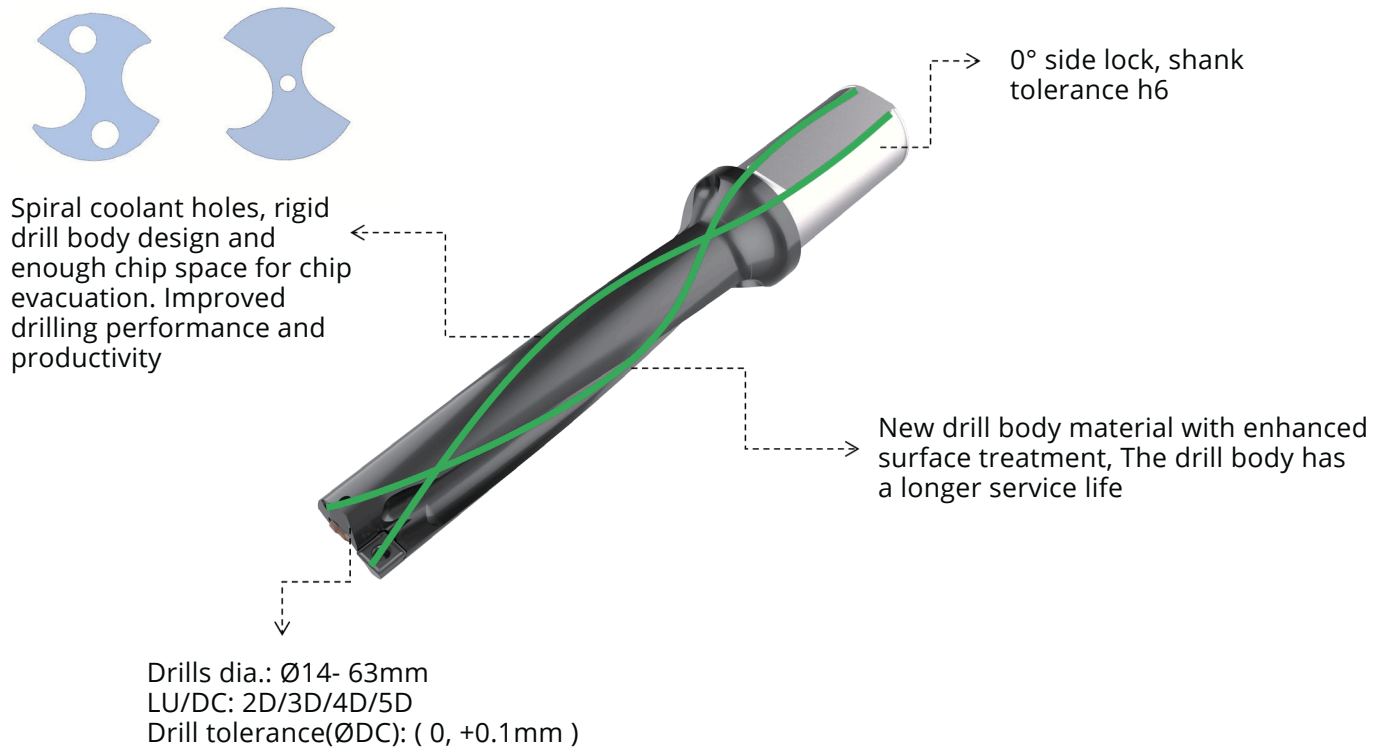


# HY Series for Drilling

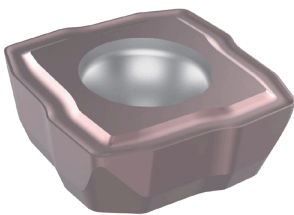


## HY series--Drill body



## Technical Information for the HY series drill inserts

### Central



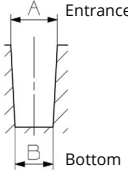
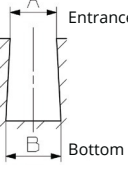
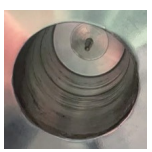
- Variable cutting edge improves the centering performance
- The changing cutting edge width, better matches the drilling characteristics of the center insert
- DM universal geometry and DL sharp geometry
- With AP301U, AP273U drilling grades

### Peripheral



- Wiper design improves the strength of the tip and produces a superior surface finish of the hole
- All ground inserts to create better stability for drilling
- DM universal geometry and DL sharp geometry
- With AP273U, AC271P, AC371P, AP371M drilling grades

## Application problems and solutions

| Picture                                                                             | Phenomenon                                | Analyze                                                                                                                                    | Solutions                                                                                                                                                                                                                                                                                                                                                                        |
|-------------------------------------------------------------------------------------|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | An inverted cone shaped hole              | 1.The cutting force of the periphery is greater than the center<br>2. Peripheral insert wear<br>3. High hardness of the workpiece          | 1. Select a rigid drill body (reduce overhang length/ HY series).<br>2. Reducing the feed rate can reduce the axial force which will reduce the drilling resistance.<br>3. The cooling hole of the peripheral insert is blocked and reducing chip evacuation.<br>4. Peripheral insert is wearing out too quickly. Use a grade of insert that is more resistant to wear.          |
|    | A horn shaped hole                        | The cutting force of the central insert is greater than the peripheral and causes the rotation axis of the drill body to change            | 1. Select a rigid drill body (reduce overhang length/ HY series) .<br>2. Reducing the feed rate can reduce the axial force which will reduce the drilling resistance.<br>3. Select a drill body with a larger flute for the center insert.<br>4. Pecking or using multi-stage drilling procedures.                                                                               |
|    | The hole has a spiral pattern of damage   | Abnormal centering of the drill body.<br>The chips make the drill body wobble                                                              | 1. When entering the hole, reduce the feed rate. Mill the uneven area of the workpiece to ensure the centering stability of the drilling operation.<br>2. Allow the chips to be completely evacuated and reduce the speed of the drill body leaving the workpiece.                                                                                                               |
|  | chips winding                             | The chip breaker does not match the workpiece material or the parameters are to be debugged                                                | 1. For alloy steel, increasing the feed per rev, the thickness of the chips is increased and greater bending stress is generated. This should break the chips.<br>2. For materials with good toughness such as low carbon steel/stainless steel, by reducing the feed per rev and increasing the speed , the chips are thinned and broken under the action of centrifugal force. |
|  | Residual bulges at the bottom of the hole | The runout between the centerline of the workpiece and the centerline of the drill body exceeds 0.03mm. Inaccurate use of eccentric device | 1. In the lathe, re-set the cutting tool.<br>2. Select an eccentric device and match it to the drill body.                                                                                                                                                                                                                                                                       |

## Applications for the HY series

1. The diameter of the hole is required to be in a positive tolerance, such as a threaded hole.
2. You experience chip winding on the original HP series drills.
3. The hardness of forgings, cast steel, ADI ductile iron and other materials is about HRC28-38 or difficult machining workpieces.

**HY series drill body makes it easier to obtain a positive tolerance aperture, but it is necessary to adjust the machining strategy according to the influencing factors of drilling diameter.**



## Application examples

|                    |                                                                                   |
|--------------------|-----------------------------------------------------------------------------------|
| Tools              | HY-2D155-S20-SP02                                                                 |
|                    | XONT 020204E-DM AP301U                                                            |
|                    | SPET 020205E-DL AP371M                                                            |
| Workpiece          |  |
| Materials          | 1.4837 Heat-resistant stainless steel                                             |
| Cutting Conditions | Vc= 107 m/min<br>fn= 0.05 mm/rev                                                  |
| Coolant            | Internal cooling                                                                  |
| Test result        | Solve the problems of the bad rigidity, breaking and processing time              |

|                    |                                                                                     |
|--------------------|-------------------------------------------------------------------------------------|
| Tools              | HY-2D220-S25-SP04                                                                   |
|                    | XONT 040305E-DL AP273U                                                              |
|                    | SPET 040307E-DL AP273U                                                              |
| Workpiece          |  |
| Materials          | SUS316L                                                                             |
| Cutting Conditions | Vc= 120 m/min<br>fn= 0.08 mm/rev                                                    |
| Coolant            | Internal cooling                                                                    |
| Test result        | Solve the problems of chips winding and meet the needs of automated production      |

## Grade introduction



### Carbon steel / Alloy steel

#### Basic application

##### AP273U(P15-P35)

1st choice for steel drilling; The composite nanostructure coating is deposited on the substrate with high strength and high wear resistance. It has a controllable coating structure, good wear resistance and coating strength

##### AC271P(P15-P35)

Supplementary grades for cast steel and forged steel under complex working conditions; Using chemical vapor deposition on the substrate with good toughness; Strengthen the abrasion resistance of the cutting tool and the oxidation resistance of the coating

##### AC371P(P25-P40)

Supplementary grades for poor working conditions or workpiece with hard points; The substrate has good toughness and wear resistance to complement safe drilling applications



### Stainless steel

#### Basic application

##### AP273U(M25-M35)

1st choice for stainless steel drilling; With controllable coating structure, better wear resistance and coating strength, it is a good universal grade

##### AP371M(M25-M40)

1st choice of heat-resistant stainless steel; The nano-structure coating is deposited on the fine crystalline substrate. The smooth surface and high hardness of the coating can improve the resistance of the cutting tool to Built-up edge and oxidation



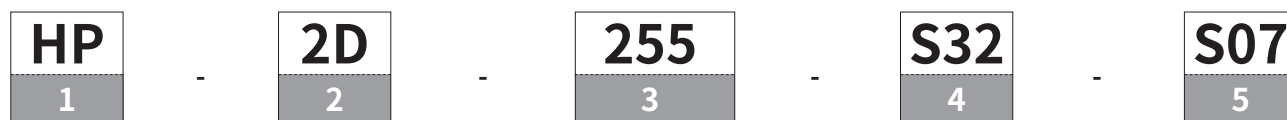
### Ni-based superalloy/ Ti-alloy (Type $\alpha$ / Type $\alpha+\beta$ )

#### Basic application

##### AP371M(S25-S35)

Supplementary grades for Ni-based superalloy,  $\alpha+\beta$  type Ti-alloy. The nano-structure coating is deposited on the fine crystalline substrate. The smooth surface and high hardness of the coating can improve the resistance of the cutting tool to Built-up edge and oxidation

## Code system



| 1- series of drill bodies |
|---------------------------|
| HP series<br>HY series    |

| 2- Aspectratio                           |
|------------------------------------------|
| Lu/Dc=2<br>Lu/Dc=3<br>Lu/Dc=4<br>Lu/Dc=5 |

| 3- Drill Dia.                                               |
|-------------------------------------------------------------|
| 255-- Drill Dia. Dc 25.5mm<br>0875-- Drill Dia. Dc 0.875 in |

| 4- Shank Dia.                                                             |
|---------------------------------------------------------------------------|
| S32--- Side lock, Shank Dia. 32mm<br>S125-- Side lock, Shank Dia. 1.25 in |

| 5- Matching Insert                                            |
|---------------------------------------------------------------|
| S07-- Matching SPMT 07 insert<br>SP03-- Matching N0.03 insert |

