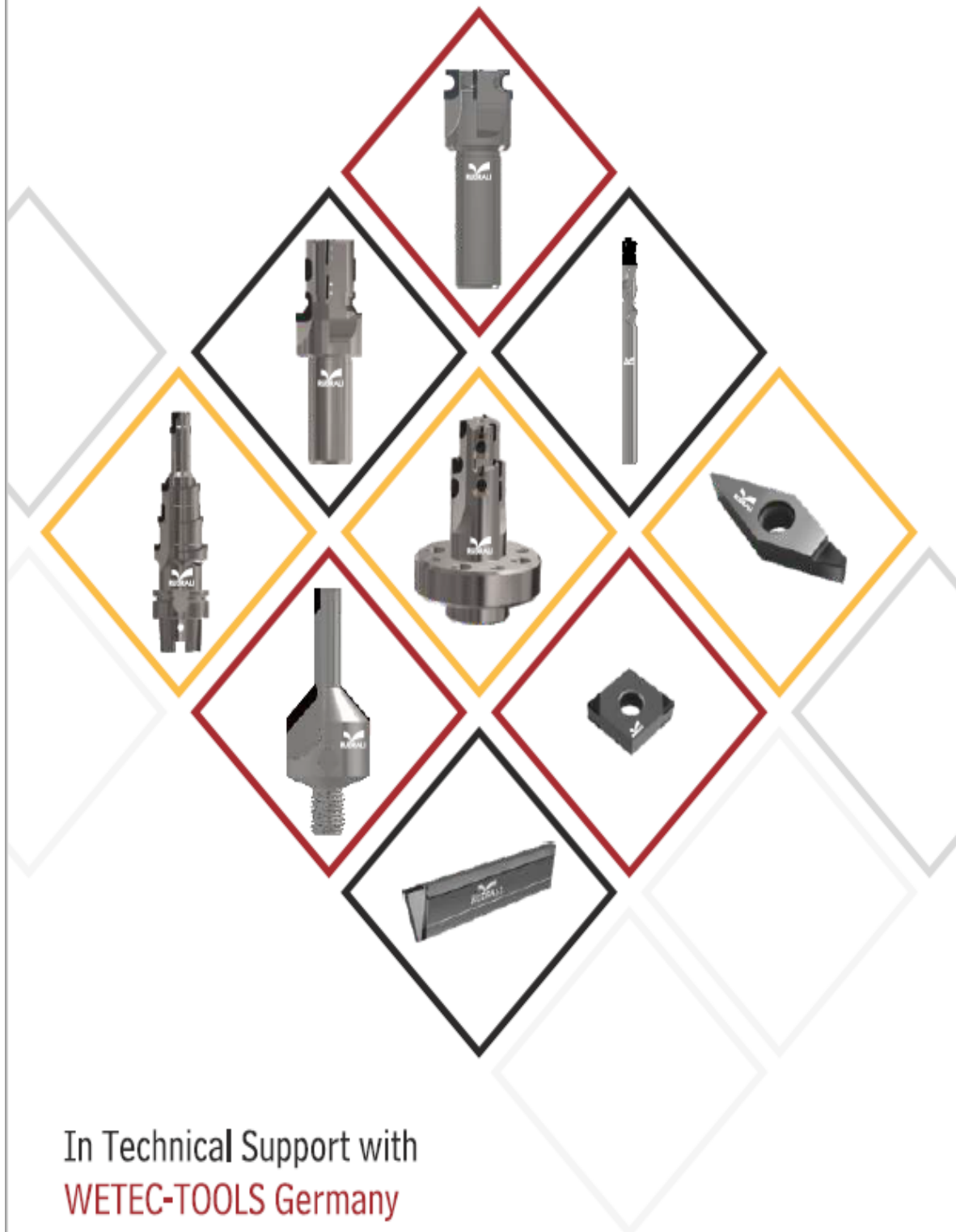




In Technical Support with
WETEC-TOOLS Germany



Index

Nomenclator ---- Page no. 1

CBN Grade ---- Page 2 to 4

CBN Standard Insert

C – Shape ---- Page 5 to 10

D – Shape ---- Page 11 to 13

S – Shape ---- Page 14 to 23

T – Shape ---- Page 24 to 31

V – Shape ---- Page 32 to 35

Solid CBN ---- Page 36 to 37

PCD Grade ---- Page 38

PCD Standard Insert

C – Shape ---- Page 39 to 40

D – Shape ---- Page 41 to 42

S – Shape ---- Page 43 to 46

T – Shape ---- Page 47 to 51

V – Shape ---- Page 52 to 53

SPL. Inserts ---- Page 54

PCD Notch Tools ---- Page 55

PCD Brazed Boring ---- Page 56

Milling Nomnclature---- Page 57

Milling Cutter ---- Page 58 to 61

PCD rotary tool Nomnclatere ---- Page 62

PCD Reamer ---- Page 63 to 66

PCD Ball Nose ---- Page 67 to 68

PCD End Mill ---- Page 69 to 72

PCD Drill ---- Page 73

Spl. PCD Rotary Tools ---- Page 74 to 75

Diamond Dresser ---- Page 76 to 80

Spl. Natural Diamond Tools ---- Page 81

Spares ---- Page 82

Technacial Guidance ---- Page 83 to 101

N - C N G A 12 04 08 W -

Chart 1 :-

Code	Detail
N	1 - Edge
2N	2 - Edge
3N	3 - Edge
4N	4 - Edge
6N	6 - Edge
8N	8 - Edge
NK	With Coating
S	Solid
FE	Full Edge
LE	Left hand
RE	Right hand

Chart3: - Clearance

Code	Detail
N	Negative
A	3°
B	5°
C	7°
P	11°
D	15°
E	20°
F	25°
G	30°
O	Other

Chart5: - Hole and Chipbreaker

Code	Detail
N	No hole
R	No - Chip - breaker
A	No hole
W	With Chip - breaker
T	Straight hole
	No Chip - breaker
	Hole with counter
	No Chip - breaker
	Hole with counter
	With Chip - breaker

Chart 2 :- Insert shape

Code	Detail
C	80°
S	90°
D	55°
V	35°
T	60°
R	Round
H	Hexagonal 120°
O	Octagonal 135°
L	Rectangle 90°

Chart4: - tolerance (mm)

Code	Inscribed circle	Nose height	Thickness
A	±0.005	±0.025	±0.025
F	±0.005	±0.013	±0.025
C	±0.013	±0.025	±0.025
H	±0.013	±0.013	±0.025
E	±0.025	±0.025	±0.025
G	±0.025	±0.025	±0.13
J	±0.005	±0.05	±0.025
K	±0.013	±0.05	±0.025
L	±0.025	±0.05	±0.025
M	±0.08	±0.2	±0.13
N	±0.08	±0.05	±0.025
U	±0.13	±0.08	±0.13

Table 6 :- Cutting edge length(in mm.)

Table 6: Cutting edge length (mm)											
Shape	IC (Inscribe circle)	Code	Cutting - Edge length	IC (Inscribe circle)	Shape	Code	Cutting - Edge length	IC (Inscribe circle)	IC (Inscribe circle)		
C		03	3.55	3.5	T	06	6.9	3.97	W		
		04	4.97	4.3		08	8.2	4.76		03	3.8
		06	6.4	6.35		09	9.6	5.56		04	4.3
		08	8.0	7.94		11	11.0	6.35		05	5.4
		09	9.7	9.525		16	16.5	9.525		06	6.5
		12	12.9	12.7		22	22.0	12.7		08	8.7
		16	16.1	15.875		27	27.5	15.875		10	10.9
		19	19.3	19.05		33	33.0	19.05		08	8.0
S		25	25.8	25.4	D	07	7.7	6.35	R		
		06	6.35	6.35		09	9.7	7.94		12	12.0
		S7	7.14	7.14		11	11.6	9.525		12	12.7
		07	7.94	7.94		15	15.5	12.7		15	15.875
		09	9.525	9.525		19	19.4	15.875		16	16.0
		12	12.7	12.7		19	19.4	15.875		19	19.05
		15	15.875	15.875		08	8.3	4.76		20	20.0
		19	19.05	19.05		09	9.7	5.56		24	24.0
		25	25.4	25.4		11	11.1	6.35		25	25.0
		31	31.75	31.75		16	16.6	9.525		25	25.4
						22	22.1	12.7		32	32.0

Table 7: - Thickness (mm)

Code	Thickness
01	1.59
T1	1.94
02	2.38
T2	2.78
03	3.18
T3	3.97
04	4.76
05	5.56
06	6.35
07	7.94
09	9.52

Table 8: - Nose Radius (mm)

Code	Nose Radius
00	Sharp
003	0.03
008	0.08
01	0.1
015	0.15
018	0.18
02	0.2
04	0.4
08	0.8
10	1.0
12	1.2
16	1.6
20	2.0
24	2.4
32	3.2

Chart9: - Special

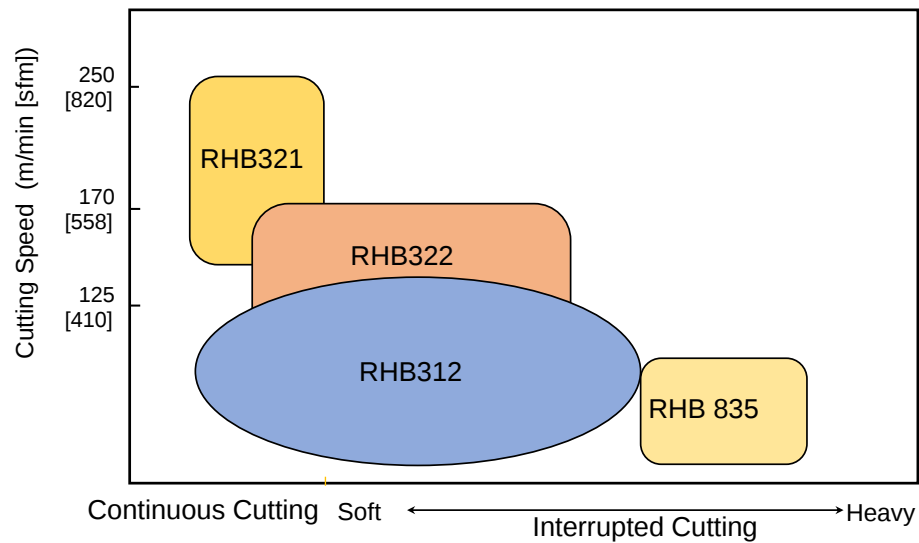
Code	Detail
W	Wiper

Chart10: - Special

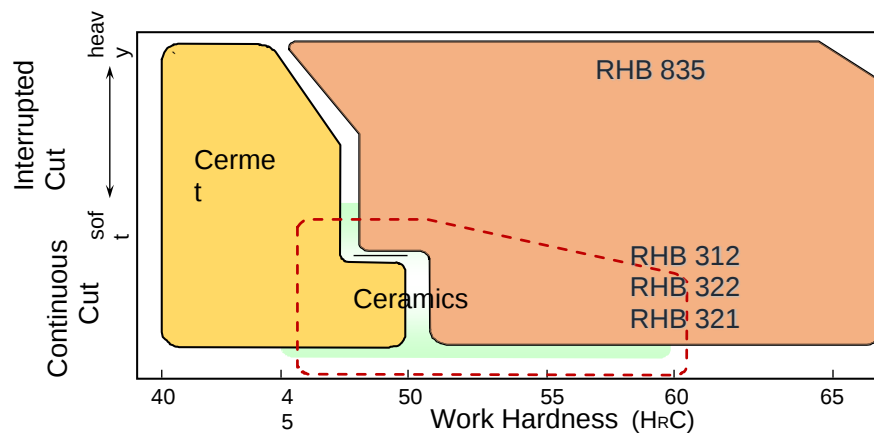
Code	Detail
-	Standard
LF	Sharpe Cutting Edge
LS	Low Cutting Force
HS	Strong cutting Edge

	RUDRALI HI-TECH TOOLS				
GRADES DETAIL FOR FERROUS & MACHINING - CBN (Cubic Boron Nitride)					
CBN GRADES					
Rudrali Grades		Cutting Speed m/min	Feed rate (f) mm / rev	DOC: (ap) mm	Main Application
RHB 316	CAST IRON MACHINING	200 to 1000	0.1~0.5	0.2 ~1.0	High speed machining of cast iron (FC), Exotic Alloy, grey cast iron & Powder metals
RHB 314		200 to 500	0.1 to 0.4	0.2~0.5	High speed turning and milling of gray and nodular cast irons,ductile cast Iron
RHB 835	Hard Part MACHINING	50-100-150	0,03-0,1-0,20	0,03-0,2-0,30	Heavy Interrupted machining of hardened steel
RHB 321		120-180-250	0,03-0,1-0,15	0,03-0,1-0,2	High speed For long jobs continuous machining on hardened steel
RHB 322		70-130-170	0,03-0,15-0,30	0,03-0.2-0,35	High effeciency & machining of hardened Steel.
RHB 312		50-120-150	0,03-0,10-0,30	0,03-0,2-0,30	High precision machining of Hardened Steel for plain & light intruption
RHS 356	Solid CBN	C.I. Boring: upto 1000 (Wet), Bed Mill: 1500, Carbide Roll Turn: 40, sprayed facing: 80	C.I.: rough: 0.0.3, Finish: 0.1~0.25 Bed Mill:0.2/t, carbide:0.15 Spryd face bor: rough 0.04 Finish 0.03	CI : Boring 0.2, Bed mill: 2.5 (2 Pass), carbide: 0.2 sprayed face bore: Rough: 3.0, Finish 0.5	High speed roughing of cast iron (FC), Exotic Alloy
GRADES DETAIL FOR FERROUS & MACHINING - CBN (Cubic Boron Nitride)					
Coated grades					
Rudrali Grades		Cutting Speed m/min	Feed rate (f) mm / rev	DOC: (ap) mm	Main Application
RHK 16K	CAST IRON MACHINING	500 to 1200	0.1~0.5	0.2 ~1.0	High speed machining of cast iron (FC), Exotic Alloy, grey cast iron
RH 35K	Hard Part MACHINING	50-100-150	0,03-0,1-0,20	0,03-0,2-0,30	Heavy Interrupted machining of hardened steel
RH 12K		120-160-300	0,05-0,2-0,50	0,03-0,2-0,30	High speed machining of Hardened Steel for plain & light intruption

Recommended Grades for Hard Turning



Recommended Area of CBN



Recommended Cutting Conditions

Grade	Cutting Speed V(m/min[sfm])				
	50 [164]	100 [328]	150 [492]	200 [656]	250 [820]
RHB312					
RHB322					
RHB835					
RHB321					

Grade	Feed Rate f(mm/rev.[ipr]) D.O.C d(mm[inch])	Feed Rate				
		0	0.1	0.2	0.3	0.5
RHB312	f					
RHB312	d					
RHB322	f					
RHB322	d					
RHB835	f					
RHB835	d					
RHB321	f					
RHB321	d					

Coolant : DRY Cut is recommended for interrupted cut.

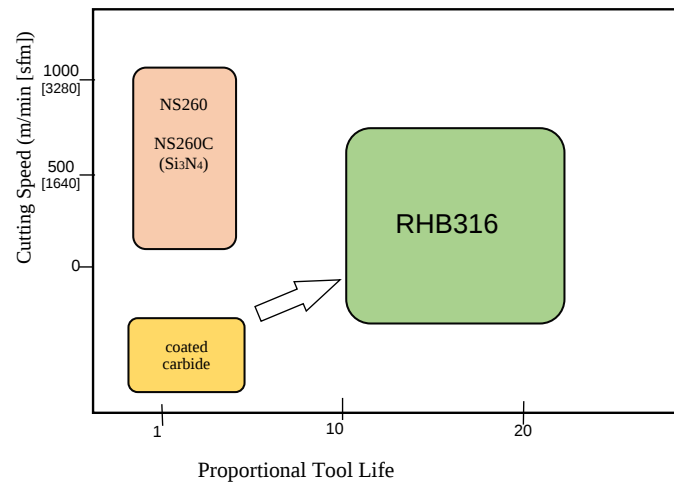
Recommended Cutting Condition for Coated CBN

Grade	Cutting Speed V(m/min[sfm])					
	50 [164]	100 [328]	(120) [394]	150 [492]	200 [656]	300 [984]
RH 35K						
RH 90K						
RH 12K						

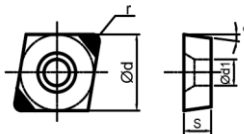
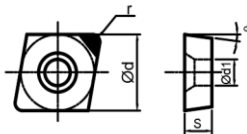
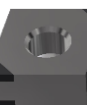
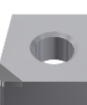
Grade	Feed Rate f(mm/rev.[ipr])	D.O.C d(mm[inch])					
		0	0.1	0.2	0.3	0.4	0.5
RH 35K	f						
	d						
RH 90K	f						
	d						
RH 12K	f						
	d						

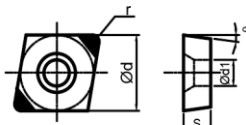
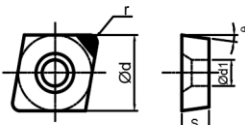
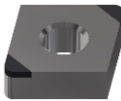
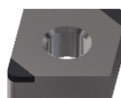
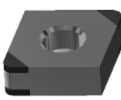
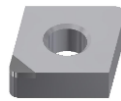
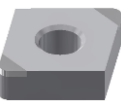
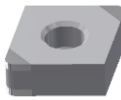
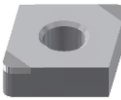
Coolant : DRY Cut is recommended for interrupted cut.

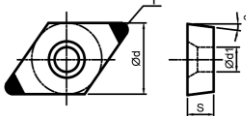
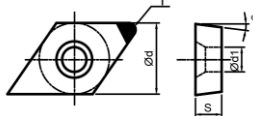
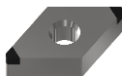
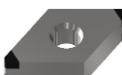
Advantages of RHB316

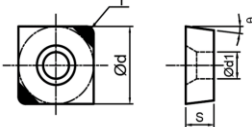
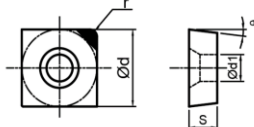
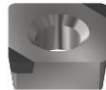
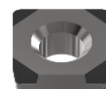
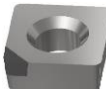
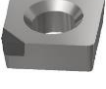


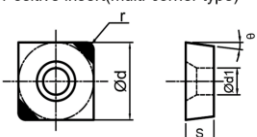
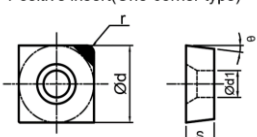
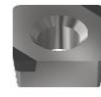
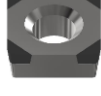
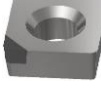
RHB316 provides high efficiency machining and extended tool life for continuous rough cutting of cast iron.

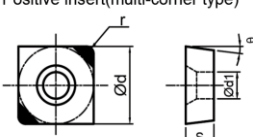
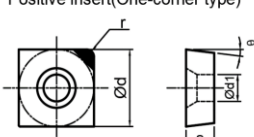
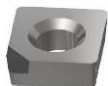
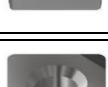
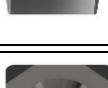
		RUDRALI HI-TECH TOOLS													
CBN INSERTS															
SHAPE	Positive insert(multi-corner type) Positive insert(One-corner type)							● = Stock items Hard Part Grade :RHB312 , RHB321, RHB 835 , RH12K , RH35K Cast Iron Grade : RHB316 , RHB314 , RH16K CBN Grades Un-coated Coated							
C								RHB312	RHB322	RHB835	RHB314	RHB316	RH12K	RH35K	RH16K
80°-CBN															
SHAPE	ITEM Descreption	Ød	Ød1	θ	r	S	No. of corner								
	NK - CPGW 09T302	9.525	4.4	11	0.2	3.97	1								
	NK - CPGW 09T304				0.4										
	NK - CPGW 09T308				0.8										
	2NK - CPGW 09T302	9.525	4.4	11	0.2	3.97	2								
	2NK - CPGW 09T304				0.4										
	2NK - CPGW 09T308				0.8										
	N - CNMA 120402	12.7	5.16	0	0.2	4.76	1	●		●		●			
	N - CNMA 120404				0.4			●		●		●			
	N - CNMA 120408				0.8			●		●		●			
	N - CNMA 120412				1.2			●		●		●			
	2N - CNMA 120402	12.7	5.16	0	0.2	4.76	1	●		●		●			
	2N- CNMA 120404				0.4			●		●		●			
	2N - CNMA 120408				0.8			●		●		●			
	2N - CNMA 120412				1.2			●		●		●			
	4N - CNMA 120402	12.7	5.16	0	0.2	4.76	1	●		●		●			
	4N - CNMA 120404				0.4			●		●		●			
	4N - CNMA 120408				0.8			●		●		●			
	4N - CNMA 120412				1.2			●		●		●			
	NK - CNMA 120402	12.7	5.16	0	0.2	4.76	1						●	●	●
	NK - CNMA 120404				0.4								●	●	●
	NK - CNMA 120408				0.8								●	●	●
	NK - CNMA 120412				1.2								●	●	●
	2NK - CNMA 120402	12.7	5.16	0	0.2	4.76	1						●	●	●
	2NK - CNMA 120404				0.4								●	●	●
	2NK - CNMA 120408				0.8								●	●	●
	2NK - CNMA 120412				1.2								●	●	●
	4NK- CNMA 120402	12.7	5.16	0	0.2	4.76	1						●	●	●
	4NK - CNMA 120404				0.4								●	●	●
	4NK - CNMA 120408				0.8								●	●	●
	4NK - CNMA 120412				1.2								●	●	●
	N - CNGA 120402	12.7	5.16	0	0.2	4.76	1	●		●		●			
	N - CNGA 120404				0.4			●		●		●			
	N - CNGA 120408				0.8			●		●		●			
	N - CNGA 120412				1.2			●		●		●			

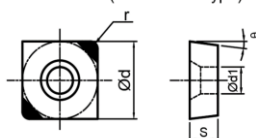
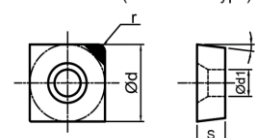
		RUDRALI HI-TECH TOOLS													
CBN INSERTS															
SHAPE	Positive insert(multi-corner type)  Positive insert(One-corner type) 							● = Stock items							
C								Hard Part Grade :RHB312 , RHB321,							
								RHB 835 , RH12K , RH35K							
								Cast Iron Grade : RHB316 , RHB314 , RH16K							
80°-CBN								CBN Grades							
								Un-coated					Coated		
SHAPE	ITEM Descreption	Ød	Ød1	θ	r	S	No. of corner	RHB312	RHB322	RHB835	RHB314	RHB316	RH12K	RH35K	RH16K
	2N - CNGA 120402	12.7	5.16	0	0.2	4.76	1	●		●		●			
	2N - CNGA 120404				0.4			●		●		●			
	2N - CNGA 120408				0.8			●		●		●			
	2N - CNGA 120412				1.2			●		●		●			
	2N - CNGA 120402 HS	12.7	5.16	0	0.2	4.76	1			●					
	2N - CNGA 120404 HS				0.4					●					
	2N - CNGA 120408 HS				0.8					●					
	2N - CNGA 120412 HS				1.2					●					
	2N - CNGA 120402 LS	12.7	5.16	0	0.2	4.76	1	●				●			
	2N - CNGA 120404 LS				0.4			●				●			
	2N - CNGA 120408 LS				0.8			●				●			
	2N - CNGA 120412 LS				1.2			●				●			
	4N - CNGA 120402 LS	12.7	5.16	0	0.2	4.76	1	●				●			
	4N - CNGA 120404 LS				0.4			●				●			
	4N - CNGA 120408 LS				0.8			●				●			
	4N - CNGA 120412 LS				1.2			●				●			
	4N - CNGA 120402 HS	12.7	5.16	0	0.2	4.76	1			●					
	4N - CNGA 120404 HS				0.4					●					
	4N - CNGA 120408 HS				0.8					●					
	4N - CNGA 120412 HS				1.2					●					
	NK - CNGA 120402	12.7	5.16	0	0.2	4.76	1						●	●	●
	NK - CNGA 120404				0.4								●	●	●
	NK - CNGA 120408				0.8								●	●	●
	NK - CNGA 120412				1.2								●	●	●
	2NK - CNGA 120402	12.7	5.16	0	0.2	4.76	1						●	●	●
	2NK - CNGA 120404				0.4								●	●	●
	2NK - CNGA 120408				0.8								●	●	●
	2NK - CNGA 120412				1.2								●	●	●
	4NK - CNGA 120402	12.7	5.16	0	0.2	4.76	1						●	●	●
	4NK - CNGA 120404				0.4								●	●	●
	4NK - CNGA 120408				0.8								●	●	●
	4NK - CNGA 120412				1.2								●	●	●
	2NK - CNGA 120402 LS	12.7	5.16	0	0.2	4.76	1						●	●	●
	2NK - CNGA 120404 LS				0.4								●	●	●
	2NK - CNGA 120408 LS				0.8								●	●	●
	2NK - CNGA 120412 LS				1.2								●	●	●

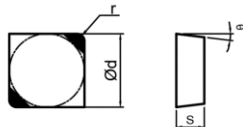
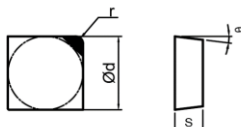
		RUDRALI HI-TECH TOOLS																
CBN INSERTS																		
SHAPE	Positive insert(multi-corner type)  Positive insert(One-corner type) 							● = Stock items										
D								Hard Part Grade :RHB312 , RHB321,										
								RHB 835 , RH12K , RH35K										
55°-CBN								Cast Iron Grade : RHB316 , RHB314 , RH16K										
CBN Grades																		
SHAPE	ITEM Descreption	Ød	Ød1	θ	r	S	No. of corner	Un-coated					Coated					
	2N - DNGA 150402	12.7	5.16	0	0.2	4.76	1	●			●		●					
	2N - DNGA 150404				0.4			●		●		●						
	2N - DNMA 150408				0.8			●		●		●						
	2N - DNGA 150412				1.2			●		●		●						
	2NK - DNGA 150402	12.7	5.16	0	0.2	4.76	1							●	●	●		
	2NK - DNGA 150404				0.4										●	●	●	
	2NK - DNGA 150408				0.8										●	●	●	
	2NK - DNGA 150412				1.2									●	●	●		
	4N - DNMA 150404	12.7	5.16	0	0.2	4.76	1	●			●		●					
	4N - DNMA 150404				0.4			●		●		●						
	4N - DNMA 150408				0.8			●		●		●						
	4N - DNMA 150412				1.2			●		●		●						
	4NK - DNMA 150404	12.7	5.16	0	0.2	4.76	1							●	●	●		
	4NK - DNMA 150404				0.4											●	●	●
	4NK - DNMA 150408				0.8											●	●	●
	4NK - DNMA 150412				1.2										●	●	●	
	4N - DNGA 150404	12.7	5.16	0	0.2	4.76	1	●			●		●					
	4N - DNGA 150404				0.4			●		●		●						
	4N - DNMA 150408				0.8			●		●		●						
	4N - DNGA 150412				1.2			●		●		●						
	4NK - DNGA 150404	12.7	5.16	0	0.2	4.76	1							●	●	●		
	4NK - DNGA 150404				0.4											●	●	●
	4NK - DNGA 150408				0.8											●	●	●
	4NK - DNGA 150412				1.2										●	●	●	

