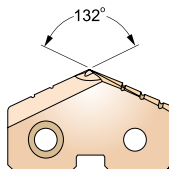


SM-POINT SPADE DRILL INSERTS - CARBIDE P40

- SM-POINT EINWEG BOHREINSATZ - VOLLHARTMETALL P40
- Plaquettes SPADE DRILL, pointe SM - Carbure P40
- CUSPIDI SM-POINT - MD P40



- ▶ For general use in carbon steels and alloys steels.
- ▶ Improved stability and hole straightness by newly developed thinning design.
- ▶ Less thrust force and excellent self-centering.
- ▶ Any non-standard size available.
- ▶ Für allgemeine Anwendung in Kohlenstoffstählen und legierten Stählen
- ▶ Erhöhte Stabilität und Fluchtgenauigkeit durch neu entwickelte Querschnitengeometrie
- ▶ Verminderte Bohrkraft und ausgezeichnete Selbstzentrierung
- ▶ Jede Abmessung außerhalb des Kataloges lieferbar

cutting conditions : p.A380

| | | | | |
|-------------------------|------------------------|----------|-------------|------|
| Recommended Tool Holder | Flat Shank | Page | Plain Shank | Page |
| | INDEXABLE DRILL HOLDER | D245-246 | - | - |
| | ER COLLET CHUCK | | D73-115 | |

| Series Min. to Max. mm (inch) | Diameter | | | Thick Metric (mm, inch) | EDP No. | | |
|---|--|----------------|-------------------|-------------------------------|-------------|--------------|----------|
| | Inch (inch) | Metric (mm) | Decimal (inch) | | CARBIDE P40 | | |
| | | | | | TiN | TiCN | TiAlN |
| Y Ø9.50 (.374) to Ø11.07 (.436) | 3/8 | 9.50 | .3740 | 2.4 (3/32) | SM855095 | SM860095 | SM865095 |
| | | 9.53 | .3750 | | SM805024 | SM810024 | SM815024 |
| | 25/64 | 9.80 | .3858 | | SM855098 | SM860098 | SM865098 |
| | | 9.92 | .3906 | | SM805025 | SM810025 | SM815025 |
| | 13/32 | 10.00 | .3937 | | SM855100 | SM860100 | SM865100 |
| | | 10.20 | .4016 | | SM855102 | SM860102 | SM865102 |
| | | 10.32 | .4062 | | SM805026 | SM810026 | SM815026 |
| | | 10.50 | .4134 | | SM855105 | SM860105 | SM865105 |
| | | 10.72 | .4219 | | SM805027 | SM810027 | SM815027 |
| | | 10.80 | .4252 | | SM855108 | SM860108 | SM865108 |
| Z Ø11.11(.437) to Ø12.95(.510) | 7/16 | 11.00 | .4331 | 2.4 (3/32) | SM855110 | SM860110 | SM865110 |
| | | 11.11 | .4375 | | SM805028 | SM810028 | SM815028 |
| | 11.50 | .4528 | SM855115 | | SM860115 | SM865115 | |
| | 29/64 | 11.51 | .4531 | | SM805029 | SM810029 | SM815029 |
| | 15/32 | 11.91 | .4688 | | SM805030 | SM810030 | SM815030 |
| | 31/64 | 12.00 | .4724 | | SM855120 | SM860120 | SM865120 |
| | | 12.30 | .4844 | | SM805031 | SM810031 | SM815031 |
| | 1/2 | 12.50 | .4921 | | SM855125 | SM860125 | SM865125 |
| | | 12.70 | .5000 | | SM805032 | SM810032 | SM815032 |
| | 0 Ø12.98 (.511) to Ø17.65 (.695) | 33/64 | 13.00 | | .5118 | 3.2 (1/8) | SM855130 |
| 13.10 | | | .5156 | SM805033 | SM810033 | | SM815033 |
| 17/32 | | 13.49 | .5312 | SM805034 | SM810034 | | SM815034 |
| 35/64 | | 13.50 | .5315 | SM855135 | SM860135 | | SM865135 |
| | | 13.89 | .5469 | SM805035 | SM810035 | | SM815035 |
| 9/16 | | 14.00 | .5512 | SM855140 | SM860140 | | SM865140 |
| | | 14.29 | .5625 | SM805036 | SM810036 | | SM815036 |
| 37/64 | | 14.50 | .5709 | SM855145 | SM860145 | | SM865145 |
| | | 14.68 | .5781 | SM805037 | SM810037 | | SM815037 |
| 19/32 | | 15.00 | .5906 | SM855150 | SM860150 | | SM865150 |
| | 15.08 | .5938 | SM805038 | SM810038 | SM815038 | | |
| 39/64 | 15.48 | .6094 | SM805039 | SM810039 | SM815039 | | |
| | 15.50 | .6102 | SM855155 | SM860155 | SM865155 | | |
| 5/8 | 15.88 | .6250 | SM805040 | SM810040 | SM815040 | | |
| | 16.00 | .6299 | SM855160 | SM860160 | SM865160 | | |

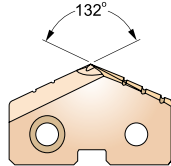
◎ : Excellent ○ : Good

| ISO Material Description | P | | | | | | | | | | | M | | | K | | | | | |
|--------------------------------|-----------------|-----|-----|-----|-----|-----------------|-----|-----|-----|---------------------------------------|-----|-----------------|-----|-----|----------------|-----|----------------------|-----|------------------------|-----|
| | Non-alloy steel | | | | | Low alloy steel | | | | High alloyed steel, and tool steel | | Stainless steel | | | Grey cast iron | | Nodular cast iron | | Malleable cast iron | |
| VDI 3323 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| HRc | | | | | | | | | | | | | | | | | | | | |
| HB | 125 | 190 | 250 | 270 | 300 | 180 | 275 | 300 | 350 | 200 | 325 | 200 | 240 | 180 | 180 | 260 | 160 | 250 | 130 | 230 |
| Recommended | ◎ | ◎ | ◎ | ◎ | | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

| ISO Material Description | N | | | | | | | | | | S | | | | | | H | | | | |
|--------------------------------|----------------------------|-----|------------------------|----|-----|--|----|-----|---------------------------|----|-----------------------------|-----|-----|-----|-----|-------|-----------------|-----|-------------------|----------------------|-----------------------|
| | Aluminum- wrought alloy | | Aluminum-cast, alloyed | | | Copper and Copper Alloys (Bronze / Brass) | | | Non Metallic Materials | | Heat Resistant Super Alloys | | | | | | Titanium Alloys | | Hardened steel | Chilled Cast Iron | Hardened Cast Iron |
| VDI 3323 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |
| HRc | | | | | | | | | | | | | | | | | | | | | |
| HB | 60 | 100 | 75 | 90 | 130 | 110 | 90 | 100 | | | 200 | 280 | 250 | 350 | 320 | 400Rm | 1050Rm | 550 | 630 | 400 | 550 |
| Recommended | ○ | ○ | | | | | | | | | ○ | ○ | ○ | ○ | ○ | | | ◎ | | | |

SM-POINT SPADE DRILL INSERTS - CARBIDE P40

- SM-POINT EINWEG BOHREINSATZ - VOLLHARTMETALL P40
- Plaquettes SPADE DRILL, pointe SM - Carbure P40
- CUSPIDI SM-POINT - MD P40



- ▶ For general use in carbon steels and alloys steels.
- ▶ Improved stability and hole straightness by newly developed thinning design.
- ▶ Less thrust force and excellent self-centering.
- ▶ Any non-standard size available.
- ▶ Für allgemeine Anwendung in Kohlenstoffstählen und legierten Stählen
- ▶ Erhöhte Stabilität und Fluchtgenauigkeit durch neu entwickelte Querschnitengeometrie
- ▶ Verminderte Bohrkraft und ausgezeichnete Selbstzentrierung
- ▶ Jede Abmessung außerhalb des Kataloges lieferbar

cutting conditions : p.A380

| | | | | |
|------------------------|------------------------|-----------------|-------------|---------|
| Recommended ToolHolder | Flat Shank | Page | Plain Shank | Page |
| | INDEXABLE DRILL HOLDER | D245-246 | - | - |
| | | ER COLLET CHUCK | | D73-115 |

