Menetmaró, menetörvénylő, kombinált szerszámok

Gewindewirbler — Gewindefräser — Gewindelehren

Thread whirl cutters — Thread milling cutters — Thread gauges

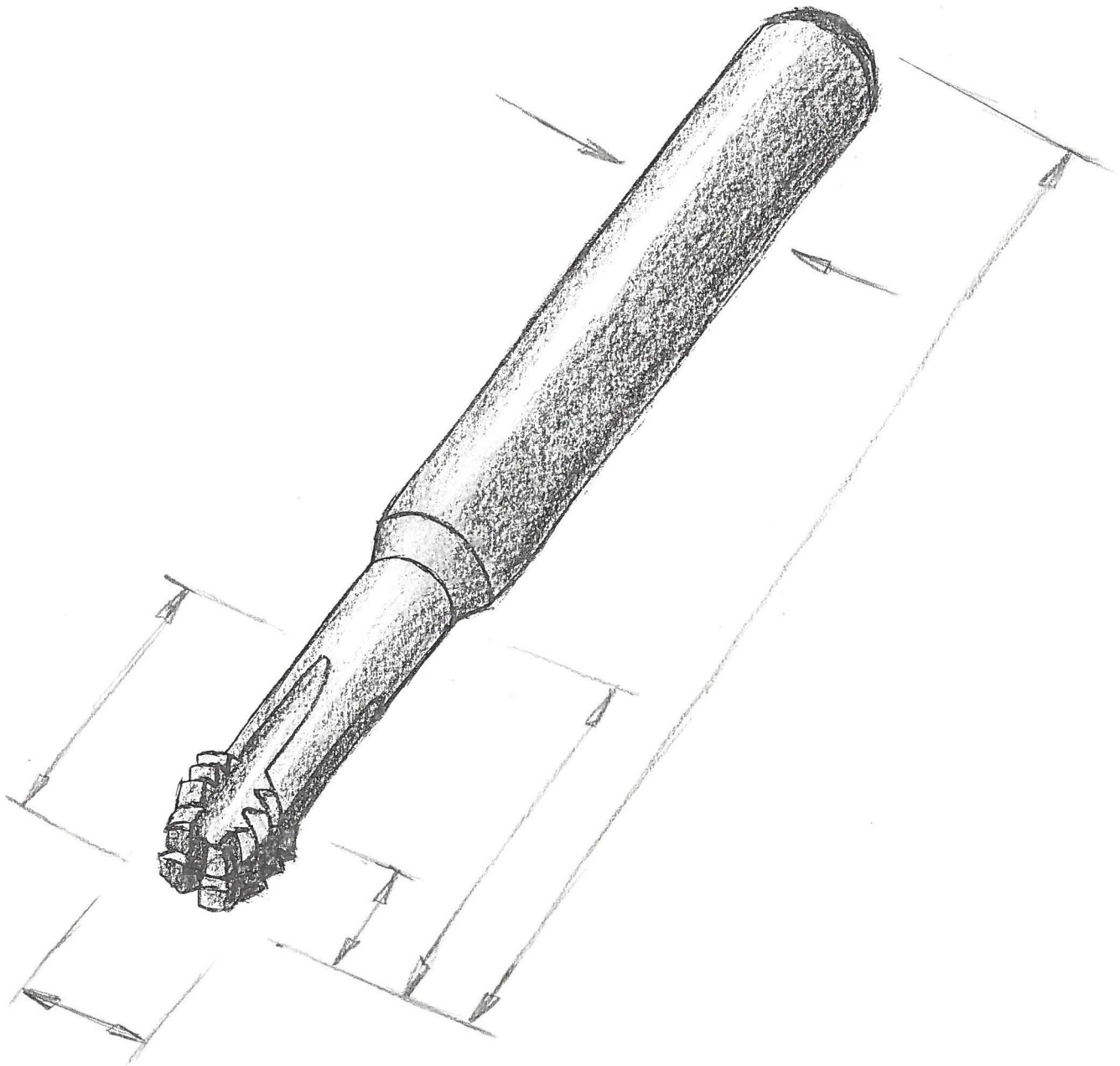
DE-EN-ID TM.1

Katalog
Gewindewirbler
Gewindefräser
Gewindelehren

Catalogue
Thread whirl cutters
Thread milling cutters
Thread gauges

DE-EN-ID TM.1


TAP
DC
DC
DC



VERFÜGBARKEIT DER ARTIKEL

- ● ID *Lagerartikel*
- ● ID *Kurzfristig lieferbar*
- * ID *Ab Lager lieferbar solange Vorrat*

AVAILABILITY OF THE ARTICLES

- ● ID Stock item
- ● ID Available at short notice
- * ID Available from stock, while stock lasts

Unser innovatives KMU ist im Berner Jura in der Schweiz zu Hause, idyllisch eingebettet zwischen Hügeln und am Ufer der hier noch jungen Birs gelegen. Hier werden bereits seit 1940 die Hochleistungs-Gewindewerkzeuge unserer Marke DC entwickelt, produziert und in die ganze Welt geliefert.

Seit der Gründung unseres Unternehmens konzentrieren wir uns auf die Erweiterung unseres Angebotes an Gewindebohrern und Gewindeformern aus HSSE / HSSE-PM, um die Bedürfnisse unserer Kunden optimal zu erfüllen, und auf die Entwicklung neuer Werkzeugtypen für die neusten Technologien und Werkstoffe.

Im Jahre 2000 haben wir den neuen Produktionsbereich „ONE STEP", ausgestattet mit modernsten Produktionstechnologien, für die Entwicklung und Herstellung von zuverlässigen und leistungsstarken Vollhartmetall-Gewindefräsern geschaffen. In der Zwischenzeit wurde unser VHM-Programm stark weiterentwickelt und ausgebaut, mit Schwerpunkt auf Gewindewirblern.

Seit 2010 wird der Entwicklung unserer Mikrowerkzeuge besonders viel Aufmerksamkeit gewidmet. Das Resultat ist unser in der Zwischenzeit echt breites „nano"-Programm, das Gewindewirbler, Gewindebohrer, Gewindeformer, Gewindelehren und Prüfgewindelehren im Durchmesserbereich von 0.3 – 2.75 mm beinhaltet. Als ISO 17025/2005 akkreditiertes Unternehmen ist die DC Nano Tools SA Ihr Spezialist für diesen Bereich.

Heute werden unsere Hochleistungs-Gewindewerkzeuge weltweit und in sämtlichen Branchen dort eingesetzt, wo Wert auf ***Qualität***, ***Leistung*** *und* ***Zuverlässigkeit*** *der Produkte gelegt wird.*

Falls Sie in unserem breit gefächerten Standardprogramm nicht finden sollten was Sie benötigen, ändern wir Werkzeuge Ihren Bedürfnissen entsprechend ab oder stellen spezifische Sonderwerkzeuge basierend auf Ihren Vorgaben und Zeichnungen für Sie her.

Für Fragen, auf die Sie in unserem Katalog keine Antwort finden, stehen wir Ihnen selbstverständlich gerne zur Verfügung.

„Zuerst war ich auf der Suche nach den besten Werkzeugen, dann entschied ich mich, diese selbst herzustellen"

Daniel Charpilloz – 1940

Our innovative SME is at home in the Berner Jura in Switzerland, idyllically nestled between hills and on the banks of the still young river called Birs. This is where since 1940 the high-performance threading tools of our brand DC are developed, manufactured and supplied all over the world.

Since the foundation of our company, we have focused on expanding our range of HSSE / HSSE-PM taps and thread formers in order to optimally meet our customers' needs and on constantly developing new tool types for the latest technologies and materials.

In 2000, we created the new "ONE STEP" production division, equipped with the latest production technologies, for the development and manufacture of reliable and powerful solid carbide thread milling cutters. In the meantime, our CAR programme has been greatly developed and expanded, with a focus on thread whirling cutters.

Since 2010, special attention has been paid to the development of our micro tools. The result is our in the meantime really broad "nano" programme, which includes thread whirlers, taps, thread formers, thread gauges and check thread gauges in the diameter range from 0.3 - 2.75 mm. As an ISO 17025/2005 accredited company, DC Nano Tools SA is your specialist in this field.

Today, our high performance threading tools are used worldwide and in all industries where **quality**, **performance** and **reliability** of the products are paramount.

If you do not find what you need in our wide range of standard products, we can modify tools to suit your needs or manufacture specific special items, based on your specifications and drawings.

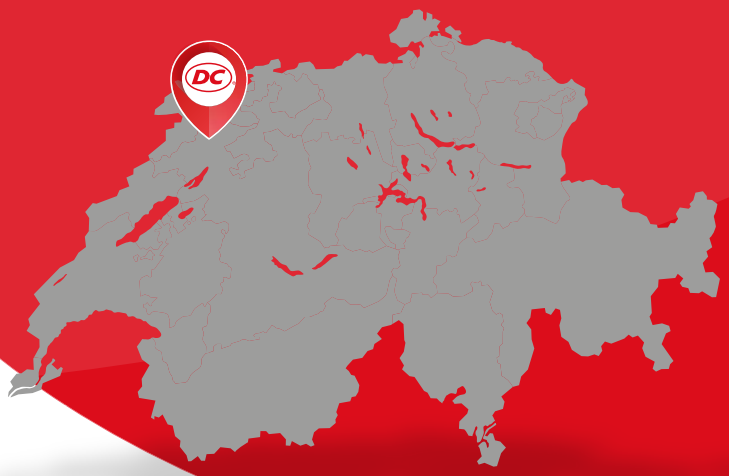
For questions, to which you cannot find an answer in our catalogue, we are of course gladly at your entire disposal.

"In the beginning, I was looking for the best tools, then I decided to produce them myself"

Daniel Charpilloz – 1940

DC SWISS WELTWEIT

UND IMMER IN IHRER NÄHE



KUNDENNÄHE

Sie finden immer einen kompetenten Ansprechpartner, egal ob im Mutterwerk in der Schweiz, bei einer unserer Tochtergesellschaften in Deutschland, Italien und England, oder bei einer unserer vielen Vertretungen bzw. einem unserer Stützpunkthändler weltweit.

CUSTOMER PROXIMITY

You will always find a competent contact person, whether at our main site in Switzerland, at one of our subsidiaries in Germany, Italy and England, or at one of our many representatives or re-sellers worldwide.

Niederlassungen - Subsidiaries
Technologiepartner - Technology Partners
Vertretungen - Distributors

Für weitere Länder : dcswiss.com/de/verkaufsnetz
For further countries: : dcswiss.com/en/sales-network

DC SWISS WORLDWIDE

AND ALWAYS CLOSE TO YOU

SWISS QUALITY

***100 % made by DC SWISS** - garantiert von der Entwicklung des Werkzeuges über dessen Herstellung bis zur Endkontrolle, dank unseres Fachwissens und unserer Kompetenz in allen Bereichen der Gewindewerkzeugherstellung.*

100 % made by DC SWISS - guaranteed from the development of the tool to its production and straight through to the end control, thanks to our know-how and competencies in the whole field of threading tool manufacturing.

UNSERE WERTE

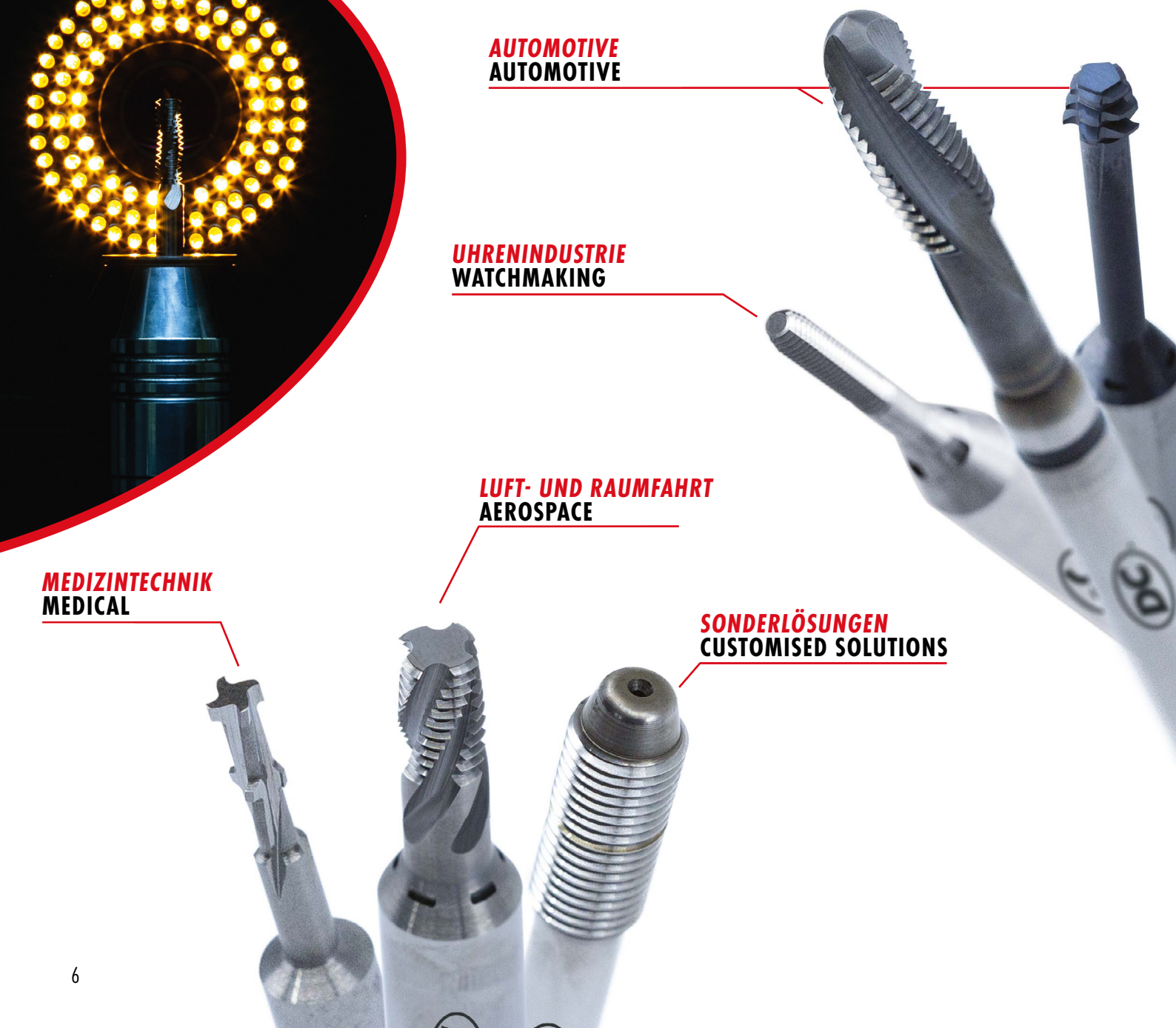
LEISTUNG

Wir sind darin bestrebt, neue leistungsstarke Gewindewerkzeuge zu entwickeln und die Leistungsfähigkeit unserer Standardprodukte den aktuellen Bedürfnissen unserer Kunden anzupassen. Wir legen grossen Wert auf ein konstantes Preis- / Leistungsverhältnis, als Basis für eine vertrauensvolle Beziehung zu unseren Kunden.

OUR VALUES

PERFORMANCE

We make every effort to develop new high-performance threading tools and to adapt the performance of our standard tools to the current needs of our customers. We attach great importance to a constant price/performance ratio as the basis for a trusting relationship with our customers.



AUTOMOTIVE
AUTOMOTIVE

UHRENINDUSTRIE
WATCHMAKING

LUFT- UND RAUMFAHRT
AEROSPACE

MEDIZINTECHNIK
MEDICAL

SONDERLÖSUNGEN
CUSTOMISED SOLUTIONS

FACHKENNTNIS

Der Wert unserer Fachkenntnisse zeigt sich in unserer einzigartigen Art und Weise der Problemlösung, indem wir unser seit 1940 angesammeltes Fachwissen, unsere Erfahrungen und Kompetenzen zum Ausdruck bringen, diese miteinander verbinden und umsetzen.

ZUVERLÄSSIGKEIT

Wir wissen, dass sich dauerhafte Beziehungen nur auf einem soliden Vertrauensverhältnis aufbauen lassen, basierend auf Transparenz und dem täglichen Engagement jedes einzelnen Mitarbeiters, unseren Kunden Werkzeuge und Dienstleistungen bester Qualität zu liefern.

KNOW-HOW

The value of our know-how represents in a unique way the solving of problems and articulates, implements and associates the whole knowledge, experiences and competences accumulated since 1940.

RELIABILITY

We know that lasting relationships can only be built on the basic of confidence, transparency and the daily efforts of each of our employees to provide our customers with tools and services of an excellent quality.

GEWINDESCHNEIDEN
THREAD CUTTING

GEWINDEFORMEN
THREAD FORMING

LUFT- UND RAUMFAHRT
AEROSPACE

GEWINDEFRÄSEN
THREAD MILLING

AUTOMOTIVE
AUTOMOTIVE

MEDIZINTECHNIK
MEDICAL

SONDERLÖSUNGEN
CUSTOMISED SOLUTIONS

ENERGIEERZEUGUNG
POWER GENERATION

UHRENINDUSTRIE
WATCHMAKING

ALLGEMEINER MASCHINENBAU
GENERAL ENGINEERING

GEWINDEWIRBELN
THREAD WHIRLING

GEWINDELEHREN
THREAD GAUGES

GEWINDESCHNEIDFUTTER
TAPPING CHUCKS

GEWINDESCHNEIDEISEN
DIES

UNSERE KOMPETENZEN
KALIBRIEREN & MESSEN

DC SWISS besitzt eine eigene messtechnische Abteilung, die von der Schweizerischen Akkreditierungsstelle (SAS) als Kalibrierlaboratorium für die Messgrösse "Länge" zugelassen ist.

DC SWISS kann daher Dienstleistungen im Bereich Kalibrieren und Messen von Gewindeverbindungen anbieten.

Ein Zertifikat ist ein schriftlicher Nachweis über die Qualität der messtechnischen Ausrüstung des Unternehmens. Als Mitglied der DC SWISS Holding bietet Ihnen DC NANO TOOLS SA (Akkreditierung SCS 0143) die Prüfung und Kalibrierung von Gewindelehrdornen und Gewindelehrringen nach der internationalen Norm ISO 17025 an.

Unsere Werkzeuge sind das Ergebnis zahlreicher Studien, hoher Fachkompetenzen und langjähriger Erfahrung. Sie werden von uns kontinuierlich bis an ihre Leistungsgrenzen getestet. Dieses Know-how stellen wir Ihnen mit unseren Dienstleistungen zur Verfügung, damit Sie die beste Lösung für Ihre Anwendung erhalten – von der ersten Studie an bis zur Serienfertigung.

Wir beherrschen sämtliche Aspekte der Gewindeschneidtechnologie und stellen Ihnen gerne unsere umfassende Erfahrung auf diesem Gebiet zur Verfügung, sei es bei der Konstruktion, der Fertigung oder der messtechnischen Kontrolle auf den einzelnen Stufen des Fertigungsprozesses.

Konstruktion

Jede Konstruktion ist einzigartig. Für ihre Realisierung gibt es allerdings oft mehrere Lösungen. Wir beraten Sie bei der Auswahl der geeigneten Gewindeverbindung, unter anderem zum Einsatz einstellbarer Schrauben oder hochwertiger selbstsichernder Gewinde. Gemeinsam mit Ihren Konstrukteuren finden wir die für Ihr Projekt bestmögliche Lösung, die wichtige Aspekte wie Masse, Machbarkeit, Produktions- und Montagekosten berücksichtigt.

Fertigung

Jedes Gewindewerkzeug erfordert eine spezifische Programmierung unter Berücksichtigung zahlreicher Parameter. Wir helfen Ihnen bei der individuellen Einstellung Ihrer Maschinen und Werkzeuge, damit Sie optimale Fertigungsergebnisse erzielen können. Wir unterstützen Sie bei den erforderlichen Prüfungen und Messungen, sodass Sie sicher sein können, dass Ihre Gewinde exakt den Vorgaben entsprechen. Auch die perfekte Anpassung des Werkzeuges an Ihre Anforderungen ist für uns selbstverständlich. Probleme bei komplexen Geometrien oder atypischen Positionierungen lassen sich oft mit einer speziellen Werkzeugaufnahme lösen.

Messtechnik

Wir bieten Ihnen nicht nur eine umfangreiche Palette an Messlehren, sondern zeigen Ihnen auch, wie man sie korrekt verwendet und vor allem überprüft, um dauerhaft erstklassige Fertigungsergebnisse zu erzielen. Auch spezifischere Messinstrumente sind erhältlich, etwa zur Überprüfung des Rundlaufs, wie auch alle Zertifizierungen. Wir unterstützen Sie bei der Einrichtung Ihrer Prüfverfahren. Dieser kostenpflichtige Service ist für Flankendurchmesser von 0.1 bis 3.0 mm und für Aussendurchmesser von 0.1 bis 3.5 mm verfügbar. Gehen Sie keine Risiken ein, sondern nutzen Sie die Kompetenzen von DC NANO TOOLS SA für das Kalibrieren Ihrer Messinstrumente.

Aus- und Weiterbildung

In unserem Anwendungszentrum und unserem Labor bieten wir allen Kunden Einführungen in die Theorie und beste Praxis der Gewindeschneidtechnologie an – von der Konstruktion über die Fertigung bis zum Einsatz von Gewindeverbindungen. Auf Wunsch vertiefen wir diese Informationen in spezifischen Schulungen zu bestimmten Themen, wie beispielsweise die Sicherung von Gewindeverbindungen.

OUR EXPERTISE
CALIBRATION & METROLOGY SERVICE

DC SWISS has a metrology lab that is accredited by the Swiss Accreditation Service as a laboratory for calibrating lengths.

DC SWISS is able to offer a calibration and metrology service for screw connections.

A certificate is written confirmation of the quality of a company's metrological equipment. DC NANO TOOLS SA (SCS accreditation 0143), a member of the DC SWISS Group, can inspect and calibrate thread plug gauges as well as thread ring gauges in accordance with the ISO 17025 international standard.

Our tools are the result of numerous studies. We design them using all the knowledge we have acquired over many years, always testing them to their utmost limits. We share all this knowledge with you in the form of our services. Our aim is to provide the most appropriate solution in each case, from feasibility study right through to mass production.

We are experts in all aspects of the process of screw threading, and are able to offer you our assembly expertise from design, machining and metrological inspection through the various stages of creating screw connections.

Design expertise
Each design is unique, but there are often multiple solutions. We can advise you on which type of screw fixing to choose, for example adjustable, self-locking or high-quality screws. During the design phase, we can help your designers to identify and decide the best-performing screw fixing in terms of dimensions, practicality, production costs and assembly.

Machining expertise
Each tool calls for special programming involving numerous parameters. We can help you to get the best out of your machines and tools in order to achieve maximum performance via personalised programming. We can provide you with support in the inspection and measurement phase, so you can be sure of having produced the screw thread you were expecting. And if a tool needs to be customised, we can do this so that it meets all your requirements. Often, a particular approach to fitting makes it possible to resolve a problem caused by complex geometry or unusual positioning.

Metrological expertise
We supply a large number of measuring gauges and also advice on how to use and inspect them in order to ensure the required quality is consistently achieved. Other more specific measures are available, such as concentricity and certification measures. We can assist you in setting up control procedures. This service is available for pitch diameters of 0.1 to 3.0 mm, and external diameters of 0.1 to 3.5 mm. Don't take the risk – benefit from the expertise of DC NANO TOOLS SA to calibrate your measuring tools.

Training
In our application centre and our laboratory, we distribute full information and advice on best practice to all our customers in the design, manufacture and use of screw fixings. We can provide on-demand training in specific subjects such as secure fixings.

SWISS ACCREDITATION
sas.admin.ch SCS 0143

Certificate CH07/0649

The management system of

DC Swiss SA

CP 363,
Grand rue 19
CH - 2735 Malleray

has been assessed and certified as meeting the requirements of

ISO 9001:2015

For the following activities

Design, development, manufacturing, marketing, sales and distribution of cutting tools. Expertise in threading technology.

This certificate is valid from 19 June 2018 until 18 June 2021
and remains valid subject to satisfactory surveillance audits
Recertification audit due before 7 June 2021
Issue 6. Certified since September 2007

Authorised by

SGS Société Générale de Surveillance SA
Technoparkstrasse 1 8005 Zurich Switzerland
t +41 (0)44 445-16-80 f +41 (0)44 445-16-88 www.sgs.com

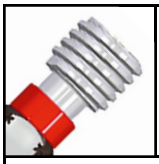
REGISTER — REGISTER

Gewindewirbeln
Thread whirling

Zentrierbohrer, Spiralbohrer
Spotting drills, Twist drills

Gewindefräsen
Thread milling

REGISTER — REGISTER



Gewindelehrdorne
Thread plug gauges

Gewindelehrringe
Thread ring gauges

Alle nano-Gewindelehrdorne sind SCS-zertifiziert und das kostenpflichtige Zertifikat auf Bestellung lieferbar.
All nano thread plug gauges are SCS-certified and the paid certificate is available on request.

Alle nano-Gewindelehrringe haben ein Prüfzertifikat, realisiert mit SCS-akkreditierten Prüf-Gewindelehrdornen. Das kostenpflichtige Prüfzertifikat ist auf Bestellung lieferbar.
All nano ring gauges have a certificate of measurement, established with SCS certified plug check gauges. The paid certificate is available on request.

REGISTER — REGISTER

Prüfgewindelehrdorne
Thread plug check gauges

M nano

RN05-1	174	RN15-1	174
RN05-2	179	RN15-2	179

MF nano

RN05-1	175	RN15-1	175
RN05-2	180	RN15-2	180

UNC nano

RN05-1	176	RN15-1	176
RN05-2	181	RN15-2	181

UNF nano

RN05-1	176	RN15-1	176
RN05-2	181	RN15-2	181

S nano

RN05-1	177	RN15-1	177
RN05-2	182	RN15-2	182

SF nano

RN05-1	178	RN15-1	178
RN05-2	183	RN15-2	183

Mit SCS-Zertifikat.
SCS certificate included.

Abnutzungsprüfdorne
Master plug gauges WEAR

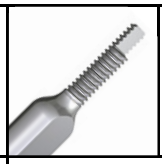
M nano

RN05-3	184	RN15-3	184

MF nano

RN05-3	185	RN15-3	185

Mit SCS-Zertifikat.
SCS certificate included.



