

COGSDILL TOOL PRODUCTS

CHAMBER BURNISHING TOOLS (CBT)



INSTRUCTION MANUAL



COGSDILL TOOL

products, inc.

1. GENERAL INSTRUCTIONS FOR EXPANDING CHAMBER ROLLER BURNISHING TOOLS

Expanding chamber roller burnishing tools are designed to produce an extremely fine surface finish (15 micro inches or less) in armament shell chambers. The expanding chamber roller burnishing tool does this by applying a steady rolling force to the surface of the chamber. Reference Figure 1.

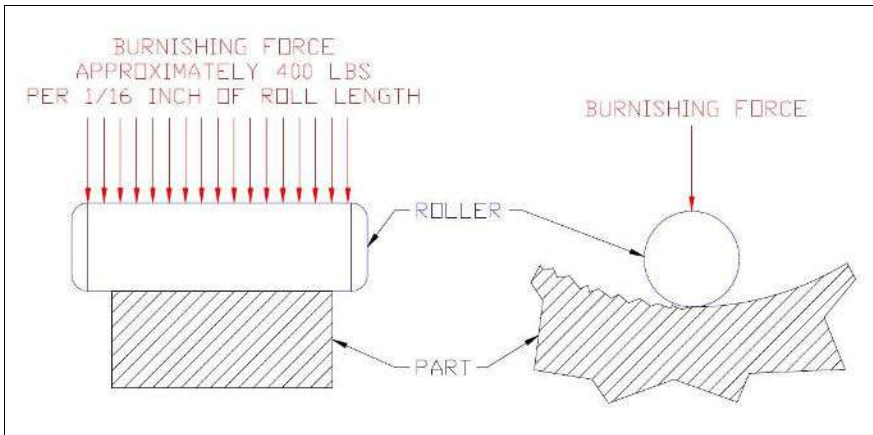


Figure 1

Applying a steady rolling force is accomplished through the use of hardened tapered ROLLERS riding on an inversely tapered MANDREL. The ROLLERS are held in place around the MANDREL by a CAGE. The CAGE containing the ROLLERS is pushed back onto the MANDREL by a bearing mounted STOP. This action expands the ROLLERS to contact the surface of the chamber. To control the rolling force, the tool is equipped with a mechanism referred to as an overtravel. Reference figure 2. Each tool is designed for a specific chamber geometry.

