

# UFP

## COATED HSS END MILLS











*Better performance than Coated Solid Carbide End Mills*

*Better Hardness, Better Toughness than HSS Co8*

*Dramatically reduced price of HSS making it very competitive*



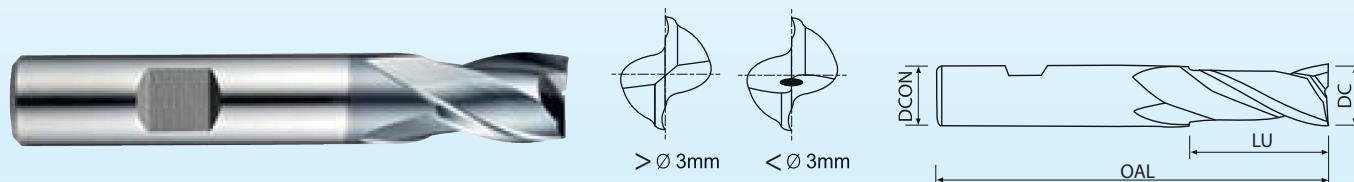
**Perfect solution to protect Carbide chipping problems under vibrations.**

ITEM	DESCRIPTION	SIZE		P			M	N	
				Carbon Steels	Alloy Steels	Prehardened Steels	Stainless Steels	Copper	Cast Iron
		Min.	Max.	~HB225	HB225~352	HRC30~40			
UFP02	 HSS, 2 FLUTE SHORT LENGTH (Center Cut)	D1.0	D25.0	1	1	2	1	2	1
UFP05	 HSS, 3 FLUTE SHORT LENGTH (Center Cut)	D1.0	D25.0	1	1	2	1	2	1
UFP08	 HSS, 4 FLUTE SHORT LENGTH (Center Cut)	D1.0	D25.0	1	1	2	1	2	1
UFP10	 HSS, 4 FLUTE MULTIPLE HELIX SHORT LENGTH (Center Cut)	D3.0	D25.0	1	1	2	1	2	1
UFP12	 HSS, 4 FLUTE LONG LENGTH (Center Cut)	D2.0	D25.0	1	1	2	1	2	1
UFP15	 HSS, 2 FLUTE SHORT LENGTH BALL NOSE	R0.5	R12.5	1	1	2	1	2	1
UFP32	 HSS, MULTI FLUTE, SHORT LENGTH ROUGHING- FINE (Center Cut)	D6.0	D25.0	1	1	2	1	2	1
UFP34	 HSS, MULTI FLUTE, LONG LENGTH ROUGHING- FINE (Center Cut)	D6.0	D25.0	1	1	2	1	2	1
UFP36	 HSS, MULTI FLUTE, SHORT LENGTH ROUGHING- COARSE (Center Cut)	D6.0	D25.0	1	1	2	1	2	1
UFP38	 HSS, MULTI FLUTE MULTIPLE HELIX SHORT LENGTH CORNER RADIUS ROUGHING - FINE (Center Cut)	D6.0	D25.0	1	1	2	1	2	1

1 - excellent 2 - good

## 2 FLUTE SHORT LENGTH (Center Cut)

COATED END MILLS



Helix Angle - 30°  
Type of shank - HB

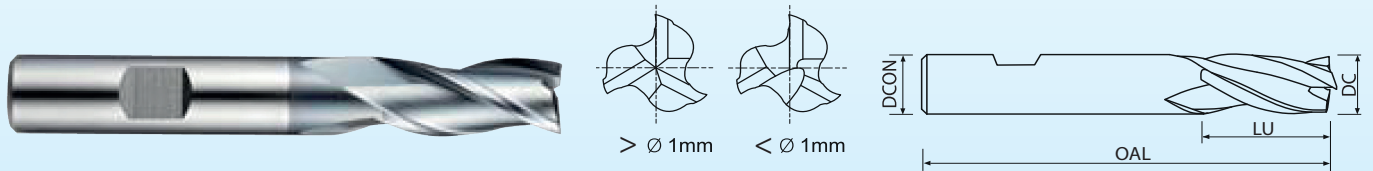
**HSS** COATED

**UFP02**

EDP No.	DC	DCON	APMX	OAL	Z	TU
UFP0201000B06003047	1	6	2,5	47	2	HB
UFP0202000B06004048	2	6	4	48		
UFP0203000B06005049	3	6	5	49		
UFP0204000B06007051	4	6	7	51		
UFP0205000B06008052	5	6	8	52		
UFP0206000B06008052	6	6	8	52		
UFP0207000B08010060	7	8	10	60		
UFP0208000B08011061	8	8	11	61		
UFP0209000B10011061	9	10	11	61		
UFP0210000B10013063	10	10	13	63		
UFP0212000B12016073	12	12	16	73		
UFP0214000B12016073	14	12	16	73		
UFP0216000B16019079	16	16	19	79		
UFP0218000B16019079	18	16	19	79		
UFP0220000B20022088	20	20	22	88		
UFP0222000B20022088	22	20	22	88		
UFP0225000B25026102	25	25	26	102		