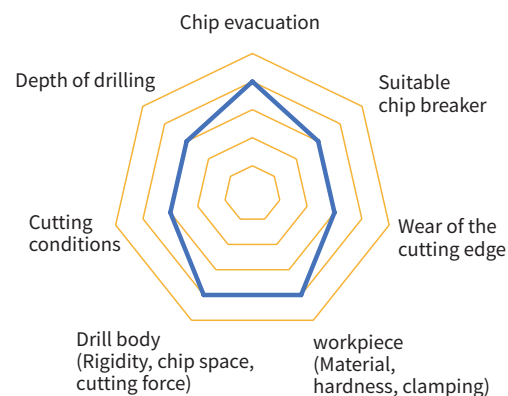
## Drill tolerance and hole tolerance---HPseries

| HP series |                 | φ13-φ21.5mm   | φ22-φ50mm     |
|-----------|-----------------|---------------|---------------|
| 2*DC      | Drill tolerance | 0,-0.1        | 0,-0.1        |
|           | Hole tolerance  | -0.1 ~ +0.15  | -0.1 ~ +0.15  |
| 3*DC      | Drill tolerance | 0,-0.1        | 0,-0.1        |
|           | Hole tolerance  | -0.1 ~ +0.18  | -0.12 ~ +0.2  |
| 4*DC      | Drill tolerance | 0,-0.1        | 0,-0.1        |
|           | Hole tolerance  | -0.15 ~ +0.20 | -0.15 ~ +0.25 |

## Drill tolerance and hole tolerance---HYseries

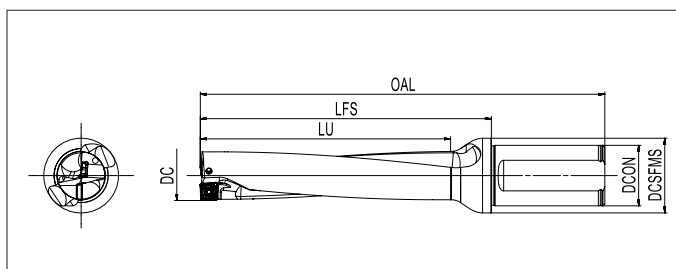
| HY series |                 | φ13-φ21.5mm   | φ22-φ50mm     |
|-----------|-----------------|---------------|---------------|
| 2*DC      | Drill tolerance | 0,+0.1        | 0,+0.1        |
|           | Hole tolerance  | -0.1 ~ +0.15  | -0.1 ~ +0.15  |
| 3*DC      | Drill tolerance | 0,+0.1        | 0,+0.1        |
|           | Hole tolerance  | -0.1 ~ +0.18  | -0.12 ~ +0.2  |
| 4*DC      | Drill tolerance | 0,+0.1        | 0,+0.1        |
|           | Hole tolerance  | -0.15 ~ +0.20 | -0.15 ~ +0.25 |

## Influencing factors of drilling diameter



## HY series drill body 2xD

LU/DC=2

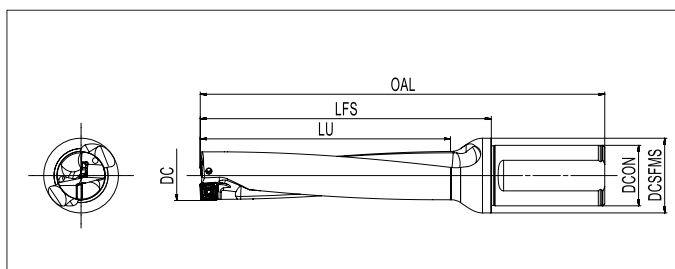


| Designation       | Dimension (mm) |    |     |      |     |        | Weight<br>Kg | Insert                       | Screw & Wrench      |
|-------------------|----------------|----|-----|------|-----|--------|--------------|------------------------------|---------------------|
|                   | DC             | LU | OAL | DCON | LFS | DCSFMS |              |                              |                     |
| HY-2D140-S20-SP02 | 14.0           | 31 | 94  | 20   | 44  | 25     | 0.16         | XONT 020204E<br>SPET 020204E | SP020045<br>FT-TP06 |
| HY-2D145-S20-SP02 | 14.5           | 33 | 96  | 20   | 46  | 25     | 0.16         |                              |                     |
| HY-2D150-S20-SP02 | 15.0           | 34 | 97  | 20   | 47  | 25     | 0.16         |                              |                     |
| HY-2D155-S20-SP02 | 15.5           | 36 | 99  | 20   | 49  | 25     | 0.17         |                              |                     |
| HY-2D160-S20-SP02 | 16.0           | 36 | 101 | 20   | 51  | 25     | 0.17         |                              |                     |
| HY-2D165-S20-SP03 | 16.5           | 37 | 102 | 20   | 52  | 25     | 0.17         | XONT 030305E<br>SPET 030305E | SP022049<br>FT-TP07 |
| HY-2D170-S25-SP03 | 17.0           | 38 | 109 | 25   | 53  | 32     | 0.28         |                              |                     |
| HY-2D175-S25-SP03 | 17.5           | 40 | 111 | 25   | 55  | 32     | 0.29         |                              |                     |
| HY-2D180-S25-SP03 | 18.0           | 40 | 112 | 25   | 56  | 32     | 0.29         |                              |                     |
| HY-2D185-S25-SP03 | 18.5           | 40 | 112 | 25   | 56  | 32     | 0.29         |                              |                     |
| HY-2D188-S25-SP03 | 18.8           | 40 | 112 | 25   | 56  | 32     | 0.29         |                              |                     |
| HY-2D190-S25-SP03 | 19.0           | 42 | 114 | 25   | 58  | 32     | 0.30         |                              |                     |
| HY-2D195-S25-SP03 | 19.5           | 44 | 116 | 25   | 60  | 32     | 0.31         |                              |                     |
| HY-2D200-S25-SP04 | 20.0           | 44 | 117 | 25   | 61  | 32     | 0.32         | XONT 040305E<br>SPET 040305E | SP025072<br>FT-TP08 |
| HY-2D205-S25-SP04 | 20.5           | 46 | 120 | 25   | 64  | 32     | 0.32         |                              |                     |
| HY-2D210-S25-SP04 | 21.0           | 46 | 120 | 25   | 64  | 32     | 0.32         |                              |                     |
| HY-2D215-S25-SP04 | 21.5           | 47 | 121 | 25   | 65  | 32     | 0.32         |                              |                     |
| HY-2D220-S25-SP04 | 22.0           | 48 | 122 | 25   | 66  | 32     | 0.34         |                              |                     |
| HY-2D230-S25-SP04 | 23.0           | 51 | 125 | 25   | 69  | 32     | 0.35         |                              |                     |
| HY-2D240-S25-SP05 | 24.0           | 53 | 127 | 25   | 71  | 32     | 0.35         | XONT 050305E<br>SPET 050305E | SP030082<br>FT-TP09 |
| HY-2D250-S25-SP05 | 25.0           | 56 | 130 | 25   | 74  | 32     | 0.37         |                              |                     |
| HY-2D260-S32-SP05 | 26.0           | 56 | 137 | 32   | 77  | 40     | 0.58         |                              |                     |
| HY-2D270-S32-SP05 | 27.0           | 59 | 139 | 32   | 79  | 40     | 0.60         |                              |                     |
| HY-2D280-S32-SP05 | 28.0           | 60 | 142 | 32   | 82  | 40     | 0.63         |                              |                     |
| HY-2D290-S32-SP05 | 29.0           | 62 | 144 | 32   | 84  | 40     | 0.65         |                              |                     |
| HY-2D300-S32-SP06 | 30.0           | 65 | 147 | 32   | 87  | 40     | 0.65         | XONT 060406E<br>SPET 060406E | SP035094<br>FT-TP10 |
| HY-2D310-S40-SP06 | 31.0           | 66 | 160 | 40   | 90  | 48     | 1.02         |                              |                     |
| HY-2D320-S40-SP06 | 32.0           | 68 | 162 | 40   | 92  | 48     | 1.04         |                              |                     |
| HY-2D330-S40-SP06 | 33.0           | 70 | 165 | 40   | 95  | 48     | 1.07         |                              |                     |
| HY-2D340-S40-SP06 | 34.0           | 73 | 168 | 40   | 98  | 48     | 1.10         |                              |                     |
| HY-2D350-S40-SP06 | 35.0           | 76 | 171 | 40   | 101 | 48     | 1.14         |                              |                     |



