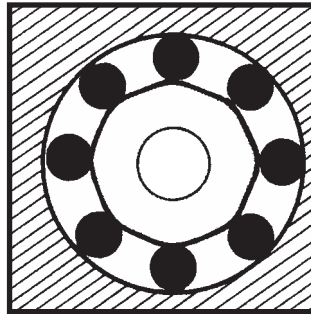


## Bearingizing tools

*The Bearingizing Tool combines roller burnishing with peening action. As the tool is rotated at a high speed the rolls spin, rise, and fall over a cammed arbor, delivering up to 200,000 rapid fire blows per minute to the work surface. The peaks and valleys of the machined surface are compacted into a smooth, hardened, and ultrafine surface finish.*



The Bearingizer *may* be the tool of choice where the following conditions exist:

- Parts with *thin walls* — Bearingizing eliminates barrel-shaping of the part.
- Parts with *irregular wall thicknesses* — the Bearingizing tool will produce a very round hole, whereas the Roll-a-Finish™ tool might generate a slightly egg-shaped hole, due to variations in wall thickness.
- Applications where *porosity* is an issue (e.g., oil-impregnated bearings) — the smaller “footprint” of the Bearingizing roll leaves pores in the surface intact.
- Applications where *very tight tolerances* must be held — the Bearingizer reduces springback in the work surface material. The Bearingizing tool can, in some materials and with proper part preparation, hold size as close as  $\pm .002\text{mm}$  (.0001 inch), while the Roll-a-Finish tool can achieve tolerances of  $\pm .006\text{mm}$  (.00025 inch).

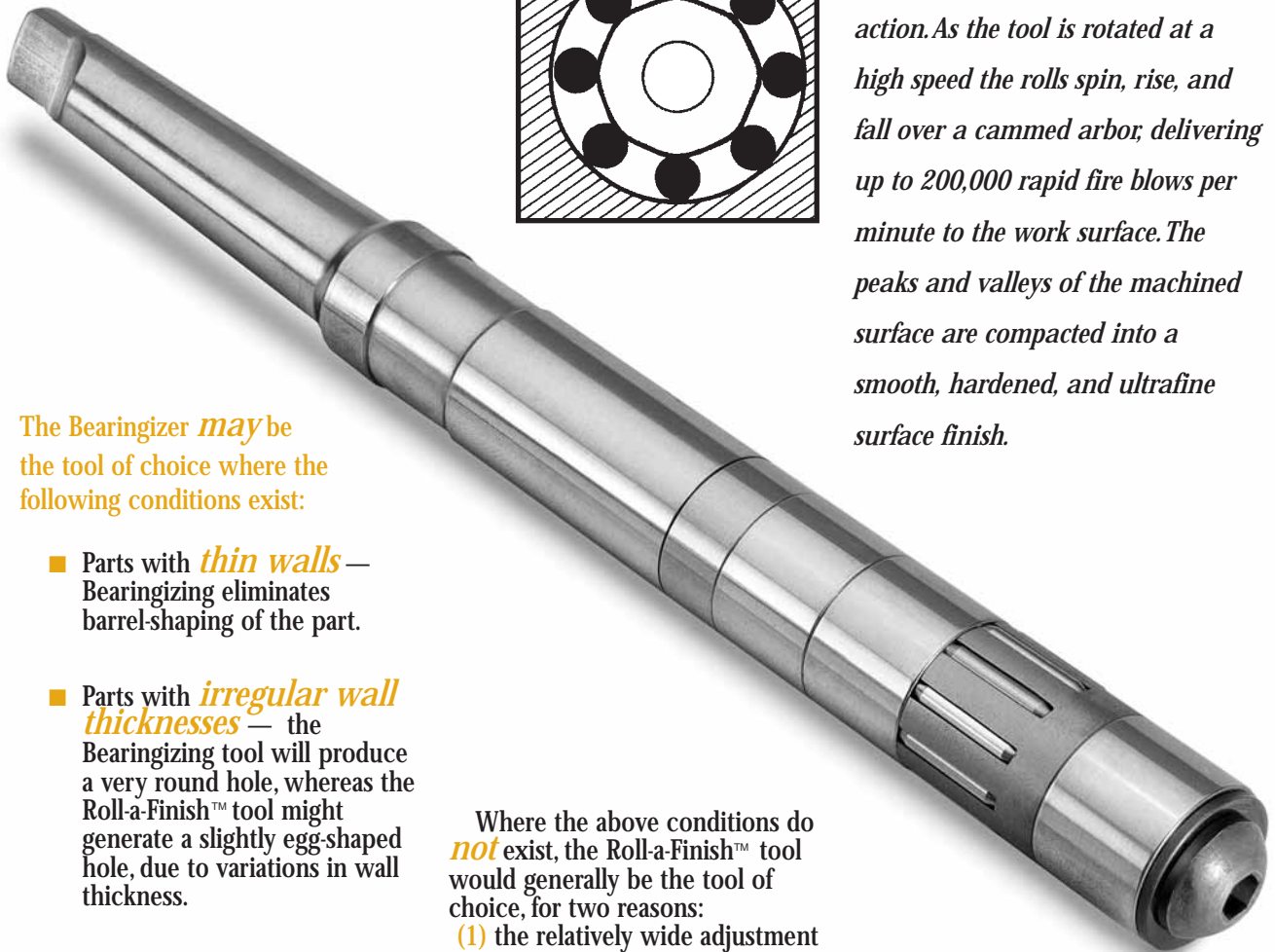
Where the above conditions *not* exist, the Roll-a-Finish™ tool would generally be the tool of choice, for two reasons:

