

For HSM applications, Seco presents the Jabro TORNADO programme.
TORNADO covers a complete range of solid carbide end mills especially developed for High Speed Machining.
In addition to this standard programme, special end mills can be supplied where the standard tooling range cannot be applied.

Shank description:

K = Short

ML = Medium Long

L = Long

TL = Transfer Long

VL = Long with tapered OD reduction

VXL = Extra long with tapered OD reduction

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JH111

Seco Material Group	Coolant*	Helical ramping							
		v_c m/min	f_z mm/tooth	a_p mm	a_e mm				
7a >48-56 HRc	M	150	$0,004 \times D_C$	$0,03 \times D_C$	–				
7b >56-62 HRc	M	90	$0,003 \times D_C$	$0,02 \times D_C$	–				
7c >62-65 HRc	M	55	$0,003 \times D_C$	$0,01 \times D_C$	–				
7d >65 HRc	M	35	$0,002 \times D_C$	$0,01 \times D_C$	–				
12-13	A	185	$0,007 \times D_C$	$0,03 \times D_C$	–				
14-15	A	160	$0,007 \times D_C$	$0,02 \times D_C$	–				

Seco Material Group	Coolant*	Copy milling finishing				Copy milling roughing			
		v_c m/min	f_z mm/tooth	a_p mm	a_e mm	v_c m/min	f_z mm/tooth	a_p mm	a_e mm
7a >48-56 HRc	M	210-350	$0,013 \times D_C$	$0,02 \times D_C$	$0,01 \times D_C$	140-200	$0,019 \times D_C$	$0,10 \times D_C$	$0,30 \times D_C$
7b >56-62 HRc	M	130-210	$0,012 \times D_C$	$0,02 \times D_C$	$0,01 \times D_C$	100-140	$0,015 \times D_C$	$0,07 \times D_C$	$0,25 \times D_C$
7c >62-65 HRc	M	90-130	$0,010 \times D_C$	$0,01 \times D_C$	$0,01 \times D_C$	60-100	$0,013 \times D_C$	$0,05 \times D_C$	$0,20 \times D_C$
7d >65 HRc	M	70-90	$0,010 \times D_C$	$0,01 \times D_C$	$0,01 \times D_C$	40-60	$0,011 \times D_C$	$0,04 \times D_C$	$0,15 \times D_C$
12-13	A	345	$0,015 \times D_C$	$0,03 \times D_C$	$0,02 \times D_C$	250	$0,013 \times D_C$	$0,15 \times D_C$	$0,30 \times D_C$
14-15	A	290	$0,014 \times D_C$	$0,02 \times D_C$	$0,02 \times D_C$	200	$0,012 \times D_C$	$0,15 \times D_C$	$0,20 \times D_C$

* E = Emulsion
M = Mist spray
A = Air

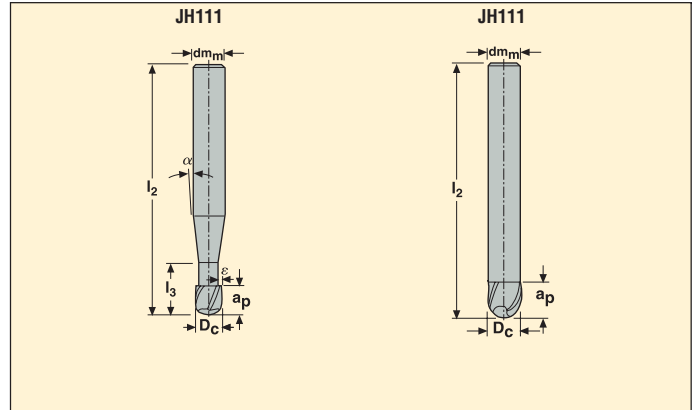
Note that cutting speed is always given at the working diameter. See section "Cutting calculations and definitions" page 162.

Note that longer versions of the tool may need a reduction of recommended axial depth of cut a_p . See section "Cutting calculations and definitions" page 162.

Solid carbide radius cutter



- Tolerances
- Run-out = 0,01 mm
- $D_c = -0.02/-0.04$
- Radius = ± 0.01
- $dm_m = h5$



Type	Part No.	Dimensions in mm						α°	Z_n
		D_c	dm_m	l_2	l_3	a_p	ϵ		
3	JH111-MEGA-64								
	111K020-MEGA-64	2	4	40	4	2	0,05	6°30'	2
13	111020-MEGA-64	2	6	60	4	2	0,05	8°	2
	111021-MEGA-64	2	3	50	10	2	0,05	4°	2
	111L020-MEGA-64	2	6	80	4	2	0,05	8°	2
	111025-MEGA-64	2,5	6	60	5	2,5	0,05	7°30'	2
	111K030-MEGA-64	3	4	40	6	3	0,05	3°30'	2
	111030-MEGA-64	3	6	60	6	3	0,10	5°30°	2
	111031-MEGA-64	3	3	50	-	3	-	-	2
	111L030-MEGA-64	3	6	80	6	3	0,10	5°30'	2
	111035-MEGA-64	3,5	6	65	7	3,5	0,15	4°	2
	111K040-MEGA-64	4	4	40	-	4	-	-	2
20	111040-MEGA-64	4	6	65	8	4	0,15	3°30'	2
	111041-MEGA-64	4	4	60	-	4	-	-	2
	111L040-MEGA-64	4	6	80	8	4	0,15	3°30'	2
	111K050-MEGA-64	5	6	50	10	5	0,20	2°	2
	111050-MEGA-64	5	6	65	10	5	0,20	2°	2
	111051-MEGA-64	5	5	60	-	5	-	-	2
	111L050-MEGA-64	5	6	100	10	5	0,20	2°	2
	111K060-MEGA-64	6	6	50	-	6	-	-	2
	111060-MEGA-64	6	8	75	12	6	0,20	3°	2
	111061-MEGA-64	6	6	75	-	6	-	-	2
31	111L060-MEGA-64	6	8	100	12	6	0,20	3°	2
	111K080-MEGA-64	8	8	65	-	8	-	-	2
	111080-MEGA-64	8	8	75	-	8	-	-	2
	111L080-MEGA-64	8	8	110	-	8	-	-	2
	111K100-MEGA-64	10	10	65	-	10	-	-	2
	111100-MEGA-64	10	10	80	-	10	-	-	2
	111L100-MEGA-64	10	10	125	-	10	-	-	2
	111120-MEGA-64	12	12	90	-	12	-	-	2
	111L120-MEGA-64	12	12	125	-	12	-	-	2
	111160-MEGA-64	16	16	100	-	16	-	-	2
45	111L160-MEGA-64	16	16	150	-	16	-	-	2

Picture key symbols see pages 14-15.

JH160

Seco Material Group	Coolant*	Helical ramping							
		v_c m/min	f_z mm/tooth	a_p mm	a_e mm				
1-2	M	250	$0,007 \times D_C$	$0,04 \times D_C$	–				
3-4	M	210	$0,007 \times D_C$	$0,04 \times D_C$	–				
5-6	M	180	$0,006 \times D_C$	$0,03 \times D_C$	–				
7a >48-56 HRc	M	150	$0,004 \times D_C$	$0,03 \times D_C$	–				
7b >56-62 HRc	M	90	$0,003 \times D_C$	$0,02 \times D_C$	–				
7c >62-65 HRc	M	55	$0,003 \times D_C$	$0,01 \times D_C$	–				
7d >65 HRc	M	35	$0,002 \times D_C$	$0,01 \times D_C$	–				

Seco Material Group	Coolant*	Copy milling finishing							
		v_c m/min	f_z mm/tooth	a_p mm	a_e mm				
1-2	M	500	$0,015 \times D_C$	$0,03 \times D_C$	$0,02 \times D_C$				
3-4	M	385	$0,014 \times D_C$	$0,03 \times D_C$	$0,02 \times D_C$				
5-6	M	325	$0,013 \times D_C$	$0,02 \times D_C$	$0,02 \times D_C$				
7a >48-56 HRc	M	280	$0,013 \times D_C$	$0,02 \times D_C$	$0,01 \times D_C$				
7b >56-62 HRc	M	150	$0,012 \times D_C$	$0,02 \times D_C$	$0,01 \times D_C$				
7c >62-65 HRc	M	110	$0,010 \times D_C$	$0,01 \times D_C$	$0,01 \times D_C$				
7d >65 HRc	M	85	$0,010 \times D_C$	$0,01 \times D_C$	$0,01 \times D_C$				

* E = Emulsion
M = Mist spray
A = Air

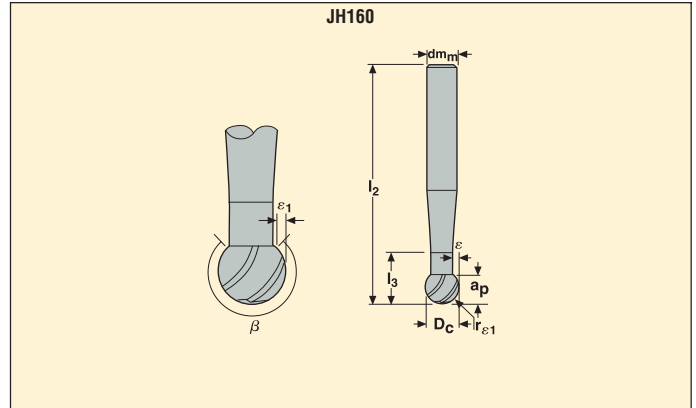
Note that cutting speed is always given at the working diameter. See section "Cutting calculations and definitions" page 162.

Note that longer versions of the tool may need a reduction of recommended axial depth of cut a_p . See section "Cutting calculations and definitions" page 162.

Solid carbide radius cutter



- Tolerances
- Run-out = 0.01 mm
- $dm_m = h5$
- $D_c = -0.02/-0.06$
- $r_{\epsilon 1} = +/-0.01$



Type	Part No.	Dimensions in mm								β	z_n
		D_c	dm_m	l_2	l_3	a_p	ϵ	ϵ_1	$r_{\epsilon 1}$		
7 	160030-MEGA-64	3	3	60	4,5	2,3	0,6	0,27	1,5	250°	4
	160040-MEGA-64	4	4	60	5,6	3,1	0,8	0,36	2	250°	4
	160050-MEGA-64	5	5	70	6,4	3,9	1,0	0,45	2,5	250°	4
	160060-MEGA-64	6	6	80	9,7	4,7	1,2	0,54	3	250°	4
	160080-MEGA-64	8	8	85	11,2	6,2	1,6	0,72	4	250°	4
13 	160100-MEGA-64	10	10	100	15,6	7,8	2,0	0,90	5	250°	4
	160120-MEGA-64	12	12	125	17,2	9,4	2,4	1,08	6	250°	4
20											
28 											
30 											
43 											
47 											

Picture key symbols see pages 14-15.