## HY series drill body 2xD

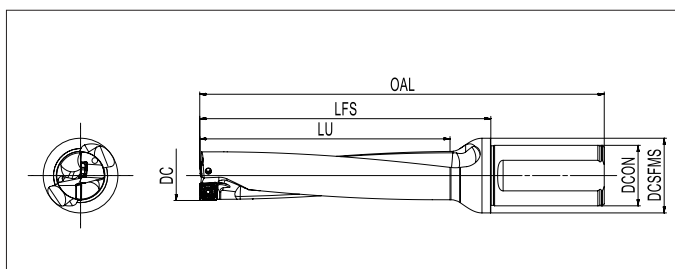
LU/DC=2



| Designation       | Dimension (mm) |     |     |      |     |        | Weight<br>Kg | Insert                       | Screw & Wrench      |
|-------------------|----------------|-----|-----|------|-----|--------|--------------|------------------------------|---------------------|
|                   | DC             | LU  | OAL | DCON | LFS | DCSFMS |              |                              |                     |
| HY-2D360-S40-SP07 | 36.0           | 77  | 174 | 40   | 104 | 48     | 1.16         | XONT 070406E<br>SPET 070406E | SP035094<br>FT-TP10 |
| HY-2D370-S40-SP07 | 37.0           | 79  | 175 | 40   | 105 | 48     | 1.19         |                              |                     |
| HY-2D380-S40-SP07 | 38.0           | 80  | 178 | 40   | 108 | 48     | 1.24         |                              |                     |
| HY-2D390-S40-SP07 | 39.0           | 82  | 180 | 40   | 110 | 48     | 1.29         |                              |                     |
| HY-2D400-S40-SP07 | 40.0           | 85  | 183 | 40   | 113 | 48     | 1.32         |                              |                     |
| HY-2D410-S40-SP07 | 41.0           | 90  | 187 | 40   | 117 | 48     | 1.38         |                              |                     |
| HY-2D420-S40-SP07 | 42.0           | 91  | 189 | 40   | 119 | 48     | 1.42         |                              |                     |
| HY-2D430-S40-SP07 | 43.0           | 91  | 192 | 40   | 122 | 50     | 1.47         |                              |                     |
| HY-2D440-S40-SP08 | 44.0           | 93  | 194 | 40   | 124 | 63     | 1.65         | XONT 080508E<br>SPET 080508E | SP040110<br>FT-TP15 |
| HY-2D450-S40-SP08 | 45.0           | 95  | 197 | 40   | 127 | 63     | 1.71         |                              |                     |
| HY-2D460-S40-SP08 | 46.0           | 98  | 200 | 40   | 130 | 63     | 1.75         |                              |                     |
| HY-2D470-S40-SP08 | 47.0           | 101 | 202 | 40   | 132 | 63     | 1.80         |                              |                     |
| HY-2D480-S40-SP08 | 48.0           | 104 | 205 | 40   | 135 | 63     | 1.86         |                              |                     |
| HY-2D490-S40-SP08 | 49.0           | 105 | 207 | 40   | 137 | 63     | 1.92         |                              |                     |
| HY-2D500-S40-SP08 | 50.0           | 105 | 174 | 40   | 104 | 63     | 1.99         |                              |                     |
| HY-2D510-S40-SP08 | 51.0           | 108 | 214 | 40   | 144 | 63     | 2.11         |                              |                     |
| HY-2D520-S40-SP08 | 52.0           | 110 | 216 | 40   | 146 | 63     | 2.17         |                              |                     |
| HY-2D530-S40-SP09 | 53.0           | 113 | 219 | 40   | 149 | 63     | 2.15         | XONT 090608E<br>SPET 090608E | SP040110<br>FT-TP15 |
| HY-2D540-S40-SP09 | 54.0           | 114 | 221 | 40   | 151 | 63     | 2.22         |                              |                     |
| HY-2D550-S40-SP09 | 55.0           | 116 | 224 | 40   | 154 | 63     | 2.31         |                              |                     |
| HY-2D560-S40-SP09 | 56.0           | 118 | 227 | 40   | 157 | 63     | 2.40         |                              |                     |
| HY-2D570-S40-SP09 | 57.0           | 120 | 229 | 40   | 159 | 63     | 2.48         |                              |                     |
| HY-2D580-S40-SP09 | 58.0           | 122 | 232 | 40   | 162 | 63     | 2.57         |                              |                     |
| HY-2D590-S40-SP09 | 59.0           | 124 | 234 | 40   | 164 | 63     | 2.61         |                              |                     |
| HY-2D600-S40-SP09 | 60.0           | 126 | 237 | 40   | 167 | 63     | 2.77         |                              |                     |
| HY-2D610-S40-SP09 | 61.0           | 129 | 241 | 40   | 171 | 63     | 2.89         |                              |                     |
| HY-2D620-S40-SP09 | 62.0           | 131 | 243 | 40   | 173 | 63     | 2.95         |                              |                     |
| HY-2D630-S40-SP09 | 63.0           | 133 | 246 | 40   | 176 | 63     | 3.06         |                              |                     |

## HY series drill body 3xD

LU/DC=3

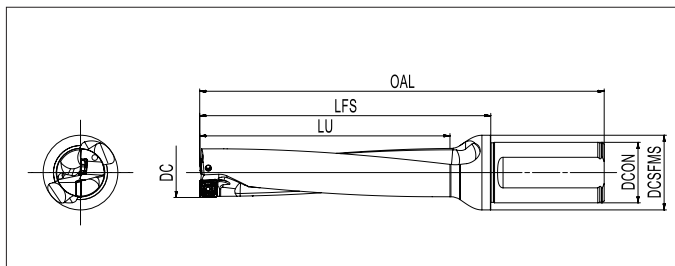


| Designation       | Dimension (mm) |    |     |      |     |        | Weight<br>Kg | Insert                       | Screw & Wrench      |
|-------------------|----------------|----|-----|------|-----|--------|--------------|------------------------------|---------------------|
|                   | DC             | LU | OAL | DCON | LFS | DCSFMS |              |                              |                     |
| HY-3D140-S20-SP02 | 14.0           | 44 | 108 | 20   | 58  | 25     | 0.16         | XONT 020204E<br>SPET 020204E | SP020045<br>FT-TP06 |
| HY-3D145-S20-SP02 | 14.5           | 47 | 110 | 20   | 60  | 25     | 0.16         |                              |                     |
| HY-3D150-S20-SP02 | 15.0           | 49 | 112 | 20   | 62  | 25     | 0.17         |                              |                     |
| HY-3D155-S20-SP02 | 15.5           | 51 | 114 | 20   | 64  | 25     | 0.17         |                              |                     |
| HY-3D160-S20-SP02 | 16.0           | 51 | 116 | 20   | 66  | 25     | 0.18         |                              |                     |
| HY-3D165-S20-SP03 | 16.5           | 53 | 118 | 20   | 68  | 25     | 0.18         | XONT 030305E<br>SPET 030305E | SP022049<br>FT-TP07 |
| HY-3D170-S25-SP03 | 17.0           | 54 | 119 | 25   | 69  | 32     | 0.29         |                              |                     |
| HY-3D175-S25-SP03 | 17.5           | 57 | 122 | 25   | 72  | 32     | 0.30         |                              |                     |
| HY-3D180-S25-SP03 | 18.0           | 57 | 123 | 25   | 73  | 32     | 0.31         |                              |                     |
| HY-3D185-S25-SP03 | 18.5           | 59 | 125 | 25   | 75  | 32     | 0.31         |                              |                     |
| HY-3D190-S25-SP03 | 19.0           | 60 | 132 | 25   | 76  | 32     | 0.32         |                              |                     |
| HY-3D193-S25-SP03 | 19.3           | 63 | 135 | 25   | 79  | 32     | 0.32         |                              |                     |
| HY-3D195-S25-SP03 | 19.5           | 63 | 135 | 25   | 79  | 32     | 0.32         |                              |                     |
| HY-3D200-S25-SP04 | 20.0           | 63 | 137 | 25   | 81  | 32     | 0.34         | XONT 040305E<br>SPET 040305E | SP025072<br>FT-TP08 |
| HY-3D205-S25-SP04 | 20.5           | 64 | 138 | 25   | 82  | 32     | 0.34         |                              |                     |
| HY-3D210-S25-SP04 | 21.0           | 66 | 140 | 25   | 84  | 32     | 0.34         |                              |                     |
| HY-3D215-S25-SP04 | 21.5           | 68 | 142 | 25   | 86  | 32     | 0.35         |                              |                     |
| HY-3D220-S25-SP04 | 22.0           | 69 | 143 | 25   | 87  | 32     | 0.36         |                              |                     |
| HY-3D225-S25-SP04 | 22.5           | 72 | 146 | 25   | 90  | 32     | 0.37         |                              |                     |
| HY-3D230-S25-SP04 | 23.0           | 73 | 147 | 25   | 91  | 32     | 0.38         |                              |                     |
| HY-3D235-S25-SP04 | 23.5           | 75 | 149 | 25   | 93  | 32     | 0.39         |                              |                     |



## HY series drill body 3xD

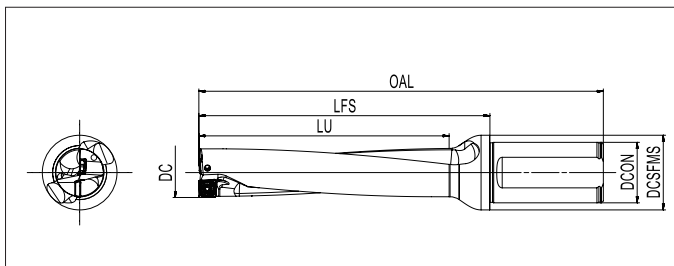
LU/DC=3



| Designation       | Dimension (mm) |     |     |      |     |        | Weight<br>Kg | Insert                       | Screw & Wrench      |
|-------------------|----------------|-----|-----|------|-----|--------|--------------|------------------------------|---------------------|
|                   | DC             | LU  | OAL | DCON | LFS | DCSFMS |              |                              |                     |
| HY-3D240-S25-SP05 | 24.0           | 77  | 151 | 25   | 95  | 32     | 0.39         | XONT 050305E<br>SPET 050305E | SP030082<br>FT-TP09 |
| HY-3D245-S25-SP05 | 24.5           | 79  | 153 | 25   | 97  | 32     | 0.39         |                              |                     |
| HY-3D250-S25-SP05 | 25.0           | 81  | 155 | 25   | 99  | 32     | 0.41         |                              |                     |
| HY-3D253-S25-SP05 | 25.3           | 81  | 155 | 25   | 99  | 32     | 0.41         |                              |                     |
| HY-3D255-S25-SP05 | 25.5           | 81  | 156 | 25   | 100 | 32     | 0.42         |                              |                     |
| HY-3D260-S32-SP05 | 26.0           | 81  | 162 | 32   | 102 | 40     | 0.63         |                              |                     |
| HY-3D265-S32-SP05 | 26.5           | 83  | 164 | 32   | 104 | 40     | 0.64         |                              |                     |
| HY-3D270-S32-SP05 | 27.0           | 85  | 165 | 32   | 105 | 40     | 0.65         |                              |                     |
| HY-3D275-S32-SP05 | 27.5           | 88  | 168 | 32   | 108 | 40     | 0.67         |                              |                     |
| HY-3D280-S32-SP05 | 28.0           | 88  | 169 | 32   | 109 | 40     | 0.68         |                              |                     |
| HY-3D285-S32-SP05 | 28.5           | 88  | 171 | 32   | 111 | 40     | 0.69         |                              |                     |
| HY-3D290-S32-SP05 | 29.0           | 90  | 172 | 32   | 112 | 40     | 0.71         |                              |                     |
| HY-3D295-S32-SP05 | 29.5           | 93  | 175 | 32   | 115 | 40     | 0.72         |                              |                     |
| HY-3D300-S32-SP06 | 30.0           | 95  | 177 | 32   | 117 | 40     | 0.72         | XONT 060406E<br>SPET 060406E | SP035094<br>FT-TP10 |
| HY-3D305-S32-SP06 | 30.5           | 96  | 178 | 32   | 118 | 40     | 0.72         |                              |                     |
| HY-3D310-S40-SP06 | 31.0           | 97  | 191 | 40   | 121 | 48     | 1.09         |                              |                     |
| HY-3D315-S40-SP06 | 31.5           | 98  | 192 | 40   | 122 | 48     | 1.1          |                              |                     |
| HY-3D320-S40-SP06 | 32.0           | 100 | 194 | 40   | 124 | 48     | 1.12         |                              |                     |
| HY-3D325-S40-SP06 | 32.5           | 102 | 196 | 40   | 126 | 48     | 1.14         |                              |                     |
| HY-3D330-S40-SP06 | 33.0           | 103 | 198 | 40   | 128 | 48     | 1.15         |                              |                     |
| HY-3D335-S40-SP06 | 33.5           | 105 | 200 | 40   | 130 | 48     | 1.17         |                              |                     |
| HY-3D340-S40-SP06 | 34.0           | 106 | 201 | 40   | 131 | 48     | 1.19         |                              |                     |
| HY-3D345-S40-SP06 | 34.5           | 109 | 204 | 40   | 134 | 48     | 1.22         |                              |                     |
| HY-3D350-S40-SP06 | 35.0           | 110 | 205 | 40   | 135 | 48     | 1.24         |                              |                     |
| HY-3D355-S40-SP06 | 35.5           | 112 | 207 | 40   | 137 | 48     | 1.26         |                              |                     |