| Series Min. to Max. mm (inch) | Diameter | | | Thick Metric (mm, inch) | EDP No. | | |
|--|----------------|----------------|-------------------|-------------------------------|-------------|----------|----------|
| | Inch (inch) | Metric (mm) | Decimal (inch) | | CARBIDE P40 | | |
| | | | | | TiN | TiCN | TiAlN |
| 0 Ø12.98(.511) to Ø17.65(.695) | 41/64 | 16.27 | .6406 | 3.2 (1/8) | SM805041 | SM810041 | SM815041 |
| | | 16.50 | .6496 | | SM855165 | SM860165 | SM865165 |
| | 21/32 | 16.67 | .6562 | | SM805042 | SM810042 | SM815042 |
| | | 17.00 | .6693 | | SM855170 | SM860170 | SM865170 |
| | 43/64 | 17.07 | .6719 | | SM805043 | SM810043 | SM815043 |
| | 11/16 | 17.46 | .6875 | | SM805044 | SM810044 | SM815044 |
| | | 17.50 | .6890 | | SM855175 | SM860175 | SM865175 |
| | 45/64 | 17.86 | .7031 | | SM805045 | SM810045 | SM815045 |
| | | 18.00 | .7087 | | SM855180 | SM860180 | SM865180 |
| | | 23/32 | 18.26 | | .7188 | SM805046 | SM810046 |
| 1 Ø17.53 (.690) to Ø24.38 (.960) | | 18.50 | .7283 | 4.0 (5/32) | SM855185 | SM860185 | SM865185 |
| | 47/64 | 18.65 | .7344 | | SM805047 | SM810047 | SM815047 |
| | | 19.00 | .7480 | | SM855190 | SM860190 | SM865190 |
| | 3/4 | 19.05 | .7500 | | SM805048 | SM810048 | SM815048 |
| | 49/64 | 19.45 | .7656 | | SM805049 | SM810049 | SM815049 |
| | | 19.50 | .7677 | | SM855195 | SM860195 | SM865195 |
| | 25/32 | 19.84 | .7812 | | SM805050 | SM810050 | SM815050 |
| | | 20.00 | .7874 | | SM855200 | SM860200 | SM865200 |
| | 51/64 | 20.24 | .7969 | | SM805051 | SM810051 | SM815051 |
| | | 20.50 | .8071 | | SM855205 | SM860205 | SM865205 |
| | 13/16 | 20.64 | .8125 | | SM805052 | SM810052 | SM815052 |
| | | 21.00 | .8268 | | SM855210 | SM860210 | SM865210 |
| | 27/32 | 21.43 | .8438 | | SM805054 | SM810054 | SM815054 |
| | 55/64 | 21.83 | .8594 | | SM805055 | SM810055 | SM815055 |
| | | 22.00 | .8661 | | SM855220 | SM860220 | SM865220 |
| | 7/8 | 22.23 | .8750 | | SM805056 | SM810056 | SM815056 |
| | 57/64 | 22.62 | .8906 | | SM805057 | SM810057 | SM815057 |
| | | 23.00 | .9055 | | SM855230 | SM860230 | SM865230 |
| 29/32 | 23.02 | .9062 | SM805058 | SM810058 | SM815058 | | |
| 59/64 | 23.42 | .9219 | SM805059 | SM810059 | SM815059 | | |
| 15/16 | 23.81 | .9375 | SM805060 | SM810060 | SM815060 | | |
| | 24.00 | .9449 | SM855240 | SM860240 | SM865240 | | |

◎ : Excellent ○ : Good

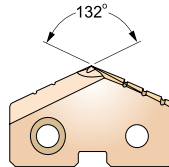
| ISO Material Description | P | | | | | | | | | | M | | | | K | | | | | | | |
|--------------------------------|-----------------|-----|-----|-----|-----|-----------------|-----|-----|-----|-----|---------------------------------------|-----|-----|-----|-----------------|-----|-----|----------------|-----|----------------------|--|------------------------|
| | Non-alloy steel | | | | | Low alloy steel | | | | | High alloyed steel, and tool steel | | | | Stainless steel | | | Grey cast iron | | Nodular cast iron | | Malleable cast iron |
| VDI 3323 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | | |
| HRc | | 13 | 25 | 28 | 32 | 10 | 29 | 32 | 38 | 15 | 35 | 15 | 23 | 10 | 10 | 26 | 3 | 25 | | 21 | | |
| HB | 125 | 190 | 250 | 270 | 300 | 180 | 275 | 300 | 350 | 200 | 325 | 200 | 240 | 180 | 180 | 260 | 160 | 250 | 130 | 230 | | |
| Recommended | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | |

| ISO Material Description | N | | | | | | | | | | S | | | | | | H | | | | |
|--------------------------------|----------------------------|-----|------------------------|----|-----|--|----|-----|---------------------------|----|-----------------------------|-----|-----|-----|-----|-------|-----------------|-----|-------------------|----------------------|-----------------------|
| | Aluminum- wrought alloy | | Aluminum-cast, alloyed | | | Copper and Copper Alloys (Bronze / Brass) | | | Non Metallic Materials | | Heat Resistant Super Alloys | | | | | | Titanium Alloys | | Hardened steel | Chilled Cast Iron | Hardened Cast Iron |
| VDI 3323 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |
| HRc | | | | | | | | | | | 15 | 30 | 25 | 38 | 34 | | | 55 | 60 | 42 | 55 |
| HB | 60 | 100 | 75 | 90 | 130 | 110 | 90 | 100 | | | 200 | 280 | 250 | 350 | 320 | 400Rm | 1050Rm | 550 | 630 | 400 | 550 |
| Recommended | ○ | ○ | | | | | | | | | ○ | ○ | ○ | ○ | ○ | | | ◎ | | | |



SM-POINT SPADE DRILL INSERTS - CARBIDE P40

- SM-POINT EINWEG BOHREINSATZ - VOLLHARTMETALL P40
- Plaquettes SPADE DRILL, pointe SM - Carbure P40
- CUSPIDI SM-POINT - MD P40



cutting conditions : p.A380

- ▶ For general use in carbon steels and alloys steels.
- ▶ Improved stability and hole straightness by newly developed thinning design.
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- ▶ Any non-standard size available.
- ▶ Für allgemeine Anwendung in Kohlenstoffstählen und legierten Stählen
- ▶ Erhöhte Stabilität und Fluchtgenauigkeit durch neu entwickelte Querschnidengeometrie
- ▶ Verminderte Bohrkraft und ausgezeichnete Selbstzentrierung
- ▶ Jede Abmessung außerhalb des Kataloges lieferbar

| | | | | |
|------------------------|------------------------|----------|-------------|---------|
| Recommended ToolHolder | Flat Shank | Page | Plain Shank | Page |
| | INDEXABLE DRILL HOLDER | D245-246 | - | - |
| | ER COLLET CHUCK | | | D73-115 |

| Series Min. to Max. mm (inch) | Diameter | | | Thick Metric (mm, inch) | EDP No. | | |
|---|----------------|----------------|-------------------|-------------------------------|-------------|----------|----------|
| | Inch (inch) | Metric (mm) | Decimal (inch) | | CARBIDE P40 | | |
| | | | | | TiN | TiCN | TiAlN |
| 2 Ø24.41 (.961) to Ø35.05 (1.380) | 31/32 | 24.61 | .9688 | 4.8 (3/16) | SM805062 | SM810062 | SM815062 |
| | 63/64 | 25.00 | .9843 | | SM855250 | SM860250 | SM865250 |
| | 1 | 25.40 | 1.0000 | | SM805100 | SM810100 | SM815100 |
| | 1-1/64 | 25.80 | 1.0156 | | SM805101 | SM810101 | SM815101 |
| | | 26.00 | 1.0236 | | SM855260 | SM860260 | SM865260 |
| | 1-1/32 | 26.19 | 1.0312 | | SM805102 | SM810102 | SM815102 |
| | 1-3/64 | 26.59 | 1.0469 | | SM805103 | SM810103 | SM815103 |
| | 1-1/16 | 26.99 | 1.0625 | | SM805104 | SM810104 | SM815104 |
| | | 27.00 | 1.0630 | | SM855270 | SM860270 | SM865270 |
| | 1-3/32 | 27.78 | 1.0938 | | SM805106 | SM810106 | SM815106 |
| | | 28.00 | 1.1024 | | SM855280 | SM860280 | SM865280 |
| | 1-7/64 | 28.18 | 1.1094 | | SM805107 | SM810107 | SM815107 |
| | 1-1/8 | 28.58 | 1.1250 | | SM805108 | SM810108 | SM815108 |
| | | 29.00 | 1.1417 | | SM855290 | SM860290 | SM865290 |
| | 1-5/32 | 29.37 | 1.1562 | | SM805110 | SM810110 | SM815110 |
| | | 30.00 | 1.1811 | | SM855300 | SM860300 | SM865300 |
| | 1-3/16 | 30.16 | 1.1875 | | SM805112 | SM810112 | SM815112 |
| | 1-7/32 | 30.96 | 1.2188 | | SM805114 | SM810114 | SM815114 |
| | | 31.00 | 1.2205 | | SM855310 | SM860310 | SM865310 |
| | 1-1/4 | 31.75 | 1.2500 | | SM805116 | SM810116 | SM815116 |
| | | 32.00 | 1.2598 | | SM855320 | SM860320 | SM865320 |
| | 1-9/32 | 32.54 | 1.2812 | | SM805118 | SM810118 | SM815118 |
| | | 33.00 | 1.2992 | | SM855330 | SM860330 | SM865330 |
| | 1-5/16 | 33.34 | 1.3125 | | SM805120 | SM810120 | SM815120 |
| | 34.00 | 1.3386 | SM855340 | SM860340 | SM865340 | | |
| 1-11/32 | 34.13 | 1.3438 | SM805122 | SM810122 | SM815122 | | |
| 1-3/8 | 34.93 | 1.3750 | SM805124 | SM810124 | SM815124 | | |
| | 35.00 | 1.3780 | SM855350 | SM860350 | SM865350 | | |