## 3 FLUTE SHORT LENGTH (Center Cut)

COATED END MILLS



Helix Angle - 30°  
Type of shank - HB

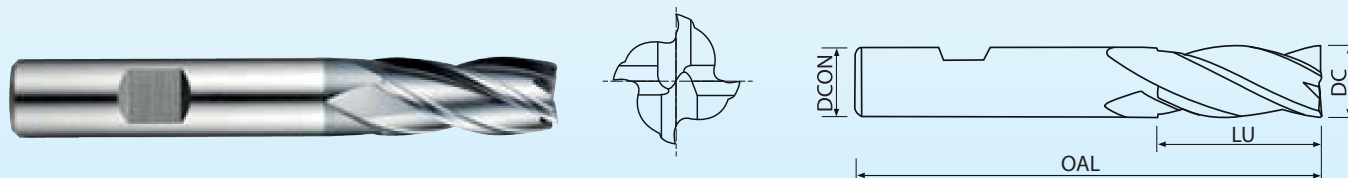
**HSS** COATED

**UFP05**

EDP No.	DC	DCON	APMX	OAL	Z	TU
UFP0501000B06003047	1	6	3	47	3	HB
UFP0502000B06007051	2	6	7	51		
UFP0503000B06008052	3	6	8	52		
UFP0504000B06011055	4	6	11	55		
UFP0505000B06013057	5	6	13	57		
UFP0506000B06013057	6	6	13	57		
UFP0507000B08016066	7	8	16	66		
UFP0508000B08019069	8	8	19	69		
UFP0509000B10019069	9	10	19	69		
UFP0510000B10022072	10	10	22	72		
UFP0512000B12026083	12	12	26	83		
UFP0514000B12026083	14	12	26	83		
UFP0516000B16032092	16	16	32	92		
UFP0518000B16032092	18	16	32	92		
UFP0520000B20038104	20	20	38	104		
UFP0522000B20038104	22	20	38	104		
UFP0525000B25045121	25	25	45	121		

## 4 FLUTE SHORT LENGTH (Center Cut)

COATED END MILLS



Helix Angle - 30°  
Type of shank - HB

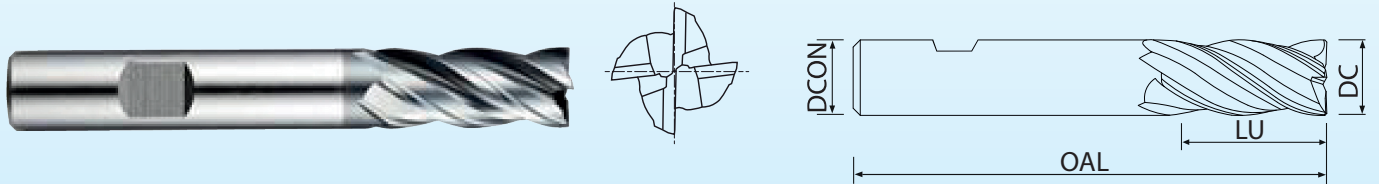
**HSS** COATED

**UFP08**

EDP No.	DC	DCON	APMX	OAL	Z	TU
UFP0801000B06003049	1	6	3	49	4	HB
UFP0802000B06007051	2	6	7	51		
UFP0803000B06008052	3	6	8	52		
UFP0804000B06011055	4	6	11	55		
UFP0805000B06013057	5	6	13	57		
UFP0806000B06013057	6	6	13	57		
UFP0807000B08016066	7	8	16	66		
UFP0808000B08019069	8	8	19	69		
UFP0809000B10019069	9	10	19	69		
UFP0810000B10022072	10	10	22	72		
UFP0812000B12026083	12	12	26	83		
UFP0814000B12026083	14	12	26	83		
UFP0816000B16032092	16	16	32	92		
UFP0818000B16032092	18	16	32	92		
UFP0820000B20038104	20	20	38	104		
UFP0822000B20038104	22	20	38	104		
UFP0825000B25045121	25	25	45	121		

## 4 FLUTE MULTIPLE HELIX SHORT LENGTH (Center Cut)

COATED END MILLS



Helix Angle - **M-Helix**  
Type of shank - **HB**

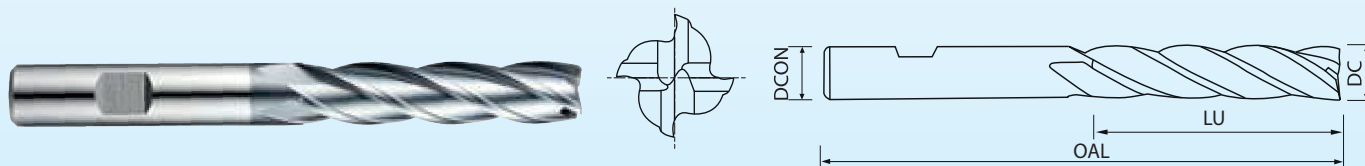
**HSS** COATED

**UFP10**

EDP No.	DC	DCON	APMX	OAL	Z	TU
UFP1003000B06008052	3	6	8	52	4	HB
UFP1004000B06011055	4	6	11	55		
UFP1005000B06013057	5	6	13	57		
UFP1006000B06013057	6	6	13	57		
UFP1007000B08016066	7	8	16	66		
UFP1008000B08019069	8	8	19	69		
UFP1009000B10019069	9	10	19	69		
UFP1010000B10022072	10	10	22	72		
UFP1012000B12026083	12	12	26	83		
UFP1014000B12026083	14	12	26	83		
UFP1016000B16032092	16	16	32	92		
UFP1018000B16032092	18	16	32	92		
UFP1020000B20038104	20	20	38	104		
UFP1022000B20038104	22	20	38	104		
UFP1025000B25045121	25	25	45	121		

