IMCO

Power. Precision. Performance.

SHEAR IT. CLEAR IT.

STREAKERS® M2 SERIES END MILLS

Put aluminum in its place.

CONTENTS:

Shear through aluminum at higher feeds with the STREAKERS® M2 Series from IMCO.

Because of M2's unique design, you can take more aggressive chip loads without gumming up the works. Rough it out and finish it with one tool, even at low horsepower.

IMCO

Power. Precision. Performance.

M2 SERIES

Shear it and clear it.

The STREAKERS M2 Series makes chips move aside so you can get the job done. IMCO's unique design makes the entire STREAKERS M2 Series first-rate roughers as well as excellent finishers:

- High-volume metal removal without maxing out horsepower; sheds chips as fast as you can make them.
- Reduced chatter over a broad range of speeds. Powerful performance at speeds as low as 3,000 RPM; excels in performance at speeds well above 10,000 RPM.
- Less spindle drag draws less power while removing more metal.

Excellent performance in aluminum and non-ferrous metals.

The one-tool choice for roughing and finishing in these materials:

- Aluminum alloys
- Magnesium and copper alloys
- High silicon, die cast and extruded aluminum parts
- Composites

STREAKERS M2 Series Features

45° helix creates a high shear plane in the cutting zone, resulting in more efficient chip formation and evacuation.

Unique cutting-edge geometry carves out more metal per minute. STREAKERS are designed especially for really aggressive chip loads.

Special flute design helps curl and evacuate even large chips and keeps the Streaker running clog free.

Cylindrical land for superior finishes.

High-end substrate of ultra-fine grain carbide stays cooler at very high spindle speeds –10,000 RPM and higher. Tough core runs at higher speeds without tool distortion.

M203 Square

M202B Ball

M202 Square

M202N Radius w/ neck relief

Options

Neck relief

Better clearance in deep cavities and easier machining tight against walls.

End designs

Range of corner radii – ideal for aerospace and other industrial uses. Helps prevent cutting-end chipping.

Square end – routine machining and finishing.

Ball end – minimizes tool deflection and increases productivity when contouring in deep cavities.

Shank designs

H6 tolerance shanks – fit all collets and conform to shrink-fit requirements.

Flats – available on many sizes for end mill holders.

Choose the length for the job.

Extra rigidity – choose stub length.

Medium-to-deep cuts – order standard, long or extra-long flute length and reach.

Extra rigidity in deep pockets, cavities – choose short flute length.

Finishing passes – order extra-long flute length.

Deep cavity work – use stub-length flutes.

Improved productivity and surface finish.

Cycle time was a critical problem for a customer machining aluminum using a competitor's 3-flute end mill at 1,300 SFM and 60 IPM with an axial and radial cut of .125". Switching to a STREAKERS end mill allowed running at 90 IPM and increasing the axial and radial depths of cut to .265". That cut cycle time by 15 minutes – a 50% feed rate increase.

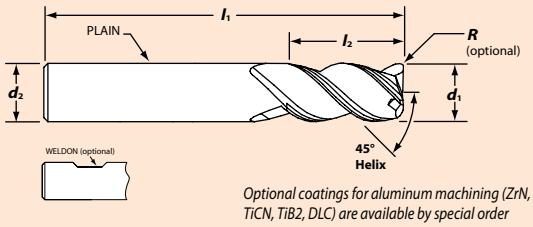
3-FLUTE STREAKERS:

3's a Charm.

There are several reasons to use the 3-flute version of the STREAKERS: more stability in the cut, less power draw through the spindle and a great finish. The center cutting design allows the 3-flute STREAKERS to ramp and plunge into parts, and it works great in many non-ferrous materials.

Square End and Corner Radius

For high performance milling in all types of aluminum and non-ferrous metals. Superior roughing tool and finisher, even on lower horsepower machinery.



