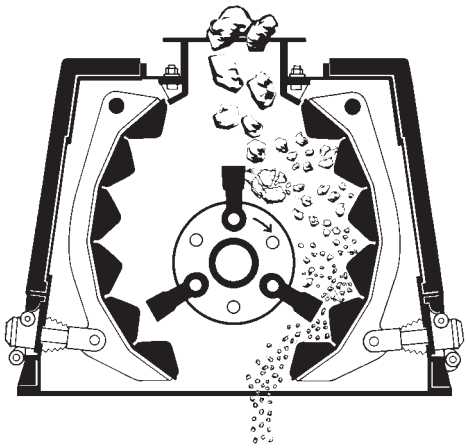
REVERSIBLE IMPACTORS

Pennsylvania Crusher®

The Most Choices, The Most Experience



THE REVERSIBLE IMPACTOR is a highly versatile crusher, first developed and patented by Pennsylvania Crusher in 1937. Since its introduction, a number of design improvements have been made, resulting in the advanced models available today.

As material enters the Reversible Impactor, it is struck by massive steel hammers which cause it to fracture along its natural fault lines into smaller pieces. Now moving at the high velocity imparted by the swinging hammers, these pieces strike the stationary breaker blocks, resulting in further size reduction. The particles then rebound into the path of the hammers, repeating the reduction cycle until the sized material exits through the open bottom of the crusher.

This method of reduction produces a cubical product at high reduction ratios of up to 35 to 1, depending on the friability of the input material.

Overcrushing and excessive production of fines are prevented because the bottom of the crusher is completely open, with no screen bars or other obstructions to impede material flow. In addition, power requirements are reduced by one-half or more of that required by hammermill grate-type crushers producing the same nominal output. Finally, when processing high moisture materials, this design reduces the chance of plugging.

ADVANTAGES OF REVERSIBILITY

With the ability of the rotor assembly to be rotated in either direction, the operator gains important advantages:

- Both hammer faces wear evenly.
- Breaker blocks on either side of the crushing chamber provide twice the wear area as compared to single direction crushers.
- Improved crushing performance as the hammers maintain a sharper profile, imparting a solid, direct impact to the incoming material. In a single direction crusher, hammers develop a rounded profile that delivers only a glancing blow to the material, resulting in lowered capacity and increased power draw.
- There is no need to pull the crusher out of service to manually turn the hammers.

TRAMP IRON PROTECTION

Pennsylvania Reversible Impactors are extremely forgiving of tramp materials. Upon encountering an uncrushable, the free-swinging hammers will lay back. In addition, the open bottom design of these models allows such material to exit quickly, usually without damage to the crusher. In any case, for the best insurance against such damage, we advise that every effort be made to remove uncrushables from the input material prior to the crusher.

OUTPUT SIZE FLEXIBILITY

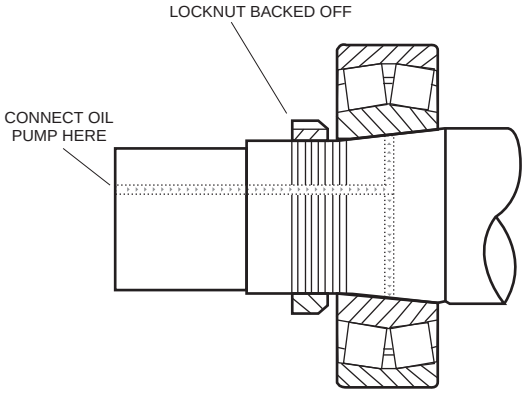
When operating the Pennsylvania Reversible Impactor, the user has the ability to vary the output size across an extremely wide range. In most models, the breaker blocks which line the interior of the crushing chamber are fixed to an adjustable support. This entire assembly can be adjusted toward or away from the hammer circle; the closer these blocks are set to the hammer circle, the finer the output size produced. This adjustment can be made without shutting down the crusher.

More pronounced changes of output size are accomplished by changing the operating speed. Normally this only requires a change in the V-belt drive arrangement or motor speed.