## 4 FLUTE LONG LENGTH (Center Cut)

COATED END MILLS



Helix Angle - 30°  
Type of shank - HB

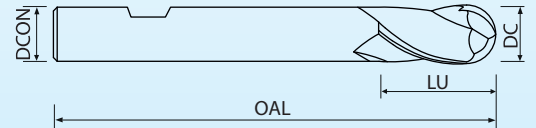
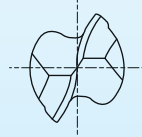
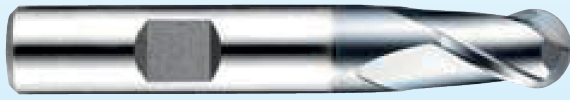
**HSS** COATED

**UFP12**

EDP No.	DC	DCON	APMX	OAL	Z	TU
UFP1202000B06010054	2	6	10	54	4	HB
UFP1203000B06012056	3	6	12	56		
UFP1204000B06019063	4	6	19	63		
UFP1205000B06024068	5	6	24	68		
UFP1206000B06024068	6	6	24	68		
UFP1207000B08030080	7	8	30	80		
UFP1208000B08038088	8	8	38	88		
UFP1209000B10038088	9	10	38	88		
UFP1210000B10045095	10	10	45	95		
UFP1212000B12053110	12	12	53	110		
UFP1214000B12053110	14	12	53	110		
UFP1216000B16063123	16	16	63	123		
UFP1218000B16063123	18	16	63	123		
UFP1220000B20075141	20	20	75	141		
UFP1222000B20075141	22	20	75	141		
UFP1225000B25090166	25	25	90	166		

## 2 FLUTE SHORT LENGTH BALL NOSE

COATED END MILLS



Helix Angle - 30°  
Type of shank - HB

**HSS**

**COATED**

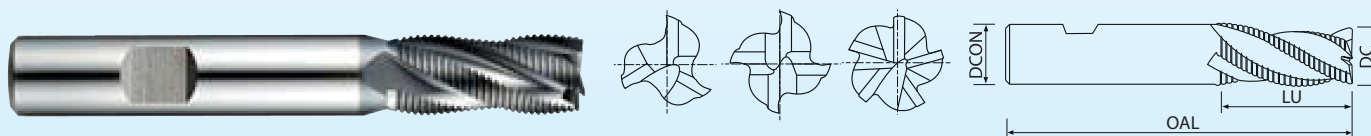
**UFP15**

EDP No.	DC	RE	DCON	APMX	OAL	Z	TU
UFP1501005B06003047	1	0,5	6	2,5	47	2	HB
UFP1502010B06004048	2	1	6	4	48		
UFP1503015B06005049	3	1,5	6	5	49		
UFP1504020B06007051	4	2	6	7	51		
UFP1505025B06008052	5	2,5	6	8	52		
UFP1506030B06008052	6	3	6	8	52		
UFP1507035B08010060	7	3,5	8	10	60		
UFP1508040B08011061	8	4	8	11	61		
UFP1509045B10011061	9	4,5	10	11	61		
UFP1510050B10013063	10	5	10	13	63		
UFP1512060B12016073	12	6	12	16	73		
UFP1514070B12016073	14	7	12	16	73		
UFP1516080B16019079	16	8	16	19	79		
UFP1518090B16019079	18	9	16	19	79		
UFP1520100B20022088	20	10	20	22	88		
UFP1525125B25026102	25	12,5	25	26	102		



## MULTI FLUTE SHORT LENGTH ROUGHING - FINE (Center Cut)

COATED END MILLS



Helix Angle - 30°  
 Type of shank - HB  
 Type of Periphery - Fine

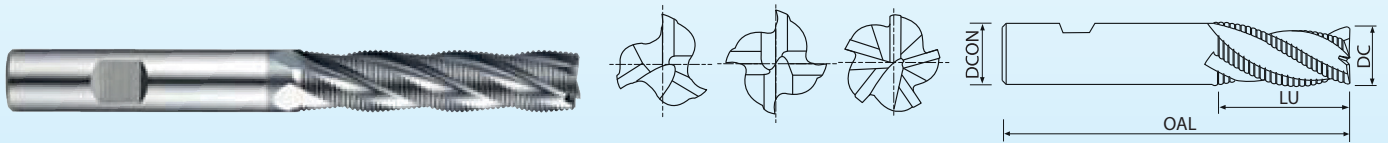
**HSS** COATED

**UFP32**

EDP No.	DC	DCON	APMX	OAL	Z	TU
UFP3206000B06013057	6	6	13	57	3	HB
UFP3207000B10016066	7	10	16	66	3	
UFP3208000B10019069	8	10	19	69	3	
UFP3209000B10019069	9	10	19	69	3	
UFP3210000B10022072	10	10	22	72	4	
UFP3212000B12026083	12	12	26	83	4	
UFP3214000B12026083	14	12	26	83	4	
UFP3216000B16032092	16	16	32	92	4	
UFP3218000B16032092	18	16	32	92	4	
UFP3220000B20038104	20	20	38	104	4	
UFP3225000B25045121	25	25	45	121	5	

