



S I N C E 1 8 3 5

- Rockmaster
- Super Black Diamond
- Black Diamond
- Cobra

McLanahan
CORPORATION

SINGLE ROLL CRUSHERS



SINGLE ROLL CRUSHERS

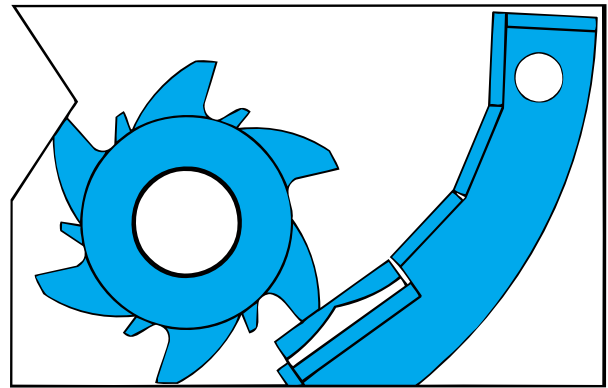
Why use a Single Roll Crusher?

1. The single roll crusher reduces large size particles in the feed to a medium size while producing a considerably lower percentage of fines than other crushers.
2. The single roll design is much more effective in reducing slabby material in comparison to jaw or gyratory crushers. When properly maintained, the "interrupted opening" between roll teeth and corresponding grooves in the crushing plate liners (see photo below) assure that slabby material cannot slip through uncrushed.
3. Roll crushers perform better than other types of crushers when fed wet and sticky materials. (These crushers are not intended for highly abrasive material such as gravel or taconite unless presence of clay, permafrost or similar material prevents use of other crusher design).
4. Single roll crushers often require less horsepower and lower headroom in comparison to other primary reduction crushers.



Crushing Plate

Crushing is carried out along the full width of the extra long, curved crushing plate, preventing material from jumping away from the roll. The fabricated steel crushing plate, either corrugated or smooth faced, extends from the top of the hopper. The crushing plate has easily replaceable wear liners that may be either slotted or smooth. The slotted design reduces slabs in the product when crushing slabby feeds.



As the sketch above illustrates, the generous throat opening is designed to accept large slabby feeds. The crushing action is a combination of slow speed impact, splitting, accomplished by teeth piercing the feed lump as material is pulled through the tapered opening between crushing plate and roll. The curved crushing plate, with wide opening at the top and narrow opening at bottom, allows for maximum reduction ratio. Typically 6 to 1.

Shafts and Bearings

Roll shafts, countershafts and hinge shafts (located at the top of the crushing plate) are made of turned, ground and polished alloy steel of ample design and size to withstand crushing forces. Self aligning anti-friction roller bearings mounted in heavy duty steel housings are bolted to the frame to support the roll shaft and countershaft. Optional taconite seals can be provided for extremely dusty or wet material feeds.

Roll Design

Many types of rolls in various alloys of steel or chilled iron can be furnished with an extremely broad range of roll teeth configuration available. This assures the most efficient crushing of any specific material. With over 100 years of crushing experience, McLanahan Corporation has extensive data on the use of a great many styles of teeth on all types of materials. Correct recommendations of roll size and tooth selection is an important part of the service.

Frame

The base frames on all duty classes of our crushers are of heavy duty fabricated steel construction. All frames are substantially reinforced and braced for rugged crushing applications and years of service. The rigid construction prevents distortion of the frame during operation, resulting in maximum bearing, gear and shaft life.

Hopper

The hopper areas on single roll crushers are of a large, unrestricted design spanning the full width of the crusher roll. This construction allows the machine to crush large feed lumps delivered into the hopper. The hopper is flanged at the top and equipped with drilled bolt holes for attachment of an auxiliary hopper or feed chute above the crusher. Renewable, abrasion-resistant steel wear liners are furnished on the interior hopper side walls.

Product Size Adjustment

Product size adjustment, with the exception of the Cobra Single Roll Crusher, consists of a hydraulic hand pump, three way directional valve (forward/neutral/reverse), hydraulic cylinder with clevis and quick disconnect pin. The hydraulic cylinder is attached to the center vertical rib on the crushing plate to make a product size adjustment. After adjustment, the cylinder is removed from the crushing plate and supported in a bracket on the crusher frame isolating the hydraulic cylinder from shock and crushing forces.

The Cobra Single Roll Crusher is provided with a manual turnbuckle screw adjustment to adjust the location of the crushing plate.

Gears, Pinions and Drives

Single roll crushers utilize machine cut teeth on the gear set between the roll shaft and countershaft. Gear teeth are designed with a wide face and large profile for maximum strength and power transmission. With the exception of the Cobra Single Roll Crusher, all gearing is cut from alloy steel. The Cobra Single Roll Crusher utilizes a cast iron gear and an alloy steel pinion gear.

