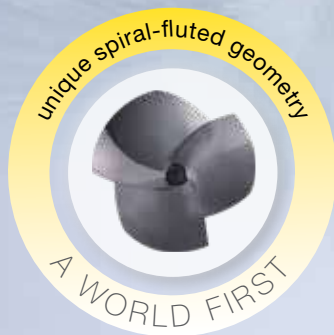


GUHRING

NEW

EXTENDED
PROGRAM



Countersinks with convex cutting edges

- round, precise and chatter-free countersinking
- reduction of feed force by 60 %
- reduction of radial force by 50 %

SpyroTec

Twisted HSS and HSCO countersink

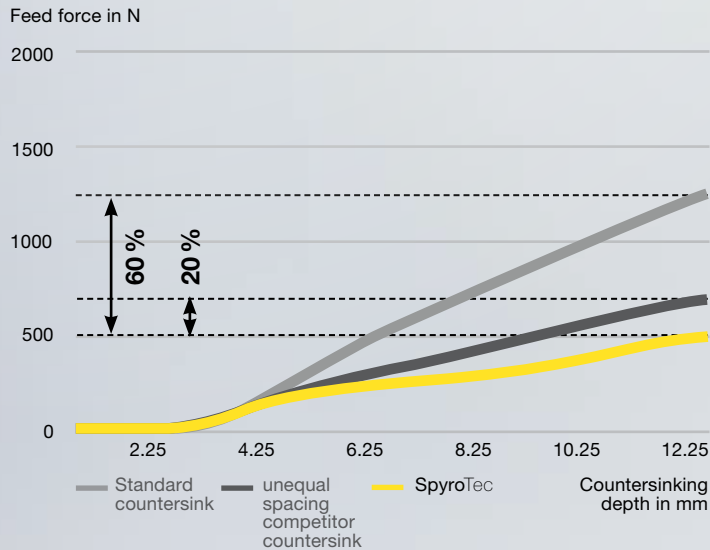
GUHRING – YOUR WORLDWIDE PARTNER

SpyroTec

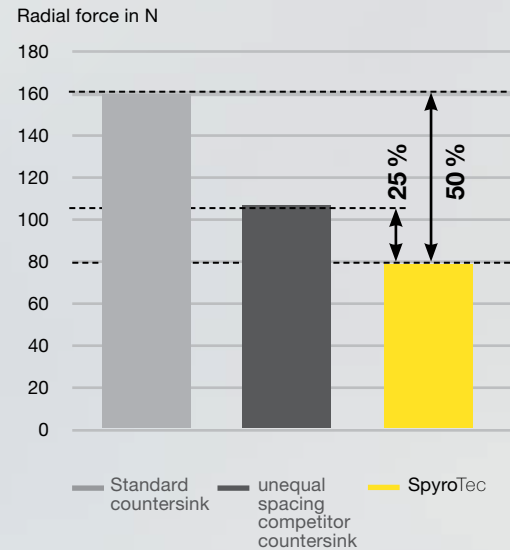
THE INNOVATIVE, TWISTED HSS AND HSCO COUNTERSINK

The axial and radial forces that occur during countersinking operations are significantly reduced due to the unique geometry of the SpyroTec cutting edges. The convex form and variable pitch of the helical cutting edges results in a stable countersinking process with minimal vibration, even when

using a hand drill. Round, precise, chatter-free countersinking is guaranteed. The TiAlN coating ensures higher wear resistance and thermal protection, which guarantees longer tool life in many different materials and applications.



**LOWER FEED FORCE BY APPROX. 60%
COMPARED TO STANDARD COUNTERSINKS**



**LOWER RADIAL FORCE BY APPROX. 50%
COMPARED TO STANDARD COUNTERSINKS**

- standard program
- 90°, 82°, and 60° countersinks
- round shank version
- tri-flat shank version
- long length round shank version



Countersinking with standard countersink



SpyroTec



CONVEX CUTTING EDGES

Three different convex cutting edges in combination with three unequal helix angles enable extremely stable and low-vibration cutting processes without any chatter marks.

TiAIN COATING

The TiAlN coating provides high hardness and excellent thermal protection.

CUTTING MATERIAL

The high-quality HSS and HSCO substrates hold up well in high-temperature applications, providing long tool life in a wide variety of materials.

— FOR UNC/UNF FLAT HEAD SOCKET CAP SCREWS —

SpyroTec 82°

Ideal for fasteners with 82° heads.

from p. 17



NEW

SpyroTec 82°
including sets

— FOR METRIC FLAT HEAD SOCKET CAP SCREWS —

SpyroTec 90°

Ideal for fasteners with 90° heads.
Perfect choice for general deburring and
chamfering of holes.

from p. 8

NEW

SpyroTec 90°
Sets now with Ø 25mm

— FOR METRIC FLAT HEAD SOCKET CAP SCREWS —

SpyroTec 60°

Ideal for fasteners with 60° heads.

from p. 13



NEW

SpyroTec 60°
now available
as a set.