## MULTI FLUTE SHORT LENGTH ROUGHING - FINE (Center Cut)

COATED END MILLS



Helix Angle - 30°  
 Type of shank - HB  
 Type of Periphery - Fine

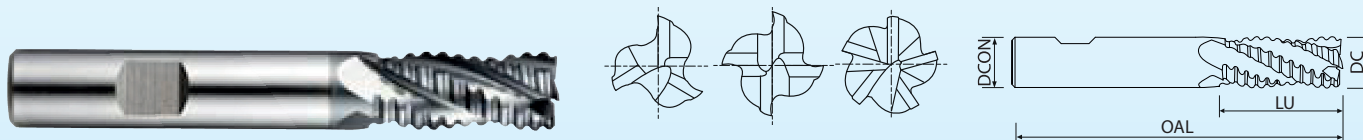
**HSS** COATED

**UFP34**

EDP No.	DC	DCON	APMX	OAL	Z	TU
UFP3406000B06024068	6	6	24	68	3	HB
UFP3407000B10030080	7	10	30	80	3	
UFP3408000B10038088	8	10	38	88	3	
UFP3409000B10038088	9	10	38	88	3	
UFP3410000B10045095	10	10	45	95	4	
UFP3412000B12053110	12	12	53	110	4	
UFP3414000B12053110	14	12	53	110	4	
UFP3416000B16063123	16	16	63	123	4	
UFP3418000B16063123	18	16	63	123	4	
UFP3420000B20075141	20	20	75	141	4	
UFP3425000B25090166	25	25	90	166	5	

# MULTI FLUTE SHORT LENGTH ROUGHING - COARSE (Center Cut)

COATED END MILLS



Helix Angle - 30°  
 Type of Shank - HB  
 Type of Periphery - Coarse

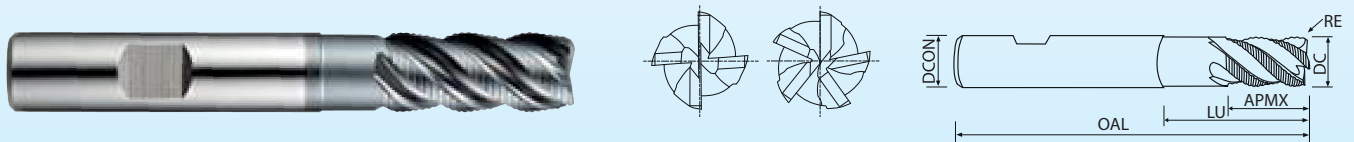
**HSS COATED**

**UFP36**

EDP No.	DC	DCON	APMX	OAL	Z	TU
UFP3606000B06013057	6	6	13	57	3	HB
UFP3607000B10016066	7	10	16	66	3	
UFP3608000B10019069	8	10	19	69	3	
UFP3609000B10019069	9	10	19	69	3	
UFP3610000B10022072	10	10	22	72	4	
UFP3612000B12026083	12	12	26	83	4	
UFP3614000B12026083	14	12	26	83	4	
UFP3616000B16032092	16	16	32	92	4	
UFP3618000B16032092	18	16	32	92	4	
UFP3620000B20038104	20	20	38	104	4	
UFP3625000B25045121	25	25	45	121	5	

# MULTI FLUTE MULTIPLE HELIX SHORT LENGTH CORNER RADIUS ROUGHING - FINE (Center Cut)

COATED END MILLS



Helix Angle - **M-Helix**  
Type of shank - **HB**  
Type of Periphery - **Fine**

**HSS**

**COATED**

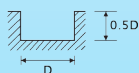
**UFP38**

EDP No.	DC	RE	DCON	APMX	OAL	LU	Z	TU
UFP3806005B06013057	6	0,5	6	13	57	-	4	HB
UFP3807005B10016066	7	0,5	10	16	66	-	4	
UFP3808005B10019069	8	0,5	10	19	69	-	4	
UFP3809005B10019069	9	0,5	10	19	69	-	4	
UFP3810005B10022072	10	0,5	10	22	72	31	4	
UFP3812005B12026083	12	0,5	12	26	83	37	4	
UFP3814010B12026083	14	1	12	26	83	-	5	
UFP3816010B16032092	16	1	16	32	92	44	5	
UFP3818010B16032092	18	1	16	32	92	-	5	
UFP3820010B20038104	20	1	20	38	104	54	5	
UFP3825010B25045121	25	1	25	45	121	63	5	