- (1) the relatively wide adjustment range of the Roll-a-Finish tool, which is typically 1.01mm (.040 inch), and
- (2) the ease of adjustment, with the castellated adjusting collar on the Roll-a-Finish tool.

The Bearingizing tool features a greater number of rolls, and rolls of a smaller diameter, as compared to the Roll-a-Finish tool, and can only be adjusted by change of rolls. The Bearingizer also requires a closer presize than the Roll-a-Finish tool.

But where the above conditions *do* exist, the Bearingizing tool should be considered.

While the Roll-a-Finish Tool increases surface hardness by about 5 to 10%, Bearingizing increases hardness by 10 to 30%, but with less surface penetration.

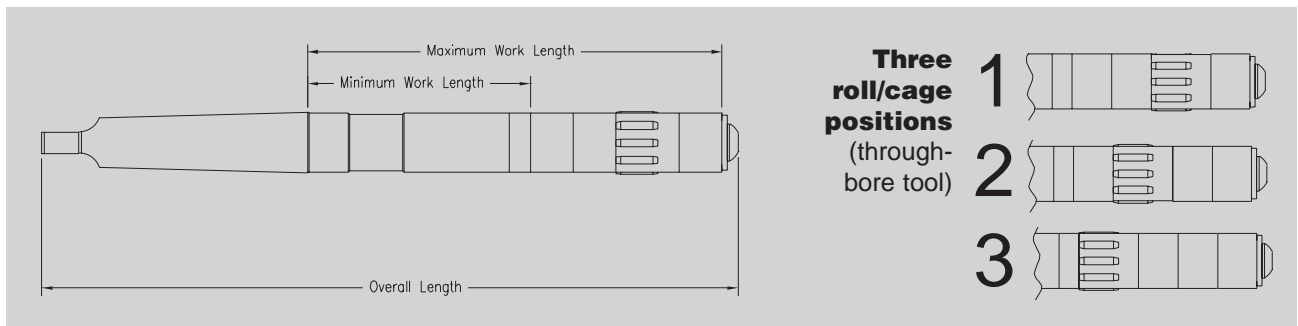


# Standard tool specifications

Bearingizing tools provide three roll positions over the cammed arbor (see below). When the forward (#1 position) of cam becomes worn, the roll cage can be repositioned to the #2 and #3 positions by exchanging positions with the moveable collars. This presents NEW cam surfaces and original BUILD-UP. After all positions

on the cam are worn beyond producing acceptable parts, oversize rolls can be used to further extend tool life. Roll sizes are available in increments of .0025 mm (.0001inch) and the tool will accommodate a range of roll sizes up to .0508 mm (.002 inch).