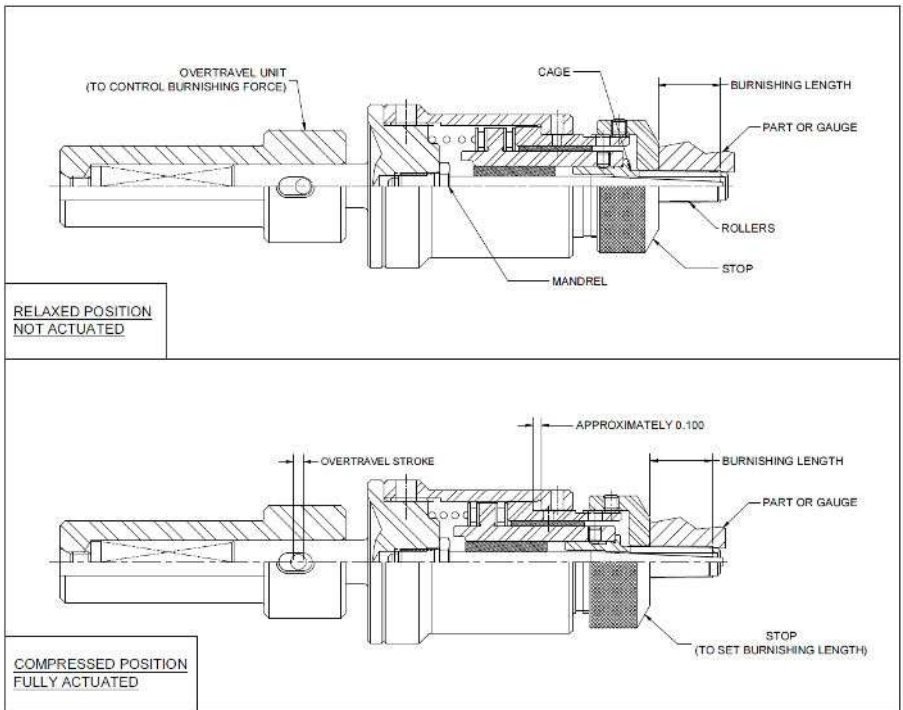


Figure 2

There are only two adjustments, or settings, that can be made to the expanding roller burnishing tool

1. The BURNISHING LENGTH can be adjusted to ensure the entire surface area of the chamber is roller burnished.
2. The ROLLER BURNISHING FORCE can be controlled by the amount of compression of the overtravel unit to perfectly finish the chamber surface.

2. PART PREPARATION

Proper part preparation is essential to obtain optimum results from roller burnishing. Due to the fact that no metal is removed in the process, finish depends on the existence of a uniform and tearfree reamed finish which will be caused to flow under the force exerted through the rolls.

- It is important to ream the chamber to the exact chamber geometry (Taper, etc.)
- A 30-50 microinch (2-3 micrometer) Ra is considered ideal for chamber burnishing.
- Reamed size should be no more than 0.001 inches undersized on diameter.

3. OPERATION

STEP 1: SETTING BURNISHING LENGTH

To adjust the BURNISHING LENGTH: First, rotate the STOP/STOP ADAPTER until an inserted 3/32 HEX WRENCH locks the HOUSING and the STOP ADAPTER together. Next, loosen the three set screws and rotate the STOP to the desired BURNISHING LENGTH. Looking from the working end of the tool, rotate the STOP clockwise to increase the BURNISHING LENGTH or counterclockwise to decrease the BURNISHING LENGTH.

Reference Figure 3.

When adjusting the BURNISHING LENGTH, keep in mind that the contact point of the ROLLER should be around 0.005 inches away from the start of the angle in the chamber. Reference Figure 4.

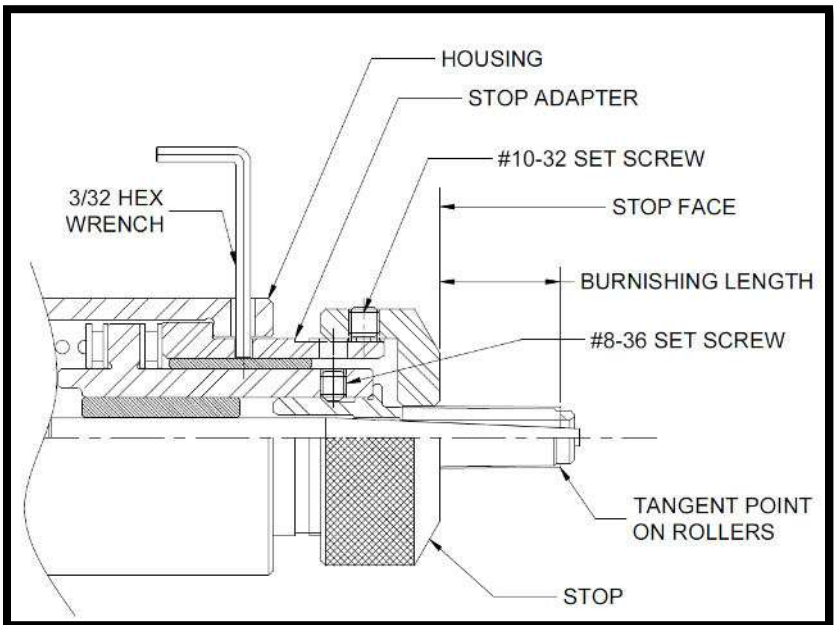


Figure 3

It is recommended that a shadowgraph be used to set the BURNISHING LENGTH. Calipers or a test part could also be used. The more accurately the STOP is set, the better.

