# NPA

EXPANSION

Member IMC Group Ingersoll Cutting Tools

## New Product Announcement



**MILLING - INDEXABLE**

### Cutter Series (Depth of Cut)

15G1B (.024")
**15G1D, 5G1D (.040")** NEW
15G1F, 5G5F, 5G6F (.060")
15M1P, 5M5P, 5M6P (.088")
5G5Q, 5G6Q (.107")
5G5M, 5G6M (.145")

### Insert Series

SDXS04 (4 mm)
**SDXS06 (6 mm)** NEW
SDXS09 (9 mm)
SDES13, SDMS13 (13 mm)
SDXS16 (16 mm)
SDES19, SDMS19 (19 mm)

### Geometries

MM: Positive Geometry
MR: Heavy Duty (HD)
MR1: HD – Keen Edge
MRH: Hardened Steels
PH: Positive Geometry

### Diameter Range

0.375-7.000"

### Grades

IN2504, IN2505, IN2510, IN2515, IN2530, IN2535, IN2537, IN4005, IN4015, IN4030, IN4035, IN6537, IN7035

### Lead Angle

12°

### Adaptions

Cylindrical, Weldon, TopOn, ChipSurfer, Face Mill

### Materials

- Steel
- Stainless Steel
- Cast Iron
- Non-Ferrous
- High-Temp Alloys
- Hardened Steel

**See it in action! »**

GOLDSFEED™

NEW **Ingersoll has Expanded the Proven GoldSFeed Line with a New SDXS06 Insert and Related Cutters**

- Hi-feed, high-positive designed 4-corner insert with wiping flats that can eliminate secondary passes.
- SDXS06 inserts feature a 12° lead-angle to produce 5x the feed rates in any material.
- Inserts include multiple types of edge reinforcement and corner configurations.




SFEEDUP™ HIGH SPEED & FEED EXPANSION

ingersoll-imc.com

NEW

# 6 mm Expansion


# Overview

Our most popular hi-feed mill series, **GoldSFeed** (formerly GoldQuad), is now expanded to include a 6 mm cutter series.

## FEATURES & BENEFITS:

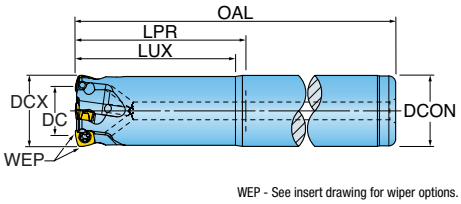
- Six hi-feed families offering insert sizes of 4, 6, 9, 13, 16, and 19 mm, multiple cutter - adaptions, pilot sizes and densities.
- Inserts feature 12° lead-angles to produce 5x the feed rates in any material.
- Each cutter family includes light, medium, and heavy duty insert geometries, multiple edge configurations, and our most advanced grades.
- Inserts include multiple types of edge reinforcement and corner configurations.
- All cutter families offer inserts with radial wiping flats that can eliminate secondary passes.

# Contents

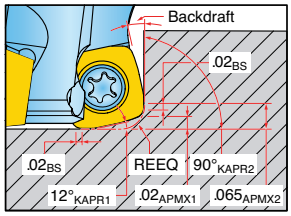
Face | Lead Angle | Shoulder | Ramp | Contour | Pocket | Corkscrew | Plunge | Coolant

# 4 mm • Series 15G1B

## HI-FEED END MILL - CYLINDRICAL SHANK (4 MM INSERT)




WEP - See insert drawing for wiper options.



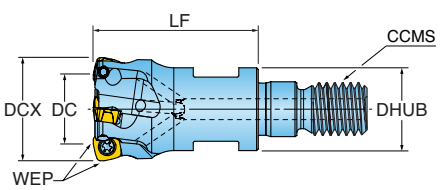

| Part Number | DCX Cutting Dia. Max. | DC Cutting Dia. | LUX Usable Length Max. | LPR Protruding Length | REEQ Program Radius Equivalent | OAL Overall Length | ZEFF Effective Teeth | DCON Shank Dia. | RMPX Ramp Angle Max. |
|---|---|---|---|---|---|---|---|---|---|
| **INCH** | | | | | | | | | |
| 15G1B-03015R8R01 | 0.375 | 0.167 | 1.300 | 1.500 | 0.043 | 2.920 | 2 | 0.375 | 1.80 |
| 15G1B-05015S4R01 | 0.500 | 0.291 | 1.300 | 1.500 | 0.042 | 3.280 | 3 | 0.500 | 4.70 |
| 15G1B-06015S6R01 | 0.625 | 0.415 | 1.300 | 1.500 | 0.042 | 3.410 | 4 | 0.625 | 3.00 |
| 15G1B-07015S7R01 | 0.750 | 0.540 | 1.300 | 1.500 | 0.042 | 3.500 | 5 | 0.750 | 2.20 |

Insert screw tightening torque: 5–8 in lb

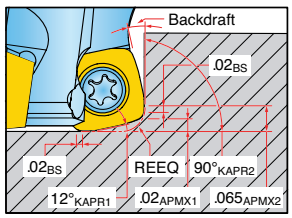
Face | Lead Angle | Shoulder | Ramp | Contour | Pocket | Corkscrew | Plunge | Coolant

# 4 mm • Series 15G1B

## HI-FEED END MILL - TOPON (4 MM INSERT)




WEP - See insert drawing for wiper options.



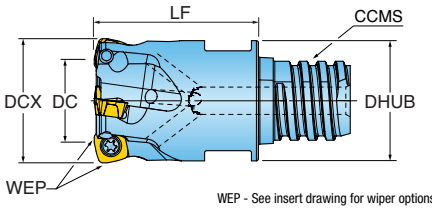

| Part Number | DCX Cutting Dia. Max. | DC Cutting Dia. | LF Functional Length | ZEFF Effective Teeth | REEQ Program Radius Equivalent | DHUB Hub Dia. | CCMS Connection Code Machine Side | RMPX Ramp Angle Max. |
|---|---|---|---|---|---|---|---|---|
| **INCH** | | | | | | | | |
| 15G1B-05007X4R01 | 0.500 | 0.291 | 0.75 | 3 | 0.042 | 0.465 | TopOn M06 | 4.70 |
| 15G1B-06010X5R01 | 0.625 | 0.415 | 1.00 | 4 | 0.042 | 0.505 | TopOn M08 | 3.00 |
| 15G1B-07010X6R01 | 0.750 | 0.540 | 1.00 | 5 | 0.043 | 0.704 | TopOn M10 | 2.20 |

Insert screw tightening torque: 5–8 in lb

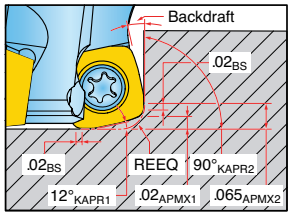
Face | Lead Angle | Shoulder | Ramp | Contour | Pocket | Corkscrew | Plunge | Coolant

# 4 mm • Series 15G1B

## HI-FEED END MILL - CHIPSURFER (4 MM INSERT)




WEP - See insert drawing for wiper options.

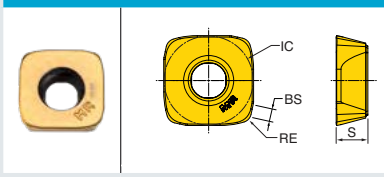



| Part Number | DCX Cutting Dia. Max. | DC Cutting Dia. | LF Functional Length | ZEFF Effective Teeth | REEQ Program Radius Equivalent | DHUB Hub Dia. | CCMS Connection Code Machine Side | RMPX Ramp Angle Max. |
|---|---|---|---|---|---|---|---|---|
| **INCH** | | | | | | | | |
| 15G1B-03006T6R01 | 0.375 | 0.167 | 0.669 | 2 | 0.043 | 0.369 | ChipSurfer T06 | 1.80 |
| 15G1B-05007T8R01 | 0.500 | 0.291 | 0.748 | 3 | 0.042 | 0.485 | ChipSurfer T08 | 4.70 |
| 15G1B-06008TRR01 | 0.625 | 0.415 | 0.827 | 4 | 0.042 | 0.605 | ChipSurfer T10 | 3.00 |
| 15G1B-07010TSR01 | 0.750 | 0.540 | 1.024 | 5 | 0.042 | 0.725 | ChipSurfer T12 | 2.20 |

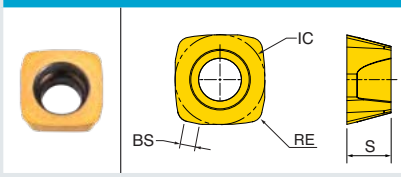
Insert screw tightening torque: 5–8 in lb

## 4 mm • Inserts • MR MR1 MM

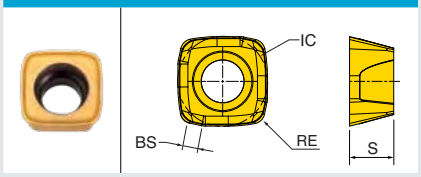
### SDXS0402MPR-MR




### SDXS0402MPR-MR1




### SDXS0402MPR-MM




| Part Number | Application | RE Corner Radius | BS Wiper Length | IC Inscribed Circle Dia. | S Thickness | IH Insert Hand | Grade | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | IN2505 | IN2530 |
| SDXS0402MPR-MR | Hi-Feed, Heavy Duty | 0.021 | 0.022 | 4 mm | 0.079 | Right | • | • |
| SDXS0402MPR-MR1 | Hi-Feed, Heavy Duty Keen Edge | 0.021 | 0.022 | 4 mm | 0.079 | Right | • | • |
| SDXS0402MPR-MM | Hi-Feed, Positive Geometry | 0.021 | 0.022 | 4 mm | 0.079 | Right | • | • |

## 4 mm • Hardware

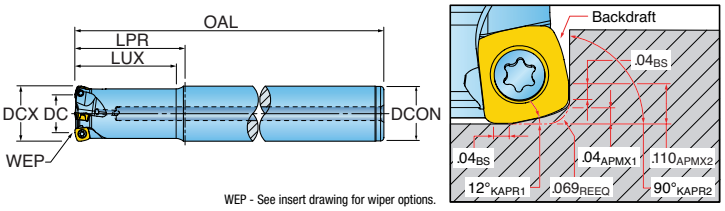
| Part Number |  Insert Screw* |  Driver |
|---|---|---|
| 15G1B-03015R8R01 | TS18034I/HG-P | DS-TP06S-NEU |
| 15G1B-05015S4R01 | TS18034I/HG-P | DS-TP06S-NEU |
| 15G1B-06015S6R01 | SM18-041-00 | DS-TP06S-NEU |
| 15G1B-07015S7R01 | SM18-041-00 | DS-TP06S-NEU |
| 15G1B-03006T6R01 | TS18034I/HG-P | DS-TP06S-NEU |
| 15G1B-05007T8R01 | TS18034I/HG-P | DS-TP06S-NEU |
| 15G1B-06008TRR01 | SM18-041-00 | DS-TP06S-NEU |
| 15G1B-07010TSR01 | SM18-041-00 | DS-TP06S-NEU |
| 15G1B-05007X4R01 | TS18034I/HG-P | DS-TP06S-NEU |
| 15G1B-06010X5R01 | SM18-041-00 | DS-TP06S-NEU |
| 15G1B-07010X6R01 | SM18-041-00 | DS-TP06S-NEU |

*Insert screw tightening torque: 5–8 in lb

Face | Lead Angle | Shoulder | Ramp | Contour | Pocket | Corkscrew | Plunge | Coolant

# 6 mm • Series 15G1D NEW

## HI-FEED END MILL - CYLINDRICAL SHANK (6 MM INSERT)




WEP - See insert drawing for wiper options.

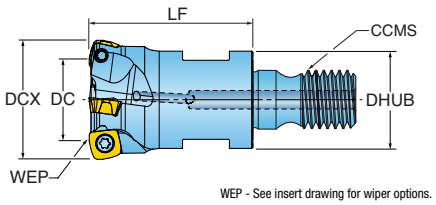
| Part Number | DCX Cutting Dia. Max. | DC Cutting Dia. | LUX Usable Length Max. | LPR Protruding Length | OAL Overall Length | ZEFF Effective Teeth | REEQ Program Radius Equivalent | DCON Shank Dia. | RMPX Ramp Angle Max. |
|---|---|---|---|---|---|---|---|---|---|
| **INCH** | | | | | | | | | |
| 15G1D-06015S6R01 | 0.625 | 0.314 | 1.500 | 1.500 | 4.000 | 2 | 0.069 | 0.625 | 2.50 |
| 15G1D-07020S7R01 | 0.750 | 0.438 | 2.000 | 2.000 | 5.000 | 3 | 0.069 | 0.750 | 3.50 |
| 15G1D-07030S7R01 | 0.750 | 0.438 | 3.000 | 3.000 | 6.000 | 3 | 0.069 | 0.750 | 3.50 |
| 15G1D-08020S8R01 | 0.875 | 0.562 | 2.000 | 2.000 | 7.000 | 4 | 0.069 | 0.875 | 3.00 |
| 15G1D-10020S1R01 | 1.000 | 0.686 | 2.000 | 2.000 | 10.000 | 4 | 0.069 | 1.000 | 2.50 |
| 15G1D-10030S1R01 | 1.000 | 0.686 | 3.000 | 3.000 | 7.000 | 4 | 0.069 | 1.000 | 2.50 |
| 15G1D-12030S9R01 | 1.250 | 0.936 | 3.000 | 3.000 | 5.500 | 5 | 0.069 | 1.250 | 2.00 |

Insert screw tightening torque: 10–14 in lb

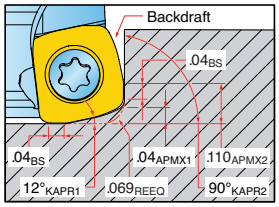
Face | Lead Angle | Shoulder | Ramp | Contour | Pocket | Corkscrew | Plunge | Coolant

# 6 mm • Series 15G1D NEW

## HI-FEED END MILL - TOPON (6 MM INSERT)




WEP - See insert drawing for wiper options.



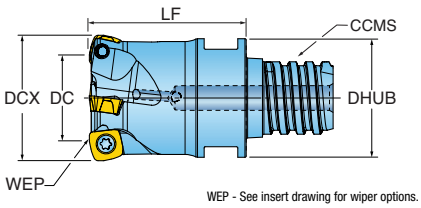

| Part Number | DCX Cutting Dia. Max. | DC Cutting Dia. | LF Functional Length | ZEFF Effective Teeth | REEQ Program Radius Equivalent | DHUB Hub Dia. | CCMS Connection Code Machine Side | RMPX Ramp Angle Max. |
|---|---|---|---|---|---|---|---|---|
| **INCH** | | | | | | | | |
| 15G1D-06010X5R01 | 0.625 | 0.314 | 1.000 | 2 | 0.069 | 0.50 | TopOn M08 | 2.50 |
| 15G1D-07010X6R01 | 0.750 | 0.438 | 1.000 | 3 | 0.069 | 0.70 | TopOn M10 | 3.50 |
| 15G1D-08010X7R01 | 0.875 | 0.562 | 1.000 | 4 | 0.069 | 0.70 | TopOn M12 | 3.00 |
| 15G1D-10013X7R01 | 1.000 | 0.686 | 1.380 | 4 | 0.069 | 0.82 | TopOn M12 | 2.50 |
| 15G1D-12015X8R01 | 1.250 | 0.936 | 1.500 | 5 | 0.069 | 1.13 | TopOn M16 | 2.00 |
| 15G1D-15015X8R01 | 1.500 | 1.186 | 1.500 | 6 | 0.069 | 1.13 | TopOn M16 | 1.60 |
| 15G1D-15017X9R01 | 1.500 | 1.186 | 1.750 | 6 | 0.069 | 1.42 | TopOn M20 | 1.60 |

Insert screw tightening torque: 10–14 in lb

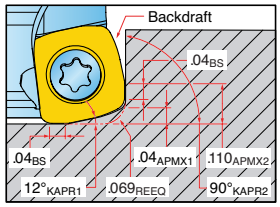
Face | Lead Angle | Shoulder | Ramp | Contour | Pocket | Corkscrew | Plunge | Coolant

# 6 mm • Series 15G1D NEW

## HI-FEED END MILL - CHIPSURFER (6 MM INSERT)




WEP - See insert drawing for wiper options.



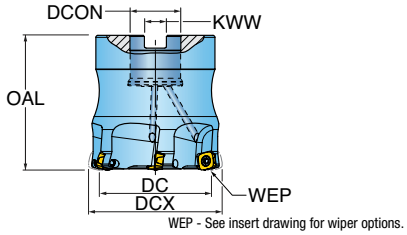

| Part Number | DCX Cutting Dia. Max. | DC Cutting Dia. | LF Functional Length | ZEFF Effective Teeth | REEQ Program Radius Equivalent | DHUB Hub Dia. | CCMS Connection Code Machine Side | RMPX Ramp Angle Max. |
|---|---|---|---|---|---|---|---|---|
| **INCH** | | | | | | | | |
| 15G1D-06008TRR01 | 0.625 | 0.314 | 0.83 | 2 | 0.069 | 0.61 | ChipSurfer T10 | 2.50 |
| 15G1D-07010TSR01 | 0.750 | 0.438 | 1.00 | 3 | 0.069 | 0.72 | ChipSurfer T12 | 3.50 |
| 15G1D-10012TUR01 | 1.000 | 0.686 | 1.25 | 4 | 0.069 | 0.97 | ChipSurfer T15 | 2.50 |

Insert screw tightening torque: 10–14 in lb

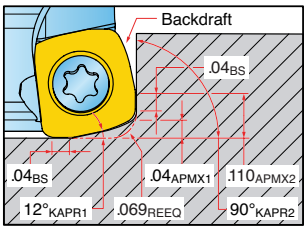
Face | Lead Angle | Shoulder | Ramp | Contour | Pocket | Corkscrew | Plunge | Coolant

# 6 mm • Series 5G1D NEW

## HI-FEED FACE MILL (6 MM INSERT)




WEP - See insert drawing for wiper options.