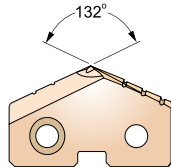
◎ : Excellent ○ : Good

| ISO Material Description | P | | | | | | | | | | M | | | | K | | | | | |
|--------------------------------|-----------------|-----|-----|-----|-----|-----------------|-----|-----|-----|-----|---------------------------------------|-----|-----------------|-----|----------------|-----|-------------------|-----|---------------------|-----|
| | Non-alloy steel | | | | | Low alloy steel | | | | | High alloyed steel, and tool steel | | Stainless steel | | Grey cast iron | | Nodular cast iron | | Malleable cast iron | |
| VDI 3323 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| HRc | | 13 | 25 | 28 | 32 | 10 | 29 | 32 | 38 | 15 | 35 | 15 | 23 | 10 | 10 | 26 | 3 | 25 | | 21 |
| HB | 125 | 190 | 250 | 270 | 300 | 180 | 275 | 300 | 350 | 200 | 325 | 200 | 240 | 180 | 180 | 260 | 160 | 250 | 130 | 230 |
| Recommended | ◎ | ◎ | ◎ | ◎ | | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

| ISO Material Description | N | | | | | S | | | | | | | | | | H | | | | | |
|--------------------------------|------------------------|-----|------------------------|----|-----|--|----|-----|------------------------|----|-----------------------------|-----|-----|-----|-----|-----------------|--------|----------------|-------------------|--------------------|-----|
| | Aluminum-wrought alloy | | Aluminum-cast, alloyed | | | Copper and Copper Alloys (Bronze / Brass) | | | Non Metallic Materials | | Heat Resistant Super Alloys | | | | | Titanium Alloys | | Hardened steel | Chilled Cast Iron | Hardened Cast Iron | |
| VDI 3323 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |
| HRc | | | | | | | | | | | 15 | 30 | 25 | 38 | 34 | | | 55 | 60 | 42 | 55 |
| HB | 60 | 100 | 75 | 90 | 130 | 110 | 90 | 100 | | | 200 | 280 | 250 | 350 | 320 | 400Rm | 1050Rm | 550 | 630 | 400 | 550 |
| Recommended | ○ | ○ | | | | | ○ | | | | ○ | ○ | ○ | ○ | ○ | | | ◎ | | | |

SM-POINT SPADE DRILL INSERTS - CARBIDE P40

- SM-POINT EINWEG BOHREINSATZ - VOLLHARTMETALL P40
- Plaquettes SPADE DRILL, pointe SM - Carbure P40
- CUSPIDI SM-POINT - MD P40



cutting conditions : p.A380

- ▶ For general use in carbon steels and alloys steels.
- ▶ Improved stability and hole straightness by newly developed thinning design.
- ▶ Less thrust force and excellent self-centering.
- ▶ Any non-standard size available.

- ▶ Für allgemeine Anwendung in Kohlenstoffstählen und legierten Stählen
- ▶ Erhöhte Stabilität und Fluchtgenauigkeit durch neu entwickelte Querschnitengeometrie
- ▶ Verminderte Bohrkraft und ausgezeichnete Selbstzentrierung
- ▶ Jede Abmessung außerhalb des Kataloges lieferbar

| | | | | |
|------------------------|------------------------|----------|-------------|---------|
| Recommended ToolHolder | Flat Shank | Page | Plain Shank | Page |
| | INDEXABLE DRILL HOLDER | D245-246 | - | - |
| | ER COLLET CHUCK | | | D73-115 |

| Series Min. to Max. mm (inch) | Diameter | | | Thick Metric (mm, inch) | EDP No. | | |
|--|----------------|----------------|-------------------|-------------------------------|-------------|----------|----------|
| | Inch (inch) | Metric (mm) | Decimal (inch) | | CARBIDE P40 | | |
| | | | | | TiN | TiCN | TiAlN |
| 3 Ø34.37 (1.353) to Ø47.80 (1.882) | 1-13/32 | 35.72 | 1.4062 | 6.4 (1/4) | SM805126 | SM810126 | SM815126 |
| | | 36.00 | 1.4173 | | SM855360 | SM860360 | SM865360 |
| | | 1-7/16 | 36.51 | | 1.4375 | SM805128 | SM810128 |
| | 37.00 | | 1.4567 | | SM855370 | SM860370 | SM865370 |
| | 1-15/32 | 37.31 | 1.4688 | | SM805130 | SM810130 | SM815130 |
| | | 38.00 | 1.4961 | | SM855380 | SM860380 | SM865380 |
| | 1-1/2 | 38.10 | 1.5000 | | SM805132 | SM810132 | SM815132 |
| | | 1-17/32 | 38.89 | | 1.5312 | SM805134 | SM810134 |
| | | | 39.00 | | 1.5354 | SM855390 | SM860390 |
| | | 1-9/16 | 39.69 | | 1.5625 | SM805136 | SM810136 |
| | | | 40.00 | | 1.5748 | SM855400 | SM860400 |
| | | 1-19/32 | 40.48 | | 1.5938 | SM805138 | SM810138 |
| | | | 41.00 | | 1.6142 | SM855410 | SM860410 |
| | | 1-5/8 | 41.28 | | 1.6250 | SM805140 | SM810140 |
| | | | 42.00 | | 1.6535 | SM855420 | SM860420 |
| | | 1-21/32 | 42.07 | | 1.6562 | SM805142 | SM810142 |
| | 1-11/16 | | 42.86 | | 1.6875 | SM805144 | SM810144 |
| | | | 43.00 | | 1.6929 | SM855430 | SM860430 |
| | 1-23/32 | | 43.66 | | 1.7188 | SM805146 | SM810146 |
| | | | 44.00 | | 1.7323 | SM855440 | SM860440 |
| | 1-3/4 | | 44.45 | | 1.7500 | SM805148 | SM810148 |
| | | | 45.00 | | 1.7717 | SM855450 | SM860450 |
| | 1-25/32 | | 45.24 | | 1.7812 | SM805150 | SM810150 |
| | | | 46.00 | | 1.8110 | SM855460 | SM860460 |
| 1-13/16 | 46.04 | | 1.8125 | SM805152 | SM810152 | SM815152 | |
| | 1-27/32 | 46.83 | 1.8438 | SM805154 | SM810154 | SM815154 | |
| | | 47.00 | 1.8504 | SM855470 | SM860470 | SM865470 | |
| | 1-7/8 | 47.63 | 1.8750 | SM805156 | SM810156 | SM815156 | |

◎ : Excellent ○ : Good

| ISO | P | | | | | | | | | | M | | | | K | | | | | | | |
|----------------------|-----------------|-----|-----|-----|-----|-----------------|-----|-----|-----|-----|------------------------------------|-----|-----|-----|-----------------|-----|-----|----------------|-----|-------------------|--|---------------------|
| Material Description | Non-alloy steel | | | | | Low alloy steel | | | | | High alloyed steel, and tool steel | | | | Stainless steel | | | Grey cast iron | | Nodular cast iron | | Malleable cast iron |
| VDI 3323 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | | |
| HRc | 13 | 25 | 28 | 32 | 36 | 10 | 29 | 32 | 38 | 15 | 35 | 15 | 23 | 10 | 10 | 26 | 3 | 25 | | 21 | | |
| HB | 125 | 190 | 250 | 270 | 300 | 180 | 275 | 300 | 350 | 200 | 325 | 200 | 240 | 180 | 180 | 260 | 160 | 250 | 130 | 230 | | |
| Recommended | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | |

| ISO | N | | | | | S | | | | | | | | | | H | | | | | |
|----------------------|------------------------|-----|------------------------|----|-----|---|----|-----|------------------------|----|-----------------------------|-----|-----|-----|-----|-----------------|--------|----------------|-------------------|--------------------|-----|
| Material Description | Aluminum-wrought alloy | | Aluminum-cast, alloyed | | | Copper and Copper Alloys (Bronze / Brass) | | | Non Metallic Materials | | Heat Resistant Super Alloys | | | | | Titanium Alloys | | Hardened steel | Chilled Cast Iron | Hardened Cast Iron | |
| VDI 3323 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |
| HRc | | | | | | | | | | | 15 | 30 | 25 | 38 | 34 | | | 55 | 60 | 42 | 55 |
| HB | 60 | 100 | 75 | 90 | 130 | 110 | 90 | 100 | | | 200 | 280 | 250 | 350 | 320 | 400Rm | 1050Rm | 550 | 630 | 400 | 550 |
| Recommended | ○ | ○ | | | | | ○ | | | | ○ | ○ | ○ | ○ | ○ | | | ◎ | | | |

SELECTION GUIDE



| SERIES | 1~8 | Y,Z,0,1~4 | Y,Z,0,1,2 |
|---------------|------------|---------------|-----------------|
| TOOL MATERIAL | HSS M4 | SUPER HSS T15 | PREMIUM HSS M48 |
| POINT | STANDARD | STANDARD | STANDARD |
| SIZE MIN | Ø17.86(#1) | Ø9.5(#Y) | Ø9.5(#Y) |
| SIZE MAX | Ø114.3(#8) | Ø65.09(#4) | Ø35(#2) |
| PAGE | A286 | A292 | A297 |



Please visit globalyg1.com/mat for material search

SURFACE TREATMENT

TiN / TiCN / TiAIN

INSERTS & HOLDERS SPADE DRILLS

For General Machines and Drilling Large Diameters
Longer Tool Life and High Productivity