Kalibrier-Gewindelehrdorne
Calibration thread plug gauges

S nano

EN00	186

Mit SCS-Zertifikat.
SCS certificate included.

nano-Gewindelehren - Prüfmittel - SCS-Zertifikat
Bestellformular für nano-Gewindelehren
Micro-Safelock

Härtevergleichstabelle
Tabelle Zoll - mm
Umrechnungstabelle
Kernlochbohrungen
Aussendurchmesser
Technischer Fragebogen
Liefer- und Zahlungsbedingungen

Weitere Informationen finden Sie unter
www.dcswiss.com

nano-Thread gauges - Inspection devices - SCS Measurement certificate
Order form for nano thread gauges
Micro-Safelock

Hardness chart
Chart inches - mm
Conversion table
Core holes
Turned diameters
Technical questionnaire
Delivery and payment conditions

Further information are available on
www.dcswiss.com

PIKTOGRAMME — PICTOGRAPHS

Vollhartmetall-Gewindewirbler, Gewindefräser, Bohrgewindefräser, Zirkular-Bohrgewindefräser, Zentrierbohrer und Spiralbohrer
Solid carbide thread whirl cutters, thread milling cutters, thrillers, circular drill thread milling cutters, spotting drills and twist drills

VHM CAR — *Vollhartmetall*
Solid carbide

VS — *DC-"VS"-Verschleissschutzschicht für den allgemeinen Einsatz*
DC "VS" wear-protective coating for general use

VX — *DC-"VX"-Verschleissschutzschicht für rostfreie Stähle und Nickellegierungen*
DC "VX" wear-protective coating for stainless steels and Nickel alloys

VH — *DC-"VH"-Verschleissschutzschicht für gehärtete Stähle (≤ 63 HRC)*
DC "VH" wear-protective coating for tempered steels (≤ 63 HRC)

NIHS — *Schweizerische Uhrenindustrie-Norm*
Norm of Swiss Watch Industry

HRC ≤ 63 — *Für Werkstoffe ≤ 63 HRC (GWH - GFH)*
For materials ≤ 63 HRC (GWH - GFH)

h5/h6 — *Schafttoleranz h5 / h6*
Shank tolerance h5 / h6

h5 — *Schafttoleranz h5*
Shank tolerance h5

h6 — *Schafttoleranz h6*
Shank tolerance h6

< 3µm — *Rundlaufgenauigkeit*
Shape accuracy

HSC — *HSC-Bearbeitung*
HSC-Machining

 *GW1000-Profil*
GW1000 profile

 *GW2000-Profil*
GW2000 profile

 *GW3000-Profil*
GW3000 profile

 *GWi3000-Profil*
GWi3000 profile

 *GWi5000-Profil*
GWi5000 profile

 *Anzahl Zähne zur Programmierung (GWi5000)*
Number of teeth for programming (GWi5000)

 *Für gratfreie Gewinde (GWi5000)*
For burr-free threads (GWi5000)

 *Zirkular-Bohrgewindefräser-Profil*
Circular drill thread milling cutter profile

 *Zirkular-Bohrgewindefräser mit Kühlkanal*
Circular drill thread milling cutter with cooling channel

> 20 bar — *Innenkühlung mindestens 20 bar*
Internal coolant min. 20 bar

 *Kühlkanal*
Internal cooling channel

 *Kühlkanal (BGF, 2 Spannuten)*
Internal cooling channel (BGF, 2 flutes)

 *Kühlkanal (BGF, 3 Spannuten)*
Internal cooling channel (BGF, 3 flutes)

 R10 — *10° Rechtsspiralnuten*
10° right-hand spiral flutes

 R15 — *15° Rechtsspiralnuten*
15° right-hand spiral flutes

 R27 — *27° Rechtsspiralnuten*
27° right-hand spiral flutes

 R27 — *27° Rechtsspiralnuten*
27° right-hand spiral flutes

 R0 — *0° Drallwinkel (GWi5000 - GWH)*
0° helix angle (GWi5000 - GWH)

 R10 — *10° Rechtsdrallwinkel*
10° right-hand helix angle

 L3 — *3° Linksdrallwinkel (ZBGF)*
3° left-hand helix angle (ZBGF)

 45° — *Mit 45° Senker zum Anfasen des Gewindes*
With 45° chamfer for countersinking

 *Radius auf Aussendurchmesser*
Radius on external diameter

 *Kühlkanal GWi Ø 0.8 - ≤ 6.35 mm*
Cooling channel GWi Ø 0.8 - ≤ 6.35 mm

 *Kühlkanal GWi Ø > 6.35 - ≤ 20 mm*
Cooling channel GWi Ø > 6.35 - ≤ 20 mm

 1:16 — *Konisches Gewinde 1:16 (NPT - NPTF)*
Tapered thread 1:16 (NPT - NPTF)

 2 x D_1 — *Gewindelänge 2 x D_1*
Thread length 2 x D_1

 2.5 x D_1 — *Gewindelänge 2.5 x D_1*
Thread length 2.5 x D_1

 3 x D_1 — *Gewindelänge 3 x D_1*
Thread length 3 x D_1

 4 x D_1 — *Gewindelänge 4 x D_1*
Thread length 4 x D_1

PIKTOGRAMME — PICTOGRAPHS

Gewindelänge 1.5 x D_1
Thread length 1.5 x D_1

Gewindelänge 2 x D_1
Thread length 2 x D_1

Gewindelänge 2.5 x D_1
Thread length 2.5 x D_1

Innengewinde
Internal thread

Aussengewinde
External thread

Innengewinde (GW - GWi - GWH)
Internal thread (GW - GWi - GWH)

Sacklöcher (BGF)
Blind holes (BGF)

Durchgangslöcher (BGF)
Through holes (BGF)

BGF, 2 Spannuten
BGF, 2 flutes

BGF, 3 Spannuten
BGF, 3 flutes

EG-Gewinde
Thread EG (for wire screw thread inserts)

Kernlochdurchmesser
Core-hole diameter

Anzahl Spannuten (Z)
Number of flutes (Z)

Werkzeugdrehrichtung "links"
Sense of rotation of tool "left"

Auf Anfrage
On request

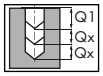
Unvollständigen Gang entfernen (GF61 - GFH61),
Umstellung auf neue Ausführung im Gange
Removal of incomplete thread (GF61 - GFH61),
change to new version in progress

Fasenwinkel 90°
Chamfer 90°

Bohrtiefe 5 x d_1
Drilling depth 5 x d_1

Bohrtiefe 6 x d_1
Drilling depth 6 x d_1

Bohrtiefe 8 x d_1
Drilling depth 8 x d_1



Tieflochbohren mit Entspanen
Drilling with pecking

130° Spitzenwinkel
130° point angle

140° Spitzenwinkel
140° point angle

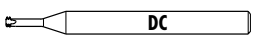
30° Rechtsspiralnuten
30° right-hand spiral flutes

Innenkühlung, mit 2 stirnseitigen Schmiermittelaustritten
Internal coolant, with 2 frontal outflows

Innenkühlung, mit 2 gedrallten Kühlkanälen
Internal coolant, with 2 twisted coolant channels

Für Bohrtiefe 3 x d_1
For drilling depth 3 x d_1

Für Bohrtiefe 5 x d_1
For drilling depth 5 x d_1



Baumasse nach DC-Werksnorm
General dimensions as per DC standards

Schaftmasse nach DIN 6535 HA
Shank dimensions as per DIN 6535 HA

Bemerkung GFM

Zur Vermeidung grösserer Profilüberfräsungen darf der Fräser-Ø für Regelgewinde nicht grösser als ⅔ (Feingewinde ¾) des zu fräsenden Gewinde-Ø sein.

Notice GFM

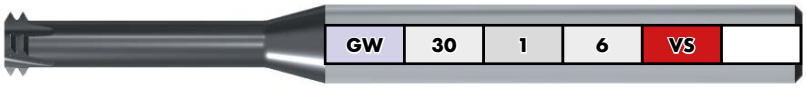
In order to avoid profile defects it is important that the tool diameter does not exceed ⅔ of the diameter of the work-piece thread for coarse threads (¾ for fine threads).

KODIERUNG — CODIFICATION

VHM-Gewindewirbler

Solid carbide thread whirl cutters

Beispiel - Example



Standardausführung	Standard execution	**GW**					
Für gehärteten Stahl (55 - ≤ 63 HRC)	For hardened steels (55 - ≤ 63 HRC)	**GWH**					
Mit Kühlkanal	With cooling channel	**GWi**					
Einzahn	Single tooth		**11**				
Mehrzahn-Einzelprofil	Single profile, multi toothed		**20**				
Mehrzahn-Doppelprofil	Double pitch with multi flutes		**30**				
Mehrzahn-Vollprofil	Multi fluted with full profile		**50**				
Aussenkühlung	External lubrication			**1**			
Innenkühlung	Internal lubrication			**6**			
Gewindelänge 2 x D_1	Thread length 2 x D_1				**5**		
Gewindelänge 2.5 x D_1	Thread length 2.5 x D_1				**6**		
Gewindelänge 3 x D_1	Thread length 3 x D_1				**7**		
Gewindelänge 4 x D_1	Thread length 4 x D_1				**9**		
VS-Verschleissschutzschicht, generell	VS wear-protective coating, general					**VS**	
VX-Beschichtung für rostfreie Stähle und Nickelleg.	VX coating for stainless steels and Nickel alloys					**VX**	
VH-Beschichtung für gehärtete Stähle (≤ 63 HRC)	VH coating for hardened steels (≤ 63 HRC)					**VH**	
Spezialausführung	Special execution						**SP**

VHM-Zirkular-Bohrgewindefräser

Solid carbide circular drill thread milling cutters

Beispiel - Example

Standardausführung	Standard execution	**ZBGF**					
Spiralnuten 3°	Spiral flutes 3°		**60**				
Innenkühlung	Internal lubrication			**6**			
Gewindelänge 2 x D_1	Thread length 2 x D_1				**5**		
Gewindelänge 3 x D_1	Thread length 3 x D_1				**7**		
VS-Verschleissschutzschicht, generell	VS wear-protective coating, general					**VS**	
Spezialausführung	Special execution						**SP**

KODIERUNG — CODIFICATION

VHM-Gewindefräser

Solid carbide thread milling cutters

Beispiel - Example

Standardausführung	Standard execution	**GF**						
Für gehärteten Stahl (55 - ≤ 63 HRC)	For hardened steels (55 - ≤ 63 HRC)	**GFH**						
Mit 45° Senkfase	With 45° chamfer for countersinking	**GFS**						
Polyvalenter Gewindefräser	For multi sizes thread milling cutters	**GFM**						
Bohrgewindefräser	Thrillers	**BGF**						
Spiralnuten 27° (GF61), 10° (GFH)	Spiral flutes 27° (GF61), 10° (GFH)		**61**					
Spiralnuten 15° (GF62, GFM62)	Spiral flutes 15° (GF62, GFM62)		**62**					
Spiralnuten 27° (GFS)	Spiral flutes 27°(GFS)		**66**					
Bohrgewindefräser zweilippig	Thrillers 2 flutes		**67**					
Bohrgewindefräser dreilippig	Thrillers 3 flutes		**68**					
Aussenkühlung	External lubrication			**1**				
Innenkühlung	Internal lubrication			**6**				
Gewindelänge 1.5 x D_1	Thread lenght 1.5 x D_1				**0**			
Gewindelänge 2 x D_1	Thread length 2 x D_1				**5**			
Gewindelänge 2.5 x D_1	Thread length 2.5 x D_1				**6**			
VS-Verschleissschutzschicht, generell	VS wear-protective coating, general					**VS**		
VX-Beschichtung für rostfreie Stähle und Nickelleg.	VX coating for stainless steels and Nickel alloys					**VX**		
VH-Beschichtung für gehärtete Stähle (≤ 63 HRC)	VH coating for hardened steels (≤ 63 HRC)					**VH**		
Spezialausführung	Special execution						**SP**	
Profil für Aussengewinde	Profile for external threads							**EX**

Bemerkung GFM

Zur Vermeidung grösserer Profilüberfräsungen darf der Fräser-Ø für Regelgewinde nicht grösser als ⅔ (Feingewinde ¾) des zu fräsenden Gewinde-Ø sein.

Notice GFM

In order to avoid profile defects it is important that the tool diameter does not exceed ⅔ of the diameter of the work-piece thread for coarse threads (¾ for fine threads).

ANWENDUNGSGRUPPEN

Beispiele für Anwendungsgruppen

11 Automatenstahl

1.0711	9S20
1.0715	9SMn28
1.0718	9SMnPb28
1.0726	35S20
1.0737	9SMnPb36

12 Baustahl, Einsatzstahl

1.0037	St37-2 (S235JR)
1.0050	St50-2 (E295)
1.0060	St60-2 (E335)
1.5919	15CrNi6
1.7131	16MnCr5

13 Kohlenstoffstahl

1.0503	C45
1.0535	C55
1.0601	C60
1.1545	C105W1
1.2067	102Cr6 (100Cr6)

14 Stahl legiert < 850 N/mm2

1.2363	X100CrMoV5-1
1.3551	80MoCrV42-16
1.7218	25CrMo4
1.7220	34CrMo4
1.7225	42CrMo4

15 Stahl legiert / vergütet > 850 - < 1150 N/mm2

1.3553	X82WMoCrV6-5-4
1.6580	30CrNiMo8
1.7220	34CrMo4
1.7225	42CrMo4
1.8507	34CrAlMo5

16 Hochfester Stahl ≤ 44 HRC

	EN-GJS-1200-2
1.6582	34CrNiMo6v
1.7225	42CrMo4v
1.7228	50CrMo4v
1.8515	31CrMo12v

17 Stahl vergütet > 44 - ≤ 54 HRC

> 44 - ≤ 54 HRC

18 Stahl gehärtet > 54 - ≤ 63 HRC

> 54 - ≤ 63 HRC

21 Rostfreier Stahl, geschwefelt

1.4005	X12CrS13
1.4104	X14CrMoS17
1.4305	X10CrNiS18-9

22 Austenitisch

1.4301	X5CrNi18-10
1.4406	X2CrNiMoN17-12-2
1.4435	X2CrNiMo18-14-3
1.4541	X6CrNiTi18-10
1.4571	X6CrNiMoTi17-12-2

23 Ferritisch, martensitisch < 850 N/mm2

1.4112	X90CrMoV18
1.4540	X4CrNiCuNb16-4
1.4582	X4CrNiMoNb25-7
1.4762	X10CrAl24
1.4922	X20CrMo11-1

24 Ferritisch, martensitisch > 850 - < 1150 N/mm2

1.4057	X17CrNi17-2
1.4125	X105CrMo17
1.4542	X5CrNiCuNb16-4
1.4548	X5CrNiCuNb17-4-4
1.4748	X85CrMoV18-2

31 Grauguss

0.6015	GG15
0.6020	GG20
0.6025	GG25
0.6030	GG30

32 Kugelgraphitguss, Temperguss

0.7040	GGG40
0.7043	GGG40.3
0.7050	GGG50
0.7060	GGG60
0.7080	GGG80

41 Reintitan

3.7024	Grad1
3.7034	Grad2
3.7055	Grad3
3.7065	Grad4

42 Titanlegierung

3.7124	TiCu2.5
	Ti6Al7Nb
3.7164	TiAl6V4 (Grad5)
3.7174	TiAl6V6Sn2

51 Nickellegierung 1 ≤ 850 N/mm2

1.3912	Ni36 (Invar)
2.4360	NiCu30Fe (Monel 400)
2.4816	NiCr15Fe (Inconel 600)
1.4876	X10NiCrAlTi32-20

52 Nickellegierung 2 > 850 - ≤ 1150 N/mm2

2.4375	NiCu30Al (MonelK500)
2.4631	NiCr20TiAl (Nimonic 80)
2.4668	NiCr19NbMo (Inconel718)

53 Nickellegierung 3 > 1150 - ≤ 1600 N/mm2

2.4631	NiCr20TiAl (Nimonic80)
2.4668	NiCr19NbMo (Inconel718)

61 Reinkupfer (Elektrolytkupfer)

2.0060	E-Cu57 (E-Cu)

62 Messing, Bronze, Rotguss (kurzspanend)

2.0401	CuZn39Pb3 (Ms58)
2.0402	CuZn40Pb2 (Ms58)
2.1030	CuSn8 (Bz)
2.1096	G-CuSn5ZnPb

63 Messing (langspanend)

2.0240	CuZn15 (Ms85)
2.0265	CuZn30 (Ms70)
2.0321	CuZn37 (Ms63)

71 Al unlegiert

3.0205	Al99
3.0255	Al99.5

72 Al legiert Si < 1.5 %

3.1255	AlCuSiMn
3.1355	AlCuMg2
3.2315	AlMgSi1
3.3206	AlMgSi0.5
3.4345	AlZnMgCu0.5

73 Al legiert Si > 1.5 % - < 10 %

3.2161	G-AlSi8Cu3
3.2162	GD-AlSi8Cu3
3.2341	G-AlSi5Mg
3.2371	G-AlSi7Mg

74 Al legiert Si > 10 %, Mg-Legierungen

3.2381	G-AlSi10Mg
3.2382	GD-AlSi10Mg
3.2581	G-AlSi12
3.2583	G-AlSi12 (Cu)

81 Thermoplaste

Delrin (POM)
Teflon
Nylon

82 Duroplaste

Bakelit
Novopan

83 Faserverstärkte Kunststoffe

Glasfaserverstärkte
Thermo- und Duroplaste

Referenz: DIN

91 Gelbgold

2N18
Au585AgCu205
3N18
Au917AgCu44

92 Rotgold

4N18
5N18
Au585CuAg325
Au750AgCu
Au917Cu83

93 Weissgold

Au750PdCu125
Au750PdCu150
Au585PdCu150
Au925Pd75

94 Silber

Ag999
Ag800Cu
Ag925Cu

APPLICATION GROUPS

Examples for application groups

11 Free-cutting steels

1.0711	1212
1.0715	1213
1.0718	12L13
1.0726	1140
1.0737	12L14

12 Structural, cementation steels

1.0037	1015
1.0050	A570 Gr.50
1.0060	A572 Gr.65
1.5919	3115
1.7131	5115

13 Carbon steels

1.0503	1045
1.0535	1055
1.0601	1060
1.1545	W110
1.2067	L 3

14 Alloy steels < 850 N/mm2

1.2363	A2
1.3551	M50
1.7218	4130
1.7220	4135
1.7225	4140

15 Alloy steels hard./temp. > 850 - < 1150 N/mm2

1.3553	-
1.6580	4340
1.7220	4135
1.7225	4140
1.8507	A355CLD (K23510)

16 High tensile alloy steels ≤ 44 HRC

	EN-GJS-1200-2
1.6582	4340
1.7225	4140
1.7228	4150
1.8515	-

17 Alloy steels tempered > 44 - ≤ 54 HRC

> 44 - ≤ 54 HRC

18 Alloy steels hardened > 54 - ≤ 63 HRC

> 54 - ≤ 63 HRC

21 Free machining stainless steels

1.4005	416
1.4104	430F
1.4305	303

22 Austenitic stainless steels

1.4301	304
1.4406	316LN
1.4435	316L
1.4541	321
1.4571	316Ti

23 Ferritic and martensitic < 850 N/mm2

1.4112	440B
1.4540	XM12 (15-5PH)
1.4582	-
1.4762	446
1.4821	4922

24 Ferritic and martensitic > 850 - < 1150 N/mm2

1.4057	431
1.4125	440C
1.4542	630 (17-4PH)
1.4748	-

31 Cast iron

0.6015	A48-25B
0.6020	A48-30B
0.6025	A48-40B
0.6030	A48-45B

32 Spheroidal graphite + malleable cast iron

0.7040	60-40-18
0.7043	-
0.7050	65-45-12
0.7060	80-55-06
0.7080	120-90-02

41 Pure titanium

3.7024	Gr.1
3.7034	Gr.2
3.7055	Gr.3
3.7065	Gr.4

42 Titanium alloys

3.7124	Alloy 230
	F-1295
3.7164	Gr.5
3.7174	-

51 Nickel alloys 1 ≤ 850 N/mm2

1.3912	K93600
2.4360	N04400
1.4816	N08800

52 Nickel alloys 2 > 850 - ≤ 1150 N/mm2

2.4375	N05500 (B865)
2.4631	N07080 (B637)
2.4668	N07718 (B637)

53 Nickel alloys 3 > 1150 - ≤ 1600 N/mm2

2.4631	N07080 (B637)
2.4668	N07718 (B637)

61 Pure copper (electrolytic copper)

2.0060	C11000

62 Short chip brass, phosphor bronze, gun metal

2.0401	C38500
2.0402	C37800
2.1030	C52100
2.1096	-

63 Long chip brass

2.0240	C23000
2.0265	C26000
2.0321	C27200

71 Al unalloyed

3.0205	1200
3.0255	1050A

72 Al alloyed Si < 1.5 %

3.1255	2014
3.1355	2024
3.2315	6082
3.3206	6060
3.4345	7020

73 Al alloyed Si > 1.5 % - < 10 %

3.2161	380.1
3.2162	-
3.2341	-
3.2371	A 356.2

74 Al alloyed Si > 10 %, Mg-alloys

3.2381	A360
3.2382	-
3.2581	A413
3.2583	413.1

81 Thermoplastics

Delrin (POM)
Teflon
Nylon

82 Duroplastics

Bakelit
Novopan

83 Glass fibre reinforced plastics

Glass fibre reinforced,
Thermo and Duroplastics

Reference: AISI/ASTM/UNS

91 Yellow gold

2N18
Au585AgCu205
3N18
Au917AgCu44

92 Red gold

4N18
5N18
Au585CuAg325
Au750AgCu
Au917Cu83

93 White gold

Au750PdCu125
Au750PdCu150
Au585PdCu150
Au925Pd75

94 Silver

Ag999
Ag800Cu
Ag925Cu

SPEZIFIZIERUNGEN — SPECIFICATIONS

VS-BESCHICHTUNG — VS-COATING

VS

- *DC-"VS"-Verschleissschutzschicht für den allgemeinen Einsatz*
- *Zum Vermeiden von Kaltschweissungen*

*** *** *** *** *** *** ***

- DC "VS" wear-protective coating for general use
- To prevent cold welding

NEU: VX-BESCHICHTUNG — NEW: VX-COATING

VX

- *DC-"VX"-Verschleissschutzschicht für höhere Verschleissfestigkeit in rostfreien Stählen und Nickellegierungen, ermöglicht höhere Standzeiten*
- *Zum Vermeiden von Kaltschweissungen*

*** *** *** *** *** *** *** *** *** ***

- Improved wear resistance and longer tool life in stainless steels and Nickel alloys thanks to the DC "VX"-coating
- To prevent cold welding

NEU: VH-BESCHICHTUNG — NEW: VH-COATING

VH

- *DC-"VH"-Verschleissschutzschicht für die Trockenbearbeitung von gehärteten Stählen mit einer Härte von 55 - 63 HRC*
- *Gegen Hitzeentwicklung und plastische Verformung*

*** *** *** *** *** *** *** *** *** ***

- DC "VH" wear-protective coating for dry machining of tempered steels with a hardness of 55 - 63 HRC
- Against heat development and plastic deformation

Gewindewirbler GW *SERIES 1000* — Thread whirl cutter GW SERIES 1000

- *Universell einsetzbar*
- *Hohe Prozesssicherheit*
- *Für kleinste Durchmesser geeignet*
- *Mehr Raum für die Spanevakuation*
- *Für Gewindetiefen bis 2.5 x D_1*

*** *** *** *** ***

- Universal application
- High process security
- Suitable for the smallest dimensions
- More space for chip evacuation
- For threading depths up to 2.5 x D_1

Gewindewirbler GW *SERIES 2000* — Thread whirl cutter GW SERIES 2000

- *Vorschubgeschwindigkeit multipliziert mit der Anzahl der Zähne*
- *Weniger Verschleiss, verbesserte Standzeit*
- *Variable Anzahl Zähne, je nach Abmessung*
- *Für Gewindetiefen bis 2.5 x D_1*

*** *** *** *** *** *** *** ***

- Feed rate multiplied by number of teeth
- Less wear, longer tool life
- The number of teeth varies, depending on the size
- For threading depths up to 2.5 x D_1

Gewindewirbler GW *SERIES 3000* — Thread whirl cutter GW SERIES 3000

- *Prozesssicherheit, weniger Radius-Werkzeugkorrekturen auf der CNC*
- *Für Gewindetiefen bis 4 x D_1*

*** *** *** *** *** *** *** ***

- Secure process, reduction in NC-corrections
- For threading depths up to 4 x D_1

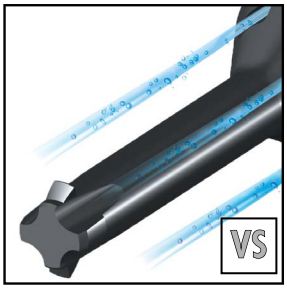
Gewindewirbler GWi *SERIES 3000* — Thread whirl cutter GWi SERIES 3000

- *Dank optimaler, spezifischer Kühlmittelzufuhr:*
  - *verbesserte Spanabfuhr*
  - *doppelte Standzeit*
- *Für Gewindetiefen bis 4 x D_1*

*** *** *** *** *** ***

- Thanks to an optimal, specific coolant supply:
  - improved chip evacuation
  - twice the tool life
- For threading depths up to 4 x D_1

Gewindewirbler GWi *SERIES 5000* — Thread whirl cutter GWi SERIES 5000

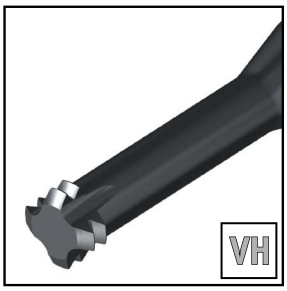


- *Seine spezifische Geometrie erlaubt das Schlichten des Kerndurchmessers und auch das Entgraten des hergestellten Profils*
- *Geometrisch einwandfreies Gewinde dank spezieller Schnittaufteilung*
- *Für absolut gratfreie Gewinde, selbst in schwer zerspanbaren Werkstoffen, unter Einhaltung der Masshaltigkeit (Toleranz)*
- *Hohe Oberflächenqualität dank spezifischer Schneidkantenkonditionierung*
- *Sehr gute Spanevakuierung und hohe Standzeit dank optimaler Kühlmittelzufuhr*
- *Prozesssicherheit, weniger Radius-Werkzeugkorrekturen auf der CNC*
- *LH-Rotation - Linksschneidend für weniger Druck auf den Schneidkanten*
- *Für Gewindetiefen bis 3 x D_1*

*** *** *** *** *** *** *** *** *** ***

- Its specific geometry allows the final milling of the internal diameter and also the deburring of the realised profile
- Geometrically perfect thread thanks to special cutting division
- For absolutely burr-free threads, even in difficult-to-machine materials, while maintaining dimensional accuracy (tolerance)
- High surface quality thanks to specific cutting edge conditioning
- Improved chip evacuation and long tool life thanks to optimum coolant supply
- Secure process, reduction in NC-corrections
- LH rotation - left-hand cutting for less pressure on the cutting edges
- For threading depths up to 3 x D_1

Gewindewirbler GWH *SERIES 3000* — Thread whirl cutter GWH SERIES 3000

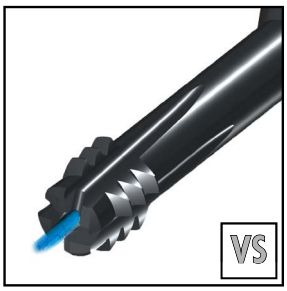


- *Speziell angepasste Schneidengeometrie für hohe Prozesssicherheit bei der Bearbeitung von hochfesten Werkstoffen bis 63 HRC*
- *Hohe Oberflächenqualität dank spezifischer Schneidkantenkonditionierung*
- *LH-Rotation - Linksschneidend für weniger Druck auf den Schneidkanten*
- *Für Gewindetiefen bis 3 x D_1*

*** *** *** *** *** *** *** *** *** ***

- Special cutting geometry for high process security when machining high-tensile materials up to 63 HRC
- High surface quality thanks to specific cutting edge conditioning
- LH rotation - left-hand cutting for less pressure on the cutting edges
- For threading depths up to 3 x D_1

Zirkular-Bohrgewindefräser ZBGF *SERIES 6000* — Circular drill thread milling cutter ZBGF SERIES 6000



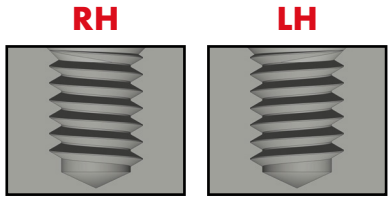
- *Kombiniertes Werkzeug zum Schneiden des Kernloches und Wirbeln des Gewindes*
- *Fortschrittliche Innenkühlung für optimale Spanabfuhr (mindestens 20 bar)*
- *Hohe Oberflächenqualität dank spezifischer Schneidkantenkonditionierung*
- *LH-Rotation - Linksschneidend für weniger Druck auf den Schneidkanten*
- *Für Gewindetiefen bis 3 x D_1*

*** *** *** *** *** *** *** *** *** ***

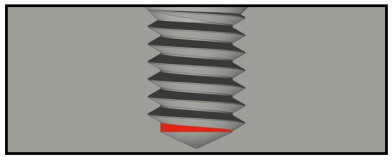
- Combinated tool for drilling the core hole and whirling the thread
- Advanced internal cooling for optimum chip removal (at least 20 bar)
- High surface quality thanks to specific cutting edge conditioning
- LH rotation - left-hand cutting for less pressure on the cutting edges
- For threading depths up to 3 x D_1

SPEZIFISCHE ANWENDUNGSFÄLLE — SPECIFIC APPLICATION CASES

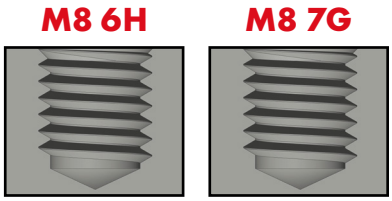
GW - GWH - GWi - GF - GFH - GFS - GFM



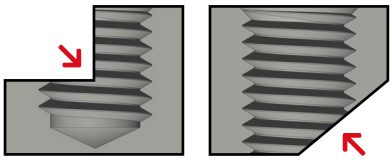
Ein einziger Gewindewirbler / Gewindefräser für Rechts- und Linksgewinde
The same thread whirler / cutter can be used for right- and left-hand threads



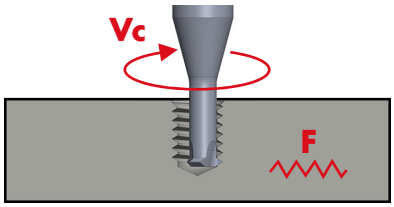
Für Gewinde bis fast auf den Grund der Vorbohrung
For threads to be cut near to the bottom of blind holes



Je nach Wahl, gewünschte Toleranz einstellbar
Required tolerance adjustable as per users choice

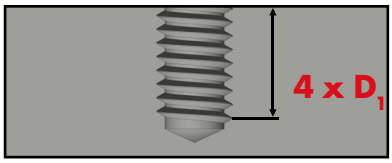


Für Gewinde mit unterbrochenem Schnitt, mit schrägem Anschnitt oder Austritt
For threads with interrupted cut or with oblique entrance or exit