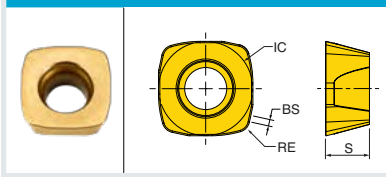



| Part Number | DCX Cutting Dia. Max. | DC Cutting Dia. | OAL Overall Length | ZEFF Effective Teeth | REEQ Program Radius Equivalent | DCON Bore Dia. | KWW Keyway | RMPX Ramp Angle Max. |
|---|---|---|---|---|---|---|---|---|
| **INCH** | | | | | | | | |
| 5G1D-15R01 | 1.500 | 1.186 | 1.500 | 6 | 0.069 | 0.500 | 0.25 | 1.60 |
| 5G1D-20R01 | 2.000 | 1.686 | 2.000 | 6 | 0.069 | 0.750 | 0.31 | 1.00 |
| 5G1D-20R02 | 2.000 | 1.686 | 2.000 | 7 | 0.069 | 0.750 | 0.31 | 1.00 |

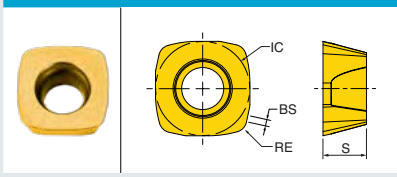
Insert screw tightening torque: 10–14 in lb

# 6 mm • Inserts • MR MR1 MM NEW

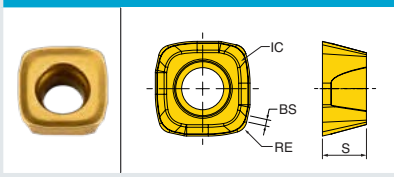
**SDXS0603MPR-MR**




**SDXS0603MPR-MR1**




**SDXS0603MPR-MM**




| Part Number | Application | RE Corner Radius | BS Wiper Length | IC Inscribed Circle Dia. | S Thickness | NOI No. of Indexes | IH Insert Hand | Grades | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | IN2504 | IN2510 | IN4005 | IN2505 | IN4030 | IN2530 | IN4035 | IN2535 | IN7035 | IN6537 | IN2537 |
| SDXS0603MPR-MR | Hi-Feed, Heavy Duty | 0.034 | 0.041 | 6 mm | 0.118 | 4 | Right | • | • | • | • | • | • | | • | | • | • |
| SDXS0603MPR-MR1 | Hi-Feed, Heavy Duty Keen Edge | 0.034 | 0.041 | 6 mm | 0.118 | 4 | Right | | | | • | • | • | • | • | • | | |
| SDXS0603MPR-MM | Hi-Feed, Positive Geometry | 0.034 | 0.041 | 6 mm | 0.118 | 4 | Right | | | • | • | • | • | • | • | • | | |

# 6 mm • Hardware NEW

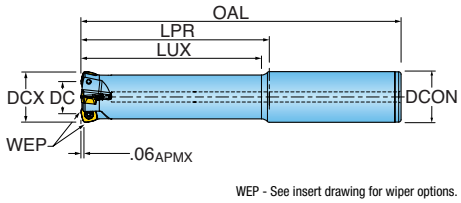
| Part Number | Insert Screw* | Driver | Retention Bolt | Optional: Coolant Bolt | Optional: Torque Driver Handle | Optional: Preset Torque Adapter | Optional: Torque Driver Bit |
|---|---|---|---|---|---|---|---|
| 15G1D... | SM25-054-00 | DS-0020 | - | - | DS-A00-.25-S | DT-11-.25 | DS-T08B |
| 5G1D-15R01 | SM25-054-00 | DS-0020 | SD-04-46 | - | DS-A00-.25-S | DT-11-.25 | DS-T08B |
| 5G1D-20R01 | SM25-054-00 | DS-0020 | SD-06-48 | SD-06-A6 | DS-A00-.25-S | DT-11-.25 | DS-T08B |
| 5G1D-20R02 | SM25-054-00 | DS-0020 | SD-06-48 | SD-06-A6 | DS-A00-.25-S | DT-11-.25 | DS-T08B |

*Insert screw tightening torque: 10–14 in lb

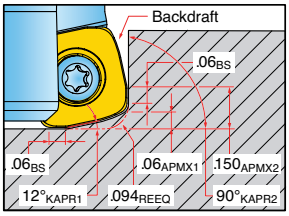
Face | Lead Angle | Shoulder | Ramp | Contour | Pocket | Corkscrew | Plunge | Coolant

# 9 mm • Series 15G1F

## HI-FEED END MILL - CYLINDRICAL SHANK (9 MM INSERT)




WEP - See insert drawing for wiper options.



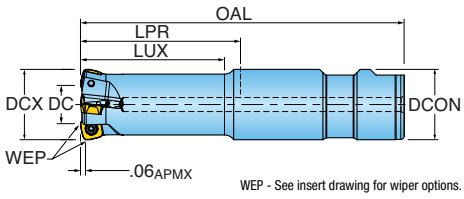

| Part Number | DCX Cutting Dia. Max. | DC Cutting Dia. | LUX Usable Length Max. | LPR Protruding Length | OAL Overall Length | ZEFF Effective Teeth | REEQ Program Radius Equivalent | KAPR Cutting Edge Angle | DCON Shank Dia. | RMPX Ramp Angle Max. |
|---|---|---|---|---|---|---|---|---|---|---|
| **INCH** | | | | | | | | | | |
| 15G1F-10019S1R01 | 1.000 | 0.524 | 1.78 | 1.97 | 7.00 | 3 | 0.094 | 12° | 1.000 | 5.5 |
| 15G1F-10020S1R01 | 1.000 | 0.524 | 1.81 | 2.00 | 10.00 | 3 | 0.094 | 12° | 1.000 | 5.5 |
| 15G1F-12047S9R01 | 1.250 | 0.773 | 4.55 | 4.75 | 8.00 | 3 | 0.094 | 12° | 1.250 | 3.3 |
| 15G1F-12047S9R02 | 1.250 | 0.773 | 4.55 | 4.75 | 8.00 | 4 | 0.094 | 12° | 1.250 | 3.3 |
| 15G1F-15060S9R01 | 1.500 | 1.022 | 6.00 | 6.00 | 10.00 | 4 | 0.094 | 12° | 1.250 | 2.3 |
| 15G1F-15060S9R02 | 1.500 | 1.022 | 6.00 | 6.00 | 10.00 | 5 | 0.094 | 12° | 1.250 | 2.3 |

Insert screw tightening torque: 14–18 in lb

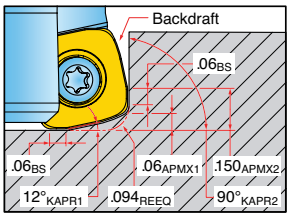
Face | Lead Angle | Shoulder | Ramp | Contour | Pocket | Corkscrew | Plunge | Coolant

# 9 mm • Series 15G1F

## HI-FEED END MILL - WELDON SHANK (9 MM INSERT)




WEP - See insert drawing for wiper options.



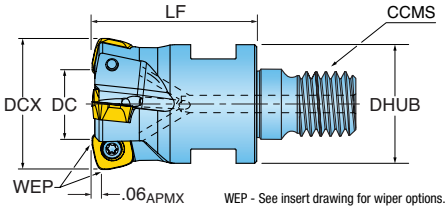

| Part Number | DCX Cutting Dia. Max. | DC Cutting Dia. | LUX Usable Length Max. | LPR Protruding Length | OAL Overall Length | ZEFF Effective Teeth | REEQ Program Radius Equivalent | KAPR Cutting Edge Angle | DCON Shank Dia. | RMPX Ramp Angle Max. |
|---|---|---|---|---|---|---|---|---|---|---|
| **INCH** | | | | | | | | | | |
| 15G1F-12027E2R01 | 1.250 | 0.773 | 2.55 | 2.75 | 5.75 | 3 | 0.094 | 12° | 1.250 | 3.3 |
| 15G1F-12027E2R02 | 1.250 | 0.773 | 2.55 | 2.75 | 5.75 | 4 | 0.094 | 12° | 1.250 | 3.3 |
| 15G1F-12047E2R01 | 1.250 | 0.773 | 4.55 | 4.75 | 7.75 | 3 | 0.094 | 12° | 1.250 | 3.3 |
| 15G1F-15016E2R01 | 1.500 | 1.022 | 1.69 | 1.69 | 6.00 | 4 | 0.094 | 12° | 1.250 | 2.3 |
| 15G1F-15016E2R02 | 1.500 | 1.022 | 1.69 | 1.69 | 6.00 | 5 | 0.094 | 12° | 1.250 | 2.3 |

Insert screw tightening torque: 14–18 in lb

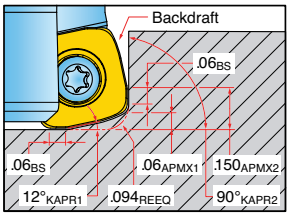
Face | Lead Angle | Shoulder | Ramp | Contour | Pocket | Corkscrew | Plunge | Coolant

# 9 mm • Series 15G1F

## HI-FEED END MILL - TOPON (4 MM INSERT)




WEP - See insert drawing for wiper options.



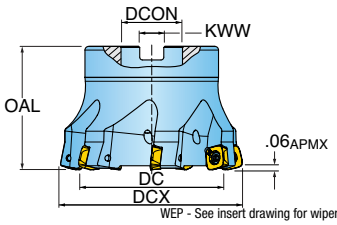

| Part Number | DCX Cutting Dia. Max. | DC Cutting Dia. | LF Functional Length | ZEFF Effective Teeth | REEQ Program Radius Equivalent | KAPR Cutting Edge Angle | DHUB Hub Dia. | CCMS Connection Code Machine Side | RMPX Ramp Angle Max. |
|---|---|---|---|---|---|---|---|---|---|
| **INCH** | | | | | | | | | |
| 15G1F-10015X7R01 | 1.000 | 0.524 | 1.57 | 3 | 0.094 | 12° | 0.82 | TopOn M12 | 5.5 |
| 15G1F-12015X8R02 | 1.250 | 0.773 | 1.57 | 4 | 0.094 | 12° | 1.13 | TopOn M16 | 3.3 |
| 15G1F-15017X9R01 | 1.500 | 1.022 | 1.57 | 5 | 0.094 | 12° | 1.42 | TopOn M20 | 2.3 |

Insert screw tightening torque: 14–18 in lb

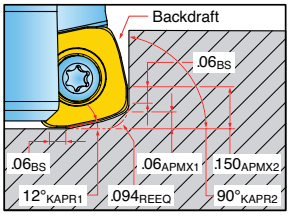
Face | Lead Angle | Shoulder | Ramp | Contour | Pocket | Corkscrew | Plunge | Coolant

# 9 mm • Series 5G5F, 5G6F

## HI-FEED FACE MILL (6 MM INSERT)




WEP - See insert drawing for wiper options.

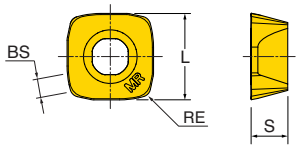



| Part Number | DCX Cutting Dia. Max. | DC Cutting Dia. | OAL Overall Length | ZEFF Effective Teeth | REEQ Program Radius Equivalent | DCON Bore Dia. | KWW Keyway | RMPX Ramp Angle Max. |
|---|---|---|---|---|---|---|---|---|
| **INCH** | | | | | | | | |
| 5G5F-20R01 | 2.000 | 1.521 | 1.97 | 7 | 0.094 | 0.750 | 0.31 | 1.5 |
| 5G6F-20R01 | 2.000 | 1.521 | 1.97 | 6 | 0.094 | 0.750 | 0.31 | 1.5 |
| 5G5F-25R01 | 2.500 | 2.020 | 1.97 | 8 | 0.094 | 0.750 | 0.31 | 1.1 |
| 5G5F-30R01 | 3.000 | 2.520 | 2.00 | 9 | 0.094 | 1.000 | 0.38 | 0.8 |
| 5G6F-30R01 | 3.000 | 2.520 | 2.00 | 7 | 0.094 | 1.000 | 0.38 | 0.8 |

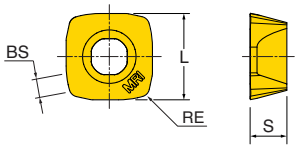
Insert screw tightening torque: 14–18 in lb

# 9 mm • Inserts • MR MR1 MM MRH

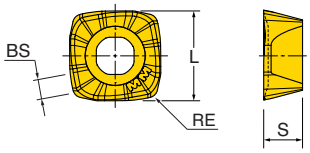
## SDXS0904MPR-MR



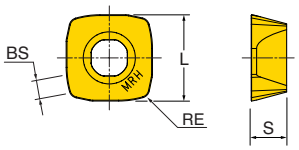

## SDXS0904MPR-MR1




## SDXS0904MPR-MM




## SDXS0904MPR-MRH




| Part Number | Application | RE Corner Radius | BS Wiper Length | L Cutting Edge Length | S Thickness | Grade | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | IN2504 | IN4005 | IN2505 | IN4030 | IN2530 | IN7035 | IN4035 | IN2535 |
| SDXS0904MPR-MR | Heavy Duty | 0.040 | 0.060 | 0.370 | 0.158 | | • | • | • | • | | • | • |
| SDXS0904MPR-MR1 | Flat-Top, Keen Edge | 0.040 | 0.060 | 0.370 | 0.158 | | | | • | • | • | • | • |
| SDXS0904MPR-MM | Multi-Purpose | 0.040 | 0.060 | 0.370 | 0.158 | | • | • | • | • | • | • | • |
| SDXS0904MPR-MRH | Hardened Steels | 0.040 | 0.060 | 0.370 | 0.158 | • | | | | | | | |

# 9 mm • Hardware

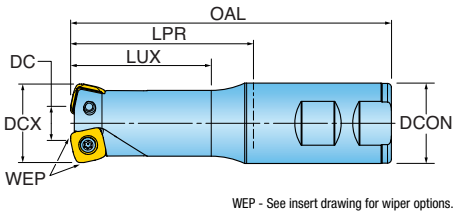
| Part Number | Insert Screw* | Driver | Retention Bolt | Optional: Coolant Bolt |
|---|---|---|---|---|
| 15G1F... | SM30-075-R0 | DS-T09W | - | - |
| 5G5F-20R01 | SM30-075-R0 | DS-T09W | SD-06-48 | SD06-A6 |
| 5G6F-20R01 | SM30-075-R0 | DS-T09W | SD-06-48 | SD06-A6 |
| 5G5F-25R01 | SM30-075-R0 | DS-T09W | SD-06-48 | SD06-A6 |
| 5G5F-30R01 | SM30-075-R0 | DS-T09W | SD-08-47 | SD-08-C9 |
| 5G6F-30R01 | SM30-075-R0 | DS-T09W | SD-08-47 | SD-08-C9 |

*Insert screw tightening torque: 14–18 in lb

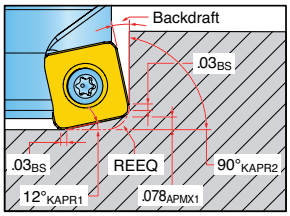
Face | Lead Angle | Shoulder | Ramp | Contour | Pocket | Corkscrew | Plunge | Coolant

# 13 mm • Series 15M1P

## HI-FEED END MILL - WELDON SHANK (13 MM INSERT)




WEP - See insert drawing for wiper options.



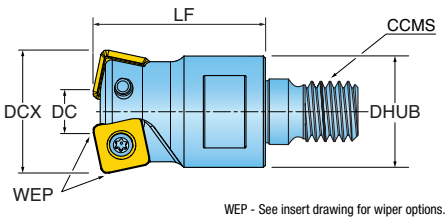

| Part Number | DCX Cutting Dia. Max. | DC Cutting Dia. | LUX Usable Length Max. | LPR Protruding Length | OAL Overall Length | ZEFF Effective Teeth | REEQ Program Radius Equivalent | DCON Shank Dia. | RMPX* Ramp Angle Max. |
|---|---|---|---|---|---|---|---|---|---|
| **INCH** | | | | | | | | | |
| 15M1P-1202781R01 | 1.250 | 0.423 | 2.00 | 2.75 | 5.00 | 2 | 0.125 | 1.250 Weldon | 13.10 |
| 15M1P-12047S9R01 | 1.250 | 0.423 | 4.00 | 4.75 | 8.00 | 2 | 0.125 | 1.250 Cylindrical | 13.10 |
| 15M1P-1502786R01 | 1.500 | 0.673 | 2.00 | 2.75 | 5.41 | 3 | 0.125 | 1.500 Weldon | 7.10 |
| 15M1P-1505386R01 | 1.500 | 0.673 | 5.00 | 5.34 | 8.00 | 3 | 0.125 | 1.500 Weldon | 7.10 |

*All of the above data is with insert SDES1305MDR-MR installed. Please see Technical Literature for dimensions when using other inserts.
Insert screw tightening torque: 30–35 in lb

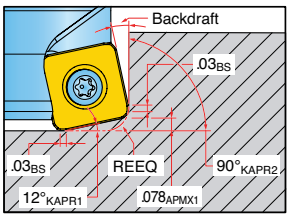
Face | Lead Angle | Shoulder | Ramp | Contour | Pocket | Corkscrew | Plunge | Coolant

13 mm • Series 15M1P

## HI-FEED END MILL - TOPON (13 MM INSERT)




WEP - See insert drawing for wiper options.



