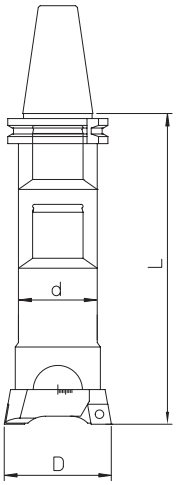
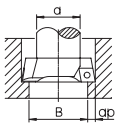
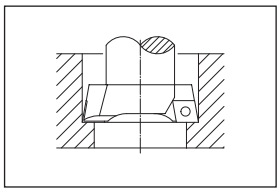
RECOMMENDED CUTTING CONDITIONS FOR ROUGHING OPERATIONS **WITH DOUBLE-BIT HEADS TS**

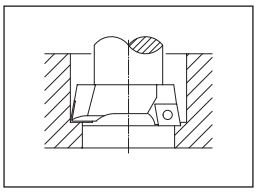


material	boring bar dimensions	working conditions	cutting speed Vc = m/min. diameter			feed fn = mm/rev (twin cutters) insert radius		
			D < 38	D = 38~120	D > 120	R = 0.2	R = 0.4	R = 0.8
carbon steel HB ≤ 200	L / d = 2.5	good	120 - 180	140 - 200	160 - 250		0.2 - 0.4	0.3 - 0.5
	L / d = 4	normal	100 - 160	120 - 180	140 - 200		0.2 - 0.4	0.3 - 0.5
	L / d = 6.3	difficult	70 - 100	70 - 100	70 - 100	0.15 - 0.3	0.2 - 0.4	
carbon steel HB > 200	L / d = 2.5	good	100 - 160	120 - 180	140 - 200		0.2 - 0.4	0.3 - 0.5
	L / d = 4	normal	80 - 140	100 - 160	120 - 180		0.2 - 0.4	0.3 - 0.5
	L / d = 6.3	difficult	60 - 90	70 - 100	70 - 100	0.15 - 0.3	0.2 - 0.4	
stainless steel AISI 304 - 316	L / d = 2.5	good	80 - 110	90 - 120	100 - 140		0.2 - 0.4	0.3 - 0.5
	L / d = 4	normal	70 - 100	80 - 110	90 - 120		0.2 - 0.4	0.3 - 0.5
	L / d = 6.3	difficult	60 - 90	60 - 90	60 - 90	0.15 - 0.3	0.2 - 0.4	
cast iron	L / d = 2.5	good	90 - 120	100 - 140	120 - 160		0.2 - 0.4	0.3 - 0.5
	L / d = 4	normal	70 - 100	90 - 120	100 - 140		0.2 - 0.4	0.3 - 0.5
	L / d = 6.3	difficult	60 - 90	60 - 90	60 - 90	0.15 - 0.3	0.2 - 0.4	
aluminium	L / d = 2.5	good	160 - 250	200 - 300	250 - 350		0.3 - 0.5	0.4 - 0.6
	L / d = 4	normal	140 - 200	160 - 250	200 - 300		0.3 - 0.5	0.4 - 0.6
	L / d = 6.3	difficult	100 - 150	100 - 150	100 - 150	0.2 - 0.4	0.3 - 0.5	

cutting depth ap = mm	working range Ø = mm	max. cutting depth steel	max. cutting depth cast iron, aluminium
	18 - 28	1.5 - 2	2 - 2.5
	28 - 50	2 - 3	2.5 - 3.5
	50 - 68	3 - 4	3.5 - 5
	68 - 200	4 - 5	5 - 7
	200 - 500	5 - 6	6 - 8



Twin cutters at the same cutting diameter

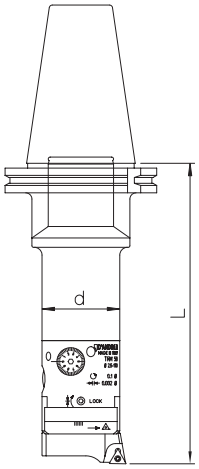


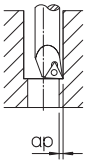
Twin cutters at different cutting diameters

It's advisable to start with B hole ≥ the boring bar diameter d.