For through-hole, semi-bottoming, or bottoming applications.



## Bearingizing Tools 4.76 to 31.75 mm (.188 to 1.250 in.)

NOMINAL TOOL SIZE		BUILD-UP RANGE		CAM DIAMETER		SHANK	OVERALL LENGTH		WORK LENGTH				NO. OF ROLLS
MM	INCHES	MM	INCHES	MM	INCHES		MM	INCHES	MAXIMUM		MINIMUM		
4.76	.188	4.727 4.829	.1861 .1901	3.254	.1281	#1 MT	139.7	5.5	74.61	2.938	55.56	2.188	6
5.56	.219	5.522 5.624	.2174 .2214	4.049	.1594	#1 MT	139.7	5.5	74.61	2.938	55.56	2.188	6
6	.236	5.951 6.053	.2343 .2383	4.242	.1670	#1 MT	152.4	6	87.31	3.438	60.32	2.375	6
6.35	.250	6.314 6.416	.2486 .2526	4.587	.1806	#1 MT	152.4	6	87.31	3.438	60.32	2.375	6
7	.276	6.967 7.069	.2743 .2783	5.243	.2064	#1 MT	152.4	6	87.31	3.438	58.74	2.313	6
7.14	.281	7.109 7.211	.2799 .2839	5.382	.2119	#1 MT	152.4	6	87.31	3.438	58.74	2.313	6
7.94	.313	7.904 8.006	.3112 .3152	5.618	.2212	#1 MT	152.4	6	87.31	3.438	58.74	2.313	6
8	.315	7.968 8.069	.3137 .3177	5.667	.2238	#1 MT	152.4	6	87.31	3.438	58.74	2.313	6
8.73	.343	8.700 8.801	.3425 .3465	6.414	.2525	#1 MT	177.8	7	112.71	4.438	77.79	3.063	6
9	.354	8.966 9.068	.3530 .3570	6.683	.2631	#1 MT	177.8	7	112.71	4.438	77.79	3.063	6
9.53	.375	9.495 9.596	.3738 .3778	6.396	.2518	#1 MT	177.8	7	112.71	4.438	79.38	3.125	6
10	.394	9.970 10.071	.3965 .3925	6.871	.2705	#1 MT	177.8	7	112.71	4.438	79.38	3.125	6
10.32	.406	10.290 10.391	.4051 .4091	7.191	.2831	#1 MT	203.2	8	138.11	5.438	90.49	3.563	6
11	.433	10.973 11.074	.4320 .4360	7.059	.2779	#1 MT	203.2	8	138.11	5.438	93.66	3.688	6
11.11	.438	11.087 11.189	.4365 .4405	7.176	.2825	#1 MT	203.2	8	138.11	5.438	93.66	3.688	6
11.91	.469	11.882 11.984	.4678 .4718	7.971	.3138	#1 MT	203.2	8	138.11	5.438	93.66	3.688	8
12	.472	11.963 12.065	.4710 .4750	8.062	.3174	#1 MT	203.2	8	138.11	5.438	93.66	3.688	8

# Standard tool specifications

Bearingizing Tools 4.76 to 31.75 mm (.188 to 1.250 in.)