JH150

Seco Material Group	Coolant*	Helical ramping							
		v_c m/min	f_z mm/tooth	a_p mm	a_e mm				
7a >48-56 HRc	M	150	$0,004 \times D_C$	$0,03 \times D_C$	–				
7b >56-62 HRc	M	90	$0,003 \times D_C$	$0,02 \times D_C$	–				
7c >62-65 HRc	M	55	$0,003 \times D_C$	$0,01 \times D_C$	–				
7d >65 HRc	M	35	$0,002 \times D_C$	$0,01 \times D_C$	–				
12-13	A	185	$0,007 \times D_C$	$0,03 \times D_C$	–				
14-15	A	160	$0,007 \times D_C$	$0,02 \times D_C$	–				

Seco Material Group	Coolant*	Copy milling finishing				Copy milling roughing			
		v_c m/min	f_z mm/tooth	a_p mm	a_e mm	v_c m/min	f_z mm/tooth	a_p mm	a_e mm
7a >48-56 HRc	M	280	$0,013 \times D_C$	$0,02 \times D_C$	$0,01 \times D_C$	170	$0,014 \times D_C$	$0,06 \times D_C$	$0,20 \times D_C$
7b >56-62 HRc	M	150	$0,012 \times D_C$	$0,02 \times D_C$	$0,01 \times D_C$	100	$0,013 \times D_C$	$0,04 \times D_C$	$0,15 \times D_C$
7c >62-65 HRc	M	110	$0,010 \times D_C$	$0,01 \times D_C$	$0,01 \times D_C$	80	$0,011 \times D_C$	$0,03 \times D_C$	$0,10 \times D_C$
7d >65 HRc	M	85	$0,010 \times D_C$	$0,01 \times D_C$	$0,01 \times D_C$	60	$0,011 \times D_C$	$0,02 \times D_C$	$0,05 \times D_C$
12-13	A	345	$0,015 \times D_C$	$0,03 \times D_C$	$0,02 \times D_C$	250	$0,013 \times D_C$	$0,15 \times D_C$	$0,30 \times D_C$
14-15	A	290	$0,014 \times D_C$	$0,02 \times D_C$	$0,02 \times D_C$	200	$0,012 \times D_C$	$0,15 \times D_C$	$0,20 \times D_C$

* E = Emulsion
M = Mist spray
A = Air

Note that cutting speed is always given at the working diameter. See section "Cutting calculations and definitions" page 162.

Note that longer versions of the tool may need a reduction of recommended axial depth of cut a_p . See section "Cutting calculations and definitions" page 162.

JHK-R

Seco Material Group	Coolant*	Helical ramping							
		v_c m/min	f_z mm/tooth	a_p mm	a_e mm				
1-2	M	250	$0,007 \times D_C$	$0,04 \times D_C$	–				
3-4	M	210	$0,007 \times D_C$	$0,04 \times D_C$	–				
5-6	M	180	$0,006 \times D_C$	$0,03 \times D_C$	–				
7a >48-56 HRC	M	150	$0,004 \times D_C$	$0,03 \times D_C$	–				
7b >56-62 HRC	M	90	$0,003 \times D_C$	$0,02 \times D_C$	–				
7c >62-65 HRC	M	55	$0,003 \times D_C$	$0,01 \times D_C$	–				
7d >65 HRC	M	35	$0,002 \times D_C$	$0,01 \times D_C$	–				
8-9	M	100	$0,007 \times D_C$	$0,03 \times D_C$	–				
10-11	M	70	$0,007 \times D_C$	$0,02 \times D_C$	–				
12-13	A	185	$0,007 \times D_C$	$0,03 \times D_C$	–				
14-15	A	160	$0,007 \times D_C$	$0,02 \times D_C$	–				
16	E	max	$0,010 \times D_C$	$0,05 \times D_C$	–				
17	E	280	$0,008 \times D_C$	$0,03 \times D_C$	–				
20	E	60	$0,006 \times D_C$	$0,03 \times D_C$	–				
21	E	30	$0,006 \times D_C$	$0,01 \times D_C$	–				
22	E	80	$0,007 \times D_C$	$0,03 \times D_C$	–				
Graphite	A	600	$0,009 \times D_C$	$0,03 \times D_C$	–				
Plastic soft	M	400	$0,008 \times D_C$	$0,04 \times D_C$	–				
Plastic hard	M	175	$0,007 \times D_C$	$0,02 \times D_C$	–				
Copper	E	450	$0,008 \times D_C$	$0,04 \times D_C$	–				

Seco Material Group	Coolant*	Copy milling finishing				Copy milling roughing			
		v_c m/min	f_z mm/tooth	a_p mm	a_e mm	v_c m/min	f_z mm/tooth	a_p mm	a_e mm
1-2	M	500	$0,015 \times D_C$	$0,03 \times D_C$	$0,02 \times D_C$	290	$0,019 \times D_C$	$0,15 \times D_C$	$0,40 \times D_C$
3-4	M	385	$0,014 \times D_C$	$0,03 \times D_C$	$0,02 \times D_C$	250	$0,018 \times D_C$	$0,12 \times D_C$	$0,30 \times D_C$
5-6	M	325	$0,013 \times D_C$	$0,02 \times D_C$	$0,02 \times D_C$	215	$0,018 \times D_C$	$0,10 \times D_C$	$0,28 \times D_C$
7a >48-56 HRC	M	280	$0,013 \times D_C$	$0,02 \times D_C$	$0,01 \times D_C$	170	$0,014 \times D_C$	$0,06 \times D_C$	$0,20 \times D_C$
7b >56-62 HRC	M	150	$0,012 \times D_C$	$0,02 \times D_C$	$0,01 \times D_C$	100	$0,013 \times D_C$	$0,04 \times D_C$	$0,15 \times D_C$
7c >62-65 HRC	M	110	$0,010 \times D_C$	$0,01 \times D_C$	$0,01 \times D_C$	80	$0,011 \times D_C$	$0,03 \times D_C$	$0,10 \times D_C$
7d >65 HRC	M	85	$0,010 \times D_C$	$0,01 \times D_C$	$0,01 \times D_C$	60	$0,011 \times D_C$	$0,02 \times D_C$	$0,05 \times D_C$
8-9	M	210	$0,015 \times D_C$	$0,03 \times D_C$	$0,02 \times D_C$	110	$0,014 \times D_C$	$0,12 \times D_C$	$0,15 \times D_C$
10-11	M	125	$0,014 \times D_C$	$0,02 \times D_C$	$0,01 \times D_C$	70	$0,013 \times D_C$	$0,08 \times D_C$	$0,12 \times D_C$
12-13	A	345	$0,015 \times D_C$	$0,03 \times D_C$	$0,02 \times D_C$	250	$0,013 \times D_C$	$0,15 \times D_C$	$0,30 \times D_C$
14-15	A	290	$0,014 \times D_C$	$0,02 \times D_C$	$0,02 \times D_C$	200	$0,012 \times D_C$	$0,15 \times D_C$	$0,20 \times D_C$
16	E	max	$0,020 \times D_C$	$0,05 \times D_C$	$0,05 \times D_C$	max	$0,022 \times D_C$	$0,20 \times D_C$	$0,40 \times D_C$
17	E	345	$0,016 \times D_C$	$0,05 \times D_C$	$0,03 \times D_C$	300	$0,018 \times D_C$	$0,20 \times D_C$	$0,30 \times D_C$
20	E	150	$0,013 \times D_C$	$0,02 \times D_C$	$0,01 \times D_C$	90	$0,012 \times D_C$	$0,15 \times D_C$	$0,20 \times D_C$
21	E	75	$0,012 \times D_C$	$0,02 \times D_C$	$0,01 \times D_C$	45	$0,011 \times D_C$	$0,10 \times D_C$	$0,12 \times D_C$
22	E	170	$0,014 \times D_C$	$0,03 \times D_C$	$0,02 \times D_C$	90	$0,012 \times D_C$	$0,20 \times D_C$	$0,30 \times D_C$
Graphite	A	500	$0,018 \times D_C$	$0,05 \times D_C$	$0,05 \times D_C$	800	$0,020 \times D_C$	$0,30 \times D_C$	$0,40 \times D_C$
Plastic soft	M	max	$0,016 \times D_C$	$0,05 \times D_C$	$0,02 \times D_C$	max	$0,018 \times D_C$	$0,50 \times D_C$	$0,50 \times D_C$
Plastic hard	M	175	$0,015 \times D_C$	$0,04 \times D_C$	$0,02 \times D_C$	200	$0,016 \times D_C$	$0,20 \times D_C$	$0,20 \times D_C$
Copper	E	max	$0,016 \times D_C$	$0,04 \times D_C$	$0,03 \times D_C$	max	$0,017 \times D_C$	$0,20 \times D_C$	$0,30 \times D_C$

* E = Emulsion
M = Mist spray
A = Air

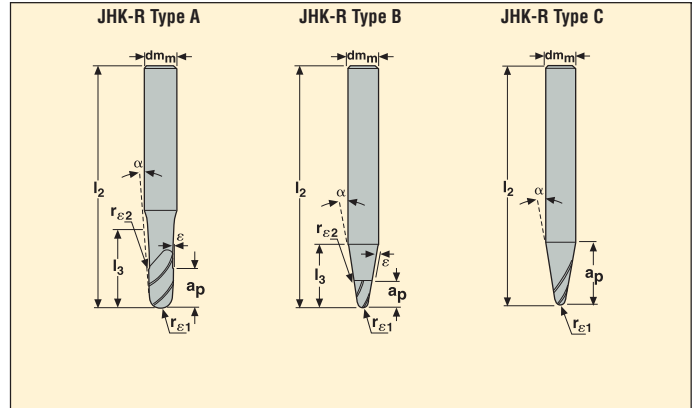
Note that cutting speed is always given at the working diameter. See section "Cutting calculations and definitions" page 162.

Note that longer versions of the tool may need a reduction of recommended axial depth of cut a_p . See section "Cutting calculations and definitions" page 162.

Solid carbide tapered end mill



- Tolerances
- Run-out = 0,01 mm
- $dm_m = h_5$
- $D_e = n.a.$
- $r_{e1} = +/-0.01$



Type	Part No.	Dimensions in mm							α°	Type	z_n
		dm_m	l_2	l_3	a_p	ϵ	r_{e1}	r_{e2}			
3	JHK010-010R-MEGA	3	50	6	2,6	0,10	1	2	1°	A	2
	JHK010-015R-MEGA	4	50	10	4	0,15	1,5	2	1°	A	2
	JHK010-020R-MEGA	5	50	14	5,5	0,2	2	2	1°	A	2
13	JHK020-010R-MEGA	3	50	8	2,6	0,1	1	2	2°	A	2
	JHK020-015R-MEGA	4	50	12	4	0,15	1,5	2	2°	A	2
	JHK020-020R-MEGA	5	50	16	5,5	0,2	2	2	2°	A	2
19	JHK030-010R-MEGA	3	50	10	2,6	0,1	1	2	3°	A	2
	JHK030-015R-MEGA	4	50	12	4	0,15	1,5	2	3°	A	2
	JHK030-020R-MEGA	6	70	18	5,5	0,2	2	2	3°	A	2
26	JHK050-010R-MEGA	6	60	15	2,6	0,1	1	2	5°	A	2
	JHK050-015R-MEGA	6	60	20,3	4	0,15	1,5	2	5°	B	2
	JHK050-020R-MEGA	8	80	27	5,5	0,2	2	2	5°	B	2
35	JHK100-010R-MEGA	6	60	12,8	2,6	0,1	1	2	10°	B	2
	JHK100-015R-MEGA	6	60	-	9,9	-	1,5	2	10°	C	2
	JHK150-010R-MEGA	6	70	-	8,3	-	1	2	15°	C	2
43	JHK150-015R-MEGA	6	70	-	6,9	-	1,5	2	15°	C	2
	JHK300-010R-MEGA	8	70	-	5,9	-	1	2	30°	C	2
	JHK300-015R-MEGA	8	70	-	3,7	-	1,5	2	30°	C	2
47											

Picture key symbols see pages 14-15.