— SPECIAL TOOL —

SpyroTec 120°

Ideal for sheet metal rivets.

For further information please contact us!

NEW

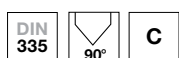
SpyroTec 120°
available
as special tool



90° Countersinks, spiral-fluted

Series

5500



Tool material

HSCO

Coating

TiAIN **A**

Shank form

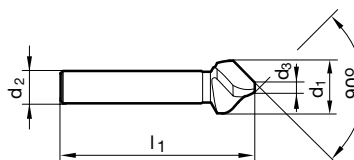
cyl.

Material		Suitability
P	Steel	●
M	Stainless steel	●
K	Cast iron	●
N	Aluminum	○
S	Ni / Ti alloys	○
H	Hardened steel	

●=Optimal ○=Secondary

- 3 different convex cutting edges
- low-vibration cutting processes
- for round and chatter-free countersinking
- considerably lower feed force required
- for universal application

Operating parameters pg. 22



d1	d2	d3	l1	Z	Code no.	EDP Number
mm	mm	mm	mm			
6.300	5.000	1.500	45.000	3	6.300	9055000063000
8.000	6.000	2.000	50.000	3	8.000	9055000080000
8.300	6.000	2.000	50.000	3	8.300	9055000083000
10.000	6.000	2.500	50.000	3	10.000	9055000100000
10.400	6.000	2.500	50.000	3	10.400	9055000104000
11.500	8.000	2.800	56.000	3	11.500	9055000115000
12.400	8.000	2.800	56.000	3	12.400	9055000124000
15.000	10.000	3.200	60.000	3	15.000	9055000150000
16.500	10.000	3.200	60.000	3	16.500	9055000165000
19.000	10.000	3.500	63.000	3	19.000	9055000190000
20.500	10.000	3.500	63.000	3	20.500	9055000205000
23.000	10.000	3.800	67.000	3	23.000	9055000230000
25.000	10.000	3.800	67.000	3	25.000	9055000250000
31.000	12.000	4.200	71.000	3	31.000	9055000310000
40.000	12.000	10.000	75.000	3	40.000	9055000400000



90° Countersinks, spiral-fluted

Series

5501

DIN
335

C

Tool material

HSCO

Coating

TiAlN

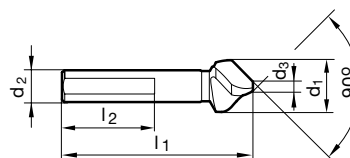
Shank form

tri-flat

Material		Suitability
P	Steel	●
M	Stainless steel	●
K	Cast iron	●
N	Aluminum	○
S	Ni / Ti alloys	○
H	Hardened steel	
●=Optimal ○=Secondary		

- 3 different convex cutting edges
- tri-flat shank prevents slipping in the chuck
- perfect for hand drills
- low-vibration cutting processes
- for round and chatter-free countersinking
- considerably lower feed force required
- for universal application

Operating parameters pg. 22

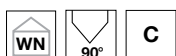


d1	d2	d3	l1	l2	Z	Code no.	EDP Number
mm	mm	mm	mm	mm			
6.300	5.000	1.500	45.000	30.000	3	6.300	9055010063000
8.000	6.000	2.000	50.000	30.000	3	8.000	9055010080000
8.300	6.000	2.000	50.000	30.000	3	8.300	9055010083000
10.000	6.000	2.500	50.000	30.000	3	10.000	9055010100000
10.400	6.000	2.500	50.000	30.000	3	10.400	9055010104000
11.500	8.000	2.800	56.000	30.000	3	11.500	9055010115000
12.400	8.000	2.800	56.000	30.000	3	12.400	9055010124000
15.000	10.000	3.200	60.000	30.000	3	15.000	9055010150000
16.500	10.000	3.200	60.000	30.000	3	16.500	9055010165000
19.000	10.000	3.500	63.000	30.000	3	19.000	9055010190000
20.500	10.000	3.500	63.000	30.000	3	20.500	9055010205000
23.000	10.000	3.800	67.000	30.000	3	23.000	9055010230000
25.000	10.000	3.800	67.000	30.000	3	25.000	9055010250000
31.000	12.000	4.200	71.000	30.000	3	31.000	9055010310000
40.000	12.000	10.000	75.000	30.000	3	40.000	9055010400000

90° Countersinks, spiral-fluted

Series

5503



Tool material

HSS

Coating

TiAIN **A**

Shank form

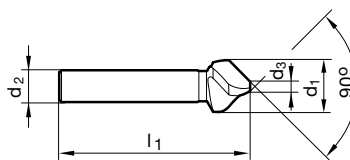
cyl.

