

# NEW Products



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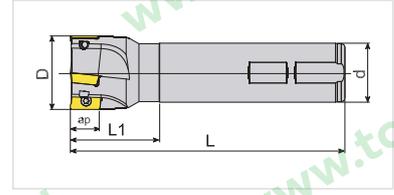
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# Shouldering

## FM03 TYPE

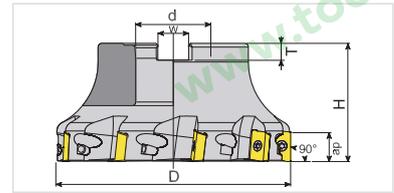
### Shoulder Endmill



Designation	Stock	No. of Inserts	Dimension (mm)					Adapter	Coolant	Kg
			D	d	L1	L	ap			
FM03.10-1010-080L-1T	●	1	10	10	20	80	9.0	S	√	0.05
FM03.10-1016-100L-1T	●	1	10	16	30	100	9.0	S	√	0.13
FM03.10-1212-080L-1T	●	1	12	12	20	80	9.0	S	√	0.07
FM03.10-1216-100L-1T	●	1	12	16	30	100	9.0	S	√	0.14
FM03.10-1416-100L-2T	●	2	14	16	30	100	9.0	S	√	0.15
FM03.10-1416-150L-2T	●	2	14	16	30	150	9.0	S	√	0.23
FM03.10-1616-100L-2T	●	2	16	16	30	100	9.0	S	√	0.16
FM03.10-1616-150L-2T	●	2	16	16	40	150	9.0	S	√	0.24
FM03.10-1616-200L-2T	●	2	16	16	60	200	9.0	S	√	0.32
FM03.10-1820-150L-2T	●	2	18	20	30	150	9.0	S	√	0.36
FM03.10-1820-200L-2T	●	2	18	20	50	200	9.0	S	√	0.48
FM03.10-2020-150L-3T	●	3	20	20	40	150	9.0	S	√	0.37
FM03.10-2020-200L-3T	●	3	20	20	60	200	9.0	S	√	0.49
FM03.10-2525-150L-3T	●	3	25	25	40	150	9.0	S	√	0.58
FM03.10-2525-200L-3T	●	3	25	25	60	200	9.0	S	√	0.77
FM03.10-3232-150L-4T	●	4	32	32	40	150	9.0	S	√	0.95
FM03.10-3232-200L-4T	●	4	32	32	60	200	9.0	S	√	1.26
FM03.10-4032-150L-5T	●	5	40	32	40	150	9.0	S	√	1.09
FM03.10-4032-200L-5T	●	5	40	32	40	200	9.0	S	√	1.40
FM03.10-4032-250L-5T	●	5	40	32	40	250	9.0	S	√	1.72

## FM03 TYPE

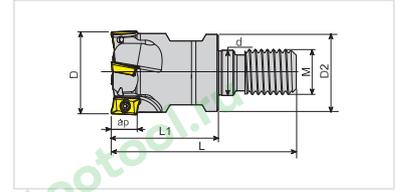
### Shoulder Shell Mill



Designation	Stock	No. of Inserts	Dimension (mm)					Adapter	Coolant	Kg	
			D	d	H	W	T				
FM03.10-040-16-06T	●	6	40	16	40	8.4	5.6	9.0	A	√	0.23
FM03.10-050-22-07T	●	7	50	22	40	10.4	6.3	9.0	A	√	0.41
FM03.10-063-22-08T	●	8	63	22	40	10.4	6.3	9.0	A	√	0.57
FM03.10-080-27-08T	●	8	80	27	50	12.4	7.0	9.0	B	√	1.20
FM03.10-100-32-10T	●	10	100	32	50	14.4	8.0	9.0	B	√	1.70

# FM03 TYPE

## Shoulder Mill Modular



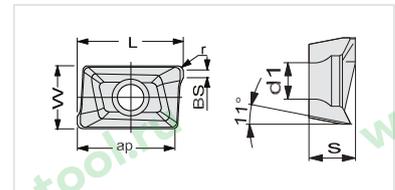
Designation	Stock	No. of Inserts	Dimension (mm)							√	Kg
			D	M	D2	L1	L	d	ap		
FM03.10-016-M08-2T	●	2	16	M8	14.75	30	47	8.5	9.0	√	0.03
FM03.10-020-M10-3T	●	3	20	M10	18.00	30	51	10.5	9.0	√	0.05
FM03.10-025-M12-3T	●	3	25	M12	21.00	35	59	12.5	9.0	√	0.08
FM03.10-032-M16-4T	●	4	32	M16	29.00	35	60	17.0	9.0	√	0.16
FM03.10-040-M16-5T	●	5	40	M16	29.00	43	70	17.0	9.0	√	0.23
FM03.10-042-M16-5T	●	5	42	M16	29.00	43	70	17.0	9.0	√	0.25

## Shoulder Mill Modular

TYPE		
	Insert screw	Wrench
FM03.10	1200013-SS2.5TX06	TPF-08

## Available Inserts

### APKT



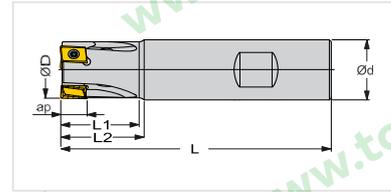
Workpiece	Material	Code	Machining Type											
			●	⊕	⊖	⊕	⊖	⊕	⊖	⊕	⊖	⊕	⊖	⊕
Steel	P	●	⊕	⊖					●	⊕	⊖	⊕	⊖	⊕
Stainless steel	M	⊕	⊖						●	⊕	⊖	⊕	⊖	⊕
Cast iron	K	⊖						●	⊕	⊖	⊕	⊖	⊕	⊖
Non-ferrous metal	N	●												
Heat resistant alloy, Titanium alloy	S	⊕							●	⊕	⊖	⊕	⊖	⊕
Hardened steel	H	⊖												