◎ : Excellent ○ : Good

Recommended cutting conditions : p.A375



| ISO | VDI 3323 | Material Description | Composition / Structure / Heat Treatment | HB | HRc | | | |
|-----|---------------------|--------------------------------|--|---------------------------------------|-----|----|---|---|
| P | 1 | Non-alloy steel | About 0.15% C Annealed | 125 | | ○ | ◎ | ◎ |
| | 2 | | About 0.45% C Annealed | 190 | 13 | ○ | ◎ | ◎ |
| | 3 | | About 0.45% C Quenched & Tempered | 250 | 25 | ○ | ◎ | ◎ |
| | 4 | | About 0.75% C Annealed | 270 | 28 | ○ | ◎ | ◎ |
| | 5 | | About 0.75% C Quenched & Tempered | 300 | 32 | | | |
| | 6 | Low alloy steel | Annealed | 180 | 10 | ○ | ◎ | ◎ |
| | 7 | | Quenched & Tempered | 275 | 29 | ○ | ◎ | ◎ |
| | 8 | | Quenched & Tempered | 300 | 32 | | ○ | ◎ |
| | 9 | | Quenched & Tempered | 350 | 38 | | ○ | ◎ |
| | 10 | | High alloyed steel, and tool steel | Annealed | 200 | 15 | | ○ |
| | 11 | Quenched & Tempered | | 325 | 35 | | ○ | ◎ |
| M | 12 | Stainless steel | Ferritic / Martensitic Annealed | 200 | 15 | ◎ | ○ | |
| | 13 | | Martensitic Quenched & Tempered | 240 | 23 | ◎ | ○ | |
| | 14 | | Austenitic | 180 | 10 | ◎ | ○ | |
| K | 15 | Grey cast iron | Pearlitic / ferritic | 180 | 10 | ◎ | ○ | ○ |
| | 16 | | Pearlitic (Martensitic) | 260 | 26 | ○ | ◎ | ◎ |
| | 17 | Nodular cast iron | Ferritic | 160 | 3 | ◎ | ○ | ○ |
| | 18 | | Pearlitic | 250 | 25 | ○ | ◎ | ◎ |
| | 19 | | Ferritic | 130 | | ◎ | ○ | ○ |
| 20 | Malleable cast iron | Pearlitic | 230 | 21 | ○ | ◎ | ◎ | |
| N | 21 | Aluminum-wrought alloy | Not Curable | 60 | | ◎ | ○ | ○ |
| | 22 | | Curable Hardened | 100 | | ◎ | ○ | ○ |
| | 23 | Aluminum-cast, alloyed | ≤ 12% Si, Not Curable | 75 | | | | |
| | 24 | | ≤ 12% Si, Curable Hardened | 90 | | | | |
| | 25 | | > 12% Si, Not Curable | 130 | | | | |
| | 26 | | Copper and Copper Alloys | Cutting Alloys, PB>1% | 110 | | | |
| | 27 | Copper Alloys (Bronze / Brass) | CuZn, CuSnZn (Brass) | 90 | | ◎ | ○ | ○ |
| | 28 | | CuSn, lead-free copper and electrolytic copper | 100 | | | | |
| | 29 | | Non Metallic Materials | Duroplastic, Fiber Reinforced Plastic | | | | |
| | 30 | | Rubber, Wood, etc. | | | | | |
| S | 31 | Heat Resistant Super Alloys | Fe Based Annealed | 200 | 15 | | ◎ | ◎ |
| | 32 | | Cured | 280 | 30 | | ○ | ◎ |
| | 33 | | Annealed | 250 | 25 | | ○ | ◎ |
| | 34 | | Ni or Co Based Cured | 350 | 38 | | ○ | ◎ |
| | 35 | Cast | 320 | 34 | | ○ | ◎ | |
| | 36 | Titanium Alloys | Pure Titanium | 400 Rm | | | | |
| | 37 | | Alpha + Beta Alloys Hardened | 1050 Rm | | | | |
| H | 38 | Hardened steel | Hardened | 550 | 55 | | ○ | ◎ |
| | 39 | | Hardened | 630 | 60 | | | |
| | 40 | Chilled Cast Iron | Cast | 400 | 42 | | | |
| | 41 | Hardened Cast Iron | Hardened | 550 | 55 | | | |

| | | | | |
|---------------|-----------------------|--|--|-------------|
| REAMERS | TAPER SHANK | | TAPER SHANK HOLDERS - INCH/METRIC | A364 |
| COUNTER SINKS | FLANGED SHANK | | FLANGED STRAIGHT SHANK HOLDERS - INCH/METRIC | A364 |
| COUNTER BORES | STRAIGHT SHANK | | STRAIGHT SHANK HOLDERS - INCH | A382 |

| Y,Z,0,1,2 | Y,Z,0,1~3 | Y,Z,0,1~3 | 1~3 | Y,Z,0,1~3 | Y,Z,0,1,2 | Y,Z,0,1,2 | Y,Z,0,1~3 | Y,Z,0,1~3 | Y,Z,0,1,2 |
|--------------------|-------------|-------------|-------------|---------------|-----------------|-------------|-------------|-------------|-------------------------|
| CARBIDE K10 | CARBIDE K20 | CARBIDE P40 | HSS M4 | SUPER HSS T15 | PREMIUM HSS M48 | CARBIDE K10 | CARBIDE K20 | CARBIDE P40 | SUPER COBALT T15 |
| STANDARD | STANDARD | STANDARD | SM-POINT | SM-POINT | SM-POINT | SM-POINT | SM-POINT | SM-POINT | FALT BOTTOM |
| Ø9.5(#Y) | Ø9.5(#Y) | Ø9.5(#Y) | Ø17.86(#1) | Ø9.5(#Y) | Ø9.5(#Y) | Ø9.5(#Y) | Ø9.5(#Y) | Ø9.5(#Y) | Ø9.5(#Y) |
| Ø35(#2) | Ø47.63(#3) | Ø47.63(#3) | Ø47.63(#3) | Ø47.63(#3) | Ø35(#2) | Ø35(#2) | Ø47.63(#3) | Ø47.63(#3) | Ø35(#2) |
| A300 | A303 | A307 | A312 | A315 | A319 | A322 | A325 | A329 | A361 |
| TiN / TiCN / TiAlN | | | | | | | | | TiN / Hardslick / TiAlN |



| | | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|----|---------------------------------------|
| | | | | | | | | | | | 1 | DREAM DRILLS -FLAT BOTTOM |
| | | | | | | | | | | | 2 | DREAM DRILLS -INOX |
| | | | | | | | | | | | 3 | DREAM DRILLS -ML |
| | | | | | | | | | | | 4 | DREAM DRILLS -ML |
| | | | | | | | | | | | 5 | DREAM DRILLS -ML |
| | | | | | | | | | | | 6 | DREAM DRILLS -ML |
| | | | | | | | | | | | 7 | DREAM DRILLS -ML |
| | | | | | | | | | | | 8 | DREAM DRILLS -ML |
| | | | | | | | | | | | 9 | DREAM DRILLS -ML |
| | | | | | | | | | | | 10 | DREAM DRILLS -ML |
| | | | | | | | | | | | 11 | DREAM DRILLS -ML |
| | | | | | | | | | | | 12 | DREAM DRILLS for HIGH HARDENED STEELS |
| | | | | | | | | | | | 13 | DREAM DRILLS for HIGH HARDENED STEELS |
| | | | | | | | | | | | 14 | DREAM DRILLS for HIGH HARDENED STEELS |
| | | | | | | | | | | | 15 | GENERAL CARBIDE DRILLS |
| | | | | | | | | | | | 16 | GENERAL CARBIDE DRILLS |
| | | | | | | | | | | | 17 | GENERAL CARBIDE DRILLS |
| | | | | | | | | | | | 18 | GENERAL CARBIDE DRILLS |
| | | | | | | | | | | | 19 | GENERAL CARBIDE DRILLS |
| | | | | | | | | | | | 20 | GENERAL CARBIDE DRILLS |
| | | | | | | | | | | | 21 | GENERAL CARBIDE DRILLS |
| | | | | | | | | | | | 22 | GENERAL CARBIDE DRILLS |
| | | | | | | | | | | | 23 | GENERAL CARBIDE DRILLS |
| | | | | | | | | | | | 24 | GENERAL CARBIDE DRILLS |
| | | | | | | | | | | | 25 | GENERAL CARBIDE DRILLS |
| | | | | | | | | | | | 26 | GENERAL CARBIDE DRILLS |
| | | | | | | | | | | | 27 | GENERAL CARBIDE DRILLS |
| | | | | | | | | | | | 28 | GENERAL CARBIDE DRILLS |
| | | | | | | | | | | | 29 | GENERAL CARBIDE DRILLS |
| | | | | | | | | | | | 30 | GENERAL CARBIDE DRILLS |
| | | | | | | | | | | | 31 | GENERAL CARBIDE DRILLS |
| | | | | | | | | | | | 32 | GENERAL CARBIDE DRILLS |
| | | | | | | | | | | | 33 | GENERAL CARBIDE DRILLS |
| | | | | | | | | | | | 34 | GENERAL CARBIDE DRILLS |
| | | | | | | | | | | | 35 | GENERAL CARBIDE DRILLS |
| | | | | | | | | | | | 36 | GENERAL CARBIDE DRILLS |
| | | | | | | | | | | | 37 | GENERAL CARBIDE DRILLS |
| | | | | | | | | | | | 38 | GENERAL CARBIDE DRILLS |
| | | | | | | | | | | | 39 | GENERAL CARBIDE DRILLS |
| | | | | | | | | | | | 40 | GENERAL CARBIDE DRILLS |
| | | | | | | | | | | | 41 | GENERAL CARBIDE DRILLS |

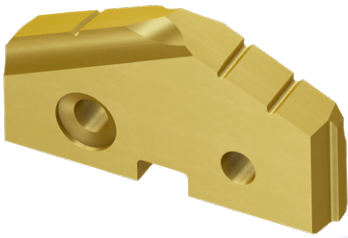
| Coating | Characteristics |
|------------|--|
| H | <ul style="list-style-type: none"> -First choice for excellent wear resistance and toughness -Preventive of chipping due to cold welding -Achieve high penetration rates even in deep holes with reliable tool life -Coefficient of friction against steel : 0.25 -Color : Bronze |
| TiN | <ul style="list-style-type: none"> -Increased tool life over non-coating -Improved wear resistance and high hardness -For normal applications -Coefficient of friction against steel : 0.4 -Color : Gold |

| Coating | Characteristics |
|------------------|--|
| TiCN | <ul style="list-style-type: none"> -Maximum working temperature up to 400°C -Better wear resistance over non-coating -Coefficient of friction against steel : 0.4 -Color : Blue-Grey |
| TiAlN | <ul style="list-style-type: none"> -Maximum working temperature up to 800°C -Excellent heat and oxidation resistance -Coefficient of friction against steel : 0.4 -Color : Violet-Grey |
| Hardslick | <ul style="list-style-type: none"> -Better chip evacuation for tapping and drilling -High hardness and improved lubrication -Coefficient of friction against steel : 0.2 -Color : Black-Grey |

