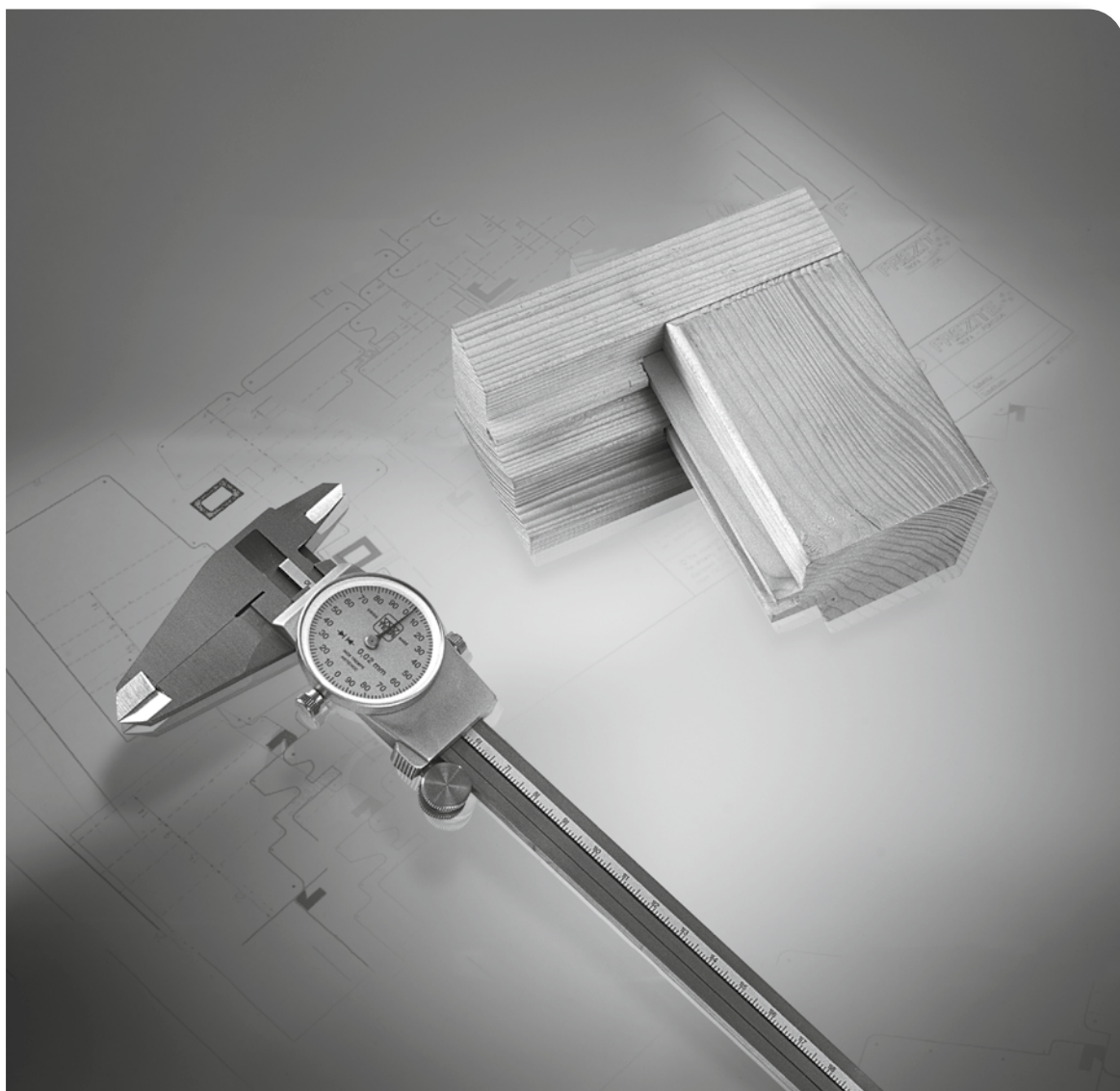


# ProChipper®



tooling systems



**Informationen**  
*Information*

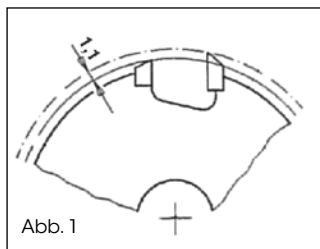


**Konstruktionsmerkmale**

EN 847-1: Maschinen-Werkzeuge für die Holzbearbeitung - Sicherheits-technische Anforderungen.  
Teil 1: Fräs- und Hobelwerkzeuge, Kreissägeblätter.  
Dieser Teil der Europäischen Sicherheitsnorm regelt das Arbeiten an Holzbearbeitungsmaschinen und den Einsatz von Holzbearbeitungswerkzeugen in Bezug auf den aktuellen Stand der Sicherheitstechnik.

**Manueller Vorschub - MAN**

Für Handvorschub ist nur Gegenlaufspannung zulässig!  
Die Werkstücke werden mit der Hand zugeführt und vorgeschoben ohne Verwendung mechanischer Spann- und Zuführrichtungen.  
Konstruktionsmerkmale MAN:  
Spandickenbegrenzung mit einem Schneidenüberstand von maximal 1,1 mm über die gesamte Schneidprofillänge bei "Nichtrundform" (Abb.1) und von maximal 3,0 mm bei "kreisrunder" Werkzeugform (Abb.2).  
Die Werkzeuge sind mit der maximalen und minimalen Drehzahl, sowie mit "MAN" gekennzeichnet.