Material		Suitability
P	Steel	●
M	Stainless steel	○
K	Cast iron	●
N	Aluminum	○
S	Ni / Ti alloys	○
H	Hardened steel	

●=Optimal ○=Secondary

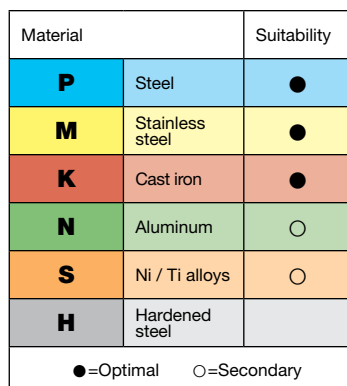
- long version for recessed machining points
- 3 different convex cutting edges
- low-vibration cutting processes
- for round and chatter-free countersinking
- considerably lower feed force required
- for universal application

Operating parameters pg. 22



d1	d2	d3	l1	Z	Code no.	EDP Number
mm	mm	mm	mm			
6.300	5.000	1.500	104.000	3	6.300	9055030063000
8.300	6.000	2.000	105.000	3	8.300	9055030083000
10.400	6.000	2.500	107.000	3	10.400	9055030104000
12.400	8.000	2.800	108.000	3	12.400	9055030124000
16.500	10.000	3.200	111.000	3	16.500	9055030165000
20.500	10.000	3.500	114.000	3	20.500	9055030205000
25.000	10.000	3.800	118.000	3	25.000	9055030250000
31.000	12.000	4.200	140.000	3	31.000	9055030310000

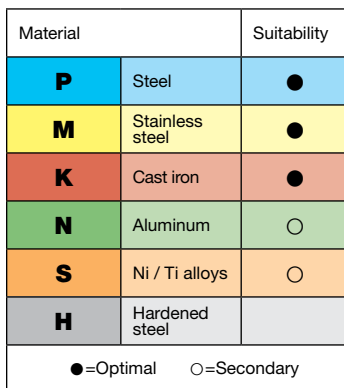
5538



- | | |
|------------|------|
| Shank form | cyl. |
|------------|------|

[illegible]

5539



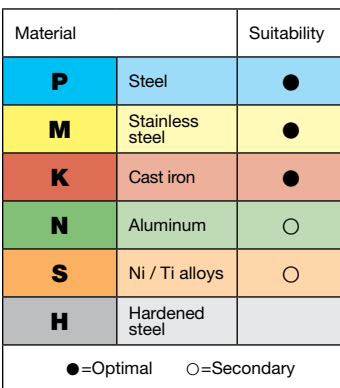
- consisting of art. no. 5501
- 3 different convex cutting edges
- tri-flat shank prevents slipping in the chuck
- perfect for hand drills
- low-vibration cutting processes
- for round and chatter-free countersinking
- considerably lower feed force required
- for universal application

Operating parameters pg. 22

Tool material	HSCO
Coating	TiAlN 
Shank form	tri-flat

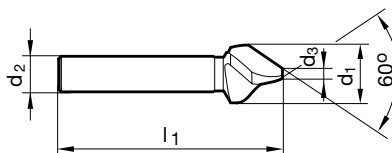
[illegible]

5670



- 3 different convex cutting edges
- low-vibration cutting processes
- for round and chatter-free countersinking
- considerably lower feed force required
- for universal application

Tool material	HSS
Coating	TiAlN 
Shank form	cyl.



GUHRING

**60° Countersinks, spiral-fluted**

Series

5671DIN
334**C**

Tool material

HSS

Coating

TiAlN **A**

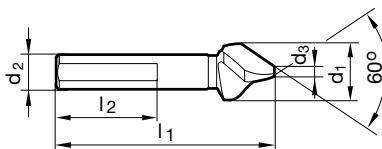
Shank form

tri-flat

Material		Suitability
P	Steel	●
M	Stainless steel	●
K	Cast iron	●
N	Aluminum	○
S	Ni / Ti alloys	○
H	Hardened steel	
●=Optimal ○=Secondary		

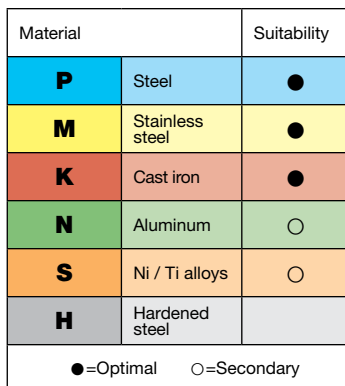
- 3 different convex cutting edges
- tri-flat shank prevents slipping in the chuck
- perfect for hand drills
- low-vibration cutting processes
- for round and chatter-free countersinking
- considerably lower feed force required
- for universal application

Operating parameters pg. 23



d1	d2	d3	l1	l2	Z	Code no.	EDP Number
mm	mm	mm	mm	mm			
6.300	5.000	1.600	45.00	30	3	6.300	9056710063000
8.000	6.000	2.000	50.00	30	3	8.000	9056710080000
10.000	6.000	3.200	56.00	30	3	10.000	9056710100000
12.500	8.000	3.200	56.00	30	3	12.500	9056710125000
16.000	10.000	4.000	63.00	30	3	16.000	9056710160000
20.000	10.000	5.000	67.00	30	3	20.000	9056710200000
25.000	10.000	6.300	71.00	30	3	25.000	9056710250000

5672



- consisting of art. no. 5670
- 3 different convex cutting edges
- low-vibration cutting processes
- for round and chatter-free countersinking
- considerably lower feed force required
- for universal application

Operating parameters pg. 23

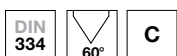
Tool material	HSS
Coating	TiAlN 
Shank form	cyl.