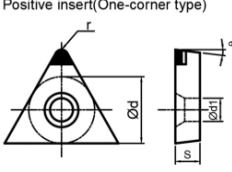
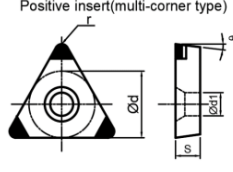
		RUDRALI HI-TECH TOOLS														
CBN INSERTS																
SHAPE	Positive insert(multi-corner type) Positive insert(One-corner type)							● = Stock items								
S								Hard Part Grade :RHB312 , RHB321,								
								RHB 835 , RH12K , RH35K								
90°-CBN								Cast Iron Grade : RHB316 , RHB314 , RH16K								
	CBN Grades															
SHAPE	ITEM Descreption	Ød	Ød1	θ	r	S	No. of corner	Un-coated					Coated			
								RHB312	RHB322	RHB835	RHB314	RHB316	RH12K	RH35K	RH16K	
	2N - SCGW 090302	9.525	4.4	7	0.2	3.18	2	●			●	●				
	2N - SCGW 090304							●		●	●					
	2N - SCGW 090308							●		●	●					
	2NK - SCGW 090302	9.525	4.4	7	0.2	3.18	2							●	●	●
	2NK - SCGW 090304													●	●	●
	2NK - SCGW 090308													●	●	●
	4N - SCGW 090302	9.525	4.4	7	0.2	3.18	4	●			●	●				
	4N - SCGW 090304							●		●	●					
	4N - SCGW 090308							●		●	●					
	4NK - SCGW 090302	9.525	4.4	7	0.2	3.18	4							●	●	●
	4NK - SCGW 090304													●	●	●
	4NK - SCGW 090308													●	●	●
	N - SPGW 090302	9.525	4.4	11	0.2	3.18	1	●			●	●				
	N - SPGW 090304							●		●	●					
	N - SPGW 090308							●		●	●					
	NK - SPGW 090302	9.525	4.4	11	0.2	3.18	1							●	●	●
	NK - SPGW 090304													●	●	●
	NK - SPGW 090308													●	●	●
	2N - SPGW 090302	9.525	4.4	11	0.2	3.18	2	●			●	●				
	2N - SPGW 090304							●		●	●					
	2N - SPGW 090308							●		●	●					
	2NK - SPGW 090302	9.525	4.4	11	0.2	3.18	2							●	●	●
	2NK - SPGW 090304													●	●	●
	2NK - SPGW 090308													●	●	●
	4N - SPGW 090302	9.525	4.4	11	0.2	3.18	4	●			●	●				
	4N - SPGW 090304							●		●	●					
	4N - SPGW 090308							●		●	●					
	4NK - SPGW 090302	9.525	4.4	11	0.2	3.18	4							●	●	●
	4NK - SPGW 090304													●	●	●
	4NK - SPGW 090308													●	●	●
	N - SCMW 09T302	9.525	4.4	7	0.2	3.97	1	●			●	●				
	N - SCMW 09T304							●		●	●					
	N - SCMW 09T308							●		●	●					

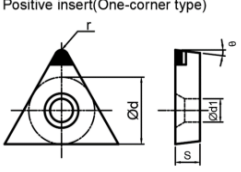
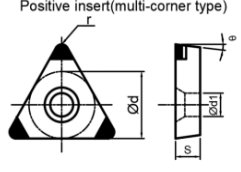
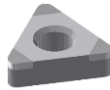
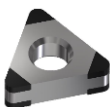
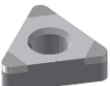
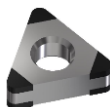
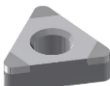
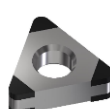
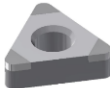
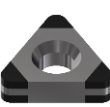
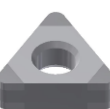
		RUDRALI HI-TECH TOOLS														
CBN INSERTS																
SHAPE	Positive insert(multi-corner type) Positive insert(One-corner type)							● = Stock items								
S								Hard Part Grade :RHB312 , RHB321,								
								RHB 835 , RH12K , RH35K								
90°-CBN								Cast Iron Grade : RHB316 , RHB314 , RH16K								
	CBN Grades															
SHAPE	ITEM Description	Ød	Ød1	θ	r	S	No. of corner	Un-coated					Coated			
								RHB312	RHB322	RHB835	RHB314	RHB316	RH12K	RH35K	RH16K	
	NK - SCMW 09T302	9.525	4.4	7	0.2	3.97	1							●	●	●
	NK - SCMW 09T304				0.4								●	●	●	
	NK - SCMW 09T308				0.8								●	●	●	
	2N - SCMW 09T302	9.525	4.4	7	0.2	3.97	2	●		●		●				
	2N - SCMW 09T304				0.4			●		●		●				
	2N - SCMW 09T308				0.8			●		●		●				
	2NK - SCMW 09T302	9.525	4.4	7	0.2	3.97	2							●	●	●
	2NK - SCMW 09T304				0.4								●	●	●	
	2NK - SCMW 09T308				0.8								●	●	●	
	4N - SCMW 09T302	9.525	4.4	7	0.2	3.97	4	●		●		●				
	4N - SCMW 09T304				0.4			●		●		●				
	4N - SCMW 09T308				0.8			●		●		●				
	4NK - SCMW 09T302	9.525	4.4	7	0.2	3.97	4							●	●	●
	4NK - SCMW 09T304				0.4								●	●	●	
	4NK - SCMW 09T308				0.8								●	●	●	
	N - SCGW 09T302	9.525	4.4	7	0.2	3.97	1	●		●		●				
	N - SCGW 09T304				0.4			●		●		●				
	N - SCGW 09T308				0.8			●		●		●				
	NK - SCGW 09T302	9.525	4.4	7	0.2	3.97	1							●	●	●
	NK - SCGW 09T304				0.4								●	●	●	
	NK - SCGW 09T308				0.8								●	●	●	
	2N - SCGW 09T302	9.525	4.4	7	0.2	3.97	2	●		●		●				
	2N - SCGW 09T304				0.4			●		●		●				
	2N - SCGW 09T308				0.8			●		●		●				
	2NK - SCGW 09T302	9.525	4.4	7	0.2	3.97	2							●	●	●
	2NK - SCGW 09T304				0.4								●	●	●	
	2NK - SCGW 09T308				0.8								●	●	●	
	4N - SCGW 09T302	9.525	4.4	7	0.2	3.97	4	●		●		●				
	4N - SCGW 09T304				0.4			●		●		●				
	4N - SCGW 09T308				0.8			●		●		●				
	4NK - SCGW 09T302	9.525	4.4	7	0.2	3.97	4							●	●	●
	4NK - SCGW 09T304				0.4								●	●	●	
	4NK - SCGW 09T308				0.8								●	●	●	

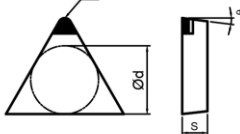
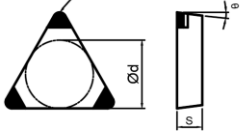
		RUDRALI HI-TECH TOOLS														
CBN INSERTS																
SHAPE	Positive insert(multi-corner type) Positive insert(One-corner type)							● = Stock items								
S								Hard Part Grade :RHB312 , RHB321,								
								RHB 835 , RH12K , RH35K								
								Cast Iron Grade : RHB316 , RHB314 , RH16K								
90°-CBN								CBN Grades								
								Un-coated					Coated			
SHAPE	ITEM Descreption	Ød	Ød1	θ	r	S	No. of corner	RHB312	RHB322	RHB835	RHB314	RHB316	RH12K	RH35K	RH16K	
	N - SPGW 09T302	9.525	4.4	11	0.2	3.97	1	●		●		●				
	N - SPGW 09T304				0.4			●		●		●				
	N - SPGW 09T308				0.8			●		●		●				
	NK - SPGW 09T302	9.525	4.4	11	0.2	3.97	1						●	●	●	
	NK - SPGW 09T304				0.4								●	●	●	
	NK - SPGW 09T308				0.8								●	●	●	
	2N - SPGW 09T302	9.525	4.4	11	0.2	3.97	2	●		●		●				
	2N - SPGW 09T304				0.4			●		●		●				
	2N - SPGW 09T308				0.8			●		●		●				
	2NK - SPGW 09T302	9.525	4.4	11	0.2	3.97	2						●	●	●	
	2NK - SPGW 09T304				0.4								●	●	●	
	2NK - SPGW 09T308				0.8								●	●	●	
	4N - SPGW 09T302	9.525	4.4	11	0.2	3.97	4	●		●		●				
	4N - SPGW 09T304				0.4			●		●		●				
	4N - SPGW 09T308				0.8			●		●		●				
	4NK - SPGW 09T302	9.525	4.4	11	0.2	3.97	4						●	●	●	
	4NK - SPGW 09T304				0.4								●	●	●	
	4NK - SPGW 09T308				0.8								●	●	●	
	N - SCMW 120402	12.7	5.5	7	0.2	4.76	1	●		●		●				
	N - SCMW 120404				0.4			●		●		●				
	N - SCMW 120408				0.8			●		●		●				
	NK - SCMW 120402	12.7	5.5	7	0.2	4.76	1						●	●	●	
	NK - SCMW 120404				0.4								●	●	●	
	NK - SCMW 120408				0.8								●	●	●	
	2N - SCMW 120402	12.7	5.5	7	0.2	4.76	2	●		●		●				
	2N - SCMW 120404				0.4			●		●		●				
	2N - SCMW 120408				0.8			●		●		●				
	2NK - SCMW 120402	12.7	5.5	7	0.2	4.76	2						●	●	●	
	2NK - SCMW 120404				0.4								●	●	●	
	2NK - SCMW 120408				0.8								●	●	●	
	4N - SCMW 120402	12.7	5.5	7	0.2	4.76	4	●		●		●				
	4N - SCMW 120404				0.4			●		●		●				
	4N - SCMW 120408				0.8			●		●		●				
	4NK - SCMW 120402	12.7	5.5	7	0.2	4.76	4						●	●	●	
	4NK - SCMW 120404				0.4								●	●	●	
	4NK - SCMW 120408				0.8								●	●	●	

		RUDRALI HI-TECH TOOLS															
CBN INSERTS																	
SHAPE S 90°-CBN		Positive insert(multi-corner type)  Positive insert(One-corner type) 						● = Stock items									
								Hard Part Grade :RHB312 , RHB321,									
								RHB 835 , RH12K , RH35K									
								Cast Iron Grade : RHB316 , RHB314 , RH16K									
								CBN Grades									
SHAPE		ITEM Descreption	Ød	Ød1	θ	r	S	No. of corner	RHB312	RHB322	RHB835	RHB314	RHB316	RH12K	RH35K	RH16K	
	2NK - SNGA 120402	12.7	5.16	0	0.2	4.76	2							●	●	●	
	2NK - SNGA 120404				0.4												
	2NK - SNGA 120408				0.8												
	2NK - SNGA 120412				1.2												
	4N - SNGA 120402	12.7	5.16	0	0.2	4.76	4	●		●		●					
	4N - SNGA 120404				0.4			●		●							
	4N - SNGA 120408				0.8			●		●							
	4N - SNGA 120412				1.2			●		●							
	4NK - SNGA 120402	12.7	5.16	0	0.2	4.76	4							●	●	●	
	4NK - SNGA 120404				0.4												
	4NK - SNGA 120408				0.8												
	4NK - SNGA 120412				1.2												

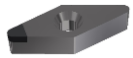
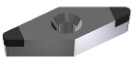
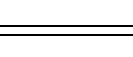
		RUDRALI HI-TECH TOOLS													
CBN INSERTS															
SHAPE	Positive insert(multi-corner type) Positive insert(One-corner type)							● = Stock items							
S								Hard Part Grade :RHB312 , RHB321,							
								RHB 835 , RH12K , RH35K							
90°-CBN								Cast Iron Grade : RHB316 , RHB314 , RH16K							
								CBN Grades							
								Un-coated					Coated		
SHAPE	ITEM Descreption	Ød	Ød1	θ	r	S	No. of corner	RHB312	RHB322	RHB835	RHB314	RHB316	RH12K	RH35K	RH16K
	N - SPGN 090302	9.525	NIL	11	0.2	3.18	1	●		●		●			
	N - SPGN 090304				0.4			●		●					
	N - SPGN 090308				0.8			●		●					
	NK - SPGN 090302	9.525	NIL	11	0.2	3.18	1						●	●	●
	NK - SPGN 090304				0.4							●	●	●	
	NK - SPGN 090308				0.8							●	●	●	
	2N - SPGN 090302	9.525	NIL	11	0.2	3.18	2	●		●		●			
	2N - SPGN 090304				0.4			●		●					
	2N - SPGN 090308				0.8			●		●					
	2NK - SPGN 090302	9.525	NIL	11	0.2	3.18	2						●	●	●
	2NK - SPGN 090304				0.4							●	●	●	
	2NK - SPGN 090308				0.8							●	●	●	
	4N - SPGN 090302	9.525	NIL	11	0.2	3.18	4	●		●		●			
	4N - SPGN 090304				0.4			●		●					
	4N - SPGN 090308				0.8			●		●					
	4NK - SPGN 090302	9.525	NIL	11	0.2	3.18	4						●	●	●
	4NK - SPGN 090304				0.4							●	●	●	
	4NK - SPGN 090308				0.8							●	●	●	

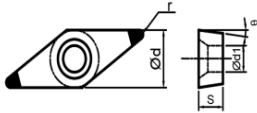
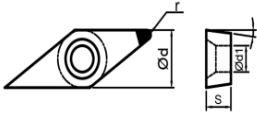
		RUDRALI HI-TECH TOOLS														
CBN INSERTS																
SHAPE	Positive insert(One-corner type) Positive insert(multi-corner type)							● = Stock items								
T								Hard Part Grade :RHB312 , RHB321,								
								RHB 835 , RH12K , RH35K								
60°-CBN								Cast Iron Grade : RHB316 , RHB314 , RH16K								
	CBN Grades															
								Un-coated					Coated			
SHAPE	ITEM Descreption	Ød	Ød1	θ	r	S	No. of corner	RHB312	RHB322	RHB835	RHB314	RHB316	RH12K	RH35K	RH16K	
	3NK - TCGW 110202 LF	6.35	2.8	7	0.2	2.38	3								●	
	3NK - TCGW 110204 LF				0.4										●	
	3NK - TCGW 110208 LF				0.8										●	
	N - TPMW 110302	6.35	3.4	11	0.2	3.14	1	●		●		●				
	N - TPMW 110304				0.4			●		●		●				
	N - TPMW 110308				0.8			●		●		●				
	NK - TPMW 110302	6.35	3.4	11	0.2	3.14	1						●	●	●	
	NK - TPMW 110304				0.4								●	●	●	
	NK - TPMW 110308				0.8								●	●	●	
	N - TPGW 110302	6.35	3.4	11	0.2	3.14	1	●		●		●				
	N - TPGW 110304				0.4			●		●		●				
	N - TPGW 110308				0.8			●		●		●				
	NK - TPGW 110302	6.35	3.4	11	0.2	3.14	1						●	●	●	
	NK- TPGW 110304				0.4								●	●	●	
	NK - TPGW 110308				0.8								●	●	●	
	3N - TPGW 110302	6.35	3.4	11	0.2	3.14	3	●		●		●				
	3N- TPGW 110304				0.4			●		●		●				
	3N - TPGW 110308				0.8			●		●		●				
	3NK - TPGW 110302 LF	6.35	3.4	11	0.2	3.14	1								●	
	3NK- TPGW 110304 LF				0.4										●	
	3NK - TPGW 110308 LF				0.8										●	
	3N - TPGW 110302 LF	6.35	3.4	11	0.2	3.14	3	●		●		●				
	3N- TPGW 110304 LF				0.4			●		●		●				
	3N - TPGW 110308 LF				0.8			●		●		●				
	3NK - TPGW 110302	6.35	3.4	11	0.2	3.18	3						●	●	●	
	3NK- TPGW 110304				0.4								●	●	●	
	3NK - TPGW 110308				0.8								●	●	●	
	N - TCMW 16T302	9.525	4.4	7	0.2	3.97	1	●		●		●				
	N - TCMW 16T304				0.4			●		●		●				
	N - TCMW 16T308				0.8			●		●		●				

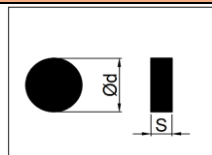
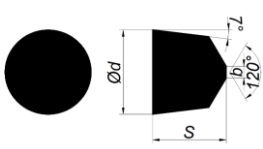
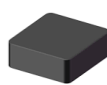
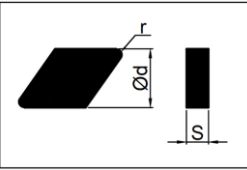
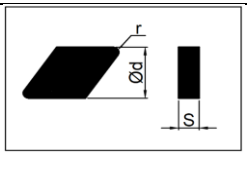
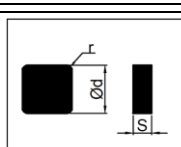
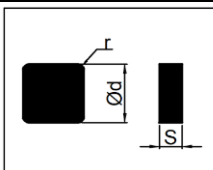
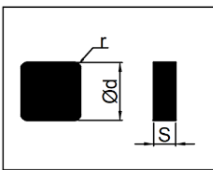
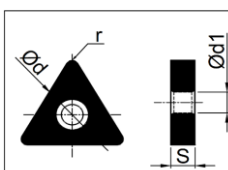
		RUDRALI HI-TECH TOOLS																		
CBN INSERTS																				
SHAPE	Positive insert(One-corner type) Positive insert(multi-corner type)							● = Stock items												
T								Hard Part Grade :RHB312 , RHB321,												
								RHB 835 , RH12K , RH35K												
								Cast Iron Grade : RHB316 , RHB314 , RH16K												
60°-CBN								CBN Grades												
								Un-coated					Coated							
SHAPE	ITEM Descreption	Ød	Ød1	θ	r	S	No. of corner	RHB312	RHB322	RHB835	RHB314	RHB316	RH12K	RH35K	RH16K					
	3NK - TNGA 160402	9.525	5.16	0	0.2	4.76	3						●	●	●					
	3NK - TNGA 160404													●	●	●				
	3NK - TNGA 160408																●	●	●	
	3NK - TNGA 160412																●	●	●	
	6N - TNGA 160402	9.525	5.16	0	0.2	4.76	6	●			●		●							
	6N - TNGA 160404									●		●								
	6N - TNGA 160408										●		●							
	6N - TNGA 160412										●		●							
	3NK - TNGA 160402 LF	9.525	5.16	0	0.2	4.76	3								●					
	3NK - TNGA 160404 LF																●			
	3NK - TNGA 160408 LF																	●		
	3NK - TNGA 160412 LF																	●		
	6N - TNGA 160402 LF	9.525	5.16	0	0.2	4.76	6						●							
	6N - TNGA 160404 LF														●					
	6N - TNGA 160408 LF															●				
	6N - TNGA 160412 LF															●				
	3NK - TNGA 160402 LS	9.525	5.16	0	0.2	4.76	3						●		●					
	3NK - TNGA 160404 LS															●		●		
	3NK - TNGA 160408 LS																●		●	
	3NK - TNGA 160412 LS																●		●	
	6N - TNGA 160402 LS	9.525	5.16	0	0.2	4.76	6	●					●							
	6N - TNGA 160404 LS															●				
	6N - TNGA 160408 LS																●			
	6N - TNGA 160412 LS																●			
	3NK - TNGA 160402 HS	9.525	5.16	0	0.2	4.76	3							●						
	3NK - TNGA 160404 HS																●			
	3NK - TNGA 160408 HS																	●		
	3NK - TNGA 160412 HS																	●		
	6N - TNGA 160402 HS	9.525	5.16	0	0.2	4.76	6	●			●									
	6N - TNGA 160404 HS									●										
	6N - TNGA 160408 HS										●									
	6N - TNGA 160412 HS										●									
	6NK - TNGA 160402	9.525	5.16	0	0.2	4.76	6						●	●	●					
	6NK - TNGA 160404																●	●	●	
	6NK - TNGA 160408																	●	●	●
	6NK - TNGA 160412																	●	●	●

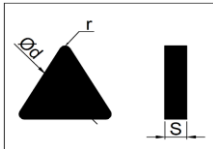
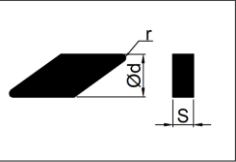
		RUDRALI HI-TECH TOOLS														
CBN INSERTS																
SHAPE	Positive insert(One-corner type) Positive insert(multi-corner type)							● = Stock items								
T								Hard Part Grade :RHB312 , RHB321,								
								RHB 835 , RH12K , RH35K								
60°-CBN								Cast Iron Grade : RHB316 , RHB314 , RH16K								
								CBN Grades								
								Un-coated					Coated			
SHAPE	ITEM Descreption	Ød	Ød1	θ	r	S	No. of corner	RHB312	RHB322	RHB835	RHB314	RHB316	RH12K	RH35K	RH16K	
	N - TPMN 090202	5.56	NIL	11	0.2	2.38	1	●		●		●				
	N - TPMN 090204				0.4			●		●		●				
	N - TPMN 090208				0.8			●		●		●				
	NK - TPMN 090202	5.56	NIL	11	0.2	2.38	1						●	●	●	
	NK - TPMN 090204				0.4								●	●	●	
	NK - TPMN 090208				0.8								●	●	●	
	3N - TPMN 090202	5.56	NIL	11	0.2	2.38	3	●		●		●				
	3N - TPMN 090204				0.4			●		●		●				
	3N - TPMN 090208				0.8			●		●		●				
	3NK - TPMN 090202	5.56	NIL	11	0.2	2.38	3						●	●	●	
	3NK - TPMN 090204				0.4								●	●	●	
	3NK - TPMN 090208				0.8								●	●	●	
	N - TPGN 090202	5.56	NIL	11	0.2	2.38	1	●		●		●				
	N - TPGN 090204				0.4			●		●		●				
	N - TPGN 090208				0.8			●		●		●				
	NK - TPGN 090202	5.56	NIL	11	0.2	2.38	1						●	●	●	
	NK - TPGN 090204				0.4								●	●	●	
	NK - TPGN 090208				0.8								●	●	●	
	3N - TPGN 090202	5.56	NIL	11	0.2	2.38	3	●		●		●				
	3N - TPGN 090204				0.4			●		●		●				
	3N - TPGN 090208				0.8			●		●		●				
	3NK - TPGN 090202	5.56	NIL	11	0.2	2.38	3						●	●	●	
	3NK - TPGN 090204				0.4								●	●	●	
	3NK - TPGN 090208				0.8								●	●	●	
	N - TPMN 110302	6.35	NIL	11	0.2	3.18	1	●		●		●				
	N - TPMN 110304				0.4			●		●		●				
	N - TPMN 110308				0.8			●		●		●				
	NK - TPMN 110302	6.35	NIL	11	0.2	3.18	1						●	●	●	
	NK - TPMN 110304				0.4								●	●	●	
	NK - TPMN 110308				0.8								●	●	●	
	3N - TPMN 110302	6.35	NIL	11	0.2	3.18	3	●		●		●				
	3N - TPMN 110304				0.4			●		●		●				
	3N - TPMN 110308				0.8			●		●		●				
	3NK - TPMN 110302	6.35	NIL	11	0.2	3.18	3						●	●	●	
	3NK - TPMN 110304				0.4								●	●	●	
	3NK - TPMN 110308				0.8								●	●	●	

CBN INSERTS

SHAPE	Positive insert(multi-corner type) Positive insert(One-corner type)							● = Stock items								
V								Hard Part Grade :RHB312 , RHB321,								
								RHB 835 , RH12K , RH35K								
								Cast Iron Grade : RHB316 , RHB314 , RH16K								
								CBN Grades								
35°-CBN								Un-coated					Coated			
SHAPE	ITEM Descreption	Ød	Ød1	θ	r	S	No. of corner	RHB312	RHB322	RHB835	RHB314	RHB316	RH12K	RH35K	RH16K	
	2NK - VBMW 160402	9.525	4.4	5	0.2	4.76	2						●	●		
	2NK - VBMW 160404												●	●	●	
	2NK - VBMW 160408												●	●	●	
	N - VBGW 160402	9.525	4.4	5	0.2	4.76	1	●		●		●				
	N - VBGW 160404											●		●		
	N - VBGW 160408											●		●		
	NK - VBGW 160402	9.525	4.4	5	0.2	4.76	1						●	●	●	
	NK - VBGW 160404													●	●	●
	NK - VBGW 160408												●	●	●	
	2N - VBGW 160402	9.525	4.4	5	0.2	4.76	2	●		●		●				
	2N - VBGW 160404											●		●		
	2N - VBGW 160408											●		●		
	2NK - VBGW 160402	9.525	4.4	5	0.2	4.76	2						●	●	●	
	2NK - VBGW 160404													●	●	●
	2NK - VBGW 160408												●	●	●	
	N - VCMW 160402	9.525	4.4	5	0.2	4.76	1	●		●		●				
	N - VCMW 160404											●		●		
	N - VCMW 160408											●		●		
	NK - VCMW 160402	9.525	4.4	5	0.2	4.76	1						●	●	●	
	NK - VCMW 160404													●	●	●
	NK - VCMW 160408												●	●	●	
	2N - VCMW 160402	9.525	4.4	5	0.2	4.76	2	●		●		●				
	2N - VCMW 160404											●		●		
	2N - VCMW 160408											●		●		
	2NK - VCMW 160402	9.525	4.4	5	0.2	4.76	2						●	●	●	
	2NK - VCMW 160404													●	●	●
	2NK - VCMW 160408												●	●	●	
	N - VCGW 160402	9.525	4.4	5	0.2	4.76	1	●		●		●				
	N - VCGW 160404											●		●		
	N - VCGW 160408											●		●		
	NK - VCGW 160402	9.525	4.4	5	0.2	4.76	1						●	●	●	
	NK - VCGW 160404													●	●	●
	NK - VCGW 160408												●	●	●	
	2N - VCGW 160402	9.525	4.4	5	0.2	4.76	2	●		●		●				
	2N - VCGW 160404											●		●		
	2N - VCGW 160408											●		●		

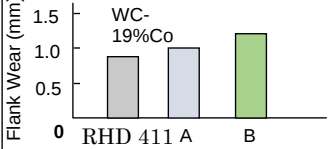
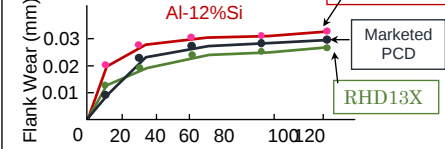
		RUDRALI HI-TECH TOOLS														
CBN INSERTS																
SHAPE		Positive insert(multi-corner type) Positive insert(One-corner type)							● = Stock items							
V									Hard Part Grade :RHB312 , RHB321,							
									RHB 835 , RH12K , RH35K							
									Cast Iron Grade : RHB316 , RHB314 , RH16K							
35°-CBN		CBN Grades														
								Un-coated					Coated			
SHAPE	ITEM Descreption	Ød	Ød1	e	r	S	No. of corner	RHB312	RHB322	RHB835	RHB314	RHB316	RH12K	RH35K	RH16K	
	NK - VNGA 160402	9.525	5.16	0	0.2	4.76	1						●	●	●	
	NK - VNGA 160404				0.4							●	●	●		
	NK - VNGA 160408				0.8							●	●	●		
	NK - VNGA 160412				1.2							●	●	●		
	2N - VNGA 160402	9.525	5.16	0	0.2	4.76	2	●		●		●				
	2N - VNGA 160404				0.4			●		●						
	2N - VNGA 160408				0.8			●		●						
	2N - VNGA 160412				1.2			●		●						
	2NK - VNGA 160402	9.525	5.16	0	0.2	4.76	2						●	●	●	
	2NK - VNGA 160404				0.4							●	●	●		
	2NK - VNGA 160408				0.8							●	●	●		
	2NK - VNGA 160412				1.2							●	●	●		
	4N - VNGA 160402	9.525	5.16	0	0.2	4.76	4	●		●		●				
	4N - VNGA 160404				0.4			●		●		●				
	4N - VNGA 160408				0.8			●		●		●				
	4N - VNGA 160412				1.2			●		●		●				
	4NK - VNGA 160402	9.525	5.16	0	0.2	4.76	4						●	●	●	
	4NK - VNGA 160404				0.4							●	●	●		
	4NK- VNGA 160408				0.8							●	●	●		
	4NK - VNGA 160412				1.2							●	●	●		

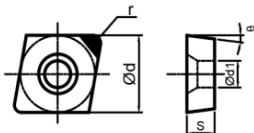
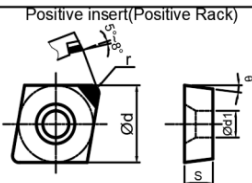
		RUDRALI HI-TECH TOOLS							
SOLID - CBN INSERTS									
ITEM Descreption		Ød (IC)	Ød1	Clear. angle	r/B	S	No. of corner	Grade	
								RHB 312	RHS3S6
	RNMN 0903	9.525	NIL	0		3.18			●
	RNMN 1204	12.7				4.76			●
	RNMN 1207	1.7				7.94			●
	RCMX060400V	6.35	NIL	7	0.8	4.76			●
	RCMX060500V	6.35			0.8	5			●
	RCMX060600V	6.35			0.8	6.35			●
	RCMX090700V	9.525			1	7.94			●
	RCMX120700V	12.7			2	7.94			●
	RCMX151000V	15.88			2	10			●
	RCMX191000V	19.05			2	10			●
	RCMX201200V	20			2	12			●
	RCMX251200V	25.4			2	12			●
	CNGN 120404	12.7	NIL	0	0.4	4.76			
	CNGN 120408				0.8				●
	CNGN 120412				1.2				●
	CNGN 120416				1.6				
	DNGN 150404	12.7	NIL	0	0.4	4.76			
	DNGN 150408				0.8				●
	DNGN 150412				1.2				●
	DNGN 150416				1.6				
	SNGN 060304	6.35	NIL	0	0.4	3.18			●
	SNGN 060308				0.8				●
	SNGN 090312				1.2				●
	SNGN 090304	9.525	NIL	0	0.4	3.18			
	SNGN 090308				0.8				●
	SNGN 090312				1.2				●
	SNGN 090316				1.6				
	SNGN 120404	12.7	NIL	0	0.4	4.76			
	SNGN 120408				0.8				●
	SNGN 120412				1.2				●
	SNGN 120416				1.6				●
	TNGA 160404	9.525	NIL	0	0.4	4.76			
	TNGA 160408				0.8				●
	TNGA 160412				1.2				●
	TNGA 160416				1.6				