All McLanahan Single Roll Crushers utilize the V-belt drive arrangement. Electric motor power is transmitted to a grooved and balanced flywheel pulley mounted on the countershaft. V-belts provide power transmission between the electric motor and the countershaft.

Safety Guards

Where used, the automatic toggle relief mechanism is completely guarded by hinged access doors. Operation of these doors is controlled by a hazardous-location limit switch, which when wired (by others) in series with the motor holding coil will discontinue electric power to the crusher when the doors are open. Countershafts are also covered with personnel access guards. Steel sectionalized protective V-belt drive guards and sealed oil bath gear guards can be provided. The Cobra Single Roll Crusher can be provided with an open atmosphere gear guard when standard gear lubrication compounds are utilized for this crusher.

Protective Devices

Roll and countershaft bearings can be equipped with temperature warning devices, which can be connected to an alarm system, or automatic shut off devices. Zero speed switches to monitor the operation of roll or countershafts are also available.

Lubrication

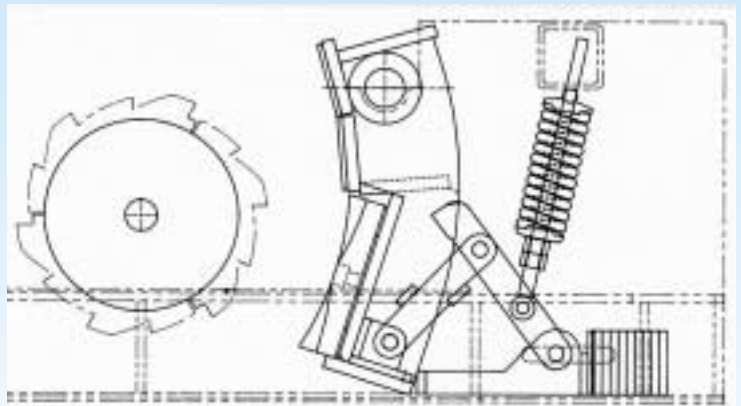
Dust proof fittings on roll and countershaft bearings ensure effective lubrication. The hinge shaft at the top of the crushing plate and steel toggle mechanisms, when used, are equipped with industrial grease type fittings. Distribution blocks are provided as grease lines are banked to a common location on each side of the crusher frame in order to facilitate maintenance. As an option, an automatic lubrication system to all bearings and lubrication points can be supplied.

Automatic Toggles—Advanced Protection Against Uncrushable Materials

When the compressive strength of an uncrushable material is higher than the combined forces holding the curved crushing plate in position relative to the crushing roll, the automatic toggle mechanisms provide relief by allowing the curved crushing plate to move back and allow tramp iron and similar uncrushable material to pass through the crusher. The toggle and spring mechanisms instantly return the crushing plate to its original position assuring a minimum passage of oversize material. There are no shear pins, blocks or bolts to break or be replaced. Continuous operation is assured.

Utilizing spring-loaded toggles assures that the crushing plate is either fully closed or open momentarily to pass tramp material within reasonable size. The toggle relief mechanism can be set at any desired resistance simply by adjusting the compression of the coil springs. Reasonable effort should be made to remove excessively large tramp material ahead of the crusher.

Cobra Crushers are supplied with either a compression spring or shear block. Please refer to the Cobra section for further details.



Toggles Open

ROCKMASTER

Ideal for reducing hard materials, the Rockmaster Single Roll Crusher is of extremely heavy-duty construction. Its rugged design allows continuous service even in the most severe crushing application. Believed to be one of the world's strongest duty single roll crushers, the Rockmaster traditionally provides years of service with minimum maintenance. The Rockmaster Crusher is the ultimate refinement of strength and design, an outgrowth of the original single roll crusher designed and first manufactured in 1894 by McLanahan.



Applications

Primary reduction of very hard rock, ore, mine refuse, and R.O.M. coal with refuse. Ideal for slabby feeds and wet sticky material.

