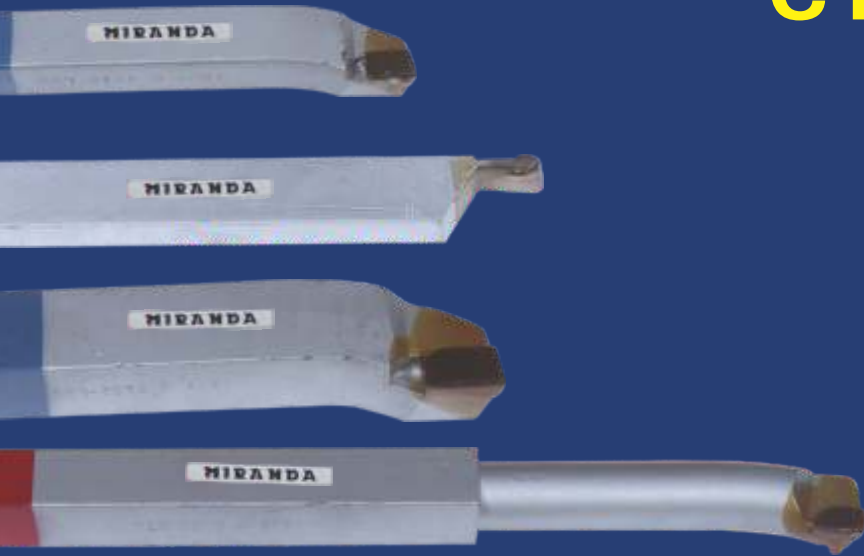


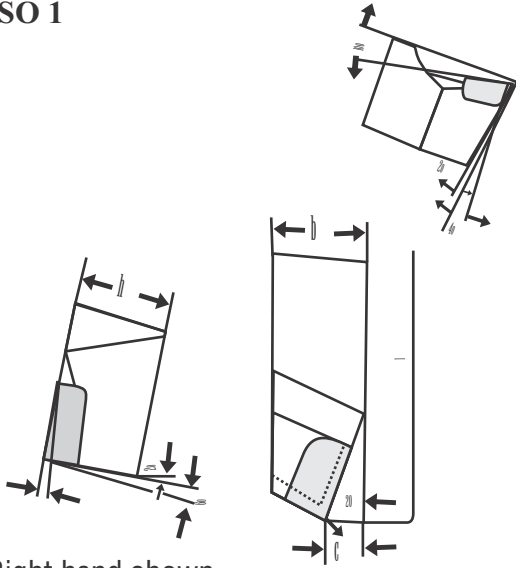


Tungsten Carbide Tipped Tools CTT




110 Bar Turning Tool

ISO 1

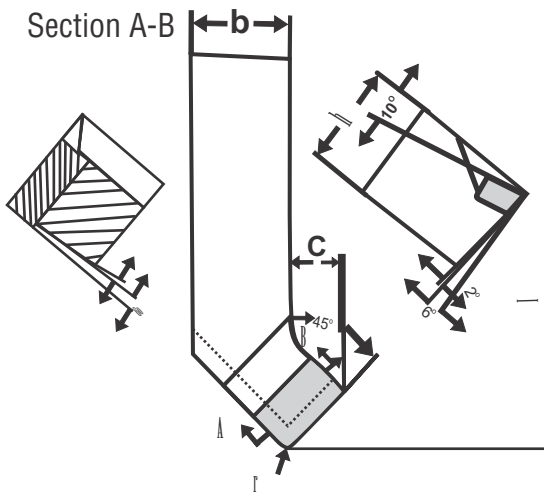


Right hand shown


Shank Section	Tool No.	h mm	b mm	c mm	i mm	Tip	
						RH	LH
	110-1010	10	10	4	90	A 8	B 8
	110-1212	12	12	5	100	A 10	B 10
	110-1616	16	16	6	110	A 12	B 12
	110-2020	20	20	8	125	A 16	B 16
	110-2525	25	25	10	140	A 20	B 20
	110-3232	32	32	12	170	A 25	B 25
	110-4040	40	40	16	200	A 32	B 32
110-1610	16	10	4	110	A 10	B 10	
110-2012	20	12	5	125	A 12	B 12	
110-2516	25	16	6	140	A 16	B 16	
110-3220	32	20	8	170	A 20	B 20	
110-4025	40	25	10	200	A 25	B 25	