ATTENTION: For boring operations at different diameters, reduce to a half the feed indicated on the above table.

RECOMMENDED CUTTING CONDITIONS FOR BORING OPERATIONS **WITH TESTAROSSA TRM / TRC / TR-E**



material	boring bar dimensions	working conditions	cutting speed Vc= m/min.	feed fn = mm/rev insert radius R = 0.0	feed fn = mm/rev insert radius R = 0.2	feed fn = mm/rev insert radius R = 0.4	quality insert	cutting depth
carbon steel HB ≤ 200	L / d = 2.5	good	200 - 300		0.05 - 0.08	0.07 - 0.1	DC100 DP300	 ap 0.1 - 0.25 mm
	L / d = 4	normal	160 - 250		0.05 - 0.08	0.07 - 0.1		
	L / d = 6.3	difficult	70 - 100	0.05 - 0.08	0.05 - 0.08			
carbon steel HB > 200	L / d = 2.5	good	160 - 250		0.05 - 0.08	0.07 - 0.1	DC100	
	L / d = 4	normal	150 - 200		0.05 - 0.08	0.07 - 0.1		
	L / d = 6.3	difficult	70 - 100	0.05 - 0.08	0.05 - 0.08			
stainless steel AISI 304 - 316	L / d = 2.5	good	120 - 160		0.05 - 0.08	0.07 - 0.1	DP300	
	L / d = 4	normal	100 - 140		0.05 - 0.08	0.07 - 0.1		
	L / d = 6.3	difficult	70 - 100	0.05 - 0.08	0.05 - 0.08			
cast iron	L / d = 2.5	good	120 - 160		0.05 - 0.08	0.07 - 0.1	DK100 DP100	
	L / d = 4	normal	100 - 140		0.05 - 0.08	0.07 - 0.1		
	L / d = 6.3	difficult	70 - 100	0.05 - 0.08	0.05 - 0.08			
aluminium	L / d = 2.5	good	300 - 400		0.05 - 0.08	0.07 - 0.1	DK100	
	L / d = 4	normal	250 - 350		0.05 - 0.08	0.07 - 0.1		
	L / d = 6.3	difficult	100 - 150	0.05 - 0.08	0.05 - 0.08			
steel HB > 200	L / d = 2.5	good	80 - 100		0.04 - 0.06	0.05 - 0.07	D20CBN	
	L / d = 4	normal	80 - 100		0.04 - 0.06	0.05 - 0.07		