Optional coatings for aluminum machining (ZrN, TiCN, TiB2, DLC) are available by special order

mm d_1 +0,000 / -0,050 d_2 h6

Model Code: M203 w/Square Corner

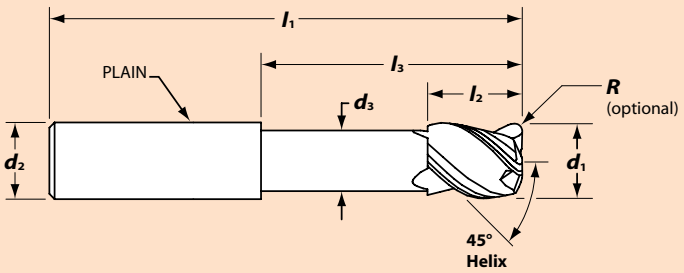
Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Plain Shank EDP	EZ-ID Number M203-xxx-xxx-SQ d1 l2
3	3	5	38	32522	M203-030-005-SQ
4	4	6	50	32524	M203-040-006-SQ
		11	50	33167	M203-040-011-SQ
5	5	6	50	32525	M203-050-006-SQ
		13	50	33169	M203-050-013-SQ
6	6	7	54	32526	M203-060-007-SQ
		16	57	33170	M203-060-016-SQ
		29	75	34302	M203-060-029-SQ
8	8	9	58	32527	M203-080-009-SQ
		19	63	33172	M203-080-019-SQ
		29	75	34303	M203-080-029-SQ
10	10	11	66	32528	M203-100-011-SQ
		22	72	33174	M203-100-022-SQ
		40	88	34311	M203-100-040-SQ
12	12	12	73	32529	M203-120-012-SQ
		26	83	33175	M203-120-026-SQ
		50	100	34305	M203-120-050-SQ
14	14	26	83	33176	M203-140-026-SQ
16	16	16	82	32530	M203-160-016-SQ
		32	92	33177	M203-160-032-SQ
		57	125	34306	M203-160-057-SQ
20	20	20	92	32502	M203-200-020-SQ
		38	104	33179	M203-200-038-SQ
		57	125	34307	M203-200-057-SQ

Model Code: M203 w/Corner Radius

Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Order Code by Corner Radius (R) (replace -xxx in EZ-ID number with decimal size below) 0,3	0,5	0,75	1,0	EZ-ID Number M203-xxx-xxx-xxx d1 l2 R
3	3	5	38	34857				M203-030-005-xxx
4	4	11	50	34858				M203-040-011-xxx
5	5	13	50	34859				M203-050-013-xxx
6	6	16	57	34860	34862			M203-060-016-xxx
		29	75	34864	34866			M203-060-029-xxx
8	8	19	63	34868	34870			M203-080-019-xxx
		29	75		34872			M203-080-029-xxx
10	10	22	72	34874	34876			M203-100-022-xxx
		40	88	34878	34880			M203-100-040-xxx
12	12	26	83		34882	34884	34886	M203-120-026-xxx
		50	100		34888		34890	M203-120-050-xxx
16	16	32	92			34892	34894	M203-160-032-xxx
		57	125				34896	M203-160-057-xxx
20	20	38	104			34898	34900	M203-200-038-xxx
		57	125				36583	M203-200-057-xxx

Square End and Corner Radius w/Neck Relief

M203N permits clearance in deeper cavities and easier machining against tight walls. Neck relief and short flute length mean increased stability of the end mill in the cut for more precise tolerances.



Optional coatings for aluminum machining (ZrN, TiCN, TiB2, DLC) are available by special order

mm d_1 +0,000 / -0,050 d_2 h6

Model Code: M203N w/Square Corner and Neck Relief

Cutter Dia d1	Shank Dia d2	Length of Cut l2	Reach LBS l3	Overall Length l1	Plain Shank EDP	EZ-ID Number M203-xxx-xxx-Nxxx-SQ-Lxxx d1 l2 l3 l1
6	6	8	20	57	33041	M203-060-008-N020-SQ
			40	75	37262	M203-060-008-N040-SQ-L75
8	8	10	26	63	33042	M203-080-010-N026-SQ
10	10	12	31	72	33043	M203-100-012-N031-SQ
			50	100	33128	M203-100-012-N050-SQ-L100
12	12	14	37	83	33044	M203-120-014-N037-SQ
			70	125	33129	M203-120-014-N070-SQ-L125
16	16	18	41	92	33045	M203-160-018-N041-SQ
			90	150	33131	M203-160-018-N090-SQ-L150
20	20	24	47	104	33046	M203-200-024-N047-SQ
			90	150	37302	M203-200-024-N090-SQ-L150

