

FRESAL CATALOGUE  
• STEEL END MILLS •

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CATALOGUE V019.01 GB  
STEEL END MILLS






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

[www.fresal.com](http://www.fresal.com)






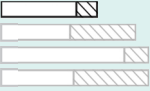








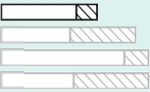


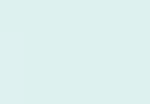




TWO FLUTE END MILLS				CODE	PAGE
		35°		1100	010
		35°		1120	011
		35°		1130	012
		35°		1140	013
		35°		1150	014

THREE FLUTE END MILLS				CODE	PAGE
		40°		1210	016
		40°		1220	017
		40°		1230	018
		45°		1240	019
		45°		1250	020
		F16 HSS-PM	45°	1260	021
		AL	45°	1270	022
		AL	45°	1270R	NEW 023
		AL	45°	1280	NEW 024
		AL	45°	1280R	NEW 025

THREE FLUTE END MILLS					CODE	PAGE
	<i>POLISHED FLUTES</i>	AL	45°		1270U <b>NEW</b>	026
	<i>POLISHED FLUTES</i>	AL	45°		2300	027
		F16 HSS-PM	45°		2140	028

FOUR FLUTE END MILLS					CODE	PAGE
			40°		1300	030
			40°		1310	031
			40°		1330	032
		F16 HSS-PM	40°		1320	033
			30°		2100	034
			30°		2110	035
			35°		2200	036
			35°		2210	037
		F16 HSS-PM	30°		2120	038
		F16 HSS-PM	30°		2130	039
		F16 HSS-PM	30°		2120R	040
		F16 HSS-PM	30°		2130R	041
		F16 HSS-PM	30°		2150	042

SPECIAL FOUR FLUTE END MILLS – “ONDALINE”						CODE	PAGE
		TI	F16 HSS-PM	30°		2400	044
SPECIAL FOUR FLUTE END MILLS – DIFFERENT HELIX ANGLE						CODE	PAGE
		TI	F16 HSS-PM	38-41°		2460	045
SPECIAL FOUR FLUTE END MILLS – DIFFERENT HELIX ANGLE CORNER RADIUS						CODE	PAGE
		TI	F16 HSS-PM	38-41°		2560	046
STAGGERED TEETH – WOODRUFF KEYSEAT						CODE	PAGE
				10°		3100	048
STAGGERED TEETH – “T” SLOT CUTTERS						CODE	PAGE
				10°		3200	049
SIDE AND FACE MILLING CUTTERS						CODE	PAGE
			F16 HSS-PM	10°		4200	050
WELDON SHANK 1		WELDON SHANK 2		CODE	PAGE		
				HSSW	051		
TECHNICAL DATASHEETS							PAGE
STEEL — Working parameters for steel. Uncoated end mills, coated with AllCut.							054
STEEL — Working parameters for steel. Uncoated end mills, coated with AllCut.							055
STEEL — Working parameters for steel. Uncoated end mills, coated with AllCut.							056
TITANIUM AND SUPER-ALLOYS — Working parameters for Titanium and super-alloys. Uncoated end mills, coated with AllCut.							057
TITANIUM AND SUPER-ALLOYS — Working parameters for Titanium and super-alloys. Uncoated end mills, coated with AllCut.							058
ALLUMINIUM — Working parameters for Alluminum. Uncoated end mills.							059
ALLUMINIUM — Working parameters for Alluminum. Uncoated end mills.							060



## Guide to the catalogue consultation

For a better and faster reading, we have divided the products in the catalog according to the number of flutes:

*Two flute end mills;*

*Three flute end mills;*

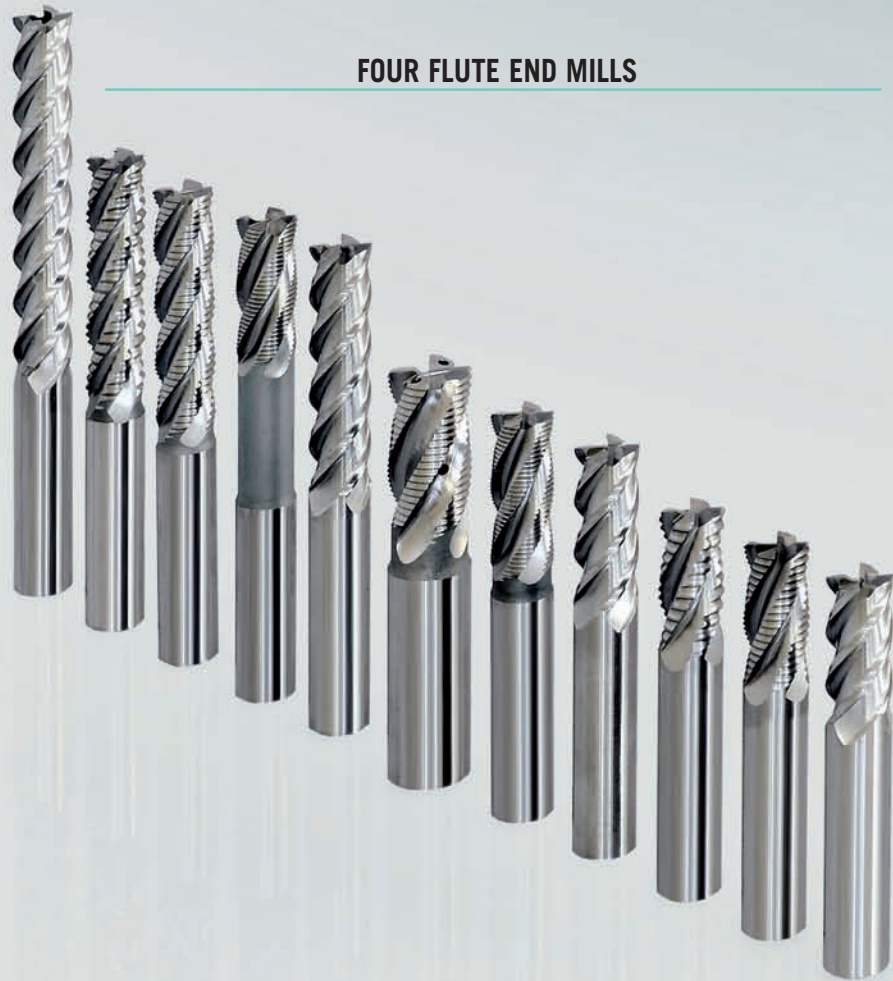
*Four flute end mills;*

*Special end mills;*

*Side and face milling cutters.*

*New.*

### FOUR FLUTE END MILLS



**NEW**



### SPECIAL END MILLS



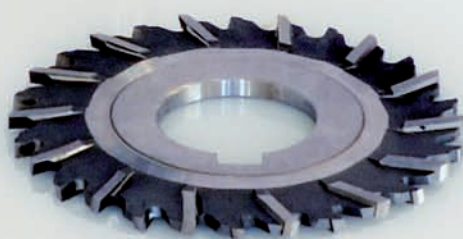
THREE FLUTE END MILLS



TWO FLUTE END MILLS

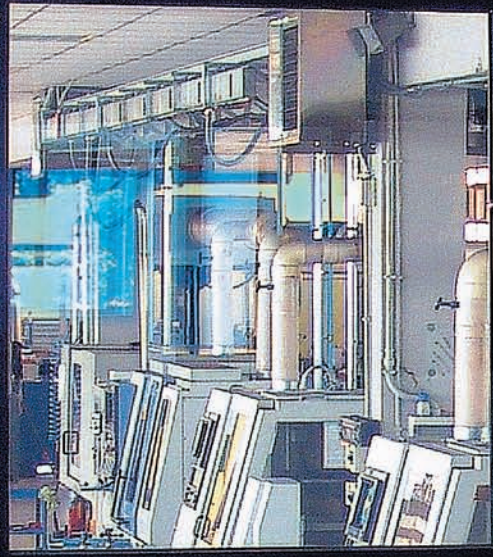
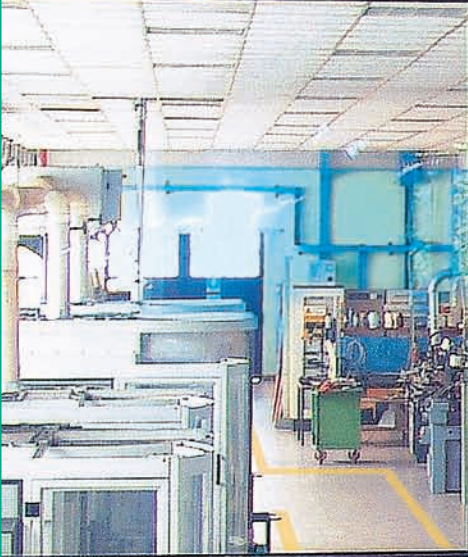


SIDE AND FACE MILLING CUTTERS



# FRESAL

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**We produce  
reliable and  
innovative tools  
through  
the use of high  
technology.  
With commitment  
and passion.**

The range of tools  
in this catalog is the result  
of our experience  
and listening to the needs  
of our customers.

Many of the items  
that are now part of our  
standard production  
are the result of  
specific solutions.

Because it is  
important for us  
to realize excellent tools  
and offer the best service  
in a logic of wider  
collaboration.

Key  
to quickly find  
information

Type of tools.  
Short description.  
Material icons.  
Helix angle.  
Length.  
Lateral view.

### TWO FLUTED END MILLS

**FRESAL**  
UTENSILI

1100 it's particularly recommended for milling medium tensile strength materials.

DIN 327D

35°

F10  
AS1M2

90°

T 2

FRESAL	COATINGS	CODES	D	L	LT	#	F
UNCATED	AllCut	UNCATED	ø6	ø6	ø6	ø6	ø6
2	•	1100002	2	4	48	6	2
2.5	•	1100025	2.5	5	49	6	2
3	•	1100003	3	5	49	6	2
3.5	•	1100035	3.5	6	50	6	2
4	•	1100004	4	7	51	6	2
4.5	•	1100045	4.5	7	51	6	2
5	•	1100005	5	8	52	6	2
5.5	•	1100055	5.5	8	52	6	2
6	•	1100006	6	8	52	6	2
6.5	•	1100065	6.5	10	60	10	2
7	•	1100007	7	10	60	10	2
7.5	•	1100075	7.5	10	60	10	2
8	•	1100008	8	11	61	10	2
8.5	•	1100085	8.5	11	61	10	2
9	•	1100009	9	11	61	10	2
9.5	•	1100095	9.5	11	61	10	2
10	•	1100010	10	13	63	10	2
10.5	•	11000105	10.5	13	70	12	2
11	•	1100011	11	13	70	12	2
12	•	1100012	12	16	73	12	2
13	•	1100013	13	16	73	12	2
14	•	1100014	14	16	73	12	2
15	•	1100015	15	19	79	16	2
16	•	1100016	16	19	79	16	2
17	•	1100017	17	19	79	16	2
18	•	1100018	18	19	79	16	2
19	•	1100019	19	19	79	16	2
20	•	1100020	20	22	88	20	2
22	•	1100022	22	22	88	20	2
24	•	1100024	24	26	102	25	2
25	•	1100025	25	26	102	25	2
26	•	1100026	26	26	102	25	2
28	•	1100028	28	26	102	25	2
30	•	1100030	30	26	102	25	2

**1100**

### TWO FLUTED END MILLS

**FRESAL**  
UTENSILI

1120 it's particularly recommended for milling medium tensile strength materials.

FRESAL NORM

35°

90°

F10  
AS1M2

FRESAL	COATINGS	CODES	D	L	LT	#	F
UNCATED	AllCut	UNCATED	ø6	ø6	ø6	ø6	ø6
6	•	1120006	6	13	57	6	2
8	•	1120008	8	25	75	10	2
10	•	1120010	10	28	78	10	2
12	•	1120012	12	32	89	12	2
14	•	1120014	14	32	89	12	2
16	•	1120016	16	36	96	16	2
18	•	1120018	18	40	100	16	2
20	•	1120020	20	45	111	20	2

**1120**

**AC AllCut** is a coating whose ACiC structure allows a reduced wear on many different work conditions and materials. Available in stock.

The constructive geometry of those end mills allows their use on a very wide range of applications.

Fresal Code.

Steel grade and indication of use.

Coatings and delivery time.

Peculiarities.

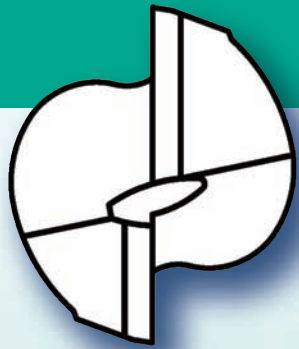
# FRESAL

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TWO FLUTE  
END MILLS



# TWO FLUTE END MILLS



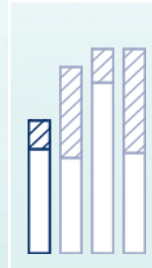
# FRESAL

UTENSILI

**1100** it's particularly recommended for milling medium tensile strength materials.

DIN  
327D

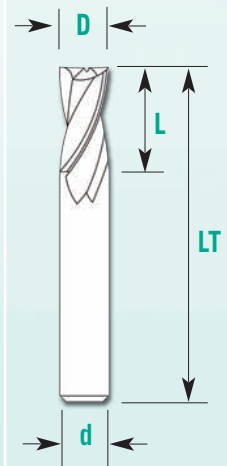
35°



F10  
AISI M42

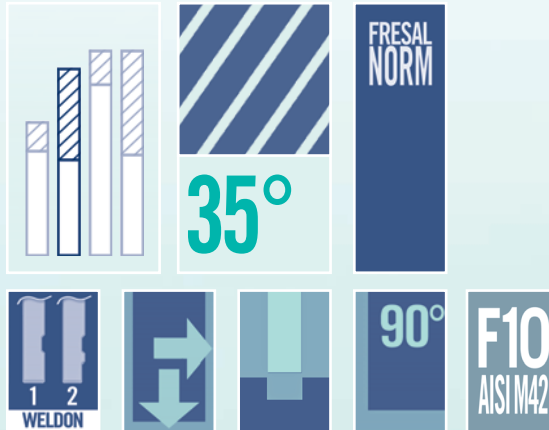
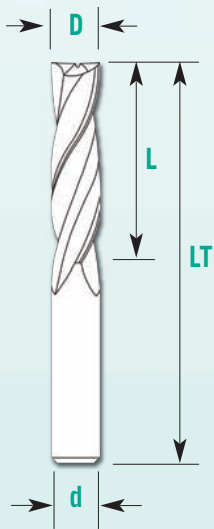
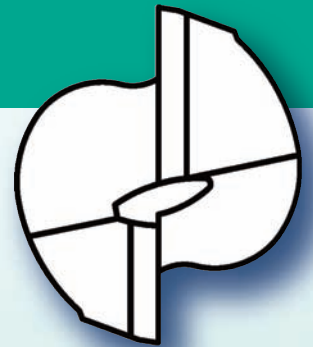


90°



FRESAL		COATINGS		CODES		D	L	LT	d	z
Ø	UNCOATED	ALLCUT	UNCOATED	AC	e8			h6		
2	⊙	⊙	1100D02	...AC	2	4	48	6	2	
2,5	⊙	⊙	1100D025	...AC	2,5	5	49	6	2	
3	⊙	⊙	1100D03	...AC	3	5	49	6	2	
3,5	⊙	⊙	1100D035	...AC	3,5	6	50	6	2	
4	⊙	⊙	1100D04	...AC	4	7	51	6	2	
4,5	⊙	⊙	1100D045	...AC	4,5	7	51	6	2	
5	⊙	⊙	1100D05	...AC	5	8	52	6	2	
5,5	⊙	⊙	1100D055	...AC	5,5	8	52	6	2	
6	⊙	⊙	1100D06	...AC	6	8	52	6	2	
6,5	⊙	⊙	1100D065	...AC	6,5	10	60	10	2	
7	⊙	⊙	1100D07	...AC	7	10	60	10	2	
7,5	⊙	⊙	1100D075	...AC	7,5	10	60	10	2	
8	⊙	⊙	1100D08	...AC	8	11	61	10	2	
8,5	⊙	⊙	1100D085	...AC	8,5	11	61	10	2	
9	⊙	⊙	1100D09	...AC	9	11	61	10	2	
9,5	⊙	⊙	1100D095	...AC	9,5	11	61	10	2	
10	⊙	⊙	1100D10	...AC	10	13	63	10	2	
10,5	⊙	⊙	1100D105	...AC	10,5	13	70	12	2	
11	⊙	⊙	1100D11	...AC	11	13	70	12	2	
12	⊙	⊙	1100D12	...AC	12	16	73	12	2	
13	⊙	⊙	1100D13	...AC	13	16	73	12	2	
14	⊙	⊙	1100D14	...AC	14	16	73	12	2	
15	⊙	⊙	1100D15	...AC	15	19	79	16	2	
16	⊙	⊙	1100D16	...AC	16	19	79	16	2	
17	⊙	⊙	1100D17	...AC	17	19	79	16	2	
18	⊙	⊙	1100D18	...AC	18	19	79	16	2	
19	⊙	⊙	1100D19	...AC	19	19	79	16	2	
20	⊙	⊙	1100D20	...AC	20	22	88	20	2	
22	⊙	⊙	1100D22	...AC	22	22	88	20	2	
24	⊙	⊙	1100D24	...AC	24	26	102	25	2	
25	⊙	⊙	1100D25	...AC	25	26	102	25	2	
26	⊙	⊙	1100D26	...AC	26	26	102	25	2	
28	⊙	⊙	1100D28	...AC	28	26	102	25	2	
30	⊙	⊙	1100D30	...AC	30	26	102	25	2	

1120 it's particularly recommended for milling medium tensile strength materials.



