

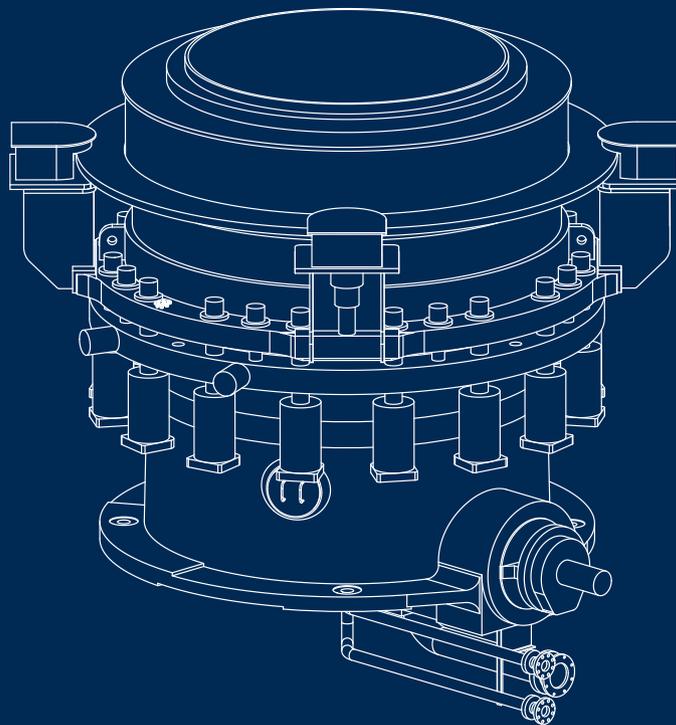
Raptor® Cone Crushers for Mining and Aggregate



FLS

The crusher designed to reduce maintenance

We used input from plant and maintenance personnel around the globe to incorporate features that reduce your maintenance time and increase production.



Key benefits

- High reliability
- Acceptability
- Accessibility
- Structural integrity
- Safety
- High performance bronze technology
- Automation



Low profile design allows versatility in structural designs

Reliable: Rock solid performance

Our Raptor cone crusher spare parts are designed to offer excellent performance with increased durability, smoother operation and reduced maintenance expenses. We keep your essential equipment running.

Structural Integrity

The critical load bearing components of the Raptor cone crushers meet specifications that typically exceed what is commonly offered in a conventional cone crusher. The major components are cast of high grade steel. The eccentric material selection provides greater certainty of a reliable surface finish over a long period of service.

Accessibility

Our design gives you better access to the inside of the crusher. We provide features such as mainframe inspection ports, cartridge countershaft boxes and specially-designed tools.

Mobility

Productive and versatile, our cone crusher is readily mounted and easily transportable on a portable/mobile cone/screen chassis. Now your closed circuit plant can be as mobile as your needs.

Versatility

Meets your changing needs head-on with a cone crusher known for its flexibility. Our crushers are operating in some of the most demanding mineral processing applications worldwide.

Security and Safety

Our crushers are easy and quick to maintain. They let you develop a proactive maintenance strategy to prevent surprises and keep all equipment running longer.

We use fail-safe hydraulics to protect the crusher from a mechanical overload in the event that an accumulator bladder fails. An internal relief valve within the tramp release cylinders provides immediate, alternate protection from severe and costly mechanical damage to the crusher. The crushing action rotates counterclockwise to prevent the machine from self-tightening the setting if the adjustment ring movement is excessive (ring bounce), the ring gear brake fails or the thread clamping fails.

Superior bronze bearing technology

Raptor cone crushers have high-integrity bronze bearings for all internal moving components that are load bearing or involved in load transmission. Our bronze technology uses a unique process to achieve uniform material distribution, optimum concentricity and a structure free from porosity. Bushings are designed to handle the hardest applications while providing a long and reliable life.

Automation

Our advanced overload sensing technology detects crushing force overload before it causes a problem. If desired, you can have the automation system take the necessary corrective action so your operators do not have to. The same advanced automation system can optimise crusher performance with feed control, setting adjustment, lubrication monitoring and hydraulics tracking.

Many important benefits and features are standard in every Raptor Cone Crusher.

Standard benefits:

- Wide operating speed range
- Long liner life
- Low maintenance requirements
- High pivot point crushing action
- Advanced hydraulics

Standard features:

- Inspection ports
- Fewer accumulators than cylinders
- Major components are made with heavy-duty alloy steel
- Integral countershaft assembly
- Dual-acting tramp release and clearing cylinders frame with three to four arms
- Improved head action for higher capacity
- Replaceable, non-contacting T/U seal arrangement



RAPTOR® 250

The R250 is our smallest and lightest weight cone crusher. Its low-profile design makes it a perfect fit for a portable and mobile chassis.