CALCULATION FORMULAS FOR BORING

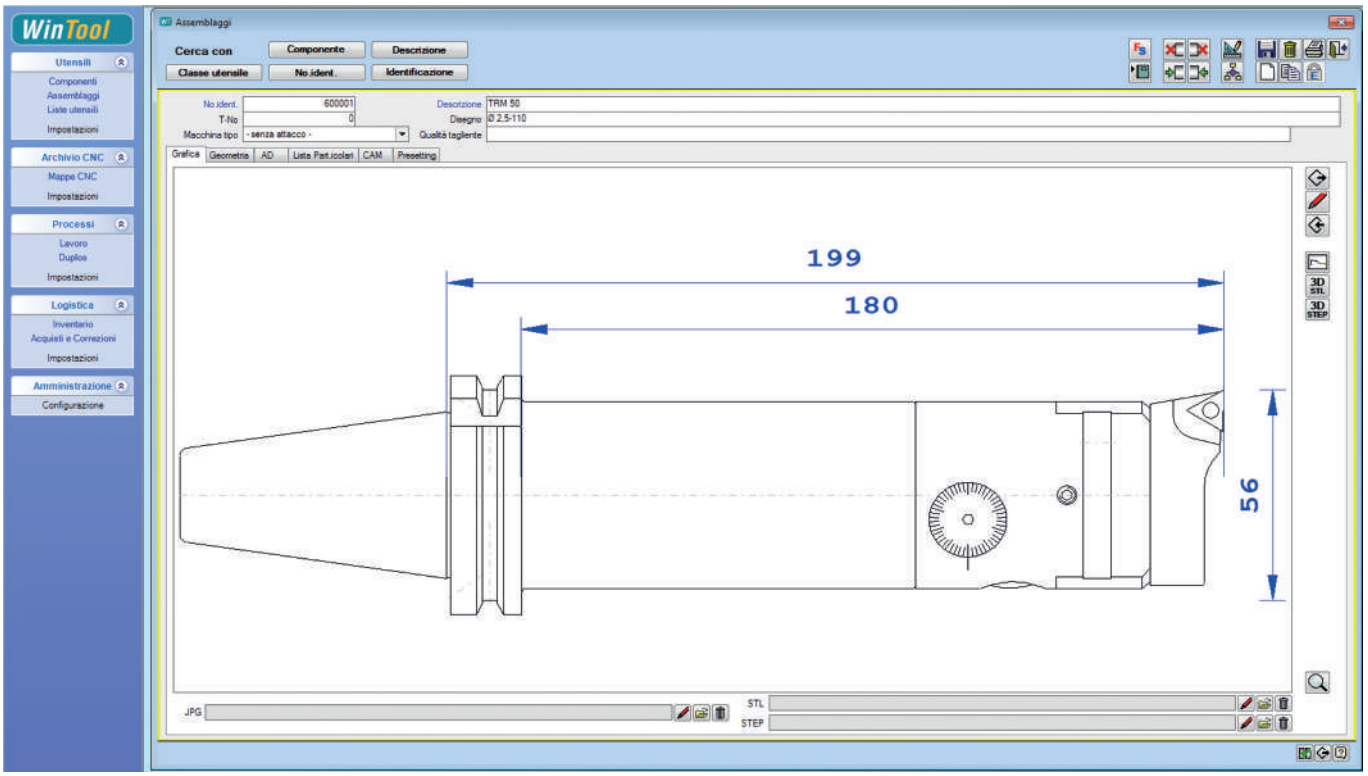
Vc cutting speed (m/min.)
D diameter of workpiece (mm)
n number of revolutions / min' (rev./min)
Vf feed rate (mm/min.)
fn feed / rev. (mm/rev)
π 3.14

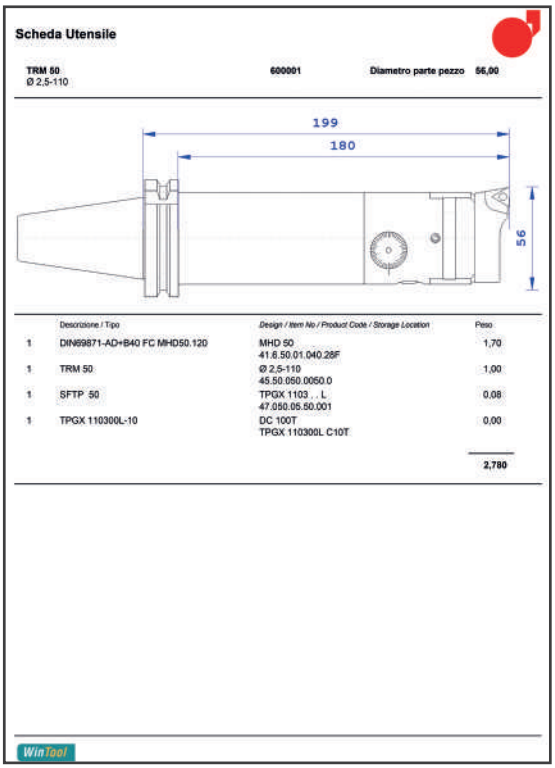
$$Vc = \frac{\pi \cdot D \cdot n}{1000}$$

