

*The Cutting Edge **M**astered*



F45

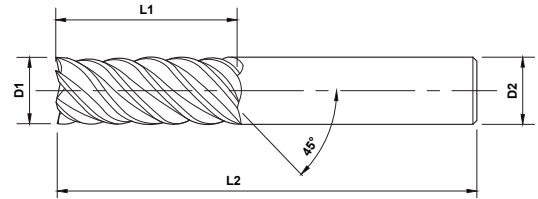
- 6 Flute 45° Helix
- Eccentric Relief
- High Performance Finishers





The F45 is a unique solid carbide endmill designed to achieve an impeccable finish in hard metals like stainless steel, alloys, and titanium. Additionally, the 45 degree spiral achieves faster feed rates.

6 Flute 45 Degree Eccentric Relief High Performance Finishers



F45 Square End, Fractional Sizes

D1	L1	D2	L2	Uncoated	PowerA
3/16	5/8	3/16	2	411-002	411-002-1
1/4	3/4	1/4	2-1/2	411-004	411-004-1
5/16	7/8	5/16	2-1/2	411-006	411-006-1
3/8	1	3/8	2-1/2	411-008	411-008-1
7/16	1	7/16	2-1/2	411-010	411-010-1
1/2	1	1/2	3	411-012	411-012-1
9/16	1	9/16	3	411-014	411-014-1
5/8	1-1/4	5/8	3-1/2	411-016	411-016-1
3/4	1-1/2	3/4	4	411-018	411-018-1
7/8	1-1/2	7/8	4	411-020	411-020-1
1	1-1/2	1	4	411-022	411-022-1
1	2-1/4	1	5	411-024	411-024-1

F45 Corner Radius, Fractional Sizes

D1	L1	D2	L2	R	Uncoated	PowerA
1/4	3/4	1/4	2-1/2	.010	411-200	411-200-1
5/16	7/8	5/16	2-1/2	.012	411-210	411-210-1
3/8	1	3/8	2-1/2	.012	411-220	411-220-1
7/16	1	7/16	2-1/2	.015	411-231	411-231-1
1/2	1	1/2	3	.015	411-241	411-241-1
9/16	1	9/16	3	.020	411-252	411-252-1
5/8	1-1/4	5/8	3-1/2	.020	411-262	411-262-1
3/4	1-1/2	3/4	4	.030	411-273	411-273-1
7/8	1-1/2	7/8	4	.030	411-283	411-283-1
1	1-1/2	1	4	.030	411-293	411-293-1

Tolerance: Cutter Diameters: + .000 - .002
Shank Diameters: H6 Tolerance

F45 Square End, Metric Sizes

D1	L1	D2	L2	Uncoated	PowerA
5	16	5	50	511-002	511-002-1
6	19	6	63	511-004	511-004-1
7	19	8	63	511-006	511-006-1
8	21	8	63	511-008	511-008-1
9	22	10	70	511-010	511-010-1
10	25	10	70	511-012	511-012-1
11	25	11	70	511-014	511-014-1
12	25	12	75	511-016	511-016-1
14	30	14	88	511-018	511-018-1
16	32	16	88	511-020	511-020-1
18	35	18	100	511-022	511-022-1
20	38	20	100	511-024	511-024-1
22	38	22	100	511-026	511-026-1
25	38	25	100	511-028	511-028-1

F45 Corner Radius, Metric Sizes

D1	L1	D2	L2	R	Uncoated	PowerA
5	16	5	50	0.25	511-200	511-200-1
6	19	6	63	0.25	511-210	511-210-1
8	21	8	63	0.25	511-230	511-230-1
7	19	8	63	0.25	511-220	511-220-1
9	22	10	70	0.50	511-241	511-241-1
10	25	10	70	0.50	511-251	511-251-1
11	25	11	70	0.50	511-261	511-261-1
12	25	12	75	0.50	511-271	511-271-1
14	30	14	88	0.50	511-281	511-281-1
16	32	16	88	0.50	511-291	511-291-1
18	35	18	100	1.00	511-303	511-303-1
20	38	20	100	1.00	511-313	511-313-1
22	38	22	100	1.00	511-323	511-323-1
25	38	25	100	1.25	511-334	511-334-1

