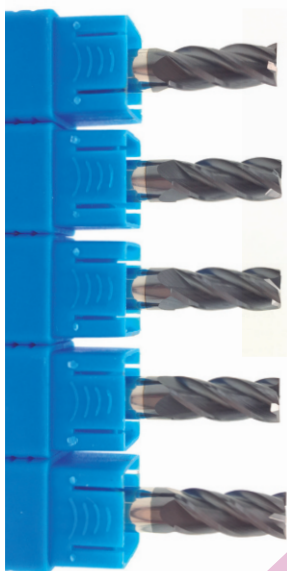


# FRESAS MD 45 HRC STD



# FRESAS TOPO RETO MD 4 CORTES 45HRC TIALN



LINHA  
STANDARD

CÓDIGO	D1	L1	Dhi	L2
	DIÂMETRO	COMPRIMENTO DE CORTE	DIÂMETRO DE HASTE	COMPRIMENTO TOTAL
4540100	1	3	3	50
4540104	1	3	4	50
4540107	1	3	6	50
4540150	1,5	3	3	50
4540154	1,5	3	4	50
4540157	1,5	3	6	50
4540200	2	6	3	50
4540204	2	6	4	50
4540207	2	6	6	50
4540254	2,5	6	4	50
4540257	2,5	6	6	50
4540300	3	8	3	50
4540304	3	8	4	50
4540307	3	8	6	50
4540354	3,5	8	4	50
4540400	4	11	4	50
4540407	4	11	6	50
4540454	4,5	11	5	50



# FRESAS TOPO RETO MD 4 CORTES 45HRC TIALN



LINHA  
STANDART

CÓDIGO	D1	L1	Dhi	L2
	DIÂMETRO	COMPRIMENTO DE CORTE	DIÂMETRO DE HASTE	COMPRIMENTO TOTAL
4540500	5	13	5	50
4540504	5	13	6	50
4540600	6	15	6	50
4540704	7	20	8	50
4540800	8	20	8	50
4541000	10	25	10	50
4541104	11	25	12	50
4541200	12	30	12	50
4541304	13	30	14	50
4541400	14	30	14	50
4541402	14	40	14	50
4541502	15	40	15	50
4541602	16	40	16	50
4541802	18	40	18	50
4541902	19	40	20	50
4542002	20	40	20	50
4542202	22	45	22	50
4542502	25	45	25	50



# FRESAS TOPO RETO MD 4 CORTES LONGA 45HRC TIALN



LINHA  
STANDART

CÓDIGO	D1	L1	Dhi	L2
	DIÂMETRO	COMPRIMENTO DE CORTE	DIÂMETRO DE HASTE	COMPRIMENTO TOTAL
4540105	1	5	4	75
4540155	1,5	5	4	75
4540156	1,5	10	4	100
4540205	2	10	4	75
4540208	2	10	6	75
4540255	2,5	6	4	75
4540301	3	8	3	75
4540305	3	8	4	75
4540308	3	10	6	75
4540302	3	15	3	100
4540401	4	20	4	75
4540408	4	11	6	75
4540402	4	20	4	100
4540409	4	20	6	100
4540501	5	20	5	75



# FRESAS TOPO RETO MD 4 CORTES LONGA 45HRC TIALN



LINHA  
STANDART

CÓDIGO	D1	L1	Dhi	L2
	DIÂMETRO	COMPRIMENTO DE CORTE	DIÂMETRO DE HASTE	COMPRIMENTO TOTAL
4540502	5	30	5	100
4540601	6	20	6	75
4540602	6	30	6	100
4540603	6	40	6	150
4540801	8	25	8	75
4540802	8	30	8	100
4540803	8	40	8	150
4540904	9	20	10	75
4541002	10	40	10	100
4541003	10	50	10	150
4541202	12	45	12	100
4541203	12	70	12	150
4541403	14	50	14	150
4541603	16	70	16	150
4542003	20	58	20	150



# FRESAS TOPO RETO MD 2 CORTES 45HRC TIALN



LINHA  
STANDART

CÓDIGO	D1	L1	Dh	L2
	DIÂMETRO	COMPRIMENTO DE CORTE	DIÂMETRO DE HASTE	COMPRIMENTO TOTAL
4520100	1	3	3	50
4520104	1	3	4	50
4520107	1	3	6	50
4520150	1,5	3	3	50
4520154	1,5	3	4	50
4520157	1,5	3	6	50
4520200	2	6	3	50
4520204	2	6	4	50
4520207	2	6	6	50
4520254	2,5	6	4	50
4520257	2,5	6	6	50
4520300	3	8	3	50
4520304	3	8	4	50
4520307	3	8	6	50
4520354	3,5	8	4	50
4520400	4	11	4	50



# FRESAS TOPO RETO MD 2 CORTES 45HRC TIALN



LINHA  
STANDART

CÓDIGO	D	L1	Dh	L2
	DIÂMETRO	COMPRIMENTO DE CORTE	DIÂMETRO DE HASTE	COMPRIMENTO TOTAL
4520407	4	11	6	50
4520454	4,5	11	5	50
4520500	5	13	5	50
4520504	5	13	6	50
4520600	6	15	6	50
4520654	6,5	20	8	60
4520704	7	20	8	60
4520800	8	20	8	60
4521000	10	25	10	75
4521200	12	30	12	75
4521402	14	40	14	100
4521504	15	30	16	80
4521602	16	45	16	100
4521802	18	45	18	100
4522002	20	50	20	100



