

CoroDrill® 428

Wide range of application possibilities

Highly productive gun drills

Easy to use

- No pre-setting
- No need for tool room service

Single-lip 428.9

- Diameter range: 1.90 - 40.50 mm (.075 - 1.594 inch)
- Max length: $\leq 100 \times D$ (MC) or $\leq 150 \times D$ (DHM)
- Hole tolerance: IT9
- Surface finish: 0.1-3.0 μm
- Filter resolution: 10 - 20 μm
- Viscosity: $\varnothing$ 1.9 - 40.50 mm = 10 - 20 mm^2/S
- Cooling lubricant (coolant) required

Solid carbide gun drills 428.5

- Diameter range: 0.8 - 12.00 mm (.031 - .472 inch)
- Hole depth: 275 mm (10.827 inch)
- Hole tolerance: IT8
- Surface finish: 0.1 - 3.0 μm
- Filter resolution: 5 - 10 μm
- Viscosity: $\varnothing$ 0.8 - 2.0 mm = 7 - 10 mm^2/S , $\varnothing$ 2.0 - 12 mm = 10 - 20 mm^2/S
- Cooling lubricant (coolant) required



Twin-lip 428.2

- Diameter range: 6.00 - 26.50 mm (.236 - 1.043 inch)
- Max length: $\leq 100 \times D$
- Hole tolerance: IT10
- Surface finish: 1.0 - 4.0 μm
- Filter resolution: 10 - 20 μm
- Viscosity: $\varnothing$ 6.00 - 26.50 mm = 10 - 20 mm^2/S
- Cooling lubricant (coolant) required
- Suitable for short chipping materials
- The feed rate can be increased compared to single-lip

High feed gun drills 428.7

- Diameter range: 3.00 - 12.00 mm (.118 - .472 inch)
- Hole depth: 275 mm (10.827 inch)
- Hole tolerance: IT8
- Surface finish: 0.1-3.0 μm
- Filter resolution: 10 - 20 μm
- Viscosity: $\varnothing$ 3.00 - 12.00 mm = 10 - 20 mm^2/S
- Cooling lubricant (coolant) required

Wide application area

- Optimized grade- and geometry combinations for most workpiece materials
- When ordering state workpiece material to be drilled

Customer specified diameter

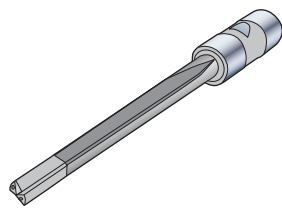
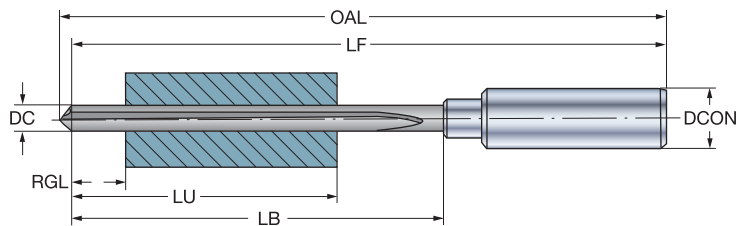
- Finish ground within 0.01 mm (.0004 inch) increments

ISO application area:



CoroDrill® 428

Twin-lip gun drill 428.2



- Hole depth:

Hole tolerance:

Surface finish R_a , μm :

Cutting fluid:

Tolerance:
- $\leq 100 \times \text{diameter}$ (Note! max OAL = 1250 mm)

IT10

0.1-4.0

Neat oil

DC = h5

DCON = h6

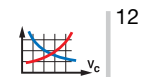
Diameter range		Ordering code	P K N			Dimensions, mm, inch
Min	Max					
DC	DC		K15	K15	K15	RGL
6.00	8.55	428.2-xxxxx-AAAA-BBB	☆	☆	☆	25
.278	.336					.984
8.56	13.05	428.2-xxxxx-AAAA-BBB	☆	☆	☆	25
.337	.513					.984
13.06	18.05	428.2-xxxxx-AAAA-BBB	☆	☆	☆	25
.514	.710					.984
18.06	23.00	428.2-xxxxx-AAAA-BBB	☆	☆	☆	30
.711	.905					1.181
23.01	26.50	428.2-xxxxx-AAAA-BBB	☆	☆	☆	35
.906	1.043					1.378

Ordering example for gun drill head DC 6.00 mm (.236 inch), length 250 mm (9.842 inch) with driver No 002 for drilling stainless steel:

When ordering gun drills the following must be stated:
Drill diameter, xxxxx in the ordering code.

2 pieces 428.2-06000-0250-002

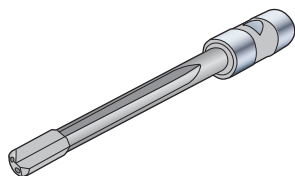
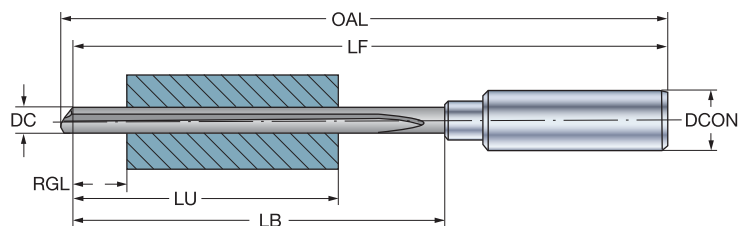
For further information, please contact your local sales representative.



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CoroDrill® 428

Single-lip gun drill 428.9



Hole depth: ≤ 150xD
Hole tolerance: IT9
Surface finish R_a , μm : 0.1-3.0
Cutting fluid: Neat oil
Tolerance: DC = h5
 DCON = d9

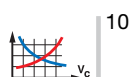
Diameter range		Ordering code	Diameter range, mm, inch				
Min	Max		P	M	K	N	S
DC	DC		K15	K15	K15	K15	K15
1.90	2.60	428.9-xxxxx-AAAA-BBB	☆	☆	☆	☆	☆
.075	.102						
2.61	3.35	428.9-xxxxx-AAAA-BBB	☆	☆	☆	☆	☆
.103	.132						
3.36	4.05	428.9-xxxxx-AAAA-BBB	☆	☆	☆	☆	☆
.133	.159						
4.06	5.15	428.9-xxxxx-AAAA-BBB	☆	☆	☆	☆	☆
.160	.202						
5.16	7.05	428.9-xxxxx-AAAA-BBB	☆	☆	☆	☆	☆
.203	.277						
7.06	8.55	428.9-xxxxx-AAAA-BBB	☆	☆	☆	☆	☆
.278	.336						
8.56	13.05	428.9-xxxxx-AAAA-BBB	☆	☆	☆	☆	☆
.337	.513						
13.06	18.05	428.9-xxxxx-AAAA-BBB	☆	☆	☆	☆	☆
.514	.710						
18.06	23.00	428.9-xxxxx-AAAA-BBB	☆	☆	☆	☆	☆
.711	.905						
23.01	26.50	428.9-xxxxx-AAAA-BBB	☆	☆	☆	☆	☆
.906	1.043						
26.51	32.00	428.9-xxxxx-AAAA-BBB	☆	☆	☆	☆	☆
1.044	1.259						
32.01	40.50	428.9-xxxxx-AAAA-BBB	☆	☆	☆	☆	☆
1.260	1.594						

Ordering example for gun drill head DC 1,90 mm (.075 inch), length 250 mm (9.842 inch) with driver No 002 for drilling stainless steel:

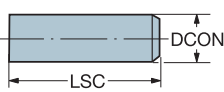
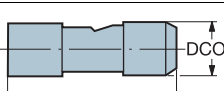
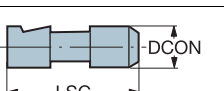
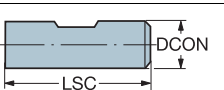
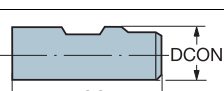
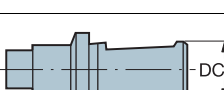
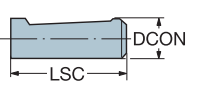
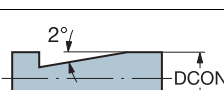
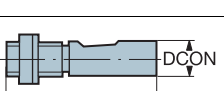
2 pieces 428.9-01900-0250-002

When ordering gun drills the following must be stated:
Drill diameter, xxxxx in the ordering code.

