

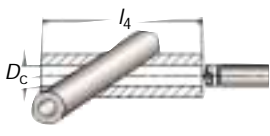





## Choice of tool

	Delta drill family		U-drill family	
	Solid carbide drills	Brazed carbide drills	Indexable drills	
<p>Drill diameter, <math>D_c</math> Drilling depth, <math>l_4</math></p>	<p>Delta-C R415.5 3 - 20,0 2 - <math>5 \times D_c</math></p>	<p>Delta R411.5 9,5 - 30,4 3,5 - <math>5 \times D_c</math></p>	<p>Coromant U R416.2 12,7 - 58 2 - <math>4 \times D_c</math></p>	<p>T-MAX U R416.9 60 - 80 <math>2,5 \times D_c</math></p>
Ordering information see page	67	71	75	See Rotating Tools catalogue
<b>Workpiece material</b>				
<b>P</b> - Steel	3	3	3	3
- Steel, hardened	2	3	3	3
<b>M</b> - Stainless steel	1	3	2	3
- Heat resistant alloys	1	3	2	3
<b>K</b> - Cast iron	3	3	3	3
- Aluminium alloys	2	3	2	3
<b>Surface finish Ra</b>	1-2 $\mu\text{m}$	1-2 $\mu\text{m}$	1-5 $\mu\text{m}$	6-10 $\mu\text{m}$
<b>Hole tolerance</b>	IT8-10	IT8-10	+0,3/-0,1 +0,4/-0,1	$\pm 0,2$
<b>Machine</b>	All types			
<b>Tool</b>				
- Cutting fluid: Internal	- Yes	Yes	Yes	Yes
External	Yes -	-	-	-
- Insert type	-	-	LCMX/WCMX	WCMX
- Tailor Made	-	Yes	Yes	-
<b>Type of industry</b>				
- Die & mould	3	3	3	3
- Automotive	3	3	3	3
- Heat ex. plates	-	2	3	-
- Aerospace	3	2	2	2
- Oil industry	2	2	3	3
- General engineering	3	3	3	3
<b>Cutting data</b>	See pages 142 - 149.			

Good choice 3  $\longleftrightarrow$  1 Less suitable choice



	Gun drills	Ejector	STS	
	428.9	424.6	420.6	
				
<b>Drill diameter, <math>D_c</math></b> <b>Drilling depth, <math>l_4</math></b>	0,98 - 35 $\leq 80 \times D_c$	18,4 - 65 $50/100 \times D_c$	15,6 - 65 $100 \times D_c$	
Ordering information see page	83	See Rotating Tools catalogue		
<b>Workpiece material</b>				
– Steel – Steel, hardened	2	3	3	
– Stainless steel – Heat resistant alloys	2	1	3	
– Cast iron – Aluminium alloys	2	3	3	
<b>Surface finish <math>R_a</math></b>	0,1-3,2 $\mu\text{m}$	2 $\mu\text{m}$	2 $\mu\text{m}$	
<b>Hole tolerance</b>	IT9	IT10	IT10	
<b>Machine</b>				
– DHD machines	–	Yes	Yes	
– NC machines	–	Yes	–	
– Lathes	–	Yes	–	
– Most conventional machines	–	Yes	–	
– Machining centres	Yes	Yes	–	
– Special gun drilling machines	Yes	–	–	
<b>Tool</b>				
– Cutting fluid: Internal	Yes	Yes	Yes	
– Insert type	–	–	–	
<b>Cutting data</b>	See page 153			

Good choice = 3  $\longleftrightarrow$  1 = Less suitable choice



## Choice of tool for boring

ROUGHING-FINISHING		Diameter				
		25-270 mm	25-101 mm	3-26 mm	25-103,5 mm	25-103,5 mm
		391.68A	391.69A	391.37A	391.38A	391.39A
Ordering information see page		See Rotating Tools catalogue				
<b>Workpiece material</b>						
<b>P</b> – Steel – Steel, hardened		3	3	3	3	3
		3	3	3	3	3
<b>M</b> – Stainless steel – Heat resistant alloys		3	3	3	3	3
		3	3	3	3	3
<b>K</b> – Cast iron – Aluminium alloys		3	3	3	3	3
		3	3	3	3	3
<b>Working areas</b>						
– Internal		3	3	3	3	3
– External		–	–	–	–	–
<b>Hole tolerance</b>		IT9	IT9	IT6	IT6	IT7
<b>Machine</b>		All Types				
– Machine type						
<b>Tool</b>						
– Entering angle		90°, 75°	90°, 75°	92°, 75°	92°, 75°	92°, 75°
– Adjustable with scale		–	–	0,01 mm	0,01 mm	0,01 mm
– Boring depth		4 × Bar dia.	6 × D <sub>C</sub>	13,5-40 mm	3,5 × D <sub>5m</sub>	6 × D <sub>C</sub>
– Cutting fluid		Internal	Internal	Internal	Internal	Internal
– Damped		–	Yes	–	–	Yes
– Type of boring		single edge twin edge step boring		single edge		
– Insert type		T-MAX U T-MAX P	T-MAX U	T-MAX U	T-MAX U	T-MAX U
<b>Cutting data</b>		See Rotating Tools catalogue				

Good choice = 3 ←————→ 1 = Less suitable choice



The Coromant Delta family of drills are highly productive tools, developed for close tolerance production with high security within a wide application area.

- Excellent chipbreaking — close tolerances — good surface finish
- Precision centering — no need for pre-drilling — tighter hole concentricity
- Light cutting geometry — low feed force — low power consumption
- Weak and thin workpieces can be drilled without deflection
- Regrindable geometry
- High penetration rate — high productivity

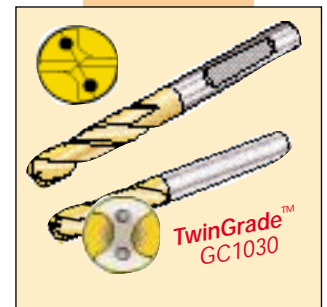
## Coromant Delta-C drills R415.5 for diameters 3,00 – 20,00 mm

- The solid carbide drill with PVD coating
- TwinGrade (compound grade) for stainless steels
- Chamfering drills for tapped holes M4 — M16
- Recommended drilling depth 2–3 and 4–5 times the diameter
- Drills with internal and external coolant supply are available
- Whistle Notch shank according to DIN 6535 HE, cylindrical shank according to DIN 6535 HA and drill design according to DIN 6537 as standard.

### Requirements

The Delta-C drill requires modern, high capacity machines and stable machining conditions.

When drilling in stainless steels always use internal coolant.



## Coromant Delta drills R411.5 for diameters 9,50 – 30,40 mm

- The brazed, carbide tipped drill, TIN-coated as standard
- Optimized geometries and coatings for special applications
- Recommended drilling depths 3,5 and 5 times the diameter
- Shank designs: Cylindrical with flat (*first choice*) and Coromant Whistle Notch. Cylindrical available as Tailor Made.
- Different type of drills are available as Tailor Made e.g. shank size, coating, chamfering insert, diameter and length.





Coromant Delta-C drills

# Coromant Delta-C

## A precision tool for high productivity hole making

Hole diameters 3,00—20,00 mm

### Delta-C — the first choice in modern high performance machines

- Self-centering drill
- No need for pre-drilling
- Good surface finish
- Easy-to-regrind geometry
- Drill design according to DIN 6537
- Tolerance m7 to suit tapping operations
- Chamfering drills for M4 – M16 threads

#### Short design:

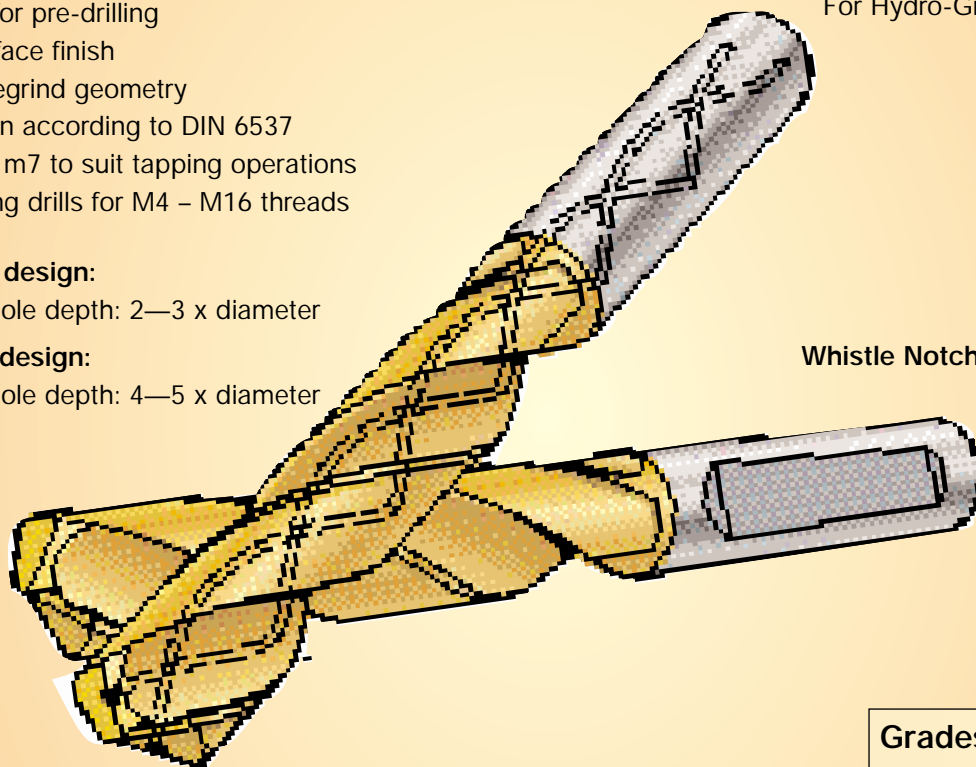
Max hole depth: 2—3 x diameter

#### Long design:

Max hole depth: 4—5 x diameter

### Good clamping features

Cylindrical shank according to DIN 6535 HA (K).  
For Hydro-Grip precision chucks.

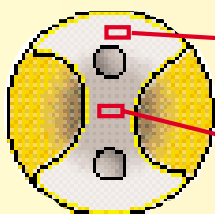


Whistle Notch shank according to  
DIN 6535 HE (K)  
(K = coolant holes)

### Two drills in one — the unique TwinGrade™ GC1030

GC1030 for stainless steels is a PVD-coated compound grade for productivity with long tool life in demanding stainless and duplex steels.

The low feeds that are normally applied to stainless steel can now be raised substantially, maintaining good drilling performance.



PVD-coated



Low speed centre performance



High speed peripheral performance

### Grades

**P M K** GC1020

Basic choice for mixed production steel, stainless and cast iron.

**M** GC1030

**P K** GC1040

First choice in steel.  
Also for cast iron.

**P K** GC1010

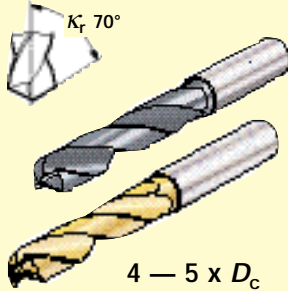
For high speeds in steel and cast iron.