## HY series drill body 3xD

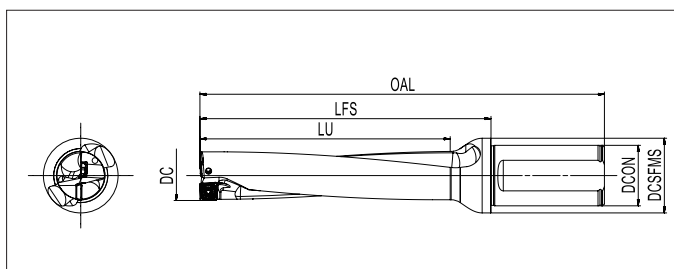
LU/DC=3



| Designation       | Dimension (mm) |     |     |      |     |        | Weight<br>Kg | Insert                       | Screw & Wrench      |
|-------------------|----------------|-----|-----|------|-----|--------|--------------|------------------------------|---------------------|
|                   | DC             | LU  | OAL | DCON | LFS | DCSFMS |              |                              |                     |
| HY-3D360-S40-SP07 | 36.0           | 112 | 209 | 40   | 139 | 48     | 1.28         | XONT 070406E<br>SPET 070406E | SP035094<br>FT-TP10 |
| HY-3D370-S40-SP07 | 37.0           | 115 | 212 | 40   | 142 | 48     | 1.33         |                              |                     |
| HY-3D380-S40-SP07 | 38.0           | 118 | 216 | 40   | 146 | 48     | 1.39         |                              |                     |
| HY-3D383-S40-SP07 | 38.3           | 119 | 217 | 40   | 147 | 48     | 1.41         |                              |                     |
| HY-3D385-S40-SP07 | 38.5           | 119 | 217 | 40   | 147 | 48     | 1.42         |                              |                     |
| HY-3D390-S40-SP07 | 39.0           | 121 | 219 | 40   | 149 | 48     | 1.44         |                              |                     |
| HY-3D395-S40-SP07 | 39.5           | 123 | 221 | 40   | 151 | 48     | 1.44         |                              |                     |
| HY-3D400-S40-SP07 | 40.0           | 125 | 223 | 40   | 153 | 48     | 1.47         |                              |                     |
| HY-3D405-S40-SP07 | 40.5           | 127 | 223 | 40   | 153 | 48     | 1.57         |                              |                     |
| HY-3D410-S40-SP07 | 41.0           | 127 | 227 | 40   | 157 | 48     | 1.62         |                              |                     |
| HY-3D420-S40-SP07 | 42.0           | 130 | 230 | 40   | 160 | 48     | 1.68         |                              |                     |
| HY-3D430-S40-SP07 | 43.0           | 133 | 234 | 40   | 164 | 50     | 1.77         | XONT 080508E<br>SPET 080508E | SP040110<br>FT-TP15 |
| HY-3D440-S40-SP08 | 44.0           | 136 | 237 | 40   | 167 | 50     | 1.81         |                              |                     |
| HY-3D450-S40-SP08 | 45.0           | 104 | 242 | 40   | 172 | 50     | 1.90         |                              |                     |
| HY-3D460-S40-SP08 | 46.0           | 144 | 246 | 40   | 176 | 50     | 1.98         |                              |                     |
| HY-3D470-S40-SP08 | 47.0           | 146 | 249 | 40   | 179 | 63     | 2.12         |                              |                     |
| HY-3D480-S40-SP08 | 48.0           | 149 | 253 | 40   | 183 | 63     | 2.30         |                              |                     |
| HY-3D490-S40-SP08 | 49.0           | 152 | 256 | 40   | 186 | 63     | 2.39         |                              |                     |
| HY-3D495-S40-SP08 | 49.5           | 153 | 258 | 40   | 188 | 63     | 2.31         |                              |                     |
| HY-3D500-S40-SP08 | 50.0           | 155 | 260 | 40   | 190 | 63     | 2.37         |                              |                     |
| HY-3D510-S40-SP08 | 51.0           | 158 | 264 | 40   | 194 | 63     | 2.58         |                              |                     |
| HY-3D520-S40-SP08 | 52.0           | 161 | 267 | 40   | 197 | 63     | 2.69         | XONT 090608E<br>SPET 090608E | SP040110<br>FT-TP15 |
| HY-3D530-S40-SP09 | 53.0           | 164 | 271 | 40   | 201 | 63     | 2.71         |                              |                     |
| HY-3D540-S40-SP09 | 54.0           | 167 | 274 | 40   | 204 | 63     | 2.81         |                              |                     |
| HY-3D550-S40-SP09 | 55.0           | 171 | 279 | 40   | 209 | 63     | 2.94         |                              |                     |
| HY-3D560-S40-SP09 | 56.0           | 174 | 283 | 40   | 213 | 63     | 3.07         |                              |                     |
| HY-3D570-S40-SP09 | 57.0           | 177 | 286 | 40   | 216 | 63     | 3.19         |                              |                     |
| HY-3D580-S40-SP09 | 58.0           | 180 | 290 | 40   | 220 | 63     | 3.32         |                              |                     |
| HY-3D590-S40-SP09 | 59.0           | 183 | 293 | 40   | 223 | 63     | 3.41         |                              |                     |
| HY-3D600-S40-SP09 | 60.0           | 186 | 297 | 40   | 227 | 63     | 3.55         |                              |                     |
| HY-3D610-S40-SP09 | 61.0           | 190 | 302 | 40   | 232 | 63     | 3.71         |                              |                     |
| HY-3D620-S40-SP09 | 62.0           | 193 | 305 | 40   | 235 | 63     | 3.94         |                              |                     |
| HY-3D630-S40-SP09 | 63.0           | 196 | 309 | 40   | 239 | 63     | 4.10         |                              |                     |

## HY series drill body 4xD

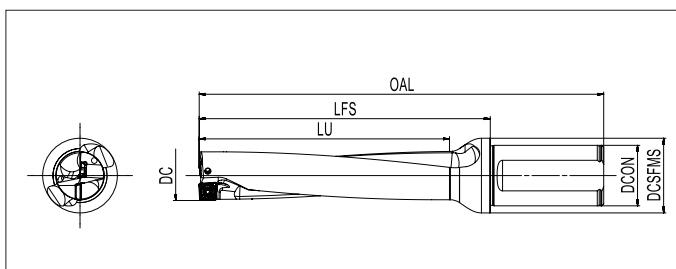
LU/DC=4



| Designation       | Dimension (mm) |     |     |      |     |        | Weight<br>Kg | Insert                       | Screw & Wrench      |
|-------------------|----------------|-----|-----|------|-----|--------|--------------|------------------------------|---------------------|
|                   | DC             | LU  | OAL | DCON | LFS | DCSFMS |              |                              |                     |
| HY-4D140-S20-SP02 | 14.0           | 59  | 122 | 20   | 72  | 25     | 0.17         | XONT 020204E<br>SPET 020204E | SP020045<br>FT-TP06 |
| HY-4D145-S20-SP02 | 14.5           | 62  | 125 | 20   | 75  | 25     | 0.17         |                              |                     |
| HY-4D150-S20-SP02 | 15.0           | 64  | 127 | 20   | 77  | 25     | 0.17         |                              |                     |
| HY-4D155-S20-SP02 | 15.5           | 66  | 129 | 20   | 79  | 25     | 0.18         |                              |                     |
| HY-4D160-S20-SP02 | 16.0           | 67  | 132 | 20   | 82  | 25     | 0.19         |                              |                     |
| HY-4D165-S20-SP03 | 16.5           | 69  | 134 | 20   | 84  | 25     | 0.19         | XONT 030305E<br>SPET 030305E | SP022049<br>FT-TP07 |
| HY-4D170-S25-SP03 | 17.0           | 71  | 142 | 25   | 86  | 32     | 0.30         |                              |                     |
| HY-4D175-S25-SP03 | 17.5           | 73  | 145 | 25   | 89  | 32     | 0.31         |                              |                     |
| HY-4D180-S25-SP03 | 18.0           | 75  | 147 | 25   | 91  | 32     | 0.32         |                              |                     |
| HY-4D185-S25-SP03 | 18.5           | 77  | 149 | 25   | 93  | 32     | 0.33         |                              |                     |
| HY-4D190-S25-SP03 | 19.0           | 79  | 151 | 25   | 95  | 32     | 0.34         | XONT 040305E<br>SPET 040305E | SP025072<br>FT-TP08 |
| HY-4D193-S25-SP03 | 19.3           | 83  | 155 | 25   | 99  | 32     | 0.34         |                              |                     |
| HY-4D195-S25-SP03 | 19.5           | 83  | 155 | 25   | 99  | 32     | 0.34         |                              |                     |
| HY-4D200-S25-SP04 | 20.0           | 83  | 157 | 25   | 101 | 32     | 0.36         |                              |                     |
| HY-4D205-S25-SP04 | 20.5           | 86  | 160 | 25   | 104 | 32     | 0.37         |                              |                     |
| HY-4D210-S25-SP04 | 21.0           | 89  | 161 | 25   | 105 | 32     | 0.37         | XONT 050305E<br>SPET 050305E | SP030082<br>FT-TP09 |
| HY-4D215-S25-SP04 | 21.5           | 89  | 163 | 25   | 107 | 32     | 0.38         |                              |                     |
| HY-4D220-S25-SP04 | 22.0           | 91  | 165 | 25   | 109 | 32     | 0.39         |                              |                     |
| HY-4D225-S25-SP04 | 22.5           | 93  | 168 | 25   | 112 | 32     | 0.40         |                              |                     |
| HY-4D230-S25-SP04 | 23.0           | 95  | 170 | 25   | 114 | 32     | 0.41         |                              |                     |
| HY-4D240-S25-SP05 | 24.0           | 101 | 175 | 25   | 119 | 32     | 0.42         | XONT 060406E<br>SPET 060406E | SP035094<br>FT-TP10 |
| HY-4D245-S25-SP05 | 24.5           | 102 | 177 | 25   | 121 | 32     | 0.44         |                              |                     |
| HY-4D250-S25-SP05 | 25.0           | 107 | 180 | 25   | 124 | 32     | 0.45         |                              |                     |
| HY-4D253-S25-SP05 | 25.3           | 107 | 180 | 25   | 124 | 32     | 0.46         |                              |                     |
| HY-4D260-S32-SP05 | 26.0           | 107 | 188 | 32   | 128 | 40     | 0.68         |                              |                     |
| HY-4D265-S32-SP05 | 26.5           | 109 | 190 | 32   | 130 | 40     | 0.70         | XONT 060406E<br>SPET 060406E | SP035094<br>FT-TP10 |
| HY-4D270-S32-SP05 | 27.0           | 112 | 192 | 32   | 132 | 40     | 0.71         |                              |                     |
| HY-4D280-S32-SP05 | 28.0           | 115 | 197 | 32   | 137 | 40     | 0.74         |                              |                     |
| HY-4D290-S32-SP05 | 29.0           | 120 | 201 | 32   | 141 | 40     | 0.78         |                              |                     |
| HY-4D295-S32-SP05 | 29.5           | 123 | 204 | 32   | 144 | 40     | 0.80         |                              |                     |
| HY-4D300-S32-SP06 | 30.0           | 125 | 207 | 32   | 147 | 40     | 0.80         | XONT 060406E<br>SPET 060406E | SP035094<br>FT-TP10 |
| HY-4D310-S40-SP06 | 31.0           | 128 | 222 | 40   | 152 | 48     | 1.18         |                              |                     |
| HY-4D320-S40-SP06 | 32.0           | 131 | 226 | 40   | 156 | 48     | 1.21         |                              |                     |
| HY-4D330-S40-SP06 | 33.0           | 136 | 231 | 40   | 161 | 48     | 1.26         |                              |                     |
| HY-4D340-S40-SP06 | 34.0           | 140 | 235 | 40   | 165 | 48     | 1.31         |                              |                     |
| HY-4D350-S40-SP06 | 35.0           | 145 | 240 | 40   | 170 | 48     | 1.36         |                              |                     |