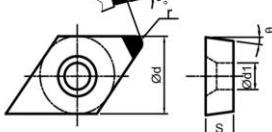
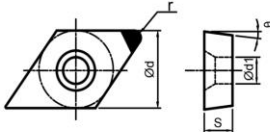
		RUDRALI HI-TECH TOOLS							
SOLID - CBN INSERTS									
ITEM Description		Ød	Ød1	Clear. angle	r/B	S	No. of corner	Grade	
								RHB 312	RHS356
	TNGN 160404	9.53	NIL	0	0.4	4.76			
	TNGN 160408				0.8				●
	TNGN 160412				1.2				●
	TNGN 160416				1.6				
	VNGN 160404	9.53	NIL	0	0.4	4.76			
	VNGN 160408				0.8				●
	VNGN 160412				1.2				●
	VNGN 160416				1.6				

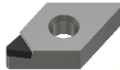
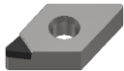
		RUDRALI HI-TECH TOOLS			
PCD - GRADES					
Grade		Cutting Speed m/min	Feed rate (f) mm / rev	DOC: (ap) mm	Main Application
RHD SY50	Non ferrous Machining	800 ~ 2000	0.05 ~ 0.2	0.1 ~ 3.0	Finishing, roughing, and interrupted machining of aluminum and non-ferrous materials.
RHD 13X		800 ~ 2000	0.05 ~ 0.2	0.1 ~ 3.0	Machining of aluminum, copper, wood, rubber, graphite, and carbide
RHD 18X		800 ~ 2000	0.05 ~ 0.2	0.1 ~ 3.0	High-silicon aluminum alloys, ceramics, and carbide cutting

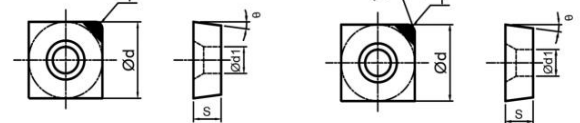
Application of PCD

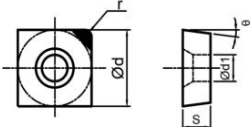
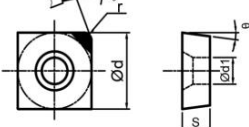
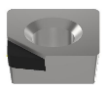
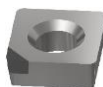
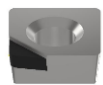
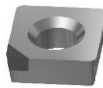
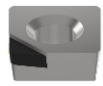
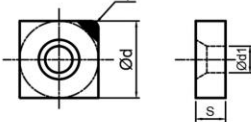
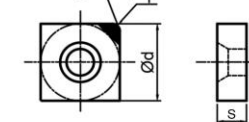
Grade	RHD 411	RHD 13X	RHD SY50
Applications	☐High Si Aluminum ☐Carbide, Ceramics, Semi-sintered ☐Rock, Stone ☐Al-SiC MMC	☐Non-ferrous materials (Aluminum, Copper) ☐FRP, Hard Rubber, Carbon ☐Carbide, Ceramics	☐Interrupted Cutting of Non-ferrous Materials ☐Plastic, Wood, Inorganic Material
Performance	☐Cutting Carbide  V=15m/min, f=0.18mm/rev, d=0.5mm, Wet Cutting Time: 13min ☐Cutting Aluminum Alloy  V=300m/min, f=0.1mm/rev, d=0.2mm, Dry		

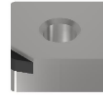
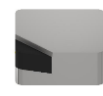
		RUDRALI HI-TECH TOOLS										
PCD INSERTS												
SHAPE	Positive insert(Plain)  Positive insert(Positive Rack)  ● = Stock items											
C												
80° - PCD									PCD GRADE			
SHAPE	ITEM Descreption	Ød	Ød1	θ	r	S	No. of corner	Type	RHD SY50	RHD 13X	RHD 18X	
	CPMW 090302	9.525	4.4	11	0.2	3.18	1	Plain	●			
	CPMW 090304				0.4				●			
	CPMW 090308				0.8				●			
	CPMT 090302	9.525	4.4	11	0.2	3.18	2	Positive Rack	●			
	CPMT 090304				0.4				●			
	CPMT 090308				0.8				●			
	CPGW 090302	9.525	4.4	11	0.2	3.18	1	Plain	●			
	CPGW 090304				0.4				●			
	CPGW 090308				0.8				●			
	CPGT 090302	9.525	4.4	11	0.2	3.18	2	Positive Rack	●			
	CPGT 090304				0.4				●			
	CPGT 090308				0.8				●			
	CPMW 09T302	9.525	4.4	11	0.2	3.97	1	Plain	●			
	CPMW 09T304				0.4				●			
	CPMW 09T308				0.8				●			
	CPMT 09T302	9.525	4.4	11	0.2	3.97	2	Positive Rack	●			
	CPMT 09T304				0.4				●			
	CPMT 09T308				0.8				●			
	CPGW 09T302	9.525	4.4	11	0.2	3.97	1	Plain	●			
	CPGW 09T304				0.4				●			
	CPGW 09T308				0.8				●			
	CPGT 09T302	9.525	4.4	11	0.2	3.97	2	Positive Rack	●			
	CPGT 09T304				0.4				●			
	CPGT 09T308				0.8				●			
	CNMA 120402	12.7	5.16	0	0.2	4.76	1	Plain	●			
	CNMA 120404				0.4				●			
	CNMA 120408				0.8				●			
	CNMA 120412				1.2				●			
	CNMT 120402	12.7	5.16	0	0.2	4.76	1	Positive Rack	●			
	CNMT 120404				0.4				●			
	CNMT 120408				0.8				●			
	CNMT 120412				1.2				●			
	CNGA 120402	12.7	5.16	0	0.2	4.76	1	Plain	●			
	CNGA 120404				0.4				●			
	CNGA 120408				0.8				●			
	CNGA 120412				1.2				●			
	CNGT 120402	12.7	5.16	0	0.2	4.76	1	Positive Rack	●			
	CNGT 120404				0.4				●			
	CNGT 120408				0.8				●			
	CNGT 120412				1.2				●			

		RUDRALI HI-TECH TOOLS										
PCD INSERTS												
SHAPE	Positive insert(Plain) ● = Stock items											
D												
55°- PCD									PCD GRADE			
SHAPE	ITEM Descreption	Ød	Ød1	θ	r	S	No. of corner	Type	RHD SY50	RHD 13X	RHD 18X	
	DCMW 070202	6.35	2.8	7	0.2	2.38	1	Plain	●			
	DCMW 070204				0.4				●			
	DCMW 070208				0.8				●			
	DCMT 070202	6.35	2.8	7	0.2	2.38	1	Positive Rack	●			
	DCMT 070204				0.4				●			
	DCMT 070208				0.8				●			
	DCGW 070202	6.35	2.8	7	0.2	2.38	1	Plain	●			
	DCGW 070204				0.4				●			
	DCGW 070208				0.8				●			
	DCGT 070202	6.35	2.8	7	0.2	2.38	1	Positive Rack	●			
	DCGT 070204				0.4				●			
	DCGT 070208				0.8				●			
	DCMW 11T302	9.525	4.4	7	0.2	2.38	1	Plain	●			
	DCMW 11T304				0.4				●			
	DCMW 11T308				0.8				●			
	DCMT 11T302	9.525	4.4	7	0.2	2.38	1	Positive Rack	●			
	DCMT 11T304				0.4				●			
	DCMT 11T308				0.8				●			
	DCGW 11T302	9.525	4.4	7	0.2	2.38	1	Plain	●			
	DCGW 11T304				0.4				●			
	DCGW 11T308				0.8				●			
	DCGT 11T302	9.525	4.4	7	0.2	2.38	1	Positive Rack	●			
	DCGT 11T304				0.4				●			
	DCGT 11T308				0.8				●			
	DNMA 150402	12.7	5.16	0	0.2	4.76	1	Plain	●			
	DNMA 150404				0.4				●			
	DNMA 150408				0.8				●			
	DNMA 150412				1.2				●			

		RUDRALI HI-TECH TOOLS									
PCD INSERTS											
SHAPE		Positive insert(Plain) Positive insert(Positive Rack) ● = Stock items									
D											
55° - PCD									PCD GRADE		
SHAPE	ITEM Descreption	Ød	Ød1	θ	r	S	No. of corner	Type	RHD SY50	RHD 13X	RHD 18X
	DNMT 150402	12.7	5.16	0	0.2	4.76	1	Positive Rack	●		
	DNMT 150404				0.4				●		
	DNMT 150408				0.8				●		
	DNMT 150412				1.2				●		
	DNGA 150402	12.7	5.16	0	0.2	4.76	1	Plain	●		
	DNGA 150404				0.4				●		
	DNGA 150408				0.8				●		
	DNGA 150412				1.2				●		
	DNGT 150402	12.7	5.16	0	0.2	4.76	1	Positive Rack	●		
	DNGT 150404				0.4				●		
	DNGT 150408				0.8				●		
	DNGT 150412				1.2				●		

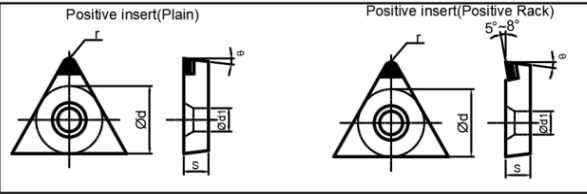
SHAPE		Positive insert(Plain)							Positive insert(Positive Rack)							● = Stock items		
S																		
90° - PCD																PCD GRADE		
SHAPE	ITEM Description	Ød	Ød1	θ	r	S	No. of corner	Type	RHD SY50	RHD 13X	RHD 18X							
	SPGT 090302	9.525	4.4	11	0.2	3.18	1	Positive Rack	●									
	SPGT 090304				0.4				●									
	SPGT 090308				0.8				●									
	SCMW 09T302	9.525	4.4	7	0.2	3.97	1	Plain	●									
	SCMW 09T304				0.4				●									
	SCMW 09T308				0.8				●									
	SCMT 09T302	9.525	4.4	7	0.2	3.97	1	Positive Rack	●									
	SCMT 09T304				0.4				●									
	SCMT 09T308				0.8				●									
	SCGW 09T302	9.525	4.4	7	0.2	3.97	1	Plain	●									
	SCGW 09T304				0.4				●									
	SCGW 09T308				0.8				●									
	SCGT 09T302	9.525	4.4	7	0.2	3.97	1	Positive Rack	●									
	SCGT 09T304				0.4				●									
	SCGT 09T308				0.8				●									
	SPMW 09T302	9.525	4.4	11	0.2	3.97	1	Plain	●									
	SPMW 09T304				0.4				●									
	SPMW 09T308				0.8				●									
	SPMT 09T302	9.525	4.4	11	0.2	3.97	1	Positive Rack	●									
	SPMT 09T304				0.4				●									
	SPMT 09T308				0.8				●									
	SPGW 09T302	9.525	4.4	11	0.2	3.97	1	Plain	●									
	SPGW 09T304				0.4				●									
	SPGW 09T308				0.8				●									
	SPGT 09T302	9.525	4.4	11	0.2	3.97	1	Positive Rack	●									
	SPGT 09T304				0.4				●									
	SPGT 09T308				0.8				●									
	SCMW 120402	12.7	5.5	7	0.2	4.76	1	Plain	●									
	SCMW 120404				0.4				●									
	SCMW 120408				0.8				●									
	SCMT 120402	12.7	5.5	7	0.2	4.76	1	Positive Rack	●									
	SCMT 120404				0.4				●									
	SCMT 120408				0.8				●									

		RUDRALI HI-TECH TOOLS										
PCD INSERTS												
SHAPE	Positive insert(Plain)  Positive insert(Positive Rack)  ● = Stock items											
S												
90° - PCD									PCD GRADE			
SHAPE	ITEM Descreption	Ød	Ød1	θ	r	S	No. of corner	Type	RHD SY50	RHD 13X	RHD 18X	
	SCGW 120402	12.7	5.5	7	0.2	4.76	1	Plain	●			
	SCGW 120404				0.4				●			
	SCGW 120408				0.8				●			
	SCGT 120402	12.7	5.5	7	0.2	4.76	1	Positive Rack	●			
	SCGT 120404				0.4				●			
	SCGT 120408				0.8				●			
	SPMW 120402	12.7	5.5	7	0.2	4.76	1	Plain	●			
	SPMW 120404				0.4				●			
	SPMW 120408				0.8				●			
	SPMT 120402	12.7	5.5	7	0.2	4.76	1	Positive Rack	●			
	SPMT 120404				0.4				●			
	SPMT 120408				0.8				●			
	SPGW 120402	12.7	5.5	7	0.2	4.76	1	Plain	●			
	SPGW 120404				0.4				●			
	SPGW 120408				0.8				●			
	SPGT 120402	12.7	5.5	7	0.2	4.76	1	Positive Rack	●			
	SPGT 120404				0.4				●			
	SPGT 120408				0.8				●			
	RUDRALI HI-TECH TOOLS											
PCD INSERTS												
SHAPE	Negative insert(Plain)  Negative insert(Positive Rack)  ● = Stock items											
S												
90° - PCD									PCD GRADE			
SHAPE	ITEM Descreption	Ød	Ød1	θ	r	S	No. of corner	Type	RHD SY50	RHD 13X	RHD 18X	
	SNMA 120402	12.7	5.16	0	0.2	4.76	1	Plain	●			
	SNMA 120404				0.4				●			
	SNMA 120408				0.8				●			
	SNMA 120412				1.2				●			
	SNMT 120402	12.7	5.16	0	0.2	4.76	1	Positive Rack	●			
	SNMT 120404				0.4				●			
	SNMT 120408				0.8				●			
	SNMT 120412				1.2				●			

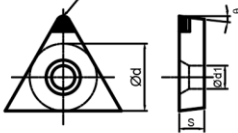
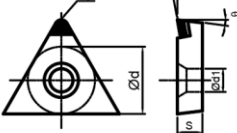
		RUDRALI HI-TECH TOOLS										
PCD INSERTS												
SHAPE		Negative insert(Plain) Negative insert(Positive Rack)							● = Stock items			
S												
90° - PCD									PCD GRADE			
SHAPE	ITEM Descreption	Ød	Ød1	θ	r	S	No. of corner	Type	RHD SY50	RHD 13X	RHD 18X	
	SNGA 120402	12.7	5.16	0	0.2	4.76	2	Plain	●			
	SNGA 120404				0.4				●			
	SNGA 120408				0.8				●			
	SNGA 120412				1.2				●			
	SNGT 120402	12.7	5.16	0	0.2	4.76	2	Positive Rack	●			
	SNGT 120404				0.4				●			
	SNGT 120408				0.8				●			
	SNGT 120412				1.2				●			
		RUDRALI HI-TECH TOOLS										
PCD INSERTS												
SHAPE		Positive insert(Plain type) Positive insert(With positive rack)							● = Stock items			
S												
90° - PCD									PCD GRADE			
SHAPE	ITEM Descreption	Ød	Ød1	θ	r	S	No. of corner	Type	RHD SY50	RHD 13X	RHD 18X	
	SCMN 090302	9.525	NIL	7	0.2	3.18	1	Plain	●			
	SCMN 090304				0.4				●			
	SCMN 090308				0.8				●			
	SCMR 090302	9.525	NIL	7	0.2	3.18	1	Positive Rack	●			
	SCMR 090304				0.4				●			
	SCMR 090308				0.8				●			
	SCGN 090302	9.525	NIL	7	0.2	3.18	1	Plain	●			
	SCGN 090304				0.4				●			
	SCGN 090308				0.8				●			
	SCGR 090302	9.525	NIL	7	0.2	3.18	1	Positive Rack	●			
	SCGR 090304				0.4				●			
	SCGR 090308				0.8				●			
	SPGN 090302	9.525	NIL	11	0.2	3.18	1	Plain	●			
	SPGN 090304				0.4				●			
	SPGN 090308				0.8				●			
	SPGR 090302	9.525	NIL	11	0.2	3.18	1	Positive Rack	●			
	SPGR 090304				0.4				●			
	SPGR 090308				0.8				●			

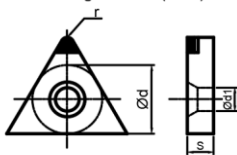
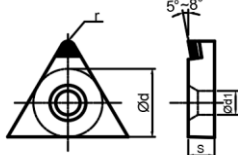
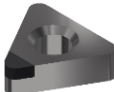
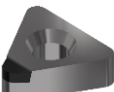
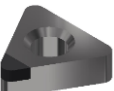
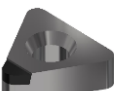
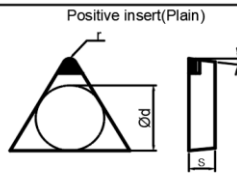
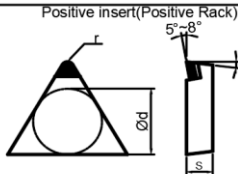
PCD INSERTS

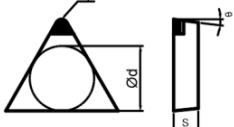
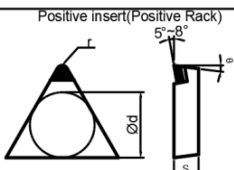
● = Stock items

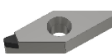


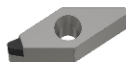
60° - PCD								PCD GRADE			
SHAPE	ITEM Description	Ød	Ød1	θ	r	S	No. of corner	Type	RHD SY50	RHD 13X	RHD 18X
	TPMT 090202	5.56	2.8	7	0.2	2.38	1	Positive Rack	●		
	TPMT 090204				0.4				●		
	TPMT 090208				0.8				●		
	TPGW 090202	5.56	2.8	7	0.2	2.38	1	Plain	●		
	TPGW 090204				0.4				●		
	TPGW 090208				0.8				●		
	TPGT 090202	5.56	2.8	7	0.2	2.38	1	Positive Rack	●		
	TPGT 090204				0.4				●		
	TPGT 090208				0.8				●		
	TCMW 110202	6.35	2.8	7	0.2	2.38	1	Plain	●		
	TCMW 110204				0.4				●		
	TCMW 110208				0.8				●		
	TCMT 110202	6.35	2.8	7	0.2	2.38	1	Positive Rack	●		
	TCMT 110204				0.4				●		
	TCMT 110208				0.8				●		
	TCGW 110202	6.35	2.8	7	0.2	2.38	3	Plain	●		
	TCGW 110204				0.4				●		
	TCGW 110208				0.8				●		
	TCGT 110202	6.35	2.8	7	0.2	2.38	3	Positive Rack	●		
	TCGT 110204				0.4				●		
	TCGT 110208				0.8				●		
	TPMW 110302	6.35	3.4	11	0.2	3.14	1	Plain	●		
	TPMW 110304				0.4				●		
	TPMW 110308				0.8				●		
	TPMT 110302	6.35	3.4	11	0.2	3.14	1	Positive Rack	●		
	TPMT 110304				0.4				●		
	TPMT 110308				0.8				●		
	TPGW 110302	6.35	3.4	11	0.2	3.14	1	Plain	●		
	TPGW 110304				0.4				●		
	TPGW 110308				0.8				●		

		RUDRALI HI-TECH TOOLS										
PCD INSERTS												
SHAPE	Positive Insert(Plain) Positive Insert(Positive Rack) ● = Stock items											
T												
60° - PCD									PCD GRADE			
SHAPE	ITEM Description	Ød	Ød1	θ	r	S	No. of corner	Type	RHD SY50	RHD 13X	RHD 18X	
	TPGT 110302	6.35	3.4	11	0.2	3.14	1	Positive Rack	●			
	TPGT 110304				0.4				●			
	TPGT 110308				0.8				●			
	TCMW 16T302	9.525	4.4	7	0.2	3.97	1	Plain	●			
	TCMW 16T304				0.4				●			
	TCMW 16T308				0.8				●			
	TCMT 16T302	9.525	4.4	7	0.2	3.97	1	Positive Rack	●			
	TCMT 16T304				0.4				●			
	TCMT 16T308				0.8				●			
	TCGW 16T302	9.525	4.4	7	0.2	3.97	1	Plain	●			
	TCGW 16T304				0.4				●			
	TCGW 16T308				0.8				●			
	TCGT 16T302	9.525	4.4	7	0.2	3.97	1	Positive Rack	●			
	TCGT 16T304				0.4				●			
	TCGT 16T308				0.8				●			
	TCMW 160402	9.525	4.4	7	0.2	4.76	1	Plain	●			
	TCMW 160404				0.4				●			
	TCMW 160408				0.8				●			
	TCMT 160402	9.525	4.4	7	0.2	4.76	1	Positive Rack	●			
	TCMT 160404				0.4				●			
	TCMT 160408				0.8				●			
	TCGW 160402	9.525	4.4	7	0.2	4.76	3	Plain	●			
	TCGW 160404				0.4				●			
	TCGW 160408				0.8				●			
	TCGT 160402	9.525	4.4	7	0.2	4.76	3	Positive Rack	●			
	TCGT 160404				0.4				●			
	TCGT 160408				0.8				●			

		RUDRALI HI-TECH TOOLS										
PCD INSERTS												
SHAPE	Negative insert(Plain) Negative insert(Positive Rack) ● = Stock items											
T												
60° - PCD									PCD GRADE			
SHAPE	ITEM Descreption	Ød	Ød1	θ	r	S	No. of corner	Type	RHD SY50	RHD 13X	RHD 18X	
	TNMA 160402	9.525	5.16	0	0.2	4.76	1	Plain	●			
	TNMA 160404				0.4				●			
	TNMA 160408				0.8				●			
	TNMA 160412				1.2				●			
	TNMT 160402	9.525	5.16	0	0.2	4.76	1	Positive Rack	●			
	TNMT 160404				0.4				●			
	TNMT 160408				0.8				●			
	TNMT 160412				1.2				●			
	TNGA 160402	9.525	5.16	0	0.2	4.76	3	Plain	●			
	TNGA 160404				0.4				●			
	TNGA 160408				0.8				●			
	TNGA 160412				1.2				●			
	TNGT 160402	9.525	5.16	0	0.2	4.76	3	Positive Rack	●			
	TNGT 160404				0.4				●			
	TNGT 160408				0.8				●			
	TNGT 160412				1.2				●			
	RUDRALI HI-TECH TOOLS											
PCD INSERTS												
SHAPE	Positive insert(Plain) Positive insert(Positive Rack) ● = Stock items											
T												
60° - PCD									PCD GRADE			
SHAPE	ITEM Descreption	Ød	Ød1	θ	r	S	No. of corner	Type	RHD SY50	RHD 13X	RHD 18X	
	TPMN 090202	5.56	NIL	11	0.2	2.38	1	Plain	●			
	TPMN 090204				0.4				●			
	TPMN 090208				0.8				●			
	TPMR 090202	5.56	NIL	11	0.2	2.38	1	Positive Rack	●			
	TPMR 090204				0.4				●			
	TPMR 090208				0.8				●			

		RUDRALI HI-TECH TOOLS										
PCD INSERTS												
SHAPE	Positive insert(Plain)  Positive insert(Positive Rack) 								● = Stock items			
T												
60°- PCD												
SHAPE	ITEM Descrption	Ød	Ød1	θ	r	S	No. of corner	Type	RHD SY50	RHD 13X	RHD 18X	
	TPGN 090202	5.56	NIL	11	0.2	2.38	1	Plain	●			
	TPGN 090204				0.4				●			
	TPGN 090208				0.8				●			
	TPGR 090202	5.56	NIL	11	0.2	2.38	3	Positive Rack	●			
	TPGR 090204				0.4				●			
	TPGR 090208				0.8				●			
	TPMN 110302	6.35	NIL	11	0.2	3.18	1	Plain	●			
	TPMN 110304				0.4				●			
	TPMN 110308				0.8				●			
	TPMR 110302	6.35	NIL	11	0.2	3.18	1	Positive Rack	●			
	TPMR 110304				0.4				●			
	TPMR 110308				0.8				●			
	TPGN 110302	6.35	NIL	11	0.2	3.18	3	Plain	●			
	TPGN 110304				0.4				●			
	TPGN 110308				0.8				●			
	TPGR 110302	6.35	NIL	11	0.2	3.18	3	Positive Rack	●			
	TPGR 110304				0.4				●			
	TPGR 110308				0.8				●			
	TPMN 16T302	9.525	NIL	11	0.2	3.97	1	Plain	●			
	TPMN 16T304				0.4				●			
	TPMN 16T308				0.8				●			
	TPMR 16T302	9.525	NIL	11	0.2	3.97	1	Positive Rack	●			
	TPMR 16T304				0.4				●			
	TPMR 16T308				0.8				●			
	TPGN 16T302	9.525	NIL	11	0.2	3.97	3	Plain	●			
	TPGN 16T304				0.4				●			
	TPGN 16T308				0.8				●			
	TPGR 16T302	9.525	NIL	11	0.2	3.97	3	Positive Rack	●			
	TPGR 16T304				0.4				●			
	TPGR 16T308				0.8				●			

		RUDRALI HI-TECH TOOLS										
PCD INSERTS												
SHAPE		Positive insert(Plain) Positive insert(Positive Rack) ● = Stock items										
V												
35° - PCD												
SHAPE	ITEM Descrption	Ød	Ød1	θ	r	S	No. of corner	Type	RHD SY50	RHD 13X	RHD 18X	
	VCMW 110302	6.35	2.8	7	0.2	3.18	1	Plain	●			
	VCMW 110304				0.4				●			
	VCMW 110308				0.8				●			
	VCMT 110302	6.35	2.8	7	0.2	3.18	1	Positive Rack	●			
	VCMT 110304				0.4				●			
	VCMT 110308				0.8				●			
	VCGW 110302	6.35	2.8	7	0.2	3.18	1	Plain	●			
	VCGW 110304				0.4				●			
	VCGW 110308				0.8				●			
	VCGT 110302	6.35	2.8	7	0.2	3.18	1	Positive Rack	●			
	VCGT 110304				0.4				●			
	VCGT 110308				0.8				●			
	VBMW 160402	9.525	4.4	5	0.2	4.76	1	Plain	●			
	VBMW 160404				0.4				●			
	VBMW 160408				0.8				●			
	VBMT 160402	9.525	4.4	5	0.2	4.76	1	Positive Rack	●			
	VBMT 160404				0.4				●			
	VBMT 160408				0.8				●			
	VBGW 160402	9.525	4.4	5	0.2	4.76	1	Plain	●			
	VBGW 160404				0.4				●			
	VBGW 160408				0.8				●			
	VBGT 160402	9.525	4.4	5	0.2	4.76	1	Positive Rack	●			
	VBGT 160404				0.4				●			
	VBGT 160408				0.8				●			
	VCMW 160402	9.525	4.4	5	0.2	4.76	1	Plain	●			
	VCMW 160404				0.4				●			
	VCMW 160408				0.8				●			

		RUDRALI HI-TECH TOOLS										
PCD INSERTS												
SHAPE		Positive insert(Plain) Positive insert(Positive Rack) ● = Stock items								PCD GRADE		
V												
35° - PCD												
SHAPE	ITEM Descreption	Ød	Ød1	θ	r	S	No. of corner	Type	RHD SY50	RHD 13X	RHD 18X	
	VCMT 160402	9.525	4.4	5	0.2	4.76	1	Positive Rack	●			
	VCMT 160404				0.4				●			
	VCMT 160408				0.8				●			
	VCGW 160402	9.525	4.4	5	0.2	4.76	1	Plain	●			
	VCGW 160404				0.4				●			
	VCGW 160408				0.8				●			
	VCGT 160402	9.525	4.4	5	0.2	4.76	1	Positive Rack	●			
	VCGT 160404				0.4				●			
	VCGT 160408				0.8				●			
		RUDRALI HI-TECH TOOLS										
PCD INSERTS												
SHAPE		Negative insert(Plain) Negative insert(Positive Rack) ● = Stock items								PCD GRADE		
V												
35° - PCD												
SHAPE	ITEM Descreption	Ød	Ød1	θ	r	S	No. of corner	Type	RHD SY50	RHD 13X	RHD 18X	
	VNMA 160402	9.525	5.16	0	0.2	4.76	1	Plain				
	VNMA 160404				0.4				●			
	VNMA 160408				0.8				●			
	VNMA 160412				1.2							
	VNMT 160402	9.525	5.16	0	0.2	4.76	1	Positive Rack				
	VNMT 160404				0.4				●			
	VNMT 160408				0.8				●			
	VNMT 160412				1.2							
	VNGA 160402	9.525	5.16	0	0.2	4.76	1	Plain				
	VNGA 160404				0.4				●			
	VNGA 160408				0.8				●			
	VNGA 160412				1.2							
	VNGT 160402	9.525	5.16	0	0.2	4.76	1	Positive Rack				
	VNGT 160404				0.4				●			
	VNGT 160408				0.8				●			
	VNGT 160412				1.2							