FRESAL		COATINGS	CODES		D	L	LT	d	z
Ø	UNCOATED	ALLCUT	UNCOATED	AC	e8			h6	
6	⊙	⊙	1120D06	...AC	6	13	57	6	2
8	⊙	⊙	1120D08	...AC	8	25	75	10	2
10	⊙	⊙	1120D10	...AC	10	28	78	10	2
12	⊙	⊙	1120D12	...AC	12	32	89	12	2
14	⊙	⊙	1120D14	...AC	14	32	89	12	2
16	⊙	⊙	1120D16	...AC	16	36	96	16	2
18	⊙	⊙	1120D18	...AC	18	40	100	16	2
20	⊙	⊙	1120D20	...AC	20	45	111	20	2



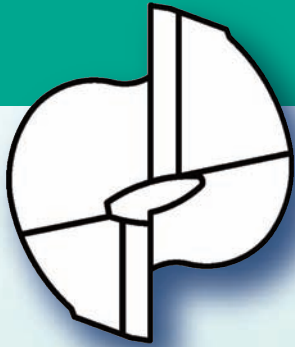
**AllCut** is a coating whose AlCrN structure allows a reduced wear on many different work conditions and materials.

*Available in stock.*

The constructive geometry of those end mills allows their use on a very wide range of applications.



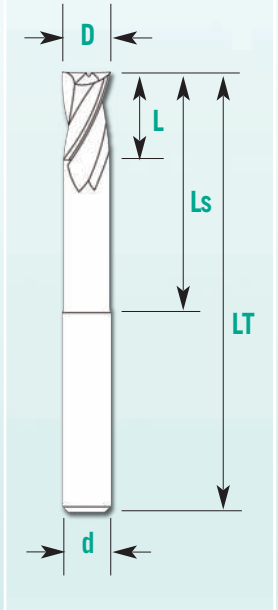
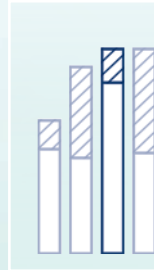
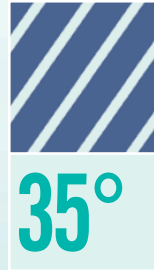
# TWO FLUTE END MILLS



# FRESAL

UTENSILI

1130 it's particularly recommended for milling medium tensile strength materials.



FRESAL		COATINGS	CODES		D	L	LT	Ls	d	z
Ø	UNCOATED	ALLCUT	UNCOATED	AC	e8				h6	
3	⊙	⊙	1130D03	...AC	3	8	56	14	6	2
4	⊙	⊙	1130D04	...AC	4	11	63	23	6	2
5	⊙	⊙	1130D05	...AC	5	13	68	30	6	2
6	⊙	⊙	1130D06	...AC	6	13	68	32	6	2
7	⊙	⊙	1130D07	...AC	7	16	80	32	10	2
8	⊙	⊙	1130D08	...AC	8	19	88	44	10	2
9	⊙	⊙	1130D09	...AC	9	19	88	44	10	2
10	⊙	⊙	1130D10	...AC	10	22	95	53	10	2
11	⊙	⊙	1130D11	...AC	11	22	102	58	12	2
12	⊙	⊙	1130D12	...AC	12	26	110	64	12	2
14	⊙	⊙	1130D14	...AC	14	26	110	64	12	2
15	⊙	⊙	1130D15	...AC	15	32	123	73	16	2
16	⊙	⊙	1130D16	...AC	16	32	123	73	16	2
18	⊙	⊙	1130D18	...AC	18	32	123	75	16	2
20	⊙	⊙	1130D20	...AC	20	38	141	90	20	2
22	⊙	⊙	1130D22	...AC	22	38	141	90	20	2
25	⊙	⊙	1130D25	...AC	25	45	166	108	25	2

The constructive geometry of those end mills allows their use on a very wide range of applications.

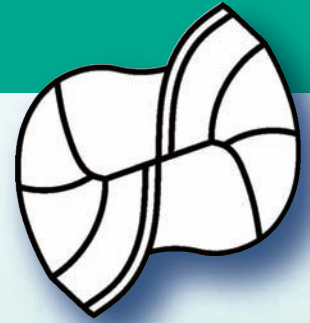
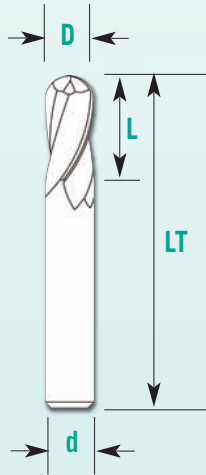


**ALLCUT** is a coating whose AlCrN structure allows a reduced wear on many different work conditions and materials.

*Available in stock.*



1140 it's particularly recommended for milling medium tensile strength materials.



FRESAL		COATINGS		CODES		D	L	LT	d	z
∅	UNCOATED	ALLCUT	UNCOATED	AC	h 10			h 6		
2	⊙	⊙	1140D02	...AC	2	4	48	6	2	
3	⊙	⊙	1140D03	...AC	3	5	49	6	2	
4	⊙	⊙	1140D04	...AC	4	7	51	6	2	
5	⊙	⊙	1140D05	...AC	5	8	52	6	2	
6	⊙	⊙	1140D06	...AC	6	8	52	6	2	
8	⊙	⊙	1140D08	...AC	8	11	61	10	2	
10	⊙	⊙	1140D10	...AC	10	13	63	10	2	
12	⊙	⊙	1140D12	...AC	12	16	73	12	2	
14	⊙	⊙	1140D14	...AC	14	16	73	12	2	
16	⊙	⊙	1140D16	...AC	16	19	79	16	2	
18	⊙	⊙	1140D18	...AC	18	19	79	16	2	
20	⊙	⊙	1140D20	...AC	20	22	88	20	2	



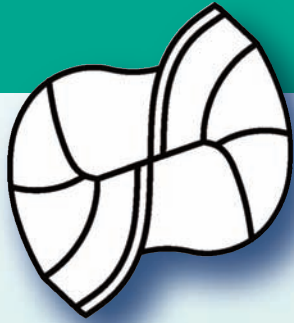
**AllCut** is a coating whose AlCrN structure allows a reduced wear on many different work conditions and materials.

*Available in stock.*

The constructive geometry of those end mills allows their use on a very wide range of applications.



# TWO FLUTE END MILLS ball nose



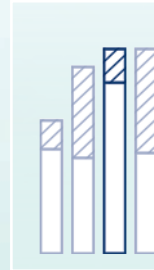
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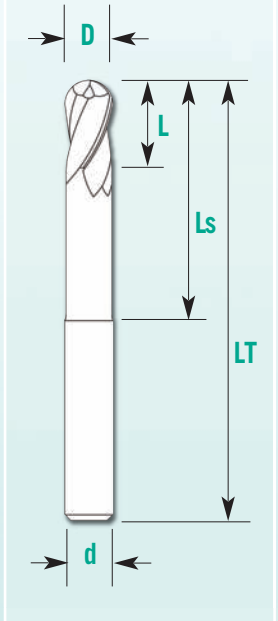
1150 it's particularly recommended for milling medium tensile strength materials.

ISO  
1641-I

35°



F10  
AISI M42



FRESAL		COATINGS		CODES		D	L	LT	Ls	d	z
Ø	UNCOATED	ALLCUT	UNCOATED	AC	h 10					h 6	
3	⊙	⊙	1150D03	...AC	3	8	56	14	6	2	
4	⊙	⊙	1150D04	...AC	4	11	63	23	6	2	
5	⊙	⊙	1150D05	...AC	5	13	68	30	6	2	
6	⊙	⊙	1150D06	...AC	6	13	68	32	6	2	
8	⊙	⊙	1150D08	...AC	8	19	88	44	10	2	
10	⊙	⊙	1150D10	...AC	10	22	95	53	10	2	
12	⊙	⊙	1150D12	...AC	12	26	110	64	12	2	
14	⊙	⊙	1150D14	...AC	14	26	110	64	12	2	
16	⊙	⊙	1150D16	...AC	16	32	123	73	16	2	
18	⊙	⊙	1150D18	...AC	18	32	123	75	16	2	
20	⊙	⊙	1150D20	...AC	20	38	141	90	20	2	

The constructive geometry of those end mills allows their use on a very wide range of applications.

AC  
ALLCUT

**AllCut** is a coating whose AlCrN structure allows a reduced wear on many different work conditions and materials.

*Available in stock.*

# FRESAL

## UTENSILI

THREE FLUTE  
END MILLS



# THREE FLUTE END MILLS



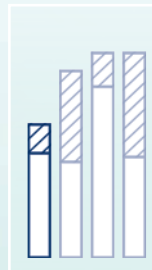
# FRESAL

UTENSILI

1210 it's particularly recommended for milling medium tensile strength materials.

FRESAL  
NORM

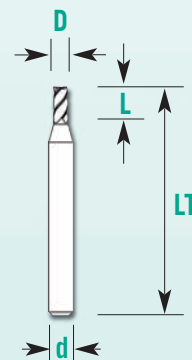
40°



F10  
AISI M42



90°



FRESAL		COATINGS	CODES		D	L	LT	d	z
Ø	UNCOATED	ALLCUT	UNCOATED	AC	h10			h6	
1	⊙	⊙	1210D01	...AC	1	2	46	6	3
1,5	⊙	⊙	1210D015	...AC	1,5	3	46	6	3
2	⊙	⊙	1210D02	...AC	2	3,5	46	6	3
2,5	⊙	⊙	1210D025	...AC	2,5	5,5	46	6	3
3	⊙	⊙	1210D03	...AC	3	7	46	6	3
3,5	⊙	⊙	1210D035	...AC	3,5	9,5	46	6	3
4	⊙	⊙	1210D04	...AC	4	11	46	6	3
4,5	⊙	⊙	1210D045	...AC	4,5	11	46	6	3
5	⊙	⊙	1210D05	...AC	5	13	46	6	3
5,5	⊙	⊙	1210D055	...AC	5,5	13	46	6	3
6	⊙	⊙	1210D06	...AC	6	16	46	6	3

The constructive "philosophy" of those end mills includes their "disposable" use on a wide range of applications.

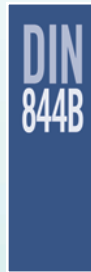
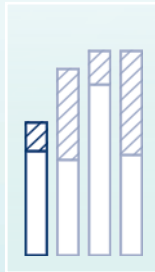
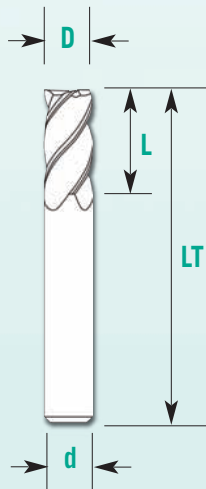
AC  
ALLCUT

**AllCut** is a coating whose AlCrN structure allows a reduced wear on many different work conditions and materials.

*Available in stock.*



1220 it's particularly recommended for milling medium tensile strength materials.



FRESAL		COATINGS	CODES		D	L	LT	d	z
Ø	UNCOATED	ALLCUT	UNCOATED	AC	js 14			h6	
3	⊙	⊙	1220D03	...AC	3	8	52	6	3
4	⊙	⊙	1220D04	...AC	4	11	55	6	3
5	⊙	⊙	1220D05	...AC	5	13	57	6	3
6	⊙	⊙	1220D06	...AC	6	13	57	6	3
7	⊙	⊙	1220D07	...AC	7	16	66	10	3
8	⊙	⊙	1220D08	...AC	8	19	69	10	3
9	⊙	⊙	1220D09	...AC	9	19	69	10	3
10	⊙	⊙	1220D10	...AC	10	22	72	10	3
11	⊙	⊙	1220D11	...AC	11	22	79	12	3
12	⊙	⊙	1220D12	...AC	12	26	83	12	3
13	⊙	⊙	1220D13	...AC	13	26	83	12	3
14	⊙	⊙	1220D14	...AC	14	26	83	12	3
15	⊙	⊙	1220D15	...AC	15	32	92	16	3
16	⊙	⊙	1220D16	...AC	16	32	92	16	3
17	⊙	⊙	1220D17	...AC	17	32	92	16	3
18	⊙	⊙	1220D18	...AC	18	32	92	16	3
19	⊙	⊙	1220D19	...AC	19	32	92	16	3
20	⊙	⊙	1220D20	...AC	20	38	104	20	3
22	⊙	⊙	1220D22	...AC	22	38	104	20	3
25	⊙	⊙	1220D25	...AC	25	45	121	25	3



**AllCut** is a coating whose AlCrN structure allows a reduced wear on many different work conditions and materials.

*Available in stock.*

The constructive geometry of those end mills allows their use on a very wide range of applications.



# THREE FLUTE END MILLS



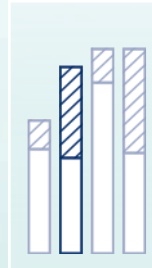
# FRESAL

UTENSILI

1230 it's particularly recommended for milling medium tensile strength materials.

DIN  
844B

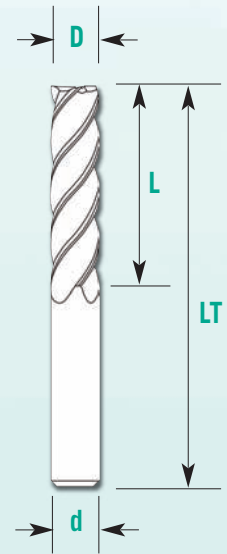
40°



F10  
AISI M42



90°



FRESAL		COATINGS		CODES		D	L	LT	d	z
Ø	UNCOATED	ALLCUT	UNCOATED	AC		js 14			h6	
3	⊙	⊙	1230D03	...AC	3	12	56	6	3	
4	⊙	⊙	1230D04	...AC	4	19	63	6	3	
5	⊙	⊙	1230D05	...AC	5	24	68	6	3	
6	⊙	⊙	1230D06	...AC	6	24	68	6	3	
7	⊙	⊙	1230D07	...AC	7	30	80	10	3	
8	⊙	⊙	1230D08	...AC	8	38	88	10	3	
9	⊙	⊙	1230D09	...AC	9	38	88	10	3	
10	⊙	⊙	1230D10	...AC	10	45	95	10	3	
11	⊙	⊙	1230D11	...AC	11	45	102	12	3	
12	⊙	⊙	1230D12	...AC	12	53	110	12	3	
13	⊙	⊙	1230D13	...AC	13	53	110	12	3	
14	⊙	⊙	1230D14	...AC	14	53	110	12	3	
15	⊙	⊙	1230D15	...AC	15	63	123	16	3	
16	⊙	⊙	1230D16	...AC	16	63	123	16	3	
18	⊙	⊙	1230D18	...AC	18	63	123	16	3	
20	⊙	⊙	1230D20	...AC	20	75	141	20	3	
25	⊙	⊙	1230D25	...AC	25	90	166	25	3	

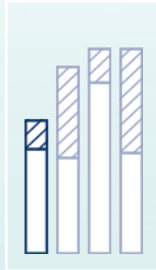
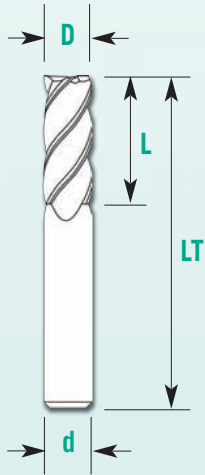
The constructive geometry of those end mills allows their use on a very wide range of applications.