For further information, please contact your local sales representative.



Drivers for gun drills CoroDrill® 428.2 and 428.9

Drivers for gun drills 428.2 and 428.9	Diameter range		Driver ³⁾	Dimensions, millimeter, inch (mm, in.)			
	DC mm	DC inch		D CON	D CON"	LSC	LSC"
	1.90-4.50	.075-.177	006	6	.236	36	1.417
	1.90-7.30	.075-.287	010	10	.394	40	1.575
	1.90-12.40	.075-.488	016	16	.630	48	1.890
	1.90-15.90	.075-.626	020	20	.787	50	1.969
	6.00-19.50	.236-.768	025	25	.984	56	2.205
	1.90-18.20	.075-.716	125	25	.984	70	2.756
	18.30-23.00	.720-.905	225	25	.984	70	2.756
	23.10-49.00	.909-1.929	325	25	.984	70	2.756
	1.90-20.50	.075-.807	002	16	.630	45	1.772
	1.90-29.60	.075-1.165	003	20	.787	70	2.756
	10.00-48.99	.394-1.929	005	32	1.260	70	2.756
	4.00-20.50	.157-.807	035	19.05	.750	70	2.756
	6.00-49.00	.236-1.929	036	25.40	1.000	70	2.756
	1.90-7.30	.075-.287	601	10	.394	40	1.575
	7.30-19.60	.236-.772	801	25	.984	70	2.756
	6.55-12.50	.258-.492	602	10	.394	40	1.575
	19.60-49.00	.772-1.929	802 ¹⁾	25	.984	70	2.756
	1.95-12.60	.077-.496	701	16	.630	50	1.969
	12.60-20.50	.496-.807	702	16	.630	50	1.969
	1.95-12.59	.077-.495	903	10	.394	40	1.575
	1.95-12.59	.077-.495	904	12	.472	45	1.772
	1.95-16.59	.077-.667	905	16	.630	48	1.890
	1.95-20.50	.077-.807	906	20	.787	50	1.969
	6.00-49.00	.236-1.929	907	25	.984	56	2.205
	9.70-49.00	.382-1.929	908	32	1.260	60	2.362
	9.70-49.00	.382-1.929	909	40	1.575	70	2.756
	1.95-16.59	.077-.667	405	16	.630	40	1.575
	1.95-20.50	.077-.807	406	20	.787	40	1.575
	6.00-26.60	.236-1.047	407	25	.984	45	1.772
	9.70-34.50	.382-1.358	408	32	1.260	45	1.772
	9.70-42.70	.382-1.681	409	40	1.575	55	2.165
	1.95-9.00	.077-.354	603	10	.394	40	1.575
	1.95-12.59	.077-.495	604	12	.472	45	1.772
	1.95-16.59	.077-.667	605	16	.630	48	1.890
	1.95-20.50	.077-.807	606	20	.787	50	1.969
	6.00-49.00	.236-1.929	607	25	.984	56	2.205
	9.70-49.00	.382-1.929	608	32	1.260	60	2.362
	1.95-9.80	.077-.386	101	12.70	.500	38.10	1.500
	1.95-12.00	.077-.472	102	16	.630	69.8	2.748
	3.96-15.20	.156-.598	103	19.05	.750	69.8	2.748
	3.96-29.60	.156-1.165	104	20	.787	69.8	2.748
	3.96-20.50	.156-.807	204	19.05	.750	70	2.756
	6.00-49.00	.024-1.929	205	25.40	1.000	69.8	2.748
	6.00-49.00	.024-1.929	206	28	1.102	69.8	2.748
	9.70-49.00	.382-1.929	207	31.75	1.250	69.8	2.748
	9.70-49.00	.382-1.929	208	36	1.417	69.8	2.748
	9.70-49.00	.382-1.929	209	38.10	1.500	69.8	2.748
	1.90-12.00	.075-.472	301 ²⁾	16	.630	112	4.409
	1.90-15.20	.075-.598	302 ²⁾	20	.787	126	4.961
	6.00-26.00	.236-1.024	303 ²⁾	28	1.102	126	4.961

1) Supplied with driving dog.

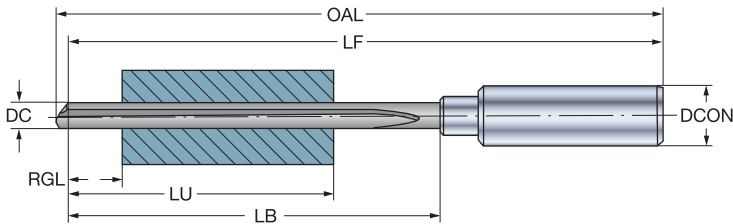
2) Adjustable

3) Available on request.

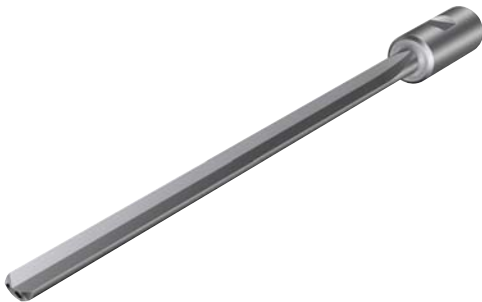
CoroDrill® 428.5, 428.7

Solid carbide gun drills 428.5

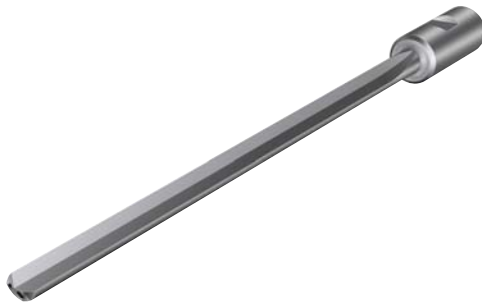
High feed gun drills 428.7



Solid carbide gun drills 428.5



High feed gun drills 428.7



Max hole depth, mm:	275
Hole tolerance:	IT8
Surface finish R_a , μm :	0.1-3.0
Cutting fluid:	Neat oil
Tolerance, DC:	h5
Tolerance, DCON:	g6

Max hole depth, mm:	275
Hole tolerance:	IT8
Surface finish R_a , μm :	0.1-3.0
Cutting fluid:	Neat oil
Tolerance, DC:	h5
Tolerance, DCON:	g6

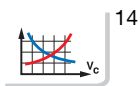
Diameter range mm (inch)	Ordering code P K N	Dimensions, mm (inch)	Diameter range mm (inch)	Ordering code P K N	Dimensions, mm (inch)
DC		RGL	DC		RGL
0.8-12.00 (.039-.472)	428.5- xxxxx-AAAA-BBB	8-25 (.315-.984)	3.00-12.00 (.118-.472)	428.7- xxxxx-AAAA-BBB	8-25 (.315-.984)

Ordering example for gun drill head Dc 3.00 mm (.118 inch), length 250 mm (9.842 inch) with driver No C01 for drilling stainless steel:

2 pieces 428.5-03000-0250-C01

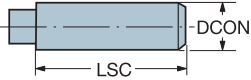
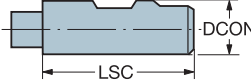
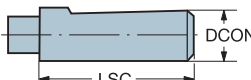
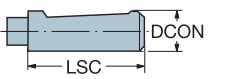
When ordering gun drills the following must be stated:
Drill diameter, xxxxx in the ordering code.

For further information, please contact your local sales representative.