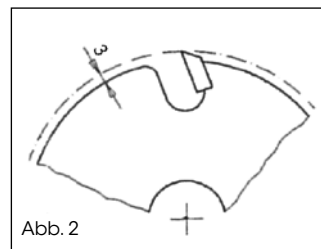


**Construction Specifications**

EN 847-1 :Tools for woodworking. Safety requirements.  
Part 1: Milling tools and circular saw blades.  
This standard is applicable to all hazards arising from the design and use of tools for woodworking machines, and describes the methods for the elimination or reduction of these hazards by tool design and by the provision of information.

**MAN - Manual Feed**

Cutters for working on single machines with manual feed. These tools are designed to achieve the specific purpose of protecting the operator on the manual feed:  
• Major reduction of the injuries, in case of contact with the tool in motion.  
• Reduction of the danger of wood kickback when machining. These cutters are designed with:  
• Not round form tool, with deflector, where the maximum difference between the cutting edge is 1,1 mm (Fig.1)  
• Round form tool, with maximum way out for the cutting edge of 3mm (Fig.2).  
All cutters are marked with maximum and minimum working rotation. This kind of tools is identified with the marking "MAN".

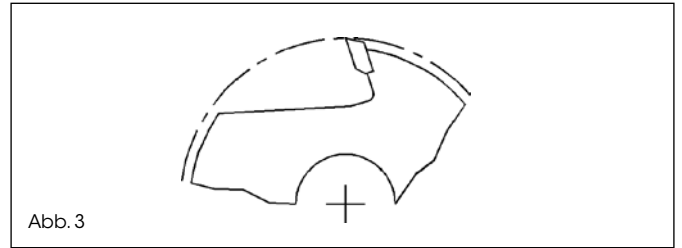


**Mechanischer Vorschub - MEC**

Die Werkstücke werden durch kraftbetriebene Spann- und Zuführrichtungen vorgeschoben.  
Konstruktionsmerkmale MEC:  
Keine Spandickenbegrenzung, d.h., der Schneidenüberstand ist nicht begrenzt.  
Die Werkzeuge sind mit der maximalen Drehzahl, sowie mit "MEC" gekennzeichnet. (Abb.3)

**MEC - Mechanical Feed**

Cutters meant for working in machines with automatic working and feed cycle. All cutters are marked with maximum admissible rotation (Fig.3). This kind of tools is identified with the marking "MEC"

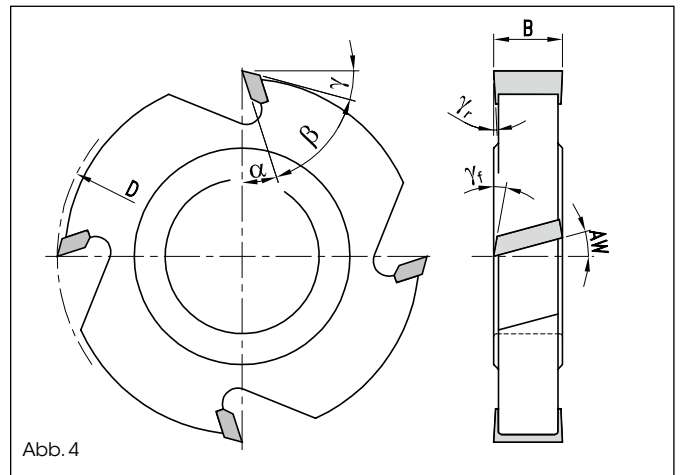


**Terminologie**

- $\alpha$  - Spanwinkel
- $\beta$  - Keilwinkel
- $\gamma$  - Rückenfreiwinkel
- K - Fasefreiwinkel
- AW - Achswinkel (Brustschräge)
- yf - Flankenfreiwinkel
- yr - Radialfreiwinkel
- B - Werkzeugbreite/ Schneidlänge

**Terminology**

- $\alpha$  - Cutting angle
- $\beta$  - Working angle
- $\gamma$  - Front outlet angle
- K - alternating angle
- AW - Axial cut angle
- yf - Sidely outlet cut
- yr - Across outlet angle
- B - Cutter width/ Knife length



- b - Grundkörperstärke
- C - Fase/Rundmesser
- d - Bohrungsdurchmesser
- D - Werkzeugdurchmesser
- Db - Basisdurchmesser
- DKN - Doppelkeilnute
- H - Messerhöhe
- HB - Materialstärke
- Hn - Negative Helix (Spirale)
- Hp - Positive Helix (Spirale)
- I - Nutmesser
- INF - Unten liegend
- KN - Keilnut
- KS - Kühlschlitz
- KSB - Kreissägeblatt
- L1 - Gesamtlänge
- L2 - Nutzlänge
- LH - Linkslauf
- MAN - Manueller Vorschub
- MEC - Mechanischer Vorschub
- ML - Mitnahmeloeh
- n - Drehzahl (RPM)
- nmax - Maximale Drehzahl
- P - Profil
- Pt - Profiltiefe

