

CASE STUDY #1

Norton Century45 Centerless Grinding Wheels



APPLICATION: **CENTERLESS BAR GRINDING** | MARKET: **INDUSTRIAL**

THE CUSTOMER'S CHALLENGE

This facility grinds long Inconel bars. The performance of their incumbent grinding wheel on this difficult-to-grind alloy was seriously affecting their ability to get this job done in a competitive lead-time and price. The Norton application engineer was brought in to examine their current process and grinding wheels to determine 1. how costs could be cut, 2. while still producing equal or improved part quality over the incumbent, 3. in a safe working environment.

INCUMBENT INFORMATION/PERFORMANCE

Incumbent Wheel: 24" x 20" x 12", 80 grit silicon carbide, resin bond wheel
Stock Removal/Pass: .005"

vs.

NORTON CENTURY45 INFORMATION

Norton Wheel: 24" x 20" x 12" two wheel set, comprised of 10" 32CA60-PB45 and 10" 32CA80-PB45, silicon carbide/aluminum oxide blend, resin bond wheels

MACHINE/HP: Cincinnati Twin Grip 40

COOLANT: Water soluble 5%

PART MATERIAL: Inconel, alloys

PART DIAMETERS: 0.5" - 1.75"

PART LENGTHS: 28"

FINISH REQUIRED: 32 micro-inches

Norton Wheel Achievements

Overall the biggest testimonial for this bond is the amount of stock that the Norton wheel can pull from the Inconel bars. Numerous passes have been eliminated with this new wheel because it pulls twice the stock vs. the incumbent wheel. The increased stock removal and eliminated passes have allowed more competitive grinding – and pricing.

1. The Norton Century45 wheel had a 140% increase in stock removal rate vs. the incumbent wheel: .012" stock removal/pass vs. incumbent's .005" stock removal/pass
2. 100% improvement in life vs. incumbent wheel through a 50% reduction in cycle time
3. Additional operator safety achievement: it was observed that the Norton wheel significantly reduced the noise during grind

Management Assessment

The Norton Century45 wheel produced a total cost reduction of 30%. The reduction in noise also helps to maintain a safer work environment, which manager felt will go a long way in next financial and safety audit.

COMPONENTS	STANDARD PRODUCT	NORTON CENTURY45	NET BENEFIT
Wheel Cost / Annum	\$16,813.88	\$7,686.93	\$9,126.95
Machining Cost / Annum	\$313,868.72	\$224,564.34	\$89,304.04
Wheel Change Cost / Annum	\$672.56	\$302.65	\$369.91
Parts / Wheel (Max)	1,667 Parts	3,704 Parts	+ 2,037 Parts
TOTAL COST:	\$331,355.00	\$232,554.00	= \$98,801.00 (30% Savings)

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CASE STUDY #2

Norton Century45 Centerless Grinding Wheels

APPLICATION: **CENTERLESS BAR GRINDING** | MARKET: **INDUSTRIAL**

THE CUSTOMER'S CHALLENGE

The production foreman was looking for a way to improve his overall bar grinding operation. He thought he could accomplish that with a wheel that will grind more parts, allowing him to minimize downtime and inventory, without compromising part quality. Additionally, the machine operators were complaining that the incumbent wheels are hard to work with. The ideal solution would be to extend wheel life – and require less work from the operators, to keep their production rate high throughout their entire shift.

INCUMBENT INFORMATION/PERFORMANCE

Incumbent Wheel: 24" x 10" x 305mm, 120-grit aluminum oxide/silicon carbide resin bond
 Stock Removal/Pass: .005"



NORTON CENTURY45 INFORMATION

Norton Wheel: 24" x 10" x 305mm, 32AC120-SB45 aluminum oxide/silicon carbide resin bond

MACHINE/HP: 220 Cincinnati/35 HP
 COOLANT: Cimperial 16 Pink
 PART MATERIAL: Titanium
 PART DIAMETERS: 0.118" - 0.500"
 PART LENGTHS: 10' - 12'

Norton Wheel Achievements

The driver really was longer wheel life. Norton Century45 wheels produced a 36% increase in wheel life over the incumbent wheel. And, the part quality was as good as the competition. Also the operator mentioned that he was compensating less with the Norton wheel, which is viewed as a plus by operators and management.