AC  
ALLCUT

**AllCut** is a coating whose AlCrN structure allows a reduced wear on many different work conditions and materials.

*Available in stock.*

1240 it's particularly recommended for milling medium tensile strength materials.



FRESAL		COATINGS		CODES		D	L	LT	d	z
∅	UNCOATED	ALLCUT	UNCOATED	AC	js 14			h6		
6	⊙	⊙	1240D06	...AC	6	16	60	6	3	
8	⊙	⊙	1240D08	...AC	8	25	75	10	3	
10	⊙	⊙	1240D10	...AC	10	28	78	10	3	
12	⊙	⊙	1240D12	...AC	12	32	89	12	3	
14	⊙	⊙	1240D14	...AC	14	32	89	12	3	
16	⊙	⊙	1240D16	...AC	16	36	96	16	3	
18	⊙	⊙	1240D18	...AC	18	40	100	16	4	
20	⊙	⊙	1240D20	...AC	20	45	111	20	4	
22	⊙	⊙	1240D22	...AC	22	45	111	20	4	
25	⊙	⊙	1240D25	...AC	25	50	126	25	4	
30	⊙	⊙	1240D30	...AC	30	63	139	25	4	
32	⊙	⊙	1240D32	...AC	32	63	143	32	4	
35	⊙	⊙	1240D35	...AC	35	70	150	32	4	
40	⊙	⊙	1240D40	...AC	40	70	150	32	4	



**AllCut** is a coating whose AlCrN structure allows a reduced wear on many different work conditions and materials.

*Available in stock.*

High efficiency end mill with low vibration trend



# THREE FLUTE END MILLS



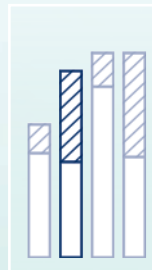
# FRESAL

UTENSILI

1250 it's particularly recommended for milling medium tensile strength materials.

DIN  
844B

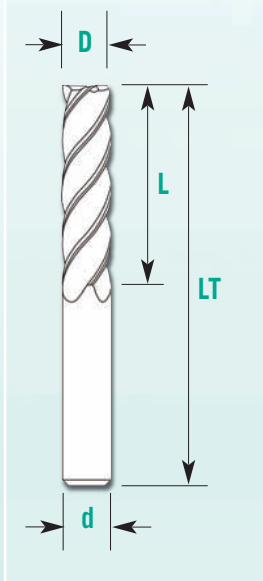
45°



F10  
AISI M42



90°



FRESAL		COATINGS		CODES		D	L	LT	d	z
Ø	UNCOATED	ALLCUT	UNCOATED	AC	js 14			h6		
6	⊙	⊙	1250D06	...AC	6	24	68	6	3	
8	⊙	⊙	1250D08	...AC	8	38	68	10	3	
10	⊙	⊙	1250D10	...AC	10	45	95	10	3	
12	⊙	⊙	1250D12	...AC	12	53	110	12	3	
14	⊙	⊙	1250D14	...AC	14	53	110	12	3	
16	⊙	⊙	1250D16	...AC	16	63	123	16	3	
18	⊙	⊙	1250D18	...AC	18	63	123	16	4	
20	⊙	⊙	1250D20	...AC	20	75	141	20	4	
25	⊙	⊙	1250D25	...AC	25	90	166	25	4	



High efficiency end mill with low vibration trend

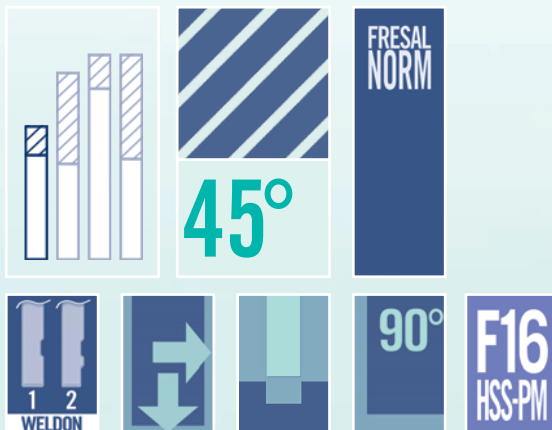
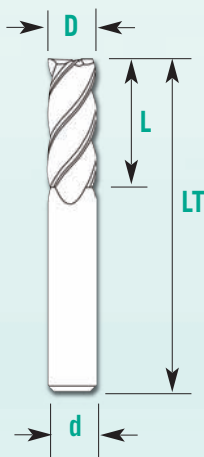
AC  
ALLCUT

**AllCut** is a coating whose AlCrN structure allows a reduced wear on many different work conditions and materials.

*Available in stock.*



1260 it's particularly recommended for milling medium and medium-high tensile strength materials.



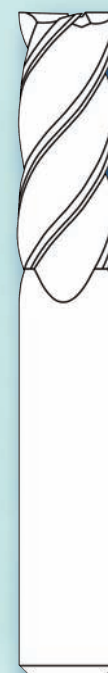
FRESAL		COATINGS		CODES		D	L	LT	d	z
∅	UNCOATED	ALLCUT	UNCOATED	AC	js 14			h6		
3	⊙	⊙	1260D03	...AC	3	8	52	6	3	
4	⊙	⊙	1260D04	...AC	4	11	55	6	3	
5	⊙	⊙	1260D05	...AC	5	13	57	6	3	
6	⊙	⊙	1260D06	...AC	6	16	60	6	3	
7	⊙	⊙	1260D07	...AC	7	22	72	10	3	
8	⊙	⊙	1260D08	...AC	8	25	75	10	3	
9	⊙	⊙	1260D09	...AC	9	25	75	10	3	
10	⊙	⊙	1260D10	...AC	10	28	78	10	3	
12	⊙	⊙	1260D12	...AC	12	32	89	12	3	
14	⊙	⊙	1260D14	...AC	14	32	92	12	3	
16	⊙	⊙	1260D16	...AC	16	36	96	16	3	
18	⊙	⊙	1260D18	...AC	18	40	100	16	4	
20	⊙	⊙	1260D20	...AC	20	45	111	20	4	
22	⊙	⊙	1260D22	...AC	22	45	111	20	4	
25	⊙	⊙	1260D25	...AC	25	50	126	25	4	
30	⊙	⊙	1260D30	...AC	30	63	139	25	4	



**AllCut** is a coating whose AlCrN structure allows a reduced wear on many different work conditions and materials.

*Available in stock.*

High efficiency end mill with low vibration trend



# THREE FLUTE END MILLS

POLISHED FLUTES



# FRESAL

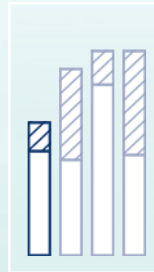
UTENSILI

1270 it's particularly recommended for milling aluminum and plastic materials.

FRESAL  
NORM

AL  
ALUMINIUM

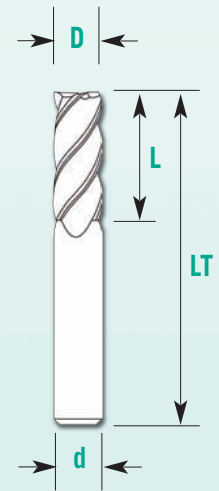
45°



F10  
AISI M42

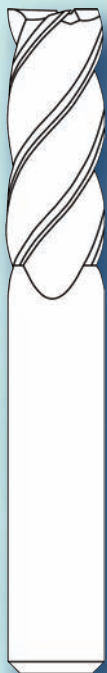


90°



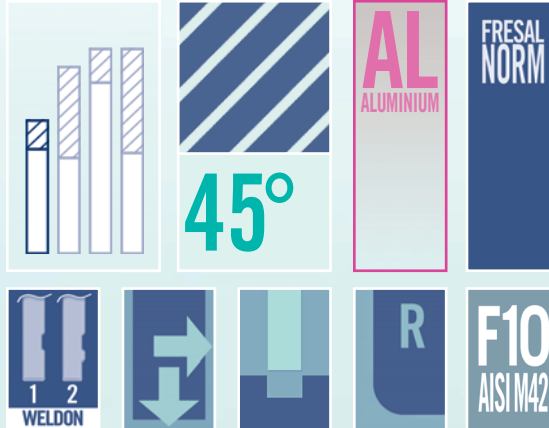
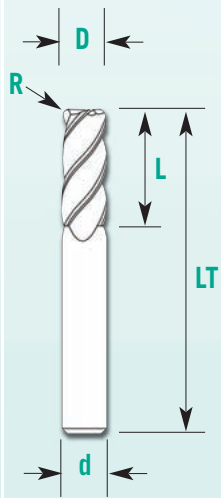
FRESAL		COATINGS	CODES		D	L	LT	d	z
Ø	UNCOATED	ALLCUT	UNCOATED	AC	js 14			h6	
6	⊙	-	1270D06	-	6	16	60	6	3
8	⊙	-	1270D08	-	8	25	75	10	3
10	⊙	-	1270D10	-	10	28	78	10	3
12	⊙	-	1270D12	-	12	32	89	12	3
16	⊙	-	1270D16	-	16	36	96	16	3
20	⊙	-	1270D20	-	20	45	111	20	3
25	⊙	-	1270D25	-	25	50	126	25	3

The teeth polished finishing permits a very easy shaving removal, as well as an important reduction of adhesion phenomena which are typical of the light alloys processing.



1270R it's particularly recommended for milling aluminum and plastic materials.

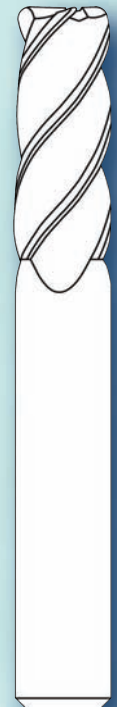
**THREE FLUTE  
END MILLS**  
*POLISHED FLUTES*



FRESAL		COATINGS		CODES		D	L	LT	d	z
Ø	UNCOATED	ALLCUT	UNCOATED	AC	js 14			h6		
6	⊙	-	1270RD06	-	6	16	60	6	3	
8	⊙	-	1270RD08	-	8	25	75	10	3	
10	⊙	-	1270RD10	-	10	28	78	10	3	
12	⊙	-	1270RD12	-	12	32	89	12	3	
16	⊙	-	1270RD16	-	16	36	96	16	3	
20	⊙	-	1270RD20	-	20	45	111	20	3	
25	⊙	-	1270RD25	-	25	50	126	25	3	

**NEW**

The teeth polished finishing permits a very easy shaving removal, as well as an important reduction of adhesion phenomena which are typical of the light alloys processing.



# THREE FLUTE END MILLS

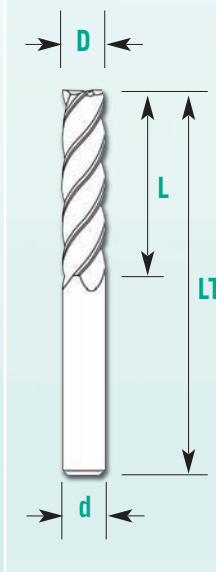
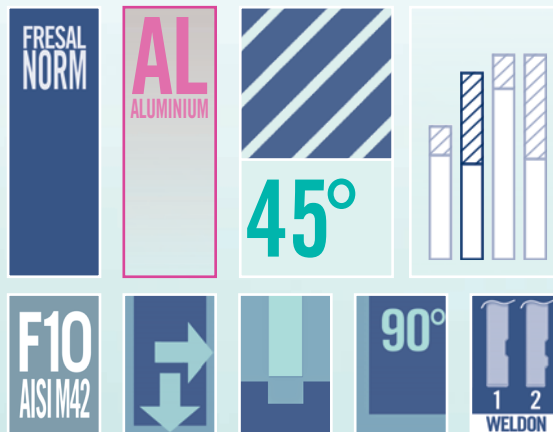
POLISHED FLUTES



# FRESAL

UTENSILI

1280 it's particularly recommended for milling aluminum and plastic materials.



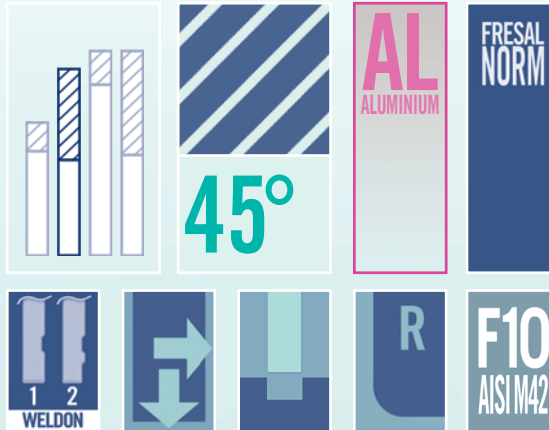
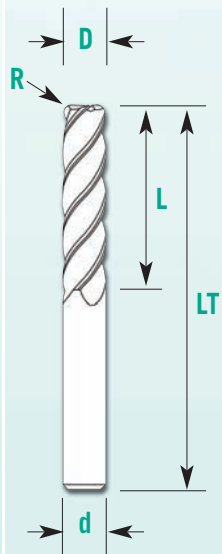
NEW



FRESAL		COATINGS	CODES		D	L	LT	d	z
Ø	UNCOATED	ALLCUT	UNCOATED	AC	js 14			h6	
6	⊙	-	1280D06	-	6	24	68	6	3
8	⊙	-	1280D08	-	8	38	88	10	3
10	⊙	-	1280D10	-	10	45	95	10	3
12	⊙	-	1280D12	-	12	53	110	12	3
16	⊙	-	1280D16	-	16	63	123	16	3
20	⊙	-	1280D20	-	20	75	141	20	3
25	⊙	-	1280D25	-	25	90	166	25	3

The teeth polished finishing permits a very easy shaving removal, as well as an important reduction of adhesion phenomena which are typical of the light alloys processing.

1280R it's particularly recommended for milling aluminum and plastic materials.



FRESAL		COATINGS		CODES		D	L	LT	d	z	R
Ø	UNCOATED	ALLCUT	UNCOATED	AC	js 14			h6			
8	⊙	-	1280D08R1	-	8	38	88	8	3	1	
8	⊙	-	1280D08R2	-	8	38	88	8	3	2	
8	⊙	-	1280D08R3	-	8	38	88	8	3	3	
8	⊙	-	1280D08R4	-	8	38	88	8	3	4	
10	⊙	-	1280D10R1	-	10	45	95	10	3	1	
10	⊙	-	1280D10R2	-	10	45	95	10	3	2	
10	⊙	-	1280D10R3	-	10	45	95	10	3	3	
10	⊙	-	1280D10R4	-	10	45	95	10	3	4	
12	⊙	-	1280D12R1	-	12	53	110	12	3	1	
12	⊙	-	1280D12R2	-	12	53	110	12	3	2	
12	⊙	-	1280D12R3	-	12	53	110	12	3	3	
12	⊙	-	1280D12R4	-	12	53	110	12	3	4	
16	⊙	-	1280D16R1	-	16	63	123	16	3	1	
16	⊙	-	1280D16R2	-	16	63	123	16	3	2	
16	⊙	-	1280D16R3	-	16	63	123	16	3	3	
16	⊙	-	1280D16R4	-	16	63	123	16	3	4	
20	⊙	-	1280D20R1	-	20	75	141	20	3	1	
20	⊙	-	1280D20R2	-	20	75	141	20	3	2	
20	⊙	-	1280D20R3	-	20	75	141	20	3	3	
20	⊙	-	1280D20R4	-	20	75	141	20	3	4	

NEW



The teeth polished finishing permits a very easy shaving removal, as well as an important reduction of adhesion phenomena which are typical of the light alloys processing.