## HY series drill body 4xD

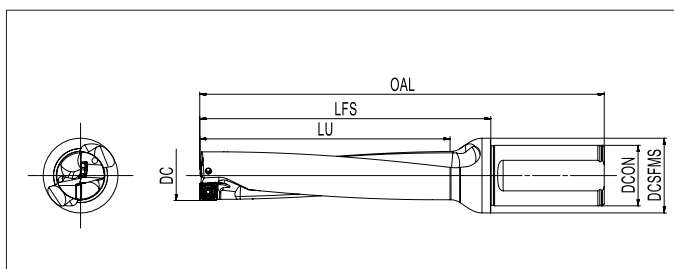
LU/DC=4



| Designation       | Dimension (mm) |     |     |      |     |        | Weight<br>Kg | Insert                       | Screw & Wrench      |
|-------------------|----------------|-----|-----|------|-----|--------|--------------|------------------------------|---------------------|
|                   | DC             | LU  | OAL | DCON | LFS | DCSFMS |              |                              |                     |
| HY-4D360-S40-SP07 | 36.0           | 148 | 245 | 40   | 175 | 48     | 1.43         | XONT 070406E<br>SPET 070406E | SP035094<br>FT-TP10 |
| HY-4D370-S40-SP07 | 37.0           | 151 | 249 | 40   | 179 | 48     | 1.48         |                              |                     |
| HY-4D380-S40-SP07 | 38.0           | 157 | 254 | 40   | 184 | 48     | 1.54         |                              |                     |
| HY-4D390-S40-SP07 | 39.0           | 161 | 258 | 40   | 188 | 48     | 1.62         |                              |                     |
| HY-4D400-S40-SP07 | 40.0           | 167 | 263 | 40   | 193 | 48     | 1.77         |                              |                     |
| HY-4D410-S40-SP07 | 41.0           | 168 | 268 | 40   | 198 | 48     | 1.86         |                              |                     |
| HY-4D420-S50-SP07 | 42.0           | 172 | 282 | 50   | 202 | 63     | 2.64         |                              |                     |
| HY-4D430-S50-SP07 | 43.0           | 176 | 287 | 50   | 207 | 63     | 2.74         | XONT 080508E<br>SPET 080508E | SP040110<br>FT-TP15 |
| HY-4D440-S50-SP08 | 44.0           | 180 | 291 | 50   | 211 | 63     | 2.83         |                              |                     |
| HY-4D450-S50-SP08 | 45.0           | 185 | 297 | 50   | 217 | 63     | 2.95         |                              |                     |
| HY-4D460-S50-SP08 | 46.0           | 188 | 302 | 50   | 222 | 63     | 3.05         |                              |                     |
| HY-4D470-S50-SP08 | 47.0           | 193 | 306 | 50   | 226 | 63     | 3.12         |                              |                     |
| HY-4D480-S50-SP08 | 48.0           | 197 | 311 | 50   | 231 | 63     | 3.25         |                              |                     |
| HY-4D490-S50-SP08 | 49.0           | 201 | 315 | 50   | 235 | 63     | 3.36         |                              |                     |
| HY-4D500-S50-SP08 | 50.0           | 204 | 320 | 50   | 240 | 63     | 3.51         |                              |                     |
| HY-4D505-S50-SP08 | 50.5           | 208 | 322 | 50   | 242 | 63     | 3.56         |                              |                     |
| HY-4D510-S50-SP08 | 51.0           | 209 | 325 | 50   | 245 | 63     | 3.61         |                              |                     |
| HY-4D520-S50-SP08 | 52.0           | 213 | 329 | 50   | 249 | 63     | 3.75         | XONT 090608E<br>SPET 090608E | SP040110<br>FT-TP15 |
| HY-4D530-S50-SP09 | 53.0           | 218 | 333 | 50   | 253 | 63     | 3.83         |                              |                     |
| HY-4D540-S50-SP09 | 54.0           | 221 | 338 | 50   | 258 | 63     | 3.92         |                              |                     |
| HY-4D550-S50-SP09 | 55.0           | 226 | 343 | 50   | 263 | 63     | 4.12         |                              |                     |
| HY-4D560-S50-SP09 | 56.0           | 230 | 349 | 50   | 269 | 63     | 4.32         |                              |                     |
| HY-4D570-S50-SP09 | 57.0           | 234 | 353 | 50   | 273 | 63     | 4.45         |                              |                     |
| HY-4D580-S50-SP09 | 58.0           | 238 | 357 | 50   | 277 | 63     | 4.63         |                              |                     |
| HY-4D590-S50-SP09 | 59.0           | 242 | 362 | 50   | 282 | 63     | 4.92         |                              |                     |
| HY-4D600-S50-SP09 | 60.0           | 246 | 367 | 50   | 287 | 63     | 5.23         |                              |                     |
| HY-4D610-S50-SP09 | 61.0           | 250 | 372 | 50   | 292 | 63     | 5.55         |                              |                     |
| HY-4D620-S50-SP09 | 62.0           | 254 | 376 | 50   | 296 | 63     | 5.87         |                              |                     |
| HY-4D630-S50-SP09 | 63.0           | 258 | 381 | 50   | 301 | 63     | 6.18         |                              |                     |

## HY series drill body 5xD

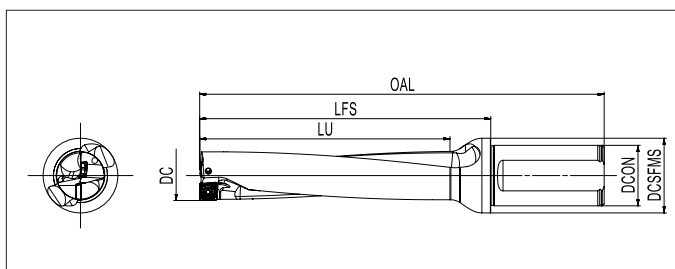
LU/DC=5



| Designation       | Dimension (mm) |     |     |      |     |        | Weight<br>Kg | Insert                       | Screw & Wrench      |
|-------------------|----------------|-----|-----|------|-----|--------|--------------|------------------------------|---------------------|
|                   | DC             | LU  | OAL | DCON | LFS | DCSFMS |              |                              |                     |
| HY-5D140-S20-SP02 | 14.0           | 73  | 136 | 20   | 86  | 25     | 0.18         | XONT 020204E<br>SPET 020204E | SP020045<br>FT-TP06 |
| HY-5D145-S20-SP02 | 14.5           | 76  | 139 | 20   | 89  | 25     | 0.18         |                              |                     |
| HY-5D150-S20-SP02 | 15.0           | 79  | 142 | 20   | 92  | 25     | 0.18         |                              |                     |
| HY-5D155-S20-SP02 | 15.5           | 82  | 145 | 20   | 95  | 25     | 0.19         |                              |                     |
| HY-5D160-S20-SP02 | 16.0           | 83  | 148 | 20   | 98  | 25     | 0.20         |                              |                     |
| HY-5D165-S20-SP03 | 16.5           | 86  | 151 | 20   | 101 | 25     | 0.20         | XONT 030305E<br>SPET 030305E | SP022049<br>FT-TP07 |
| HY-5D170-S25-SP03 | 17.0           | 88  | 159 | 25   | 103 | 32     | 0.31         |                              |                     |
| HY-5D175-S25-SP03 | 17.5           | 91  | 163 | 25   | 107 | 32     | 0.33         |                              |                     |
| HY-5D180-S25-SP03 | 18.0           | 93  | 165 | 25   | 109 | 32     | 0.33         |                              |                     |
| HY-5D185-S25-SP03 | 18.5           | 96  | 168 | 25   | 112 | 32     | 0.34         |                              |                     |
| HY-5D190-S25-SP03 | 19.0           | 98  | 170 | 25   | 114 | 32     | 0.35         |                              |                     |
| HY-5D193-S25-SP03 | 19.3           | 102 | 174 | 25   | 118 | 32     | 0.36         |                              |                     |
| HY-5D195-S25-SP03 | 19.5           | 102 | 174 | 25   | 118 | 32     | 0.36         |                              |                     |
| HY-5D200-S25-SP04 | 20.0           | 103 | 177 | 25   | 121 | 32     | 0.38         | XONT 040305E<br>SPET 040305E | SP025072<br>FT-TP08 |
| HY-5D205-S25-SP04 | 20.5           | 105 | 179 | 25   | 123 | 32     | 0.39         |                              |                     |
| HY-5D210-S25-SP04 | 21.0           | 108 | 182 | 25   | 126 | 32     | 0.40         |                              |                     |
| HY-5D215-S25-SP04 | 21.5           | 111 | 184 | 25   | 128 | 32     | 0.41         |                              |                     |
| HY-5D220-S25-SP04 | 22.0           | 113 | 187 | 25   | 131 | 32     | 0.42         |                              |                     |
| HY-5D230-S25-SP04 | 23.0           | 119 | 194 | 25   | 138 | 32     | 0.45         |                              |                     |
| HY-5D240-S25-SP05 | 24.0           | 125 | 199 | 25   | 143 | 32     | 0.47         | XONT 050305E<br>SPET 050305E | SP030082<br>FT-TP09 |
| HY-5D250-S25-SP05 | 25.0           | 132 | 205 | 25   | 149 | 32     | 0.50         |                              |                     |
| HY-5D253-S25-SP05 | 25.3           | 132 | 205 | 25   | 149 | 32     | 0.50         |                              |                     |
| HY-5D260-S32-SP05 | 26.0           | 133 | 214 | 32   | 154 | 40     | 0.73         |                              |                     |
| HY-5D265-S32-SP05 | 26.5           | 136 | 216 | 32   | 156 | 40     | 0.75         |                              |                     |
| HY-5D270-S32-SP05 | 27.0           | 139 | 219 | 32   | 159 | 40     | 0.77         |                              |                     |
| HY-5D280-S32-SP05 | 28.0           | 143 | 225 | 32   | 165 | 40     | 0.81         |                              |                     |
| HY-5D290-S32-SP05 | 29.0           | 149 | 231 | 32   | 171 | 40     | 0.85         |                              |                     |

