

Roller Burnishing Tools

The company DREX®-TOOLS has since 1980 a great experience in the fields of the burnishing. The company, with the support of technical assistance with big experience has created a new line of tools. This is due to the continuous improvement that the market demands and also to new needs of our customers. As a result of this, we are now able to offer on the worldwide market innovative products of valuable quality, that can provide the company several advantages for what concern the relation time/money. Thanks to its multiyear experience in the field of the burnishing, DREX®-TOOLS is become an important referring point for the roller burnishing tools technology.



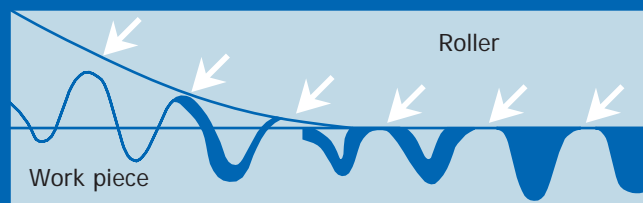
- Accurate tolerance of the size and the taper.
- Fast and accurate adjustment mechanism.
- Fast execution of the processing in one single pass.
- Precise and mirror-like finishing of the surface.
- Suitable to lathes, boring machines, drilling and CNC machines.

Roller burnishing tools technology

The roller burnishing is a cold working process which produces a fine surface finished by the planetary rotation of hardened rolls over a bored or turned metal surface, improving the surface finishing.

In the burnishing process, the pressure generated by the rolls on the touch-point of a surface, generates a small deformation of the surface's structure of the part. Since all machined surfaces consist of a series of peaks and valleys of irregular height and spacing, the plastic deformation created by the roller burnishing is a displacement of the material in the peaks which cold flow under pressure into the valleys. The result is a mirror-like finishing with a tough, work hardened, wear and corrosion resistant surface.

The roller burnishing pressure required depends from a number of factors like ductility and tensile strengths of the material, surface roughness before and after roller burnishing, and diameter and shape of the rolls.



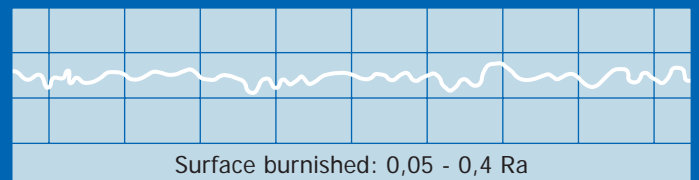
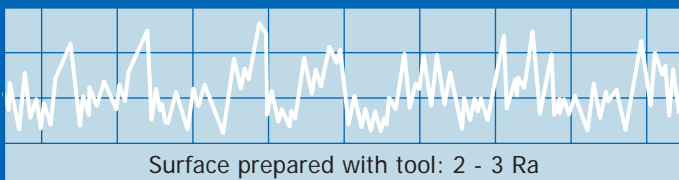
Advantages of roller burnishing

With the roller burnishing a high surface finishing can be obtained on a lot of metals. Bored or turned surfaces with a superficial roughness of 3 RA can be finished at 0,4 - 0,05 RA in only one single pass. Roller burnishing replaces grinding, honing, lapping and other expensive secondary operations.

A micrometrical adjustment system permit the setting of the tool with small increments in order to cover the tolerance range of any part.

Depending on the type of the material, the surface hardness can be increased to more than 10 RC by burnishing and also the resistance becomes more high.

With roller burnishing tools it is possible to work a big quantity of pieces. In many cases rolls and cones hold the sizes through 15.000 to 20.000 operations.