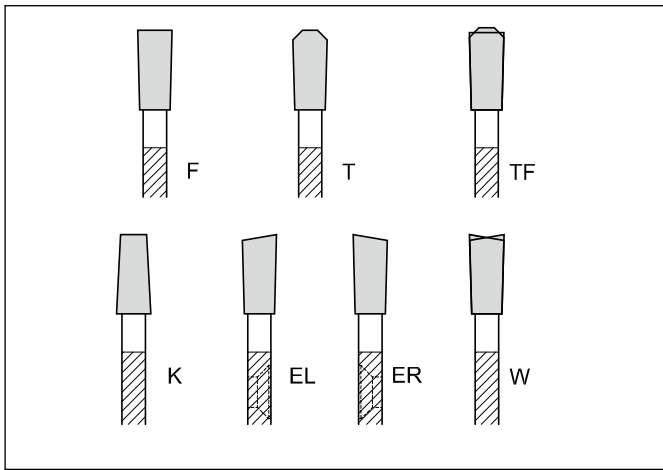
- b - Body thickness
- C - Chamfering/Rounding knife
- d - Bore
- D - Cutter diameter
- Db - Base diameter
- DKN - Double Keyway
- H - Knife length
- HB - Wood thickness
- Hn - Negative helix
- Hp - Positive helix
- I - Grooving knife
- INF - Inferior position
- KN - Keyway
- KS - Frigovit cooling slot
- KSB - circular sawblade
- L1 - Total length
- L2 - Cutting length
- LH - Left hand rotation
- MAN - Manual feed
- MEC - Mechanical feed
- ML - Pinhole
- n - R.P.M.
- nmax - maximum R.P.M.
- P - Profile
- Pt - Profile depth



R	- Radius	R	- Radius
RH	- Rechtslauf	RH	- Right hand
Rz	- Räumschneiden	Rz	- Wipers
S	- Schaftdurchmesser/ Messerstärke	S	- Shank diameter/ Knife thickness
SDB	- Spandickenbegrenzt	SDB	- With chip thickness limitation
SUP	- Oben liegend	SUP	- Superior cutting position
t	- Teilung	t	- Pitch
T	- Eingriffstiefe	T	- Grooving depth
TK	- Teilkreis	TK	- Grooving circle
V	- Anzahl Vorschneider	V	- Spurs
Z	- Zähnezahl	Z	- Edges
ZB	- Zerspanbreite	ZB	- Hogger width
ZS	- Anzahl Zerspanersegmente	ZS	- Hogger segments
α	- Winkel	α	- Bevel / Chamfer / angle

**Zahnformen an HW Kreissägen**

**Circular Saw blades Tooth shapes**



F	- Flachzahn	F	- Flat tooth
T	- Trapezzahn	T	- Trapezoidal tooth
TF	- Trapez-Flachzahn	TF	- Trapezoidal-flat teeth
K	- Konischer Zahn	K	- Conical tooth
ER	- Einseitig spitz, rechts	ER	- Top bevel tooth, right hand side
EL	- Einseitig spitz, links	EL	- Top bevel tooth, left hand side
W	- Wechselzahn	W	- Alternative top bevel teeth

**Werkzeug-Drehrichtung**

• Rechtslauf (RH)  
Vom Antrieb aus gesehen rechtsdrehend ("rechte-Hand-Regel"). Bei Sicht auf die Schneiden entgegen dem Uhrzeigersinn laufend. (Abb.5)  
• Linkslauf (LH)  
Vom Antrieb aus gesehen linksdrehend ("linke-Hand-Regel"). Bei Sicht auf die Schneiden mit dem Uhrzeiger laufend. (Abb. 6)

**Cutter rotation sense**

• Right hand rotation (RH)  
Top view on tool: counter clockwise rotation. (Fig. 5)  
• Left hand rotation (LH)  
Top view on tool: clockwise rotation. (Fig.6)

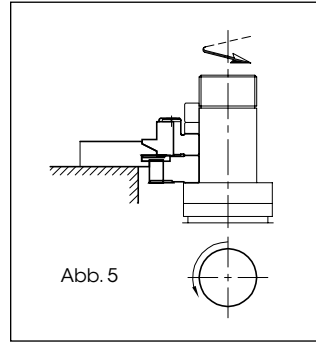


Abb. 5

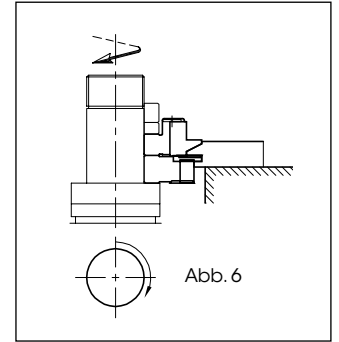


Abb. 6

**Schaftwerkzeuge**

• Linkslauf (LH)  
Vom Antrieb aus gesehen linksdrehend ("linke-Hand-Regel"). Bei Sicht auf Schaftende. (Abb.7)  
• Rechtslauf (RH)  
Vom Antrieb aus gesehen rechtsdrehend ("rechte-Hand-Regel"). Bei Sicht auf Schaftende. (Abb.8)