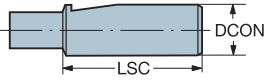
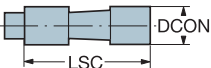
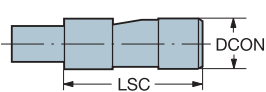
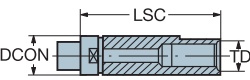
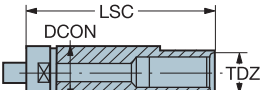
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Drivers for gun drills CoroDrill® 428.5 and 428.7

Drivers for gun drills 428.5 and 428.7	Diameter range, mm, inch		Driver	Dimensions, mm, inch				
	DC	DC"	No.	DCON	DCON"	LSC	LSC"	TDZ
	0.80-6.50	.075-.256	C00	10	.394	40	1.575	
	0.80-8.00	.075-.315	C01	12	.472	45	1.772	
	0.80-11.40	.075-.449	C02	16	.630	48	1.890	
	0.80-12.00	.075-.472	C03	20	.787	50	1.969	
	0.80-12.00	.075-.472	C04	25	.984	56	2.205	
	0.80-12.00	.075-.472	C05	32	1.260	60	2.362	
	0.80-2.799	.031-.110	C06	4	.157	34	1.339	
	2.80-4.00	.110-.157	C07	4	.157	35	1.378	
	1.00-7.10	.075-.280	C10	10	.394	40	1.575	
	1.00-8.00	.075-.315	C11	12	.472	45	1.772	
	1.00-12.00	.075-.472	C12	16	.630	48	1.890	
	1.00-12.00	.075-.472	C13	20	.787	50	1.969	
	1.00-12.00	.075-.472	C20	25	.984	56	2.205	
	1.00-12.00	.075-.472	C21	32	1.260	60	2.362	
	1.00-12.00	.075-.472	C22	40	1.575	70	2.756	
	1.00-7.10	.075-.280	C30	10	.394	40	1.575	
	1.00-8.00	.075-.315	C31	12	.472	45	1.772	
	1.00-11.40	.075-.449	C32	16	.630	48	1.890	
	1.00-12.00	.075-.472	C33	20	.787	50	1.969	
	1.00-12.00	.075-.472	C34	25	.984	56	2.205	
	1.00-12.00	.075-.472	C35	32	1.260	60	2.362	
	1.00-12.00	.075-.472	C35	32	1.260	60	2.362	
	1.00-6.50	.075-.256	C40	10	.394	40	1.575	
	1.00-8.00	.075-.315	C41	12	.472	45	1.772	
	1.00-11.40	.075-.449	C42	16	.630	48	1.890	
	1.00-12.00	.075-.472	C43	20	.787	50	1.969	
	1.00-12.00	.075-.472	C44	25	.984	56	2.205	

Driver Available on request.

Drivers for gun drills CoroDrill® 428.5 and 428.7

Drivers for gun drills 428.5 and 428.7	Diameter range, mm, inch		Driver	Dimensions, mm, inch				
	DC	DC"		DCON	DCON"	LSC	LSC"	TDZ
	1.00-8.70	.075-.343	D00	16	.630	50	1.969	
	1.00-8.30 1.00-12.00	.075-.327 .075-.472	D10 D11	12.7 19.05	.500 .750	38.1 69.8	1.500 2.748	
	1.00-12.00	.075-.472	D20	25.4	1.000	69.8	2.748	
	1.00-12.00	.075-.472	D30	12.7	.500	38.1	1.500	
	1.00-6.80 1.00-12.00	.075-.268 .075-.472	D40 D42	10 25	.394 .984	60 100	2.362 3.937	M6x0.5 M16x1.5
	1.00-10.00 1.00-12.00	.268-.394 .075-.472	D50 D51	10 16	.394 .630	60 80	2.362 3.150	M6x0.5 M10x1

Driver Available on request.

CoroChuck™ 930

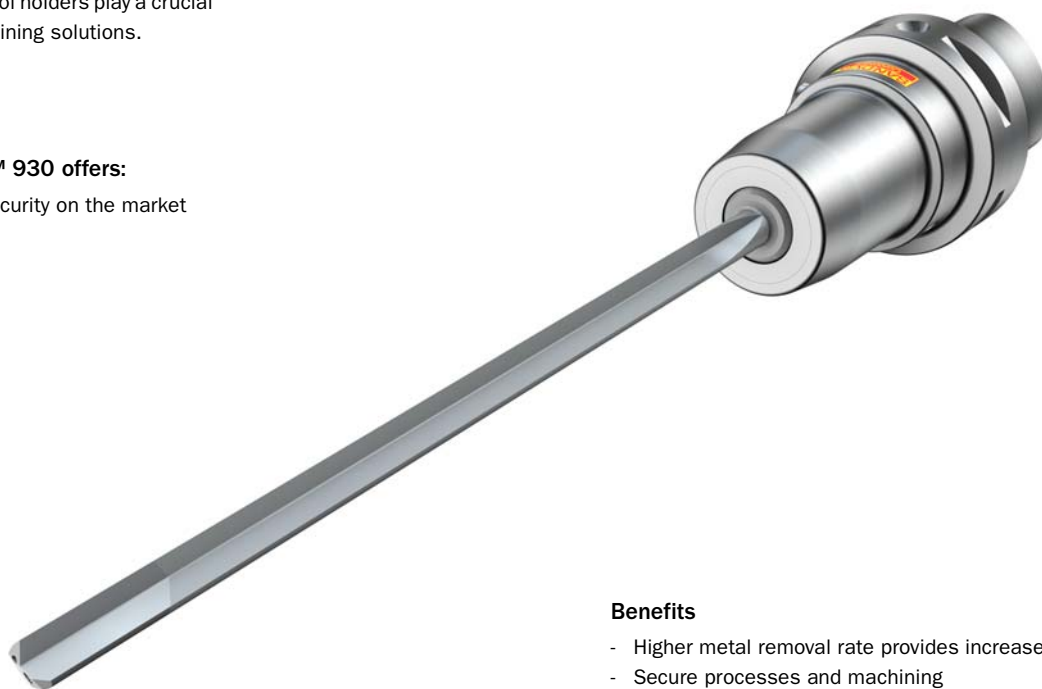
High precision hydraulic chuck

Efficient, quality machining requires first class equipment all the way from the machine to the tool tip.

Secure, precise tool holders play a crucial role in most machining solutions.

The CoroChuck™ 930 offers:

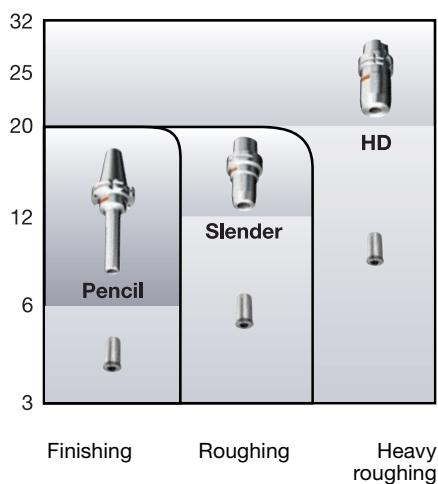
- Best pull-out security on the market
- Easy handling
- High precision



Benefits

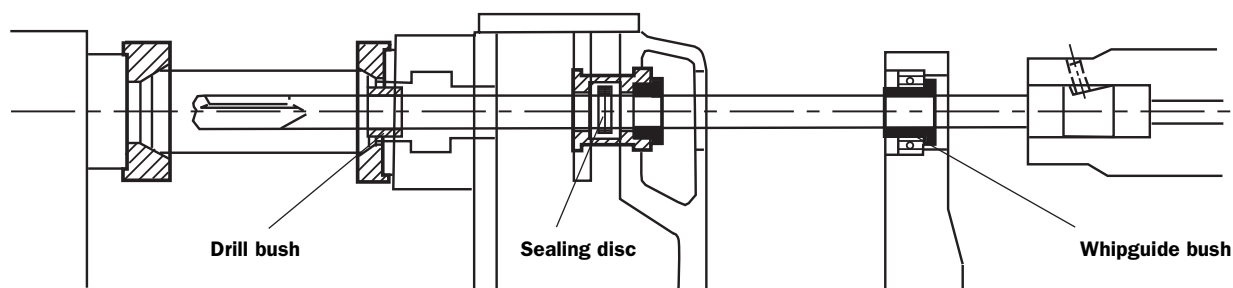
- Higher metal removal rate provides increased productivity
- Secure processes and machining
- Quick tool change and set-up
- Enhanced surface finish and increased tool life
- Closer hole tolerance

Diameter, mm



Information about CoroChuck™ 930 is also available on the web:
www.sandvik.coromant.com/en-gb/products/corochuck_930

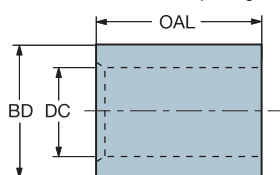
Accessories for Gun drilling - Drill bush, Sealing disc, Whipguide bush



Drill bush

According to DIN 179 extended model made of tool steel, hardened throughout.