Measure from the end of the STOP to the tangent point of the ROLLER and adjust the STOP as needed to achieve the chamber's BURNISHING LENGTH dimension minus 0.005 inches as shown in Figure 4 (for ROLLER clearance). The BURNISHING LENGTH dimension MUST NOT be any longer than the length of the chamber reamer to avoid contact between the ROLLERS and the angle in the chamber.

Tighten the three set screws to hold the STOP in place.

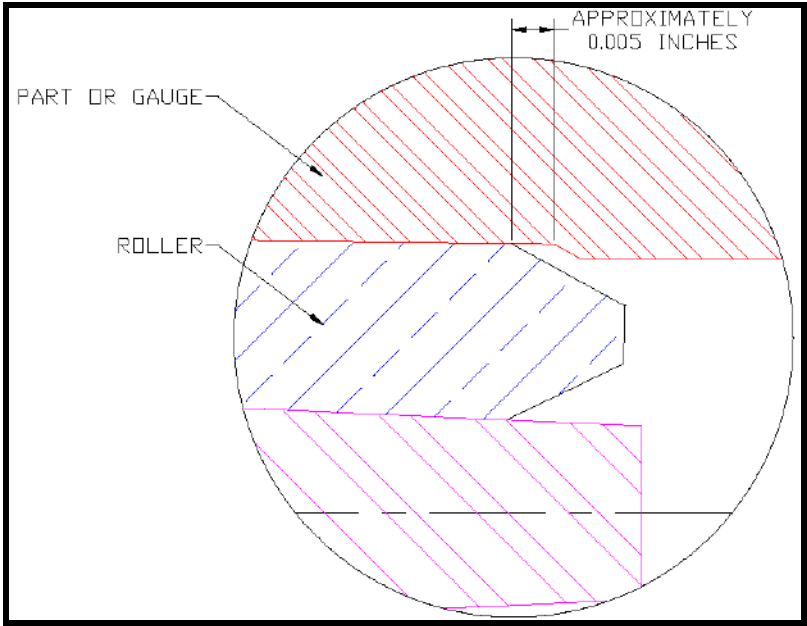


Figure 4

STEP 2: SETTING THE TOOL STROKE IN THE MACHINE

Feed the tool into the part until the face of the STOP touches the part. Continued axial feeding of the tool, after the tool is fully expanded and in contact with the surface of the chamber, will compress the overtravel and provide the necessary controlled roller burnishing force.

To determine how far to feed the tool after the stop touches the part:

EXAMPLE CALCULATION (Numbers may differ from specific application – Check Engineering drawing)

1. THE DISTANCE TO BE TRAVELED AFTER STOP TOUCHES PART IS 0.100
2. THE OVERTRAVEL COMPRESSION REQUIRED TO PROVIDE THE NECESSARY ROLLER BURNISHING FORCE IS APPROXIMATELY .060 INCHES. THIS WILL YIELD APPROXIMATELY 360 LBS. OF FORCE. (THIS IS FROM THE ENGINEERING DRAWING OF THE SPECIFIC ROLLER BURNISHING TOOL.)

THEREFORE THE TOTAL STROKE REQUIRED AFTER TOUCHING THE FACE OF THE STOP ON THE PART WOULD BE: (1)+(2)

OR:

$$0.100 + 0.060 = 0.160 \text{ INCHES}$$

STEP 3: BURNISHING A PART AND FINE TUNING THE SETUP

1. Rotate the tool or part at approximately 150 SFM.
2. Feed the tool into the part at approximately 0.010 IPR. The slow feed needs to start before the tool enters the part to avoid contact between the face of the ROLLERS and the face of the part.
3. After the STOP contacts the part face, continue feeding the tool until final compression is reached at 0.160 inches (OR THE TOTAL STROKE CALCULATED IN STEP 2).
4. Dwell at full compression for one to two seconds.
5. Inspect the part to ensure the chamber is: 1. Burnished to depth and 2. Has an acceptable surface finish.
6. If the surface finish isn't satisfactory, adjust the machine stroke in increments of 0.015 inches to improve the surface finish.
7. If necessary, adjust the STOP to fine tune the BURNISHING LENGTH.