PRODUCT FEATURES

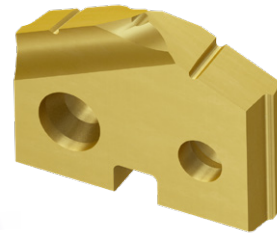
SPADE DRILLS (Standard, SM-Point)

Reference page : p.A299 - p.A380



Standard-Point

Standard Point
and Neutral Rake Angle for
Stable Cutting
Self Centering
Chip Breaking
Rigidity on Center



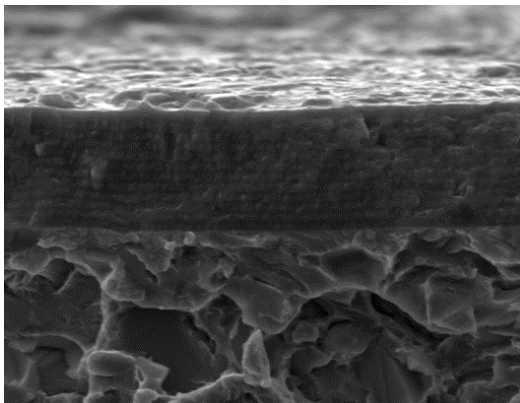
SM-Point

Multiple Web Thinning for and Radius Back Face
for Increased Cutting Speed and Feed
Wide Chip Space
Good Self-Centering
Less Tool Lead-off
Reduction in bell mouching



Multi Layers

Carbide



Multi layered 'H'-coating Micro Grain Carbide Insert

Outstanding Productivity & Reliability

H - Coating

(Upgraded AlCrN-Based : **Multi-Layer coating**)

- Higher worn-out resistance and Lower friction
- Higher Cutting Speed and Feed
- Improved drill Hole Quality



Special features of SM-Point Spade Drill

This new "Hybrid Point" combines the strength of the standard point with additional "Web Thinning".

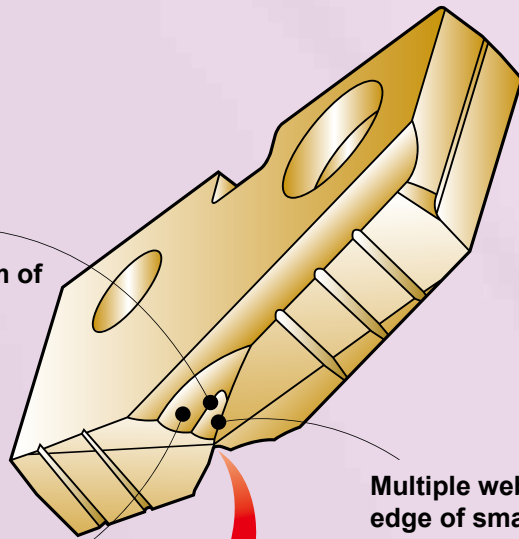
This new point increases stability, reduces thrust, improves centering and allows increased speeds and feeds.

Multiple thinning form at the bottom of the large thinning.

- ▶ The optimum thinning for the difference from the cutting speed, the cutting quantity and the cutting load according to the distance from the drill point to the cutting edge.

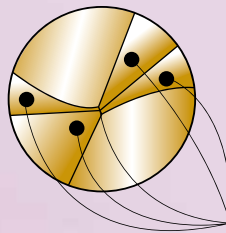
Radius back face

- ▶ Wide chip space



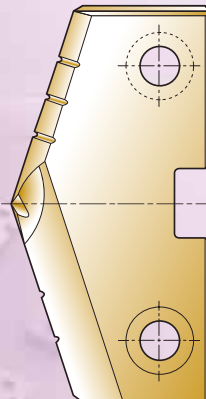
Multiple web thinning with the cutting edge of small web thinning.

- ▶ Good self-centering
- ▶ Less tool lead off
- ▶ Reduction in bell mouching, thrust
- ▶ Increased stability

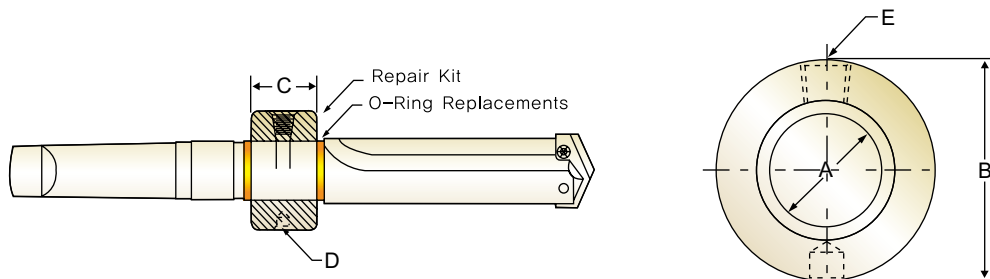


Four-facet point

- ▶ Self-centering
- ▶ Less thrust force



HOLDER ACCESSORIES
ROTARY COOLANT ADAPTER (RCA) AND ACCESSORIES



Inch

| Item No. | I.D. | O.D. | Length | Thread for Driving Rod | Pipe Tap | RCA Repair Kit Item No. | RCA O-Ring Replacements Item No. |
|----------|-------|-------|--------|------------------------|----------|-------------------------|----------------------------------|
| | A | B | C | D | E | | |
| PR110048 | 3/4 | 1-3/4 | 7/8 | 5/16-NC | ◆1/8 | PR210048 | PR310048 |
| PR110100 | 1 | 2-1/8 | 1-1/8 | 5/16-NC | ◆1/8 | PR210100 | PR310100 |
| PR110116 | 1-1/4 | 2-1/2 | 1-3/8 | 3/8-NC | ◆1/4 | PR210116 | PR310116 |
| PR110148 | 1-3/4 | 3 | 1-3/8 | 3/8-NC | ◆1/4 | PR210148 | PR310148 |
| PR110216 | 2-1/4 | 3-3/4 | 1-3/4 | 1/2-NC | ◆1/2 | PR210216 | PR310216 |

Metric

| Item No. | I.D. | O.D. | Length | Thread for Driving Rod | Pipe Tap | RCA Repair Kit Item No. | RCA O-Ring Replacements Item No. |
|----------|-------|-------|--------|------------------------|----------|-------------------------|----------------------------------|
| | A | B | C | D | E | | |
| PR120190 | 19.05 | 44.45 | 22.23 | M8 × 1.25 | ◆1/8 | PR220190 | PR320190 |
| PR120254 | 25.40 | 53.97 | 28.57 | M8 × 1.25 | ◆1/8 | PR220254 | PR320254 |
| PR120317 | 31.75 | 63.50 | 34.92 | M10 × 1.5 | ◆1/4 | PR220317 | PR320317 |
| PR120444 | 44.45 | 76.20 | 34.92 | M10 × 1.5 | ◆1/4 | PR220444 | PR320444 |
| PR120571 | 57.15 | 95.27 | 44.45 | M12 × 1.75 | ◆1/2 | PR220571 | PR320571 |

◆ Thread to BSP & ISO 7-1

TORX SCREWS

| Holder Series | Item No. | TORX Hand Driver | Drill Range Used With | |
|---------------|----------|------------------|-----------------------|--------------------|
| | | | Inch | Metric |
| Y | J07Y0010 | J05Y0070 | 3/8 ~ 27/64 | 9.5 mm ~ 11.0 mm |
| Z | J07Z0110 | | 7/16 ~ 1/2 | 11.5 mm ~ 12.5 mm |
| 0 | J0800210 | J0500080 | 33/64 ~ 11/16 | 13.0 mm ~ 17.5 mm |
| 0.5 | J0805310 | | 39/64 ~ 11/16 | 15.5 mm ~ 17.5 mm |
| 1 | J0910410 | J0510090 | 45/64 ~ 15/16 | 18.0 mm ~ 24.0 mm |
| 1.5 | J0915510 | | 55/64 ~ 15/16 | 22.0 mm ~ 24.0 mm |
| 2 | J1520610 | J0520150 | 31/32 ~ 1-3/8 | 25.0 mm ~ 35.0 mm |
| 2.5 | J1525710 | | 1-3/16 ~ 1-3/8 | 30.0 mm ~ 35.0 mm |
| 3,4 | J2030810 | | 1-13/32 ~ 2-9/16 | 36.0 mm ~ 65.0 mm |
| 5 ~ 8 | J2550910 | J0550250 | 2-1/2 ~ 4-1/2 | 64.0 mm ~ 114.0 mm |