Capacities shown in Tons per Hour

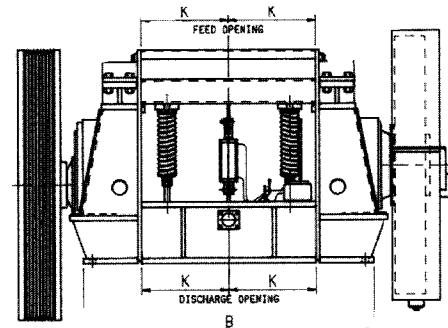
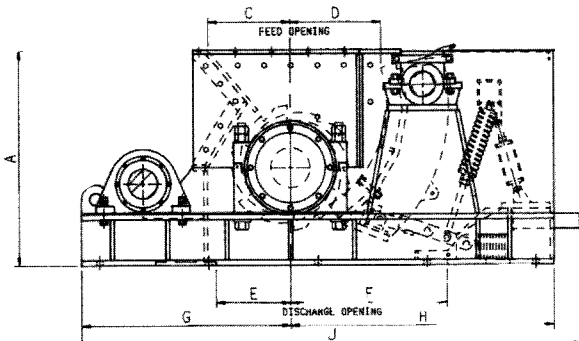
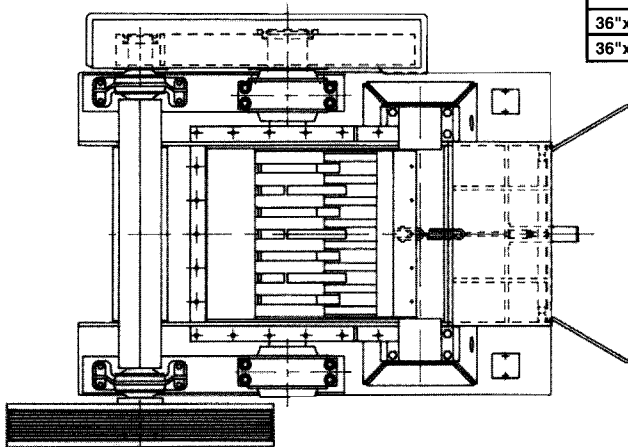
Square Screen Openings	Lengths of Roll					
	36"	42"	48"	54"	60"	72"
3"	125	167	209	251	292	335
4"	146	195	244	292	341	390
5"	167	223	278	334	390	446
6"	186	251	313	376	439	501
7"	209	279	348	418	487	557
8"	251	335	418	501	585	669

Capacities shown are based upon standard roll speed crushing material with a bulk density of 100 lbs. per cubic foot. Heavier materials will result in higher capacities. Under certain conditions roll speed may be increased yielding considerably higher capacities.

Larger product sizes may be produced if required. In the event the feed is screened prior to the crusher, the capacity would be approximately 75% of what is listed above.

SIZE	A	B	C	D	E	F	G	H	J	K
21"x36"	4'-6"	5'-11"	1'-9"	1'-8"	1'-9"	3'-6"	4'-4"	6'-0"	11'-0"	1'-6 1/2"
21"x48"	4'-6"	6'-11"	1'-9"	1'-8"	1'-9"	3'-6"	4'-4"	6'-0"	11'-0"	2'-1 1/2"
21"x60"	4'-6"	7'-11"	1'-9"	1'-8"	1'-9"	3'-6"	4'-4"	6'-0"	11'-0"	2'-7 1/2"
24"x36"	4'-11"	5'-11"	2'-0"	1'-11"	2'-0"	3'-10"	5'-0"	6'-6"	11'-6"	1'-6 1/2"
24"x42"	4'-11"	6'-5"	2'-0"	1'-11"	2'-0"	3'-10"	5'-0"	6'-6"	11'-6"	1'-10 1/2"
24"x48"	4'-11"	6'-11"	2'-0"	1'-11"	2'-0"	3'-10"	5'-0"	6'-6"	11'-6"	2'-1 1/2"
24"x54"	4'-11"	7'-5"	2'-0"	1'-11"	2'-0"	3'-10"	5'-0"	6'-6"	11'-6"	2'-4 1/2"
24"x60"	4'-11"	7'-11"	2'-0"	1'-11"	2'-0"	3'-10"	5'-0"	6'-6"	11'-6"	2'-7 1/2"
24"x72"	4'-11"	8'-11"	2'-0"	1'-11"	2'-0"	3'-10"	5'-0"	6'-6"	11'-6"	3'-1 1/2"
30"x48"	5'-6"	7'-6"	2'-3"	2'-6"	2'-1"	4'-3"	5'-9"	7'-3"	13'-0"	2'-2"
30"x54"	5'-6"	8'-0"	2'-3"	2'-6"	2'-1"	4'-3"	5'-9"	7'-3"	13'-0"	2'-5"
30"x60"	5'-6"	8'-6"	2'-3"	2'-6"	2'-1"	4'-3"	5'-9"	7'-3"	13'-0"	2'-8"
30"x72"	5'-6"	9'-6"	2'-3"	2'-6"	2'-1"	4'-3"	5'-9"	7'-3"	13'-0"	3'-2"
36"x60"	6'-1"	9'-2"	2'-5"	2'-10"	2'-3"	4'-10"	6'-8"	8'-0"	13'-9"	2'-8"
36"x72"	6'-1"	10'-2"	2'-5"	2'-10"	2'-3"	4'-10"	6'-8"	8'-0"	13'-9"	3'-2"

The smaller Rockmasters, with 21" and 24" roll diameters, are capable of reducing material to a nominal 3" product size, while 30" and 36" diameter rolls usually are limited to reducing material to 5" through 10" product sizes. In some applications, the 30" diameter machine can be used to reduced run-of-mine material to 4".