[illegible]

60° Countersink sets, spiral-fluted

Series

5673



Material		Suitability
P	Steel	●
M	Stainless steel	●
K	Cast iron	●
N	Aluminum	○
S	Ni / Ti alloys	○
H	Hardened steel	

●=Optimal ○=Secondary

- consisting of art. no. 5671
- 3 different convex cutting edges
- tri-flat shank prevents slipping in the chuck
- perfect for hand drills
- low-vibration cutting processes
- for round and chatter-free countersinking
- considerably lower feed force required
- for universal application

Operating parameters pg. 23

Tool material

HSS

Coating

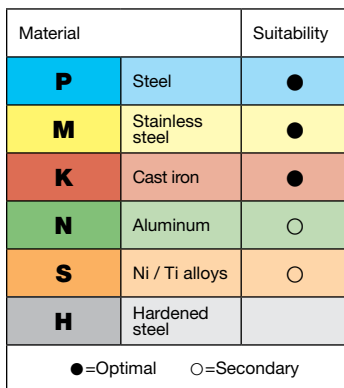
TiAIN **A**

Shank form

cyl.

[illegible]

5674



cyl.

Technical drawing of a bolt. The drawing shows a bolt with a hexagonal head and a threaded shank. The dimensions are labeled as follows: d_1 is the nominal diameter of the bolt, d_2 is the diameter of the shank, d_3 is the diameter of the hexagonal head, l_1 is the length of the shank, and g_{30} is the thickness of the hexagonal head.



d1	d2	d3	l1	Z	Code no.	EDP Number
frac.	inch	inch	inch			
1/4	0.2500	0.0600	2.000	3	6.350	9056740063500
5/16	0.2500	0.0800	2.000	3	7.938	9056740079380
3/8	0.2500	0.0900	2.000	3	9.525	9056740095250
1/2	0.3750	0.1500	2.250	3	12.700	9056740127000
5/8	0.3750	0.1800	2.250	3	15.875	9056740158750
3/4	0.5000	0.2100	2.750	3	19.050	9056740190500
7/8	0.5000	0.2300	2.750	3	22.225	9056740222250
1	0.5000	0.2500	2.750	3	25.400	9056740254000
1 1/4	0.5000	0.3700	3.000	3	31.750	9056740317500

82° Countersinks, SpyroTec

Series

5675



Tool material

HSCO

Coating

TiAIN **A**

Shank form

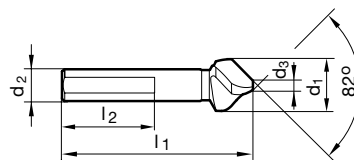
tri-flat

Material		Suitability
P	Steel	●
M	Stainless steel	●
K	Cast iron	●
N	Aluminum	○
S	Ni / Ti alloys	○
H	Hardened steel	

●=Optimal ○=Secondary

- 3 different convex cutting edges
- tri-flat shank prevents slipping in the chuck
- perfect for hand drills
- low-vibration cutting processes
- for round and chatter-free countersinking
- considerably lower feed force required
- for universal application

Operating parameters pg. 22



d1	d2	d3	l1	l2	Z	Code no.	EDP Number
frac.	inch	inch	inch	inch			
1/4	0.2500	0.0600	2.000	1.18	3	6.350	9056750063500
5/16	0.2500	0.0800	2.000	1.18	3	7.938	9056750079380
3/8	0.2500	0.0900	2.000	1.18	3	9.525	9056750095250
1/2	0.3750	0.1500	2.250	1.18	3	12.700	9056750127000
5/8	0.3750	0.1800	2.250	1.18	3	15.875	9056750158750
3/4	0.5000	0.2100	2.750	1.18	3	19.050	9056750190500
7/8	0.5000	0.2300	2.750	1.18	3	22.225	9056750222250
1	0.5000	0.2500	2.750	1.18	3	25.400	9056750254000
1 1/4	0.5000	0.3700	3.000	1.18	3	31.750	9056750317500

5676



Material		Suitability
P	Steel	●
M	Stainless steel	●
K	Cast iron	●
N	Aluminum	○
S	Ni / Ti alloys	○
H	Hardened steel	

●=Optimal ○=Secondary

- consisting of art. no. 5674
- 3 different convex cutting edges
- low-vibration cutting processes
- for round and chatter-free countersinking
- considerably lower feed force required
- for universal application

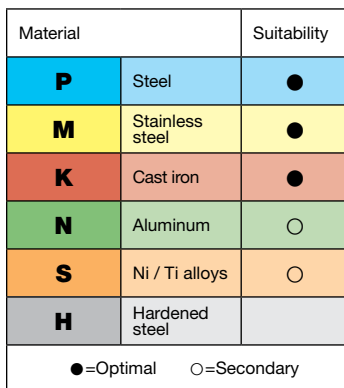
Tool material	HSCO
Coating	TiAlN 
Shank form	cyl.