## HY series drill body 5xD

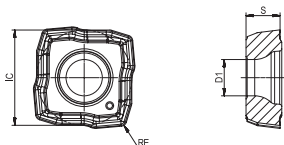
LU/DC=5



| Designation       | Dimension (mm) |     |     |      |     |        | Weight<br>Kg | Insert                       | Screw & Wrench      |
|-------------------|----------------|-----|-----|------|-----|--------|--------------|------------------------------|---------------------|
|                   | DC             | LU  | OAL | DCON | LFS | DCSFMS |              |                              |                     |
| HY-5D300-S32-SP06 | 30.0           | 155 | 237 | 32   | 177 | 40     | 0.88         | XONT 060406E<br>SPET 060406E | SP035094<br>FT-TP10 |
| HY-5D310-S40-SP06 | 31.0           | 159 | 253 | 40   | 183 | 48     | 1.26         |                              |                     |
| HY-5D320-S40-SP06 | 32.0           | 164 | 258 | 40   | 188 | 48     | 1.31         |                              |                     |
| HY-5D330-S40-SP06 | 33.0           | 169 | 264 | 40   | 194 | 48     | 1.36         |                              |                     |
| HY-5D340-S40-SP06 | 34.0           | 175 | 270 | 40   | 200 | 48     | 1.42         |                              |                     |
| HY-5D350-S40-SP06 | 35.0           | 181 | 276 | 40   | 206 | 48     | 1.49         |                              |                     |
| HY-5D360-S40-SP07 | 36.0           | 186 | 282 | 40   | 212 | 48     | 1.57         | XONT 070406E<br>SPET 070406E | SP035094<br>FT-TP10 |
| HY-5D370-S40-SP07 | 37.0           | 189 | 286 | 40   | 216 | 48     | 1.64         |                              |                     |
| HY-5D380-S40-SP07 | 38.0           | 195 | 292 | 40   | 222 | 48     | 1.72         |                              |                     |
| HY-5D390-S40-SP07 | 39.0           | 201 | 298 | 40   | 228 | 48     | 1.79         |                              |                     |
| HY-5D400-S40-SP07 | 40.0           | 208 | 304 | 40   | 234 | 48     | 1.84         |                              |                     |
| HY-5D410-S40-SP07 | 41.0           | 215 | 310 | 40   | 240 | 48     | 2.11         |                              |                     |
| HY-5D420-S50-SP07 | 42.0           | 219 | 325 | 50   | 245 | 63     | 2.85         |                              |                     |
| HY-5D430-S50-SP07 | 43.0           | 223 | 331 | 50   | 251 | 63     | 2.96         |                              |                     |
| HY-5D440-S50-SP08 | 44.0           | 226 | 335 | 50   | 255 | 63     | 3.15         | XONT 080508E<br>SPET 080508E | SP040110<br>FT-TP15 |
| HY-5D450-S50-SP08 | 45.0           | 230 | 342 | 50   | 262 | 63     | 3.28         |                              |                     |
| HY-5D460-S50-SP08 | 46.0           | 234 | 348 | 50   | 268 | 63     | 3.41         |                              |                     |
| HY-5D470-S50-SP08 | 47.0           | 240 | 353 | 50   | 273 | 63     | 3.52         |                              |                     |
| HY-5D480-S50-SP08 | 48.0           | 245 | 359 | 50   | 279 | 63     | 3.67         |                              |                     |
| HY-5D490-S50-SP08 | 49.0           | 250 | 364 | 50   | 284 | 63     | 3.82         |                              |                     |
| HY-5D500-S50-SP08 | 50.0           | 254 | 370 | 50   | 290 | 63     | 3.99         |                              |                     |
| HY-5D510-S50-SP08 | 51.0           | 259 | 376 | 50   | 296 | 63     | 4.13         |                              |                     |
| HY-5D520-S50-SP08 | 52.0           | 265 | 381 | 50   | 301 | 63     | 4.30         |                              |                     |



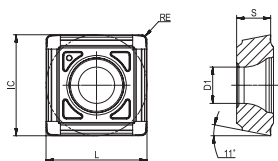
## XONT---Central inserts

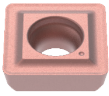


| Central inserts                                                                                                                                                                                                          | Designation     | Machining conditions |     |     |      | ● Good | ⬮ General | ✖ Bad  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----------------------|-----|-----|------|--------|-----------|--------|
|                                                                                                                                                                                                                          |                 | Dimension(mm)        |     |     |      | ●      | ●         | ●      |
|                                                                                                                                                                                                                          |                 | IC                   | S   | RE  | D1   | P      | M         | K      |
|                                                                                                                                                                                                                          |                 |                      |     |     |      | AP301U | AP273U    | AP301U |
| <br>DM universal geometry<br><br><br>DL sharp geometry | XONT 020204E-DM | 4.9                  | 2.4 | 0.4 | 2.2  | ●      | -         | ●      |
|                                                                                                                                                                                                                          | XONT 030305E-DM | 5.7                  | 2.6 | 0.5 | 2.5  | ●      | -         | ●      |
|                                                                                                                                                                                                                          | XONT 030305E-DL | 5.7                  | 2.6 | 0.5 | 2.5  |        | ●         | -      |
|                                                                                                                                                                                                                          | XONT 040305E-DM | 6.8                  | 2.8 | 0.5 | 2.8  | ●      | -         | ●      |
|                                                                                                                                                                                                                          | XONT 040305E-DL | 6.8                  | 2.8 | 0.5 | 2.8  |        | ●         | -      |
|                                                                                                                                                                                                                          | XONT 050305E-DM | 8.4                  | 3.0 | 0.5 | 3.2  | ●      | -         | ●      |
|                                                                                                                                                                                                                          | XONT 050305E-DL | 8.4                  | 3.0 | 0.5 | 3.2  |        | ●         | -      |
|                                                                                                                                                                                                                          | XONT 060406E-DM | 10.2                 | 3.5 | 0.6 | 4.0  | ●      | -         | ●      |
|                                                                                                                                                                                                                          | XONT 060406E-DL | 10.2                 | 3.5 | 0.6 | 4.0  |        | ●         | -      |
|                                                                                                                                                                                                                          | XONT 070406E-DM | 12.35                | 4.0 | 0.6 | 4.0  | ●      | -         | ●      |
|                                                                                                                                                                                                                          | XONT 070406E-DL | 12.35                | 4.0 | 0.6 | 4.0  |        | ●         | -      |
|                                                                                                                                                                                                                          | XONT 080508E-DM | 14.9                 | 4.5 | 0.8 | 4.7  | ●      | -         | ●      |
|                                                                                                                                                                                                                          | XONT 080508E-DL | 14.9                 | 4.5 | 0.8 | 4.7  |        | ●         | -      |
|                                                                                                                                                                                                                          | XONT 090608E-DM | 17.9                 | 5.5 | 0.8 | 4.75 | ●      | -         | ●      |
|                                                                                                                                                                                                                          | XONT 090608E-DL | 17.9                 | 5.5 | 0.8 | 4.75 |        | -         | -      |

● Stocked ○ Unstocked ▲ Stopped in the near future

## SPET--- Peripheral inserts



|                                                                                                                                                                                                                                                             |                 |                      |     |     |      | ● Good |        | ⚙ General |        | ✖ Bad  |   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----------------------|-----|-----|------|--------|--------|-----------|--------|--------|---|
|                                                                                                                                                                                                                                                             |                 | Machining conditions |     |     |      | ●      | ⚙      | ●         | ●      | ●      | ● |
| Peripheral inserts                                                                                                                                                                                                                                          | Designation     | Dimension(mm)        |     |     |      | P      |        | M         | K      | S      |   |
|                                                                                                                                                                                                                                                             |                 | IC                   | S   | RE  | D1   | AP273U | AC371P | AP371M    | AC271P | AP471S |   |
| <div></div> <div>DM universal geometry</div> <div></div> <div>DL sharp geometry</div> | SPET 020204E-DM | 5.1                  | 2.4 | 0.4 | 2.2  | ●      |        |           | ●      |        |   |
|                                                                                                                                                                                                                                                             | SPET 020205E-DL | 5.1                  | 2.4 | 0.5 | 2.2  |        |        | ●         |        | ○      |   |
|                                                                                                                                                                                                                                                             | SPET 030305E-DM | 6.0                  | 2.6 | 0.5 | 2.5  | ●      | ●      |           | ●      |        |   |
|                                                                                                                                                                                                                                                             | SPET 030306E-DL | 6.0                  | 2.6 | 0.6 | 2.5  |        | ●      | ●         |        | ○      |   |
|                                                                                                                                                                                                                                                             | SPET 040305E-DM | 7.4                  | 2.8 | 0.5 | 2.8  | ●      | ●      |           | ●      |        |   |
|                                                                                                                                                                                                                                                             | SPET 040307E-DL | 7.4                  | 2.8 | 0.7 | 2.8  |        | ●      | ●         |        | ○      |   |
|                                                                                                                                                                                                                                                             | SPET 050305E-DM | 8.9                  | 3.0 | 0.5 | 3.2  | ●      | ●      |           | ●      |        |   |
|                                                                                                                                                                                                                                                             | SPET 050308E-DL | 8.9                  | 3.0 | 0.8 | 3.2  |        | ●      | ●         |        | ○      |   |
|                                                                                                                                                                                                                                                             | SPET 060406E-DM | 10.65                | 3.5 | 0.6 | 4.2  | ●      | ●      |           | ●      |        |   |
|                                                                                                                                                                                                                                                             | SPET 060408E-DL | 10.65                | 3.5 | 0.8 | 4.2  |        | ●      | ●         |        | ○      |   |
|                                                                                                                                                                                                                                                             | SPET 070406E-DM | 12.65                | 4.0 | 0.6 | 4.0  | ●      | ●      |           | ●      |        |   |
|                                                                                                                                                                                                                                                             | SPET 070410E-DL | 12.65                | 4.0 | 1.0 | 4.0  |        |        | -         |        | -      |   |
|                                                                                                                                                                                                                                                             | SPET 080508E-DM | 15.45                | 4.5 | 0.8 | 4.7  | ●      | ●      |           | ●      |        |   |
|                                                                                                                                                                                                                                                             | SPET 080510E-DL | 15.45                | 4.5 | 1.0 | 4.7  |        |        | -         |        | -      |   |
|                                                                                                                                                                                                                                                             | SPET 090608E-DM | 18.6                 | 5.5 | 0.8 | 4.75 | ●      |        |           | ●      |        |   |
|                                                                                                                                                                                                                                                             | SPET 090610E-DL | 18.6                 | 5.5 | 1.0 | 4.75 |        |        | -         |        | -      |   |