# CUTTING CONDITIONS

## UFP02

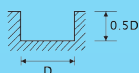
Material	P																				M			
	Structural Steels Carbon Steels				Structural Steels Carbon Steels Cast Irons				Carbon Steels Alloy Steels Tool Steels				Prehardened Steels Alloy Steels Tool Steels				Alloy Steels Tool Steels				Stainless Steels			
Hardness					~ HRC20				HRC20 ~ HRC30				HRC30 ~ HRC35				HRC35 ~ HRC40							
Strength	~ 500N/mm <sup>2</sup>				500 ~ 800N/mm <sup>2</sup>				800 ~ 1000N/mm <sup>2</sup>				1000 ~ 1100N/mm <sup>2</sup>				1100 ~ 1300N/mm <sup>2</sup>							
Diameter	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz
2	8400	140	53	0,008	7080	110	44	0,008	5880	95	37	0,008	3780	80	24	0,011	2400	50	15	0,01	2640	55	17	0,01
3	6000	190	57	0,016	4920	160	46	0,016	4020	140	38	0,017	2760	95	26	0,017	2160	75	20	0,017	2380	85	22	0,018
4	5160	275	65	0,027	4320	210	54	0,024	3780	190	48	0,025	2400	110	30	0,023	1920	90	24	0,023	2110	100	27	0,024
5	4680	305	74	0,033	3900	240	61	0,031	3120	220	49	0,035	2040	120	32	0,029	1620	90	25	0,028	1780	100	28	0,028
6	4200	320	79	0,038	3480	250	66	0,036	2760	230	52	0,042	1740	130	33	0,037	1380	100	26	0,036	1520	110	29	0,036
8	3120	330	78	0,053	2640	290	66	0,055	2160	240	54	0,056	1380	140	35	0,051	1070	100	27	0,047	1180	110	30	0,047
10	2520	360	79	0,071	2160	320	68	0,074	1740	275	55	0,079	1080	150	34	0,069	840	120	26	0,071	920	130	29	0,071
12	2160	330	81	0,076	1740	290	66	0,083	1380	250	52	0,091	890	140	34	0,079	700	100	26	0,071	770	110	29	0,071
14	1920	320	84	0,083	1500	250	66	0,083	1200	235	53	0,098	760	130	33	0,086	600	95	26	0,079	660	105	29	0,08
16	1620	320	81	0,099	1380	235	69	0,085	1070	215	54	0,1	670	120	34	0,09	530	95	27	0,09	580	105	29	0,091
18	1380	290	78	0,105	1140	235	64	0,103	950	190	54	0,1	600	120	34	0,1	480	90	27	0,094	530	100	30	0,094
20	1140	265	72	0,116	940	200	59	0,106	840	180	53	0,107	530	110	33	0,104	430	85	27	0,099	470	95	30	0,101
22	1010	220	70	0,109	850	180	59	0,106	720	150	50	0,104	480	95	33	0,099	380	65	26	0,086	420	70	29	0,083
25	900	185	71	0,103	760	170	60	0,112	590	140	46	0,119	430	90	34	0,105	300	60	24	0,1	330	65	26	0,098



RPM = rev./min.  
FEED = mm/min.  
Vc = m/min.  
Fz = mm/tooth

## UFP05 SLOTTING

Material	P																				M			
	Structural Steels Carbon Steels				Structural Steels Carbon Steels Cast Irons				Carbon Steels Alloy Steels Tool Steels				Prehardened Steels Alloy Steels Tool Steels				Alloy Steels Tool Steels				Stainless Steels			
Hardness					~ HRC20				HRC20 ~ HRC30				HRC30 ~ HRC35				HRC35 ~ HRC40							
Strength	~ 500N/mm <sup>2</sup>				500 ~ 800N/mm <sup>2</sup>				800 ~ 1000N/mm <sup>2</sup>				1000 ~ 1100N/mm <sup>2</sup>				1100 ~ 1300N/mm <sup>2</sup>							
Diameter	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz
2	7800	85	49	0,004	6600	65	41	0,003	5760	55	36	0,003	3600	40	23	0,004	2280	35	14	0,005	2510	40	16	0,005
3	5520	120	52	0,007	4680	100	44	0,007	4020	60	38	0,005	2640	55	25	0,007	2160	55	20	0,008	2380	60	22	0,008
4	5160	170	65	0,011	4320	140	54	0,011	3600	95	45	0,009	2280	60	29	0,009	1800	65	23	0,012	1980	70	25	0,012
5	4560	190	72	0,014	3840	155	60	0,013	3120	110	49	0,012	2040	75	32	0,012	1560	65	25	0,014	1720	70	27	0,014
6	4020	275	76	0,023	3360	230	63	0,023	2760	170	52	0,021	1740	110	33	0,021	1320	90	25	0,023	1450	100	27	0,023
8	3120	290	78	0,031	2640	250	66	0,032	2160	180	54	0,028	1380	120	35	0,029	1070	100	27	0,031	1180	110	30	0,031
10	2520	300	79	0,04	2160	250	68	0,039	1680	190	53	0,038	1070	140	34	0,044	820	110	26	0,045	900	120	28	0,044
12	2160	330	81	0,051	1740	275	66	0,053	1440	205	54	0,047	890	140	34	0,052	700	110	26	0,052	770	120	29	0,052
14	1920	300	84	0,052	1620	265	71	0,055	1200	190	53	0,053	790	130	35	0,055	600	100	26	0,056	660	110	29	0,056
16	1620	290	81	0,06	1380	250	69	0,06	1070	180	54	0,056	670	120	34	0,06	530	100	27	0,063	580	110	29	0,063
18	1380	290	78	0,07	1070	230	61	0,072	950	180	54	0,063	600	115	34	0,064	480	95	27	0,066	530	105	30	0,066
20	1140	275	72	0,08	950	230	60	0,081	840	170	53	0,067	530	110	33	0,069	430	95	27	0,074	470	105	30	0,074
22	1010	275	70	0,091	880	235	61	0,089	720	180	50	0,083	480	115	33	0,08	380	100	26	0,088	420	110	29	0,087
25	900	290	71	0,107	760	250	60	0,11	590	190	46	0,107	430	120	34	0,093	300	100	24	0,111	330	110	26	0,111

