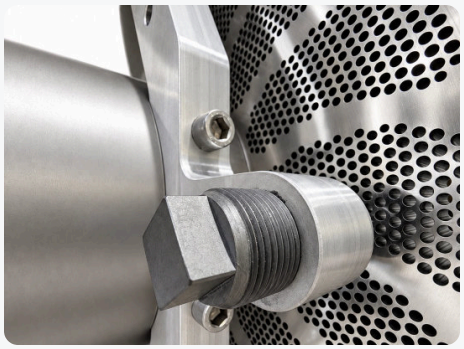
ROTARY III™ · CASE STUDY

ROTARY III™ on an ABS extrusion line: +8.57% saleable output and 5.0% lower resin use.

On a 720 lb/h (327 kg/h) ABS extrusion line operating 350 days per year, replacing intermittent screen changes with a PATT ROTARY III™ constant-pressure screen changer eliminated 1.0 hour/day of downtime, removed an 800 psi (55 bar) pressure swing, increased annual saleable output by 8.57% (+518,112 lb / +235.0 t), and reduced raw resin consumption by 5.0% (302,400 lb / 137.2 t).



ROTARY III™ Precision Rotary Filter Disk · Sizes A–F · 70–17,000 lb/h (30–7,700 kg/h)

+8.57%
Total annual saleable output gain (+518,112 lb / +235.0 t/yr)

−5.0%
Direct raw resin reduction via tighter gauge (302,400 lb / 137.2 t/yr)

+4.17%
Direct uptime recovered (4 × 15 min daily stops eliminated)

−100% ΔP swing
Eliminates 800 psi (55 bar) cyclic pressure climb (2,500→3,300 psi)

Operating baseline: hidden losses between screen changes

A continuous single-screw ABS extrusion line producing 720 lb/h (327 kg/h)—equivalent to 17,280 lb/day (7,838 kg/day) and 6,048,000 lb/year (2,743 metric tons/year) across 350 operating days—relied on intermittent screen changes four times per day. Each change required 15 minutes of production stoppage and stabilization, directly forfeiting 1.0 hour of output every 24 hours (4.17% of scheduled runtime).

Less visible—but even larger—was the throughput penalty caused by rising back-pressure between changes. Starting clean at 2,500 psi (172 bar), head pressure climbed steadily to 3,300 psi (228 bar) before the next swap—an 800 psi (55 bar) differential pressure swing averaging 400 psi (27.6 bar) above clean-screen baseline. As pressure rose, screw back-flow increased, forcing operators to either accept lost throughput or over-gauge sheet/profile dimensions to stay above minimum thickness limits.



Sub-Micron Disk Flatness & 95% Cavity Area: Precision-lapped rotary filter disks maintain metal-to-metal sealing up to 6,500 psi (448 bar) with zero freeze-seal chillers or hydraulic power units.