Designation	Dimension (mm)								CVD Coated					PVD Coated							
	L	W	S	r	BS	d1	ap	TCP9330	TCP9340	TCP9350	TCK5215	TCK5315	TCK5225	TCK5325	TPM8115	TPM8125	TPM8225	TPM8135	TPG4235	TPK4235H	
APKT-GM	1003PDER-GM	11.0	6.7	3.5	0.5	0.09	2.88	9.0	●							●	●				

# Shouldering

## MEA TYPE

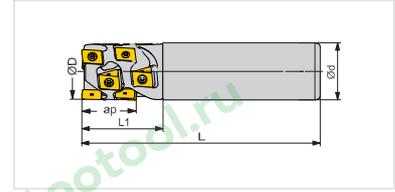
### Shoulder Endmill



Designation	Stock	No. of Inserts	Dimension (mm)						Adapter	🔹	Kg
			D	d	L1	L2	L	ap			
MEA08N-1615-150L-2T		2	16	15	40	41.0	150	8.0	S	√	0.18
MEA08N-1616-085L-2T-W		2	16	16	26	28.0	85	8.0	W	√	0.12
MEA08N-1616-100L-2T		2	16	16	26	28.0	100	8.0	S	√	0.13
MEA08N-1616-150L-2T		2	16	16	40	41.0	150	8.0	S	√	0.18
MEA08N-2020-090L-2T-W		2	20	20	26	28.0	90	8.0	W	√	0.19
MEA08N-2020-110L-2T		2	20	20	26	28.0	110	8.0	S	√	0.22
MEA08N-2020-160L-2T		2	20	20	26	28.0	160	8.0	S	√	0.28
MEA08N-2020-110L-3T		3	20	20	26	28.0	110	8.0	S	√	0.25
MEA08N-2220-110L-3T		3	22	20	26	28.0	110	8.0	S	√	0.24
MEA08N-2525-095L-3T-W		3	25	25	26	28.0	95	8.0	W	√	0.30
MEA08N-2525-120L-3T		3	25	25	26	28.0	120	8.0	S	√	0.39
MEA08N-2525-160L-3T		3	25	25	26	28.0	160	8.0	S	√	0.45
MEA08N-2525-720L-4T		4	25	25	30	32.0	120	8.0	S	√	0.43
MEA08N-3232-110L-3T-W		3	32	32	30	32.0	110	8.0	W	√	0.60
MEA08N-3232-130L-3T		3	32	32	30	32.0	130	8.0	S	√	0.72
MEA08N-3232-200L-4T		4	32	32	30	32.0	200	8.0	S	√	1.14
MEA08N-3232-130L-5T		5	32	32	30	32.0	130	8.0	S	√	0.73
MEA08N-4032-110L-4T-W		4	40	32	-	30.0	110	8.0	W	√	0.68
MEA08N-4040-130L-4T		4	40	32	-	30.0	130	8.0	S	√	0.81
MEA08N-4040-130L-6T		6	40	32	-	30.0	130	8.0	S	√	0.82
MEA11N-2525-095L-3T-W	○	3	25	25	33	35.0	95	9.0	W	√	0.30
MEA11N-2525-120L-3T	○	3	25	25	33	35.0	120	9.0	S	√	0.40
MEA11N-3232-110L-4T-W	○	4	32	32	38	40.0	110	9.0	W	√	0.60
MEA11N-3232-130L-4T	○	4	32	32	38	40.0	130	9.0	S	√	0.73
MEA11N-3232-200L-4T		4	32	32	38	40.0	200	9.0	S	√	1.16
4032-115L-5T-W		5	40	32	38	44.0	115	9.0	W	√	0.72
MEA11N-4032-130L-5T		5	40	32	38	44.0	130	9.0	S	√	0.83
MEA13N-2525-095L-2T-W		2	25	25	33	35.0	95	12.5	W	√	0.29
MEA13N-2525-120L-2T		2	25	25	33	35.0	120	12.5	S	√	0.39
MEA13N-2525-160L-2T		2	25	25	33	35.0	160	12.5	S	√	0.53
MEA13N-3232-110L-3T-W		3	32	32	38	40.0	110	12.5	W	√	0.59
MEA13N-3232-130L-3T		3	32	32	38	40.0	130	12.5	S	√	0.72
MEA13N-3232-200L-3T		3	32	32	38	40.0	200	12.5	S	√	1.08
MEA13N-3232-250L-3T		3	32	32	48	50.0	250	12.5	S	√	1.44
MEA13N-4032-130L-3T		3	40	32	-	40.0	130	12.5	S	√	0.81
MEA13N-4032-115L-4T-W		4	40	32	-	40.0	115	12.5	W	√	0.72
MEA13N-4032-130L-4T		4	40	32	-	40.0	130	12.5	S	√	0.81
MEA13N-4032-200L-4T		4	40	32	-	40.0	200	12.5	S	√	1.53
MEA13N-4032-250L-4T		4	40	32	48	50.0	250	12.5	S	√	2.25
MEA13N-5032-130L-4T		4	50	32	-	36.5	130	12.5	S	√	0.96