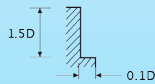


RPM = rev./min.  
FEED = mm/min.  
Vc = m/min.  
Fz = mm/tooth

# CUTTING CONDITIONS

## UFP05 SIDE CUTTING

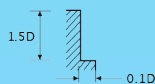
Material	P																				M							
	Structural Steels Carbon Steels					Structural Steels Carbon Steels Cast Irons					Carbon Steels Alloy Steels Tool Steels				Prehardened Steels Alloy Steels Tool Steels				Alloy Steels Tool Steels				Stainless Steels					
Hardness						~ HRC20					HRC20 ~ HRC30				HRC30 ~ HRC35				HRC35 ~ HRC40									
Strength	~ 500N/mm <sup>2</sup>					500 ~ 800N/mm <sup>2</sup>					800 ~ 1000N/mm <sup>2</sup>				1000 ~ 1100N/mm <sup>2</sup>				1100 ~ 1300N/mm <sup>2</sup>									
Diameter	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz
2	9840	120	62	0,004	8160	95	51	0,004	6600	80	41	0,004	4560	60	29	0,004	2880	50	18	0,006	3170	55	20	0,006				
3	6960	175	66	0,008	5760	145	54	0,008	4560	90	43	0,007	3240	80	31	0,008	2640	80	25	0,01	2900	90	27	0,01				
4	6240	220	78	0,012	5280	185	66	0,012	4200	130	53	0,01	2760	90	35	0,011	2280	90	29	0,013	2510	100	32	0,013				
5	5640	250	89	0,015	4800	210	75	0,015	3480	150	55	0,014	2400	100	38	0,014	2040	90	32	0,015	2240	100	35	0,015				
6	5040	360	95	0,024	4320	300	81	0,023	3120	230	59	0,025	2160	150	41	0,023	1800	120	34	0,022	1980	130	37	0,022				
8	3840	395	97	0,034	3120	325	78	0,035	2400	240	60	0,033	1560	170	39	0,036	1320	140	33	0,035	1450	155	36	0,036				
10	3000	420	94	0,047	2520	350	79	0,046	1920	250	60	0,043	1200	180	38	0,05	1070	150	34	0,047	1180	165	37	0,047				
12	2520	420	95	0,056	2160	360	81	0,056	1680	275	63	0,055	1080	180	41	0,056	890	150	34	0,056	980	165	37	0,056				
14	2160	420	95	0,065	1800	340	79	0,063	1380	250	61	0,06	940	170	41	0,06	760	145	33	0,064	840	160	37	0,063				
16	1920	395	97	0,069	1560	330	78	0,071	1200	240	60	0,067	790	170	40	0,072	660	140	33	0,071	730	155	37	0,071				
18	1620	370	92	0,076	1380	320	78	0,077	1070	235	61	0,073	700	155	40	0,074	600	130	34	0,072	660	145	37	0,073				
20	1500	360	94	0,08	1260	305	79	0,081	940	230	59	0,082	620	150	39	0,081	530	130	33	0,082	580	145	36	0,083				
22	1380	370	95	0,089	1140	320	79	0,094	890	235	62	0,088	560	155	39	0,092	480	130	33	0,09	530	145	37	0,091				
25	1200	395	94	0,11	1010	330	79	0,109	760	250	60	0,11	500	160	39	0,107	430	145	34	0,112	470	160	37	0,113				