Boring Tool



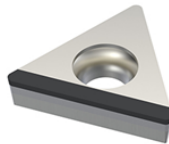
Grooving Tool



Parting Tool



VSR Bite



Full Edge Insert



Reamer Blade



Internal Groove



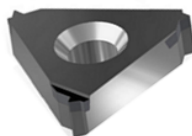
Grooving Blade



Profile Turning



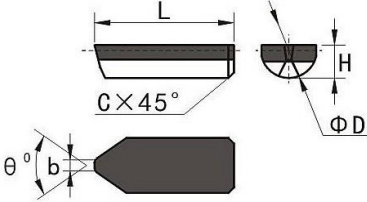
SPL. PCD tool

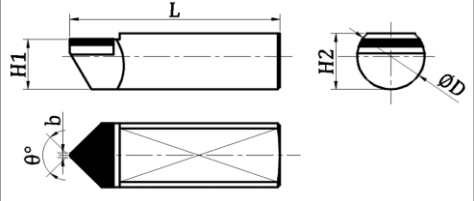


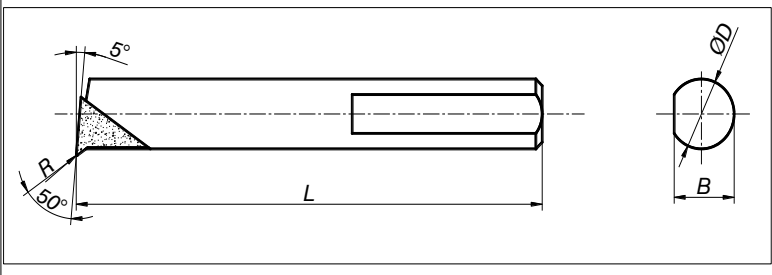
Threading Insert

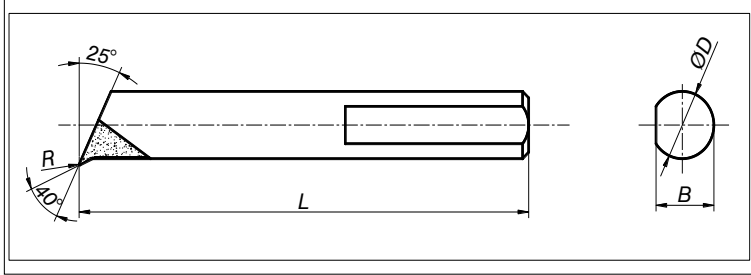


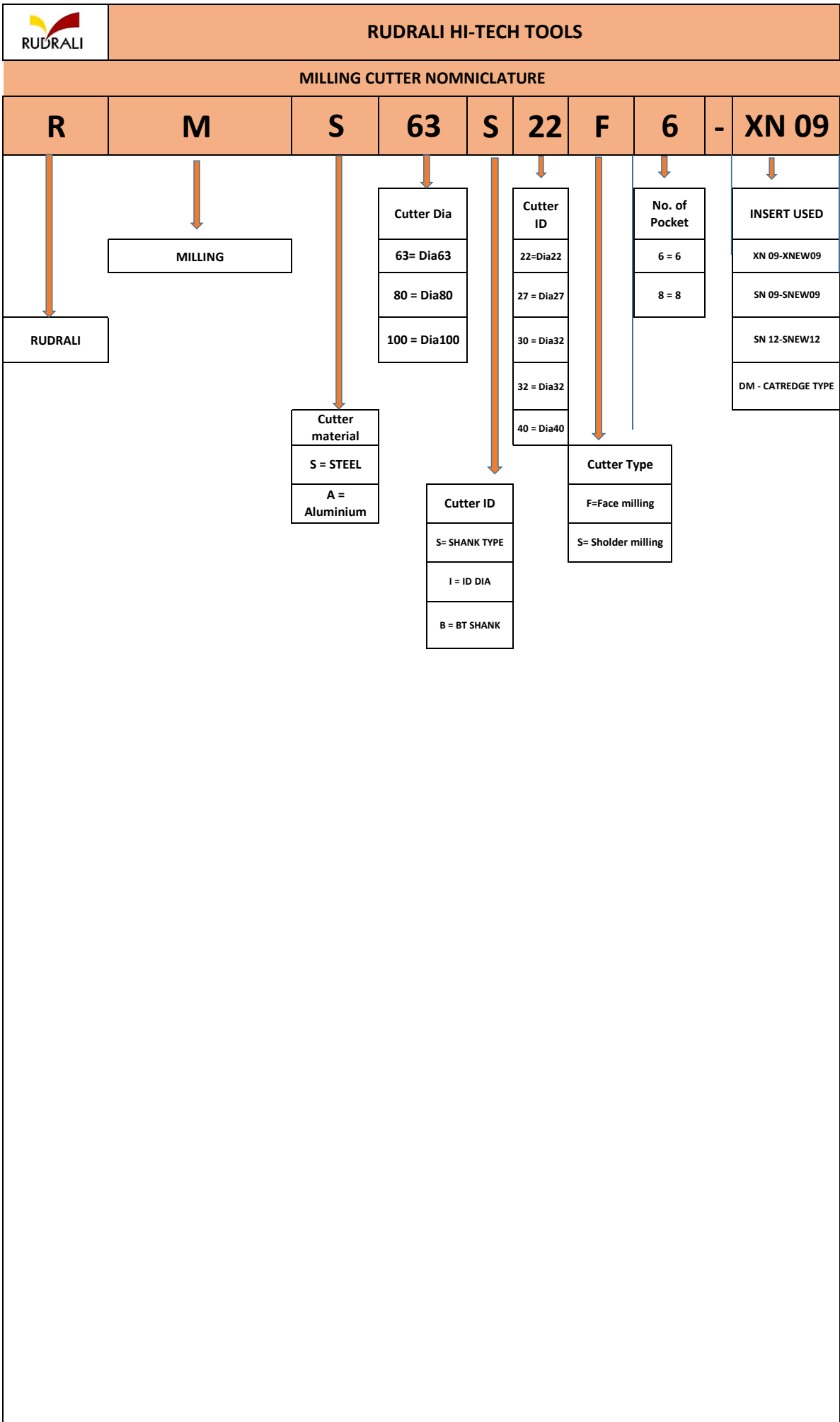
Engraving Tool

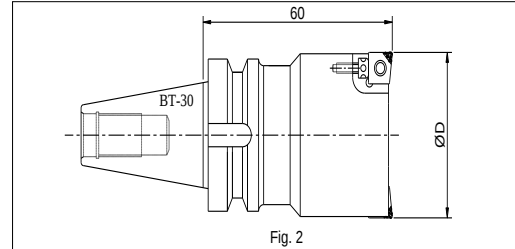
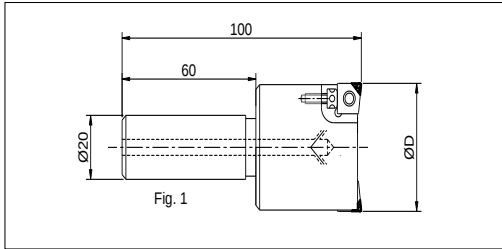
 RUDRALI HI-TECH TOOLS											
PCD NOTCH TOOLS											
											
										PCD GRADE	
Item code	D	b	H1	H2	L	θ°				RHD SY50	RHD 13X
RPNT25528016-0.5F	2.5	0.5	1.6		5.2	80					
RPNT30558018-0.6F	3	0.6	1.8		5.5	80					
RPNT32628018-0.6F	3.2	0.6	1.8		6.2	80					
RPNT40807023-0.7F	4	0.7	2.3		7.83	70					
RPNT40958024-0.8F	4	0.8	2.4		9.55	80					
RPNT45118027-0.9F	4.5	0.9	2.75		10.75	80					
RPNT50908030-1.0F	5	1	3		9	80					

 RUDRALI HI-TECH TOOLS											
PCD NOTCH TOOLS											
											
										PCD GRADE	
Item Code	D	b	H1	H2	L	θ°				RHD SY50	RHD 13X
RPNT40808033-0.7	4	0.7	3.3	3.4	7.98	80					
RPNT4010033-0.8	4	0.8	3.3	3.4	9.68	80					
RPNT45118035-0.9	4.5	0.9	3.5	3.9	10.8	80					
RPNT70178030-0.5	7	0.5	3		17	80					
RPNT801780375-0.5	8	0.5	3.75		17	80					
RPNT80178045-1.0	8	1	4.5		17	80					
RPNT901780525-1.0	9	1	5.25		17	80					
RPNT10178060-1.0	10	1	6		17	80					
RPNT10208070-1.0	10	1	7		20	80					
RPNT12208075-1.0	12	1	7.5		20	80					
RPNT12208085-1.0	12	1	8.5		20	80					
RPNT12258095-1.0	12	1	9.5		25	80					
RPNT142580105-1.0	14	1	10.5		25	80					
RPNT14258012-1.0	14	1	12		25	80					
RPNT16258014-1.0	16	1.5	14		25	80					
RPNT18258015-1.0	18	1.5	15		25	80					

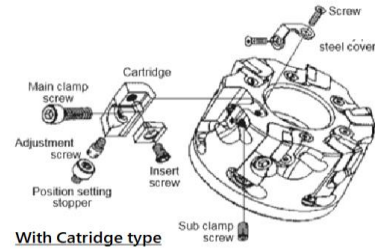
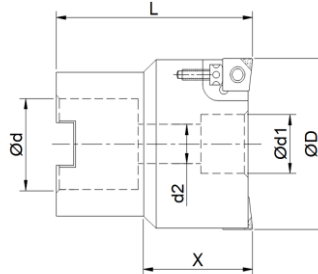
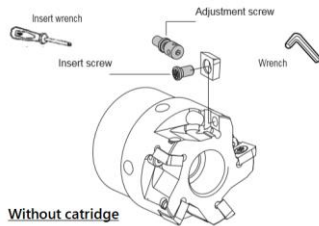
		RUDRALI HI-TECH TOOLS											
PCD BORING TOOLS													
												PCD GRADE	
Item code		D	B	R	L			RHD SY50	RHD 13X	RHD 18X			
RDBB302560-5Deg.		3	2.5	0.1	60								
RDBB403560-5deg.		4	3.5	0.1	60								
RDBB504580-5deg.		5	4.5	0.1	80								
RDBB605080-5deg.		6	5	0.1	80								
RDBB706080-5deg.		7	6	0.1	80								

												PCD GRADE	
Item code		D	B	R	L			RHD SY50	RHD 13X	RHD 18X			
RDBB302560-25Deg.		3	2.5	0.1	60								
RDBB403560-25deg.		4	3.5	0.1	60								
RDBB504580-25deg.		5	4.5	0.1	80								
RDBB605080-25deg.		6	5	0.1	80								
RDBB706080-25deg.		7	6	0.1	80								

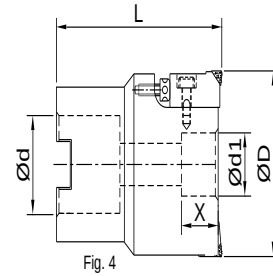
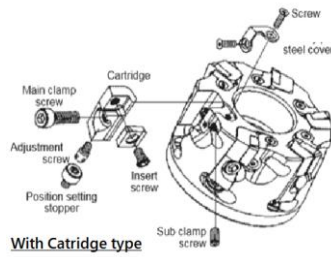




Cat. No.	ØD	Ød	No. of Teeth	Fig.	Insert used	Cutter Body Type	SCREW	Stock
RMS18S18F2-SN09	18		2	Fig.1	SNEW 0803	Steel		●
RMS20S20F1-SN09	20		1	Fig.1	SNEW 09T3	Steel		●
RMS32S20F3-SN09	32		3	Fig.1	SNEW 09T3	Steel		●
RMS30B30F3-SN09	30		3	Fig.2	SNEW 09T3	Steel		●
RMS40B30F4-SN09	40		4	Fig.2	SNEW 09T3	Steel		●
RMS30B40F4-XN09	30		4	Fig.2	SNEW 09T3	Steel		●
RMS40S20F4-XN09	40		4	Fig.1	SNEW 09T3	Steel		●
RMS40B40F4-XN09	40		4	Fig.2	SNEW 09T3	Steel		●

PCD MILLING CUTTER


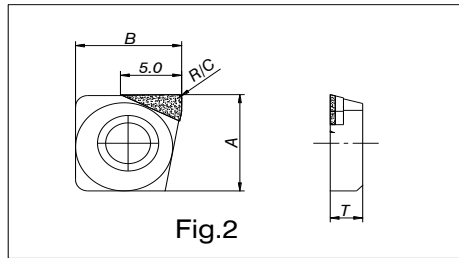
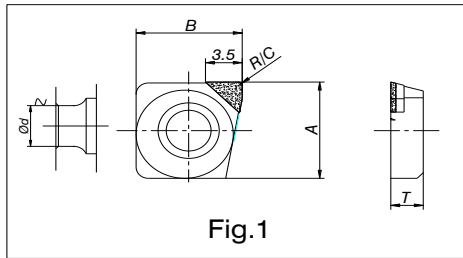
Cutter Body Type	Cat. No.	No. Pocket	ØD	Ød	Ød1	Ød2	L	Insert used	Stock
Steel	RMS40I224F-SN09	4	40	22	15.5	11	50~80	SNEW 09T3	●
Steel	RMS50I22F5-SN09	5	50	22	20	11	50~80	SNEW 09T3	●
Steel	RMS63I22F6-SN09	5	63	22	20	11	50~80	SNEW 09T3	●
Aluminium	RMA80I27F5-SN09	5	80	27	22	14	50~80	SNEW 09T3	●
Aluminium	RMA125I40F7-SN09	7	125	40	30	20	50~80	SNEW 09T3	●
Aluminium	RMA100I32F6-SN09	6	100	32	30	17	50~80	SNEW 09T3	●
Aluminium	RMA160I40F8-SN09	8	160	40	90	20	50~80	SNEW 09T3	●
Steel	RMS63I22F7-XN09	7	63	22	20	11	50~80	XNEW 0903	●
Steel	RMS8027F9-XN09	9	80	27	28	13	50~80	XNEW 0903	●
Aluminium	RMA80I27F5-SN12	5	80	27	22	14	50~80	SNEW 1204	●
Aluminium	RMA100I32F6-SN12	6	100	32	30	17	50~80	SNEW 1204	●
Aluminium	RMA125I40F7-SN12	7	125	40	30	20	50~80	SNEW 1204	●
Aluminium	RMA160I40F8-SN12	8	160	40	90	20	50~80	SNEW 1204	●
Aluminium	RMA80I27F5-SP12	5	80	27	22	14	50~80	SPHW 1204	●
Aluminium	RMA100I32F6-SP12	6	100	32	30	17	50~80	SPHW 1204	●
Aluminium	RMA125I40F7-SP12	7	125	40	30	20	50~80	SPHW 1204	●
Aluminium	RMA160I40F8-SP12	8	160	40	90	20	50~80	SPHW 1204	●

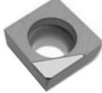
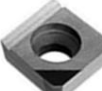
PCD MILLING CUTTER


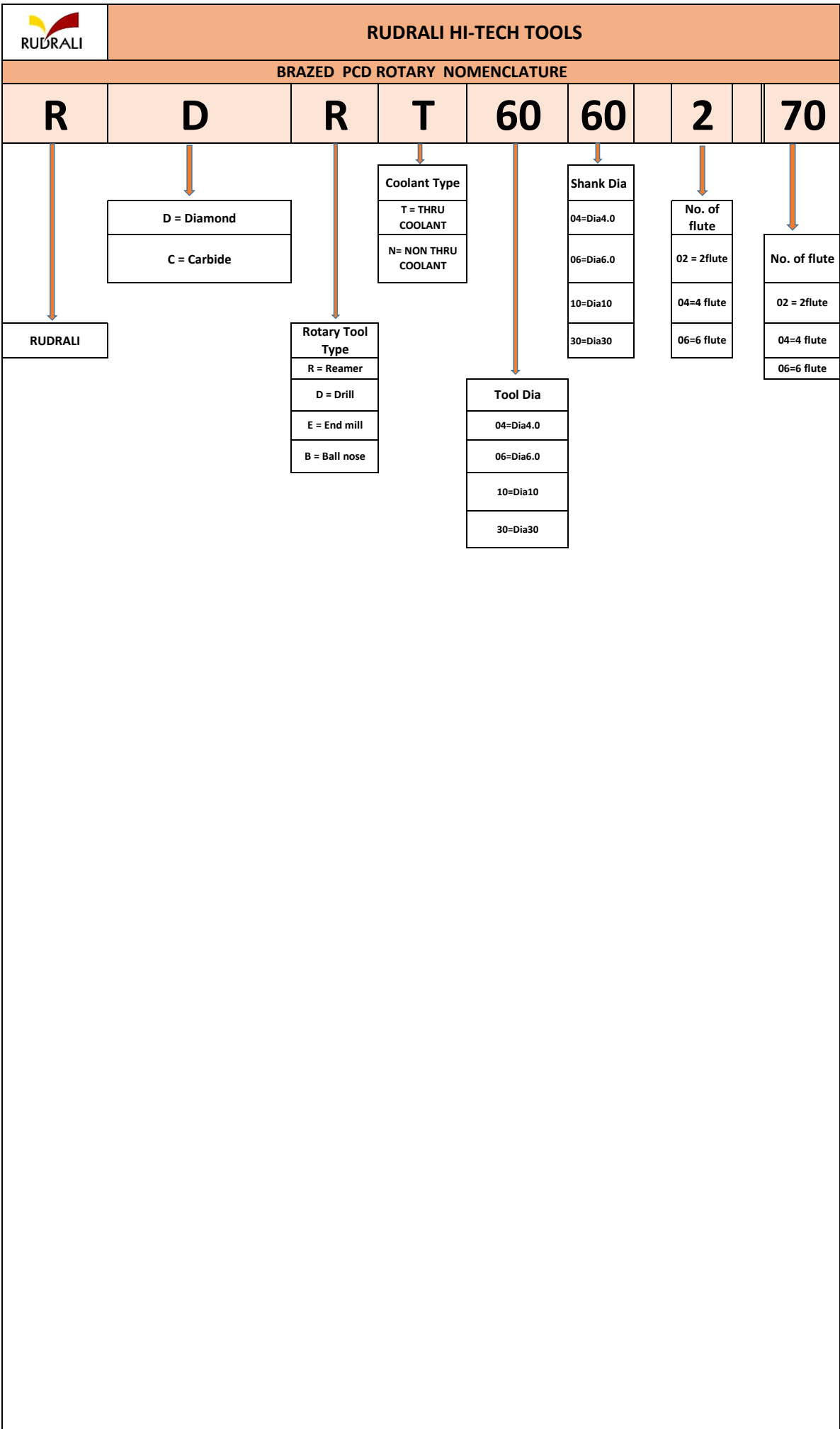
Cutter Body Type	Cat. No.	No. Pocket	ØD	Ød	Ød1	Ød2	L	Insert used	Stock
Aluminium	RMA60I22F5-DM0147	5	60	22			50~80	DMI -0147	●
Aluminium	RMA80I27F6-DM0147	6	80	27			50~80	DMI -0147	●
Aluminium	RMA100I32F8-DM0147	8	100	32			50~80	DMI -0147	●
Aluminium	RMA125I40F8-DM0147	8	125	40			50~80	DMI -0147	●
Aluminium	RMA125I40F10-DM0147	10	125	40			50~80	DMI -0147	●
Aluminium	RMA160I40F12-DM0147	12	160	40			50~80	DMI -0147	●

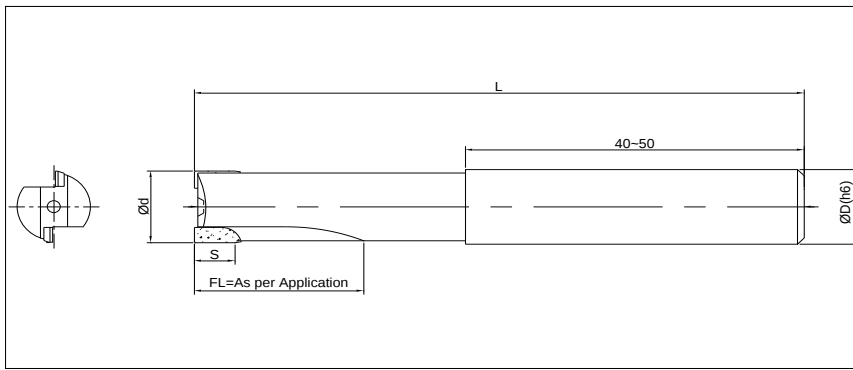
SPARES FOR MILLING CUTTER

Catredge	Cat. No.	Main Screw	Spanner	Insert Screw	Spanner	Adjustable Screw	Spanner
NA	RMS40I224F-SN09	NA	NA	RTFH0409M	RTHS040	RAS0520	
NA	RMS50I22F5-SN09	NA	NA	RTFH0409M	RTHS040	RAS0520	
NA	RMS63I22F6-SN09	NA	NA	RTFH0409M	RTHS040	RAS0520	
RMC-SN09	RMA80I27F5-SN09	RLNS0828	RHS060	RTFH0409M	RTHS040	RAS0520	
RMC-SN09	RMA125I40F7-SN09	RLNS0828	RHS060	RTFH0409M	RTHS040	RAS0520	
RMC-SN09	RMA100I32F6-SN09	RLNS0828	RHS060	RTFH0409M	RTHS040	RAS0520	
RMC-SN09	RMA160I40F8-SN09	RLNS0828	RHS060	RTFH0409M	RTHS040	RAS0520	
NA	RMS63I22F7-XN09	NA	NA	RTFH0409M	RTHS040	RAS0520	
RMC-XN09	RMS8027F9-XN09	RLNS0828	RHS060	RTFH0409M	RTHS040	RAS0520	
RMC-SN12	RMA80I27F5-SN12	RLNS0828	RHS060	RTFH0509M	RTHS050	RAS0520	
RMC-SN12	RMA100I32F6-SN12	RLNS0828	RHS060	RTFH0509M	RTHS050	RAS0520	
RMC-SN12	RMA125I40F7-SN12	RLNS0828	RHS060	RTFH0509M	RTHS050	RAS0520	
RMC-SN12	RMA160I40F8-SN12	RLNS0828	RHS060	RTFH0509M	RTHS050	RAS0520	
RMC-SP12	RMA80I27F5-SP12	RLNS0828	RHS060	RTFH0509M	RTHS050	RAS0520	
RMC-SP12	RMA100I32F6-SP12	RLNS0828	RHS060	RTFH0509M	RTHS050	RAS0520	
RMC-SP12	RMA125I40F7-SP12	RLNS0828	RHS060	RTFH0509M	RTHS050	RAS0520	
RMC-SP12	RMA160I40F8-SP12	RLNS0828	RHS060	RTFH0509M	RTHS050	RAS0520	
NA	RMA60I22F5-D147	NA	NA	RLNS0828	RHLS060	RAS0520	
NA	RMA80I27F6-D147	NA	NA	RLNS0828	RHLS060	RAS0520	
NA	RMA100I32F8-D147	NA	NA	RLNS0828	RHLS060	RAS0520	
NA	RMA125I40F8-D147	NA	NA	RLNS0828	RHLS060	RAS0520	
NA	RMA125I40F10-D147	NA	NA	RLNS0828	RHLS060	RAS0520	
NA	RMA160I40F12-D147	NA	NA	RLNS0828	RHLS060	RAS0520	

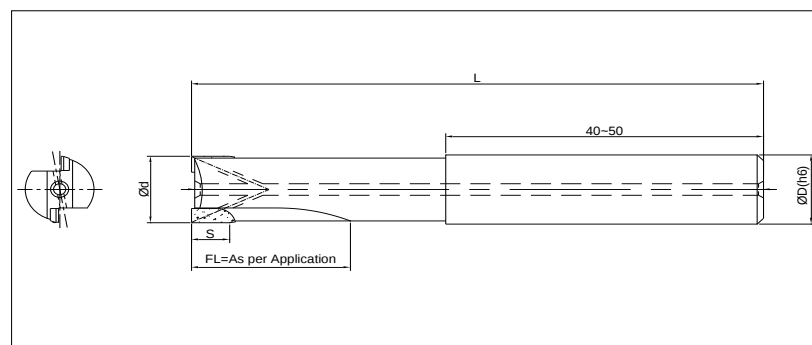
PCD MILLING INSERT

PCD Grades

Cat. No.	Cat. No.	A	B	T	d	Fig.	Application				RHD SY50	RHD 13X	RHD 18X
	SNEW 09T3	9.525	9.525	3.97	4.4	Fig.1	Std.						
	SNEW 09T3 - R	9.525	9.525	3.97	4.4	Fig.1	Std. With radius						
	SNEW 09T3 -50	9.525	9.525	3.97	4.4	Fig.2	Std.						
	SNEW 09T3 -HM	9.525	9.525	3.97	4.4	Fig.1	Hatch Milling						
	XNEW 0903	10.4	10.4	3.97	4.4	Fig.1	Std.						
	XNEW 0903 - R	10.4	10.4	3.97	4.4	Fig.1	Std. With radius						
	XNEW 0903 -50	10.4	10.4	3.97	4.4	Fig.2	Std.						
	XNEW 0903 -HM	10.4	10.4	3.97	4.4	Fig.1	Hatch Milling						
	XNEW 0903 -BF	10.4	10.4	3.97	4.4	Fig.1	Burr free						
	SNEW 1204	12.7	12.7	4.76		Fig.1	Std.						
	SNEW 1204 - R	12.7	12.7	4.76		Fig.1	Std.						
	SNEW 1204 - 50	12.7	12.7	4.76		Fig.2	Std.						
	SNEW 1204 - HM	12.7	12.7	4.76		Fig.1	Hatch Milling						
	SPHW 1204	12.7	12.7	4.76		Fig.1	Std.						
	SPHW 1204 - R	12.7	12.7	4.76		Fig.1	Std.						
	SPHW 1204 - 50	12.7	12.7	4.76		Fig.2	Std.						
	DMI -0147	12	30	12			Std.						
	DMI -0147 W	12	30	12			Wiper						
	DMI -0147 HM	12	30	12			Hatch Milling						

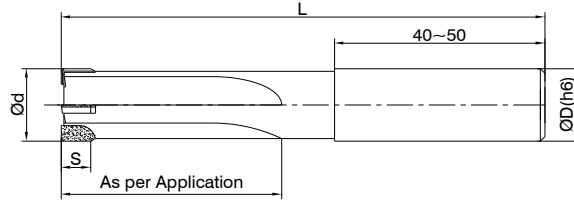
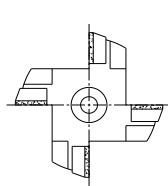


PCD Reamer

PCD Grades

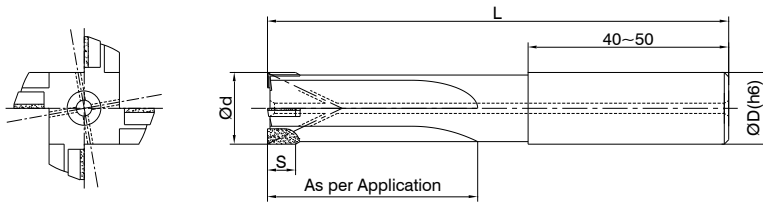
Cat. Name	Ød	L	S	ØD	No. of Flute	Coolant (Y/N)	Body Type (Steel/WC)	RHD SY50	RHD 13X	RHD 18X
RDRN040602_ _	4	60~120	7	6	2	N	WC			
RDRN060602_ _	6	60~120	7	6	2	N	WC			
RDRN080802_ _	8	60~180	7	8	2	N	WC			
RDRN101002_ _	10	60~180	7	10	2	N	WC			
RDRN121202_ _	12	60~180	7	12	2	N	WC			
RDRN141402_ _	14	60~180	7	14	2	N	WC			
RDRN161602_ _	16	60~250	7	16	2	N	WC			
RDRN181802_ _	18	60~250	7	18	2	N	WC			
RDRN202002_ _	20	60~250	7	20	2	N	Steel & WC Both			