MAINTAINABILITY

Pennsylvania Reversible Impactors incorporate a number of practical features which enable maintenance to be performed quickly and easily. These include:

- Hinged or removable end doors. When opened, these expose the interior of the crusher completely, providing unrestricted access. This greatly speeds any work required on hammers, breaker blocks and frame liners; all can be changed with minimal time and effort.
- Breaker blocks which are both reversible and interchangeable with one another. Doing so enables every breaker block to attain its maximum life before replacement is necessary, helping to reduce labor and replacement parts expenses.
- Split bearing housings. Most inspections and routine maintenance can be performed easily by simply removing the bearing cap, with no need to disturb the rotor assembly. Whenever rotor removal is necessary, the lower portion of the bearing housing remains fixed on the crusher frame. This ensures proper alignment when the rotor is re-installed.
- Hydraulic bearing removal on most machine sizes. This allows the operator to attach a standard shop pump to the end of the rotor shaft and pump oil through the machined passageway to a point between the bearing and the rotor shaft. The pressurized oil frees the bearing from its position on the rotor shaft taper.



MODEL CAL REVERSIBLE IMPACTOR

The Pennsylvania Model CAL is the culmination of 60 years of design improvements to the reversible impact crusher. It has been successfully applied by nearly every segment of the mineral processing industry.

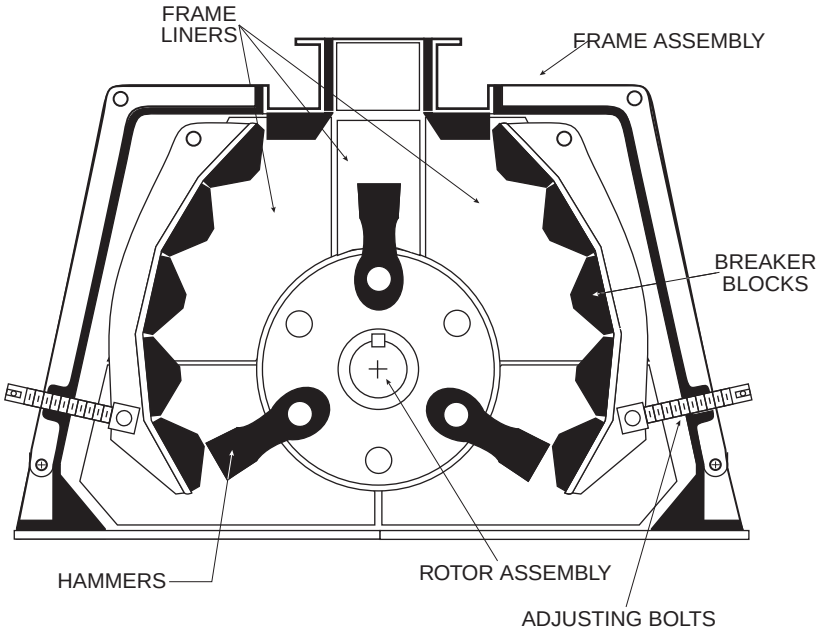
Our design combines excellent reliability, impressive ruggedness and superb performance, coupled with low initial cost and low maintenance costs. These advantages have made the Pennsylvania Model CAL Reversible Impactor the preferred choice.

FRAME ASSEMBLY

Fabricated of heavy steel plate, this assembly is equipped with two large hinged end doors. These provide for complete access to crusher internals for normal maintenance.

FRAME LINERS

The frame is protected from wear by rugged liners fabricated of abrasion resistant steel plate. All liners are replaceable to accommodate for normal wear.



BREAKER BLOCKS

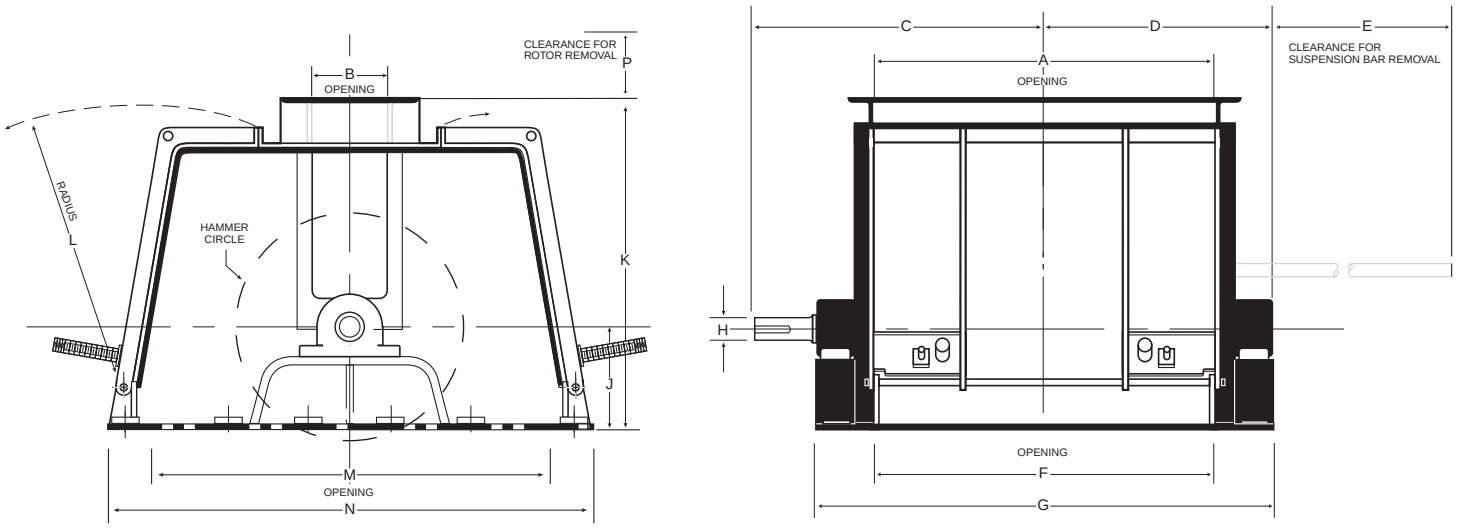
These blocks provide the impact surface and are normally cast of manganese steel. Each block is reversible and interchangeable in order to gain their full wear capability. In addition, the blocks are mounted on an adjustable support which enables the user to maintain consistent output gradation over the life of the crushing components.