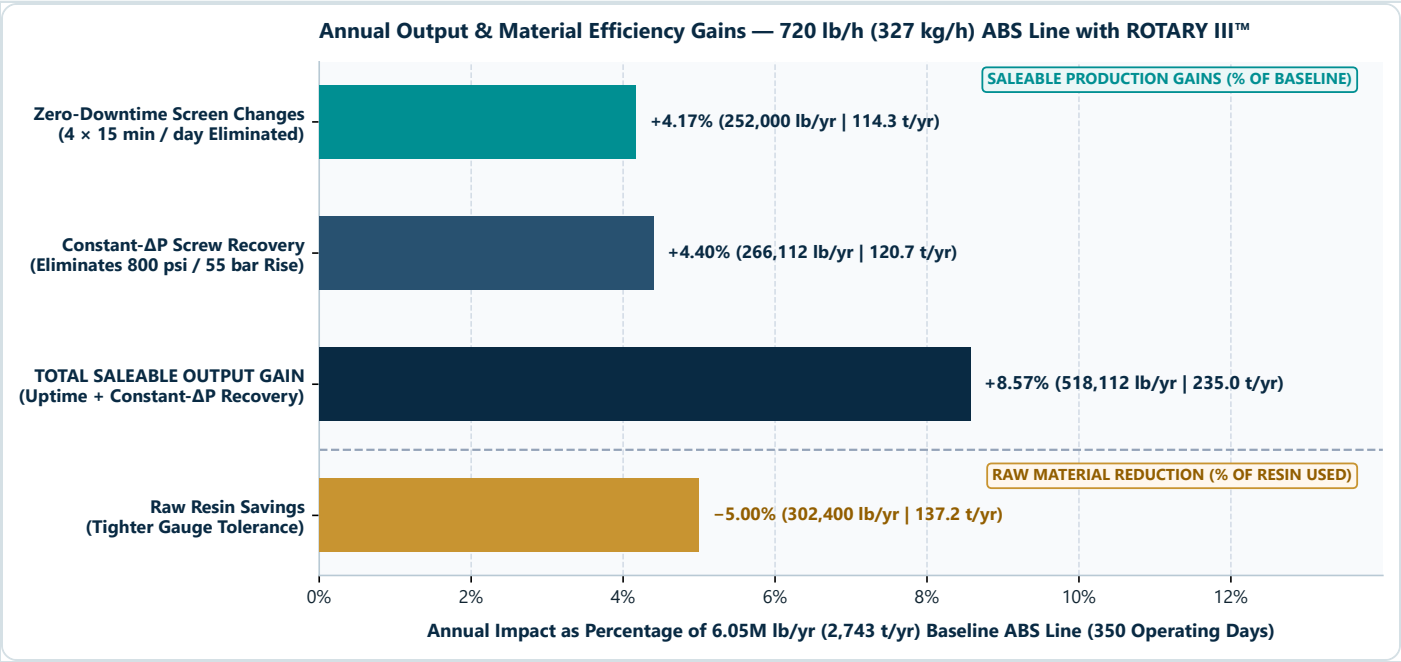


Closed-Loop ΔP Sensing & Indexing: Melt-pressure transducers monitor upstream and downstream pressure continuously so Gen IV control holds ΔP constant and eliminates the 800 psi (55 bar) pressure climb.

Annual output and material efficiency gains

Upgrading to continuous constant-pressure filtration with ROTARY III™ unlocks three compounding operational improvements on the exact same extruder—expressed below

both as percentages of annual line baseline and in dual Imperial/Metric annual tonnage.



All percentages calculated on the measured 6,048,000 lb/yr (2,743 t/yr) ABS line baseline across 350 operating days/year.

Step-by-step engineering calculation breakdown

Measured operating inputs and annual efficiency gains across 350 operating days/year (Metric & Imperial).

Efficiency Driver / Parameter	Measured Operating Basis	% of Annual Baseline	Annual Physical Volume
Production line baseline	ABS · 720 lb/h (327 kg/h) · 350 days/yr	100.0%	6,048,000 lb (2,743.3 t)
1. Zero-downtime screen changes	4 swaps/day × 15 min = 1.0 hr/day recovered	**+4.17% output**	+252,000 lb (+114.3 t)
Eliminated ΔP operating swing	2,500 → 3,300 psi (172 → 228 bar) · 800 psi span	**−100% ΔP climb**	400 psi (27.6 bar) avg. excess ΔP removed
2. Constant-ΔP extruder recovery*	−11% output per 1,000 psi ΔP → 4.40% recovered (31.7 lb/h)	**+4.40% output**	+266,112 lb (+120.7 t)
Total saleable output gain (1 + 2)	**Zero stops + full constant-ΔP screw delivery**	**+8.57% output**	**+518,112 lb (+235.0 t)**
3. Raw resin consumption savings	Tighter dimensional/gauge control under steady pressure (864 lb/day)	**−5.00% resin**	302,400 lb (137.2 t) saved

*Back-pressure throughput loss rate (−11% per 1,000 psi / 69 bar increase) derived from an independent laboratory single-screw extruder performance study.

PLANT VALUE FORMULA — BENCHMARK YOUR OWN LINE

[+8.57% × Annual Saleable Line Margin] + [5.00% × Annual Resin Spend] = Total Annual Economic Impact

Combined production and raw-material efficiency gain equals **~13.6% of annual line volume**—achieved without increasing extruder screw size, drive power, or floor space.

Why all three operational gains stack simultaneously

Conventional screen-changer payback estimates often count only screen-change downtime. In continuous extrusion, stabilizing differential pressure delivers two additional structural gains that compound every shift.