# THREE FLUTE END MILLS

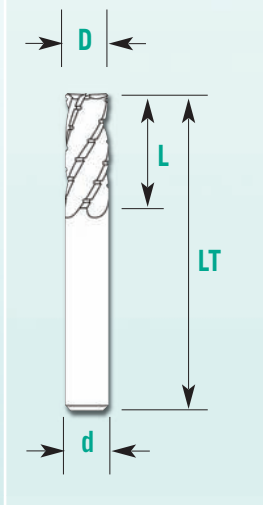
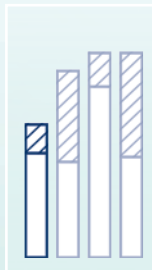
**POLISHED FLUTES**



# FRESAL

UTENSILI

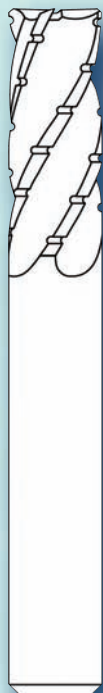
**1270U** it's particularly recommended for milling aluminum and plastic materials.



**NEW**

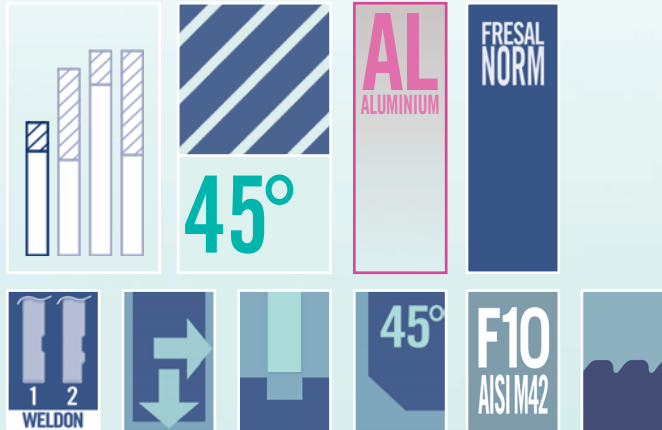
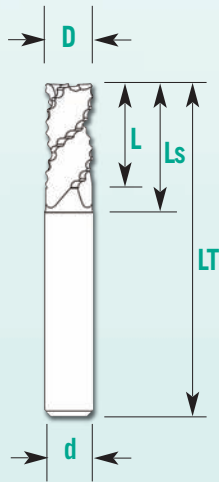
FRESAL		COATINGS	CODES		D	L	LT	d	z
Ø	UNCOATED	ALLCUT	UNCOATED	AC	js 14			h6	
6	⊙	-	1270UD06	-	6	16	60	6	3
8	⊙	-	1270UD08	-	8	25	75	10	3
10	⊙	-	1270UD10	-	10	28	78	10	3
12	⊙	-	1270UD12	-	12	32	89	12	3
16	⊙	-	1270UD16	-	16	36	96	16	3
20	⊙	-	1270UD20	-	20	45	111	20	3

The teeth polished finishing permits a very easy shaving removal, as well as an important reduction of adhesion phenomena which are typical of the light alloys processing.



**2300** it's particularly recommended for roughing processes on aluminum and its alloys.

**THREE FLUTE END MILLS**  
for roughing processes  
**POLISHED FLUTES**



FRESAL		COATINGS	CODES		D	L	LT	Ls	d	z
Ø	UNCOATED	ALLCUT	UNCOATED	AC	js 14				h6	
10	⊙	-	2300D10	-	10	22	72	28	10	3
12	⊙	-	2300D12	-	12	26	83	32	12	3
16	⊙	-	2300D16	-	16	32	92	40	16	3
20	⊙	-	2300D20	-	20	38	104	48	20	3
25	⊙	-	2300D25	-	25	45	121	56	25	3

The teeth polished finishing permits a very easy shaving removal, as well as an important reduction of adhesion phenomena which are typical of the light alloys processing.



# THREE FLUTE END MILLS

for roughing processes  
- fine pitch



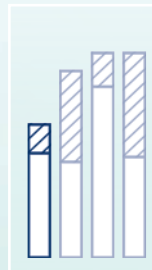
# FRESAL

UTENSILI

2140 it's particularly recommended for roughing processes on medium and medium-high resistance materials.

DIN  
844B

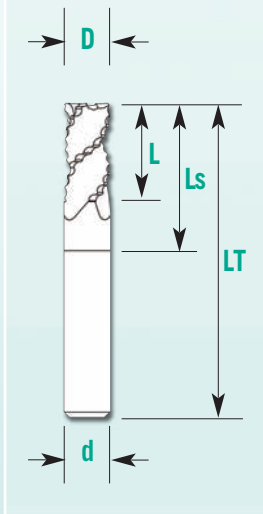
45°



F16  
HSS-PM



45°



FRESAL		COATINGS		CODES		D	L	LT	Ls	d	z
Ø	UNCOATED	ALLCUT	UNCOATED	AC	js 14					h6	
8	⊙	⊙	2140D08	...AC	8	19	69	25	10	3	
10	⊙	⊙	2140D10	...AC	10	22	72	28	10	3	
12	⊙	⊙	2140D12	...AC	12	26	83	32	12	3	
16	⊙	⊙	2140D16	...AC	16	32	92	40	16	3	
20	⊙	⊙	2140D20	...AC	20	38	104	48	20	3	
25	⊙	⊙	2140D25	...AC	25	45	121	56	25	3	

High efficiency end mill  
with low vibration  
trend

AC  
ALLCUT

**AllCut** is a coating whose AlCrN structure allows a reduced wear on many different work conditions and materials.

*Available in stock.*





# FRESAL

## UTENSILI

FOUR FLUTE  
END MILLS



# FOUR FLUTE END MILLS



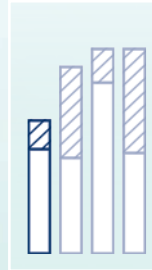
# FRESAL

UTENSILI

1300 it's particularly recommended for milling medium tensile strength materials.

DIN  
844B

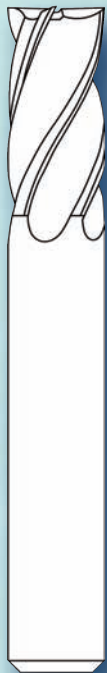
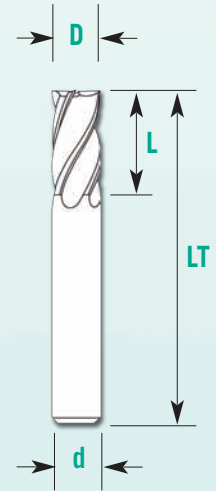
40°



F10  
AISI M42



90°



FRESAL		COATINGS		CODES		D	L	LT	d	z
Ø	UNCOATED	ALLCUT	UNCOATED	AC	js 14			h6		
3	⊙	⊙	1300D03	...AC	3	8	52	6	4	
4	⊙	⊙	1300D04	...AC	4	11	55	6	4	
5	⊙	⊙	1300D05	...AC	5	13	57	6	4	
6	⊙	⊙	1300D06	...AC	6	13	57	6	4	
7	⊙	⊙	1300D07	...AC	7	16	66	10	4	
8	⊙	⊙	1300D08	...AC	8	19	69	10	4	
9	⊙	⊙	1300D09	...AC	9	19	69	10	4	
10	⊙	⊙	1300D10	...AC	10	22	72	10	4	
11	⊙	⊙	1300D11	...AC	11	22	79	12	4	
12	⊙	⊙	1300D12	...AC	12	26	83	12	4	
13	⊙	⊙	1300D13	...AC	13	26	83	12	4	
14	⊙	⊙	1300D14	...AC	14	26	83	12	4	
15	⊙	⊙	1300D15	...AC	15	32	92	16	4	
16	⊙	⊙	1300D16	...AC	16	32	92	16	4	
17	⊙	⊙	1300D17	...AC	17	32	92	16	4	
18	⊙	⊙	1300D18	...AC	18	32	92	16	4	
19	⊙	⊙	1300D19	...AC	19	32	92	16	4	
20	⊙	⊙	1300D20	...AC	20	38	104	20	4	
22	⊙	⊙	1300D22	...AC	22	38	104	20	5	
25	⊙	⊙	1300D25	...AC	25	45	121	25	5	
30	⊙	⊙	1300D30	...AC	30	45	121	25	6	
32	⊙	⊙	1300D32	...AC	32	53	133	32	6	
40	⊙	⊙	1300D40	...AC	40	63	155	32	8	

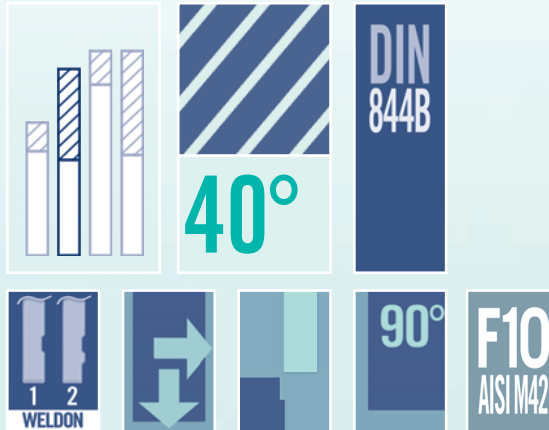
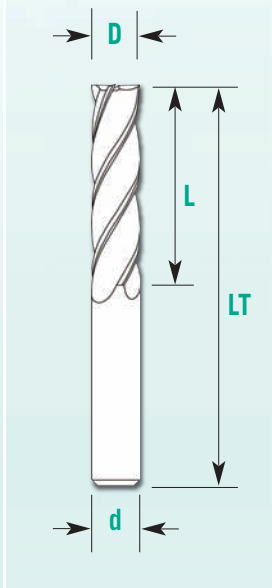
The constructive geometry of those end mills allows their use on a very wide range of applications.

AC  
ALLCUT

**AllCut** is a coating whose AlCrN structure allows a reduced wear on many different work conditions and materials.

*Available in stock.*

1310 it's particularly recommended for milling medium tensile strength materials.



FRESAL		COATINGS		CODES		D	L	LT	d	z
Ø	UNCOATED	ALLCUT	UNCOATED	AC	js 14			h6		
3	⊙	⊙		1310D03 ...AC	3	12	56	6	4	
4	⊙	⊙		1310D04 ...AC	4	19	63	6	4	
5	⊙	⊙		1310D05 ...AC	5	24	68	6	4	
6	⊙	⊙		1310D06 ...AC	6	24	68	6	4	
7	⊙	⊙		1310D07 ...AC	7	30	80	10	4	
8	⊙	⊙		1310D08 ...AC	8	38	88	10	4	
9	⊙	⊙		1310D09 ...AC	9	38	88	10	4	
10	⊙	⊙		1310D10 ...AC	10	45	95	10	4	
12	⊙	⊙		1310D12 ...AC	12	53	110	12	4	
14	⊙	⊙		1310D14 ...AC	14	53	110	12	4	
16	⊙	⊙		1310D16 ...AC	16	63	123	16	4	
18	⊙	⊙		1310D18 ...AC	18	63	123	16	4	
20	⊙	⊙		1310D20 ...AC	20	75	141	20	4	



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*Available in stock.*

The constructive geometry of those end mills allows their use on a very wide range of applications.



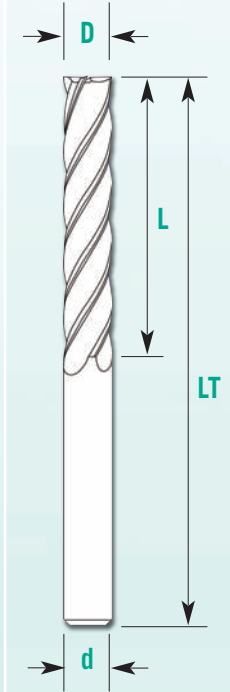
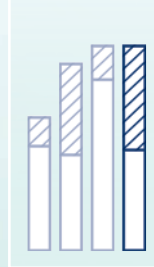
# FOUR FLUTE END MILLS



# FRESAL

UTENSILI

1330 it's particularly recommended for milling medium tensile strength materials.



FRESAL		COATINGS		CODES		D	L	LT	d	z
Ø	UNCOATED	ALLCUT	UNCOATED	AC		js 14			h6	
6	⊙	⊙	1330D06	...AC		6	56	100	6	4
8	⊙	⊙	1330D08	...AC		8	63	113	10	4
10	⊙	⊙	1330D10	...AC		10	70	120	10	4
12	⊙	⊙	1330D12	...AC		12	80	137	12	4
14	⊙	⊙	1330D14	...AC		14	80	137	12	4
16	⊙	⊙	1330D16	...AC		16	90	150	16	4
18	⊙	⊙	1330D18	...AC		18	100	160	16	4
20	⊙	⊙	1330D20	...AC		20	110	176	20	4
25	⊙	⊙	1330D25	...AC		25	125	201	25	5

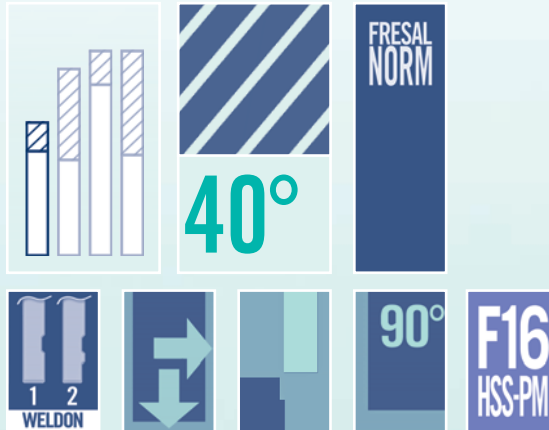
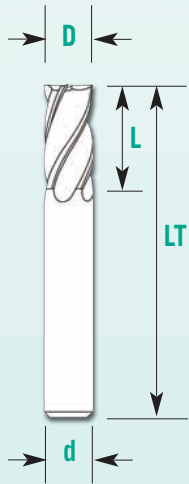
The constructive geometry of those end mills allows their use on a very wide range of applications.



**ALLCUT** is a coating whose AlCrN structure allows a reduced wear on many different work conditions and materials.

*Available in stock.*

1320 it's particularly recommended for roughing processes on medium and medium-high resistance materials.



FRESAL		COATINGS		CODES		D	L	LT	d	z
Ø	UNCOATED	ALLCUT	UNCOATED	AC	js 14			h6		
3	⊙	⊙	1320D03	...AC	3	8	52	6	4	
4	⊙	⊙	1320D04	...AC	4	11	55	6	4	
5	⊙	⊙	1320D05	...AC	5	13	57	6	4	
6	⊙	⊙	1320D06	...AC	6	16	60	6	4	
7	⊙	⊙	1320D07	...AC	7	22	72	10	4	
8	⊙	⊙	1320D08	...AC	8	25	75	10	4	
9	⊙	⊙	1320D09	...AC	9	25	75	10	4	
10	⊙	⊙	1320D10	...AC	10	28	78	10	4	
12	⊙	⊙	1320D12	...AC	12	32	89	12	4	
14	⊙	⊙	1320D14	...AC	14	32	92	16	4	
16	⊙	⊙	1320D16	...AC	16	36	96	16	4	
18	⊙	⊙	1320D18	...AC	18	40	100	16	4	
20	⊙	⊙	1320D20	...AC	20	45	111	20	4	
22	⊙	⊙	1320D22	...AC	22	45	111	20	5	
25	⊙	⊙	1320D25	...AC	25	50	126	25	5	
30	⊙	⊙	1320D30	...AC	30	63	139	25	6	



**AllCut** is a coating whose AlCrN structure allows a reduced wear on many different work conditions and materials.

*Available in stock.*

High efficiency end mill with low vibration trend



# FOUR FLUTE END MILLS for roughing - thick pitch



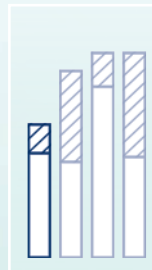
# FRESAL

UTENSILI

2100 it's particularly recommended for milling medium tensile strength materials.