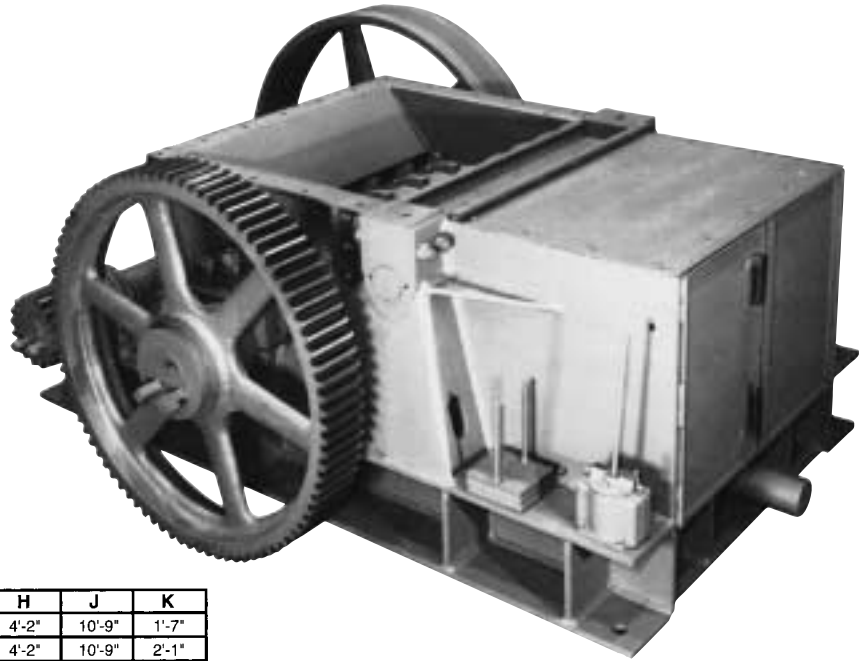


SUPER BLACK DIAMOND

The McLanahan Super Black Diamond incorporates all the basic advantages of single roll construction, including non-plugging operation on wet, sticky feeds and the ability to provide high throughput capacities in continuous applications.

Applications

Primary reduction of medium to hard shale, coal, salt, lime, phosphate rock, cinders and other medium hard feeds. Not intended for use on hard materials requiring the Rockmaster Crusher.