NOMINAL TOOL SIZE		BUILD-UP RANGE		CAM DIAMETER		SHANK	OVERALL LENGTH		WORK LENGTH				NO. OF ROLLS
MM	INCHES	MM	INCHES	MM	INCHES		MM	INCHES	MAXIMUM		MINIMUM		
									MM	INCHES	MM	INCHES	
12.7	.500	12.675 12.776	.4990 .5030	8.763	.3450	#1 MT	203.2	8	138.11	5.438	93.66	3.688	8
13	.512	12.979 13.081	.5110 .5150	9.063	.3568	#1 MT	203.2	8	138.11	5.438	93.66	3.688	8
13.49	.531	13.470 13.571	.5303 .5343	9.558	.3763	#1 MT	203.2	8	138.11	5.438	93.66	3.688	8
14	.551	13.970 14.072	.5500 .5540	10.063	.3962	#1 MT	203.2	8	138.11	5.438	93.66	3.688	8
14.29	.563	14.262 14.364	.5615 .5655	10.351	.4075	#1 MT	203.2	8	138.11	5.438	93.66	3.688	8
15	.591	15.077 14.976	.5936 .5896	11.064	.4356	#2 MT	203.2	8	123.83	4.875	79.38	3.125	8
15.09	.594	15.057 15.159	.5928 .5968	11.146	.4388	#2 MT	203.2	8	123.83	4.875	79.38	3.125	8
15.87	.625	15.850 15.951	.6240 .6280	10.151	.4390	#2 MT	203.2	8	123.83	4.875	79.38	3.125	8
16	.630	15.977 16.078	.6290 .6330	11.275	.4439	#2 MT	203.2	8	123.83	4.875	79.38	3.125	8
16.67	.656	16.645 16.746	.6553 .6593	11.946	.4703	#2 MT	203.2	8	123.83	4.875	79.38	3.125	8
17	.669	16.967 17.069	.6680 .6720	12.276	.4833	#2 MT	203.2	8	123.83	4.875	79.38	3.125	8
17.46	.688	17.437 17.539	.6865 .6905	12.738	.5015	#2 MT	203.2	8	123.83	4.875	79.38	3.125	8
18	.709	17.983 18.085	.7080 .7120	13.277	.5227	#2 MT	203.2	8	123.83	4.875	79.38	3.125	10
18.26	.719	18.232 18.334	.7178 .7218	13.533	.5328	#2 MT	203.2	8	123.83	4.875	79.38	3.125	10
19	.748	18.974 19.075	.7470 .7510	14.275	.5620	#2 MT	203.2	8	123.83	4.875	79.38	3.125	10
19.05	.750	19.025 19.126	.7490 .7530	14.326	.5640	#2 MT	203.2	8	123.83	4.875	79.38	3.125	10
19.84	.781	19.820 19.921	.7803 .7843	15.121	.5953	#2 MT	203.2	8	123.83	4.875	79.38	3.125	10
20	.787	19.964 20.066	.7860 .7900	15.276	.6014	#2 MT	203.2	8	123.83	4.875	79.38	3.125	10
20.64	.813	20.612 20.714	.8115 .8155	15.913	.6265	#2 MT	203.2	8	123.83	4.875	79.38	3.125	10
21	.827	20.980 21.082	.8260 .8300	15.276	.6408	#2 MT	203.2	8	123.83	4.875	79.38	3.125	10
21.43	.844	21.407 21.509	.8428 .8468	15.133	.5958	#2 MT	228.6	9	149.23	5.875	95.25	3.75	10
22	.866	21.971 22.076	.8650 .8690	15.700	.6181	#2 MT	228.6	9	149.23	5.875	95.25	3.75	10
22.22	.875	22.200 22.301	.8740 .8780	15.926	.6270	#2 MT	228.6	9	149.23	5.875	95.25	3.75	10
23	.905	22.987 23.087	.9050 .9090	16.721	.6583	#3 MT	254.0	10	155.58	6.125	101.60	4.00	10
23.02	.906	22.995 23.096	.9053 .9093	16.721	.6583	#3 MT	254.0	10	155.58	6.125	101.60	4.00	10
23.81	.938	23.787 23.889	.9365 .9405	17.513	.6895	#3 MT	254.0	10	155.58	6.125	101.60	4.00	10
24	.945	23.978 24.078	.9440 .9480	17.701	.6969	#3 MT	254.0	10	155.58	6.125	101.60	4.00	10
24.61	.969	24.582 24.684	.9678 .9718	18.308	.7208	#3 MT	254.0	10	155.58	6.125	101.60	4.00	12
25	.984	24.968 25.070	.9830 .9870	18.702	.7363	#3 MT	254.0	10	155.58	6.125	101.60	4.00	12
25.4	1.000	25.375 25.476	.9990 1.0030	19.101	.7520	#3 MT	254.0	10	155.58	6.125	101.60	4.00	12
26.99	1.063	26.962 27.064	1.0615 1.0655	20.688	.8145	#3 MT	254.0	10	155.58	6.125	101.60	4.00	12
28.57	1.125	28.550 28.651	1.1240 1.1280	22.276	.8770	#3 MT	254.0	10	155.58	6.125	101.60	4.00	12
30.16	1.188	30.137 30.239	1.1865 1.1905	23.863	.9395	#3 MT	254.0	10	155.58	6.125	101.60	4.00	12
31.75	1.250	31.725 31.826	1.2490 1.2530	23.851	.9390	#4 MT	279.4	11	155.58	6.125	101.60	4.00	14