$$n = \frac{Vc \cdot 1000}{\pi \cdot D}$$

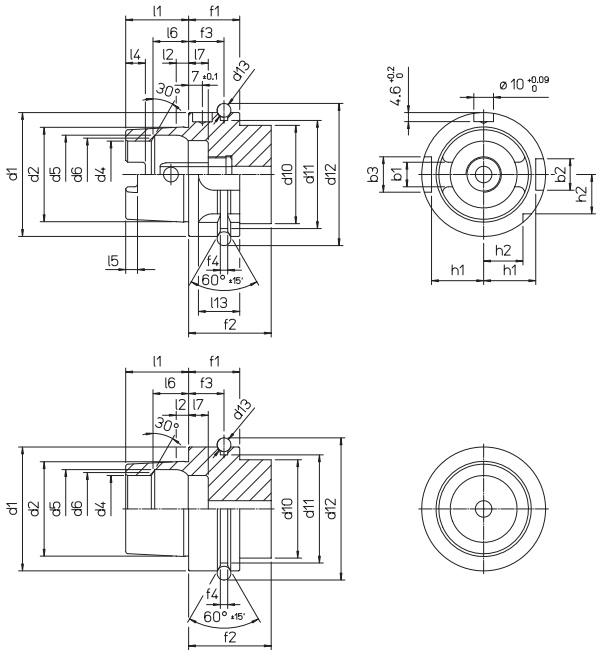
$$Vf = n \cdot fn$$

It allows to be graphically constructed in a short period of time, showing the complete composition of the Modulhard'Andrea tools, including dimensions, weight and the list of components.



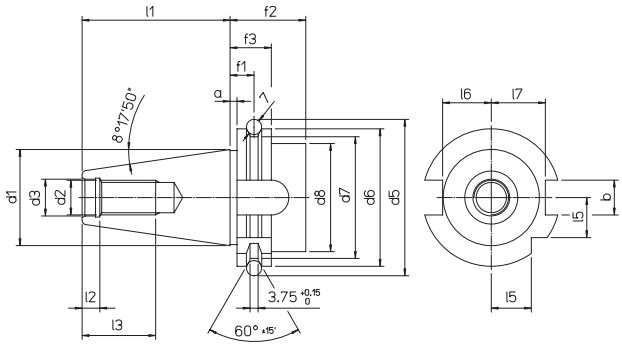


HSK-A



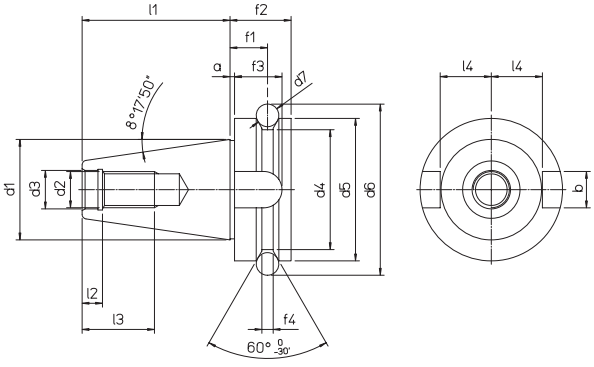
HSK	32	40	50	63	80	100
b1 $^{+0.04}_{-0.04}$	7.05	8.05	10.54	12.54	16.04	20.02
b2 H10	7	9	12	16	18	20
b3 H10	9	11	14	18	20	22
d1 h10	32	40	50	63	80	100
d2	24.007	30.007	38.009	48.010	60.012	75.013
d4 H10	17	21	26	34	42	53
d5 H11	20.5	25.5	32	40	50	63
d6	19	23	29	37	46	58
d10 max.	26	34	42	53	68	88
d11 $^{0}_{-0.1}$	26.5	34.8	43	55	70	92
d12 $^{0}_{-0.1}$	37	45	59.3	72.3	88.8	109.75
d13	4		7			
f1 $^{0}_{-0.1}$	20		26			29
f2 min.	35		42			45
f3 ± 0.1	16		18			20
f4 $^{+0.15}_{0}$	2		3.75			
h1 $^{0}_{-0.2}$	13	17	21	26.5	34	44
h2 $^{0}_{-0.3}$	9.5	12	15.5	20	25	31.5
l1 $^{0}_{-0.2}$	16	20	25	32	40	50
l2	3.2	4	5	6.3	8	10
l4 $^{+0.2}_{0}$	5	6	7.5	10	12	15
l5 $^{+0.2}_{0}$	3	3.5	4.5	6	8	10
l6 JS10	8.92	11.42	14.13	18.13	22.85	28.56
l7 $^{0}_{-0.1}$	8		10	10	12.5	12.5
l13	12		19	21	22	24