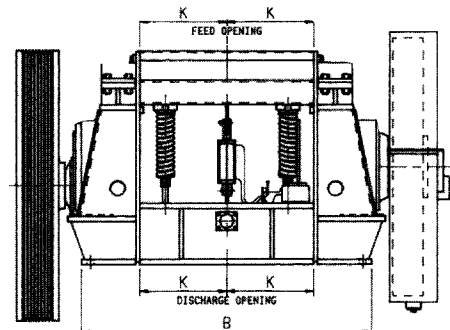
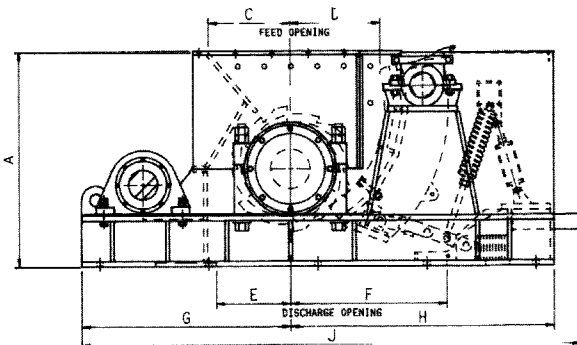
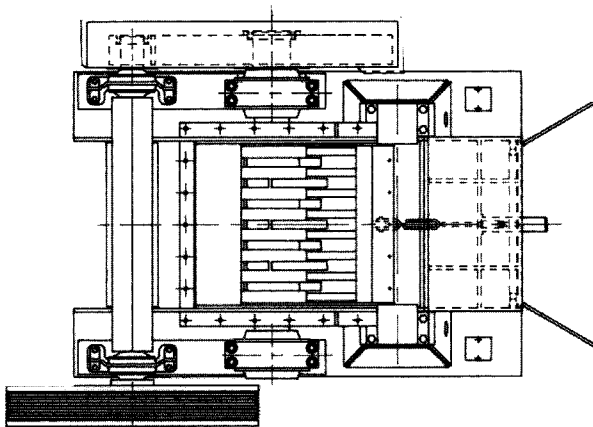
SIZE	A	B	C	D	E	F	G	H	J	K
24"x36"	4'-0"	5'-4"	1'-6"	2'-0"	1'-6"	3'-9"	4'-2"	4'-2"	10'-9"	1'-7"
24"x48"	4'-0"	6'-4"	1'-6"	2'-0"	1'-6"	3'-9"	4'-2"	4'-2"	10'-9"	2'-1"
24"x60"	4'-0"	7'-4"	1'-6"	2'-0"	1'-6"	3'-9"	4'-2"	4'-2"	10'-9"	2'-7"
24"x72"	4'-0"	8'-4"	1'-6"	2'-0"	1'-6"	3'-9"	4'-2"	4'-2"	10'-9"	3'-1"
30"x48"	5'-2"	6'-5"	1'-11"	2'-4"	1'-10"	3'-11"	5'-0"	6'-6"	11'-11"	2'-1"
30"x60"	5'-2"	7'-5"	1'-11"	2'-4"	1'-10"	3'-11"	5'-0"	6'-6"	11'-11"	2'-7"
30"x72"	5'-2"	8'-5"	1'-11"	2'-4"	1'-10"	3'-11"	5'-0"	6'-6"	11'-11"	3'-1"
36"x60"	6'-4"	7'-6"	2'-4"	2'-8"	2'-2"	4'-1"	5'-10"	7'-2"	13'-7"	2'-7"
36"x72"	6'-4"	8'-6"	2'-4"	2'-8"	2'-2"	4'-1"	5'-10"	7'-2"	13'-7"	3'-1"

Super Black Diamond Capacities

Capacities shown in Short Tons per Hour

Square Screen Openings	Lengths of Roll						
	30"	36"	42"	48"	54"	60"	72"
3"	105	125	146	167	186	209	251
4"	140	167	195	223	251	279	335
5"	174	209	244	278	313	348	418
6"	209	251	292	334	376	418	501
7"	244	292	341	390	439	487	585
8"	279	335	390	446	501	557	669

Capacities remain the same regardless of roll diameter as the peripheral speed stays constant. Under certain conditions roll speed may be increased to yield higher capacities. In the event that the feed is screened ahead of the crusher, then the capacity would be 75% of that listed. Capacities are based upon 100#/ft³ material.

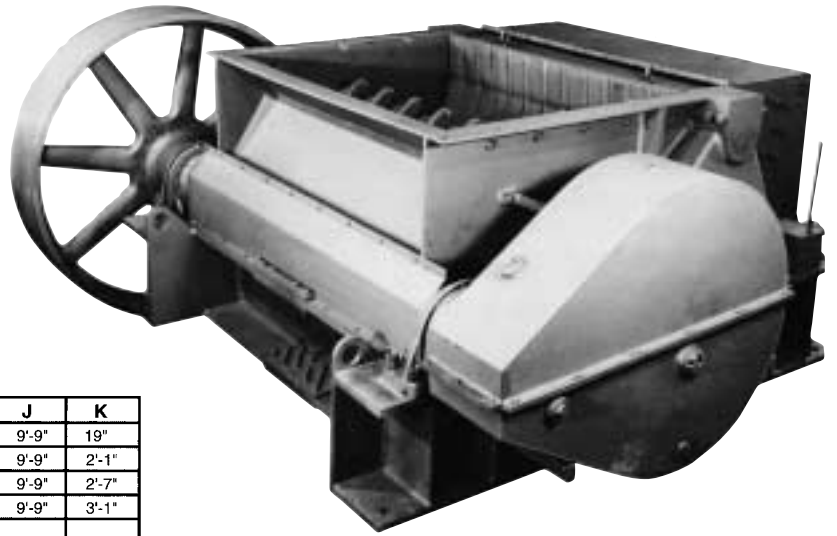


BLACK DIAMOND

The Black Diamond Crusher, with its simple design and great reliability, incorporates many of the same design features as the Rockmaster and Super Black Diamond, at a lower cost.

Applications

Primary reduction of medium to soft shale, coal, salt, lime, phosphate rock, cinders and other friable feeds. Not intended for use on harder materials requiring either a Rockmaster or Super Black Diamond Crushers.