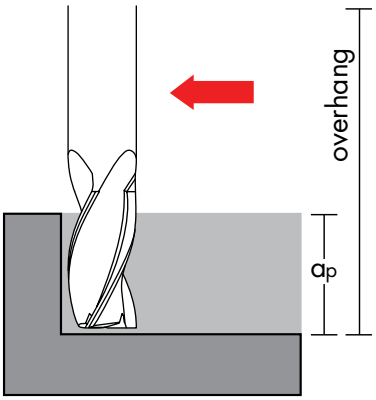
Model Code: M203N w/Corner Radius and Neck Relief

Cutter Dia d1	Shank Dia d2	Length of Cut l2	Reach LBS l3	Overall Length l1	Order Code Corner Rad (R) (replace -xxx in EZ-ID # with decimal size below) 0,5	1,0	1,5	EZ-ID Number M203-xxx-xxx-Nxxx-xxx-Lxxx d1 l2 l3 R l1
6	6	8	20	57	37261			M203-060-008-N020-xxx
			40	75	37264			M203-060-008-N040-xxx-L75
8	8	10	26	63		37266		M203-080-010-N026-xxx
10	10	12	31	72		37268		M203-100-012-N031-xxx
			50	100		37274		M203-100-012-N050-xxx-L100
12	12	14	37	83			37276	M203-120-014-N037-xxx
			70	125			37278	M203-120-014-N070-xxx-L125
16	16	18	41	92			37280	M203-160-018-N041-xxx
			90	150			37281	M203-160-018-N090-xxx-L150
20	20	24	47	104			37301	M203-200-024-N047-xxx
			90	150			37328	M203-200-024-N090-xxx-L150

M203 Streaker Application Guide • Speed & Feed

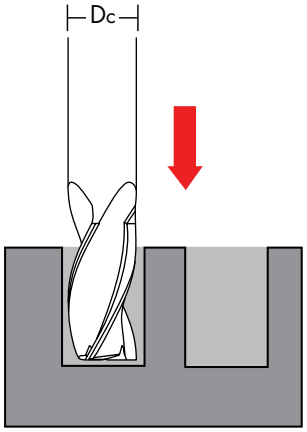
ISO Classification	Work Material	Type of Cut	Axial DOC	Radial DOC	Number of Flutes	Speed (M/min)	Feed (MM per Tooth) 3,0	6,0	10,0	12,0	16,0	20,0
N	Aluminum Alloys 2024, 6061, 7075	Slotting	.75 x D	1 x D	3	305	0.0330	0.0660	0.0991	0.1321	0.1651	0.2206
		Peripheral - Rough	1 x D	.75 x D	3	366	0.0413	0.0826	0.1238	0.1651	0.2064	0.2757
		Peripheral - Finish	1.5 x D	.01 x D	3	427	0.0519	0.1037	0.1556	0.2074	0.2593	0.3464
	High Silicon Aluminum A380, A390	Slotting	.5 x D	1 x D	3	244	0.0279	0.0559	0.0838	0.1118	0.1397	0.1866
		Peripheral - Rough	1 x D	.5 x D	3	305	0.0349	0.0699	0.1048	0.1397	0.1746	0.2333
		Peripheral - Finish	1.5 x D	.01 x D	3	366	0.0439	0.0878	0.1316	0.1755	0.2194	0.2931
	Magnesium Alloys	Slotting	.75 x D	1 x D	3	305	0.0330	0.0660	0.0991	0.1321	0.1651	0.2206
		Peripheral - Rough	1 x D	.75 x D	3	366	0.0413	0.0826	0.1238	0.1651	0.2064	0.2757
		Peripheral - Finish	1.5 x D	.01 x D	3	427	0.0519	0.1037	0.1556	0.2074	0.2593	0.3464
	Copper Alloys Brass, Bronze	Slotting	.75 x D	1 x D	3	244	0.0279	0.0559	0.0838	0.1118	0.1397	0.1866
		Peripheral - Rough	1 x D	.75 x D	3	305	0.0349	0.0699	0.1048	0.1397	0.1746	0.2333
		Peripheral - Finish	1.5 x D	.01 x D	3	366	0.0439	0.0878	0.1316	0.1755	0.2194	0.2931
	Composites Plastics, Fiberglass	Slotting	1 x D	1 x D	3	244	0.0279	0.0559	0.0838	0.1118	0.1397	0.1866
		Peripheral - Rough	1 x D	.75 x D	3	305	0.0349	0.0699	0.1048	0.1397	0.1746	0.2333
		Peripheral - Finish	1.5 x D	.01 x D	3	366	0.0439	0.0878	0.1316	0.1755	0.2194	0.2931