**Carbide drills**

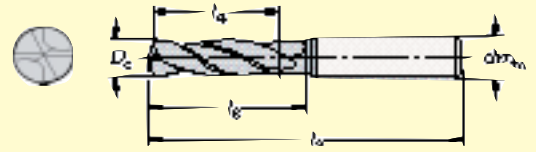
**Cylindrical shank**

**R415.5**

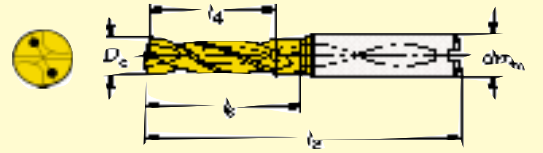


Drill diameter: 3,00—20,00 mm  
 Max hole depth:  $4-5 \times D_c$   
 Coating: GC1010 TiAlN, GC1020 Ti(CN)+TiN  
 Hole tolerance: IT9-10  
 Surface finish:  $R_a 1-2 \mu m$   
 Cutting fluid: Emulsion or cutting oil  
 Drill standard: DIN 6537  
 Tolerances:  $D_c = m7$   
 $dm_m = h6$

External coolant supply



Internal coolant supply



$l_4 =$  recommended drilling depth

Drill diameter $D_c$ mm	Ordering code External coolant supply	Coromant grade 1010 <b>P K</b>	Ordering code Internal coolant supply	Coromant grade 1020 <b>P M K</b>	Dimensions, mm			
					$dm_m$	$l_2$	$l_6$	$l_4$
3,00	R415.5-0300-50-AC0	☆	-	-	6,0	66	28	20
3,25	0325-50-AC0	☆	-	-	6,0	66	28	20
3,30	0330-50-AC0	☆	-	-	6,0	66	28	20
3,40	0340-50-AC0	☆	-	-	6,0	66	28	20
3,50	0350-50-AC0	☆	-	-	6,0	66	28	20
3,70	R415.5-0370-50-AC0	☆	-	-	6,0	66	28	20
4,00	0400-50-AC0	☆	-	-	6,0	74	36	27
4,20	0420-50-AC0	☆	-	-	6,0	74	36	27
4,30	0430-50-AC0	☆	-	-	6,0	74	36	27
4,50	0450-50-AC0	☆	-	-	6,0	74	36	27
4,65	R415.5-0465-50-AC0	☆	-	-	6,0	74	36	27
4,80	0480-50-AC0	☆	-	-	6,0	82	44	34
5,00	0500-50-AC0	☆	R415.5-0500-50-AC1	☆	6,0	82	44	35
5,10	0510-50-AC0	☆	0510-50-AC1	☆	6,0	82	44	35
5,20	0520-50-AC0	☆	0520-50-AC1	☆	6,0	82	44	35
5,50	R415.5-0550-50-AC0	☆	R415.5-0550-50-AC1	☆	6,0	82	44	35
5,55	0555-50-AC0	☆	0555-50-AC1	☆	6,0	82	44	35
5,80	0580-50-AC0	☆	0580-50-AC1	☆	6,0	82	44	35
6,00	0600-50-AC0	☆	0600-50-AC1	☆	6,0	82	44	35
6,10	0610-50-AC0	☆	0610-50-AC1	☆	8,0	91	53	39
6,20	R415.5-0620-50-AC0	☆	R415.5-0620-50-AC1	☆	8,0	91	53	39
6,30	0630-50-AC0	☆	0630-50-AC1	☆	8,0	91	53	39
6,50	0650-50-AC0	☆	0650-50-AC1	☆	8,0	91	53	39
6,60	0660-50-AC0	☆	0660-50-AC1	☆	8,0	91	53	39
6,80	0680-50-AC0	☆	0680-50-AC1	☆	8,0	91	53	39
6,90	0690-50-AC0	☆	0690-50-AC1	☆	8,0	91	53	39
7,00	R415.5-0700-50-AC0	☆	R415.5-0700-50-AC1	☆	8,0	91	53	40
7,10	0710-50-AC0	☆	0710-50-AC1	☆	8,0	91	53	40
7,40	0740-50-AC0	☆	0740-50-AC1	☆	8,0	91	53	40
7,50	0750-50-AC0	☆	0750-50-AC1	☆	8,0	91	53	40
7,80	0780-50-AC0	☆	0780-50-AC1	☆	8,0	91	53	40
8,00	R415.5-0800-50-AC0	☆	R415.5-0800-50-AC1	☆	8,0	91	53	40
8,10	0810-50-AC0	☆	0810-50-AC1	☆	10,0	103	61	44
8,40	0840-50-AC0	☆	0840-50-AC1	☆	10,0	103	61	44
8,50	0850-50-AC0	☆	0850-50-AC1	☆	10,0	103	61	44
8,60	0860-50-AC0	☆	0860-50-AC1	☆	10,0	103	61	44
8,70	R415.5-0870-50-AC0	☆	R415.5-0870-50-AC1	☆	10,0	103	61	44
8,80	0880-50-AC0	☆	0880-50-AC1	☆	10,0	103	61	44
9,00	0900-50-AC0	☆	0900-50-AC1	☆	10,0	103	61	45
9,30	0930-50-AC0	☆	0930-50-AC1	☆	10,0	103	61	45
9,50	0950-50-AC0	☆	0950-50-AC1	☆	10,0	103	61	45
9,60	R415.5-0960-50-AC0	☆	R415.5-0960-50-AC1	☆	10,0	103	61	45
9,80	0980-50-AC0	☆	0980-50-AC1	☆	10,0	103	61	45
10,00	1000-50-AC0	☆	1000-50-AC1	☆	10,0	103	61	45
10,20	1020-50-AC0	☆	1020-50-AC1	☆	12,0	118	71	50
10,40	1040-50-AC0	☆	1040-50-AC1	☆	12,0	118	71	50
10,50	R415.5-1050-50-AC0	☆	R415.5-1050-50-AC1	☆	12,0	118	71	50
10,60	1060-50-AC0	☆	1060-50-AC1	☆	12,0	118	71	50
10,80	1080-50-AC0	☆	1080-50-AC1	☆	12,0	118	71	50

Ordering example: 10 pieces R415.5-0300-50-AC0 1010

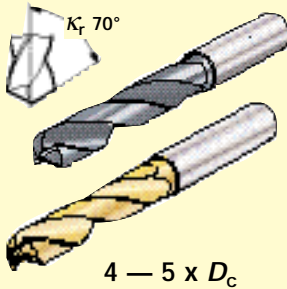


# Coromant Delta-C drills

## Carbide drills

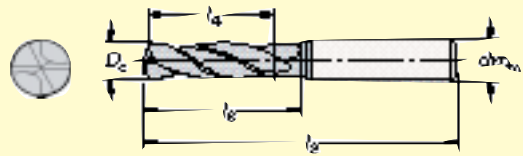
### Cylindrical shank

R415.5

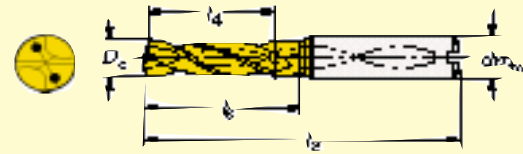


Drill diameter: 3,00—20,00 mm  
 Max hole depth: 4—5 x  $D_c$   
 Coating: GC1010 TiAlN, GC1020 Ti(CN)+TiN  
 Hole tolerance: IT9-10  
 Surface finish:  $R_a$  1—2  $\mu$ m  
 Cutting fluid: Emulsion or cutting oil  
 Drill standard: DIN 6537  
 Tolerances:  $D_c = m7$   
 $dm_m = h6$

External coolant supply



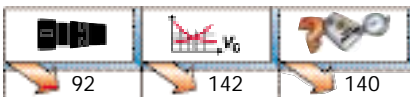
Internal coolant supply



$l_4$  = recommended drilling depth

Drill diameter $D_c$ mm	Ordering code External coolant supply	Coromant grade T010 <b>P K</b>	Ordering code Internal coolant supply	Coromant grade T020 <b>P M K</b>	Dimensions, mm			
					$dm_m$	$l_2$	$l_6$	$l_4$
11,00	R415.5- 1100-50-AC0	☆	R415.5- 1100-50-AC1	☆	12,0	118	71	51
11,20	1120-50-AC0	☆	1120-50-AC1	☆	12,0	118	71	51
11,50	1150-50-AC0	☆	1150-50-AC1	☆	12,0	118	71	51
11,80	1180-50-AC0	☆	1180-50-AC1	☆	12,0	118	71	51
12,00	1200-50-AC0	☆	1200-50-AC1	☆	12,0	118	71	51
12,20	R415.5- 1220-50-AC0	☆	R415.5- 1220-50-AC1	☆	14,0	124	77	55
12,25	1225-50-AC0	☆	1225-50-AC1	☆	14,0	124	77	55
12,50	1250-50-AC0	☆	1250-50-AC1	☆	14,0	124	77	55
12,70	1270-50-AC0	☆	1270-50-AC1	☆	14,0	124	77	55
12,75	1275-50-AC0	☆	1275-50-AC1	☆	14,0	124	77	55
12,80	R415.5-1280-50-AC0	☆	R415.5- 1280-50-AC1	☆	14,0	124	77	55
13,00	1300-50-AC0	☆	1300-50-AC1	☆	14,0	124	77	56
13,10	1310-50-AC0	☆	1310-50-AC1	☆	14,0	124	77	56
13,50	1350-50-AC0	☆	1350-50-AC1	☆	14,0	124	77	56
13,80	1380-50-AC0	☆	1380-50-AC1	☆	14,0	124	77	56
14,00	R415.5- 1400-50-AC0	☆	R415.5- 1400-50-AC1	☆	14,0	124	77	56
14,25	1425-50-AC0	☆	1425-50-AC1	☆	16,0	133	83	59
14,50	1450-50-AC0	☆	1450-50-AC1	☆	16,0	133	83	59
14,75	1475-50-AC0	☆	1475-50-AC1	☆	16,0	133	83	59
14,80	1480-50-AC0	☆	1480-50-AC1	☆	16,0	133	83	59
15,00	R415.5- 1500-50-AC0	☆	R415.5- 1500-50-AC1	☆	16,0	133	83	60
15,10	1510-50-AC0	☆	1510-50-AC1	☆	16,0	133	83	60
15,50	1550-50-AC0	☆	1550-50-AC1	☆	16,0	133	83	60
15,80	1580-50-AC0	☆	1580-50-AC1	☆	16,0	133	83	60
16,00	1600-50-AC0	☆	1600-50-AC1	☆	16,0	133	83	60
16,50	R415.5- 1650-50-AC0	☆	R415.5- 1650-50-AC1	☆	18,0	143	93	66
16,75	1675-50-AC0	☆	1675-50-AC1	☆	18,0	143	93	66
16,80	1680-50-AC0	☆	1680-50-AC1	☆	18,0	143	93	66
17,00	1700-50-AC0	☆	1700-50-AC1	☆	18,0	143	93	67
17,50	1750-50-AC0	☆	1750-50-AC1	☆	18,0	143	93	67
17,80	R415.5- 1780-50-AC0	☆	R415.5- 1780-50-AC1	☆	18,0	143	93	67
18,00	1800-50-AC0	☆	1800-50-AC1	☆	18,0	143	93	67
18,50	1850-50-AC0	☆	1850-50-AC1	☆	20,0	153	101	71
18,80	1880-50-AC0	☆	1880-50-AC1	☆	20,0	153	101	71
19,00	1900-50-AC0	☆	1900-50-AC1	☆	20,0	153	101	72
19,50	R415.5- 1950-50-AC0	☆	R415.5- 1950-50-AC1	☆	20,0	153	101	72
19,80	1980-50-AC0	☆	1980-50-AC1	☆	20,0	153	101	72
20,00	2000-50-AC0	☆	2000-50-AC1	☆	20,0	153	101	72

Ordering example: 10 pieces R415.5-1100-50-AC0 1010

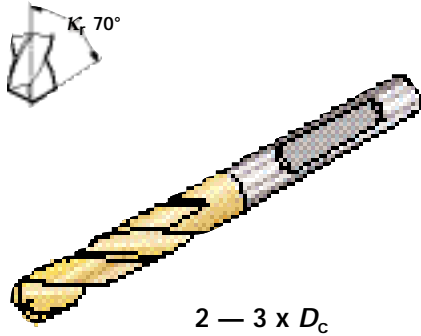




**CARBIDE DRILLS**

R415.5

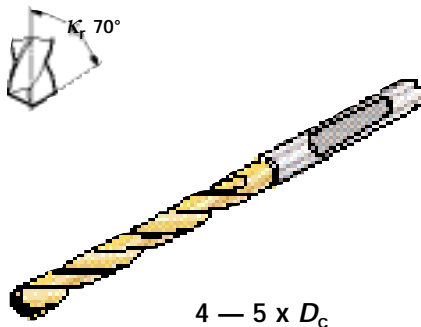
**Whistle Notch shank**



Drill diameter: 3,00—20,00 mm  
 Max hole depth:  $2-3 \times D_c$   
 Coating: GC1040 TiN, GC1020 Ti(CN)+TiN  
 Hole tolerance: IT8-9  
 Surface finish:  $R_a 1-2 \mu m$   
 Cutting fluid: Emulsion or cutting oil  
 Drill standard: DIN 6537  
 Tolerances:  $D_c = m7$   
 $dm_m = h6$

For ordering information see Rotating Tools catalogue.

