

**Mills Machine Company, Inc.**  
Custom Manufacturing, Customer Service and Rapid Response.

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## Rotary Claw Bits - Section 7

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## Overview



In 1978, Mills Machine Company started manufacturing **Claw Bits** under an agreement with Kennametal, Inc., the original patent owner of the KENCLAW® Bit. Mills Machine improved the original design by offering a **one-piece heat-treated alloy steel body with special hard-faced blocks**. This type of manufacturing allows the bit to be reworked many times over, extending the overall life of the bit.

The **KENCLAW® Bit** is best suited for drilling in **soft to medium formations** and in **unconsolidated formations** of alternate layers of very soft clay and sand rock or hard shale. Whereas a drag bit would over-torque and possibly stall in these conditions, the KENCLAW® Bit excels. KENCLAW® Bits are available in **sizes ranging from 3 1/2" to 24" in diameter** and feature a variety of manufacturing options, such as Multi-Stage Reamers, Holeopeners, Circulating Pilot Bits, and Special Jet Circulation Configurations.

After many years of custom manufacturing KENCLAW® bits and four prototype testing phases later, Mills Machine created the **MILCLAW® Bit**, an improved, perfected version of the KENCLAW® bit. Protected by a U.S. Patent, as well as several International Patents, this claw bit features a **triangular, multi-stage body design** that provides better support for the cutters and enables it to **cut through harder formations**. The MILCLAW® Bit is available in **sizes ranging from 6 1/2" to 24" in diameter** and is best suited for drilling in **medium soft to medium hard formations**.

Both the MILCLAW® Bit and the KENCLAW® Bit have one circulation hole per cutter, in order to provide maximum hole cleaning, the MILCLAW® Bit design typically provides more footage from a set of cutters than the KENCLAW® Bit design. Additionally, experience and field test reports indicate that the MILCLAW® bit runs smoother and more efficiently with a ribbed stabilizer.

The Mills **GEOCLAW® Bit** fills the niche for smaller size bullet bits. Their **construction is more versatile**, and their **performance is superior to the smaller bullet bits previously available**. Mills GEOCLAW® Bits are available in a heavy-duty crossed-bit construction and a standard pilot bit form. These unique bits fill an important need in the drilling industry.

All of Mills' Claw Bit designs offer **rapid penetration**, drilling time **as fast or faster than that of a drag bit**, and being as **tough as a roller rock bit**.

They feature economical, **inexpensive field-replaceable cutters**. The conical bullet-shaped cutters rotate in their blocks to provide a self-sharpening effect, extending the life of the bit and reducing torque.

KENCLAW® is a Registered trademark of Kennametal, Inc.

MILCLAW® is a Registered trademark of Mills Machine Company, Inc.

GEOCLAW® is a Registered trademark of Mills Machine Company, Inc.



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## Mills MILCLAW® Bits

The Mills Machine MILCLAW® Bit is an improved, perfected version of the KENCLAW® Bit. Protected by a U.S. Patent, as well as several International Patents, this claw bit features a triangular, multi-stage body design that provides better support for the cutters and enables it to cut through harder formations. MILCLAW® Bits are best suited for drilling in medium soft to medium hard formations.

MILCLAW® Bits are available in the standard sizes listed below, with the standard connections listed below. Other sizes and connections can be custom manufactured to meet your needs. Please contact one of our sales representatives for additional information.

**The design for the MILCLAW® Bit changes at 14 3/4" and larger to a Heavy Duty Reamer type.**

* Description	Part #	Pilot Bit	# Cutters	Weight		Diagram
				Lbs.	Kg.	
<b>MILCLAW® Bits</b>						
S 6 1/2" (162mm) MILCLAW® Bit, 3 1/2" API Reg. Pin	MC0612	CP18	6	35.0	15.9	
S 6 3/4" (172mm) MILCLAW® Bit, 3 1/2" API Reg. Pin	MC0634	CP18	6	35.0	15.9	
S 7 7/8" (200mm) MILCLAW® Bit, 4 1/2" API Reg. Pin	MC0778	CP18	7	51.0	23.1	
S 8 3/4" (222mm) MILCLAW® Bit, 4 1/2" API Reg. Pin	MC0834	CP18	8	60.0	27.2	
S 9" (229mm) MILCLAW® Bit, 4 1/2" API Reg. Pin	MC0900	CP18	9	65.0	29.5	
S 9 7/8" (251mm) MILCLAW® Bit, 6 5/8" API Reg. Pin	MC0978	CP18	9	88.0	39.9	
S 10 5/8" (295mm) MILCLAW® Bit, 6 5/8" API Reg. Pin	MC1058	CP18	14	128.0	58.1	
S 12 1/4" (311mm) MILCLAW® Bit, 6 5/8" API Reg. Pin	MC1214	CP18	17	-	-	
<b>MILCLAW® Reamers</b>						
14 3/4" (375mm) MILCLAW® Reamer, 6 5/8" API Reg. Pin	MC1434	MC0634		-	-	
17 1/2" (445mm) MILCLAW® Reamer, 6 5/8" API Reg. Pin	MC1712	MC0634		-	-	
20" (500mm) MILCLAW® Reamer, 6 5/8" API Reg. Pin	MC2000	MC0778		-	-	
22" (559mm) MILCLAW® Reamer, 7 5/8" API Reg. Pin	MC2200	MC0778		-	-	
24" (610mm) MILCLAW® Reamer, 7 5/8" API Reg. Pin	MC2400	MC0778		-	-	