# MEA TYPE

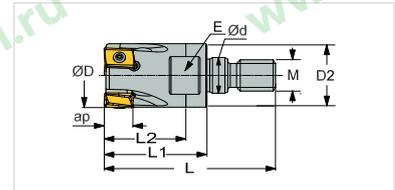
## Extended Flute Endmill



Designation	Stock	No. of Inserts	No. of flutes	Dimension (mm)					Adapter	Coolant	Kg
				D	d	L1	L	ap			
MEA08N-2020-015M-080L-2T-W	●	4	2	20	20	30	80	15	W	√	0.16
MEA08N-2525-030M-100L-2T-W	●	8	2	25	25	40	100	30	W	√	0.30
MEA08N-3232-036M-110L-3T-W	●	15	3	32	32	45	110	36	W	√	0.55
MEA08N-4032-044M-120L-4T-W	●	24	4	40	32	53	120	44	W	√	0.73
MEA11N-3232-034M-105L-2T-W	●	8	2	32	32	45	105	34	W	√	0.49
MEA11N-4032-051M-120L-3T-W	●	18	3	40	32	60	120	51	W	√	0.66
MEA11N-5032-051M-130L-4T-W	●	24	4	50	32	60	130	51	W	√	1.18
MEA13N-4032-036M-115L-2T-W	●	6	2	40	32	50	115	36	W	√	0.68
MEA13N-4032-048M-125L-3T-W	●	12	3	40	32	65	125	48	W	√	0.70
MEA13N-5032-047M-135L-3T-W	●	12	3	50	32	65	135	47	W	√	1.24
MEA13N-5032-059M-135L-4T-W	●	20	4	50	32	65	135	59	W	√	1.21

# MEA TYPE

## Shoulder Mill Modular

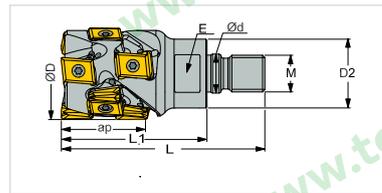


Designation	Stock	No. of Inserts	Dimension (mm)									Coolant	Kg
			D	d	D2	L2	L1	L	E	M	ap		
MEA08N-016-M08-2T	●	2	16	8.5	18.0	22	30	50	12.7	M10	8.0	√	0.04
MEA08N-020-M10-3T	●	3	20	10.5	18.7	-	30	50	15.0	M10	8.0	√	0.06
MEA08N-025-M12-4T	●	4	25	12.5	21.0	-	28	50	17.0	M12	8.0	√	0.08
MEA08N-032-M16-5T	●	5	32	17.0	29.0	-	30	55	25.0	M16	8.0	√	0.16
MEA13N-032-M16-3T	●	3	32	17.0	29.0	-	45	70	25.0	M16	12.5	√	0.22

# Shouldering

## MEA TYPE

### Extended Flute Shoulder Mill Modular



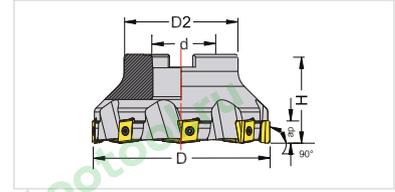
Designation	Stock	No.of Inserts	No.of flutes	Dimension (mm)									Kg
				D	d	D2	L1	L	E	M	ap		
MEA08N-025-030M-M12-2T	●	2	8	25	12.5	21	52	74	17	M12	30	√	0.12
MEA08N-032-036M-M16-3T	●	3	15	32	17	30	57	82	25	M16	36	√	0.26
MEA13N-040-036M-M16-3T	●	3	9	40	17	30	63	88	25	M16	36	√	0.37

### Parts

TYPE		
	Insert screw	Wrench
MEA08N	120018SS3.0TX07	TPF-08
MEA11N	120013-SS4.0TX10	TPF-15
MEA13N	1200135-SS4.0TX12	TPF-15
MEA16N	120323-SS5.0TX14	TPF-20

# MEA TYPE

## Shell Mill

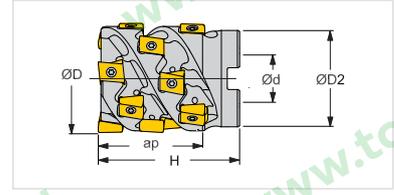


Designation	Stock	No. of Inserts	Dimension (mm)					Adapter		Kg
			D	D2	d	H	ap			
MFA08N-040-16-04T		4	40	33	33	40	8.0	A	✓	0.21
MFA08N-040-16-06T		6	40	33	33	40	8.0	A	✓	0.21
MFA08N-050-22-05T		5	50	41	41	40	8.0	A	✓	0.30
MFA08N-050-22-08T	●	8	50	41	41	40	8.0	A	✓	0.31
MFA08N-063-22-06T		6	63	50	50	40	8.0	A	✓	0.53
MFA08N-063-22-08T	●	8	63	50	50	40	8.0	A	✓	0.54
MFA08N-080-27-10T	●	10	80	60	60	50	8.0	B	✓	0.84
MFA11N-040-16-04T		4	40	33	33	40	9.0	A	✓	0.23
MFA11N-050-22-05T		5	50	41	41	40	9.0	A	✓	0.33
MFA11N-063-22-06T		6	63	50	50	40	9.0	A	✓	0.55
MFA11N-063-22-09T		9	63	50	50	40	9.0	A	✓	0.55
MFA11N-080-27-09T		9	80	60	60	50	9.0	B	✓	1.01
MFA11N-080-27-11T		11	80	60	60	50	9.0	B	✓	1.04
MFA11N-100-32-08T		8	100	78	78	50	9.0	B	✓	1.48
MFA11N-100-32-13T		13	100	78	78	50	9.0	B	✓	1.55
MFA13N-040-16-04T		4	40	33	33	40	12.5	A	✓	0.19
MFA13N-040-16-05T		5	40	33	33	40	12.5	A	✓	0.18
MFA13N-050-22-05T	●	5	50	41	41	40	12.5	A	✓	0.28
MFA13N-050-22-06T	●	6	50	41	41	40	12.5	A	✓	0.29
MFA13N-063-22-06T	●	6	63	50	50	40	12.5	A	✓	0.50
MFA13N-063-22-08T	●	8	63	50	50	40	12.5	A	✓	0.56
MFA13N-080-27-07T	●	7	80	60	60	50	12.5	B	✓	0.92
MFA13N-080-27-10T	●	10	80	60	60	50	12.5	B	✓	1.00
MFA13N-100-32-09T	●	9	100	78	78	50	12.5	B	✓	1.36
MFA13N-100-32-13T	●	13	100	78	78	50	12.5	B	✓	1.49
MFA13N-125-40-11T	●	11	125	82	82	63	12.5	B	✓	2.57
MFA13N-125-40-16T	●	16	125	82	82	63	12.5	B	✓	2.30
MFA13N-160-40-13T		13	160	130	130	63	12.5	C	✓	5.02
MFA13N-200-60-16T		16	200	160	160	63	12.5	C	✓	6.32
MFA13N-250-60-20T		20	250	180	180	63	12.5	C	✓	9.42
MFA13N-315-60-24T		24	315	240	240	63	12.5	D	✓	16.37
MFA13N-050-22-04T		4	50	41	41	40	16.0	A	✓	0.32
MFA16N-063-22-05T		5	63	50	50	40	16.0	A	✓	0.60
MFA16N-080-27-05T		5	80	60	60	50	16.0	B	✓	0.84
MFA16N-080-27-07T		7	80	60	60	50	16.0	B	✓	0.91
MFA16N-100-32-06T		6	100	78	78	50	16.0	B	✓	1.44
MFA16N-100-32-08T		8	100	78	78	50	16.0	B	✓	1.50
MFA16N-125-40-07T		7	125	82	82	63	16.0	B	✓	2.42
MFA16N-125-40-10T		10	125	82	82	63	16.0	B	✓	2.46
MFA16N-160-40-12T		12	160	130	130	63	16.0	C	×	4.28
MFA16N-200-60-12T		12	200	160	160	63	16.0	C	×	5.40