Operating parameters pg. 22

[illegible]

5677



- consisting of art. no. 5675
- 3 different convex cutting edges
- tri-flat shank prevents slipping in the chuck
- perfect for hand drills
- low-vibration cutting processes
- for round and chatter-free countersinking
- considerably lower feed force required
- for universal application

Operating parameters pg. 22

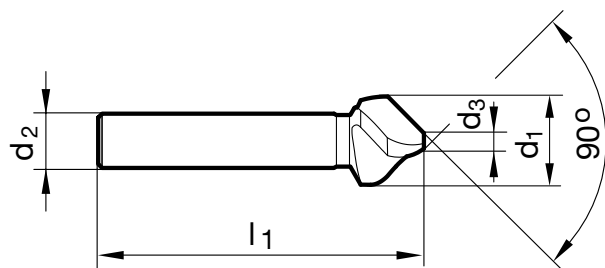
Tool material	HSCO
Coating	TiAlN 
Shank form	tri-flat

[illegible]



SPYROTEC – SPIRAL-FLUTED COUNTERSINKS

Suitable for countersinking the smallest allowable hole diameters and screw sizes listed below.



SpyroTec 90°

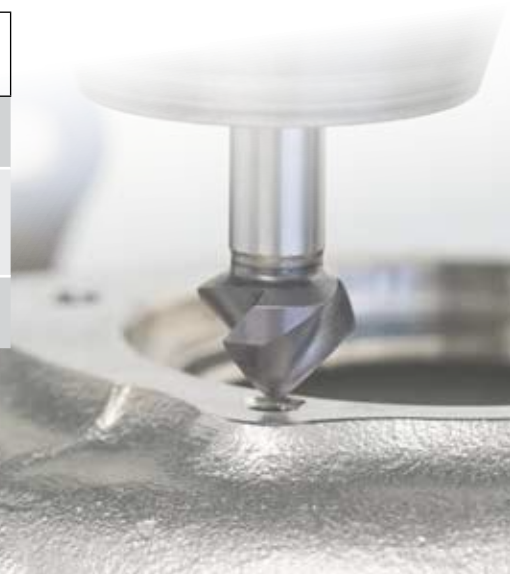
d1	smallest allowable hole Ø	for countersunk screws ISO 2009, 2010, 7046, 7047	for countersunk screws DIN 7991
6.300	2.00	-	M3
8.000	2.50	M4	-
8.300	2.50	-	M4
10.000	3.00	M5	-
10.400	3.00	-	M5
11.500	3.30	M6	-
12.400	3.30	-	M6
15.000	3.70	M8	-
16.500	3.70	-	M8
19.000	4.50	M10	-
20.500	4.50	-	M10
23.000	4.80	M12	-
25.000	4.80	-	M12
31.000	5.20	-	M16
40.000	12.00	-	M24

SpyroTec 82°

d1 frac.	Smallest hole - Ø to allow countersinking - inch
1/4	0.0830
5/16	0.1020
3/8	0.1100
1/2	0.1730
5/8	0.2010
3/4	0.2520
7/8	0.2720
1	0.2910
1 1/4	0.4090

SpyroTec 60°

d1	smallest hole - Ø to allow countersinking - mm
6.300	2.10
8.000	2.50
10.000	3.00
12.500	3.70
16.000	4.50
20.000	6.00
25.000	7.30