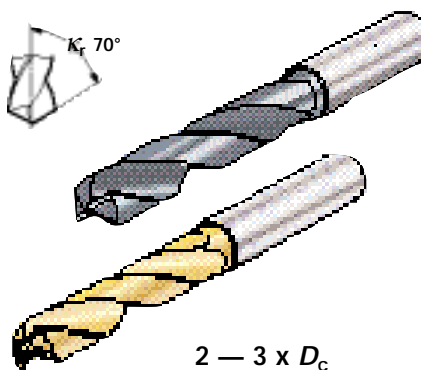
**Whistle Notch shank**



Drill diameter: 3,00—20,00 mm  
 Max hole depth:  $4-5 \times D_c$   
 Coating: GC1040 TiN, GC1020 Ti(CN)+TiN  
 Hole tolerance: IT9-10  
 Surface finish:  $R_a 1-2 \mu m$   
 Cutting fluid: Emulsion or cutting oil  
 Drill standard: DIN 6537  
 Tolerances:  $D_c = m7$   
 $dm_m = h6$

For ordering information see Rotating Tools catalogue.

**Cylindrical shank**



Drill diameter: 3,00—20,00 mm  
 Max hole depth:  $2-3 \times D_c$   
 Coating: GC1010 TiAlN, GC1020 Ti(CN)+TiN  
 Hole tolerance: IT8-9  
 Surface finish:  $R_a 1-2 \mu m$   
 Cutting fluid: Emulsion or cutting oil  
 Drill standard: DIN 6537  
 Tolerances:  $D_c = m7$   
 $dm_m = h6$

For ordering information see Rotating Tools catalogue.





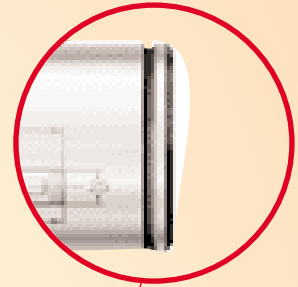
Coromant Delta drills

# — *Coromant Delta* —

– for high productivity drilling of close tolerance holes, diameter 9,50 – 30,40 mm

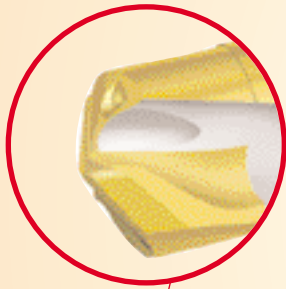
Drills 5 x D deep – as standard

Easy mounting  
– "self locating".

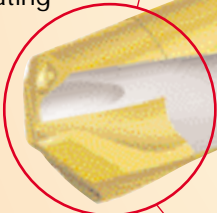


Longer total tool life  
– more regrindings

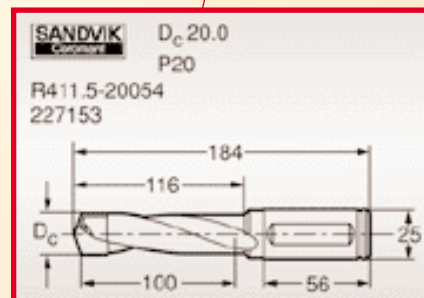
Whistle Notch



High performance  
– TiN coating

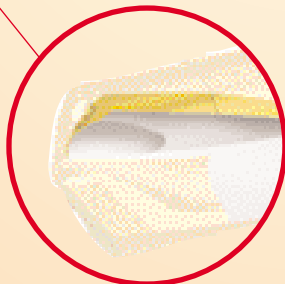


Cylindrical with flat  
(ISO 9766)



Complete information  
– permanent marking by laser

Reinforced chip flutes  
– locally hardened by laser



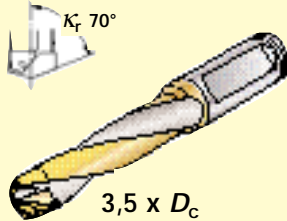
Regrinding service available



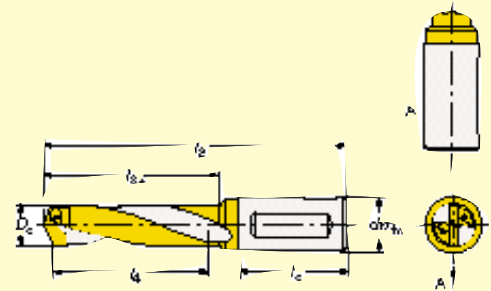
## Brazed carbide drills

Cylindrical shank with flat according to ISO 9766

R411.5



Drill diameter: 9,50-30,40 mm  
 Hole depth:  $3,5 \times D_c$   
 Hole tolerance: IT8-9  
 Surface finish:  $R_a$  1-2  $\mu m$   
 Cutting fluid: Emulsion or Neat oil  
 Tolerances:  $D_c$  =js7  
 $dm_m$  =h6



$l_4$  = Recommended drilling depth

Drill diameter $D_c$ mm	Ordering code	Coromant grades		Dimensions, mm						Stocked drills	
		P	M K	$dm_m$	$l_2$	$l_{3s}$	$l_4$	$l_c$			
9,50-10,00	R411.5- 10034 Dxx.xx	★	★	16 <sup>1)</sup>	98	39	35	48	0,1	Drills in the diameter range 9,75 – 20,00 mm are available as stocked standard in steps of 0,25 mm in grade P20.	
10,01-10,50	10534 Dxx.xx	★	★	16 <sup>1)</sup>	100	41	37	48	0,1		
10,51-11,00	11034 Dxx.xx	★	★	16 <sup>1)</sup>	103	44	39	48	0,1		
11,01-11,50	11534 Dxx.xx	★	★	16 <sup>1)</sup>	105	46	40	48	0,1		
11,51-12,00	12034 Dxx.xx	★	★	16 <sup>1)</sup>	108	49	42	48	0,1		
12,01-12,50	R411.5- 12534 Dxx.xx	★	★	16 <sup>1)</sup>	113(111)	54(52)	44	48	0,1		
12,51-13,00	13034 Dxx.xx	★	★	16 <sup>1)</sup>	113	54	46	48	0,1		
13,01-13,50	13534 Dxx.xx	★	★	16 <sup>1)</sup>	118(115)	59(56)	47	48	0,1		
13,51-14,00	14034 Dxx.xx	★	★	16 <sup>1)</sup>	118	59	49	48	0,1		
14,01-14,50	R411.5- 14534 Dxx.xx	★	★	20	123(121)	63(61)	51	50	0,2		
14,51-15,00	15034 Dxx.xx	★	★	20	123	63	53	50	0,2		
15,01-15,50	15534 Dxx.xx	★	★	20	128(125)	68(65)	54	50	0,2		
15,51-16,00	16034 Dxx.xx	★	★	20	128	68	56	50	0,2		
16,01-16,50	R411.5- 16534 Dxx.xx	★	★	20	133(171)	73(71)	58	50	0,2		
16,51-17,00	17034 Dxx.xx	★	★	20	133	73	60	50	0,2		
17,01-17,50	17534 Dxx.xx	★	★	20	136(133)	76(73)	61	50	0,3		
17,51-18,00	18034 Dxx.xx	★	★	20	136	76	63	50	0,3		
18,01-18,50	R411.5- 18534 Dxx.xx	★	★	20	139	79	65	50	0,3		
18,51-19,00	19034 Dxx.xx	★	★	25	149	81	67	56	0,3		
19,01-19,50	19534 Dxx.xx	★	★	25	154(151)	86(83)	68	56	0,3		
19,51-20,00	20034 Dxx.xx	★	★	25	154	86	70	56	0,3		
20,01-20,50	R411.5- 20534 Dxx.xx	★	★	25	159(157)	91(89)	72	56	0,4		Drills in the diameter range 20,5 – 30,00 mm are available as stocked standard in steps of 0,50 mm in grade P20.
20,51-21,00	21034 Dxx.xx	★	★	25	159	91	74	56	0,4		
21,01-21,50	21534 Dxx.xx	★	★	25	164(162)	96(94)	75	56	0,4		
21,51-22,00	22034 Dxx.xx	★	★	25	164	96	77	56	0,4		
22,01-22,50	R411.5- 22534 Dxx.xx	★	★	25	168(166)	100(98)	79	56	0,4		
22,51-23,00	23034 Dxx.xx	★	★	25	168	100	81	56	0,4		
23,01-23,50	23534 Dxx.xx	★	★	25	174(172)	106(104)	82	56	0,4		
23,51-24,00	24034 Dxx.xx	★	★	25	174	106	84	56	0,4		
24,01-24,50	R411.5- 24534 Dxx.xx	★	★	32	183(181)	110(108)	86	60	0,4		
24,51-25,00	25034 Dxx.xx	★	★	32	183	110	88	60	0,4		
25,01-25,50	25534 Dxx.xx	★	★	32	189(187)	116(114)	89	60	0,4		
25,51-26,00	26034 Dxx.xx	★	★	32	189	116	91	60	0,4		
26,01-26,50	R411.5- 26534 Dxx.xx	★	★	32	193(191)	120(118)	93	60	0,4		
26,51-27,00	27034 Dxx.xx	★	★	32	193	120	95	60	0,4		
27,01-27,50	27534 Dxx.xx	★	★	32	199(197)	126(124)	96	60	0,4		
27,51-28,00	28034 Dxx.xx	★	★	32	199	126	98	60	0,4		
28,01-28,50	R411.5- 28534 Dxx.xx	★	★	32	204(202)	131(129)	100	60	0,4		
28,51-29,00	29034 Dxx.xx	★	★	32	204	131	102	60	0,4		
29,01-29,50	29534 Dxx.xx	★	★	32	208(206)	135(133)	103	60	0,4		
29,51-30,40	30034 Dxx.xx	★	★	32	208	135	105	60	0,4		

<sup>1)</sup> Internal Coromant standard.

Ordering example: 10 pieces R411.5-10034-D09.50P20

= lengths have been modified (parenthesis = previous length)

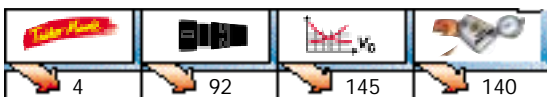
### Regrinding

For regrinding service, please contact your Sandvik representative for support.

### Carbide grades

P20, TiN-coated. For general applications.

K20, TiN coated. For stainless steel, cast iron, aluminium and heat resistant materials.