# FRESAS TOPO RETO MD 2 CORTES LONGA 45HRC TIALN



LINHA  
STANDART

CÓDIGO	D	L1	Dh	L2
	DIÂMETRO	COMPRIMENTO DE CORTE	DIÂMETRO DE HASTE	COMPRIMENTO TOTAL
4520105	1	5	4	50
4520155	1,5	5	4	50
4520156	1,5	10	4	100
4520205	2	10	4	75
4520208	2	10	6	75
4520255	2,5	6	4	75
4520301	3	8	3	75
4520305	3	8	4	75
4520308	3	10	6	75
4520303	3	15	3	100
4520401	4	20	4	75
4520408	4	11	6	75
4520402	4	20	4	100
4520409	4	20	6	100
4520501	5	30	5	75
4520503	5	30	5	100





# FRESAS TOPO RETO MD 2 CORTES LONGA 45HRC TIALN



APLICAÇÃO DO MATERIAL ● Excelente ○ Bom

## TABELA DE APLICAÇÃO LINHA STANDART < 45HRC

Ferro Aço Macio ~30HRC	Aço Duro Aço Carbono ~45HRC	Aço Carbono, Aço Ferramenta				Aço Inox	Ferro Fundido	Bronze Latão	Alumínio	Titânio	Liga Alta Tempera
		~52HRC	~55HRC	~58HRC	~65HRC						
●	○						●				

GRUPO DE MATERIAL	AÇO LIGA /AÇO FERRAMENTA						AÇO TEMPERADO		AÇO INOX		FERRO FUNDIDO	
CÓDIGO	45C, S50C, SCM		SCM, SKT, SKD		SCM, SKT, SKD		SKT, SKD		SUS 304		FC/BCD	
DUREZA	HRC < 20		HRC 20 ~ 30		HRC 30 ~ 40		HRC 45 ~ 45		-		-	
VC	88 M/Min		71 M/Min		59 M/Min		35 M/Min		71 M/Min		103 M/Min	
DIÂMETRO	R.P.M	FEED (mm/min)	R.P.M	FEED (mm/min)	R.P.M	FEED (mm/min)	R.P.M	FEED (mm/min)	R.P.M	FEED (mm/min)	R.P.M	FEED (mm/min)
3MM	9,828	455	7,488	295	6,084	195	3,926	90	7,488	345	11,232	520
4MM	7,020	430	5,616	295	4,680	200	2,808	85	5,616	345	8,424	520
5MM	5,850	450	4,446	290	3,744	200	2,340	90	4,446	345	6,552	505
6MM	4,680	430	3,744	295	3,042	195	1,872	85	3,744	345	5,616	520
8MM	3,510	430	2,808	295	2,340	200	1,404	85	2,808	345	4,212	520
10MM	2,808	430	2,223	290	1,872	200	1,118	85	2,223	340	3,276	505
12MM	2,340	430	1,872	295	1,560	200	936	85	1,872	345	2,808	520
14MM	2,340	500	1,768	325	1,482	225	936	100	1,768	380	2,600	560
16MM	2,028	500	1,560	325	1,300	225	806	100	1,560	385	2,340	575
18MM	1,820	455	1,378	290	1,144	200	728	90	1,378	345	2,080	520
20MM	1,560	430	1,248	295	1,040	200	624	85	1,248	345	1,820	505

Milling Amount (mm)



Ad = 1.5D  
RD ≤ 0.05D  
Ad = 1.5D  
RD ≤ 0.1D

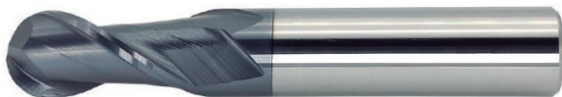
d(刃径)	Tolerance (公差)
Φ < 3	0~ -0.02
3 ≤ Φ ≤ 10	0~ -0.03
Φ > 10	0~ -0.04

Finishing(精铣)	◎
Semi-Finishing(中铣)	⊙
Roughing(粗铣)	○

LINHA  
STANDART



# FRESAS TOPO ESFÉRICA MD 2 CORTES 45HRC TIALN

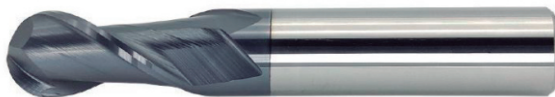


LINHA  
STANDART

CÓDIGO	HD	R-D	L1	L2
	DIÂMETRO DE HASTE	RAIO DIÂMETRO	COMPRIMENTO DE CORTE	COMPRIMENTO TOTAL
4530104	4	0.5-1,0	2	50
4530107	6	0.5-1,0	2	50
4530154	4	0.75-1,5	3	50
4530157	6	0.75-1,5	3	50
4530204	4	1,0-2,0	4	50
4530207	6	1,0-2,0	4	50
4530254	4	1.25-2,5	5	50
4530257	6	1.25-2,5	5	50
4530300	3	1.5-3,0	6	50
4530304	4	1.5-3,0	6	50
4530307	6	1.5-3,0	6	50
4530400	4	2-4,0	8	50
4530407	6	2-4,0	8	50
4530500	5	2.5-5,0	10	50
4530604	6	2.5-5,0	10	50
4530600	6	3-6,0	12	50
4530800	8	4-8,0	16	60
4531000	10	5-10,0	20	75
4531200	12	6-12,0	24	75
4531402	14	7-14,0	28	100
4531602	16	8-16,0	32	100
4532002	20	10,0-20,0	40	100