RPM = rev./min.  
FEED = mm/min.  
Vc = m/min.  
Fz = mm/tooth

## UFP08, UFP12

Material	P																				M							
	Structural Steels Carbon Steels					Structural Steels Carbon Steels Cast Irons					Carbon Steels Alloy Steels Tool Steels				Prehardened Steels Alloy Steels Tool Steels				Alloy Steels Tool Steels				Stainless Steels					
Hardness						~ HRC20					HRC20 ~ HRC30				HRC30 ~ HRC35				HRC35 ~ HRC40									
Strength	~ 500N/mm <sup>2</sup>					500 ~ 800N/mm <sup>2</sup>					800 ~ 1000N/mm <sup>2</sup>				1000 ~ 1100N/mm <sup>2</sup>				1100 ~ 1300N/mm <sup>2</sup>									
Diameter	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz
2	11040	350	69	0,008	10080	290	63	0,007	7320	205	46	0,007	4920	150	31	0,008	3960	100	25	0,006	4360	110	27	0,006				
3	7920	490	75	0,015	7200	420	68	0,015	5280	300	50	0,014	3240	215	31	0,017	2880	150	27	0,013	3170	165	30	0,013				
4	6360	575	80	0,023	5640	480	71	0,021	4320	360	54	0,021	2760	240	35	0,022	2400	180	30	0,019	2640	200	33	0,019				
5	5280	610	83	0,029	4800	505	75	0,026	3480	385	55	0,028	2400	265	38	0,028	2040	190	32	0,023	2240	210	35	0,023				
6	4680	650	88	0,035	4320	540	81	0,031	3120	395	59	0,032	2160	275	41	0,032	1740	215	33	0,031	1910	235	36	0,031				
8	3720	685	93	0,046	3120	575	78	0,046	2400	445	60	0,046	1680	290	42	0,043	1380	220	35	0,04	1520	240	38	0,039				
10	2760	755	87	0,068	2520	635	79	0,063	1920	455	60	0,059	1200	320	38	0,067	1070	240	34	0,056	1180	265	37	0,056				
12	2400	685	90	0,071	2160	575	81	0,067	1680	445	63	0,066	1070	290	40	0,068	860	220	32	0,064	950	240	36	0,063				
14	2160	660	95	0,076	1920	550	84	0,072	1320	420	58	0,08	950	275	42	0,072	760	205	33	0,067	840	225	37	0,067				
16	1920	610	97	0,079	1680	515	84	0,077	1200	410	60	0,085	820	265	41	0,081	660	200	33	0,076	730	220	37	0,075				
18	1800	550	102	0,076	1500	480	85	0,08	1070	370	61	0,086	760	235	43	0,077	600	180	34	0,075	660	200	37	0,076				
20	1500	530	94	0,088	1260	445	79	0,088	940	330	59	0,088	640	210	40	0,082	530	170	33	0,08	580	185	36	0,08				
22	1260	490	87	0,097	1140	385	79	0,084	820	305	57	0,093	560	190	39	0,085	480	155	33	0,081	530	170	37	0,08				
25	1200	445	94	0,093	1010	365	79	0,09	760	275	60	0,09	500	180	39	0,09	430	150	34	0,087	470	165	37	0,088				

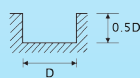
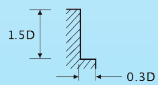


RPM = rev./min.  
FEED = mm/min.  
Vc = m/min.  
Fz = mm/tooth

# CUTTING CONDITIONS

## UFP10

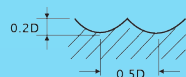
Material	P												M			
	Structural Steels Carbon Steels Cast Irons				Carbon Steels Alloy Steels Tool Steels				Prehardened Steels Alloy Steels Tool Steels				Stainless Steels			
Hardness	~ HRC20				HRc20 ~ HRc30				HRc30 ~ HRc35							
Strength	500 ~ 800N/mm <sup>2</sup>				800 ~ 1000N/mm <sup>2</sup>				1000 ~ 1300N/mm <sup>2</sup>							
Diameter	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz
3	7410	155	70	0,005	6740	140	64	0,005	4720	95	44	0,005	5090	100	48	0,005
4	5560	180	70	0,008	5050	165	63	0,008	3540	115	44	0,008	3800	125	48	0,008
5	4440	205	70	0,012	4040	185	63	0,011	2830	130	44	0,011	3060	155	48	0,013
6	3710	240	70	0,016	3370	220	64	0,016	2360	155	44	0,016	2550	180	48	0,018
8	2780	310	70	0,028	2530	280	64	0,028	1770	195	44	0,028	1910	220	48	0,029
10	2450	380	77	0,039	2230	345	70	0,039	1560	240	49	0,038	1530	295	48	0,048
12	2050	385	77	0,047	1860	350	70	0,047	1300	245	49	0,047	1270	285	48	0,056
14	1750	340	77	0,049	1590	310	70	0,049	1110	220	49	0,05	1090	260	48	0,06
16	1530	325	77	0,053	1390	295	70	0,053	980	205	49	0,052	960	240	48	0,063
18	1360	320	77	0,059	1240	295	70	0,059	870	205	49	0,059	850	240	48	0,071
20	1220	320	77	0,065	1110	290	70	0,065	780	205	49	0,066	760	235	48	0,077
25	980	245	77	0,063	890	225	70	0,063	620	160	49	0,065	610	190	48	0,078



RPM = rev./min.  
FEED = mm/min.  
Vc = m/min.  
Fz = mm/tooth

## UFP15

Material	P																M			
	Structural Steels Carbon Steels				Structural Steels Carbon Steels Cast Irons				Carbon Steels Alloy Steels Tool Steels				Prehardened Steels Alloy Steels Tool Steels				Stainless Steels			
Hardness					~ HRC20				HRc20 ~ HRc30				HRc30 ~ HRc40							
Strength	~ 500N/mm <sup>2</sup>				500 ~ 800N/mm <sup>2</sup>				800 ~ 1000N/mm <sup>2</sup>				1000 ~ 1300N/mm <sup>2</sup>							
Diameter	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz
R1.5x3.0	8760	410	83	0,023	6960	275	66	0,02	4680	150	44	0,016	2400	65	23	0,014	2640	70	25	0,013
R2.0x4.0	7200	515	90	0,036	5540	350	70	0,032	3600	190	45	0,026	1920	90	24	0,023	2110	95	27	0,023
R3.0x6.0	5280	575	100	0,054	4200	385	79	0,046	2760	215	52	0,039	1440	100	27	0,035	1580	115	30	0,036
R4.0x8.0	4020	635	101	0,079	3120	420	78	0,067	2160	240	54	0,056	1070	100	27	0,047	1180	115	30	0,049
R5.0x10.0	3300	720	104	0,109	2520	480	79	0,095	1680	275	53	0,082	820	120	26	0,073	900	130	28	0,072
R6.0x12.0	2760	635	104	0,115	2160	420	81	0,097	1440	240	54	0,083	700	100	26	0,071	770	115	29	0,075
R8.0x16.0	2040	575	103	0,141	1560	385	78	0,123	1070	215	54	0,1	530	95	27	0,09	590	110	30	0,093
R10.0x20.0	1620	505	102	0,156	1200	335	75	0,14	820	180	52	0,11	430	85	27	0,099	480	95	30	0,099
R12.5x25.0	1140	370	90	0,162	890	250	70	0,14	560	140	44	0,125	300	60	24	0,1	330	65	26	0,098