**Shank tools**

• Left hand rotation (LH)  
Counter-clockwise rotation when viewed on top of the shank. (Fig.7)  
• Righthand rotation (RH)  
Clockwise rotation when viewed on top of the shank. (Fig.8)

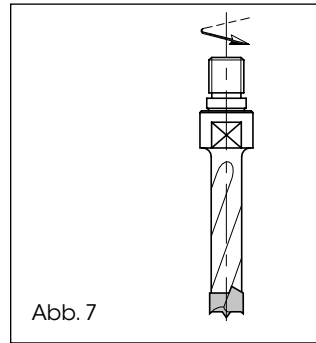


Abb. 7

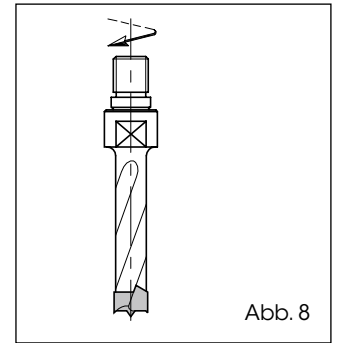


Abb. 8

**Zerspaner**

• Linke Zerspaner (LH) arbeiten auf der linken Seite der Maschine (Abb.9).  
• Rechte Zerspaner (RH) arbeiten auf der rechten Seite der Maschine (Abb.10)

**Hoggers**

• Left-hand hoggers (LH) work on the left side of the machine (Fig.9)  
• Right-hand hoggers (RH) work on the right side of the machine (Fig.10)

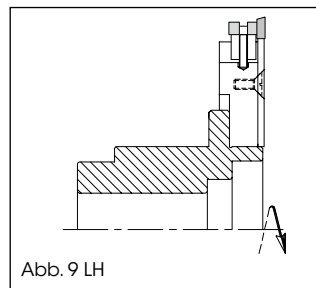


Abb. 9 LH

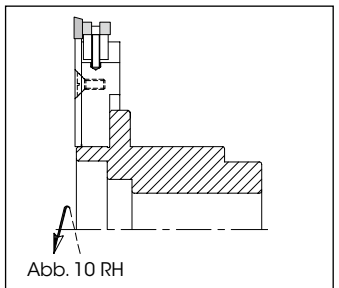


Abb. 10 RH

**Eingriffskinetik**

• Gegenlauf  
Die Schnittbewegung des Werkzeuges und die Vorschubbewegung des Werkstückes sind einander entgegengesetzt. (Abb.11)  
Für Handvorschub ist nur Gegenlaufspannung zulässig!

**Feed direction**

• Cutter working against the feed  
On the type of work the cutter and the wood movements are opposite to each other. The advantage on this would be the nice finishing for favourable cutting angles and the disadvantage is on the cutting against the wood grain. This type of cut is the only possible for manual feed (Fig. 11)



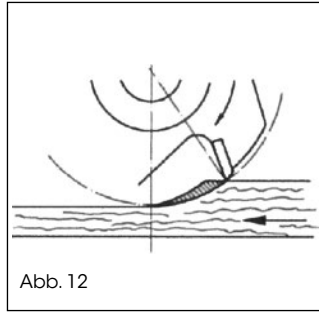
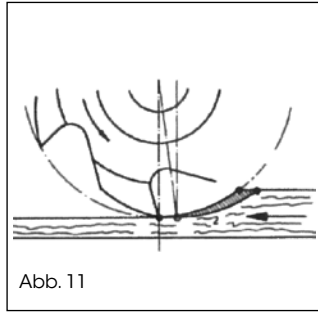
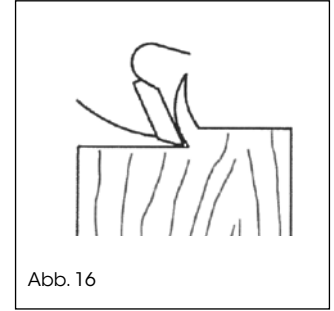
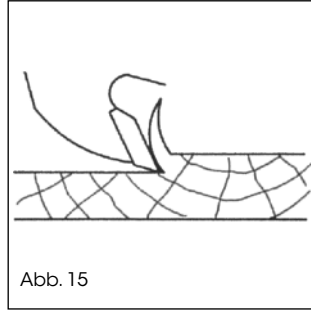


**Mechanischer Vorschub - MEC**

Die Schnittbewegung des Werkzeuges und die Vorschubbewegung des Werkstückes stimmen überein. Nur für maschinellen Vorschub geeignet! (Abb.12)

**Cutter working with the feed**

On this type of work, cutter and wood movements are in the same sense. Enables well finished surfaces when cutting towards the grain of the wood, requiring a small feed power and allowing higher feed speeds. It has the limitation of being able to work only on machines which tool feed is mechanical (over the total length of the tool. (Fig. 12)



**Schnitttrichtung**

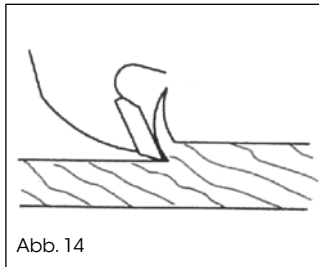
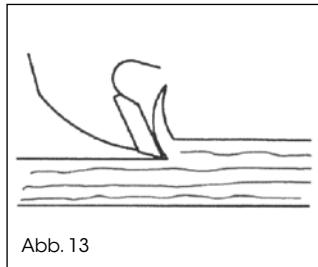
Längsschnitt mit der Faser (Abb.13) Leichte Bearbeitung, glatte Oberfläche und hohe Vorschubgeschwindigkeit möglich.