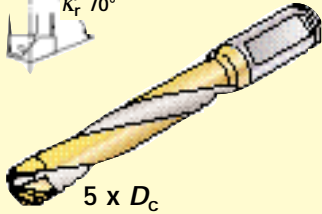
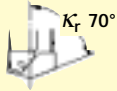


# Coromant Delta drills

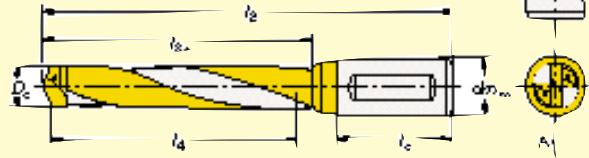
## Brazed carbide drills

Cylindrical shank with flat according to ISO 9766

R411.5



Drill diameter: 9,50-20,00 mm  
 Hole depth:  $5 \times D_c$   
 Hole tolerance: IT9-10  
 Surface finish:  $R_a$  2-4  $\mu$ m  
 Cutting fluid: Emulsion or Neat oil  
 Tolerances:  $D_c$  mm =js7  
 $dm_m$  =h6



$l_4$  = Recommended drilling depth

Drill diameter $D_c$ mm	Ordering code	Coromant grades		Dimensions, mm						Stocked drills
		<b>P</b>	<b>M</b> <b>K</b>	$dm_m$	$l_2$	$l_{3s}$	$l_4$	$l_c$		
9,50-10,00	R411.5- 10054 Dxx.xx	★	★	16 <sup>1)</sup>	113	54	50	48	0,1	Drills in the diameter range 10,0 – 20,0 mm are available as stocked standard in steps of 0,5 mm in grade P20.
10,01-10,50	10554 Dxx.xx	★	★	16 <sup>1)</sup>	116	57	53	48	0,1	
10,51-11,00	11054 Dxx.xx	★	★	16 <sup>1)</sup>	120	61	55	48	0,1	
11,01-11,50	11554 Dxx.xx	★	★	16 <sup>1)</sup>	122	63	58	48	0,1	
11,51-12,00	12054 Dxx.xx	★	★	16 <sup>1)</sup>	126	67	60	48	0,1	
12,01-12,50	R411.5- 12554 Dxx.xx	★	★	16 <sup>1)</sup>	133(130)	74(71)	63	48	0,1	
12,51-13,00	13054 Dxx.xx	★	★	16 <sup>1)</sup>	133	74	65	48	0,1	
13,01-13,50	13554 Dxx.xx	★	★	16 <sup>1)</sup>	139(135)	80(76)	68	48	0,1	
13,51-14,00	14054 Dxx.xx	★	★	16 <sup>1)</sup>	139	80	70	48	0,1	
14,01-14,50	R411.5- 14554 Dxx.xx	★	★	20	146(143)	86(83)	73	50	0,2	
14,51-15,00	15054 Dxx.xx	★	★	20	146	86	75	50	0,2	
15,01-15,50	15554 Dxx.xx	★	★	20	152(148)	92(88)	78	50	0,2	
15,51-16,00	16054 Dxx.xx	★	★	20	152	92	80	50	0,2	
16,01-16,50	R411.5- 16554 Dxx.xx	★	★	20	159(156)	99(96)	83	50	0,2	
16,51-17,00	17054 Dxx.xx	★	★	20	159	99	85	50	0,2	
17,01-17,50	17554 Dxx.xx	★	★	20	163(159)	103(99)	88	50	0,3	
17,51-18,00	18054 Dxx.xx	★	★	20	163	103	90	50	0,3	
18,01-18,50	R411.5- 18554 Dxx.xx	★	★	20	167	107	93	50	0,3	
18,51-19,00	19054 Dxx.xx	★	★	25	178	110	95	56	0,3	
19,01-19,50	19554 Dxx.xx	★	★	25	184(180)	116(112)	98	56	0,3	
19,51-20,00	20054 Dxx.xx	★	★	25	184	116	100	56	0,3	

<sup>1)</sup> Internal Coromant standard.

Ordering example: 10 pieces R411.5-10054-D09.50 P20

  = lengths have been modified (parenthesis = previous length)

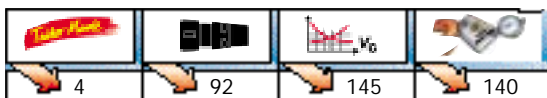
### Carbide grades

P20, TiN-coated. For general applications.

K20, TiN coated. For stainless steel, cast iron, aluminium and heat resistant materials.

### Regrinding

For regrinding service, please contact your Sandvik representative for support.





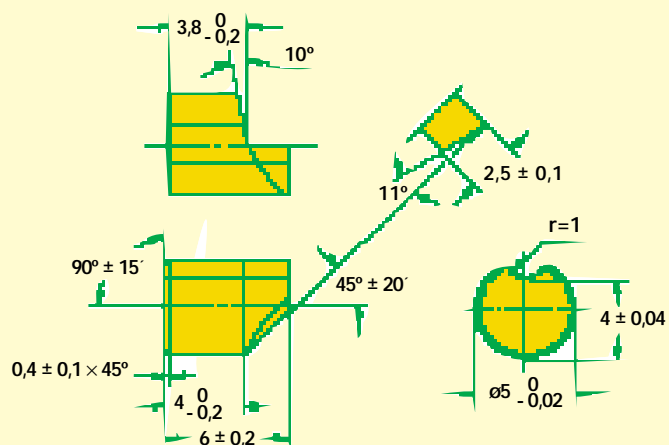
### Chamfering insert for Coromant Delta drills

Max. chamfer size 1,5 x 45°

Drill dia. > 12,25 mm



Drills with the chamfering insert mounted are available as Tailor Made.



Ordering code	Spare parts	Coromant grade		
Insert	Tension pin (Delivered with the insert).	H10F		
L142.01-05 06 00	3113 030-304	☆		

Ordering example: 5 pieces L142.01-05 06 00 H10F



- Quick quotation
- Easy to order
- Competitive delivery

#### Even more possibilities thanks to tailored design!

If you do not find what you need in our comprehensive standard programme, choose the tool shape you require and we will tailor it for you to *your* dimensions.

For more information see page 4.

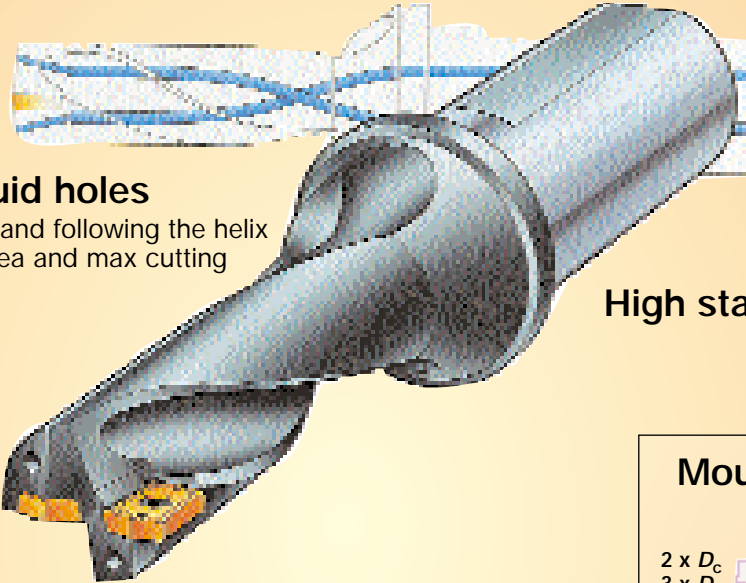


Indexable drills

# Coromant U

## Indexable drills with rigid helical design for high productivity

Lengths for hole depths: 2 x Dia., 3 x Dia. and 4 x Dia. As Tailor Made option: 5 x Dia  
Hole diameters 12,7–58 mm

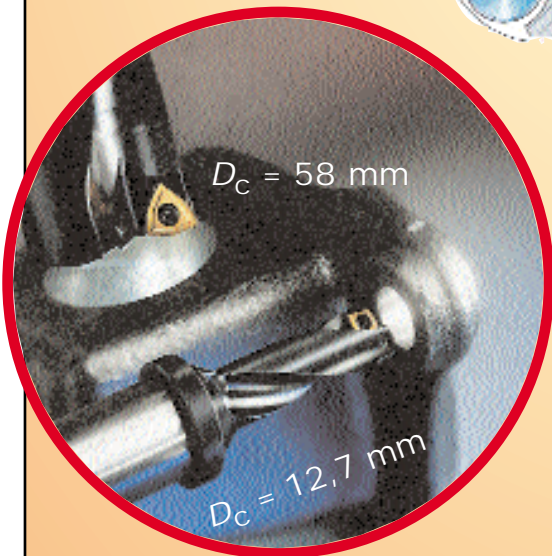
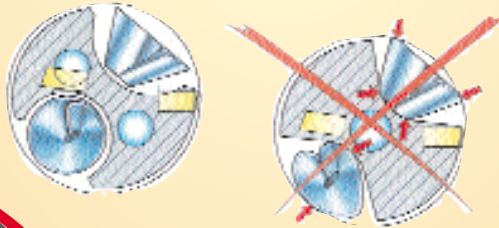


### Effective cutting fluid holes

located along the periphery and following the helix — to allow optimum flute area and max cutting fluid flow.

High stability shank

### Smooth, unobstructed chip evacuation



Hole diameter from 58 mm down to 12,7 mm

Indexable insert economy and productivity — no need for regrinding

### Mounting options

2 x  $D_c$   
3 x  $D_c$   
4 x  $D_c$    $D_c$  mm  
12,7–58

Cylindrical with flat  
- according to ISO 9766

3 x  $D_c$   
4 x  $D_c$    $D_c$  mm  
12,7–41

Coromant Capto®  
and  
KM® coupling<sup>1)</sup>

3 x  $D_c$   
4 x  $D_c$    $D_c$  mm  
12,7–41

Varilock<sup>1)</sup>

3 x  $D_c$    $D_c$  mm  
17,5–41,3

Coromant Whistle Notch<sup>1)</sup>

3 x  $D_c$   
4 x  $D_c$    $D_c$  mm  
17,5–41

Compatible with ABS holders<sup>1)</sup>

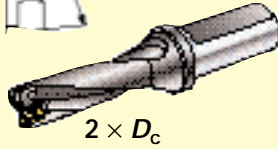
<sup>1)</sup>See Rotating Tools catalogue



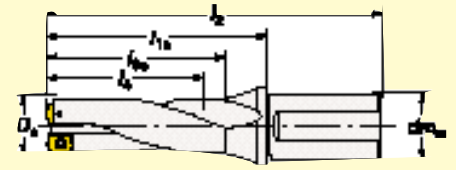
# Indexable drills

Cylindrical shank with flat according to ISO 9766

R416.2



Drill diameter: 12,7–58 mm  
 Hole depth:  $2 \times D_c$   
 Hole tolerance: +0,3 mm  
 -0,1 mm  
 Surface finish:  $R_a$  1–3  $\mu$ m  
 Cutting fluid: Emulsion  
 Tolerance  $dm_m = h_6$