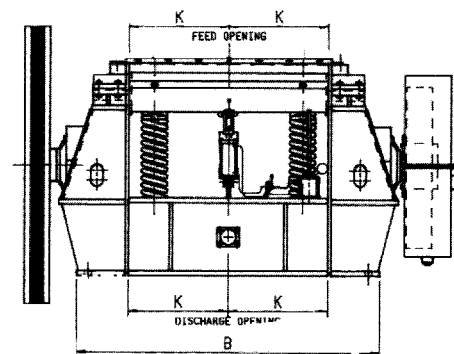
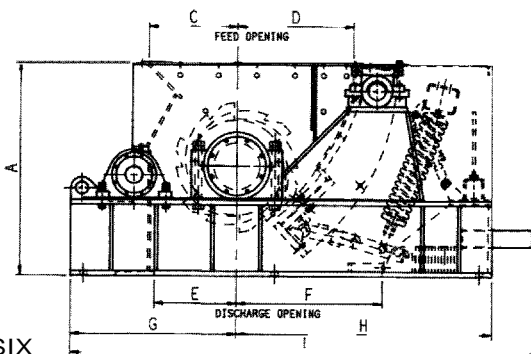
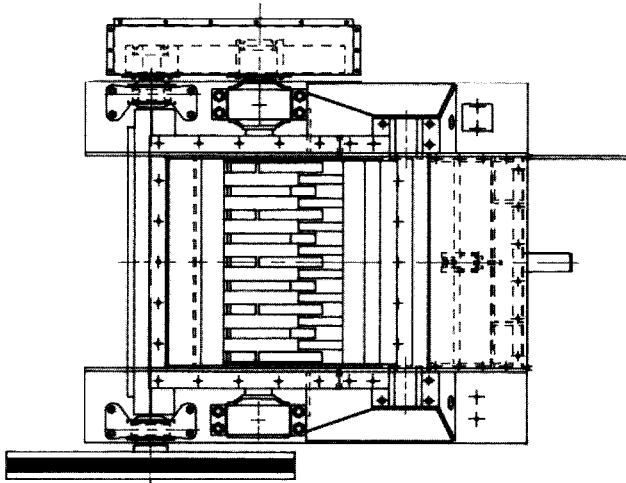


SIZE	A	B	C	D	E	F	G	H	J	K
24x36	3'-9"	4'-11"	17-1/4"	2'-1"	18"	3'-5"	3'-2"	6'-0"	9'-9"	19"
24x48	3'-9"	5'-11"	17-1/4"	2'-1"	18"	3'-5"	3'-2"	6'-0"	9'-9"	2'-1"
24x60	3'-9"	6'-11"	17-1/4"	2'-1"	18"	3'-5"	3'-2"	6'-0"	9'-9"	2'-7"
24x72	3'-9"	7'-11"	17-1/4"	2'-1"	18"	3'-5"	3'-2"	6'-0"	9'-9"	3'-1"
30x36	4'-8"	5'-5"	21-1/4"	2'-6 3/8"	21-3/4"	3'-6"	3'-6 1/2"	6'-1 1/4"	10'-9 1/2"	19"
30x48	4'-8"	6'-5"	21-1/4"	2'-6 3/8"	21-3/4"	3'-6"	3'-6 1/2"	6'-1 1/4"	10'-9 1/2"	2'-1"
30x60	4'-8"	7'-5"	21-1/4"	2'-6 3/8"	21-3/4"	3'-6"	3'-6 1/2"	6'-1 1/4"	10'-9 1/2"	2'-7"
30x72	4'-8"	8'-5"	21-1/4"	2'-6 3/8"	21-3/4"	3'-6"	3'-6 1/2"	6'-1 1/4"	10'-9 1/2"	3'-1"
36x48	5'-6"	6'-11"	2'-3 3/4"	3'-0 1/4"	2'-1 3/4"	3'-9 3/4"	4'-4"	6'-8"	12'-1 1/4"	2'-1"
36x60	5'-6"	7'-11"	2'-3 3/4"	3'-0 1/4"	2'-1 3/4"	3'-9 3/4"	4'-4"	6'-8"	12'-1 1/4"	2'-7"
36x72	5'-6"	8'-11"	2'-3 3/4"	3'-0 1/4"	2'-1 3/4"	3'-9 3/4"	4'-4"	6'-8"	12'-1 1/4"	3'-1"
36x84	5'-6"	9'-11"	2'-3 3/4"	3'-0 1/4"	2'-1 3/4"	3'-9 3/4"	4'-4"	6'-8"	12'-1 1/4"	3'-7"

Black Diamond Crusher Capacities

Screen Openings	Lengths of Roll						
	24	30	36	48	60	72	84
3/4"	31	40	47	63	80	94	110
1"	41	52	63	83	105	125	146
1 1/4"	52	65	78	105	130	156	184
1 1/2"	62	78	94	125	157	188	220
2"	83	105	125	167	210	250	292
3"	125	157	188	250	314	377	440
4"	167	209	250	335	418	500	586
5"	209	262	314	418	525	628	734
6"	250	314	376	500	628	752	880
8"	334	419	500	667	838	1000	1166
10"	418	525	628	836	1050	1256	1468

Capacities shown are based on standard roll speed. Capacities are based upon 50#/ft³ material. Under certain conditions roll speed may be increased, yielding considerably higher capacities. Capacities are based upon R.O.M. feed. In the event the feed is screened ahead of the crusher, then the capacity would be 75% of the listed.