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

GW - GWi

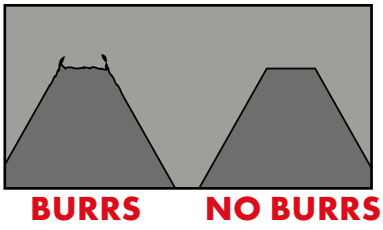


Ideal für tiefe Sacklöcher
Ideal for deep blind holes

GWH - GFH

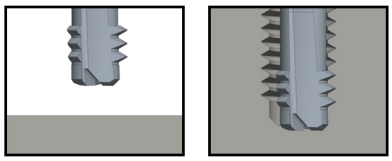
Gewinde in hochfeste Werkstoffe können realisiert werden
To realise threads in hardened materials

GWi5000

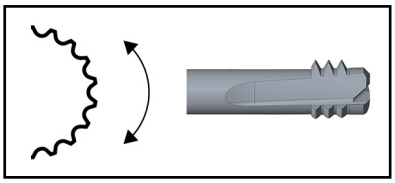


Zum Wirbeln gratfreier Gewinde
For whirling burr-free threads

ZBGF

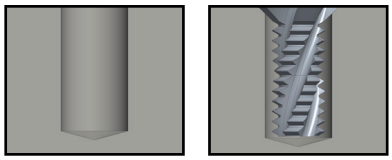


Kombiniertes Werkzeug zum Schneiden des Kernloches und des Gewindes
Combinated tool for drilling and threading



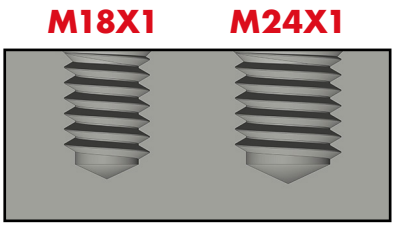
Platzgewinn im Werkzeugmagazin der Maschine; Zeiteinsparung beim Werkzeugwechsel
Space-saving in the tool carousel; time saving when tool changing

GFS



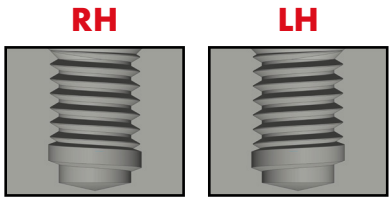
45° Ansenkung und Gewindefräsen mit einem Werkzeug
45° countersinking and thread milling with one only tool

GFM

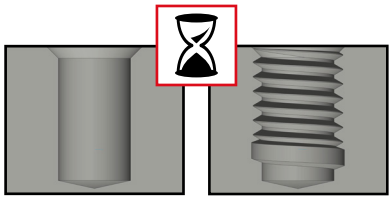


Ein einziger Gewindefräser für einen grossen Durchmesserbereich mit gleicher Steigung
One only tool for threads of a wide range of diameters with the same pitch

BGF



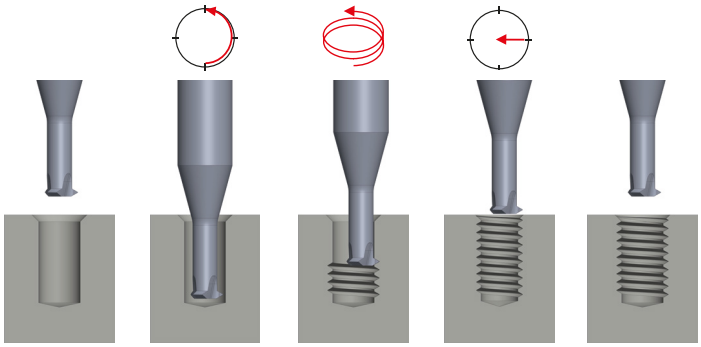
Ein einziger Bohrgewindefräser für Rechts- und Linksgewinde
The same thriller can be used for right- and left-hand threads



Platzgewinn im Werkzeugmagazin der Maschine und Einsparung von Bearbeitungszeit
Space-saving in the tool carousel and saving of machining time

ANWENDUNGSTABELLE GW— APPLICATION CHART GW

Programmierzyklus für Gewindewirbler GW1000 und GW2000
Programming cycle for thread whirling GW1000 and GW2000



Anwendungstabelle für Gewindewirbler — Application chart for thread whirling

	Werkstoff-Gruppen / Material groups		Werkstoffbezeichnung	Material designation	Härte / Hardness (HB)	Festigkeit / Tensile strength Rm (N/mm²)	Kühlung / Lubricant: Standard	Kühlung / Lubricant: Beschichtet / Coated
10	Stahl / Steels	11	Automatenstahl	Free-cutting steels	< 200	< 700		O E
		12	Baustahl, Einsatzstahl	Structural, cementation steels	< 200	< 700		O E
		13	Kohlenstoffstahl	Carbon steels	< 300	< 1000		O E
		14	Stahl legiert < 850 N/mm²	Alloy steels < 850 N/mm²	< 250	< 850		O E
		15	Stahl legiert / vergütet > 850 - < 1150 N/mm²	Alloy steels hard. / temp. > 850 - < 1150 N/mm²	> 250	> 850		O E
		16	Hochfester Stahl ≤ 44 HRC	High tensile alloy steels ≤ 44 HRC	> 250	> 850		O E
		17	Stahl vergütet > 44 - ≤ 54 HRC	Alloy steels tempered > 44 - ≤ 54 HRC	> 410	> 1400		O E
		18	Stahl gehärtet > 54 - ≤ 63 HRC	Alloy steels hardened > 54 - ≤ 63 HRC	> 560	> 1980		
20	Rostfreier Stahl / Stainless steels	21	Rostfreier Stahl, geschwefelt	Free machining stainless steels	< 250	< 850		O E
		22	Austenitisch	Austenitic stainless steels	< 250	< 850		O E
		23	Ferritisch, martensitisch < 850 N/mm²	Ferritic and martensitic < 850 N/mm²	< 250	< 850		O E
		24	Ferritisch, martensitisch > 850 - < 1150 N/mm²	Ferritic and martensitic > 850 - < 1150 N/mm²	> 250	> 850		O E
30	Guss / Cast iron	31	Grauguss	Cast iron	< 250	< 850		O E A
		32	Kugelgraphitguss, Temperguss	Spheroidal graphite + malleable cast iron	< 250	< 850		O E
40	Titan / Titanium	41	Reintitan	Pure titanium	< 250	< 850	O E	O E
		42	Titanlegierung	Titanium alloys	> 250	> 850	O E	O E
50	Nickel / Nickel	51	Nickellegierung 1 ≤ 850 N/mm²	Nickel alloys 1 ≤ 850 N/mm²	< 250	< 850		O E
		52	Nickellegierung 2 > 850 - ≤ 1150 N/mm²	Nickel alloys 2 > 850 - ≤ 1150 N/mm²	> 250	> 850		O E
		53	Nickellegierung 3 > 1150 - ≤ 1600 N/mm²	Nickel alloys 3 > 1150 - ≤ 1600 N/mm²	> 340	> 1150		O E
60	Kupfer / Copper	61	Reinkupfer (Elektrolytkupfer)	Pure copper (electrolytic copper)	< 120	< 400	O E	O E
		62	Messing, Bronze, Rotguss (kurzspanend)	Short chip brass, phosphor bronze, gun metal	< 200	< 700	O E A	O E A
		63	Messing (langspanend)	Long chip brass	< 200	< 700	O E	O E
70	Aluminium Magnesium / Aluminium Magnesium	71	Al unlegiert	Al unalloyed	< 100	< 350	O E	O E
		72	Al legiert Si < 1.5 %	Al alloyed Si < 1.5 %	< 150	< 500	O E	O E
		73	Al legiert Si > 1.5 % - < 10 %	Al alloyed Si > 1.5 % - < 10 %	< 120	< 400		O E
		74	Al legiert Si > 10 %, Mg-Legierungen	Al alloyed Si > 10 %, Mg-alloys	< 120	< 400		O E
80	Kunststoff / Plastic compounds	81	Thermoplaste	Thermoplastics	-	-	E	E
		82	Duroplaste	Duroplastics	-	-	E	E
		83	Faserverstärkte Kunststoffe	Glass fibre reinforced plastics	-	-		E A
90	Edelmetalle / Precious metals	91	Gelbgold	Yellow gold	-	-	O E	O E
		92	Rotgold	Red gold	-	-	O E	O E
		93	Weissgold	White gold	-	-		O E
		94	Silber	Silver	-	-		O E

O Optimal mit Schneidöl / Optimal with cutting oil

O Geeignet mit Schneidöl / Suitable with cutting oil

E Optimal mit Emulsion / Optimal with emulsion

E Geeignet mit Emulsion / Suitable with emulsion

GW1116

VS

Vc (m/min)		Vorschub fz (mm/Zahn)	Milling fz (mm/tooth)
Standard Standard	Beschichtet Coated	Ø 0.30 - 1.40	
	80-100		0.004-0.02
	80-100		0.004-0.02
	70-90		0.004-0.02
	70-90		0.004-0.02
	30-50		0.004-0.02
	15-40		0.004-0.02
	15-30		0.004-0.02
	40-60		0.004-0.02
	30-50		0.004-0.02
	30-50		0.004-0.02
	30-50		0.004-0.02
	90-120		0.004-0.02
	70-90		0.004-0.02
10-20	20-40	0.004-0.02	0.004-0.02
10-20	15-35	0.004-0.02	0.004-0.02
	20-40		0.004-0.02
	20-40		0.004-0.02
	20-30		0.004-0.02
150-200	200-250	0.004-0.02	0.004-0.02
100-150	150-200	0.004-0.02	0.004-0.02
100-150	150-200	0.004-0.02	0.004-0.02
150-200	200-250	0.004-0.02	0.004-0.02
150-200	200-250	0.004-0.02	0.004-0.02
	200-250		0.004-0.02
	200-250		0.004-0.02
150-200	200-250	0.004-0.02	0.004-0.02
80-120	100-200	0.004-0.02	0.004-0.02
	80-100		0.004-0.02
100-150	150-200	0.004-0.02	0.004-0.02
70-90	90-120	0.004-0.02	0.004-0.02
	30-50		0.004-0.02
	90-120		0.004-0.02

GW2016

VS VS VS VS

Vc (m/min)		Vorschub fz (mm/Zahn)				Milling fz (mm/tooth)				
Standard Standard	Beschichtet Coated	Ø 0.50 - 1.00		Ø 1.01 - 2.74		Ø 2.75 - 6.00		Ø 6.01 - 20.00		
	80-100		0.004-0.01		0.01-0.05		0.04-0.10		0.08-0.15	11
	80-100		0.004-0.01		0.01-0.05		0.04-0.10		0.08-0.15	12
	70-90		0.004-0.01		0.01-0.05		0.02-0.10		0.05-0.15	13
	70-90		0.004-0.01		0.01-0.05		0.02-0.10		0.05-0.15	14
	30-50		0.004-0.01		0.01-0.05		0.02-0.08		0.04-0.15	15
	15-40		0.003-0.01		0.006-0.03		0.008-0.05		0.01-0.08	16
	15-30		0.003-0.01		0.006-0.025		0.008-0.04		0.01-0.06	17
										18
	40-60		0.004-0.01		0.01-0.05		0.02-0.10		0.05-0.15	21
	30-50		0.004-0.01		0.01-0.03		0.02-0.05		0.03-0.08	22
	30-50		0.004-0.01		0.01-0.03		0.02-0.05		0.03-0.08	23
	30-50		0.004-0.01		0.01-0.03		0.02-0.05		0.03-0.08	24
	90-120		0.004-0.01		0.01-0.05		0.04-0.10		0.08-0.15	31
	70-90		0.004-0.01		0.01-0.05		0.02-0.10		0.05-0.15	32
10-20	20-40	0.004-0.01	0.004-0.01	0.01-0.03	0.01-0.03	0.02-0.05	0.02-0.05	0.03-0.08	0.03-0.08	41
10-20	15-35	0.004-0.01	0.004-0.01	0.01-0.03	0.01-0.03	0.02-0.05	0.02-0.05	0.03-0.08	0.03-0.08	42
	20-40		0.004-0.01		0.01-0.03		0.02-0.06		0.03-0.08	51
	20-40		0.004-0.01		0.01-0.03		0.02-0.06		0.03-0.08	52
	20-30		0.003-0.01		0.006-0.03		0.008-0.05		0.03-0.08	53
150-200	200-250	0.004-0.01	0.004-0.01	0.01-0.05	0.01-0.05	0.02-0.10	0.02-0.10	0.05-0.15	0.05-0.15	61
100-150	150-200	0.004-0.01	0.004-0.01	0.01-0.05	0.01-0.05	0.04-0.10	0.04-0.10	0.08-0.15	0.08-0.15	62
100-150	150-200	0.004-0.01	0.004-0.01	0.01-0.05	0.01-0.05	0.02-0.10	0.02-0.10	0.05-0.15	0.05-0.15	63
150-200	200-300	0.004-0.01	0.004-0.01	0.01-0.05	0.01-0.05	0.05-0.10	0.05-0.10	0.10-0.20	0.10-0.20	71
150-200	200-300	0.004-0.01	0.004-0.01	0.01-0.05	0.01-0.05	0.05-0.10	0.05-0.10	0.10-0.20	0.10-0.20	72
	200-300		0.004-0.01		0.01-0.05		0.05-0.10		0.10-0.20	73
	200-300		0.004-0.01		0.01-0.05		0.04-0.10		0.08-0.15	74
150-200	200-300	0.004-0.01	0.004-0.01	0.01-0.05	0.01-0.05	0.05-0.10	0.05-0.10	0.10-0.20	0.10-0.20	81
80-120	100-200	0.004-0.01	0.004-0.01	0.01-0.05	0.01-0.05	0.04-0.10	0.04-0.10	0.08-0.15	0.08-0.15	82
	80-100		0.004-0.01		0.01-0.05		0.04-0.10		0.08-0.15	83
100-150	150-200	0.004-0.01	0.004-0.01	0.01-0.05	0.01-0.05	0.04-0.10	0.04-0.10	0.08-0.15	0.08-0.15	91
70-90	90-120	0.004-0.01	0.004-0.01	0.01-0.05	0.01-0.05	0.02-0.10	0.02-0.10	0.04-0.15	0.04-0.15	92
	30-50		0.004-0.01		0.01-0.05		0.02-0.05		0.03-0.08	93
	90-120		0.004-0.01		0.01-0.05		0.02-0.10		0.04-0.15	94

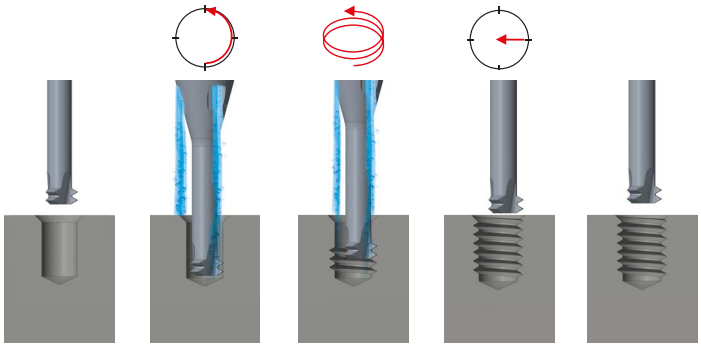
A **Optimal mit Luft**
Optimal with air

A **Geeignet mit Luft**
Suitable with air

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

ANWENDUNGSTABELLE GW - GWi — APPLICATION CHART GW - GWi

Programmierzyklus für Gewindewirbler GW3000 - GWi3000
Programming cycle for thread whirling GW3000 - GWi3000



Anwendungstabelle für Gewindewirbler — Application chart for thread whirling

	Werkstoff-Gruppen / Material groups		Werkstoffbezeichnung	Material designation	Härte / Hardness (HB)	Festigkeit / Tensile strength Rm (N/mm²)	Kühlung / Lubricant: Standard	Kühlung / Lubricant: Beschichtet / Coated
10	Stahl / Steels	11	Automatenstahl	Free-cutting steels	< 200	< 700		O E
		12	Baustahl, Einsatzstahl	Structural, cementation steels	< 200	< 700		O E
		13	Kohlenstoffstahl	Carbon steels	< 300	< 1000		O E
		14	Stahl legiert < 850 N/mm²	Alloy steels < 850 N/mm²	< 250	< 850		O E
		15	Stahl legiert / vergütet > 850 - < 1150 N/mm²	Alloy steels hard. / temp. > 850 - < 1150 N/mm²	> 250	> 850		O E
		16	Hochfester Stahl ≤ 44 HRC	High tensile alloy steels ≤ 44 HRC	> 250	> 850		O E
		17	Stahl vergütet > 44 - ≤ 54 HRC	Alloy steels tempered > 44 - ≤ 54 HRC	> 410	> 1400		O E
		18	Stahl gehärtet > 54 - ≤ 63 HRC	Alloy steels hardened > 54 - ≤ 63 HRC	> 560	> 1980		
20	Rostfreier Stahl / Stainless steels	21	Rostfreier Stahl, geschwefelt	Free machining stainless steels	< 250	< 850		O E
		22	Austenitisch	Austenitic stainless steels	< 250	< 850		O E
		23	Ferritisch, martensitisch < 850 N/mm²	Ferritic and martensitic < 850 N/mm²	< 250	< 850		O E
		24	Ferritisch, martensitisch > 850 - < 1150 N/mm²	Ferritic and martensitic > 850 - < 1150 N/mm²	> 250	> 850		O E
30	Guss / Cast iron	31	Grauguss	Cast iron	< 250	< 850		O E A
		32	Kugelgraphitguss, Temperguss	Spheroidal graphite + malleable cast iron	< 250	< 850		O E
40	Titan / Titanium	41	Reintitan	Pure titanium	< 250	< 850	O E	O E
		42	Titanlegierung	Titanium alloys	> 250	> 850	O E	O E
50	Nickel / Nickel	51	Nickellegierung 1 ≤ 850 N/mm²	Nickel alloys 1 ≤ 850 N/mm²	< 250	< 850		O E
		52	Nickellegierung 2 > 850 - ≤ 1150 N/mm²	Nickel alloys 2 > 850 - ≤ 1150 N/mm²	> 250	> 850		O E
		53	Nickellegierung 3 > 1150 - ≤ 1600 N/mm²	Nickel alloys 3 > 1150 - ≤ 1600 N/mm²	> 340	> 1150		O E
60	Kupfer / Copper	61	Reinkupfer (Elektrolytkupfer)	Pure copper (electrolytic copper)	< 120	< 400	O E	O E
		62	Messing, Bronze, Rotguss (kurzspanend)	Short chip brass, phosphor bronze, gun metal	< 200	< 700	O E A	O E A
		63	Messing (langspanend)	Long chip brass	< 200	< 700	O E	O E
70	Aluminium Magnesium / Aluminium Magnesium	71	Al unlegiert	Al unalloyed	< 100	< 350	O E	O E
		72	Al legiert Si < 1.5 %	Al alloyed Si < 1.5 %	< 150	< 500	O E	O E
		73	Al legiert Si > 1.5 % - < 10 %	Al alloyed Si > 1.5 % - < 10 %	< 120	< 400		O E
		74	Al legiert Si > 10 %, Mg-Legierungen	Al alloyed Si > 10 %, Mg-alloys	< 120	< 400		O E
80	Kunststoff / Plastic compounds	81	Thermoplaste	Thermoplastics	-	-	E	E
		82	Duroplaste	Duroplastics	-	-	E	E
		83	Faserverstärkte Kunststoffe	Glass fibre reinforced plastics	-	-		E A
90	Edelmetalle / Precious metals	91	Gelbgold	Yellow gold	-	-	O E	O E
		92	Rotgold	Red gold	-	-	O E	O E
		93	Weissgold	White gold	-	-		O E
		94	Silber	Silver	-	-		O E

O — Optimal mit Schneidöl / Optimal with cutting oil

O — Geeignet mit Schneidöl / Suitable with cutting oil

E — Optimal mit Emulsion / Optimal with emulsion

E — Geeignet mit Emulsion / Suitable with emulsion

GW3000 - GWi3000

Vc (m/min) Standard	Vc (m/min) Beschichtet / Coated	GW3016 GW3017 GW3019	GW3016VS GW3017VS GW3019VS GWi3066VS GWi3067VS GWi3069VS (VS)	GW3016VX GW3017VX GWi3066VX GWi3067VX (VX)	GW3016 GW3017 GW3019	GW3016VS GW3017VS GW3019VS GWi3066VS GWi3067VS GWi3069VS (VS)	GW3016VX GW3017VX GWi3066VX GWi3067VX (VX)	GW3016 GW3017 GW3019	GW3016VS GW3017VS GW3019VS GWi3066VS GWi3067VS GWi3069VS (VS)	GW3016VX GW3017VX GWi3066VX GWi3067VX (VX)	
		Vorschub fz (mm/Zahn) / Milling fz (mm/tooth)									
		Ø 0.80 - 2.74			Ø 2.75 - 6.00			Ø 6.01 - 20.00			
	80-100		0.01-0.05	0.01-0.05		0.04-0.10	0.04-0.10		0.08-0.15	0.08-0.15	11
	80-100		0.01-0.05	0.01-0.05		0.04-0.10	0.04-0.10		0.08-0.15	0.08-0.15	12
	70-90		0.01-0.05	0.01-0.05		0.02-0.10	0.02-0.10		0.05-0.15	0.05-0.15	13
	70-90		0.01-0.05	0.01-0.05		0.02-0.10	0.02-0.10		0.05-0.15	0.05-0.15	14
	30-50		0.01-0.05	0.01-0.05		0.02-0.08	0.02-0.08		0.04-0.15	0.04-0.15	15
	15-40		0.006-0.03	0.006-0.03		0.008-0.05	0.008-0.05		0.01-0.08	0.01-0.08	16
	15-30		0.006-0.025	0.006-0.025		0.008-0.04	0.008-0.04		0.01-0.06	0.01-0.06	17
											18
	40-60		0.01-0.05	0.01-0.05		0.02-0.10	0.02-0.10		0.05-0.15	0.05-0.15	21
	30-50		0.01-0.03	0.01-0.03		0.02-0.05	0.02-0.05		0.03-0.08	0.03-0.08	22
	30-50		0.01-0.03	0.01-0.03		0.02-0.05	0.02-0.05		0.03-0.08	0.03-0.08	23
	30-50		0.01-0.03	0.01-0.03		0.02-0.05	0.02-0.05		0.03-0.08	0.03-0.08	24
	90-120		0.01-0.05	0.01-0.05		0.04-0.10	0.04-0.10		0.08-0.15	0.08-0.15	31
	70-90		0.01-0.05	0.01-0.05		0.02-0.10	0.02-0.10		0.05-0.15	0.05-0.15	32
10-20	20-40	0.01-0.03	0.01-0.03	0.01-0.03	0.02-0.05	0.02-0.05	0.02-0.05	0.03-0.08	0.03-0.08	0.03-0.08	41
10-20	15-35	0.01-0.03	0.01-0.03	0.01-0.03	0.02-0.05	0.02-0.05	0.02-0.05	0.03-0.08	0.03-0.08	0.03-0.08	42
	20-40		0.01-0.03	0.01-0.03		0.02-0.06	0.02-0.06		0.03-0.08	0.03-0.08	51
	20-40		0.01-0.03	0.01-0.03		0.02-0.06	0.02-0.06		0.03-0.08	0.03-0.08	52
	20-30		0.006-0.03	0.006-0.03		0.008-0.05	0.008-0.05		0.03-0.08	0.03-0.08	53
150-200	200-250	0.01-0.05	0.01-0.05	0.01-0.05	0.02-0.10	0.02-0.10	0.02-0.10	0.05-0.15	0.05-0.15	0.05-0.15	61
100-150	150-200	0.01-0.05	0.01-0.05	0.01-0.05	0.04-0.10	0.04-0.10	0.04-0.10	0.08-0.15	0.08-0.15	0.08-0.15	62
100-150	150-200	0.01-0.05	0.01-0.05	0.01-0.05	0.02-0.10	0.02-0.10	0.02-0.10	0.05-0.15	0.05-0.15	0.05-0.15	63
150-200	200-300	0.01-0.05	0.01-0.05	0.01-0.05	0.05-0.10	0.05-0.10	0.05-0.10	0.10-0.20	0.10-0.20	0.10-0.20	71
150-200	200-300	0.01-0.05	0.01-0.05	0.01-0.05	0.05-0.10	0.05-0.10	0.05-0.10	0.10-0.20	0.10-0.20	0.10-0.20	72
	200-300		0.01-0.05	0.01-0.05		0.05-0.10	0.05-0.10		0.10-0.20	0.10-0.20	73
	200-300		0.01-0.05	0.01-0.05		0.04-0.10	0.04-0.10		0.08-0.15	0.08-0.15	74
150-200	200-300	0.01-0.05	0.01-0.05	0.01-0.05	0.05-0.10	0.05-0.10	0.05-0.10	0.10-0.20	0.10-0.20	0.10-0.20	81
80-120	100-200	0.01-0.05	0.01-0.05	0.01-0.05	0.04-0.10	0.04-0.10	0.04-0.10	0.08-0.15	0.08-0.15	0.08-0.15	82
	80-100		0.01-0.05	0.01-0.05		0.04-0.10	0.04-0.10		0.08-0.15	0.08-0.15	83
100-150	150-200	0.01-0.05	0.01-0.05	0.01-0.05	0.04-0.10	0.04-0.10	0.04-0.10	0.08-0.15	0.08-0.15	0.08-0.15	91
70-90	90-120	0.01-0.05	0.01-0.05	0.01-0.05	0.02-0.10	0.02-0.10	0.02-0.10	0.04-0.15	0.04-0.15	0.04-0.15	92
	30-50		0.01-0.05	0.01-0.05		0.02-0.05	0.02-0.05		0.03-0.08	0.03-0.08	93
	90-120		0.01-0.05	0.01-0.05		0.02-0.10	0.02-0.10		0.04-0.15	0.04-0.15	94

A *Optimal mit Luft*
Optimal with air

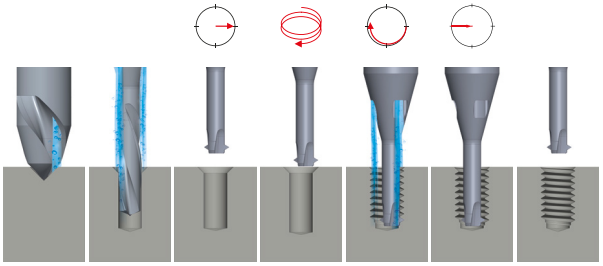
A *Geeignet mit Luft*
Suitable with air

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

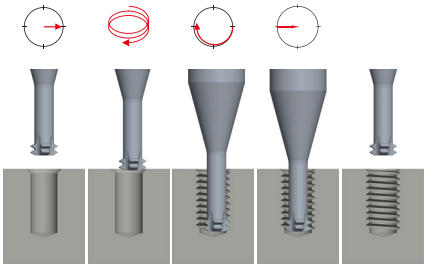
ANWENDUNGSTABELLE GWi - GWH — APPLICATION CHART GWi - GWH

Programmierzyklus für Gewindewirbler GWi5000 - GWH3000
Programming cycle for thread whirling GWi5000 - GWH3000