# Shouldering

## MEA TYPE

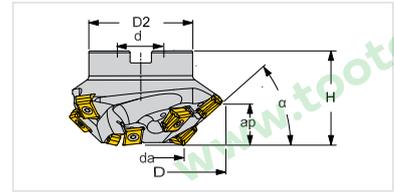
### Extended Flute Shell Mill



Designation	Stock	No. of Inserts	No. of flutes	Dimension (mm)					Adapter	🔹	Kg
				D	d	D2	h	ap			
MFA08N-032-16-36M-03T		15	3	32	16	38	58	36	A	√	0.23
MFA08N-040-16-44M-04T		24	4	40	16	38	65	44	A	√	0.38
MFA08N-050-22-54M-04T		32	4	50	22	47	75	54	A	√	0.68
MFA08N-050-22-44M-05T		30	5	50	22	47	65	44	A	√	0.61
MFA08N-063-27-60M-05T		45	5	63	27	60	80	60	A	√	1.25
MFA11N-040-16-51M-03T		18	3	40	16	38	72	51	A	√	0.31
MFA11N-050-22-51M-03T		18	3	50	22	48	71	51	A	√	0.59
MFA11N-050-22-59M-04T		28	4	50	22	48	80	59	A	√	0.66
MFA11N-063-27-59M-04T		28	4	63	27	60	81	59	A	√	1.16
MFA11N-063-27-68M-05T		40	5	63	27	60	90	68	A	√	1.30
MFA13N-050-22-36M-03T		9	3	50	22	48	56	36	A	√	0.43
MFA13N-050-22-47M-04T		16	4	50	22	48	68	47	A	√	0.54
MFA13N-063-27-36M-04T		12	4	63	27	58	60	36	A	√	0.79
MFA13N-063-27-59M-05T		25	5	63	27	58	80	59	A	√	1.09
MFA13N-080-32-58M-05T		25	5	80	32	74	75	58	A	√	1.73
MFA13N-080-32-70M-05T		30	5	80	32	74	111	70	A	√	2.65
MFA13N-100-40-59M-06T		30	6	100	40	88	86	59	A	√	3.11
MFA13N-125-40-60M-07T		42	7	125	40	100	85	60	A	√	5.63
MFA16N-063-27-47M-03T		9	3	63	27	58	68	47	A	√	0.93

## MEA TYPE

### Conical Shell Mills



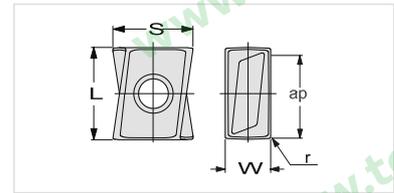
Designation	Stock	No. of Inserts	No. of flutes	Dimension (mm)						Arbor	🔹	Kg	
				D	d	D1	D2	H	a°				ap
B22° MFA13N-D50110-A32-Z0309		9	3	50	32	110.1	78	60	22°	12.20	A	√	1.92
B25° MFA13N-D50109-A32-Z0309		9	3	50	32	109.2	78	60	25°	13.55	A	√	1.85
B30° MFA13N-D50107-A32-Z0309		9	3	50	32	107.2	78	60	30°	16.00	A	√	1.81
B40° MFA13N-D50118-A27-Z0312		12	3	50	27	118.8	60	65	40°	28.88	A	√	1.99
B45° MFA13N-D50098-A27-Z0309		9	3	50	27	98.2	60	55	45°	23.50	A	√	1.17
D50145-A32-Z0318		18	3	50	32	145.6	80	76	45°	47.50	A	√	3.41
B50° MFA13N-D50094-A27-Z0309		9	3	50	27	94.3	60	55	50°	26.12	A	√	0.13
B60° MFA13N-D50085-A27-Z0309		9	3	50	27	85.2	60	55	60°	30.00	A	√	0.96
B70° MFA13N-D50074-A27-Z0309		9	3	50	27	74.3	58	60	70°	33.20	A	√	0.86
B75° MFA13N-D50068-A27-Z0309		9	3	50	27	68.6	60	55	75°	34.50	A	√	0.73
D50081-A27-Z0315		15	3	50	32	81.0	78	84	75°	57.70	A	√	1.52