ISO 2

111 CRANKED TURNING AND FACING TOOL

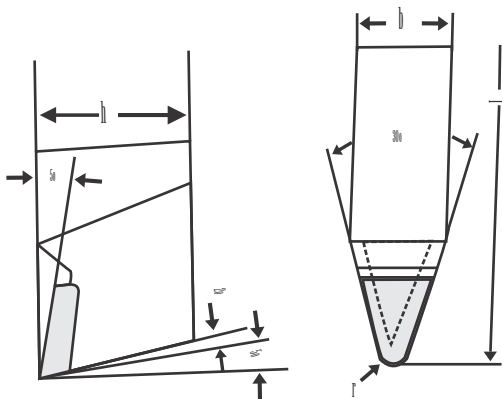



Right hand shown

Shank Section	Tool No.	h mm	b mm	l mm	C mm	Tip
	111-1010	10	10	90	6	C 8
	111-1212	12	12	100	7	C 10
	111-1616	16	16	110	8	C 12
	111-2020	20	20	125	10	C 16
	111-2525	25	25	140	12	C 20
	111-3232	32	32	170	14	C 25
	111-4040	40	40	200	18	C 32
111-1610	16	10	110	7	C 10	
111-2012	20	12	125	8	C 12	
111-2516	25	16	140	10	C 16	
111-3220	32	20	170	12	C 20	
111-4025	40	25	200	14	C 25	

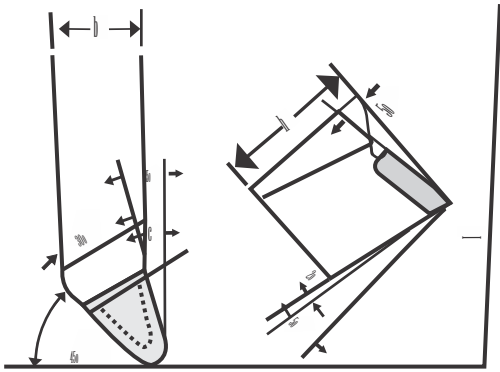
ISO 3

113 Straight Round Nose Turning Tool



Shank Section	Tool No.	h mm	b mm	l mm	r mm	Tip
	113-1010	10	10	90	1.0	G 8
	113-1212	12	12	100	1.5	G 10
	113-1616	16	16	110	2.5	G 12
	113-2020	20	20	125	3.5	G 16
	113-2525	25	25	140	4.5	G 20
	113-3232	32	32	170	6.0	G 25
110-1610	16	10	110	1.0	G 8	
110-2012	20	12	125	1.5	G 10	
110-2516	25	16	140	2.5	G 12	
110-3220	32	20	170	3.5	G 16	
110-4025	40	25	200	4.5	G 20	

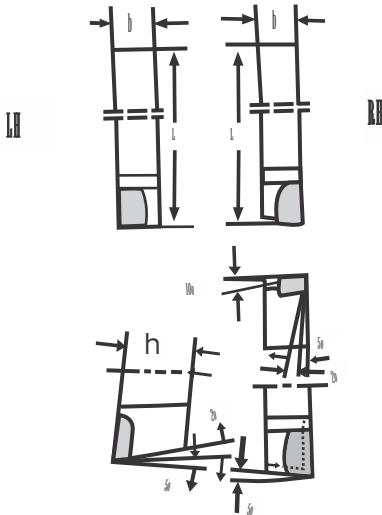
115 Cranked Round Nose Turning Tool



Right hand shown

Shank Section	Tool No.	h mm	b mm	l mm	c mm	r mm	Tip
	115-1010	10	10	90	3.0	1.0	G 8
	115-1212	12	12	100	3.5	1.5	G 10
	115-1616	16	16	110	4.5	2.5	G 12
	115-2020	20	20	125	5.0	3.5	G 16
	115-2525	25	25	140	5.5	4.5	G 20
	115-3232	32	32	170	6.5	6.0	G 25
	115-1610	16	10	110	3.0	A 10	G 8
	115-2012	20	12	125	3.5	A 12	G 10
	115-2516	25	16	140	4.5	A 16	G 12
	115-3220	32	20	170	5.0	A 20	G 16
	115-4025	40	25	200	5.5	A 25	G 20

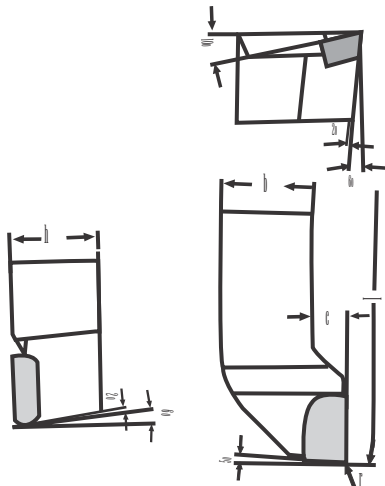
116 BAR TURNING TOOL



Shank Section	Tool No.	h mm	b mm	l mm	Tip	
					RH	LH
	116-1010	10	10	90	A 8	B 8
	116-1212	12	12	100	A 10	B 10
	116-1616	16	16	110	A 12	B 12
	116-2020	20	20	125	A 16	B 16
	116-2525	25	25	140	A 20	B 20
	116-3232	32	32	170	A 25	B 25
	110-1610	16	10	110	A 10	B 10
	110-2012	20	12	125	A 12	B 12
	110-2516	25	16	140	A 16	B 16
	110-3220	32	20	170	A 20	B 20
	110-4025	40	25	200	A 25	B 25

