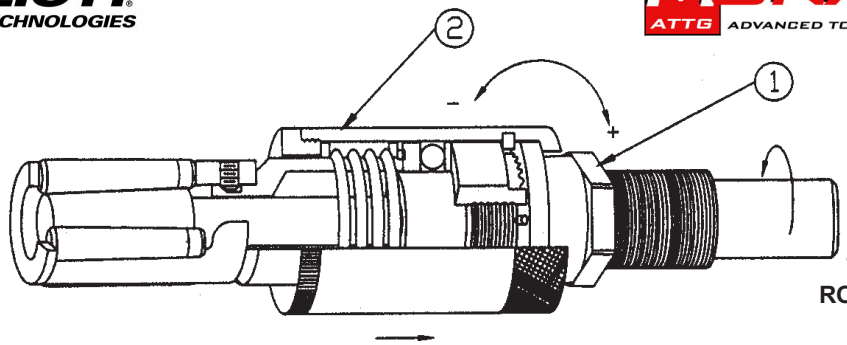
ELLIOTT TOOL TECHNOLOGIES

MONAGHAN & Associates, Incorporated
ATTG ADVANCED TOOLING TECHNOLOGY GROUP

TM-21



SETTINGS AND OPERATING INSTRUCTIONS

Monaghan roller burnishing tool

Setting the Burnishing Tool

Loosen the lock nut (1). Pull back the spring-loaded housing (2). Turn the housing left to increase the diameter or right to decrease the diameter. Adjust the diameter of the tool so that the rolls clear the surface to be burnished. Change the diameter of the tool while sliding the tool into (or onto) the workpiece. When the rolls come into contact with the surface, the tool is then adjusted for the stock allowance, desired dimensional accuracy and surface finish. Then, tighten the lock nut. The final setting can then be determined by burnishing a workpiece and measuring the size and surface finish. Do not burnish the test piece more than twice due to work-hardening of the material. This may cause flaking and incorrect tool setting. Loosen the lock nut again to make any further adjustments. When the exact stock allowance has been determined, tighten the lock nut (located behind the housing).

Note: On self-feeding tools, the feed rate on the machine must be equal to or greater than the feed rate chart minimum settings (see other side).

Caring for the Roller Burnishing Tool

A continuous stream of clean lubricant, in sufficient volume to clean and flush the tool and workpiece, should be provided during operation. In drill press operation without coolant capabilites, brush a sufficient amount of lubricant onto tool or part.

Use any standard grade of lightweight, low-viscosity lubricating oil for most metals. For aluminum or magnesium alloys, a highly refined paraffin base oil of low viscosity will work well. However, it is more desirable to provide a sufficient flow of lubricant to keep the tool from loading up with grit. Water-soluble liquids are acceptable.

Without filtration, chip particles flushed into the area to be burnished can distort the bore and mar the fine finish. The lower the required micro-finish, the more important it is to filter the lubricant. A low micron filter is recommended.

When properly used, the roller burnishing tool requires only routine maintenance. Rolls, cages and mandrels should be examined at regular intervals and replaced when necessary. It is always advisable to replace a complete set of rolls since there will be some sacrifice of tolerance and finish quality if new and used rolls are operated simultaneously.

When storing the tool, dip it in oil and wrap it in wax paper or similar protective material to prevent rusting. Before returning it to service, check the rolls and mandrel carefully for possible pitting or rusting. Replace parts as necessary.

It is important that the tool and workpiece be properly aligned. A minimal misalignment of .003” to .004” will not adversely affect the tool or the surface finish. If the tool alignment deviates more than .005” from the axis of the workpiece, bending stresses can occur. This could lead to fatigue failure of the mandrel tip. Correct alignment is more important when the tool rotates. The tool shank should be rigidly mounted in the spindle in order to prevent axial movement during the release cycle. This is particularly important in the case of large, heavy tools that work in a vertical position. In multiple-spindle automatics, the roller burnishing tool should be mounted in a top position in order to minimize chip contamination from other metal cutting operations. When a tool is used in a horizontal plane, entry into the part may be critical due to acceptance tool range built into the tool. If possible, a generous chamfer lead-in workpiece relieves the problem.

RECOMMENDED FEEDS AND SPEEDS

INTERNAL TOOLS

HOLE SIZE	INCH PER REV. MIN.	INCH PER REV. MAX.	SPEED REV/MIN.	HOLE SIZE	INCH PER REV. MIN.	INCH PER REV. MAX.	SPEED REV/MIN.
0.125	0.004	0.006	1500	2.250	0.060	0.090	170
0.187	0.004	0.006	1500	2.500	0.066	0.099	170
0.250	0.006	0.008	1500	2.750	0.043	0.064	170
0.375	0.009	0.013	1000	3.000	0.045	0.067	120
0.500	0.011	0.016	1000	3.250	0.049	0.073	120
0.625	0.015	0.022	600	3.500	0.059	0.088	120
0.750	0.018	0.027	600	3.750	0.062	0.093	100
0.875	0.020	0.030	600	4.000	0.065	0.097	100
1.000	0.026	0.039	600	4.250	0.071	0.106	100
1.250	0.038	0.057	300	4.500	0.072	0.108	85
1.500	0.045	0.067	300	4.750	0.078	0.117	85
1.750	0.046	0.069	300	5.000	0.081	0.121	85
2.000	0.056	0.084	200	5.500	0.093	0.140	75

Tools supplied with non-feed cages (full bottom tools) must be machine-fed. Suggested machine settings shown in the table are approximate. Always set the machine faster than the feed rate of the burnishing tool. Speed can be adjusted upward 25% to 50%.

STOCK ALLOWANCE/SURFACE FINISH CHART

	Workpiece Size Range	Internal Surfaces			External Surfaces		
			Surface Finish			Surface Finish	
		Stock Allowance	Machined	Roller Burnished	Stock Allowance	Machined	Roller Burnished
High Ductility	.125 to .484	0.0004 0.0007	80 125	8 8	0.0004 0.0005	80 100	8 8
	.500 to 1.000	0.0007 0.0015	60 125	8 8	0.0005 0.001	60 180	8 8
	1.031 to 2.000	0.001 0.002	60 125	8 8	0.0007 0.001	100 180	8 8
	2.031 to 6.500	0.0015 0.002 0.003	60 125 200	8 8 8	0.001 0.0015 0.002	125 300 500	8 8 8
Low Ductility	.125 to .484	0.0004 0.0007	80 100	18 18	0.0003 0.0005	60 90	18 18
	.500 to 1.000	0.0007 0.001	90 125	18 18	0.0005 0.0007	100 140	18 20
	1.031 to 2.000	0.001 0.0015	125 180	18 20	0.0005 0.001	100 180	18 20
	2.031 to 6.500	0.0015 0.002	120 200	18 24	0.001 0.0015	125 200	18 20

High ductility materials have more than 18% elongation and less than Rc 32. They include: annealed steel, stainless steel, aluminum, brass, bronze and malleable iron.

Low ductiliy materials have less than 18% elongation and a maximum hardness of Rc 40. They include: grey cast iron, modular iron, heat treated steel, magnesium alloys and hard copper alloys.

Stock allowances are based on an 8 to 180 microinch surface finish consisting of uniform peaks and valleys. The amount of stock allowance varies with job conditions, material properties, wall thickness, nature of machined surface and quality of surface finish desired. The figures shown in the chart should be used as a starting point for part preparation because of the many variables involved in machining. Determine the allowance by using these starting figures and roller burnish a workpiece to the desired finish and dimensions.

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