GWi5000



GWH3000



Anwendungstabelle für Gewindewirbler — Application chart for thread whirling

	Werkstoff-Gruppen / Material groups		Werkstoffbezeichnung	Material designation	Härte / Hardness (HB)	Festigkeit / Tensile strength Rm (N/mm²)	Kühlung / Lubricant: Standard	Kühlung / Lubricant: Beschichtet / Coated
10	Stahl / Steels	11	Automatenstahl	Free-cutting steels	< 200	< 700		O E
		12	Baustahl, Einsatzstahl	Structural, cementation steels	< 200	< 700		O E
		13	Kohlenstoffstahl	Carbon steels	< 300	< 1000		O E
		14	Stahl legiert < 850 N/mm²	Alloy steels < 850 N/mm²	< 250	< 850		O E
		15	Stahl legiert / vergütet > 850 - < 1150 N/mm²	Alloy steels hard. / temp. > 850 - < 1150 N/mm²	> 250	> 850		O E
		16	Hochfester Stahl ≤ 44 HRC	High tensile alloy steels ≤ 44 HRC	> 250	> 850		O E
		17	Stahl vergütet > 44 - ≤ 54 HRC	Alloy steels tempered > 44 - ≤ 54 HRC	> 410	> 1400		O E
		18	Stahl gehärtet > 54 - ≤ 63 HRC	Alloy steels hardened > 54 - ≤ 63 HRC	> 560	> 1980		
20	Rostfreier Stahl / Stainless steels	21	Rostfreier Stahl, geschwefelt	Free machining stainless steels	< 250	< 850		O E
		22	Austenitisch	Austenitic stainless steels	< 250	< 850		O E
		23	Ferritisch, martensitisch < 850 N/mm²	Ferritic and martensitic < 850 N/mm²	< 250	< 850		O E
		24	Ferritisch, martensitisch > 850 - < 1150 N/mm²	Ferritic and martensitic > 850 - < 1150 N/mm²	> 250	> 850		O E
30	Guss / Cast iron	31	Grauguss	Cast iron	< 250	< 850		O E
		32	Kugelgraphitguss, Temperguss	Spheroidal graphite + malleable cast iron	< 250	< 850		O E
40	Titan / Titanium	41	Reintitan	Pure titanium	< 250	< 850		O E
		42	Titanlegierung	Titanium alloys	> 250	> 850		O E
50	Nickel / Nickel	51	Nickellegierung 1 ≤ 850 N/mm²	Nickel alloys 1 ≤ 850 N/mm²	< 250	< 850		O E
		52	Nickellegierung 2 > 850 - ≤ 1150 N/mm²	Nickel alloys 2 > 850 - ≤ 1150 N/mm²	> 250	> 850		O E
		53	Nickellegierung 3 > 1150 - ≤ 1600 N/mm²	Nickel alloys 3 > 1150 - ≤ 1600 N/mm²	> 340	> 1150		O E
60	Kupfer / Copper	61	Reinkupfer (Elektrolytkupfer)	Pure copper (electrolytic copper)	< 120	< 400		O E
		62	Messing, Bronze, Rotguss (kurzspanend)	Short chip brass, phosphor bronze, gun metal	< 200	< 700		O E
		63	Messing (langspanend)	Long chip brass	< 200	< 700		O E
70	Aluminium Magnesium / Aluminium Magnesium	71	Al unlegiert	Al unalloyed	< 100	< 350		O E
		72	Al legiert Si < 1.5 %	Al alloyed Si < 1.5 %	< 150	< 500		O E
		73	Al legiert Si > 1.5 % - < 10 %	Al alloyed Si > 1.5 % - < 10 %	< 120	< 400		O E
		74	Al legiert Si > 10 %, Mg-Legierungen	Al alloyed Si > 10 %, Mg-alloys	< 120	< 400		O E
80	Kunststoff / Plastic compounds	81	Thermoplaste	Thermoplastics	-	-		E
		82	Duroplaste	Duroplastics	-	-		E
		83	Faserverstärkte Kunststoffe	Glass fibre reinforced plastics	-	-		E
90	Edelmetalle / Precious metals	91	Gelbgold	Yellow gold	-	-		O E
		92	Rotgold	Red gold	-	-		O E
		93	Weissgold	White gold	-	-		O E
		94	Silber	Silver	-	-		O E

O Optimal mit Schneidöl / Optimal with cutting oil

O Geeignet mit Schneidöl / Suitable with cutting oil

E Optimal mit Emulsion / Optimal with emulsion

E Geeignet mit Emulsion / Suitable with emulsion

		GWi5000				GWH3000		
								
		VS	VS			VH	VH	
Vc (m/min)		Vorschub fz (mm/Zahn)	Milling fz (mm/tooth)	Kühlung Lubricant		Vc (m/min)	Vorschub fz (mm/Zahn)	Milling fz (mm/tooth)	
Standard Standard	Beschichtet Coated	Ø 0.80 - 2.74	Ø 2.75 - 6.00	Standard Standard	Beschichtet Coated	Standard Standard	Ø 2.75 - 6.00	Ø 6.01 - 12.70	
	80-100	0.007-0.05	0.04-0.10						11
	80-100	0.007-0.05	0.04-0.10						12
	70-90	0.007-0.05	0.02-0.10						13
	70-90	0.007-0.05	0.02-0.10						14
	30-50	0.007-0.05	0.02-0.08						15
	15-40	0.004-0.03	0.008-0.05		E		0.008-0.05	0.01-0.08	16
	15-30	0.004-0.025	0.008-0.04		E		0.008-0.04	0.01-0.06	17
					A		0.01-0.025	0.015-0.035	18
	40-60	0.007-0.05	0.02-0.10						21
	30-50	0.007-0.03	0.02-0.05						22
	30-50	0.007-0.03	0.02-0.05						23
	30-50	0.007-0.03	0.02-0.05						24
	90-120	0.007-0.05	0.04-0.10		E A		0.04-0.10	0.08-0.15	31
	70-90	0.007-0.05	0.02-0.10						32
	20-40	0.007-0.03	0.02-0.05						41
	15-35	0.007-0.03	0.02-0.05						42
	20-40	0.007-0.03	0.02-0.06						51
	20-40	0.007-0.03	0.02-0.06						52
	20-30	0.004-0.03	0.008-0.05						53
	200-250	0.007-0.05	0.02-0.10						61
	150-200	0.007-0.05	0.04-0.10		E A		0.04-0.10	0.08-0.15	62
	150-200	0.007-0.05	0.02-0.10						63
	200-300	0.007-0.05	0.05-0.10						71
	200-300	0.007-0.05	0.05-0.10						72
	200-300	0.007-0.05	0.05-0.10						73
	200-300	0.007-0.05	0.04-0.10		E A		0.04-0.10	0.08-0.15	74
	200-300	0.007-0.05	0.05-0.10						81
	100-200	0.007-0.05	0.04-0.10						82
	80-100	0.007-0.05	0.04-0.10		E A		0.04-0.10	0.08-0.15	83
	150-200	0.007-0.05	0.04-0.10						91
	90-120	0.007-0.05	0.02-0.10						92
	30-50	0.007-0.05	0.02-0.05						93
	90-120	0.007-0.05	0.02-0.10						94

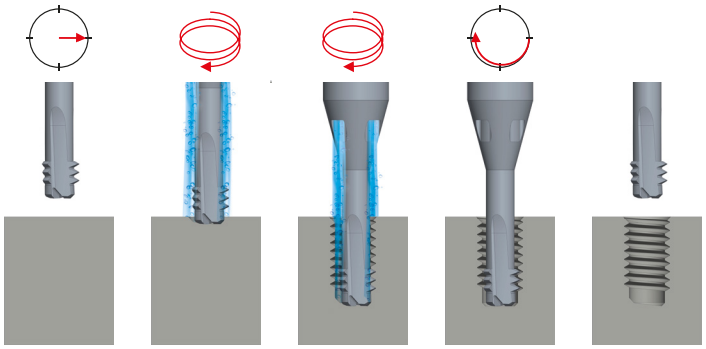
A **Optimal mit Luft**
Optimal with air

A **Geeignet mit Luft**
Suitable with air

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

ANWENDUNGSTABELLE ZBGF — APPLICATION CHART ZBGF

Programmierzyklus für Zirkular-Bohrgewindefräser ZBGF6065 - ZBGF6067
Programming cycle for circular drill thread milling cutters ZBGF6065 - ZBGF6067



Anwendungstabelle für ZBGF

Application chart for ZBGF

	Werkstoff-Gruppen Material groups		Werkstoffbezeichnung	Material designation	Härte Hardness (HB)	Festigkeit Tensile strength Rm (N/mm²)	Kühlung Lubricant	
							Standard Standard	Beschichtet Coated
10	Stahl Steels	11	Automatenstahl	Free-cutting steels	< 200	< 700		O E
		12	Baustahl, Einsatzstahl	Structural, cementation steels	< 200	< 700		O E
		13	Kohlenstoffstahl	Carbon steels	< 300	< 1000		O E
		14	Stahl legiert < 850 N/mm²	Alloy steels < 850 N/mm²	< 250	< 850		O E
		15	Stahl legiert / vergütet > 850 - < 1150 N/mm²	Alloy steels hard. / temp. > 850 - < 1150 N/mm²	> 250	> 850		O E
		16	Hochfester Stahl ≤ 44 HRC	High tensile alloy steels ≤ 44 HRC	> 250	> 850		O E
		17	Stahl vergütet > 44 - ≤ 54 HRC	Alloy steels tempered > 44 - ≤ 54 HRC	> 410	> 1400		O E
		18	Stahl gehärtet > 54 - ≤ 63 HRC	Alloy steels hardened > 54 - ≤ 63 HRC	> 560	> 1980		
20	Rostfreier Stahl Stainless steels	21	Rostfreier Stahl, geschwefelt	Free machining stainless steels	< 250	< 850		O E
		22	Austenitisch	Austenitic stainless steels	< 250	< 850		O E
		23	Ferritisch, martensitisch < 850 N/mm²	Ferritic and martensitic < 850 N/mm²	< 250	< 850		O E
		24	Ferritisch, martensitisch > 850 - < 1150 N/mm²	Ferritic and martensitic > 850 - < 1150 N/mm²	> 250	> 850		O E
30	Guss Cast iron	31	Grauguss	Cast iron	< 250	< 850		O E
		32	Kugelgraphitguss, Temperguss	Spheroidal graphite + malleable cast iron	< 250	< 850		O E
40	Titan Titanium	41	Reintitan	Pure titanium	< 250	< 850		O E
		42	Titanlegierung	Titanium alloys	> 250	> 850		O E
50	Nickel Nickel	51	Nickellegierung 1 ≤ 850 N/mm²	Nickel alloys 1 ≤ 850 N/mm²	< 250	< 850		O E
		52	Nickellegierung 2 > 850 - ≤ 1150 N/mm²	Nickel alloys 2 > 850 - ≤ 1150 N/mm²	> 250	> 850		O E
		53	Nickellegierung 3 > 1150 - ≤ 1600 N/mm²	Nickel alloys 3 > 1150 - ≤ 1600 N/mm²	> 340	> 1150		O E
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		O E
		63	Messing (langspanend)	Long chip brass	< 200	< 700		O E
70	Aluminium Magnesium Aluminium Magnesium	71	Al unlegiert	Al unalloyed	< 100	< 350		O E
		72	Al legiert Si < 1.5 %	Al alloyed Si < 1.5 %	< 150	< 500		O E
		73	Al legiert Si > 1.5 % - < 10 %	Al alloyed Si > 1.5 % - < 10 %	< 120	< 400		O E
		74	Al legiert Si > 10 %, Mg-Legierungen	Al alloyed Si > 10 %, Mg-alloys	< 120	< 400		O E
80	Kunststoff Plastic compounds	81	Thermoplaste	Thermoplastics	-	-		E
		82	Duroplaste	Duroplastics	-	-		E
		83	Faserverstärkte Kunststoffe	Glass fibre reinforced plastics	-	-		E
90	Edelmetalle Precious metals	91	Gelbgold	Yellow gold	-	-		O E
		92	Rotgold	Red gold	-	-		O E
		93	Weissgold	White gold	-	-		O E
		94	Silber	Silver	-	-		O E

O Optimal mit Schneidöl / Optimal with cutting oil

O Geeignet mit Schneidöl / Suitable with cutting oil

E Optimal mit Emulsion / Optimal with emulsion

E Geeignet mit Emulsion / Suitable with emulsion

Vc (m/min)		ZBGF		
		ZBGF6065VS	ZBGF6067VS	
				
		VS	VS	
Standard Standard	Beschichtet Coated	Vorschub fz (mm/Zahn)	Milling fz (mm/tooth	
	50-100	0.02-0.06		11
	50-100	0.01-0.05		12
	50-100	0.01-0.05		13
	50-100	0.01-0.05		14
	40-80	0.01-0.05		15
	30-60	0.008-0.04		16
	30-60	0.006-0.025		17
				18
	40-80	0.01-0.04		21
	30-50	0.01-0.04		22
	30-60	0.01-0.04		23
	30-50	0.01-0.03		24
	70-140	0.01-0.05		31
	50-100	0.01-0.05		32
	30-50	0.01-0.04		41
	30-50	0.01-0.04		42
	40-60	0.01-0.03		51
	30-50	0.01-0.03		52
	30-50	0.005-0.03		53
				61
	100-200	0.01-0.05		62
	100-200	0.01-0.05		63
	100-200	0.01-0.05		71
	100-200	0.01-0.05		72
	100-200	0.01-0.05		73
	70-140	0.01-0.05		74
	80-180	0.05-0.10		81
	80-180	0.02-0.08		82
	50-150	0.02-0.10		83
	80-120	0.02-0.08		91
	50-100	0.01-0.05		92
	40-80	0.01-0.04		93
	50-100	0.01-0.05		94

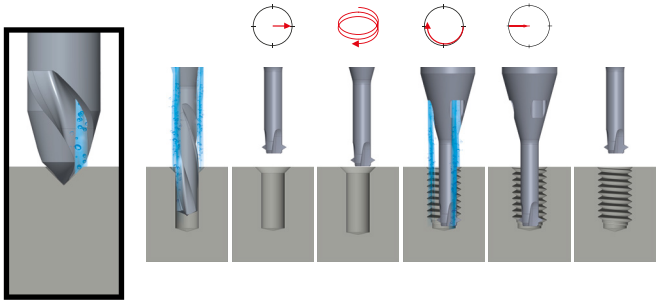
A ***Optimal mit Luft***
Optimal with air

A ***Geeignet mit Luft***
Suitable with air

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

ANWENDUNGSTABELLE C315VS — APPLICATION CHART C315VS

Programmierzyklus für Zentrierbohrer C315VS
Programming cycle for spotting drills C315VS



Anwendungstabelle für Zentrierbohrer — Application chart for spotting drills

	Werkstoff-Gruppen Material groups		Werkstoffbezeichnung	Material designation	Härte Hardness (HB)	Festigkeit Tensile strength Rm (N/mm²)	Kühlung Lubricant: Standard	Kühlung Lubricant: Beschichtet Coated
10	Stahl Steels	11	Automatenstahl	Free-cutting steels	< 200	< 700		O E
		12	Baustahl, Einsatzstahl	Structural, cementation steels	< 200	< 700		O E
		13	Kohlenstoffstahl	Carbon steels	< 300	< 1000		O E
		14	Stahl legiert < 850 N/mm²	Alloy steels < 850 N/mm²	< 250	< 850		O E
		15	Stahl legiert / vergütet > 850 - < 1150 N/mm²	Alloy steels hard. / temp. > 850 - < 1150 N/mm²	> 250	> 850		O E
		16	Hochfester Stahl ≤ 44 HRC	High tensile alloy steels ≤ 44 HRC	> 250	> 850		O E
		17	Stahl vergütet > 44 - ≤ 54 HRC	Alloy steels tempered > 44 - ≤ 54 HRC	> 410	> 1400		O E
		18	Stahl gehärtet > 54 - ≤ 63 HRC	Alloy steels hardened > 54 - ≤ 63 HRC	> 560	> 1980		
20	Rostfreier Stahl Stainless steels	21	Rostfreier Stahl, geschwefelt	Free machining stainless steels	< 250	< 850		O E
		22	Austenitisch	Austenitic stainless steels	< 250	< 850		O E
		23	Ferritisch, martensitisch < 850 N/mm²	Ferritic and martensitic < 850 N/mm²	< 250	< 850		O E
		24	Ferritisch, martensitisch > 850 - < 1150 N/mm²	Ferritic and martensitic > 850 - < 1150 N/mm²	> 250	> 850		O E
30	Guss Cast iron	31	Grauguss	Cast iron	< 250	< 850		O E
		32	Kugelgraphitguss, Temperguss	Spheroidal graphite + malleable cast iron	< 250	< 850		O E
40	Titan Titanium	41	Reintitan	Pure titanium	< 250	< 850		O E
		42	Titanlegierung	Titanium alloys	> 250	> 850		O E
50	Nickel Nickel	51	Nickellegierung 1 ≤ 850 N/mm²	Nickel alloys 1 ≤ 850 N/mm²	< 250	< 850		O E
		52	Nickellegierung 2 > 850 - ≤ 1150 N/mm²	Nickel alloys 2 > 850 - ≤ 1150 N/mm²	> 250	> 850		O E
		53	Nickellegierung 3 > 1150 - ≤ 1600 N/mm²	Nickel alloys 3 > 1150 - ≤ 1600 N/mm²	> 340	> 1150		O E
60	Kupfer Copper	61	Reinkupfer (Elektrolytkupfer)	Pure copper (electrolytic copper)	< 120	< 400		O E
		62	Messing, Bronze, Rotguss (kurzspanend)	Short chip brass, phosphor bronze, gun metal	< 200	< 700		O E
		63	Messing (langspanend)	Long chip brass	< 200	< 700		O E
70	Aluminium Magnesium Aluminium Magnesium	71	Al unlegiert	Al unalloyed	< 100	< 350		O E
		72	Al legiert Si < 1.5 %	Al alloyed Si < 1.5 %	< 150	< 500		O E
		73	Al legiert Si > 1.5 % - < 10 %	Al alloyed Si > 1.5 % - < 10 %	< 120	< 400		O E
		74	Al legiert Si > 10 %, Mg-Legierungen	Al alloyed Si > 10 %, Mg-alloys	< 120	< 400		O E
80	Kunststoff Plastic compounds	81	Thermoplaste	Thermoplastics	-	-		E
		82	Duroplaste	Duroplastics	-	-		E
		83	Faserverstärkte Kunststoffe	Glass fibre reinforced plastics	-	-		E
90	Edelmetalle Precious metals	91	Gelbgold	Yellow gold	-	-		O E
		92	Rotgold	Red gold	-	-		O E
		93	Weissgold	White gold	-	-		O E
		94	Silber	Silver	-	-		O E

O Optimal mit Schneidöl / Optimal with cutting oil

O Geeignet mit Schneidöl / Suitable with cutting oil

E Optimal mit Emulsion / Optimal with emulsion

E Geeignet mit Emulsion / Suitable with emulsion

C315VS

Vc (m/min)		Vorschub f (mm/U) / Feed rate f (mm/rev.)						
Standard Standard	Beschichtet Coated	Ø 1.40	Ø 2.00	Ø 3.00	Ø 4.00	Ø 6.00	Ø 8.00	
	120	0.05	0.08	0.10	0.12	0.15	0.20	11
	120	0.05	0.08	0.10	0.12	0.15	0.20	12
	120	0.05	0.08	0.10	0.12	0.15	0.20	13
	80	0.05	0.08	0.10	0.12	0.15	0.20	14
	60	0.03	0.04	0.06	0.08	0.12	0.18	15
	40	0.02	0.03	0.04	0.05	0.06	0.07	16
	40	0.02	0.03	0.04	0.05	0.06	0.07	17
								18
	60	0.03	0.04	0.06	0.08	0.12	0.18	21
	50	0.03	0.04	0.06	0.07	0.09	0.11	22
	50	0.03	0.04	0.06	0.07	0.09	0.11	23
	50	0.03	0.04	0.06	0.07	0.09	0.11	24
	100	0.04	0.05	0.07	0.09	0.11	0.15	31
	100	0.04	0.05	0.07	0.09	0.11	0.15	32
	25	0.03	0.04	0.06	0.07	0.09	0.11	41
	25	0.04	0.07	0.09	0.11	0.14	0.18	42
	25	0.025	0.03	0.04	0.05	0.07	0.09	51
	20	0.025	0.03	0.04	0.05	0.07	0.09	52
	10	0.025	0.03	0.04	0.05	0.07	0.09	53
	100	0.06	0.09	0.11	0.13	0.18	0.23	61
	100	0.06	0.09	0.11	0.13	0.16	0.18	62
	80	0.06	0.09	0.11	0.13	0.16	0.18	63
	150	0.06	0.09	0.11	0.13	0.18	0.23	71
	150	0.06	0.09	0.11	0.13	0.18	0.23	72
	100	0.06	0.09	0.11	0.13	0.18	0.23	73
	100	0.06	0.09	0.11	0.13	0.18	0.23	74
	200	0.08	0.11	0.13	0.15	0.20	0.25	81
	200	0.08	0.11	0.13	0.15	0.20	0.25	82
	100	0.08	0.11	0.13	0.15	0.20	0.25	83
	200	0.08	0.11	0.13	0.15	0.20	0.25	91
	150	0.08	0.11	0.13	0.15	0.20	0.25	92
	100	0.08	0.11	0.13	0.15	0.20	0.25	93
	100	0.08	0.11	0.13	0.15	0.20	0.25	94

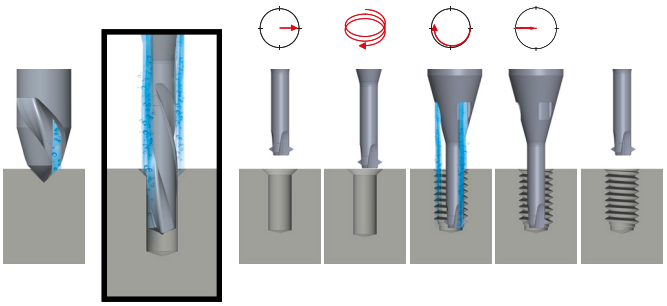
A ***Optimal mit Luft***
Optimal with air

A ***Geeignet mit Luft***
Suitable with air

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

ANWENDUNGSTABELLE FZ315VS — APPLICATION CHART FZ315VS

Programmierzyklus für Spiralbohrer FZ315VS
Programming cycle for twist drills FZ315VS



Anwendungstabelle für Spiralbohrer

Application chart for twist drills

	Werkstoff-Gruppen Material groups		Werkstoffbezeichnung	Material designation	Härte Hardness (HB)	Festigkeit Tensile strength Rm (N/mm²)	Kühlung Lubricant	
							Standard Standard	Beschichtet Coated
10	Stahl Steels	11	Automatenstahl	Free-cutting steels	< 200	< 700		O E
		12	Baustahl, Einsatzstahl	Structural, cementation steels	< 200	< 700		O E
		13	Kohlenstoffstahl	Carbon steels	< 300	< 1000		O E
		14	Stahl legiert < 850 N/mm²	Alloy steels < 850 N/mm²	< 250	< 850		O E
		15	Stahl legiert / vergütet > 850 - < 1150 N/mm²	Alloy steels hard. / temp. > 850 - < 1150 N/mm²	> 250	> 850		O E
		16	Hochfester Stahl ≤ 44 HRC	High tensile alloy steels ≤ 44 HRC	> 250	> 850		O E
		17	Stahl vergütet > 44 - ≤ 54 HRC	Alloy steels tempered > 44 - ≤ 54 HRC	> 410	> 1400		O E
		18	Stahl gehärtet > 54 - ≤ 63 HRC	Alloy steels hardened > 54 - ≤ 63 HRC	> 560	> 1980		
20	Rostfreier Stahl Stainless steels	21	Rostfreier Stahl, geschwefelt	Free machining stainless steels	< 250	< 850		O E
		22	Austenitisch	Austenitic stainless steels	< 250	< 850		O E
		23	Ferritisch, martensitisch < 850 N/mm²	Ferritic and martensitic < 850 N/mm²	< 250	< 850		O E
		24	Ferritisch, martensitisch > 850 - < 1150 N/mm²	Ferritic and martensitic > 850 - < 1150 N/mm²	> 250	> 850		O E
30	Guss Cast iron	31	Grauguss	Cast iron	< 250	< 850		O E
		32	Kugelgraphitguss, Temperguss	Spheroidal graphite + malleable cast iron	< 250	< 850		O E
40	Titan Titanium	41	Reintitan	Pure titanium	< 250	< 850		O E
		42	Titanlegierung	Titanium alloys	> 250	> 850		O E
50	Nickel Nickel	51	Nickellegierung 1 ≤ 850 N/mm²	Nickel alloys 1 ≤ 850 N/mm²	< 250	< 850		O E
		52	Nickellegierung 2 > 850 - ≤ 1150 N/mm²	Nickel alloys 2 > 850 - ≤ 1150 N/mm²	> 250	> 850		O E
		53	Nickellegierung 3 > 1150 - ≤ 1600 N/mm²	Nickel alloys 3 > 1150 - ≤ 1600 N/mm²	> 340	> 1150		O E
60	Kupfer Copper	61	Reinkupfer (Elektrolytkupfer)	Pure copper (electrolytic copper)	< 120	< 400		O E
		62	Messing, Bronze, Rotguss (kurzspanend)	Short chip brass, phosphor bronze, gun metal	< 200	< 700		O E
		63	Messing (langspanend)	Long chip brass	< 200	< 700		O E
70	Aluminium Magnesium Aluminium Magnesium	71	Al unlegiert	Al unalloyed	< 100	< 350		O E
		72	Al legiert Si < 1.5 %	Al alloyed Si < 1.5 %	< 150	< 500		O E
		73	Al legiert Si > 1.5 % - < 10 %	Al alloyed Si > 1.5 % - < 10 %	< 120	< 400		O E
		74	Al legiert Si > 10 %, Mg-Legierungen	Al alloyed Si > 10 %, Mg-alloys	< 120	< 400		O E
80	Kunststoff Plastic compounds	81	Thermoplaste	Thermoplastics	-	-		E
		82	Duroplaste	Duroplastics	-	-		E
		83	Faserverstärkte Kunststoffe	Glass fibre reinforced plastics	-	-		E
90	Edelmetalle Precious metals	91	Gelbgold	Yellow gold	-	-		O E
		92	Rotgold	Red gold	-	-		O E
		93	Weissgold	White gold	-	-		O E
		94	Silber	Silver	-	-		O E

O Optimal mit Schneidöl / Optimal with cutting oil

O Geeignet mit Schneidöl / Suitable with cutting oil

E Optimal mit Emulsion / Optimal with emulsion

E Geeignet mit Emulsion / Suitable with emulsion

	FZ315VS								FZ315VS				
Vc (m/min) Ø 0.58 - 2.0		Vorschub f (mm/U) / Feed rate f (mm/rev.)						Vc (m/min) Ø 2.01 - 5.4		Vorschub f (mm/U) / Feed rate f (mm/rev.)				
Standard Standard	Beschichtet Coated	Ø0.58-0.82	Ø0.83-1.07	Ø1.08-1.46	Ø1.47-2.0	Q1	Qx	Standard Standard	Beschichtet Coated	Ø2.01-3.05	Ø3.06-4.5	Ø4.51-5.4	Qx	
	40-60	0.02-0.035	0.03-0.045	0.04-0.055	0.05-0.065	1xd$_1$-4xd$_1$	1xd$_1$-2xd$_1$		80-110	0.07-0.12	0.12-0.18	0.18-0.23		11
	40-60	0.02-0.035	0.03-0.045	0.04-0.055	0.05-0.065	1xd$_1$-4xd$_1$	1xd$_1$-2xd$_1$		80-110	0.07-0.12	0.12-0.17	0.17-0.22		12
	35-55	0.015-0.025	0.025-0.035	0.035-0.045	0.045-0.055	1xd$_1$-4xd$_1$	1xd$_1$-2xd$_1$		70-100	0.07-0.12	0.12-0.17	0.17-0.22		13
	35-55	0.015-0.025	0.025-0.035	0.035-0.045	0.045-0.055	1xd$_1$-4xd$_1$	1xd$_1$-2xd$_1$		70-100	0.07-0.12	0.12-0.17	0.17-0.22		14
	35-55	0.015-0.025	0.025-0.035	0.035-0.045	0.045-0.055	1xd$_1$-4xd$_1$	1xd$_1$-2xd$_1$		70-100	0.07-0.12	0.12-0.17	0.17-0.22		15
	35-55	0.015-0.025	0.025-0.035	0.035-0.045	0.045-0.055	1xd$_1$-4xd$_1$	1xd$_1$-2xd$_1$		70-100	0.07-0.10	0.10-0.14	0.14-0.17		16
	30-45	0.015-0.025	0.025-0.035	0.035-0.045	0.045-0.055	1xd$_1$-4xd$_1$	1xd$_1$-2xd$_1$		60-80	0.07-0.10	0.10-0.15	0.14-0.18		17
														18
	30-45	0.015-0.025	0.025-0.035	0.035-0.045	0.045-0.055	1xd$_1$-4xd$_1$	1xd$_1$-2xd$_1$		60-80	0.045-0.055	0.055-0.07	0.07-0.10		21
	30-45	0.015-0.025	0.025-0.035	0.035-0.045	0.045-0.055	1xd$_1$-4xd1	1xd$_1$-2xd$_1$		60-80	0.045-0.055	0.055-0.07	0.07-0.10		22
	35-50	0.02-0.025	0.025-0.035	0.04-0.05	0.05-0.065	1xd$_1$-4xd$_1$	1xd$_1$-2xd$_1$		60-80	0.05-0.065	0.05-0.065	0.06-0.09		23
	35-50	0.02-0.025	0.025-0.035	0.04-0.05	0.05-0.065	1xd$_1$-4xd$_1$	1xd$_1$-2xd$_1$		60-80	0.05-0.065	0.05-0.065	0.06-0.09		24
	50-80	0.025-0.045	0.045-0.065	0.065-0.085	0.085-0.10	4xd$_1$-8xd$_1$	4xd$_1$		90-130	0.10-0.15	0.15-0.20	0.20-0.25		31
	40-70	0.025-0.045	0.045-0.065	0.065-0.085	0.085-0.10	4xd$_1$-8xd$_1$	4xd$_1$		80-120	0.10-0.14	0.14-0.18	0.18-0.23		32
	15-25	0.005-0.02	0.015-0.045	0.04-0.06	0.055-0.07	1/2xd$_1$-1xd$_1$	1/4xd$_1$-1/2xd$_1$		30-40	0.055-0.07	0.055-0.07	0.055-0.07	1/3xd$_1$-1/2xd$_1$	41
	15-25	0.005-0.02	0.015-0.045	0.04-0.06	0.055-0.07	1/2xd$_1$-1xd$_1$	1/4xd$_1$-1/2xd$_1$		30-40	0.055-0.07	0.055-0.07	0.055-0.07	1/3xd$_1$-1/2xd$_1$	42
	15-25	0.005-0.02	0.02-0.025	0.025-0.035	0.035-0.05	1/2xd$_1$-1xd$_1$	1/2xd$_1$		30-40	0.035-0.05	0.035-0.05	0.05-0.08		51
	15-25	0.015-0.02	0.02-0.025	0.025-0.035	0.035-0.05	1/2xd$_1$-1xd$_1$	1/2xd$_1$		30-40	0.035-0.05	0.035-0.05	0.05-0.08		52
	15-25	0.005-0.01	0.01-0.02	0.02-0.03	0.03-0.04	1/2xd$_1$-1xd$_1$	1/2xd$_1$		30-40	0.03-0.04	0.03-0.04	0.04-0.06		53
	50-80	0.05-0.08	0.06-0.10	0.08-0.12	0.12-0.15	4xd$_1$-8xd$_1$	4xd$_1$		130-180	0.12-0.15	0.15-0.20	0.20-0.25		61
	50-80	0.05-0.08	0.06-0.10	0.08-0.12	0.12-0.15	4xd$_1$-8xd$_1$	4xd$_1$		130-180	0.12-0.15	0.15-0.20	0.20-0.25		62
	50-80	0.05-0.08	0.06-0.10	0.08-0.12	0.12-0.15	4xd$_1$-8xd$_1$	4xd$_1$		80-110	0.12-0.15	0.14-0.18	0.18-0.23		63
	50-80	0.05-0.08	0.06-0.10	0.08-0.12	0.12-0.15	2xd$_1$-3xd$_1$	3xd$_1$		130-180	0.12-0.15	0.15-0.20	0.20-0.25		71
	50-80	0.05-0.08	0.06-0.10	0.08-0.12	0.12-0.15	2xd$_1$-3xd$_1$	3xd$_1$		130-180	0.12-0.15	0.15-0.20	0.20-0.25		72
	50-80	0.05-0.08	0.06-0.10	0.08-0.12	0.12-0.15	2xd$_1$-3xd$_1$	3xd$_1$		100-130	0.12-0.15	0.14-0.18	0.18-0.23		73
	50-80	0.05-0.08	0.06-0.10	0.08-0.12	0.12-0.15	2xd$_1$-3xd$_1$	3xd$_1$		100-130	0.12-0.15	0.14-0.18	0.18-0.23		74
	50-80	0.05-0.08	0.06-0.10	0.08-0.12	0.12-0.15	4xd$_1$-8xd$_1$	4xd$_1$		130-180	0.12-0.15	0.15-0.20	0.20-0.25		81
	50-80	0.05-0.08	0.06-0.10	0.08-0.12	0.12-0.15	4xd$_1$-8xd$_1$	4xd$_1$		130-180	0.12-0.15	0.15-0.20	0.20-0.25		82
	40-60	0.02-0.035	0.03-0.045	0.04-0.055	0.05-0.065	2xd$_1$-3xd$_1$	3xd$_1$		80-120	0.07-0.12	0.12-0.18	0.18-0.23		83
	50-80	0.02-0.035	0.03-0.045	0.04-0.055	0.05-0.065	2xd$_1$-3xd$_1$	3xd$_1$		130-180	0.07-0.12	0.12-0.17	0.17-0.22		91
	50-80	0.02-0.035	0.03-0.045	0.04-0.055	0.05-0.065	2xd$_1$-3xd$_1$	3xd$_1$		130-180	0.07-0.12	0.12-0.17	0.17-0.22		92
	40-60	0.02-0.035	0.03-0.045	0.04-0.055	0.05-0.065	2xd$_1$-3xd$_1$	3xd$_1$		80-110	0.07-0.12	0.12-0.17	0.17-0.22		93
	40-60	0.02-0.035	0.03-0.045	0.04-0.055	0.05-0.065	2xd$_1$-3xd$_1$	3xd$_1$		80-110	0.07-0.12	0.12-0.17	0.17-0.22		94