01

Zero-downtime screen renewal (+4.17% uptime)

ROTARY III™ indexes a fresh portion of the rotary filter disk continuously into the melt stream via Gen IV adaptive ΔP control, eliminating all four 15-minute daily stoppages and reclaiming 350 full production hours per year.

02

Full screw pumping efficiency (+4.40% output)

Holding constant differential pressure (±40 psi / ±2.8 bar standard; configurable to ±1 bar / ±14.5 psi) eliminates the 400 psi average back-pressure rise that drives drag-flow slip inside single-screw extruders—restoring 31.7 lb/h (14.4 kg/h) of continuous output.

03

Tighter gauge control (−5.0% resin consumption)

When die inlet pressure no longer cycles by 800 psi (55 bar), downstream product thickness remains steady. Operators can run closer to minimum target gauge specification without risking thin spots, cutting raw ABS consumption by 5.0% per unit produced.

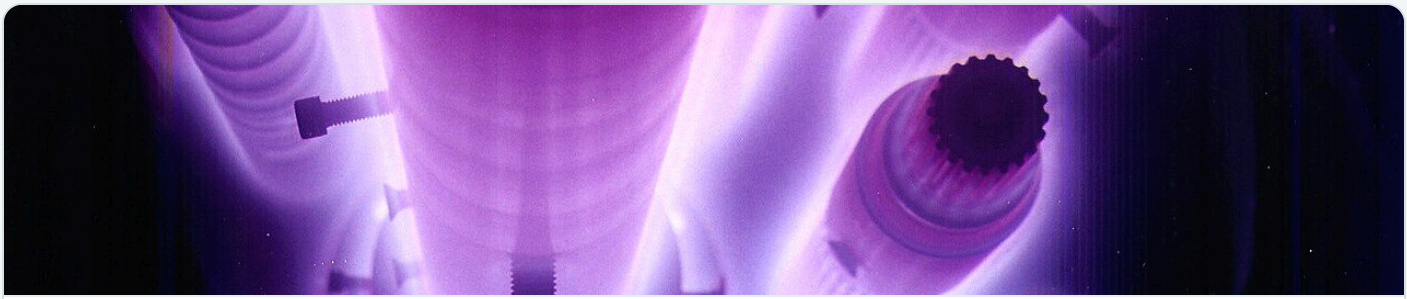
04

95% screen cavity utilization & metal-to-metal sealing

Precision-lapped, pulse-plasma-nitrided sealing surfaces deliver leak-free containment up to 6,500 psi (448 bar) with zero freeze-seal chillers or hydraulic power units, while optional 1.8× wave breaker plates expand active filtration area by 80% in the same line footprint.



In-House CNC Precision Machining: Manufactured under one roof in Saint-Eustache to tight tolerances for leak-free metal-to-metal sealing.



In-House Pulse Plasma Nitriding: Deep 250+ µm diffusion case hardens sliding faces against wear and galling without brittle coatings.



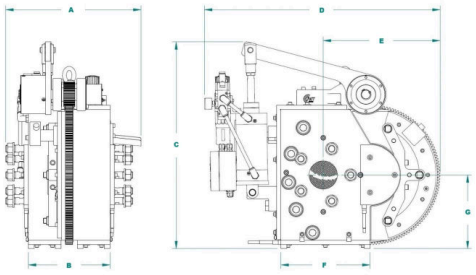
Optional 1.8× Wave Upgrade: Expands active filtration area by +80% in just ≈15 mm (0.59 in) of extra width for finer filtration or higher regrind.

Applying ROTARY III™ to your extrusion line

ROTARY III™ is built in six frame sizes (A–F) covering 10–1,480 cm^2 flat active area (expandable to 2,664 cm^2 / 413 in^2 with 1.8× wave-shaped breaker plates) and throughputs from 70 to 17,000 lb/h (30 to 7,700 kg/h) across blown film, cast film, sheet, pipe, profile, compounding, and recycling lines.

To run a custom percentage output and material-savings calculation for your own line, send your polymer grade, nominal hourly throughput, current screen-change frequency and downtime per swap, clean-to-dirty operating pressure range, and target filtration fineness.

Explore ROTARY III™ A–F specifications & dimensions →



ROTARY III™ Envelope Reference (A–G): Compact installation geometry engineered to drop cleanly into existing single- and twin-screw extrusion lines.