

MICRO AND FINE MILLING



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Made in the USA

## Applications and Advantages

### THE PROBLEM:

Limited state funding for road maintenance programs have forced public agencies to look at other alternatives such as thin lift asphalt treatments, micro surfacing and slurry seals. Thinner lifts require a smoother surface.

### THE SOLUTION:



Micro Milled Surface



Standard Milled Surface

Micro milling allows agencies to combine the benefits of milling such as restoring ride and providing a better bonding surface to thin lift treatments, typically not possible with a standard milled surface. Micro milling reduces the costly fill expense seen in standard milling. The smoother surface dramatically reduces both tack coat and fill required with a standard milled surface.

### THE APPLICATIONS:

**SURFACE TREATMENTS: THIN LIFT OVERLAY/ MICROSURFACING / SLURRY OVERLAYS** Improve ride, restore curb line, provide a better bond

**SURFACE / FRICTION COURSE REMOVAL** Remove and replace only what is needed

**CORRECTIONAL WORK** Less material required, easier to match multiple passes

**SURFACE PREP BEFORE OVERLAY** Line removal and RAP creation

**FAULTED CONCRETE CORRECTION** Cost effective method for correcting faulted concrete

**WHEEL RUT REMOVAL** Provides a temporary solution for wheel rutted streets

**INCREASED SKID NUMBERS** Provides a temporary improvement in skid resistance

**PROVIDE TEMPORARY DRIVING SURFACE** A smoother surface is a safer surface

**BRIDGE DECK REPAIR** Ease and uniformity of membrane removal

**IN-FIELD CRUSHING** Generates smaller gradation reducing crushing cost

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### THE BENEFITS:

- IMPROVED RIDE!
- REDUCTION IN MATERIAL COST!
- REDUCTION IN CONSTRUCTION COST!
- SAFER DRIVING SURFACE!
- REDUCTION IN RAP PROCESSING COST!
- ENHANCES THE LIFE CYCLE OF THE PAVEMENT- BETTER DENSITY!



Keystone Micro Mill Drum at 100'/min

#### Fine Milling

- Roughly twice the number of bits as a standard drum
- Performance based tests should be used to measure surface texture smoothness
- Best if used in 2-3" milling depths, single lift 2-3" mill and fill jobs

#### Micro Milling

- Roughly three times the number of bits as a standard drum
- Tighter performance based tests should be used to measure surface texture smoothness
- Best if used in 0-2" milling depths, when surface texture matters the most



Micro Milled Surface Fine Milled Surface



Up-close Micro Milled Surface



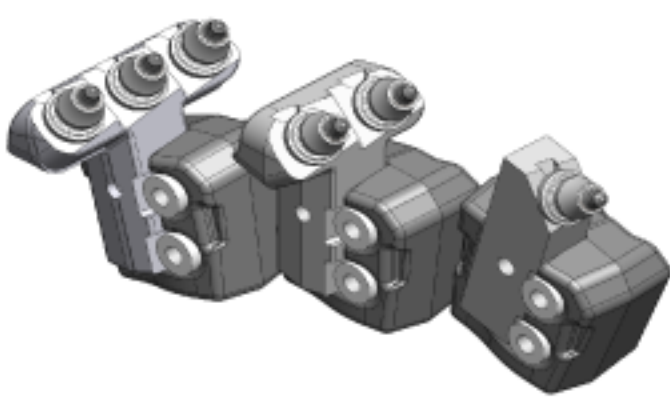
Micro Milled Surface-Ready for Traffic



RAP Produced with Micro Milling



## Wedge Lock Quick-Change System

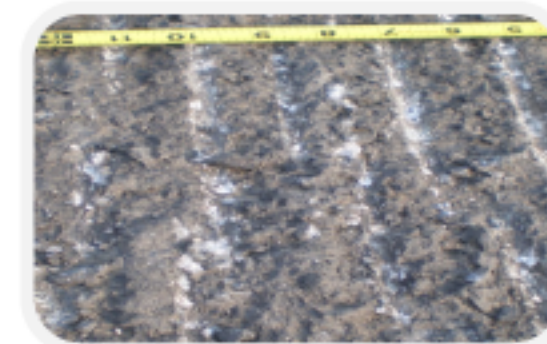


- Interchangeable toolholders allow contractors to switch from standard milling drum to fine or micro milling drum simply by changing toolholders.
- Tapered wedge locking system and precision machined parts insure uniform gauge length throughout the entire length of drum (unlike Morse Taper quick-change systems).
- Interchangeable toolholders allow contractors to vary bit count to achieve smaller or larger gradation.
- Has two to three times more space between the wraps compared to all other fine and micro mill drums, increasing production by providing extra room for material flow.
- Base blocks are designed to last the life of the machine making it the most durable quick-change system on the market.

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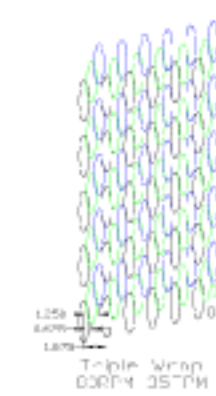
## WRAP DESIGN AND MICRO MILLING

### The Effect of Forward Cutting Speed on Surface Pattern



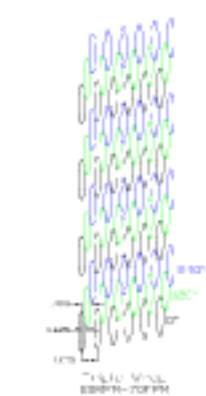
¾" standard triple wrap drum at 60'/min shows surface strikes at ¾", 1 ¼" and 1 ¾" (15mm, 30mm 45mm)

### Wrap Design Technology to Minimize Forward Cutting Speeds Effect



#### Standard ¾" (15mm) Triple Wrap Drum

- Speed is a much larger factor on surface texture.
- Pattern is uneven and choppy at common operating speeds.



#### Keystone's 2R<sup>2</sup> Wrap Drum

- Pattern is uniform at different cutting speeds.
- Bit consumption decreases with repeating bit design.
- Material sizing is smaller.



.31" (8mm) Triple Wrap Fine Mill Drum (300 tools) vs. 2R<sup>2</sup> Standard Drum (200 tools)

-More tools do not guarantee a smoother surface.



.47" (12mm) 2R<sup>2</sup> Fine Mill Drum vs. .31" (8mm) Triple Wrap Drum at same cutting speed

-Tighter drum spacing does not guarantee smoother surface patterns.