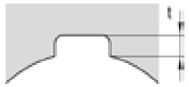
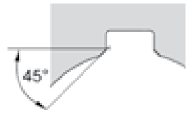
Type SH117 - Holder can be located directly in the turret and m/c spindle

Broaching



Chamfering

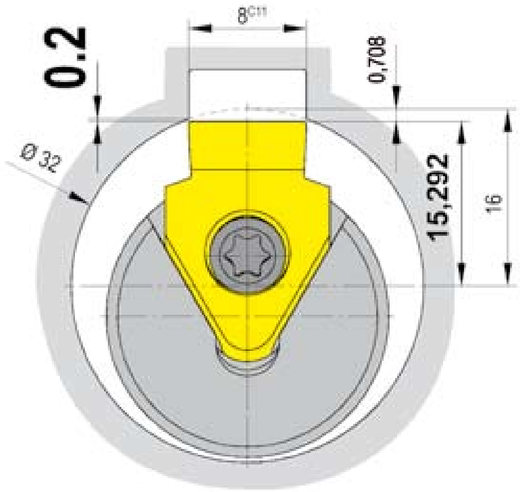


Dimensions DIN				Broaching						Chamfering				
Width	Tolerance grade	D_{min}	t	Inserts	w	Toolholder	Tool length l_2 .1.	.2.	.3.	Inserts	Toolholder	Tool length l_2 .1.	.2.	.3.
6	C11	22	2,6	S117.0610.22	6,12	SH117.0025...10	50	70		S117.3045.10	SH117.0025...10	50	70	
7	C11	27	3,3	S117.0710.27	7,13	SH117.0025...10	50	70		S117.3045.10	SH117.0025...10	50	70	
8	C11	32	3,4	S117.0810.32	8,13	SH117.0025...10	50	70		S117.3045.10	SH117.0025...10	50	70	
10	C11	40	4,2	S117.1014.40	10,13	SH117.0032...16	50	75	100	S117.6045.14	SH117.0032...16	50	75	100
12	C11	50	5,1	S117.1214.50	12,15	SH117.0032...16	50	75	100	S117.6045.14	SH117.0032...16	50	75	100
16	C11	70	6,6	S117.1614.70	12,15	SH117.0032...16	50	75	100	S117.6045.14	SH117.0032...16	50	75	100
24	C11	100	8,5	S117.2414.100	12,15	SH117.0032...16	50	75	100	S117.6045.14	SH117.0032...16	50	75	100
5	P9	17	2,7	S117.0497.02.10	4,98	SH117.1725...10	40	55		S117.1545.10	SH117.1725...10	40	55	
6	P9	17	3,4	S117.0597.02.10	5,98	SH117.1725...10	40	55		S117.1545.10	SH117.1725...10	40	55	
8	P9	22	4,1	S117.0796.02.10	7,98	SH117.0025...10	50	70		S117.3045.10	SH117.0025...10	50	70	
10	P9	30	4,2	S117.0996.03.14	9,98	SH117.3032...16	50	75	100	S117.6045.14	SH117.3032...16	50	75	100
12	P9	38	5,7	S117.1196.03.14	11,97	SH117.0032...16	50	75	100	S117.6045.14	SH117.0032...16	50	75	100
14	P9	40	6,8	S117.1396.03.16	13,97	SH117.4032...16	50	75	100	S117.6045.14	SH117.0032...16	50	75	100
5	JS9	17	2,7	S117.0500.02.10	5,01	SH117.1725...10	40	55		S117.1545.10	SH117.1725...10	40	55	
6	JS9	17	3,4	S117.0600.02.10	6,01	SH117.1725...10	40	55		S117.1545.10	SH117.1725...10	40	55	
8	JS9	22	4,1	S117.0800.02.10	8,01	SH117.0025...10	50	70		S117.3045.10	SH117.0025...10	50	70	
10	JS9	30	4,2	S117.1000.03.14	10,01	SH117.3032...16	50	75	100	S117.6045.14	SH117.3032...16	50	75	100
12	JS9	38	5,7	S117.1200.03.14	12,01	SH117.0032...16	50	75	100	S117.6045.14	SH117.0032...16	50	75	100
12	JS9	38	8,5	S117.1200.05.14	12,00	SH117.0032...16	50	75	100	S117.6045.14	SH117.0032...16	50	75	100
14	JS9	40	6,8	S117.1400.03.16	14,01	SH117.4032...16	50	75	100	S117.6045.14	SH117.0032...16	50	75	100