117 CRANKED KNIFE TOOL

ISO 6

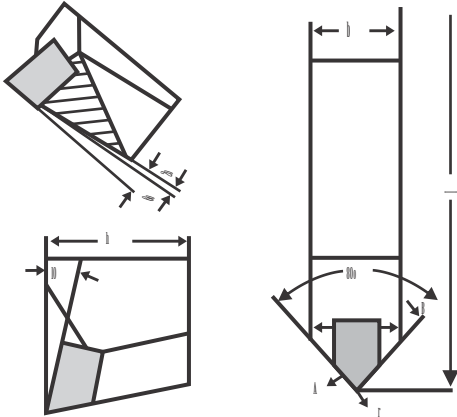


Shank Section	Tool No.	h mm	b mm	l mm	C mm	Tip	
						RH	LH
	117-1010	10	10	90	4	A 8	B 8
	117-1212	12	12	100	5	A 10	B 10
	117-1616	16	16	110	6	A 12	B 12
	117-2020	20	20	125	8	A 16	B 16
	117-2525	25	25	140	10	A 20	B 20
	117-3232	32	32	170	12	A 25	B 25
	117-4040	40	40	200	14	A 32	B 32
	110-1610	16	10	110	5	A 10	B 10
	110-2012	20	12	125	6	A 12	B 12
	110-2516	25	16	140	8	A 16	B 16
	110-3220	32	20	170	10	A 20	B 20
110-4025	40	25	200	12	A 25	B 25	

Right hand shown

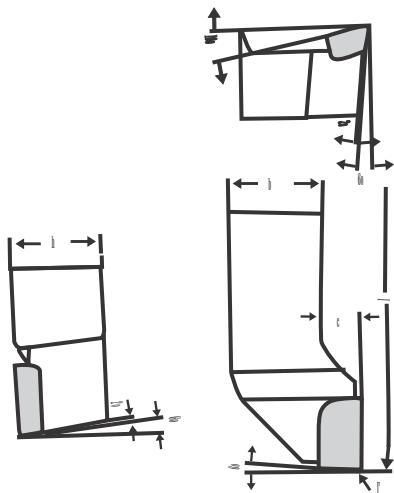
122 STRAIGHT FINISHING TOOL

IND 1 Section A-B



Shank Section	Tool No.	h mm	b mm	l mm	Tip
	IND-1-1010	10	10	90	E 5
	IND-1-1212	12	12	100	E 6
	IND-1-1616	16	16	110	E 8
	IND-1-2020	20	20	125	E 10
	IND-1-2525	25	25	140	E 12
	IND-1-3232	32	32	170	E 16
	IND-1-1610	16	10	110	E 5
	IND-1-2012	20	12	125	E 6
	IND-1-2516	25	16	140	E 8
	IND-1-3220	32	20	170	E 10
	IND-1-4025	40	25	200	E 12

ISO 3

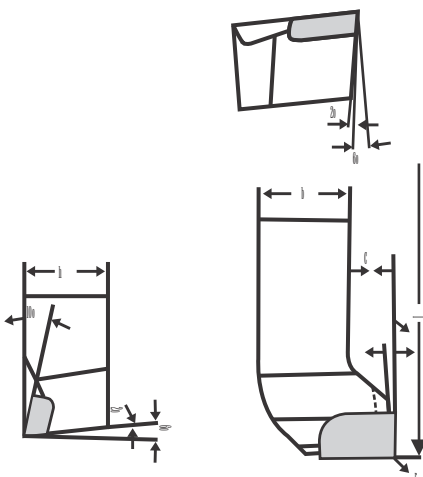


123 CRANKED FINISHING TOOL

Shank Section	Tool No.	h mm	b mm	c mm	l mm	Tip	
						RH	LH
	123-1010	10	10	4	90	A 08	B 08
	123-1212	12	12	6	100	A 10	B 10
	123-1616	16	16	8	110	A 12	B 12
	123-2020	20	20	10	125	A 16	B 16
	123-2525	25	25	12	140	A 20	B 20
	123-3232	32	32	14	170	A 25	B 25
	123-1610	16	10	5	110	A 10	B 10
	123-2012	20	12	6	125	A 12	B 12
	123-2516	25	16	8	140	A 16	B 16
	123-3220	32	20	10	170	A 20	B 20
	123-4025	40	25	12	200	A 25	B 25