## Parts

TYPE		
	Insert screw	Wrench
MFA08N	120018-SS3.0TX07	TPF-08
MFA11N	120013-SS4.0TX10	TPF-15
MFA13N	1200135-SS4.0TX12	TPF-15
MFA16N	120323-SS5.0TX14	TPF-20

## Available Inserts

### LNKT



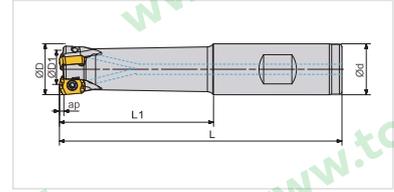
Workpiece	Material	Machining Type											
		●	●	●	●	●	●	●	●	●	●		
Steel	P	●	●	●					●	●	●	●	●
Stainless steel	M	●	●	●					●	●	●	●	●
Cast iron	K	●			●	●	●	●	●	●	●	●	●
Non-ferrous metal	N												
Heat resistant alloy, Titanium alloy	S								●	●	●	●	
Hardened steel	H								●	●	●	●	

Designation	Dimension (mm)					CVD Coated				PVD Coated											
	L	W	S	r	ar	TCp9330	TCp9340	TCp9350	TCK5215	TCK5315	TCK5225	TCK5325	TPM8115	TPM8125	TPM8225	TPM8135	TPG4235	TPK4235H			
 LNKT-GH	080404ER-GH	8.59	4.24	7.43	0.4	8.0												●	●		
	080408ER-GH	8.59	4.24	7.43	0.8	8.0															
	110608ER-GH	10.50	6.00	11.27	0.8	9.0													●	●	
	130608ER-GH	13.81	6.65	13.00	0.8	12.5														●	●
	130612ER-GH	13.81	6.65	13.00	1.2	12.5															
	160708ER-GH	17.05	7.00	15.83	0.8	16.0														●	●
	160712ER-GH	17.05	7.00	15.83	1.2	16.0															

# Shouldering

## ELN TYPE

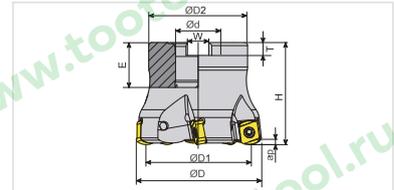
### High Feed Endmill



Designation	Stock	No. of Inserts	Dimension (mm)						Adapter	⚡	Kg
			D	D1	d	L1	L	ap			
ELN15R-3232-150L-2T		2	32	19.7	32	70	150	1.5	S	√	0.8
ELN15R-3232-200L-2T		2	32	19.7	32	120	200		S	√	1.0
ELN15R-3532-150L-2T		2	35	22.7	32	45	150		S	√	0.9
ELN15R-3532-200L-2T		2	35	22.7	32	45	200		S	√	1.2
ELN15R-4032-150L-3T		3	40	27.7	32	45	150		S	√	0.9
ELN15R-4032-200L-3T		3	40	27.7	32	45	200		S	√	1.3

## ELN TYPE

### High Feed Shell Mill



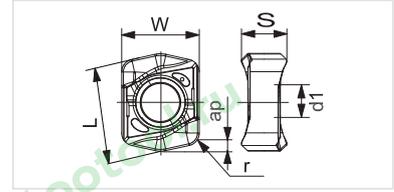
Designation	Stock	No. of Inserts	Dimension (mm)								Arbor	⚡	Kg	
			D	D1	d	D2	H	E	T	W				ap
ELN15R-050-22-04T		4	50	37.6	22	47	50	20	6.3	10.4	1.5	A	√	0.4
ELN15R-063-22-05T		5	63	50.6	22	59	50	20	6.3	10.4		A	√	0.8
ELN15R-080-27-06T		6	80	67.6	27	76	63	22	7.0	12.4		B	√	1.6
ELN15R-100-32-07T		7	100	87.6	32	96	63	25	8.0	14.4		B	√	2.2
ELN15R-125-40-08T		8	125	112.6	40	100	63	37	9.0	16.4		B	√	3.0
ELN15R-160-40-10T		10	160	147.6	40	100	63	46	9.0	16.4		C	X	5.0
ELN15R-200-60-12T		12	200	187.6	60	130	63	38	14.0	25.7		C	X	7.2

### Parts

TYPE		
	Insert screw	Wrench
ELN11R	120018-SS3.0TX07	TPF-08
ELN15R	120157-SS5.0TX12	TPF-20

## Available Inserts

### ENMU



Workpiece			Machining Type											
	Material	Grade	●	⊕	⊖	⊕	⊖	⊕	⊖	⊕	⊖	⊕	⊖	⊕
Steel	P	●	⊕	⊖	⊕					●	⊕	⊖	⊕	⊖
Stainless steel	M	⊕	⊖	⊕						●	⊕	⊖	⊕	⊖
Cast iron	K	⊕			●	⊕	⊖	⊕	⊖	●	⊕	⊖	⊕	⊖
Non-ferrous metal	N													
Heat resistant alloy, Titanium alloy	S									●	⊕	⊖	⊕	⊖
Hardened steel	H												⊕	⊖

Designation	Dimension (mm)							CVD Coated					PVD Coated						
	L	W	S	r	d1	ap	TCR9330	TCR9340	TCR9350	TCK5215	TCK5315	TCK5225	TCK5325	TPM8115	TPM8125	TPM8225	TPM8135	TPG4235	TPK4235H
ENMU-GL 	150620ER-GL	15	12	6	2.0	5.9	1.5								●	●			
ENMU-GM 	150620ER-GM	15	12	6	2.0	5.9	1.5												

