REVOCUT™
Revolutionary Cutting Tools™

GEN-II

ROTARY TOOL SYSTEM

BY ENDRES MACHINING INNOVATIONS

CUT FASTER, LONGER

Rotary Cutting Inserts

Revocut Gen-II achieves higher throughput with longer tool life using self-propelled rotary cutting tools. By setting the rake angles appropriately and mounting the insert on a sealed, bearinged cartridge, chip formation side flow drives the insert rotation. Through an elegantly simple design realized over years of development and optimization, Revocut Gen-II tools deliver higher performance with ease of use.

The Revocut Advantage

Insert rotation provides three benefits. First, it spreads the heat. Unlike a conventional fixed-insert tool where the intense heat of chip formation remains focused on the insert corner, Gen-II continuously moves the insert relative to the heat source. This allows the tool to run faster at lower temperature and wear rate.

Second, rotation of the insert spreads the wear. Whether the wear mechanism at work is abrasion and/or dissolution, over time the wear is spread around the entire circumference of the round insert. That means less frequent insert indexing. With Revocut Gen-II, depending on depth of cut and chip load you get 10-20 equivalent “corners” of cutting between insert indexes. In a sense, it is continuously indexing itself for you.

Third, for materials which are prone to creating notch wear, there is no point where the notch can form on a rotating insert. And if a small chip occurs in the cutting edge, unlike fixed-insert tools that can leave a record of that edge chip as a ridge in the surface finish, small chips on a Revocut Gen-II cutting edge just rotate through the cut leaving virtually no blemish in the surface finish.

REVOCUT™

INCREASE PRODUCTION

Cut at Higher Speeds

By spreading the heat and wear, Revocut can maintain or improve tool life at surface speeds 1.5-3.0 times that of fixed-insert tools.

Cut at Higher Feed Rates

The 26-mm round Gen-II insert from Revocut naturally thins the chip. In lighter cuts, feeds of 1.0 mm/tooth [0.040 in/tooth] are commonly achievable. Surface finish increases with feed squared divided by corner radius, meaning we can run up to 4 times the feed typically taken with a 0.8 mm corner radius and maintain similar R_a and R_z in turning and cylinder boring. Add wipers on a face mill and get R_a of 0.6-1.0 μm [24-40 μin] at up to 0.3-0.45 mm/tooth [0.012-0.018 in/tooth]. For heavier cuts, Revocut Gen-II delivers excellent performance at nominal cut depths up to 3.5 mm [0.140 in] and 0.3 mm/tooth [0.012 in/tooth].

Cut with Greater Flexibility

Revocut Gen-II enables your equipment to produce more each hour of operation. When fixturing or part stiffness cannot support higher loads that come with higher feed, you can crank up the spindle speed because Gen-II from Revocut can handle it without frying the insert and without increasing insert indexes.

If your equipment can accommodate more feed, you can hold speed steady and gain productivity and extremely long tool life. In bottleneck ops, go all out on feed and speed to increase throughput of the entire production line. And if all you need is longer tool life, maintain cycle time as is and greatly increase time between insert indexes, lessening the burden on your tool room and improving overall CPU.

Move Beyond Existing Constraints

Revocut Gen-II works particularly well with short chipping materials, and has proven itself to increase time between insert indexes 10-30x or reduce cycle time by 30-60% in gray iron, compacted graphite iron, nodular/ductile iron, high Ni/Cr castings, and thermal-spray coatings. We are continuously advancing the technology for other materials and applications.

REVOCUT™

PRODUCTION CYCLE TIME ⬇ 34%

Semi-finish Cylinder Boring CGI Cylinder Block

Conditions

- Cutter: 98 mm [3.86 in], 4 teeth (2 effective) with stabilizer pads
- Insert: positive-rake coated carbide
- Coolant: through-spindle at 48 bar [~700 psi]
- Depth of Cut (a_p): 0.45 mm [0.018 in]
- Cutting Speed (v_c): 180 m/min [590 ft/min] → 600 rpm
- Chip Load (f_z): 0.61 mm/tooth [0.024 in/tooth]
- Feed Rate (f_n): 1.22 mm/rev [0.048 in/rev]
- Feed Speed (v_f): 730 mm/min [28.8 in/min]

Results

- Cycle Time: 14.8 sec/bore
- 34% reduction in cycle time
- 3x parts per index

REVOCUT™

TOOL LIFE ↑ 5-10X

Cylinder Boring Thermal-Spray Lined Cylinders

Conditions

- Cutter: 82 mm [3.23 in], 3 teeth (1 effective) without stabilizer pads
- Insert: positive-rake coated carbide
- Coolant: through-spindle at 20 bar [~300 psi]
- Depth of Cut (a_p): 0.35 mm [0.014 in]
- Cutting Speed (v_c): 250 m/min [820 ft/min] → 1,000 rpm
- Chip Load (f_z): 0.75 mm/tooth [0.030 in/tooth]
- Feed Rate (f_n): 0.75 mm/rev [0.030 in/rev]
- Feed Speed (v_f): 750 mm/min [29.5 in/min]