Right hand shown

ISO 5



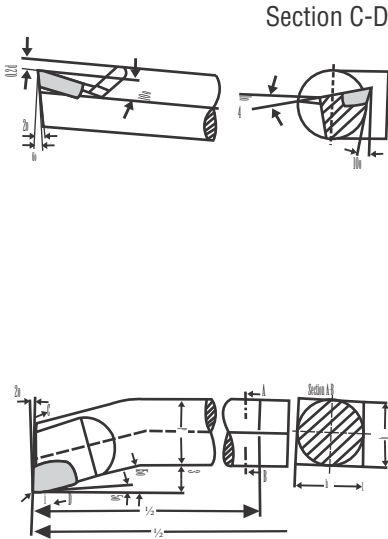
126 CRANKED FACING TOOL

Shank Section	Tool No.	h mm	b mm	l mm	C mm	Tip	
						RH	LH
	126-1010	10	10	90	5	B 8	A 8
	126-1212	12	12	100	6	B 10	A 10
	126-1616	16	16	110	8	B 12	A 12
	126-2020	20	20	125	10	B 16	A 16
	126-2525	25	25	140	12	B 20	A 20
	126-3232	32	32	170	16	B 25	A 25
	126-1610	16	10	110	6	B 10	A 10
	126-2012	20	12	125	8	B 12	A 12
	126-2516	25	16	140	10	B 16	A 16
	126-3220	32	20	170	12	B 20	A 20
	126-4025	40	25	200	16	B 25	A 25

Right hand shown

135 - 136 BORING AND FACING TOOL

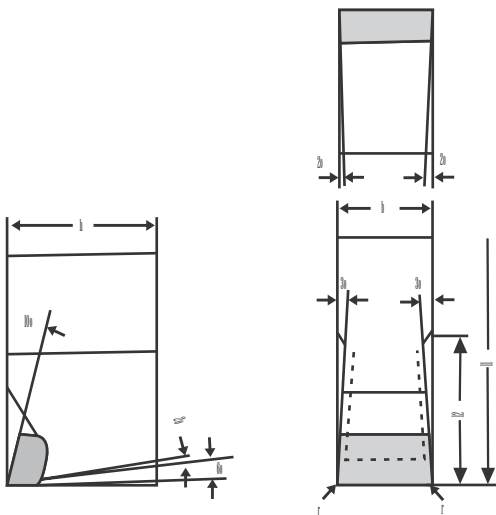
ISO - 9



Shank Section	Tool No.	h mm	b mm	d mm	c mm	l1 mm	l2 mm	Smallest bore size mm	Tip
	135-0808	8	8	8	3	125	40	1A	A 5
	135-1010	10	10	10	4	150	50	18	A 6
	135-1212	12	12	12	5	180	63	21	A 8
	135-1616	16	16	16	6	210	80	27	A 10
	135-2020	20	20	20	8	250	100	34	A 12
	135-2525	25	25	25	10	300	125	43	A 16
	135-3232	32	32	32	12	355	160	52	A 20
							h1		
	136-8	-	-	8	3	125	7.5	14	A 5
	136-10	-	-	10	4	150	9.5	18	A 6
	136-12	-	-	12	5	180	11.5	21	A 8
	136-16	-	-	16	6	210	13.5	27	A 10
	136-20	-	-	20	8	250	19.5	34	A 12
136-25	-	-	25	10	300	24.5	43	A 16	
136-32	-	-	32	12	355	31.5	52	A 20	

ISO 4

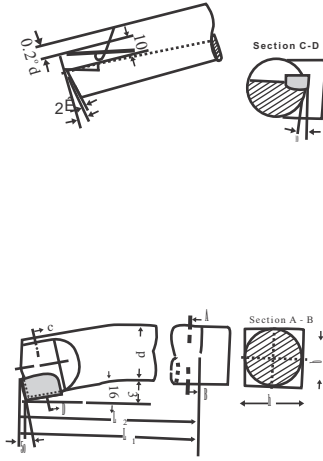
127 RECESSING TOOL



Shank Section	Tool No.	h mm	b mm	l mm	C mm	Tip
	127-1010	10	10	90	10	C 10
	127-1212	12	12	100	12	C 12
	127-1616	16	16	110	16	C 16
	127-2020	20	20	125	20	C 20
	127-2525	25	25	140	25	C 25
	127-3232	32	32	170	32	C 32
	127-1610	16	10	110	16	C 10
	127-2012	20	12	125	20	C 12
	127-2516	25	16	140	25	C 16
	127-3220	32	20	170	32	C 20
	127-4025	40	25	200	40	C 25