Series # 5500, 5501, 5538, 5539, 5674, 5675, 5676, 5677

Material group	Hardness		SFM	Feed Rate - IPR								
	HRc	Bhn		6.30 mm	8.00 mm	10.00 mm	12.50 mm	16.00 mm	20.00 mm	25.00 mm	31.50 mm	41.00 mm
				0.248 In.	0.315 In.	0.394 In.	0.492 In.	0.630 In.	0.787 In.	0.984 In.	1.240 In.	1.614 In.
Common structural steels	-	≤ 150	135	0.0045	0.0050	0.0055	0.0060	0.0065	0.0070	0.0085	0.0095	0.0110
	≤ 32	≤ 301	130	0.0030	0.0030	0.0035	0.0040	0.0045	0.0050	0.0060	0.0065	0.0085
Free-cutting steels	≤ 25	≤ 255	135	0.0045	0.0050	0.0055	0.0060	0.0065	0.0070	0.0085	0.0095	0.0110
	≤ 32	≤ 301	130	0.0030	0.0030	0.0035	0.0040	0.0045	0.0050	0.0060	0.0065	0.0085
Unalloyed heat-treatable steels	≤ 20	≤ 220	135	0.0045	0.0050	0.0055	0.0060	0.0065	0.0070	0.0085	0.0095	0.0110
	≤ 25	≤ 255	130	0.0045	0.0050	0.0055	0.0060	0.0065	0.0070	0.0085	0.0095	0.0110
	≤ 32	≤ 301	80	0.0030	0.0030	0.0035	0.0040	0.0045	0.0050	0.0060	0.0065	0.0085
Alloyed heat-treatable steels	≤ 32	≤ 301	60	0.0045	0.0050	0.0055	0.0060	0.0065	0.0070	0.0085	0.0095	0.0110
	≤ 43	≤ 402	50	0.0030	0.0030	0.0035	0.0040	0.0045	0.0050	0.0060	0.0065	0.0085
Unalloyed case hardened steels	≤ 25	≤ 255	105	0.0045	0.0050	0.0055	0.0060	0.0065	0.0070	0.0085	0.0095	0.0110
Alloyed case hardened steels	≤ 32	≤ 301	60	0.0045	0.0050	0.0055	0.0060	0.0065	0.0070	0.0085	0.0095	0.0110
	≤ 43	≤ 402	45	0.0030	0.0030	0.0035	0.0040	0.0045	0.0050	0.0060	0.0065	0.0085
Nitriding steels	≤ 32	≤ 301	60	0.0030	0.0030	0.0035	0.0040	0.0045	0.0050	0.0060	0.0065	0.0085
	≤ 43	≤ 402	50	0.0015	0.0020	0.0025	0.0025	0.0030	0.0030	0.0035	0.0045	0.0055
Tool steels	≤ 25	≤ 255	70	0.0030	0.0030	0.0035	0.0040	0.0045	0.0050	0.0060	0.0065	0.0085
	≤ 43	≤ 402	60	0.0015	0.0020	0.0025	0.0025	0.0030	0.0030	0.0035	0.0045	0.0055
High speed steels	≤ 43	≤ 402	60	0.0015	0.0020	0.0025	0.0025	0.0030	0.0030	0.0035	0.0045	0.0055
Spring steels	≤ 38	≤ 354	45	0.0015	0.0020	0.0025	0.0025	0.0030	0.0030	0.0035	0.0045	0.0055
Hardened steels	≤ 48	≤ 460										
	≤ 66	-										
Stainless steels, sulphured	≤ 28	≤ 273	65	0.0030	0.0030	0.0035	0.0040	0.0045	0.0050	0.0060	0.0065	0.0085
	≤ 36	≤ 337	50	0.0015	0.0020	0.0025	0.0025	0.0030	0.0030	0.0035	0.0045	0.0055
	≤ 46	≤ 435	60	0.0015	0.0020	0.0025	0.0025	0.0030	0.0030	0.0035	0.0045	0.0055