Give measurement DC when placing an order.



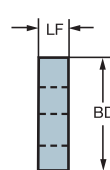
Diameter range		Dimensions, mm, inch					
DC	DC"	BD	BD"	OAL	OAL"		
0.8-1.099	.0314-.0432	3	.118	9	.354		
1.1-1.899	.0433-.0747	4	.157	9	.354		
1.9-2.699	.0748-.1062	5	.197	9	.354		
2.7-3.399	.1063-.1338	6	.236	12	.472		
3.4-4.099	.1339-.1613	7	.276	12	.472		
4.1-5.099	.1614-.2007	8	.315	12	.472		
5.1-6.099	.2008-.2401	10	.394	16	.630		
6.1-8.099	.2402-.3188	12	.472	16	.630		
8.1-10.099	.3189-.3975	15	.591	20	.787		
10.1-12.099	.3976-.4763	18	.709	20	.787		
12.1-15.099	.4764-.5944	22	.866	28	1.102		
15.1-18.099	.5945-.7125	26	1.024	28	1.102		
18.1-22.099	.7126-.8699	30	1.181	36	1.417		
22.1-26.099	.8700-1.0275	35	1.378	36	1.417		
26.1-30.099	1.0276-1.1849	42	1.654	45	1.772		
30.1-35.099	1.1850-1.3818	48	1.890	45	1.772		
35.1-42.099	1.3819-1.6574	55	2.165	56	2.205		

Sealing disc¹⁾

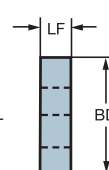
Made of special plastic

Give drill diameter DC when placing an order.

Single-lip



Twin-lip



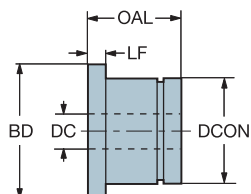
Diameter range		Dimensions, mm, inch					
DC	DC"	BD	BD"	LF	LF"		
0.8-6.5	.031-.256	20	.787	4	.118		
4.8-20.8	.189-.819	32	1.260	4	.157		
6.5-26.0	.256-1.024	40	1.575	4	.157		
26.0-41.0	1.024-1.614	90	3.543	4	.157		

¹⁾ The sealing disc fits tightly onto the drill shank and must be held in position in the chip box with retaining device. This prevents the disc moving with the feed motion, which could cause chip obstruction.

Form whipguide bush

Made of special plastic

Give drill diameter DC when placing an order.



Diameter range		Dimensions, mm, inch							
DC	DC"	DCON	DCON"	BD	BD"	OAL	OAL"	LF	LF"
1.9-16.4	.075-.646	20	.787	26	1.024	20	.866		
1.9-23.8	.075-.937	30	1.181	38	1.496	26	1.024		
5.6-33.7	.220-1.327	45	1.772	50	2.047	26	1.024		

For further information, please contact your local sales representative.

Cutting data for gun drills CoroDrill® 428.9

Metric version

ISO	MC No.(CMC No.)	Material	Specific cutting force k_{c1}	Hardness Brinell	Cutting speed	Drill diameter, mm			
						0.98-3.00	3.00-6.30	6.00-12.50	12.50-40.50
						Feed f_n mm/r			
P		Unalloyed							
	P1.1.Z.AN (01.1)	Non-hardened 0.10-0.25% C	1500	90-200	60-120	0.003-0.010	0.005-0.030	0.015-0.055	0.020-0.110
	P1.2.Z.AN (01.2)	Non-hardened 0.25-0.55% C	1600	125-225	50-120	0.003-0.010	0.005-0.030	0.015-0.055	0.020-0.110
	P1.3.Z.AN (01.3)	Non-hardened 0.55-0.80% C	1700	150-250	40-100	0.003-0.010	0.004-0.025	0.010-0.050	0.020-0.100
		Low alloy steel							
	P2.1.Z.AN (02.1)	Non-hardened	1700	150-260	40-120	0.003-0.010	0.004-0.030	0.010-0.055	0.020-0.110
	P2.5.Z.HT (02.2)	Hardened and tempered	1900	220-450	40-120	0.003-0.010	0.004-0.025	0.010-0.050	0.020-0.100
		High alloy steel							
	P3.0.Z.AN (03.11)	Annealed	1950	150-250	40-100	0.003-0.010	0.004-0.025	0.010-0.050	0.020-0.100
	P3.0.Z.HT (03.21)	Hardened tool steel	2900	250-350	50-100	0.003-0.010	0.005-0.025	0.015-0.050	0.030-0.100
M		Castings							
	P1.5.C.UT (06.1)	Unalloyed	1400	90-225	50-120	0.003-0.010	0.005-0.030	0.015-0.055	0.020-0.110
K		Rolled/forged							
	P5.0.Z.AN (5.11)	Ferritic/Martensitic, non hardened	1800	150-270	40-90	0.003-0.008	0.004-0.025	0.010-0.040	0.020-0.100
K		Malleable							
	M1.0.Z.AQ (05.21)	Austenitic	1950	150-275	40-90	0.003-0.008	0.004-0.025	0.010-0.040	0.020-0.100
		Grey							
	K1.1.C.NS (07.1)	Ferritic	790	110-145	70-90	0.005-0.010	0.008-0.030	0.020-0.070	0.050-0.190
	K1.1.C.NS (07.2)	Pearlitic	900	150-270	60-90	0.004-0.010	0.005-0.030	0.010-0.070	0.030-0.190
		Nodular							
	K2.1.C.UT (08.1)	Low tensile strength	890	150-220	60-90	0.004-0.010	0.008-0.030	0.010-0.070	0.030-0.190
	K2.2.C.UT (08.2)	High tensile strength	1100	200-330	15-90	0.003-0.010	0.003-0.030	0.005-0.070	0.010-0.190
		Aluminium alloys							
	K3.1.C.UT (09.1)	Ferritic	900	125-230	70-90	0.005-0.010	0.008-0.030	0.020-0.070	0.050-0.190
S		Copper and copper alloys							
	K3.3.C.UT (09.2)	Pearlitic	1350	200-300	60-90	0.004-0.010	0.005-0.030	0.010-0.070	0.030-0.190
	N1.3.C.UT (30.21)	Cast, non aging	600	40-100	65-300	0.005-0.015	0.005-0.040	0.020-0.070	0.030-0.150
	N3.3.U.UT (33.1)	Free cutting alloys (Pb > 1%)	550	70-160	65-300	0.005-0.015	0.005-0.040	0.020-0.070	0.030-0.150
S		Iron base							
	N3.2.C.UT (33.2)	Brass and leaded bronzes (Pb ≤ 1%)	550	50-200	65-300	0.005-0.015	0.005-0.040	0.020-0.070	0.030-0.150
	20.11	Annealed or solution treated	2400	180-230	10-40	0.003-0.008	0.004-0.025	0.010-0.040	0.020-0.100
	S2.0.Z.AN (20.21)	Annealed or solution treated	2650	140-300	10-40	0.003-0.008	0.004-0.025	0.010-0.040	0.020-0.100
S		Nickel base							
	20.31	Annealed or solution treated	2700	180-230	10-40	0.003-0.008	0.004-0.025	0.010-0.040	0.020-0.100
S		Cobalt alloys							
	S4.2.Z.AN (23.21)	Annealed or solution treated	1400	600-1100	20-50	0.003-0.008	0.004-0.025	0.010-0.040	0.020-0.100
S		Titanium							
		Alfa- , near Alfa- and Alfa + Beta alloys annealed	1400	600-1100	20-50	0.003-0.008	0.004-0.025	0.010-0.040	0.020-0.100