**Cutting sense**

Cutting towards the grain. Easy cut, producing a good quality surface and possible with high feed speeds. (Fig. 13)

Längsschnitt gegen die Faser. Schwierige Bearbeitung wegen Vorspaltung. Möglichst diese Schnitttrichtung vermeiden. (Abb.14)

Cutting against the grain. Difficult cut, as fibres tend to lift. If possible avoid this type of work. (Fig. 14)



Querschnitt Bearbeitung einfach, jedoch leicht raue Oberfläche. (Abb.15)

Cross cut. Teeth cut easily, but leave a rough surface (fig.15).

Hirnschnitt-stirnseitig Der Winkel zwischen der Bewegungsrichtung der Schneide und der Faserebene ist 90°. Bearbeitung schwer, leicht raue Oberfläche. (Abb.16)

Cutting against the grain Rotation of teeth 90° to direction of grain. Difficult cutting, rough surface. Only possible with low feed speeds. (Fig.16)

**Vorschubgeschwindigkeit**

Geschwindigkeit mit der das Werkstück dem Werkzeug oder das Werkzeug dem festgespannten Werkstück zugeführt wird.

**Cutting feed**

The quality to be obtained on a surface is associated to the cutting feed especially of each tooth feed and the number of teeth of the tool.

Durch die Faktoren Zähnezah, Drehzahl und Zahnvorschub fz (aus Tabelle) wird die optimale Vorschubgeschwindigkeit ermittelt. (Abb.19)

The feed speed can be easily calculated as following and determined by the diagram (Fig.19)

$$V_f = \frac{fz \cdot Z \cdot n}{1.000}$$

- $V_f$  - Vorschubgeschwindigkeit (m/min)
- Z - Zähnezahl
- n - Drehzahl (1/min)
- fz - Vorschub je Zahn (mm)

- $V_f$  - Feed speed (m/min)
- Z - Number of teeth
- n - RPM (1/min)
- fz - Feed per tip (mm)

Bei der Auswahl des Zahnvorschubes wird zwischen der Bearbeitung ohne Werkzeugüberstand (Kreissägen) unterschieden. (Abb.17)

To choose the feed per tip it makes a difference if working with (sawing) or without hangover (milling). (Fig.17)

Für die Bearbeitung von Weichholz längs gelten folgende Werte:

To work softwood, please see the values below:

	Sägen (mm) <i>Sawing</i>	Fräsen (mm) <i>Milling/Planing</i>
Grobe Spanungsgüte <i>Rough finishing</i>	0,8 - 2,5	2,5 - 5,0
Mittlere Spanungsgüte <i>Medium finishing</i>	0,4 - 0,8	0,8 - 2,5
Feine Spanungsgüte <i>Fine finishing</i>	0,1 - 0,4	0,3 - 0,8

Abb. 17

Beispiel:  
Für einen Fräser mit 4 Zähnen aus Hartmetall (HW), mit Durchmesser 140mm und einer Drehzahl von 6.000 Umdrehungen, ist für die Endbearbeitung (schlichten) der Werkstückvorschub zu ermitteln.

Example:  
A cutter with 4 edges in Hard Metal, with 140mm diameter turning at 6.000 rpm for a finishing work. What is the cutting feed?

$$V_f = \frac{0,4 \times 4 \times 6.000}{1.000} = 9,6 \text{ m/min}$$

- fz = 0,4 mm (siehe Tabelle)
- Z = 4 Zähnezahl
- N = 6.000 Umdrehungen/Minute

- fz = 0,4 mm/r.p.m.
- Z = 4 teeth
- n = 6.000 r.p.m

Siehe auch Abb. 19.

By graphic calculation, see Fig.19.



**Schnittgeschwindigkeit**

Die Schnittgeschwindigkeit ist abhängig vom zu bearbeitenden Werkstoff, sie wird bestimmt von der Drehzahl und dem Durchmesser des Werkzeuges. Die Schnittgeschwindigkeit wird angegeben in m/s und errechnet sich nach folgender Formel:

$$V_c = \frac{D \cdot \pi \cdot n}{60.000} \text{ m/s}$$

- D - Werkzeugdurchmesser in mm.
- n - Drehzahl pro Minute
- $\pi$  - Konstante 3,14

Die Wahl einer günstigen Schnittgeschwindigkeit ist für das Erzielen eines guten Arbeitsergebnisses von Bedeutung.

Aus Abb.18+20 können Richtwerte für die Schnittgeschwindigkeit abgelesen werden:

**Cutting speed**

The cutting speed, i.e. the speed of the cutter edge radius is calculated considering the diameter of the cutter on the cutting point and in the number of rotations (angular speed). It is calculated from the formula:

- D - External diameter in mm
- n - Number of rotations per min.
- $\pi$  - Constant = 3,14

The diagram of Fig. 18+20, recommends cutting speed values in each specific case.