## ВИДЫ ОБРАБОТКИ



Диаметр инструмента $\phi D_c$	Мак. Глубина резания Max. ap	Мак. Угол врезания $\sigma^\circ$	Мак. глубина погружения A	Мак. ширина плунжерного фрезерования W	Min. Обрабатываемое отверстие $\phi D1$	Мак. Обрабатываемое отверстие $\phi D2$	Мак. ширина резания при увеличении отверстия ae
32	1.5	2	0.5	6	47	47	25
35	1.5	1.7	0.5	6	53	53	28
40	1.5	1.3	0.5	6	63	63	33
50	1.5	0.9	0.5	6	83	83	43
52	1.5	0.8	0.5	6	87	87	45
63	1.5	0.6	0.5	6	109	109	56
66	1.5	0.5	0.5	6	115	115	59
80	1.5	0.5	0.5	6	143	143	73
100	1.5	0.34	0.5	6	183	183	93
120	1.5	0.26	0.5	6	223	223	108
160	1.5	0.2	0.5	6	303	303	153
200	1.5	0.15	0.5	6	383	383	193

# СТАНДАРТНЫЕ РЕЖИМЫ РЕЗАНИЯ ELN15R

## ENMU 150620ER-GL

ISO	Обрабатываемый материал	Твердость	Скорость резания V <sub>c</sub> (м/мин)	Подача на зуб fz (мм/зуб)							
				Диам. инструмента: øDc (мм)		ø32, z=2		ø35, z=2		ø40, z=2	
				ø32 ~ ø200	fz (мм/зуб)	n	Vf	n	Vf	n	Vf
<b>P</b>	Углеродистая сталь	~ 300HB	100 - 300	0.5 - 1.5	0.15	1,990	3,980	1,820	3,640	1,590	4,770
	Легированная сталь	~ 300HB	100 - 300	0.5 - 1.5	0.15	1,990	3,980	1,820	3,640	1,590	4,770
	Предварительно закаленная сталь	30 ~ 40HRC	100 - 200	0.5 - 1.0	0.15	1,490	2,380	1,360	2,180	1,190	2,860
		30 ~ 40HRC	100 - 200	0.5 - 1.5	0.15	1,490	2,980	1,360	2,720	1,190	3,570
	30 ~ 40HRC	100 - 200	0.5 - 1.0	0.15	1,490	2,380	1,360	2,180	1,190	2,860	
<b>M</b>	Нержавеющая сталь	~ 200HB	100 - 150	0.3 - 0.7	0.1	1,190	1,190	1,090	1,090	950	1,430
		~ 200HB	100 - 150	0.3 - 0.8	0.1	1,190	1,430	1,090	1,310	950	1,710
<b>K</b>	Серый чугун	150 ~ 250HB	100 - 300	0.5 - 1.5	0.15	1,990	3,980	1,820	3,640	1,590	4,770
		150 ~ 250HB	100 - 300	0.5 - 1.5	0.15	1,990	3,980	1,820	3,640	1,590	4,770
	Ковкие чугуны	150 ~ 250HB	80 - 200	0.5 - 1.5	0.15	1,490	2,980	1,360	2,720	1,190	3,570
		150 ~ 250HB	80 - 200	0.5 - 1.5	0.15	1,490	2,980	1,360	2,720	1,190	3,570
<b>S</b>	Титановый сплав	~ 40HRC	30 - 60	0.3 - 0.7	0.08	400	400	360	360	320	480
	Жаропрочный сплав	~ 40HRC	20 - 50	0.1 - 0.3	0.05	300	120	270	110	240	140
<b>H</b>	Закаленные стали	40 ~ 50HRC	80 - 150	0.1 - 0.5	0.05	1,190	710	1,090	650	950	850
		40 ~ 50HRC	80 - 150	0.1 - 0.3	0.05	1,190	470	1,090	430	950	560
	Закаленные стали	50 ~ 60HRC	50 - 70	0.05 - 0.2	0.03	600	120	550	110	480	140
		50 ~ 60HRC	50 - 70	0.03 - 0.07	0.03	600	60	550	55	480	70

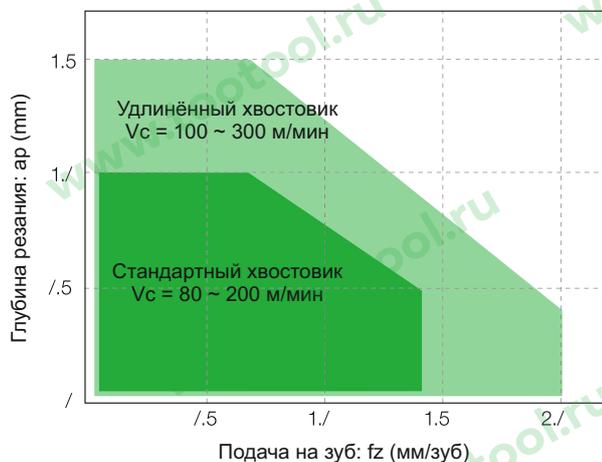
Когда стружка остается в зоне резания во время фрезерования, используйте подачу воздуха для того чтобы извлечь стружку из зоны резания.

Длина вылета инструмента должна быть как можно короче, чтобы избежать вибрации. Когда вылет инструмента большой, уменьшите обороты и подачу.

## РЕКОМЕНДАЦИИ В ИСПОЛЬЗОВАНИИ

### ■ Применение стандартного или длинного хвостовика

При использовании длинного хвостовика, пожалуйста понизьте режимы резания (V<sub>c</sub>, fz, ap) до 70% из аксиальных режимов для стандартного хвостовика.