The cutting data recommendation is based upon the length/DC ratio and the machine tool configuration and stability

Cutting data for gun drills CoroDrill® 428.9

Inch version

ISO	MC No.(CMC No.)	Material	Specific cutting force k_{c1} lbs/in ²	Hardness Brinell HB	Cutting speed v_c ft/min	Drill diameter, inch			
						.039-.118	.118-.248	.236-.492	.492-1.594
						Feed f_n inch/rev			
P	P1.1.Z.AN (01.1)	Unalloyed Non-hardened 0.10-0.25% C	216,500	90-200	195-395	.0001-.0004	.0002-.0012	.0006-.0022	.0008-.0043
	P1.2.Z.AN (01.2)	Non-hardened 0.25-0.55% C	233,000	125-225	165-395	.0001-.0004	.0002-.0012	.0006-.0022	.0008-.0043
	P1.3.Z.AN (01.3)	Non-hardened 0.55-0.80% C	247,000	150-250	130-330	.0001-.0004	.0002-.0010	.0004-.0020	.0008-.0039
	P2.1.Z.AN (02.1)	Low alloy steel Non-hardened	246,500	150-260	130-395	.0001-.0004	.0002-.0012	.0004-.0022	.0008-.0043
	P2.5.Z.HT (02.2)	Hardened and tempered	278,500	220-450	130-395	.0001-.0004	.0002-.0010	.0004-.0020	.0008-.0039
	P3.0.Z.AN (03.11)	High alloy steel Annealed	282,000	150-250	130-330	.0001-.0004	.0002-.0010	.0004-.0020	.0008-.0039
	P3.0.Z.HT (03.21)	Hardened tool steel	420,000	250-350	165-330	.0001-.0004	.0002-.0010	.0006-.0020	.0012-.0039
	P1.5.C.UT (06.1)	Castings Unalloyed	204,000	90-225	165-395	.0001-.0004	.0002-.0012	.0006-.0022	.0008-.0043
	P2.6.C.UT (06.2)	Low alloyed (alloying elements < 5%)	230,500	150-250	130-330	.0001-.0004	.0002-.0010	.0004-.0020	.0008-.0039
	P5.0.Z.AN (05.11)	Rolled/forged Ferritic/Martensitic, non hardened	262,000	150-270	130-295	.0001-.0003	.0002-.0010	.0004-.0016	.0008-.0039
M	M1.0.Z.AQ (05.21)	Austenitic	285,000	150-275	130-295	.0001-.0003	.0002-.0010	.0004-.0016	.0008-.0039
K	K1.1.C.NS (07.1)	Malleable Ferritic	115,000	110-145	230-295	.0002-.0004	.0003-.0012	.0008-.0028	.0020-.0075
	K1.1.C.NS (07.2)	Pearlitic	131,000	150-270	195-295	.0002-.0004	.0002-.0012	.0004-.0028	.0012-.0075
	K2.1.C.UT (08.1)	Grey Low tensile strength	130,000	150-220	195-295	.0002-.0004	.0003-.0012	.0004-.0028	.0012-.0075
	K2.2.C.UT (08.2)	High tensile strength	159,500	200-330	50-295	.0001-.0004	.0001-.0012	.0002-.0028	.0004-.0075
	K3.1.C.UT (09.1)	Nodular Ferritic	130,000	125-230	230-295	.0002-.0004	.0003-.0012	.0008-.0028	.0020-.0075
	K3.3.C.UT (09.2)	Pearlitic	194,500	200-300	195-295	.0002-.0004	.0002-.0012	.0004-.0028	.0012-.0075
N	N1.3.C.UT (30.21)	Aluminium alloys Cast, non aging	87,000	40-100	65-300	.0002-.0006	.0002-.0016	.0008-.0028	.0012-.0059
	N3.3.U.UT (33.1)	Copper and copper alloys Free cutting alloys (Pb > 1%)	79,500	70-160	65-300	.0002-.0006	.0002-.0016	.0008-.0028	.0012-.0059
	N3.2.C.UT (33.2)	Brass and leaded bronzes (Pb ≤ 1%)	80,000	50-200	65-300	.0002-.0006	.0002-.0016	.0008-.0028	.0012-.0059
S	20.11	Iron base Annealed or solution treated	348,000	180-230	35-130	.0001-.0003	.0002-.0010	.0004-.0016	.0008-.0039
	S2.0.Z.AN (20.21)	Nickel base Annealed or solution treated	383,000	140-300	35-130	.0001-.0003	.0002-.0010	.0004-.0016	.0008-.0039
	20.31	Cobalt alloys Annealed or solution treated	391,500	180-230	35-130	.0001-.0003	.0002-.0010	.0004-.0016	.0008-.0039
	S4.2.Z.AN (23.21)	Titanium Alfa-, near Alfa- and Alfa + Beta alloys annealed	203,000	600-1100	65-165	.0001-.0003	.0002-.0010	.0004-.0016	.0008-.0039

The cutting data recommendation is based upon the length/DC ratio and the machine tool configuration and stability

Cutting data for gun drills CoroDrill® 428.2

Metric version

ISO	MC No.(CMC No.)	Material	Specific cutting force k_{c1} N/mm ²	Hardness Brinell HB	Cutting speed v_c m/min	Drill diameter, mm			
						0.98-3.00	3.00-6.30	6.00-12.50	12.50-40.50
						Feed f_n mm/r			
P	P1.1.Z.AN (01.1)	Unalloyed Non-hardened 0.10-0.25% C	1500	90-200	60-120	0.003-0.010	0.005-0.030	0.015-0.055	0.020-0.110
	P1.2.Z.AN (01.2)		1600	125-225	50-120	0.003-0.010	0.005-0.030	0.015-0.055	0.020-0.110
	P1.3.Z.AN (01.3)		1700	150-250	40-100	0.003-0.010	0.004-0.025	0.010-0.050	0.020-0.100
	P2.1.Z.AN (02.1)	Low alloy steel Non-hardened	1700	150-260	40-120	0.003-0.010	0.004-0.030	0.010-0.055	0.020-0.110
	P2.5.Z.HT (02.2)		1900	220-450	40-120	0.003-0.010	0.004-0.025	0.010-0.050	0.020-0.100
	P3.0.Z.AN (03.11)	High alloy steel Annealed	1950	150-250	40-100	0.003-0.010	0.004-0.025	0.010-0.050	0.020-0.100
	P3.0.Z.HT (03.21)		2900	250-350	50-100	0.003-0.010	0.005-0.025	0.015-0.050	0.030-0.100
	P1.5.C.UT (06.1)	Castings Unalloyed	1400	90-225	50-120	0.003-0.010	0.005-0.030	0.015-0.055	0.020-0.110
	P2.6.C.UT (06.2)		1600	150-250	40-100	0.003-0.010	0.004-0.025	0.010-0.050	0.020-0.100
	P2.6.C.UT (06.2)	Low alloyed (alloying elements < 5%)	1600	150-250	40-100	0.003-0.010	0.004-0.025	0.010-0.050	0.020-0.100
K	K1.1.C.NS (07.1)	Malleable Ferritic	790	110-145	70-90	0.005-0.010	0.008-0.030	0.020-0.070	0.050-0.190
	K1.1.C.NS (07.2)		900	150-270	60-90	0.004-0.010	0.005-0.030	0.010-0.070	0.030-0.190
	K2.1.C.UT (08.1)	Grey Low tensile strength	890	150-220	60-90	0.004-0.010	0.008-0.030	0.010-0.070	0.030-0.190
	K2.2.C.UT (08.2)		1100	200-330	15-90	0.003-0.010	0.003-0.030	0.005-0.070	0.010-0.190
	K3.1.C.UT (09.1)	Nodular Ferritic	900	125-230	70-90	0.005-0.010	0.008-0.030	0.020-0.070	0.050-0.190
	K3.3.C.UT (09.2)		1350	200-300	60-90	0.004-0.010	0.005-0.030	0.010-0.070	0.030-0.190
N	N1.3.C.UT (30.21)	Aluminium alloys Cast, non aging	600	40-100	65-300	0.005-0.015	0.005-0.040	0.020-0.070	0.030-0.150
	N3.3.U.UT (33.1)	Copper and copper alloys Free cutting alloys (Pb > 1%)	550	70-160	65-300	0.005-0.015	0.005-0.040	0.020-0.070	0.030-0.150
	N3.2.C.UT (33.2)		550	50-200	65-300	0.005-0.015	0.005-0.040	0.020-0.070	0.030-0.150