ROTOR ASSEMBLY

This is a precision assembly. The rotor discs are machined from heavy, abrasion resistant steel plate. These discs are keyed to the rotor shaft and held with a clamping nut. The rotor shaft itself is machined from a heat treated alloy steel forging. The entire assembly is mounted on heavy duty spherical roller bearings within split housings.

HAMMERS

Heavy T-head style hammers provide complete coverage across the entire rotor assembly. These hammers are normally cast of manganese steel.



GENERAL DATA & DIMENSIONS – MODEL CAL – BRITISH IMPERIAL UNITS (inches)

MACHINE SIZE	MAX. INPUT SIZE	WEIGHT (lb)	ROTOR INERTIA (GR²) (lb-ft²)	A	B	C	D	E	F	G	H	J	K	L	M	N	P
3-32A	6"	4,200	305	9¾"	1'-1"	1'-8⅞"	1'-2¼"	—	9¾"	2'-4½"	2⅛"	1'-2½"	4'-0"	3'-6⁹⁄₁₆"	4'-7"	5'-11"	8"
5-32A	6"	5,950	573	1'-7¼"	1'-1"	2'-3"	1'-7"	9"	1'-7¼"	3'-2"	3"	1'-2½"	4'-0"	3'-6⁹⁄₁₆"	4'-7"	5'-11"	8"
5-38A	8"	8,400	1,132	1'-7¼"	1'-3½"	2'-3"	1'-7⅝"	1'-2⅞"	1'-7¼"	3'-3¼"	3"	1'-5¼"	4'-9"	4'-2⅛""	5'-3¼"	7'-0"	9"
7-38A	8"	10,900	1,670	2'-4½"	1'-3½"	2'-8⅝"	2'-0⅜"	1'-5⅝"	2'-6"	4'-0½"	3¼"	1'-5¼"	4'-9"	4'-2⅛"	5'-3¼"	7'-0"	9"
9-38A	8"	13,300	2,190	3'-2"	1'-3½"	3'-2½"	2'-5"	2'-3"	3'-2"	4'-10"	4⅜₁₆"	1'-5¼"	4'-9"	4'-2⅛"	5'-3¼"	7'-0"	9"
11-38A	8"	15,450	2,750	4'-0"	1'-3½"	4'-0"	3'-0"	3'-0"	4'-1½"	6'-0"	4¼"	1'-5¼"	4'-9"	4'-2"	5'-3¼"	7'-0"	9'
13-38A	8"	17,550	3.275	4'-9⅜"	1'-3½"	4'-4¹¹⁄₁₆"	3'-4¹¹⁄₁₆"	3'-0⁵⁄₁₆"	4'-10⅞"	6'-9⅜"	5"	1'-5¼"	4'-9"	4'-2"	5'-3¼"	7'-0"	9"
11-44A	10"	19,000	5,300	4'-0"	1'-6"	4'-0"	3'-0"	3'-0"	4'-1¾"	6'-0"	4¼"	1'-8"	5'-6"	4'-10"	6'-2½"	8'-1"	11"
15-44A	10"	24,900	7,400	5'-6¾"	1'-6"	4'-9⅜"	3'-9⅜"	4'-6⅝"	5'-8¼"	7'-6¾"	4½"	1'-8"	5'-6"	4'-10"	6'-2½"	8'-1"	11"
19-44A	10"	34,000	9,700	7'-1½"	1'-6"	5'-11³⁄₁₆"	4'-8²³⁄₃₂"	6'-0⁹⁄₃₂"	7'-3"	9'-4¼"	5"	1'-8"	5'-6"	4'-10"	6'-2½"	8'-1"	11"