RECOMMENDATIONS				
TOOL NO.	PART NAME / NO.	RECOMMENDED BURNISHING FORCE (LBS)	OVERTRAVEL STROKE TO ACHIEVE BURNISHING FORCE (IN.)	RPM @ 200 SFM
CBT-9MM	9MM	360	0.060	2,000
CBT-380-AUTO	380 AUTO	360	0.060	2,000
CBT-40-S&W	40 S&W	360	0.060	1,800
CBT-45-ACP	45 ACP	400	0.070	1,600
CBT-38-AUTO	38 AUTO	400	0.070	2,000
CBT-357-MAG	357 MAG	550	0.090	2,000
CBT-357-SIG	357 SIG	360	0.060	1,800
CBT-223-REM	223 REM	630	0.050	2,000
CBT-243-WIN	243 & 308 WIN	630	0.050	1,700
270-WIN	270 WIN & 30-06 SPRING	810	0.030	1,700
CBT-7MM-REM	7MM REM	810	0.030	1,500
CBT-30-30-WIN	30-30 WIN	630	0.050	1,900

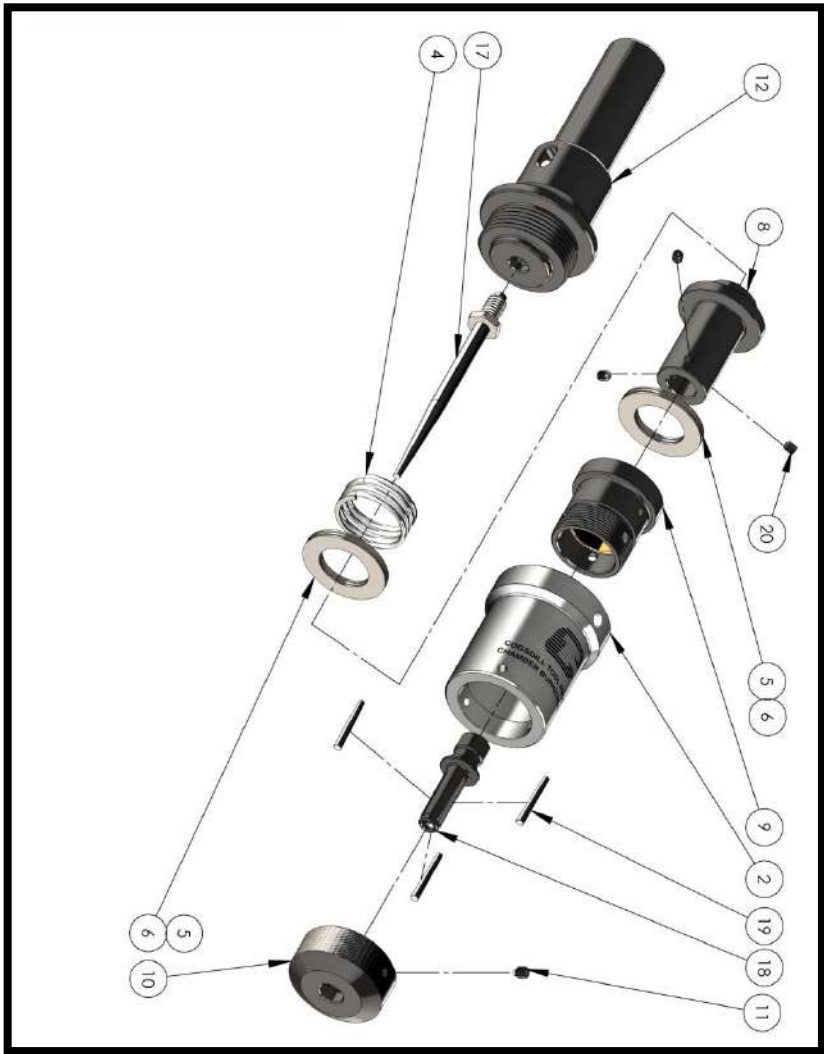
Recommended Dwell at Full Burnishing Force: 2 SECONDS