Results

- Cycle Time: 10.3 sec/bore
- Held size and minimal wear over 500-bore test
- Additional tests run at 500 rpm up to 2 mm/rev (8 sec/bore)

REVOCUT™

PRODUCTION TOOL LIFE ↑ 5X

Rough Milling Nodular Iron Differential Carrier

Conditions

- Cutter: 160 mm, 14 teeth, negative
- Insert: 2-sided silicon nitride with 3° x 0.25 mm chamfer
- Coolant: dry
- Depth of Cut (a_p): 3.25 mm [0.128 in]
- Cutting Speed (v_c): 500 m/min [1,640 ft/min] → 1,000 rpm
- Chip Load (f_z): 0.25 mm/tooth [0.010 in/tooth]
- Feed Rate (f_n): 3.5 mm/rev [0.138 in/rev]
- Feed Speed (v_f): 3,500 mm/min [138 in/min]

Results (Replacement of Gen-I)

- Cycle-time reduction of 20%
- Reduction in cutting speed enabled by increased tooth count yielding 5x tool life

REVOCUT™

CYCLE TIME ↓ 43%

Finish Milling Nodular Iron Differential Carrier

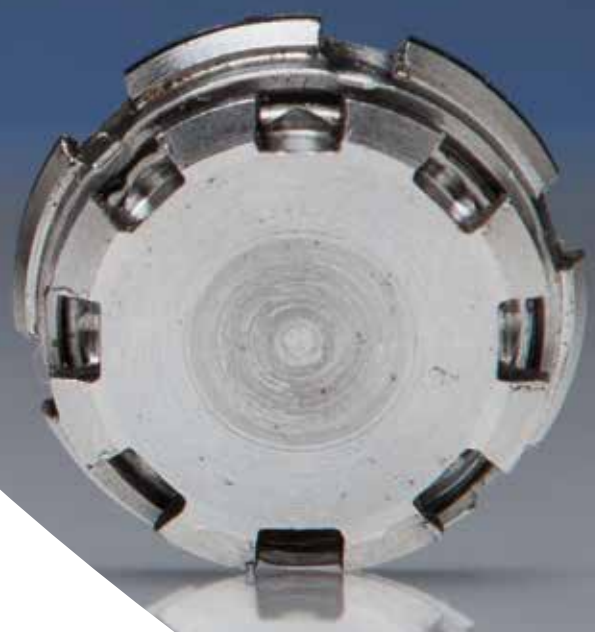
Conditions

- Cutter: 160 mm, 12 primary teeth + 2 adjustable wipers, negative
- Insert (primary): 2-sided coated carbide with positive grind
- Insert (wiper): 8-edged coated carbide
- Coolant: targeted through-spindle
- Depth of Cut (a_p): 0.5 mm [0.020 in]
- Cutting Speed (v_c): 1,000 m/min [3,280 ft/min] → 2,000 rpm
- Chip Load (f_z): 0.25 mm/tooth [0.010 in/tooth]
- Feed Rate (f_n): 3.5 mm/rev [0.138 in/rev]
- Feed Speed (v_f): 7,000 mm/min [276 in/min]

Results (Replacement of Gen-I)

- Same cutting speed and chip load
- 43% reduction in cycle time enabled by increased tooth count plus Chip-Load Leveling™

REVOCUT™



FEED SPEED ↑ 5.2X

Rough Milling High Ni/Cr Turbocharger Housing Face

Conditions

- Cutter: 80 mm, 6 teeth, positive
- Insert: coated carbide
- Coolant: targeted through-spindle
- Depth of Cut (a_p): 2.5 mm [0.100 in]
- Cutting Speed (v_c): 360 m/min [1,180 ft/min] → 1,430 rpm
- Chip Load (f_z): 0.25 mm/tooth [0.010 in/tooth]
- Feed Rate (f_n): 1.5 mm/rev [0.059 in/rev]
- Feed Speed (v_f): 2,150 mm/min [84.6 in/min]

Results

- Feed speed of 5.2x the production rate that yields only 3-4 parts per corner
- Approximately 2-parts equivalent machined with no noticeable wear

REVOCUT™

ABOUT US

Technology at the Cutting Edge

REVOCUT Gen-II is a joint development of Rotary Technologies Corp. and Endres Machining Innovations (EMI).

EMI was founded in 2005 to develop and commercialize game-changing new technologies in the cutting-tool industry.

Complementing EMI's industry-leading R&D is an offering of engineering services, including knowledge-transfer, application development, and machinability testing, all of which support a customer's efforts to reduce cost, improve quality, and reduce time to market.

Endres Machining INNOVATIONS™
Technology at the cutting edge™

1402 East Sharon Ave. Suite 1001 Phone: 906-487-9364
Houghton, MI 49931

20140806

REVOCUT™