A ***Optimal mit Luft***
Optimal with air

A ***Geeignet mit Luft***
Suitable with air

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

ANWENDUNGSTABELLE F286VS — APPLICATION CHART F286VS

Anwendungstabelle für Spiralbohrer

Application chart for twist drills

	Werkstoff-Gruppen Material groups		Werkstoffbezeichnung	Material designation	Härte Hardness (HB)	Festigkeit Tensile strength Rm (N/mm²)	Kühlung Lubricant Standard	 Beschichtet Coated
10	Stahl Steels	11	Automatenstahl	Free-cutting steels	< 200	< 700		O E
		12	Baustahl, Einsatzstahl	Structural, cementation steels	< 200	< 700		O E
		13	Kohlenstoffstahl	Carbon steels	< 300	< 1000		O E
		14	Stahl legiert < 850 N/mm²	Alloy steels < 850 N/mm²	< 250	< 850		O E
		15	Stahl legiert / vergütet > 850 - < 1150 N/mm²	Alloy steels hard. / temp. > 850 - < 1150 N/mm²	> 250	> 850		O E
		16	Hochfester Stahl ≤ 44 HRC	High tensile alloy steels ≤ 44 HRC	> 250	> 850		
		17	Stahl vergütet > 44 - ≤ 54 HRC	Alloy steels tempered > 44 - ≤ 54 HRC	> 410	> 1400		
		18	Stahl gehärtet > 54 - ≤ 63 HRC	Alloy steels hardened > 54 - ≤ 63 HRC	> 560	> 1980		
20	Rostfreier Stahl Stainless steels	21	Rostfreier Stahl, geschwefelt	Free machining stainless steels	< 250	< 850		O E
		22	Austenitisch	Austenitic stainless steels	< 250	< 850		O E
		23	Ferritisch, martensitisch < 850 N/mm²	Ferritic and martensitic < 850 N/mm²	< 250	< 850		O E
		24	Ferritisch, martensitisch > 850 - < 1150 N/mm²	Ferritic and martensitic > 850 - < 1150 N/mm²	> 250	> 850		O E
30	Guss Cast iron	31	Grauguss	Cast iron	< 250	< 850		
		32	Kugelgraphitguss, Temperguss	Spheroidal graphite + malleable cast iron	< 250	< 850		
40	Titan Titanium	41	Reintitan	Pure titanium	< 250	< 850		O E
		42	Titanlegierung	Titanium alloys	> 250	> 850		
50	Nickel Nickel	51	Nickellegierung 1 ≤ 850 N/mm²	Nickel alloys 1 ≤ 850 N/mm²	< 250	< 850		O E
		52	Nickellegierung 2 > 850 - ≤ 1150 N/mm²	Nickel alloys 2 > 850 - ≤ 1150 N/mm²	> 250	> 850		
		53	Nickellegierung 3 > 1150 - ≤ 1600 N/mm²	Nickel alloys 3 > 1150 - ≤ 1600 N/mm²	> 340	> 1150		
60	Kupfer Copper	61	Reinkupfer (Elektrolytkupfer)	Pure copper (electrolytic copper)	< 120	< 400		O E
		62	Messing, Bronze, Rotguss (kurzspanend)	Short chip brass, phosphor bronze, gun metal	< 200	< 700		
		63	Messing (langspanend)	Long chip brass	< 200	< 700		O E
70	Aluminium Magnesium Aluminium Magnesium	71	Al unlegiert	Al unalloyed	< 100	< 350		O E
		72	Al legiert Si < 1.5 %	Al alloyed Si < 1.5 %	< 150	< 500		O E
		73	Al legiert Si > 1.5 % - < 10 %	Al alloyed Si > 1.5 % - < 10 %	< 120	< 400		O E
		74	Al legiert Si > 10 %, Mg-Legierungen	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	Edelmetalle Precious metals	91	Gelbgold	Yellow gold	-	-		
		92	Rotgold	Red gold	-	-		
		93	Weissgold	White gold	-	-		O E
		94	Silber	Silver	-	-		O E

O *Optimal mit Schneidöl*
Optimal with cutting oil

O *Geeignet mit Schneidöl*
Suitable with cutting oil

E *Optimal mit Emulsion*
Optimal with emulsion

E *Geeignet mit Emulsion*
Suitable with emulsion

F286VS

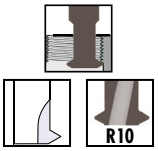
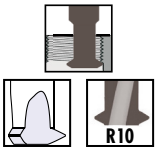
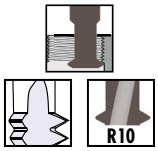
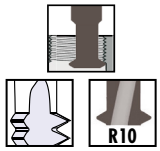
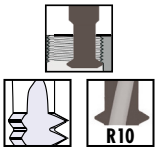
Vc (m/min)		Vorschub f (mm/U) / Feed rate f (mm/rev.)						
Standard Standard	Beschichtet Coated	Ø 0.8 - 1.2	Ø 1.21 - 3.0	Ø 3.01 - 6.0	Ø 6.01 - 8.5	Ø 8.51 - 11.0	Ø 11.02 - 14.0	
	70-90	0.015-0.025	0.015-0.025	0.035-0.045	0.11-0.13	0.15-0.17	0.18-0.22	11
	70-90	0.10-0.20	0.015-0.025	0.035-0.045	0.11-0.13	0.15-0.17	0.18-0.22	12
	70-90	0.10-0.20	0.015-0.025	0.035-0.045	0.11-0.13	0.15-0.17	0.18-0.22	13
	70-90	0.10-0.20	0.015-0.025	0.035-0.045	0.11-0.13	0.15-0.17	0.18-0.22	14
	60-80	0.10-0.20	0.015-0.025	0.035-0.045	0.07-0.09	0.11-0.13	0.15-0.17	15
								16
								17
								18
	40-60	0.008-0.012	0.015-0.02	0.035-0.04	0.075-0.085	0.095-0.105	0.15-0.16	21
	40-60	0.008-0.012	0.015-0.02	0.035-0.04	0.075-0.085	0.095-0.105	0.15-0.16	22
	40-60	0.008-0.012	0.015-0.02	0.035-0.04	0.075-0.085	0.095-0.105	0.15-0.16	23
	40-60	0.008-0.012	0.015-0.02	0.035-0.04	0.075-0.085	0.095-0.105	0.15-0.16	24
								31
								32
	40-80	0.003-0.006	0.008-0.012	0.01-0.018	0.025-0.03	0.055-0.06	0.075-0.085	41
								42
	30-50	0.008-0.012	0.015-0.02	0.035-0.04	0.075-0.085	0.095-0.105	0.11-0.13	51
								52
								53
	70-150	0.15-0.25	0.035-0.045	0.055-0.065	0.11-0.13	0.15-0.17	0.18-0.22	61
								62
	70-150	0.15-0.25	0.035-0.045	0.055-0.065	0.11-0.13	0.15-0.17	0.18-0.22	63
	100-160	0.025-0.035	0.045-0.055	0.075-0.085	0.15-0.17	0.22-0.26	0.30-0.34	71
	100-160	0.025-0.035	0.045-0.055	0.075-0.085	0.15-0.17	0.22-0.26	0.30-0.34	72
	60-130	0.02-0.03	0.035-0.045	0.055-0.065	0.11-0.13	0.16-0.20	0.22-0.26	73
								74
								81
								82
								83
								91
								92
	40-60	0.008-0.012	0.015-0.02	0.035-0.04	0.075-0.085	0.095-0.105	0.15-0.16	93
	40-60	0.008-0.012	0.015-0.02	0.035-0.04	0.075-0.085	0.095-0.105	0.15-0.16	94

A ***Optimal mit Luft***
Optimal with air

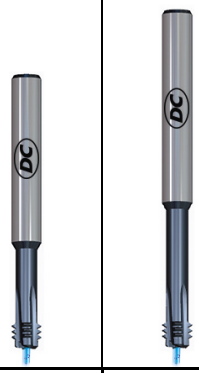
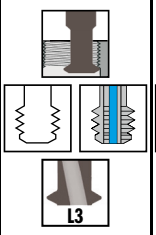
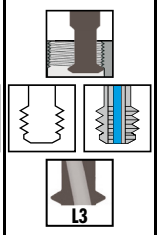
A ***Geeignet mit Luft***
Suitable with air

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

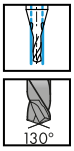
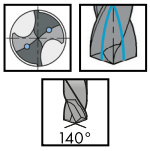
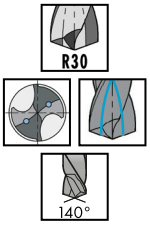
Inhaltsverzeichnis - VHM-Gewindewirbler Typ GW
Directory - Solid carbide thread whirl cutters type GW

		GW										
Typ **Type**		GW1116	GW1116VS	GW2016	GW2016VS	GW3016	GW3016VS	GW3016VX	GW3017	GW3017VS	GW3017VX	GW3019	GW3019VS
Beschichtung **Coating**			VS		VS		VS	VX		VS	VX		VS
													
Gewindelänge **Thread length**													
Merkmale **Characteristics**													
M	ISO DIN 14 ISO DIN 13	44	44	47	47	50	50	50	51	51	51	52	52
MF	ISO DIN 13					53	53	53	54	54	54	55	55
UNC	ASME B1.1					56	56	56	57	57	57	58	58
UNF	ASME B1.1					59	59	59	60	60	60	61	61
S	NIHS 06-10	45	45	48	48	62	62	62	63	63	63	64	64
SL	SL 15-01	46	46	49	49	62	62						

Inhaltsverzeichnis - VHM-Gewindewirbler Typ GWi - GWH, Zirkular-Bohrgewindefräser Typ ZBGF
Directory - Solid carbide thread whirl cutters type GWi - GWH, circular drill thread milling cutters type ZBGF

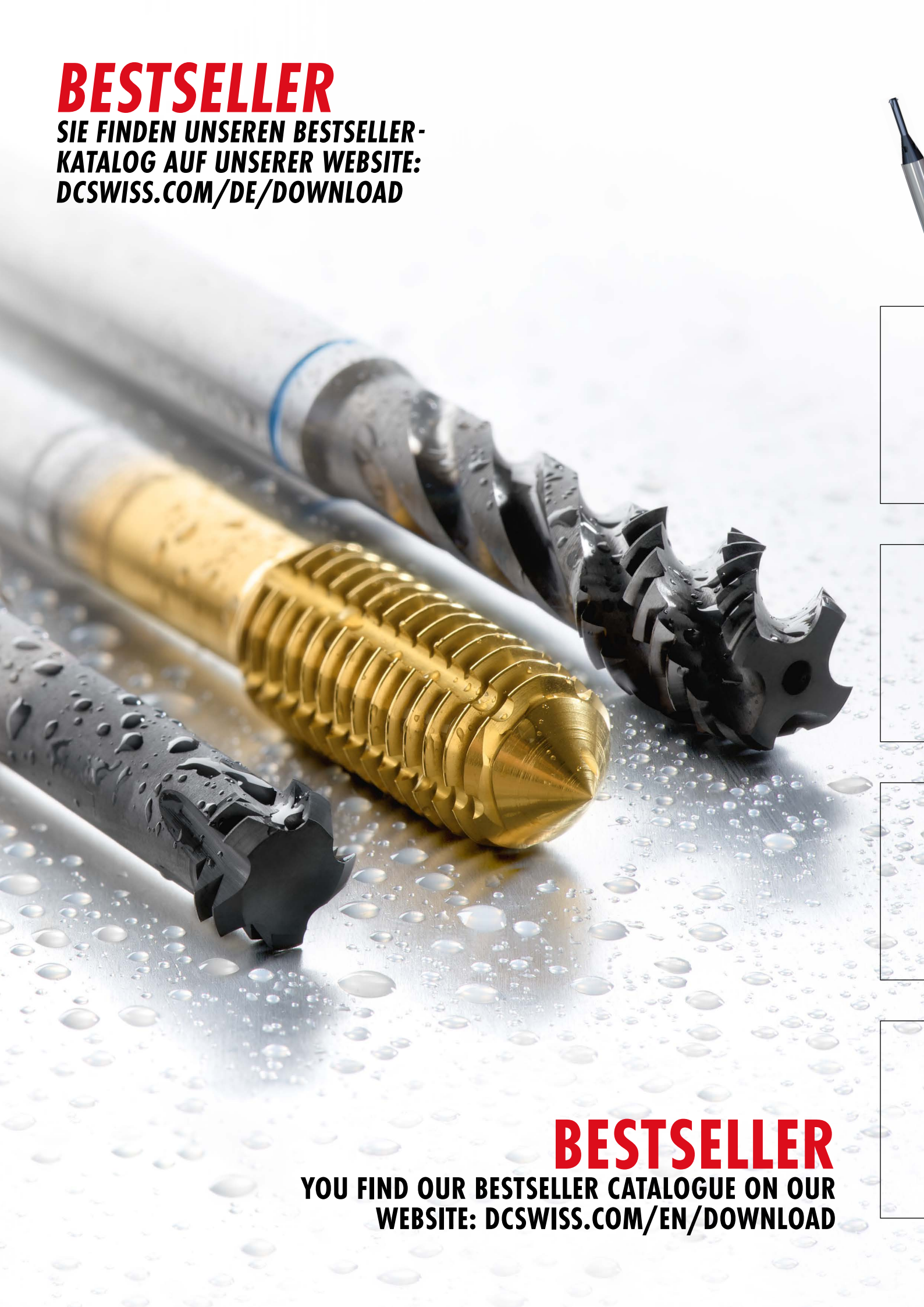
		GWi							GWH		ZBGF	
Typ **Type**		GWi3066VS	GWi3066VX	GWi3067VS	GWi3067VX	GWi3069VS	GWi5066VS	GWi5067VS	GWH3015VH	GWH3017VH	ZBGF6065VS	ZBGF6067VS
Beschichtung **Coating**		VS	VX	VS	VX	VS	VS	VS	VH	VH	VS	VS
												
Gewindelänge **Thread length**		 2.5 x D_1		 3 x D_1		 4 x D_1	 2.5 x D_1	 3 x D_1	 2 x D_1	 3 x D_1	 2 x D_1	 3 x D_1
Merkmale **Characteristics**		 R10		 R10		 R10	 R0	 R0	 R0	 R0	 L3	 L3
M	ISO DIN 14 ISO DIN 13	65	65	66	66	68	82	82	89	89	90	90
MJ	ISO 5855			67	67							
MF	ISO DIN 13	69	69	70	70	72						
MJF	ISO 5855			71	71							
UNC	ASME B1.1	73	73	74	74	76	83	83			91	91
UNJC	ISO 3161			75	75							
UNF	ASME B1.1	77	77	78	78	80	84	84			92	92
UNJF	ISO 3161			79	79							
S	NIHS 06-10	81	81	81	81		85					

Inhaltsverzeichnis - VHM-Zentrierbohrer Typ C, VHM-Spiralbohrer Typ FZ - F
Directory - Solid carbide spotting drills type C, solid carbide twist drills type FZ - F

	C	FZ		F
Typ **Type**	**C315VS**	**FZ315VS**	**FZ315VS**	**F286VS**
Beschichtung **Coating**	VS	VS	VS	VS
				
Bohrtiefe **Drilling depth**				
Merkmale **Characteristics**				
C315VS	86			
FZ315VS		87	87	
F286VS				88

BESTSELLER

SIE FINDEN UNSEREN BESTSELLER-KATALOG AUF UNSERER WEBSITE: DCSWISS.COM/DE/DOWNLOAD



BESTSELLER

YOU FIND OUR BESTSELLER CATALOGUE ON OUR WEBSITE: DCSWISS.COM/EN/DOWNLOAD

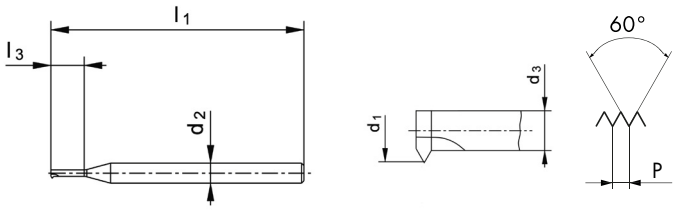
M ISO DIN 14 ISO DIN 13

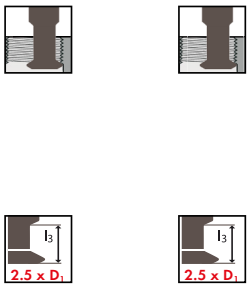
VHM CAR | < 3µm | DC | h5

GW

GW1116 | R10

GW1116VS | R10 | VS





Ø D_1 M	P mm	d_1 mm	l_1 mm	l_3 mm	d_2 h5 mm	d_3 mm			GW1116 ID	GW1116VS ID
0.3	0.08	0.21	39	0.9	3	0.1	1	0.23	● 194227	● 194245
0.35	0.09	0.25	39	1	3	0.13	1	0.28	● 194228	● 194246
0.4	0.1	0.29	39	1.2	3	0.15	1	0.32 [1]	● 194229	● 194247
0.5	0.125	0.36	39	1.5	3	0.19	1	0.41 [1]	● 194230	● 194248
0.6	0.15	0.43	39	1.7	3	0.23	1	0.5 [1]	● 194231	● 194249
0.7	0.175	0.5	39	2	3	0.27	1	0.58 [1]	● 194232	● 194250
0.8	0.2	0.57	39	2.3	3	0.31	1	0.66 [1]	● 194233	● 194251
0.9	0.225	0.64	39	2.6	3	0.34	1	0.74 [1]	● 194234	● 194252
1	0.25	0.71	39	2.9	3	0.38	1	0.75	● 194235	● 194253
1.2	0.25	0.91	39	3.4	3	0.58	1	0.95	● 194236	● 194254
1.4	0.3	1.06	39	3.9	3	0.66	1	1.1	● 194237	● 194255

[1] **4H5H → 4H6H =** +0.02mm

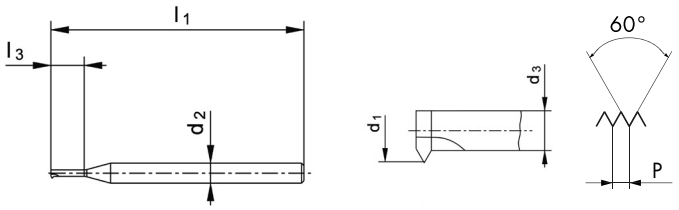
S NIHS 06-10

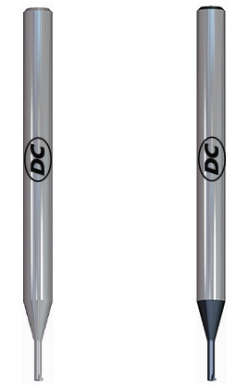
VHM CAR | < 3µm | DC | h5

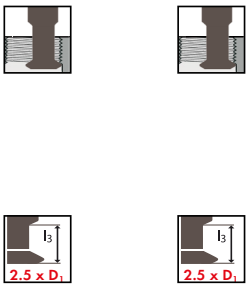
GW

GW1116 R10

GW1116VS R10 VS







Ø D_1 S	P mm	d_1 mm	l_1 mm	l_3 mm	d_2 h5 mm	d_3 mm			GW1116 ID	GW1116VS ID
0.3	0.08	0.21	39	0.9	3	0.1	1	0.23	166930	166940
0.35	0.09	0.25	39	1	3	0.13	1	0.28	194226	194244
0.4	0.1	0.29	39	1.2	3	0.15	1	0.32 [1]	166931	166941
0.5	0.125	0.36	39	1.5	3	0.19	1	0.41 [1]	166932	166942
0.6	0.15	0.43	39	1.7	3	0.23	1	0.5 [1]	166933	166943
0.7	0.175	0.5	39	2	3	0.27	1	0.58 [1]	166934	166944
0.8	0.2	0.57	39	2.3	3	0.31	1	0.66 [1]	166935	166945
0.9	0.225	0.64	39	2.6	3	0.34	1	0.74 [1]	166936	166946
1	0.25	0.71	39	2.9	3	0.38	1	0.82 [1]	166937	166947
1.2	0.25	0.91	39	3.4	3	0.58	1	1.02 [1]	166938	166948
1.4	0.3	1.06	39	3.9	3	0.66	1	1.18 [1]	166939	166949

[1] **4H5H → 4H6H =** +0.02mm

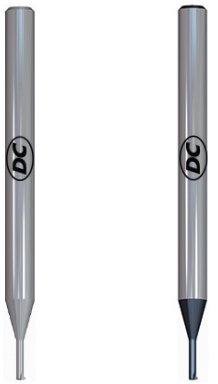
SL

SL 15-01

VHM CAR | < 3µm | DC | h5

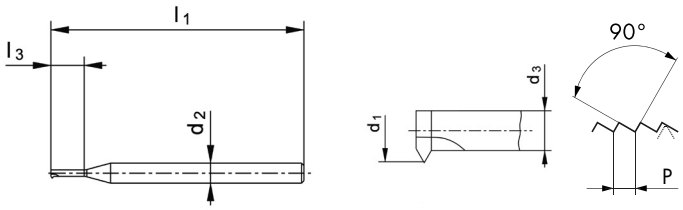
GW

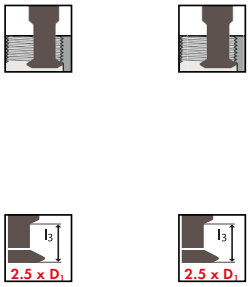
GW1116	GW1116VS		



GW1116

GW1116VS





Ø D_1 SL	P mm	d_1 mm	l_1 mm	l_3 mm	d_2 h5 mm	d_3 mm			ID	ID
0.3	0.06	0.23	39	0.9	3	0.15	1	0.27	600017	600023
0.35	0.06	0.28	39	1	3	0.2	1	0.32	600237	600243
0.4	0.08	0.31	39	1.2	3	0.2	1	0.36	600018	600024
0.5	0.1	0.39	39	1.4	3	0.25	1	0.46	600019	600025
0.6	0.125	0.46	39	1.7	3	0.29	1	0.55	600020	600026
0.7	0.15	0.53	39	2	3	0.32	1	0.64	600021	600027
0.8	0.15	0.63	39	2.2	3	0.42	1	0.74	600238	600244
0.9	0.175	0.7	39	2.5	3	0.46	1	0.83	600239	600245
1	0.2	0.77	39	2.8	3	0.49	1	0.92	600240	600246
1.2	0.2	0.97	39	3.3	3	0.69	1	1.12	600241	600247
1.4	0.25	1.11	39	3.9	3	0.76	1	1.3	600242	600248

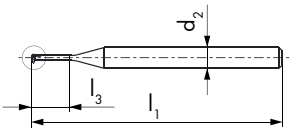
M ISO DIN 14 ISO DIN 13

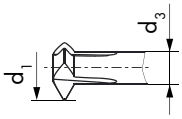
VHM CAR | < 3µm | DC | h5

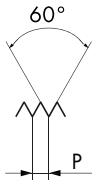
GW

GW2016

GW2016VS







Ø D_1 M	P mm	d_1 mm	l_1 mm	l_3 mm	d_2 h5 mm	d_3 mm			GW2016 ID	GW2016VS ID
0.5	0.125	0.36	39	1.5	3	0.19	3	0.41 [1]	194262	194275
0.6	0.15	0.43	39	1.7	3	0.22	3	0.5 [1]	194263	194276
0.7	0.175	0.5	39	2	3	0.26	3	0.58 [1]	194264	194277
0.8	0.2	0.57	39	2.3	3	0.29	3	0.66 [1]	166974	166993
0.9	0.225	0.64	39	2.6	3	0.33	3	0.74 [1]	166975	166994
1	0.25	0.71	39	2.9	3	0.36	3	0.75	166976	166995
1.2	0.25	0.91	39	3.4	3	0.56	3	0.95	166977	166996
1.4	0.3	1.06	39	3.9	3	0.64	3	1.1	166978	166997
1.6	0.35	1.2	39	4.5	3	0.71	3	1.25	166979	166998
1.8	0.35	1.4	39	5	3	0.91	3	1.45	166980	166999
2	0.4	1.54	39	5.6	3	0.98	3	1.6	166981	167000
2.3	0.4	1.84	39	6.3	3	1.28	3	1.9	194265	167399
2.5	0.45	1.98	39	6.9	3	1.35	3	2.05	166982	167001
2.6	0.45	2.08	39	7.1	3	1.45	3	2.15	194266	194278
3	0.5	2.43	51	8.4	5	1.73	4	2.5	166983	167002
3.5	0.6	2.81	51	9.9	5	1.97	4	2.9	166984	167003
4	0.7	3.2	51	11.3	5	2.22	4	3.3	166985	167004
5	0.8	4.08	51	14	5	2.96	4	4.2	166986	167005
6	1	4.85	51	16.8	5	3.45	4	5	166987	167006