Adjustments – Apply these adjustments when programming the following applications.



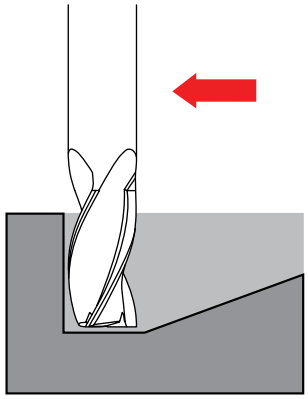
1. Long reach mills with large overhang

- Reduce speed rate and chipload by 10%



2. Plunge entry into work piece

- Reduce chipload by 80% of recommended slotting rate
- Peck mill if axial DOC (ap) exceeds 50% of Dc



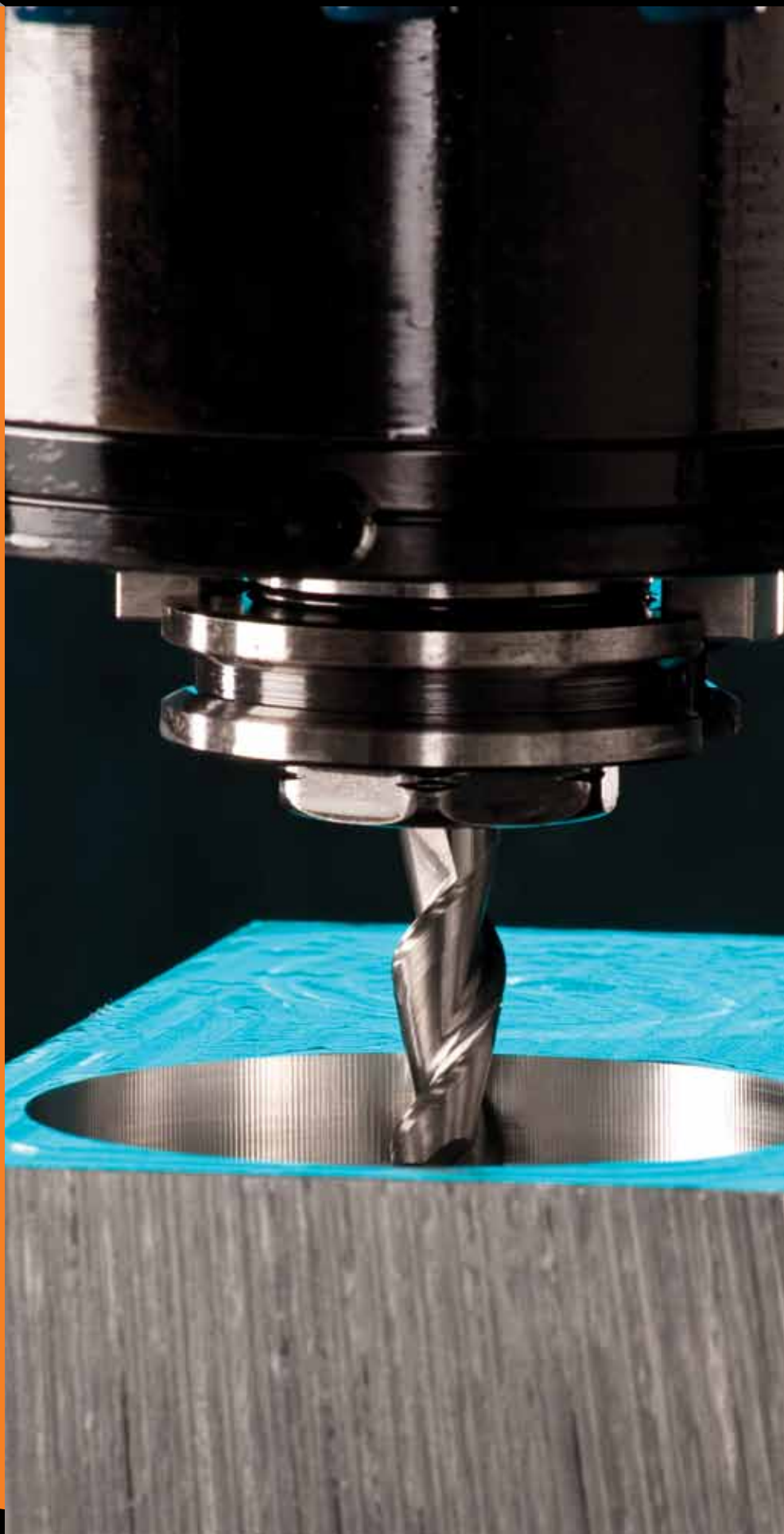
3. Ramp entry into work piece

- Ramp at 1.5°–2.5° angle
- Reduce chipload by 20% of recommended slotting rate

2-FLUTE STREAKERS:

Streaking Through Aluminum.

The unique design of STREAKERS® mills permit heavy chip loads to be taken without packing up the flutes. The result? High output can be achieved on smaller machines as well as machines equipped with high-speed spindles. Keep the chip load within the horsepower limits of the machine and watch the aluminum chips fly.

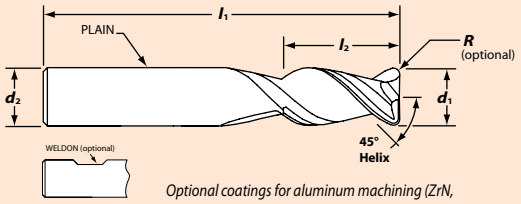


M202

Square End and Corner Radius

Ideal for high performance milling in all types of aluminum including high silicon, die case and extruded aluminum parts.