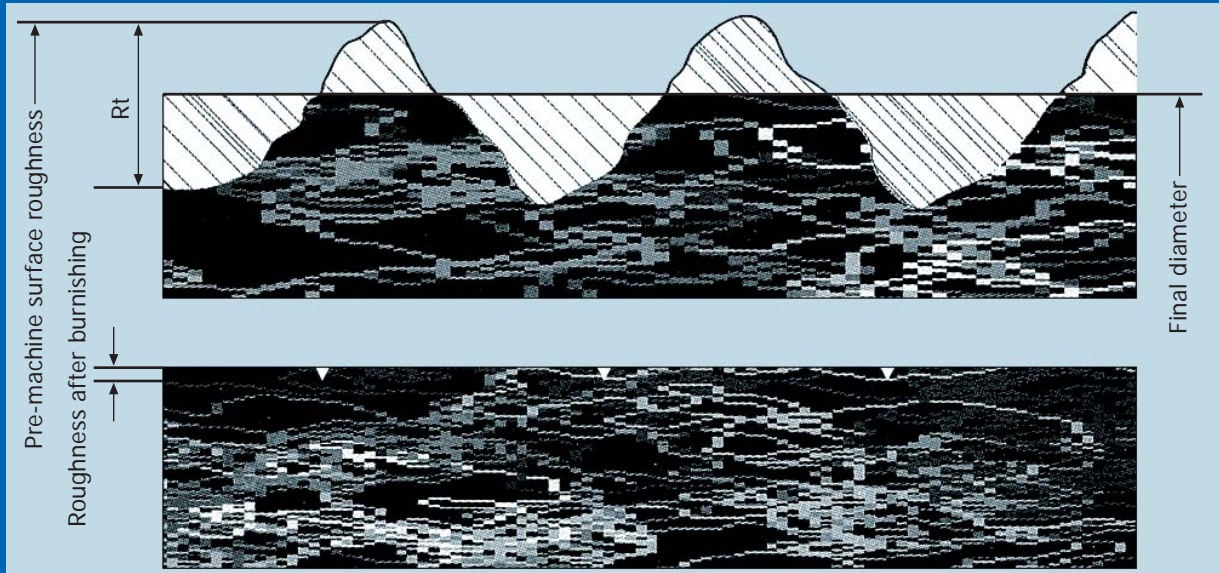
Pre-machining of the work piece

The work piece must be prepared for the roller burnishing with the right stock allowance and the right surface finishing rate. The amount of the stock allowance depends from the job conditions, the material properties, the wall thickness of the part, the type of the machined surface and the quality of the desired surface finishing. The following chart shows typical stock allowances for internal and external burnishing. However, because of the number of variables involved, these references should be considered only not binding.

An exact stock allowance can be established by tests. It is important never to burnish parts with too much stock allowance: a roller burnishing in such conditions reduces the life of the tool but can also produce flaking of the burnishing surface.

High ductility materials have an elongation of more than 18% and a hardness less than RC 25. They include annealed steel, aluminium, brass, bronze a.s.o.

Low ductility materials have an elongation less that 18% and a hardness of max. RC 45.



Surface profile before and after the roller burnishing

Stock allowance - Surface finishing chart

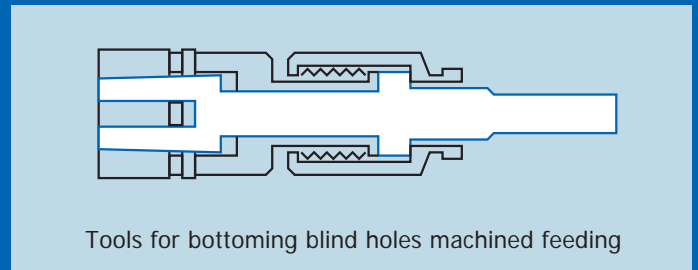
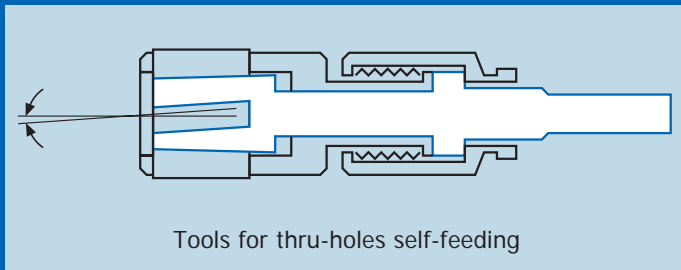
Workpiece size range mm		Inside surfaces					Outside surfaces				
		Stock allowance mm	Surface finish Ra (Rt)				Stock allowance mm	Surface finish Ra (Rt)			
			Machined Ra		Roller burnished (Rt)			Machined Ra		Roller burnished (Rt)	
High Ductility Material	3 - 12	0.010	2.0	(8)	0.2	(1)	0.010	2.0	(8)	0.2	(1)
		0.017	3.1	(12)	0.2	(1)		0.015	2.5	(10)	0.2
	12 - 25	0.017	1.5	(6)	0.2	(1)	0.012	2.0	(8)	0.2	(1)
		0.040	3.1	(12)	0.2	(1)		0.025	4.5	(18)	0.2
25 - 50	0.025	1.5	(6)	0.2	(1)	0.017	2.5	(10)	0.2	(1)	
	0.050	3.1	(12)	0.2	(1)		0.025	4.5	(18)	0.2	(1)
50 - 165	0.040	1.5	(6)	0.2	(1)	0.025	3.1	(12)	0.2	(1)	
	0.075	5.0	(20)	0.2	(1)		0.050	10.1	(40)	0.2	(1)
Low Ductility Material	3 - 12	0.010	2.0	(8)	0.4	(2)	0.008	1.5	(6)	0.4	(2)
		0.017	2.5	(10)	0.4	(2)		0.012	2.3	(9)	0.4
	12 - 25	0.017	2.2	(9)	0.4	(2)	0.012	2.5	(10)	0.4	(2)
		0.025	3.1	(12)	0.4	(2)		0.018	3.5	(14)	0.4
25 - 50	0.025	3.1	(12)	0.4	(2)	0.012	2.5	(10)	0.4	(2)	
	0.040	4.5	(18)	0.4	(2)		0.025	4.5	(18)	0.4	(2)
50 - 165	0.040	3.0	(12)	0.4	(2)	0.020	3.1	(12)	0.4	(2)	
	0.050	5.0	(20)	0.6	(3)		0.035	5.0	(20)	0.4	(2)