Cast iron	≤ 23	≤ 242	105	0.0045	0.0050	0.0055	0.0060	0.0065	0.0070	0.0085	0.0095	0.0110
	≤ 38	≤ 354	65	0.0045	0.0050	0.0055	0.0060	0.0065	0.0070	0.0085	0.0095	0.0110
Spheroidal graphite iron and malleable cast iron	≤ 23	≤ 242	90	0.0045	0.0050	0.0055	0.0060	0.0065	0.0070	0.0085	0.0095	0.0110
	≤ 38	≤ 354	80	0.0045	0.0050	0.0055	0.0060	0.0065	0.0070	0.0085	0.0095	0.0110
Chilled cast iron	≤ 38	≤ 354	35	0.0015	0.0020	0.0025	0.0025	0.0030	0.0030	0.0035	0.0045	0.0055
New cast materials GGV	≤ 20	≤ 220	90	0.0045	0.0050	0.0055	0.0060	0.0065	0.0070	0.0085	0.0095	0.0110
	≤ 32	≤ 301	60	0.0045	0.0050	0.0055	0.0060	0.0065	0.0070	0.0085	0.0095	0.0110
New cast materials ADI	≤ 32	≤ 301										
	≤ 43	≤ 402										
Special alloys	≤ 54	≤ 549	35	0.0015	0.0020	0.0025	0.0025	0.0030	0.0030	0.0035	0.0045	0.0055
Ti and Ti-alloys	≤ 25	≤ 255	60	0.0030	0.0030	0.0035	0.0040	0.0045	0.0050	0.0060	0.0065	0.0085
	≤ 43	≤ 402	45	0.0015	0.0020	0.0025	0.0025	0.0030	0.0030	0.0035	0.0045	0.0055
Aluminium and Al-alloys	-	≤ 120	375	0.0060	0.0065	0.0065	0.0075	0.0085	0.0090	0.0100	0.0120	0.0135
Al wrought alloys	-	≤ 200	290	0.0060	0.0065	0.0065	0.0075	0.0085	0.0090	0.0100	0.0120	0.0135
Al cast alloys ≤ 10 % Si	-	≤ 180	165	0.0045	0.0050	0.0055	0.0060	0.0065	0.0070	0.0085	0.0095	0.0110
	-	≤ 180	130	0.0045	0.0050	0.0055	0.0060	0.0065	0.0070	0.0085	0.0095	0.0110
Magnesium alloys	-	≤ 120	415	0.0060	0.0065	0.0065	0.0075	0.0085	0.0090	0.0100	0.0120	0.0135
Copper, low-alloyed	-	≤ 150	250	0.0060	0.0065	0.0065	0.0075	0.0085	0.0090	0.0100	0.0120	0.0135
Brass, short-chipping	-	≤ 180	330	0.0060	0.0065	0.0065	0.0075	0.0085	0.0090	0.0100	0.0120	0.0135
	-	≤ 180	210	0.0060	0.0065	0.0065	0.0075	0.0085	0.0090	0.0100	0.0120	0.0135
Bronze, short-chipping	-	≤ 180	130	0.0060	0.0065	0.0065	0.0075	0.0085	0.0090	0.0100	0.0120	0.0135
	≤ 25	≤ 255	110	0.0060	0.0065	0.0065	0.0075	0.0085	0.0090	0.0100	0.0120	0.0135
Bronze, long-chipping	≤ 25	≤ 255	100	0.0060	0.0065	0.0065	0.0075	0.0085	0.0090	0.0100	0.0120	0.0135
	≤ 32	≤ 301	80	0.0060	0.0065	0.0065	0.0075	0.0085	0.0090	0.0100	0.0120	0.0135
Duroplastics			130	0.0060	0.0065	0.0065	0.0075	0.0085	0.0090	0.0100	0.0120	0.0135
Thermoplastics			165	0.0060	0.0065	0.0065	0.0075	0.0085	0.0090	0.0100	0.0120	0.0135
Reinforced plastics - Kevlar												
Reinforced plastics - GFK / CFK												