The 2-flute design allows maximum flute-to-flute spacing for greater stock removal and effective chip evacuation – ideal when you're going deep in to the metal to remove material incrementally.



Optional coatings for aluminum machining (ZrN, TiCN, TiB2, DLC) are available by special order

mm d_1 +0,000 / -0,050 d_2 h6

Model Code: M202 w/Square Corner

Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Plain Shank EDP	EZ-ID Number M203-xxx-xxx-SQ d1 l2
3	3	5	38	32971	M202-030-005-SQ
4	4	6	50	32972	M202-040-006-SQ
		11	50	36974	M202-040-011-SQ
5	5	6	50	32973	M202-050-006-SQ
		13	50	36976	M202-050-013-SQ
6	6	7	54	32974	M202-060-007-SQ
		16	57	62402	M202-060-016-SQ
8	8	9	58	32975	M202-080-009-SQ
		19	63	62403	M202-080-019-SQ
10	10	11	66	32976	M202-100-011-SQ
		22	72	62404	M202-100-022-SQ
12	12	12	73	32977	M202-120-012-SQ
		26	83	62406	M202-120-026-SQ
14	14	26	83	62407	M202-140-026-SQ
16	16	16	82	32978	M202-160-016-SQ
		32	92	62408	M202-160-032-SQ
20	20	20	92	32979	M202-200-020-SQ
		38	104	62410	M202-200-038-SQ