The cutting data recommendation is based upon the length/DC ratio and the machine tool configuration and stability

Cutting data for gun drills CoroDrill® 428.2

Inch version

ISO	MC No.(CMC No.)	Material	Specific cutting force k_{c1}	Hardness Brinell	Cutting speed	Drill diameter, inch			
						.039-.118	.118-.248	.236-.492	.492-1.594
						Feed f_n inch/rev			
P	P1.1.Z.AN (01.1)	Unalloyed Non-hardened 0.10-0.25% C	216,500	90-200	195-395	.0001-.0004	.0002-.0012	.0006-.0022	.0008-.0043
	P1.2.Z.AN (01.2)		233,000	125-225	165-395	.0001-.0004	.0002-.0012	.0006-.0022	.0008-.0043
	P1.3.Z.AN (01.3)		247,000	150-250	130-330	.0001-.0004	.0002-.0010	.0004-.0020	.0008-.0039
	P2.1.Z.AN (02.1)	Low alloy steel Non-hardened	246,500	150-260	130-395	.0001-.0004	.0002-.0012	.0004-.0022	.0008-.0043
	P2.5.Z.HT (02.2)		278,500	220-450	130-395	.0001-.0004	.0002-.0010	.0004-.0020	.0008-.0039
	P3.0.Z.AN (03.11)	High alloy steel Annealed	282,000	150-250	130-330	.0001-.0004	.0002-.0010	.0004-.0020	.0008-.0039
	P3.0.Z.HT (03.21)		420,000	250-350	165-330	.0001-.0004	.0002-.0010	.0006-.0020	.0012-.0039
	P1.5.C.UT (06.1)	Castings Unalloyed	204,000	90-225	165-395	.0001-.0004	.0002-.0012	.0006-.0022	.0008-.0043
	P2.6.C.UT (06.2)		230,500	150-250	130-330	.0001-.0004	.0002-.0010	.0004-.0020	.0008-.0039
	K1.1.C.NS (07.1)	Malleable Ferritic	115,000	110-145	230-295	.0002-.0004	.0003-.0012	.0008-.0028	.0020-.0075
K	K1.1.C.NS (07.2)		131,000	150-270	195-295	.0002-.0004	.0002-.0012	.0004-.0028	.0012-.0075
	K2.1.C.UT (08.1)	Grey Low tensile strength	130,000	150-220	195-295	.0002-.0004	.0003-.0012	.0004-.0028	.0012-.0075
	K2.2.C.UT (08.2)		159,500	200-330	50-295	.0001-.0004	.0001-.0012	.0002-.0028	.0004-.0075
	K3.1.C.UT (09.1)	Nodular Ferritic	130,000	125-230	230-295	.0002-.0004	.0003-.0012	.0008-.0028	.0020-.0075
	K3.3.C.UT (09.2)		194,500	200-300	195-295	.0002-.0004	.0002-.0012	.0004-.0028	.0012-.0075
	N1.3.C.UT (30.21)	Aluminium alloys Cast, non aging	87,000	40-100	65-300	.0002-.0006	.0002-.0016	.0008-.0028	.0012-.0059
N	N3.3.U.UT (33.1)	Copper and copper alloys Free cutting alloys (Pb > 1%)	79,500	70-160	65-300	.0002-.0006	.0002-.0016	.0008-.0028	.0012-.0059
	N3.2.C.UT (33.2)		80,000	50-200	65-300	.0002-.0006	.0002-.0016	.0008-.0028	.0012-.0059

The cutting data recommendation is based upon the length/DC ratio and the machine tool configuration and stability

Cutting data for solid carbide gun drills CoroDrill® 428.5

Metric version

ISO	MC No.(CMC No.)	Material	Specific cutting force k_{c1}	Hardness Brinell	Cutting speed	Drill diameter, mm		
						0.80-3.00	3.00-6.00	6.00-12.00
						Feed f_n mm/r		
P		Unalloyed steel						
	P1.1.Z.AN (01.1)	Non-hardened 0.10-0.25% C	1500	90-200	40-60	0.004-0.008	0.008-0.022	0.015-0.036
	P1.2.Z.AN (01.2)	Non-hardened 0.25-0.55% C	1600	125-225	35-60	0.004-0.008	0.008-0.022	0.015-0.036
	P1.3.Z.AN (01.3)	Non-hardened 0.55-0.80% C	1700	150-250	25-50	0.004-0.008	0.007-0.017	0.010-0.031
		Low alloy steel						
	P2.1.Z.AN (02.1)	Non-hardened	1700	150-260	25-60	0.004-0.008	0.007-0.022	0.010-0.036
	P2.5.Z.HT (02.2)	Hardened and tempered	1900	220-450	25-60	0.004-0.008	0.007-0.017	0.010-0.031
		High alloy steel						
	P3.0.Z.AN (03.11)	Annealed	1950	150-250	25-50	0.004-0.008	0.007-0.017	0.010-0.031
	P3.0.Z.HT (03.21)	Hardened tool steel	2900	250-350	35-50	0.004-0.008	0.008-0.017	0.015-0.031
K		Steel castings						
	P1.5.C.UT (06.1)	Unalloyed	1400	90-225	35-60	0.004-0.008	0.008-0.022	0.015-0.036
	P2.6.C.UT (06.2)	Low alloyed (alloying elements < 5%)	1600	150-250	25-50	0.004-0.008	0.007-0.017	0.010-0.031
		Malleable cast iron						
	K1.1.C.NS (07.1)	Ferritic	790	110-145	70-90	0.012-0.015	0.015-0.030	0.030-0.120
	K1.1.C.NS (07.2)	Pearlitic	900	150-270	60-90	0.011-0.015	0.012-0.030	0.020-0.120
		Grey cast iron						
	K2.1.C.UT (08.1)	Low tensile strength	890	150-220	70-100	0.010-0.015	0.015-0.030	0.020-0.120
	K2.2.C.UT (08.2)	High tensile strength	1100	200-330	60-90	0.009-0.015	0.006-0.030	0.010-0.120
		Nodular cast iron						
N		Aluminium alloys						
	N1.3.C.UT (30.21)	Cast, non aging	600	40-100	100-300	0.012-0.060	0.060-0.012	0.012-0.110
		Copper and copper alloys						
	N3.3.U.UT (33.1)	Free cutting alloys (Pb > 1%)	550	70-160	80-150	0.012-0.060	0.060-0.012	0.012-0.110
	N3.2.C.UT (33.2)	Brass and leaded bronzes (Pb ≤ 1%)	550	50-200	80-150	0.008-0.060	0.060-0.012	0.012-0.110

The cutting data recommendation is based upon the length/DC ratio and the machine tool configuration and stability