PCD Reamer

PCD Grades

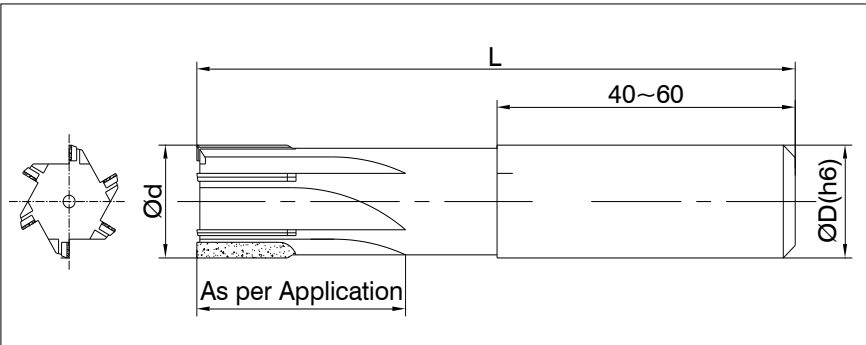
Cat. Name	Ød	L	S	ØD	No. of Flute	Coolant (Y/N)	Body Type(Steel/ WC)	RHD SY50	RHD 13X	RHD 18X
RDRT060602_ _	6	60~120	7	6	2	Y	WC	●		
RDRT080802_ _	8	60~180	7	8	2	Y	WC	●		
RDRT101002_ _	10	60~180	7	10	2	Y	WC	●		
RDRT121202_ _	12	60~180	7	12	2	Y	WC	●		
RDRT141402_ _	14	60~180	7	14	2	Y	WC	●		
RDRT161602_ _	16	60~250	7	16	2	Y	WC	●		
RDRT181802_ _	18	60~250	7	18	2	Y	WC	●		
RDRT202002_ _	20	60~250	2	20	2	Y	Steel & WC Both	●		

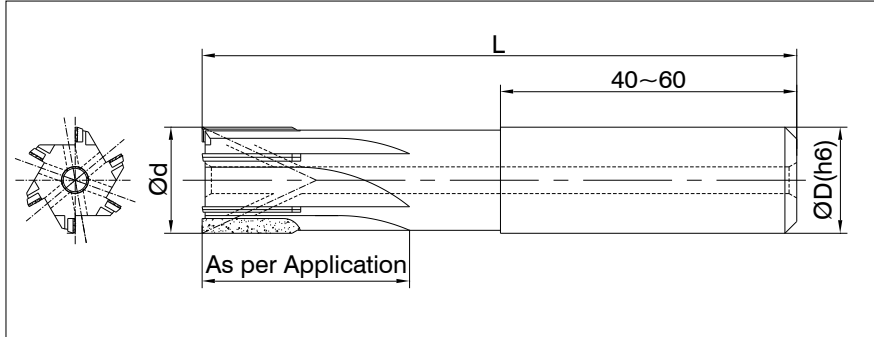
PCD Reamer

**PCD
Grades**

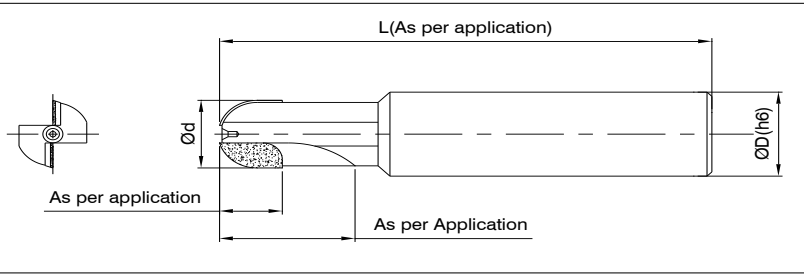
Cat. Name	Ød	L	S	ØD	No. of Flute	Coolant (Y/N)	Body Type(Steel/ WC)	PCD Grades		
								RHD SY50	RHD 13X	RHD 18X
RDRN101004_ _	10	60~180	7	10	4	N	WC	●		
RDRN121204_ _	12	60~180	7	12	4	N	WC	●		
RDRN141404_ _	14	60~180	7	14	4	N	WC	●		
RDRN161604_ _	16	60~250	7	16	4	N	WC	●		
RDRN181804_ _	18	60~250	7	18	4	N	WC	●		
RDRN202004_ _	20	60~250	7	20	4	N	Steel &WC Both	●		
RDRN222004_ _	22	60~250	7	20	4	N	Steel &WC Both	●		
RDRN242004_ _	24	60~250	7	20	4	N	Steel &WC Both	●		
RDRN262004_ _	26	60~250	7	20	4	N	Steel &WC Both	●		
RDRN282004_ _	28	60~250	7	20	4	N	Steel &WC Both	●		
RDRN302004_ _	30	60~250	7	20	4	N	steel	●		

PCD Reamer

**PCD
Grades**

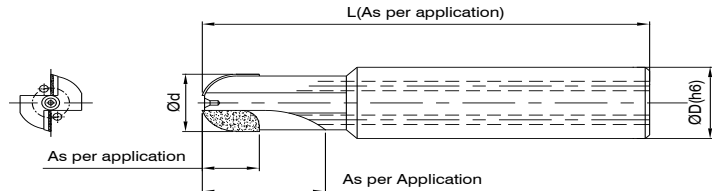
Cat. Name	Ød	L	S	ØD	No. of Flute	Coolant (Y/N)	Body Type(Steel/WC)	PCD Grades		
								RHD SY50	RHD 13X	RHD 18X
RDRT10104_ _	10	60~180	7	10	4	Y	WC	●		
RDRT121204_ _	12	60~180	7	12	4	Y	WC	●		
RDRT141404_ _	14	60~180	7	14	4	Y	WC	●		
RDRT161604_ _	16	60~250	7	16	4	Y	WC	●		
RDRT181804_ _	18	60~250	7	18	4	Y	WC	●		
RDRT202004_ _	20	60~250	7	20	4	Y	Steel &WC Both	●		
RDRT222004_ _	22	60~250	7	20	4	Y	Steel &WC Both	●		
RDRT242004_ _	24	60~250	7	20	4	Y	Steel &WC Both	●		
RDRT262004_ _	26	60~250	7	20	4	Y	Steel &WC Both	●		
RDRT282004_ _	28	60~250	7	20	4	Y	Steel &WC Both	●		
RDRT302004_ _	30	60~250	7	20	4	Y	steel	●		

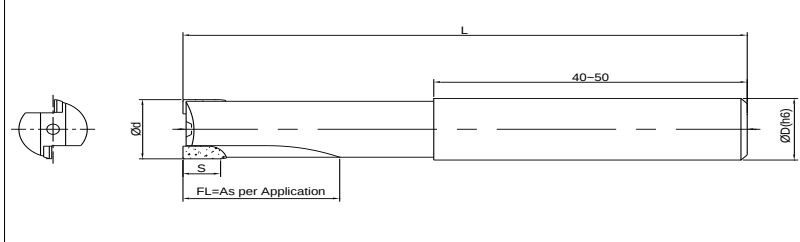
	RUDRALI HI-TECH TOOLS										
PCD Reamer											
										PCD Grades	
Cat. Name	Ød	L	S	ØD	No. of Flute	Coolant (Y/N)	Body Type(Steel/ WC)	RHD SY50	RHD 13X	RHD 18X	
RDRN181806_ _	18	60~250	7	18	6	N	WC	●			
RDRN20206_ _	20	60~250	7	20	6	N	Steel & WC Both	●			
RDRN22206_ _	22	60~250	7	20	6	N	Steel & WC Both	●			
RDRN24206_ _	24	60~250	7	20	6	N	Steel & WC Both	●			
RDRN26206_ _	26	60~250	7	20	6	N	Steel & WC Both	●			
RDRN28206_ _	28	60~250	7	20	6	N	Steel & WC Both	●			
RDRN30206_ _	30	60~250	7	20	6	N	steel	●			

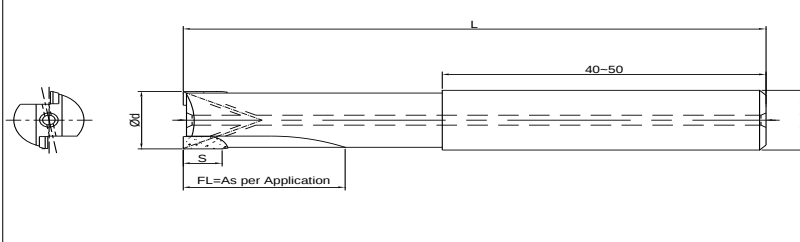
	RUDRALI HI-TECH TOOLS										
PCD Reamer											
										PCD Grades	
Cat. Name	Ød	L	S	ØD	No. of Flute	Coolant (Y/N)	Body Type(Steel/ WC)	RHD SY50	RHD 13X	RHD 18X	
RDRT161606_ _	16	60~250	7	16	6	Y	WC	●			
RDRT181806_ _	18	60~250	7	18	6	Y	WC	●			
RDRT20206_ _	20	60~250	7	20	6	Y	Steel & WC Both	●			
RDRT22206_ _	22	60~250	7	20	6	Y	Steel & WC Both	●			
RDRT24206_ _	24	60~250	7	20	6	Y	Steel & WC Both	●			
RDRT26206_ _	26	60~250	7	20	6	Y	Steel & WC Both	●			
RDRT28206_ _	28	60~250	7	20	6	Y	Steel & WC Both	●			
RDRT30206_ _	30	60~250	7	20	6	Y	steel	●			

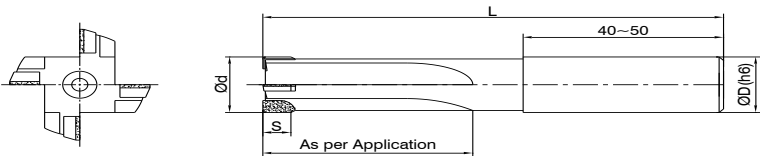
PCD ball Nose Cutter

**PCD
Grades**

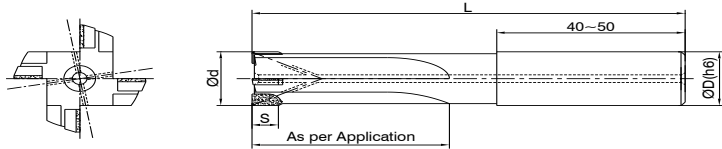
Cat. Name	Ød	L	S	ØD	No. of Flute	Coolant (Y/N)	Body Type(Steel/ WC)	PCD Grades		
								RHD SY50	RHD 13X	RHD 18X
RDBN060602_ _	6	60~250		6	2	N	WC	●		
RDBN080802_ _	8	60~250		8	2	N	WC	●		
RDBN101002_ _	10	60~250		10	2	N	WC	●		
RDBN121202_ _	12	60~250		12	2	N	WC	●		
RDBN141402_ _	14	60~250		14	2	N	WC	●		
RDBN161602_ _	16	60~250		16	2	N	WC	●		
RDBN181802_ _	18	60~250		18	2	N	Steel	●		
RDBN202002_ _	20	60~250		20	2	N	Steel	●		
RDBN222002_ _	22	60~250		20	2	N	Steel	●		
RDBN24002_ _	24	60~250		20	2	N	Steel	●		
RDBN26002_ _	26	60~250		20	2	N	Steel	●		
RDBN28002_ _	28	60~250		20	2	N	Steel	●		
RDBN30002_ _	30	60~250		20	2	N	Steel	●		

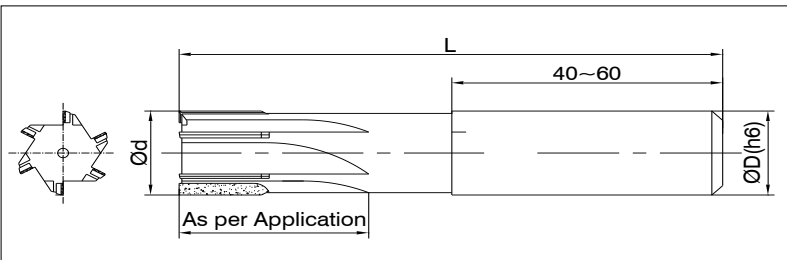
	RUDRALI HI-TECH TOOLS										
	PCD Ball Nose Cutter										
										PCD Grades	
Cat. Name	Ød	L	S	ØD	No. of Flute	Coolant (Y/N)	Body Type(Steel/ WC)	RHD SY50	RHD 13X	RHD 18X	
RDBT080802_ _	8	60~250		8	2	N	WC	●			
RDBT101002_ _	10	60~250		10	2	N	WC	●			
RDBT121202_ _	12	60~250		12	2	N	WC	●			
RDBT141402_ _	14	60~250		14	2	N	WC	●			
RDBT161602_ _	16	60~250		16	2	N	WC	●			
RDBT181802_ _	18	60~250		18	2	Y	Steel	●			
RDBT181802_ _	18	60~250		18	2	N	Steel	●			
RDBT202002_ _	20	60~250		20	2	N	Steel	●			
RDBT202002_ _	20	60~250		20	2	Y	Steel	●			
RDBT222202_ _	22	60~250		20	2	Y	Steel	●			
RDBY24002_ _	24	60~250		20	2	Y	Steel	●			
RDBT26002_ _	26	60~250		20	2	Y	Steel	●			
RDBT28002_ _	28	60~250		20	2	Y	Steel	●			
RDBT30002_ _	30	60~250		20	2	Y	Steel	●			

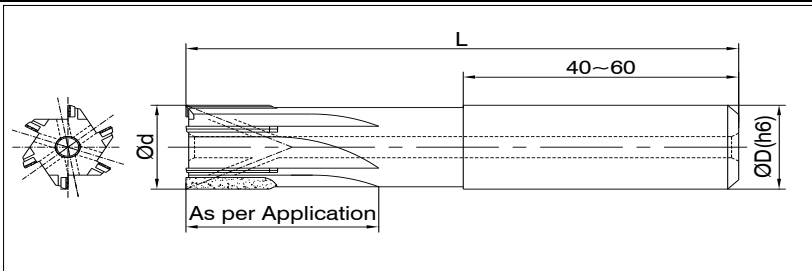
	RUDRALI HI-TECH TOOLS										
	PCD End Mill Cutter										
									PCD Grades		
Cat. Name	Ød	L	S	ØD	No. of Flute	Coolant (Y/N)	Body Type(Steel/ WC)	RHD SY50	RHD 13X	RHD 18X	
RDEN040602_ _	4	60~120	7	6	2	N	WC	●			
RDEN060602_ _	6	60~120	7	6	2	N	WC	●			
RDEN080802_ _	8	60~180	7	8	2	N	WC	●			
RDEN101002_ _	10	60~180	7	10	2	N	WC	●			
RDEN121202_ _	12	60~180	7	12	2	N	WC	●			
RDEN141402_ _	14	60~180	7	14	2	N	WC	●			
RDEN161602_ _	16	60~250	7	16	2	N	WC	●			
RDEN181802_ _	18	60~250	7	18	2	N	WC	●			
RDEN202002_ _	20	60~250	7	20	2	N	Steel &WC Both	●			

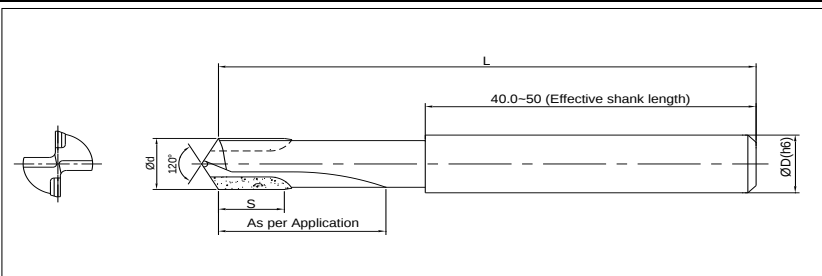
	RUDRALI HI-TECH TOOLS										
	PCD End Mill Cutter										
									PCD Grades		
Cat. Name	Ød	L	S	ØD	No. of Flute	Coolant (Y/N)	Body Type(Steel/ WC)	RHD SY50	RHD 13X	RHD 18X	
RDET060602_ _	6	60~120	7	6	2	Y	WC	●			
RDET080802_ _	8	60~180	7	8	2	Y	WC	●			
RDET101002_ _	10	60~180	7	10	2	Y	WC	●			
RDET121202_ _	12	60~180	7	12	2	Y	WC	●			
RDET141402_ _	14	60~180	7	14	2	Y	WC	●			
RDET161602_ _	16	60~250	7	16	2	Y	WC	●			
RDET181802_ _	18	60~250	7	18	2	Y	WC	●			
RDET202002_ _	20	60~250	2	20	2	Y	Steel &WC Both	●			

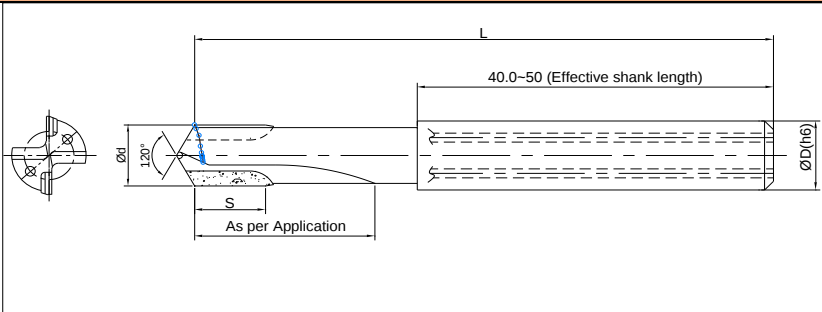
	RUDRALI HI-TECH TOOLS																		
PCD End Mill Cutter																			
											<table><tr><th colspan="3">PCD Grades</th></tr><tr><td>RHD SY50</td><td>RHD 13X</td><td>RHD 18X</td></tr></table>			PCD Grades			RHD SY50	RHD 13X	RHD 18X
PCD Grades																			
RHD SY50	RHD 13X	RHD 18X																	
Cat. Name								Ød	L	S	ØD	No. of Flute	Coolant (Y/N)	Body Type(Steel/ WC)					
RDEN101004_ _								10	60~180	7	10	4	N	WC	●				
RDEN121204_ _								12	60~180	7	12	4	N	WC	●				
RDEN141404_ _								14	60~180	7	14	4	N	WC	●				
RDEN161604_ _								16	60~250	7	16	4	N	WC	●				
RDEN181804_ _								18	60~250	7	18	4	N	WC	●				
RDEN202004_ _								20	60~250	7	20	4	N	Steel &WC Both	●				
RDEN222004_ _								22	60~250	7	20	4	N	Steel &WC Both	●				
RDEN242004_ _								24	60~250	7	20	4	N	Steel &WC Both	●				
RDEN262004_ _								26	60~250	7	20	4	N	Steel &WC Both	●				
RDEN282004_ _								28	60~250	7	20	4	N	Steel &WC Both	●				
RDEN302004_ _								30	60~250	7	20	4	N	steel	●				

	RUDRALI HI-TECH TOOLS															
PCD End Mill Cutter																
								 <table><tr><th colspan="3">PCD Grades</th></tr><tr><td>RHD SY50</td><td>RHD 13X</td><td>RHD 18X</td></tr></table>			PCD Grades			RHD SY50	RHD 13X	RHD 18X
PCD Grades																
RHD SY50	RHD 13X	RHD 18X														
Cat. Name	Ød	L	S	ØD	No. of Flute	Coolant (Y/N)	Body Type(Steel/WC)	RHD SY50	RHD 13X	RHD 18X						
RDET101004_ _	10	60~180	7	10	4	Y	WC	●								
RDET121204_ _	12	60~180	7	12	4	Y	WC	●								
RDET141404_ _	14	60~180	7	14	4	Y	WC	●								
RDET161604_ _	16	60~250	7	16	4	Y	WC	●								
RDET181804_ _	18	60~250	7	18	4	Y	WC	●								
RDET202004_ _	20	60~250	7	20	4	Y	Steel &WC Both	●								
RDET222004_ _	22	60~250	7	20	4	Y	Steel &WC Both	●								
RDET242004_ _	24	60~250	7	20	4	Y	Steel &WC Both	●								
RDET262004_ _	26	60~250	7	20	4	Y	Steel &WC Both	●								
RDET282004_ _	28	60~250	7	20	4	Y	Steel &WC Both	●								
RDET302004_ _	30	60~250	7	20	4	Y	steel	●								

		RUDRALI HI-TECH TOOLS														
PCD End Mill Cutter																
								<table><tr><th colspan="3">PCD Grades</th></tr><tr><td>RHD SY50</td><td>RHD 13X</td><td>RHD 18X</td></tr></table>			PCD Grades			RHD SY50	RHD 13X	RHD 18X
PCD Grades																
RHD SY50	RHD 13X	RHD 18X														
Cat. Name	Ød	L	S	ØD	No. of Flute	Coolant (Y/N)	Body Type(Steel/WC)	RHD SY50	RHD 13X	RHD 18X						
RDEN181804__	18	60~250	7	18	6	N	WC	●								
RDEN202004__	20	60~250	7	20	6	N	Steel &WC Both	●								
RDEN222004__	22	60~250	7	20	6	N	Steel &WC Both	●								
RDEN242004__	24	60~250	7	20	6	N	Steel &WC Both	●								
RDEN262004__	26	60~250	7	20	6	N	Steel &WC Both	●								
RDEN282004__	28	60~250	7	20	6	N	Steel &WC Both	●								
RDEN302004__	30	60~250	7	20	6	N	steel	●								

		RUDRALI HI-TECH TOOLS														
PCD End Mill Cutter																
								<table><tr><th colspan="3">PCD Grades</th></tr><tr><td>RHD SY50</td><td>RHD 13X</td><td>RHD 18X</td></tr></table>			PCD Grades			RHD SY50	RHD 13X	RHD 18X
PCD Grades																
RHD SY50	RHD 13X	RHD 18X														
Cat. Name	Ød	L	S	ØD	No. of Flute	Coolant (Y/N)	Body Type(Steel/WC)	RHD SY50	RHD 13X	RHD 18X						
RDET161604__	16	60~250	7	16	6	Y	WC	●								
RDET181804__	18	60~250	7	18	6	Y	WC	●								
RDET202004__	20	60~250	7	20	6	Y	Steel &WC Both	●								
RDET222004__	22	60~250	7	20	6	Y	Steel &WC Both	●								
RDET242004__	24	60~250	7	20	6	Y	Steel &WC Both	●								
RDET262004__	26	60~250	7	20	6	Y	Steel &WC Both	●								
RDET282004__	28	60~250	7	20	6	Y	Steel &WC Both	●								
RDET302004__	30	60~250	7	20	6	Y	steel	●								

		RUDRALI HI-TECH TOOLS											
PCD Drill													
												PCD Grades	
Cat. Name	Ød	L		S	ØD	No. of Flute	Coolant (Y/N)	Body Type(Steel/ WC)	RHD SY50	RHD 13X	RHD 18X		
RDDN060602__	6	60~120		7	6	2	N	WC	●				
RDDN080802__	8	60~180		7	8	2	N	WC	●				
RDDN101002__	10	60~180		7	10	2	N	WC	●				
RDDN121202__	12	60~180		7	12	2	N	WC	●				
RDDN141402__	14	60~180		7	14	2	N	WC	●				
RDDN161602__	16	60~250		7	16	2	N	WC	●				
RDDN181802__	18	60~250		7	18	2	N	WC	●				
RDDN202002__	20	60~250		7	20	2	N	WC	●				

		RUDRALI HI-TECH TOOLS											
PCD Drill													
												PCD Grades	
Cat. Name	Ød	L		S	ØD	No. of Flute	Coolant (Y/N)	Body Type(Steel/ WC)	RHD SY50	RHD 13X	RHD 18X		
RDDT060602__	6	60~120		7	6	2	Y	WC	●				
RDDT080802__	8	60~180		7	8	2	Y	WC	●				
RDDT101002__	10	60~180		7	10	2	Y	WC	●				
RDDT121202__	12	60~180		7	12	2	Y	WC	●				
RDDT141402__	14	60~180		7	14	2	Y	WC	●				
RDDT161602__	16	60~250		7	16	2	Y	WC	●				
RDDT181802__	18	60~250		7	18	2	Y	WC	●				
RDDT202002__	20	7	20	2	20	2	Y	WC	●				



HSK Integral Reamer



HSK Integral Reamer



PCD Milling Cutter



Trepanning Tool



Flange Reamer



OD Profile Tool



Bell Mouth Cutter



BT Integral Reamer



Ball Nose End Mill



Parent Bore Reamer



Spherical Dom Profile Cutter



OD Profile Reamer



Step Drill



Multi Step Drill



Candle Drill



PCD Helical Drill With Chamfer



PCD Helical Drill



PCD Threaded Countersink Drill



Thread Shank Reamer



Sinking Tool



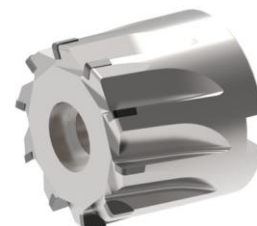
PCD Threaded Countersink Reamer



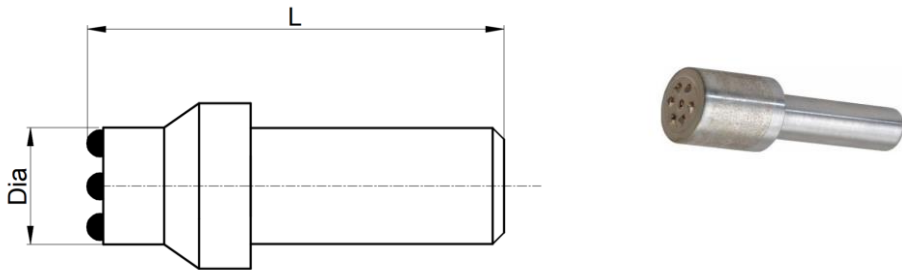
PCD Profile Tool

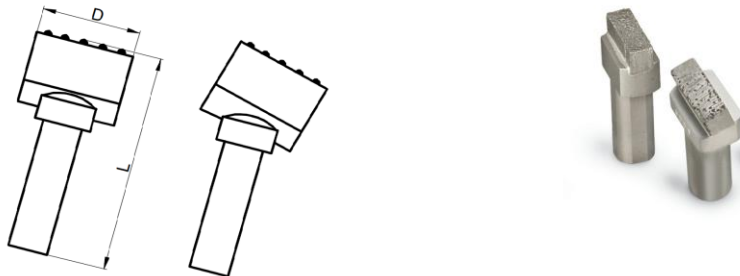


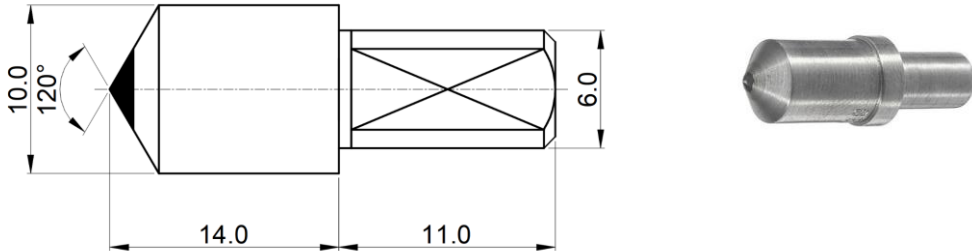
St. Shank Reamer



Indexable Milling Cutter

		RUDRALI HI-TECH TOOLS					
Dimond Dressers							
					Diamond Grades		
Cat. Name		Blade Size	Shank Size (inch.)	Shank Size (mm.)		MCD	NATURAL
RGD 1		RHD - DG 6	Dia 1/2" X 3" L	Dia 12.7 X 75L			
RGD 2		RHD - DG 10	Dia 1/2" X 3" L	Dia 12.7 X 75L			
RGD 3		RHD - DG 12	Dia 1/2" X 3" L	Dia 12.7 X 75L			
RGD 4		RHD - DG 15	Dia 5/8" X 4" L	Dia15.9 X 100L			

		RUDRALI HI-TECH TOOLS					
Dimond Dressers							
					Diamond Grades		
Cat. Name		Blade Size	Shank Size (inch.)	Shank Size (mm.)		MCD	NATURAL
RGDS 1		RHDS - DG 6	D = 1/2" X L = 3"	D = 12.7 X L = 75			
RGDS 2		RHDS - DG 10	D = 1/2" X L = 3"	D = 12.7 X L = 75			
RGDS 3		RHDS - DG 12	D = 1/2" X L = 3"	D = 12.7 X L = 75			
RGDS 4		RHDS - DG 15	D = 5/8" X 4" L	D = 15.9 X L = 100			