JH 120

Seco Material Group	Coolant*	Helical/facing ramping				Slotting			
		v_c m/min	f_z mm/tooth	a_p mm	a_e mm	v_c m/min	f_z mm/tooth	a_p mm	a_e mm
7a >48-56 HRc	M	150	$0,004 \times D_C$	$0,03 \times D_C$	–	110	$0,004 \times D_C$	$0,18 \times D_C$	–
7b >56-62 HRc	M	90	$0,003 \times D_C$	$0,02 \times D_C$	–	70	$0,003 \times D_C$	$0,08 \times D_C$	–
7c >62-65 HRc	M	55	$0,003 \times D_C$	$0,01 \times D_C$	–	50	$0,002 \times D_C$	$0,05 \times D_C$	–
7d >65 HRc	M	35	$0,002 \times D_C$	$0,01 \times D_C$	–	35	$0,002 \times D_C$	$0,03 \times D_C$	–

Seco Material Group	Coolant*	Side milling finishing				Side milling roughing			
		v_c m/min	f_z mm/tooth	a_p mm	a_e mm	v_c m/min	f_z mm/tooth	a_p mm	a_e mm
7a >48-56 HRc	M	300	$0,006 \times D_C$	$0,80 \times D_C$	$0,03 \times D_C$	250	$0,005 \times D_C$	$1,00 \times D_C$	$0,03 \times D_C$
7b >56-62 HRc	M	175	$0,006 \times D_C$	$0,64 \times D_C$	$0,02 \times D_C$	150	$0,004 \times D_C$	$0,80 \times D_C$	$0,03 \times D_C$
7c >62-65 HRc	M	90	$0,004 \times D_C$	$0,40 \times D_C$	$0,02 \times D_C$	80	$0,003 \times D_C$	$0,50 \times D_C$	$0,02 \times D_C$
7d >65 HRc	M	60	$0,004 \times D_C$	$0,30 \times D_C$	$0,01 \times D_C$	55	$0,003 \times D_C$	$0,30 \times D_C$	$0,01 \times D_C$

* E = Emulsion
M = Mist spray
A = Air

Note that longer versions of the tool may need a reduction of recommended axial depth of cut a_p . See section "Cutting calculations and definitions" page 162 .

JH 130

Seco Material Group	Coolant*	Helical/facing ramping							
		v_c m/min	f_z mm/tooth	a_p mm	a_e mm				
7a >48-56 HRC	M	150	$0,004 \times D_C$	$0,03 \times D_C$	–				
7b >56-62 HRC	M	90	$0,003 \times D_C$	$0,02 \times D_C$	–				
7c >62-65 HRC	M	55	$0,003 \times D_C$	$0,01 \times D_C$	–				
7d >65 HRC	M	35	$0,002 \times D_C$	$0,01 \times D_C$	–				

Seco Material Group	Coolant*	Side milling finishing				Side milling roughing			
		v_c m/min	f_z mm/tooth	a_p mm	a_e mm	v_c m/min	f_z mm/tooth	a_p mm	a_e mm
7a >48-56 HRC	M	300	$0,006 \times D_C$	$0,80 \times D_C$	$0,03 \times D_C$	250	$0,005 \times D_C$	$1,00 \times D_C$	$0,03 \times D_C$
7b >56-62 HRC	M	175	$0,006 \times D_C$	$0,64 \times D_C$	$0,02 \times D_C$	150	$0,004 \times D_C$	$0,80 \times D_C$	$0,03 \times D_C$
7c >62-65 HRC	M	90	$0,004 \times D_C$	$0,40 \times D_C$	$0,02 \times D_C$	80	$0,003 \times D_C$	$0,50 \times D_C$	$0,02 \times D_C$
7d >65 HRC	M	60	$0,004 \times D_C$	$0,30 \times D_C$	$0,01 \times D_C$	55	$0,003 \times D_C$	$0,30 \times D_C$	$0,01 \times D_C$

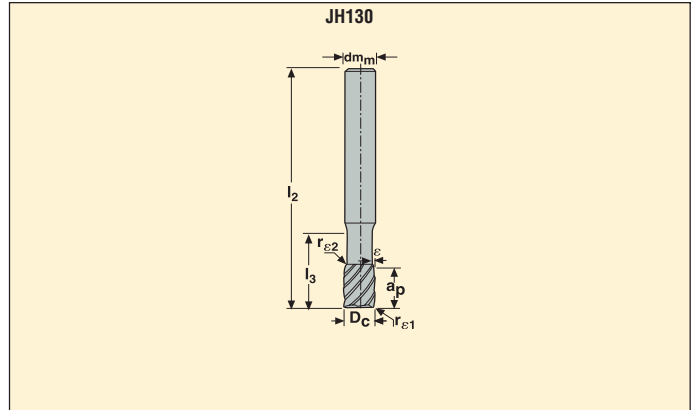
* E = Emulsion
M = Mist spray
A = Air

Note that longer versions of the tool may need a reduction of recommended axial depth of cut a_p . See section "Cutting calculations and definitions" page 162 .

Solid carbide multi flute



- Tolerances
- Run-out = 0,01 mm
- $dm_m = h5$
- $D_c = -0.02/-0.04$
- $r_{e1} = +/-0.05$



Type	Part No.	Dimensions in mm								Z _n
		D _c	dm _m	l ₂	l ₃	a _p	ε	r _{e1}	r _{e2}	
JH130-MEGA										
10/11/12	130060-MEGA	6	6	55	12	6	0,2	0,2	2	5
	130080-MEGA	8	8	60	16	8	0,3	0,2	2	5
	130100-MEGA	10	10	70	20	10	0,3	0,3	2	6
13	130120-MEGA	12	12	80	24	12	0,3	0,5	3	6
	130160-MEGA	16	16	90	30	16	0,3	0,5	4	8
	130200-MEGA	20	20	100	35	20	0,4	0,5	4	8
19										
23	MEGA									
40										
42										
61										

Picture key symbols see pages 14-15.

JH 140

Seco Material Group	Coolant*	Helical ramping							
		v_c m/min	f_z mm/tooth	a_p mm	a_e mm				
1-2	M	250	$0,007 \times D_C$	$0,04 \times D_C$	–				
3-4	M	210	$0,007 \times D_C$	$0,04 \times D_C$	–				
5-6	M	180	$0,006 \times D_C$	$0,03 \times D_C$	–				
7a >48-56 HRc	M	150	$0,004 \times D_C$	$0,03 \times D_C$	–				
7b >56-62 HRc	M	90	$0,003 \times D_C$	$0,02 \times D_C$	–				
7c >62-65 HRc	M	55	$0,003 \times D_C$	$0,01 \times D_C$	–				
7d >65 HRc	M	35	$0,002 \times D_C$	$0,01 \times D_C$	–				
12-13	A	185	$0,007 \times D_C$	$0,03 \times D_C$	–				
14-15	A	160	$0,007 \times D_C$	$0,02 \times D_C$	–				

Seco Material Group	Coolant*	Copy milling finishing							
		v_c m/min	f_z mm/tooth	a_p mm	a_e mm				
1-2	M	500	$0,015 \times D_C$	$0,03 \times D_C$	$0,02 \times D_C$				
3-4	M	385	$0,014 \times D_C$	$0,03 \times D_C$	$0,02 \times D_C$				
5-6	M	325	$0,013 \times D_C$	$0,02 \times D_C$	$0,02 \times D_C$				
7a >48-56 HRc	M	280	$0,013 \times D_C$	$0,02 \times D_C$	$0,01 \times D_C$				
7b >56-62 HRc	M	150	$0,012 \times D_C$	$0,02 \times D_C$	$0,01 \times D_C$				
7c >62-65 HRc	M	110	$0,010 \times D_C$	$0,01 \times D_C$	$0,01 \times D_C$				
7d >65 HRc	M	85	$0,010 \times D_C$	$0,01 \times D_C$	$0,01 \times D_C$				
12-13	A	345	$0,015 \times D_C$	$0,03 \times D_C$	$0,02 \times D_C$				
14-15	A	290	$0,014 \times D_C$	$0,02 \times D_C$	$0,02 \times D_C$				

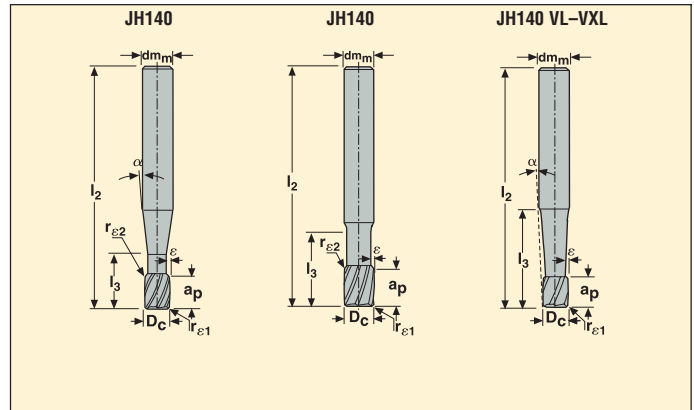
* E = Emulsion
M = Mist spray
A = Air

Note that longer versions of the tool may need a reduction of recommended axial depth of cut a_p . See section "Cutting calculations and definitions" page 162.