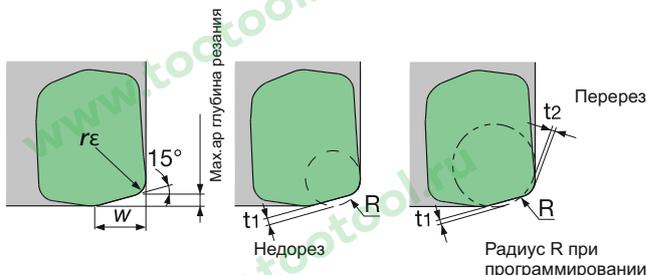


Диаметр инструмента: Dc=ø32~40 мм  
Обрабатываемый материал: C55 (200HB)

L/D Коэффициент вылета  
Стандартный хвостовик: L/D ≤ 3  
Удлиненный хвостовик: L/D = 4

### ■ Геометрия инструмента для программирования

При программировании в САМ инструмент следует рассматривать как радиусные фрезы. Обычно, радиус закругления должен быть задан как R = 3 мм. Если использовать больший радиус, будет происходить перерез. В следующей таблице показано, сколько осталось неразрезанных (t1) и перерезанных (t2).

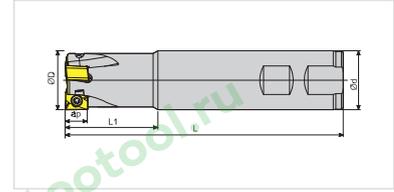


Мак.ар глубина резания ар(мм)	Радиус в угле rε	W (мм)	Радиус R при программировании	Недорез t1	Перерез t2
1.5	2	6	2	1	-
			3	0.77	-
			4	0.54	0.26

Каждое значение в таблице вычисляется теоретически при максимальном значении.

# AEM TYPE

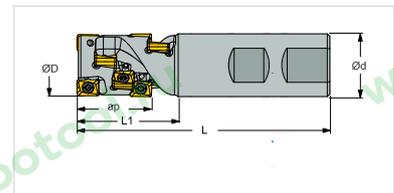
## Shoulder Endmill



Designation	Stock	No. of Inserts	Dimension (mm)					Adapter	✓	Kg
			D	d	L1	L	ap			
AEM90AX09N-1616-090L-2T		2	16	16	26	90	8.0	S	✓	0.12
AEM90AX09N-1616-085L-2T-W		2	16	16	26	85	8.0	W	✓	0.11
AEM90AX09N-2020-110L-3T		3	20	20	26	110	8.0	S	✓	0.23
AEM90AX09N-2020-090L-3T-W		3	20	20	26	90	8.0	W	✓	0.18
AEM90AX09N-2525-120L-4T		4	25	25	26	120	8.0	S	✓	0.39
AEM90AX09N-2525-095L-4T-W		4	25	25	26	95	8.0	W	✓	0.30
AEM90AX09N-3232-130L-5T		5	32	32	30	130	8.0	S	✓	0.72
AEM90AX09N-3232-110L-5T-W		5	32	32	30	110	8.0	W	✓	0.60
AEM90AX12N-2525-120L-2T		2	25	25	35	120	12.0	S	✓	0.36
AEM90AX12N-2525-110L-2T-W		2	25	25	35	110	12.0	W	✓	0.35
AEM90AX12N-3232-130L-3T		3	32	32	40	130	12.0	S	✓	0.65
AEM90AX12N-3232-110L-3T-W		3	32	32	40	110	12.0	W	✓	0.59
AEM90AX12N-4032-130L-4T		4	40	32	40	130	12.0	S	✓	0.83
AEM90AX12N-4032-115L-4T-W		4	40	32	40	115	12.0	W	✓	0.73
AEM90AX17N-3232-130L-2T		2	32	32	44	130	16.3	S	✓	0.70
AEM90AX17N-3232-095L-2T-W		2	32	32	30	95	16.3	W	✓	0.50
AEM90AX17N-4032-130L-3T		3	40	32	44	130	16.3	S	✓	0.76
AEM90AX17N-4032-110L-3T-W		3	40	32	35	110	16.3	W	✓	0.64

# AEM TYPE

## Extended Flute Shoulder Endmill

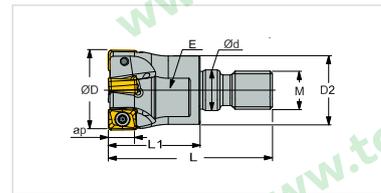


Designation	Stock	No. of flutes	No. of Inserts	Dimension (mm)					Adapter	✓	Kg
				D	d	L1	L	ap			
AEM90AX09N-2525-035M-100L-2T-W		2	10	25	25	38	100	35	W	✓	0.30
AEM90AX09N-3232-042M-115L-3T-W		3	18	32	32	50	115	42	W	✓	0.52
AEM90AX12N-4032-043M-130L-2T-W		2	8	40	32	66	130	43	W	✓	0.77

# Shouldering

## AEM TYPE

### Shoulder Mill Modular



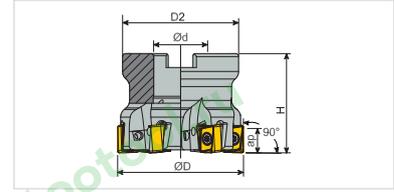
Designation	Stock	No. of Inserts	Dimension (mm)								√	Kg
			D	M	D2	L1	L	d	E	ap		
AEM90AX09N-020-M10-3T		3	3	M10	18.7	30	51	10.5	16	8	√	0.06
AEM90AX09N-025-M12-4T		4	4	M12	21.0	28	52	12.5	17	8	√	0.07
AEM90AX09N-032-M16-5T		5	5	M16	29.0	30	57	17.0	25	8	√	0.16
AEM90AX09N-040-M16-6T		6	6	M16	29.0	40	67	17.0	25	8	√	0.30

### Parts

TYPE		
	Insert screw	Wrench
AEM90AX09N	120018-SS3.0TX07	TPF-08
AEM90AX12N	1200135-SS4.0TX12	TPF-15
AEM90AX17N	120323-SS5.0TX14	TPF-20