$l_{1s}$  = programming length  
 $l_4$  = Recommended max drilling depth

Drill diameter $D_c$ mm	Ordering code	Dimensions, mm						Inserts <sup>1)</sup>	Spare parts		Radial adjustment (max)		
		$dm_m$	$l_{1s}$	$l_2$	$l_{3s}$	$l_4$	Insert screw		Screwdriver (Torx)		Max $D_c$		
12,7	R416.2- 0127L20-21	20	41	91	28	25	0,2	LCMX 02..P LCMX 02..C	5513 020-33	416.1-860 (T7)	+ 1,2	→ 15,1	
13	0130L20-21		42	92	29	26	0,2				+ 1,15		15,3
13,5	0135L20-21		43	93	30	27	0,2				+ 1,1		15,7
14	0140L20-21		44	95	31	28	0,2				+ 1,0		16,0
14,5	0145L20-21		46	96	32	29	0,2				+ 0,9		16,3
15	0150L20-21		47	97	33	30	0,2				+ 0,85		16,7
15,5	0155L20-21		49	99	35	31	0,2				+ 0,75		17,0
16	0160L20-21		51	101	36	32	0,2				+ 0,7		17,4
16,5	0165L20-21		52	102	37	33	0,2				+ 0,6		17,7
17	0170L20-21		53	103	38	34	0,2				+ 0,5		18,0
17,5	R416.2- 0175L25-21	25	55	111	39	35	0,3	LCMX 03	5513 020-19	416.1-860 (T7)	+ 1,0	→ 19,5	
18	0180L25-21		56	112	40	36	0,3				+ 0,9		19,8
18,5	0185L25-21		57	113	41	37	0,3				+ 0,85		20,2
19	0190L25-21		58	114	42	38	0,3				+ 0,8		20,6
20	0200L25-21		61	117	44	40	0,3				+ 0,75		21,5
21	R416.2- 0210L25-21	25	64	120	46	42	0,3	LCMX 04	5513 020-20	416.1-860 (T7)	+ 1,5	→ 24,0	
22	0220L25-21		66	122	48	44	0,3				+ 1,25		24,5
23	0230L25-21		69	125	50	46	0,3				+ 1,0		25,0
24	0240L25-21		71	127	52	48	0,4				+ 0,75		25,5
25	0250L25-21		74	130	54	50	0,4				+ 0,5		26,0
26	R416.2- 0260L32-21		32	77	137	56	52				0,6		WCMX 05
27	0270L32-21	79		139	58	54	0,6	+ 2,2	31,4				
28	0280L32-21	82		142	60	56	0,6	+ 2,1	32,2				
29	0290L32-21	84		144	62	58	0,6	+ 1,8	32,6				
30	0300L32-21	87		147	64	60	0,6	+ 1,8	33,0				
31	R416.2- 0310L40-21	40	90	160	66	62	1,0	WCMX 06	416.1-833	416.1-863 (T10)	+ 3,5	→ 38,0	
32	0320L40-21		92	162	68	64	1,0				+ 3,2		38,4
33	0330L40-21		95	165	70	66	1,1				+ 3,0		39,0
34	0340L40-21		98	168	73	68	1,1				+ 2,8		39,6
35	0350L40-21		101	171	75	70	1,1				+ 2,5		40,0
36	0360L40-21		104	174	77	72	1,1				+ 2,3		40,6
37	0370L40-21		105	175	78	74	1,2				+ 2,0		41,0
38	0380L40-21		108	178	80	76	1,2				+ 1,8		41,6
39	0390L40-21		110	180	82	78	1,2				+ 1,5		42,0
40	0400L40-21		113	183	84	80	1,3				+ 1,2		42,4
41	0410L40-21	117	187	87	82	1,3	+ 1,0	43,0					
42	R416.2- 0420L40-21	40	119	189	89	84	1,3	WCMX 08	416.1-834	416.1-864 (T15)	+ 4,2	→ 50,4	
43	0430L40-21		122	192	91	86	1,3				+ 4,0		51,0
44	0440L40-21		124	194	93	88	1,4				+ 3,7		51,4
45	0450L40-21		127	197	95	90	1,4				+ 3,6		52,2
46	0460L40-21		130	200	97	92	1,5				+ 3,3		52,6
47	0470L40-21		132	202	99	94	1,8				+ 3,0		53,0
48	0480L40-21		135	205	101	96	1,8				+ 2,7		53,4
49	0490L40-21		137	207	103	98	1,9				+ 2,5		54,0
50	0500L40-21		140	210	105	100	2,0				+ 2,2		54,4
51	0510L40-21		144	214	108	102	2,0				+ 2,0		55,0
52	0520L40-21		146	216	110	104	2,1				+ 1,8		55,6
53	0530L40-21		149	219	112	106	2,2				+ 1,5		56,0
54	0540L40-21		151	221	114	108	2,2				+ 1,2		56,4
55	0550L40-21		154	224	116	110	2,3				+ 0,8		56,6
56	0560L40-21		157	227	118	112	2,4				+ 0,6		57,2
57	0570L40-21		159	229	120	114	2,4				+ 0,5		58,0
58	0580L40-21		162	232	122	116	2,5				+ 0,4		58,8

<sup>1)</sup> Inserts are ordered separately.

Ordering example: 2 pieces R416.2-0127L20-21

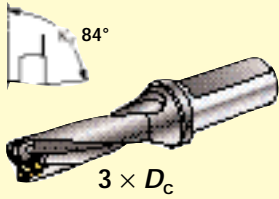


# Coromant U drills

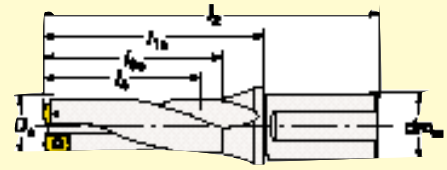
## Indexable drills

Cylindrical shank with flat according to ISO 9766

R416.2



Drill diameter: 12,7–58 mm  
 Hole depth:  $3 \times D_c$   
 Hole tolerance: +0,3 mm  
 -0,1 mm  
 Surface finish:  $R_a$  1–3  $\mu$ m  
 Cutting fluid: Emulsion  
 Tolerance  $dm_m = h6$



$l_{1s}$  = programming length  
 $l_4$  = Recommended max drilling depth

Drill diameter $D_c$ mm	Ordering code	Dimensions, mm						Inserts <sup>1)</sup>	Spare parts		Radial adjustment (max)		
		$dm_m$	$l_{1s}$	$l_2$	$l_{3s}$	$l_4$	Insert screw		Screwdriver (Torx)		Max $D_c$		
12,7	R416.2- 0127L20-31	20	54	104	41	38	0,2	LCMX 02..P LCMX 02..C	5513 020-33	416.1-860 (T7)	+ 1,2	→ 15,1	
13			55	105	42	39	0,2				+ 1,15		15,3
13,5			56	106	43	41	0,2				+ 1,1		15,7
14			58	108	45	42	0,2				+ 1,0		16,0
14,5			60	110	46	44	0,2				+ 0,9		16,3
15			62	112	48	45	0,2				+ 0,85		16,7
15,5			64	114	50	47	0,2				+ 0,75		17,0
16			66	116	51	48	0,2				+ 0,7		17,4
16,5			68	118	53	50	0,2				+ 0,6		17,7
17			69	119	54	51	0,2				+ 0,5		18,0
17,5	R416.2- 0175L25-31	25	72	128	56	53	0,3	LCMX 03	5513 020-19	416.1-860 (T7)	+ 1,0	→ 19,5	
18			73	129	57	54	0,3				+ 0,9		19,8
18,5			75	131	59	56	0,3				+ 0,85		20,2
19			76	132	60	57	0,3				+ 0,8		20,6
20	81	137	64	60	0,3	+ 0,75	21,5						
21	R416.2- 0210L25-31	25	84	140	66	63	0,3	LCMX 04	5513 020-20	416.1-860 (T7)	+ 1,5	→ 24,0	
22			87	143	69	66	0,3				+ 1,25		24,5
23			91	147	72	69	0,3				+ 1,0		25,0
24			95	151	76	72	0,4				+ 0,75		25,5
25			99	155	79	75	0,4				+ 0,5		26,0
26	R416.2- 0260L32-31	32	102	162	81	78	0,6	WCMX 05	416.1-832	416.1-862 (T9)	+ 2,5	→ 31,0	
27			105	165	84	81	0,6				+ 2,2		31,4
28			109	169	87	84	0,6				+ 2,1		32,2
29			112	172	90	87	0,7				+ 1,8		32,6
30			117	177	94	90	0,7				+ 1,8		33,0
31	R416.2- 0310L40-31	40	121	191	97	93	1,0	WCMX 06	416.1-833	416.1-863 (T10)	+ 3,5	→ 38,0	
32			124	194	100	96	1,0				+ 3,2		38,4
33			128	198	103	99	1,1				+ 3,0		39,0
34			131	201	106	102	1,1				+ 2,8		39,6
35			135	205	109	105	1,2				+ 2,5		40,0
36			139	209	112	108	1,2				+ 2,3		40,6
37			142	212	115	111	1,3				+ 2,0		41,0
38			146	216	118	114	1,3				+ 1,8		41,6
39			149	219	121	117	1,4				+ 1,5		42,0
40			153	223	124	120	1,4				+ 1,2		42,4
41			157	227	127	123	1,5				+ 1,0		43,0
42	R416.2- 0420L40-31	40	160	230	130	126	1,5	WCMX 08	416.1-834	416.1-864 (T15)	+ 4,2	→ 50,4	
43			164	234	133	129	1,6				+ 4,0		51,0
44			167	237	136	132	1,7				+ 3,7		51,4
45			172	242	140	135	1,7				+ 3,6		52,2
46			176	246	143	138	1,8				+ 3,3		52,6
47			179	249	146	141	2,1				+ 3,0		53,0
48			183	253	149	144	2,2				+ 2,7		53,4
49			186	256	152	147	2,3				+ 2,5		54,0
50			190	260	155	150	2,3				+ 2,2		54,4
51			194	264	158	153	2,4				+ 2,0		55,0
52			197	267	161	156	2,5				+ 1,8		55,6
53			201	271	164	159	2,6				+ 1,5		56,0
54			204	274	167	162	2,7				+ 1,2		56,4
55			209	279	171	165	2,8				+ 0,8		56,6
56			213	283	174	168	2,9				+ 0,6		57,2
57			216	286	177	171	3,0				+ 0,5		58,0
58			220	290	180	174	3,1				+ 0,4		58,8

<sup>1)</sup> Inserts are ordered separately.

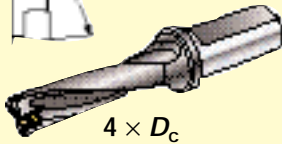
Ordering example: 2 pieces R416.2-0127L20-31



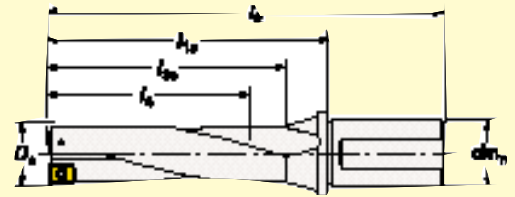
## Indexable drills

Cylindrical shank with flat according to ISO 9766

R416.2



Drill diameter: 12,7–58 mm  
 Hole depth:  $4 \times D_c$   
 Hole tolerance: +0,4 mm  
 -0,1 mm  
 Surface finish:  $R_a$  2–5  $\mu$ m  
 Cutting fluid: Emulsion  
 Tolerance  $dm_m = h6$