Solid carbide corner radius cutter



- Tolerances
- Run-out = 0,01 mm
- $dm_m = h_5$
- $D_c = -0.02/-0.04$
- $r_{e1} = +/-0.02$



Type	Part No.	Dimensions in mm									α°	Z_n
		D_c	dm_m	l_2	l_3	a_p	ϵ	r_{e1}	r_{e2}			
3	JH140-MEGA											
	140020R050-MEGA	2	4	40	6	2	0,05	0,5	2	6°	2	
	140VL020-MEGA	2	6	80	35	2	0,05	0,5	—	3°30'	2	
8	140030R050-MEGA	3	4	40	9	3	0,1	0,5	2	2°30'	2	
	140030R100-MEGA	3	4	40	9	3	0,1	1	2	2°30'	2	
	140VL030-MEGA	3	6	80	40	3	0,1	1	—	2°30'	2	
	140040R050-MEGA	4	6	50	10	4	0,15	0,5	2	4°30'	2	
	140040R100-MEGA	4	6	50	10	4	0,15	1	2	4°30'	2	
	140VL040-MEGA	4	6	80	50	4	0,15	1	—	1°30'	2	
13	140060R100-MEGA	6	6	55	15	6	0,2	1	2	—	4	
	140060R150-MEGA	6	6	55	15	6	0,2	1,5	2	—	4	
	140VL060-MEGA	6	8	100	55	6	0,2	1,5	—	1°30'	4	
	140VXL060-MEGA	6	10	125	60	6	0,2	1,5	—	2°	4	
	140080R100-MEGA	8	8	60	20	8	0,3	1	2	—	4	
	140080R150-MEGA	8	8	60	20	8	0,3	1,5	2	—	4	
19	140080R200-MEGA	8	8	60	20	8	0,3	2	2	—	4	
	140VL080-MEGA	8	10	100	60	8	0,3	2	—	1°30'	4	
	140VXL080-MEGA	8	12	150	65	8	0,3	2	—	2°	4	
	140100R100-MEGA	10	10	70	25	8	0,3	1	2	—	4	
	140100R200-MEGA	10	10	70	25	8	0,3	2	2	—	4	
	140100R250-MEGA	10	10	70	25	8	0,3	2,5	2	—	4	
23	140VL100-MEGA	10	12	125	60	8	0,3	2,5	—	1°30'	4	
	140VXL100-MEGA	10	12	150	80	8	0,3	2,5	—	1°	4	
	140120R200-MEGA	12	12	80	25	10	0,3	2	3	—	4	
	140120R300-MEGA	12	12	80	25	10	0,3	3	3	—	4	
	140VL120-MEGA	12	16	125	70	10	0,3	3,0	—	2°	4	
	140VXL120-MEGA	12	16	175	100	10	0,3	3	—	1°30'	4	
34	140160R400-MEGA	16	16	90	32	12	0,3	4	4	—	4	
	140VXL160-MEGA	16	20	200	100	12	0,3	4	—	1°30'	4	
43												
46												

Picture key symbols see pages 14-15.

JH 720

Seco Material Group	Coolant*	Helical ramping							
		v_c m/min	f_z mm/tooth	a_p mm	a_e mm				
8-9	M	100	$0,007 \times D_C$	$0,03 \times D_C$	–				
10-11	M	70	$0,007 \times D_C$	$0,02 \times D_C$	–				
16	E	max	$0,010 \times D_C$	$0,05 \times D_C$	–				
17	E	280	$0,008 \times D_C$	$0,03 \times D_C$	–				
20	E	60	$0,006 \times D_C$	$0,03 \times D_C$	–				
21	E	30	$0,006 \times D_C$	$0,01 \times D_C$	–				
22	E	80	$0,007 \times D_C$	$0,03 \times D_C$	–				
Plastic soft	M	400	$0,008 \times D_C$	$0,04 \times D_C$	–				
Plastic hard	M	175	$0,007 \times D_C$	$0,02 \times D_C$	–				
Copper	E	450	$0,008 \times D_C$	$0,04 \times D_C$	–				

Seco Material Group	Coolant*	Copy milling finishing							
		v_c m/min	f_z mm/tooth	a_p mm	a_e mm				
8-9	M	210	$0,015 \times D_C$	$0,03 \times D_C$	$0,02 \times D_C$				
10-11	M	125	$0,014 \times D_C$	$0,02 \times D_C$	$0,01 \times D_C$				
16	E	max	$0,020 \times D_C$	$0,05 \times D_C$	$0,05 \times D_C$				
17	E	345	$0,016 \times D_C$	$0,05 \times D_C$	$0,03 \times D_C$				
20	E	150	$0,013 \times D_C$	$0,02 \times D_C$	$0,01 \times D_C$				
21	E	75	$0,012 \times D_C$	$0,02 \times D_C$	$0,01 \times D_C$				
22	E	170	$0,014 \times D_C$	$0,03 \times D_C$	$0,02 \times D_C$				
Plastic soft	M	max	$0,016 \times D_C$	$0,05 \times D_C$	$0,02 \times D_C$				
Plastic hard	M	175	$0,015 \times D_C$	$0,04 \times D_C$	$0,02 \times D_C$				
Copper	E	max	$0,016 \times D_C$	$0,04 \times D_C$	$0,03 \times D_C$				

* E = Emulsion
M = Mist spray
A = Air

Note that cutting speed is always given at the working diameter. See section "Cutting calculations and definitions" page 162.

Note that longer versions of the tool may need a reduction of recommended axial depth of cut a_p . See section "Cutting calculations and definitions" page 162.

JH 910

Seco Material Group	Coolant*	Helical/facing ramping				Slotting			
		v_c m/min	f_z mm/tooth	a_p mm	a_e mm	v_c m/min	f_z mm/tooth	a_p mm	a_e mm
1-2	M	250	$0,007 \times D_C$	$0,04 \times D_C$	–	200	$0,006 \times D_C$	$1,20 \times D_C$	–
3-4	M	210	$0,007 \times D_C$	$0,04 \times D_C$	–	180	$0,005 \times D_C$	$0,80 \times D_C$	–
5-6	M	180	$0,006 \times D_C$	$0,03 \times D_C$	–	160	$0,005 \times D_C$	$0,20 \times D_C$	–
8-9**	M	100	$0,007 \times D_C$	$0,03 \times D_C$	–	95	$0,006 \times D_C$	$0,10 \times D_C$	–
10-11**	M	70	$0,007 \times D_C$	$0,02 \times D_C$	–	60	$0,005 \times D_C$	$0,10 \times D_C$	–
12-13	A	185	$0,007 \times D_C$	$0,03 \times D_C$	–	175	$0,006 \times D_C$	$0,32 \times D_C$	–
14-15	A	160	$0,007 \times D_C$	$0,02 \times D_C$	–	150	$0,005 \times D_C$	$0,16 \times D_C$	–
20**	E	60	$0,006 \times D_C$	$0,03 \times D_C$	–	50	$0,005 \times D_C$	$0,15 \times D_C$	–
21**	E	30	$0,006 \times D_C$	$0,01 \times D_C$	–	25	$0,005 \times D_C$	$0,08 \times D_C$	–
22**	E	80	$0,007 \times D_C$	$0,03 \times D_C$	–	75	$0,005 \times D_C$	$0,24 \times D_C$	–
Graphite	A	600	$0,009 \times D_C$	$0,03 \times D_C$	–	600	$0,007 \times D_C$	$0,48 \times D_C$	–
Plastic hard	M	175	$0,007 \times D_C$	$0,02 \times D_C$	–	150	$0,006 \times D_C$	$0,25 \times D_C$	–
Copper	E	450	$0,008 \times D_C$	$0,04 \times D_C$	–	350	$0,006 \times D_C$	$0,25 \times D_C$	–

Seco Material Group	Coolant*	Side milling finishing				Side milling roughing			
		v_c m/min	f_z mm/tooth	a_p mm	a_e mm	v_c m/min	f_z mm/tooth	a_p mm	a_e mm
1-2	M	450	$0,011 \times D_C$	$1,00 \times D_C$	$0,04 \times D_C$	350	$0,010 \times D_C$	$1,50 \times D_C$	$0,05 \times D_C$
3-4	M	390	$0,010 \times D_C$	$0,80 \times D_C$	$0,04 \times D_C$	310	$0,010 \times D_C$	$1,00 \times D_C$	$0,04 \times D_C$
5-6	M	350	$0,010 \times D_C$	$0,80 \times D_C$	$0,03 \times D_C$	280	$0,009 \times D_C$	$1,00 \times D_C$	$0,04 \times D_C$
8-9**	M	200	$0,011 \times D_C$	$0,80 \times D_C$	$0,03 \times D_C$	155	$0,010 \times D_C$	$1,00 \times D_C$	$0,04 \times D_C$
10-11**	M	145	$0,010 \times D_C$	$0,64 \times D_C$	$0,02 \times D_C$	120	$0,010 \times D_C$	$0,80 \times D_C$	$0,03 \times D_C$
12-13	A	285	$0,011 \times D_C$	$0,80 \times D_C$	$0,02 \times D_C$	250	$0,010 \times D_C$	$1,00 \times D_C$	$0,04 \times D_C$
14-15	A	245	$0,010 \times D_C$	$0,64 \times D_C$	$0,02 \times D_C$	200	$0,010 \times D_C$	$0,80 \times D_C$	$0,03 \times D_C$
20**	E	120	$0,010 \times D_C$	$0,56 \times D_C$	$0,02 \times D_C$	80	$0,009 \times D_C$	$0,70 \times D_C$	$0,03 \times D_C$
21**	E	50	$0,009 \times D_C$	$0,40 \times D_C$	$0,01 \times D_C$	40	$0,008 \times D_C$	$0,52 \times D_C$	$0,02 \times D_C$
22**	E	145	$0,010 \times D_C$	$0,80 \times D_C$	$0,03 \times D_C$	120	$0,010 \times D_C$	$1,00 \times D_C$	$0,04 \times D_C$
Graphite	A	400	$0,013 \times D_C$	$1,00 \times D_C$	$0,05 \times D_C$	600	$0,012 \times D_C$	$1,00 \times D_C$	$0,50 \times D_C$
Plastic hard	M	250	$0,011 \times D_C$	$0,80 \times D_C$	$0,04 \times D_C$	190	$0,010 \times D_C$	$1,00 \times D_C$	$0,15 \times D_C$
Copper	E	550	$0,011 \times D_C$	$1,00 \times D_C$	$0,05 \times D_C$	450	$0,011 \times D_C$	$1,25 \times D_C$	$0,25 \times D_C$

* E = Emulsion

M = Mist spray

A = Air

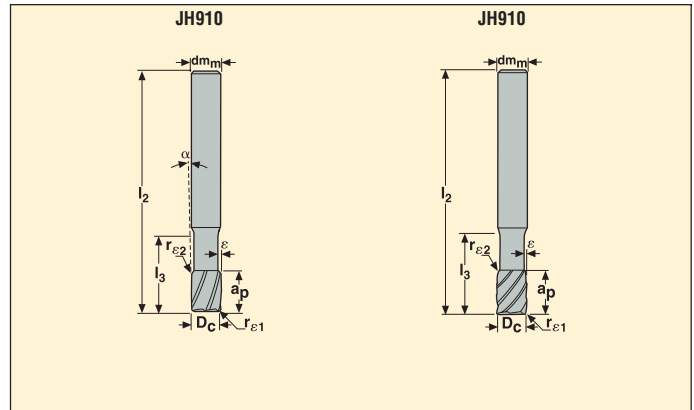
** In the following material groups use TRIBON coating

Note that longer versions of the tool may need a reduction of recommended axial depth of cut a_p . See section "Cutting calculations and definitions" page 162.