DIN  
844B

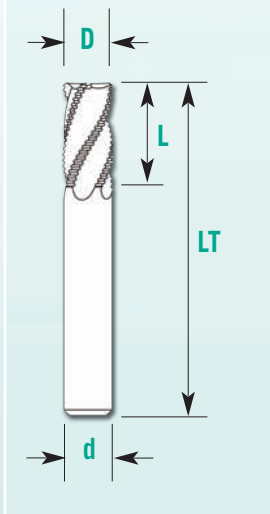
30°



F10  
AISI M42



45°



FRESAL		COATINGS		CODES		D	L	LT	d	z
Ø	UNCOATED	ALLCUT	UNCOATED	AC		js 14			h6	
6	⊙	⊙	2100D06	...AC		6	13	57	6	3
8	⊙	⊙	2100D08	...AC		8	19	69	10	3
10	⊙	⊙	2100D10	...AC		10	22	72	10	4
12	⊙	⊙	2100D12	...AC		12	26	83	12	4
14	⊙	⊙	2100D14	...AC		14	26	83	12	4
16	⊙	⊙	2100D16	...AC		16	32	92	16	4
18	⊙	⊙	2100D18	...AC		18	32	92	16	4
20	⊙	⊙	2100D20	...AC		20	38	104	20	4
22	⊙	⊙	2100D22	...AC		22	38	104	20	4
25	⊙	⊙	2100D25	...AC		25	45	121	25	4
30	⊙	⊙	2100D30	...AC		30	45	121	25	4



The constructive geometry of those end mills allows their use on a very wide range of applications.

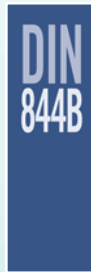
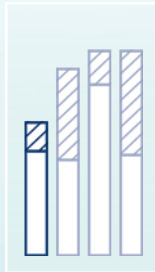
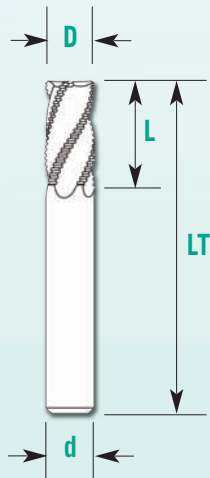
AC  
ALLCUT

**AllCut** is a coating whose AlCrN structure allows a reduced wear on many different work conditions and materials.

*Available in stock.*

2110 it's particularly recommended for milling medium tensile strength materials.

**FOUR FLUTE END MILLS**  
for roughing  
- fine pitch



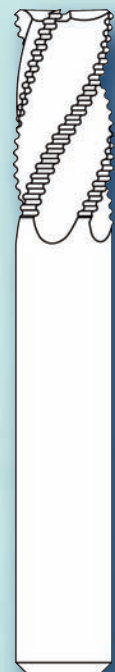
FRESAL		COATINGS		CODES		D	L	LT	d	z
∅	UNCOATED	ALLCUT	UNCOATED	AC	js 14			h6		
6	⊙	⊙	2110D06	...AC	6	13	57	6	3	
7	⊙	⊙	2110D07	...AC	7	16	66	10	3	
8	⊙	⊙	2110D08	...AC	8	19	69	10	3	
9	⊙	⊙	2110D09	...AC	9	19	69	10	4	
10	⊙	⊙	2110D10	...AC	10	22	72	10	4	
11	⊙	⊙	2110D11	...AC	11	22	79	12	4	
12	⊙	⊙	2110D12	...AC	12	26	83	12	4	
13	⊙	⊙	2110D13	...AC	13	26	83	12	4	
14	⊙	⊙	2110D14	...AC	14	26	83	12	4	
16	⊙	⊙	2110D16	...AC	16	32	92	16	4	
18	⊙	⊙	2110D18	...AC	18	32	92	16	4	
20	⊙	⊙	2110D20	...AC	20	38	104	20	4	
22	⊙	⊙	2110D22	...AC	22	38	104	20	4	
25	⊙	⊙	2110D25	...AC	25	45	121	25	4	
30	⊙	⊙	2110D30	...AC	30	45	121	25	4	
32	⊙	⊙	2110D32	...AC	32	53	133	32	4	
40	⊙	⊙	2110D40	...AC	40	63	143	32	4	



**AllCut** is a coating whose AlCrN structure allows a reduced wear on many different work conditions and materials.

*Available in stock.*

The constructive geometry of those end mills allows their use on a very wide range of applications.

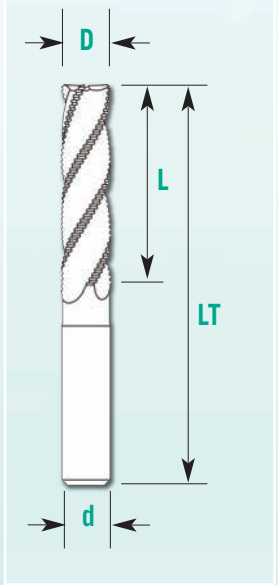
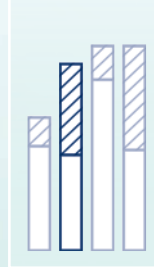
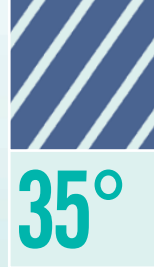


**FOUR FLUTE  
END MILLS**  
for roughing  
- thick pitch



**FRESAL**  
UTENSILI

2200 it's particularly recommended for milling medium tensile strength materials.



FRESAL		COATINGS		CODES		D	L	LT	d	z
Ø	UNCOATED	ALLCUT	UNCOATED	AC		js 14			h6	
6	⊙	⊙	2200D06	...AC		6	24	68	6	3
8	⊙	⊙	2200D08	...AC		8	38	88	10	3
10	⊙	⊙	2200D10	...AC		10	45	95	10	4
12	⊙	⊙	2200D12	...AC		12	53	110	12	4
14	⊙	⊙	2200D14	...AC		14	53	110	12	4
16	⊙	⊙	2200D16	...AC		16	63	123	16	4
18	⊙	⊙	2200D18	...AC		18	63	123	16	4
20	⊙	⊙	2200D20	...AC		20	75	141	20	4
25	⊙	⊙	2200D25	...AC		25	90	166	25	5



The constructive geometry of those end mills allows their use on a very wide range of applications.



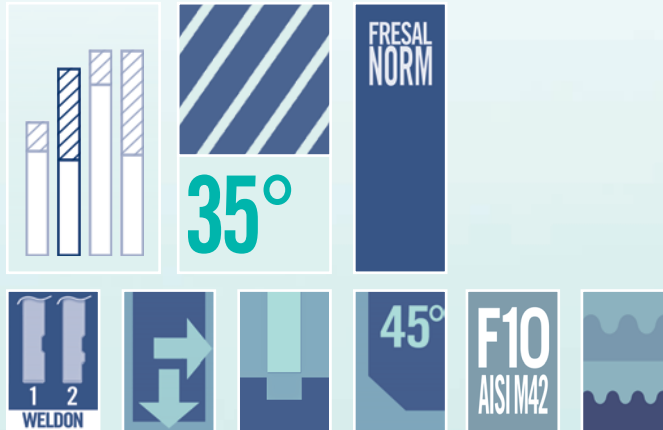
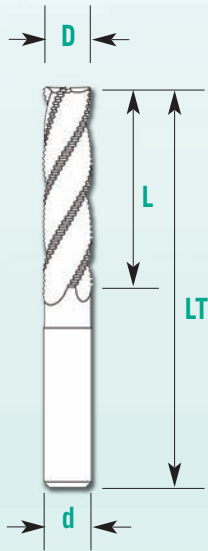
**ALLCUT** is a coating whose AlCrN structure allows a reduced wear on many different work conditions and materials.

*Available in stock.*



2210 it's particularly recommended for milling medium tensile strength materials.

**FOUR FLUTE END MILLS**  
for roughing  
- fine pitch



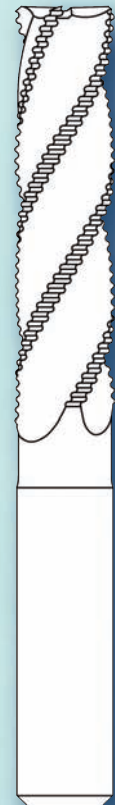
FRESAL		COATINGS	CODES		D	L	LT	d	z
Ø	UNCOATED	ALLCUT	UNCOATED	AC	js 14			h6	
6	⊙	⊙	2210D06	...AC	6	24	68	6	3
8	⊙	⊙	2210D08	...AC	8	38	88	10	3
10	⊙	⊙	2210D10	...AC	10	45	95	10	4
12	⊙	⊙	2210D12	...AC	12	53	110	12	4
14	⊙	⊙	2210D14	...AC	14	53	110	12	4
16	⊙	⊙	2210D16	...AC	16	63	123	16	4
18	⊙	⊙	2210D18	...AC	18	63	123	16	4
20	⊙	⊙	2210D20	...AC	20	75	141	20	4
25	⊙	⊙	2210D25	...AC	25	90	166	25	5



**AllCut** is a coating whose AlCrN structure allows a reduced wear on many different work conditions and materials.

*Available in stock.*

The constructive geometry of those end mills allows their use on a very wide range of applications.

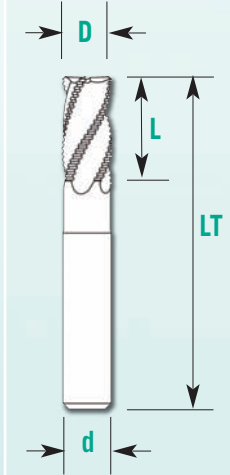
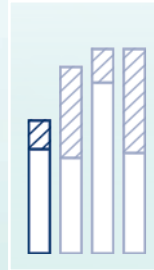


**FOUR FLUTE  
END MILLS**  
for roughing  
- fine pitch



**FRESAL**  
UTENSILI

2120 it's particularly recommended for roughing processes on medium and medium-high resistance materials.



FRESAL		COATINGS		CODES		D	L	LT	d	z
Ø	UNCOATED	ALLCUT	UNCOATED	AC		js 14			h6	
6	⊙	⊙	2120D06	...AC	6	16	60	6	3	
7	⊙	⊙	2120D07	...AC	7	22	72	10	3	
8	⊙	⊙	2120D08	...AC	8	25	75	10	3	
9	⊙	⊙	2120D09	...AC	9	25	75	10	4	
10	⊙	⊙	2120D10	...AC	10	28	78	10	4	
11	⊙	⊙	2120D11	...AC	11	28	85	12	4	
12	⊙	⊙	2120D12	...AC	12	32	89	12	4	
14	⊙	⊙	2120D14	...AC	14	32	92	16	4	
16	⊙	⊙	2120D16	...AC	16	36	96	16	4	
18	⊙	⊙	2120D18	...AC	18	40	100	16	4	
20	⊙	⊙	2120D20	...AC	20	45	111	20	4	
25	⊙	⊙	2120D25	...AC	25	50	126	25	5	
30	⊙	⊙	2120D30	...AC	30	63	139	25	5	
32	⊙	⊙	2120D32	...AC	32	63	143	32	5	



High efficiency end mill. The constructive geometry of those end mills allows their use on a very wide range of applications.

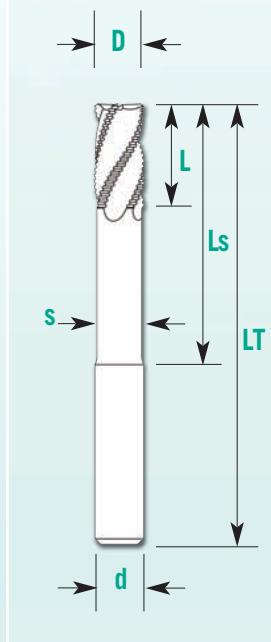


**ALLCUT** is a coating whose AlCrN structure allows a reduced wear on many different work conditions and materials.

*Available in stock.*



2130 it's particularly recommended for roughing processes on medium and medium-high resistance materials.



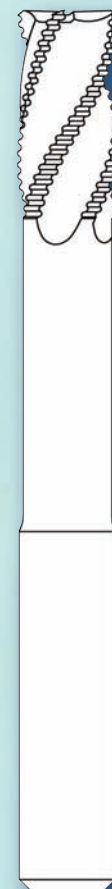
FRESAL		COATINGS		CODES		D	L	LT	Ls	s	d	z
Ø	UNCOATED	ALLCUT	UNCOATED	AC	h 10						h 6	
12	⊙	⊙	2130D12.065	...AC	12	30	110	65	11	12	4	
12	⊙	⊙	2130D12.085	...AC	12	40	130	85	11	12	4	
16	⊙	⊙	2130D16.077	...AC	16	32	125	77	15	16	4	
16	⊙	⊙	2130D16.102	...AC	16	40	150	102	15	16	4	
20	⊙	⊙	2130D20.080	...AC	20	40	130	80	18	20	4	
20	⊙	⊙	2130D20.100	...AC	20	50	150	100	18	20	4	
20	⊙	⊙	2130D20.120	...AC	20	50	170	120	18	20	4	
25	⊙	⊙	2130D25.094	...AC	25	50	150	94	23	25	5	
25	⊙	⊙	2130D25.124	...AC	25	50	180	124	23	25	5	
32	⊙	⊙	2130D32.100	...AC	32	70	160	100	30	32	5	
32	⊙	⊙	2130D32.160	...AC	32	70	210	160	30	32	5	



**AllCut** is a coating whose AlCrN structure allows a reduced wear on many different work conditions and materials.

*Available in stock.*

High efficiency end mill. The constructive geometry of those end mills allows their use on a very wide range of applications.

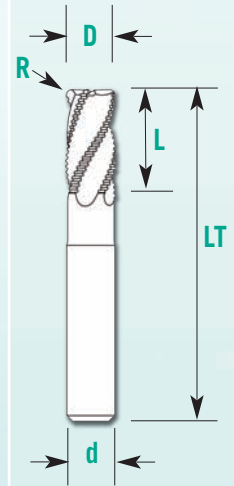
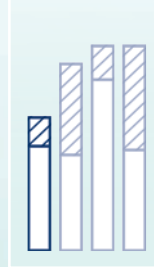


**FOUR FLUTE  
END MILLS**  
*roughing - fine pitch  
corner radius*



**FRESAL**  
UTENSILI

**2120R** it's particularly recommended for roughing processes on medium and medium-high resistance materials.



FRESAL		COATINGS		CODES		D	R	L	LT	d	z
Ø	UNCOATED	ALLCUT	UNCOATED	AC	js 14					h6	
12	⊙	⊙	2120D12R25	...AC	12	2,5	32	89	12	4	
12	⊙	⊙	2120D12R40	...AC	12	4	32	89	12	4	
16	⊙	⊙	2120D16R25	...AC	16	2,5	36	96	16	4	
16	⊙	⊙	2120D16R40	...AC	16	4	36	96	16	4	
20	⊙	⊙	2120D20R25	...AC	20	2,5	45	111	20	4	
20	⊙	⊙	2120D20R40	...AC	20	4	45	111	20	4	
25	⊙	⊙	2120D25R25	...AC	25	2,5	50	126	25	5	
25	⊙	⊙	2120D25R40	...AC	25	4	50	126	25	5	

The constructive geometry of those end mills allows their use on a very wide range of applications.