Application Tips:

- It is important to use a machine with mechanical spindle lock.
- The use of proper coolant is key to a goo surface finish long` tool life as well as chip evacuation.
- A relief groove or the possibility for a "ramp down" exit out of the cut is necessary at the end of the broached groove.
- Setting of the tool if very important. Double check the component diameter before taking the first pass.
- The tool should be set at the 12 o'clock position to ensure that chips fall away from the groove.
- Take an accurate measurement of the insert and program the dimension into the machine tool parameter.
- osition the tool at the start position of the first stroke an d program a stop to perform a visual check to assure a collision free first pass of the tool

Machining example:
Bore diameter 32 mm, groove width 8 mm:
At a radius of 16 mm and with a clearance of 0,2 mm for safety at the r 0,2 mm corner radii, the tool has to be set at 15,292 mm in X-axis to avoid any collision at the beginning of the process.



Calculation of the start position b_1:

$c^2 = a^2 + b^2$

$b^2 = c^2 - a^2$

$b = \sqrt{c^2 - a^2}$

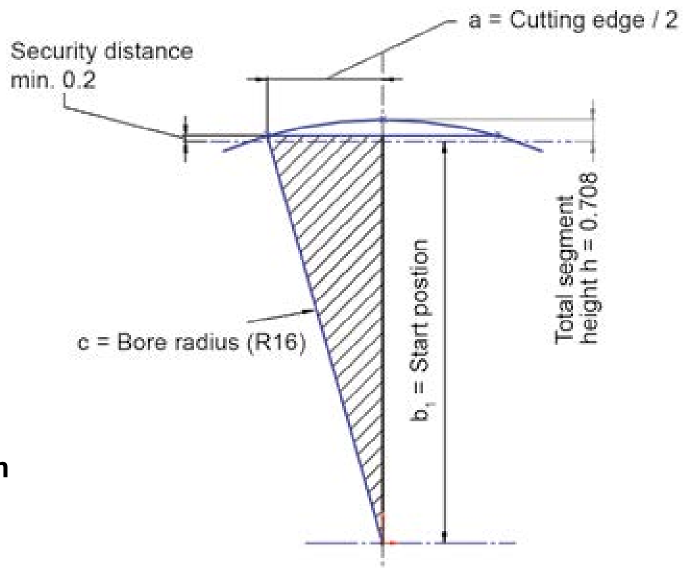
$b = \sqrt{16^2 - 4^2}$

$b = 15{,}491933$

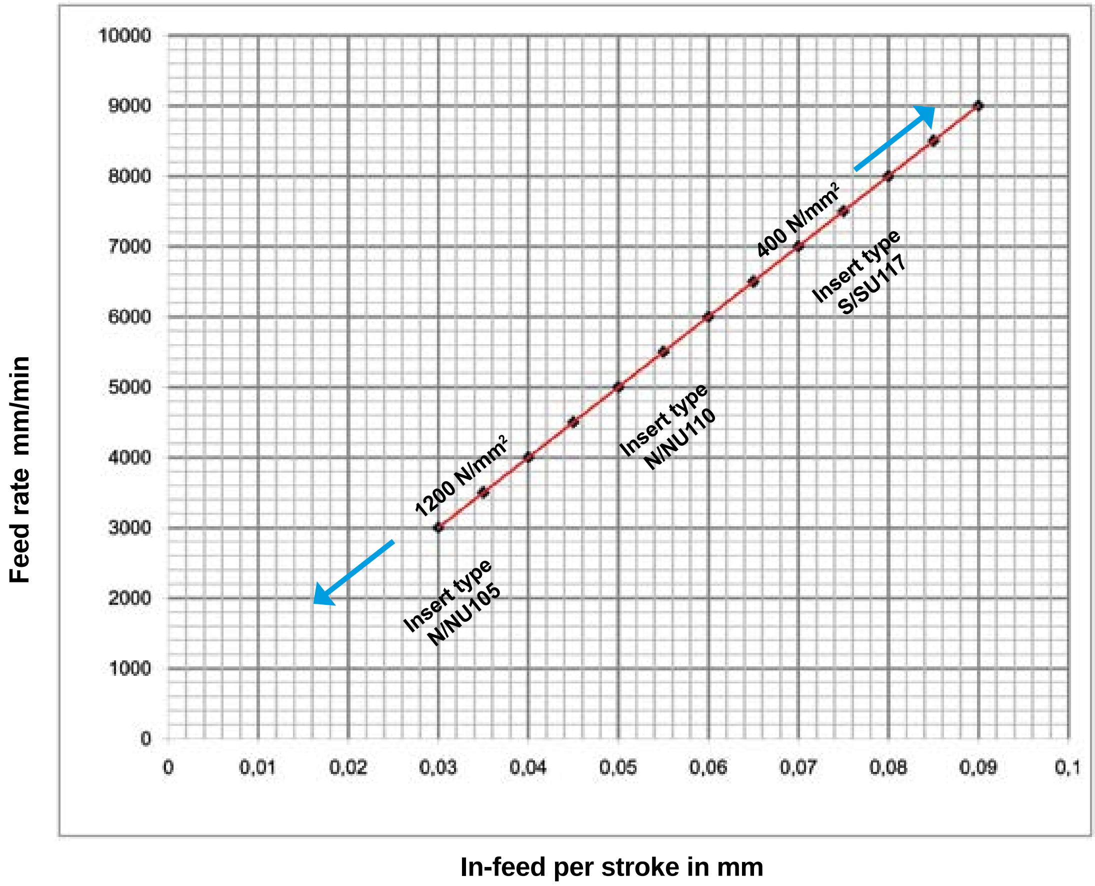
$b_1 = b$ - Clearance distance

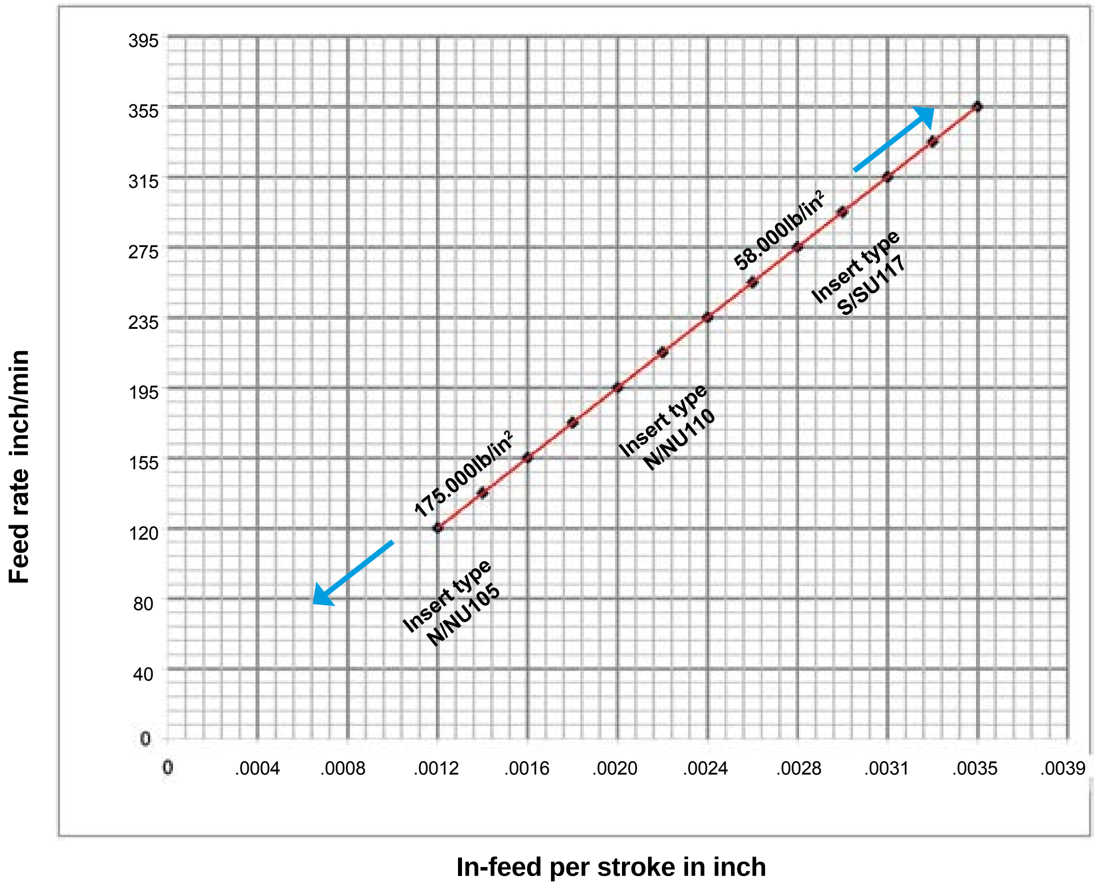
$b_1 = 15{,}492 - 0{,}2 = 15{,}292$ mm

→ equals as a start position at Ø 30.584 mm



Dimensions in mm


Feed rate mm/min
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
0
0,01
0,02
0,03
0,04
0,05
0,06
0,07
0,08
0,09
0,1
400 N/mm²
Insert type S/SU117
Insert type N/NU110
1200 N/mm²
Insert type N/NU105
In-feed per stroke in mm


Feed rate inch/min
395
355
315
275
235
195
155
120
80
40
0
0
.0004
.0008
.0012
.0016
.0020
.0024
.0028
.0031
.0035
.0039
58.000lb/in²
Insert type S/SU117
Insert type N/NU110
175.000lb/in²
Insert type N/NU105
In-feed per stroke in inch

Example for broaching on a TRAUB TNA 400 with C-Axis

NC - Program

N……(BROACHING)	Sequence Number and Application
G97 T…… M5	constant RPM, Tool callout, Spindle Stop
M17	C - axis ON
G94	Feed Rate in mm/min
L1 = 30.584	choose Parameter for start Ø
M8 M19	Coolant ON, Spindle Break ON
N100	Sequence Number for repetition START
G0 XL1 Z5	Start position in X and Z in front of part
G1 Z-25 F8000	Linear move in Z at feed rate of 8000 mm/min
G0 X30.584	Rapid move in X to start Ø i.e. drop down position
G0 Z5	Rapid move in Z to start position.
L1 = L1+0.16	As Ø programming is in effect the depth of cut must be doubled (Depth of Cut is 0.08 mm)
N200	Sequence Number of repetition END.
G22 P100 Q200 H45	Repetition Cycle with Sequence Number from START to END and Number of repetitions

Example:

- Groove according to table in bore **Ø 32 mm**
- Groove width **8^{C11}**
- Depth of Cut per Stroke 0.08 mm
- The **Number of Strokes** resulted out of complete cutting depth from start position to the bottom of the groove divided by depth of cut per stroke
- This . alue must then be multiplied by 2 (because Ø Programming) and Value is programmed as the Number of Strokes in the NC-Programme.