Solid carbide corner radius cutter



- Tolerances
- Run-out = 0.01 mm
- $dm_m = h5$
- $D_c = -0.02/-0.04$
- $r_{e1} = +/-0.05$



Type	Part No.	-MEGA*	-TRIBON*	Dimensions in mm										α°	z_n
				D_c	dm_m	l_2	l_3	a_p	ϵ	r_{e1}	r_{e2}	m			
4	910020R020	■	■	2	3	40	6	3	0,05	0,2	2	-	4°	3	
	910L020	■	■	2	3	60	10	3	0,05	0,2	2	-	2°30'	3	
	910025R020	■	■	2,5	3	40	6	4	0,05	0,2	2	-	2°	3	
	910030R010	■	■	3	3	40	7	4	0,1	0,1	2	-	-	3	
13	910030R020	■	■	3	3	40	7	4	0,1	0,2	2	-	-	3	
	910L030	■	■	3	3	60	14	4	0,1	0,2	2	-	-	3	
	910035R020	■	■	3,5	6	50	9	5	0,15	0,2	2	-	6°	3	
	910040R020	■	■	4	6	50	9	5	0,15	0,2	2	-	5°	3	
19	910040R030	■	■	4	6	50	9	5	0,15	0,3	2	-	5°	3	
	910040R050	■	■	4	6	50	9	5	0,15	0,5	2	-	5°	3	
	910L040	■	■	4	6	65	18	5	0,15	0,2	2	-	3°	3	
	910050R020	■	■	5	6	50	11	6	0,2	0,2	2	-	2°30'	3	
21	910L050	■	■	5	6	65	22	6	0,2	0,2	2	-	1°30'	3	
	910060R020	■	■	6	6	60	14	7	0,2	0,2	2	-	-	3	
	910060R030	■	■	6	6	60	14	7	0,2	0,3	2	-	-	3	
	910060R050	■	■	6	6	60	14	7	0,2	0,5	2	-	-	3	
23	910L060	■	■	6	6	80	26	7	0,2	0,3	2	-	-	3	
	910RS070	■	■	7	6	100	-	8	0,5	0,3	3	30	-	3	
	910080R020	■	■	8	8	60	18	9	0,3	0,2	2	-	-	3	
	910080R050	■	■	8	8	60	18	9	0,3	0,5	2	-	-	3	
37	910L080	■	■	8	8	85	36	9	0,3	0,5	2	-	-	3	
	910RS090	■	■	9	8	100	-	11	0,5	0,5	3	30	-	3	
	910100R020	■	■	10	10	70	25	12	0,3	0,2	2	-	-	3	
	910100R050	■	■	10	10	70	25	12	0,3	0,5	2	-	-	3	
44	910100R100	■	■	10	10	70	25	12	0,3	1	2	-	-	3	
	910L100	■	■	10	10	100	45	12	0,3	0,5	2	-	-	3	
	910RS110	■	■	11	10	125	-	13	0,5	0,5	3	30	-	3	
	910120R050	■	■	12	12	80	30	15	0,3	0,5	3	-	-	3	
53	910120R100	■	■	12	12	80	30	15	0,3	1	3	-	-	3	
	910120R150	■	■	12	12	80	30	15	0,3	1,5	3	-	-	3	
	910L120	■	■	12	12	125	54	15	0,3	0,5	3	-	-	3	
	910RS130	■	■	13	12	150	-	16	0,5	0,6	3	35	-	3	
53	910160R100	■	■	16	16	90	38	18	0,3	1	4	-	-	3	
	910L160	■	■	16	16	125	65	18	0,3	1	4	-	-	3	
	910RS170	■	■	17	16	150	-	20	0,5	0,6	3	40	-	3	
	910200R100	■	■	20	20	100	40	22	0,4	1	4	-	-	3	

* Ordering example:
 MEGA: 910020R020-MEGA
 TRIBON: 910020R020-TRIBON

Picture key symbols see pages 14-15.

JH 930

Seco Material Group	Coolant*	Helical/facing ramping							
		vc m/min	fz mm/tooth	ap mm	ae mm				
1-2	M	250	0,007 x D _C	0,04 x D _C	–				
3-4	M	210	0,007 x D _C	0,04 x D _C	–				
5-6	M	180	0,006 x D _C	0,03 x D _C	–				
7a >48-56 HRC	M	150	0,004 x D _C	0,03 x D _C	–				
7b >56-62 HRC	M	90	0,003 x D _C	0,02 x D _C	–				
7c >62-65 HRC	A	55	0,003 x D _C	0,01 x D _C	–				
7d >65 HRC	A	35	0,002 x D _C	0,01 x D _C	–				
12-13	E	185	0,007 x D _C	0,03 x D _C	–				
14-15	E	160	0,007 x D _C	0,02 x D _C	–				
20	E	60	0,006 x D _C	0,03 x D _C	–				
21	E	30	0,006 x D _C	0,01 x D _C	–				
22	E	80	0,007 x D _C	0,03 x D _C	–				

Seco Material Group	Coolant*	Side milling finishing				Side milling roughing			
		vc m/min	fz mm/tooth	ap mm	ae mm	vc m/min	fz mm/tooth	ap mm	ae mm
1-2	M	450	0,011 x D _C	1,00 x D _C	0,04 x D _C	350	0,010 x D _C	1,50 x D _C	0,05 x D _C
3-4	M	390	0,010 x D _C	0,80 x D _C	0,04 x D _C	310	0,010 x D _C	1,00 x D _C	0,04 x D _C
5-6	M	350	0,010 x D _C	0,80 x D _C	0,03 x D _C	280	0,009 x D _C	1,00 x D _C	0,04 x D _C
7a >48-56 HRC	M	300	0,006 x D _C	0,80 x D _C	0,03 x D _C	250	0,005 x D _C	1,00 x D _C	0,03 x D _C
7b >56-62 HRC	M	175	0,006 x D _C	0,64 x D _C	0,02 x D _C	150	0,004 x D _C	0,80 x D _C	0,03 x D _C
7c >62-65 HRC	A	90	0,004 x D _C	0,40 x D _C	0,02 x D _C	80	0,003 x D _C	0,50 x D _C	0,02 x D _C
7d >65 HRC	A	60	0,004 x D _C	0,30 x D _C	0,01 x D _C	55	0,003 x D _C	0,30 x D _C	0,01 x D _C
12-13	E	285	0,011 x D _C	0,80 x D _C	0,02 x D _C	250	0,010 x D _C	1,00 x D _C	0,04 x D _C
14-15	E	245	0,010 x D _C	0,64 x D _C	0,02 x D _C	200	0,010 x D _C	0,80 x D _C	0,03 x D _C
20	E	120	0,010 x D _C	0,56 x D _C	0,02 x D _C	80	0,009 x D _C	0,70 x D _C	0,03 x D _C
21	E	50	0,009 x D _C	0,40 x D _C	0,01 x D _C	40	0,008 x D _C	0,52 x D _C	0,02 x D _C
22	E	145	0,010 x D _C	0,80 x D _C	0,03 x D _C	120	0,010 x D _C	1,00 x D _C	0,04 x D _C

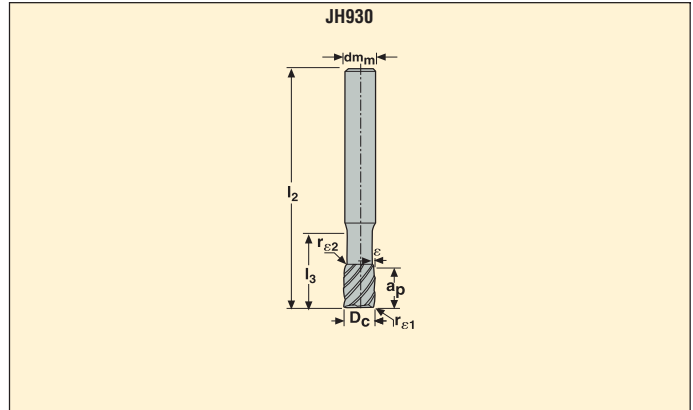
* E = Emulsion
M = Mist spray
A = Air

Note that longer versions of the tool may need a reduction of recommended axial depth of cut ap. See section "Cutting calculations and definitions" page 162.

Solid carbide multi flute



- Tolerances
- Run-out = 0,01 mm
- $dm_m = h5$
- $D_c = -0.02/-0.04$
- $r_{e1} = +/-0.05$



Type	Part No.	Dimensions in mm								Z _n
		D _c	dm _m	l ₂	l ₃	a _p	ε	r _{e1}	r _{e2}	
JH930-MEGA										
10/11/12										
	930060R020-MEGA	6	6	55	15	9	0,2	0,2	2	5
	930060R050-MEGA	6	6	55	15	9	0,2	0,5	2	5
	930080R020-MEGA	8	8	60	18	12	0,3	0,2	2	5
	930080R050-MEGA	8	8	60	18	12	0,3	0,5	2	5
13	930100R030-MEGA	10	10	70	25	15	0,3	0,3	2	6
	930100R100-MEGA	10	10	70	25	15	0,3	1,0	2	6
	930120R050-MEGA	12	12	80	30	18	0,3	0,5	3	6
	930120R100-MEGA	12	12	80	30	18	0,3	1,0	3	6
19	930160R050-MEGA	16	16	90	35	24	0,3	0,5	4	8
	930160R100-MEGA	16	16	90	35	24	0,3	1,0	4	8
	930200R050-MEGA	20	20	100	38	30	0,4	0,5	4	8
MEGA	930200R100-MEGA	20	20	100	38	30	0,4	1,0	4	8
23										
38										
42										
47										

Picture key symbols see pages 14-15.

JH 421

Seco Material Group	Coolant*	Helical/facing ramping				Slotting			
		v_c m/min	f_z mm/tooth	a_p mm	a_e mm	v_c m/min	f_z mm/tooth	a_p mm	a_e mm
16	E	max	$0,007 \times D_C$	$0,5 \times D_C$	–	max	$0,013 \times D_C$	$0,5 \times D_C$	–
Plastic soft	A	max	$0,007 \times D_C$	$0,5 \times D_C$	–	max	$0,013 \times D_C$	$1,0 \times D_C$	–
Plastic hard	M	400	$0,005 \times D_C$	$0,5 \times D_C$	–	400	$0,010 \times D_C$	$0,7 \times D_C$	–
Copper	E	400	$0,004 \times D_C$	$0,5 \times D_C$	–	400	$0,008 \times D_C$	$0,5 \times D_C$	–

Seco Material Group	Coolant*	Side milling finishing				Side milling roughing			
		v_c m/min	f_z mm/tooth	a_p mm	a_e mm	v_c m/min	f_z mm/tooth	a_p mm	a_e mm
16	E	max	$0,005 \times D_C$	max	$0,2 \times D_C$	max	$0,015 \times D_C$	$1,0 \times D_C$	$0,4 \times D_C$
Plastic soft	A	max	$0,005 \times D_C$	max	$0,2 \times D_C$	max	$0,015 \times D_C$	$1,0 \times D_C$	$0,5 \times D_C$
Plastic hard	M	600	$0,005 \times D_C$	max	$0,2 \times D_C$	400	$0,012 \times D_C$	$1,0 \times D_C$	$0,4 \times D_C$
Copper	E	600	$0,005 \times D_C$	max	$0,2 \times D_C$	400	$0,010 \times D_C$	$1,0 \times D_C$	$0,4 \times D_C$

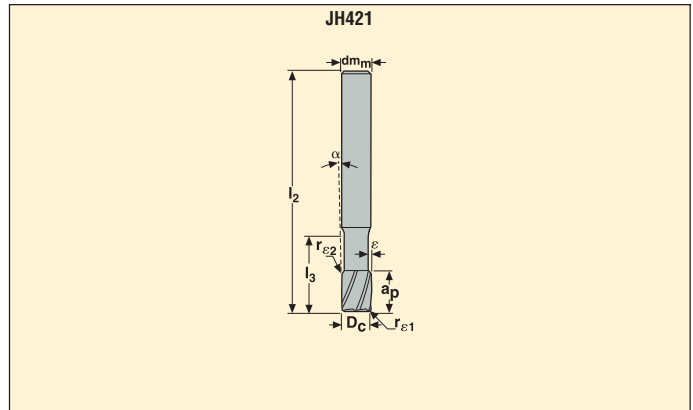
* E = Emulsion
M = Mist spray
A = Air

Note that longer versions of the tool may need a reduction of recommended axial depth of cut a_p . See section "Cutting calculations and definitions" page 162.