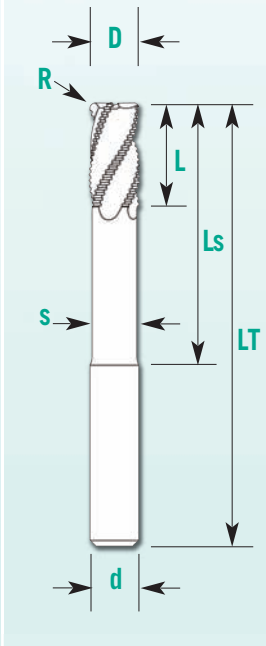


**AllCut** is a coating whose AlCrN structure allows a reduced wear on many different work conditions and materials.

*Available in stock.*



**2130R** it's particularly recommended for roughing processes on medium and medium-high resistance materials.



FRESAL		COATINGS	CODES		D	R	L	LT	Ls	s	d	z
∅	UNCOATED	ALLCUT	UNCOATED	AC	h 10						h 6	
12	⊙	⊙	2130D12.065R25	...AC	12	2,5	30	110	65	11	12	4
12	⊙	⊙	2130D12.065R40	...AC	12	4	30	110	65	11	12	4
12	⊙	⊙	2130D12.085R25	...AC	12	2,5	40	130	85	11	12	4
12	⊙	⊙	2130D12.085R40	...AC	12	4	40	130	85	11	12	4
16	⊙	⊙	2130D16.077R25	...AC	16	2,5	32	125	77	15	16	4
16	⊙	⊙	2130D16.077R40	...AC	16	4	32	125	77	15	16	4
16	⊙	⊙	2130D16.102R25	...AC	16	2,5	40	150	102	15	16	4
16	⊙	⊙	2130D16.102R40	...AC	16	4	40	150	102	15	16	4
20	⊙	⊙	2130D20.080R25	...AC	20	2,5	40	130	80	18	20	4
20	⊙	⊙	2130D20.080R40	...AC	20	4	40	130	80	18	20	4
20	⊙	⊙	2130D20.100R25	...AC	20	2,5	50	150	100	18	20	4
20	⊙	⊙	2130D20.100R40	...AC	20	4	50	150	100	18	20	4
20	⊙	⊙	2130D20.120R25	...AC	20	2,5	50	170	120	18	20	4
20	⊙	⊙	2130D20.120R40	...AC	20	4	50	170	120	18	20	4



**AllCut** is a coating whose AlCrN structure allows a reduced wear on many different work conditions and materials.

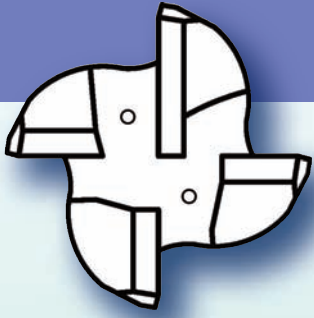
*Available in stock.*

The constructive geometry of those end mills allows their use on a very wide range of applications.



# FOUR FLUTE END MILLS

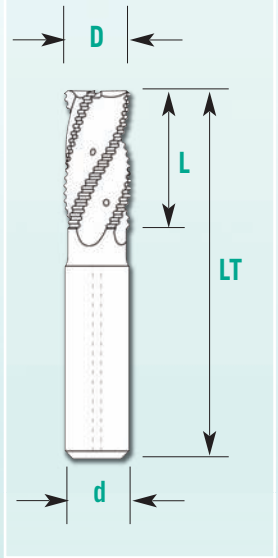
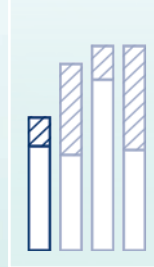
*roughing - fine pitch*



# FRESAL

UTENSILI

2150 it's particularly recommended for roughing processes on medium and medium-high resistance materials.



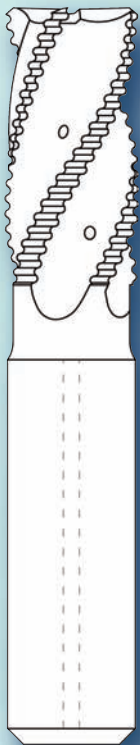
FRESAL		COATINGS		CODES		D	L	LT	d	z
Ø	UNCOATED	ALLCUT	UNCOATED	AC		js 14			h6	
16	⊙	⊙	2150D16	...AC		16	32	92	16	4
20	⊙	⊙	2150D20	...AC		20	38	104	20	4
25	⊙	⊙	2150D25	...AC		25	45	121	25	4
30	⊙	⊙	2150D30	...AC		30	45	121	25	6
32	⊙	⊙	2150D32	...AC		32	53	133	32	6

High efficiency end mill with internal lubrication. The constructive geometry of those end mills allows their use on a very wide range of applications.



**ALLCUT** is a coating whose AlCrN structure allows a reduced wear on many different work conditions and materials.

*Available in stock.*



# FRESAL

## UTENSILI

SPECIAL  
FOUR FLUTE  
END MILLS



# FOUR FLUTE END MILLS "ondaline" series



# FRESAL

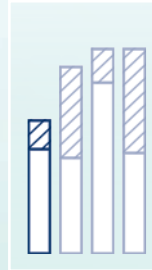
UTENSILI

2400 it's particularly recommended for milling Titanium and its alloys.

DIN  
844B

TI  
TITANIUM

30°

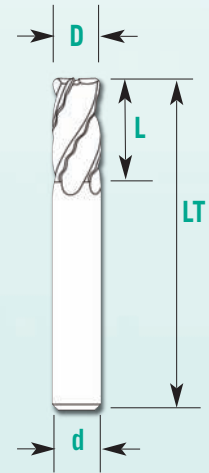


F16  
HSS-PM

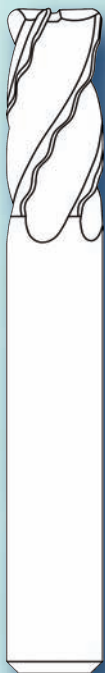


R

1 2  
WELDON



FRESAL		COATINGS		CODES		D	L	LT	d	z
Ø	UNCOATED	ALLCUT	UNCOATED	AC		js 14			h6	
12	⊙	⊙	2400D12	...AC		12	26	83	12	4
12	⊙	⊙	2400LD12	...AC		12	50	120	12	4
16	⊙	⊙	2400D16	...AC		16	32	92	16	4
16	⊙	⊙	2400LD16	...AC		16	50	130	16	4
20	⊙	⊙	2400D20	...AC		20	38	104	20	4
20	⊙	⊙	2400LD20	...AC		20	50	130	20	4
25	⊙	⊙	2400D25	...AC		25	45	121	25	5
30	⊙	⊙	2400D30	...AC		30	45	121	25	6
32	⊙	⊙	2400D32	...AC		32	53	133	32	6



The cutting edge constructive geometry on these end mills allows their high efficiency use on roughing processes.

AC  
ALLCUT

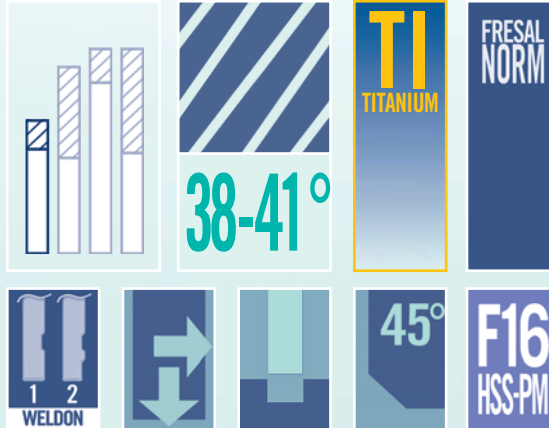
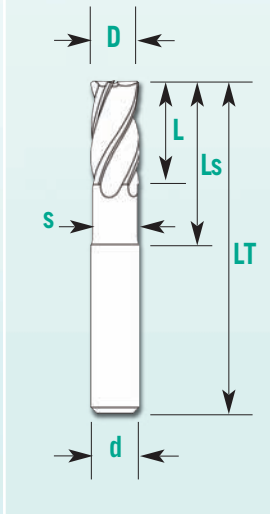
**AllCut** is a coating whose AlCrN structure allows a reduced wear in many different work conditions and on different materials.

*Available in  
3 working days.*



2460 it's particularly recommended for milling stainless steels and Titanium alloys.

FOUR FLUTE  
END MILLS  
*different  
helix angle*



FRESAL		COATINGS	CODES		D	L	LT	Ls	s	d	z
Ø	UNCOATED	ALLCUT	UNCOATED	AC	h 10					h 6	
6	⊙	⊙	2460D06	...AC	6	16	57	33	5,5	6	4
8	⊙	⊙	2460D08	...AC	8	19	72	34	7,5	10	4
10	⊙	⊙	2460D10	...AC	10	22	72	37	9	10	4
12	⊙	⊙	2460D12	...AC	12	26	83	41	11	12	4
16	⊙	⊙	2460D16	...AC	16	32	92	47	15	16	4
20	⊙	⊙	2460D20	...AC	20	38	104	53	19	20	4
25	⊙	⊙	2460D25	...AC	25	45	121	60	23,5	25	6



**AllCut** is a coating whose AlCrN structure allows a reduced wear on many different work conditions and materials.

*Available in stock.*

The unequal angle of helixes allows a high efficiency processing, without any sort of vibration

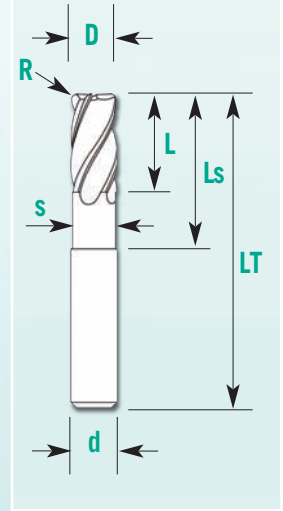
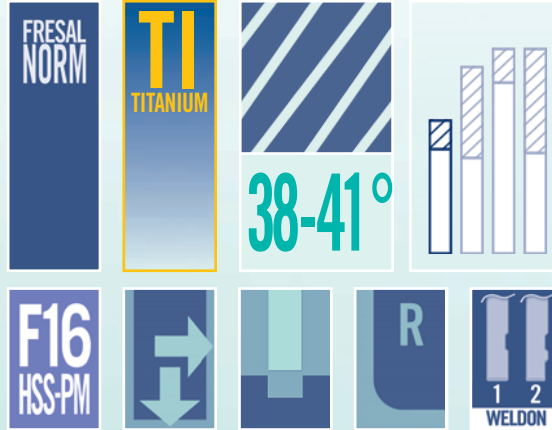


**FOUR FLUTE  
END MILLS**  
*different helix angle  
corner radius*



**FRESAL**  
UTENSILI

**2560** it's particularly recommended for milling stainless steels and Titanium alloys.



FRESAL		COATINGS	CODES		D	R	L	LT	Ls	s	d	z
Ø	UNCOATED	ALLCUT	UNCOATED	AC	h10						h6	
8	⊙	⊙	2560D08.10	...AC	8	1	19	72	34	7,5	10	4
8	⊙	⊙	2560D08.25	...AC	8	2,5	19	72	34	7,5	10	4
10	⊙	⊙	2560D10.10	...AC	10	1	22	72	37	9	10	4
10	⊙	⊙	2560D10.25	...AC	10	2,5	22	72	37	9	10	4
12	⊙	⊙	2560D12.25	...AC	12	2,5	26	83	41	11	12	4
12	⊙	⊙	2560D12.40	...AC	12	4	26	83	41	11	12	4
16	⊙	⊙	2560D16.25	...AC	16	2,5	32	92	47	15	16	4
16	⊙	⊙	2560D16.40	...AC	16	4	32	92	47	15	16	4
20	⊙	⊙	2560D20.25	...AC	20	2,5	38	104	53	19	20	4
20	⊙	⊙	2560D20.40	...AC	20	4	38	104	53	19	20	4
25	⊙	⊙	2560D25.25	...AC	25	2,5	45	121	60	23,5	25	6
25	⊙	⊙	2560D25.40	...AC	25	4	45	121	60	23,5	25	6
25	⊙	⊙	2560D25.60	...AC	25	6	45	121	60	23,5	25	6



The unequal angle of helices allows a high efficiency processing, without any sort of vibration



**AllCut** is a coating whose AlCrN structure allows a reduced wear on many different work conditions and materials.

*Available in stock.*

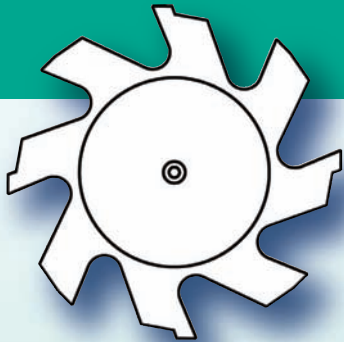
# FRESAL

## UTENSILI

ALTERNATE  
HELICAL FLUTES  
END MILLS



# ALTERNATE HELICAL FLUTES END MILLS for woodruff keyseats

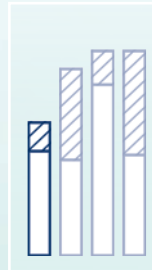


# FRESAL

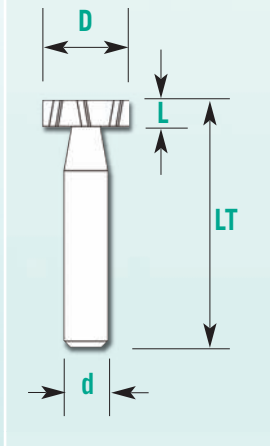
UTENSILI

**3100** it's particularly recommended for milling medium tensile strength materials.

DIN  
850B



F10  
AISI M42



FRESAL		COATINGS	CODES		D	L	LT	d	z
Ø	UNCOATED	ALLCUT	UNCOATED	AC	h 11	e 8		h 6	
10,5	⊙	⊙	3100D10.5x2	...AC	10,5	2	50	6	6
10,5	⊙	⊙	3100D10.5x3	...AC	10,5	3	50	6	6
13,5	⊙	⊙	3100D13.5x2	...AC	13,5	2	56	10	6
13,5	⊙	⊙	3100D13.5x3	...AC	13,5	3	56	10	6
13,5	⊙	⊙	3100D13.5x4	...AC	13,5	4	56	10	6
16,5	⊙	⊙	3100D16.5x3	...AC	16,5	3	56	10	8
16,5	⊙	⊙	3100D16.5x4	...AC	16,5	4	56	10	8
16,5	⊙	⊙	3100D16.5x5	...AC	16,5	5	56	10	8
16,5	⊙	⊙	3100D16.5x6	...AC	16,5	6	56	10	8
19,5	⊙	⊙	3100D19.5x3	...AC	19,5	3	56	10	8
19,5	⊙	⊙	3100D19.5x4	...AC	19,5	4	56	10	8
19,5	⊙	⊙	3100D19.5x5	...AC	19,5	5	56	10	8
19,5	⊙	⊙	3100D19.5x6	...AC	19,5	6	56	10	8
22,5	⊙	⊙	3100D22.5x4	...AC	22,5	4	56	10	10
22,5	⊙	⊙	3100D22.5x5	...AC	22,5	5	56	10	10
22,5	⊙	⊙	3100D22.5x6	...AC	22,5	6	56	10	10
22,5	⊙	⊙	3100D22.5x8	...AC	22,5	8	56	10	10
25,5	⊙	⊙	3100D25.5x5	...AC	25,5	5	56	10	10
25,5	⊙	⊙	3100D25.5x6	...AC	25,5	6	56	10	10
25,5	⊙	⊙	3100D25.5x8	...AC	25,5	8	56	10	10
28,5	⊙	⊙	3100D28.5x6	...AC	28,5	6	56	10	10
28,5	⊙	⊙	3100D28.5x8	...AC	28,5	8	56	10	10
28,5	⊙	⊙	3100D28.5x10	...AC	28,5	10	56	12	10
32,5	⊙	⊙	3100D32.5x6	...AC	32,5	6	56	10	10
32,5	⊙	⊙	3100D32.5x8	...AC	32,5	8	56	10	10
32,5	⊙	⊙	3100D32.5x10	...AC	32,5	10	63	12	10



The constructive geometry of those end mills allows their use on a very wide range of applications.

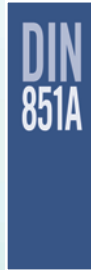
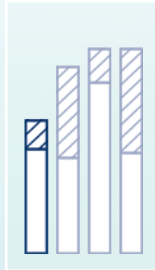
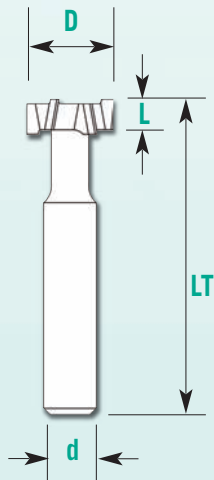
AC  
ALLCUT

**AllCut** is a coating whose AlCrN structure allows a reduced wear in many different work conditions

and on different materials.  
**Available in 3 working days.**

3200 it's particularly recommended for milling medium tensile strength materials.