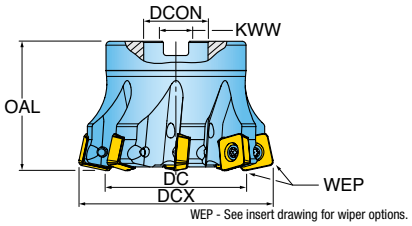

| Part Number | DCX Cutting Dia. Max. | DC Cutting Dia. | APMX Depth of Cut Max. | LF Functional Length | ZEFF Effective Teeth | REEQ Program Radius Equivalent | DHUB Hub Dia. | CCMS Connection Code Machine Side | RMPX* Ramp Angle Max. |
|---|---|---|---|---|---|---|---|---|---|
| **INCH** | | | | | | | | | |
| 15M1P-12017X8R01 | 1.250 | 0.423 | 0.088 | 1.75 | 2 | 0.125 | 1.13 | TopOn M16 | 13.10 |

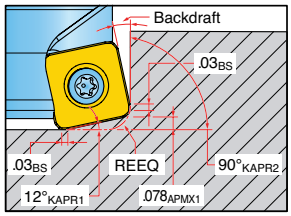
*All of the above data is with insert SDES1305MDR-MR installed. Please see Technical Literature for dimensions when using other inserts.
Insert screw tightening torque: 30–35 in lb

Face | Lead Angle | Shoulder | Ramp | Contour | Pocket | Corkscrew | Plunge | Coolant

# 13 mm • Series 5M5P, 5M6P

## HI-FEED FACE MILL (13 MM INSERT)



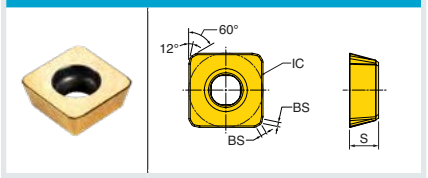




| Part Number | DCX Cutting Dia. Max. | DC Cutting Dia. | OAL Overall Length | ZEFF Effective Teeth | DCON Bore Dia. | KWW Keyway | RMPX* Ramp Angle Max. | REEQ Program Radius Equivalent |
|---|---|---|---|---|---|---|---|---|
| **INCH** | | | | | | | | |
| 5M5P-20R01 | 2.000 | 1.170 | 2.000 | 5 | 0.750 | 0.313 | 3.90 | 0.125 |
| 5M6P-20R01 | 2.000 | 1.170 | 2.000 | 4 | 0.750 | 0.313 | 3.90 | 0.125 |
| 5M5P-25R01 | 2.500 | 1.670 | 2.000 | 6 | 0.750 | 0.313 | 2.70 | 0.125 |
| 5M6P-25R01 | 2.500 | 1.670 | 2.000 | 5 | 0.750 | 0.313 | 2.70 | 0.125 |
| 5M5P-30R01 | 3.000 | 2.170 | 2.000 | 8 | 1.000 | 0.375 | 1.60 | 0.125 |
| 5M5P-30R02 | 3.000 | 2.170 | 2.000 | 8 | 1.250 | 0.500 | 1.60 | 0.125 |
| 5M6P-30R01 | 3.000 | 2.170 | 2.000 | 6 | 1.000 | 0.375 | 1.60 | 0.125 |
| 5M6P-30R02 | 3.000 | 2.170 | 2.000 | 6 | 1.250 | 0.500 | 1.60 | 0.125 |
| 5M5P-40R01 | 4.000 | 3.170 | 2.500 | 10 | 1.500 | 0.625 | 1.10 | 0.125 |
| 5M6P-40R01 | 4.000 | 3.170 | 2.500 | 8 | 1.500 | 0.625 | 1.10 | 0.125 |
| 5M5P-50R01 | 5.000 | 4.170 | 2.500 | 11 | 1.500 | 0.625 | 0.80 | 0.125 |
| 5M6P-50R01 | 5.000 | 4.170 | 2.500 | 9 | 1.500 | 0.625 | 0.80 | 0.125 |

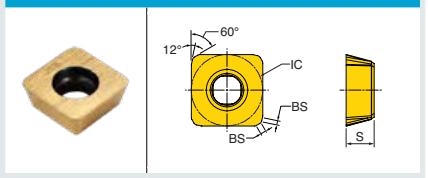
*All of the above data is with insert SDES1305MDR-MR installed. Please see Technical Literature for dimensions when using other inserts.
Insert screw tightening torque: 30–35 in lb

# 13 mm • Inserts • MR MR1 PH

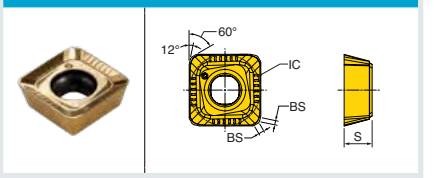
## SDES1305MDR-MR



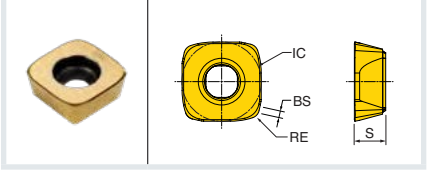

## SDES1305MDR-MR1



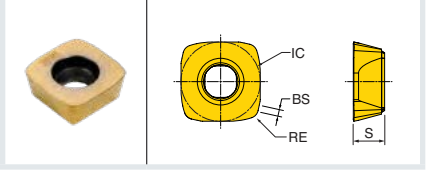

## SDMS1305MDR-PH




## SDES1305MPR-MR




## SDES1305MPR-MR1




| Part Number | Application | RE Corner Radius | BS Wiper Length | IC Inscribed Circle | S Thickness | Grade | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | IN2505 | IN2530 | IN4005 | IN4030 | IN4035 |
| SDES1305MDR-MR | Hi-Feed, Flat Face / Wiper - Facets | 0.125 | 0.030 | 13 mm | .200 | • | • | | | |
| SDES1305MDR-MR1 | Hi-Feed, Precision Flat Face / Wiper - Facets | 0.125 | 0.030 | 13 mm | .200 | • | • | | | |
| SDMS1305MDR-PH | Hi-Feed, Pos Precision / Wiper - Facets | 0.125 | 0.030 | 13 mm | .200 | • | • | • | • | • |
| SDES1305MPR-MR | Hi-Feed, Heavy Duty - Standard | 0.140 | 0.060 | 13 mm | .200 | • | • | • | | • |
| SDES1305MPR-MR1 | Hi-Feed, Heavy Duty - Precision | 0.140 | 0.060 | 13 mm | .200 | • | • | • | • | • |

# 13 mm • Hardware

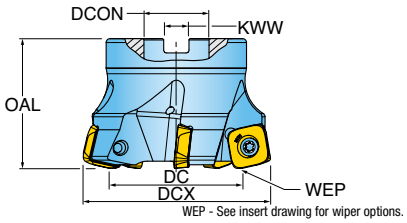
| | | | | | Optional |
|---|---|---|---|---|---|
| Part Number | Insert Screw* | Driver | Driver Bit | Retention Bolt | Coolant Bolt |
| 15M1P... | SM40-100-R0 | DS-A00T | BLD T15/S7 | – | – |
| 5M5P-20R01 | SM40-100-R0 | DS-A00T | BLD T15/S7 | SD-06-48 | SD06-A6 |
| 5M6P-20R01 | SM40-100-R0 | DS-A00T | BLD T15/S7 | SD-06-48 | SD06-A6 |
| 5M5P-25R01 | SM40-100-R0 | DS-A00T | BLD T15/S7 | SD-06-48 | SD06-A6 |
| 5M6P-25R01 | SM40-100-R0 | DS-A00T | BLD T15/S7 | SD-06-48 | SD06-A6 |
| 5M5P-30R01 | SM40-100-R0 | DS-A00T | BLD T15/S7 | SD-08-47 | SD-08-92 |
| 5M6P-30R01 | SM40-100-R0 | DS-A00T | BLD T15/S7 | SD-08-47 | SD-08-92 |
| 5M5P-30R02 | SM40-100-R0 | DS-A00T | BLD T15/S7 | SD-10-47 | SD-10-99 |
| 5M6P-30R02 | SM40-100-R0 | DS-A00T | BLD T15/S7 | SD-10-47 | SD-10-99 |
| 5M5P-40R01 | SM40-100-R0 | DS-A00T | BLD T15/S7 | SD-12-82 | SD-12-99 |
| 5M6P-40R01 | SM40-100-R0 | DS-A00T | BLD T15/S7 | SD-12-82 | SD-12-99 |
| 5M5P-50R01 | SM40-100-R0 | DS-A00T | BLD T15/S7 | SD-12-82 | SD-12-99 |
| 5M6P-50R01 | SM40-100-R0 | DS-A00T | BLD T15/S7 | SD-12-82 | SD-12-99 |

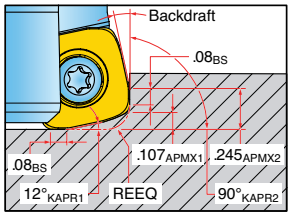
*Insert screw tightening torque: 30–35 in lb

Face | Lead Angle | Shoulder | Ramp | Contour | Pocket | Corkscrew | Plunge | Coolant

# 16 mm • Series 5G5Q, 5G6Q

## HI-FEED FACE MILL (16 MM INSERT)



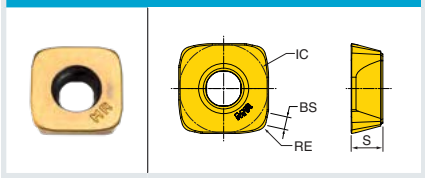




| Part Number | DCX Cutting Dia. Max. | DC Cutting Dia. | APMX Depth of Cut Max. | OAL Overall Length | ZEFF Effective Teeth | REEQ Program Radius Equivalent | DCON Bore Dia. | KWW Keyway | RMPX* Ramp Angle Max. |
|---|---|---|---|---|---|---|---|---|---|
| **INCH** | | | | | | | | | |
| 5G5Q-25R01 | 2.500 | 1.645 | 0.107 | 2.000 | 5 | 0.167 | 0.750 | 0.31 | 3.3 |
| 5G5Q-25R02 | 2.500 | 1.645 | 0.107 | 2.000 | 5 | 0.167 | 1.000 | 0.38 | 3.3 |
| 5G5Q-30R01 | 3.000 | 2.144 | 0.107 | 2.000 | 6 | 0.167 | 1.000 | 0.38 | 2.4 |
| 5G6Q-30R01 | 3.000 | 2.144 | 0.107 | 2.000 | 5 | 0.167 | 1.000 | 0.38 | 2.4 |
| 5G5Q-30R02 | 3.000 | 2.144 | 0.107 | 2.000 | 6 | 0.167 | 1.250 | 0.50 | 2.4 |
| 5G5Q-40R01 | 4.000 | 3.144 | 0.107 | 2.500 | 8 | 0.166 | 1.500 | 0.63 | 1.6 |
| 5G6Q-40R01 | 4.000 | 3.144 | 0.106 | 2.500 | 6 | 0.166 | 1.500 | 0.63 | 1.6 |
| 5G6Q-50R01 | 5.000 | 4.144 | 0.106 | 2.500 | 8 | 0.166 | 1.500 | 0.63 | 1.2 |
| 5G6Q-60R01 | 6.000 | 5.144 | 0.106 | 2.500 | 9 | 0.166 | 1.500 | 0.63 | 0.9 |

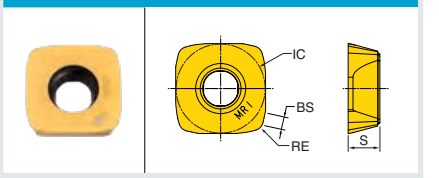
Insert screw tightening torque: 40–45 in lb

# 16 mm • Inserts • MR MR1 MM

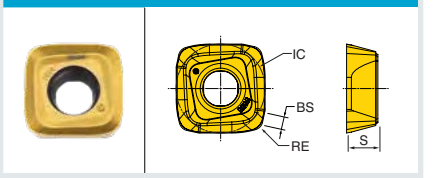
## SDXS1605MPR-MR




## SDXS1605MPR-MR1




## SDXS1605MPR-MM




| Part Number | Application | RE Corner Radius | BS Wiper Length | IC Inscribed Circle | S Thickness | NOI Number of Indexes | IH Insert Hand | Grade | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | IN2505 | IN2515 | IN2530 | IN2535 | IN4005 | IN4015 | IN4030 | IN4035 | IN7035 |
| SDXS1605MPR-MR | Utility Insert - Heavy Duty | 0.210 | 0.079 | 16 mm | 0.220 | 4 | Right | • | | • | • | • | | | • | |
| SDXS1605MPR-MR1 | Utility Insert - Heavy Duty Keen Edge | 0.210 | 0.079 | 16 mm | 0.220 | 4 | Right | • | • | • | • | • | • | | • | • |
| SDXS1605MPR-MM | Positive Geometry | 0.210 | 0.079 | 16 mm | 0.220 | 4 | Right | • | • | • | • | • | • | • | • | • |

# 16 mm • Hardware

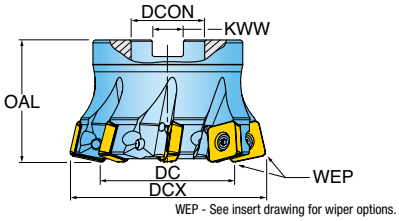
| Part Number |  Insert Screw* |  Retention Bolt |  Driver Handle |  Torx Driver Blade |
|---|---|---|---|---|
| 5G5Q-25R01 | SM50-130-R0 | SD-06-48 | DS-A00T | DS-T206B |
| 5G5Q-25R02 | SM50-130-R0 | SD-08-48 | DS-A00T | DS-T206B |
| 5G5Q-30R01 | SM50-130-R0 | SD-08-47 | DS-A00T | DS-T206B |
| 5G6Q-30R01 | SM50-130-R0 | SD-08-47 | DS-A00T | DS-T206B |
| 5G5Q-30R02 | SM50-130-R0 | SD-10-47 | DS-A00T | DS-T206B |
| 5G5Q-40R01 | SM50-130-R0 | SD-12-82 | DS-A00T | DS-T206B |
| 5G6Q-40R01 | SM50-130-R0 | SD-12-82 | DS-A00T | DS-T206B |
| 5G6Q-50R01 | SM50-130-R0 | SD-12-82 | DS-A00T | DS-T206B |
| 5G6Q-60R01 | SM50-130-R0 | SD-12-82 | DS-A00T | DS-T206B |

*Insert screw tightening torque: 40–45 in lb

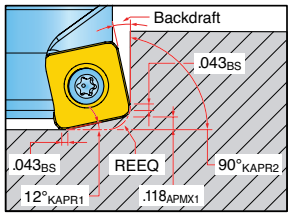
Face | Lead Angle | Shoulder | Ramp | Contour | Pocket | Corkscrew | Plunge | Coolant

# 19 mm • Series 5G5M, 5G6M

## HI-FEED FACE MILL (19 MM INSERT)




WEP - See insert drawing for wiper options.