Calculation:

- Starting Position = Security Distance + Distance from Ø 32 mm to Cutting Edge (see Example on Page R34) equals a segment height of **0.508 mm** + Security Distance of **0.20 mm** to a total of **0.708 mm**.
- Starting Position = **30.584 mm** (32 - [0.708 x 2] = 30.584 mm.
- The groove depth of **2.90 mm** added to the **0.708 mm = 3.608 mm**.
- This is the dimension from the starting position to the bottom of the groove and in order to program this on the Ø, the **3.608 mm** dimension must be **multiplied by 2** which will equal the sum of **7.216 mm**.
- When the **7.216 mm** is divided by **(2 x 0.08 mm) = 0.16 mm** depth per stroke the Result will be **45.1 Strokes** and therefore **45 total Strokes** are programmed.

The remainder of 0.1 Strokes to achieve the finish dimension must be programmed using the fine correction.

Attention: The true depth of cut for the insert will be 0.08 mm.

Example for broaching on SIEMENS Control Machines with lockable Spindle

NC - Program

N……(BROACHING)	Sequence Number and Application
T…… M5 LF	Tool callout, Spindle Stop
M…… LF	Brake ON
G94 LF	Feed Rate in mm/min
R1 = 30.584 LF	choose Parameter for start Ø
M8 LF	Coolant ON
N100 LF	Sequence Number for repetition START
G0 XR1 Z5 LF	Start position in X and Z in front of part
G1 Z-25 F8000 LF	Linear move in Z at feed rate of 8000 mm/min
G0 X30.584	Rapid move in X to start Ø i.e. drop down position
G0 Z5	Rapid move in Z to start position.
R1 = R1+0.16	As Ø programming is in effect the depth of cut must be doubled (Depth of Cut is 0.08 mm)
N200	Sequence Number of repetition END.
…………………………..LF	Repetition Cycle with Sequence Number from START to END and Number of repetitions.

Example:

- Groove according to table in bore **Ø 32 mm**
- Groove width **8^{C11}**
- Depth of Cut per Stroke 0.08 mm
- The **Number of Strokes** resulted out of complete cutting depth from start position to the bottom of the groove divided by depth of cut per stroke
- This Value must then be multiplied by 2 (because Ø Programming) and Value is programmed as the Number of Strokes in the NC-Programme.

Calculation:

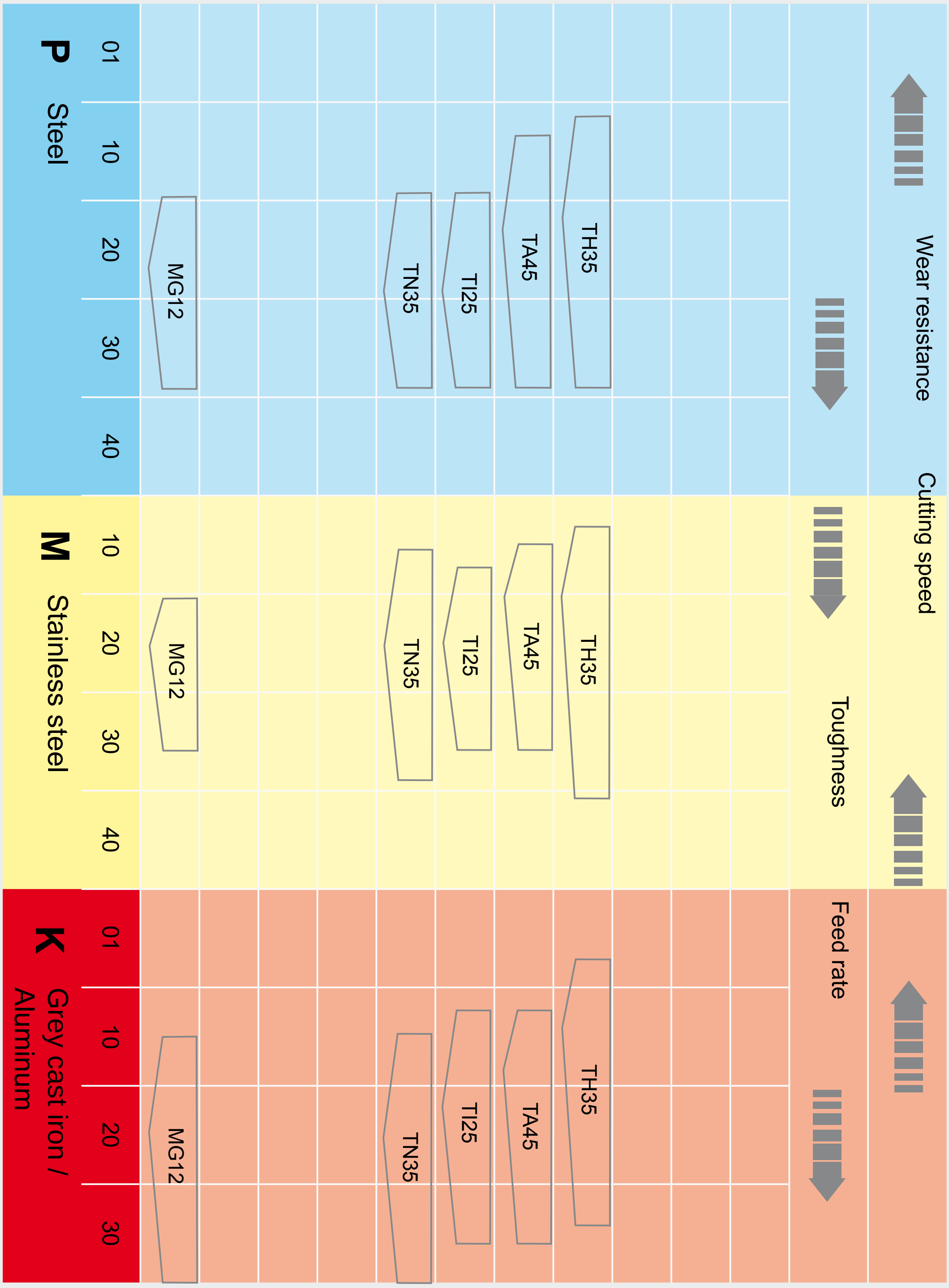
- Starting Position = Security Distance + Distance from Ø 32 mm to Cutting Edge (see Example on Page R34) equals a segment height of **0.508 mm** + Security Distance of **0.20 mm** to a total of **0.708 mm**.
- Starting Position = **30.584 mm** (32 - [0.708 x 2] = 30.584 mm.
- The groove depth of **2.90 mm** added to the **0.708 mm = 3.608 mm**.
- This is the dimension from the starting position to the bottom of the groove and in order to program this on the Ø, the **3.608 mm** dimension must be **multiplied by 2** which will equal the sum of **7.216 mm**.
- When the **7.216 mm** is divided by **(2 x 0.08 mm) = 0.16 mm** depth per stroke the Result will be **45.1 Strokes** and therefore **45 total Strokes** are programmed.

The remainder of 0.1 Strokes to achieve the finish dimension must be programmed using the fine correction.