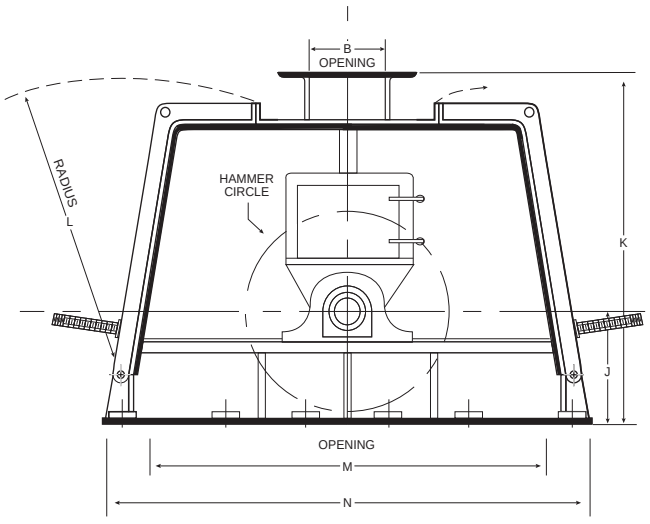
GENERAL DATA & DIMENSIONS – MODEL CAL – INTERNATIONAL METRIC UNITS (mm)

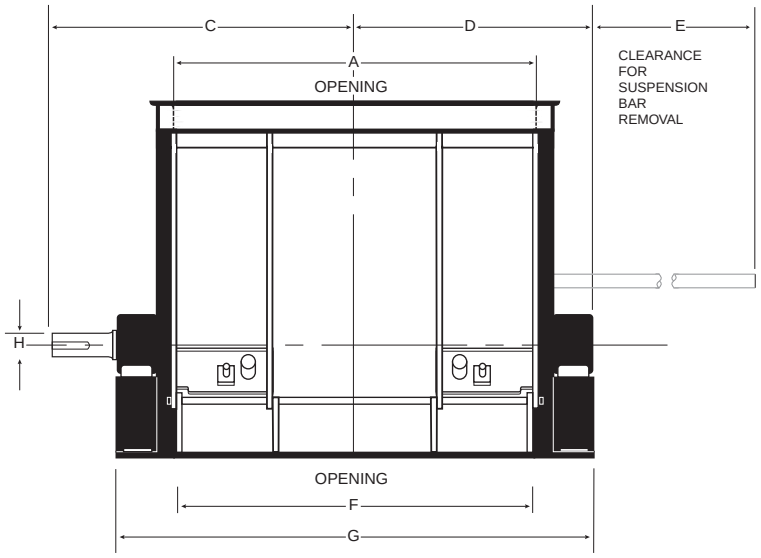
MACHINE SIZE SIZE	MAX. INPUT	WEIGHT (kg)	ROTOR INERTIA (GR²) (kg-m²)	A	B	C	D	E	F	G	H	J	K	L	M	N	P
3-32A	150	1,906	12.7	248	330	530	362	—	248	724	54	368	1219	1081	1397	1803	203
5-32A	150	2,700	24.2	489	330	686	483	229	489	965	76	368	1219	1081	1397	1803	203
5-38A	200	3,810	47.7	489	394	686	498	378	489	997	76	438	1448	1273	1607	2134	229
7-38A	200	4,944	70.5	724	394	829	619	448	762	1232	83	438	1448	1273	1607	2134	229
9-38A	200	6,032	92.3	965	394	978	737	686	965	1473	106	438	1448	1273	1607	2134	229
11-38A	200	7,008	116.0	1219	394	1219	914	914	1257	1829	108	438	1448	1270	1607	2134	229
13-38A	200	7,960	137.5	1457	394	1338	1033	922	1495	2067	127	438	1448	1270	1607	2134	229
11-44A	250	8,620	223.5	1219	457	1219	914	914	1264	1829	108	508	1676	1473	1892	2464	279
15-44A	250	11,300	312.0	1695	457	1457	1153	1387	1733	2305	114	508	1676	1473	1892	2464	279
19-44A	250	15,425	408.7	2172	457	1808	1440	1836	2210	2851	127	508	1676	1473	1892	2464	279

MODEL CA REVERSIBLE IMPACTOR

Pennsylvania CA Reversible Impactors are specifically designed to handle larger input sizes and higher capacities with ease. Their construction is extra heavy – the most robust in the industry – thus ensuring reliable duty and a long service life even under the harshest conditions.