● Stocked ○ Unstocked ▲ Stopped in the near future

## Cutting data recommendation

| Materials        |                                        |                                                    |              | Brinell hardness (HB) | Tensile strength (N/mm <sup>2</sup> ) | Recommendation for HY series |     |     |            |     |     |            |     |    |
|------------------|----------------------------------------|----------------------------------------------------|--------------|-----------------------|---------------------------------------|------------------------------|-----|-----|------------|-----|-----|------------|-----|----|
| ISO              | Classification of materials            |                                                    |              |                       |                                       | AP273U                       |     |     | AC371P     |     |     | AP371M     |     |    |
|                  |                                        |                                                    |              |                       |                                       | Vc (m/min)                   |     |     | Vc (m/min) |     |     | Vc (m/min) |     |    |
|                  |                                        |                                                    |              |                       |                                       | ●                            | ⊕   | ⊗   | ●          | ⊕   | ⊗   | ●          | ⊕   | ⊗  |
| P                | Unalloyed steel                        | C ≤ 0.25%                                          | Annealed     | 125                   | 428                                   | 200                          | 150 | 130 | 240        | 180 | 160 | -          | -   | -  |
|                  |                                        | 0.25 < C ≤ 0.55%                                   | Annealed     | 190                   | 639                                   | 190                          | 150 | 120 | 200        | 160 | 120 | -          | -   | -  |
|                  |                                        | 0.25 < C ≤ 0.55%                                   | Heat-treated | 210                   | 708                                   | 180                          | 140 | 100 | 190        | 150 | 120 | -          | -   | -  |
|                  |                                        | C > 0.55%                                          | Annealed     | 190                   | 639                                   | 180                          | 140 | 100 | 190        | 150 | 120 | -          | -   | -  |
|                  |                                        | C > 0.55%                                          | Heat-treated | 300                   | 1013                                  | 150                          | 110 | 75  | 160        | 120 | 90  | -          | -   | -  |
|                  |                                        | Free cutting steel (short chip)                    | Annealed     | 220                   | 745                                   | 180                          | 140 | 100 | 190        | 150 | 120 | -          | -   | -  |
|                  | Low alloy steel                        | Annealed                                           |              | 175                   | 591                                   | 160                          | 130 | 100 | 180        | 140 | 100 | -          | -   | -  |
|                  |                                        | Heat-treated                                       |              | 300                   | 1013                                  | 150                          | 110 | 75  | 160        | 120 | 90  | -          | -   | -  |
|                  |                                        | Heat-treated                                       |              | 380                   | 1282                                  | -                            | -   | -   | -          | -   | -   | -          | -   | -  |
|                  |                                        | Heat-treated                                       |              | 430                   | 1477                                  | -                            | -   | -   | -          | -   | -   | -          | -   | -  |
|                  | High alloy steel                       | Annealed                                           |              | 200                   | 675                                   | 180                          | 140 | 100 | 190        | 150 | 120 | -          | -   | -  |
|                  |                                        | Hardened and tempered                              |              | 300                   | 1013                                  | 150                          | 110 | 75  | 160        | 120 | 90  | -          | -   | -  |
|                  |                                        | Hardened and tempered                              |              | 400                   | 1361                                  | -                            | -   | -   | -          | -   | -   | -          | -   | -  |
|                  | Stainless steel                        | Ferrite/Martensite, Annealed                       |              | 200                   | 675                                   | 180                          | 140 | 100 | 190        | 150 | 120 | -          | -   | -  |
|                  |                                        | Martensite,Heat-treated                            |              | 330                   | 1114                                  | -                            | -   | -   | -          | -   | -   | -          | -   | -  |
| M                | Stainless steel                        | Austenite, hardened                                |              | 200                   | 675                                   | 150                          | 120 | 90  | -          | -   | -   | 140        | 120 | 90 |
|                  |                                        | Austenitic, Precipitation hardened stainless steel |              | 300                   | 1013                                  | 130                          | 100 | 80  | -          | -   | -   | 130        | 100 | 80 |
|                  |                                        | Austenite , ferrite, duplex                        |              | 230                   | 778                                   | 130                          | 100 | 80  | -          | -   | -   | 130        | 100 | 80 |
| K                | Malleable cast iron                    | Ferrite                                            |              | 200                   | 400                                   | 150                          | 120 | 85  | 200        | 150 | 110 | -          | -   | -  |
|                  |                                        | Pearlite                                           |              | 260                   | 700                                   | 110                          | 90  | 65  | 150        | 120 | 80  | -          | -   | -  |
|                  | Grey cast iron                         | Low tensile strength                               |              | 180                   | 200                                   | 200                          | 150 | 130 | 240        | 180 | 160 | -          | -   | -  |
|                  |                                        | High tensile strength/austenite                    |              | 245                   | 350                                   | 150                          | 110 | 75  | 160        | 120 | 90  | -          | -   | -  |
|                  | Nodular cast iron                      | Ferrite                                            |              | 155                   | 400                                   | 140                          | 110 | 80  | 180        | 140 | 100 | -          | -   | -  |
|                  |                                        | Pearlite                                           |              | 265                   | 700                                   | 130                          | 100 | 70  | 160        | 120 | 90  | -          | -   | -  |
| N                | GGV(CGI)                               |                                                    |              | 230                   | 400                                   | -                            | -   | -   | 130        | 100 | 70  | -          | -   | -  |
|                  |                                        |                                                    |              |                       |                                       |                              |     |     |            |     |     |            |     |    |
|                  | Wrough aluminium alloy                 | Non-aging alloy                                    |              | 30                    | -                                     | -                            | -   | -   | -          | -   | -   | -          | -   | -  |
|                  |                                        | Agde alloy                                         |              | 100                   | 340                                   | -                            | -   | -   | -          | -   | -   | -          | -   | -  |
|                  | Cast aluminium alloy                   | ≤12% Si,Non-aging alloy                            |              | 75                    | 260                                   | -                            | -   | -   | -          | -   | -   | -          | -   | -  |
|                  |                                        | ≤12% Si,Agde alloy                                 |              | 90                    | 310                                   | -                            | -   | -   | -          | -   | -   | -          | -   | -  |
|                  |                                        | > 12% Si,Non-aging alloy                           |              | 130                   | 450                                   | -                            | -   | -   | -          | -   | -   | -          | -   | -  |
|                  | Magnesium alloy                        |                                                    |              | 70                    | 250                                   | -                            | -   | -   | -          | -   | -   | -          | -   | -  |
|                  | Copper and copper alloys(Bronze/Brass) | Non-alloy, electrolytic copper                     |              | 100                   | 340                                   | -                            | -   | -   | -          | -   | -   | -          | -   | -  |
|                  |                                        | Brass, bronze, red brass                           |              | 90                    | 310                                   | -                            | -   | -   | -          | -   | -   | -          | -   | -  |
|                  |                                        | Cu alloy, short chips                              |              | 110                   | 380                                   | -                            | -   | -   | -          | -   | -   | -          | -   | -  |
|                  |                                        | High strength Ampco alloy                          |              | 300                   | 1010                                  | -                            | -   | -   | -          | -   | -   | -          | -   | -  |
| S                | Heat-resisting alloy                   | Fe-based                                           | Annealed     | 200                   | 680                                   | -                            | -   | -   | -          | -   | -   | 90         | 60  | 40 |
|                  |                                        |                                                    | Aged         | 280                   | 940                                   | -                            | -   | -   | -          | -   | -   | 70         | 50  | 30 |
|                  |                                        | Ni or Co based                                     | Annealed     | 250                   | 840                                   | -                            | -   | -   | -          | -   | -   | 70         | 50  | 30 |
|                  |                                        |                                                    | Aged         | 350                   | 1180                                  | -                            | -   | -   | -          | -   | -   | 50         | 40  | 30 |
|                  |                                        |                                                    | Cast         | 320                   | 1080                                  | -                            | -   | -   | -          | -   | -   | 50         | 40  | 30 |
|                  | Titanium alloy                         | Pure titanium                                      |              | 200                   | 680                                   | -                            | -   | -   | -          | -   | -   | 120        | 90  | 60 |
|                  |                                        | α and β alloy,aged                                 |              | 375                   | 1260                                  | -                            | -   | -   | -          | -   | -   | 90         | 70  | 50 |
|                  |                                        | β alloy                                            |              | 410                   | 1400                                  | -                            | -   | -   | -          | -   | -   | -          | -   | -  |
| Tungsten alloy   |                                        |                                                    | 300          | 1010                  | -                                     | -                            | -   | -   | -          | -   | -   | -          | -   |    |
| Molybdenum alloy |                                        |                                                    | 300          | 1010                  | -                                     | -                            | -   | -   | -          | -   | -   | -          | -   |    |
| H                | Hardened steel                         | Hardened and tempered                              |              | 50HRC                 |                                       | -                            | -   | -   | -          | -   | -   | -          | -   | -  |
|                  |                                        | Hardened and tempered                              |              | 55HRC                 |                                       | -                            | -   | -   | -          | -   | -   | -          | -   | -  |
|                  |                                        | Hardened and tempered                              |              | 60HRC                 |                                       | -                            | -   | -   | -          | -   | -   | -          | -   | -  |
|                  | Chilled cast iron                      | Hardened and tempered                              |              | 50HRC                 |                                       | -                            | -   | -   | -          | -   | -   | -          | -   | -  |

\* This table shows the general cutting conditions, and the actual selection should be adjusted according to factors such as equipment rigidity, drilling depth, workpiece clamping and cooling pressure.