COBRA

The McLanahan Single Roll Cobra features a high ratio of reduction, dependability, ruggedness, low initial cost and ease of maintenance.

Applications

The Cobra design has proved highly adaptable in crushing clean coal, petroleum coke, sulphur, salt, lime, rosin, foundry cores, frozen agglomerates, sintered flyash and other friable materials. The Cobra is effective for either primary or secondary crushing of soft or friable feed materials.

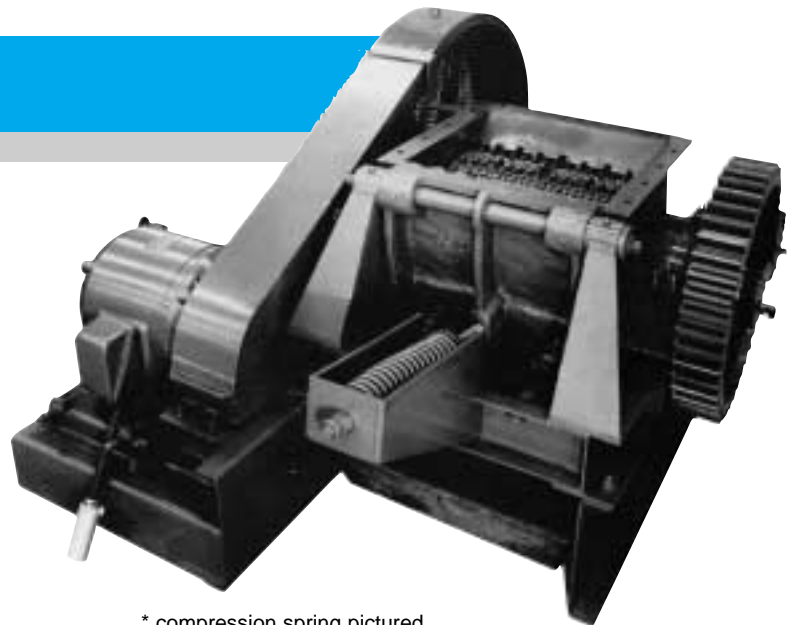
The Cobra is ideal for strip mining installations where the operator uses pickers ahead of the crusher to remove rock and other hard refuse.

Tramp Iron Protection

The Cobra can be furnished with either of two types of tramp iron protection.

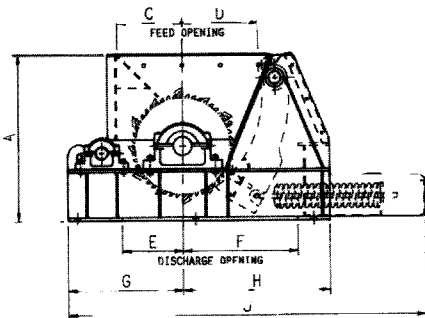
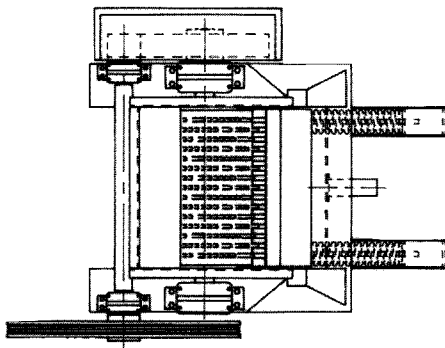
Shear blocks — Recommended where a carefully controlled product size is required or where a high percentage of tramp iron is not encountered.

Compression spring — Recommended when tramp material is present in feed. This system incorporates a large spring with a spring bolt attached to the crushing plate to allow the crushing plate to open. In Cobra Crushers with roll lengths of 24" and 36", a single spring cage is attached to the center of the crushing plate. In crushers with roll lengths of 48" and 60" a spring cage is used on each side of the crushing plate.