# FRESAS TOPO ESFÉRICA MD 2 CORTES LONGA 45HRC TIALN

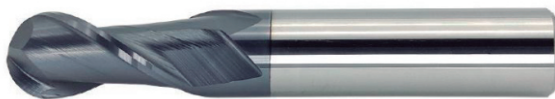


LINHA  
STANDARD

CÓDIGO	HD	R-D	L1	L2
	DIÂMETRO DE HASTE	RAIO DIÂMETRO	COMPRIMENTO DE CORTE	COMPRIMENTO TOTAL
4530105	4	1.5-1.0	2	75
4530155	4	0.75-1,5	3	75
4530205	4	1.0-2.0	4	75
4530208	6	1.0-2.0	4	75
4530255	4	1.25-2.5	5	75
4530301	3	1.5-3.0	6	75
4530302	3	1.5-3.0	6	100
4530305	4	1.5-3.0	6	75
4530308	6	1.5-3.0	6	75
4530401	4	2.0-4.0	8	75
4530402	4	2.0-4.0	8	100
4530508	6	2.0-4.0	8	75
4530409	6	2.0-4.0	8	100
4530501	5	2.5-5.0	10	75



# FRESAS TOPO ESFÉRICA MD 2 CORTES LONGA 45HRC TIALN

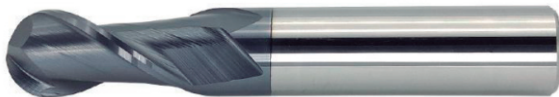


LINHA  
STANDART

CÓDIGO	DH	R-D	L1	L2
	DIÂMETRO DE HASTE	RAIO DIÂMETRO	COMPRIMENTO DE CORTE	COMPRIMENTO TOTAL
4530502	5	2.5-5.0	10	100
4530508	6	2.5-5.0	10	75
4530601	6	3.0-6.0	12	75
4530602	6	3.0-6.0	12	100
4530603	6	3.0-6.0	12	150
4530801	8	4.0-8.0	16	75
4530802	8	4.0-8.0	16	100
4530803	8	4.0-8.0	16	150
4530904	9	4,5-9.0	25	100
4531002	10	5.0-10.0	20	100
4531003	10	5.0-10.0	20	150
4531202	12	6.0-12.0	24	100
4531203	12	6.0-12.0	24	150



# FRESAS TOPO ESFÉRICA MD 2 CORTES LONGA 45HRC TIALN



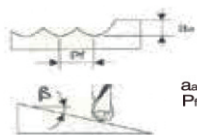
LINHA  
STANDARD

## APLICAÇÃO DO MATERIAL ● Excelente ○ Bom

### TABELA DE APLICAÇÃO LINHA STANDARD < 45HRC

Ferro Aço Macio ~30HRC	Aço Duro Aço Carbono ~45HRC	Aço Carbono, Aço Ferramenta				Aço Inox	Ferro Fundido	Bronze Latão	Alumínio	Titânio	Liga Alta Tempera
		~52HRC	~55HRC	~58HRC	~65HRC						
●	○						●				

GRUPO DE MATERIAL	AÇO LIGA /AÇO FERRAMENTA						AÇO TEMPERADO		AÇO INOX		FERRO FUNDIDO	
CÓDIGO	45C, S50C, SCM		SCM, SKT, SKD		SCM, SKT, SKD		SKT, SKD		SUS 304		FC/FCd	
DUREZA	HRC < 20		HRC 20~30		HRC 30 ~40		HRC 45 ~ 45		-		-	
VC	88 M/Min		71 M/Min		59 M/Min		35 M/Min		71 M/Min		103 M/Min	
DIÂMETRO	R.P.M	FEED (mm/min)	R.P.M	FEED (mm/min)	R.P.M	FEED (mm/min)	R.P.M	FEED (mm/min)	R.P.M	FEED (mm/min)	R.P.M	FEED (mm/min)
0.5R	46,800	545	42,120	420	28,080	230	18,720	110	42,120	490	58,500	685
1.0R	26,676	700	21,060	470	15,210	280	10,660	140	21,060	555	29,718	780
2.0R	14,976	875	11,232	560	8,190	335	5,980	175	11,232	655	14,976	875
3.0R	9,828	860	7,488	560	4,914	300	3,926	170	7,488	655	9,828	860
4.0R	7,488	875	5,616	560	3,744	305	2,990	175	5,616	655	7,488	875
5.0R	5,967	870	4,446	550	2,808	285	2,379	175	4,446	650	5,967	870
6.0R	4,914	860	3,744	560	2,340	285	1,976	175	3,744	655	4,914	860
8.0R	4,160	970	3,120	620	2,028	330	1,664	195	3,120	730	4,160	970
10.0R	3,380	890	2,496	560	1,690	310	1,352	175	2,496	655	3,380	890

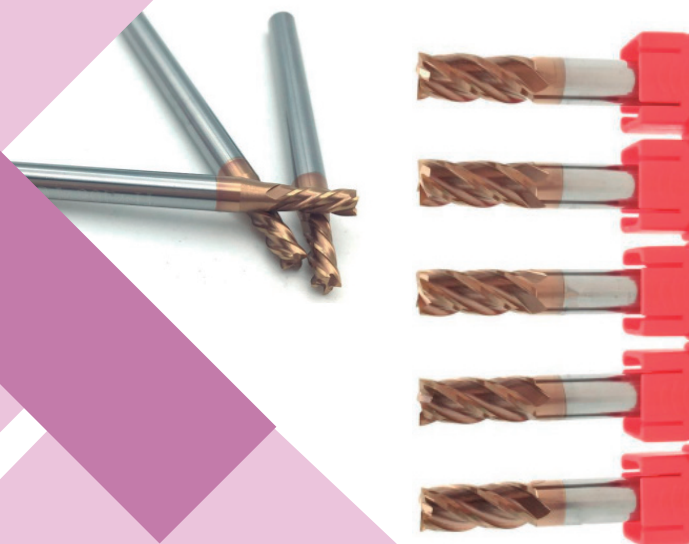


Ra = 0.02D  
Pr = 0.05D

d(刃径)	R Tolerance (R公差)
Φ ≤ 12	± 0.01
Φ > 12	± 0.015
Finishing(精铣)	◎
Semi-Finishing(中铣)	◎
Roughing(粗铣)	○