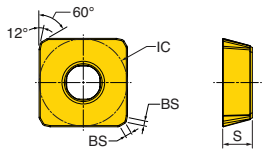



| Part Number | DCX Cutting Dia. Max. | DC Cutting Dia. | OAL Overall Length | ZEFF Effective Teeth | DCON Bore Dia. | KWW Keyway | RMPX* Ramp Angle Max. | REEQ Program Radius Equivalent |
|---|---|---|---|---|---|---|---|---|
| **INCH** | | | | | | | | |
| 5G5M-30R01 | 3.000 | 1.755 | 2.000 | 6 | 1.000 | 0.375 | 2.70 | 0.180 |
| 5G6M-30R01 | 3.000 | 1.755 | 2.000 | 5 | 1.000 | 0.375 | 4.40 | 0.180 |
| 5G5M-40R01 | 4.000 | 2.755 | 2.500 | 8 | 1.500 | 0.625 | 1.70 | 0.180 |
| 5G6M-40R01 | 4.000 | 2.755 | 2.500 | 6 | 1.500 | 0.625 | 2.60 | 0.180 |
| 5G5M-50R01 | 5.000 | 3.755 | 2.500 | 9 | 1.500 | 0.625 | 1.70 | 0.180 |
| 5G6M-50R01 | 5.000 | 3.755 | 2.500 | 7 | 1.500 | 0.625 | 1.90 | 0.180 |
| 5G5M-60R01 | 6.000 | 4.755 | 2.500 | 10 | 1.500 | 0.625 | 1.30 | 0.180 |
| 5G6M-60R01 | 6.000 | 4.755 | 2.500 | 8 | 1.500 | 0.625 | 1.50 | 0.180 |
| 5G6M-70R01 | 7.000 | 5.755 | 2.500 | 8 | 1.500 | 0.625 | 1.23 | 0.180 |

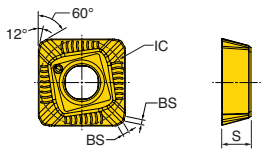
*All of the above data is with insert SDES1906MDR-MR installed. Please see Technical Literature for dimensions when using other inserts.
Insert screw tightening torque: 72–77 in lb

# 19 mm • Inserts • MR MR1 PH

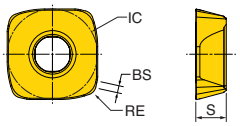
## SDES1906MDR-MR



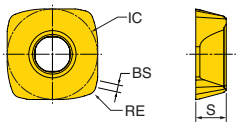

## SDMS1906MDR-PH




## SDES1906MPR-MR




## SDES1906MPR-MR1




| Part Number | Application | RE Corner Radius | BS Wiper Length | IC Inscribed Circle | S Thickness | Grade | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | IN2505 | IN2530 | IN4005 | IN4030 | IN4035 |
| SDES1906MDR-MR | Hi-Feed, Flat Face / Wiper - Facets | 0.180 | 0.043 | 19 mm | .250 | • | • | | | |
| SDMS1906MDR-PH | Hi-Feed, Pos Precision / Wiper - Facets | 0.180 | 0.043 | 19 mm | .250 | • | • | • | • | • |
| SDES1906MPR-MR | Hi-Feed, Heavy Duty - Standard | 0.212 | 0.061 | 19 mm | .250 | • | • | • | | • |
| SDES1906MPR-MR1 | Hi-Feed, Heavy Duty - Precision | 0.212 | 0.061 | 19 mm | .250 | • | • | • | • | • |

# 19 mm • Hardware

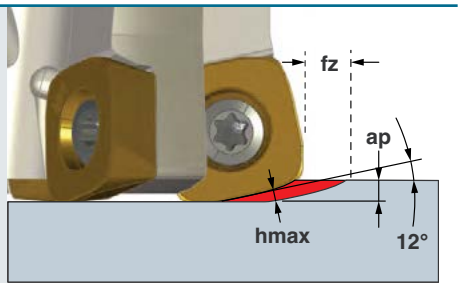
| Part Number | Insert Screw* | Driver | Retention Bolt | Optional: Coolant Bolt |
|---|---|---|---|---|
| 5G5M-30R01 | SM60-135-R0 | DS-T25T | SD-08-47 | SD-08-92 |
| 5G6M-30R01 | SM60-135-R0 | DS-T25T | SD-08-47 | SD-08-92 |
| 5G5M-40R01 | SM60-135-R0 | DS-T25T | SD-12-82 | SD-12-99 |
| 5G6M-40R01 | SM60-135-R0 | DS-T25T | SD-12-82 | SD-12-99 |
| 5G5M-50R01 | SM60-135-R0 | DS-T25T | SD-12-82 | SD-12-99 |
| 5G6M-50R01 | SM60-135-R0 | DS-T25T | SD-12-82 | SD-12-99 |
| 5G5M-60R01 | SM60-135-R0 | DS-T25T | SD-12-82 | SD-12-99 |
| 5G6M-60R01 | SM60-135-R0 | DS-T25T | SD-12-82 | SD-12-99 |
| 5G6M-70R01 | SM60-135-R0 | DS-T25T | SD-12-82 | SD-12-99 |

*Insert screw tightening torque: 72–77 in lb

# 4 mm • Operating Guidelines

## AXIAL CHIP THINNING

**NOTE:** The operating guidelines table below includes a column for feed-per-tooth (fz). That column accounts for the axial chip thinning that's generated by the cutting-edge angle (lead angle). All GoldSFeed high-feed cutters have a 12° cutting edge angle resulting in an fz that is approximately 5x the recommended chip thickness (hex).



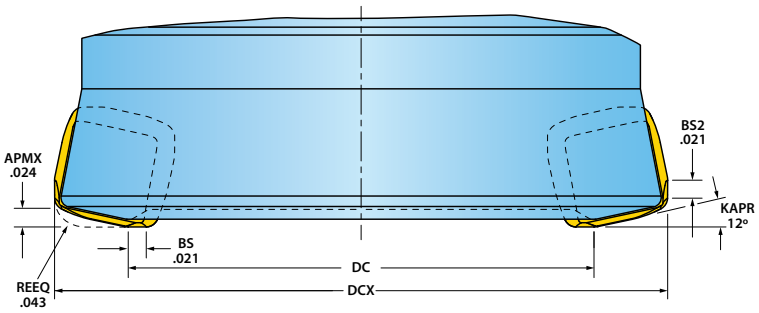

| Materials | | | | Vc Cutting Speed SFM | Hex Max. Chip Thickness (inch) | fz* Feed/Tooth (inch) | Harder «----» Tougher | | Coolant | Geometry | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ISO | Mat'l Group #VDI 3323 | Type | Examples | | | | IN2505 | IN2530 | | MR | MR1 | MM |
| P | 1–5 | Non-alloy steel | 1018, A36, 1045, A572, 1070 | 600–1000 | .002–.008 | .010–.040 | 1 | 2 | No | 1 | 2 | 3 |
| | 6–9 | Low-alloy steel | 4140, 4340, P20, 8620, 300M | 500–800 | .002–.006 | .010–.030 | 1 | 2 | No | 1 | 2 | 3 |
| | 10, 11 | High-alloy steel | H13, A2, D2, M2, T1 | 400–700 | .002–.004 | .010–.020 | 1 | 2 | No | 1 | 2 | 3 |
| M | 12, 13 | Stainless steel (ferritic & martensitic) | 410, 416, 440 | 400–700 | .002–.004 | .010–.020 | 2 | 1 | Yes | – | 1 | 2 |
| | 14 | Stainless steel (austenitic) | 303, 304, 316, 15-5, 17-4 | 500–800 | .002–.006 | .010–.030 | 2 | 1 | Yes | – | 2 | 1 |
| K | 15, 16 | Gray cast iron | CLS. 20, 30, 45 | 600–1000 | .002–.008 | .010–.040 | 1 | 2 | No | 3 | 1 | 2 |
| | 17–20 | Nodular cast iron | 60-40-18, 100-70-03 | 500–800 | .002–.006 | .010–.030 | 1 | 2 | No | 3 | 1 | 2 |
| N | 21–30 | Aluminum | 7075, 6061 | 1000+ | .004–.008 | .020–.040 | 1 | 2 | Yes | – | 2 | 1 |
| S | 31–35 | High-temp alloys | Inconel, Hastelloy, Nimonic, Monel | 80–140 | .001–.003 | .005–.015 | 2 | 1 | Yes | – | 1 | 2 |
| | 36, 37 | Titanium alloys | 6Al-4V, 5Al-5Mo-5V-3Cr | 100–200 | .002–.005 | .010–.025 | 2 | 1 | Yes | – | 1 | 2 |
| H | 38, 39 | Hardened steel >48 | A2, O1, D2 | 100–200 | .001–.004 | .005–.020 | 1 | 2 | No | 1 | – | – |

Note: Feed and speed recommendations are starting operating parameters. They are only guidelines from which further optimization should take place. Operating parameters are influenced by many machining variables. These variables may cause for reductions in feeds and speed or dramatic increases. Additionally, DOC and WOC may need to be revised to optimize the tools performance.

# 4 mm • Programming Data

## DEFINITIONS

» **DCX:** maximum cutting diameter
» **DC:** effective cutter diameter
» **KAPR:** cutting edge angle
» **APMX:** maximum depth of cut
» **REEQ:** program radius
» **BS:** axial wiper length
» **BS2:** radial wiper length



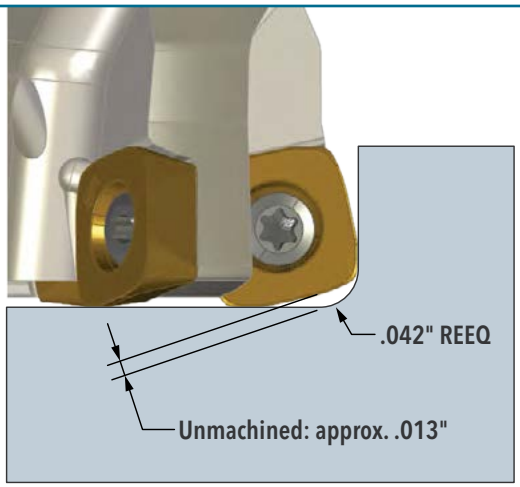

| Part Number | DCX Cutting Dia. Max. | DC Cutting Dia. |
|---|---|---|
| 15G1B-03006T6R01 | 0.375 | 0.167 |
| 15G1B-03015R8R01 | 0.375 | 0.167 |
| 15G1B-05007T8R01 | 0.500 | 0.291 |
| 15G1B-05007X4R01 | 0.500 | 0.291 |
| 15G1B-05015S4R01 | 0.500 | 0.291 |
| 15G1B-06008TRR01 | 0.625 | 0.415 |
| 15G1B-06010X5R01 | 0.625 | 0.415 |
| 15G1B-06015S6R01 | 0.625 | 0.415 |
| 15G1B-07010TSR01 | 0.750 | 0.540 |
| 15G1B-07010X6R01 | 0.750 | 0.540 |
| 15G1B-07015S7R01 | 0.750 | 0.540 |

# 4 mm • Programming Tips

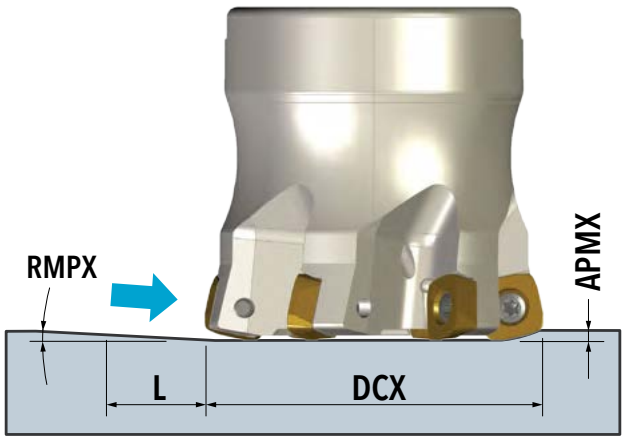
» The shape of the insert nose can be approximated by programming as-if the insert had a **.042"** corner radius (REEQ). The difference will result in an unmachined area that's approximately **.013"** deep.

» The recommendations for cutting speed, chip-thickness grade, and insert geometry are starting recommendations and should be optimized based on the type and rate of edge failure.

» The **Machining Calculator App**, on Ingersoll's website, is another resource for estimating and optimizing parameters. There are additional inputs like the radial width of cut and the effective rake angle can be included into the estimates.



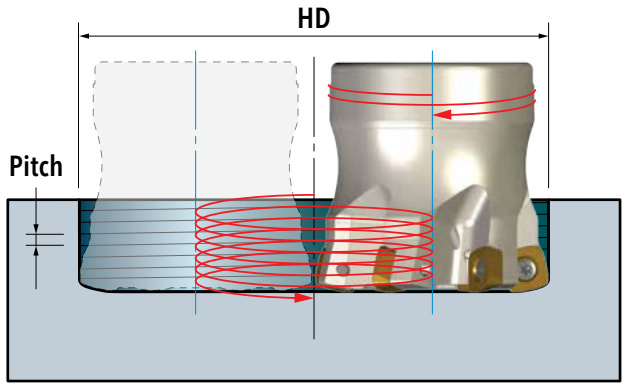
# 4 mm • Straight Ramping




| DCX Cutting Dia. Max. | RMPX Ramp Angle Max. | L* | APMX Depth of Cut Max. |
|---|---|---|---|
| 0.375 | 1.80 | 0.763 | 0.024 |
| 0.500 | 4.70 | 0.279 | 0.024 |
| 0.625 | 3.00 | 0.438 | 0.024 |
| 0.750 | 2.20 | 0.598 | 0.024 |

* L in this table is the length the cutter travels to reach the maximum depth of cut **(.024")** while traveling at the maximum ramp angle listed for the cutter.

# 4 mm • Helical Ramping




| DCX Cutting Dia. Max. | HD Hole Dia. Min. | HD Hole Dia. Max. | HD Hole Dia. Max. w/o Cusp | Max. Pitch Per Revolution |
|---|---|---|---|---|
| 0.375 | 0.476 | 0.750 | 0.542 | 0.024 |
| 0.500 | 0.704 | 1.000 | 0.791 | 0.024 |
| 0.625 | 0.952 | 1.250 | 1.040 | 0.024 |
| 0.750 | 1.202 | 1.500 | 1.290 | 0.024 |

## PITCH

The maximum pitch is determined to not exceed the maximum depth of cut (APMX) and to not exceed the maximum ramp angle (RMPX).

## EXAMPLE

» The minimum hole diameter that the **.375"** diameter cutter can interpolate from solid is **.476"** (leaving a raised cusp).

» The maximum hole diameter that the **.375"** diameter cutter can interpolate from solid is **.750"**.

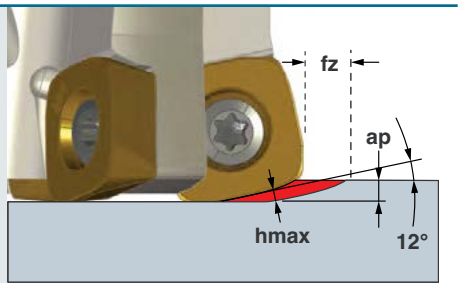
» The maximum hole diameter that the **.375"** diameter cutter can interpolate from solid while leaving a flat-bottom is **.542"** (leaving no raised cusp).

» The maximum pitch for this series matches the insert's radial wiper length of **.024"**.

# 6 mm • Operating Guidelines NEW

## AXIAL CHIP THINNING

**NOTE:** The operating guidelines table below includes a column for feed-per-tooth (fz). That column accounts for the axial chip thinning that's generated by the cutting-edge angle (lead angle). All GoldSFeed high-feed cutters have a 12° cutting edge angle resulting in an fz that is approximately 5x the recommended chip thickness (hex).



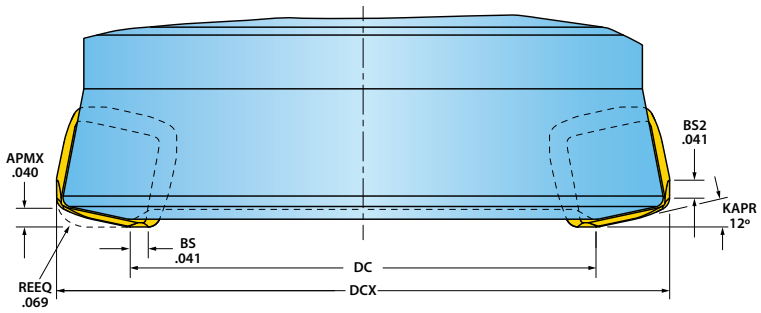

| Materials | | | | Vc Cutting Speed SFM | Hex Max. Chip Thickness (inch) | fz* Feed/ Tooth (inch) | Harder «---------» Tougher | | | | | | | | | | Coolant | Geometry | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ISO | Mat'l Group #VDI 3323 | Type | Examples | | | | IN2504 | IN2510 | IN4005 | IN2505 | IN4030 | IN2530 | IN6537 | IN7035 | IN4035 | IN2535 | | MR | MR1 | MM |
| P | 1-5 | Non-alloy steel | 1018, A36, 1045, A572, 1070 | 500-900 | .004-.010 | .020-.050 | - | - | - | 1 | 4 | 2 | 3 | - | - | - | No | 1 | 2 | 3 |
| | 6-9 | Low-alloy steel | 4140, 4340, P20, 8620, 300M | 400-600 | .003-.008 | .015-.040 | - | - | - | 1 | 4 | 2 | 3 | - | - | - | No | 1 | 2 | 3 |
| | 10, 11 | High-alloy steel | H13, A2, D2, M2, T1 | 300-500 | .003-.008 | .015-.040 | - | - | - | 1 | 4 | 2 | 3 | - | - | - | No | 1 | 2 | 3 |
| M | 12, 13 | Stainless steel (ferritic & martensitic) | 410, 416, 440 | 400-700 | .003-.008 | .015-.040 | - | - | - | - | 2 | 1 | - | - | 4 | 3 | Yes | - | 1 | 2 |
| | 14 | Stainless steel (austenitic) | 303, 304, 316, 15-5, 17-4 | 300-600 | .003-.008 | .015-.040 | - | - | - | - | 2 | 1 | - | - | 4 | 3 | Yes | - | 2 | 1 |
| K | 15, 16 | Gray cast iron | CLS. 20, 30, 45 | 500-900 | .004-.010 | .020-.050 | - | 1 | 2 | 3 | 4 | - | - | - | - | - | No | 3 | 1 | 2 |
| | 17, 18 | Ductile cast iron | 60-40-18, 100-70-03 | 400-600 | .003-.008 | .015-.040 | - | - | 1 | 2 | 3 | 4 | - | - | - | - | No | 3 | 1 | 2 |
| N | 21-30 | Aluminum | 7075, 6061 | 1000+ | .004-.010 | .020-.050 | - | - | 1 | 2 | 3 | 4 | - | - | - | - | Yes | - | 2 | 1 |
| S | 31-35 | High-temp alloys | Inconel, Hastelloy, Monel | 80-140 | .002-.004 | .010-.020 | - | - | - | - | - | - | - | 2 | 3 | 1 | Yes | - | 1 | 2 |
| | 36, 37 | Titanium alloys | 6Al-4V, 5Al-5Mo-5V-3Cr | 100-200 | .004-.006 | .020-.030 | - | - | - | - | - | - | - | 3 | 2 | 1 | Yes | - | 1 | 2 |
| H | 38, 39 | Hardened steel >48 | A2, O1, D2 | 100-200 | .002-.004 | .010-.020 | 1 | - | 3 | 2 | - | - | - | - | - | - | No | 1 | - | - |

Note: Feed and speed recommendations are starting operating parameters. They are only guidelines from which further optimization should take place. Operating parameters are influenced by many machining variables. These variables may cause for reductions in feeds and speed or dramatic increases. Additionally, DOC and WOC may need to be revised to optimize the tools performance.