DIN 69871 A (ISO 7388-1)



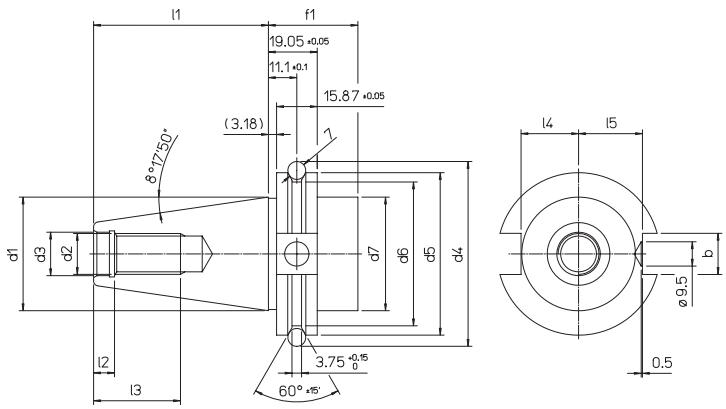
ISO	30	40	45	50	60
a ± 0.1	3.2				
b +0.5 / 0	16.1		19.3	25.7	
d1	31.75	44.45	57.15	69.85	107,95
d2 6H	M12	M16	M20	M24	M30
d3 H7	13	17	21	25	32
d5 ± 0.05	59.3	72.3	91.35	107.25	164,75
d6 0 / -0.1	50	63.55	82.55	97.50	155
d7 0 / -0.5	44.3	56.25	75.25	91.25	147,70
d8 max.	45	50	63	80	130
f1 ± 0.1	11.1				
f2 min.	35				38
f3 0 / -0.1	19.1				
l1 0 / -0.3	47.8	68.4	82.7	101.75	161,90
l2 +0.5 / 0	5.5	8.2	10	11.5	14
l3 min.	24	32	40	47	59
l5 0 / -0.3	15	18.5	24	30	49
l6 0 / -0.3	16.4	22.8	29.1	35.5	54,5
l7 0 / -0.3	19	25	31.3	37.7	59,3

MAS 403 BT A



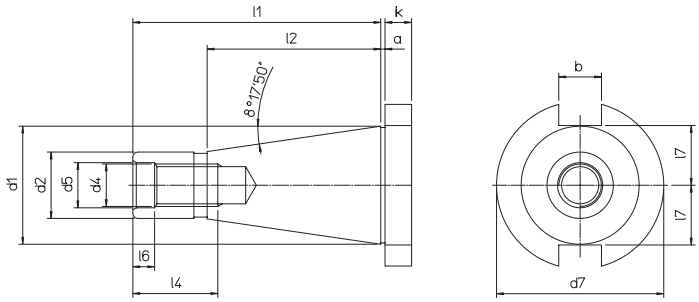
ISO	30	35	40	45	50	60
a ± 0.4	2			3		
b +0.2 / 0	16.1			19.3	25.7	25,7
d1	31.75	38.10	44.45	57.15	69.85	107,95
d2 6H	M 12		M 16	M 20	M 24	M30
d3 H8	12.5		17	21	25	31
d4 0 / -0.5	38	43	53	73	85	135
d5 h8	46	53	63	85	100	155
d6 ± 0.05	56.03	65.68	75.56	100.09	118.89	180.22
d7	8	10		12	15	20
f1 ± 0.1	13.6	14.6	16.6	21.2	23.2	28,2
f2	22	24	27	33	38	48
f3 min.	17	20	21	26	31	34
f4	4	5		6	7	11
l1 ± 0.2	48.4	56.4	65.4	82.8	101.8	161,8
l2 +0.5 / 0	7		9	11	13	16
l3 min.	24		30	36	45	56
l4 0 / -0.3	16.3	19.6	22.6	29.1	35.4	60,1