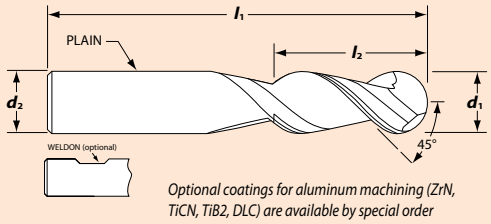
Model Code: M202 w/Corner Radius

Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Order Code by Corner Radius (R) (replace -xxx in EZ-ID number with decimal size below) 0,3	0,5	0,75	1,0	EZ-ID Number M202-xxx-xxx-xxx d1 l2 R
3	3	5	38	36973				M202-030-005-xxx
4	4	11	50	36975				M202-040-011-xxx
5	5	13	50	36977				M202-050-013-xxx
6	6	16	57	36978	36980			M202-060-016-xxx
8	8	19	63	36982	36984			M202-080-019-xxx
10	10	22	72	37043	37047			M202-100-022-xxx
12	12	26	83		37049	37052	37084	M202-120-026-xxx
16	16	32	92			37101	37161	M202-160-032-xxx
20	20	38	104			37170	37180	M202-200-038-xxx

Ball End

The M202B ball end is excellent for contouring applications in a variety of materials. Based on the same high performance design as the M202 series, but with a full end radius.

As a general rule, when using the M202B ball end mill, reduce feed rates by 25% when the axial DOC exceeds 75% of the mill diameter. Refer to speed and feed information for more detail.



Optional coatings for aluminum machining (ZrN, TiCN, TiB2, DLC) are available by special order

mm d_1 +0,000 / -0,050 d_2 h6

Model Code: M202B w/Ball End

Cutter Dia d1	Shank Dia d2	Length of Cut l2	Overall Length l1	Plain Shank EDP	EZ-ID Number M203-xxx-xxx-BN d1 l2
6	6	16	57	62412	M202-060-016-BN
8	8	19	63	62413	M202-080-019-BN
10	10	22	72	62414	M202-100-022-BN
12	12	26	83	62416	M202-120-026-BN
16	16	32	92	62418	M202-160-032-BN
20	20	38	104	62420	M202-200-038-BN

USE A MILL TO MAKE HOLES

In most materials, helical plunging moves can save money when machining holes. Helical plunging moves eliminate the time to make a tool change and the expense of buying many drills for a variety of hole diameters. All Streakers M2 series end mills are center cutting and can run straight plunge (Z-axis) moves or helical interpolation tool paths.

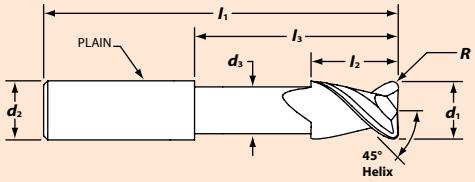
Square End and Corner Radius w/Neck Relief

M202N permits clearance in deeper cavities and easier machining against tight walls. Neck relief and short flute length mean increased stability of the end mill in the cut for more precise tolerances.

Coatings:

None (MG)

Optional coatings for aluminum machining (ZrN, TiCN, TiB2, DLC) are available by special order



mm d_1 +0,000 / -0,050 d_2 h6

Model Code: M202N w/Square Corner and Neck Relief

Cutter Dia d1	Shank Dia d2	Length of Cut l2	Reach LBS l3	Overall Length l1	Plain Shank EDP	EZ-ID Number M203-xxx-xxx-Nxx-SQ-Lxxx d1 l2 l3 l1
6	6	8	20	57	32402	M202-060-008-N020-SQ
			40	75	37201	M202-060-008-N040-SQ-L75
8	8	10	26	63	32404	M202-080-010-N026-SQ
10	10	12	31	72	32406	M202-100-012-N031-SQ
			50	100	33029	M202-100-012-N050-SQ-L100
12	12	14	37	83	32408	M202-120-014-N037-SQ
			70	125	33030	M202-120-014-N070-SQ-L125
16	16	18	41	92	32410	M202-160-018-N041-SQ
			90	150	33031	M202-160-018-N090-SQ-L150
20	20	24	47	104	32412	M202-200-024-N047-SQ
			90	150	37228	M202-200-024-N090-SQ-L150

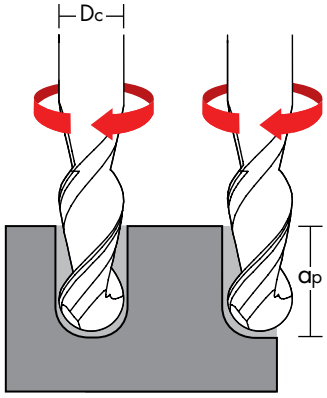
Model Code: M202N w/Corner Radius and Neck Relief