PowerA (Aluminum Titanium Nitride, AlTiN) Coating

Color: Dark Gray

Vickers Hardness: approximately 3,600 Vickers

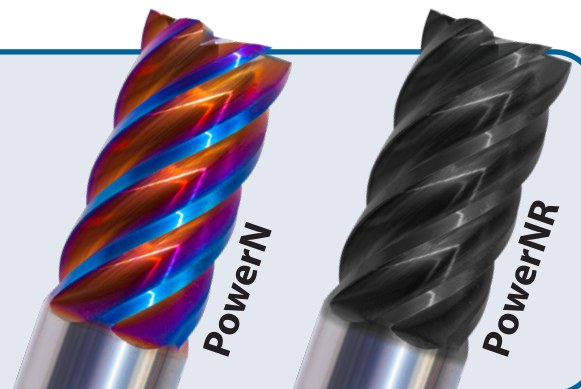
Nickel Alloys, Stainless Steel, Hardened Steels, Tool Steels, Cast Iron

An excellent broad spectrum grade. May be run in dry or minimum quantity lubrication applications, where heat can be a problem. Also handles light chip loads very well

F45 Pro+ Nanocomposite Coated

For even greater performance, specify PowerN or PowerNR coating

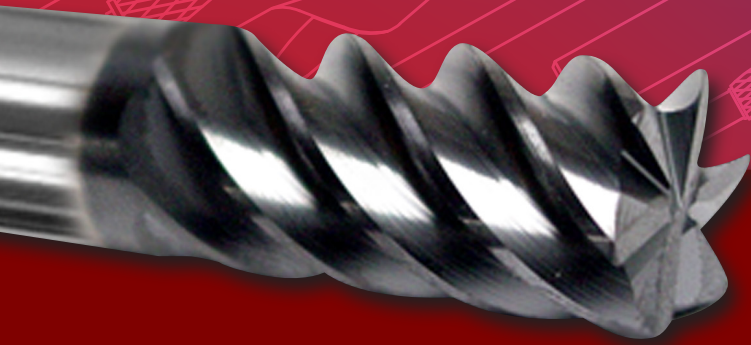
- High nano-hardness increases hardness 2-½ times
- An outstanding heat and oxidation barrier
- Ultra thin coating helps retain a super sharp edge



Recommended Speed and Feed Rates

Material	Surface Feet per Minute	Chip Load Per Tooth (IPT)				
		1/8	1/4	1/2	3/4	1
Cast Iron (Ductile)	250-400	.0005	.0015	.002	.004	.006
Cast Iron (Gray)	350-500	.0005	.002	.004	.006	.008
Cast Iron (Malleable)	200-350	.0005	.002	.004	.006	.008
Nickel Base Alloys	200-300	.0005	.001	.002	.003	.004
Stainless Steel (Free Machining)	300-400	.0005	.001	.002	.004	.006
Stainless Steel (Work Hardening)	150-300	.0005	.0005	.001	.003	.005
Steel(Low Alloy)	350-600	.0005	.001	.002	.004	.006
Steel(Medium Alloy)	200-400	.0005	.001	.002	.004	.006
Steel(High Alloy Mold-Die)	175-250	.0005	.001	.002	.004	.006
Steel(High Strength)	75-150	.0005	.0005	.001	.003	.004
Titanium (Soft)	150-300	.0005	.001	.002	.004	.006
Titanium (Hard)	50-150	.0005	.0005	.001	.003	.004

Enhanced Surface Finish
Faster Finishing Rates
Improved Tool Life
Radially Relieved For Better Accuracy
High Tolerance Concentricity



6 Flute 45 Degree
Eccentric Relief
High Performance Finishers



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