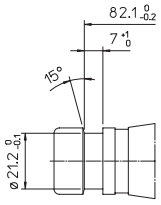
ANSI/CAT



ISO	40	45	50
b +0.2 / 0	16.1	19.3	25.7
d1 6H	44.45	57.15	69.85
d2	M 16	M 20	M 24
d3 H7	17	21	25
d4 ±0.05	72.3	91.35	108.25
d5 0 / -0.1	63.55	82.55	98.5
d6 0 / -0.5	56.25	75.25	91.25
d7 ±0.15	44.45	57.15	69.95
f1 min	35		38
l1 0 / -0.3	68.4	82.7	101.75
l2 +0.5 / 0	8.2	10	11.5
l3 min.	32	40	47
l4 0 / -0.3	22.8	29.10	35.50
l5 0 / -0.3	25	31.3	37.7

DIN 2080

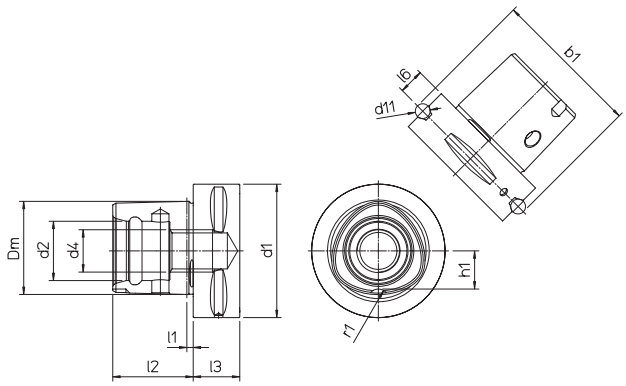




ISO 40 OTT

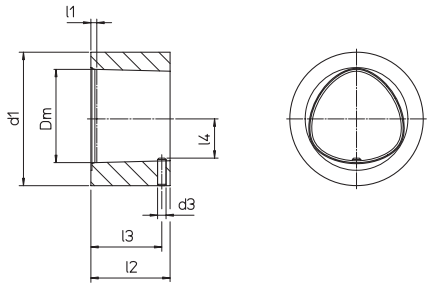
ISO	30	40	45	50
a ±0.2	1.6		3.2	
b H12	16.1		19.3	25.7
d1	31.75	44.45	57.15	69.85
d2 a10	17.4	25.3	32.4	39.6
d4 ±0.05	M 12	M 16	M 20	M 24
d5	13	17	21	26
d7 0 / -0.4	50	63	80	97.5
k ±0.15	8	10	12	12
l1	68.4	93.4	106.8	126.8
l2	48.4	65.4	82.8	101.8
l4	24	32	40	47
l6 +0.5/ 0	5.5	8.2	10	11.5
l7 max.	16.2	22.5	29	35.3

ISO 26623-1



PSC	40	50	63	80
b1 ±0.1	46	59.3	70.7	86
Dm	28	35	44	55
d1 ±0.1	40	50	63	80
d2 +0.1 -0.05	18	21	28	32
d4	M14x1.5	M16x1.5	M20x2	
d11	5	7		
l1	2.5	3		
l2 ±0.1	24	30	38	48
l3 min	20		22	30
l6 ±0.15	8	10	12	
h1 ±0.1	11	14	18	22.2
r1 ±0.3	4	5	6	7

ISO 26623-2



PSC	40	50	63	80
Dm	28	35	44	55
d1 min	40	50	63	80
d3	2.5	3	4	5
l1	2.3	2.8	2.8	2.8
l2 ±0.1	23.4	29.4	37.4	47.4
l3 ±0.2	21	26	33.5	43
l4	11.5±0.2	14.5±0.2	18.5±0.2	22.8±0.2