Solid carbide corner radius cutter



- Tolerances
- Run-out = 0.01 mm
- $dm_m = h5$
- $D_c = -0.02/-0.04$
- $r_{e1} = +/-0.05$



Type	Part No.	Dimensions in mm								α°	Z_n	
		D_c	dm_m	l_2	l_3	a_p	ϵ	r_{e1}	r_{e2}			
3	JH421-MEGA-T											
	421020R020Z2-MEGA-T	2	3	40	8	3	0,10	0,20	2	3°	2	
	421030R020Z2-MEGA-T	3	3	40	12	4	0,15	0,20	2	—	2	
	421040R020Z2-MEGA-T	4	6	50	16	5	0,20	0,20	2	3°15'	2	
62	421040R030Z2-MEGA-T	4	6	50	16	5	0,20	0,30	2	3°15'	2	
	421050R100Z2-MEGA-T	5	6	50	18	6	0,25	1	2	2°	2	
	421060R025Z2-MEGA-T	6	6	65	20	8	0,30	0,25	2	—	2	
	421060R050Z2-MEGA-T	6	6	65	20	8	0,30	0,50	2	—	2	
13	421060R100Z2-MEGA-T	6	6	65	20	8	0,30	1	2	—	2	
	421080R030Z2-MEGA-T	8	8	75	30	10	0,40	0,30	2	—	2	
	421080R060Z2-MEGA-T	8	8	75	30	10	0,40	0,60	2	—	2	
	421080R100Z2-MEGA-T	8	8	75	30	10	0,40	1	2	—	2	
18	421L080R020Z2-MEGA-T	8	8	100	40	6	0,40	0,2	2	—	2	
	421100R030Z2-MEGA-T	10	10	80	36	12	0,50	0,30	2	—	2	
	421100R080Z2-MEGA-T	10	10	80	36	12	0,50	0,80	2	—	2	
	421100R150Z2-MEGA-T	10	10	80	36	12	0,50	1,50	2	—	2	
23	421100R250Z2-MEGA-T	10	10	80	36	12	0,50	2,5	2	—	2	
	421100R250Z2AMEGA-T	10	10	80	36	12	0,50	2,5	2	—	2	
	421100R310Z2-MEGA-T	10	10	80	36	12	0,50	3,1	2	—	2	
	421L100R050Z2-MEGA-T	10	10	100	50	8	0,50	0,5	2	—	2	
35	421100R250Z2-MEGA-T	10	10	100	50	8	0,50	2,5	2	—	2	
	421L100R310Z2-MEGA-T	10	10	100	50	8	0,50	3,1	2	—	2	
	421120R030Z2-MEGA-T	12	12	90	40	14	0,50	0,30	3	—	2	
	421120R050Z2-MEGA-T	12	12	90	40	14	0,50	0,50	3	—	2	
44	421120R100Z2-MEGA-T	12	12	90	40	14	0,50	1	3	—	2	
	421120R150Z2-MEGA-T	12	12	90	40	14	0,50	1,50	3	—	2	
	421120R200Z2-MEGA-T	12	12	90	40	14	0,50	2	3	—	2	
	421120R250Z2-MEGA-T	12	12	90	40	14	0,50	2,50	3	—	2	
56	421120R250Z2AMEGA-T	12	12	90	40	14	0,50	2,50	3	—	2	
	421120R310Z2-MEGA-T	12	12	90	40	14	0,50	3,1	3	—	2	
	421L120R050Z2-MEGA-T	12	12	125	70	10	0,50	0,5	3	—	2	
	421L120R100Z2-MEGA-T	12	12	125	70	10	0,50	1	3	—	2	
	421L120R150Z2-MEGA-T	12	12	125	70	10	0,50	1,5	3	—	2	
	421L120R200Z2-MEGA-T	12	12	125	70	10	0,50	2	3	—	2	
	421L120R250Z2-MEGA-T	12	12	125	70	10	0,50	2,5	3	—	2	
	421L120R250Z2AMEGA-T	12	12	125	70	10	0,50	2,5	3	—	2	
	421L120R310Z2-MEGA-T	12	12	125	70	10	0,50	3,1	3	—	2	
	421140R050Z2-MEGA-T	14	16	90	40	16	0,50	0,5	3	—	2	
	421140R250Z2-MEGA-T	14	16	90	40	16	0,50	2,5	3	—	2	
	421140R310Z2-MEGA-T	14	16	90	40	16	0,50	3,1	3	—	2	
	421140R400Z2-MEGA-T	14	16	90	40	16	0,50	4,0	3	—	2	
	421L140R050Z2-MEGA-T	14	16	125	70	12	0,50	0,5	3	—	2	

Picture key symbols see pages 14-15.

JH 421

Seco Material Group	Coolant*	Helical/facing ramping				Slotting			
		v_c m/min	f_z mm/tooth	a_p mm	a_e mm	v_c m/min	f_z mm/tooth	a_p mm	a_e mm
16	E	max	$0,007 \times D_C$	$0,5 \times D_C$	–	max	$0,013 \times D_C$	$0,5 \times D_C$	–
Plastic soft	A	max	$0,007 \times D_C$	$0,5 \times D_C$	–	max	$0,013 \times D_C$	$1,0 \times D_C$	–
Plastic hard	M	400	$0,005 \times D_C$	$0,5 \times D_C$	–	400	$0,010 \times D_C$	$0,7 \times D_C$	–
Copper	E	400	$0,004 \times D_C$	$0,5 \times D_C$	–	400	$0,008 \times D_C$	$0,5 \times D_C$	–

Seco Material Group	Coolant*	Side milling finishing				Side milling roughing			
		v_c m/min	f_z mm/tooth	a_p mm	a_e mm	v_c m/min	f_z mm/tooth	a_p mm	a_e mm
16	E	max	$0,005 \times D_C$	max	$0,2 \times D_C$	max	$0,015 \times D_C$	$1,0 \times D_C$	$0,4 \times D_C$
Plastic soft	A	max	$0,005 \times D_C$	max	$0,2 \times D_C$	max	$0,015 \times D_C$	$1,0 \times D_C$	$0,5 \times D_C$
Plastic hard	M	600	$0,005 \times D_C$	max	$0,2 \times D_C$	400	$0,012 \times D_C$	$1,0 \times D_C$	$0,4 \times D_C$
Copper	E	600	$0,005 \times D_C$	max	$0,2 \times D_C$	400	$0,010 \times D_C$	$1,0 \times D_C$	$0,4 \times D_C$

* E = Emulsion
M = Mist spray
A = Air

Note that longer versions of the tool may need a reduction of recommended axial depth of cut a_p . See section "Cutting calculations and definitions" page 162.

JH 40

Seco Material Group	Coolant*	Helical/facing ramping				Slotting			
		v_c m/min	f_z mm/tooth	a_p mm	a_e mm	v_c m/min	f_z mm/tooth	a_p mm	a_e mm
16	E	max	$0,007 \times D_C$	$0,5 \times D_C$	–	max	$0,013 \times D_C$	$0,6 \times D_C$	–
Plastic soft	A	max	$0,007 \times D_C$	$0,5 \times D_C$	–	max	$0,013 \times D_C$	$1,0 \times D_C$	–
Copper	E	400	$0,004 \times D_C$	$0,5 \times D_C$	–	400	$0,008 \times D_C$	$0,4 \times D_C$	–

Seco Material Group	Coolant*	Side milling finishing				Side milling roughing			
		v_c m/min	f_z mm/tooth	a_p mm	a_e mm	v_c m/min	f_z mm/tooth	a_p mm	a_e mm
16	E	max	$0,005 \times D_C$	max	$0,2 \times D_C$	max	$0,015 \times D_C$	$1,3 \times D_C$	$0,4 \times D_C$
Plastic soft	A	max	$0,005 \times D_C$	max	$0,2 \times D_C$	max	$0,015 \times D_C$	$1,3 \times D_C$	$0,5 \times D_C$
Copper	E	600	$0,005 \times D_C$	max	$0,2 \times D_C$	400	$0,010 \times D_C$	$1,3 \times D_C$	$0,3 \times D_C$

* E = Emulsion
M = Mist spray
A = Air

Note that longer versions of the tool may need a reduction of recommended axial depth of cut a_p . See section "Cutting calculations and definitions" page 162.

