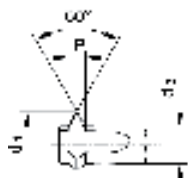
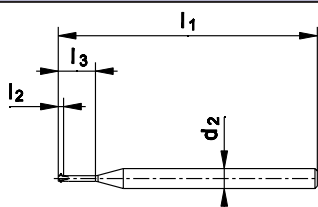
GW4016VS



GW4019



GW4019VS



GW4016

GW4016VS

GW4019

GW4019VS



Ø D₁ M P mm d₁ mm l₁ mm l₂ mm l₃ mm d₂ h5 mm d₃ mm

0.8	0.20	0.51	39	0.40	2.3	3	0.23	3	0.58*
0.9	0.225	0.57	39	0.45	2.6	3	0.26	3	0.65*
1.0	0.25	0.64	39	0.50	2.9	3	0.29	3	0.70*
1.2	0.25	0.84	39	0.50	3.4	3	0.49	3	0.90*
1.4	0.30	0.97	39	0.60	4.0	3	0.55	3	1.05*
1.6	0.35	1.09	39	0.70	4.6	3	0.60	3	1.19*
1.8	0.35	1.29	39	0.70	5.1	3	0.80	3	1.39*
2.0	0.40	1.42	39	0.80	5.6	3	0.86	3	1.54*
2.5	0.45	1.85	39	0.90	7.0	3	1.22	3	1.98*
3.0	0.50	2.28	51	1.00	8.5	5	1.58	4	2.43*
3.5	0.60	2.63	51	1.20	10.0	5	1.79	4	2.80*
4.0	0.70	2.99	51	1.40	11.4	5	2.01	4	3.20*
5.0	0.80	3.84	51	1.60	14.1	5	2.72	4	4.10*
6.0	1.00	4.55	51	2.00	17.0	5	3.15	4	4.90*

ID

ID

167105	167119
167106	167120
167107	167121
167108	167122
167109	167123
167110	167124
167111	167125
167112	167126
167113	167127
167114	167128
167115	167129
167116	167130
167117	167131
167118	167132

Ø D₁ M P mm d₁ mm l₁ mm l₂ mm l₃ mm d₂ h5 mm d₃ mm

0.8	0.20	0.51	39	0.40	3.5	3	0.23	3	0.58*
0.9	0.225	0.57	39	0.45	4.0	3	0.26	3	0.65*
1.0	0.25	0.64	39	0.50	4.4	3	0.29	3	0.70*
1.2	0.25	0.84	39	0.50	5.2	3	0.49	3	0.90*
1.4	0.30	0.97	39	0.60	6.1	3	0.55	3	1.05*
1.6	0.35	1.09	39	0.70	7.0	3	0.60	3	1.19*
1.8	0.35	1.29	39	0.70	7.8	3	0.80	3	1.39*
2.0	0.40	1.42	39	0.80	8.6	3	0.86	3	1.54*
2.5	0.45	1.85	39	0.90	10.7	3	1.22	3	1.98*
3.0	0.50	2.28	51	1.00	13.0	5	1.58	4	2.43*
3.5	0.60	2.63	51	1.20	15.2	5	1.79	4	2.80*
4.0	0.70	2.99	51	1.40	17.4	5	2.01	4	3.20*
5.0	0.80	3.84	51	1.60	21.6	5	2.72	4	4.10*
6.0	1.00	4.55	51	2.00	26.0	5	3.15	4	4.90*

ID

ID

167147	167161
167148	167162
167149	167163
167150	167164
167151	167165
167152	167166
167153	167167
167154	167168
167155	167169
167156	167170
167157	167171
167158	167172
167159	167173
167160	167174

*Tol. +0.03 mm
0

UNC-UNF

ANSI B1.1



h5

GW

GW4016



GW4016VS



VS

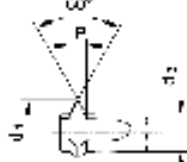
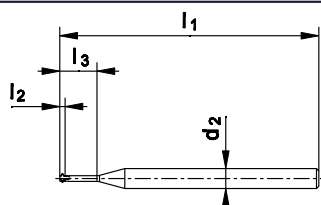
GW4019



GW4019VS



VS



GW4016

GW4016VS

GW4019

GW4019VS



ID

ID

167486

167514

167487

167515

167488

167516

167490

167518

ID

ID

167491

167519

167492

167520

ID

ID

167493

167521

167494

167522

167495

167523

167497

167525

ID

ID

167498

167526

167499

167527

Ø 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	2.10*
6	32	2.35	51	1.59	10.4	5	1.24	4	2.60*
1/4	20	4.51	51	2.54	18.5	5	2.73	4	5.00*

Ø 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*

Ø 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	2.10*
6	32	2.35	51	1.59	15.6	5	1.24	4	2.60*
1/4	20	4.51	51	2.54	28.0	5	2.73	4	5.00*

Ø 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*

*Tol. +0.03 mm
0