Kind of the tools

Self feeding tools: they are used for thru-style roller burnishing; the tool self-feeds itself independently from the machine's feed or any other external power; the only required thing is the rotation of the tool or of the work piece. The tool should be allowed to feed according to its natural rate without being forced; if used on machines equipped with self feeding, the machine feed should be slightly more (+10 ÷ 20%) than the natural feed rate of the tool.

Full bottoming style tools: these tools are supplied with non-feed cages, therefore the feed has to be given by the machine and has to be exact to obtain the closest approach to the bottom, most constantly as possible. A feed rate from 30% to 100% as shown in the chart for thru style tools is normally exhaustive for all bottoming applications. Therefore it is possible to establish the right feed rate depends from the possibility of machine's set up.

The tool is designed for conventional right hand rotation. It's possible to work with the rotation of the work piece or of the tool. The speed of the rotation is not binding but if higher than that recommended it will reduce the tool's life. If long tools are used, the speed should be reduced to prevent excessive whip.



Speed and feed rate chart

Burnishing diameter	Inside		Outside	
	Speed/RPM *	Feed mm/rev **	Speed/RPM *	Feed mm/rev **
5	1500	0,12	1000	0,15
12	1000	0,32	700	0,3
40	600	1,3	400	1,0
65	300	1,5	250	1,8
95	250	1,8	200	2,7
165	200	3,4	-	-

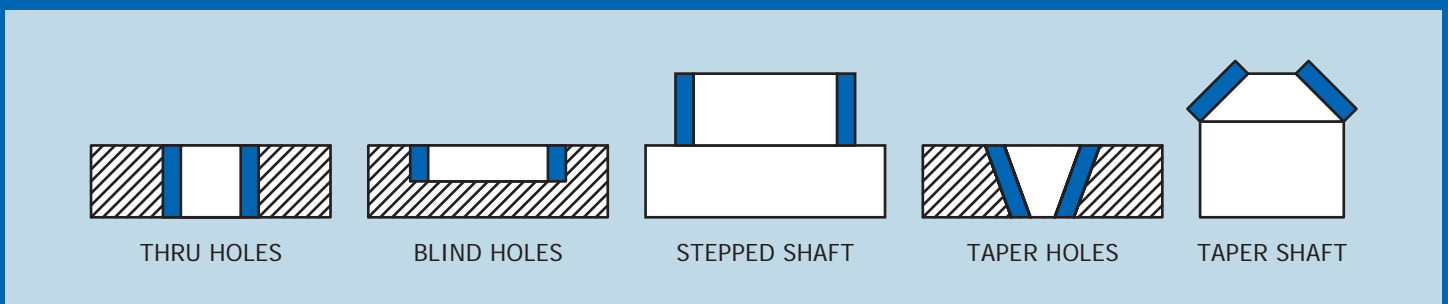
* In case of special requirements, speeds can be increased or decreased by 50%.

** In case of special requirements, the feed can be increased by 30%.

Since the speed of the rotation is not determined to the performance, it will be used high speed to obtain cycles of rapid production.

Surface that can be burnished

Good results have been obtained rolling inside thru and blind surfaces, taper and flat surfaces.