# FRESAS MD 55 HRC STD



# FRESAS TOPO RETO

## 4 CORTES BRONZE <55HRC TISIN



LINHA  
STANDART

CÓDIGO	D1	L1	D	L
	DIÂMETRO	COMPRIMENTO DE CORTE	DIÂMETRO DE HASTE	COMPRIMENTO TOTAL
5040100	1	3	3	50
5040104	1	3	4	50
5040150	1,5	4	3	50
5040154	1,5	4	4	50
5040204	2	6	4	50
5040207	2	6	6	50
5040254	2,5	8	4	50
5040300	3	8	3	50
5040304	3	8	4	50
5040307	3	8	6	50
5040354	3,5	8	4	50
5040400	4	10	4	50
5040407	4	10	6	50
5040454	4,5	10	5	50
5040500	5	13	5	50
5040504	5	13	6	50



# FRESAS TOPO RETO

## 4 CORTES BRONZE <55HRC TISIN



LINHA  
STANDART

CÓDIGO	D1	L1	D	L
	DIÂMETRO	COMPRIMENTO DE CORTE	DIÂMETRO DE HASTE	COMPRIMENTO TOTAL
5040600	6	15	6	50
5040654	6.5	20	8	60
5040704	7	20	8	60
5040800	8	20	8	60
5040904	9	25	10	75
5041000	10	25	10	75
5041104	11	25	12	75
5041200	12	30	12	75
5041304	13	35	14	80
5041400	14	32	14	80
5041402	14	45	14	100
5041600	16	35	16	80
5041602	16	45	16	100
5042002	20	45	20	100





# FRESAS TOPO RETO

## 4 CORTES BRONZE <55HRC TISIN

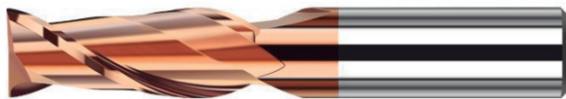


LINHA  
STANDART

CÓDIGO	D1	L1	DH	L
	DIÂMETRO	COMPRIMENTO DE CORTE	DIÂMETRO DE HASTE	COMPRIMENTO TOTAL
5040105	1	5	4	75
5040205	2	6	4	75
5040208	2	6	6	75
5040301	3	8	3	75
5040302	3	8	3	100
5040308	3	8	6	75
5040401	4	20	4	75
5040402	4	20	4	100
5040408	4	11	6	75
5040409	4	11	6	100
5040501	5	20	5	75
5040502	5	25	5	100
5040601	6	25	6	75
5040602	6	25	6	100
5040801	8	20	8	75
5040802	8	30	8	100
5041002	10	40	10	100
5041202	12	45	12	100



# FRESAS TOPO RETO 2 CORTES BRONZE <55HRC TISIN

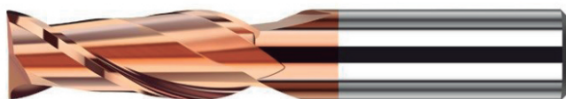


LINHA  
STANDART

CÓDIGO	D1	L1	D	L
	DIÂMETRO	COMPRIMENTO DE CORTE	DIÂMETRO DE HASTE	COMPRIMENTO TOTAL
5020104	1	3	4	50
5020204	2	6	4	50
5020300	3	8	3	50
5020301	3	8	3	75
5020302	3	8	3	100
5020304	3	8	4	50
5020400	4	11	4	50
5020401	4	11	4	75
5020402	4	11	4	100
5020500	5	13	5	50
5020501	5	15	5	75
5020502	5	25	5	100
5020600	6	15	6	50



# FRESAS TOPO RETO 2 CORTES BRONZE <55HRC TISIN

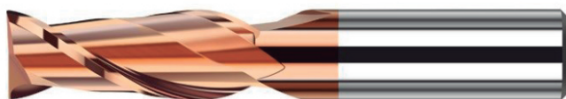


LINHA  
STANDART

CÓDIGO	D1	L1	D	L
	DIÂMETRO	COMPRIMENTO DE CORTE	DIÂMETRO DE HASTE	COMPRIMENTO TOTAL
5020600	6	15	6	50
5020601	6	20	6	75
5020602	6	25	8	100
5020800	8	20	8	60
5020801	8	20	8	75
5020802	8	30	8	100
5021000	10	25	10	75
5021002	10	40	10	100
5021200	12	30	12	75
5021202	12	45	12	100