Cutter Dia d1	Shank Dia d2	Length of Cut l2	Reach LBS l3	Overall Length l1	Order Code Corner Rad (R) (replace -xxx in EZ-ID # with decimal size below) 0,5	1,0	1,5	EZ-ID Number M203-xxx-xxx-Nxxx-xxx-Lxxx d1 l2 l3 R l1
6	6	8	20	57	37200			M202-060-008-N020-030
			40	75	37202			M202-060-008-N040-030-L75
8	8	10	26	63		37212		M202-080-010-N026-050
10	10	12	31	72		37214		M202-100-012-N031-050
			50	100		37216		M202-100-012-N050-050-L100
12	12	14	37	83			37218	M202-120-014-N037-100
			70	125			37220	M202-120-014-N070-100-L125
16	16	18	41	92			37222	M202-160-018-N041-100
			90	150			37224	M202-160-018-N090-100-L150
20	20	24	47	104			37226	M202-200-024-N047-100
			90	150			37230	M202-200-024-N090-100-L150

M202 Streaker Application Guide • Speed & Feed

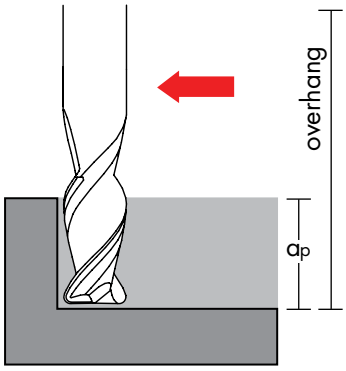
ISO Classification	Work Material	Type of Cut	Axial DOC	Radial DOC	Number of Flutes	Speed (M/min)	Feed (MM per Tooth) 3,0	6,0	10,0	12,0	16,0	20,0
N	Aluminum Alloys 2024, 6061, 7075	Slotting	1 x D	1 x D	2	305	0.0381	0.0762	0.1143	0.1524	0.1905	0.2545
		Peripheral - Rough	1 x D	.75 x D	2	366	0.0476	0.0953	0.1429	0.1905	0.2381	0.3181
		Peripheral - Finish	1.5 x D	.01 x D	2	427	0.0598	0.1197	0.1795	0.2393	0.2992	0.3997
	High Silicon Aluminum A380, A390	Slotting	.75 x D	1 x D	2	244	0.0330	0.0660	0.0991	0.1321	0.1651	0.2206
		Peripheral - Rough	1 x D	.5 x D	2	305	0.0413	0.0826	0.1238	0.1651	0.2064	0.2757
		Peripheral - Finish	1.5 x D	.01 x D	2	366	0.0519	0.1037	0.1556	0.2074	0.2593	0.3464
	Magnesium Alloys	Slotting	1 x D	1 x D	2	305	0.0381	0.0762	0.1143	0.1524	0.1905	0.2545
		Peripheral - Rough	1 x D	.75 x D	2	366	0.0476	0.0953	0.1429	0.1905	0.2381	0.3181
		Peripheral - Finish	1.5 x D	.01 x D	2	427	0.0598	0.1197	0.1795	0.2393	0.2992	0.3997
	Copper Alloys Brass, Bronze	Slotting	.75 x D	1 x D	2	244	0.0330	0.0660	0.0991	0.1321	0.1651	0.2206
		Peripheral - Rough	1 x D	.75 x D	2	305	0.0413	0.0826	0.1238	0.1651	0.2064	0.2757
		Peripheral - Finish	1.5 x D	.01 x D	2	366	0.0519	0.1037	0.1556	0.2074	0.2593	0.3464
	Composites Plastics, Fiberglass	Slotting	1 x D	1 x D	2	244	0.0330	0.0660	0.0991	0.1321	0.1651	0.2206
		Peripheral - Rough	1 x D	.75 x D	2	305	0.0413	0.0826	0.1238	0.1651	0.2064	0.2757
		Peripheral - Finish	1.5 x D	.01 x D	2	366	0.0519	0.1037	0.1556	0.2074	0.2593	0.3464

Adjustments – Apply these adjustments when programming the following applications.