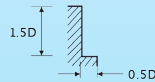


RPM = rev./min.  
FEED = mm/min.  
Vc = m/min.  
Fz = mm/tooth

## CUTTING CONDITIONS

### UFP32, UFP34, UFP36

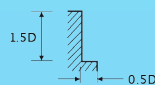
Material	P																M			
	Structural Steels Carbon Steels				Structural Steels Carbon Steels Cast Irons				Carbon Steels Alloy Steels Tool Steels				Prehardened Steels Alloy Steels Tool Steels				Stainless Steels			
Hardness					~ HRC20				HRC20 ~ HRC30				HRC30 ~ HRC40							
Strength	~ 500N/mm <sup>2</sup>				500 ~ 800N/mm <sup>2</sup>				800 ~ 1000N/mm <sup>2</sup>				1000 ~ 1300N/mm <sup>2</sup>							
Diameter	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz
6	3360	275	63	0,027	2640	215	50	0,027	1920	140	36	0,024	1560	125	29	0,027	1740	130	33	0,025
8	2880	350	72	0,041	2280	275	57	0,04	1680	190	42	0,038	1260	150	32	0,04	1440	170	36	0,039
10	2280	500	72	0,055	1800	380	57	0,053	1260	235	40	0,047	1070	190	34	0,044	1140	205	36	0,045
12	1920	500	72	0,065	1440	395	54	0,069	1080	275	41	0,064	890	215	34	0,06	960	245	36	0,064
14	1680	500	74	0,074	1260	395	55	0,078	910	275	40	0,076	760	215	33	0,071	830	245	37	0,074
16	1440	500	72	0,087	1140	395	57	0,087	790	275	40	0,087	660	215	33	0,081	720	245	36	0,085
18	1260	500	71	0,099	1070	395	61	0,092	730	275	41	0,094	590	215	33	0,091	660	245	37	0,093
20	1150	510	72	0,111	910	395	57	0,109	640	275	40	0,107	530	215	33	0,101	580	245	36	0,106
22	1070	510	74	0,095	780	395	54	0,101	560	275	39	0,098	480	215	33	0,09	520	245	36	0,094
25	950	500	75	0,105	720	380	57	0,106	500	265	39	0,106	430	215	34	0,1	470	240	37	0,102



RPM = rev./min.  
FEED = mm/min.  
Vc = m/min.  
Fz = mm/tooth

### UFP38

Material	P																M			
	Structural Steels Carbon Steels				Structural Steels Carbon Steels Cast Irons				Carbon Steels Alloy Steels Tool Steels				Prehardened Steels Alloy Steels Tool Steels				Stainless Steels			
Hardness					~ HRC20				HRC20 ~ HRC30				HRC35 ~ HRC40							
Strength	~ 500N/mm <sup>2</sup>				500 ~ 800N/mm <sup>2</sup>				800 ~ 1000N/mm <sup>2</sup>				1100 ~ 1300N/mm <sup>2</sup>							
Diameter	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz
6	4030	330	76	0,02	3170	260	60	0,021	2300	170	43	0,018	1870	150	35	0,02	2090	155	39	0,019
8	3460	420	87	0,03	2740	330	69	0,03	2020	230	51	0,028	1510	180	38	0,03	1730	205	43	0,03
10	2740	600	86	0,055	2160	455	68	0,053	1510	280	47	0,046	1280	230	40	0,045	1370	245	43	0,045
12	2300	600	87	0,065	1730	475	65	0,069	1300	330	49	0,063	1070	260	40	0,061	1150	295	43	0,064
14	2020	600	89	0,059	1510	475	66	0,063	1090	330	48	0,061	910	260	40	0,057	1000	295	44	0,059
16	1730	600	87	0,069	1370	475	69	0,069	950	330	48	0,069	790	260	40	0,066	860	295	43	0,069
18	1510	600	85	0,079	1280	475	72	0,074	880	330	50	0,075	710	260	40	0,073	790	295	45	0,075
20	1380	610	87	0,088	1090	475	68	0,087	770	330	48	0,086	640	260	40	0,081	700	295	44	0,084
25	1140	600	90	0,105	860	455	68	0,106	600	320	47	0,107	520	260	41	0,1	560	290	44	0,104



RPM = rev./min.  
FEED = mm/min.  
Vc = m/min.  
Fz = mm/tooth



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