Cutting data for solid carbide gun drills CoroDrill® 428.5

Inch version

ISO	MC No.(CMC No.)	Material	Specific cutting force k_{c1} lbs/in ²	Hardness Brinell HB	Cutting speed v_c ft/min	Drill diameter, inch		
						.039-.118	.118-.248	.236-.472
						Feed f_n inch/rev		
P		Unalloyed steel						
	P1.1.Z.AN (01.1)	Non-hardened 0.10-0.25% C	216,500	90-200	130-195	.0001-.0004	.0002-.0012	.0006-.0022
	P1.2.Z.AN (01.2)	Non-hardened 0.25-0.55% C	233,000	125-225	115-195	.0001-.0004	.0002-.0012	.0006-.0022
	P1.3.Z.AN (01.3)	Non-hardened 0.55-0.80% C	247,000	150-250	80-165	.0001-.0004	.0002-.0010	.0004-.0020
		Low alloy steel						
	P2.1.Z.AN (02.1)	Non-hardened	246,500	150-260	80-195	.0001-.0004	.0002-.0012	.0004-.0022
	P2.5.Z.HT (02.2)	Hardened and tempered	278,500	220-450	80-195	.0001-.0004	.0002-.0010	.0004-.0020
		High alloy steel						
	P3.0.Z.AN (03.11)	Annealed	282,000	150-250	80-165	.0001-.0004	.0002-.0010	.0004-.0020
	P3.0.Z.HT (03.21)	Hardened tool steel	420,000	250-350	115-165	.0001-.0004	.0002-.0010	.0006-.0020
K		Steel castings						
	P1.5.C.UT (06.1)	Unalloyed	204,000	90-225	115-195	.0001-.0004	.0002-.0012	.0006-.0022
	P2.6.C.UT (06.2)	Low alloyed (alloying elements < 5%)	230,500	150-250	80-165	.0001-.0004	.0002-.0010	.0004-.0020
		Malleable cast iron						
	K1.1.C.NS (07.1)	Ferritic	115,000	110-145	230-295	.0002-.0004	.0003-.0012	.0008-.0028
	K1.1.C.NS (07.2)	Pearlitic	131,000	150-270	195-295	.0002-.0004	.0002-.0012	.0004-.0028
		Grey cast iron						
	K2.1.C.UT (08.1)	Low tensile strength	130,000	150-220	230-330	.0002-.0004	.0003-.0012	.0004-.0028
	K2.2.C.UT (08.2)	High tensile strength	159,500	200-330	195-295	.0001-.0004	.0001-.0012	.0002-.0028
		Nodular cast iron						
N		Aluminium alloys						
	N1.3.C.UT (30.21)	Cast, non aging	87,000	40-100	330-985	.0002-.0006	.0002-.0016	.0008-.0028
		Copper and copper alloys						
	N3.3.U.UT (33.1)	Free cutting alloys (Pb > 1%)	79,500	70-160	260-490	.0002-.0006	.0002-.0016	.0008-.0028
	N3.2.C.UT (33.2)	Brass and leaded bronzes (Pb ≤ 1%)	80,000	50-200	260-490	.0002-.0006	.0002-.0016	.0008-.0028

The cutting data recommendation is based upon the length/DC ratio and the machine tool configuration and stability

Cutting data for high feed gun drills CoroDrill® 428.7

Metric version

ISO	MC No.(CMC No.)	Material	Specific cutting force k_{c1}	Hardness Brinell	Cutting speed	Drill diameter, mm	
						3.00-6.30	6.00-12.00
						Feed f_n mm/r	
P		Unalloyed steel					
	P1.1.Z.AN (01.1)	Non-hardened 0.10-0.25% C	1500	90-200	40-60	0.025-0.150	0.075-0.275
	P1.2.Z.AN (01.2)	Non-hardened 0.25-0.55% C	1600	125-225	35-60	0.025-0.150	0.075-0.275
	P1.3.Z.AN (01.3)	Non-hardened 0.55-0.80% C	1700	150-250	25-50	0.020-0.125	0.050-0.250
		Low alloy steel					
	P2.1.Z.AN (02.1)	Non-hardened	1700	150-260	25-60	0.020-0.150	0.050-0.275
	P2.5.Z.HT (02.2)	Hardened and tempered	1900	220-450	25-60	0.020-0.125	0.050-0.250
		High alloy steel					
	P3.0.Z.AN (03.11)	Annealed	1950	150-250	25-50	0.020-0.125	0.050-0.250
	P3.0.Z.HT (03.21)	Hardened tool steel	2900	250-350	35-50	0.025-0.125	0.075-0.250
K		Steel castings					
	P1.5.C.UT (06.1)	Unalloyed	1400	90-225	35-60	0.025-0.150	0.075-0.275
	P2.6.C.UT (06.2)	Low alloyed (alloying elements < 5%)	1600	150-250	25-50	0.020-0.125	0.050-0.250
		Malleable cast iron					
	K1.1.C.NS (07.1)	Ferritic	790	110-145	70-90	0.040-0.150	0.100-0.350
	K1.1.C.NS (07.2)	Pearlitic	900	150-270	60-90	0.025-0.150	0.050-0.350
		Grey cast iron					
	K2.1.C.UT (08.1)	Low tensile strength	890	150-220	70-100	0.040-0.150	0.050-0.350
	K2.2.C.UT (08.2)	High tensile strength	1100	200-330	60-90	0.015-0.150	0.025-0.350
		Nodular cast iron					
N		Aluminium alloys					
	N1.3.C.UT (30.21)	Cast, non aging	600	40-100	100-300	0.025-0.200	0.100-0.350
		Copper and copper alloys					
	N3.3.U.UT (33.1)	Free cutting alloys (Pb > 1%)	550	70-160	80-150	0.025-0.200	0.100-0.350
	N3.2.C.UT (33.2)	Brass and leaded bronzes (Pb ≤ 1%)	550	50-200	80-150	0.025-0.200	0.100-0.350

The cutting data recommendation is based upon the length/DC ratio and the machine tool configuration and stability

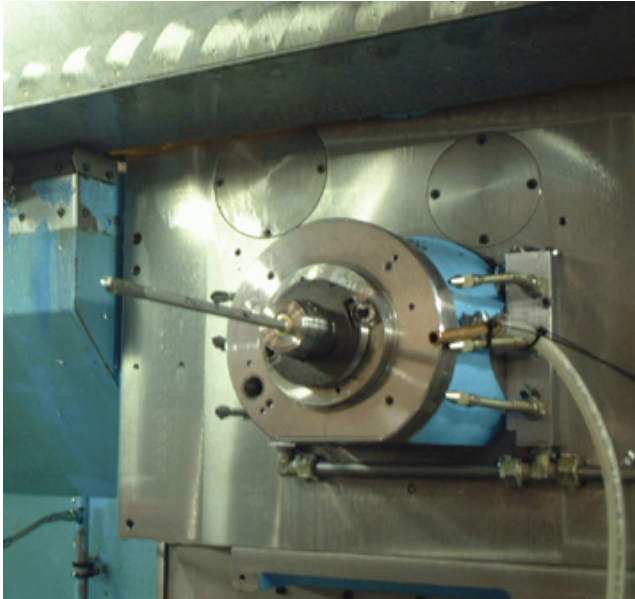
Cutting data for high feed gun drills CoroDrill® 428.7

Inch version

ISO	MC No.(CMC No.)	Material	Specific cutting force k_{c1} lbs/in ²	Hardness Brinell HB	Cutting speed v_c ft/min	Drill diameter, inch	
						.118-.248	.236-.472
						Feed f_n inch/rev	
P		Unalloyed steel					
	P1.1.Z.AN (01.1)	Non-hardened 0.10-0.25% C	216,500	90-200	130-195	.0010-.0059	.0030-.0108
	P1.2.Z.AN (01.2)	Non-hardened 0.25-0.55% C	233,000	125-225	115-195	.0010-.0059	.0030-.0108
	P1.3.Z.AN (01.3)	Non-hardened 0.55-0.80% C	247,000	150-250	80-165	.0010-.0049	.0020-.0098
		Low alloy steel					
	P2.1.Z.AN (02.1)	Non-hardened	246,500	150-260	80-195	.0010-.0059	.0020-.0108
	P2.5.Z.HT (02.2)	Hardened and tempered	278,500	220-450	80-195	.0010-.0049	.0020-.0098
		High alloy steel					
	P3.0.Z.AN (03.11)	Annealed	282,000	150-250	80-165	.0010-.0049	.0020-.0098
	P3.0.Z.HT (03.21)	Hardened tool steel	420,000	250-350	115-165	.0010-.0049	.0030-.0098
K		Steel castings					
	P1.5.C.UT (06.1)	Unalloyed	204,000	90-225	115-195	.0010-.0059	.0030-.0108
	P2.6.C.UT (06.2)	Low alloyed (alloying elements < 5%)	230,500	150-250	80-165	.0010-.0049	.0020-.0098
		Malleable cast iron					
	K1.1.C.NS (07.1)	Ferritic	115,000	110-145	230-295	.0016-.0059	.0039-.0138
	K1.1.C.NS (07.2)	Pearlitic	131,000	150-270	195-295	.0010-.0059	.0039-.0138
		Grey cast iron					
	K2.1.C.UT (08.1)	Low tensile strength	130,000	150-220	230-330	.0016-.0059	.0020-.0138
	K2.2.C.UT (08.2)	High tensile strength	159,500	200-330	195-295	.0006-.0059	.0010-.0138
		Nodular cast iron					
N		Aluminium alloys					
	N1.3.C.UT (30.21)	Cast, non aging	87,000	40-100	330-985	.0010-.0079	.0039-.0138
		Copper and copper alloys					
	N3.3.U.UT (33.1)	Free cutting alloys (Pb > 1%)	79,500	70-160	260-490	.0010-.0079	.0039-.0138
	N3.2.C.UT (33.2)	Brass and leaded bronzes (Pb ≤ 1%)	80,000	50-200	260-490	.0010-.0079	.0039-.0138