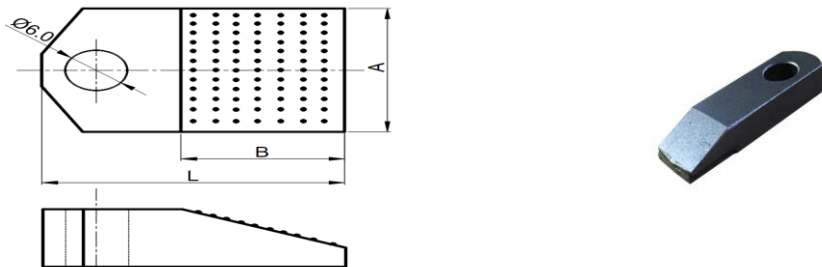
		RUDRALI HI-TECH TOOLS				
Dimond Dressers						
					Diamond Grades	
Cat. Name	Description	Shank Size (mm.)		MCD	NATURAL	
RHT 1	Rockwell hardness intendor	Dia 10.0 X 25L				
RHT 2	Super facial indentor	Dia 10.0 X 25L				
RHT 3	Vikers facial indentor	Dia 10.0 X 25L				

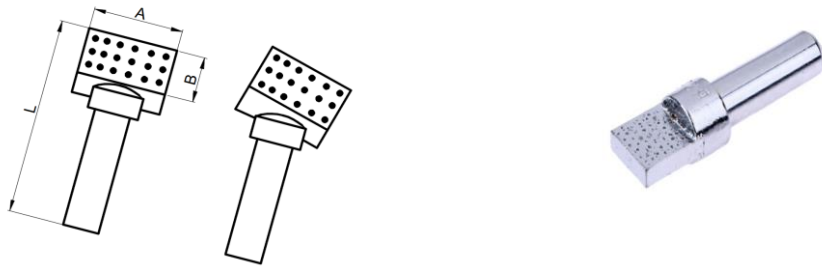
RUDRALI HI-TECH TOOLS

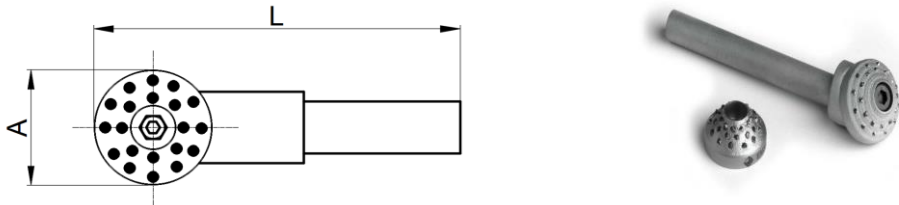
Dimond Dressers

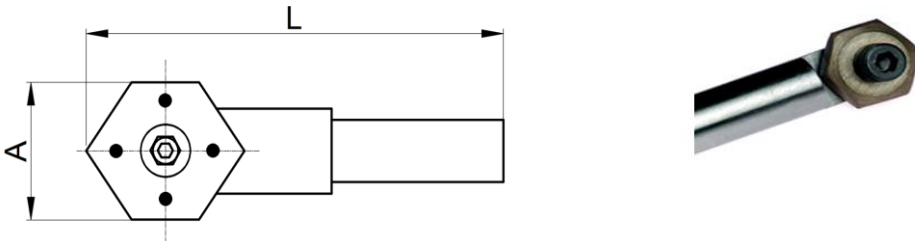
Diamond
Grades

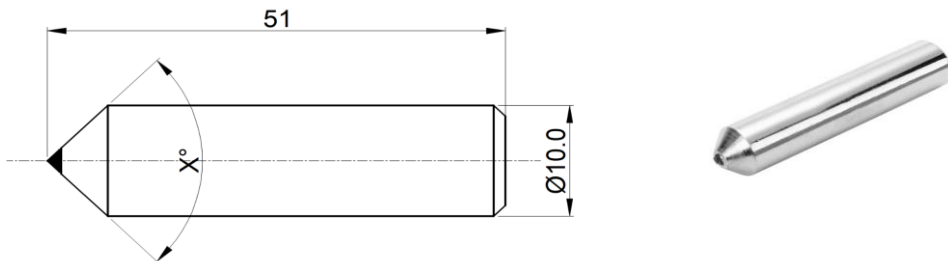
Cat. Name	Blade Size	Shank Size (inch.)	Shank Size (mm.)		MCD	NATURAL
RMP 1	RHD - 3	Dia 1/2" X 3" L	Dia 12.7 X 75L			
RMP 2	RHD - 5	Dia 1/2" X 3" L	Dia 12.7 X 75L			
RMP 3	RHD - 7	Dia 1/2" X 3" L	Dia 12.7 X 75L			
RMP 4	RHD - 9	Dia 1/2" X 3" L	Dia 12.7 X 75L			

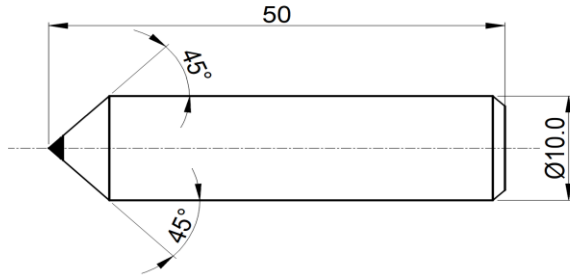
		RUDRALI HI-TECH TOOLS			
Dimond Dressers					
				Diamond Grades	
Cat. Name	Shank Size (inch.)	Shank Size (mm.)		MCD	NATURAL
RBD 1	A=2/5" X B= 2/5" X L= 1.1"	A= 10.5 X B= 10.5 X 28L			
RBD 2	A=2/5" X B3/5" X L= 1.3"	A= 10.5 X B=15.0 X L=33			
RBD 3	A=2/4" X B=2/5" X L=1.1"	A =13.0 X B= 10.0 X L=28			
RBD 4	A=3/5" X B= 2/4" X L=1.1"	A=15.0 X B= 10.0 X VL28			
RBD 5	A= 3/3.7" X B=3/5" X L=1.3"	A=20.0 X B= 15.0 X L=33			

		RUDRALI HI-TECH TOOLS			
Dimond Dressers					
				Diamond Grades	
Cat. Name	Shank Size (inch.)	Shank Size (mm.)		MCD	NATURAL
RBDS 1	A=2/5" X B= 2/5" X L= 1.1"	A= 10.5 X B= 10.5 X 28L			
RBDS 2	A=2/5" X B3/5" X L= 1.3"	A= 10.5 X B=15.0 X L=33			
RBDS 3	A=2/4" X B=2/5" X L=1.1"	A =13.0 X B= 10.0 X L=28			
RBDS 4	A=3/5" X B= 2/4" X L=1.1"	A=15.0 X B= 10.0 X VL28			
RBDS 5	A= 3/3.7" X B=3/5" X L=1.3"	A=20.0 X B= 15.0 X L=33			

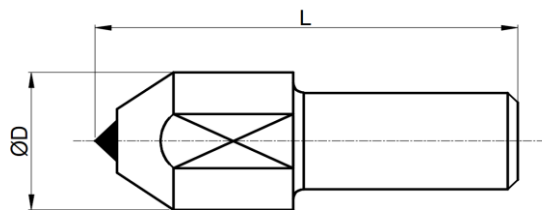
		RUDRALI HI-TECH TOOLS				
Dimond Dressers						
					Diamond Grades	
Cat. Name	Size	Shank Size (inch.)	Shank Size (mm.)	MCD	NATURAL	
RCRD 1	RH - 24	A = 2/4.1"X L= 5.9"	A = 12.5 X L = 150			
RCRD 2	RH - 36	A = 2/4.1"X L= 5.9"	A = 12.5 X L = 150			

		RUDRALI HI-TECH TOOLS				
Dimond Dressers						
					Diamond Grades	
Cat. Name	Dimond Size	Shank Size (inch.)	Shank Size (mm.)	MCD	NATURAL	
RHDD 1	1.25 Cts(6 Diamond)	A = 2/4.1"X L= 5.9"	A = 12.5 X L = 150			
RHDD 2	1.5 Cts(6 Diamond)	A = 2/4.1"X L= 5.9"	A = 12.5 X L = 150			

		RUDRALI HI-TECH TOOLS				
Dimond Dressers						
					Diamond Grades	
Cat. Name	Dimond Size	Angle	Shank Size (inch.)	Shank Size (mm.)	MCD	NATURAL
RCP 1	0.25 Ct.	60	Dia 2/5" X 1.97"	Dia 10 X 50		
RCP 2	0.25 Ct.	90	Dia 2/5" X 1.97"	Dia 10 X 50		
RCP 3	0.5 Ct.	60	Dia 2/5" X 1.97"	Dia 10 X 50		
RCP 4	0.5 Ct.	90	Dia 2/5" X 1.97"	Dia 10 X 50		
RCP 5	0.75 Ct.	90	Dia 2/5" X 1.97"	Dia 10 X 50		
RCP 6	1.0 Ct.	90	Dia 2/5" X 1.97"	Dia 10 X 50		

Dimond Dressers

**Diamond
Grades**

Cat. Name	Dimond Size	Shank Size (inch.)	Shank Size (mm.)	MCD	NATURAL
RSP 1	0.1 Ct.	Dia 2/5" X 1.97"	Dia 10 X 50		
RSP 2	0.25 Ct.	Dia 2/5" X 1.97"	Dia 10 X 50		
RSP 3	0.5 Ct.	Dia 2/5" X 1.97"	Dia 10 X 50		
RSP 4	1.0 Ct.	Dia 2/5" X 1.97"	Dia 10 X 50		
RSP 5	1.25 Ct.	Dia 2/5" X 1.97"	Dia 10 X 50		
RSP 6	1.5 Ct.	Dia 2/5" X 1.97"	Dia 10 X 50		
RSP 7	2.0 Ct.	Dia 2/5" X 1.97"	Dia 10 X 50		
RSP 8	2.5 Ct.	Dia 2/5" X 1.97"	Dia 10 X 50		
RSP 9	3.0 Ct.	Dia 2/5" X 1.97"	Dia 10 X 50		

Dimond Dressers

**Diamond
Grades**

Cat. Name	Dimond Size	Shank Size (inch.)	Shank Size (mm.)	MCD	NATURAL
RCS 1	0.1 Ct.	D= 2/5" X L = 1.97"	D = 10 X L = 50		
RCS 2	0.25 Ct.	D= 2/5" X L = 1.97"	D = 10 X L = 50		
RCS 3	0.5 Ct.	D= 2/5" X L = 1.97"	D = 10 X L = 50		
RCS 4	1.0 Ct.	D= 2/5" X L = 1.97"	D = 10 X L = 50		
RCS 5	1.25 Ct.	D= 2/5" X L = 1.97"	D = 10 X L = 50		
RCS 6	1.5 Ct.	D= 2/5" X L = 1.97"	D = 10 X L = 50		
RCS 7	2.0 Ct.	D= 2/5" X L = 1.97"	D = 10 X L = 50		
RCS 8	2.5 Ct.	D= 2/5" X L = 1.97"	D = 10 X L = 50		
RCS 9	3.0 Ct.	D= 2/5" X L = 1.97"	D = 10 X L = 50		



Posalux Tool



MCD Tool



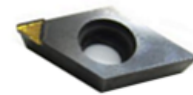
Vaccum Brazed Tool



Ice Lathe Tool



CNC Tool



Turning Tool



MCD Milling



Chamfer Tool



Fly Cutter



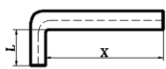
MCD Tool



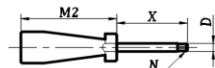
Posalux Tool



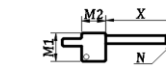
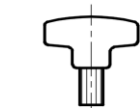
MCD Bite

SPARES
HEXAGONAL SPANNER


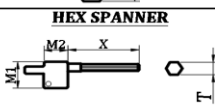
Cat. No.	T	X	L	Stock
RHLS015	1.5	52	8	●
RHLS020	2.0	58	8	●
RHLS025	2.5	60	12	●
RHLS030	3.0	65	15	●
RHLS035	3.5	70	20	●
RHLS040	4.0	72	25	●
RHLS050	5.0	80	28	●
RHLS060	6.0	90	32	●

TORX SCREW DRIVER


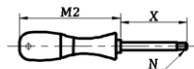
Cat. No.	N	D	X	M2	Stock
RTS07	T7	2	8		●
RTS08	T8	2.3	8		●
RTS15	T15	3.9	12		●
RTS20	T20	65	15		●
RTS25	25	70	20		●
RHS040	4.0	72	25		●
RHS050	5.0	80	28		●
RHS060	6.0	90	32		●

SPL. TORX SPANNER

TEE HEX SPANNER


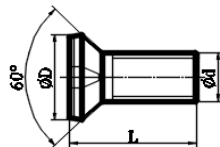
Cat. No.	T	Stock
RTHS030	3	●
RTHS040	4	●
RTHS050	5	●

HEX SPANNER


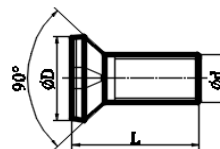
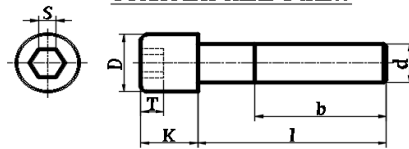
Cat. No.	T	Stock
RHS015	1.5	●
RHS020	2	●
RHS025	2.5	●

SPL. TORX SCREW DRIVER


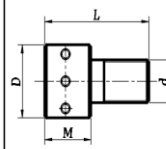
Cat. No.	N	X	M2	Stock
RTSR08IP	8IP	60	104	●
RTSR10IP	10IP	80	111	●
RTSR15IP	15IP	80	111	●
RTSR20IP	20IP	100	118	●
RTSR25IP	25IP	100	118	●

TORX FLAT HEAD SCREW


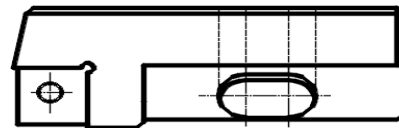
Cat. No.	d	L	D	E	Pitch	X°	Stock
RTFH1604M	M1.6	3.3	2.6	T6	0.35	60	●
RTFH0203M	M2	3.0	2.7	T6	0.35	60	●
RTFH0204M	M2	4.3	2.7	T6	0.4	60	●
RTFH2205M	M2.2	4.5	3.0	T6	0.4	60	●
RTFH2505M	M2.5	4.5	3.45	T8	0.45	60	●
RTFH2506M	M2.5	5.5	3.45	T8	0.45	60	●
RTFH0306M	M3	5.8	4.2	T10	0.45	60	●
RTFH0307M	M3	6.5	4.2	T10	0.5	60	●
RTFH0407M	M4	7.0	5.6	T15	0.5	60	●
RTFH0409M	M4	9.0	5.6	T15	0.7	60	●
RTFH0412M	M4	12	5.6	T15	0.7	60	●
RTFH0509M	M5	9.0	7.0	T20	0.7	60	●
RTFH0511M	M5	11.5	7.0	T20	0.8	60	●
RTFH0513M	M5	13	7.0	T20	0.8	60	●
RTFH0515M	M5	15	7.0	T20	0.8	60	●
RTFH0615M	M6	15	9.0	T25	1.0	60	●
RTFH0619M	M6	19	9.0	T25	1.0	60	●
RTFH0203Q	M2	3.0	2.7	T6	0.4	90	●
RTFH0204Q	M2	4.3	2.7	T6	0.4	90	●
RTFH0305Q	M3	5.3	4.3	T10	0.5	90	●
RTFH0306Q	M2	5.8	4.3	T10	0.5	90	●
RTFH0307Q	M2	6.8	4.3	T10	0.5	90	●
RTFH0407Q	M2	7.3	5.6	T15	0.7	90	●
RTFH0410Q	M2	10.3	5.6	T15	0.7	90	●
RTFH0509Q	M2	9.3	6.9	T20	0.8	90	●

TORX FLAT HEAD SCREW

TORX FLAT HEAD SCREW


Cat. No.	d	b	D	K	S	T	Stock
RLNS0318	M3	18	5.5	3	2.5	1.3	●
RLNS0420	M4	20	7.0	4	3	2	●
RLNS0522	M5	22	8.5	5	4	2.5	●
RLNS0624	M6	24	10	6	5	3	●
RLNS0828	M8	28	13	8	6	3.5	●
RLNS1032	M10	32	16	10	8	4	●
RLNS1236	M12	36	18	12	10	5	●
RLNS1440	M14	40	21	14	12	6	●
RLNS1644	M16	44	24	16	14	7	●
RLNS2052	M20	52	30	20	17	8	●
RLNS2460	M24	60	36	24	19	10	●
RLNS2766	M27	66	40	27	19	12	●
RLNS3072	M30	72	45	30	22	13.5	●

SPL. ADJUSTABLE SCREW


Cat. No.	d	D	M	L	Stock
RAS0416	M4	6	6	16	●
RAS0520	M5	8	6	20	●
RTSR15IP	M6	10	8	22	●

MILLING CATREDGE


Cat. No.	Suitable Insert	Stock
RMC-SN09	SNEW 09T3	●
RMC-SN12	SNEW 1204	●
RMC-XN09	XNEW 0903	●
RMC-SP12	XNEW 0903	●

■ Calculating Cutting Speed

(1) Calculating rotation speed from cutting speed

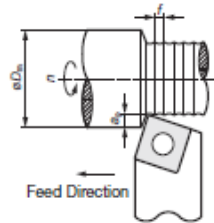
$n = \frac{1,000 \times v_c}{\pi \times D_m}$	n : Spindle Speed (min ⁻¹) v_c : Cutting speed (m/min) D_m : Inner/outer diameter of workpiece (mm) π : ≈ 3.14
---	---

Example: $v_c = 150 \text{ m/min}$, $D_m = 100 \text{ mm}$

$$n = \frac{1,000 \times 150}{3.14 \times 100} = 478 \text{ (min}^{-1}\text{)}$$

(2) Calculating cutting speed from rotational speed

$v_c = \frac{\pi \times D_m \times n}{1,000}$	Refer to the above table
---	--------------------------



- n : Spindle speed (min⁻¹)
- v_c : Cutting speed (m/min)
- f : Feed rate per revolution (mm/rev)
- a_p : Depth of cut (mm)
- D_m : Diameter of workpiece (mm)

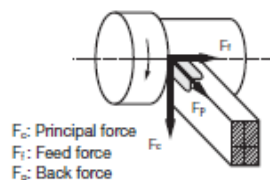
■ Calculating Power Requirements

$P_c = \frac{v_c \times f \times a_p \times k_c}{60 \times 10^3 \times \eta}$ $H = \frac{P_c}{0.75}$	P_c : Power requirements (kW) v_c : Cutting speed (m/min) f : Feed Rate (mm/rev) a_p : Depth of cut (mm) k_c : Specific cutting force (MPa) H : Required horsepower (HP) η : Machine efficiency (0.70 to 0.85)
---	---

● Rough value of k_c

Aluminum: 800MPa
 General steel: 2,500 to 3,000MPa
 Cast iron: 1,500MPa

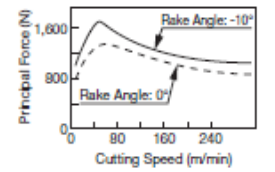
■ Three cutting force components



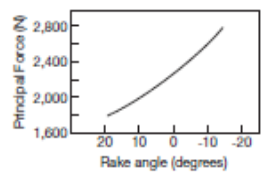
● Calculating cutting force

$P = \frac{k_c \times q}{1,000}$ $= \frac{k_c \times a_p \times f}{1,000}$	P : Cutting force (N) k_c : Specific cutting force (MPa) q : Chip area (mm) a_p : Depth of Cut (mm) f : Feed Rate (mm/rev)
---	--

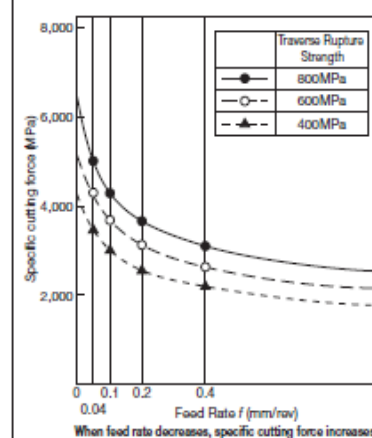
■ Relation between cutting speed and cutting force



■ Relation between rake angle and cutting force



■ Relation between feed rate and specific cutting force (for carbon steel)



■ Machined Surface Roughness

● Theoretical (geometrical) surface roughness

$h = \frac{f^2}{8 \times RE} \times 10^3$	h : Theoretical surface roughness (μm) f : Feed rate per revolution (mm/rev) RE : Corner radius (mm)
---	--

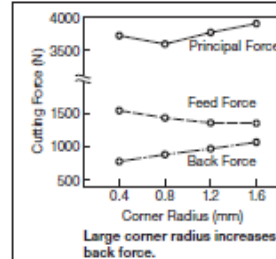
● Actual surface roughness

Steel:
 Theoretical surface roughness $\times 1.5$ to 3
 Cast iron:
 Theoretical roughness $\times 3$ to 5

● Ways to improve surface finish roughness

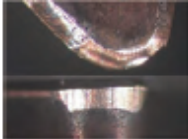
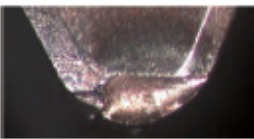
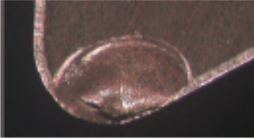
- (1) Use an insert with a larger corner radius.
- (2) Optimise the cutting speed and feed rate so that built-up edges do not occur.
- (3) Select an appropriate insert grade.
- (4) Use wiper insert.

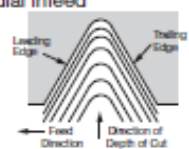
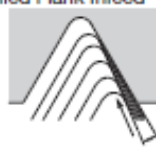
■ Relation between corner radius and 3-part force



Work Material: SCM440 (38HS)
 Insert: TNGA2204SS
 Holder: PTGNR2525-43
 Cutting Conditions: $v_c = 100 \text{ m/min}$,
 $a_p = 4 \text{ mm}$,
 $f = 0.45 \text{ mm/rev}$

Technical Guidance - CBN Turning

Failure Type	Reason	Corrective Measures
Flank Wear 	- Grade lacks wear resistance - Cutting speed is too fast	- Select a more wear-resistant grade - Reduce the cutting speed to $v_c=200\text{m/min}$ or less (higher feed rate also reduces tool-to-work contact time) - Use an insert with a larger relief angle
Crater wear 	- Grade lacks crater wear resistance	- Select a higher-efficiency grade
Breakage at Bottom of Crater 	- Cutting speed is too fast	- Reduce the cutting speed to $v_c=200\text{m/min}$ or less and increase the feed rate (low speed, high feed) (higher feed rate alone also reduces tool-to-work contact time)
Flaking 	- Grade lacks toughness - Back force is too high	- Select a tougher grade - Select an insert with a stronger cutting edge (increase negative land angle and perform honing) - If the grade is tough enough, improve the cutting edge sharpness
Notch Wear 	- High stress at boundary	- Change to a grade with a higher notch wear resistance - Increase cutting speed (150 m/min or more) - Change to the Variable Feed Rate method, which alters the feed rate in fixed output intervals - Increase negative land angle and perform honing
Chipping at Forward Notch Position 	- Impact to front cutting edge is too large or occurs constantly	- Change to a micro-grained grade with a higher fracture resistance - Increase the feed rate (higher feed rates are recommended to reduce chipping) - Select an insert with a stronger cutting edge (increase negative land angle and perform honing)
Chipping at Side Notch Position 	- Impact to side cutting edge is too large or occurs constantly	- Change to a grade with a higher fracture resistance - Reduce feed rate - Use an insert with a larger side cutting angle - Use an insert with a larger corner radius - Select an insert with a stronger cutting edge (increase negative land angle and perform honing)
Thermal Crack 	- Thermal shock is too severe	- Completely dry conditions are recommended - Select a grade with better thermal conductivity - Reduce cutting speed, feed rate, and depth of cut to decrease the machining load

Cutting	Various Features
Radial Infeed 	- Most common threading technique, used mainly for small pitch threads. - Easy to change cutting conditions such as depth of cut, etc. - Long contact point has a tendency to chatter. - Chip control is difficult. - Considerable damage tends to occur on the trailing edge side.
Flank Infeed 	- Effective for large-pitch threads and blemish-prone work material surfaces. - Chips evacuate from one side for good chip control. - The trailing edge side is worn, and therefore the flank is easily worn.
Modified Flank Infeed 	- Effective for large-pitch threads and blemish-prone work material surfaces. - Chips evacuate from one side for good chip control. - Inhibits flank wear on trailing edge side.
Alternating Flank Infeed 	- Effective for large-pitch threads and blemish-prone work material surfaces. - Wears evenly on right and left cut edges. - Since both edges are used alternately, chip control is sometimes difficult.

TroubleShooting

Reason Of Failure		Reason	Corrective Measures
Cutting Edge Failure	Excessive Wear	- Tool grade	- Select a more wear-resistant grade
		- Cutting conditions	- Reduce cutting speed - Use a suitable quantity and concentration of coolant - Change the number of passes
	Uneven Wear on Right and Left Sides	- Tool mounting	- Check whether the cutting edge inclination angle is appropriate for the thread lead angle - Check whether the tool is mounted properly
		- Cutting conditions	- Change to modified flank infeed or alternating flank infeed
	Chipping	- Cutting conditions	- If built-up edge occurs, increase the cutting speed
	Fracture	- Biting of chips	- Supply enough coolant to the cutting edge
- Cutting conditions		- Increase the number of passes and reduce the depth of cut for each pass - Use separate tools for roughing and finishing	
Shape and Accuracy	Poor surface finish roughness	- Cutting conditions	- If blemished due to low-speed machining, increase the cutting speed - If chattering occurs, decrease the cutting speed - If the depth of cut of the final pass is too small, make it larger
		- Tool grade	- Select a more wear-resistant grade
		- Inappropriate cutting edge inclination angle	- Select the correct shim to ensure relief on the side of the insert
	Inappropriate Thread Shape	- Tool mounting	- Check whether the tool is mounted properly
	Shallow Thread Depth	- Shallow depth of cut	- Check the depth of cut
		- Tool wear	- Check damage to the cutting edge

● Calculating cutting speed

$$V_c = \frac{\pi \times DC \times n}{1,000}$$

$$n = \frac{1,000 \times V_c}{\pi \times DC}$$

V_c : Cutting speed (m/min)

π : ≈ 3.14

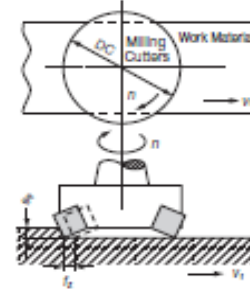
DC : Nominal cutting diameter (mm)

n : Rotation speed (min⁻¹)

V_f : Feed rate per minute (mm/min)

f_z : Feed rate per tooth (mm/t)

z : Number of teeth



● Calculating feed rate

$$V_f = f_z \times z \times n$$

$$f_z = \frac{V_f}{z \times n}$$

● Calculating Power Requirements

$$P_c = \frac{a_p \times a_p \times V_f \times k_c}{60 \times 10^3 \times \eta} = \frac{Q \times k_c}{60 \times 10^3 \times \eta}$$

P_c : Power consumption (kw)

H : Required horsepower (HP)

Q : Chip evacuation amount (cm³/min)

a_p : Cutting width (mm)

V_f : Feed rate per minute (mm/min)

a_p : Depth of cut (mm)

k_c : Cutting force (MPa)

Rough values / Steel: 2,500 to 3,000MPa

/ Cast iron: 1,500MPa

/ Aluminum: 800MPa

η : Machine efficiency (about 0.75)

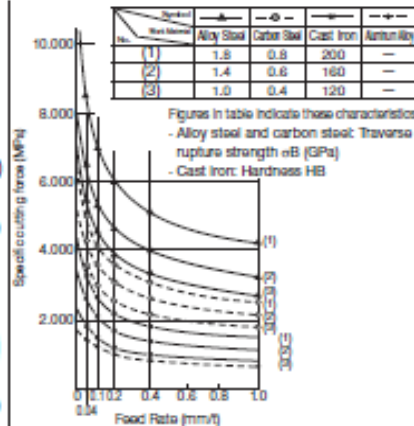
● Horsepower Requirement

$$H = \frac{P_c}{0.75}$$

● Chip evacuation amount

$$Q = \frac{a_p \times a_p \times V_f}{1,000}$$

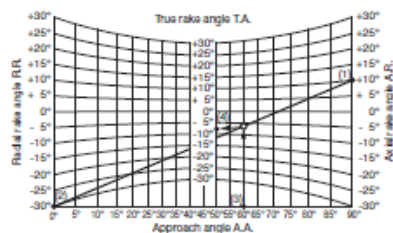
● Relation between feed rate, work material and specific cutting force