R

Carbide Grades

uncoated coated



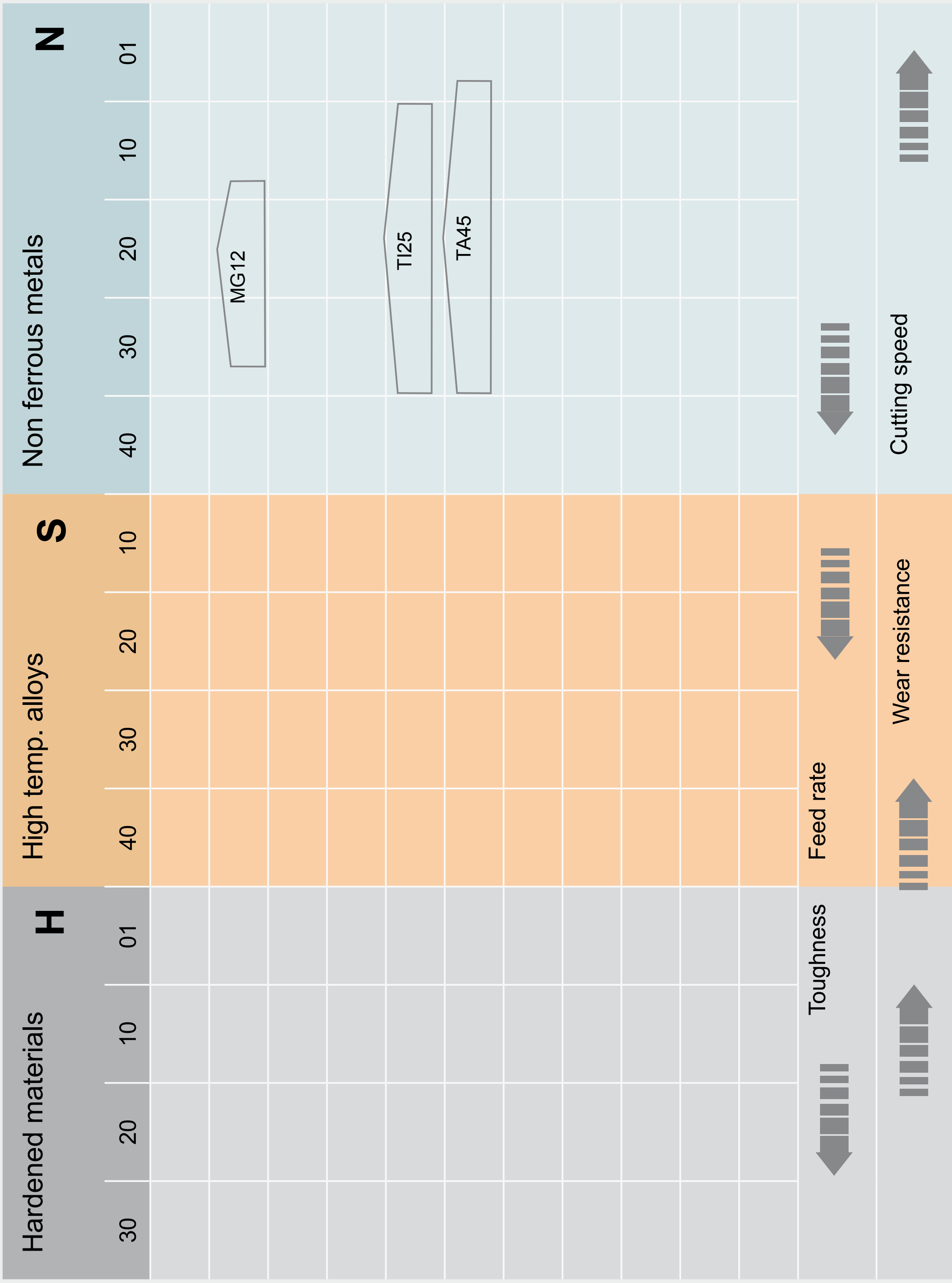
R

Carbide Grades

Synthetic cutting-tool material

uncoated

coated



UNCOATED GRADES

MG12 - a universal grade with good wear resistance. Used at low or medium cutting speeds for machining steel, cast iron and non ferrous materials

COATED GRADES

TN35 - a very popular grade TiN coated used to low or medium cutting speeds. Also recommanded for machining stainless steel or exotic alloyed materials

TI25 - a TiCN coated grade with high abrasion resistance. Recommended for machining steel and non ferrous materials at medium cutting speeds

TA45 - a TiAlN coated grade. This coating has a very high temperature stability and high hardness.

TH35 - new standard grade - extreme Oxidation resistance with high hardness and very good coefficient of friction.