JH 410

Seco Material Group	Coolant*	Helical/facing ramping				Slotting			
		v_c m/min	f_z mm/tooth	a_p mm	a_e mm	v_c m/min	f_z mm/tooth	a_p mm	a_e mm
16	E	max	$0,020 \times D_C$	$0,8 \times D_C$	–	max	$0,02 \times D_C^*$	$0,8 \times D_C^*$	–
Plastic soft	A	max	$0,013 \times D_C$	$1,0 \times D_C$	–	max	$0,013 \times D_C^*$	$1,0 \times D_C^*$	–
Copper	E	400	$0,008 \times D_C$	$0,4 \times D_C$	–	400	$0,008 \times D_C$	$0,4 \times D_C$	–

Seco Material Group	Coolant*	Side milling roughing							
		v_c m/min	f_z mm/tooth	a_p mm	a_e mm				
16	E	max	$0,025 \times D_C^{**}$	$1 \times D_C$	$0,5 \times D_C$				
Plastic soft	A	max	$0,025 \times D_C^{**}$	$1 \times D_C$	$0,5 \times D_C$				
Copper	E	400	$0,011 \times D_C$	$0,6 \times D_C$	$0,3 \times D_C$				

* Reduce feed and a_p for long versions in slotting ; ML version to $f_z = 0,01 \times D_C$ and $a_p = 0,6 \times D_C$ and TL version to $f_z = 0,007 \times D_C$ and $a_p = 0,4 \times D_C$

** Reduce feed for long versions in side milling ; ML version to $f_z = 0,015 \times D_C$ and TL version to $f_z = 0,01 \times D_C$

JH 410RS

Seco Material Group	Coolant*	Helical/facing ramping				Slotting			
		v_c m/min	f_z mm/tooth	a_p mm	a_e mm	v_c m/min	f_z mm/tooth	a_p mm	a_e mm
16	E	max***	$0,02 \times D_C$	$0,8 \times D_C$	–	max***	$0,03 \times D_C^*$	$1,0 \times D_C^*$	–
Plastic soft	M	max***	$0,02 \times D_C$	$1,0 \times D_C$	–	max***	$0,03 \times D_C^*$	$1,0 \times D_C^*$	–
Copper	E	400	$0,008 \times D_C$	$0,4 \times D_C$	–	400	$0,008 \times D_C$	$0,4 \times D_C$	–

Seco Material Group	Coolant*	Side milling roughing							
		v_c m/min	f_z mm/tooth	a_p mm	a_e mm				
16	E	max***	$0,04 \times D_C^{**}$	max	$0,5 \times D_C$				
Plastic soft	M	max***	$0,04 \times D_C^{**}$	max	$0,5 \times D_C$				
Copper	E	400	$0,011 \times D_C$	max	$0,3 \times D_C$				

* Reduce feed for long version (L) to $f_z = 0,02 \times D_C$ in slotting

** Reduce feed for long version (L) to $f_z = 0,03 \times D_C$ in side milling

***RPM should be max 20000 to avoid unbalance.

* E = Emulsion

M = Mist spray

A = Air

JH 440

Seco Material Group	Coolant*	Helical/facing ramping				Slotting			
		v_c m/min	f_z mm/tooth	a_p mm	a_e mm	v_c m/min	f_z mm/tooth	a_p mm	a_e mm
16	E	max	$0,010 \times D_C$	$0,05 \times D_C$	–	max	$0,008 \times D_C$	$0,45 \times D_C$	–
17	E	280	$0,008 \times D_C$	$0,03 \times D_C$	–	250	$0,006 \times D_C$	$0,32 \times D_C$	–
Plastic soft	M	400	$0,008 \times D_C$	$0,04 \times D_C$	–	300	$0,006 \times D_C$	$0,50 \times D_C$	–
Plastic hard	M	175	$0,007 \times D_C$	$0,02 \times D_C$	–	150	$0,006 \times D_C$	$0,25 \times D_C$	–
Copper	E	450	$0,008 \times D_C$	$0,04 \times D_C$	–	350	$0,006 \times D_C$	$0,25 \times D_C$	–

Seco Material Group	Coolant*	Copy milling finishing							
		v_c m/min	f_z mm/tooth	a_p mm	a_e mm				
16	E	max	$0,020 \times D_C$	$0,05 \times D_C$	$0,05 \times D_C$				
17	E	345	$0,016 \times D_C$	$0,05 \times D_C$	$0,03 \times D_C$				
Plastic soft	M	max	$0,016 \times D_C$	$0,05 \times D_C$	$0,02 \times D_C$				
Plastic hard	M	175	$0,015 \times D_C$	$0,04 \times D_C$	$0,02 \times D_C$				
Copper	E	max	$0,016 \times D_C$	$0,04 \times D_C$	$0,03 \times D_C$				

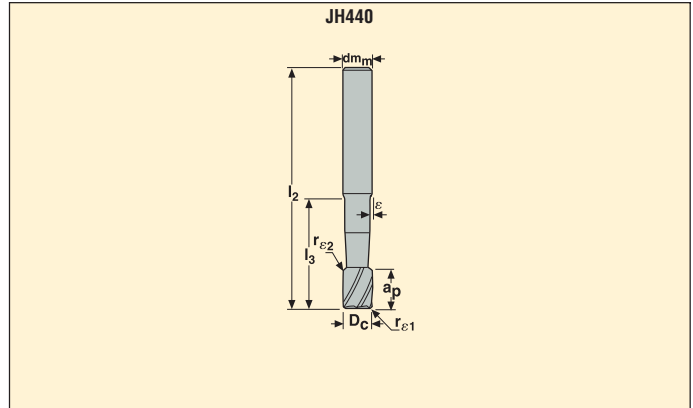
* E = Emulsion
M = Mist spray
A = Air

Note that longer versions of the tool may need a reduction of recommended axial depth of cut a_p . See section "Cutting calculations and definitions" page 162.

Solid carbide corner radius cutter



- Tolerances
- Run-out = 0,01 mm
- $dm_m = h5$
- $D_c = -0.02/-0.04$
- $r_{e1} = +/-0.05$



Type	Part No.	Dimensions in mm								Z_n
		D_c	dm_m	l_2	l_3	a_p	ϵ	r_{e1}	r_{e2}	
JH440-MEGA-T 3 	440060-MEGA-T	6	6	60	30	8	0,3	1,5	2	2
	440080-MEGA-T	8	8	60	30	10	0,4	2	2	2
	440100-MEGA-T	10	10	70	35	12	0,5	2,5	3	2
	440120-MEGA-T	12	12	80	40	12	0,5	3	3	2
	440160-MEGA-T	16	16	90	50	16	0,75	4	4	2
13 										
18 										
MEGA-T										
23 										
35 										
44 										
56 										

Picture key symbols see pages 14-15.

JH 450

Seco Material Group	Coolant*	Helical ramping							
		v_c m/min	f_z mm/tooth	a_p mm	a_e mm				
16	E	max	$0,010 \times D_C$	$0,05 \times D_C$	–				
17	E	280	$0,008 \times D_C$	$0,03 \times D_C$	–				
Plastic soft	M	400	$0,008 \times D_C$	$0,04 \times D_C$	–				
Plastic hard	M	175	$0,007 \times D_C$	$0,02 \times D_C$	–				
Copper	E	450	$0,008 \times D_C$	$0,04 \times D_C$	–				

Seco Material Group	Coolant*	Copy milling finishing				Copy milling roughing			
		v_c m/min	f_z mm/tooth	a_p mm	a_e mm	v_c m/min	f_z mm/tooth	a_p mm	a_e mm
16	E	max	$0,020 \times D_C$	$0,05 \times D_C$	$0,05 \times D_C$	max	$0,022 \times D_C$	$0,20 \times D_C$	$0,40 \times D_C$
17	E	345	$0,016 \times D_C$	$0,05 \times D_C$	$0,03 \times D_C$	300	$0,018 \times D_C$	$0,20 \times D_C$	$0,30 \times D_C$
Plastic soft	M	max	$0,016 \times D_C$	$0,05 \times D_C$	$0,02 \times D_C$	max	$0,018 \times D_C$	$0,50 \times D_C$	$0,50 \times D_C$
Plastic hard	M	175	$0,015 \times D_C$	$0,04 \times D_C$	$0,02 \times D_C$	200	$0,016 \times D_C$	$0,20 \times D_C$	$0,20 \times D_C$
Copper	E	max	$0,016 \times D_C$	$0,04 \times D_C$	$0,03 \times D_C$	max	$0,017 \times D_C$	$0,20 \times D_C$	$0,30 \times D_C$

* E = Emulsion
M = Mist spray
A = Air

Note that cutting speed is always given at the working diameter. See section "Cutting calculations and definitions" page 162.

Note that longer versions of the tool may need a reduction of recommended axial depth of cut a_p . See section "Cutting calculations and definitions" page 162.

JH 460

Seco Material Group	Coolant*	Helical ramping							
		v_c m/min	f_z mm/tooth	a_p mm	a_e mm				
16	E	max	$0,010 \times D_C$	$0,05 \times D_C$	–				
22	E	80	$0,007 \times D_C$	$0,03 \times D_C$	–				
Plastic soft	M	400	$0,008 \times D_C$	$0,04 \times D_C$	–				
Plastic hard	M	175	$0,007 \times D_C$	$0,02 \times D_C$	–				
Copper	E	450	$0,008 \times D_C$	$0,04 \times D_C$	–				

Seco Material Group	Coolant*	Copy milling finishing				Copy milling roughing			
		v_c m/min	f_z mm/tooth	a_p mm	a_e mm	v_c m/min	f_z mm/tooth	a_p mm	a_e mm
16	E	max	$0,020 \times D_C$	$0,05 \times D_C$	$0,05 \times D_C$	max	$0,022 \times D_C$	$0,20 \times D_C$	$0,40 \times D_C$
22	E	170	$0,014 \times D_C$	$0,03 \times D_C$	$0,02 \times D_C$	90	$0,012 \times D_C$	$0,20 \times D_C$	$0,30 \times D_C$
Plastic soft	M	max	$0,016 \times D_C$	$0,05 \times D_C$	$0,02 \times D_C$	max	$0,018 \times D_C$	$0,50 \times D_C$	$0,50 \times D_C$
Plastic hard	M	175	$0,015 \times D_C$	$0,04 \times D_C$	$0,02 \times D_C$	200	$0,016 \times D_C$	$0,20 \times D_C$	$0,20 \times D_C$
Copper	E	max	$0,016 \times D_C$	$0,04 \times D_C$	$0,03 \times D_C$	max	$0,017 \times D_C$	$0,20 \times D_C$	$0,30 \times D_C$

* E = Emulsion
M = Mist spray
A = Air

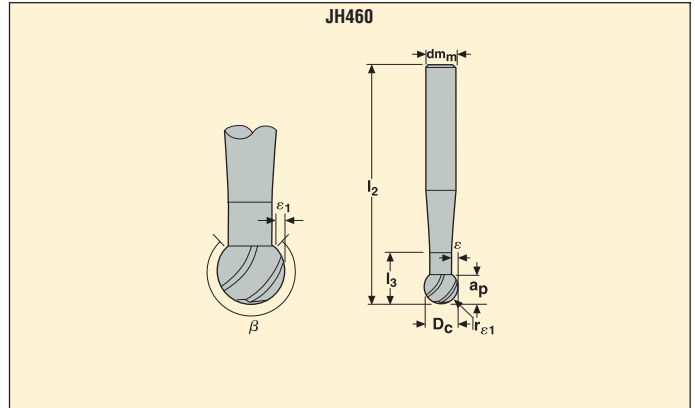
Note that cutting speed is always given at the working diameter. See section "Cutting calculations and definitions" page 162.








Note that longer versions of the tool may need a reduction of recommended axial depth of cut a_p . See section "Cutting calculations and definitions" page 162.