Series # 5503, 5670, 5671, 5672, 5673

Material group	Hardness		SFM	Feed Rate - IPR								
	HRc	Bhn		6.30 mm	8.00 mm	10.00 mm	12.50 mm	16.00 mm	20.00 mm	25.00 mm	31.50 mm	41.00 mm
				0.248 In.	0.315 In.	0.394 In.	0.492 In.	0.630 In.	0.787 In.	0.984 In.	1.240 In.	1.614 In.
Common structural steels	-	≤ 150	120	0.0045	0.0050	0.0055	0.0060	0.0065	0.0070	0.0085	0.0095	0.0110
	≤ 32	≤ 301	115	0.0030	0.0030	0.0035	0.0040	0.0045	0.0050	0.0060	0.0065	0.0085
Free-cutting steels	≤ 25	≤ 255	120	0.0045	0.0050	0.0055	0.0060	0.0065	0.0070	0.0085	0.0095	0.0110
	≤ 32	≤ 301	115	0.0030	0.0030	0.0035	0.0040	0.0045	0.0050	0.0060	0.0065	0.0085
Unalloyed heat-treatable steels	≤ 20	≤ 220	120	0.0045	0.0050	0.0055	0.0060	0.0065	0.0070	0.0085	0.0095	0.0110
	≤ 25	≤ 255	115	0.0045	0.0050	0.0055	0.0060	0.0065	0.0070	0.0085	0.0095	0.0110
	≤ 32	≤ 301	75	0.0030	0.0030	0.0035	0.0040	0.0045	0.0050	0.0060	0.0065	0.0085
Alloyed heat-treatable steels	≤ 32	≤ 301	55	0.0045	0.0050	0.0055	0.0060	0.0065	0.0070	0.0085	0.0095	0.0110
	≤ 43	≤ 402	45	0.0030	0.0030	0.0035	0.0040	0.0045	0.0050	0.0060	0.0065	0.0085
Unalloyed case hardened steels	≤ 25	≤ 255	95	0.0045	0.0050	0.0055	0.0060	0.0065	0.0070	0.0085	0.0095	0.0110
Alloyed case hardened steels	≤ 32	≤ 301	55	0.0045	0.0050	0.0055	0.0060	0.0065	0.0070	0.0085	0.0095	0.0110
	≤ 43	≤ 402	40	0.0030	0.0030	0.0035	0.0040	0.0045	0.0050	0.0060	0.0065	0.0085
Nitriding steels	≤ 32	≤ 301	55	0.0030	0.0030	0.0035	0.0040	0.0045	0.0050	0.0060	0.0065	0.0085
	≤ 43	≤ 402	45	0.0015	0.0020	0.0025	0.0025	0.0030	0.0030	0.0035	0.0045	0.0055
Tool steels	≤ 25	≤ 255	65	0.0030	0.0030	0.0035	0.0040	0.0045	0.0050	0.0060	0.0065	0.0085
	≤ 43	≤ 402	55	0.0015	0.0020	0.0025	0.0025	0.0030	0.0030	0.0035	0.0045	0.0055
High speed steels	≤ 43	≤ 402	55	0.0015	0.0020	0.0025	0.0025	0.0030	0.0030	0.0035	0.0045	0.0055
Spring steels	≤ 38	≤ 354	40	0.0015	0.0020	0.0025	0.0025	0.0030	0.0030	0.0035	0.0045	0.0055
Hardened steels	≤ 48	≤ 460										
	≤ 66	-										
Stainless steels, sulphured	≤ 28	≤ 273	60	0.0030	0.0030	0.0035	0.0040	0.0045	0.0050	0.0060	0.0065	0.0085
	≤ 36	≤ 337	45	0.0015	0.0020	0.0025	0.0025	0.0030	0.0030	0.0035	0.0045	0.0055
	≤ 46	≤ 435	50	0.0015	0.0020	0.0025	0.0025	0.0030	0.0030	0.0035	0.0045	0.0055
Cast iron	≤ 23	≤ 242	95	0.0045	0.0050	0.0055	0.0060	0.0065	0.0070	0.0085	0.0095	0.0110
	≤ 38	≤ 354	60	0.0045	0.0050	0.0055	0.0060	0.0065	0.0070	0.0085	0.0095	0.0110
Spheroidal graphite iron and malleable cast iron	≤ 23	≤ 242	80	0.0045	0.0050	0.0055	0.0060	0.0065	0.0070	0.0085	0.0095	0.0110
	≤ 38	≤ 354	75	0.0045	0.0050	0.0055	0.0060	0.0065	0.0070	0.0085	0.0095	0.0110
Chilled cast iron	≤ 38	≤ 354	30	0.0015	0.0020	0.0025	0.0025	0.0030	0.0030	0.0035	0.0045	0.0055
New cast materials GGV	≤ 20	≤ 220	80	0.0045	0.0050	0.0055	0.0060	0.0065	0.0070	0.0085	0.0095	0.0110
	≤ 32	≤ 301	50	0.0045	0.0050	0.0055	0.0060	0.0065	0.0070	0.0085	0.0095	0.0110
New cast materials ADI	≤ 32	≤ 301										
	≤ 43	≤ 402										
Special alloys	≤ 54	≤ 549	30	0.0015	0.0020	0.0025	0.0025	0.0030	0.0030	0.0035	0.0045	0.0055
Ti and Ti-alloys	≤ 25	≤ 255	55	0.0030	0.0030	0.0035	0.0040	0.0045	0.0050	0.0060	0.0065	0.0085
	≤ 43	≤ 402	40	0.0015	0.0020	0.0025	0.0025	0.0030	0.0030	0.0035	0.0045	0.0055
Aluminium and Al-alloys	-	≤ 120	340	0.0060	0.0065	0.0065	0.0075	0.0085	0.0090	0.0100	0.0120	0.0135
Al wrought alloys	-	≤ 200	265	0.0060	0.0065	0.0065	0.0075	0.0085	0.0090	0.0100	0.0120	0.0135
Al cast alloys ≤ 10 % Si	-	≤ 180	150	0.0045	0.0050	0.0055	0.0060	0.0065	0.0070	0.0085	0.0095	0.0110
	-	≤ 180	115	0.0045	0.0050	0.0055	0.0060	0.0065	0.0070	0.0085	0.0095	0.0110
Magnesium alloys	-	≤ 120	375	0.0060	0.0065	0.0065	0.0075	0.0085	0.0090	0.0100	0.0120	0.0135
Copper, low-alloyed	-	≤ 150	225	0.0060	0.0065	0.0065	0.0075	0.0085	0.0090	0.0100	0.0120	0.0135
Brass, short-chipping	-	≤ 180	300	0.0060	0.0065	0.0065	0.0075	0.0085	0.0090	0.0100	0.0120	0.0135
	-	≤ 180	190	0.0060	0.0065	0.0065	0.0075	0.0085	0.0090	0.0100	0.0120	0.0135
Bronze, short-chipping	-	≤ 180	115	0.0060	0.0065	0.0065	0.0075	0.0085	0.0090	0.0100	0.0120	0.0135
	≤ 25	≤ 255	100	0.0060	0.0065	0.0065	0.0075	0.0085	0.0090	0.0100	0.0120	0.0135
Bronze, long-chipping	≤ 25	≤ 255	90	0.0060	0.0065	0.0065	0.0075	0.0085	0.0090	0.0100	0.0120	0.0135
	≤ 32	≤ 301	75	0.0060	0.0065	0.0065	0.0075	0.0085	0.0090	0.0100	0.0120	0.0135
Duroplastics			115	0.0060	0.0065	0.0065	0.0075	0.0085	0.0090	0.0100	0.0120	0.0135
Thermoplastics			150	0.0060	0.0065	0.0065	0.0075	0.0085	0.0090	0.0100	0.0120	0.0135
Reinforced plastics - Kevlar												
Reinforced plastics - GFK / CFK												



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