All features included with the Model CAL are also provided with the Model CA Reversible Impactor.





GENERAL DATA & DIMENSIONS – MODEL CA – BRITISH IMPERIAL UNITS (inches)

MACHINE SIZE	MAX. INPUT SIZE	WEIGHT (lb)	ROTOR INERTIA (GR^2) ($lb\text{-}ft^2$)	A	B	C	D	E	F	G	H	J	K	L	M	N
2-30	6"	9,200	700	1'-8½"	1'-0½"	2'-11¼"	2'-3"	7½"	2'-5"	4'-2"	3"	1'-10"	7'-1"	4'-3½"	5'-0"	5'-8½"
3-30	6"	12,300	1,010	2'-6½"	1'-0½"	3'-4¼"	2'-8"	2'-1"	3'-3"	5'-0"	3"	1'-10"	7'-1"	4'-3½"	5'-0"	5'-8½"
3-36	8"	14,800	1,700	2'-6½"	1'-3"	3'-7¼"	2'-9"	1'-6"	3'-3½"	5'-2"	3¼"	2'-2"	8'-0"	5'-1"	6'-0"	6'-10½"
4-36	8"	16,500	2,240	3'-4½"	1'-3"	4'-0¼"	3'-2"	2'-4"	4'-1½"	6'-0"	4½"	2'-2"	8'-0"	5'-1"	6'-0"	6'-10½"
6-36	8"	24,000	3,310	5'-0½"	1'-3"	4'-10¼"	4'-0¼"	4'-0"	5'-9½"	7'-8"	4½"	2'-2"	8'-0"	5'-1"	6'-0"	6'-10½"
4-42	10"	23,500	3,925	3'-4½"	1'-5½"	4'-2"	3'-4½"	2'-2"	4'-2"	6'-2"	4"	2'-6"	9'-0"	5'-10"	7'-0"	8'-0"
5-42	10"	27,000	4,850	4'-2½"	1'-5½"	4'-7"	3'-9½"	3'-0"	5'-0"	7'-0"	4"	2'-6"	9'-0"	5'-10"	7'-0"	8'-0"
6-42	10"	30,500	5,880	5'-0½"	1'-5½"	5'-0"	4'-2½"	3'-10"	5'-10"	7'-10"	5¼"	2'-6"	9'-0"	5'-10"	7'-0"	8'-0"
7-42	10"	34,000	6,820	5'-10½"	1'-5½"	5'-5"	4'-7½"	4'-8"	6'-8"	8'-8"	5¼"	2'-6"	9'-0"	5'-10"	7'-0"	8'-0"
6-48	12"	46,000	12,900	5'-0½"	1'-8"	5'-10½"	5'-0"	3'-0"	5'-11"	9'-6"	6½"	3'-0"	10'-4"	6'-10"	8'-0"	9'-2"
8-48	12"	59,000	17,370	6'-8½"	1'-8"	6'-8½"	5'-9"	4'-8"	7'-7"	11'-2"	7"	3'-0"	10'-4"	6'-10"	8'-0"	9'-2"
7-60	16"	78,000	33,300	5'-11"	2'-1"	6'-8½"	5'-8"	3'-10"	6'-11"	11'-8"	7"	3'-10"	13'-4"	8'-6"	10'-0"	11'-4"
8-60	16"	85,000	37,700	6'-9"	2'-1"	7'-1½"	6'-3"	4'-8"	7'-9"	12'-6"	7"	3'-10"	13'-4"	8'-6"	10'-0"	11'-4"
10-60	16"	106,000	48,180	8'-5"	2'-1"	7'-11½"	7'-1"	6'-6"	9'-5"	14'-2"	8½"	3'-10"	13'-4"	8'-6"	10'-0"	11'-4"

GENERAL DATA & DIMENSIONS – MODEL CA – INTERNATIONAL (METRIC) UNITS (mm)