Recommended Speed: 150-250 SFM

Recommended Feed: 0.010-0.030 IPR

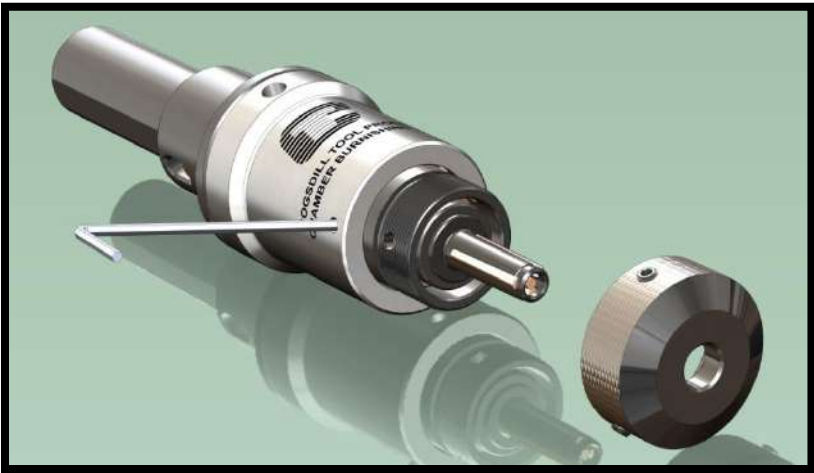
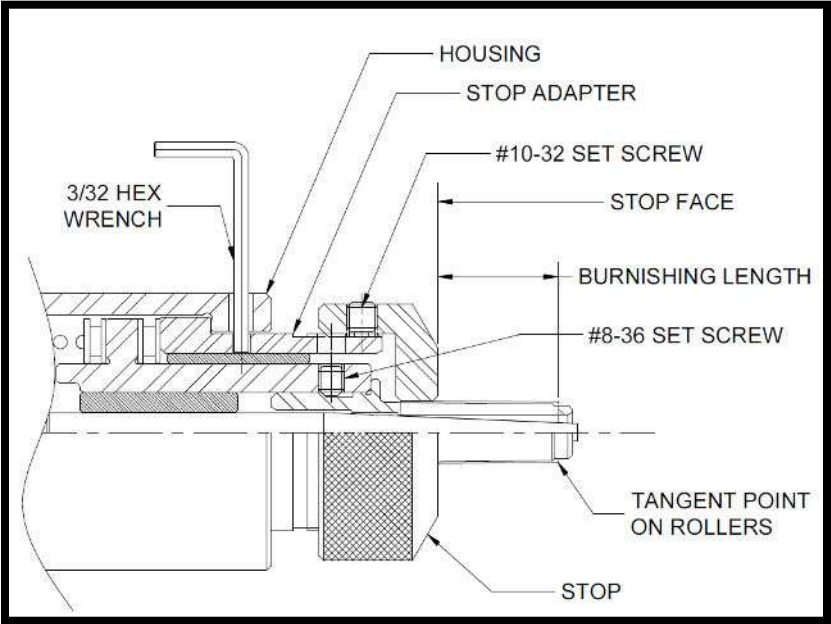
Part should be flooded with clean filtered coolant