$l_{1S}$  = programming length  
 $l_4$  = Recommended max drilling depth

Drill diameter $D_c$ mm	Ordering code	Dimensions, mm							Inserts <sup>1)</sup>	Spare parts		Radial adjustment (max)	
		$dm_m$	$l_{1S}$	$l_2$	$l_{3S}$	$l_4$		Insert screw		Screwdriver (Torx)		Max $D_c$	
12,7	R416.2- 0127L20-41		66	116	53	51	0,2	LCMX 02..P LCMX 02..C	5513 020-33	416.1-860 (T7)	+ 1,2	→ 15,1	
13	0130L20-41		68	118	55	52	0,2				+ 1,15	→ 15,3	
13,5	0135L20-41	20	70	120	57	54	0,2				+ 1,1	→ 15,7	
14	0140L20-41		72	122	59	56	0,2				+ 1,0	→ 16,0	
14,5	0145L20-41		75	125	61	58	0,2				+ 0,9	→ 16,3	
15	0150L20-41		77	127	63	60	0,2				+ 0,85	→ 16,7	
15,5	0155L20-41		79	129	65	62	0,2				+ 0,75	→ 17,0	
16	0160L20-41	20	82	132	67	64	0,2				+ 0,7	→ 17,4	
16,5	0165L20-41		84	134	69	66	0,2				+ 0,6	→ 17,7	
17	0170L20-41		86	136	71	68	0,2				+ 0,5	→ 18,0	
17,5	R416.2- 0175L25-41		89	145	73	70	0,3	LCMX 03	5513 020-19	416.1-860 (T7)	+ 1,0	→ 19,5	
18	0180L25-41		91	147	75	72	0,3				+ 0,9	→ 19,8	
18,5	0185L25-41	25	93	149	77	74	0,3				+ 0,85	→ 20,2	
19	0190L25-41		95	151	79	76	0,3				+ 0,8	→ 20,6	
20	0200L25-41		101	157	84	80	0,3				+ 0,75	→ 21,5	
21	R416.2- 0210L25-41		105	161	87	84	0,3	LCMX 04	5513 020-20	416.1-860 (T7)	+ 1,5	→ 24,0	
22	0220L25-41		109	165	91	88	0,3				+ 1,25	→ 24,5	
23	0230L25-41	25	114	170	95	92	0,4				+ 1,0	→ 25,0	
24	0240L25-41		119	175	100	96	0,4				+ 0,75	→ 25,5	
25	0250L25-41		124	180	104	100	0,4				+ 0,5	→ 26,0	
26	R416.2- 0260L32-41		128	188	107	104	0,6	WCMX 05	416.1-832	416.1-862 (T9)	+ 2,5	→ 31,0	
27	0270L32-41		132	192	111	108	0,6				+ 2,2	→ 31,4	
28	0280L32-41	32	137	197	115	112	0,7				+ 2,1	→ 32,2	
29	0290L32-41		141	201	119	116	0,7				+ 1,8	→ 32,6	
30	0300L32-41		147	207	124	120	0,8				+ 1,5	→ 33,0	
31	R416.2- 0310L40-41		152	222	128	124	1,1	WCMX 06	416.1-833	416.1-863 (T10)	+ 3,5	→ 38,0	
32	0320L40-41		156	226	132	128	1,1				+ 3,2	→ 38,4	
33	0330L40-41	40	161	231	136	132	1,2				+ 3,0	→ 39,0	
34	0340L40-41		165	235	140	136	1,2				+ 2,8	→ 39,6	
35	0350L40-41		170	240	144	140	1,3				+ 2,5	→ 40,0	
36	0360L40-41		175	245	148	144	1,3				+ 2,3	→ 40,6	
37	0370L40-41		179	249	152	148	1,4				+ 2,0	→ 41,0	
38	0380L40-41		184	254	156	152	1,4				+ 1,8	→ 41,6	
39	0390L40-41	40	188	258	160	156	1,5				+ 1,5	→ 42,0	
40	0400L40-41		193	263	164	160	1,6				+ 1,2	→ 42,4	
41	0410L40-41		198	268	168	164	1,7				+ 1,0	→ 43,0	
42	R416.2- 0420L50-41		202	282	172	168	1,8	WCMX 08	416.1-834	416.1-864 (T15)	+ 4,2	→ 50,4	
43	0430L50-41		207	287	176	172	1,9				+ 4,0	→ 51,0	
44	0440L50-41	50	211	291	180	176	1,9				+ 3,7	→ 51,4	
45	0450L50-41		217	297	185	180	2,0				+ 3,6	→ 52,2	
46	0460L50-41		222	302	189	184	2,1				+ 3,3	→ 52,6	
47	0470L50-41		226	306	193	188	2,4				+ 3,0	→ 53,0	
48	0480L50-41		231	311	197	192	2,5				+ 2,7	→ 53,4	
49	0490L50-41	50	235	315	201	196	2,6				+ 2,5	→ 54,0	
50	0500L50-41		240	320	205	200	2,7				+ 2,2	→ 54,4	
51	0510L50-41		245	325	209	204	2,8				+ 2,0	→ 55,0	
52	0520L50-41		249	329	213	208	2,9				+ 1,8	→ 55,6	
53	0530L50-41		254	334	217	212	3,0				+ 1,5	→ 56,0	
54	0540L50-41	50	258	338	221	216	3,1				+ 1,2	→ 56,4	
55	0550L50-41		264	344	226	220	3,3				+ 0,8	→ 56,6	
56	0560L50-41		269	349	230	224	3,4				+ 0,6	→ 57,2	
57	0570L50-41		273	353	234	228	3,5				+ 0,5	→ 58,0	
58	0580L50-41	50	278	358	238	232	3,6				+ 0,4	→ 58,8	

<sup>1)</sup> Inserts are ordered separately.

Ordering example: 2 pieces R416.2-0127L20-41





# Inserts

## Inserts for Coromant U drills R416.2 and T-MAX U drills R416.9

Central  
LCMX 02  
C-53  
D<sub>c</sub> 12,7-17,0



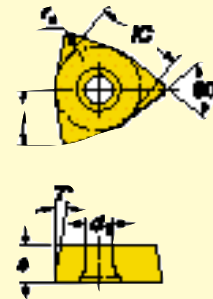
Peripheral  
LCMX 02  
P-53  
D<sub>c</sub> 12,7-17,0



LCMX 03/04  
D<sub>c</sub> 17,5-25,0



WCMX 05/06/08  
D<sub>c</sub> 26,0-80,0

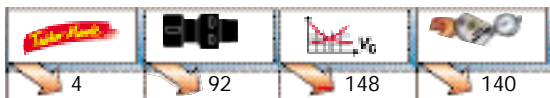


Insert code		Coromant grades see page 163												Dimensions, mm				
		P STEEL				M STAINLESS STEEL				K CAST IRON								
		3040	235	1020	1120	3040	235	1020	1120	H13A	3040	1020	1120	H13A	l	iC	d <sub>1</sub>	s
<b>All-round geometry</b>																		
02	LCMX 02 02 04 P-53	★		☆		☆		★		★	☆			2,68	-	2,5	2,38	0,4
	02 02 04 C-53		★				★				☆			2,68	-	2,5	2,38	0,4
03	LCMX 03 03 08-53	★	☆	☆		☆	☆	★	☆	★	☆	☆		3,25	-	2,5	3,18	0,8
	03 03 08-53			★			☆	★	☆		☆	☆		3,25	-	2,5	3,18	0,8
	03 03 04-58	★	☆			★	☆		☆	★				3,25	-	2,5	3,18	0,4
04	LCMX 04 03 08-53	★	☆	☆		☆	☆	★	☆	★	☆	☆		4,0	-	2,8	3,18	0,8
	04 03 08-53			★			☆	★	☆		☆	☆		4,0	-	2,8	3,18	0,8
	04 03 04-58	★	☆			★	☆		☆	★				4,0	-	2,8	3,18	0,4
05	WCMX 05 03 08 R-53	★		☆	☆		☆	☆	★	☆	☆	☆		5,07	7,938	3,2	3,18	0,8
	05 03 08 R-53			★			☆	★	☆		☆	☆		5,07	7,938	3,2	3,18	0,8
	05 03 08-58	★	☆			★	☆		☆	★				5,07	7,938	3,2	3,18	0,8
	05 03 08-56		☆				☆							5,07	7,938	3,2	3,18	0,8
06	WCMX 06 T3 08 R-53	★	☆	☆		☆	☆	★	☆	★	☆	☆		6,14	9,525	3,7	3,97	0,8
	06 T3 08 R-53			★			☆	★	☆		☆	☆		6,14	9,525	3,7	3,97	0,8
	06 T3 08-58	★	☆			★	☆		☆	★				6,14	9,525	3,7	3,97	0,8
	06 T3 08-56		☆				☆							6,14	9,525	3,7	3,97	0,8
08	WCMX 08 04 12 R-53	★	☆	☆		☆	☆	★	☆	★	☆	☆		8,14	12,7	4,3	4,76	1,2
	08 04 12 R-53			★			☆	★	☆		☆	☆		8,14	12,7	4,3	4,76	1,2
	08 04 12-58	★	☆			★	☆		☆	★				8,14	12,7	4,3	4,76	1,2
	08 04 12-56		☆				☆							8,14	12,7	4,3	4,76	1,2
05	WCMX 05 03 08 R-51		☆				☆		☆			☆		5,07	7,938	3,2	3,18	0,8
06	WCMX 06 T3 08 R-51		☆				☆		☆			☆		6,14	9,525	3,7	3,97	0,8
08	WCMX 08 04 12 R-51		☆				☆		☆			☆		8,14	12,7	4,3	4,76	1,2
<b>Optimized geometry</b>																		
02	LCMX 02 02 04 TC-53			★				★				★		2,68	-	2,5	2,38	0,4
03	LCMX 03 03 08 T-53			★				★				★		3,25	-	2,5	3,18	0,8
04	LCMX 04 03 08 T-53			★				★				★		4,0	-	2,8	3,18	0,8
05	WCMX 05 03 08 T-53			★				★				★		5,07	7,938	3,2	3,18	0,8
06	WCMX 06 T3 08 T-53			★				★				★		6,14	9,525	3,7	3,97	0,8
08	WCMX 08 04 12 T-53			★				★				★		8,14	12,7	4,3	4,76	1,2

★ = First choice

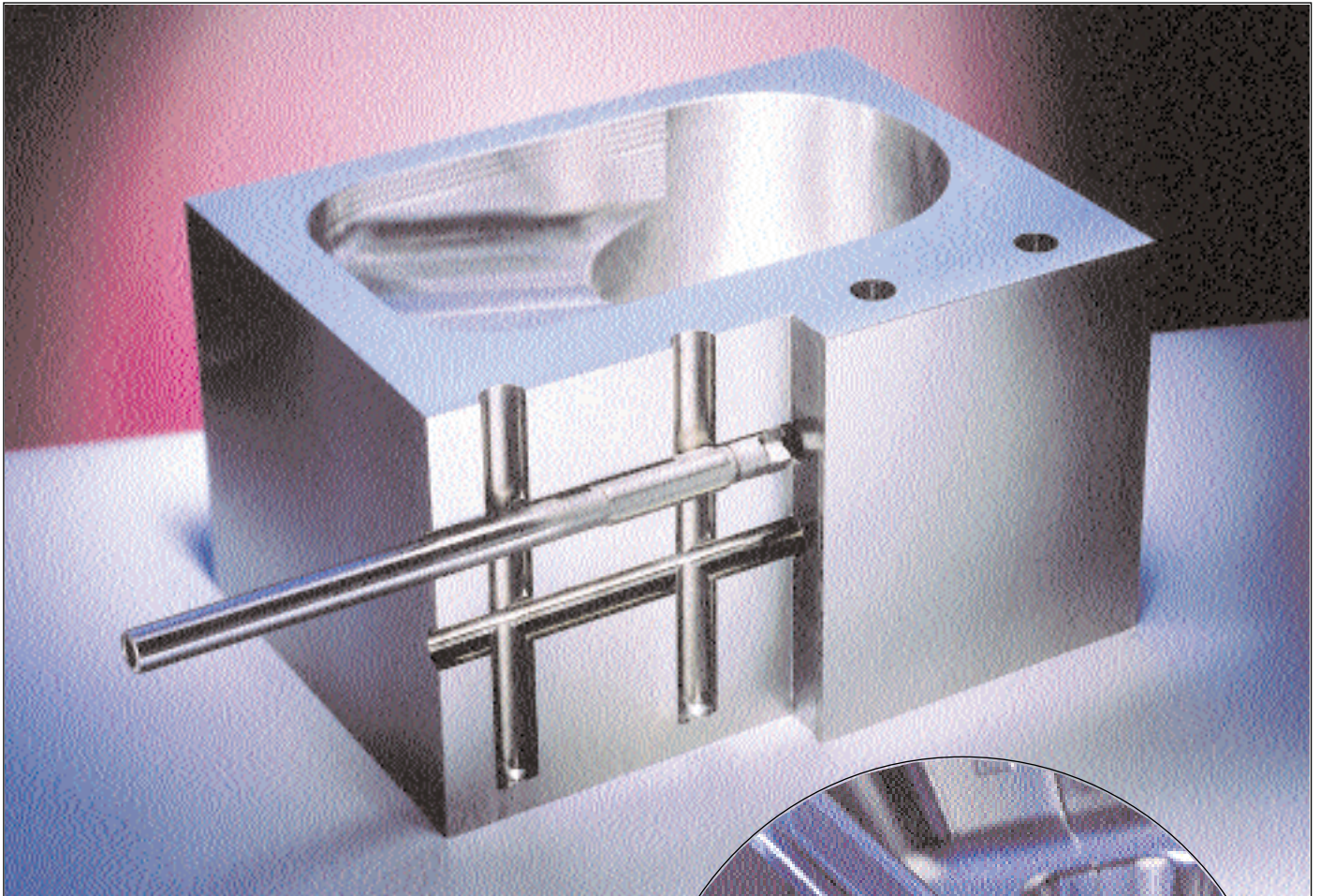
Ordering example: 100 pieces LCMX 02 02 04 P-53 3040

For spare parts see Rotating Tools catalogue.