** Note : Replacement screws sold in packages(10 screws per package)

SPADE DRILL HSS-M4

| ISO | VDI 3323 | Material Description | Vc(m/min) | | | Feed(mm/rev) | | | | | | |
|----------|----------|---|-----------------|------------|------------|--------------|----------|--------|--------|--------|--------|---------|
| | | | TiN | TiCN | TiAlN | Ø9.5-12.5 | Ø13-17.5 | Ø18-24 | Ø25-35 | Ø36-47 | Ø48-65 | Ø66-114 |
| P | 1 | Non-alloy steel | 54 | 67 | 75 | 0.15 | 0.22 | 0.28 | 0.37 | 0.46 | 0.56 | 0.67 |
| | 2 | | 49 | 58 | 69 | 0.13 | 0.19 | 0.24 | 0.34 | 0.43 | 0.50 | 0.57 |
| | 3 | | 45 | 56 | 63 | 0.13 | 0.19 | 0.23 | 0.34 | 0.43 | 0.50 | 0.58 |
| | 4 | | 45 | 56 | 63 | 0.13 | 0.19 | 0.23 | 0.34 | 0.43 | 0.50 | 0.58 |
| | 6 | Low alloy steel | 45 | 56 | 58 | 0.13 | 0.20 | 0.24 | 0.36 | 0.42 | 0.46 | 0.55 |
| | 7 | | 41 | 50 | 56 | 0.13 | 0.16 | 0.23 | 0.35 | 0.41 | 0.44 | 0.55 |
| | M | 12 | Stainless steel | 20 | 23 | 29 | 0.12 | 0.18 | 0.20 | 0.24 | 0.30 | 0.36 |
| 13 | | 20 | | 23 | 29 | 0.12 | 0.18 | 0.20 | 0.24 | 0.30 | 0.36 | 0.46 |
| 14 | | 24 | | 29 | 34 | 0.14 | 0.20 | 0.23 | 0.26 | 0.36 | 0.41 | 0.50 |
| K | 15 | Grey cast iron | 48 | 58 | 70 | 0.14 | 0.26 | 0.35 | 0.45 | 0.56 | 0.64 | 0.68 |
| | 16 | | 29 | 35 | 41 | 0.10 | 0.15 | 0.16 | 0.23 | 0.28 | 0.35 | 0.40 |
| | 17 | Nodular cast iron | 48 | 58 | 70 | 0.14 | 0.26 | 0.35 | 0.45 | 0.56 | 0.64 | 0.68 |
| | 18 | | 35 | 44 | 52 | 0.13 | 0.17 | 0.23 | 0.3 | 0.35 | 0.43 | 0.50 |
| | 19 | Malleable cast iron | 52 | 64 | 75 | 0.16 | 0.30 | 0.40 | 0.49 | 0.59 | 0.69 | 0.75 |
| | 20 | | 35 | 44 | 52 | 0.13 | 0.17 | 0.23 | 0.30 | 0.35 | 0.43 | 0.50 |
| N | 21 | Aluminum-wrought alloy | 187 | 229 | 244 | 0.19 | 0.33 | 0.41 | 0.50 | 0.54 | 0.64 | 0.70 |
| | 22 | | 92 | 137 | 137 | 0.19 | 0.33 | 0.41 | 0.46 | 0.54 | 0.64 | 0.70 |
| | 27 | Copper and Copper Alloys (Bronze / Brass) | 95 | 128 | 142 | 0.19 | 0.31 | 0.43 | 0.53 | 0.64 | 0.74 | 0.79 |

► The recommendations for speeds, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points. Speed and feed reductions (20% reduction in speed and 10% reduction in feed) are recommended.

i-ONE DRILLS

i-DREAM DRILLS

DREAM DRILLS -PRO

DREAM DRILLS -GENERAL

DREAM DRILLS -HIGH FEED

DREAM DRILLS -FLAT BOTTOM

DREAM DRILLS -INOX

DREAM DRILLS -ALU

DREAM DRILLS -MQL

DREAM DRILLS for HIGH HARDENED STEELS

GENERAL CARBIDE DRILLS

MULTI-1 DRILLS

HPD DRILLS

GOLD-P DRILLS

SUPER-GP DRILLS

STRAIGHT SHANK DRILLS

TAPER SHANK DRILLS

NC-SPOTTING DRILLS

CENTER DRILLS

SPADE DRILLS

REAMERS

COUNTER SINKS

COUNTER BORES

TECHNICAL DATA

SPADE DRILL HSS-T15

| ISO | VDI 3323 | Material Description | Vc(m/min) | | | Feed(mm/rev) | | | | | | |
|-----|---------------------|---|------------------------------------|------|-------|--------------|----------|--------|--------|--------|--------|---------|
| | | | TiN | TiCN | TiAlN | Ø9.5-12.5 | Ø13-17.5 | Ø18-24 | Ø25-35 | Ø36-47 | Ø48-65 | Ø66-114 |
| P | 1 | Non-alloy steel | 54 | 67 | 75 | 0.15 | 0.22 | 0.28 | 0.37 | 0.46 | 0.56 | 0.67 |
| | 2 | | 49 | 58 | 69 | 0.13 | 0.19 | 0.24 | 0.34 | 0.43 | 0.50 | 0.57 |
| | 3 | | 45 | 56 | 63 | 0.13 | 0.19 | 0.23 | 0.34 | 0.43 | 0.50 | 0.58 |
| | 4 | | 45 | 56 | 63 | 0.13 | 0.19 | 0.23 | 0.34 | 0.43 | 0.50 | 0.58 |
| | 6 | Low alloy steel | 45 | 56 | 58 | 0.13 | 0.20 | 0.24 | 0.36 | 0.42 | 0.46 | 0.55 |
| | 7 | | 41 | 50 | 56 | 0.13 | 0.16 | 0.23 | 0.35 | 0.41 | 0.44 | 0.55 |
| | 8 | | 39 | 47 | 53 | 0.09 | 0.15 | 0.22 | 0.28 | 0.38 | 0.41 | 0.50 |
| | 9 | | 36 | 43 | 46 | 0.08 | 0.15 | 0.21 | 0.27 | 0.38 | 0.40 | 0.51 |
| | 10 | | High alloyed steel, and tool steel | 25 | 34 | 36 | 0.08 | 0.17 | 0.20 | 0.24 | 0.30 | 0.37 |
| | 11 | 19 | | 27 | 29 | 0.08 | 0.14 | 0.18 | 0.19 | 0.25 | 0.29 | 0.34 |
| | M | 12 | Stainless steel | 20 | 23 | 29 | 0.12 | 0.18 | 0.20 | 0.24 | 0.30 | 0.36 |
| 13 | | 20 | | 23 | 29 | 0.12 | 0.18 | 0.20 | 0.24 | 0.30 | 0.36 | 0.46 |
| 14 | | 24 | | 29 | 34 | 0.14 | 0.20 | 0.23 | 0.26 | 0.36 | 0.41 | 0.50 |
| K | 15 | Grey cast iron | 48 | 58 | 70 | 0.14 | 0.26 | 0.35 | 0.45 | 0.56 | 0.64 | 0.68 |
| | 16 | | 29 | 35 | 41 | 0.10 | 0.15 | 0.16 | 0.23 | 0.28 | 0.35 | 0.40 |
| | 17 | Nodular cast iron | 48 | 58 | 70 | 0.14 | 0.26 | 0.35 | 0.45 | 0.56 | 0.64 | 0.68 |
| | 18 | | 35 | 44 | 52 | 0.13 | 0.17 | 0.23 | 0.30 | 0.35 | 0.43 | 0.50 |
| | 19 | | 52 | 64 | 75 | 0.16 | 0.30 | 0.40 | 0.49 | 0.59 | 0.69 | 0.75 |
| 20 | Malleable cast iron | 35 | 44 | 52 | 0.13 | 0.17 | 0.23 | 0.30 | 0.35 | 0.43 | 0.50 | |
| N | 21 | Aluminum-wrought alloy | 187 | 229 | 244 | 0.19 | 0.33 | 0.41 | 0.50 | 0.54 | 0.64 | 0.70 |
| | 22 | | 92 | 137 | 137 | 0.19 | 0.33 | 0.41 | 0.46 | 0.54 | 0.64 | 0.70 |
| | 27 | Copper and Copper Alloys (Bronze / Brass) | 95 | 128 | 142 | 0.19 | 0.31 | 0.43 | 0.53 | 0.64 | 0.74 | 0.79 |
| S | 31 | Heat Resistant Super Alloys | 9 | 11 | 12 | 0.08 | 0.17 | 0.20 | 0.24 | 0.30 | 0.37 | 0.39 |
| | 32 | | 8 | 9 | 11 | 0.08 | 0.14 | 0.18 | 0.19 | 0.25 | 0.29 | 0.34 |
| | 33 | | 8 | 9 | 11 | 0.08 | 0.14 | 0.18 | 0.19 | 0.25 | 0.29 | 0.34 |
| | 34 | | 8 | 9 | 11 | 0.08 | 0.14 | 0.18 | 0.19 | 0.25 | 0.29 | 0.34 |
| | 35 | | 8 | 9 | 11 | 0.08 | 0.14 | 0.18 | 0.19 | 0.25 | 0.29 | 0.34 |
| H | 38 | Hardened steel | 20 | 23 | 29 | 0.12 | 0.18 | 0.20 | 0.24 | 0.30 | 0.36 | 0.46 |

- The recommendations for speeds, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points.
 Speed and feed reductions (20% reduction in speed and 10% reduction in feed) are recommended.