# AFM TYPE

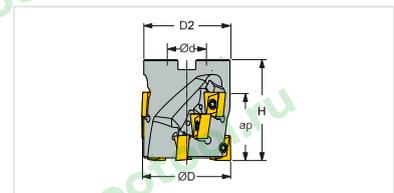
## Shell Mill



Designation	Stock	No. of Inserts	Dimension (mm)					Adapter	Cooling	Kg
			D	D2	d	H	ap			
AFM90AX09N-040-16-05T		5	40	38.4	16	40	8.0	A	√	0.22
AFM90AX09N-050-22-06T		6	50	48.0	22	40	8.0	A	√	0.36
AFM90AX09N-063-22-08T		8	63	60.0	22	40	8.0	A	√	0.62
AFM90AX12N-040-16-04T		4	40	38.0	16	40	12.0	A	√	0.20
AFM90AX12N-050-22-05T		5	50	48.0	22	40	12.0	A	√	0.32
AFM90AX12N-063-22-06T		6	63	59.2	22	40	12.0	A	√	0.65
AFM90AX12N-080-27-07T		7	80	63.0	27	50	12.0	B	√	0.85
AFM90AX12N-100-32-09T		9	100	80.0	32	50	12.0	B	√	1.47
AFM90AX17N-040-16-03T		3	40	38.0	16	40	16.3	A	√	0.32
AFM90AX17N-050-22-04T		4	50	48.0	22	40	16.3	A	√	0.30
AFM90AX17N-063-22-04T		4	63	59.2	22	40	16.3	A	√	0.63
AFM90AX17N-063-22-06T		6	63	59.2	22	40	16.3	A	√	0.67
AFM90AX17N-080-27-05T		5	80	63.0	27	50	16.3	B	√	0.79
AFM90AX17N-080-27-07T		7	80	63.0	27	50	16.3	B	√	0.80
AFM90AX17N-100-32-06T		6	100	80.0	32	50	16.3	B	√	1.39
AFM90AX17N-100-32-08T		8	100	80.0	32	50	16.3	B	√	1.47
AFM90AX17N-125-40-07T		7	125	82.0	40	63	16.3	B	√	2.24
AFM90AX17N-125-40-10T		10	125	82.0	40	63	16.3	B	√	5.41
AFM90AX17N-160-40-08T		8	160	105.0	40	63	16.3	C	×	3.64
AFM90AX17N-160-40-12T		12	160	105.0	40	63	16.3	C	×	4.09
AFM90AX17N-200-60-10T		10	200	135.0	60	63	16.3	C	×	5.99
AFM90AX17N-250-60-12T		12	250	144.0	60	63	16.3	C	×	9.36

# AFM TYPE

## Extended Flute Shell Mill

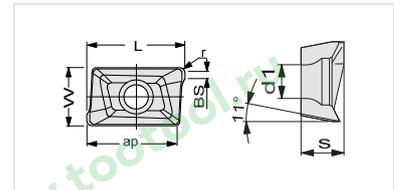


Designation	Stock	No. of flutes	No. of Inserts	Dimension (mm)					Adapter	Cooling	Kg
				D	d	D2	H	ap			
AFM90AX12N-050-22-36M-03T		3	9	50	22	48.0	60	36	A	√	0.45
AFM90AX12N-050-22-47M-04T		4	16	50	22	48.0	68	47	A	√	0.54
AFM90AX12N-063-27-47M-04T		4	16	63	27	60.0	70	47	A	√	0.89
AFM90AX17N-063-27-47M-03T		3	9	63	27	59.4	70	47	A	√	1.93
AFM90AX17N-063-27-60M-03T		3	12	63	27	59.4	85	60	A	√	1.13
AFM90AX17N-080-32-47M-04T		4	12	80	32	76.4	70	47	A	√	1.56

# Shouldering

## Parts

TYPE		
	Insert screw	Wrench
AFM90AX09N	120018-SS3.0TX07	TPF-08
AFM90AX12N	1200135-SS4.0TX12	TPF-15
AFM90AX17N	120323-SS5.0TX14	TPF-20



## Available Inserts

### ANGX

Workpiece	Steel	P	●	⊕	⊖	⊙	⊚	⊛	⊜	⊝	⊞	Machining Type
	Stainless steel	M	⊕	⊖	⊙	⊚	⊛	⊜	⊝	⊞	⊟	
Cast iron	K	⊕	⊖	⊙	⊚	⊛	⊜	⊝	⊞	⊟	⊠	
Non-ferrous metal	N	⊕	⊖	⊙	⊚	⊛	⊜	⊝	⊞	⊟	⊠	
Heat resistant alloy, Titanium alloy	S	⊕	⊖	⊙	⊚	⊛	⊜	⊝	⊞	⊟	⊠	
Hardened steel	H	⊕	⊖	⊙	⊚	⊛	⊜	⊝	⊞	⊟	⊠	

Designation	Dimension (mm)						CVD Coated					PVD Coated							
	L	W	S	r	BS	d1	TCP9330	TCP9340	TCP9350	TCK5215	TCK5315	TCK5225	TCK5325	TPM8115	TPM8125	TPM8225	TPM8135	TPG4235	TPK4235H
 <b>ANGX-GM</b>	090408R-GM	8.52	6.5	5.20	0.8	5.0	3.2	●		○					●	●			
	120508R-GM	13.67	10.0	9.15	0.8	3.5	4.5	●		○					●	●			
	170608R-GM	16.70	11.2	10.40	0.8	4.7	5.2	●		○					●	●		●	●
	170612R-GM	16.90	11.0	10.50	1.2	3.5	5.2												
	170616R-GM	16.90	11.0	10.50	1.6	3.1	5.2												
	170620R-GM	16.90	11.0	10.50	2.0	2.7	5.2												
	170624R-GM	16.90	11.0	10.50	2.4	2.3	5.2												

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