MACHINE SIZE	MAX. INPUT SIZE	WEIGHT (kg)	ROTOR INERTIA (GR^2) ($kg\text{-}m^2$)	A	B	C	D	E	F	G	H	J	K	L	M	N
2-30	150	4,180	30	521	318	895	686	191	737	1270	76	559	2159	1308	1524	1740
3-30	150	5,580	43	775	318	1022	813	635	991	1524	76	559	2159	1308	1524	1740
3-36	200	6,720	72	775	381	1099	838	457	1003	1575	83	660	2434	1549	1829	2096
4-36	200	7,490	95	1029	381	1226	965	711	1257	1829	114	660	2434	1549	1829	2096
6-36	200	10,890	140	1537	381	1480	1226	1219	1765	2337	114	660	2434	1549	1829	2096
4-42	250	10,670	166	1029	445	1270	1029	660	1270	1880	102	762	2743	1778	2134	2434
5-42	250	12,250	205	1283	445	1397	1156	914	1524	2134	102	762	2743	1778	2134	2434
6-42	250	13,840	248	1537	445	1524	1283	1168	1778	2388	133	762	2743	1778	2134	2434
7-42	250	15,430	288	1791	445	1651	1410	1422	2032	2642	133	762	2743	1778	2134	2434
6-48	300	20,870	544	1537	508	1790	1524	914	1803	2896	165	914	3150	2083	2434	2794
8-48	300	26,770	733	2045	508	2045	1753	1422	2311	3404	178	914	3150	2083	2434	2794
7-60	400	35,390	1,405	1803	635	2045	1727	1168	2108	3556	178	1168	4064	2591	3048	3454
8-60	400	38,570	1,591	2057	635	2172	1905	1422	2362	3810	178	1168	4064	2591	3048	3454
10-60	400	48,100	2,033	2565	635	2426	2159	1981	2870	4318	216	1168	4064	2591	3048	3454

MODEL CF AND CC REVERSIBLE IMPACTORS

Both models are well suited for production at lower capacities with smaller input sizes.

The only difference between these two models is found in the design of the breaker blocks and plates. The Model CF is equipped with fixed breaker blocks throughout. The Model CC also has fixed breaker blocks in its upper portion, but in addition, is equipped with adjustable lower breaker plates.

The ability to adjust these lower breaker plates allows the operator to vary the gradation of the output to suit his needs, and to then maintain this gradation over the life of the crushing components.

Models CC and CF Reversible Impactors offer the following features:

COMPACT SIZE

Both models require little installation space, usually less than the area required by a typical office desk. This makes these units highly adaptable to a variety of plant layouts.

RUGGED CONSTRUCTION

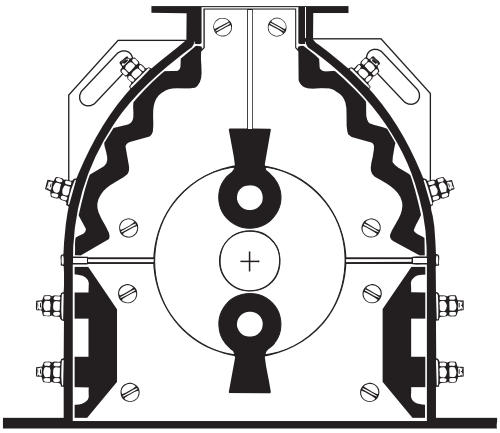
Though physically small in size, these crushers are designed and built in the same manner as our larger units.

HIGH PERFORMANCE

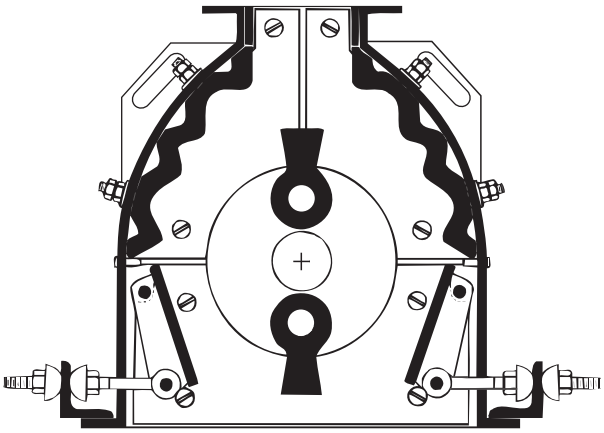
These models are capable of reduction ratios up to 16 to 1, and capacities up to 15 TPH. They are well suited to a wide variety of applications.