*Tools for hole diameters from 31.75 to 50.8mm (1.250 to 2.000 inches) are non-stocked standards; tools above 50.8mm (2.000 inches) are special. Shanks other than shown above are available upon request.*



## Operation & maintenance

### Machines

Any machine capable of rotating the tool — e.g. drill press, speed lathe, or turret lathe — may be used.

### Material

Any ductile or malleable material — powdered, laminated, cast, forged, extruded, sintered or hardened (maximum Rc 38) can be bearingized. Steel, stainless, alloy, cast iron, aluminum, copper and brass are examples.

### Procedure

Proper part preparation is essential in order to obtain precise results. Cogsdill will recommend the surface preparation and amount of stock to leave for Bearingizing, but some trials may be required to determine these factors for optimum results.

Since the change in dimension is partly governed by the character of the prepared surface, usually coarser preparation will permit a greater change in dimension than is possible with finer preparation. The consistent pattern obtained from boring will produce the best finish.

The other major factor in dimensional change is the ability of the material to grain-flow without flaking. The total change may vary from .0025mm (.0001 inch) on harder materials to as much as .0762mm (.003 inch) on sintered self-lubricating bushings. Less than .0254mm (.001 inch) stock for Bearingizing generally provides a good starting point for trials.

### Tool diameter changes

Bearingizing rolls are manufactured in increments of .0025mm (.0001 inch). Bearingizing Tools are adjustable by roll change only. One set of rolls can be removed and a new set of a different size installed, thus effectively changing the size of the tool — or compensating for tool wear. The working diameter of any tool can be changed over an approximate .1016mm (.004 inch) range by installing different sets of rolls. The rolls are diametrically opposed and available in .0025mm (.0001 inch) increments, therefore the effective tool diameter can be changed in .0051mm (.0002 inch) increments. (Refer to preceding page “Ordering Stocked Tools.”)

### Lubrication

For most metals use any standard grade of lightweight, low viscosity lubricating oil, or any mineral, sulphur or soluble oil that is compatible with the alloy or metal to be burnished and is recommended for fine surface finishing.

For aluminum or magnesium alloys, use a highly refined oil-based coolant with low viscosity.

For cast iron a mineral seal or water soluble solution is ideal — flooding the part is recommended.

### Cleaning

The Bearingizing tool should be cleaned periodically with a light-bodied oil of about 100 Saybolt universal scale, similar to a light spindle oil. A few drops applied with squirt can or brush to the rolls and cage (with cage stopped) will wash metal dust particles out when tool is operated, keeping the cam surfaces and roll pockets clean.

bearingizing  
tools