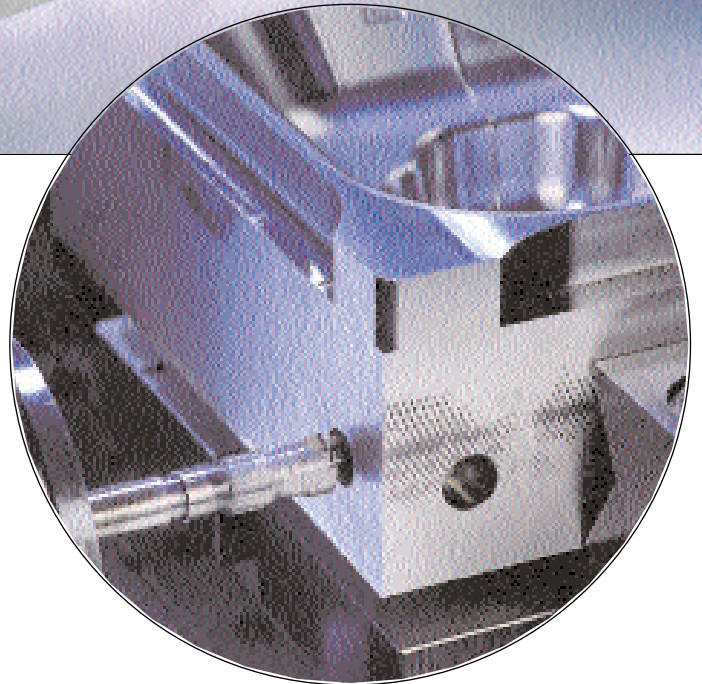




# Drilling of cross coolant holes in dies – the high productivity solution



Sandvik's STS drill and adaptor





## Deep hole drilling

# Deep hole drilling systems

When we talk about deep holes, we mean a high ratio between hole depth and hole diameter. The term "deep holes" originally referred to hole depths of over  $5 \times$  the diameter. Today, deep-hole drilling is a collective name for methods for the machining of both short and deep holes.

Deep-hole drilling is the preferred method for drilling hole depths of more than  $10 \times$  the diameter, but because of the method's high metal-removing capacity and precision, it is also competitive for small holes down to  $2 \times$  the diameter.

During drilling, it is important that the chips be broken and that they can be transported away without jamming and affecting the drilled surface. In deep-hole drilling, cutting fluid supply and chip transport have been provided for by the development of three different systems that permit trouble-free machining of hole depths of more than  $100 \times$  the diameter.

The three systems are called: the Single Tube System (STS), the Ejector system (two-tube system) and the Gun drilling system.

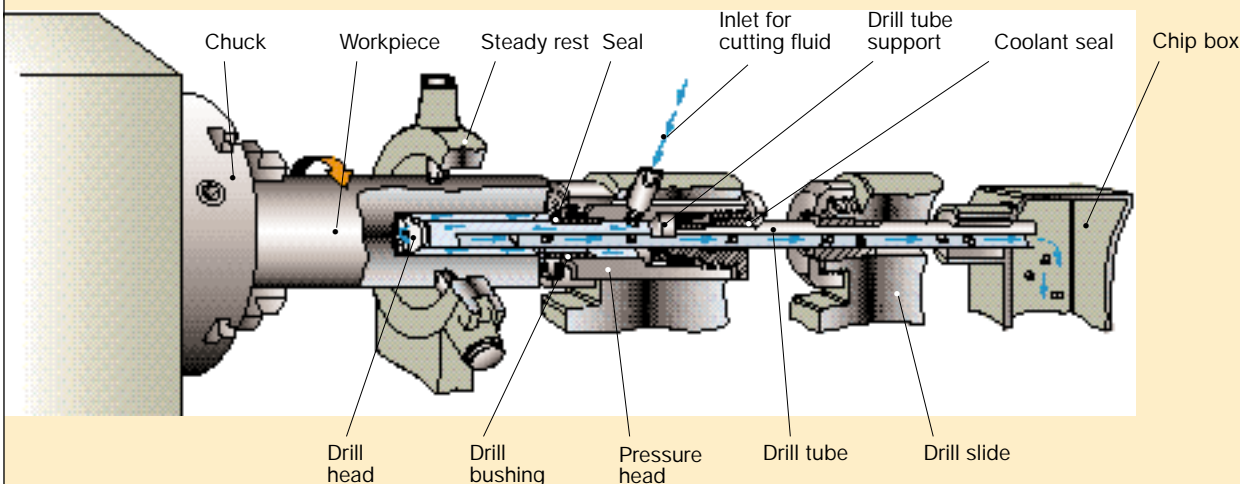
## The Single Tube System – STS

### The first choice for high productivity

The single Tube System is based on external cutting fluid supply and internal chip transport. As a rule, the drill head is screwed onto the drill tube. The cutting fluid is supplied via the space between the drill tube and the drilled hole. The cutting fluid is then removed along with the chips through the drill tube. The velocity of the cutting fluid is so high that chip transport takes place through the tube without disturbances.

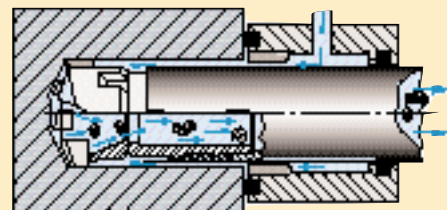
Since chip evacuation is internal, no chipflute is required in the shank, so its cross-section can be made completely round, which provides much higher rigidity than in the gundrill system. The productivity for the STS drilling is up to 5 times higher than for Gun drilling.

### The Single Tube System, STS



### Preferred application

1. High productivity
2. Long workpiece
3. Large diameters
4. Difficult chipbreaking
5. Stainless steel
6. Low carbon steel
7. Heat exchangers
8. Uneven materials
9. Long production runs
10. Special machines for mass production



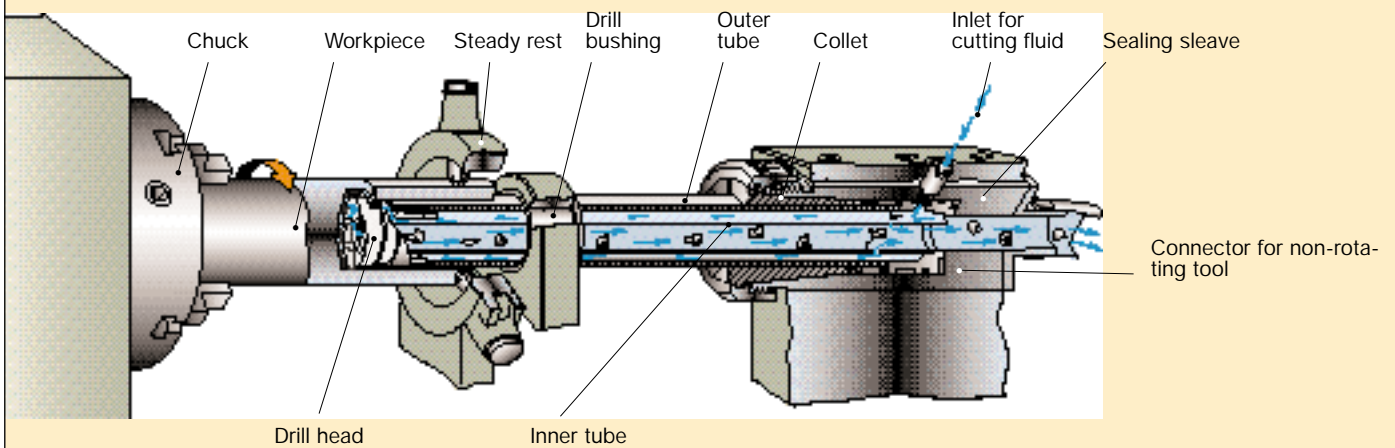


## The Ejector system

The Ejector system consists of drill head, outer tube, inner tube, connector, collet and sealing sleeve. The drill head is screwed to the drill tube by means of a four-start square thread. The inner tube is 30 mm longer than the outer tube, up to drill diameter 65 mm. The drill tube and the inner tube are attached to the connector by means of a collet and a sealing sleeve.

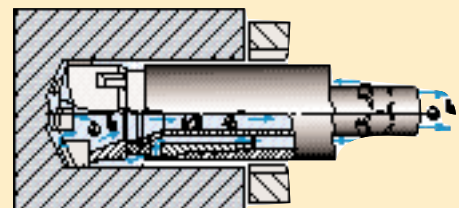
The collet and sealing sleeve must be changed for different diameter ranges, i.e. drill tube diameters.

### The Ejector system



### Preferred application

1. Economical and easy to apply to horizontal boring machines - NC lates
2. Chuck automates start from pre-drilled hole
3. NC-lathes start from pre-drilled hole
4. Machining centres with tool exchanger
5. Transfer lines
6. Easy machining materials
7. No sealing problems



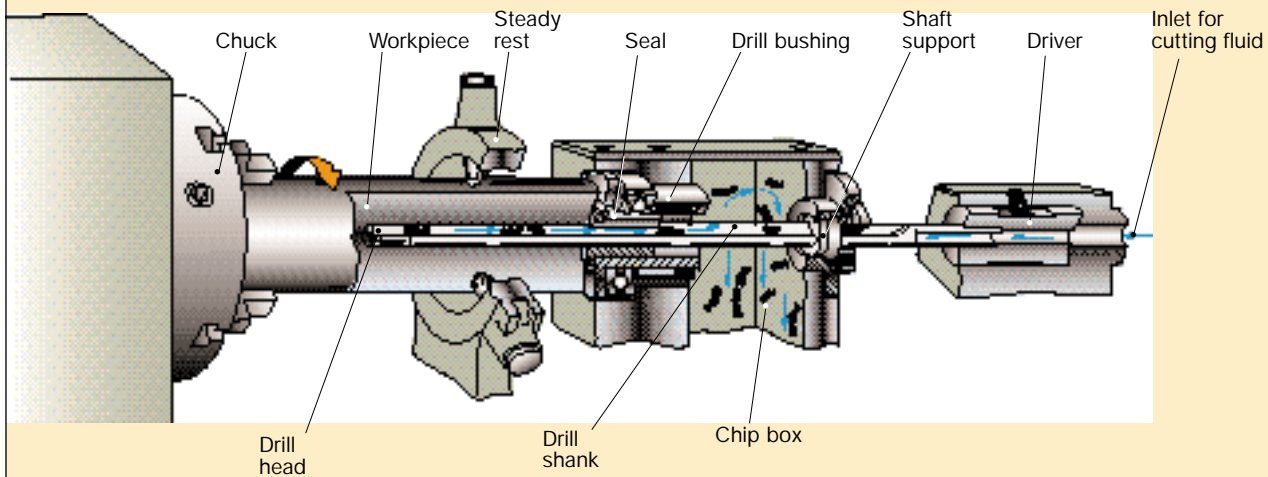


## Deep hole drilling

### The gun drill system

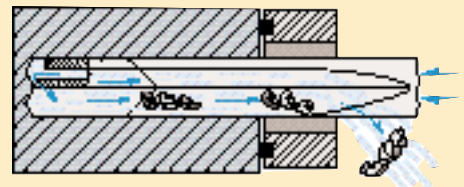
The gun drill system uses the oldest principle for cutting fluid supply. The cutting fluid is supplied through a duct inside the drill and delivers coolant to the cutting edge, after which it removes the chips through a V-shaped chip flute along the outside of the drill. Due to the V-groove, the cross-section of the tube occupies 3/4 of its circumference.