EFFICIENT OPERATION

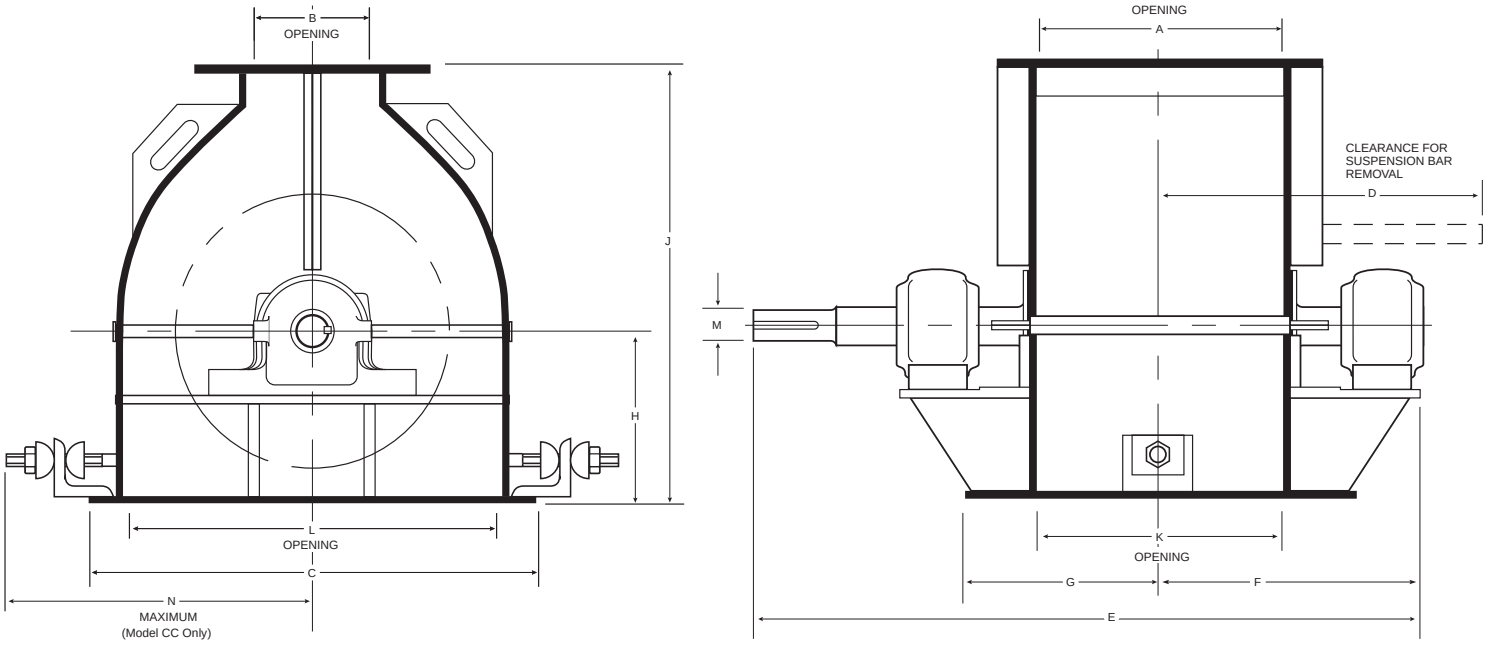
These crushers combine low initial, operational and maintenance costs with the performance and reliability for which Pennsylvania Crusher equipment is well known.



MODEL CF



MODEL CC



GENERAL DATA & DIMENSIONS – MODELS CC & CF – BRITISH IMPERIAL UNITS (inches)

IMPACTOR SIZE	MAX. INPUT SIZE	WEIGHT (lb)	ROTOR INERTIA (GR^2) ($lb\text{-}ft^2$)	A	B	C	D	E	F	G	H	J	K	L	M	N
00-16	4½"	825	22	11"	6"	2'-1¾"	1'-5"	2'-10 3/16"	1'-1¼"	10"	10"	2'-1½"	11¾"	1'-9½"	1⅝"	1'-7"
3-26	4½"	2,700	150	1'-1¼"	6"	3'-4¾"	2'-2"	3'-4 3/16"	1'-4 3/16"	1'-2⅛"	1'-2"	3'-1¼"	1'-1½"	2'-6¼"	2⅛"	2'-4⅞"

GENERAL DATA & DIMENSIONS – MODELS CC & CF – INTERNATIONAL (METRIC) UNITS (mm)

IMPACTOR SIZE	MAX. INPUT SIZE	WEIGHT (kg)	ROTOR INERTIA (GR^2) ($kg\text{-}m^2$)	A	B	C	D	E	F	G	H	J	K	L	M	N
00-16	115	374	0.9	279	152	654	432	868	337	254	254	648	298	546	41	483
3-26	115	1,225	6.3	337	152	1035	660	1020	411	356	356	946	343	768	54	733

TYPICAL APPLICATIONS FOR PENNSYLVANIA REVERSIBLE IMPACTORS

Limestone, bottom ash, carbon, coal, fertilizers, potash, metallic dross, foundry sand, glass, graphite, green and fired brick, ceramics, phosphates, salt cakes, slag and tungsten carbide, plus a wide range of other ores, minerals and materials.