The cutting data recommendation is based upon the length/DC ratio and the machine tool configuration and stability

Gun drilling in machining centres

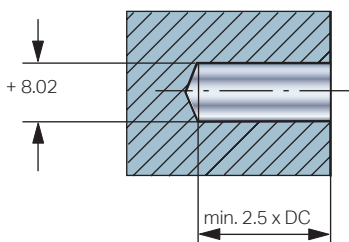


We recommend CoroDrill® 860 to make a pilot hole.

Note!

Use emulsion with a mixture or pure oil.
Make sure that the coolant pressure is sufficient.

Methods of producing guide holes

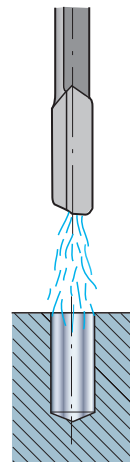


1. Pilot hole as guide bush

The guide hole should be drilled to tolerance $+0.01$ - 0.02 mm (0.000394 - 0.000787 inch) (H7) larger than the gun drill diameter.

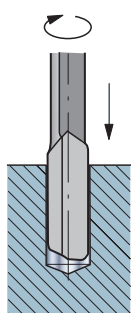
As flat bottom as possible is preferable.

A reduced feed rate can be used when entering the material.



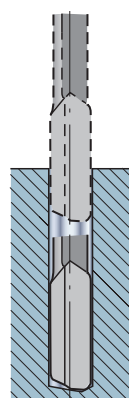
2. Feeding the gun drill into the guide hole **Caution:**

Outside the hole, the gun drill should not be rotating. Feed to insert the drill into the guide hole while supplying cutting fluid.



3. Start drilling

Start cutting rotation and cutting feed.



4. After the hole been drilled

Rapid return.

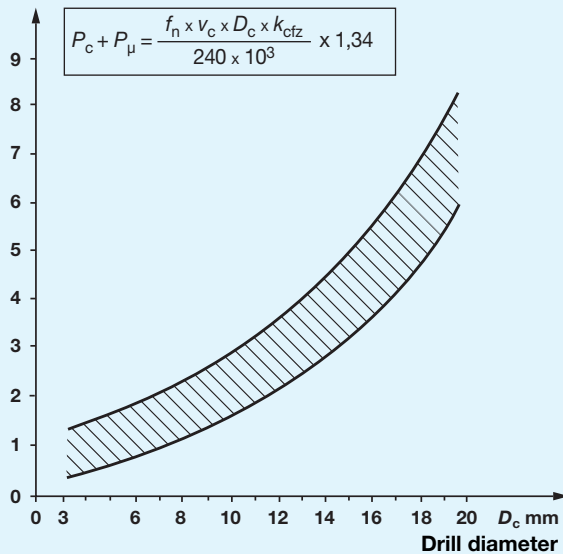
Stop at the guide hole position.

Stop the cutting rotation and coolant supply.

Pull the gun drill out from the workpiece.

Graphs for gun drills 428.9 and 428.2

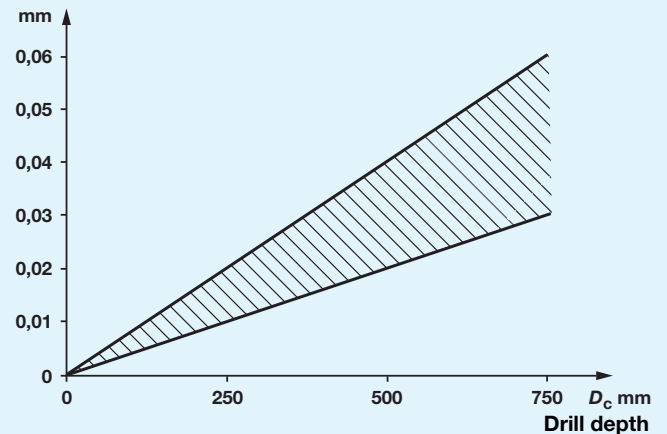
Net power

 P_c kW

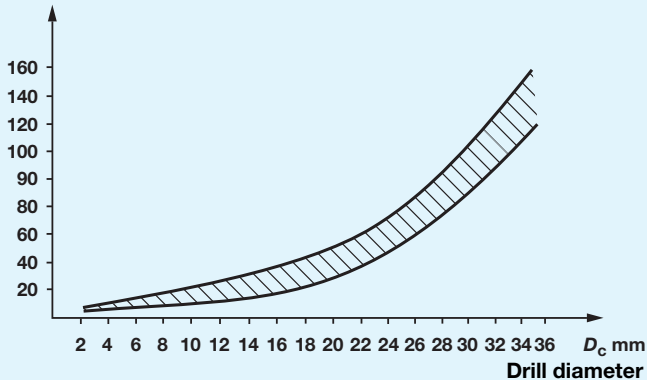
Straightness

Hole straightness depends on various factors e.g.

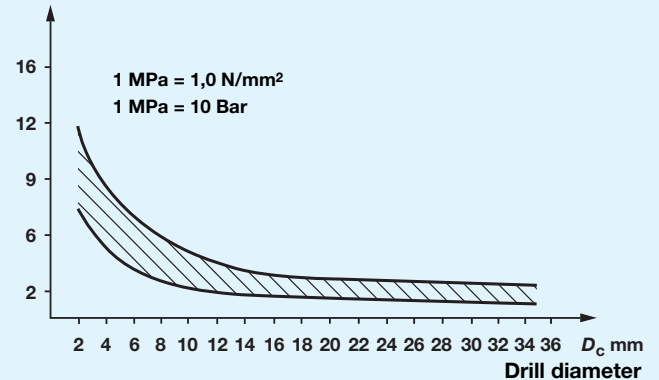
- Hole diameter and depth
- Machining method and cutting parameters
- Material quality and homogeneity
- Machine condition
- Drill bush



Cutting fluid flow

 q l/min

Cutting fluid pressure

 P MPa

Terminology and units

D_c	Drill diameter	mm
a_p	Cutting depth	mm
v_c	Cutting speed	m/min
n	Spindle speed	r/min
v_f	Feed speed	mm/min
f_n	Feed per rev.	mm/r
Q	Material removal rate	cm ³ /min
k_c	Specific cutting force	N/mm ²
$k_{c\,0,4}$	Specific cutting force for $f_z = 0,4$	N/mm ²

F_f	Feed force	N
F_μ	Feed force caused by friction	N
M_c	Torque	Nm
M_μ	Torque caused by friction	Nm
P_c	Net power	kW
P_μ	Power caused by friction	kW
κ_r	Cutting edge angle	Degrees
q	Cutting fluid quantity	l/min
p	Cutting fluid pressure	Mpa

The graphs show nominal values which should not be regarded as strict recommendations. The values may need adjusting depending on the machining conditions e.g., the type of material.

Note that only net power ratings are given. Allowance must be made for the efficiency of the machine and the cutting edge wear.