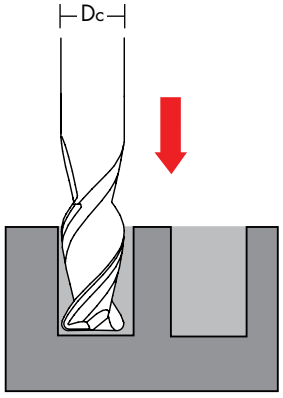
1. Ball nose end mills

- Reduce chip load by 25% from roughing/ slotting recommendation when axial DOC (ap) exceeds 75% of Dc



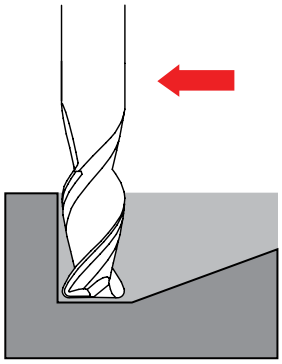
2. Long reach mills with large overhang

- Reduce speed rate and chipload by 10%



3. Plunge entry into work piece

- Reduce chipload by 80% of recommended slotting rate
- Peck mill if axial DOC (ap) exceeds 50% of Dc



4. Ramp entry into work piece

- Ramp at 1.5°–2.5° angle
- Reduce chipload by 20% of recommended slotting rate

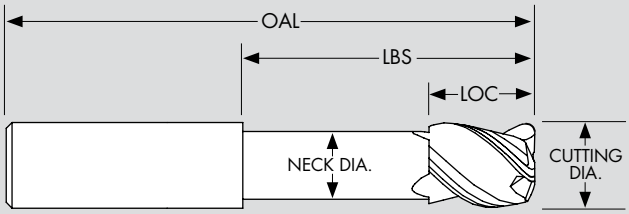
EZ-ID

How to build the new EZ-ID code

IMCO's new "smart" coding system saves you time locating part numbers. Just use the specifics of the tool you need, "plug" them into the coding system, and you're there!

How EZ-ID works.

Each EZ-ID part number actually describes the tool itself. It starts with general information (type of tool and tool "family") and gets more specific as you go.



Building the EZ-ID code, step by step.

Insert the numbers in the segments as indicated here. If a certain segment doesn't apply (neck dimension, nonstandard length or special shank), just skip it. Separate the segments with hyphens.

1 Enter the model number.

For example, the model number for a STREAKERS M2 Series 3-flute with neck relief would be M203N. In the example here, the model number for the STREAKERS 2-flute is M202.)

2 Enter the **tool diameter** (always to one decimal place). Include the leading zero for diameters less than 10mm.

3 Enter the **length of cut (LOC).** Include the leading zero for a LOC less than 100mm.

4 Enter the **length below shank (LBS) or reach**. Include the leading zero for a LBS less than 100mm. Indicate that this is a neck dimension by placing an N before the number. (If the tool has no neck, you can skip this segment altogether.)

5 Enter the **end/corner** type or size. Include the leading zero for corner radii less than 1mm. For any other end/corner type, just indicate the type: SQ = square end, BN = ball nose, CC = corner chamfer.

6 If the **overall length** you need is not the standard length for the combination of tool diameter, LOC and LBS, then enter the overall length **(OAL)** here. Indicate that this is an overall length by placing an L before the number. If you do not specify an overall length, we will assume it is standard length.

7 Enter the code for the **type of shank** you need (W = Weldon flat, WN = whistle notch, P = plain). If you do not specify a shank style, we will assume it is a plain shank.

1	2	3	4	5	6	7
MODEL	TOOL DIAMETER	LENGTH OF CUT (LOC)	LENGTH BELOW SHANK (LBS)	END	OVERALL LENGTH	SHANK
M202	– 120	– 014	– N070	– 100	– L125	– W

Segments highlighted in white may be omitted.

Put aluminum in its place.

See a video of STREAKERS M2 Series end mills in action at:

www.imcousa.com/tools/streakers

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