■ Functions of cutting edge angles

	Material	Symbol	Function	Effect
(1)	Axial rake angle	A.R.	Determines chip evacuation direction, adhesion, thrust, etc.	Available in positive to negative (large to small) rake angles. Typical combinations: Positive and Negative, Positive and Positive, Negative and Negative
(2)	Radial rake angle	R.R.		
(3)	Approach angle	A.A.	Determines chip thickness and chip evacuation direction	Large: Thin chips Small cutting force
(4)	True rake angle	T.A.	Effective rake angle	Positive (Large): Excellent machinability and low chip adhesion. Low cutting edge strength. Negative (Small): Strong cutting edge and easy chip adhesion.
(5)	Cutting edge inclination angle	I.A.	Determines chip control direction	Positive (Large): Excellent chip control and small cutting force. Low cutting edge strength.
(6)	Face cutting edge angle	F.A.	Determines surface finish roughness	Small: Excellent surface roughness.
(7)	Relief angle		Determines cutting edge strength, tool life, chattering	

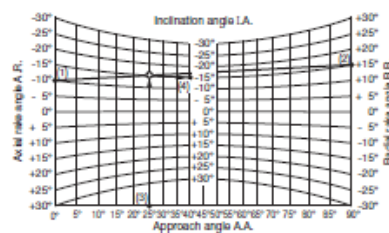
True rake angle (T.A.) table



Example: (1) A.R. (Axial rake angle) = +10°
 (2) R.R. (Radial rake angle) = -30°
 (3) A.A. (Approach angle) = 60°

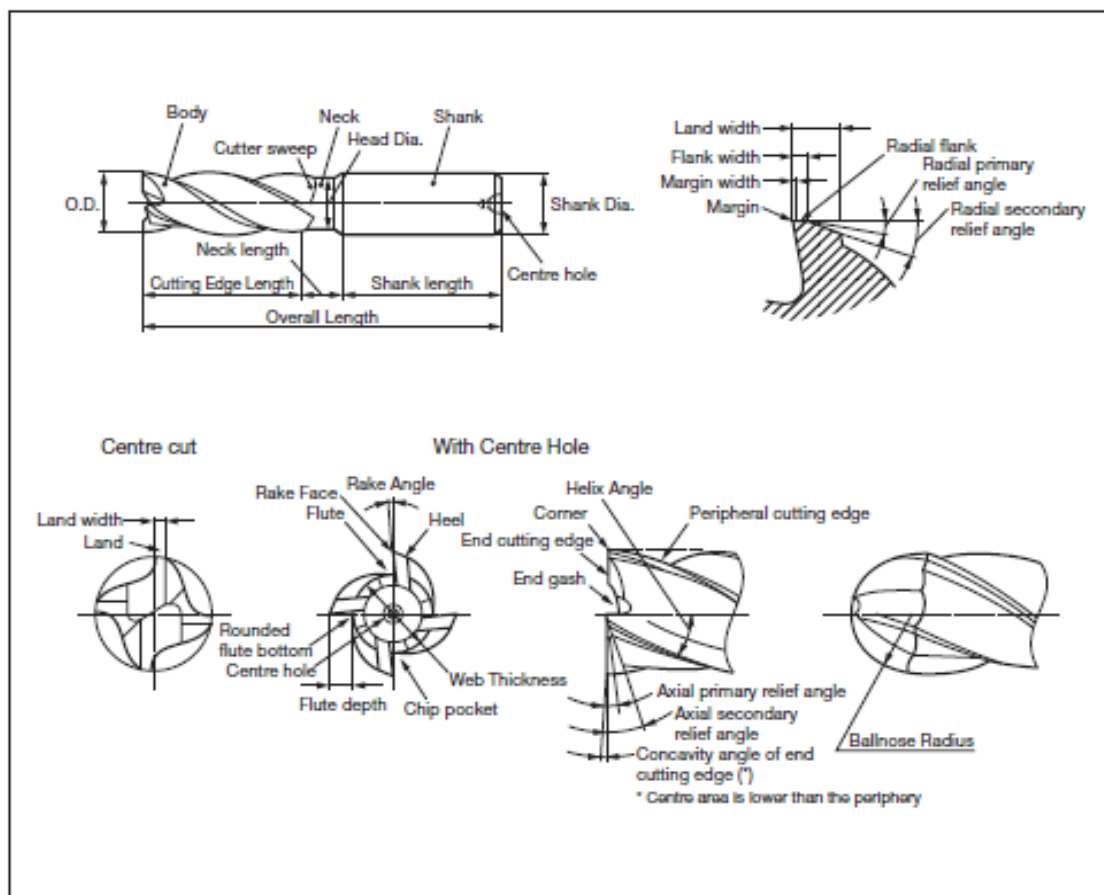
Formula: $\tan T.A. = \tan R.R. / \cos A.A. + \tan A.R. / \sin A.A.$

Inclination angle (I.A.) chart



Example: (1) A.R. (Axial rake angle) = -10°
 (2) R.R. (Radial rake angle) = +15°
 (3) A.A. (Approach angle) = 25°

Formula: $\tan I.A. = \tan A.R. / \cos A.A. - \tan R.R. / \sin A.A.$



● Calculating cutting speed

$$v_c = \frac{\pi \times DC \times n}{1,000} \quad n = \frac{1,000 \times v_c}{\pi \times DC}$$

● Calculating feed rate per revolution and per tooth

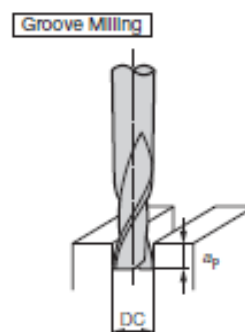
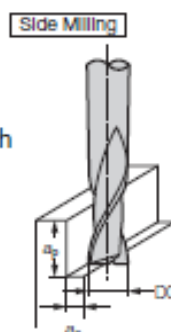
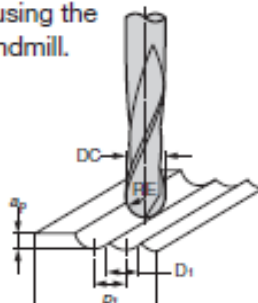
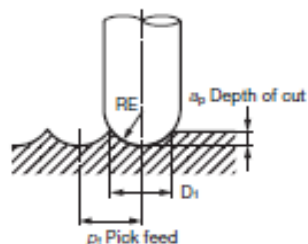
$$v_f = n \times f \quad f = \frac{v_f}{n}$$

$$v_f = n \times f_z \times z \quad f_z = \frac{f}{z} = \frac{v_f}{n \times z}$$

● Calculating notch width (D₁)

$$D_1 = 2 \times \sqrt{2 \times RE \times a_p - a_p^2}$$

● Cutting speed and feed rate (per revolution and per tooth) are calculated using the same formula as the square endmill.

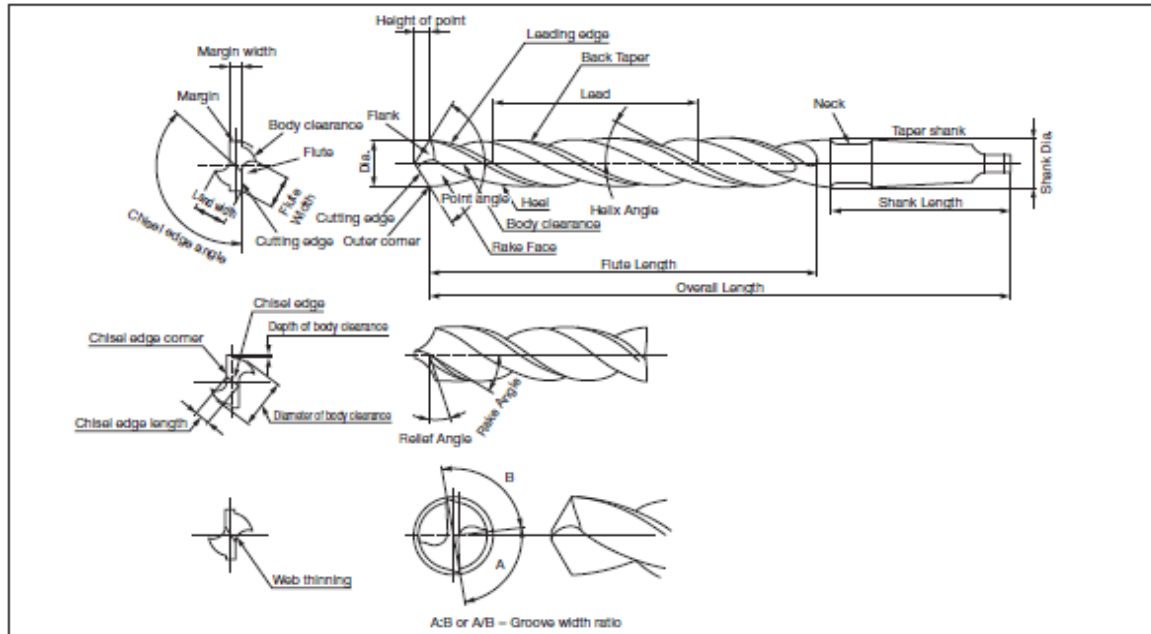


v_c : Cutting speed (m/min)
 π : ≈ 3.14
 DC : Endmill diameter (mm)
 n : Spindle speed (min⁻¹)
 v_f : Feed rate (mm/min)
 f : Feed rate per revolution (mm/rev)
 f_z : Feed rate per tooth (mm/t)
 z : Number of teeth
 a_p : Depth of cut in axial direction (mm)
 a_s : Depth of cut in radial direction (mm)
 RE : Ballnose radius

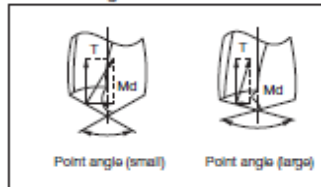
Technical Guidance -End Mill
■ Troubleshooting for Endmilling

Failure Type		Reason		Corrective Measures
Cutting Edge Failure	Excessive Wear	- Cutting Conditions	- Cutting speed is too fast - Feed rate is too large	- Decrease cutting speed and feed rate
		- Tool Shape	- The flank relief angle is too small	- Change to an appropriate flank relief angle
		- Tool Material	- Insufficient wear resistance	- Select a more wear-resistant substrate - Use a coated tool
	Chipping	- Cutting Conditions	- Feed rate is too large - Depth of cut is too large - Tool overhang is too long	- Decrease cutting speed - Reduce depth of cut - Adjust tool overhang to the correct length
		- Machine Area	- Workpiece clamping is too weak - Tool mounting is unstable	- Clamp the workpiece firmly - Make sure the tool is seated in the chuck properly
	Fracture	- Cutting Conditions	- Feed rate is too large - Depth of cut is too large - Tool overhang is too long - Cutting edge is too long	- Decrease cutting speed - Reduce depth of cut - Reduce tool overhang as much as possible - Select a tool with a shorter cutting edge
		- Tool Shape	- Web thickness is too small	- Change to more appropriate web thickness
	Deflection in wall surface	- Cutting Conditions	- Feed rate is too large - Depth of cut is too large - Tool overhang is too long - Cutting on the down-cut	- Decrease cutting speed - Reduce depth of cut - Adjust tool overhang to the correct length - Change direction to up-cut
		- Tool Shape	- Helix angle is too large - Web thickness is too small	- Use a tool with a smaller helix angle - Use a tool with the appropriate web thickness
Others	Unsatisfactory Machined Surface Finish	- Cutting Conditions	- Feed rate is too large - Chip biting	- Decrease cutting speed - Use air blow - Use an insert with a larger relief pocket
	Chattering	- Cutting Conditions	- Cutting speed is too fast - Cutting on the up-cut - Tool overhang is too long	- Decrease the cutting speed - Change direction to down-cut - Adjust tool overhang to the correct length
		- Tool Shape	- Rake angle is too large	- Use a tool with an appropriate rake angle
		- Machine Area	- Workpiece clamping is too weak - Tool mounting is unstable	- Clamp the workpiece firmly - Make sure the tool is seated in the chuck properly
	Chip blockage	- Cutting Conditions	- Feed rate is too large - Depth of cut is too large	- Decrease cutting speed - Reduce depth of cut
		- Tool Shape	- Too many teeth - Chip biting	- Reduce number of teeth - Use air blow

■ Parts of drill

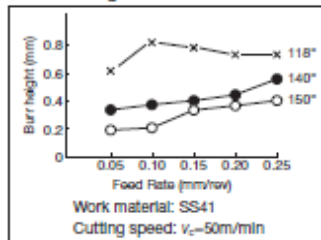


● Point angle and force



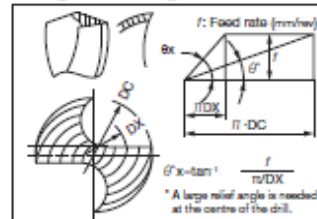
When point angle is large, thrust increases but torque decreases.

● Point angle and burr

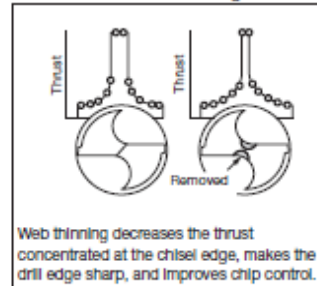


When point angle is large, burr height becomes low.

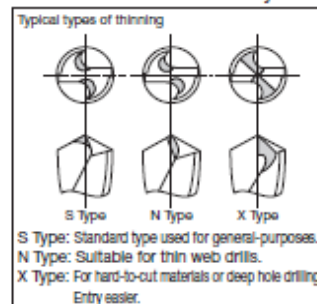
● Minimum requirement relief angle for drilling



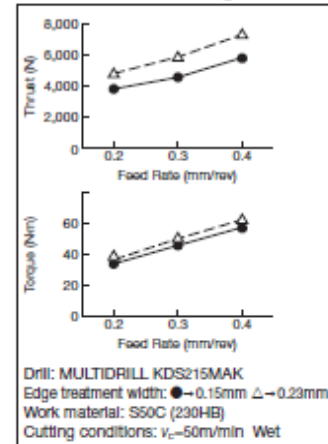
● Effects of web thinning



● Chisel width decreased by thinning



● Relation between edge treatment and cutting force



■ Troubleshooting for Drilling

Failure Type	Reason	Corrective Measures
Drill Failure	Excessive Wear on Rake Face	- Inappropriate cutting conditions - Unsuitable coolant
	Chisel Point Breakage	- Use higher cutting speeds - Increase feed rate - Reduce pressure if using internal coolant - Use coolant with more lubricity
	Chisel Point Breakage	- Off-centre starts - Equipment, work materials, etc. lack rigidity - Cutting edge is too weak
	Chisel Point Breakage	- Reduce feed rate at entry point - Pre-machining of flat surface for entry - Change cutting conditions to reduce resistance - Improve clamp strength of work material - Increase size of chisel width - Increase amount of honing on cutting edge
	Breakage on Peripheral Cutting Edge	- Inappropriate cutting conditions - Unsuitable coolant - Equipment, work materials, etc. lack rigidity - Cutting edge is too weak - Entry from peripheral cutting edge - Interruption during drill engagement
	Breakage on Peripheral Cutting Edge	- Decrease the cutting speed - Reduce feed rate - Use coolant with more lubricity - Improve clamp strength of work material - Increase amount of honing on cutting edge - Reduce the front relief angle - Increase margin width (W margin specification)
	Breakage on Peripheral Cutting Edge	- Reduce feed rate - Increase amount of honing on cutting edge - Reduce the front relief angle
	Margin Wear	- Inappropriate cutting conditions - Unsuitable coolant - Remaining margin wear - Improper tool design
	Margin Wear	- Decrease the cutting speed - Use coolant with more lubricity - Use more coolant - Schedule for earlier regrind and ensure back taper - Increase amount of back taper - Reduce margin width
	Drill Breakage	- Chip blockage - Collet clamp too weak - Equipment, work materials, etc. lack rigidity
	Drill Breakage	- Use the optimal cutting conditions and tools - Use more coolant - Use a collet with strong grip force - Improve clamp strength of work material
Unsatisfactory Hole Accuracy	Oversized Holes	- Off-centre starts - Drill lacks rigidity - Drill has runout - Equipment, work materials, etc. lack rigidity
	Oversized Holes	- Reduce feed rate at entry point - Decrease the cutting speed - Pre-machining of flat surface for entry - Use the optimal drill type for the hole depth - Improve overall drill rigidity - Improve drill mounting precision - Improve drill retention rigidity - Improve clamp strength of work material
	Poor Surface Roughness	- Inappropriate cutting conditions - Unsuitable coolant
	Poor Surface Roughness	- Increase cutting speed - Reduce feed rate - Use coolant with more lubricity
	Holes are not straight	- Off-centre starts - Drill is not mounted properly - Equipment, work materials, etc. lack rigidity
	Holes are not straight	- Increase feed rate - Improve drill mounting precision - Improve drill retention rigidity - Improve clamp strength of work material - Select a double margin tool
Unsatisfactory Chip Control	Chips clog	- Inappropriate cutting conditions - Poor chip evacuation
	Chips clog	- Increase cutting speeds - Increase feed rate - Increase volume if using internal coolant
	Long Stringy Chips	- Inappropriate cutting conditions - Strong cooling effect - Dull cutting edge
	Long Stringy Chips	- Increase feed rate - Increase cutting speeds - Reduce pressure if using internal coolant - Reduce amount of edge honing

Technical Guidance - SI Unit Conversion List
■ Basic SI units
● Quantity as a reference of SI

Quantity	Material	Symbol
Length	Metre	m
Mass	Kilogram	kg
Time	Second	s
Current	Ampere	A
Temperature	Kelvin	K
Quantity of substance	Mol	mol
Luminous intensity	Candela	cd

● Basic unit provided with unique name and symbol (extracted)

Quantity	Material	Symbol
Frequency	Hertz	Hz
Force	Newton	N
Pressure and stress	Pascal	Pa
Energy, work, and heat quantity	Joule	J
Power and efficiency	Watt	W
Voltage	Bolt	V
Electrical Resistance	Ohm	Ω

■ SI prefixes
● Prefix showing integral powers of 10 combined with SI units

Coefficient	Material	Symbol	Coefficient	Material	Symbol	Coefficient	Material	Symbol
10 ²⁴	Yotta	Y	10 ³	Kilo	k	10 ⁻⁶	Nano	n
10 ²¹	Zetta	Z	10 ²	Hecto	h	10 ⁻⁹	Pico	p
10 ¹⁸	Exa	E	10 ¹	Deca	da	10 ⁻¹²	Femto	f
10 ¹⁵	Peta	P	10 ⁰	Deci	d	10 ⁻¹⁵	Atto	a
10 ¹²	Tera	T	10 ⁻¹	Centi	c	10 ⁻¹⁸	Zepto	z
10 ⁹	Giga	G	10 ⁻²	Milli	m	10 ⁻²¹	Yocto	y
10 ⁶	Mega	M	10 ⁻³	Micro	μ			

■ Principal SI unit conversion list (☐ portions are SI units)
● Force

N	kgf
1	1.01972 × 10 ⁻¹
9.80665	1

● Stress

Pa(N/m ²)	MPa(N/mm ²)	kgf/mm ²	kgf/cm ²	kgf/m ²
1	1 × 10 ⁻⁶	1.01972 × 10 ⁻⁷	1.01972 × 10 ⁻⁸	1.01972 × 10 ⁻¹
1 × 10 ⁷	1	1.01972 × 10 ⁻¹	1.01972 × 10	1.01972 × 10 ⁶
9.80665 × 10 ⁷	9.80665	1	1 × 10 ⁷	1 × 10 ⁷
9.80665 × 10 ⁴	9.80665 × 10 ⁻²	1 × 10 ⁻²	1	1 × 10 ⁴
9.80665	9.80665 × 10 ⁻⁹	1 × 10 ⁻⁹	1 × 10 ⁻⁴	1

● Pressure

1Pa = 1N/m², 1MPa = 1N/mm²

Pa(N/m ²)	kPa	MPa	GPa	bar	kgf/cm ²	mmHg or Torr
1	1 × 10 ⁻³	1 × 10 ⁻⁶	1 × 10 ⁻⁹	1 × 10 ⁻⁵	1.01972 × 10 ⁻⁸	7.50062 × 10 ⁻⁵
1 × 10 ³	1	1 × 10 ⁻³	1 × 10 ⁻⁶	1 × 10 ⁻²	1.01972 × 10 ⁻²	7.50062
1 × 10 ⁶	1 × 10 ³	1	1 × 10 ⁻³	1 × 10	1.01972 × 10	7.50062 × 10 ³
1 × 10 ⁹	1 × 10 ⁶	1 × 10 ³	1	1 × 10 ⁴	1.01972 × 10 ⁴	7.50062 × 10 ⁶
1 × 10 ¹²	1 × 10 ⁹	1 × 10 ⁶	1 × 10 ³	1	1.01972	7.50062 × 10 ⁹
9.80665 × 10 ⁴	9.80665 × 10	9.80665 × 10 ⁻²	9.80665 × 10 ⁻⁵	9.80665 × 10 ⁻¹	1	7.35559 × 10 ⁷
1.33322 × 10 ⁷	1.33322 × 10 ⁴	1.33322 × 10 ¹	1.33322 × 10 ⁻²	1.33322 × 10 ³	1.35951 × 10 ³	1

1Pa = 1N/m²
● Work/Energy/Heat Quantity

J	kW-h	kgf-m	kcal
1	2.77778 × 10 ⁻⁷	1.01972 × 10 ⁻¹	2.38889 × 10 ⁻⁴
3.60000 × 10 ⁷	1	3.67098 × 10 ³	8.60000 × 10 ⁷
9.80665	2.72407 × 10 ⁻⁶	1	2.34270 × 10 ⁻³
4.18605 × 10 ³	1.16279 × 10 ⁻³	4.26858 × 10 ⁷	1

● Power (efficiency and motive energy) / Thermal flow

1J=1W/s, 1J=1N/m

W	kgf-m/s	PS	kcal/h
1	1.01972 × 10 ⁻¹	1.35962 × 10 ⁻³	8.60000 × 10 ⁻¹
1 × 10 ³	1.01972 × 10 ²	1.35962	8.60000 × 10 ⁷
9.80665	1	1.33333 × 10 ⁻²	8.43371
7.355 × 10 ⁷	7.5 × 10	1	6.32529 × 10 ⁷
1.16279	1.18572 × 10 ⁻¹	1.58095 × 10 ⁻³	1

1W = 1J/s, PS: Horsepower

● Specific heat

J/(kg-K)	1kcal (kg/°C) cal/(g/°C)
1	2.38889 × 10 ⁻⁴
4.18605 × 10 ³	1

● Thermal conductivity

W/(m-K)	kcal/(h-m-°C)
1	8.60000 × 10 ⁻¹
1.16279	1

● Spindle Speed

min ⁻¹	rpm
1	1

1min⁻¹=1rpm

Technical Guidance - Hardness Comparison Chart
■ Hardness Scale Comparison Chart

● Approximate corresponding values for steel hardness on the Brinell scale

Brinell 3,000kgf	Rockwell Hardness				Vickers 50kgf	Shore Hardness	Tensile Strength (GPa)
	A Scale 60kgf brale	B Scale 100kgf 1/10in ball HRB	C Scale 150kgf brale	D Scale 100kgf brale			
HB	HRA	HRB	HRC	HRD	HV	HS	
—	85.6	—	68.0	76.9	940	97	—
—	85.3	—	67.5	76.5	920	96	—
—	85.0	—	67.0	76.1	900	95	—
767	84.7	—	66.4	75.7	880	93	—
757	84.4	—	65.9	75.3	860	92	—
745	84.1	—	65.3	74.8	840	91	—
733	83.8	—	64.7	74.3	820	90	—
722	83.4	—	64.0	73.8	800	88	—
712	—	—	—	—	—	—	—
710	83.0	—	63.3	73.3	780	87	—
698	82.6	—	62.5	72.6	760	86	—
684	82.2	—	61.8	72.1	740	—	—
682	82.2	—	61.7	72.0	737	84	—
670	81.8	—	61.0	71.5	720	83	—
656	81.3	—	60.1	70.8	700	—	—
653	81.2	—	60.0	70.7	697	81	—
647	81.1	—	59.7	70.5	690	—	—
638	80.8	—	59.2	70.1	680	80	—
630	80.6	—	58.8	69.8	670	—	—
627	80.5	—	58.7	69.7	667	79	—
601	79.8	—	57.3	68.7	640	77	—
578	79.1	—	56.0	67.7	615	75	—
555	78.4	—	54.7	66.7	591	73	2.06
534	77.8	—	53.5	65.8	569	71	1.98
514	76.9	—	52.1	64.7	547	70	1.89
495	76.3	—	51.0	63.8	528	68	1.82
477	75.6	—	49.6	62.7	508	66	1.73
461	74.9	—	48.5	61.7	491	65	1.67
444	74.2	—	47.1	60.8	472	63	1.59
429	73.4	—	45.7	59.7	455	61	1.51
415	72.8	—	44.5	58.8	440	59	1.46
401	72.0	—	43.1	57.8	425	58	1.39
388	71.4	—	41.8	56.8	410	56	1.33
375	70.6	—	40.4	55.7	396	54	1.26
363	70.0	—	39.1	54.6	383	52	1.22
352	69.3	(110.0)	37.9	53.8	372	51	1.18
341	68.7	(109.0)	36.6	52.8	360	50	1.13
331	68.1	(108.5)	35.5	51.9	350	48	1.10

Brinell 3,000kgf	Rockwell Hardness				Vickers 50kgf	Shore Hardness	Tensile Strength (GPa)
	A Scale 60kgf brale	B Scale 100kgf 1/10in ball HRB	C Scale 150kgf brale	D Scale 100kgf brale			
HB	HRA	HRB	HRC	HRD	HV	HS	
321	67.5	(108.0)	34.3	50.1	339	47	1.06
311	66.9	(107.5)	33.1	50.0	328	46	1.03
302	66.3	(107.0)	32.1	49.3	319	45	1.01
293	65.7	(106.0)	30.9	48.3	309	43	0.97
285	65.3	(105.5)	29.9	47.6	301	—	0.95
277	64.6	(104.5)	28.8	46.7	292	41	0.92
269	64.1	(104.0)	27.6	45.9	284	40	0.89
262	63.6	(103.0)	26.6	45.0	276	39	0.87
255	63.0	(102.0)	25.4	44.2	269	38	0.84
248	62.5	(101.0)	24.2	43.2	261	37	0.82
241	61.8	100.0	22.8	42.0	253	36	0.80
235	61.4	99.0	21.7	41.4	247	35	0.78
229	60.8	98.2	20.5	40.5	241	34	0.76
223	—	97.3	(18.8)	—	234	—	—
217	—	96.4	(17.5)	—	228	33	0.73
212	—	95.5	(16.0)	—	222	—	0.71
207	—	94.6	(15.2)	—	218	32	0.69
201	—	93.8	(13.8)	—	212	31	0.68
197	—	92.8	(12.7)	—	207	30	0.66
192	—	91.9	(11.5)	—	202	29	0.64
187	—	90.7	(10.0)	—	196	—	0.62
183	—	90.0	(9.0)	—	192	28	0.62
179	—	89.0	(8.0)	—	188	27	0.60
174	—	87.8	(6.4)	—	182	—	0.59
170	—	86.8	(5.4)	—	178	26	0.57
167	—	86.0	(4.4)	—	175	—	0.56
163	—	85.0	(3.3)	—	171	25	0.55
156	—	82.9	(0.9)	—	163	—	0.52
149	—	80.8	—	—	156	23	0.50
143	—	78.7	—	—	150	22	0.49
137	—	76.4	—	—	143	21	0.46
131	—	74.0	—	—	137	—	0.45
126	—	72.0	—	—	132	20	0.43
121	—	69.8	—	—	127	19	0.41
116	—	67.6	—	—	122	18	0.40
111	—	65.7	—	—	117	15	0.38

1) Figures within the () are not commonly used.

2) Rockwell A, C and D scales utilise a diamond brale.

3) This chart was taken from the JIS Iron and Steel Handbook (1980).