| fn (mm/rev)     |           |                 |           |                 |           |                 |           |                 |           |                 |           |                 |           |                 |           |
|-----------------|-----------|-----------------|-----------|-----------------|-----------|-----------------|-----------|-----------------|-----------|-----------------|-----------|-----------------|-----------|-----------------|-----------|
| φ14mm-16mm      |           | φ16.5mm-19.5mm  |           | φ20mm-23.5mm    |           | φ24mm-29.5mm    |           | φ30mm-35mm      |           | φ36mm-43mm      |           | φ44mm-52mm      |           | φ53mm-63mm      |           |
| XONT 02/SPET 02 |           | XONT 03/SPET 03 |           | XONT 04/SPET 04 |           | XONT 05/SPET 05 |           | XONT 06/SPET 06 |           | XONT 07/SPET 07 |           | XONT 08/SPET 08 |           | XONT 09/SPET 09 |           |
| -DM             | -DL       | -DM             | -DL       | -DM             | -DL       | -DM             | -DL       | -DM             | -DL       | -DM             | -DL       | -DM             | -DL       | -DM             | -DL       |
| 0.04-0.06       | 0.04-0.08 | 0.04-0.06       | 0.04-0.09 | 0.04-0.10       | 0.04-0.12 | 0.04-0.10       | 0.04-0.12 | 0.06-0.12       | 0.06-0.14 | 0.06-0.12       | 0.06-0.14 | 0.08-0.12       | 0.08-0.14 | 0.08-0.12       | 0.08-0.14 |
| 0.04-0.08       | 0.04-0.08 | 0.06-0.11       | 0.06-0.11 | 0.06-0.14       | 0.06-0.14 | 0.08-0.14       | 0.08-0.14 | 0.08-0.20       | 0.08-0.20 | 0.08-0.20       | 0.08-0.20 | 0.10-0.20       | 0.10-0.20 | 0.10-0.20       | 0.10-0.20 |
| 0.04-0.08       | 0.04-0.08 | 0.06-0.11       | 0.06-0.11 | 0.06-0.14       | 0.06-0.14 | 0.08-0.14       | 0.08-0.14 | 0.08-0.20       | 0.08-0.20 | 0.08-0.20       | 0.08-0.20 | 0.10-0.20       | 0.10-0.20 | 0.10-0.20       | 0.10-0.20 |
| 0.04-0.08       | 0.04-0.08 | 0.06-0.11       | 0.06-0.11 | 0.06-0.14       | 0.06-0.14 | 0.08-0.14       | 0.08-0.14 | 0.08-0.20       | 0.08-0.20 | 0.08-0.20       | 0.08-0.20 | 0.10-0.20       | 0.10-0.20 | 0.10-0.20       | 0.10-0.20 |
| 0.04-0.06       | 0.04-0.06 | 0.06-0.09       | 0.06-0.08 | 0.06-0.11       | 0.06-0.08 | 0.08-0.11       | 0.06-0.08 | 0.08-0.16       | 0.08-0.13 | 0.08-0.16       | 0.08-0.13 | 0.10-0.16       | 0.08-0.16 | 0.10-0.16       | 0.08-0.16 |
| 0.04-0.08       | 0.04-0.08 | 0.06-0.11       | 0.06-0.11 | 0.06-0.14       | 0.06-0.14 | 0.08-0.14       | 0.08-0.14 | 0.08-0.20       | 0.08-0.20 | 0.08-0.20       | 0.08-0.20 | 0.10-0.20       | 0.10-0.20 | 0.10-0.20       | 0.10-0.20 |
| 0.04-0.08       | 0.04-0.08 | 0.06-0.11       | 0.06-0.11 | 0.06-0.14       | 0.06-0.14 | 0.08-0.14       | 0.08-0.14 | 0.08-0.20       | 0.08-0.20 | 0.08-0.20       | 0.08-0.20 | 0.10-0.20       | 0.10-0.20 | 0.10-0.20       | 0.10-0.20 |
| 0.04-0.06       | 0.04-0.06 | 0.06-0.09       | 0.06-0.08 | 0.06-0.11       | 0.06-0.08 | 0.08-0.11       | 0.06-0.08 | 0.08-0.16       | 0.08-0.13 | 0.08-0.16       | 0.08-0.13 | 0.10-0.16       | 0.08-0.16 | 0.10-0.16       | 0.08-0.16 |
| -               | -         | -               | -         | -               | -         | -               | -         | -               | -         | -               | -         | -               | -         | -               | -         |
| -               | -         | -               | -         | -               | -         | -               | -         | -               | -         | -               | -         | -               | -         | -               | -         |
| 0.04-0.08       | 0.04-0.08 | 0.06-0.11       | 0.06-0.11 | 0.06-0.14       | 0.06-0.14 | 0.08-0.14       | 0.08-0.14 | 0.08-0.20       | 0.08-0.20 | 0.08-0.20       | 0.08-0.20 | 0.10-0.20       | 0.10-0.20 | 0.10-0.20       | 0.10-0.20 |
| 0.04-0.06       | 0.04-0.06 | 0.06-0.09       | 0.06-0.08 | 0.06-0.11       | 0.06-0.08 | 0.08-0.11       | 0.06-0.08 | 0.08-0.16       | 0.08-0.13 | 0.08-0.16       | 0.08-0.13 | 0.10-0.16       | 0.08-0.16 | 0.10-0.16       | 0.08-0.16 |
| -               | -         | -               | -         | -               | -         | -               | -         | -               | -         | -               | -         | -               | -         | -               | -         |
| 0.04-0.08       | 0.04-0.08 | 0.06-0.11       | 0.06-0.11 | 0.06-0.14       | 0.06-0.14 | 0.08-0.14       | 0.08-0.14 | 0.08-0.20       | 0.08-0.20 | 0.08-0.20       | 0.08-0.20 | 0.10-0.20       | 0.10-0.20 | 0.10-0.20       | 0.10-0.20 |
| -               | -         | -               | -         | -               | -         | -               | -         | -               | -         | -               | -         | -               | -         | -               | -         |
| 0.04-0.06       | 0.04-0.08 | 0.06-0.08       | 0.04-0.09 | 0.04-0.10       | 0.04-0.12 | 0.06-0.10       | 0.06-0.12 | 0.08-0.13       | 0.08-0.16 | 0.08-0.13       | 0.08-0.16 | 0.08-0.16       | 0.10-0.16 | 0.08-0.16       | 0.10-0.16 |
| 0.04-0.06       | 0.04-0.06 | 0.04-0.06       | 0.06-0.08 | 0.06-0.11       | 0.06-0.08 | 0.08-0.11       | 0.06-0.08 | 0.06-0.14       | 0.06-0.12 | 0.06-0.14       | 0.06-0.12 | 0.08-0.14       | 0.08-0.12 | 0.08-0.14       | 0.08-0.12 |
| 0.04-0.06       | 0.04-0.08 | 0.06-0.08       | 0.04-0.09 | 0.04-0.10       | 0.04-0.12 | 0.06-0.10       | 0.06-0.12 | 0.08-0.13       | 0.08-0.16 | 0.08-0.13       | 0.08-0.16 | 0.08-0.16       | 0.10-0.16 | 0.08-0.16       | 0.10-0.16 |
| 0.06-0.12       | 0.06-0.10 | 0.08-0.12       | 0.08-0.10 | 0.10-0.16       | 0.10-0.12 | 0.10-0.16       | 0.10-0.12 | 0.10-0.20       | 0.10-0.15 | 0.10-0.20       | 0.10-0.15 | 0.12-0.20       | 0.12-0.15 | 0.12-0.20       | 0.12-0.15 |
| 0.06-0.10       | 0.06-0.08 | 0.06-0.10       | 0.06-0.08 | 0.08-0.14       | 0.08-0.10 | 0.08-0.14       | 0.08-0.10 | 0.08-0.18       | 0.08-0.12 | 0.08-0.18       | 0.08-0.12 | 0.10-0.08       | 0.10-0.12 | 0.10-0.08       | 0.10-0.12 |
| 0.06-0.12       | 0.06-0.10 | 0.08-0.12       | 0.08-0.10 | 0.10-0.16       | 0.10-0.12 | 0.10-0.16       | 0.10-0.12 | 0.10-0.20       | 0.10-0.15 | 0.10-0.20       | 0.10-0.15 | 0.12-0.20       | 0.12-0.15 | 0.12-0.20       | 0.12-0.15 |
| 0.06-0.10       | -         | 0.06-0.10       | -         | 0.08-0.14       | -         | 0.08-0.14       | -         | 0.08-0.18       | -         | 0.08-0.18       | -         | 0.10-0.08       | -         | 0.10-0.08       | -         |
| 0.06-0.12       | 0.06-0.10 | 0.08-0.12       | 0.08-0.10 | 0.10-0.16       | 0.10-0.12 | 0.10-0.16       | 0.10-0.12 | 0.10-0.20       | 0.10-0.15 | 0.10-0.20       | 0.10-0.15 | 0.12-0.20       | 0.12-0.15 | 0.12-0.20       | 0.12-0.15 |
| 0.06-0.10       | 0.06-0.08 | 0.06-0.10       | 0.06-0.08 | 0.08-0.14       | 0.08-0.10 | 0.08-0.14       | 0.08-0.10 | 0.08-0.18       | 0.08-0.12 | 0.08-0.18       | 0.08-0.12 | 0.10-0.18       | 0.10-0.12 | 0.10-0.18       | 0.10-0.12 |
| 0.06-0.10       | -         | 0.06-0.10       | -         | 0.08-0.14       | -         | 0.08-0.14       | -         | 0.08-0.18       | -         | 0.08-0.18       | -         | 0.10-0.08       | -         | 0.10-0.08       | -         |
| -               | -         | -               | -         | -               | -         | -               | -         | -               | -         | -               | -         | -               | -         | -               | -         |
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| -               | -         | -               | -         | -               | -         | -               | -         | -               | -         | -               | -         | -               | -         | -               | -         |
| -               | -         | -               | -         | -               | -         | -               | -         | -               | -         | -               | -         | -               | -         | -               | -         |
| -               | -         | -               | -         | -               | -         | -               | -         | -               | -         | -               | -         | -               | -         | -               | -         |
| -               | -         | -               | -         | -               | -         | -               | -         | -               | -         | -               | -         | -               | -         | -               | -         |
| 0.04-0.06       | 0.04-0.08 | 0.06-0.08       | 0.04-0.09 | 0.04-0.10       | 0.04-0.12 | 0.06-0.10       | 0.06-0.12 | 0.08-0.13       | 0.08-0.16 | 0.08-0.13       | 0.08-0.16 | 0.08-0.16       | 0.10-0.16 | 0.08-0.16       | 0.10-0.16 |
| 0.04-0.06       | 0.04-0.08 | 0.06-0.08       | 0.04-0.09 | 0.04-0.10       | 0.04-0.12 | 0.06-0.10       | 0.06-0.12 | 0.08-0.13       | 0.08-0.16 | 0.08-0.13       | 0.08-0.16 | 0.08-0.16       | 0.10-0.16 | 0.08-0.16       | 0.10-0.16 |
| 0.04-0.06       | 0.04-0.08 | 0.06-0.08       | 0.04-0.09 | 0.04-0.10       | 0.04-0.12 | 0.06-0.10       | 0.06-0.12 | 0.08-0.13       | 0.08-0.16 | 0.08-0.13       | 0.08-0.16 | 0.08-0.16       | 0.10-0.16 | 0.08-0.16       | 0.10-0.16 |
| 0.04-0.06       | 0.04-0.06 | 0.04-0.06       | 0.06-0.08 | 0.06-0.11       | 0.06-0.08 | 0.08-0.11       | 0.06-0.08 | 0.06-0.14       | 0.06-0.12 | 0.06-0.14       | 0.06-0.12 | 0.08-0.14       | 0.08-0.12 | 0.08-0.14       | 0.08-0.12 |
| 0.04-0.06       | 0.04-0.06 | 0.04-0.06       | 0.06-0.08 | 0.06-0.11       | 0.06-0.08 | 0.08-0.11       | 0.06-0.08 | 0.06-0.14       | 0.06-0.12 | 0.06-0.14       | 0.06-0.12 | 0.08-0.14       | 0.08-0.12 | 0.08-0.14       | 0.08-0.12 |
| 0.04-0.06       | 0.04-0.08 | 0.06-0.08       | 0.04-0.09 | 0.04-0.10       | 0.04-0.12 | 0.06-0.10       | 0.06-0.12 | 0.08-0.13       | 0.08-0.16 | 0.08-0.13       | 0.08-0.16 | 0.08-0.16       | 0.10-0.16 | 0.08-0.16       | 0.10-0.16 |
| 0.04-0.06       | 0.04-0.06 | 0.04-0.06       | 0.06-0.08 | 0.06-0.11       | 0.06-0.08 | 0.08-0.11       | 0.06-0.08 | 0.06-0.14       | 0.06-0.12 | 0.06-0.14       | 0.06-0.12 | 0.08-0.14       | 0.08-0.12 | 0.08-0.14       | 0.08-0.12 |
| -               | -         | -               | -         | -               | -         | -               | -         | -               | -         | -               | -         | -               | -         | -               | -         |
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| -               | -         | -               | -         | -               | -         | -               | -         | -               | -         | -               | -         | -               | -         | -               | -         |

The parameters are based on 3\*Dc drill body, 2\*Dc reference 1.1 coefficient; 4\*Dc reference 0.8 coefficient; 5\*Dc can refer to the 0.7 coefficient



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