[1] 4H5H → 4H6H = +0.02mm

S NIHS 06-10

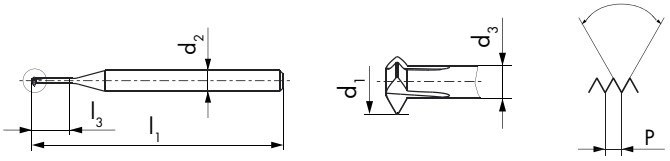
VHM CAR | < 3µm | DC | h5

GW

GW2016	GW2016VS		

GW2016 R10

GW2016VS R10 VS



Ø D_1 S	P mm	d_1 mm	l_1 mm	l_3 mm	d_2 h5 mm	d_3 mm			ID	ID
0.5	0.125	0.36	39	1.5	3	0.19	3	0.41 [1]	● 181410	● 181413
0.6	0.15	0.43	39	1.7	3	0.22	3	0.5 [1]	● 181374	● 180947
0.7	0.175	0.5	39	2	3	0.26	3	0.58 [1]	● 181375	● 181378
0.8	0.2	0.57	39	2.3	3	0.29	3	0.66 [1]	● 166969	● 166988
0.9	0.225	0.64	39	2.6	3	0.33	3	0.74 [1]	● 166970	● 166989
1	0.25	0.71	39	2.9	3	0.36	3	0.82 [1]	● 166971	● 166990
1.2	0.25	0.91	39	3.4	3	0.56	3	1.02 [1]	● 166972	● 166991
1.4	0.3	1.06	39	3.9	3	0.64	3	1.18 [1]	● 166973	● 166992

[1] **4H5H → 4H6H =** +0.02mm

SL SL 15-01

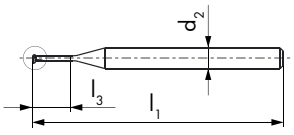
VHM CAR | < 3µm | DC | h5

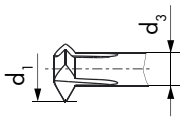
GW

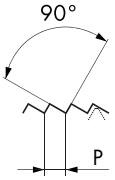
GW2016

GW2016VS









Ø D_1 SL	P mm	d_1 mm	l_1 mm	l_3 mm	d_2 h5 mm	d_3 mm			GW2016 ID	GW2016VS ID
0.5	0.1	0.39	39	1.4	3	0.25	3	0.46	600249	600257
0.6	0.125	0.46	39	1.7	3	0.29	3	0.55	600250	600258
0.7	0.15	0.53	39	2	3	0.32	3	0.64	600251	600259
0.8	0.15	0.63	39	2.2	3	0.42	3	0.74	600252	600260
0.9	0.175	0.7	39	2.5	3	0.46	3	0.83	600253	600261
1	0.2	0.77	39	2.8	3	0.49	3	0.92	600254	600262
1.2	0.2	0.97	39	3.3	3	0.69	3	1.12	600255	600263
1.4	0.25	1.11	39	3.9	3	0.76	3	1.3	600256	600264

M ISO DIN 14 ISO DIN 13

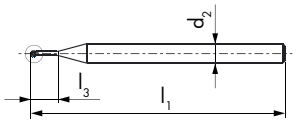
VHM CAR | < 3µm | DC | h5/h6

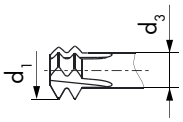
GW

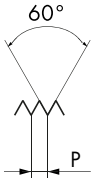
GW3016

GW3016VS

GW3016VX







GW3016	GW3016VS	GW3016VX
		
		
		

Ø D_1 M	P mm	d_1 mm	l_1 mm	l_3 mm	d_2 h5 mm	d_3 mm			ID	ID	ID
0.8	0.2	0.57	39	2.3	3	0.29	3	0.66 [1]	● 167021	● 167035	● 187261
0.9	0.225	0.64	39	2.6	3	0.33	3	0.74 [1]	● 167022	● 167036	● 187262
1	0.25	0.71	39	2.9	3	0.36	3	0.75	● 167023	● 167037	● 187263
1.2	0.25	0.91	39	3.4	3	0.56	3	0.95	● 167024	● 167038	● 187264
1.4	0.3	1.06	39	3.9	3	0.64	3	1.1	● 167025	● 167039	● 187265
1.6	0.35	1.2	39	4.5	3	0.71	3	1.25	● 167026	● 167040	● 187266
1.8	0.35	1.4	39	5	3	0.91	3	1.45	● 167027	● 167041	● 187267
2	0.4	1.54	39	5.6	3	0.98	3	1.6	● 167028	● 167042	● 187268
2.3	0.4	1.84	39	6.3	3	1.28	3	1.9	● 196140	● 167296	● 194310
2.5	0.45	1.98	39	6.9	3	1.35	3	2.05	● 167029	● 167043	● 187269
2.6	0.45	2.08	39	7.1	3	1.45	3	2.15	● 196141	● 194290	● 194311
3	0.5	2.43	51	8.4	5	1.73	4	2.5	● 167030	● 167044	● 187270
3.5	0.6	2.81	51	9.9	5	1.97	4	2.9	● 167031	● 167045	● 187271
4	0.7	3.2	51	11.3	5	2.22	4	3.3	● 167032	● 167046	● 187272
5	0.8	4.08	51	14	5	2.96	4	4.2	● 167033	● 167047	● 187273
6	1	4.85	51	16.8	5	3.45	4	5	● 167034	● 167048	● 187274
8	1.25	5.95	63	23	6 [2]	4.2	5	6.8	● 175229	● 175243	● 187275
10	1.5	7.95	67	28	8 [2]	5.85	5	8.5	● 175230	● 175244	● 187276
12	1.75	9.95	76	34	10 [2]	7.5	5	10.2	● 175231	● 175245	● 187277
14	2	10.95	95	44	12 [2]	8.15	5	12	● 196142	● 184748	● 187278
16	2	10.95	95	44	12 [2]	8.15	5	14	● 196143	● 186813	● 187279
18	2.5	13.95	105	55	14 [2]	10.45	6	15.5	● 196144	● 184503	● 187280
20	2.5	13.95	105	55	14 [2]	10.45	6	17.5	● 196145	● 186814	● 187281

[1] 4H5H → 4H6H = +0.02mm

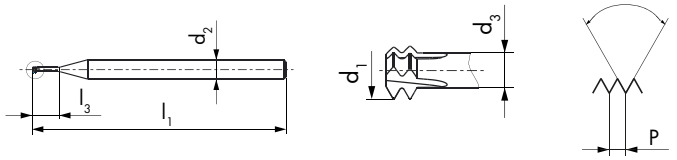
[2] Tol. h6

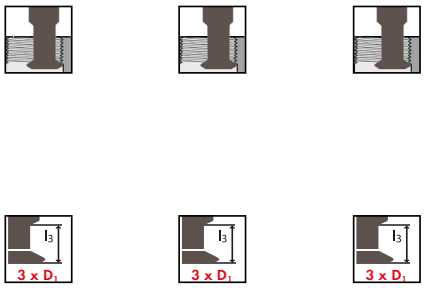
M ISO DIN 14 ISO DIN 13

VHM CAR | < 3µm | DC | h5/h6

GW

GW3017 | GW3017VS | GW3017VX





Ø D_1 M	P mm	d_1 mm	l_1 mm	l_3 mm	d_2 h5 mm	d_3 mm			ID	ID	ID
0.8	0.2	0.57	39	2.7	3	0.29	3	0.66 [1]	196172	186266	187389
0.9	0.225	0.64	39	3	3	0.33	3	0.74 [1]	196173	186267	187390
1	0.25	0.71	39	3.4	3	0.36	3	0.75	196189	186268	187391
1.2	0.25	0.91	39	4	3	0.56	3	0.95	196174	186269	187392
1.4	0.3	1.06	39	4.6	3	0.64	3	1.1	196175	186270	187393
1.6	0.35	1.2	39	5.3	3	0.71	3	1.25	196176	186271	187394
1.8	0.35	1.4	39	5.9	3	0.91	3	1.45	196177	186272	187395
2	0.4	1.54	39	6.6	3	0.98	3	1.6	183766	186273	187396
2.3	0.4	1.84	39	7.5	3	1.28	3	1.9	196190	194296	194317
2.5	0.45	1.98	39	8.1	3	1.35	3	2.05	196193	186274	187397
2.6	0.45	2.08	39	8.4	3	1.45	3	2.15	196194	194297	194318
3	0.5	2.43	51	9.9	5	1.73	4	2.5	196201	186275	187398
3.5	0.6	2.81	51	11.6	5	1.97	4	2.9	196199	186276	187399
4	0.7	3.2	51	13.3	5	2.22	4	3.3	196203	186277	187400
5	0.8	4.08	51	16.5	5	2.96	4	4.2	196205	186278	187401
6	1	4.85	51	19.8	5	3.45	4	5	196207	186279	187402
8	1.25	5.95	75	27	6 [2]	4.2	5	6.8	196209	186280	187403
10	1.5	7.95	83	33	8 [2]	5.85	5	8.5	196180	186281	187404
12	1.75	9.95	95	40	10 [2]	7.5	5	10.2	196182	186282	187405
14	2	10.95	120	52	12 [2]	8.15	5	12	196184	186283	187406
16	2	10.95	120	52	12 [2]	8.15	5	14	196186	186821	187407
18	2.5	13.95	135	65	14 [2]	10.45	6	15.5	196188	186284	187408
20	2.5	13.95	135	65	14 [2]	10.45	6	17.5	196196	186822	187409

[1] 4H5H → 4H6H = +0.02mm

[2] Tol. h6

M ISO DIN 14 ISO DIN 13

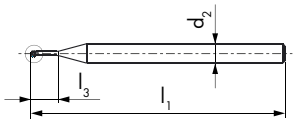
VHM CAR | < 3µm | DC | h5/h6

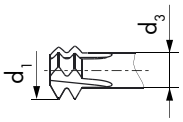
GW

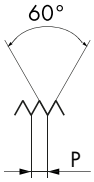
GW3019 | GW3019VS

GW3019 — R10

GW3019VS — R10 — VS







Ø D_1 M	P mm	d_1 mm	l_1 mm	l_3 mm	d_2 h5 mm	d_3 mm			ID	ID
0.8	0.2	0.57	39	3.5	3	0.29	3	0.66 [1]	● 167063	● 167077
0.9	0.225	0.64	39	3.9	3	0.33	3	0.74 [1]	● 167064	● 167078
1	0.25	0.71	39	4.4	3	0.36	3	0.75	● 167065	● 167079
1.2	0.25	0.91	39	5.2	3	0.56	3	0.95	● 167066	● 167080
1.4	0.3	1.06	39	6	3	0.64	3	1.1	● 167067	● 167081
1.6	0.35	1.2	39	6.9	3	0.71	3	1.25	● 167068	● 167082
1.8	0.35	1.4	39	7.7	3	0.91	3	1.45	● 167069	● 167083
2	0.4	1.54	39	8.6	3	0.98	3	1.6	● 167070	● 167084
2.3	0.4	1.84	39	9.8	3	1.28	3	1.9	● 196268	● 194303
2.5	0.45	1.98	39	10.6	3	1.35	3	2.05	● 167071	● 167085
2.6	0.45	2.08	39	11	3	1.45	3	2.15	● 196269	● 194304
3	0.5	2.43	51	12.9	5	1.73	4	2.5	● 167072	● 167086
3.5	0.6	2.81	51	15.1	5	1.97	4	2.9	● 167073	● 167087
4	0.7	3.2	51	17.3	5	2.22	4	3.3	● 167074	● 167088
5	0.8	4.08	51	21.5	5	2.96	4	4.2	● 167075	● 167089
6	1	4.85	51	25.8	5	3.45	4	5	● 167076	● 167090
8	1.25	5.95	75	35	6 [2]	4.2	5	6.8	● 175258	● 175274
10	1.5	7.95	83	43	8 [2]	5.85	5	8.5	● 175259	● 175275
12	1.75	9.95	95	52	10 [2]	7.5	5	10.2	● 175260	● 175276
14	2	10.95	120	68	12 [2]	8.15	5	12	● 196243	● 184751
16	2	10.95	120	68	12 [2]	8.15	5	14	● 196244	● 186829
18	2.5	13.95	135	85	14 [2]	10.45	6	15.5	● 196245	● 184754
20	2.5	13.95	135	85	14 [2]	10.45	6	17.5	● 196246	● 186830

[1] **4H5H → 4H6H =** +0.02mm

[2] **Tol. h6**

MF ISO DIN 13

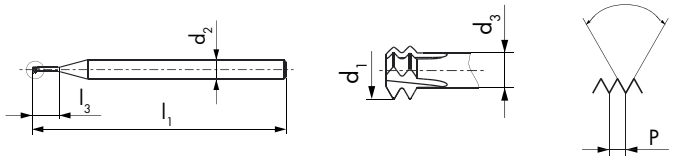
VHM CAR | < 3µm | DC | h5/h6

GW

GW3016 — R10

GW3016VS — R10 — VS

GW3016VX — R10 — VX



Ø D_1 MF	P mm	d_1 mm	l_1 mm	l_3 mm	d_2 h5 mm	d_3 mm			GW3016 ID	GW3016VS ID	GW3016VX ID
2	0.2	1.77	39	5.3	3	1.49	3	1.8	175225	171442	187282
2	0.25	1.71	39	5.4	3	1.36	3	1.75	196146	186209	187283
2.5	0.2	2.27	39	6.6	3	1.99	3	2.3	175226	175241	187284
2.5	0.25	2.21	39	6.6	3	1.86	3	2.25	175227	167299	187285
3	0.35	2.6	51	8.2	5	2.11	4	2.65	175228	175242	187286
4	0.5	3.43	51	10.9	5	2.73	4	3.5	196147	184572	187287
5	0.5	4.43	51	13.4	5	3.73	4	4.5	196148	186210	187288
6	0.75	4.95	51	16.4	5	3.9	4	5.25	196149	186211	187289
8	1	5.95	63	22	6 [1]	4.55	5	7	196150	186212	187290
10	1	7.95	67	27	8 [1]	6.55	5	9	196151	186213	187291
10	1.25	7.95	67	28	8 [1]	6.2	5	8.8	196152	186214	187292
12	1.5	9.95	76	33	10 [1]	7.85	5	10.5	196153	186215	187293
14	1.5	10.95	95	43	12 [1]	8.85	5	12.5	196154	186216	187294
16	1.5	10.95	95	43	12 [1]	8.85	5	14.5	196155	186815	187295
18	1.5	13.95	105	53	14 [1]	11.85	6	16.5	196156	186217	187296
20	1.5	13.95	105	53	14 [1]	11.85	6	18.5	196157	186816	187297

[1] Tol. h6

MF ISO DIN 13

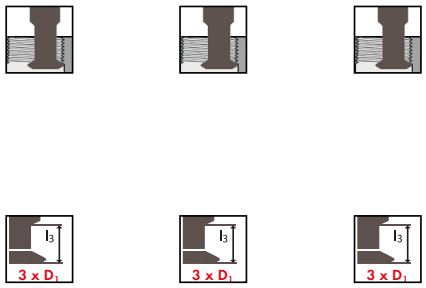
VHM CAR | < 3µm | DC | h5/h6

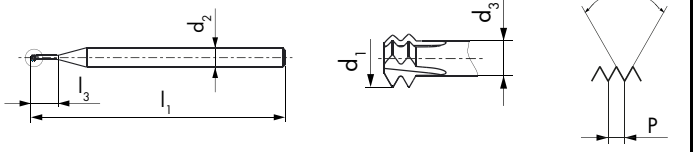
GW

GW3017

GW3017VS

GW3017VX





Ø D_1 MF	P mm	d_1 mm	l_1 mm	l_3 mm	d_2 h5 mm	d_3 mm			GW3017 ID	GW3017VS ID	GW3017VX ID
2	0.2	1.77	39	6.3	3	1.49	3	1.8	196197	186325	187410
2	0.25	1.71	39	6.4	3	1.36	3	1.75	196198	186326	187411
2.5	0.2	2.27	39	7.8	3	1.99	3	2.3	196191	186327	187412
2.5	0.25	2.21	39	7.9	3	1.86	3	2.25	196192	186328	187413
3	0.35	2.6	51	9.7	5	2.11	4	2.65	196200	186329	187414
4	0.5	3.43	51	12.9	5	2.73	4	3.5	196202	186330	187415
5	0.5	4.43	51	15.9	5	3.73	4	4.5	196204	175199	187416
6	0.75	4.95	51	19.4	5	3.9	4	5.25	196206	186331	187417
8	1	5.95	75	26	6 [1]	4.55	5	7	196208	181233	187418
10	1	7.95	83	32	8 [1]	6.55	5	9	196178	186332	187419
10	1.25	7.95	83	33	8 [1]	6.2	5	8.8	196179	186333	187420
12	1.5	9.95	95	39	10 [1]	7.85	5	10.5	196181	186334	187421
14	1.5	10.95	120	51	12 [1]	8.85	5	12.5	196183	186335	187422
16	1.5	10.95	120	51	12 [1]	8.85	5	14.5	196185	186823	187423
18	1.5	13.95	135	63	14 [1]	11.85	6	16.5	196187	186336	187424
20	1.5	13.95	135	63	14 [1]	11.85	6	18.5	196195	186824	187425

[1] Tol. h6

MF ISO DIN 13

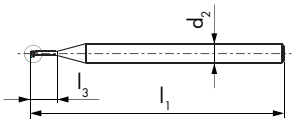
VHM CAR | < 3µm | DC | h5/h6

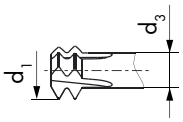
GW

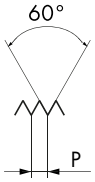
GW3019

GW3019VS

GW3019	GW3019VS		







Ø D_1 MF	P mm	d_1 mm	l_1 mm	l_3 mm	d_2 h5 mm	d_3 mm			ID	ID
2	0.2	1.77	39	8.3	3	1.49	3	1.8	175254	175270
2	0.25	1.71	39	8.4	3	1.36	3	1.75	196242	186592
2.5	0.2	2.27	39	10.3	3	1.99	3	2.3	175255	175271
2.5	0.25	2.21	39	10.4	3	1.86	3	2.25	175256	175272
3	0.35	2.6	51	12.7	5	2.11	4	2.65	175257	175273
4	0.5	3.43	51	16.9	5	2.73	4	3.5	196247	186593
5	0.5	4.43	51	20.9	5	3.73	4	4.5	196248	171033
6	0.75	4.95	51	25.4	5	3.9	4	5.25	196249	186594
8	1	5.95	75	34	6 [1]	4.55	5	7	196250	186595
10	1	7.95	83	42	8 [1]	6.55	5	9	196251	186596
10	1.25	7.95	83	43	8 [1]	6.2	5	8.8	196252	186597
12	1.5	9.95	95	51	10 [1]	7.85	5	10.5	196253	186598
14	1.5	10.95	120	67	12 [1]	8.85	5	12.5	196254	186599
16	1.5	10.95	120	67	12 [1]	8.85	5	14.5	196255	186831
18	1.5	13.95	135	83	14 [1]	11.85	6	16.5	196256	186600
20	1.5	13.95	135	83	14	11.85	6	18.5	196257	186832

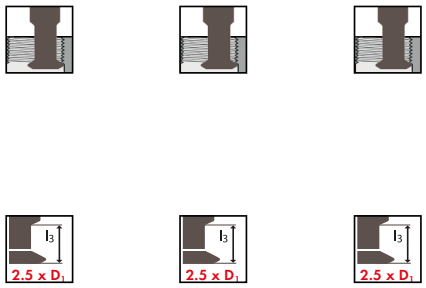
[1] Tol. h6

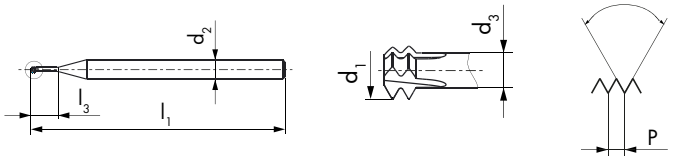
UNC ASME B1.1

VHM CAR | < 3µm | DC | h5/h6

GW

	GW3016	GW3016VS	GW3016VX
	R10	R10 VS	R10 VX





Ø" D_1 UNC	P TPI	d_1 mm	l_1 mm	l_3 mm	d_2 h5 mm	d_3 mm			GW3016 ID	GW3016VS ID	GW3016VX ID
2	56	1.66	39	6.1	3	1.02	3	1.75	167472	167500	187298
3	48	1.91	39	7	3	1.17	3	2	196158	186236	187299
4	40	2.11	39	8	3	1.22	3	2.25	167473	167501	187300
5	40	2.44	51	9.1	5	1.55	4	2.55	196159	186237	187301
6	32	2.59	51	10.2	5	1.48	4	2.75	167474	167502	187302
8	32	3.25	51	11.9	5	2.14	4	3.4	167475	167503	187303
10	24	3.6	51	14	5	2.12	4	3.8	173983	173986	187304
12	24	4.27	51	15.7	5	2.79	4	4.4	196160	186238	187305
1/4	20	4.89	51	18.2	5	3.11	4	5.1	167476	167504	187306
5/16	18	5.95	63	23	6 [1]	3.97	5	6.5	175232	175246	187307
3/8	16	7.1	67	27	8 [1]	4.87	5	8	175233	173546	187308
7/16	14	7.95	67	32	8 [1]	5.41	5	9.3	196161	186239	187309
1/2	13	9.95	76	36	10 [1]	7.21	5	10.8	175234	175247	187310

[1] Tol. h6

UNC ASME B1.1

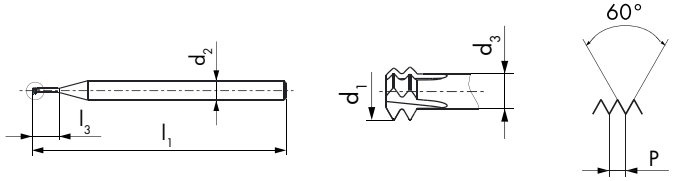
VHM CAR | < 3µm | DC | h5/h6

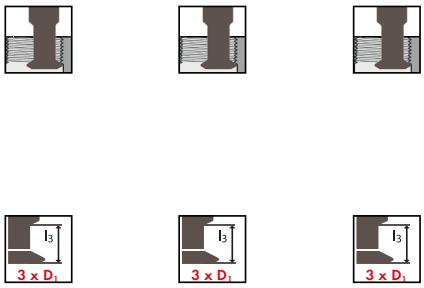
GW

GW3017

GW3017VS

GW3017VX





Ø" D_1 UNC	P TPI	d_1 mm	l_1 mm	l_3 mm	d_2 h5 mm	d_3 mm			GW3017 ID	GW3017VS ID	GW3017VX ID
2	56	1.66	39	7.2	3	1.02	3	1.75	196219	186365	187426
3	48	1.91	39	8.3	3	1.17	3	2	196221	186366	187427
4	40	2.11	39	9.4	3	1.22	3	2.25	196222	186367	187428
5	40	2.44	51	10.7	5	1.55	4	2.55	196224	186368	187429
6	32	2.59	51	12	5	1.48	4	2.75	196225	186369	187430
8	32	3.25	51	14	5	2.14	4	3.4	196227	186370	187431
10	24	3.6	51	16.4	5	2.12	4	3.8	196217	186371	187432
12	24	4.27	51	18.4	5	2.79	4	4.4	196218	186372	187433
1/4	20	4.89	51	21.4	5	3.11	4	5.1	196216	186373	187434
5/16	18	5.95	75	27	6 [1]	3.97	5	6.5	196223	186374	187435
3/8	16	7.1	83	32	8 [1]	4.87	5	8	196220	186375	187436
7/16	14	7.95	83	37	8 [1]	5.41	5	9.3	196226	186376	187437
1/2	13	9.95	95	42	10 [1]	7.21	5	10.8	196215	186377	187438

[1] Tol. h6

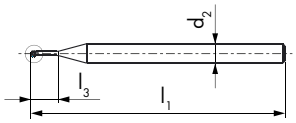
UNC ASME B1.1

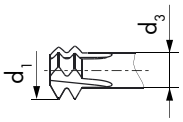
VHM CAR | < 3µm | DC | h5/h6

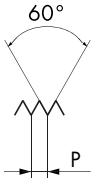
GW

GW3019


GW3019VS





GW3019	GW3019VS		
			
			
			

Ø" D_1 UNC	P TPI	d_1 mm	l_1 mm	l_3 mm	d_2 h5 mm	d_3 mm			ID	ID
2	56	1.66	39	9.4	3	1.02	3	1.75	● 167479	● 167507
3	48	1.91	39	10.8	3	1.17	3	2	● 196258	● 186601
4	40	2.11	39	12.2	3	1.22	3	2.25	● 167480	● 167508
5	40	2.44	51	13.9	5	1.55	4	2.55	● 196259	● 186602
6	32	2.59	51	15.5	5	1.48	4	2.75	● 167481	● 167509
8	32	3.25	51	18.1	5	2.14	4	3.4	● 167482	● 167510
10	24	3.6	51	21.3	5	2.12	4	3.8	● 173982	● 173979
12	24	4.27	51	23.9	5	2.79	4	4.4	● 196260	● 186603
1/4	20	4.89	51	27.7	5	3.11	4	5.1	● 167483	● 167511
5/16	18	5.95	75	35	6 [1]	3.97	5	6.5	● 175261	● 175277
3/8	16	7.1	83	41	8 [1]	4.87	5	8	● 175262	● 175278
7/16	14	7.95	83	48	8 [1]	5.41	5	9.3	● 196261	● 186604
1/2	13	9.95	95	55	10 [1]	7.21	5	10.8	● 175263	● 175279

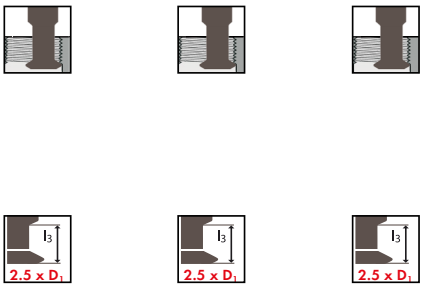
[1] Tol. h6

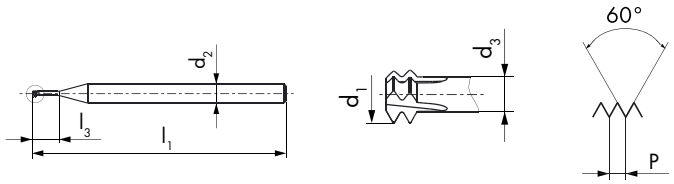
UNF ASME B1.1

VHM CAR | < 3µm | DC | h5/h6

GW

GW3016	R10		
GW3016VS	R10	VS	
GW3016VX	R10	VX	





Ø" D_1 UNF	P TPI	d_1 mm	l_1 mm	l_3 mm	d_2 h5 mm	d_3 mm			GW3016 ID	GW3016VS ID	GW3016VX ID
0	80	1.15	39	4.3	3	0.71	3	1.2	175235	175248	187311
1	72	1.44	39	5.1	3	0.95	3	1.5	175236	175249	187312
2	64	1.73	39	6	3	1.17	3	1.8	196162	186248	187313
4	48	2.23	39	7.9	3	1.49	3	2.35	175237	175250	187314
5	44	2.51	51	9	5	1.7	4	2.6	196163	186249	187315
6	40	2.77	51	10	5	1.88	4	2.9	196164	186250	187316
8	36	3.35	51	11.7	5	2.36	4	3.5	175238	175251	187317
10	32	3.91	51	13.5	5	2.8	4	4.05	167477	167505	187318
12	28	4.44	51	15.4	5	3.17	4	4.6	196165	186251	187319
1/4	28	4.95	51	17.6	5	3.68	4	5.5	167478	167506	187320
5/16	24	5.95	63	22	6 [1]	4.47	5	6.9	175239	175252	187321
3/8	24	7.1	67	26	8 [1]	5.62	5	8.5	175240	175253	187322
7/16	20	7.95	67	31	8 [1]	6.17	5	9.8	196166	186252	187323
1/2	20	9.95	76	35	10 [1]	8.17	5	11.4	196167	186253	187324