# 6 mm • Programming Data NEW

## DEFINITIONS

» **DCX:** maximum cutting diameter
» **DC:** effective cutter diameter
» **KAPR:** cutting edge angle
» **APMX:** maximum depth of cut
» **REEQ:** program radius
» **BS:** axial wiper length
» **BS2:** radial wiper length



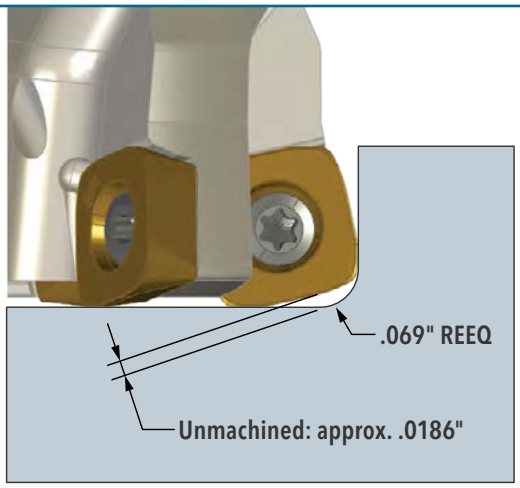

| Part Number | DCX Cutting Dia. Max. | DC Cutting Dia. |
|---|---|---|
| 15G1D-06015S6R01 | 0.625 | 0.314 |
| 15G1D-07020S7R01 | 0.750 | 0.438 |
| 15G1D-07030S7R01 | 0.750 | 0.438 |
| 15G1D-08020S8R01 | 0.875 | 0.562 |
| 15G1D-10020S1R01 | 1.000 | 0.686 |
| 15G1D-10030S1R01 | 1.000 | 0.686 |
| 15G1D-12030S9R01 | 1.250 | 0.936 |
| 15G1D-06010X5R01 | 0.625 | 0.314 |
| 15G1D-07010X6R01 | 0.750 | 0.438 |
| 15G1D-08010X7R01 | 0.875 | 0.562 |
| 15G1D-10013X7R01 | 1.000 | 0.686 |
| 15G1D-12015X8R01 | 1.250 | 0.936 |
| 15G1D-15015X8R01 | 1.500 | 1.186 |
| 15G1D-15017X9R01 | 1.500 | 1.186 |
| 15G1D-06008TRR01 | 0.625 | 0.314 |
| 15G1D-07010TSR01 | 0.750 | 0.438 |
| 15G1D-10012TUR01 | 1.000 | 0.686 |
| 5G1D-15R01 | 1.500 | 1.186 |
| 5G1D-20R01 | 2.000 | 1.686 |
| 5G1D-20R02 | 2.000 | 1.686 |

# 6 mm • Programming Tips NEW

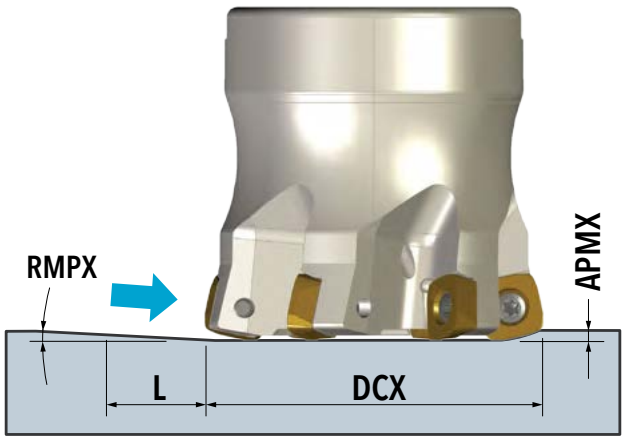
» The shape of the insert nose can be approximated by programming as-if the insert had a **.069"** corner radius (REEQ). The difference will result in an unmachined area that's approximately **.0186"** deep.

» The recommendations for cutting speed, chip-thickness grade, and insert geometry are starting recommendations and should be optimized based on the type and rate of edge failure.

» The **Machining Calculator App**, on Ingersoll's website, is another resource for estimating and optimizing parameters. There are additional inputs like the radial width of cut and the effective rake angle can be included into the estimates.



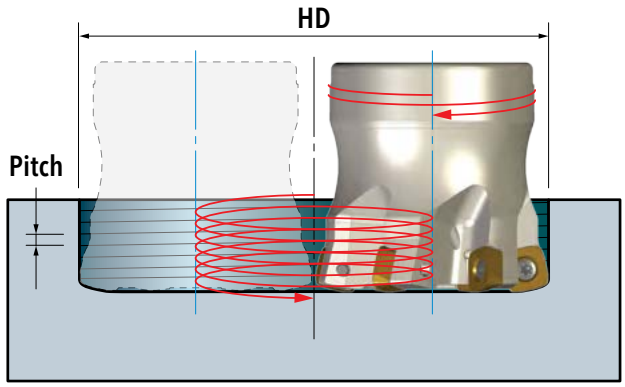
## 6 mm • Straight Ramping NEW




| DCX Cutting Dia. Max. | RMPX Ramp Angle Max. | L* | APMX Depth of Cut Max. |
|---|---|---|---|
| 0.625 | 2.500 | 0.916 | 0.040 |
| 0.750 | 3.500 | 0.653 | 0.040 |
| 0.875 | 3.000 | 0.763 | 0.040 |
| 1.000 | 2.500 | 0.916 | 0.040 |
| 1.250 | 2.000 | 1.145 | 0.040 |
| 1.500 | 1.600 | 1.432 | 0.040 |
| 2.000 | 1.000 | 2.291 | 0.040 |

* L in this table is the length the cutter travels to reach the maximum depth of cut **(.040")** while traveling at the maximum ramp angle listed for the cutter.

## 6 mm • Helical Ramping NEW




| DCX Cutting Dia. Max. | HD Hole Dia. Min. | HD Hole Dia. Max. | HD Hole Dia. Max. w/o Cusp | Max. Pitch Per Revolution |
|---|---|---|---|---|
| 0.625 | 0.812 | 1.250 | 0.939 | 0.040 |
| 0.750 | 1.044 | 1.500 | 1.188 | 0.040 |
| 0.875 | 1.288 | 1.750 | 1.437 | 0.040 |
| 1.000 | 1.538 | 2.000 | 1.686 | 0.040 |
| 1.250 | 2.032 | 2.500 | 2.186 | 0.040 |
| 1.500 | 2.534 | 3.000 | 2.686 | 0.040 |
| 2.000 | 3.534 | 4.000 | 3.686 | 0.040 |

### PITCH

The maximum pitch is determined to not exceed the maximum depth of cut (APMX) and to not exceed the maximum ramp angle (RMPX).

### EXAMPLE

» The minimum hole diameter that the **.625"** diameter cutter can interpolate from solid is **.812"** (leaving a raised cusp).

» The maximum hole diameter that the **.625"** diameter cutter can interpolate from solid is **1.250"**.

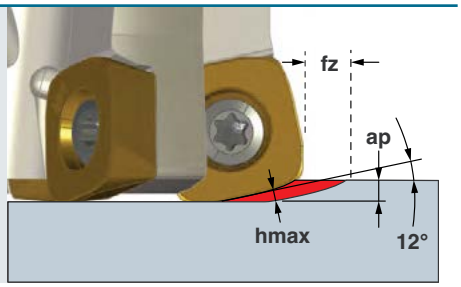
» The maximum hole diameter that the **.625"** diameter cutter can interpolate from solid while leaving a flat-bottom is **.939"** (leaving no raised cusp).

» The maximum pitch for this series matches the insert's radial wiper length of **.040"**.

# 9 mm • Operating Guidelines

## AXIAL CHIP THINNING

**NOTE:** The operating guidelines table below includes a column for feed-per-tooth (fz). That column accounts for the axial chip thinning that's generated by the cutting-edge angle (lead angle). All GoldSFeed high-feed cutters have a 12° cutting edge angle resulting in an fz that is approximately 5x the recommended chip thickness (hex).



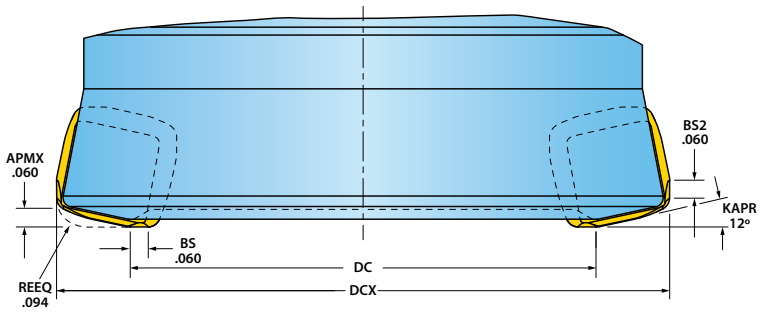

| Materials | | | | Vc Cutting Speed SFM | Hex Max. Chip Thickness (inch) | fz* Feed/ Tooth (inch) | Harder «---------» Tougher | | | | | | | | Coolant | Geometry | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ISO | Mat'l Group #VDI 3323 | Type | Examples | | | | IN2504 | IN4005 | IN2505 | IN4030 | IN2530 | IN7035 | IN4035 | IN2535 | | MR | MR1 | MM | MRH |
| P | 1-5 | Non-alloy steel | 1018, A36, 1045, A572, 1070 | 500-900 | .006-.014 | .030-.070 | - | 1 | 2 | 3 | 4 | - | - | - | No | 1 | 2 | 3 | - |
| | 6-9 | Low-alloy steel | 4140, 4340, P20, 8620, 300M | 400-600 | .005-.012 | .025-.060 | - | 1 | 2 | 3 | 4 | - | - | - | No | 1 | 2 | 3 | - |
| | 10, 11 | High-alloy steel | H13, A2, D2, M2, T1 | 300-500 | .004-.010 | .020-.050 | - | 1 | 2 | 3 | 4 | - | - | - | No | 1 | 2 | 3 | - |
| M | 12, 13 | Stainless steel (ferritic & martensitic) | 410, 416, 440 | 400-700 | .004-.010 | .020-.050 | - | - | - | 2 | 1 | - | 4 | 3 | Yes | - | 1 | 2 | - |
| | 14 | Stainless steel (austenitic) | 303, 304, 316, 15-5, 17-4 | 300-600 | .004-.010 | .020-.050 | - | - | - | 2 | 1 | - | 4 | 3 | Yes | - | 2 | 1 | - |
| K | 15, 16 | Gray cast iron | CLS. 20, 30, 45 | 500-900 | .006-.015 | .030-.075 | - | 1 | 2 | 3 | 4 | - | - | - | No | 3 | 1 | 2 | - |
| | 17-20 | Nodular cast iron | 60-40-18, 100-70-03 | 400-600 | .005-.012 | .025-.060 | - | 1 | 2 | 3 | 4 | - | - | - | No | 3 | 1 | 2 | - |
| N | 21-30 | Aluminum | 7075, 6061 | 1000+ | .004-.015 | .020-.075 | - | 1 | 2 | 3 | 4 | - | - | - | Yes | - | 2 | 1 | - |
| S | 31-35 | High-temp alloys | Inconel, Hastelloy, Nimonic, Monel | 80-140 | .002-.005 | .010-.025 | - | - | - | - | - | 2 | 3 | 1 | Yes | - | 1 | 2 | - |
| | 36, 37 | Titanium alloys | 6Al-4V, 5Al-5Mo-5V-3Cr | 100-200 | .005-.008 | .025-.040 | - | - | - | - | - | 3 | 1 | 2 | Yes | - | 1 | 2 | - |
| H | 38, 39 | Hardened steel >48 | A2, O1, D2 | 100-200 | .002-.004 | .010-.020 | 1 | 2 | 3 | - | - | - | - | - | No | 2 | - | - | 1 |

Note: Feed and speed recommendations are starting operating parameters. They are only guidelines from which further optimization should take place. Operating parameters are influenced by many machining variables. These variables may cause for reductions in feeds and speed or dramatic increases. Additionally, DOC and WOC may need to be revised to optimize the tools performance.

# 9 mm • Programming Data

## DEFINITIONS

» **DCX:** maximum cutting diameter
» **DC:** effective cutter diameter
» **KAPR:** cutting edge angle
» **APMX:** maximum depth of cut
» **REEQ:** program radius
» **BS:** axial wiper length
» **BS2:** radial wiper length



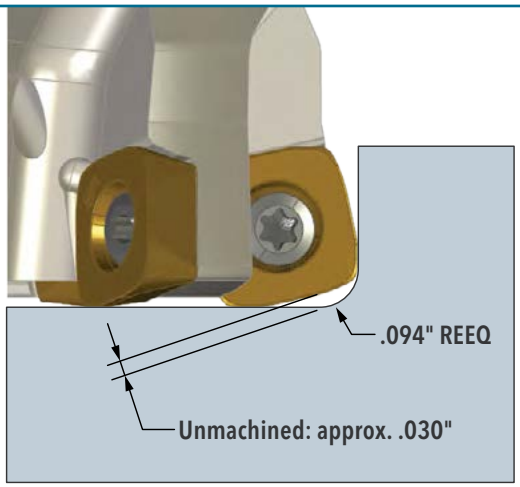

| Part Number | DCX Cutting Dia. Max. | DC Cutting Dia. |
|---|---|---|
| 15G1F-10019S1R01 | 1.000 | 0.524 |
| 15G1F-10020S1R01 | 1.000 | 0.524 |
| 15G1F-10015X7R01 | 1.000 | 0.524 |
| 15G1F-12047S9R02 | 1.250 | 0.773 |
| 15G1F-12047S9R01 | 1.250 | 0.773 |
| 15G1F-12027E2R02 | 1.250 | 0.773 |
| 15G1F-12027E2R01 | 1.250 | 0.773 |
| 15G1F-12047E2R01 | 1.250 | 0.773 |
| 15G1F-12015X8R02 | 1.250 | 0.773 |
| 15G1F-15060S9R02 | 1.500 | 1.022 |
| 15G1F-15060S9R01 | 1.500 | 1.022 |
| 15G1F-15016E2R02 | 1.500 | 1.022 |
| 15G1F-15016E2R01 | 1.500 | 1.022 |
| 15G1F-15017X9R01 | 1.500 | 1.022 |
| 5G5F-20R01 | 2.000 | 1.521 |
| 5G6F-20R01 | 2.000 | 1.521 |
| 5G5F-25R01 | 2.500 | 2.020 |
| 5G5F-30R01 | 3.000 | 2.520 |
| 5G6F-30R01 | 3.000 | 2.520 |

# 9 mm • Programming Tips

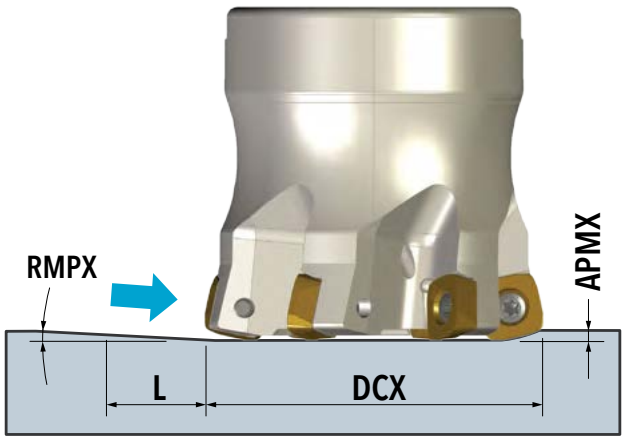
» The shape of the insert nose can be approximated by programming as-if the insert had a **.094"** corner radius (REEQ). The difference will result in an unmachined area that's approximately **.030"** deep.

» The recommendations for cutting speed, chip-thickness grade, and insert geometry are starting recommendations and should be optimized based on the type and rate of edge failure.

» The **Machining Calculator App**, on Ingersoll's website, is another resource for estimating and optimizing parameters. There are additional inputs like the radial width of cut and the effective rake angle can be included into the estimates.



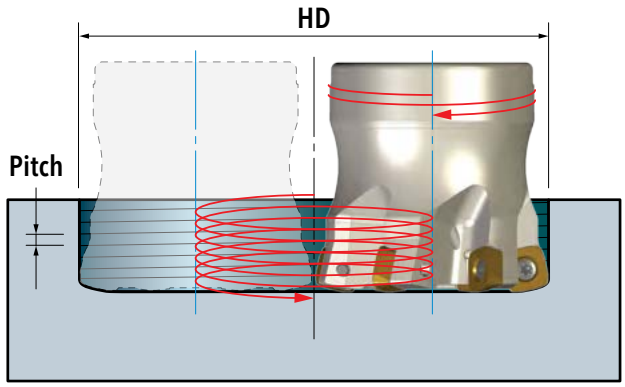
## 9 mm • Straight Ramping




| DCX Cutting Dia. Max. | RMPX Ramp Angle Max. | L* | APMX Depth of Cut Max. |
|---|---|---|---|
| 1.000 | 5.5 | 0.623 | 0.060 |
| 1.250 | 3.3 | 1.041 | 0.060 |
| 1.500 | 2.3 | 1.494 | 0.060 |
| 2.000 | 1.5 | 2.291 | 0.060 |
| 2.500 | 1.1 | 3.125 | 0.060 |
| 3.000 | 0.8 | 4.297 | 0.060 |

* L in this table is the length the cutter travels to reach the maximum depth of cut **(.060")** while traveling at the maximum ramp angle listed for the cutter.