### The gun drill system



### Preferred application

1. Small diameters
2. Difficult chipbreaking
3. Machining centres - (high coolant pressure needed)
4. NC lathes

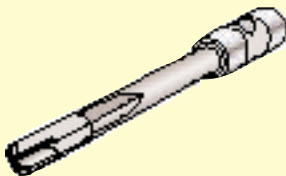
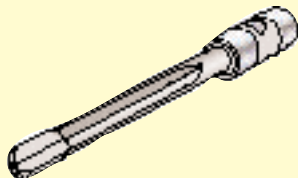




## Gun drills

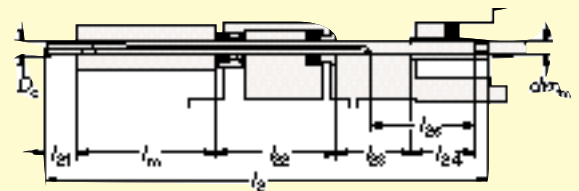
Solid carbide and carbide tipped heads  
428.9

Drill diameter: 0,98-35,00 mm  
 Hole depth: Over 100 × diameter  
 Hole tolerance: IT9  
 Surface finish:  $R_a$  0,1-3,20  $\mu$ m  
 Cutting fluid: Neat oil  
 Tolerance:  $D_c = h6$   
 $dm_m = d9$

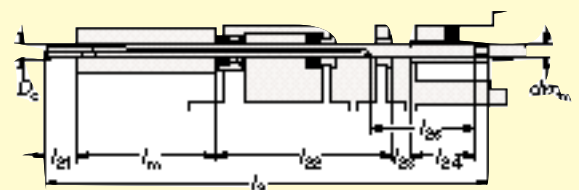


$D_c$  = Drill diameter  
 $dm_m$  = Tube diameter  
 $l_2$  = Overall length with or without driver  
 $l_{21}$  = Addition for regrinding  
 $l_m$  = Depth of hole

Without steady rest



With steady rest



$l_{22}$  = Length of chip box with or without tool steady  
 $l_{23}$  = Minimum clearance  
 $l_{24}$  = Soldering length  
 $l_{25}$  = Cylindrical length of tube

### Solid carbide head

Drill diameter $D_c$ mm	Ordering code <b>P M K</b>	Dimensions, mm			
		$l_{21}$	$l_{23}$	$l_{24}$	$l_{25}$
0,98- 2,15	428.9-xxxxx-AAAA-BBB	10	25	20	25
2,16- 2,40	xxxxx-AAAA-BBB	11	25	20	25
2,41- 2,70	xxxxx-AAAA-BBB	12	25	20	25
2,71- 3,00	xxxxx-AAAA-BBB	13	25	20	25
3,01- 3,30	xxxxx-AAAA-BBB	14	30	20	25
3,31- 3,60	428.9-xxxxx-AAAA-BBB	15	30	20	25
3,61- 3,95	xxxxx-AAAA-BBB	16	30	20	25
3,96- 4,35	xxxxx-AAAA-BBB	18	30	40	50
4,36- 4,75	xxxxx-AAAA-BBB	19	30	40	50
4,76- 5,55	xxxxx-AAAA-BBB	20	30	40	50
5,56- 6,30	428.9-xxxxx-AAAA-BBB	21	30	40	50
6,31- 6,55	xxxxx-AAAA-BBB	22	30	40	50
6,56- 7,05	xxxxx-AAAA-BBB	23	30	40	50
7,06- 7,55	xxxxx-AAAA-BBB	24	50	40	50
7,56- 8,60	xxxxx-AAAA-BBB	25	50	40	50
8,61- 9,20	428.9-xxxxx-AAAA-BBB	22	50	40	50
9,21-12,70	xxxxx-AAAA-BBB	22	50	40	55
12,71-15,20	xxxxx-AAAA-BBB	25	50	40	55
15,21-16,10	xxxxx-AAAA-BBB	25	80	40	55
16,11-20,60	xxxxx-AAAA-BBB	30	80	50	70
20,61-23,60	428.9-xxxxx-AAAA-BBB	34	80	50	70
23,61-25,70	xxxxx-AAAA-BBB	34	80	56	90
25,71-35,00	xxxxx-AAAA-BBB	38	80	65	90

### Carbide tipped head

Drill diameter $D_c$ mm	Ordering code <b>P M K</b>	Dimensions, mm			
		$l_{21}$	$l_{23}$	$l_{24}$	$l_{25}$
5,56- 7,05	428.9-xxxxx-AAAA-BBB	18	30	40	50
7,06- 7,55	xxxxx-AAAA-BBB	18	50	40	50
7,56- 9,20	xxxxx-AAAA-BBB	22	50	40	50
9,21-10,60	xxxxx-AAAA-BBB	22	50	40	55
10,61-15,20	xxxxx-AAAA-BBB	25	50	40	55
15,21-16,10	428.9-xxxxx-AAAA-BBB	25	80	40	55
16,11-20,60	xxxxx-AAAA-BBB	30	80	50	70
20,61-23,60	xxxxx-AAAA-BBB	34	80	50	70
23,61-25,70	xxxxx-AAAA-BBB	34	80	65	90
25,71-35,00	xxxxx-AAAA-BBB	38	80	65	90

When ordering gun drills the following must be stated:

- Drill diameter, xxxxx in the ordering code.
- Overall length  $l_2$ , AAAA in the ordering code.
- If required, driver No., BBB in the ordering code.
- Material to be drilled.
- If the drill requires a solid carbide head or a tipped head.

Ordering example for gun drill with solid carbide head  $D_c$  1,90 mm, length 250 mm with driver No 002 for drilling stainless steel:  
 2 pieces 428.9-01900-0250-002 solid carbide head for stainless steel.

Other dimensions on request

### Calculation of overall length

By using the diagram above, the correct overall length to be included in the ordering code, can be calculated.

$l_2$  = Overall length with or without driver

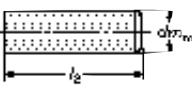
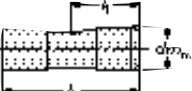
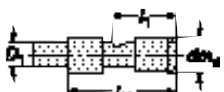
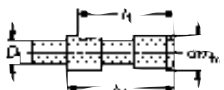
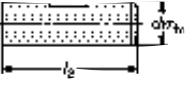
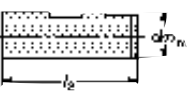
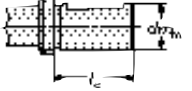
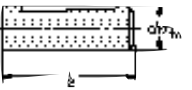
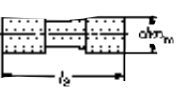
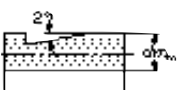
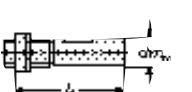
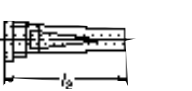


## SAFETY INFORMATION

Precautions when grinding and brazing of cemented carbide, see back inside cover.



# Gun drilling

Gun drills 428.9	Drill diameter	Driver	Dimensions, mm						Shank type
	$D_c$ mm	No.	$dm_m$	$D_1$	$l_1$	$l_2$	$l_{21}$	$l_c$	
	0,98- 1,94	Special design	4	-	-	30	-	-	-
	1,90-20,50	002	16	-	31	45	-	-	-
	1,90-29,60	003	20	-	34	70	-	-	-
	10,00-48,99	005	32	-	34	70	-	-	-
	4,00-20,50	035	19,05	-	34	70	-	-	-
	6,00-49,00	036	25,40	-	34	70	-	-	-
	9,70-49,00	037	31,75	-	34	70	-	-	-
	9,70-49,00	038	38,10	-	34	70	-	-	-
	1,90- 7,30	601	10	-	24	40	-	-	-
7,30-19,60	801	25	-	33,30	70	-	-	-	
	6,55-12,50	602	10	8,20	24	-	40	-	-
	19,60-27,70	802 <sup>1)</sup>	25	20,30	33,30	-	70	-	-
	27,70-49,00	803 <sup>1)</sup>	25	26,40	33,30	-	70	-	-
	1,95-12,60	701	16	-	47	-	50	-	-
	12,60-20,50	702	16	13,5	47	-	50	-	-
	1,95-12,59	903	10	-	-	40	-	-	Weldon
	1,95-12,59	904	12	-	-	45	-	-	
	1,95-16,59	905	16	-	-	48	-	-	
	1,95-20,50	906	20	-	-	50	-	-	
	6,00-49,00	907	25	-	-	56	-	-	Weldon
	9,70-49,00	908	32	-	-	60	-	-	
	9,70-49,00	909	40	-	-	70	-	-	
	1,95-16,59	405	16	-	-	-	-	40	Coromant
	1,95-20,50	406	20	-	-	-	-	40	Whistle Notch
	6,00-26,60	407	25	-	-	-	-	45	
	9,70-34,50	408	32	-	-	-	-	45	
	9,70-42,70	409	40	-	-	-	-	55	
	1,95- 9,00	603	10	-	-	40	-	-	Whistle Notch
	1,95-12,59	604	12	-	-	45	-	-	
	1,95-16,59	605	16	-	-	48	-	-	
	1,95-20,50	606	20	-	-	50	-	-	
	6,00-49,00	607	25	-	-	56	-	-	
	9,70-49,00	608	32	-	-	60	-	-	
	1,95- 9,80	101	12,70	-	-	38,10	-	-	-
	1,95-12,00	102	16	-	-	70	-	-	-
	3,96-15,20	103	19,05	-	-	70	-	-	-
	3,96-29,60	104	20	-	-	70	-	-	-
	3,96-20,50	204	19,05	-	-	70	-	-	-
	6,00-49,00	205	25,40	-	-	70	-	-	-
	6,00-49,00	206	28	-	-	70	-	-	-
	9,70-49,00	207	31,75	-	-	70	-	-	-
	9,70-49,00	208	36	-	-	70	-	-	-
	9,70-49,00	209	38,10	-	-	70	-	-	-
	1,90-12,00	301 <sup>2)</sup>	16	-	112	-	-	-	-
	1,90-15,20	302 <sup>2)</sup>	20	-	126	-	-	-	-
	6,00-26,00	303 <sup>2)</sup>	28	-	126	-	-	-	-
	8,70-32,60	304 <sup>2)</sup>	36	-	162	-	-	-	-
	11,90-49,00	305 <sup>2)</sup>	48	-	166	-	-	-	-
	1,90- 9,20	501 <sup>2)</sup>	-	-	-	84	-	-	Morse taper 1
	9,20-16,10	503 <sup>2)</sup>	-	-	-	84	-	-	Morse taper 3
	16,10-23,60	504 <sup>2)</sup>	-	-	-	131	-	-	Morse taper 4
	23,40-34,00	505 <sup>2)</sup>	-	-	-	200	-	-	Morse taper 4

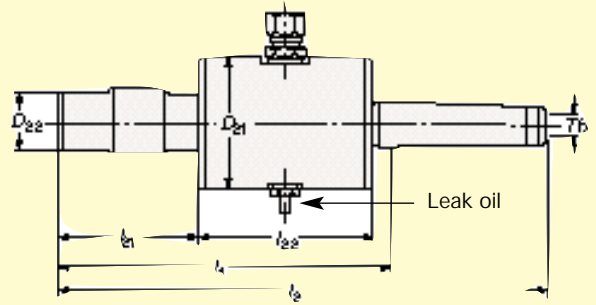
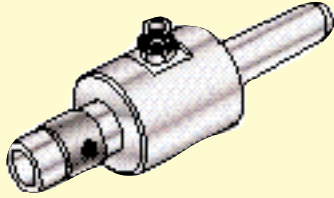
1) Supplied with driving dog.

2) Adjustable.



## Oil supply unit

For drill diameter: 1,95-35 mm



Drill diameter	Driver	Oil supply unit size <sup>1)</sup>	Shank	Max rev	Max pressure	Dimensions, mm						
						$D_c$ mm	$dm_m$ mm	Morse taper	RPM	MPa	$D_{21}$	$D_{22}$
1,95-25	10-28	1	3	10000	10	75	48	152,0	233	75	72	M12
25,01-35	28-38,1	2	4	4000	5	95	60	165	270	75	84	M14

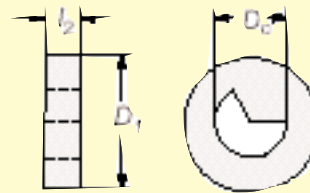
<sup>1)</sup> Oil supply units for drivers no. 002, 801, 802, 803 are stocked items. Oil supply units for other drivers on request.

Ordering example: 1 piece Oil supply unit, size 1

## Sealing disc

For drill diameter: 1,95-40 mm

The sealing disc fits tightly onto the drill shank and must be held in position in the chip box with a retaining device. This prevents the disc moving with the feed motion, which could cause chip obstruction.



	Drill diameter	Dimensions, mm	
	$D_c$ mm	$D_1$	$l_2$
Sealing disc	1,95- 6,24	20	3
	5,70-20,50	32	4
	6,25-32,00	40	4
	24,61-40,00	90	4

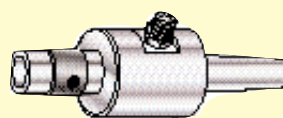
Ordering example: 1 piece sealing disc for drill diameter 1,95 mm

## Tool mounting

428.9  
Gun drill  
Page 83



Mounting direct into machine spindle



Oil supply units



Oil supply unit for automatic toolchange