SPADE DRILL HSS-M48

| ISO | VDI 3323 | Material Description | Vc(m/min) | | | Feed(mm/rev) | | | | | | |
|----------|----------|---|------------------------------------|------------|------------|--------------|----------|--------|--------|--------|--------|---------|
| | | | TiN | TiCN | TiAlN | Ø9.5-12.5 | Ø13-17.5 | Ø18-24 | Ø25-35 | Ø36-47 | Ø48-65 | Ø66-114 |
| P | 1 | Non-alloy steel | 54 | 67 | 75 | 0.15 | 0.22 | 0.28 | 0.37 | 0.46 | 0.56 | 0.67 |
| | 2 | | 49 | 58 | 69 | 0.13 | 0.19 | 0.24 | 0.34 | 0.43 | 0.50 | 0.57 |
| | 3 | | 45 | 56 | 63 | 0.13 | 0.19 | 0.23 | 0.34 | 0.43 | 0.50 | 0.58 |
| | 4 | | 45 | 56 | 63 | 0.13 | 0.19 | 0.23 | 0.34 | 0.43 | 0.50 | 0.58 |
| | 6 | Low alloy steel | 45 | 56 | 58 | 0.13 | 0.20 | 0.24 | 0.36 | 0.42 | 0.46 | 0.55 |
| | 7 | | 41 | 50 | 56 | 0.13 | 0.16 | 0.23 | 0.35 | 0.41 | 0.44 | 0.55 |
| | 8 | | 39 | 47 | 53 | 0.09 | 0.15 | 0.22 | 0.28 | 0.38 | 0.41 | 0.50 |
| | 9 | | 36 | 43 | 46 | 0.08 | 0.15 | 0.21 | 0.27 | 0.38 | 0.40 | 0.51 |
| | 10 | | High alloyed steel, and tool steel | 25 | 34 | 36 | 0.08 | 0.17 | 0.20 | 0.24 | 0.30 | 0.37 |
| | 11 | 19 | | 27 | 29 | 0.08 | 0.14 | 0.18 | 0.19 | 0.25 | 0.29 | 0.34 |
| | K | 15 | Grey cast iron | 48 | 58 | 70 | 0.14 | 0.26 | 0.35 | 0.45 | 0.56 | 0.64 |
| 16 | | 29 | | 35 | 41 | 0.10 | 0.15 | 0.16 | 0.23 | 0.28 | 0.35 | 0.40 |
| 17 | | Nodular cast iron | 48 | 58 | 70 | 0.14 | 0.26 | 0.35 | 0.45 | 0.56 | 0.64 | 0.68 |
| 18 | | | 35 | 44 | 52 | 0.13 | 0.17 | 0.23 | 0.30 | 0.35 | 0.43 | 0.50 |
| 19 | | Malleable cast iron | 52 | 64 | 75 | 0.16 | 0.30 | 0.40 | 0.49 | 0.59 | 0.69 | 0.75 |
| 20 | | | 35 | 44 | 52 | 0.13 | 0.17 | 0.23 | 0.30 | 0.35 | 0.43 | 0.50 |
| N | 21 | Aluminum-wrought alloy | 187 | 229 | 244 | 0.19 | 0.33 | 0.41 | 0.50 | 0.54 | 0.64 | 0.70 |
| | 22 | | 92 | 137 | 137 | 0.19 | 0.33 | 0.41 | 0.46 | 0.54 | 0.64 | 0.70 |
| | 27 | Copper and Copper Alloys (Bronze / Brass) | 95 | 128 | 142 | 0.19 | 0.31 | 0.43 | 0.53 | 0.64 | 0.74 | 0.79 |
| S | 31 | Heat Resistant Super Alloys | 9 | 11 | 12 | 0.08 | 0.17 | 0.20 | 0.24 | 0.30 | 0.37 | 0.39 |
| | 32 | | 8 | 9 | 11 | 0.08 | 0.14 | 0.18 | 0.19 | 0.25 | 0.29 | 0.34 |
| | 33 | | 8 | 9 | 11 | 0.08 | 0.14 | 0.18 | 0.19 | 0.25 | 0.29 | 0.34 |
| | 34 | | 8 | 9 | 11 | 0.08 | 0.14 | 0.18 | 0.19 | 0.25 | 0.29 | 0.34 |
| | 35 | | 8 | 9 | 11 | 0.08 | 0.14 | 0.18 | 0.19 | 0.25 | 0.29 | 0.34 |
| H | 38 | Hardened steel | 20 | 23 | 29 | 0.12 | 0.18 | 0.20 | 0.24 | 0.30 | 0.36 | 0.46 |

► The recommendations for speeds, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points.
Speed and feed reductions (20% reduction in speed and 10% reduction in feed) are recommended.



SPADE DRILL CARBIDE-K10

| ISO | VDI 3323 | Material Description | Vc(m/min) | | | Feed(mm/rev) | | | | |
|----------|----------|----------------------|-----------|------|-------|--------------|----------|--------|--------|--------|
| | | | TiN | TiCN | TiAlN | Ø9.5~12.5 | Ø13~17.5 | Ø18~24 | Ø25~35 | Ø36~47 |
| K | 15 | Grey cast iron | 95 | 101 | 125 | 0.17 | 0.26 | 0.32 | 0.42 | 0.53 |
| | 16 | | 56 | 70 | 79 | 0.13 | 0.18 | 0.23 | 0.28 | 0.33 |
| | 17 | Nodular cast iron | 95 | 101 | 125 | 0.17 | 0.26 | 0.32 | 0.42 | 0.53 |
| | 18 | | 66 | 81 | 93 | 0.13 | 0.15 | 0.28 | 0.33 | 0.37 |
| | 19 | Malleable cast iron | 98 | 125 | 137 | 0.18 | 0.30 | 0.37 | 0.46 | 0.56 |
| | 20 | | 66 | 81 | 93 | 0.13 | 0.15 | 0.28 | 0.33 | 0.37 |

SPADE DRILL CARBIDE-K20

| ISO | VDI 3323 | Material Description | Vc(m/min) | | | Feed(mm/rev) | | | | | |
|----------|----------|---|------------------------------------|-----------------|-------|--------------|----------|--------|--------|--------|------|
| | | | TiN | TiCN | TiAlN | Ø9.5-12.5 | Ø13-17.5 | Ø18-24 | Ø25-35 | Ø36-47 | |
| P | 1 | Non-alloy steel | 94 | 110 | 119 | 0.20 | 0.24 | 0.31 | 0.42 | 0.46 | |
| | 2 | | 76 | 82 | 96 | 0.15 | 0.22 | 0.29 | 0.36 | 0.40 | |
| | 3 | | 66 | 70 | 84 | 0.15 | 0.22 | 0.28 | 0.36 | 0.40 | |
| | 4 | Low alloy steel | 66 | 70 | 84 | 0.15 | 0.22 | 0.28 | 0.36 | 0.40 | |
| | 6 | | 73 | 81 | 88 | 0.15 | 0.23 | 0.29 | 0.38 | 0.42 | |
| | 7 | | 66 | 73 | 81 | 0.15 | 0.21 | 0.28 | 0.37 | 0.41 | |
| | 8 | | 62 | 70 | 78 | 0.12 | 0.20 | 0.27 | 0.33 | 0.40 | |
| | 9 | | 53 | 58 | 64 | 0.10 | 0.18 | 0.23 | 0.30 | 0.38 | |
| | 10 | | High alloyed steel, and tool steel | 50 | 56 | 67 | 0.09 | 0.18 | 0.22 | 0.28 | 0.31 |
| | 11 | | | 37 | 46 | 50 | 0.09 | 0.18 | 0.22 | 0.28 | 0.31 |
| | M | | 12 | Stainless steel | 38 | 43 | 47 | 0.10 | 0.18 | 0.20 | 0.24 |
| 13 | | 38 | 43 | | 47 | 0.10 | 0.18 | 0.20 | 0.24 | 0.30 | |
| 14 | | 43 | 49 | | 55 | 0.12 | 0.20 | 0.23 | 0.27 | 0.35 | |
| K | 15 | Grey cast iron | 95 | 101 | 125 | 0.17 | 0.26 | 0.32 | 0.42 | 0.53 | |
| | 16 | | 56 | 70 | 79 | 0.13 | 0.18 | 0.23 | 0.28 | 0.33 | |
| | 17 | Nodular cast iron | 95 | 101 | 125 | 0.17 | 0.26 | 0.32 | 0.42 | 0.53 | |
| | 18 | | 66 | 81 | 93 | 0.13 | 0.15 | 0.28 | 0.33 | 0.37 | |
| | 19 | Malleable cast iron | 98 | 125 | 137 | 0.18 | 0.30 | 0.37 | 0.46 | 0.56 | |
| 20 | 66 | | 81 | 93 | 0.13 | 0.15 | 0.28 | 0.33 | 0.37 | | |
| N | 21 | Aluminum-wrought alloy | 366 | 396 | 427 | 0.24 | 0.38 | 0.45 | 0.50 | 0.53 | |
| | 22 | | 244 | 290 | 291 | 0.22 | 0.33 | 0.40 | 0.45 | 0.48 | |
| | 27 | Copper and Copper Alloys (Bronze / Brass) | 136 | 168 | 193 | 0.15 | 0.24 | 0.29 | 0.39 | 0.47 | |
| S | 31 | Heat Resistant Super Alloys | 50 | 55 | 62 | 0.19 | 0.19 | 0.21 | 0.24 | 0.30 | |
| | 32 | | 38 | 44 | 46 | 0.15 | 0.17 | 0.20 | 0.21 | 0.25 | |
| | 33 | | 38 | 44 | 46 | 0.15 | 0.17 | 0.20 | 0.21 | 0.25 | |
| | 34 | | 38 | 44 | 46 | 0.15 | 0.17 | 0.20 | 0.21 | 0.25 | |
| | 35 | | 38 | 44 | 46 | 0.15 | 0.17 | 0.20 | 0.21 | 0.25 | |
| H | 38 | Hardened steel | 38 | 43 | 47 | 0.10 | 0.18 | 0.20 | 0.24 | 0.30 | |

► The recommendations for speeds, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points. Speed and feed reductions (20% reduction in speed and 10% reduction in feed) are recommended.