RAPTOR® 900

Our R900 is dimensionally similar to the R650 with the benefit of a larger eccentric throw. Liner design makes the crusher suitable for handling anything from primary crusher feed down to pebble crushing duty.



RAPTOR® 350

The R350 is ideal for generating high quality product at a constant setting under consistently high loads.



RAPTOR® 1100

The R1100 is specifically designed to cope with the high capacities demanded by today's modern mines. It uses only four accumulators to operate the 16 tramp cylinders, making it especially maintenance friendly.



RAPTOR® 450

Our R450 model is the largest of our crushers that do not require a backliner. It processes more usable and saleable aggregate per ton than competitive models in its class.



RAPTOR® 1300

Our R1300 is dimensionally similar to the R1100 with the benefit of a larger eccentric throw. This is the last of the four crushers in our series (R650, R900, R1100, R1300) that have been specifically designed to replace the classic Symons 7' crushers.



RAPTOR® 500

The R500 is our smallest cone crusher that is specifically designed for mining. It follows the mining standards for availability and durability and is a perfect fit for pebble crushing.



RAPTOR® 2500

The R2500 is our largest cone crusher. It is designed to handle pre-crushing duties from the primary crusher and to prepare feed for a SAG mill to reduce retention times in the mill. A dedicated direct drive with variable speed come standard.



RAPTOR® 650

Our R650 is a great fit to replace the common aging crusher population in this size, like the Symons 7' crusher. It is also the smallest crusher in the series to have an optional direct drive with variable speed.

Includes the capability to perform the following

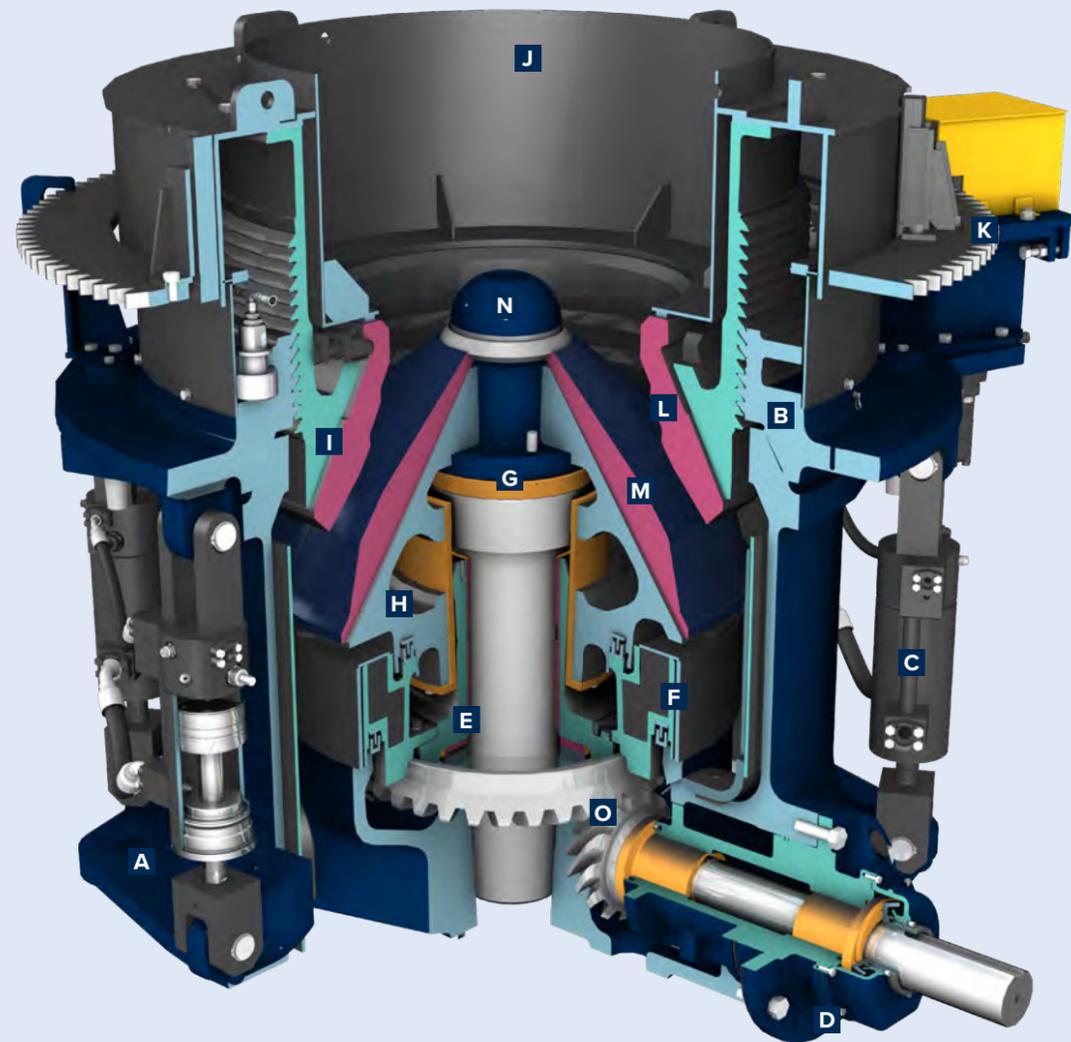
- Connectivity
- Crusher Health
- Performance Optimisation