* compression spring pictured

SIZE	A	B	C	D	E	F	G	H	J	K
18"x24"	2'-2"	3'-2"	9-3/8"	14-1/4"	13-1/2"	2'-5"	2'-5"	2'-7 3/4"	6'-11"	13"
18"x36"	2'-3"	4'-2"	9-3/8"	14-1/4"	13-1/2"	2'-5"	2'-7"	2'-7 3/4"	6'-11"	19"
18"x48"	2'-3"	5'-2"	9-3/8"	14-1/4"	13-1/2"	2'-5"	2'-9"	2'-7 3/4"	6'-11"	2'-1"
18"x60"	2'-3"	6'-2"	9-3/8"	14-1/4"	13-1/2"	2'-5"	2'-11"	2'-7 3/4"	6'-11"	2'-7"
18"x72"	2'-3"	7'-2"	9-3/8"	14-1/4"	13-1/2"	2'-5"	2'-11"	2'-7 3/4"	6'-11"	3'-1"
24"x36"	3'-4 5/8"	4'-3"	17"	23-1/4"	15-1/2"	2'-7"	2'-9"	3'-2 1/2"	8'-10"	1'-7"
24"x48"	3'-4 5/8"	5'-3"	17"	23-1/4"	15-1/2"	2'-7"	2'-11"	3'-2 1/2"	8'-10"	2'-1"
24"x60"	3'-4 5/8"	6'-3"	17"	23-1/4"	15-1/2"	2'-7"	3'-1"	3'-2 1/2"	8'-10"	2'-7"
24"x72"	3'-4 5/8"	7'-3"	17"	23-1/4"	15-1/2"	2'-7"	3'-3"	3'-2 1/2"	8'-10"	3'-1"
30"x48"	4'-3"	6'-2"	20-1/2"	2'-0 1/2"	19"	3'-0"	3'-3"	3'-10"	9'-4"	2'-1"
30"x60"	4'-3"	7'-2"	20-1/2"	2'-0 1/2"	19"	3'-0"	3'-5"	3'-10"	9'-4"	2'-7"
30"x72"	4'-3"	8'-2"	20-1/2"	2'-0 1/2"	19"	3'-0"	3'-7"	3'-10"	9'-4"	3'-1"

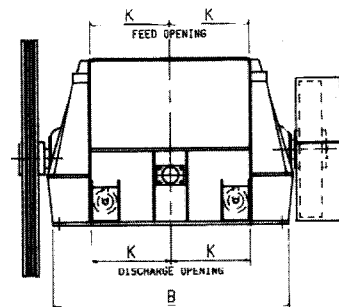


Cobra Crusher Capacities in Tons per Hour

Based on average friable material weighing 50 lbs./cu. ft.

Screen Openings	Length of Roll		
	24"	36"	48"
2"	83	167	210
3"	125	250	314
4"	167	335	418
5"	209	418	525
6"	250	500	628
8"	334	667	838
10"	418	836	1050

Capacities are the same for all diameters in a given roll length as the peripheral speed remains constant. In the event that the feed is screened ahead of the crusher, then the capacity would be 75% of that listed.



APPLICATION RESEARCH LABORATORY

How a Single Roll is selected

1. Material to be crushed.
2. Percent and type of rock or refuse present in feed.
3. Feed size — three dimensions of the average maximum piece.
4. Product size required.
5. Capacity required.
6. Bulk density in #/ft³.

McLanahan Application Research Laboratory

This well equipped facility is available to assist in making recommendations on all types of roll crushers. Crushers are available for reducing your samples, as is an extensive library of data on the characteristics of many types of materials. McLanahan will make crusher size and type recommendations based on actual tests conducted on material to be processed in your application.



Ask for These Other Quality McLanahan Products.



Triple Roll
Crushers



Double Roll
Crushers



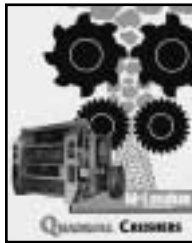
Feeder Breakers



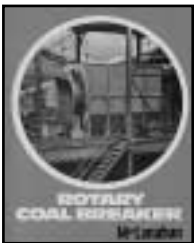
Bulk Material
Sampling Systems



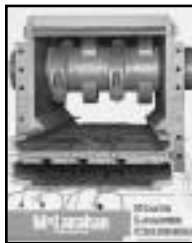
Pug Mill Mixers



Quadroll Crushers



Rotary Coal
Breakers



Stage Loader
Crushers



History

In 1892 Samuel Calvin McLanahan designed and patented the first Single Roll Crusher. McLanahan Corporation offers the longest, most experienced, and broadest product line of any roll crusher manufacturer. Have a unique or tough application? Ask the McLanahan sales department because we have tried it all.



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Guards are recommended for safe operation of the equipment.
In some photos safety guards are not shown.