Recommended speeds for different kinds of materials:

Werkstoff - Material	V <sub>c</sub> (Hs) (m/s)	V <sub>c</sub> (HW) (m/s)
Weichholz - Soft wood	50 - 80	60 - 90
Hartholz - Hard wood	40 - 60	50 - 80
Spanplatte - Chipboard	-	60 - 80
Sperrholz - Plywood	-	60 - 80
Thermoplaste - Thermoplastics	-	40 - 60
Aluminium - Aluminium	15-45	25 - 60

Abb. 18

**Sicherheitshinweise**

Die Werkzeuge sind konform zu europäischen Norm EN847-1 hergestellt. Beim Umgang mit Maschinenwerkzeugen besteht durch die sehr scharfen Schneiden Verletzungsgefahr. Der Werkzeugeinbau und die Bedienung der Maschine darf nur durch sicherheitsmäßig unterwiesenes, sachkundiges Personal erfolgen.

Die Maschine ist gegen unbeabsichtigtes Einschalten zu sichern: Es dürfen nur Werkzeuge verwendet werden, die aufgrund ihrer Abmessung als zuverlässig gekennzeichnet sind.

Alle Teile einer Werkzeugkombination müssen für die vorgesehene Drehzahl zulässig sein.

Werkzeuge mit sichtbarem Verschleiß und Beschädigungen dürfen nicht verwendet werden.

Es empfiehlt sich Schutzhandschuhe zu tragen, um Schnittverletzungen zu vermeiden.

Die Werkzeugbefestigung hat mit den vom Maschinenhersteller vorgesehenen Spannmitteln zu erfolgen. Etwaige Anzugsdrehmomentangaben sind zu beachten und dürfen nicht überschritten werden. Das Werkzeug ist mit richtiger Drehrichtung einzubauen.

Während der Benutzung: Regelmäßig Schneidenschleiß kontrollieren. Oft genügt eine Reinigung der werkzeug von Aufbauschneide, Harzansatz, um temporär verbesserte Ergebnisse zu erzielen.

**Safety regulations**

A wood cutter is considered a dangerous tool, due to its positive cutting angles, sharp cutting edges, and high working speeds.

As the manufacturer protects the tools against transport damages, also the user should have maximum care with the handling of the tool. The placement of the tools in a hard base may cause small cracks or even complete breakage of the cutting edge.

The tool and its fitting on the machine should be very well cleaned. The assembly and placement of the tool should only be made using grind spacers. Also assure that the fitting between the tool bore and the spindle is dirt free, in order to allow a smooth fitting of the tool in the spindle.

Assure that all the clamping screws that the tool has all of the cutting edges in perfect conditions. Control the sense of rotation.

Compare the rotations admitted on the tool, with the ones selected on the machine.

All the equipments should have the proper protections, according with the applied law. Use the proper protection for each type of job.

During use: Control the wear of the tool. During the cut, chips of wood together with resin are glued in the cutting edges. This will provoke the reduction of the cutting angle, causing the diminishing of the capacity to remove the chips and consequently increasing the cutting effort. The cutter should be cleaned up frequently.