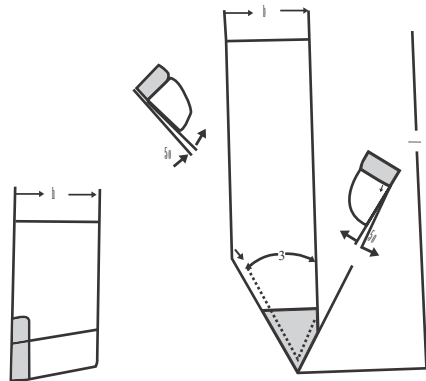
ISO -8

130-131 BORING TOOL



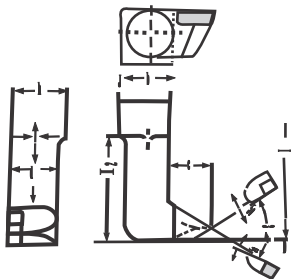
Shank Section	Tool No.	h mm	b mm	d mm	C mm	l1 mm	l2 mm	Smallest bore size mm	Tip
	130-0808	8	8	8	3	125	40	14	A 5
	130-1010	10	10	10	4	150	50	18	A 6
	130-1212	12	12	12	5	180	63	21	A 8
	130-1616	16	16	16	6	210	80	27	A 10
	130-2020	20	20	20	8	250	100	34	A 12
	130-2525	25	25	25	10	300	125	43	A 16
	130-3232	32	32	32	12	355	160	52	A 20
	131-8	-	-	8	3	125	7.5	14	A 5
	131-10-	-	10	4	150	9.5	18	A 6	
	131-12-	-	12	5	180	11.5	21	A 8	
	131-16-	-	16	6	210	13.5	27	A 10	
	131-20-	-	20	8	250	19.5	34	A 12	
	131-25-	-	25	10	300	24.5	43	A 16	
	131-32-	-	32	12	355	31.5	52	A 20	

165 STRAIGHT THREADING TOOL



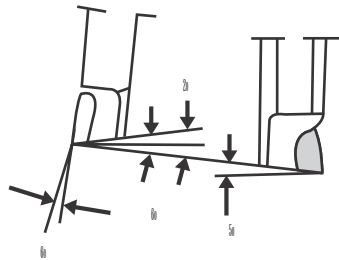
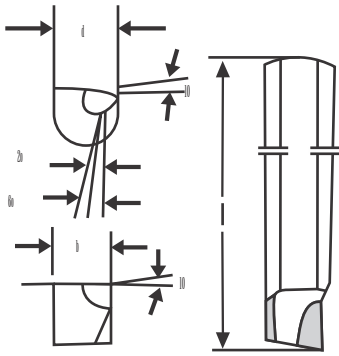
Shank Section	Tool No.	h mm	b mm	l mm	Tip
	165-1010	10	10	90	E 4
	165-1212	12	12	100	E 5
	165-1616	16	16	110	E 6
	165-2020	20	20	125	E 8
	165-2525	25	25	140	E 10
	165-3232	32	32	170	E 12
	165-1610	16	10	110	E 5
	165-2012	20	12	125	E 6
	165-2516	25	16	140	E 8
	165-3220	32	20	170	E 10
	165-4025	40	25	200	E 12

166 INTERNAL THREADING TOOL



Shank Section	Tool No.	h mm	b mm	d mm	C mm	l1 mm	l2 mm	Smallest bore size mm	Tip
	166-1010	10	10	9	12	100	30	24	E 4
	166-1212	12	12	11	14	110	35	30	E 5
	166-1616	16	16	15	16	140	45	36	E 6
	166-2020	20	20	18	18	160	55	45	E 8
	166-2525	25	25	22	20	200	65	55	E 10
	166-3232	32	32	28	25	250	75	70	E 12

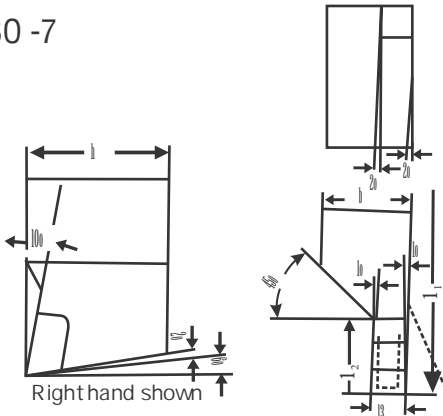
141 BORING TOOL



Right hand shown
SHANK TOLERANCES
 B=h 11
 D=h 8

Shank	Tool No.	b/d mm/inch	l mm	h mm/inch	Tip	
					RH	LH
	141-0006	6	18	5.5	A 6	B 6
	141-0008	8	24	7.5	A 6	B 6
	141-0010	10	50	8.5	A 8	B 8
	141-0012	12	60	10.5	A 10	B 10
	141-0016	16	90	14.0	A 12	B 12
	141-0020	20	120	17.0	A 16	B 16
	141-0025	25	175	22.0	A 20	B 20
	141-0606	6	18		A 6	B 6
	141-0808	8	24		A 6	B 6
	141-1010	10	50		A 8	B 8
	141-1212	12	60		A 10	B 10
	141-1616	16	90		A 12	B 12
	141-2020	20	120		A 16	B 16
	141-2525	25	175		A 20	B 20
	E.141. 3/8"	3/8"	50	21/64"	A 8	B 8
	E.141. 1/2"	1/2"	60	27/64"	A 10	B 10
	E.141. 5/8"	5/8"	90	35/64"	A 12	B 12
	E.141. 3/4"	3/4"	120	43/64"	A 16	B 16
	E.141. 1.0"	1.0"	175	7/8"	A 20	B 20
	E.141. 3/8"	3/8"	50		A 8	B 8
	E.141. 1/2"	1/2"	60		A 10	B 10
	E.141. 5/8"	5/8"	90		A 12	B 12
	E.141. 3/4"	3/4"	120		A 16	B 16
	E.141. 1.0"	1.0"	175		A 20	B 20