Technical Guidance - Tolerance Chart

■ Dimensional Tolerance of Standard Fittings [Excerpt from JIS B 0401 (1999)]

● Dimensional Tolerance Used for Shafts of Standard Fittings

Classification of Reference Dimensions (mm)	Shaft Tolerance Class																										Unit: μm					
	greater or less	b9	c9	d8	d9	e7	e8	e9	f6	f7	f8	g5	g6	h5	h6	h7	h8	h9	js5	js6	js7	k5	k6	m5	m6	n6	p6	r6	s6	t6	u6	x6
—	3	-140 -165	-60 -85	-20 -34	-20 -45	-14 -24	-14 -28	-14 -39	-6 -12	-6 -16	-6 -20	-2 -6	-2 -8	0 -4	0 -6	0 -10	0 -14	0 -25	±2	±3	±5	+4 0	+6 0	+6 +2	+8 +2	+10 +4	+12 +6	+16 +10	+20 +14	—	+24 +18	+26 +20
3	6	-140 -170	-70 -100	-30 -48	-30 -60	-20 -32	-20 -38	-20 -50	-10 -18	-10 -22	-10 -28	-4 -9	-4 -12	0 -5	0 -8	0 -12	0 -18	0 -30	±2.5	±4	±6	+6 +1	+9 +1	+9 +4	+12 +4	+16 +8	+20 +12	+23 +15	+27 +19	—	+31 +23	+36 +28
6	10	-150 -186	-80 -116	-40 -62	-40 -76	-25 -40	-25 -47	-25 -61	-13 -22	-13 -28	-13 -35	-5 -11	-5 -14	0 -6	0 -9	0 -15	0 -22	0 -36	±3	±4.5	±7.5	+7 +1	+10 +1	+12 +6	+15 +6	+19 +10	+24 +15	+28 +19	+32 +23	—	+37 +28	+43 +34
10	14	-150 -193	-95 -138	-50 -77	-50 -93	-32 -50	-32 -59	-32 -75	-16 -27	-16 -34	-16 -43	-6 -14	-6 -17	0 -8	0 -11	0 -18	0 -27	0 -43	±4	±5.5	±9	+9 +1	+12 +1	+15 +7	+18 +7	+23 +12	+29 +18	+34 +23	+39 +28	—	+44 +33	+40 +35
14	18	-150 -212	-95 -162	-50 -98	-50 -117	-32 -61	-32 -73	-32 -92	-16 -33	-16 -41	-16 -53	-6 -16	-6 -20	0 -9	0 -13	0 -21	0 -33	0 -52	±4.5	±6.5	±10.5	+11 +2	+15 +2	+17 +8	+21 +8	+28 +15	+35 +22	+41 +28	+48 +35	—	+54 +41	+67 +48
18	24	-160 -212	-110 -162	-65 -98	-65 -117	-40 -61	-40 -73	-40 -92	-20 -33	-20 -41	-20 -53	-7 -16	-7 -20	0 -9	0 -13	0 -21	0 -33	0 -52	±4.5	±6.5	±10.5	+11 +2	+15 +2	+17 +8	+21 +8	+28 +15	+35 +22	+41 +28	+48 +35	—	+54 +41	+67 +48
24	30	-170 -232	-120 -182	-80 -119	-80 -142	-50 -75	-50 -89	-50 -112	-25 -41	-25 -50	-25 -64	-9 -20	-9 -25	0 -11	0 -16	0 -25	0 -39	0 -62	±5.5	±8	±12.5	+13 +2	+18 +2	+20 +9	+25 +9	+33 +17	+42 +26	+50 +34	+59 +43	—	+64 +54	+76 +60
30	40	-180 -242	-130 -192	-90 -129	-90 -152	-60 -85	-60 -108	-60 -134	-30 -49	-30 -60	-30 -76	-10 -23	-10 -29	0 -13	0 -19	0 -30	0 -46	0 -74	±6.5	±9.5	±15	+15 +2	+21 +2	+24 +11	+30 +11	+39 +20	+51 +32	+62 +43	+78 +59	+94 +75	+121 +102	—
40	50	-190 -264	-140 -214	-100 -149	-100 -174	-60 -90	-60 -106	-60 -134	-30 -49	-30 -60	-30 -76	-10 -23	-10 -29	0 -13	0 -19	0 -30	0 -46	0 -74	±6.5	±9.5	±15	+15 +2	+21 +2	+24 +11	+30 +11	+39 +20	+51 +32	+62 +43	+78 +59	+94 +75	+121 +102	—
50	65	-200 -274	-150 -224	-110 -159	-110 -184	-70 -105	-70 -126	-70 -159	-35 -58	-35 -71	-35 -90	-12 -27	-12 -34	0 -15	0 -22	0 -35	0 -54	0 -87	±7.5	±11	±17.5	+18 +3	+25 +3	+28 +13	+35 +13	+45 +23	+59 +37	+73 +51	+93 +71	+113 +91	+146 +124	—
65	80	-220 -307	-170 -257	-120 -174	-120 -207	-72 -107	-72 -126	-72 -159	-36 -58	-36 -71	-36 -90	-12 -27	-12 -34	0 -15	0 -22	0 -35	0 -54	0 -87	±7.5	±11	±17.5	+18 +3	+25 +3	+28 +13	+35 +13	+45 +23	+59 +37	+73 +51	+93 +71	+113 +91	+146 +124	—
80	100	-240 -327	-180 -267	-140 -207	-140 -240	-80 -117	-80 -142	-80 -174	-40 -61	-40 -73	-40 -92	-14 -33	-14 -41	0 -16	0 -25	0 -39	0 -62	0 -100	±9	±12.5	±20	+21 +3	+28 +3	+33 +15	+40 +15	+52 +27	+68 +43	+90 +65	+125 +100	+159 +134	—	—
100	120	-260 -360	-200 -300	-160 -240	-160 -240	-90 -135	-90 -165	-90 -210	-45 -68	-45 -83	-45 -106	-14 -33	-14 -41	0 -18	0 -25	0 -40	0 -63	0 -100	±9	±12.5	±20	+21 +3	+28 +3	+33 +15	+40 +15	+52 +27	+68 +43	+90 +65	+125 +100	+159 +134	—	—
120	140	-280 -380	-210 -310	-145 -208	-145 -245	-85 -125	-85 -148	-85 -185	-43 -68	-43 -83	-43 -106	-14 -33	-14 -41	0 -18	0 -25	0 -40	0 -63	0 -100	±9	±12.5	±20	+21 +3	+28 +3	+33 +15	+40 +15	+52 +27	+68 +43	+90 +65	+125 +100	+159 +134	—	—
140	160	-310 -410	-230 -330	-170 -270	-170 -270	-100 -140	-100 -160	-100 -210	-50 -79	-50 -96	-50 -122	-15 -35	-15 -44	0 -20	0 -29	0 -46	0 -72	0 -115	±10	±14.5	±23	+24 +4	+33 +4	+37 +17	+46 +17	+60 +31	+79 +50	+109 +80	+159 +130	—	—	
160	180	-340 -455	-240 -355	-180 -280	-180 -280	-110 -165	-110 -172	-110 -215	-50 -79	-50 -96	-50 -122	-15 -35	-15 -44	0 -20	0 -29	0 -46	0 -72	0 -115	±10	±14.5	±23	+24 +4	+33 +4	+37 +17	+46 +17	+60 +31	+79 +50	+109 +80	+159 +130	—	—	
180	200	-380 -495	-260 -375	-190 -295	-190 -295	-110 -165	-110 -172	-110 -215	-50 -79	-50 -96	-50 -122	-15 -35	-15 -44	0 -20	0 -29	0 -46	0 -72	0 -115	±10	±14.5	±23	+24 +4	+33 +4	+37 +17	+46 +17	+60 +31	+79 +50	+109 +80	+159 +130	—	—	
200	225	-420 -535	-280 -395	-210 -315	-210 -315	-125 -180	-125 -192	-125 -235	-62 -98	-62 -119	-62 -151	-18 -43	-18 -54	0 -25	0 -36	0 -57	0 -89	0 -140	±12.5	±18	±28.5	+29 +4	+40 +4	+46 +21	+57 +21	+73 +37	+98 +62	+144 +108	+198 +150	+252 +198	—	—
225	250	-480 -610	-300 -430	-230 -360	-230 -360	-135 -202	-135 -214	-135 -265	-68 -108	-68 -131	-68 -165	-20 -47	-20 -60	0 -27	0 -40	0 -63	0 -97	0 -155	±13.5	±20	±31.5	+32 +5	+45 +5	+50 +23	+63 +23	+80 +40	+108 +68	+166 +126	+222 +172	+276 +232	—	—
250	280	-540 -670	-330 -460	-250 -380	-250 -380	-150 -225	-150 -240	-150 -300	-75 -120	-75 -135	-75 -180	-25 -60	-25 -75	0 -30	0 -45	0 -70	0 -105	0 -165	±15	±22.5	±36	+36 +4	+48 +20	+54 +20	+66 +20	+84 +34	+108 +66	+156 +108	+216 +156	+276 +216	—	—
280	315	-600 -740	-360 -500	-270 -405	-270 -405	-165 -247	-165 -264	-165 -324	-82 -126	-82 -141	-82 -186	-25 -60	-25 -75	0 -30	0 -45	0 -70	0 -105	0 -165	±15	±22.5	±36	+36 +4	+48 +20	+54 +20	+66 +20	+84 +34	+108 +66	+156 +108	+216 +156	+276 +216	—	—
315	355	-680 -820	-400 -540	-300 -435	-300 -435	-180 -270	-180 -288	-180 -354	-90 -135	-90 -153	-90 -204	-30 -75	-30 -90	0 -36	0 -54	0 -81	0 -121	0 -181	±18	±27	±42	+42 +4	+54 +21	+60 +21	+72 +21	+96 +37	+120 +82	+168 +114	+228 +168	+288 +228	—	—
355	400	-760 -915	-440 -595	-330 -465	-330 -465	-200 -292	-200 -312	-200 -384	-100 -150	-100 -165	-100 -216	-30 -75	-30 -90	0 -36	0 -54	0 -81	0 -121	0 -181	±18	±27	±42	+42 +4	+54 +21	+60 +21	+72 +21	+96 +37	+120 +82	+168 +114	+228 +168	+288 +228	—	—
400	450	-840 -995	-480 -635	-360 -510	-360 -510	-210 -306	-210 -324	-210 -396	-105 -157	-105 -183	-105 -240	-30 -75	-30 -90	0 -36	0 -54	0 -81	0 -121	0 -181	±18	±27	±42	+42 +4	+54 +21	+60 +21	+72 +21	+96 +37	+120 +82	+168 +114	+228 +168	+288 +228	—	—
450	500	-915 -1065	-540 -695	-400 -550	-400 -550	-230 -330	-230 -354	-230 -426	-115 -171	-115 -207	-115 -270	-30 -75	-30 -90	0 -36	0 -54	0 -81	0 -121	0 -181	±18	±27	±42	+42 +4	+54 +21	+60 +21	+72 +21	+96 +37	+120 +82	+168 +114	+228 +168	+288 +228	—	—

Technical Guidance - Tolerance Chart

■ Dimensional Tolerance of Standard Fittings [Excerpt from JIS B 0401 (1999)]

● Dimensional Tolerance Used for Holes of Standard Fittings

Classification of Reference Dimensions (mm)	Hole Tolerance Class																											Unit: μm										
	or greater	B10	C9	C10	D8	D9	D10	E7	E8	E9	F6	F7	F8	G6	G7	H6	H7	H8	H9	H10	JS6	JS7	K6	K7	M6	M7	N6	N7	P6	P7	R7	S7	T7	U7	X7			
—	3	+180 +140	+85 +60	+100 +60	+34 +20	+45 +20	+60 +20	+24 +14	+28 +14	+39 +14	+12 +6	+16 +6	+20 +6	+8 +2	+12 +2	+6 0	+10 0	+14 0	+25 0	+40 0	± 3	± 5	0 -6	0 -10	-2 -8	-2 -12	-4 -10	-4 -14	-6 -12	-6 -16	-10 -20	-14 -24	—	—	-18 -28	-20 -30		
3	6	+188 +140	+100 +70	+118 +70	+48 +30	+60 +30	+78 +30	+32 +20	+38 +20	+50 +20	+18 +10	+22 +10	+28 +10	+12 +4	+16 +4	+8 0	+12 0	+16 0	+30 0	+48 0	± 4	± 6	+2 -6	+3 -9	-1 -9	0 -12	-5 -13	-4 -16	-9 -17	-8 -20	-11 -23	-15 -27	—	—	-19 -31	-24 -36		
6	10	+208 +150	+116 +80	+138 +80	+62 +40	+76 +40	+98 +40	+40 +25	+47 +25	+61 +25	+22 +13	+28 +13	+35 +13	+14 +5	+20 +5	+9 0	+15 0	+22 0	+36 0	+58 0	± 4.5	± 7.5	+2 -7	+5 -10	-3 -12	0 -15	-7 -16	-4 -19	-12 -21	-9 -24	-13 -28	-17 -32	—	—	-22 -37	-28 -43		
10	14	+220 +150	+138 +95	+165 +95	+77 +50	+93 +50	+120 +50	+50 +32	+59 +32	+75 +32	+27 +16	+34 +16	+43 +16	+17 +6	+24 +6	+11 0	+18 0	+27 0	+43 0	+70 0	± 5.5	± 9	+2 -9	+6 -12	-4 -15	0 -18	-9 -20	-5 -23	-15 -26	-11 -29	-16 -34	-21 -39	—	—	-26 -44	-33 -56		
14	18																																				-33 -54	-46 -67
18	24	+244 +160	+162 +110	+194 +110	+98 +65	+117 +65	+149 +65	+61 +40	+73 +40	+92 +40	+33 +20	+41 +20	+53 +20	+20 +7	+28 +7	+13 0	+21 0	+33 0	+52 0	+84 0	± 6.5	± 10.5	+2 -11	+6 -15	-4 -17	0 -21	-11 -24	-7 -28	-18 -31	-14 -35	-20 -41	-27 -48	—	—	-33 -54	-46 -67		
24	30																																				-33 -54	-46 -67
30	40	+270 +170	+182 +120	+220 +120	+119 +80	+142 +80	+180 +80	+75 +50	+89 +50	+112 +50	+41 +25	+50 +25	+64 +25	+25 +9	+34 +9	+16 0	+25 0	+39 0	+62 0	+100 0	± 8	± 12.5	+3 -13	+7 -18	-4 -20	0 -25	-12 -28	-8 -33	-21 -37	-17 -42	-25 -50	-34 -59	—	—	-39 -64	-51 -76		
40	50																																				-39 -64	-51 -76
50	65	+310 +190	+214 +140	+260 +140	+146 +100	+174 +100	+220 +100	+90 +60	+106 +60	+134 +60	+49 +30	+60 +30	+76 +30	+29 +10	+40 +10	+19 0	+30 0	+46 0	+74 0	+120 0	± 9.5	± 15	+4 -15	+9 -21	-5 -24	0 -30	-14 -33	-9 -39	-26 -45	-21 -51	-30 -60	-42 -72	-55 -85	-76 -106	—	—		
65	80																																				-30 -60	-42 -72
80	100	+360 +220	+257 +170	+310 +170	+174 +120	+207 +120	+260 +120	+107 +72	+126 +72	+159 +72	+58 +36	+71 +36	+90 +36	+34 +12	+47 +12	+22 0	+35 0	+54 0	+87 0	+140 0	± 11	± 17.5	+4 -18	+10 -25	-6 -28	0 -35	-16 -38	-10 -45	-30 -52	-24 -59	-38 -73	-58 -93	-78 -113	-111 -146	—	—		
100	120																																				-38 -73	-58 -93
120	140	+420 +260	+300 +200	+360 +200																																	-48 -88	-77 -117
140	160																																				-48 -88	-77 -117
160	180	+440 +280	+310 +210	+370 +210	+208 +145	+245 +145	+305 +145	+125 +85	+148 +85	+185 +85	+68 +43	+83 +43	+106 +43	+39 +14	+54 +14	+25 0	+40 0	+63 0	+100 0	+160 0	± 12.5	± 20	+4 -21	+12 -28	-8 -33	0 -40	-20 -45	-12 -52	-36 -61	-28 -68	-50 -90	-85 -125	-119 -159	—	—			
180	200																																				-53 -93	-93 -131
200	225	+525 +340	+355 +240	+425 +240																																	-60 -106	-105 -151
225	250																																				-60 -106	-105 -151
250	280	+565 +380	+375 +260	+445 +260	+242 +170	+285 +170	+355 +170	+148 +100	+172 +100	+215 +100	+79 +50	+96 +50	+122 +50	+44 +15	+61 +15	+29 0	+46 0	+72 0	+115 0	+185 0	± 14.5	± 23	+5 -24	+13 -33	-8 -37	0 -46	-22 -51	-14 -60	-41 -70	-33 -79	-63 -109	-113 -159	—	—	-67 -113	-123 -169		
280	315																																				-74 -126	-126 -172
315	355	+690 +480	+430 +300	+510 +300	+271 +190	+320 +190	+400 +190	+162 +110	+191 +110	+240 +110	+88 +56	+108 +56	+137 +56	+49 +17	+69 +17	+32 0	+52 0	+81 0	+130 0	+210 0	± 16	± 26	+5 -27	+16 -36	-9 -41	0 -52	-25 -57	-14 -66	-47 -79	-36 -88	-78 -130	—	—	-74 -126	-126 -172			
355	400																																				-87 -144	-144 -190
400	450	+830 +600	+500 +360	+590 +360	+299 +210	+350 +210	+440 +210	+182 +125	+214 +125	+265 +125	+98 +62	+119 +62	+151 +62	+54 +18	+75 +18	+36 0	+57 0	+89 0	+140 0	+230 0	± 18	± 28.5	+7 -29	+17 -40	-10 -46	0 -57	-26 -62	-16 -73	-51 -87	-41 -98	-87 -144	-144 -190	—	—	-87 -144	-144 -190		
450	500																																				-103 -166	-166 -222

■ Dimensional Tolerance and Fittings [Excerpt from JIS B 0401 (1999)]

● Standard Fittings for Holes

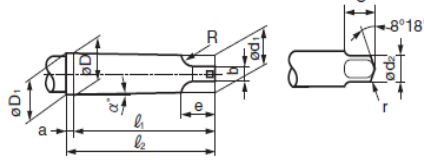
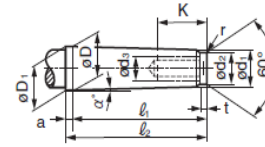
Reference Hole	Shaft Tolerance Class														
	Gap fitting					Intermediate fitting			Tight fitting						
H6					g5	h5	js5	k5	m5						
					f6	g6	h6	js6	k6	m6	n6*	p6*			
H7					f6	g6	h6	js6	k6	m6	n6	p6*	r6*	s6	t6
				e7	f7		h7	js7							
H8					f7		h7								
				e8	f8		h8								
			d9	e9											
H9			d8	e8			h8								
		c9	d9	e9			h9								
H10	b9	c9	d9												

Note: *Exceptions may arise with these fittings depending on the dimension category.

● Standard Fittings for Shafts

Reference Shaft	Hole Tolerance Class														
	Gap fitting					Intermediate fitting			Tight fitting						
h5						H6	JS6	K6	M6	N6*	P6				
h6					F6	G6	H6	JS6	K6	M6	N6	P6*			
					F7	G7	H7	JS7	K7	M7	N7	P7*	R7	S7	T7
h7				E7	F7		H7								
					F8		H8								
h8			D8	E8	F8		H8								
			D9	E9			H9								
h9			D8	E8			H8								
		C9	D9	E9			H9								
	B10	C10	D10												

Note: *Exceptions may arise with these fittings depending on the dimension category.

Technical Guidance -Standard Taper
Standard of Tapers
Morse Taper
Fig 1 With Tang

Fig 2 Drawing Thread Type


(Unit: mm)

Morse Taper Number	Taper ⁽¹⁾		Taper Angle (α)	Taper								Tang						Fig
				D	a	D ₁ ⁽²⁾ (approx.)	d ₁ ⁽²⁾ (approx.)	ℓ ₁ (Max)	ℓ ₂ (Max)	d ₂ (Max)	b	C (Max)	e (Max)	R	r			
0	$\frac{1}{19.212}$	0.05205	1°29'27"	9.045	3	9.2	6.1	56.5	59.5	6.0	3.9	6.5	10.5	4	1	1		
1	$\frac{1}{20.047}$	0.04988	1°25'43"	12.065	3.5	12.2	9.0	62.0	65.5	8.7	5.2	8.5	13.5	5	1.2			
2	$\frac{1}{20.020}$	0.04995	1°25'50"	17.780	5	18.0	14.0	75.0	80.0	13.5	6.3	10	16	6	1.6			
3	$\frac{1}{19.922}$	0.05020	1°26'16"	23.825	5	24.1	19.1	94.0	99.0	18.5	7.9	13	20	7	2			
4	$\frac{1}{19.245}$	0.05194	1°29'15"	31.267	6.5	31.6	25.2	117.5	124.0	24.5	11.9	16	24	8	2.5			
5	$\frac{1}{19.002}$	0.05263	1°30'26"	44.399	6.5	44.7	36.5	149.5	156.0	35.7	15.9	19	29	10	3			
6	$\frac{1}{19.180}$	0.05214	1°29'36"	63.348	8	63.8	52.4	210.0	218.0	51.0	19.0	27	40	13	4			
7	$\frac{1}{19.231}$	0.05200	1°29'22"	83.058	10	83.6	68.2	286.0	296.0	66.8	28.6	35	54	19	5			

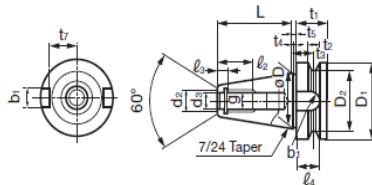
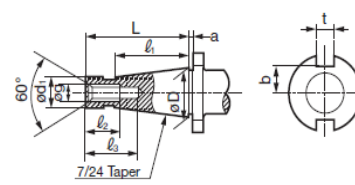
Morse Taper Number	Taper ⁽¹⁾		Taper Angle (α)	Taper						Screw Part					Fig
				D	a	D ₁ ⁽²⁾ (approx.)	d ₁ ⁽²⁾ (approx.)	ℓ ₁ (Max)	ℓ ₂ (Max)	d ₂ (Max)	d ₃	K (Min)	t (Max)	r	
0	$\frac{1}{19.212}$	0.05205	1°29'27"	9.045	3	9.2	6.4	50	53	6	—	—	4	0.2	2
1	$\frac{1}{20.047}$	0.04988	1°25'43"	12.065	3.5	12.2	9.4	53.5	57	9	M 6	16	5	0.2	
2	$\frac{1}{20.020}$	0.04995	1°25'50"	17.780	5	18.0	14.6	64	69	14	M10	24	5	0.2	
3	$\frac{1}{19.922}$	0.05020	1°26'16"	23.825	5	24.1	19.8	81	86	19	M12	28	7	0.6	
4	$\frac{1}{19.254}$	0.05194	1°29'15"	31.267	6.5	31.6	25.9	102.5	109	25	M16	32	9	1	
5	$\frac{1}{19.002}$	0.05263	1°30'26"	44.399	6.5	44.7	37.6	129.5	136	35.7	M20	40	9	2.5	
6	$\frac{1}{19.180}$	0.05214	1°29'36"	63.348	8	63.8	53.9	182	190	51	M24	50	12	4	
7	$\frac{1}{19.231}$	0.05200	1°29'22"	83.058	10	83.6	70.0	250	260	65	M33	80	18.5	5	

Note (1) The fractional values are the taper standards.

 (2) Diameters D₁ and d₁ are calculated from the diameter D value, the taper, a, and l₁, and rounded up to one decimal place.

Remark 1. Tapers are measured using JIS B 3301 ring gauges. At least 75% must be correct.

2. Screws must have metric coarse screw thread as per JIS B 0205 and Class 3 precision as per JIS B 0209.

Bottle Grip Taper
American Standard Taper (National Taper)
Fig 3

Fig 4

Bottle Grip Taper

(Units: mm)

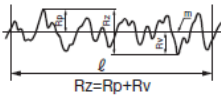
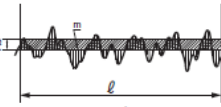
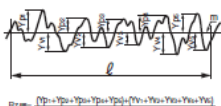
Taper No.	D (Standard Dimensions)	D ₁	D ₂	t ₁	t ₂	t ₃	t ₄	t ₅	d ₂	d ₃	L	l ₂	l ₃	l ₄	g	b ₁	t ₇	Fig
BT30	31.75	46	38	20	8	13.6	2	2	14	12.5	48.4	24	7	17	M12	16.1	16.3	3
BT35	38.10	53	43	22	10	14.6	2	2	14	12.5	56.4	24	7	20	M12	16.1	19.6	
BT40	44.45	63	53	25	10	16.6	2	2	19	17	65.4	30	8	21	M16	16.1	22.6	
BT45	57.15	85	73	30	12	21.2	3	3	23	21	82.8	36	9	26	M20	19.3	29.1	
BT50	69.85	100	85	35	15	23.2	3	3	27	25	101.8	45	11	31	M24	25.7	35.4	
BT60	107.95	155	135	45	20	28.2	3	3	33	31	161.8	56	12	34	M30	25.7	60.1	

American Standard Taper (National Taper)

(Units: mm)

Taper No.	Nominal Size	D	d ₁	L	l ₁ (Min)	l ₂ (Min)	l ₃ (Min)	g	a	t	b	Fig
30	1 1/4"	31.750	17.4	68.4	48.4	24	34	1/2"	1.6	15.9	16	4
40	1 3/4"	44.450	25.3	93.4	65.4	32	43	5/8"	1.6	15.9	22.5	
50	2 3/4"	69.850	39.6	126.8	101.8	47	62	1"	3.2	25.4	35	
60	4 1/4"	107.950	60.2	206.8	161.8	59	76	1 1/4"	3.2	25.4	60	

Technical Guidance -Surface Roughness
■ Surface Roughness
● Types and Definitions of Typical Surface Roughness

Type	Symbol	Method of Determination	Descriptive Figure
R Max.	⁽¹⁾ Rz	This value is found by extracting the reference length in the mean line direction from the surface roughness curve, measuring the intervals between the peaks and valleys in the extracted area in the longitudinal magnification direction of the surface roughness curve, and expressing this value in micrometres (µm). Remarks: When finding Rz, any areas deemed to be scratches are removed before extracting the reference length from an area with no high peaks or low valleys.	 $Rz = R_p + R_v$
Calculated Roughness	Ra	This value is found by extracting the reference length in the mean line direction from the roughness curve, taking the average line direction of the extracted area as the X-axis and the longitudinal magnification direction as the Y-axis and expressing the value found by the equation below in micrometres (µm) with the roughness curve expressed by $y=f(x)$.	 $Ra = \frac{1}{l} \int_0^l f(x) dx$
10-point Average Roughness	⁽²⁾ Rz JIS	This value is found by extracting the reference length in the mean line direction from the roughness curve, finding the sum of the mean absolute peak height taken from the five highest peaks (Yp) and the mean absolute valley height taken from the five lowest valleys (Yv) measured in the longitudinal magnification direction from the mean line direction of the extracted area and expressing this value in micrometres (µm).	 $Rz_{JIS} = \frac{(Y_{p1} + Y_{p2} + Y_{p3} + Y_{p4} + Y_{p5}) + (Y_{v1} + Y_{v2} + Y_{v3} + Y_{v4} + Y_{v5})}{5}$

Designated values for the above types of maximum height (Rz)⁽¹⁾, 10-point average roughness (Rz JIS)⁽²⁾, calculated average roughness (Ra) classifications, and reference length l are shown on the table at right with triangular symbols.

⁽¹⁾The maximum height symbol (Rz) is calculated according to the new JIS B 0601:2001 standard. (This value was Ry under the old standard.)

⁽²⁾The 10-point average roughness (Rz JIS) is calculated according to the new JIS B 0601:2001 standard. (This value was Rz under the old standard.)

● Relationship with triangular symbol display

Designated values for maximum height ⁽¹⁾ (Rz)	Designated values for calculated average roughness (Ra)	Designated values for 10-point average roughness ⁽²⁾ (Rz JIS)	Standard reference l length value (mm)	Triangular * Symbols
(0.05) 0.1 0.2 0.4	(0.012) 0.025 0.05 0.10	(0.05) 0.1 0.2 0.4	0.25	
0.8	0.20	0.8		
1.6 3.2 6.3	0.40 0.80 1.6	1.6 3.2 6.3	0.8	
12.5 (18) 25	3.2 6.3	12.5 (18) 25	2.5	
(35) 50 (70) 100	12.5 25	(35) 50 (70) 100	8	
(140) 200 (280) 400 (560)	(50) (100)	(140) 200 (280) 400 (560)	—	—

Remarks: The designated values in () do not apply unless otherwise stated.

* Finish symbols (triangular symbol (▽) and tilde (~)) were removed from JIS in the 1994 revision.

Overseas Customers



Corporate Sales Office
Plot No. 113/7 'S' Block,
MIDC Bhosari, Pune-411026 (MAH.)

India
Contact : + 919168889992

Northern Region
New Delhi
Contact : + 919168640096

Southern Region
Bangalore
Contact : + 919158050500

West Region
Gujarat
Contact: +918888157434

* Factory • Sales Office ■ Dealers



Solapur Plant
Rudrali Hi Tech Tools Pvt. Ltd.
E-94, M.I.D.C., Akkalkot Road,
Solapur-413006(MAH.) India.
Tel : +91-217-2651709
Mob : +918380084299

Pune Plant
Rudrali Hi Tech Tools Pvt. Ltd.
Plot No. 113/7 'S' Block, MIDC Bhosari
Pune - 411026 (MAH.) India.
Tel : +91-20-27128590
Mob : + 918888807065

Email : info@rudrali.com www.rudralihitechtools.com