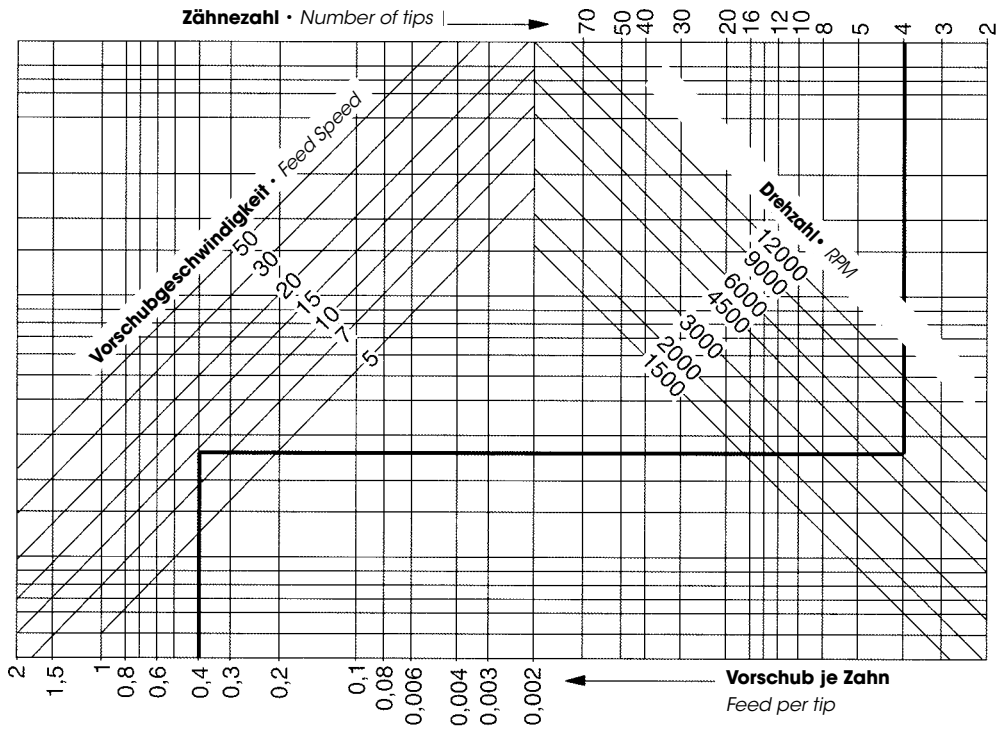


Abb.19

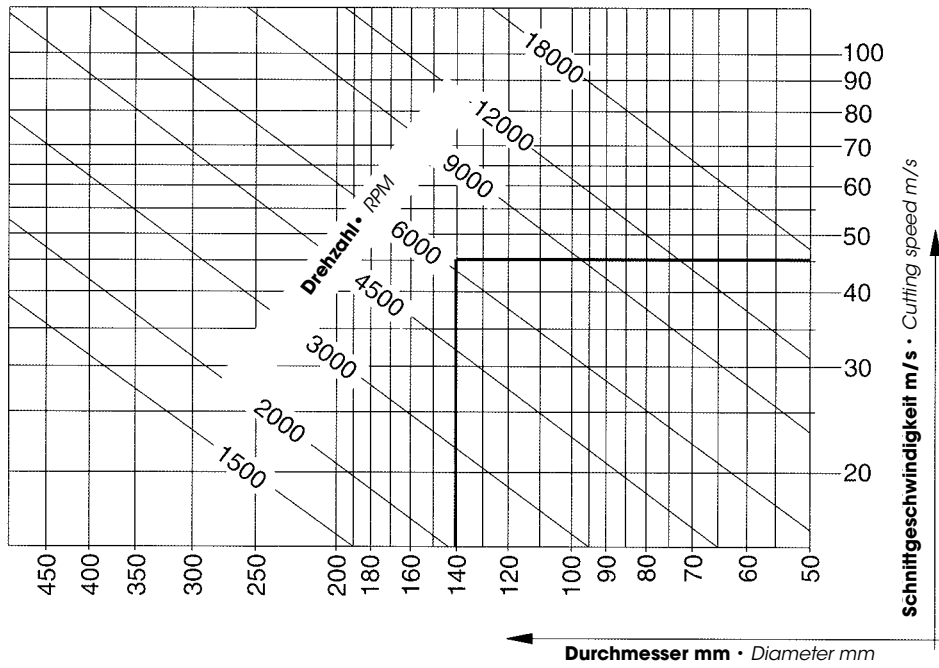


Abb.20



**Art. 1****Conclusion and subject of the agreement**

The general terms and conditions of business and delivery below shall apply exclusively – even if no reference is made to them in the individual case – to all our offers, deliveries, services and work performed, and in particular also to future business transactions. Any deviating provisions agreed shall require to be confirmed by us in writing in order to be valid. The aforementioned clause requiring the written form may only be dispensed with in writing. Deviating General Terms and Conditions of Business of the Customer shall not be applicable, even if we do not expressly contradict them in the individual case. Our Conditions of Sale shall only apply to companies within the meaning of Sec. 310 (1) German Civil Code (BGB).

**Art. 2****Offers and conclusion of the agreement**

(1) All our offers and cost estimates are non-binding and subject to change without notice. For the conclusion of the agreement, our written order confirmation shall be pertinent. Measurements, weights, figures and drawings, or any other details, shall only be binding, in regard to the execution of the order, if the latter have explicitly been confirmed in writing. The technical data pertaining to our own products, as well as those to be found in our commercial range, shall apply subject to change.

(2) For the scope of the order, solely our written order confirmation shall be pertinent. Any subsequent additions, amendments or other subsidiary agreements shall require to be confirmed by us in writing in order to be valid.

(3) Unless they are marked to the contrary, all measurements will be given in millimetres. Tolerances shall be in accordance with the applicable DIN standards, or otherwise ProLock works standards.

**Art. 3 Prices**

(1) Prices agreed are in euros, exclusive of VAT, packaging, freight, postage and insurance. Value Added Tax, at the respective statutory rate, will be added to the prices.

(2) The numbers of items, quantities and weights ascertained by us shall be pertinent for calculating the net prices, unless the recipient immediately contests the latter. The unit prices shall apply to the standard execution types specified. When repeat orders are placed for specially-designed goods, we reserve the right to recalculate the price each time.

(3) We charge for tool sets consisting of combinations in accordance with the price lists for individual tools. For combinations of tools that are not included in the price list, a surcharge in the amount of our general rates is applied for adapting them in line with the intended function.

(4) The net value of goods invoiced by us shall be pertinent for calculating shipping and packing costs. Domestic orders: For orders under EUR 300.00 we charge for shipping and packing depending on the weight. As from a net value of goods of EUR 300.00 we deliver free of any shipping and packing costs up to a weight of 30 kg. Any additional costs incurred for express delivery are to be borne by the customer, as well as any special forms of packaging and despatch in line with the customer's wishes.

Orders from abroad: Packing and shipping costs are charged ex works.

(5) We shall be entitled to charge the customer the usual costs of a creditworthiness check.