# FRESAS TOPO RETO 2 CORTES BRONZE <55HRC TISIN



LINHA  
STANDART

## APLICAÇÃO DO MATERIAL ● Excelente ○ Bom

### TABELA DE APLICAÇÃO LINHA STANDART < 55HRC

Ferro Aço Macio ~30HRC	Aço Duro Aço Carbono ~45HRC	Aço Carbono, Aço Ferramenta				Aço Inox	Ferro Fundido	Bronze Latão	Alumínio	Titânio	Liga Alta Tempera			
		~52HRC	~55HRC	~58HRC	~65HRC									
●	●	○				●								
GRUPO DE MATERIAL	INOX 304	MODERADAMENTE DIFÍCIL SUS	INOX 316L	TITÂNIO (LIGAS)	AÇO MACIO	FERRO FUNDIDO SC	ALTA TEMPERATURA (LIGAS)							
VC	72 ~90 M/min	56 ~70 M/Min	48 ~ 60 M/Min	40 ~56 M/min	120 ~160 M/min	96 ~120 M/min	20 ~ 25 M/min							
DIÂMETRO	R.P.M	FEED (mm/min)	R.P.M	FEED (mm/min)	R.P.M	FEED (mm/min)	R.P.M	FEED (mm/min)	R.P.M	FEED (mm/min)	R.P.M	FEED (mm/min)		
4MM	5,732	573	4,459	357	3,822	229	3,185	153	9,554	955	7,643	764	1,592	70
5MM	4,586	550	3,567	357	3,057	306	2,548	153	7,643	917	6,115	734	1,274	56
6MM	3,822	611	2,972	416	2,548	306	2,123	170	6,369	1,019	5,096	815	1,062	72
8MM	2,866	573	2,229	401	1,911	306	1,592	191	4,777	1,146	3,822	917	796	86
10MM	2,293	550	1,783	357	1,529	275	1,274	155	3,822	917	3,057	734	637	69
12MM	1,911	497	1,486	327	1,274	255	1,062	170	3,185	892	2,548	713	531	81
14MM	1,638	439	1,274	290	1,092	231	910	157	2,730	797	2,184	638	455	82
16MM	1,433	401	1,115	268	955	210	796	143	2,389	717	1,911	573	398	78



# FRESAS TOPO ESFÉRICA 2 CORTES BRONZE <55HRC TISIN



LINHA  
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CÓDIGO	D1	L1	D	L
	DIÂMETRO	COMPRIMENTO DE CORTE	DIÂMETRO DE HASTE	COMPRIMENTO TOTAL
5030104	1	2	5	50
5030204	2	4	4	50
5030205	2	4	4	75
5030207	2	4	6	50
5030208	2	4	6	75
5030209	2	4	6	100
5030300	3	6	3	50
5030301	3	6	3	75
5030302	3	6	3	100
5030304	3	6	4	50
5030305	3	6	4	75
5030306	3	6	4	100
5030307	3	6	6	50
5030308	3	6	6	75
5030309	3	6	6	100
5030400	4	8	4	50



# FRESAS TOPO ESFÉRICA 2 CORTES BRONZE <55HRC TISIN



LINHA  
STANDART

CÓDIGO	D1	L1	D	L
	DIÂMETRO	COMPRIMENTO DE CORTE	DIÂMETRO DE HASTE	COMPRIMENTO TOTAL
5030401	4	8	4	75
5030402	4	8	4	100
5030407	4	8	6	50
5030408	4	8	6	75
5030500	5	10	5	50
5030501	5	10	5	75
5030502	5	10	5	100
5030600	6	12	6	50
5030601	6	12	6	75
5030602	6	12	6	100
5030800	8	16	8	60
5030801	8	16	8	75
5030802	8	16	8	100
5031000	10	20	10	75
5031002	10	20	10	100
5031200	12	24	12	75
5031202	12	24	12	100



# FRESAS TOPO ESFÉRICA 2 CORTES BRONZE <55HRC TISIN



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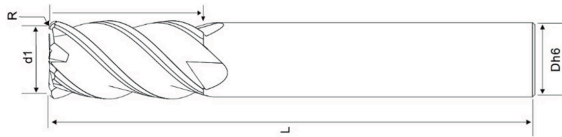
## APLICAÇÃO DO MATERIAL ● Excelente ○ Bom

### TABELA DE APLICAÇÃO LINHA STANDART < 55HRC

Ferro Aço Macio ~30HRC	Aço Duro Aço Carbono ~45HRC	Aço Carbono, Aço Ferramenta				Aço Inox	Ferro Fundido	Bronze Latão	Alumínio	Titânio	Liga Alta Tempera	
		~52HRC	~55HRC	~58HRC	~65HRC							
●	●	○				●						
GRUPO DE MATERIAL	AÇO LIGA /AÇO FERRAMENTA				AÇO TEMPERADO		AÇO INOX	FERRO FUNDIDO				
CÓDIGO	45C, S50C, SCM	SCM, SKT, SKD	SCM, SKT, SKD	SCM, SKT, SKD	SKT, SKD	SUS 304	FC/ FCD					
DUREZA	HRC <20	HRC 20~30	HRC 30 ~40	HRC 45 ~ 45	-	-						
VC	94 M/Min	71 M/Min	44 M/Min	38 M/Min	71 M/Min	94 M/Min						
DIÂMETRO	R.P.M	FEED (mm/min)	R.P.M	FEED (mm/min)	R.P.M	FEED (mm/min)	R.P.M	FEED (mm/min)	R.P.M	FEED (mm/min)		
0.5R	46,800	380	42,120	290	28,080	160	18,720	75	42,120	340	58,500	4
1.0R	26,676	485	21,060	325	15,210	195	10,660	95	21,060	385	29,718	5
2.0R	14,976	610	11,232	385	8,190	230	5,980	120	11,232	455	14,976	6
3.0R	9,828	600	7,488	385	4,914	210	3,926	120	7,488	455	9,828	6
4.0R	7,488	610	5,616	385	3,744	210	2,990	120	5,616	455	7,488	6
5.0R	5,967	605	4,446	385	2,808	200	2,379	120	4,446	450	5,967	6
6.0R	4,914	600	3,744	385	3,640	200	1,976	120	3,744	455	4,914	6
8.0R	4,160	675	3,120	430	2,028	210	1,664	135	3,120	505	4,160	6
10.0R	3,380	615	2,496	430	1,690	215	1,352	135	2,496	455	3,380	6