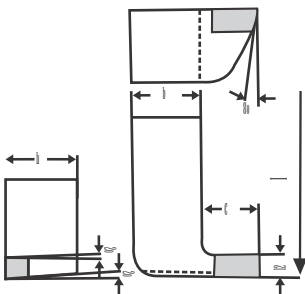
ISO -7



150 PARTING TOOL

Shank	Tool No.	h mm	b mm	l1 mm	l2 mm	l3 mm	Tip
	150-1208	12	8	100	12	3	D 3
	150-1610	16	10	110	14	4	D 4
	150-2012	20	12	125	16	5	D 5
	150-2516	25	16	140	20	6	D 6
	150-3220	32	20	170	25	8	D 8
	150-4025	40	25	200	32	10	D 10

156 CRANKED INTERNAL RECESSING TOOL

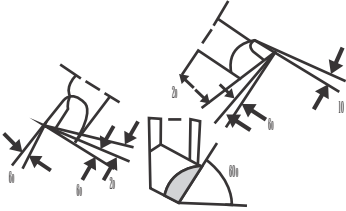
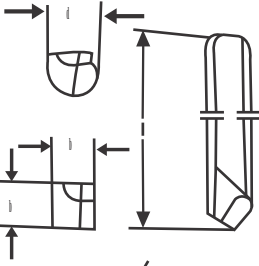


Right hand shown

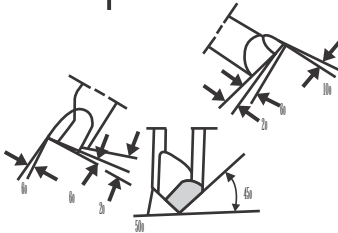
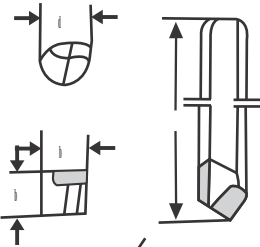
Shank	Tool No.	h mm	b mm	c mm	l1 mm	l2 mm	Smallest bore size mm	Tip
	156-1212	12	12	11	110	4	30	D 4
	156-1616	16	16	14	140	5	40	D 5
	156-2020	20	20	18	160	6	50	D 6
	156-2525	25	25	20	200	8	60	D 8
	156-3232	32	32	28	250	10	85	D 10
	156-4040	40	40	30	315	12	100	D 12

140-142 BORING TOOL

140 Type



142 Type



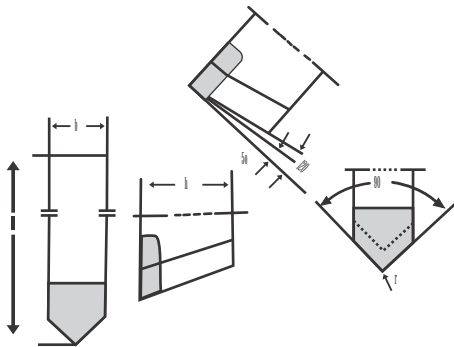
b = h 11

SHANK TOLERANCES d = h 8



Shank	Tool No.	b/d		h		Tip	
		mm/inch	mm	mm/inch	RH	LH	
	141-0006	6	18	5.5	A 6	B 6	
	141-0008	8	24	7.5	A 6	B 6	
	141-0010	10	50	8.5	A 8	B 8	
	141-0012	12	60	10.5	A 10	B 10	
	141-0016	16	90	14.0	A 12	B 12	
	141-0020	20	120	17.0	A 16	B 16	
	141-0025	25	175	22.0	A 20	B 20	
	141-0606	6	18		A 6	B 6	
	141-0808	8	24		A 6	B 6	
	141-1010	10	50		A 8	B 8	
	141-1212	12	60		A 10	B 10	
	141-1616	16	90		A 12	B 12	
	141-2020	20	120		A 16	B 16	
	141-2525	25	175		A 20	B 20	
	E.141. 3/8"	3/8"	50	21/64"	A 8	B 8	
	E.141. 1/2"	1/2"	60	27/64"	A 10	B10	
	E.141. 5/8"	5/8"	90	35/64"	A 12	B 12	
	E.141. 3/4"	3/4"	120	43/64"	A 16	B 16	
	E.141. 1.0"	1.0"	175	7/8"	A 20	B 20	
	E.141. 3/8"	3/8"	50		A 8	B 8	
	E.141. 1/2"	1/2"	60		A 10	B 10	
	E.141. 5/8"	5/8"	90		A 12	B 10	
	E.141. 3/4"	3/4"	120		A 16	B 12	
	E.141. 1.0"	1.0"	175		A 20	B 20	