## 9 mm • Helical Ramping




| DCX Cutting Dia. Max. | HD Hole Dia. Min. | HD Hole Dia. Max. | HD Hole Dia. Max. w/o Cusp | Max. Pitch Per Revolution |
|---|---|---|---|---|
| 1.000 | 1.324 | 2.000 | 1.524 | 0.060 |
| 1.250 | 1.822 | 2.500 | 2.023 | 0.060 |
| 1.500 | 2.320 | 3.000 | 2.522 | 0.060 |
| 2.000 | 3.320 | 4.000 | 3.520 | 0.060 |
| 2.500 | 4.330 | 5.000 | 4.520 | 0.060 |
| 3.000 | 5.330 | 6.000 | 5.520 | 0.060 |

### PITCH

The maximum pitch is determined to not exceed the maximum depth of cut (APMX) and to not exceed the maximum ramp angle (RMPX).

### EXAMPLE

» The minimum hole diameter that the **1.000"** diameter cutter can interpolate from solid is **1.324"** (leaving a raised cusp).

» The maximum hole diameter that the **1.000"** diameter cutter can interpolate from solid is **2.000"**.

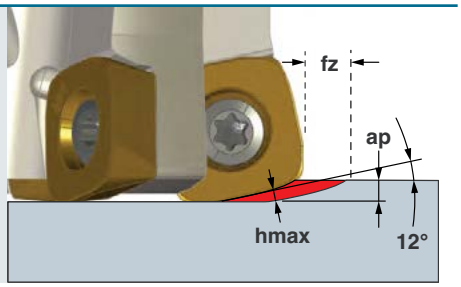
» The maximum hole diameter that the **1.000"** diameter cutter can interpolate from solid while leaving a flat-bottom is **1.542"** (leaving no raised cusp).

» The maximum pitch for this series matches the insert's radial wiper length of **.060"**.

# 13 mm • Operating Guidelines

## AXIAL CHIP THINNING

**NOTE:** The operating guidelines table below includes a column for feed-per-tooth (fz). That column accounts for the axial chip thinning that's generated by the cutting-edge angle (lead angle). All GoldSFeed high-feed cutters have a 12° cutting edge angle resulting in an fz that is approximately 5x the recommended chip thickness (hex).



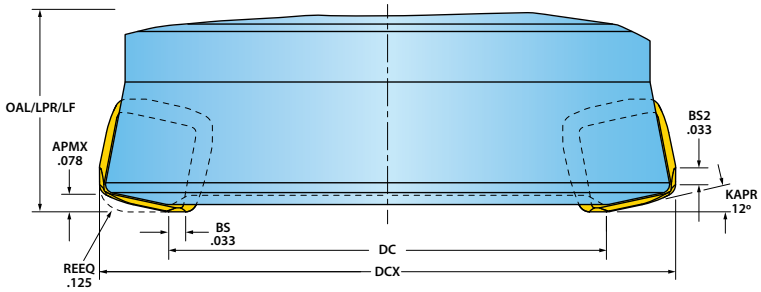

| Materials | | | | Vc Cutting Speed SFM | Hex Max. Chip Thickness (inch) | fz* Feed/Tooth (inch) | Harder «---------» Tougher | | | | | | | Coolant | Geometry | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ISO | Mat'l Group #VDI 3323 | Type | Examples | | | | IN4005 | IN2505 | IN4030 | IN2530 | IN7035 | IN4035 | IN2535 | | MR | MR1 | PH |
| P | 1-5 | Non-alloy steel | 1018, A36, 1045, A572, 1070 | 450-750 | .006-.018 | .030-.090 | 1 | 2 | 3 | 4 | - | - | - | No | 1 | 2 | 3 |
| | 6-9 | Low-alloy steel | 4140, 4340, P20, 8620, 300M | 350-550 | .005-.015 | .025-.075 | 1 | 2 | 3 | 4 | - | - | - | No | 1 | 2 | 3 |
| | 10, 11 | High-alloy steel | H13, A2, D2, M2, T1 | 250-450 | .004-.012 | .020-.060 | 1 | 2 | 3 | 4 | - | - | - | No | 1 | 2 | 3 |
| M | 12, 13 | Stainless steel (ferritic & martensitic) | 410, 416, 440 | 350-550 | .004-.010 | .020-.050 | - | - | 2 | 1 | - | 4 | 3 | Yes | - | 1 | 2 |
| | 14 | Stainless steel (austenitic) | 303, 304, 316, 15-5, 17-4 | 250-500 | .004-.008 | .020-.040 | - | - | 2 | 1 | - | 4 | 3 | Yes | - | 2 | 1 |
| K | 15, 16 | Gray cast iron | CLS. 20, 30, 45 | 500-900 | .006-.020 | .030-.100 | 1 | 2 | 3 | 4 | - | - | - | No | 3 | 1 | 2 |
| | 17-20 | Nodular cast iron | 60-40-18, 100-70-03 | 350-650 | .005-.015 | .025-.075 | 1 | 2 | 3 | 4 | - | - | - | No | 3 | 1 | 2 |
| N | 21-30 | Aluminum | 7075, 6061 | 1000+ | - | - | 1 | 2 | 3 | 4 | - | - | - | Yes | - | 2 | 1 |
| S | 31-35 | High-temp alloys | Inconel, Hastelloy, Nimonic, Monel | 60-110 | .002-.005 | .010-.025 | - | - | - | - | 2 | 3 | 1 | Yes | - | 1 | 2 |
| | 36, 37 | Titanium alloys | 6Al-4V, 5Al-5Mo-5V-3Cr | 100-170 | .004-.008 | .020-.040 | - | - | - | - | 3 | 1 | 2 | Yes | - | 1 | 2 |
| H | 38, 39 | Hardened steel >48 | A2, O1, D2 | 100-200 | .002-.005 | .010-.025 | 2 | 1 | - | - | - | - | - | No | 1 | 2 | - |

Note: Feed and speed recommendations are starting operating parameters. They are only guidelines from which further optimization should take place. Operating parameters are influenced by many machining variables. These variables may cause for reductions in feeds and speed or dramatic increases. Additionally, DOC and WOC may need to be revised to optimize the tools performance.

# 13 mm (MDR Inserts) • Programming Data

## DEFINITIONS

- » **DCX:** maximum cutting diameter
- » **DC:** effective cutter diameter
- » **KAPR:** cutting edge angle
- » **APMX:** maximum depth of cut
- » **REEQ:** program radius
- » **BS:** axial wiper length
- » **BS2:** radial wiper length
- » **OAL:** overall length
- » **LPR:** protruding length
- » **LF:** functional length



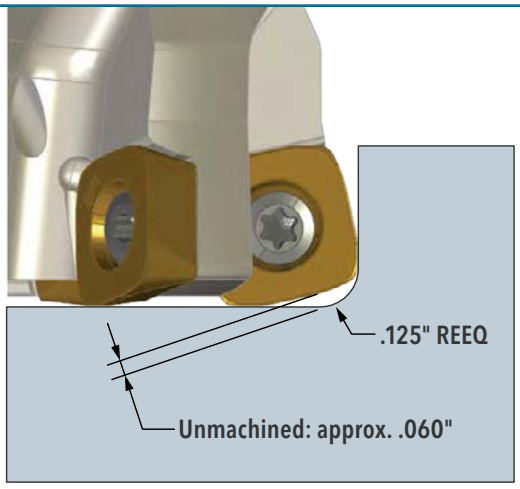

**Using inserts SDES1305MDR-MR, SDES1305MDR-MR1, SDMS1305MDR-PH, & SDXS1305MDR-PH**

| Part Number | DCX Cutting Dia. Max. | DC Cutting Dia. | OAL Overall Length |
|---|---|---|---|
| 15M1P-1202781R01 | 1.250 | 0.423 | 2.750 |
| 15M1P-12047S9R01 | 1.250 | 0.423 | 4.750 |
| 15M1P-1502786R01 | 1.500 | 0.673 | 2.750 |
| 15M1P-1505386R01 | 1.500 | 0.673 | 5.340 |
| 15M1P-12017X8R01 | 1.250 | 0.423 | 1.750 |
| 5M5P-20R01 | 2.000 | 1.170 | 2.000 |
| 5M6P-20R01 | 2.000 | 1.170 | 2.000 |
| 5M5P-25R01 | 2.500 | 1.170 | 2.000 |
| 5M6P-25R01 | 2.500 | 1.170 | 2.000 |
| 5M5P-30R01 | 3.000 | 2.170 | 2.000 |
| 5M6P-30R01 | 3.000 | 2.170 | 2.000 |
| 5M5P-30R02 | 3.000 | 2.170 | 2.000 |
| 5M6P-30R02 | 3.000 | 2.170 | 2.000 |
| 5M5P-40R01 | 4.000 | 3.170 | 2.500 |
| 5M6P-40R01 | 4.000 | 3.170 | 2.500 |
| 5M5P-50R01 | 5.000 | 4.170 | 2.500 |
| 5M6P-50R01 | 5.000 | 4.170 | 2.500 |

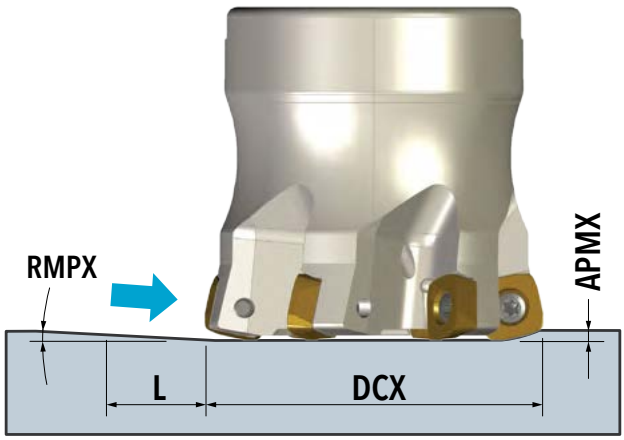
# 13 mm (MDR Inserts) • Programming Tips

Using inserts SDES1305MDR-MR, SDES1305MDR-MR1, SDMS1305MDR-PH, & SDXS1305MDR-PH

- » The shape of the insert nose can be approximated by programming as-if the insert had a **.094"** corner radius (REEQ). The difference will result in an unmachined area that's approximately **.060"** deep.
- » The recommendations for cutting speed, chip-thickness grade, and insert geometry are starting recommendations and should be optimized based on the type and rate of edge failure.
- » The **Machining Calculator App**, on Ingersoll's website, is another resource for estimating and optimizing parameters. There are additional inputs like the radial width of cut and the effective rake angle can be included into the estimates.



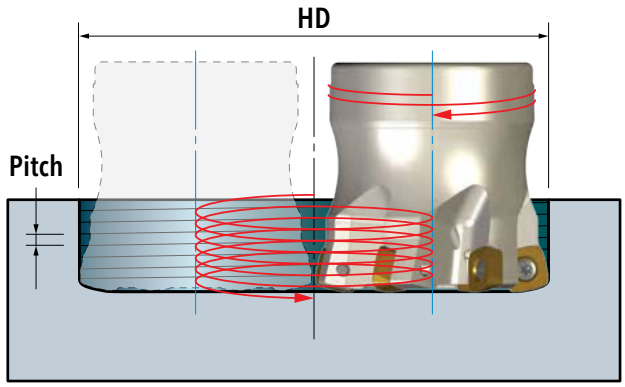
# 13 mm (MDR Inserts) • Straight Ramping




| Using Inserts SDES1305MDR-MR, SDES1305MDR-MR1, SDMS1305MDR-PH, & SDXS1305MDR-PH | | | |
|---|---|---|---|
| **DCX** Cutting Dia. Max. | **RMPX** Ramp Angle Max. | **L*** | **APMX** Depth of Cut Max. |
| 1.250 | 13.10 | 0.344 | 0.078 |
| 1.500 | 7.10 | 0.631 | 0.078 |
| 2.000 | 3.90 | 1.147 | 0.078 |
| 2.500 | 2.70 | 1.656 | 0.078 |
| 3.000 | 1.60 | 2.794 | 0.078 |
| 4.000 | 1.10 | 4.063 | 0.078 |
| 5.000 | 0.80 | 5.587 | 0.078 |

* L in this table is the length the cutter travels to reach the maximum depth of cut **(.078")** while traveling at the maximum ramp angle listed for the cutter.

# 13 mm (MDR Inserts) • Helical Ramping




## PITCH

The maximum pitch is determined to not exceed the maximum depth of cut (APMX) and to not exceed the maximum ramp angle (RMPX).

| Using Inserts SDES1305MDR-MR, SDES1305MDR-MR1, SDMS1305MDR-PH, & SDXS1305MDR-PH | | | | | |
|---|---|---|---|---|---|
| **DCX** Cutting Dia. Max. | **HD** Hole Dia. Min. | **HD** Hole Dia. Max. | **HD** Hole Dia. Min. w/o Cusp | **HD** Hole Dia. Max. w/o Cusp | Max. Pitch Per Revolution |
| 1.250 | 1.502 | 2.500 | 1.607 | 1.673 | 0.078 |
| 1.500 | 2.000 | 3.000 | 2.107 | 2.173 | 0.078 |
| 2.000 | 2.996 | 4.000 | 3.104 | 3.170 | 0.078 |
| 2.500 | 3.996 | 5.000 | 4.102 | 4.170 | 0.078 |
| 3.000 | 5.002 | 6.000 | 5.105 | 5.171 | 0.078 |
| 4.000 | 7.002 | 8.000 | 7.102 | 7.170 | 0.078 |
| 5.000 | 9.002 | 10.000 | 9.104 | 9.170 | 0.078 |

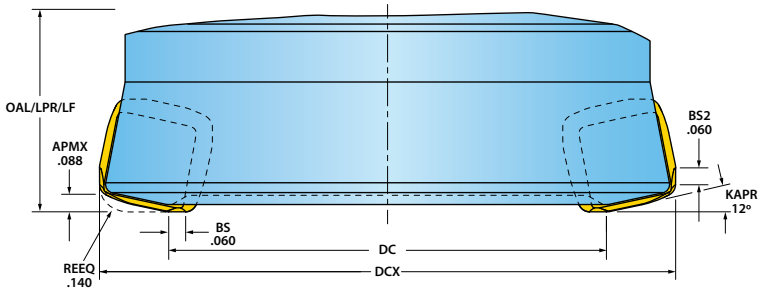
» The table lists the maximum and minimum hole diameters (HD) for helical interpolating a hole from solid stock. For holes where a flat-bottom is required, the table includes maximum and minimum hole diameters such that no cusp is remaining at the bottom of the hole.

» The figure shows that the maximum pitch (advance for every 360° of machine travel) should not exceed **.078"**.

# 13 mm (MPR Inserts) • Programming Data

## DEFINITIONS

- » **DCX:** maximum cutting diameter
- » **DC:** effective cutter diameter
- » **KAPR:** cutting edge angle
- » **APMX:** maximum depth of cut
- » **REEQ:** program radius
- » **BS:** axial wiper length
- » **BS2:** radial wiper length
- » **OAL:** overall length
- » **LPR:** protruding length
- » **LF:** functional length



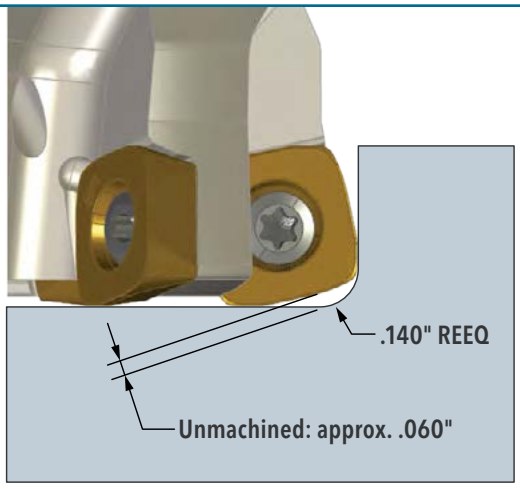

**Using Inserts SDES1305MPR-MR, SDES1305MPR-MR1, SDXS1305MPR-MR, & SDXS1305MPR-MR1**

| Part Number | DCX Cutting Dia. Max. | DC Cutting Dia. | OAL Overall Length |
|---|---|---|---|
| 15M1P-1202781R01 | 2.220 | 0.533 | 2.735 |
| 15M1P-12047S9R01 | 1.220 | 0.533 | 4.735 |
| 15M1P-1502786R01 | 1.470 | 0.784 | 2.735 |
| 15M1P-1505386R01 | 1.470 | 0.784 | 5.325 |
| 15M1P-12017X8R01 | 1.220 | 0.533 | 1.735 |
| 5M5P-20R01 | 1.970 | 1.281 | 1.985 |
| 5M6P-20R01 | 1.970 | 1.281 | 1.985 |
| 5M5P-25R01 | 2.470 | 1.781 | 1.985 |
| 5M6P-25R01 | 2.470 | 1.781 | 1.985 |
| 5M5P-30R01 | 2.970 | 2.281 | 1.985 |
| 5M6P-30R01 | 2.970 | 2.281 | 1.985 |
| 5M5P-30R02 | 2.970 | 2.281 | 1.985 |
| 5M6P-30R02 | 2.970 | 2.281 | 1.985 |
| 5M5P-40R01 | 3.970 | 3.281 | 2.485 |
| 5M6P-40R01 | 3.970 | 3.281 | 2.485 |
| 5M5P-50R01 | 4.970 | 4.281 | 2.485 |
| 5M6P-50R01 | 4.970 | 4.281 | 2.485 |

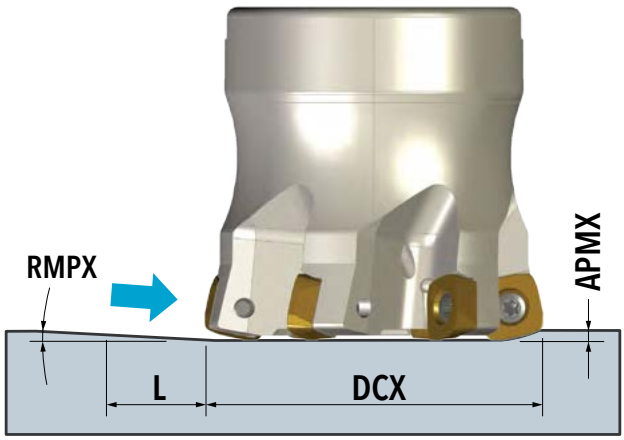
# 13 mm (MPR Inserts) • Programming Tips

Using Inserts SDES1305MPR-MR, SDES1305MPR-MR1, SDXS1305MPR-MR, & SDXS1305MPR-MR1

- » The shape of the insert nose can be approximated by programming as-if the insert had a **.140"** corner radius (REEQ). The difference will result in an unmachined area that's approximately **.060"** deep.
- » The recommendations for cutting speed, chip-thickness grade, and insert geometry are starting recommendations and should be optimized based on the type and rate of edge failure.
- » The **Machining Calculator App**, on Ingersoll's website, is another resource for estimating and optimizing parameters. There are additional inputs like the radial width of cut and the effective rake angle can be included into the estimates.