1. The Norton Century45 wheel provided a 17% increase in stock removal rate vs. the incumbent wheel: .006" stock removal/pass vs. incumbent's .005" stock removal/pass

Management Assessment

The production foreman felt that he met his goals and commented that the Norton Century45 wheel is priced competitively, especially given the additional wheel life.

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CASE STUDY #3

Norton Century45 Centerless Grinding Wheels

APPLICATION: **CENTERLESS BAR GRINDING** | MARKET: **INDUSTRIAL**

THE CUSTOMER'S CHALLENGE

This plant manager had been given the mandate from upper management to reduce abrasive costs, in order to decrease overall costs. After studying his operation, the manager and Norton territory manager felt the best way to do that is to reduce the number of passes/part, thereby achieving higher MRR and faster throughput. Because this plant grinds numerous parts, the new wheel has to be able to grind a variety of materials to reduce inventory and ensure operators select the correct wheel for each material ground.

INCUMBENT INFORMATION/PERFORMANCE

Incumbent Wheel: 24" x 8" x 305mm, 46-grit aluminum oxide resin bond
 Stock Removal/Pass: .004"

VS.

NORTON CENTURY45 INFORMATION

Norton Wheel: 24" x 8" x 305mm, 3NQAC36-SB45, ceramic/aluminum oxide/silicon carbide resin bond

MACHINE: Cincinnati #3 / 50 HP

COOLANT: Semi-synthetic 3%

PART MATERIAL: 1045, 10V45, 4140, 17-4

PART DIAMETERS: 3.5" - 7.5"

PART LENGTHS: 12" - 26"

Norton Wheel Achievements

The Norton Century45 B45 bond wheel accomplished the reduced passes goal on a variety of materials and provided a significant improvement in the grinding of 17-4 PH steel bars. Also, operators commented that the Norton wheel ran much cooler than current wheels, improving part finish.

1. The Norton Century45 wheel provided a 25% increase in stock removal rate vs. the incumbent wheel: .005" stock removal/pass vs. incumbent's .004" stock removal/pass
2. The Norton Century45 wheel produced a 32% improvement in G-ratio
3. The Norton wheel also produced a 100% cost/performance improvement over the incumbent
4. Operators observed a reduced grinding sound from the Norton Century45 wheel

Management Assessment

Based on the improvements shown with the Norton wheels, upper management felt that the original goals were met and supported the plant manager's decision to use the Norton wheels.

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CASE STUDY #4

Norton Century45 Centerless Grinding Wheels



APPLICATION: **CENTERLESS BAR GRINDING** | MARKET: **INDUSTRIAL**

THE CUSTOMER'S CHALLENGE

The foreman told the Norton salesperson that he needed to improve MRR and wheel life in his stainless steel operation. When asked why/what was he really trying to accomplish with that goal, the foreman said that he had been challenged to reduce costs and improve the surface finish of the parts ground.

INCUMBENT INFORMATION/PERFORMANCE

Incumbent Wheel: 24" x 8" x 305mm, 46-grit aluminum oxide resin wheel

VS.

NORTON CENTURY45 INFORMATION

Norton Wheel: 24" x 8" x 305mm, 3NQAC54-RB45, ceramic/aluminum oxide/silicon carbide resin bond

MACHINE: Cincinnati #3

PART MATERIAL: 1045, Stainless Steel (300 series), copper

PART DIAMETERS: 1" - 2"

PART LENGTHS: 10' - 12'

Norton Wheel Achievements

1. The Norton Century45 wheel provided a 243% increase in G-ratio over the incumbent
2. Improved surface finish was observed across the surface of the bar

Management Assessment

The foreman felt that the Norton wheels met his ultimate goal and believes this should bring in additional business, especially when customers observe the improved finish.

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