Solid carbide radius cutter



- Tolerances
- Run-out = 0,01 mm
- $dm_m = h5$
- $D_c = 0.02/-0.06$
- $r_{\epsilon 1} = +/-0.01$



Type	Part No.	Dimensions in mm								β	z_n
		D_c	dm_m	l_2	l_3	a_p	ϵ	ϵ_1	$r_{\epsilon 1}$		
3 	460030-HEMI	3	3	60	4,8	2,3	0,75	0,27	1,5	250°	2
	460040-HEMI	4	4	60	5,6	3,1	1,00	0,36	2	250°	2
	460050-HEMI	5	5	70	6,4	3,9	1,25	0,45	2,5	250°	2
	460060-HEMI	6	6	80	9,7	4,7	1,50	0,54	3	250°	2
13 	460080-HEMI	8	8	85	11,2	6,2	2,00	0,72	4	250°	2
	460100-HEMI	10	10	100	15,6	7,8	2,50	0,90	5	250°	2
17 	460120-HEMI	12	12	125	17,2	9,4	3,00	1,08	6	250°	2
28 											
37 											
43 											
54 											

Picture key symbols see pages 14-15.

JH 820

SMG	Coolant*	Helical/facing ramping				Slotting			
		v_c m/min	f_z mm/tooth	a_p mm	a_e mm	v_c m/min	f_z mm/tooth	a_p mm	a_e mm
17	E	280	$0,008 \times D_C$	$0,03 \times D_C$	–	250	$0,006 \times D_C$	$0,32 \times D_C$	–
MMC	E	280	$0,008 \times D_C$	$0,03 \times D_C$	–	250	$0,006 \times D_C$	$0,32 \times D_C$	–

* E = Emulsion

M = Mist spray

A = Air

Note that longer versions of the tool may need a reduction of recommended axial depth of cut a_p . See section "Cutting calculations and definitions" page 162.

JH 830

Seco Material Group	Coolant*	Helical/facing ramping				Slotting			
		v_c m/min	f_z mm/tooth	a_p mm	a_e mm	v_c m/min	f_z mm/tooth	a_p mm	a_e mm
17	E	280	$0,008 \times D_C$	$0,03 \times D_C$	–	250	$0,006 \times D_C$	$0,32 \times D_C$	–
MMC	E	280	$0,008 \times D_C$	$0,03 \times D_C$	–	250	$0,006 \times D_C$	$0,32 \times D_C$	–

Seco Material Group	Coolant*	Side milling finishing				Side milling roughing			
		v_c m/min	f_z mm/tooth	a_p mm	a_e mm	v_c m/min	f_z mm/tooth	a_p mm	a_e mm
17	E	325	$0,012 \times D_C$	$0,80 \times D_C$	$0,03 \times D_C$	295	$0,011 \times D_C$	$1,0 \times D_C$	$0,05 \times D_C$
MMC	E	325	$0,012 \times D_C$	$0,80 \times D_C$	$0,03 \times D_C$	295	$0,011 \times D_C$	$1,0 \times D_C$	$0,05 \times D_C$

* E = Emulsion
M = Mist spray
A = Air

Note that longer versions of the tool may need a reduction of recommended axial depth of cut a_p . See section "Cutting calculations and definitions" page 162.

JH 970

Seco Material Group	Coolant*	Helical ramping							
		v_c m/min	f_z mm/tooth	a_p mm	a_e mm				
1-2	M	250	$0,007 \times D_C$	$0,04 \times D_C$	–				
3-4	M	210	$0,007 \times D_C$	$0,04 \times D_C$	–				
5-6	M	180	$0,006 \times D_C$	$0,03 \times D_C$	–				
8-9	M	100	$0,007 \times D_C$	$0,03 \times D_C$	–				
10-11	M	70	$0,007 \times D_C$	$0,02 \times D_C$	–				
20	E	60	$0,006 \times D_C$	$0,03 \times D_C$	–				
21	E	30	$0,006 \times D_C$	$0,01 \times D_C$	–				
22	E	80	$0,007 \times D_C$	$0,03 \times D_C$	–				

Seco Material Group	Coolant*	Copy milling finishing				Copy milling roughing			
		v_c m/min	f_z mm/tooth	a_p mm	a_e mm	v_c m/min	f_z mm/tooth	a_p mm	a_e mm
1-2	M	500	$0,015 \times D_C$	$0,03 \times D_C$	$0,02 \times D_C$	290	$0,019 \times D_C$	$0,17 \times D_C$	$0,44 \times D_C$
3-4	M	385	$0,014 \times D_C$	$0,03 \times D_C$	$0,02 \times D_C$	250	$0,018 \times D_C$	$0,13 \times D_C$	$0,33 \times D_C$
5-6	M	325	$0,013 \times D_C$	$0,02 \times D_C$	$0,02 \times D_C$	215	$0,018 \times D_C$	$0,11 \times D_C$	$0,31 \times D_C$
8-9	M	210	$0,015 \times D_C$	$0,03 \times D_C$	$0,02 \times D_C$	110	$0,014 \times D_C$	$0,13 \times D_C$	$0,17 \times D_C$
10-11	M	125	$0,014 \times D_C$	$0,02 \times D_C$	$0,01 \times D_C$	70	$0,013 \times D_C$	$0,09 \times D_C$	$0,13 \times D_C$
20	E	150	$0,013 \times D_C$	$0,02 \times D_C$	$0,01 \times D_C$	90	$0,012 \times D_C$	$0,17 \times D_C$	$0,22 \times D_C$
21	E	75	$0,012 \times D_C$	$0,02 \times D_C$	$0,01 \times D_C$	45	$0,011 \times D_C$	$0,11 \times D_C$	$0,13 \times D_C$
22	E	170	$0,014 \times D_C$	$0,03 \times D_C$	$0,02 \times D_C$	90	$0,012 \times D_C$	$0,22 \times D_C$	$0,33 \times D_C$

* E = Emulsion
M = Mist spray
A = Air

Note that cutting speed is always given at the working diameter. See section "Cutting calculations and definitions" page 162.

Note that longer versions of the tool may need a reduction of recommended axial depth of cut a_p . See section "Cutting calculations and definitions" page 162.

JH110

Seco Material Group	Coolant*	Helical/facing ramping							
		v_c m/min	f_z mm/tooth	a_p mm	a_e mm				
12-13	A	185	$0,007 \times D_C$	$0,03 \times D_C$	–				
14-15	A	160	$0,007 \times D_C$	$0,02 \times D_C$	–				

Seco Material Group	Coolant*	Copy milling finishing				Copy milling roughing			
		v_c m/min	f_z mm/tooth	a_p mm	a_e mm	v_c m/min	f_z mm/tooth	a_p mm	a_e mm
12-13	A	345	$0,015 \times D_C$	$0,03 \times D_C$	$0,02 \times D_C$	250	$0,013 \times D_C$	$0,15 \times D_C$	$0,30 \times D_C$
14-15	A	290	$0,014 \times D_C$	$0,02 \times D_C$	$0,02 \times D_C$	200	$0,012 \times D_C$	$0,15 \times D_C$	$0,20 \times D_C$

* E = Emulsion
M = Mist spray
A = Air

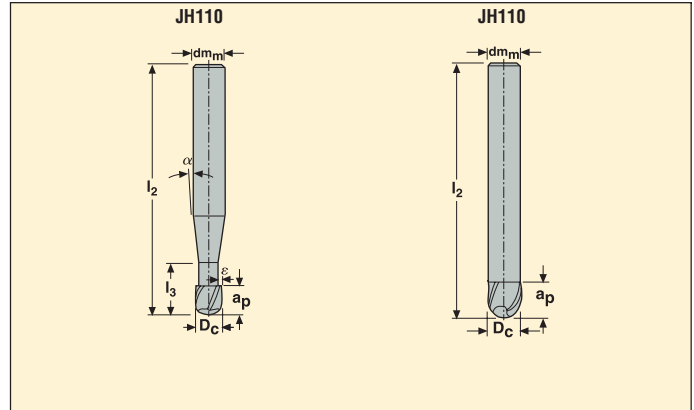
Note that cutting speed is always given at the working diameter. See section "Cutting calculations and definitions" page 162.

Note that longer versions of the tool may need a reduction of recommended axial depth of cut a_p . See section "Cutting calculations and definitions" page 162

Solid carbide radius cutter



- Tolerances
- Run-out = 0.01 mm
- $dm_m = h5$
- $D_c = -0.02/-0.04$
- Radius = +/-0.01



Type	Part No.	Dimensions in mm						α°	Z_n
		D_c	dm_m	l_2	l_3	a_p	ϵ		
3	JH110-MEGA								
	110K020-MEGA	2	4	40	4	2	0,05	6°30'	2
	110020-MEGA	2	6	60	4	2	0,05	8°	2
13	110L020-MEGA	2	6	80	4	2	0,05	8°	2
	110VL020-MEGA	2	6	80	35	2	0,05	3°30'	2
	110025-MEGA	2,5	6	60	5	2,5	0,05	7°30'	2
19	110K030-MEGA	3	4	40	6	3	0,05	3°30'	2
	110030-MEGA	3	6	60	6	3	0,1	5°30'	2
	110L030-MEGA	3	6	80	6	3	0,1	5°30'	2
31	110VL030-MEGA	3	6	80	40	3	0,1	2°30'	2
	110035-MEGA	3,5	6	65	7	3,5	0,15	4°	2
	110K040-MEGA	4	4	40	—	4	—	—	2
43	110040-MEGA	4	6	65	8	4	0,15	3°30'	2
	110L040-MEGA	4	6	80	8	4	0,15	3°30'	2
	110VL040-MEGA	4	6	80	50	4	0,15	1°30'	2
45	110K050-MEGA	5	6	50	10	5	0,2	2°	2
	110050-MEGA	5	6	65	10	5	0,2	2°	2
	110L050-MEGA	5	6	100	10	5	0,2	2°	2
45	110VL050-MEGA	5	8	100	55	5	0,2	2°	2
	110K060-MEGA	6	6	50	—	6	—	—	2
	110060-MEGA	6	8	75	12	6	0,2	3°	2
45	110L060-MEGA	6	8	100	12	6	0,2	3°	2
	110VL060-MEGA	6	8	100	55	6	0,2	1°30'	2
	110VXL060-MEGA	6	10	125	60	6	0,2	2°	2
45	110K080-MEGA	8	8	65	—	8	—	—	2
	110080-MEGA	8	8	75	—	8	—	—	2
	110L080-MEGA	8	8	110	—	8	—	—	2
45	110VL080-MEGA	8	10	125	60	8	0,3	1°30'	2
	110VXL080-MEGA	8	12	150	65	8	0,3	2°	2
	110K100-MEGA	10	10	65	—	10	—	—	2
45	110100-MEGA	10	10	80	—	10	—	—	2
	110L100-MEGA	10	10	125	—	10	—	—	2
	110VL100-MEGA	10	12	125	60	8	0,3	1°30'	2
45	110VXL100-MEGA	10	12	150	80	8	0,3	1°	2
	110120-MEGA	12	12	90	—	12	—	—	2
	110L120-MEGA	12	12	125	—	12	—	—	2
45	110VL120-MEGA	12	16	125	70	10	0,3	2°	2
	110VXL120-MEGA	12	16	175	100	10	0,3	1°30'	2
	110160-MEGA	16	16	100	—	16	—	—	2
45	110L160-MEGA	16	16	150	—	16	—	—	2
	110VXL160-MEGA	16	20	200	100	12	0,3	1°30'	2

Picture key symbols see pages 14-15.