[1] Tol. h6

UNF ASME B1.1

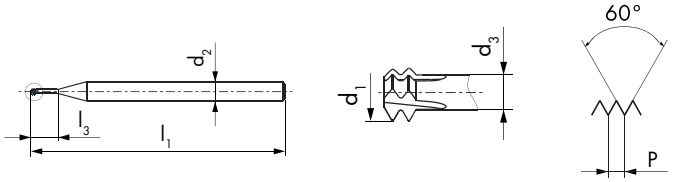
VHM CAR | < 3µm | DC | h5/h6

GW

GW3017 — R10

GW3017VS — R10 — VS

GW3017VX — R10 — VX



Ø" D_1 UNF	P TPI	d_1 mm	l_1 mm	l_3 mm	d_2 h5 mm	d_3 mm			GW3017 ID	GW3017VS ID	GW3017VX ID
0	80	1.15	39	5	3	0.71	3	1.2	• 196228	• 186404	• 187439
1	72	1.44	39	6.1	3	0.95	3	1.5	• 196233	• 186405	• 187440
2	64	1.73	39	7.1	3	1.17	3	1.8	• 196234	• 186406	• 187441
4	48	2.23	39	9.3	3	1.49	3	2.35	• 196236	• 186407	• 187442
5	44	2.51	51	10.6	5	1.7	4	2.6	• 196238	• 186408	• 187443
6	40	2.77	51	11.7	5	1.88	4	2.9	• 196239	• 186409	• 187444
8	36	3.35	51	13.8	5	2.36	4	3.5	• 196241	• 186410	• 187445
10	32	3.91	51	15.9	5	2.8	4	4.05	• 196231	• 184633	• 187446
12	28	4.44	51	18.1	5	3.17	4	4.6	• 196232	• 186411	• 187447
1/4	28	4.95	51	20.7	5	3.68	4	5.5	• 196230	• 186412	• 187448
5/16	24	5.95	75	26	6 [1]	4.47	5	6.9	• 196237	• 186413	• 187449
3/8	24	7.1	83	31	8 [1]	5.62	5	8.5	• 196235	• 186414	• 187450
7/16	20	7.95	83	36	8 [1]	6.17	5	9.8	• 196240	• 186415	• 187451
1/2	20	9.95	95	41	10 [1]	8.17	5	11.4	• 196229	• 186416	• 187452

[1] Tol. h6

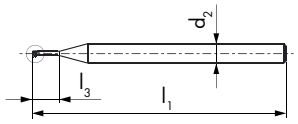
UNF ASME B1.1

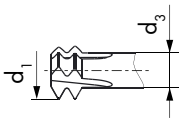
VHM CAR | < 3µm | DC | h5/h6

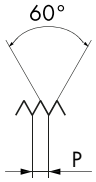
GW

GW3019 R10

GW3019VS R10 VS







Ø" D_1 UNF	P TPI	d_1 mm	l_1 mm	l_3 mm	d_2 h5 mm	d_3 mm			GW3019 ID	GW3019VS ID
0	80	1.15	39	6.6	3	0.71	3	1.2	175264	175280
1	72	1.44	39	7.9	3	0.95	3	1.5	175265	175281
2	64	1.73	39	9.3	3	1.17	3	1.8	196262	186605
4	48	2.23	39	12.1	3	1.49	3	2.35	175266	172376
5	44	2.51	51	13.8	5	1.7	4	2.6	196263	169815
6	40	2.77	51	15.2	5	1.88	4	2.9	196264	186606
8	36	3.35	51	18	5	2.36	4	3.5	175267	175282
10	32	3.91	51	20.8	5	2.8	4	4.05	167484	167512
12	28	4.44	51	23.6	5	3.17	4	4.6	196265	186607
1/4	28	4.95	51	27.1	5	3.68	4	5.5	167485	167513
5/16	24	5.95	75	34	6 [1]	4.47	5	6.9	175268	175283
3/8	24	7.1	83	40	8 [1]	5.62	5	8.5	175269	175284
7/16	20	7.95	83	47	8 [1]	6.17	5	9.8	196266	186608
1/2	20	9.95	95	54	10 [1]	8.17	5	11.4	196267	186609

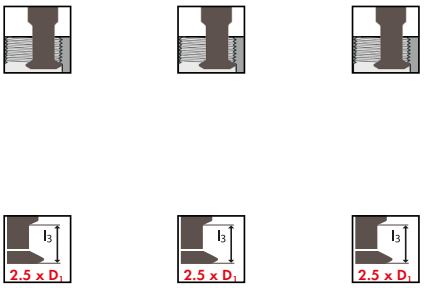
[1] Tol. h6

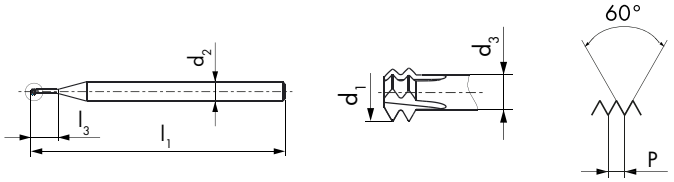
S NIHS 06-10 SL SL 15-01

VHM CAR | < 3µm | DC | h5

GW

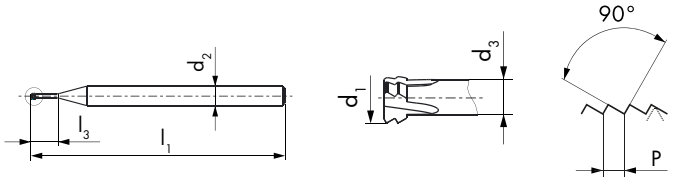
	GW3016	GW3016VS	GW3016VX
	R10	R10 VS	R10 VX





Ø D_1 S	P mm	d_1 mm	l_1 mm	l_3 mm	d_2 h5 mm	d_3 mm			ID	ID	ID
0.8	0.2	0.57	39	2.3	3	0.29	3	0.66 [1]	● 196168	● 194287	● 194305
0.9	0.225	0.64	39	2.6	3	0.33	3	0.74 [1]	● 196169	● 182875	● 194306
1	0.25	0.71	39	2.9	3	0.36	3	0.82 [1]	● 180683	● 168667	● 194307
1.2	0.25	0.91	39	3.4	3	0.56	3	1.02 [1]	● 196170	● 194288	● 194308
1.4	0.3	1.06	39	3.9	3	0.64	3	1.18 [1]	● 196171	● 194289	● 194309

[1] 4H5H → 4H6H = +0.02mm



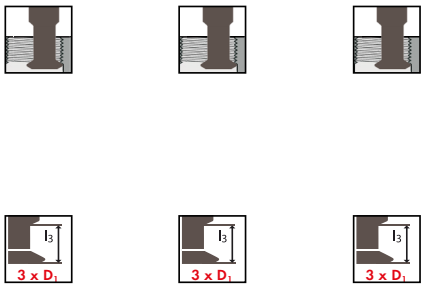
Ø D_1 SL	P mm	d_1 mm	l_1 mm	l_3 mm	d_2 h5 mm	d_3 mm			ID	ID
0.8	0.15	0.63	39	2.3	3	0.42	3	0.74	● 600028	● 600034
0.9	0.175	0.7	39	2.6	3	0.46	3	0.83	● 600029	● 600035
1	0.2	0.77	39	2.9	3	0.49	3	0.92	● 600030	● 600036
1.2	0.2	0.97	39	3.4	3	0.69	3	1.11	● 600031	● 600037
1.4	0.25	1.11	39	3.9	3	0.76	3	1.3	● 600032	● 600038

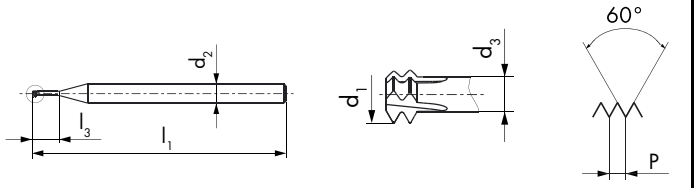
S NIHS 06-10

VHM CAR | < 3µm | DC | h5

GW

GW3017 | GW3017VS | GW3017VX





Ø D_1 S	P mm	d_1 mm	l_1 mm	l_3 mm	d_2 h5 mm	d_3 mm			ID	ID	ID
0.8	**0.2**	0.57	39	2.7	3	0.29	3	0.66 [1]	● **196210**	● **194291**	● **194312**
0.9	**0.225**	0.64	39	3	3	0.33	3	0.74 [1]	● **196211**	● **194292**	● **194313**
1	**0.25**	0.71	39	3.4	3	0.36	3	0.82 [1]	● **196214**	● **194293**	● **194314**
1.2	**0.25**	0.91	39	4	3	0.56	3	1.02 [1]	● **196212**	● **194294**	● **194315**
1.4	**0.3**	1.06	39	4.6	3	0.64	3	1.18 [1]	● **196213**	● **194295**	● **194316**

[1] **4H5H → 4H6H =** +0.02mm

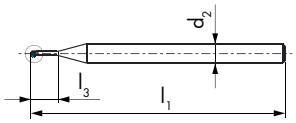
S NIHS 06-10

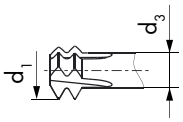
VHM CAR | < 3µm | DC | h5

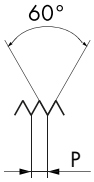
GW

GW3019

GW3019VS







GW3019	GW3019VS		
			
			
			

Ø D_1 S	P mm	d_1 mm	l_1 mm	l_3 mm	d_2 h5 mm	d_3 mm			ID	ID
0.8	**0.2**	0.57	39	3.5	3	0.29	3	0.66 [1]	● **196270**	● **194298**
0.9	**0.225**	0.64	39	3.9	3	0.33	3	0.74 [1]	● **196271**	● **194299**
1	**0.25**	0.71	39	4.4	3	0.36	3	0.82 [1]	● **196274**	● **194300**
1.2	**0.25**	0.91	39	5.2	3	0.56	3	1.02 [1]	● **196272**	● **194301**
1.4	**0.3**	1.06	39	6	3	0.64	3	1.18 [1]	● **196273**	● **194302**

[1] **4H5H → 4H6H =** +0.02mm

M ISO DIN 14
ISO DIN 13

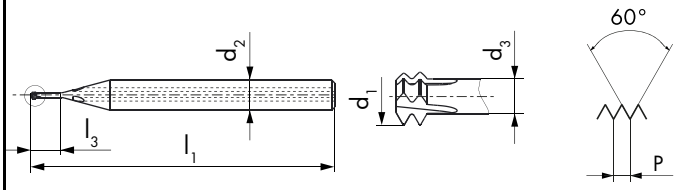
VHM CAR | < 3µm | DC | h6

GWi

GWi3066VS

GWi3066VX

GWi3066VS	GWi3066VX		



Ø D_1 M	P mm	d_1 mm	l_1 mm	l_3 mm	d_2 h6 mm	d_3 mm			ID	ID
0.8	0.2	0.57	40	2.3	3	0.29	3	0.66	● 186029	● 187325
0.9	0.225	0.64	40	2.6	3	0.33	3	0.74	● 186030	● 187326
1	0.25	0.71	40	2.9	3	0.36	3	0.75	● 186031	● 187327
1.2	0.25	0.91	40	3.4	3	0.56	3	0.95	● 186032	● 187328
1.4	0.3	1.06	40	3.9	4	0.64	3	1.1	● 186033	● 187329
1.6	0.35	1.2	40	4.5	4	0.71	3	1.25	● 186034	● 187330
1.8	0.35	1.4	40	5	4	0.91	3	1.45	● 186035	● 187331
2	0.4	1.54	40	5.6	4	0.98	3	1.6	● 186036	● 187332
2.3	0.4	1.84	40	6.3	4	1.28	3	1.9	● 194324	● 194334
2.5	0.45	1.98	40	6.9	4	1.35	3	2.05	● 186037	● 187333
2.6	0.45	2.08	40	7.1	4	1.45	3	2.15	● 194325	● 194335
3	0.5	2.43	51	8.4	5	1.73	4	2.5	● 186038	● 187334
3.5	0.6	2.81	51	9.9	6	1.97	4	2.9	● 186039	● 187335
4	0.7	3.2	51	11.3	6	2.22	4	3.3	● 186040	● 187336
5	0.8	4.08	51	14	8	2.96	4	4.2	● 186041	● 187337
6	1	4.85	51	16.8	8	3.45	4	5	● 186042	● 187338
8	1.25	5.95	75	23	6	4.2	5	6.8	● 186043	● 187339
10	1.5	7.95	83	28	8	5.85	5	8.5	● 186044	● 187340
12	1.75	9.95	95	34	10	7.5	5	10.2	● 186045	● 187341
14	2	10.95	120	44	12	8.15	5	12	● 186046	● 187342
16	2	10.95	120	44	12	8.15	5	14	● 186817	● 187343
18	2.5	13.95	135	55	14	10.45	6	15.5	● 186047	● 187344
20	2.5	13.95	135	55	14	10.45	6	17.5	● 186818	● 187345

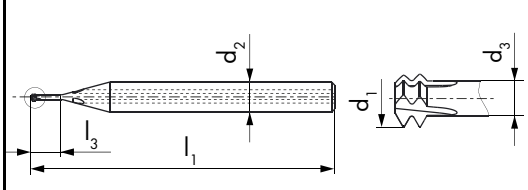
M ISO DIN 13

VHM CAR | < 3µm | DC | h6

GWi

GWi3067VS — R10 — VS

GWi3067VX — R10 — VX



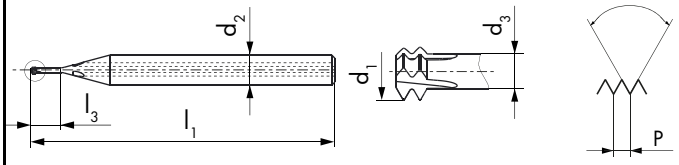
GWi3067VS	GWi3067VX		
			
			
 3 x D1	 3 x D1		

Ø D1 M	P mm	d1 mm	l1 mm	l3 mm	d2 h6 mm	d3 mm			ID	ID
1.4	0.3	1.06	40	4.6	4	0.64	3	1.1	186443	187453
1.6	0.35	1.2	40	5.3	4	0.71	3	1.25	186444	187454
1.8	0.35	1.4	40	5.9	4	0.91	3	1.45	186445	187455
2	0.4	1.54	40	6.6	4	0.98	3	1.6	186446	187456
2.3	0.4	1.84	40	7.5	4	1.28	3	1.9	194327	194337
2.5	0.45	1.98	40	8.1	4	1.35	3	2.05	186447	187457
2.6	0.45	2.08	40	8.4	4	1.45	3	2.15	194328	194338
3	0.5	2.43	51	9.9	5	1.73	4	2.5	186448	187458
3.5	0.6	2.81	51	11.6	6	1.97	4	2.9	186449	187459
4	0.7	3.2	51	13.3	6	2.22	4	3.3	186450	187460
5	0.8	4.08	51	16.5	8	2.96	4	4.2	186451	187461
6	1	4.85	51	19.8	8	3.45	4	5	186452	187462
8	1.25	5.95	75	27	6	4.2	5	6.8	186453	187463
10	1.5	7.95	83	33	8	5.85	5	8.5	186454	187464
12	1.75	9.95	95	40	10	7.5	5	10.2	186455	187465
14	2	10.95	120	52	12	8.15	5	12	186456	187466
16	2	10.95	120	52	12	8.15	5	14	186825	187467
18	2.5	13.95	135	65	14	10.45	6	15.5	186457	187468
20	2.5	13.95	135	65	14	10.45	6	17.5	186826	187469

GWi

GWi3067VS

GWi3067VX



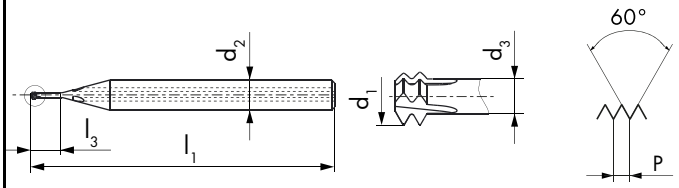
GWi3067VS	GWi3067VX		
			

Ø D_1 MJ	P mm	d_1 mm	l_1 mm	l_3 mm	d_2 h6 mm	d_3 mm			ID	ID
3	0.5	2.17	51	9.9	5	1.47	4	2.55	● 188820	● 188843
4	0.7	2.84	51	13.3	6	1.86	4	3.4	● 188821	● 188844
5	0.8	3.67	51	16.5	8	2.55	4	4.3	● 188822	● 188845
6	1	4.34	51	19.8	8	2.94	4	5.1	● 188823	● 188846
8	1.25	5.95	75	27	6	4.2	5	6.9	● 188824	● 188847
10	1.5	7.95	83	33	8	5.85	5	8.6	● 188825	● 188848
12	1.75	9.95	95	40	10	7.5	5	10.4	● 188826	● 188849

VHM CAR | < 3µm | DC | h6

GWi

GWi3069VS | R10 | VS



Ø D1 M	P mm	d1 mm	l1 mm	l3 mm	d2 h6 mm	d3 mm			ID
3	0.5	2.43	51	12.9	5	1.73	4	2.5	186610
3.5	0.6	2.81	51	15.1	6	1.97	4	2.9	186611
4	0.7	3.2	51	17.3	6	2.22	4	3.3	186612
5	0.8	4.08	51	21.5	8	2.96	4	4.2	186613
6	1	4.85	51	25.8	8	3.45	4	5	186614
8	1.25	5.95	75	35	6	4.2	5	6.8	186615
10	1.5	7.95	83	43	8	5.85	5	8.5	186616
12	1.75	9.95	95	52	10	7.5	5	10.2	186617
14	2	10.95	120	68	12	8.15	5	12	186618
16	2	10.95	120	68	12	8.15	5	14	186833
18	2.5	13.95	135	85	14	10.45	6	15.5	186619
20	2.5	13.95	135	85	14	10.45	6	17.5	186834

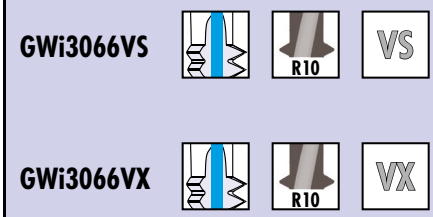
MF ISO DIN 13

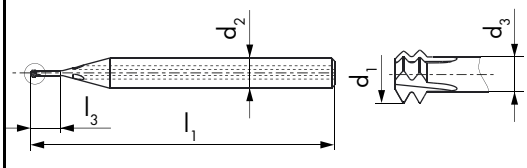
VHM CAR | < 3µm | DC | h6

GWi

GWi3066VS

GWi3066VX





GWi3066VS	GWi3066VX		
			
			
 2.5 x D1	 2.5 x D1		

Ø D1 MF	P mm	d1 mm	l1 mm	l3 mm	d2 h6 mm	d3 mm			ID	ID
2	0.2	1.77	40	5.3	4	1.49	3	1.8	● 186086	● 187346
2	0.25	1.71	40	5.4	4	1.36	3	1.75	● 186087	● 187347
2.5	0.2	2.27	40	6.6	4	1.99	3	2.3	● 186088	● 187348
2.5	0.25	2.21	40	6.6	4	1.86	3	2.25	● 186089	● 187349
3	0.35	2.6	51	8.2	5	2.11	4	2.65	● 186090	● 187350
4	0.5	3.43	51	10.9	6	2.73	4	3.5	● 186091	● 187351
5	0.5	4.43	51	13.4	8	3.73	4	4.5	● 186092	● 187352
6	0.75	4.95	51	16.4	8	3.9	4	5.25	● 186093	● 187353
8	1	5.95	75	22	6	4.55	5	7	● 186094	● 187354
10	1	7.95	83	27	8	6.55	5	9	● 186095	● 187355
10	1.25	7.95	83	28	8	6.2	5	8.8	● 186096	● 187356
12	1.5	9.95	95	33	10	7.85	5	10.5	● 186097	● 187357
14	1.5	10.95	120	43	12	8.85	5	12.5	● 186098	● 187358
16	1.5	10.95	120	43	12	8.85	5	14.5	● 186819	● 187359
18	1.5	13.95	135	53	14	11.85	6	16.5	● 186099	● 187360
20	1.5	13.95	135	53	14	11.85	6	18.5	● 186820	● 187361

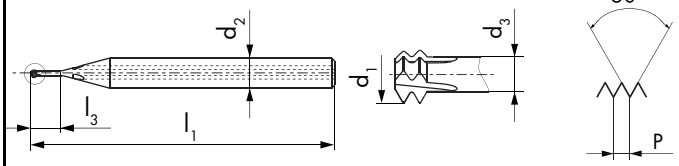
MF ISO DIN 13

VHM CAR | < 3µm | DC | h6

GWi

GWi3067VS


GWi3067VX

GWi3067VS	GWi3067VX		
			



Ø D_1 MF	P mm	d_1 mm	l_1 mm	l_3 mm	d_2 h6 mm	d_3 mm			ID	ID
2	0.2	1.77	40	6.3	4	1.49	3	1.8	186488	187470
2	0.25	1.71	40	6.4	4	1.36	3	1.75	186489	187471
2.5	0.2	2.27	40	7.8	4	1.99	3	2.3	186490	187472
2.5	0.25	2.21	40	7.9	4	1.86	3	2.25	186491	187473
3	0.35	2.6	51	9.7	5	2.11	4	2.65	186492	187474
4	0.5	3.43	51	12.9	6	2.73	4	3.5	186493	187475
5	0.5	4.43	51	15.9	8	3.73	4	4.5	186494	187476
6	0.75	4.95	51	19.4	8	3.9	4	5.25	186495	187477
8	1	5.95	75	26	6	4.55	5	7	186496	187478
10	1	7.95	83	32	8	6.55	5	9	186497	187479
10	1.25	7.95	83	33	8	6.2	5	8.8	186498	187480
12	1.5	9.95	95	39	10	7.85	5	10.5	186499	187481
14	1.5	10.95	120	51	12	8.85	5	12.5	186500	187482
16	1.5	10.95	120	51	12	8.85	5	14.5	186827	187483
18	1.5	13.95	135	63	14	11.85	6	16.5	186501	187484
20	1.5	13.95	135	63	14	11.85	6	18.5	186828	187485

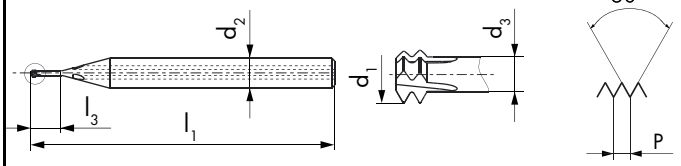
MJF ISO 5855

VHM CAR | < 3µm | DC | h6

GWi

GWi3067VS

GWi3067VX



GWi3067VS	GWi3067VX		
			



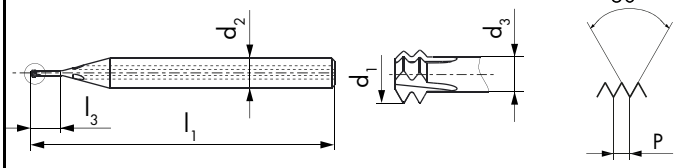
Ø D1 MJF	P mm	d1 mm	l1 mm	l3 mm	d2 h6 mm	d3 mm			ID	ID
6	0.75	4.76	51	19.4	8	3.71	4	5.35	188827	188850
8	1	5.95	75	26	6	4.55	5	7.1	188828	188851
10	1.25	7.95	83	33	8	6.2	5	8.9	188829	188852
12	1.5	9.95	95	39	10	7.85	5	10.6	188830	188853

MF ISO DIN 13

VHM CAR | < 3µm | DC | h6

GWi

GWi3069VS

GWi3069VS

Ø D_1 MF	P mm	d_1 mm	l_1 mm	l_3 mm	d_2 h6 mm	d_3 mm			ID
3	0.35	2.6	51	12.7	5	2.11	4	2.65	186620
4	0.5	3.43	51	16.9	6	2.73	4	3.5	186621
5	0.5	4.43	51	20.9	8	3.73	4	4.5	186622
6	0.75	4.95	51	25.4	8	3.9	4	5.25	186623
8	1	5.95	75	34	6	4.55	5	7	186624
10	1	7.95	83	42	8	6.55	5	9	186625
10	1.25	7.95	83	43	8	6.2	5	8.8	186626
12	1.5	9.95	95	51	10	7.85	5	10.5	186627
14	1.5	10.95	120	67	12	8.85	5	12.5	186628
16	1.5	10.95	120	67	12	8.85	5	14.5	186835
18	1.5	13.95	135	83	14	11.85	6	16.5	186629
20	1.5	13.95	135	83	14	11.85	6	18.5	186836

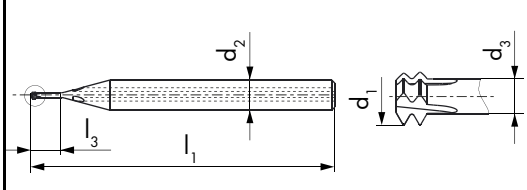
UNC ASME B1.1

VHM CAR | < 3µm | DC | h6

GWi

GWi3066VS — R10 — VS

GWi3066VX — R10 — VX



GWi3066VS	GWi3066VX		
			
			
 (2.5 x D1)	 (2.5 x D1)		

Ø" D1 UNC	P TPI	d1 mm	l1 mm	l3 mm	d2 h6 mm	d3 mm			ID	ID
2	56	1.66	40	6.1	4	1.02	3	1.75	● 186128	● 187362
3	48	1.91	40	7	4	1.17	3	2	● 186129	● 187363
4	40	2.11	51	8	5	1.22	3	2.25	● 186130	● 187364
5	40	2.44	51	9.1	5	1.55	4	2.55	● 186131	● 187365
6	32	2.59	51	10.2	6	1.48	4	2.75	● 186132	● 187366
8	32	3.25	51	11.9	6	2.14	4	3.4	● 186133	● 187367
10	24	3.6	51	14	8	2.12	4	3.8	● 186134	● 187368
12	24	4.27	51	15.7	8	2.79	4	4.4	● 186135	● 187369
1/4	20	4.89	51	18.2	8	3.11	4	5.1	● 186136	● 187370
5/16	18	5.95	75	23	6	3.97	5	6.5	● 186137	● 187371
3/8	16	7.1	83	27	8	4.87	5	8	● 186138	● 187372
7/16	14	7.95	83	32	8	5.41	5	9.3	● 186139	● 187373
1/2	13	9.95	95	36	10	7.21	5	10.8	● 186140	● 187374

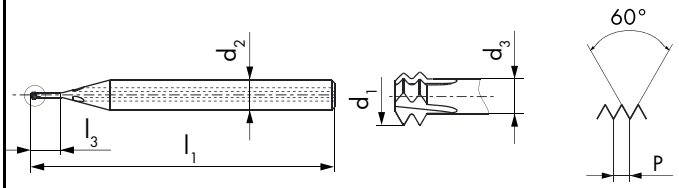
UNC ASME B1.1

VHM CAR | < 3µm | DC | h6

GWi

GWi3067VS

GWi3067VX



Ø" D_1 UNC	P TPI	d_1 mm	l_1 mm	l_3 mm	d_2 h6 mm	d_3 mm			GWi3067VS ID	GWi3067VX ID
4	40	2.11	51	9.4	5	1.22	3	2.25	186526	187486
5	40	2.44	51	10.7	5	1.55	4	2.55	186527	187487
6	32	2.59	51	12	6	1.48	4	2.75	186528	187488
8	32	3.25	51	14	6	2.14	4	3.4	186529	187489
10	24	3.6	51	16.4	8	2.12	4	3.8	186530	187490
12	24	4.27	51	18.4	8	2.79	4	4.4	186531	187491
1/4	20	4.89	51	21.4	8	3.11	4	5.1	186532	187492
5/16	18	5.95	75	27	6	3.97	5	6.5	186533	187493
3/8	16	7.1	83	32	8	4.87	5	8	186534	187494
7/16	14	7.95	83	37	8	5.41	5	9.3	186535	187495
1/2	13	9.95	95	42	10	7.21	5	10.8	186536	187496

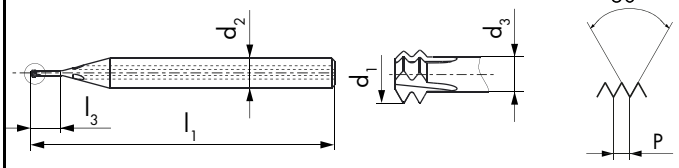
UNJC ISO 3161

VHM CAR | < 3µm | DC | h6

GWi

GWi3067VS

GWi3067VX



GWi3067VS	GWi3067VX		
			
			
			

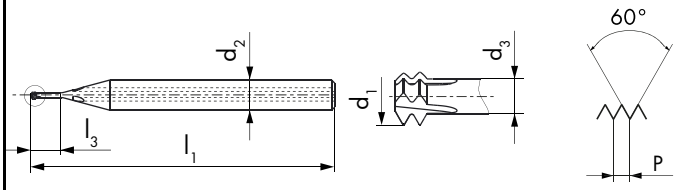
Ø" D_1 UNJC	P TPI	d_1 mm	l_1 mm	l_3 mm	d_2 h6 mm	d_3 mm			ID	ID
6	32	2.59	51	12	6	1.48	4	2.8	● 188831	● 188854
10	24	3.6	51	16.4	8	2.12	4	3.9	● 188832	● 188855
1/4	20	4.89	51	21.4	8	3.11	4	5.2	● 188833	● 188856
5/16	18	5.95	75	27	6	3.97	5	6.7	● 188834	● 188857
3/8	16	7.1	83	32	8	4.87	5	8.1	● 188835	● 188858
1/2	13	9.95	95	42	10	7.21	5	10.9	● 188836	● 188859