# FRESAS TOROIDAL MD 4 CORTES CURTA 55HRC TISIN STD



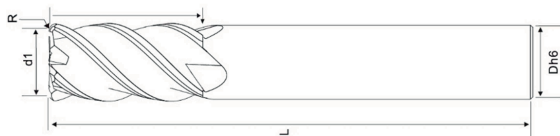
LINHA  
STANDART

CÓDIGO	D1	R	L1	DH	L
	DIÂMETRO	RAIO	COMPRIMENTO DE CORTE	DIÂMETRO DE HASTE	COMPRIMENTO TOTAL
5050104	1	0,3	3	4	50
5050154	1.5	0,5	3	4	50
5050204	2	0,5	6	4	50
5050207	2	0,5	6	6	50
5050300	3	0,5	8	3	50
5050302	3	0,5	8	4	50
5050304	3	0,5	8	6	50
5050305	3	1,0	8	3	50
5050400	4	0,5	10	4	50
5050403	4	0,5	10	6	50
5050406	4	1,0	10	4	50
5050500	5	0,5	13	5	50
5050504	5	1,0	13	5	50
5050600	6	0,5	15	6	50
5050604	6	1,0	15	6	50
5050607	6	1,5	15	6	50
5050800	8	0,5	20	8	60
5050804	8	1,0	20	8	60
5050807	8	1,5	20	8	60
5050808	8	2,0	20	8	60
5051000	10	0,5	25	10	75
5051004	10	1,0	25	10	75
5051007	10	1,5	25	10	75
5051008	10	1,0	25	10	75
5051200	12	0,5	30	12	75
5051204	12	1,0	30	12	75
5051207	12	1,5	30	12	75
5051208	12	2,0	30	12	75





# FRESAS TOROIDAL MD 4 CORTES LONGA 55HRC TISIN STD

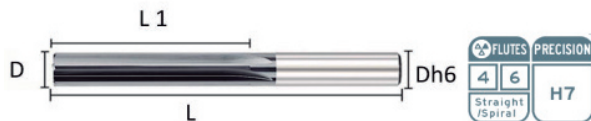


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CÓDIGO	D1	R	L1	DH	L
	DIÂMETRO	RAIO	COMPRIMENTO DE CORTE	DIÂMETRO DE HASTE	COMPRIMENTO TOTAL
5050205	2	0,5	6	4	75
5050301	3	0,5	8	3	75
5050303	3	0,5	8	4	75
5050401	4	0,5	10	4	75
5050402	4	0,5	15	6	100
5050404	4	0,5	10	6	75
5050405	4	0,5	15	4	100
5050407	4	1,0	10	4	75
5050408	4	1,0	15	6	100
5050409	4	1,0	10	6	75
5050410	4	1,0	15	5	100
5050501	5	0,5	15	5	75
5050502	5	0,5	15	6	100
5050600	6	0,5	20	6	75
5050602	6	0,5	20	6	100
5050603	6	0,5	25	6	150
5050605	6	1,0	20	6	75
5050606	6	1,0	20	6	100
5050801	6	0,5	20	8	75
5050802	8	0,5	20	8	100
5050803	8	0,5	25	8	150
5050805	8	1,0	20	8	75
5050806	8	1,0	10	8	100
5051002	10	0,5	25	10	100
5051003	10	0,5	30	10	150
5051005	10	1,0	25	10	100
5051006	10	1,0	30	10	150
5051202	12	0,5	30	12	100
5051203	12	0,5	40	12	150
5051205	12	1,0	30	12	100
5051206	12	1,0	40	12	150



# ALARGADOR DE METAL DURO STD ISO 45 HRC TIALN

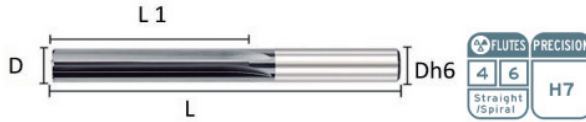


CÓDIGO	D	L1	DH	L	CANAL RETO
	DIÂMETRO	COMPRIMENTO DE CORTE	DIÂMETRO DE HASTE	COMPRIMENTO TOTAL	QUANTIDADE DE CANAIS
110030	3	35	3	75	4
110040	4	35	4	75	4
110050	6	35	5	75	6
110060	6	50	6	100	6
110080	8	50	8	100	6
110100	10	50	10	100	6
110120	12	50	12	100	6

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# ALARGADOR DE METAL DURO STD ISO 45 HRC TIALN



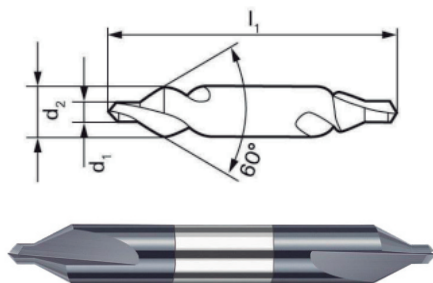
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## PARÂMETROS DE CORTE ALARGADOR MD