APPLICATIONS EXPERTISE

Determination of the correct model and size of crusher for any application entails meticulous analysis of all factors. Our applications engineering staff has devoted a considerable portion of their professional careers to this end. Our recommendations, therefore, as to the crusher type and size are based upon proven experience with thousands of installations around the world. At our disposal we also have the advantage of 90+ years of test results performed on countless materials from every continent; often our data base even includes results from several locations within the same mineral deposit.

Additionally, you will find us well equipped to provide accessory equipment, including drying and other systems. We will also review your planned general arrangement of the input and discharge equipment, to ensure compatibility with the operation of the crusher.

TEST CRUSHING

Periodically, a new or unusual application is encountered which may require a more detailed study of the material to be crushed. In such instances, we recommend test crushing of the material in our Test Crushing Facility. It is equipped with full-size crushers, along with the apparatus needed to determine capacity, gradation, moisture content, abrasiveness and proper height-of-drop, as well as other characteristics that are essential for proper crusher selection and operation.

All test crushing is performed by experienced technicians under the direction of our senior application professionals. For full details, contact your Pennsylvania Crusher representative or our main office as listed in this brochure.

DESIGN ENGINEERING

Pennsylvania Crusher has always been at the forefront of crusher innovation. In fact, many of today's basic crushing equipment concepts and testing methods were pioneered by Pennsylvania®.

New designs and materials are continually being developed and applied to both new crushers as well as to those already in service. Computer-aided design, CAD, is used extensively for this purpose.

Working with our Application, Manufacturing and Service Departments, our design professionals have earned a reputation for the development of crushers which provide unsurpassed performance and reliability.

SUPPORT SERVICES

Our Parts & Service Department is involved with the customer far more extensively than is usually found with ordinary parts and service groups. Each member of the staff has a keen understanding of the importance of the crusher to your operation. Consequently, all members of this department demonstrate a personal commitment to keeping your crusher at its peak operating condition.

We maintain detailed records of all crushers we have shipped, including details of past modifications, service records and other pertinent data. Modification drawings are kept as far back as sixty years, for there are numerous instances where such Pennsylvania equipment is still in productive service.

In addition, we provide worldwide installation, start up or repair supervision and other on-site services at prevailing rates. When our on-site presence is not required, our field service advisors can provide assistance by telephone or fax to answer whatever questions you may have.

OTHER PENNSYLVANIA IMPACT TYPE CRUSHERS

COALPACTOR

This design reduces coking coals to the required coking size, with minimal generation of fines. It is also widely used for the size reduction of lignite and petroleum coke.

TWIN ROTOR IMPACTOR

When processing wet sticky materials as commonly found in clay, brick and remediation applications, this crusher delivers unsurpassed performance.

CAGE MILL

For size reduction of relatively dry, friable materials that require high reduction ratios. Widely used for fertilizers, chemicals, coals and other dry bulk materials.

SLAGPACTOR

This unit is ideally suited for reducing slag having large metallic inclusions. The impact force generated by the massive swing hammers liberates the inclusions while reducing the slag in size.

Photos may show optional equipment. All dimensions are approximate. Certified drawings will be furnished for installation.

For further information on these and other crushers, please contact your local Pennsylvania Crusher representative or our main office as listed in this brochure.

THE MOST CHOICES – THE MOST EXPERIENCE

The pioneering work of Pennsylvania Crusher has put our company in the forefront of material reduction technology since 1905.

We design and build virtually every type of crusher - impact, shear, attrition or compression - capable of producing a wide range of capacities, gradations and reduction ratios.

As a result, our experienced team of application engineers is free to recommend the particular crusher model and size that best suits your application, without the compromises imposed on others by product line limitations.

We maintain a data base of test results of materials from every portion of the globe. This pool of knowledge, plus our unsurpassed level of experience, assures that your selection will be based upon the best possible information.

For additional information or for a free copy of our Handbook of Crushing, contact your local Pennsylvania Crusher representative or our main office as listed below.

Pennsylvania Crusher®

The Most Choices, The Most Experience

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