Exploded View with Part Numbers



ITEM NO.		PART NUMBER	DESCRIPTION	QTY.
2		CBT-D02	BODY	1
4		CBT-D04	SPRING	1
5		CBT-D05	THRUST BEARING, NTA-1423	2
6		CBT-D06	THRUST RACE, TRA-1423	4
8		CBT-D08	CAGE ADAPTOR	1
9		CBT-D09	STOP ADAPTOR	1
10		CBT-(CALIBER)-D10	STOP	1
11		CBT-D11	#10-32 SET SCREW	1
12		CBT-D12	SHANK ADAPTOR ASS'Y	1
	1	CBT-D01	SHANK	1
	13	CBT-D13	1/4-20 SET SCREW	1
	14	CBT-D14	500-25 DISC	1
	15	CBT-D15	#500-18 BELLEVILLE WASHER	80
	16	CBT-D16	3/16 DOWEL PIN	1
17		CBT-(CALIBER)-D17	MANDREL	1
18		CBT-(CALIBER)-D18	CAGE	1
19		CBT-(CALIBER)-D19	ROLL	3
20		CBT-D20	#8-36 SET SCREW	3

Changing the CAGE and ROLLERS:

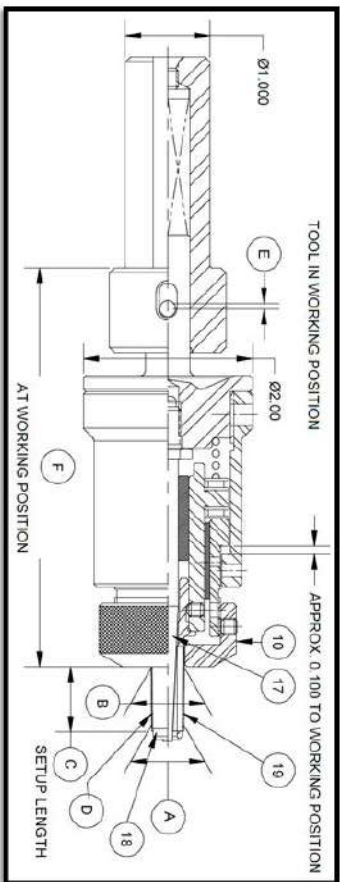


1. Align the holes in the DETAIL 2 HOUSING and the DETAIL 9 STOP ADAPTER and insert the 3/32 HEX WRENCH, which will lock the HOUSING and STOP ADAPTER together.
2. Loosen the three #10-32 set screws in the DETAIL 10 STOP.
3. Unscrew the DETAIL 10 STOP
4. Wrap the DETAIL 18 CAGE with tape so the DETAIL 19 ROLLS don't fall out during disassembly or assembly.
5. Once DETAIL 10 STOP is removed, align the holes in DETAIL 9 STOP ADAPTER with the set screws that hold the DETAIL 18 CAGE in place and loosen the three #8-36 set screws with the 5/64 HEX WRENCH.
6. Remove the DETAIL 18 CAGE by pulling straight out.
7. Reverse steps 1-4 to assemble.

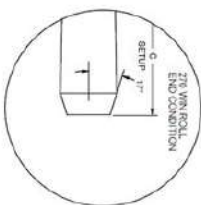
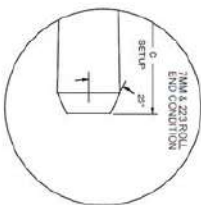
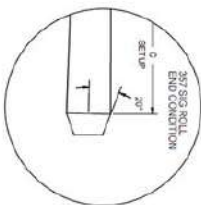
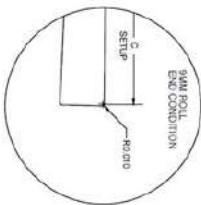
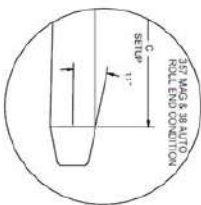
Changing the MANDREL