(6) Should any costs relating to the order change considerably after concluding the transaction, the contracting parties shall be obliged to agree upon a price adjustment. A change in costs shall be deemed considerable if the respective charges increase or decrease by over 20%. Should no agreement be reached, we shall be entitled to withdraw from the contract within two weeks of the negotiations failing.

**Art. 4 Terms of payment**

(1) Unless anything to the contrary has been agreed, the amount invoiced shall be due for payment within 10 days of invoicing with a 2% cash discount or at the latest within 30 days of invoicing without any deduction. Work contracted out (e.g. repairs, services) shall be due for payment immediately upon invoicing, without any deduction. The aforementioned payment deadlines shall be deemed to have been complied only to the extent that we are able to access and use the funds within these deadlines. Payments must be made to our paying agent without any additional costs for us. Payment in cash shall be equivalent to payment to one of our business accounts once we are able to access and use the funds.

(2) Offsetting shall only be permissible with undisputed claims or any which have been established with legal finality. The customer shall have no right of retention unless it is based on the same contractual relationship.

(3) We shall be entitled to request payments to account for services provided.

(4) In the case of first orders, we shall only deliver in return for advance payment or cash on delivery.

**Art. 5 Delivery**

(1) Unless anything to the contrary has explicitly been agreed, we shall deliver ex works or distribution centre.

(2) Said delivery dates shall only be deemed non-binding orientational data, unless they have expressly been designated binding.

(3) The delivery deadline shall commence upon the order confirmation being submitted, however not prior to the customer producing any applicable documentation, authorisations and clearances to be obtained or prior to receipt of any deposit agreed.

(4) The delivery deadline is deemed to have been adhered to if the items to be delivered have left the factory prior to its expiry or readiness for despatch has been notified to the customer.

(5) Unforeseen events that are beyond our control (e.g. disruptions to business, strikes or lock-outs at either our premises or those of one of our suppliers or carriers) shall extend the delivery time accordingly. The same shall apply in the event of any retrospective changes to the order.

(6) We can only guarantee delivery times subject to timely and proper deliveries from our own suppliers. We shall be entitled to deliver prematurely or make partial deliveries, and also to issue interim invoices. We shall, moreover, be entitled to alter the agreed contractual items or deviate from its description if such alteration or deviation is reasonable for the customer, taking into account our interests.

(7) Should the delivery be delayed at the customer's wish, or should the customer default in formally accepting the deliveries in good time, any storage costs incurred shall be charged to the customer as from the calendar month following the notification of the contractual items being ready for acceptance. We shall, however, be entitled, following the setting and fruitless expiry of a reasonable deadline, to make use of the contractual items and/or to re-deliver them to the Customer with a reasonably extended deadline.

(8) We shall not be in default if the customer, on its part, is late in providing information that is necessary for us to be able to execute the contract.

(8) Call-off orders shall be accepted in full, subject to any agreement to the contrary, within three months of the order being confirmed. Following the expiry of this period, the residual or entire delivery shall be made at the customer's expense. The Customer shall be obliged to take delivery of the item purchased. Clause 8 of this Article shall apply *mutatis mutandis*.

(10) We reserve the right to deliver more or less than the quantity ordered, within a reasonable scope.

**Art. 6 Passing of risk**

(1) The risk shall pass to the customer once the contractual items leave our works or warehouse, regardless of whether by means of our own transport or third party transport.

(2) Should the delivery be delayed due to a circumstance that is the customer's fault, the risk shall pass to the customer upon the notification being issued that the contractual items are ready for acceptance. The latter shall also apply if partial deliveries are made, or if we have agreed to perform other services, e.g. relating to the shipping costs, making delivery or installation.

(3) Deliveries shall not be insured against breakage or damage in transit, fire, theft, etc., unless the customer specifically requests it. Should the customer request that insurance be concluded, the latter shall be concluded at the customer's expense.

**Art. 7 Reservation of ownership**

(1) We reserve our ownership in all items purchased until such time as payment of all present and future claims arising from the business connection with the customer has been made in full. The latter shall apply without regard to the legal grounds or the time at which such claims arise, i.e. in particular also to any claims arising from bills of exchange, cheques, money orders or the balance to be settled by the customer arising from an existing current account held with us.

(2) The customer may neither pledge items ordered that are subject to a reservation of ownership, nor assign them by way of security. In the case of distraint, seizure or any other dispositions by a third party, the customer shall be required to inform us without delay. It may only sell on contractual items that are subject to reservation of ownership in the orderly course of business, as long as the claim arising from the re-sale passes to us. In the event of selling the items on, the customer already at this point assigns to us its claims arising from the resale of contractual items, including the corresponding receivables arising from bills of exchange or cheques, along with any ancillary rights. In the event of an item ordered being sold together with





**ProLock**®



tool system

**ProLock Werkzeugsysteme GmbH & Co. KG**  
Gartenstraße 95  
D-72458 Albstadt-Ebingen  
Tel +49 74 31 / 13 43 1-0  
Fax +49 74 31 / 13 43 1-11  
[www.pro-lock.de](http://www.pro-lock.de)  
[info@pro-lock.de](mailto:info@pro-lock.de)

09/2024