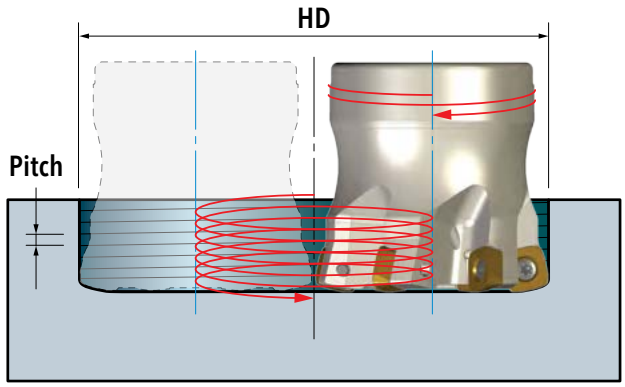
# 13 mm (MPR Inserts) • Straight Ramping




| Using Inserts SDES1305MPR-MR, SDES1305MPR-MR1, SDXS1305MPR-MR, & SDXS1305MPR-MR1 | | | |
|---|---|---|---|
| **DCX** Cutting Dia. Max. | **RMPX** Ramp Angle Max. | **L*** | **APMX** Depth of Cut Max. |
| 1.220 | 9.10 | 0.556 | 0.088 |
| 1.470 | 5.20 | 0.971 | 0.088 |
| 2.960 | 2.90 | 1.739 | 0.088 |
| 3.960 | 2.10 | 2.402 | 0.088 |
| 4.961 | 1.20 | 4.202 | 0.088 |
| 5.961 | 0.80 | 6.303 | 0.088 |
| 6.961 | 0.60 | 8.404 | 0.088 |

* L in this table is the length the cutter travels to reach the maximum depth of cut **(.088")** while traveling at the maximum ramp angle listed for the cutter.

# 13 mm (MPR Inserts) • Helical Ramping




## PITCH

The maximum pitch is determined to not exceed the maximum depth of cut (APMX) and to not exceed the maximum ramp angle (RMPX).

| Using Inserts SDES1305MPR-MR, SDES1305MPR-MR1, SDXS1305MPR-MR, & SDXS1305MPR-MR1 | | | | | |
|---|---|---|---|---|---|
| **DCX** Cutting Dia. Max. | **HD** Hole Dia. Min. | **HD** Hole Dia. Max. | **HD** Hole Dia. Min. w/o Cusp | **HD** Hole Dia. Max. w/o Cusp | Max. Pitch Per Revolution |
| 1.220 | 1.504 | 2.440 | 1.635 | 1.753 | 0.088 |
| 1.470 | 2.004 | 2.940 | 2.136 | 2.254 | 0.088 |
| 1.970 | 3.000 | 3.940 | 3.133 | 3.251 | 0.088 |
| 2.470 | 3.998 | 4.940 | 4.133 | 4.251 | 0.088 |
| 2.970 | 5.014 | 5.940 | 5.134 | 5.252 | 0.088 |
| 3.970 | 7.012 | 7.940 | 7.131 | 7.251 | 0.088 |
| 4.970 | 9.012 | 9.940 | 9.133 | 9.251 | 0.088 |

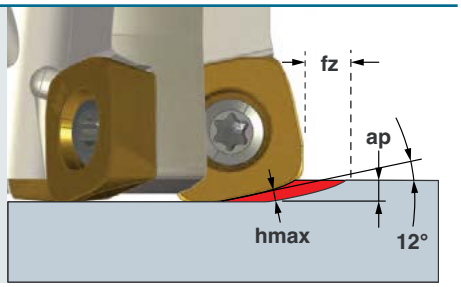
» The table lists the maximum and minimum hole diameters (HD) for helical interpolating a hole from solid stock. For holes where a flat-bottom is required, the table includes maximum and minimum hole diameters such that no cusp is remaining at the bottom of the hole.

» The figure shows that the maximum pitch (advance for every 360° of machine travel) should not exceed **.088"**.

# 16 mm • Operating Guidelines

## AXIAL CHIP THINNING

**NOTE:** The operating guidelines table below includes a column for feed-per-tooth (fz). That column accounts for the axial chip thinning that's generated by the cutting-edge angle (lead angle). All GoldSFeed high-feed cutters have a 12° cutting edge angle resulting in an fz that is approximately 5x the recommended chip thickness (hex).



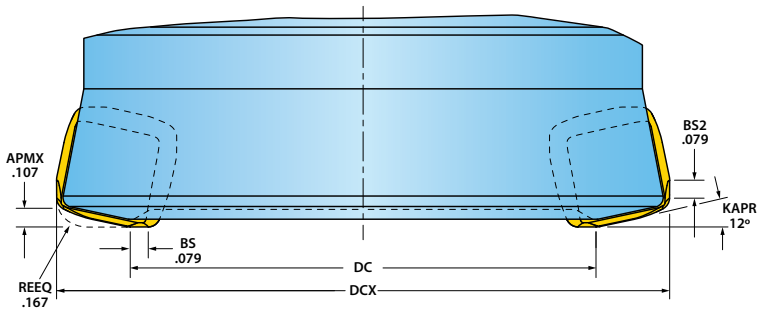

| Materials | | | | Vc Cutting Speed SFM | Hex Max. Chip Thickness (inch) | fz* Feed/ Tooth (inch) | Harder «---------» Tougher | | | | | | | | Coolant | Geometry | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ISO | Mat'l Group #VDI 3323 | Type | Examples | | | | IN4015 | IN2515 | IN4005 | IN2505 | IN4030 | IN2530 | IN7035 | IN4035 | IN2535 | | MR | MR1 | MM |
| P | 1-5 | Non-alloy steel | 1018, A36, 1045, A572, 1070 | 400-600 | .008-.022 | .040-.110 | - | - | 1 | 2 | 3 | 4 | - | - | - | No | 1 | 2 | 3 |
| | 6-9 | Low-alloy steel | 4140, 4340, P20, 8620, 300M | 300-500 | .008-.018 | .040-.090 | - | - | 1 | 2 | 3 | 4 | - | - | - | No | 1 | 2 | 3 |
| | 10, 11 | High-alloy steel | H13, A2, D2, M2, T1 | 200-400 | .008-.015 | .040-.075 | - | - | 1 | 2 | 3 | 4 | - | - | - | No | 1 | 2 | 3 |
| M | 12, 13 | Stainless steel (ferritic & martensitic) | 410, 416, 440 | 200-400 | .006-.012 | .030-.060 | - | - | - | - | 4 | 3 | - | 2 | 1 | Yes | - | 1 | 2 |
| | 14 | Stainless steel (austenitic) | 303, 304, 316, 15-5, 17-4 | 300-500 | .004-.008 | .020-.040 | - | - | - | - | 4 | 3 | - | 2 | 1 | Yes | - | 2 | 1 |
| K | 15, 16 | Gray cast iron | CLS. 20, 30, 45 | 500-900 | .004-.025 | .020-.125 | 1 | 2 | 3 | 4 | - | - | - | - | - | No | 3 | 1 | 2 |
| | 17-20 | Nodular cast iron | 60-40-18, 100-70-03 | 300-700 | .004-.020 | .020-.100 | 1 | 2 | 3 | 4 | - | - | - | - | - | No | 3 | 1 | 2 |
| N | 21-30 | Aluminum | 7075, 6061 | 1000+ | .004-.025 | .020-.125 | 1 | 2 | 3 | 4 | - | - | - | - | - | Yes | - | 2 | 1 |
| S | 31-35 | High-temp alloys | Inconel, Hastelloy, Nimonic, Monel | 50-100 | .002-.005 | .010-.025 | - | - | - | - | - | 4 | 3 | 2 | 1 | Yes | - | 1 | 2 |
| | 36, 37 | Titanium alloys | 6Al-4V, 5Al-5Mo-5V-3Cr | 90-150 | .004-.008 | .020-.040 | - | - | - | - | - | 4 | 3 | 2 | 1 | Yes | - | 1 | 2 |
| H | 38, 39 | Hardened steel >48 | A2, O1, D2 | 100-200 | .003-.005 | .015-.025 | - | - | 1 | 2 | - | - | - | - | - | No | 1 | - | - |

Note: Feed and speed recommendations are starting operating parameters. They are only guidelines from which further optimization should take place. Operating parameters are influenced by many machining variables. These variables may cause for reductions in feeds and speed or dramatic increases. Additionally, DOC and WOC may need to be revised to optimize the tools performance.

# 16 mm • Programming Data

## DEFINITIONS

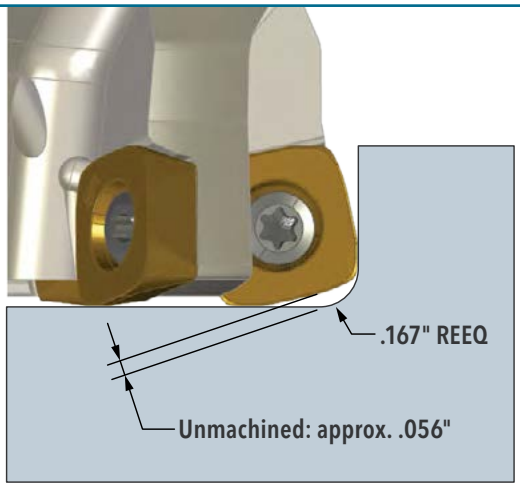
- » **DCX:** maximum cutting diameter
- » **DC:** effective cutter diameter
- » **KAPR:** cutting edge angle
- » **APMX:** maximum depth of cut
- » **REEQ:** program radius
- » **BS:** axial wiper length
- » **BS2:** radial wiper length



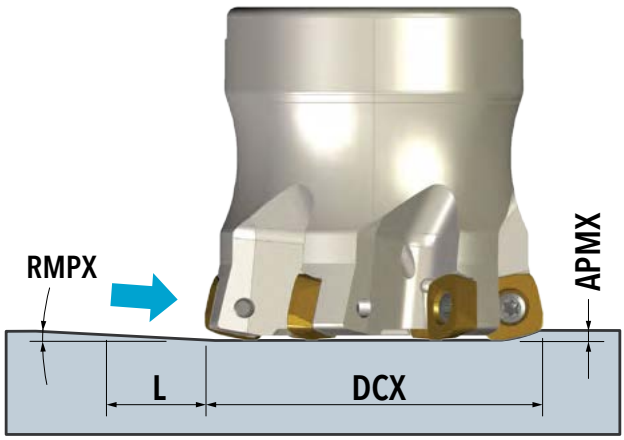

| Part Number | DCX Cutting Dia. Max. | DC Cutting Dia. |
|---|---|---|
| 5G5Q-25R01 | 2.500 | 1.645 |
| 5G5Q-25R02 | 2.500 | 1.645 |
| 5G5Q-30R01 | 3.000 | 2.144 |
| 5G6Q-30R01 | 3.000 | 2.144 |
| 5G5Q-30R02 | 3.000 | 2.144 |
| 5G5Q-40R01 | 4.000 | 3.144 |
| 5G6Q-40R01 | 4.000 | 3.144 |
| 5G6Q-50R01 | 5.000 | 4.144 |
| 5G6Q-60R01 | 6.000 | 5.144 |

# 16 mm • Programming Tips

- » The shape of the insert nose can be approximated by programming as-if the insert had a **.167"** corner radius (REEQ). The difference will result in an unmachined area that's approximately **.056"** deep.
- » The recommendations for cutting speed, chip-thickness grade, and insert geometry are starting recommendations and should be optimized based on the type and rate of edge failure.
- » The **Machining Calculator App**, on Ingersoll's website, is another resource for estimating and optimizing parameters. There are additional inputs like the radial width of cut and the effective rake angle can be included into the estimates.



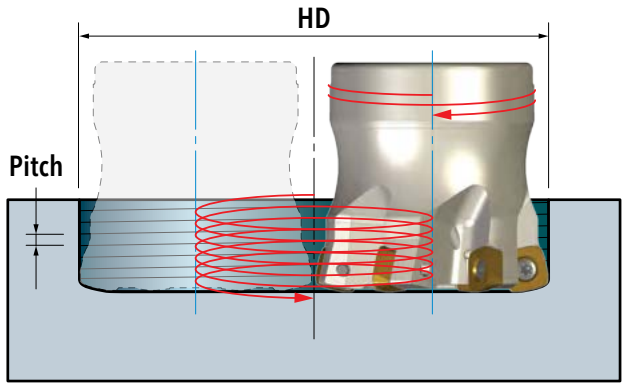
# 16 mm • Straight Ramping




| DCX Cutting Dia. Max. | RMPX Ramp Angle Max. | L* | APMX Depth of Cut Max. |
|---|---|---|---|
| 2.500 | 3.3 | 1.856 | 0.107 |
| 3.000 | 2.4 | 2.553 | 0.107 |
| 4.000 | 1.6 | 3.831 | 0.107 |
| 5.000 | 1.2 | 5.108 | 0.107 |
| 6.000 | 0.9 | 6.811 | 0.107 |

* L in this table is the length the cutter travels to reach the maximum depth of cut **(.107")** while traveling at the maximum ramp angle listed for the cutter.

# 16 mm • Helical Ramping




| DCX Cutting Dia. Max. | HD Hole Dia. Min. | HD Hole Dia. Max. | HD Hole Dia. Max. w/o Cusp | Max. Pitch Per Revolution |
|---|---|---|---|---|
| 2.500 | 3.822 | 5.000 | 4.145 | 0.107 |
| 3.000 | 4.822 | 6.000 | 5.144 | 0.107 |
| 4.000 | 6.822 | 8.000 | 7.144 | 0.107 |
| 5.000 | 8.824 | 10.000 | 9.144 | 0.107 |
| 6.000 | 10.824 | 12.000 | 11.144 | 0.107 |

## PITCH

The maximum pitch is determined to not exceed the maximum depth of cut (APMX) and to not exceed the maximum ramp angle (RMPX).

## EXAMPLE

» The minimum hole diameter that the **2.500"** diameter cutter can interpolate from solid is **3.822"** (leaving a raised cusp).

» The maximum hole diameter that the **2.500"** diameter cutter can interpolate from solid is **5.000"**.

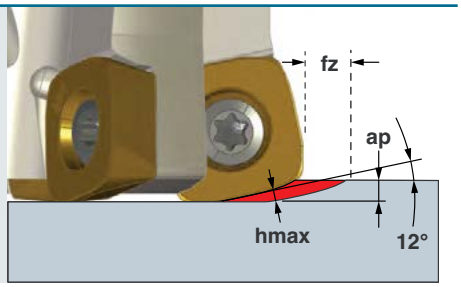
» The maximum hole diameter that the **2.500"** diameter cutter can interpolate from solid while leaving a flat-bottom is **4.145"** (leaving no raised cusp).

» The maximum pitch for this series matches the insert's radial wiper length of **.107"**.

# 19 mm • Operating Guidelines

## AXIAL CHIP THINNING

**NOTE:** The operating guidelines table below includes a column for feed-per-tooth (fz). That column accounts for the axial chip thinning that's generated by the cutting-edge angle (lead angle). All GoldSFeed high-feed cutters have a 12° cutting edge angle resulting in an fz that is approximately 5x the recommended chip thickness (hex).