Material	AÇO			BRONZE			ALUMÍNIO		
Vc	8 ~ 16m/min			10 ~ 25m/min			15 ~ 30m/min		
Dia.	RPM	FEED	ALLOWANCE	RPM	FEED	ALLOWANCE	RPM	FEED	ALLOWANCE
4	950	0.04 ~ 0.06	0.1 ~ 0.2	1600	0.04 ~ 0.06	0.1 ~ 0.2	2000	0.04 ~ 0.06	0.1 ~ 0.2
5	760	0.05 ~ 0.09	0.1 ~ 0.3	1300	0.05 ~ 0.09	0.1 ~ 0.2	1600	0.05 ~ 0.09	0.1 ~ 0.2
6	640	0.06 ~ 0.12	0.1 ~ 0.4	1050	0.06 ~ 0.12	0.1 ~ 0.2	1300	0.06 ~ 0.12	0.1 ~ 0.2
7	550	0.07 ~ 0.14	0.1 ~ 0.5	910	0.07 ~ 0.14	0.1 ~ 0.2	1150	0.07 ~ 0.14	0.1 ~ 0.2
8	480	0.08 ~ 0.16	0.1 ~ 0.6	800	0.08 ~ 0.16	0.1 ~ 0.2	1000	0.08 ~ 0.16	0.1 ~ 0.2
9	430	0.09 ~ 0.18	0.1 ~ 0.7	710	0.09 ~ 0.18	0.1 ~ 0.2	890	0.09 ~ 0.18	0.1 ~ 0.2
10	380	0.1 ~ 0.20	0.1 ~ 0.8	640	0.10 ~ 0.20	0.1 ~ 0.2	800	0.10 ~ 0.20	0.1 ~ 0.2
11	350	0.11 ~ 0.22	0.1 ~ 0.9	580	0.11 ~ 0.22	0.1 ~ 0.2	720	0.11 ~ 0.22	0.1 ~ 0.2
12	320	0.12 ~ 0.24	0.1 ~ 1.0	530	0.12 ~ 0.24	0.1 ~ 0.2	660	0.12 ~ 0.24	0.1 ~ 0.2
13	290	0.13 ~ 0.26	0.1 ~ 1.1	490	0.13 ~ 0.26	0.1 ~ 0.2	610	0.13 ~ 0.26	0.1 ~ 0.2
14	270	0.14 ~ 0.28	0.1 ~ 1.2	460	0.14 ~ 0.28	0.1 ~ 0.2	570	0.14 ~ 0.28	0.1 ~ 0.2
15	250	0.15 ~ 0.30	0.1 ~ 1.3	430	0.15 ~ 0.30	0.1 ~ 0.2	530	0.15 ~ 0.30	0.1 ~ 0.2
16	240	0.16 ~ 0.32	0.1 ~ 1.4	400	0.16 ~ 0.32	0.1 ~ 0.2	500	0.16 ~ 0.32	0.1 ~ 0.2
17	225	0.17 ~ 0.34	0.1 ~ 1.5	380	0.18 ~ 0.34	0.1 ~ 0.2	470	0.18 ~ 0.34	0.1 ~ 0.2
18	210	0.18 ~ 0.36	0.1 ~ 1.6	350	0.20 ~ 0.36	0.1 ~ 0.2	440	0.20 ~ 0.36	0.1 ~ 0.2
19	200	0.19 ~ 0.38	0.1 ~ 1.7	340	0.22 ~ 0.38	0.1 ~ 0.2	420	0.22 ~ 0.38	0.1 ~ 0.2
20	190	0.20 ~ 0.40	0.1 ~ 1.8	320	0.24 ~ 0.40	0.1 ~ 0.2	400	0.24 ~ 0.40	0.1 ~ 0.2



# BROCA DE CENTRO DE METAL 45 HRC TIALN



CÓDIGO	D1	D2	L1
	DIÂMETRO	COMPRIMENTO DE CORPO	COMPRIMENTO TOTAL
334100	1,00	4,00	45
334125	1,25	4,00	45
334150	1,50	4,00	45
334160	1,60	4,00	45
334200	2,00	5,00	50
334250	2,50	6,00	50
334315	3,15	8,00	50
334400	4,00	10,00	60

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# BROCA DE METAL DURO DIN 338 45 HRC TIAIN