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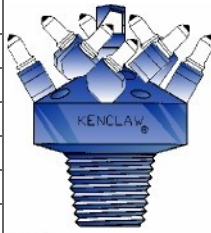
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## Mills KENCLAW® Bits

Mills Machine KENCLAW® Bits are best suited for drilling in soft to medium formations and in unconsolidated formations of alternate layers of very soft clay and sand rock or hard shale. Whereas a drag bit would over-torque and possibly stall in these conditions, the KENCLAW® Bit excels. KENCLAW® Bits are available in sizes ranging from 3 1/2" to 24".

* Description	Part #	Pilot Bit	# Cutters	Weight		Diagram
				Lbs.	Kg.	
<b>KENCLAW® Bits</b>						
S 4 1/2" (108mm) KENCLAW® Bit, 2 3/8" API Reg. Pin	MK0412-238	CP-12	4 C6	9.0	4.1	
S 4 3/4" (121mm) KENCLAW® Bit, 2 3/8" API Reg. Pin	MK0434-238	CP-12	4 C6	12.0	5.4	
S 5 1/4" (133mm) KENCLAW® Bit, 2 3/8" API Reg. Pin	MK0514-238	CP-12	4 C6	13.0	5.9	
S 4 3/4" (121mm) KENCLAW® Bit, 2 7/8" API Reg. Pin	MK0434-278	CP-12	4 C6	14.0	6.4	
S 5 1/2" (133mm) KENCLAW® Bit, 2 7/8" API Reg. Pin	MK0512-278	CP-12	4 C6	17.0	7.7	
S 5 1/2" (140mm) KENCLAW® Bit, 3 1/2" API Reg. Pin	MK0512-312	CP-18	4 C-23	19.0	6.8	
S 5 5/8" (143mm) KENCLAW® Bit, 3 1/2" API Reg. Pin	MK0558-312	CP-18	4 C-23	20.0	8.2	
S 5 7/8" (149mm) KENCLAW® Bit, 3 1/2" API Reg. Pin	MK0578-312	CP-18		-		
S 6" (152mm) KENCLAW® Bit, 3 1/2" API Reg. Pin	MK0600-312	CP-18	5 C-23	21.0	9.5	
S 6 1/4" (159mm) KENCLAW® Bit, 3 1/2" API Reg. Pin	MK0614-312	CP-18	5 C-23	21.0	9.5	
S 6 1/2" (165mm) KENCLAW® Bit, 3 1/2" API Reg. Pin	MK0612-312	CP-18	5 C-23	21.0	9.5	
S 6 3/4" (172mm) KENCLAW® Bit, 3 1/2" API Reg. Pin	MK0634-312	CP-18	5 C-23	22.0	10	
S 7 7/8" (200mm) KENCLAW® Bit, 4 1/2" API Reg. Pin	MK0778-412	CP-18	8 C-23	34.0	15.8	
S 8 1/2" (216mm) KENCLAW® Bit, 4 1/2" API Reg. Pin	MK0812-412	CP-18	8 C-23	36.0	13.6	
S 8 3/4" (222mm) KENCLAW® Bit, 4 1/2" API Reg. Pin	MK0834-412	CP-18	8 C-23	40.0	18.1	
S 9" (229mm) KENCLAW® Bit, 4 1/2" API Reg. Pin	MK0900-412	CP-18	8 C-23	40.0	18.1	
S 9 7/8" (251mm) KENCLAW® Bit, 6 5/8" API Reg. Pin	MK0978-658	CP-18	9 C-23	57.0	25.9	
S 10 5/8" (270mm) KENCLAW® Bit, 6 5/8" API Reg. Pin	MK1058-658	CP-18	9 C-23	70.0	31.8	
S 12 1/4" (311mm) KENCLAW® Bit, 6 5/8" API Reg. Pin	MK1214-658	CP-18	12 C-23	110.0	49.9	

## Mills GEOCLAW® Bits

Mills Machine GEOCLAW® Bits were designed specifically for the geothermal drilling industry. Its construction is more versatile and its performance is superior to other smaller bullet bits previously available.