Roller burnishing tools for thru and blind holes

Thru holes series **TH** : diameter range from Ø6 to Ø350 mm

Blind holes series **TB** : diameter range from Ø6 to Ø350 mm

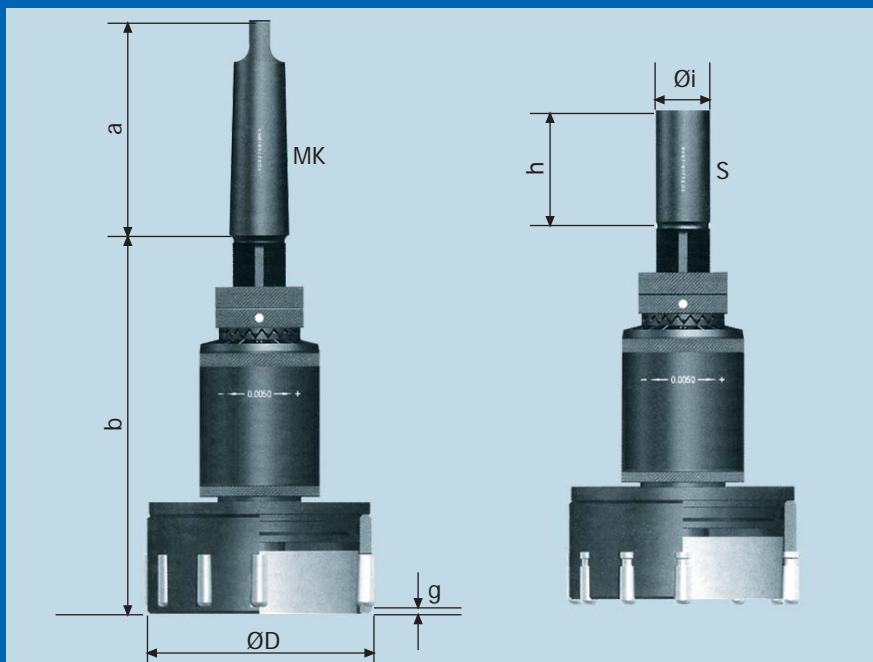
Technical characteristics

The roller burnishing tools series **TH** and **TB** thanks to their micrometric regulation's system can process burnishing in H8 tolerance: once adjusted on the diameter, they can process a high number of holes without any other regulation.

These tools are capable to process all kinds of materials with 1.400 N/mm² tensile strength and hardness up to max. 45 HRC. The tools work with a right hand rotation, it is possible to work with the rotation of the work piece or of the tool.

For the tools from diameter 6 to diameter 80 the adjustment precision is 0,0025 mm, for the tools with a diameter bigger than 80 mm the adjustment precision is 0,0050 mm.

Two different types of tools can be produced: series **TH** for thru holes and series **TB** for blind holes. Tools series **TH** are supplied with an automatic feeding (self-feeding): the tool self-feeds itself independently from the machine's feed or any other external power, the only required thing is the rotation of the tool or of the work piece. The tool should be allowed to feed according to its natural rate without being forced; if used on machined equipped with self feeding, the machine feed should be slightly more (+10 ÷ 20%) than the natural feed rate of the tool. On request can be supplied tools series **TH** with cage without self-feeding to use with machine feeding. Tools series **TB** can only be supplied with machine feeding.



Tool structure

Roller burnishing tools series **TH** and **TB** consist of a body and a rolling head. The tool body includes a special adjustment mechanism; cage, cone and rollers are the part of the rolling heads. The tool shank can be straight or Morse taper.

The tools with diameter over 34mm can execute an unlimited rolling length. The tools with a diameter under 35mm can execute standard rolling length (see chart below). Special tools with longer rolling lengths can be produced on request.

Diameter range Ø	Shank Morse Taper	Shank Straight (Øixh)	a	b	c	g	Note
006-014				146		1.5	Standard rolling length 50 mm Longer lengths on request
015-021				146		2	
022-034	MK2	Ø20 h6 x 50	78.5	139	34	2.5	
035-049				142.5		3	Unlimited roller length
050-080	MK3	Ø25 h6 x 56	98	177.5	48	3.5	
081-160	MK4	Ø32 h6 x 60	123	195	62	4	
161-350	MK5	Ø40 h6 x 80	155.5	272.5	89	4.5	

Tool's characteristics

The roller burnishing tools series TH and TB have a wide diameter range. For example, a roller burnishing tool type TH-020.00-1-50-MK2 with nominal size of 20 mm can process all sizes between Ø 19,90 mm and Ø 20,90 mm.

Tools for special diameters and lengths can be produced on request.

- **Choice of the tool**

Choose the tool according to the diameter to burnish, the type of the hole (thru or blind hole), the rolling length and the type of the shank.

- **Processing diameter**

Select carefully the diameter that you need to process. (e.g. 25,43 ...).

- **Choice of the cage** - To establish according to the machine and the work piece.

- Automatic feeding (self-feeding) for thru holes: **code 1**
- Machine feeding (not self-feeding) for thru holes **only on request: code 2**
- Machine feeding (not self-feeding) for blind holes: **code 3**

- **Standard rolling length 50 or 100 mm** (to specify only for diameter from 6 to 34).

It doesn't need to be stated for diameter over 34 mm because of the unlimited rolling length; it must be stated for diameter under 35 mm. Besides standard models, the rolling lengths can be 150, 200, 250, 300 mm.

Special requests for rolling lengths not mentioned above will be evaluated case by case.

- **Shank** - According to your needs: **MK** = Morse taper shank / **S** = Straight shank

Order sample: Roller burnishing tool for thru holes Ø 30,00 mm, rolling length 50 mm, straight shank Ø 20 mm.

Code: TH - 030.00 - 1 - 50 - S20