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CÓDIGO	DIMENSÕES	CÓDIGO	DIMENSÕES	CÓDIGO	DIMENSÕES
338010	1,00x12x34	338046	4,60x52x86	338087	8,70x61x125
338011	1,10x18x34	338047	4,70x52x86	338088	8,80x61x125
338012	1,20x18x34	338048	4,80x52x86	338089	8,90x81x125
338013	1,30x18x34	338049	4,90x52x86	338090	9,00x81x125
338014	1,40x18x34	338050	5,00x52x86	338091	9,10x81x125
338015	1,50x18x34	338051	5,10x52x86	338095	9,50x81x125
338016	1,60x22x46	338052	5,20x52x86	338096	9,60x81x125
338017	1,70x22x46	338053	5,30x52x86	338098	9,80x87x133
338018	1,80x22x46	338054	5,40x52x86	338099	9,90x87x133
338019	1,90x22x46	338055	5,50x57x93	338100	10,0x87x133
338020	2,00x24x49	338056	5,60x57x93	338101	10,1x87x133
338021	2,10x27x53	338057	5,70x57x93	338102	10,2x87x133
338022	2,20x27x53	338058	5,80x57x93	338105	10,5x87x133
338023	2,30x30x57	338059	5,90x57x93	338108	10,8x94x142
338024	2,40x30x57	338060	6,00x57x93	338110	11,0x94x142
338025	2,50x30x57	338061	6,10x63x101	338115	11,5x94x142
338026	2,60x33x61	338062	6,20x63x101	338118	11,8x101x152
338027	2,70x33x61	338063	6,30x63x101	338120	12,0x101x152
338028	2,80x33x61	338064	6,40x63x101	338122	12,2x101x152
338029	2,90x33x61	338065	6,50x63x101	338125	12,5x101x152
338030	3,00x33x61	338066	6,60x69x109	338128	12,8x101x152
338031	3,10x36x65	338067	6,70x69x109	338130	13,0x101x152
338032	3,20x36x65	338068	6,80x69x109	338135	13,5x108x160
338033	3,30x36x65	338069	6,90x69x109	338138	13,8x108x160
338034	3,40x36x65	338070	7,00x69x109	338140	14,0x108x160
338035	3,50x39x70	338071	7,10x69x109	338142	14,2x114x169
338036	3,60x43x75	338072	7,20x69x109	338145	14,2x114x169
338037	3,70x43x75	338073	7,30x69x109	338148	14,2x114x169
338038	3,80x43x75	338074	7,40x69x109	338150	15,0x114x169
338039	3,90x43x75	338075	7,50x69x109	338155	15,5x120x178
338040	4,0x43x75	338076	7,60x75x117	338158	15,8x120x178
338041	4,10x43x75	338077	7,70x75x117	338160	16,0x120x178
338042	4,20x43x75	338078	7,80x75x117		
338043	4,30x47x80	338079	7,90x75x117		
338044	4,40x47x80	338080	8,00x75x117		
338045	4,50x47x80	338081	8,10x75x117		



# BROCA DE METAL DURO DIN 338 45 HRC TIAIN



Material	AÇO MOLE	AÇO CARBONO	AÇO DE LIGA	FERRO FUNDIDO	AÇO FERRAMENTA
CÓDIGO	1010, 2020 CHUMBALLOY	1040, 1045, 4140 8620, 6150	1040, 1045, 4140 8620, 6150	FCD400, FC 250 FOFO	Vh13, VND, VC131 52100, D2, M2, P20
DUREZA	-	~ HRC 30	HRC 30-45	-	-
VC	97 m/min	73 m/min	48 m/min	90 m/min	41m/min
DIÂMETRO	RPM / AVANÇO mm / min	RPM / AVANÇO mm / min	RPM / AVANÇO mm / min	RPM / AVANÇO mm / min	RPM / AVANÇO mm / min
3mm	10750 / 920	7650 / 693	5130 / 459	9430 / 1,593	4230 / 252
4mm	8145 / 805	6100 / 600	4000 / 400	7100 / 1,400	3264 / 200
5mm	6100 / 693	4500 / 510	3000 / 340	5700 / 1,200	2500 / 190
6mm	5100 / 566	3800 / 430	2500 / 280	4750 / 530	2100 / 162
7mm	4300 / 490	3200 / 365	2160 / 240	4000 / 450	1850 / 142
8mm	3800 / 430	2900 / 320	1900 / 210	3500 / 390	1600 / 123
9mm	3400 / 378	2560 / 285	1680 / 187	3160 / 350	1437 / 110
10mm	3060 / 339	2300 / 256	1515 / 168	2839 / 315	1293 / 100
11mm	2838 / 315	2093 / 232	1376 / 153	2581 / 286	1175 / 90
12mm	2549 / 283	1919 / 213	1261 / 140	2365 / 262	1077 / 83
13mm	2353 / 261	1771 / 197	1164 / 129	2183 / 242	999 / 77
14mm	2185 / 242	1644 / 182	1081 / 120	2027 / 225	923 / 71
15mm	2039 / 226	1535 / 170	1009 / 112	1892 / 210	862 / 66
16mm	1912 / 212	1411 / 156	928 / 103	1740 / 193	792 / 61

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# CILINDRO DE METAL DURO RETIFICADO H6



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CÓDIGO	DESCRIÇÃO	APLICAÇÃO
998020	CILINDRO 2 X 100	K10-K15
998030	CILINDRO 3 X 100	K10-K15
998040	CILINDRO 4 X 100	K10-K15
998050	CILINDRO 5 X 100	K10-K15
998060	CILINDRO 6 X 100	K10-K15
998070	CILINDRO 7 X 100	K10-K15
998080	CILINDRO 8 X 100	K10-K15
998090	CILINDRO 9 X 100	K10-K15
998100	CILINDRO 10 X 100	K10-K15
998110	CILINDRO 11 X 100	K10-K15
998120	CILINDRO 12 X 100	K10-K15
998130	CILINDRO 13 X 100	K10-K15
998140	CILINDRO 14 X 100	K10-K15
998160	CILINDRO 16 X 100	K10-K15



# CILINDRO DE METAL DURO RETIFICADO H6



CÓDIGO	DESCRIÇÃO	APLICAÇÃO
998200	CILINDRO 20 X 100	K10-K15
999020	CILINDRO 2 X 330	K10-K15
999030	CILINDRO 3 X 330	K10-K15
999040	CILINDRO 4 X 330	K10-K15
999050	CILINDRO 5 X 330	K10-K15
999060	CILINDRO 6 X 330	K10-K15
999070	CILINDRO 7 X 330	K10-K15
999080	CILINDRO 8 X 330	K10-K15
999090	CILINDRO 9 X 330	K10-K15
999100	CILINDRO 10 X 330	K10-K15
999120	CILINDRO 12 X 330	K10-K15
999140	CILINDRO 14 X 330	K10-K15
999160	CILINDRO 16 X 330	K10-K15
999200	CILINDRO 20 X 330	K10-K15

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STANDART