STAGGERED  
TEETH  
"T" slot cutters



FRESAL		COATINGS		CODES		D	L	LT	LS	S	d	z
Ø	UNCOATED	ALLCUT	UNCOATED	AC	h 12	h 12					h 6	
12,5	⊙	⊙	3200D12.5	...AC	12,5	6	57	14	5	10	6	
16	⊙	⊙	3200D16	...AC	16	8	62	19	6,5	10	6	
18	⊙	⊙	3200D18	...AC	18	8	70	22	8	12	6	
19	⊙	⊙	3200D19	...AC	19	9	72	24	8,5	12	6	
21	⊙	⊙	3200D21	...AC	21	9	74	26	10	12	8	
22	⊙	⊙	3200D22	...AC	22	10	76	27	10,5	12	8	
25	⊙	⊙	3200D25	...AC	25	11	82	29	12	16	8	
28	⊙	⊙	3200D28	...AC	28	12	86	33	13	16	8	
32	⊙	⊙	3200D32	...AC	32	14	90	37	15	16	8	



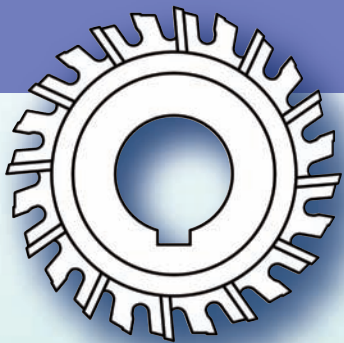
**AllCut** is a coating whose AlCrN structure allows a reduced wear in many different work conditions and on different materials.

*Available in 3 working days.*

The constructive geometry of those end mills allows their use on a very wide range of applications.



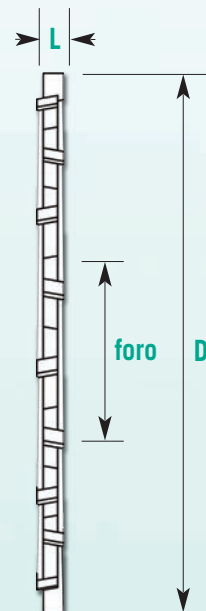
# SIDE AND FACE MILLING CUTTERS STAGGERED TEETH



# FRESAL

UTENSILI

4200 it's particularly recommended for roughing processes on medium and medium-high resistance materials.



FRESAL		COATINGS	CODES		D	L	z	foro
Ø	UNCOATED	ALLCUT	UNCOATED	AC	js 16	k 11		H7
63	⊙	⊙	4200D63.20	...AC	63	2	28	22
63	⊙	⊙	4200D63.25	...AC	63	2,5	28	22
63	⊙	⊙	4200D63.30	...AC	63	3	28	22
63	⊙	⊙	4200D63.35	...AC	63	3,5	28	22
80	⊙	⊙	4200D80.20	...AC	80	2	32	22
80	⊙	⊙	4200D80.25	...AC	80	2,5	32	22
80	⊙	⊙	4200D80.30	...AC	80	3	32	22
80	⊙	⊙	4200D80.35	...AC	80	3,5	32	22
100	⊙	⊙	4200D100.20	...AC	100	2	36	27
100	⊙	⊙	4200D100.25	...AC	100	2,5	36	27
100	⊙	⊙	4200D100.30	...AC	100	3	36	27
100	⊙	⊙	4200D100.35	...AC	100	3,5	36	27
125	⊙	⊙	4200D125.20	...AC	125	2	40	32
125	⊙	⊙	4200D125.25	...AC	125	2,5	40	32
125	⊙	⊙	4200D125.30	...AC	125	3	40	32
125	⊙	⊙	4200D125.35	...AC	125	3,5	40	32
125	⊙	⊙	4200D125.40	...AC	125	4	40	32
125	⊙	⊙	4200D125.50	...AC	125	5	40	32

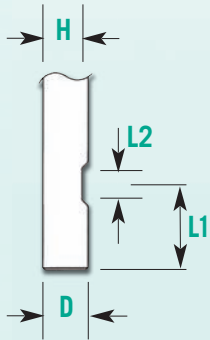
Hole with longitudinal key



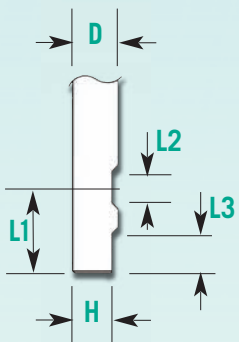
**AllCut** is a coating whose AlCrN structure allows a reduced wear in many different work conditions and on different materials.

*Available in 3 working days.*

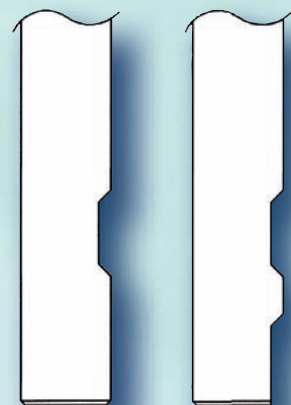
HSSW are lateral coupling planes realized on cylindrical shanks in accordance with the DIN6535 – Form HB



Ø	WELDON			D h6	L1 +0,0 -1,0	L2 +0,05 -0	L3 +1,0 -0	H h11
	WELDON 1	WELDON 2	CODES					
6	⊙	-	HSSWD06	6	18	4,2	-	4,8
8	⊙	-	HSSWD08	8	18	5,5	-	6,6
10	⊙	-	HSSWD10	10	20	7	-	8,4
12	⊙	-	HSSWD12	12	22,5	8	-	10,2
14	⊙	-	HSSWD14	14	24	10	-	14,2
16	⊙	-	HSSWD16	16	24	10	-	14,2
18	⊙	-	HSSWD18	18	25	11	-	18,2
20	⊙	-	HSSWD20	20	25	11	-	18,2
25	-	⊙	HSSWD25	25	32	12	17	23
32	-	⊙	HSSWD32	32	-	-	-	-



Weldon coupling is an economic solution for heavy milling operations

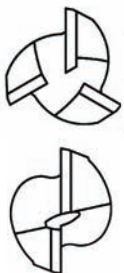
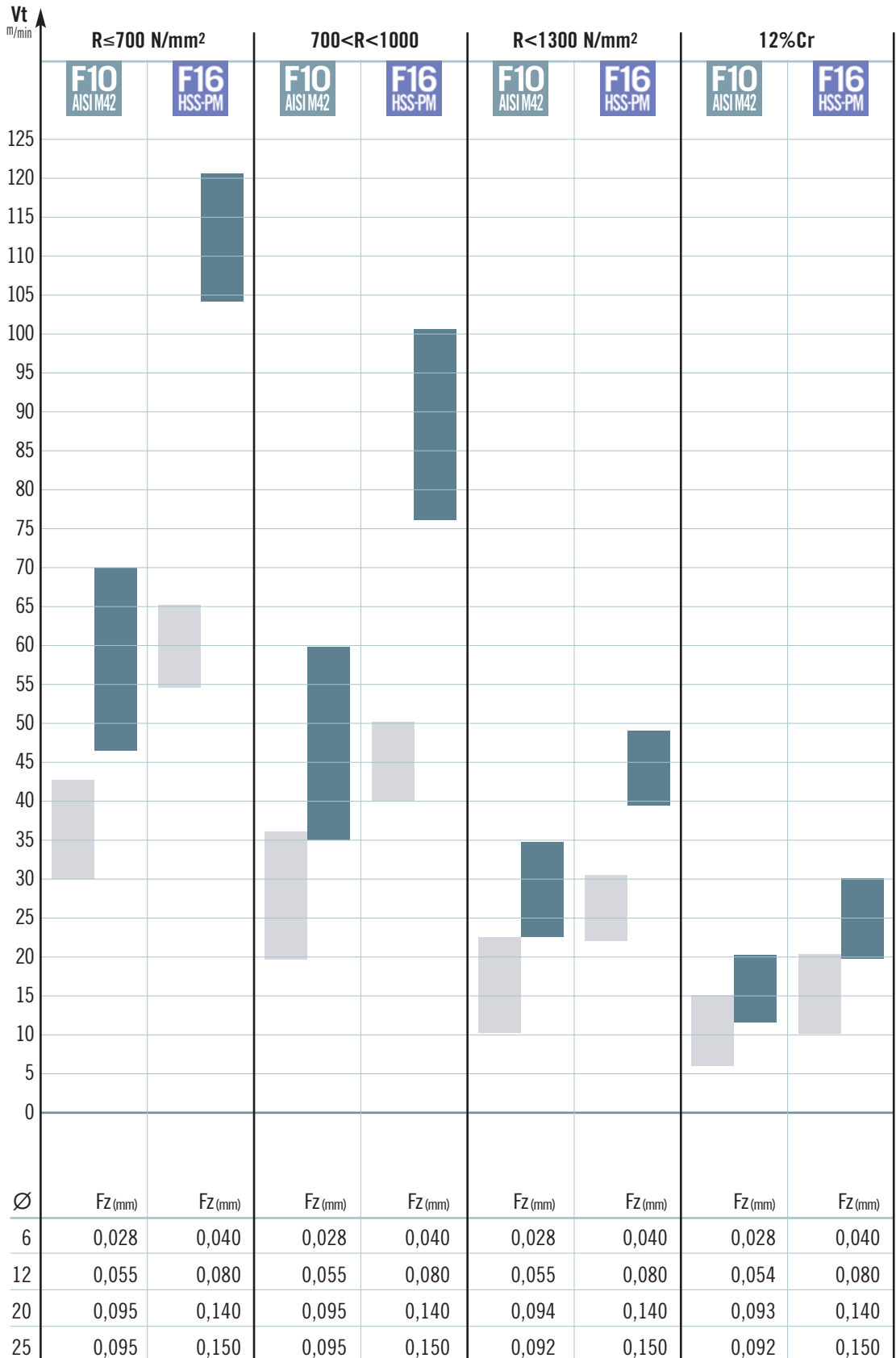
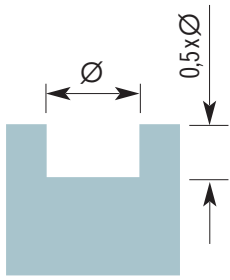




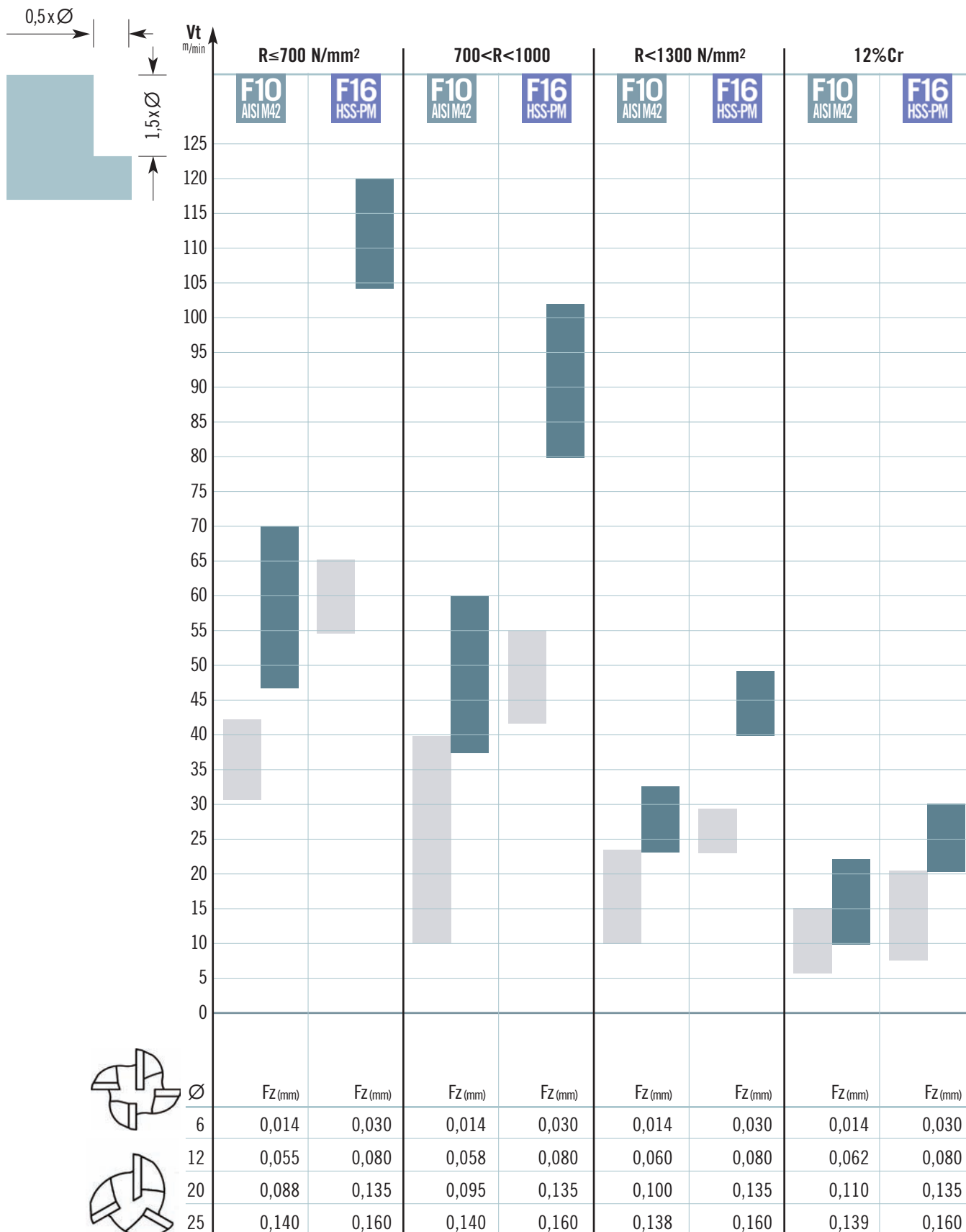




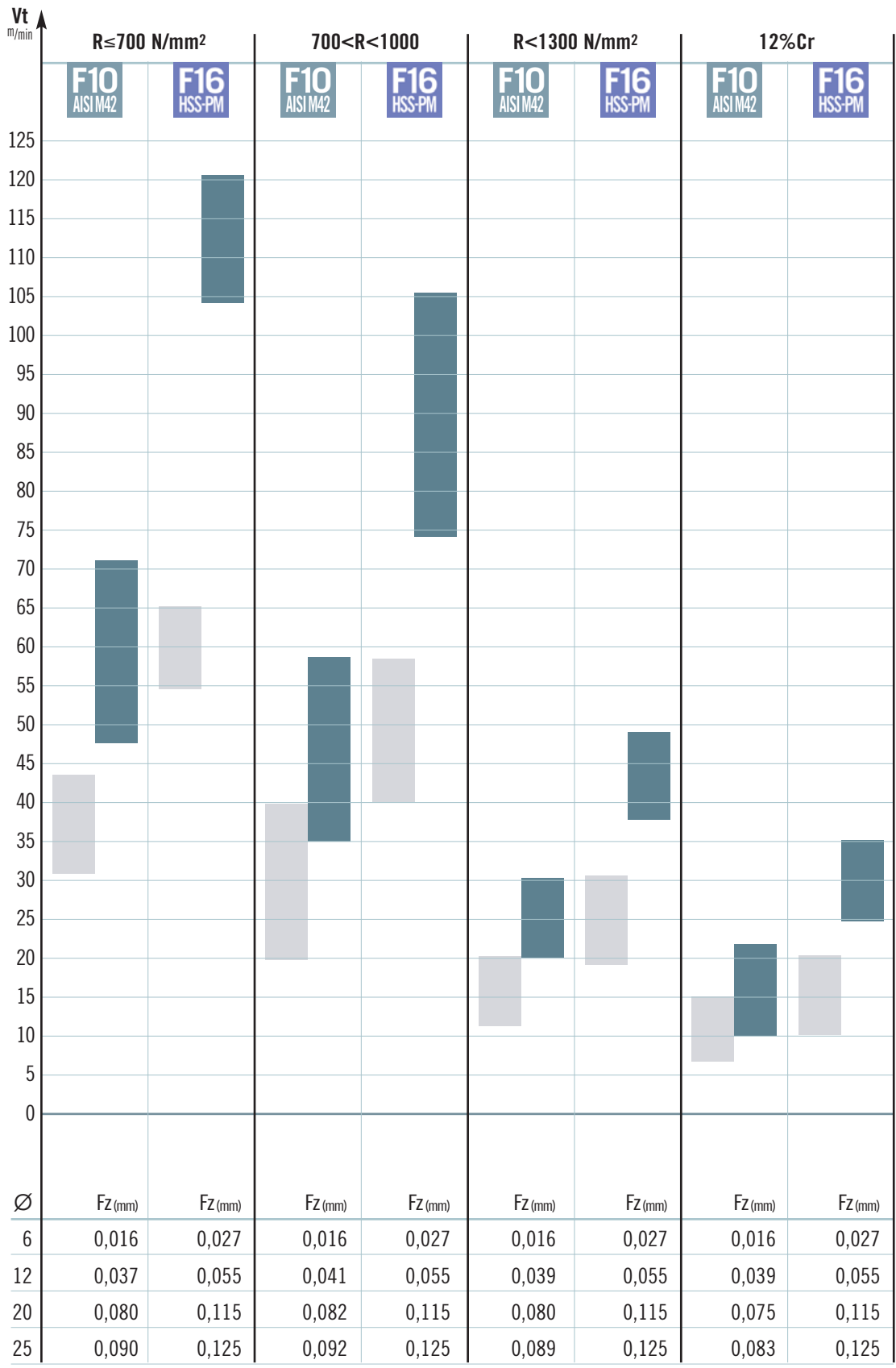
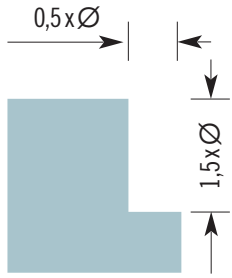
Working parameters for steel.  
Uncoated end mills, coated with AllCut.