163 STRAIGHT TURNING TOOL & GROOVING TOOL

Shank Section	Tool No.	h mm	b mm	l mm	Tip
	163-1010	10	10	90	F 10
	163-1212	12	12	100	F 12
	163-1616	16	16	110	F 16
	163-2020	20	20	125	F 20
	163-2525	25	25	140	F 25
	163-3232	32	32	170	F 32
	163-1610	16	10	110	F 10
	160-2012	20	12	125	F12
	163-2516	25	16	140	F 16
	163-3220	32	20	170	F 20



Indian Standard Application of Carbides for Machining, Ranges of application and Colour Code

<p>Identification Colour</p> 	<p>Designation</p>	<p>Material to be Machined Steel, steel casting Machining Conditions Turnin Threading and Milling-High cutting speed</p> <p>Material to be Machined Steel, steel casting, Malleable cast iron forming long chips Machining & Milling-Medium cutting speed and medium chip section, Planing with small chip section</p> <p>Material to be Machined Steel, steel casting, Malleable cast iron forming long chips Machining Conditions Turning, Milling & Planning-Medium or low cutting speed, medium or large chip section and machining under unfavourable conditions such as heat erogenous material, changing hardness or chip section, intermittent tuming or subject to vibrations.</p> <p>Material to be Machined Steel, steel Casting, with sand inclusions or shrinkage cavities Machining Conditions Turning, Planing of using large rake angle; for machining under unfavourable conditions, such as heat erogenous materials, changing hardness or chip sections, intermittent turning or subject to vibrations; and work on automatic machines.</p>
	<p>K10</p> <p>K20</p>	<p>Material to be Machined Grey cast iron of hardness more than 220 HB, Malleable cast iron forming short chips, Tempered steel, Aluminium alloys containing silicon, copper alloys, plastics, glass, hard rubber, hard carboard, porcelain, stone.</p> <p>Machining, Conditions Turning, Milling, Boring, Scraping</p> <p>Material to be Machined Grey cast iron of hardness more than 220 HB, Non-ferrous metals, such as Copper, Brass, Aluminium, Laminated wood of abrasive type Machining, Conditions Turning, milling, planing, requiring high toughness.</p>

GUIDE TO MACHINING

Feed	Depth of cut	Material Designation	Brinell Hardness HB	CUTTING SPEED IN M / MIN				Working angles	
				0.1mm - 0.3mm	0.25mm-0.5mm	0.4mm - 1.0mm	above 0.80 mm	Clearance Angle Degrees	Side rake Angle Degrees
Steel	Containing 0.25 - .035% C Containing 0.35 - 0.45% C Containing 0.45 - 0.60% C Over 0.6% C		up to 150 150 - 200 200 - 250 250 - 315	P10	P20 and P25	P20 and P30	P40	5-8	12-18
				220 - 110	170 - 80	110 - 60	70 - 30	5-8	12
				200 - 100	150 - 70	100 - 55	65 - 30	5-8	12
				150 - 80	120 - 55	75 - 40	50 - 25	5-8	6
Alloy steel			315 - 400	P10	P10 and P20			5 - 8	6
				75 - 30	50 - 20				
Stainless Steel			above 400	M 10 and K 10 40 - 15				5 - 8	6
Cast Steel			up to 150 150 - 200 200 - 250 250 - 315	P10 and M 10	P20	Cutting edge with high surface finish required (diamond lapping)			
				150 - 80	120 - 60				
Grey Iron			up to 170 170 - 230 above 230	P20 and P20	P 25	P 30	P 40	5-8	12
				200 - 100	160 - 70	100 - 50	60 - 30	5-8	6 - 12
				160 - 90	120 - 60	90 - 45	50 - 25	5-8	6 - 12
				140 - 75	100 - 50	75 - 40	45 - 25	5-8	0
Malleable iron, black - heart Malleable iron, White - heart			up to 170 170 - 230 above 230	100 - 50	60 - 30	45 - 25	30 - 20		
				K 10	K 10	P 30 and K 20		5-8	6 - 12
Chilled iron			up to 80 Shore above 80 Shore	100 - 60	90 - 50	70 - 40		5-8	6 - 8
				100 - 55	75 - 45	65 - 35		5-8	0 - 6
Copper, Brass, Bronze			up to 80 Shore above 80 Shore	90 - 40	70 - 30	50 - 20		5-8	6 - 12
				P 20 and M 10	P 20 and P 10			5-8	6 - 12
Alluminium alloys			up to 80 - 120	150 - 80	120 - 60				
				120 - 60	100 - 50				
Alluminium alloys containing Si			above 120	K 10	Skin turning (low cutting depth and high feed)			6	0
				10 - 5					
Alluminium alloys containing Si			above 120	K 10	depth and high feed)			6	0
				5 - 1.5					
Alluminium alloys containing Si			above 120	K 20	K 20			10	18 - 25
				500 - 400	400 - 310			80 - 10	
Alluminium alloys containing Si			above 120	400 - 300	300 - 250				
				K 10 and K 20	K 20				
Alluminium alloys containing Si			above 120	800 - 500	600 - 300			10	20 - 30
				1000 - 600	800 - 500			10	12 - 20
Alluminium alloys containing Si			above 120	800 - 500	600 - 300			10	12
				200 - 150	150 - 80				