SPADE DRILL FLAT BOTTOM HSS-T15

 RPM = rev./min.
 FEED = mm/rev.

| ISO | VDI 3323 | Material Description | Vc(m/min) | | Feed(mm/rev) | | | |
|----------|----------|---|-----------------|------------|--------------|----------|--------|--------|
| | | | TiN | TiAlN | Ø9.5-12.5 | Ø13-17.5 | Ø18-24 | Ø25-35 |
| P | 1 | Non-alloy steel | 54 | 60 | 0.12 | 0.18 | 0.22 | 0.30 |
| | 2 | | 46 | 55 | 0.10 | 0.15 | 0.19 | 0.27 |
| | 3 | | 45 | 50 | 0.10 | 0.15 | 0.18 | 0.27 |
| | 4 | | 42 | 46 | 0.08 | 0.14 | 0.17 | 0.22 |
| | 6 | Low alloy steel | 45 | 46 | 0.10 | 0.16 | 0.19 | 0.29 |
| | 7 | | 40 | 45 | 0.10 | 0.13 | 0.18 | 0.28 |
| | 8 | | 38 | 42 | 0.07 | 0.12 | 0.18 | 0.22 |
| | 9 | | 34 | 37 | 0.06 | 0.12 | 0.17 | 0.22 |
| | 10 | High alloyed steel, and tool steel | 27 | 29 | 0.07 | 0.12 | 0.15 | 0.20 |
| | 11 | | 22 | 23 | 0.07 | 0.12 | 0.15 | 0.20 |
| | M | 12 | Stainless steel | 23 | 25 | 0.13 | 0.15 | 0.18 |
| 13 | | 23 | | 25 | 0.13 | 0.15 | 0.18 | 0.22 |
| 14 | | 26 | | 29 | 0.17 | 0.18 | 0.20 | 0.23 |
| K | 15 | Grey cast iron | 51 | 60 | 0.12 | 0.21 | 0.29 | 0.40 |
| | 16 | | 38 | 48 | 0.10 | 0.14 | 0.20 | 0.25 |
| | 17 | Nodular cast iron | 51 | 60 | 0.12 | 0.21 | 0.29 | 0.40 |
| | 18 | | 38 | 48 | 0.10 | 0.14 | 0.20 | 0.25 |
| | 19 | Malleable cast iron | 56 | 66 | 0.13 | 0.25 | 0.35 | 0.41 |
| | 20 | | 38 | 48 | 0.10 | 0.14 | 0.20 | 0.25 |
| N | 21 | Aluminum-wrought alloy | 208 | 213 | 0.17 | 0.28 | 0.36 | 0.43 |
| | 22 | | 112 | 121 | 0.17 | 0.28 | 0.36 | 0.41 |
| | 27 | Copper and Copper Alloys (Bronze / Brass) | 48 | 70 | 0.15 | 0.26 | 0.37 | 0.45 |
| S | 31 | Heat Resistant Super Alloys | 20 | 10 | 0.06 | 0.14 | 0.16 | 0.19 |
| | 32 | | 7 | 9 | 0.06 | 0.11 | 0.14 | 0.15 |
| | 33 | | 7 | 9 | 0.06 | 0.11 | 0.14 | 0.15 |
| | 34 | | 7 | 9 | 0.06 | 0.11 | 0.14 | 0.15 |
| | 35 | | 7 | 9 | 0.06 | 0.11 | 0.14 | 0.15 |
| H | 38 | Hardened steel | 23 | 25 | 0.13 | 0.15 | 0.18 | 0.22 |

► The recommendations for speeds, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points.
 Speed and feed reductions (20% reduction in speed and 10% reduction in feed) are recommended.

 i-ONE
 DRILLS

 i-DREAM
 DRILLS

 DREAM
 DRILLS
 -PRO

 DREAM
 DRILLS
 -GENERAL

 DREAM
 DRILLS
 -HIGH FEED

 DREAM
 DRILLS
 -FLAT BOTTOM

 DREAM
 DRILLS
 -INOX

 DREAM
 DRILLS
 -ALU

 DREAM
 DRILLS
 -MQL

 DREAM DRILLS
 for HIGH
 HARDENED STEELS

 GENERAL
 CARBIDE
 DRILLS

 MULTI-1
 DRILLS

 HPD
 DRILLS

 GOLD-P
 DRILLS

 SUPER-GP
 DRILLS

 STRAIGHT
 SHANK
 DRILLS

 TAPER SHANK
 DRILLS

 NC-
 SPOTTING
 DRILLS

 CENTER
 DRILLS

**SPADE
 DRILLS**

REAMERS

 COUNTER
 SINKS

 COUNTER
 BORES

 TECHNICAL
 DATA



SPADE DRILL CARBIDE-P40

RPM = rev./min.
FEED = mm/rev.

| ISO | VDI 3323 | Material Description | Vc(m/min) | | | Feed(mm/rev) | | | | | |
|----------|-----------|---|------------------------------------|-----------------|------------|--------------|-----------|--------|--------|--------|------|
| | | | TiN | TiCN | TiAlN | Ø9.5-12.5 | Ø13-17.5 | Ø18-24 | Ø25-35 | Ø36-47 | |
| P | 1 | Non-alloy steel | 94 | 110 | 119 | 0.20 | 0.24 | 0.31 | 0.42 | 0.46 | |
| | 2 | | 76 | 82 | 96 | 0.15 | 0.22 | 0.29 | 0.36 | 0.40 | |
| | 3 | | 66 | 70 | 84 | 0.15 | 0.22 | 0.28 | 0.36 | 0.40 | |
| | 4 | | 66 | 70 | 84 | 0.15 | 0.22 | 0.28 | 0.36 | 0.40 | |
| | 6 | Low alloy steel | 73 | 81 | 88 | 0.15 | 0.23 | 0.29 | 0.38 | 0.42 | |
| | 7 | | 66 | 73 | 81 | 0.15 | 0.21 | 0.28 | 0.37 | 0.41 | |
| | 8 | | 62 | 70 | 78 | 0.12 | 0.20 | 0.27 | 0.33 | 0.40 | |
| | 9 | | 53 | 58 | 64 | 0.10 | 0.18 | 0.23 | 0.30 | 0.38 | |
| | 10 | | High alloyed steel, and tool steel | 50 | 56 | 67 | 0.09 | 0.18 | 0.22 | 0.28 | 0.31 |
| | 11 | | | 37 | 46 | 50 | 0.09 | 0.18 | 0.22 | 0.28 | 0.31 |
| | 12 | | | Stainless steel | 38 | 43 | 47 | 0.10 | 0.18 | 0.20 | 0.24 |
| 13 | 38 | 43 | 47 | | 0.10 | 0.18 | 0.20 | 0.24 | 0.30 | | |
| 14 | 43 | 49 | 55 | | 0.12 | 0.20 | 0.23 | 0.27 | 0.35 | | |
| K | 15 | Grey cast iron | 95 | 101 | 125 | 0.17 | 0.26 | 0.32 | 0.42 | 0.53 | |
| | 16 | | 56 | 70 | 79 | 0.13 | 0.18 | 0.23 | 0.28 | 0.33 | |
| | 17 | Nodular cast iron | 95 | 101 | 125 | 0.17 | 0.26 | 0.32 | 0.42 | 0.53 | |
| | 18 | | 66 | 81 | 93 | 0.13 | 0.15 | 0.28 | 0.33 | 0.37 | |
| | 19 | Malleable cast iron | 98 | 125 | 137 | 0.18 | 0.30 | 0.37 | 0.46 | 0.56 | |
| | 20 | | 66 | 81 | 93 | 0.13 | 0.15 | 0.28 | 0.33 | 0.37 | |
| N | 21 | Aluminum-wrought alloy | 366 | 396 | 427 | 0.24 | 0.38 | 0.45 | 0.50 | 0.53 | |
| | 22 | | 244 | 290 | 291 | 0.22 | 0.33 | 0.40 | 0.45 | 0.48 | |
| | 27 | Copper and Copper Alloys (Bronze / Brass) | 136 | 168 | 193 | 0.15 | 0.24 | 0.29 | 0.39 | 0.47 | |
| S | 31 | Heat Resistant Super Alloys | 50 | 55 | 62 | 0.19 | 0.19 | 0.21 | 0.24 | 0.30 | |
| | 32 | | 38 | 44 | 46 | 0.15 | 0.17 | 0.20 | 0.21 | 0.25 | |
| | 33 | | 38 | 44 | 46 | 0.15 | 0.17 | 0.20 | 0.21 | 0.25 | |
| | 34 | | 38 | 44 | 46 | 0.15 | 0.17 | 0.20 | 0.21 | 0.25 | |
| | 35 | | 38 | 44 | 46 | 0.15 | 0.17 | 0.20 | 0.21 | 0.25 | |
| H | 38 | Hardened steel | 38 | 43 | 47 | 0.10 | 0.18 | 0.20 | 0.24 | 0.30 | |

► The recommendations for speeds, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points. Speed and feed reductions (20% reduction in speed and 10% reduction in feed) are recommended.

i-ONE DRILLS
i-DREAM DRILLS
DREAM DRILLS -PRO
DREAM DRILLS -GENERAL
DREAM DRILLS -HIGH FEED
DREAM DRILLS -FLAT BOTTOM
DREAM DRILLS -INOX
DREAM DRILLS -ALU
DREAM DRILLS -MQL
DREAM DRILLS for HIGH HARDENED STEELS
GENERAL CARBIDE DRILLS
MULTI-1 DRILLS
HPD DRILLS
GOLD-P DRILLS
SUPER-GP DRILLS
STRAIGHT SHANK DRILLS
TAPER SHANK DRILLS
NC-SPOTTING DRILLS
CENTER DRILLS
SPADE DRILLS
REAMERS
COUNTER SINKS
COUNTER BORES
TECHNICAL DATA