UNC ASME B1.1

VHM CAR | < 3µm | DC | h6

GWi

GWi3069VS

Ø" D_1 UNC	P TPI	d_1 mm	l_1 mm	l_3 mm	d_2 h6 mm	d_3 mm			ID
6	32	2.59	51	15.5	6	1.48	4	2.75	186630
8	32	3.25	51	18.1	6	2.14	4	3.4	186631
10	24	3.6	51	21.3	8	2.12	4	3.8	186632
12	24	4.27	51	23.9	8	2.79	4	4.4	186633
1/4	20	4.89	51	27.7	8	3.11	4	5.1	186634
5/16	18	5.95	75	35	6	3.97	5	6.5	186635
3/8	16	7.1	83	41	8	4.87	5	8	186636
7/16	14	7.95	83	48	8	5.41	5	9.3	186637
1/2	13	9.95	95	55	10	7.21	5	10.8	186638

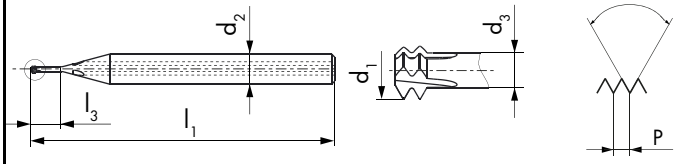
UNF ASME B1.1

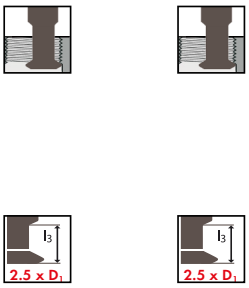
VHM CAR | < 3µm | DC | h6

GWi

GWi3066VS

GWi3066VX





Ø" D_1 UNF	P TPI	d_1 mm	l_1 mm	l_3 mm	d_2 h6 mm	d_3 mm			GWi3066VS ID	GWi3066VX ID
0	80	1.15	40	4.3	4	0.71	3	1.2	186167	187375
1	72	1.44	40	5.1	4	0.95	3	1.5	186168	187376
2	64	1.73	40	6	4	1.17	3	1.8	186169	187377
4	48	2.23	51	7.9	5	1.49	3	2.35	186170	187378
5	44	2.51	51	9	5	1.7	4	2.6	186171	187379
6	40	2.77	51	10	6	1.88	4	2.9	186172	187380
8	36	3.35	51	11.7	6	2.36	4	3.5	186173	187381
10	32	3.91	51	13.5	8	2.8	4	4.05	186174	187382
12	28	4.44	51	15.4	8	3.17	4	4.6	186175	187383
1/4	28	4.95	51	17.6	8	3.68	4	5.5	186176	187384
5/16	24	5.95	75	22	6	4.47	5	6.9	186177	187385
3/8	24	7.1	83	26	8	5.62	5	8.5	186178	187386
7/16	20	7.95	83	31	8	6.17	5	9.8	186179	187387
1/2	20	9.95	95	35	10	8.17	5	11.4	186180	187388

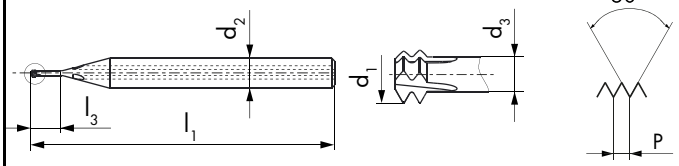
UNF ASME B1.1

VHM CAR | < 3µm | DC | h6

GWi

GWi3067VS


GWi3067VX

GWi3067VS	GWi3067VX		
			



Ø" D1 UNF	P TPI	d1 mm	l1 mm	l3 mm	d2 h6 mm	d3 mm			ID	ID
4	48	2.23	51	9.3	5	1.49	3	2.35	● 186559	● 187497
5	44	2.51	51	10.6	5	1.7	4	2.6	● 186560	● 187498
6	40	2.77	51	11.7	6	1.88	4	2.9	● 186561	● 187499
8	36	3.35	51	13.8	6	2.36	4	3.5	● 186562	● 187500
10	32	3.91	51	16	8	2.8	4	4.05	● 186563	● 187501
12	28	4.44	51	18.1	8	3.17	4	4.6	● 186564	● 187502
1/4	28	4.95	51	20.7	8	3.68	4	5.5	● 186565	● 187503
5/16	24	5.95	75	26	6	4.47	5	6.9	● 186566	● 187504
3/8	24	7.1	83	31	8	5.62	5	8.5	● 186567	● 187505
7/16	20	7.95	83	36	8	6.17	5	9.8	● 186568	● 187506
1/2	20	9.95	95	41	10	8.17	5	11.4	● 186569	● 187507

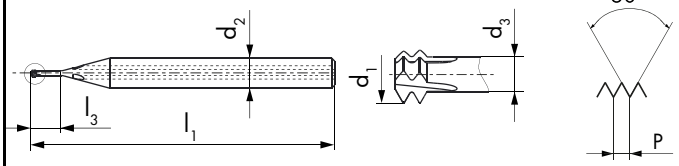
UNJF ISO 3161

VHM CAR | < 3µm | DC | h6

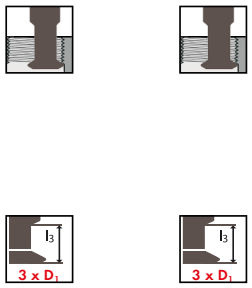
GWi

GWi3067VS

GWi3067VX



GWi3067VS	GWi3067VX		
			



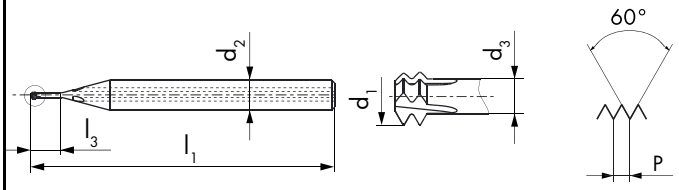
Ø" D1 UNJF	P TPI	d1 mm	l1 mm	l3 mm	d2 h6 mm	d3 mm			ID	ID
8	36	2.99	51	13.8	6	2	4	3.55	● 188837	● 188860
10	32	3.51	51	16	8	2.4	4	4.1	● 188838	● 188861
1/4	28	4.84	51	20.7	8	3.57	4	5.55	● 188839	● 188862
5/16	24	5.95	75	26	6	4.47	5	7	● 188840	● 188863
3/8	24	7.1	83	31	8	5.62	5	8.6	● 188841	● 188864
1/2	20	9.95	95	41	10	8.17	5	11.55	● 188842	● 188865

UNF ASME B1.1

VHM CAR | < 3µm | DC | h6

GWi

GWi3069VS | R10 | VS



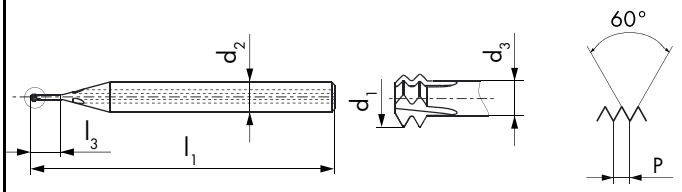
Ø" D_1 UNF	P TPI	d_1 mm	l_1 mm	l_3 mm	d_2 h6 mm	d_3 mm			ID
6	40	2.77	51	15.2	6	1.88	4	2.9	186639
8	36	3.35	51	18	6	2.36	4	3.5	186640
10	32	3.91	51	20.8	8	2.8	4	4.05	186641
12	28	4.44	51	23.6	8	3.17	4	4.6	186642
1/4	28	4.95	51	27.1	8	3.68	4	5.5	186643
5/16	24	5.95	75	34	6	4.47	5	6.9	186644
3/8	24	7.1	83	40	8	5.62	5	8.5	186645
7/16	20	7.95	83	47	8	6.17	5	9.8	186646
1/2	20	9.95	95	54	10	8.17	5	11.4	186647

S NIHS 06-10

VHM CAR | < 3µm | DC | h6

GWi

GWi3066VS	R10	VS	
GWi3066VX	R10	VX	
GWi3067VS	R10	VS	
GWi3067VX	R10	VX	



GWi3066VS	GWi3066VX	GWi3067VS	GWi3067VX
			
			
 2.5 x D1	 2.5 x D1	 3 x D1	 3 x D1

Ø D1 S	P mm	d1 mm	l1 mm	l3 mm	d2 h6 mm	d3 mm			ID	ID
0.8	0.2	0.57	40	2.3	3	0.29	3	0.66[1]	● 194319	● 194329
0.9	0.225	0.64	40	2.6	3	0.33	3	0.74[1]	● 194320	● 194330
1	0.25	0.71	40	2.9	3	0.36	3	0.82[1]	● 194321	● 194331
1.2	0.25	0.91	40	3.4	3	0.56	3	1.02[1]	● 194322	● 194332
1.4	0.3	1.06	40	3.9	4	0.64	3	1.18[1]	● 194323	● 194333

[1] 4H5H → 4H6H = +0.02mm

Ø D1 S	P mm	d1 mm	l1 mm	l3 mm	d2 h6 mm	d3 mm			ID	ID
1.4	0.3	1.06	40	4.6	4	0.64	3	1.18[1]	● 194326	● 194336

[1] 4H5H → 4H6H = +0.02mm

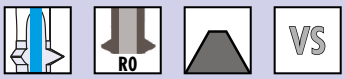
M ISO DIN 14 ISO DIN 13

VHM CAR | < 3µm | DC | h6

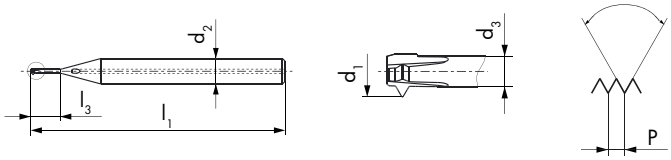
GWi

	GWi5066VS	GWi5067VS		
				

GWi5066VS 

GWi5067VS 

LH-rot. LH-rot.



Ø D_1 M	P mm	d_1 mm	l_1 mm	l_3 mm	d_2 h6 mm	d_3 mm			ID
0.8	0.2	0.55	40	2.3	3	0.27	1	0.58 [1]	189165
0.9	0.225	0.62	40	2.6	3	0.31	1	0.65 [1]	189166
1	0.25	0.66	40	2.9	3	0.31	1	0.7 [1]	189167
1.2	0.25	0.86	40	3.4	3	0.51	1	0.9 [1]	189168
1.4	0.3	1.03	40	4	4	0.61	1	1.05 [1]	189169
1.6	0.35	1.16	40	4.6	4	0.67	1	1.19 [1]	189170
1.8	0.35	1.36	40	5.1	4	0.87	1	1.39 [1]	189171
2	0.4	1.5	40	5.6	4	0.94	1	1.54 [1]	189172
2.5	0.45	1.94	40	7	4	1.31	1	1.98 [1]	189173
3	0.5	2.38	51	8.3	5	1.68	2	2.45 [2]	193422
3.5	0.6	2.75	51	9.7	6	1.91	2	2.85 [2]	193423
4	0.7	3.13	51	11.1	6	2.15	2	3.25 [2]	193424
5	0.8	4	51	13.7	8	2.88	2	4.1 [2]	193425
6	1	4.75	51	16.5	8	3.35	2	4.9 [2]	193426

Ø D_1 M	P mm	d_1 mm	l_1 mm	l_3 mm	d_2 h6 mm	d_3 mm			ID
1.4	0.3	1.03	40	4.7	4	0.61	1	1.05 [1]	189174
1.6	0.35	1.16	40	5.4	4	0.67	1	1.19 [1]	189175
1.8	0.35	1.36	40	6	4	0.87	1	1.39 [1]	189176
2	0.4	1.5	40	6.6	4	0.94	1	1.54 [1]	189177
2.5	0.45	1.94	40	8.2	4	1.31	1	1.98 [1]	189178
3	0.5	2.38	51	9.8	5	1.68	2	2.45 [2]	193432
3.5	0.6	2.75	51	11.4	6	1.91	2	2.85 [2]	193433
4	0.7	3.13	51	13.1	6	2.15	2	3.25 [2]	193434
5	0.8	4	51	16.2	8	2.88	2	4.1 [2]	193435
6	1	4.75	51	19.5	8	3.35	2	4.9 [2]	193436

[1] Tol. = +0/0.02mm / [2] Tol. = +0/0.03mm

UNC ASME B1.1

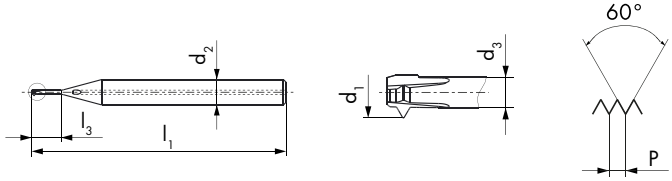
VHM CAR | < 3µm | DC | h6

GWi

GWi5066VS

GWi5067VS

LH-rot.



Ø" D_1 UNC	P TPI	d_1 mm	l_1 mm	l_3 mm	d_2 h6 mm	d_3 mm			ID
4	40	2.05	51	8.1	5	1.16	2	2.15 [1]	● 193427
6	32	2.51	51	10	6	1.4	2	2.65 [1]	● 193428
1/4	20	4.76	51	17.8	8	2.98	2	5 [1]	● 193429

[1] Tol. = +0/0.03mm

GWi5066VS | GWi5067VS

LH-rot.

Ø" D_1 UNC	P TPI	d_1 mm	l_1 mm	l_3 mm	d_2 h6 mm	d_3 mm			ID
4	40	2.05	51	9.5	5	1.16	2	2.15 [1]	● 193437
6	32	2.51	51	11.8	6	1.4	2	2.65 [1]	● 193438
1/4	20	4.76	51	21	8	2.98	2	5 [1]	● 193439

[1] Tol. = +0/0.03mm

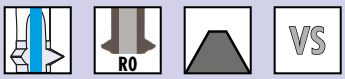
UNF ASME B1.1

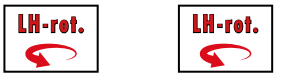
VHM CAR | < 3µm | DC | h6

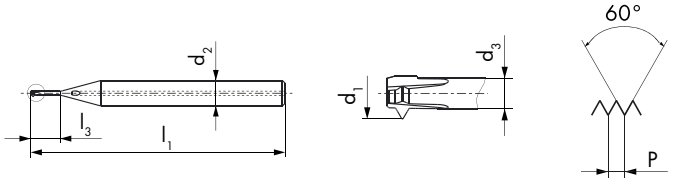
GWi

	GWi5066VS	GWi5067VS		
				

GWi5066VS 

GWi5067VS 





Ø" D_1 UNF	P TPI	d_1 mm	l_1 mm	l_3 mm	d_2 h6 mm	d_3 mm			ID
10	32	3.83	51	13.3	8	2.72	2	3.95 [1]	● 193430
1/4	28	5.22	51	17.3	8	3.95	2	5.4 [1]	● 193431

[1] Tol. = +0/0.03mm

Ø" D_1 UNF	P TPI	d_1 mm	l_1 mm	l_3 mm	d_2 h6 mm	d_3 mm			ID
10	32	3.83	51	15.7	8	2.72	2	3.95 [1]	● 193440
1/4	28	5.22	51	20.5	8	3.95	2	5.4 [1]	● 193441

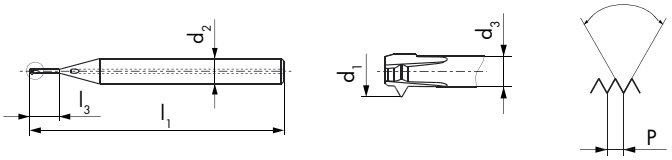
[1] Tol. = +0/0.03mm

S NIHS 06-10

VHM CAR | < 3µm | DC | h6

GWi

GWi5066VS



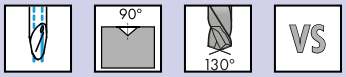
GWi5066VS

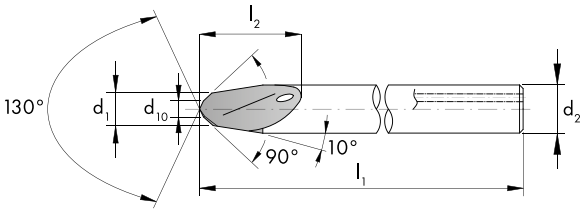
Ø D_1 S	P mm	d_1 mm	l_1 mm	l_3 mm	d_2 h6 mm	d_3 mm			ID
0.8	**0.2**	0.55	40	2.3	3	0.27	1	0.59 [1]	● **189204**
0.9	**0.225**	0.62	40	2.6	3	0.31	1	0.67 [1]	● **189205**
1	**0.25**	0.66	40	2.9	3	0.31	1	0.74 [1]	● **189206**
1.2	**0.25**	0.86	40	3.4	3	0.51	1	0.94 [1]	● **189207**
1.4	**0.3**	1.03	40	4	4	0.61	1	1.09 [1]	● **189208**

[1] **Tol. =** +0/0.01mm

C

C315VS





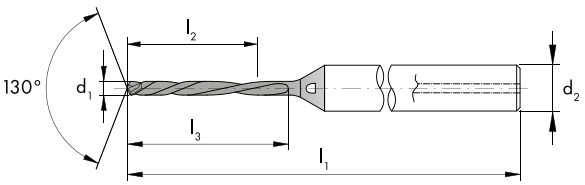
Ø d_1	l_1 mm	l_2 mm	d_2 h6 mm	d_{10} mm		ID
1.4	40	6	3	0.5	2	● 182872
2	40	6.2	3	1	2	● 182873
3	40	6.3	3	1.5	2	● 182874
4	50	8	4	2	2	● 190331
6	60	12	6	3	2	● 190332
8	70	16	8	4	2	● 190333

FZ

FZ315VS


FZ315VS





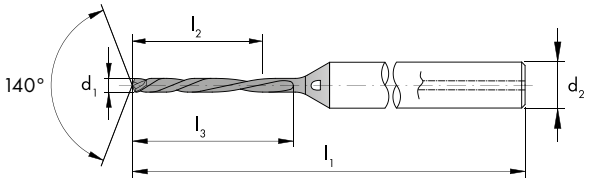
FZ315VS	FZ315VS		
			

Ø d_1	D_1 mm	l_1 mm	l_2 mm	l_3 mm	d_2 h6 mm		ID
0.58	M0.8	42	4.6	5.7	3	2	● 182863
0.59	S0.8	42	4.7	5.8	3	2	● 188023
0.65	M0.9	45	5.2	6.4	3	2	● 182864
0.67	S0.9	45	5.4	6.6	3	2	● 188024
0.7	M1	45	5.6	6.9	3	2	● 182865
0.74	S1	45	5.9	7.3	3	2	● 188025
0.9	M1.2	45	7.2	8.8	3	2	● 182866
0.94	S1.2	48	7.5	9.2	3	2	● 188026
1.05	M1.4	48	8.4	10.3	3	2	● 182867
1.09	S1.4	48	8.7	10.7	3	2	● 188027
1.19	M1.6	48	9.5	11.7	3	2	● 182868
1.39	M1.8	52	11.1	13.6	4	2	● 182869
1.54	M2	55	12.3	15.1	4	2	● 182870
1.98	M2.5	55	15.8	19.4	4	2	● 182871

Ø d_1	D_1 mm	l_1 mm	l_2 mm	l_3 mm	d_2 h6 mm		ID
2.15	UNC4	63	12.9	19.4	4	2	● 190326
2.45	M3	65	14.7	22.1	4	2	● 190321
2.65	UNC6	68	15.9	23.9	4	2	● 190327
2.85	M3.5	68	17.1	25.7	4	2	● 190322
3.25	M4	74	19.5	29.3	6	2	● 190323
3.95	UNF10	78	23.7	35.6	6	2	● 190329
4.1	M5	80	24.6	36.9	6	2	● 190324
4.9	M6	84	29.4	44.1	6	2	● 190325
5	UNC1/4	84	30	45	6	2	● 190328
5.4	UNF1/4	88	32.4	48.6	6	2	● 190330

F

F286VS



Ø d_1 (m7)	D_1 mm	l_1 mm	l_2 mm	l_3 mm	d_2 h6 mm		ID
3.3	M4	66	23	28	6	2	* 160989
4.2	M5	74	29	36	6	2	* 160990
5	M6	82	35	44	6	2	* 160991
6.8	M8	91	43	53	8	2	* 160992
8.5	M10	103	49	61	10	2	* 160993
10.2	M12	118	56	71	12	2	* 160994

VHM CAR | < 3µm | DC | h5/h6

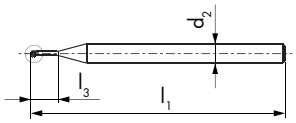
GWH

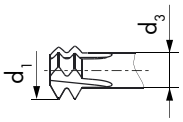
GWH3015VH | GWH3017VH

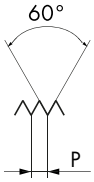
GWH3015VH — RO — VH

GWH3017VH — RO — VH


LH-rot. | LH-rot.





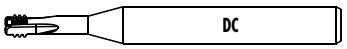
Ø D1 M	P mm	d1 mm	l1 mm	l3 mm	d2 h5 mm	d3 mm			ID
3	0.5	2.4	51	6.8	5	1.7	4	2.5	● 196558
3.5	0.6	2.8	51	7.9	5	1.96	4	2.9	● 196559
4	0.7	3.2	51	9.1	5	2.22	4	3.3	● 196560
5	0.8	4	51	11.2	5	2.88	4	4.2	● 196561
6	1	4.8	51	13.5	5	3.4	4	5	● 196562
8	1.25	6.4	67	18	8[1]	4.65	5	6.8	● 196563
10	1.5	7.95	67	23	8[1]	5.85	5	8.5	● 196564
12	1.75	9.6	76	27	10[1]	7.15	5	10.25	● 196565

[1] Tol. h6

Ø D1 M	P mm	d1 mm	l1 mm	l3 mm	d2 h5 mm	d3 mm			ID
3	0.5	2.4	51	9.8	5	1.7	4	2.5	● 196582
3.5	0.6	2.8	51	11.4	5	1.96	4	2.9	● 196583
4	0.7	3.2	51	13.1	5	2.22	4	3.3	● 196584
5	0.8	4	51	16.2	5	2.88	4	4.2	● 196585
6	1	4.8	51	19.5	5	3.4	4	5	● 196586
8	1.25	6.4	83	26	8[1]	4.65	5	6.8	● 196587
10	1.5	7.95	83	33	8[1]	5.85	5	8.5	● 196588
12	1.75	9.6	95	39	10[1]	7.15	5	10.25	● 196589

[1] Tol. h6

VHM CAR



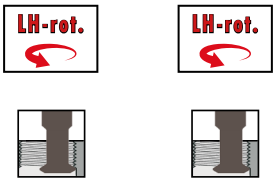
h6

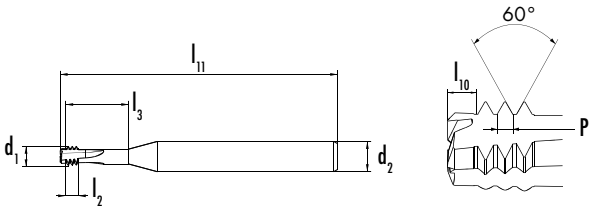
ZBGF

ZBGF6065VS	ZBGF6067VS		

ZBGF6065VS

ZBGF6067VS



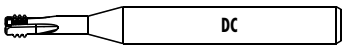


Ø D1 M	P mm	d1 mm	l11 mm	l2 mm	l3 mm	d2 h6 mm	l10 mm		ID
3	0.5	2.43	55	1.5	7.5	4	0.75	3	● 181605
4	0.7	3.05	55	2.1	10.1	6	1.05	3	● 181606
5	0.8	4.08	55	2.4	12.4	6	1.2	3	● 181607
6	1	4.5	64	3	15	6	1.5	4	● 181608
8	1.25	5.95	64	3.75	19.8	6	1.88	4	● 181609
10	1.5	7.95	74	4.5	24.5	8	2.25	4	● 181610
12	1.75	9.95	80	5.25	29.3	10	2.63	4	● 181611
16	2	11.95	92	6	38	12	3	4	● 181612

Ø D1 M	P mm	d1 mm	l11 mm	l2 mm	l3 mm	d2 h6 mm	l10 mm		ID
3	0.5	2.43	55	1.5	10.5	4	0.75	3	● 181613
4	0.7	3.05	55	2.1	14.1	6	1.05	3	● 181614
5	0.8	4.08	55	2.4	17.4	6	1.2	3	● 181615
6	1	4.5	72	3	21	6	1.5	4	● 181616
8	1.25	5.95	72	3.75	27.8	6	1.88	4	● 181617
10	1.5	7.95	90	4.5	34.5	8	2.25	4	● 181618
12	1.75	9.95	102	5.25	41.3	10	2.63	4	● 181619
16	2	11.95	115	6	54	12	3	4	● 181620

UNC ASME B1.1

VHM CAR



h6

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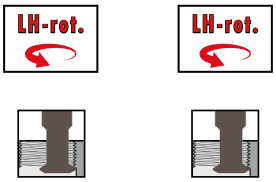
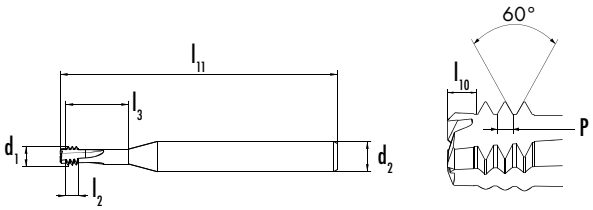


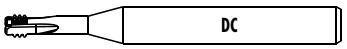


Ø" D_1 UNC	P TPI	d_1 mm	l_{11} mm	l_2 mm	l_3 mm	d_2 h6 mm	l_{10} mm		ID
4	40	2.11	55	1.9	7.6	4	0.95	3	● 183509
6	32	2.59	55	2.4	9.4	4	1.19	3	● 183510
8	32	3.1	55	2.4	10.8	6	1.19	3	● 183511
10	24	3.6	55	3.2	12.9	6	1.59	3	● 183512
1/4	20	4.8	64	3.8	16.6	6	1.91	4	● 183513
5/16	18	5.95	64	4.2	20.2	6	2.12	4	● 183514
3/8	16	7.1	74	4.8	23.9	8	2.38	4	● 183515
1/2	13	9.95	80	5.9	31.3	10	2.93	4	● 183516
5/8	11	11.95	92	6.9	38.7	12	3.46	4	● 183517

Ø" D_1 UNC	P TPI	d_1 mm	l_{11} mm	l_2 mm	l_3 mm	d_2 h6 mm	l_{10} mm		ID
8	32	3.1	55	2.4	14.9	6	1.19	3	● 183520
1/4	20	4.8	72	3.8	22.9	6	1.91	4	● 183522
5/16	18	5.95	72	4.2	28.1	6	2.12	4	● 183523
3/8	16	7.1	90	4.8	33.4	8	2.38	4	● 183524
1/2	13	9.95	102	5.9	44	10	2.93	4	● 183525
5/8	11	11.95	115	6.9	54.6	12	3.46	4	● 183526

UNF ASME B1.1

VHM CAR



h6

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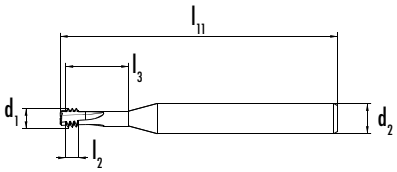

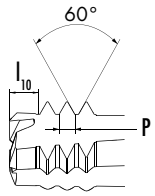

Ø" D_1 UNF	P TPI	d_1 mm	l_{11} mm	l_2 mm	l_3 mm	d_2 h6 mm	l_{10} mm		ID
4	48	2.23	55	1.6	7.3	4	0.79	3	● 183527
8	36	3.1	55	2.1	10.5	6	1.06	3	● 183528
10	32	3.91	55	2.4	12.1	6	1.19	3	● 183529
1/4	28	4.8	64	2.7	15.5	6	1.36	4	● 183530
5/16	24	5.95	64	3.2	19.1	6	1.59	4	● 183531
3/8	24	7.1	74	3.2	22.3	8	1.59	4	● 183532
7/16	20	7.95	74	3.8	26.1	8	1.91	4	● 183533
1/2	20	9.95	80	3.8	29.3	10	1.91	4	● 183534
5/8	18	11.95	92	4.2	36	12	2.12	4	● 183535

Ø" D_1 UNF	P TPI	d_1 mm	l_{11} mm	l_2 mm	l_3 mm	d_2 h6 mm	l_{10} mm		ID
4	48	2.23	55	1.6	10.2	4	0.79	3	● 183536
8	36	3.1	55	2.1	14.7	6	1.06	3	● 183537
10	32	3.91	55	2.4	16.9	6	1.19	3	● 183538
1/4	28	4.8	72	2.7	21.8	6	1.36	4	● 183539
5/16	24	5.95	72	3.2	27	6	1.59	4	● 183540
3/8	24	7.1	90	3.2	31.8	8	1.59	4	● 183541
7/16	20	7.95	90	3.8	37.2	8	1.91	4	● 183542
1/2	20	9.95	102	3.8	42	10	1.91	4	● 183543
5/8	18	11.95	115	4.2	51.9	12	2.12	4	● 183544