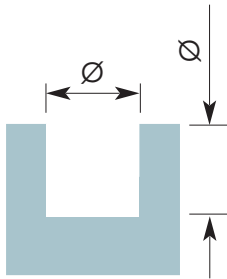
Working parameters for steel.  
Uncoated end mills, coated with ALLCUT.



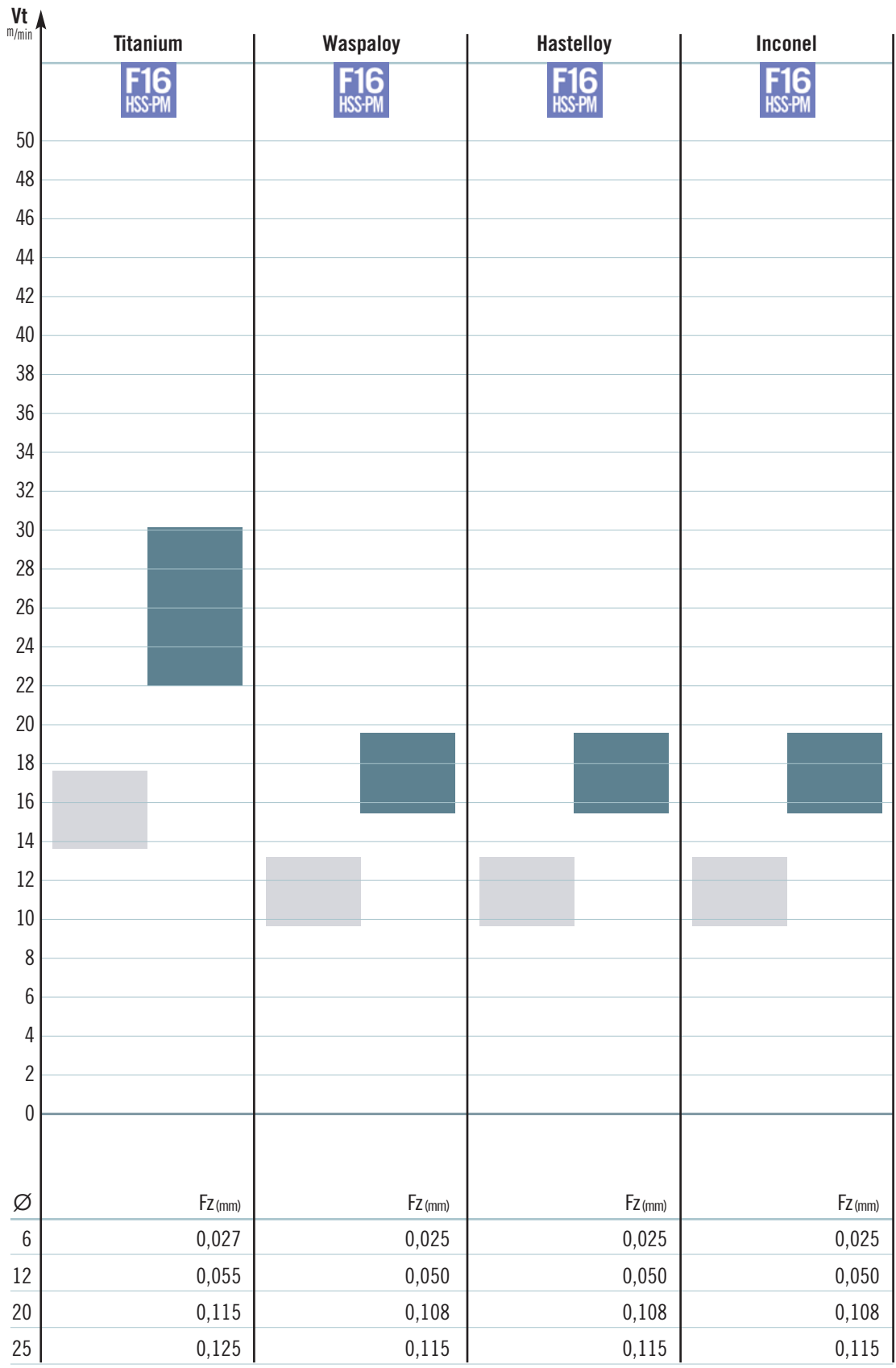
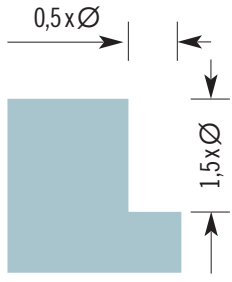
Working parameters for steel.  
Uncoated end mills, coated with AllCut.



Working parameters for Titanium and super-alloys.  
Uncoated end mills, coated with ALLCUT.

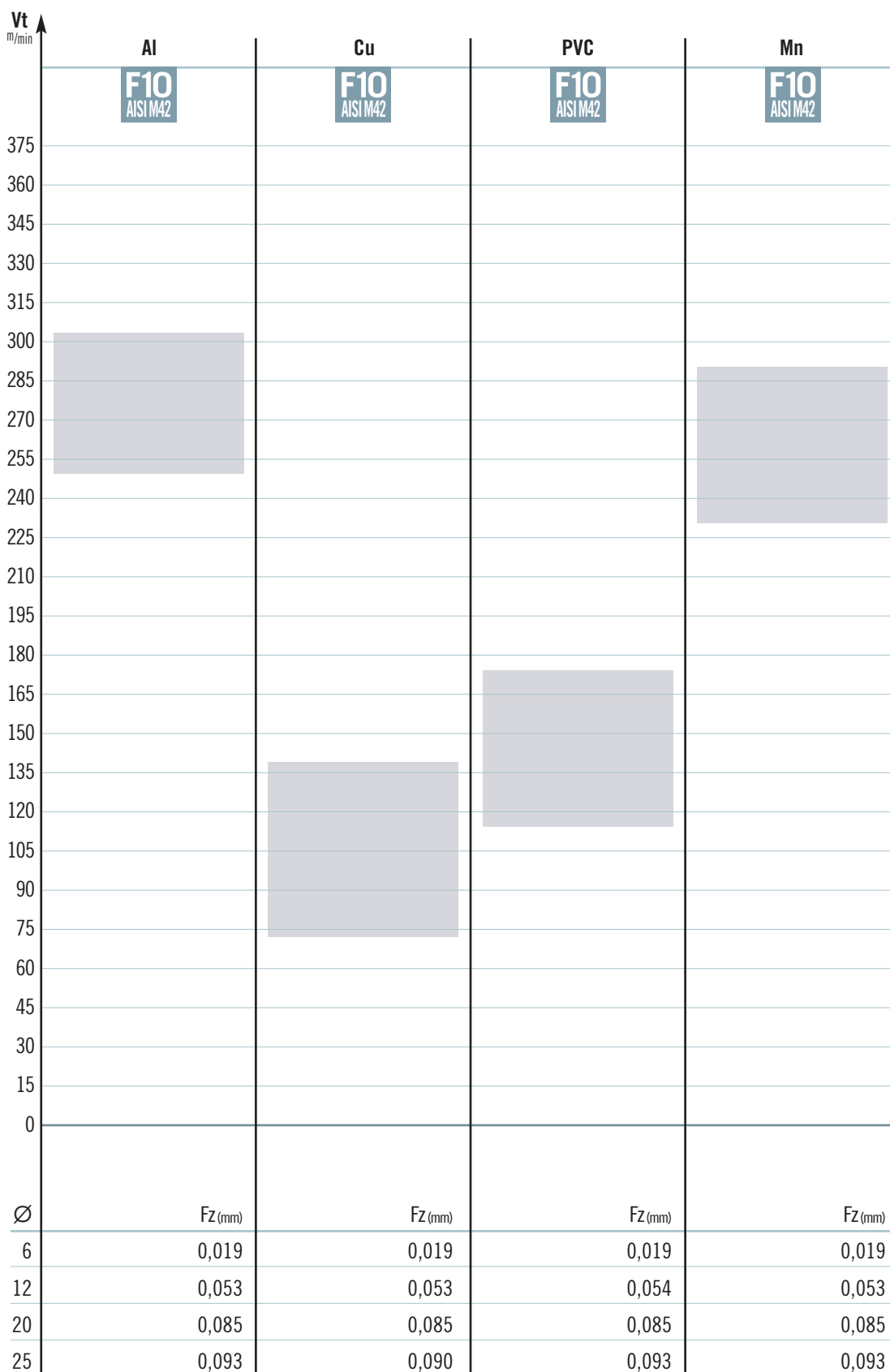
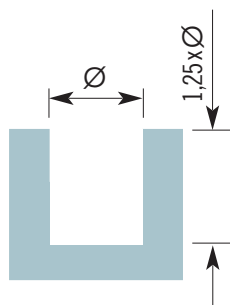


Working parameters for Titanium and super-alloys.  
Uncoated end mills, coated with AllCut.



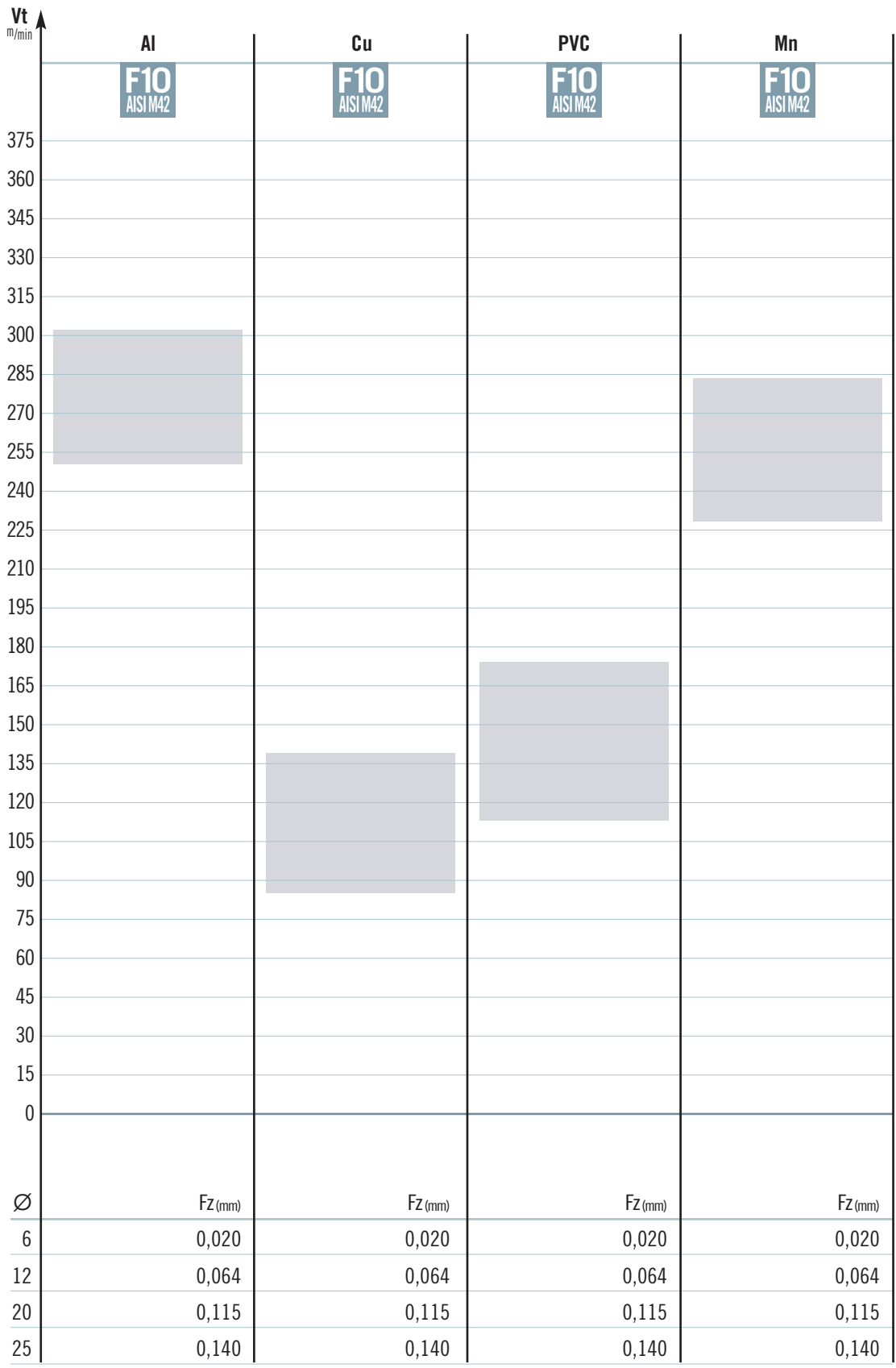
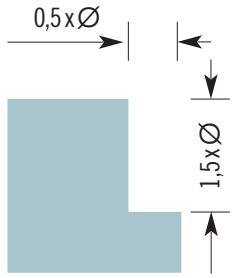
## Working parameters for Aluminum. Uncoated end mills.

UN  
UNCOATED



Working parameters for Alluminum.  
Uncoated end mills.

UN  
UNCOATED







**Reaming  
is a finishing operation  
performed  
to obtain holes of  
high accuracy.**

It's necessary to seek the best working conditions (*cutting speed, adequate allowance, a suitable lubrication, etc.*) to get the best hole quality in terms of surface finishing, roundness of the hole and tight tolerances.

In most processes are produced through holes, for which it is recommended the use of reamers with left helical grooves.

FRESAL range for this application provides **three types of reamers** complying with the standards DIN 206/B (*AL10*) for hand reaming, DIN 212B/D (*AL20*), DIN 208B (*AL35*) with conical shank and an **extra-long series** realized according to internal standard (*AL27*) and a series with brazed flutes (*AL70*).

These three «families» are built to obtain holes with **H7 tolerance** and **centesimal progression**.

For the production of Blind Holes in H7 tolerance, we recommend the use of reamers HMALD20 with right helical grooves according to DIN 212D.

**Service:**  
any diameter not immediately available will be provided within 24 hours.

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THE CATALOGUE  
FRESAL  
SOLID CARBIDE REAMERS  
FRESAL  
STEEL REAMERS**



**ASK FOR  
THE CATALOGUE**  
FRESAL SOLID CARBIDE REAMERS  
FRESAL STEEL REAMERS





# SUPERIOR QUALITY

FRESAL, a company turned to the future, that considers technology and innovation essential bench marks for the realization of products of advanced high quality.

The preparation, the enthusiasm and the experience acquired by FRESAL staff are necessary ingredients to supply end-users with efficient solutions to the ever growing demands of higher productivity and quality in milling applications.

*We remind you that the wide range of Fresal standard tools is made of three more specific catalogues:*

FRESAL — Catalogue SOLID CARBIDE END MILLS

FRESAL — Catalogue SOLID CARBIDE DRILLS

FRESAL — Catalogue REAMERS



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UTENSILI



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