* Description	Part #	Pilot Bit	# Cutters	Weight		Diagram
				Lbs.	Kg.	
<b>GEOCLAW® Bits</b>						
S 3 7/8" (98mm) GEOCLAW® Bit, 2 3/8" API Reg. Pin	MG378-238	Crossed Bit	5 C6	8.0	3.6	
S 4 1/4" (105mm) GEOCLAW® Bit, 2 3/8" API Reg. Pin	MG414-238	Crossed Bit	5 C6	9.0	4.1	
S 4 1/2" (108mm) GEOCLAW® Bit, 2 3/8" API Reg. Pin	MG412-238	Crossed Bit	5 C6	10.0	4.5	
S 4 3/4" (121mm) GEOCLAW® Bit, 2 3/8" API Reg. Pin	MG434-238	Crossed Bit	5 C6	10.0		
S 5 1/4" (133mm) GEOCLAW® Bit, 2 7/8" API Reg. Pin	MG514-278	Crossed Bit	6 C6	14.0	6.4	

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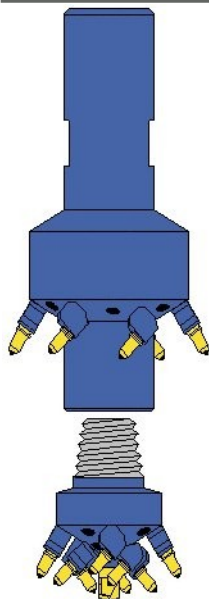
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## Claw Hole Openers



Mills Machine manufactures a full line of rotary claw bits that include many variations of the original design. One of the popular options is the claw reamer or hole opener. Like our KENCLAW® line of bits, these bits will work in clay to medium shale rock (up to 6000 psi rock).

Carbide cutters rotate in their block to promote a self sharpening action and reduce torque on the drill string. These cutters are inexpensive and easily replaced in the field.

These hole openers will cut as fast as a drag bit while at the same time they are as tough as a soft to medium formation rock bit. They are suitable for either air or fluid drilling.

The claw hole openers can be used with either rock bits as a pilot or with the Mills KENCLAW® or MILCLAW®. Versatility lies within our ability to manufacture in single, double or multi-stage versions to offer the best product for your individual needs.

These tough, high-quality units are designed for long life. All edges exposed to wear are hard surfaced with tungsten carbide material. The threaded tool joints and bodies are made from 4142 heat treated alloy steel. Each hole opener is individually designed and manufactured for your specific application.

## Claw Bit Components

Replacement Blocks, Bullet Cutters and Pilot Bits for Mills KENCLAW®, MILCLAW® and GEOCLAW Bits

Mills Machine has several other sizes and styles of bullet cutters and blocks to meet your specific needs. Please call us for detailed information.

**Repairs.** The larger sizes of KENCLAW® and MILCLAW® can be reworked to like new condition at a reasonable cost. We can replace the bullet cutters, blocks and pilot bits with new components and repair any damaged threads. The cost depends on the amount of wear or damage that the bit has incurred. Contact the factory for more information.

Description	Part #	Weight	
		Lbs.	Kg.
<b>Cutters</b>			
Standard Bullet	_C23	0.4	0.2
Mini - Bullet	CMM6K	0.2	0.1
<b>Blocks</b>			
Cutter Block for Mini-Bullet	CMM6BS	0.4	0.2
Cutter Block for Standard Bullet	_C20B	0.7	0.3
<b>Pilot Bits</b>			
Pilot Bit, 7/8 (22.2mm), NC Thread	CP12	0.7	0.3
Pilot Bit, 7/8 (22.2mm), NC Thread	CP15	1.3	0.6
Pilot Bit, 1" (25.4mm), NC Thread	CP16	1.5	0.7
Pilot Bit, 3/4 (19.1mm), NC Thread	CP17	1.2	0.5
Pilot Bit, 1 1/4 (31.8mm), 5-stub Acme Thread	CP18	1.6	0.7

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