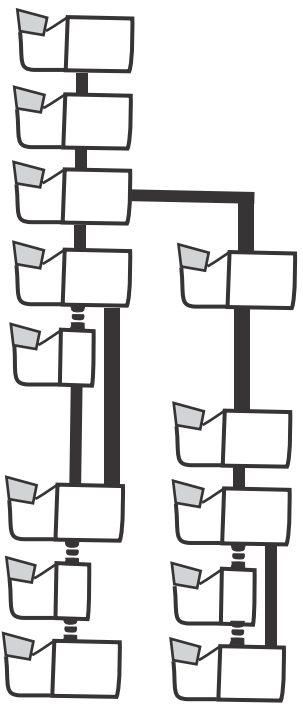
GRINDING CARBIDE TOOLS

INSTRUCTIONS

- (1) Use only true - running, properly dressed grinding wheels.
- (2) Wet grinding is preferable to dry. A copious and constant supply of coolant should be directed to the tip.
- (3) Always grind against the cutting edge. i.e. from tip to shank and never use, heay use, heavy pressure. The finish ground tip must neither shine nor shoe any discolouring.
- (4) Always use a gauge when grinding tool angles. The face of the chip breaker should also be ground true and square.
- (5) Never quench hot tools in water.
- (6) Check tool after grinding and before use.

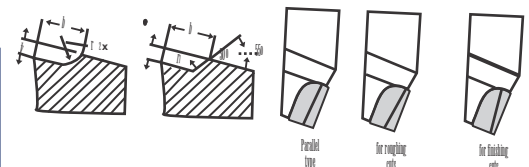
TOOL GRINDING DATA

Grinding Operations	Grinding Wheel				Peripheral Speed m/sec.	Grinding Method
	Type	Abrasive	Grit	Grade of Bond		
Grinding shank base of new tools	Cup wheel or cylinder	Corundum	36...46	H...K	18 - 25	Machine
Grinding clearance on shank	Straight wheel	Corundum	36...46	M...N	18 - 25	Ofihand
Rough grinding tip	Straight or cup wheel	Silicon carbide	36...46	L...K	12 - 20	Ofihand
Finish grinding tip	Cup wheel	Silicon carbide	80...100	L...K	6 - 12	Machine
Grinding primary rake land	Cup wheel	Diamond	D 100..D 70	Metal	12 - 18	Ofihand
or Grinding chip breaker into tip	Straight or cup wheel	Silicon carbide	150...200	J...K		
Grinding clearance lands	Straight or cup wheel	Diamond	D 100..D 70	Plastic or Metal	12 - 18	Ofihand
Fine grinding tip (for precision tools)	Straight or cup wheel	Silicon carbide	100...200	K...M		
Honing Cutting edge*	Cup wheel	Diamond	D 100..D 70	Plastic or Metal	12 - 18	Ofihand
	Cup wheel	Silicon carbide	180...220	J...K		
	Cup wheel	Diamond	D 50...D 30	Plastic or Metal	12 - 18	Ofihand
	Cup wheel	Diamond	D 15..D 7	Plastic		
	Hand hone	Silicon or boron carbide	Not coarser than used for preceding grind	Commercial type	The from and extent of the chanter honed on the machining conditions. it is essential to hone the cutting edge if the tool is to be used for roughing or interrupted cuts.	
	Diamond lap	Diamond				



Chip Breaker Dimensions

Tensile strength of work tons/sq.in	Wide (b) when using feeds (s) of		Depth mm
	under 0.5 mm	over 0.5 mm	
Up to 48	12x to 8xs	1mm + 6xs	0.6-0.8
From 48 to 63	10x to 7xs	1mm + 5xs	0.4+0.6
Over 63	9x to 6xs	1mm + 4xs	0.3+0.4



- (1) The larger multipliers apply to smaller feeds and vice versa.



MIRANDA TOOLS

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