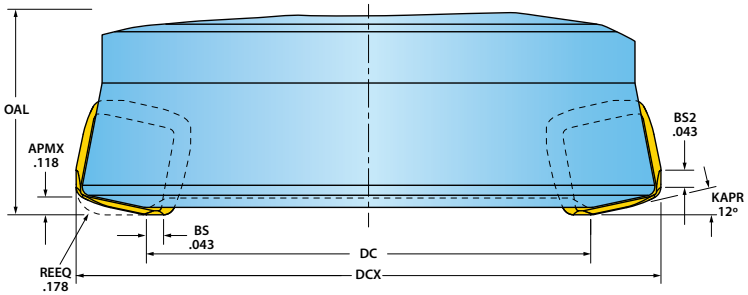

| Materials | | | | Vc Cutting Speed SFM | Hex Max. Chip Thickness (inch) | fz* Feed/Tooth (inch) | Harder «----» Tougher | | | | | | Coolant | Geometry | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ISO | Mat'l Group #VDI 3323 | Type | Examples | | | | IN4005 | IN2505 | IN4030 | IN2530 | IN4035 | IN2535 | | MR | MR1 | PH |
| P | 1-5 | Non-alloy steel | 1018, A36, 1045, A572, 1070 | 300-600 | .008-.025 | .040-.125 | 1 | 2 | 3 | 4 | - | - | No | 1 | 2 | 3 |
| | 6-9 | Low-alloy steel | 4140, 4340, P20, 8620, 300M | 250-500 | .008-.020 | .040-.100 | 1 | 2 | 3 | 4 | - | - | No | 1 | 2 | 3 |
| | 10, 11 | High-alloy steel | H13, A2, D2, M2, T1 | 200-400 | .008-.016 | .040-.080 | 1 | 2 | 3 | 4 | - | - | No | 1 | 2 | 3 |
| M | 12, 13 | Stainless steel (ferritic & martensitic) | 410, 416, 440 | 200-400 | .006-.014 | .030-.070 | - | - | 4 | 3 | 2 | 1 | Yes | - | 1 | 2 |
| | 14 | Stainless steel (austenitic) | 303, 304, 316, 15-5, 17-4 | 300-500 | .004-.008 | .020-.040 | - | - | 4 | 3 | 2 | 1 | Yes | - | 2 | 1 |
| K | 15, 16 | Gray cast iron | CLS. 20, 30, 45 | 500-900 | .004-.025 | .020-.125 | 1 | 2 | 3 | 4 | - | - | No | 3 | 1 | 2 |
| | 17-20 | Nodular cast iron | 60-40-18, 100-70-03 | 300-700 | .004-.020 | .020-.100 | 1 | 2 | 3 | 4 | - | - | No | 3 | 1 | 2 |
| N | 21-30 | Aluminum | 7075, 6061 | 1000+ | .004-.025 | .020-.125 | 1 | 2 | 3 | 4 | - | - | Yes | - | 2 | 1 |
| S | 31-35 | High-temp alloys | Inconel, Hastelloy, Nimonic, Monel | 50-100 | .002-.005 | .010-.025 | - | - | 4 | 3 | 2 | 1 | Yes | - | 1 | 2 |
| | 36, 37 | Titanium alloys | 6Al-4V, 5Al-5Mo-5V-3Cr | 90-150 | .004-.008 | .020-.040 | - | - | 4 | 3 | 2 | 1 | Yes | - | 1 | 2 |
| H | 38, 39 | Hardened steel >48 | A2, O1, D2 | 100-200 | .003-.005 | .015-.025 | 2 | 1 | - | - | - | - | No | 1 | - | - |

Note: Feed and speed recommendations are starting operating parameters. They are only guidelines from which further optimization should take place. Operating parameters are influenced by many machining variables. These variables may cause for reductions in feeds and speed or dramatic increases. Additionally, DOC and WOC may need to be revised to optimize the tools performance.

# 19 mm (MDR Inserts) • Programming Data

## DEFINITIONS

- » **DCX:** maximum cutting diameter
- » **DC:** effective cutter diameter
- » **KAPR:** cutting edge angle
- » **APMX:** maximum depth of cut
- » **REEQ:** program radius
- » **BS:** axial wiper length
- » **BS2:** radial wiper length
- » **OAL:** overall length



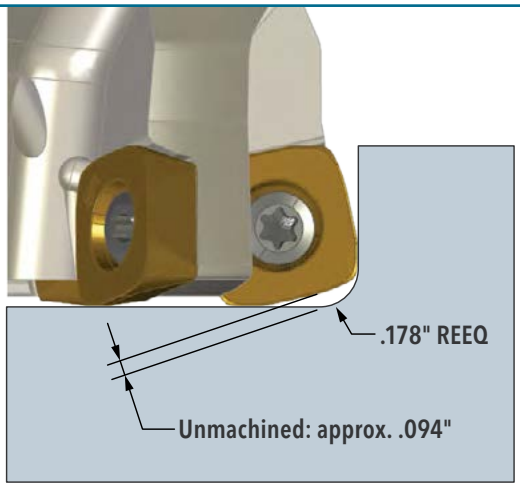

**Using Inserts SDES1906MDR-MR, SDMS1906MDR-PH**

| Part Number | DCX Cutting Dia. Max. | DC Cutting Dia. | OAL Overall Length |
|---|---|---|---|
| 5G5M-30R01 | 3.000 | 1.766 | 2.000 |
| 5G6M-30R01 | 3.000 | 1.755 | 2.000 |
| 5G5M-40R01 | 4.000 | 2.769 | 2.500 |
| 5G6M-40R01 | 4.000 | 2.755 | 2.500 |
| 5G5M-50R01 | 5.000 | 3.759 | 2.500 |
| 5G6M-50R01 | 5.000 | 3.755 | 2.500 |
| 5G5M-60R01 | 6.000 | 4.757 | 2.500 |
| 5G6M-60R01 | 6.000 | 4.755 | 2.500 |
| 5G6M-70R01 | 7.000 | 5.755 | 2.500 |

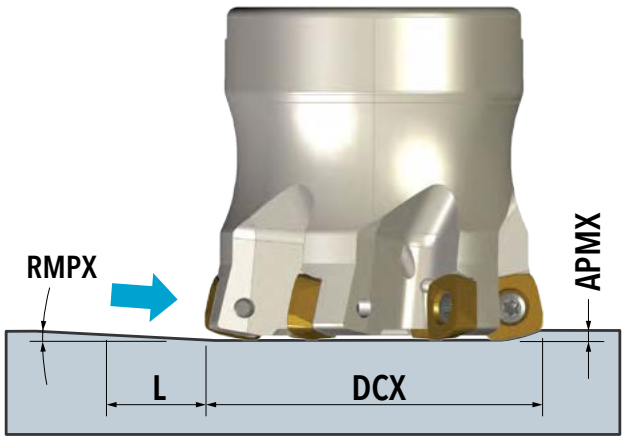
# 19 mm (MDR Inserts) • Programming Tips

Using Inserts SDES1906MDR-MR, SDMS1906MDR-PH

- » The shape of the insert nose can be approximated by programming as-if the insert had a **.178"** corner radius (REEQ). The difference will result in an unmachined area that's approximately **.094"** deep.
- » The recommendations for cutting speed, chip-thickness grade, and insert geometry are starting recommendations and should be optimized based on the type and rate of edge failure.
- » The **Machining Calculator App**, on Ingersoll's website, is another resource for estimating and optimizing parameters. There are additional inputs like the radial width of cut and the effective rake angle can be included into the estimates.



# 19 mm (MDR Inserts) • Straight Ramping

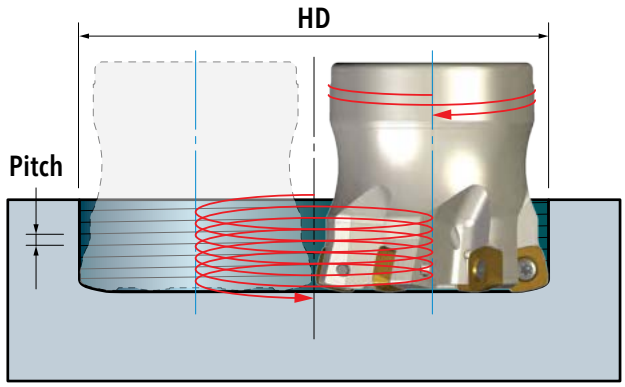



Using Inserts SDES1906MDR-MR, SDMS1906MDR-PH

| DCX Cutting Dia. Max. | RMPX Ramp Angle Max. | L* | APMX Depth of Cut Max. |
|---|---|---|---|
| 3.000 | 2.70 | 2.505 | 0.118 |
| 4.000 | 1.70 | 3.978 | 0.118 |
| 5.000 | 1.70 | 3.978 | 0.118 |
| 6.000 | 1.30 | 5.201 | 0.118 |
| 7.000 | 1.02 | 6.629 | 0.118 |

* L in this table is the length the cutter travels to reach the maximum depth of cut **(.118")** while traveling at the maximum ramp angle listed for the cutter.

# 19 mm (MDR Inserts) • Helical Ramping




Using Inserts SDES1906MDR-MR, SDMS1906MDR-PH

| DCX Cutting Dia. Max. | HD Hole Dia. Min. | HD Hole Dia. Max. | HD Hole Dia. Max. w/o Cusp | Max. Pitch Per Revolution |
|---|---|---|---|---|
| 3.000 | 4.518 | 6.000 | 4.766 | 0.118 |
| 4.000 | 6.520 | 8.000 | 6.769 | 0.118 |
| 5.000 | 8.520 | 10.000 | 8.759 | 0.118 |
| 6.000 | 10.520 | 12.000 | 10.757 | 0.118 |
| 7.000 | 12.521 | 14.000 | 12.755 | 0.118 |

## PITCH

The maximum pitch is determined to not exceed the maximum depth of cut (APMX) and to not exceed the maximum ramp angle (RMPX).

## EXAMPLE

» The minimum hole diameter that the **3.000"** diameter cutter can interpolate from solid is **4.518"** (leaving a raised cusp).

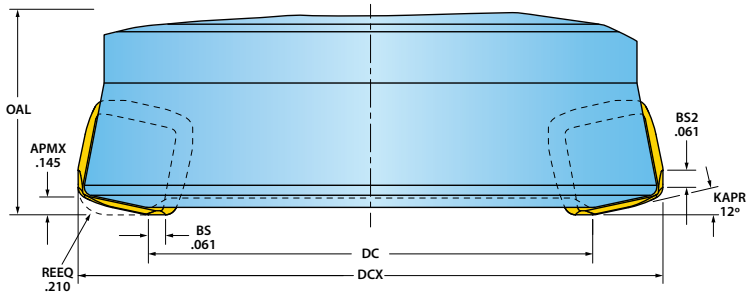
» The maximum hole diameter that the **3.000"** diameter cutter can interpolate from solid is **6.000"** (leaving a raised cusp).

» The maximum hole diameter that the **3.000"** diameter cutter can interpolate from solid while leaving a flat-bottom is **4.766"** (leaving no raised cusp).

# 19 mm (MPR Inserts) • Programming Data

## DEFINITIONS

- » **DCX:** maximum cutting diameter
- » **DC:** effective cutter diameter
- » **KAPR:** cutting edge angle
- » **APMX:** maximum depth of cut
- » **REEQ:** program radius
- » **BS:** axial wiper length
- » **BS2:** radial wiper length
- » **OAL:** overall length



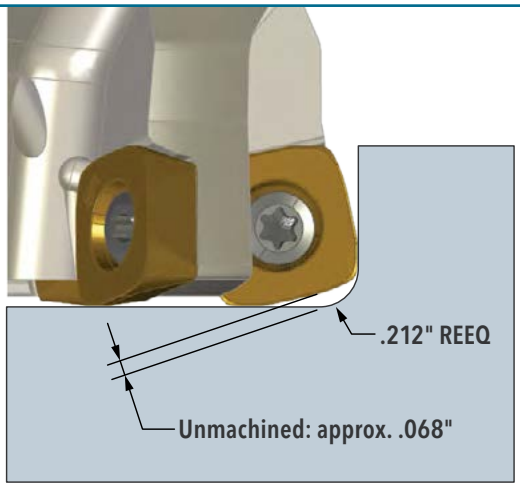

**Using Inserts SDES1906MPR-MR, SDES1906MPR-MR1, SDXS1906MPR-MR, & SDXS1906MPR-MR1**

| Part Number | DCX Cutting Dia. Max. | DC Cutting Dia. | OAL Overall Length |
|---|---|---|---|
| 5G5M-30R01 | 2.960 | 1.903 | 1.981 |
| 5G6M-30R01 | 2.960 | 1.894 | 1.981 |
| 5G5M-40R01 | 3.960 | 2.906 | 2.481 |
| 5G6M-40R01 | 3.960 | 2.894 | 2.481 |
| 5G5M-50R01 | 4.961 | 3.897 | 2.481 |
| 5G6M-50R01 | 4.961 | 3.894 | 2.481 |
| 5G5M-60R01 | 5.961 | 4.896 | 2.481 |
| 5G6M-60R01 | 5.961 | 4.894 | 2.481 |
| 5G6M-70R01 | 6.961 | 5.894 | 2.481 |

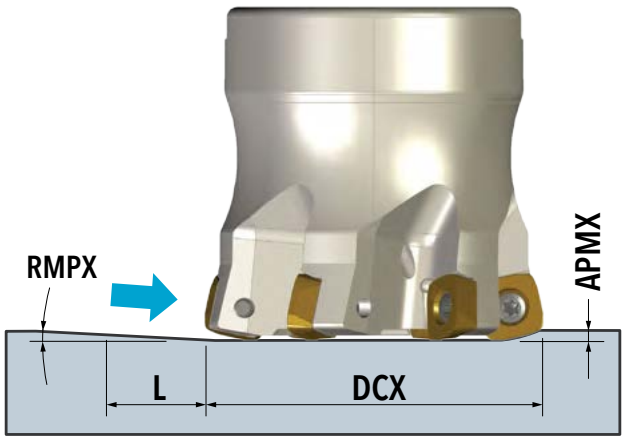
# 19 mm (MPR Inserts) • Programming Tips

Using Inserts SDES1906MPR-MR, SDES1906MPR-MR1, SDXS1906MPR-MR, & SDXS1906MPR-MR1

- » The shape of the insert nose can be approximated by programming as-if the insert had a **.212"** corner radius (REEQ). The difference will result in an unmachined area that's approximately **.068"** deep.
- » The recommendations for cutting speed, chip-thickness grade, and insert geometry are starting recommendations and should be optimized based on the type and rate of edge failure.
- » The **Machining Calculator App**, on Ingersoll's website, is another resource for estimating and optimizing parameters. There are additional inputs like the radial width of cut and the effective rake angle can be included into the estimates.



# 19 mm (MPR Inserts) • Straight Ramping

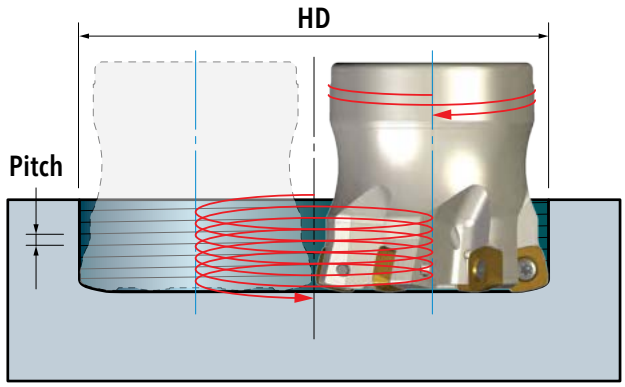



Using Inserts SDES1906MPR-MR, SDES1906MPR-MR1, SDXS1906MPR-MR, & SDXS1906MPR-MR1

| DCX Cutting Dia. Max. | RMPX Ramp Angle Max. | L* | APMX Depth of Cut Max. |
|---|---|---|---|
| 2.960 | 1.90 | 4.373 | 0.145 |
| 3.960 | 1.20 | 6.924 | 0.145 |
| 4.961 | 1.40 | 5.935 | 0.145 |
| 5.961 | 1.10 | 7.553 | 0.145 |
| 6.961 | 1.02 | 8.145 | 0.145 |

* L in this table is the length the cutter travels to reach the maximum depth of cut **(.145")** while traveling at the maximum ramp angle listed for the cutter.

# 19 mm (MPR Inserts) • Helical Ramping




Using Inserts SDES1906MPR-MR, SDES1906MPR-MR1, SDXS1906MPR-MR, & SDXS1906MPR-MR1

| DCX Cutting Dia. Max. | HD Hole Dia. Min. | HD Hole Dia. Max. | HD Hole Dia. Max. w/o Cusp | Max. Pitch Per Revolution |
|---|---|---|---|---|
| 2.960 | 4.526 | 5.920 | 4.863 | 0.145 |
| 3.960 | 6.528 | 7.920 | 6.866 | 0.145 |
| 4.961 | 8.528 | 9.922 | 8.858 | 0.145 |
| 5.961 | 10.528 | 11.922 | 10.857 | 0.145 |
| 6.961 | 12.530 | 13.922 | 12.895 | 0.145 |

## PITCH

The maximum pitch is determined to not exceed the maximum depth of cut (APMX) and to not exceed the maximum ramp angle (RMPX).

## EXAMPLE

» The minimum hole diameter that the **2.960"** diameter cutter can interpolate from solid is **4.526"** (leaving a raised cusp).

» The maximum hole diameter that the **2.960"** diameter cutter can interpolate from solid is **5.920"** (leaving a raised cusp).

» The maximum hole diameter that the **2.960"** diameter cutter can interpolate from solid while leaving a flat-bottom is **4.863"** (leaving no raised cusp).