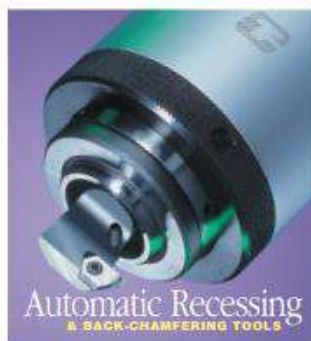
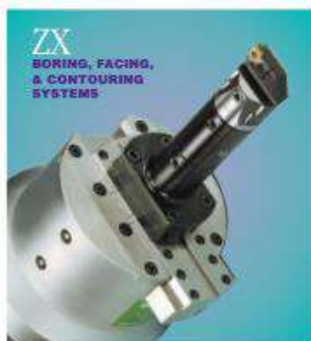
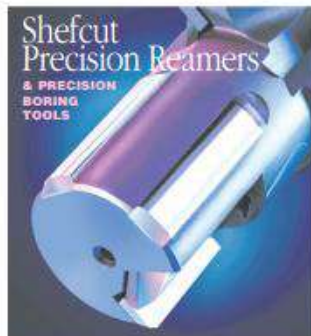
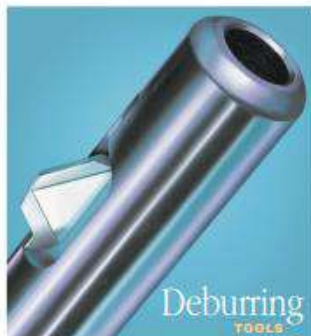
1. To prevent the DETAIL 19 ROLLS from falling out of the DETAIL 18 CAGE during disassembly, wrap DETAIL 18 CAGE with tape.
2. Using a 2-1/2 inch diameter spanner wrench with a 1/4 inch pin, loosen the DETAIL 2 HOUSING.
3. NOTE: The housing is under spring pressure. Use caution and remove the DETAIL 2 HOUSING slowly.
4. Use a 1/2 inch open ended wrench to loosen the DETAIL 17 MANDREL and remove it.
5. Reverse these steps to install the new DETAIL 17 MANDREL



GAUGE	BODY	CAGE (D18)	MANDREL (D17)	ROLLS (D19)	STOP (D10)	A' MIN. DIA.	B' MAX. DIA.	C' SETUP LENGTH	D' TAPER PER FOOT INCLUDED	APPROX. BURNISHING FORCE (LBS)	E' OVERTRAVEL COMPRESSION	F' LENGTH IN WORKING POSITION
9MM	CBT-ASSY	9MM	9MM	9MM	5MM	0.381	0.395	0.765	0.2232	360	0.060	4.67
380 AUTO	CBT-ASSY	380 AUTO	380 AUTO	380 AUTO	0.377	0.3825	0.692	0.0982	360	0.060	4.67	
40 58 W	CBT-ASSY	40 58 W	40 58 W	40 58 W	0.424	0.4284	0.856	0.0622	360	0.060	4.67	
45 ACP	CBT-ASSY	45 ACP	45 ACP	45 ACP	0.474	0.4812	0.909	0.1034	400	0.070	4.66	
38 AUTO	CBT-ASSY	38 AUTO	38 AUTO	38 AUTO	0.387	0.395	0.918	0.0777	400	0.070	4.66	
357 MAG	CBT-ASSY	357 MAG	357 MAG	357 MAG	0.380	0.381	1.302	0.0096	350	0.050	4.64	
357 SIG	CBT-ASSY	357 SIG	357 SIG	357 SIG	0.425	0.4285	0.663	0.0630	360	0.060	4.67	
223 REM	CBT-ASSY	223 REM	223 REM	223 REM	0.3553	0.3804	1.434	0.2100	630	0.048	4.68	
243 & 308 WIN	CBT-ASSY	243 WIN	243 WIN	243 WIN	0.4551	0.4738	1.554	0.1440	630	0.048	4.68	
270 WIN & 30-05 SPRING	CBT-ASSY	270 WIN	270 WIN	270 WIN	0.4425	0.4740	1.940	0.1949	810	0.032	4.70	
7MM REM	CBT-ASSY	7MM REM	7MM REM	7MM REM	0.4918	0.5135	2.048	0.1451	810	0.032	4.70	
30-30 WIN	CBT-ASSY	30-30 WIN	30-30 WIN	30-30 WIN	0.4030	0.4233	1.455	0.1753	630	0.048	4.68	



OTHER PRODUCTS FROM  **COGSDILL TOOL PRODUCTS, INC.**



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FOR ADDITIONAL INFORMATION



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