# MAQ Diamond Burnishing Tool Quick-Start Guide

## 1. Purpose

Achieve mirror-quality surface finish in a single pass – even in bores up to 15×D – using the MAQ diamond burnishing tool. This process improves surface finish through cold plastic deformation without removing material.

- 2. Compatible Materials
- Carbon steels
- Tool steels
- Cast irons
- Ferrous & non-ferrous alloys (ISO groups P, M, K, N, S)

#### 3. Pre-Burnish Requirements

- Previous turning operation should leave  $Ra \le 1.6 \mu m (64 \mu in)$
- Ensure no hard scale or built-up edge is present prior to burnishing





## 4. Initial Machine Settings

Parameter	Recommended Range	Starting Value	Notes
Interference (tool radial penetration)	0.05–0.20 mm (0.002–0.008 in)	0.10 mm (0.004 in)	Increase gradually if required to reach target Ra. Ensure not to exceed material yield limits.
Cutting speed	60–230 m/min (200–750 SFM)	Match the speed used in the final turning pass	Maintain stable RPM for consistent finish.
Feed rate	0.08–0.15 mm/rev (0.003–0.006 IPR)	~70 % of the turning- pass feed	Excessive feed may reduce surface quality.

#### Quick Rules of Thumb

- 1. Speed: Match the final finishing-turn speed
- 2. Feed: Begin at ~70 % of the turning feed
- 3. Interference: Start at 0.10 mm (0.004 in); adjust incrementally

## 5. Expected Results

- Typical post-burnish roughness:  $Ra \le 0.3 \mu m (12 \mu in)$
- Minimal dimensional change: Typically within 10–15  $\mu m$  (0.0004–0.0006 in), depending on material and process parameters
- Especially on precision bores, size change is negligible as material is plastically displaced rather than removed
- Validated on STMD tools for mirror-finish results in bores up to 15× tool diameter



## 6. Additional Tips

- Use adequate coolant or lubrication to prevent built-up edge and overheating
- Ensure correct tool alignment misalignment affects surface finish and dimensional stability
- For softer or ductile materials, reduce feed or use smaller interference increments to control deformation
- Avoid burnishing interrupted surfaces such as keyways, grooves, or threads

### 7. Safety & Maintenance

- Inspect the diamond tip regularly for wear or chipping. Replace when needed
- Follow standard machine-tool safety procedures, including eye protection, proper clamping, and chip evacuation
- Store the burnishing tool in a clean, protected environment to preserve tool integrity