More details on page 18 thru 21

Raptor benefits and features

	250	350	450	500	650	900	1100	1300	2500
Benefits (in addition to standard)									
Small and lightweight for site flexibility	●	●	●						
Can fit onto a portable cone/screen chassis	●	●	●						
Significant eccentric throw	●	●	●	●		●		●	●
No backliner material needed for liner installation	●	●	●						
Processes more usable and saleable aggregate per ton than competitive models in its class	●	●	●						
Upgrades available	●	●	●	●	●	●	●	●	●
Easy access to load-carrying bearings	●	●	●	●	●	●	●	●	●
Features (in addition to standard)									
Inverted tramp release cylinders	●	●	●	●	●	●	●	●	●
Integrated single head bushing	●	●	●						
Ideal for secondary application following a jaw		●	●	●	●	●	●	●	●
Ideal for secondary application following a gyratory					●	●	●	●	●
Ideal for tertiary application	●	●	●	●	●	●	●	●	
Spiral bevel gear	●	●	●	●			●	●	●
Skew teeth bevel gear					●	●			
Belt drive available	●	●	●	●	●	●	●	●	
Direct drive with variable speed options available					●	●	●	●	●
Accepts feed that is 25% larger than crushers of a comparable size			●	●	●	●	●	●	●
Fail-safe hydraulics	●	●	●	●	●	●	●	●	●
Increased bowl travel						●		●	●

Raptor® cone crushers: R250, R350 and R450



- A** Main frame assembly
- B** Adjustment ring assembly
- C** Tramp release assembly
- D** Countershaft box assembly
- E** Eccentric sub-assembly
- F** Counterweight sub-assembly
- G** Socket assembly
- H** Head assembly
- I** Bowl assembly
- J** Hopper assembly
- K** Adjustment mechanism assembly
- L** Bowl liner
- M** Mantle
- N** Feed plate assembly
- O** Gear & Pinion

Raptor® 250

Like its predecessor (Raptor 200), the R250 has slower speed ratios, which gives you greater flexibility in production. Its durable, low-profile design allows you to easily fit it onto a portable chassis. The inverted tramp release cylinders keep the hydraulics cleaner than conventional designs. Our integrated countershaft box and single head bushing make your maintenance easier and less expensive.

Raptor® 350

The Raptor 350 offers the versatility of slower speed ratios to give you more flexibility in production. This machine is ideal for generating high quality product at a constant setting under consistently high loads. This model features advanced hydraulics, which ensure protection from mechanical overload through bypass release. It also protects the hydraulic cylinders from damage if the accumulator fails.

Raptor® 450

The Raptor R450 is ideal as a secondary crusher following a jaw crusher. This machine gives you more usable and saleable aggregate per tonne processed than competitive models in its class. Versatile and highly portable, the Raptor R450 can accept primary-crushed ore from a jaw crusher with greater flexibility (up to 25% larger material) because of its 1.3m (52-inch head) diameter, large feed opening, high-pivot-point crushing action, and wide crushing stroke. Outstanding gradation control and cubical product also make the R450 an excellent tertiary crusher for aggregate, asphalt and concrete products.

Pre-wired and standardized lube & HPU for easy setup. No backliner material necessary for liners!

Closed Side Settings (CSS)

Model:		10mm (3/8")	13mm (1/2")	16mm (5/8")	19mm (3/4")	22mm (7/8")	25mm (1")	32mm (1 1/4")	38mm (1 1/2")	45mm (1 3/4")
Raptor 250	mtph:	120-150	140-180	170-210	180-225	190-240	210-260	220-280	240-290	260-310
	stph:	130-165	155-200	190-230	200-250	210-265	230-290	245-310	265-320	290-340
Raptor 350	mtph:	140-190	170-230	200-260	220-300	260-320	280-350	320-400	360-450	410-520
	stph:	155-210	185-255	220-285	245-330	285-355	310-385	355-440	395-495	450-575
Raptor 450	mtph:	160-210	200-260	350-320	290-370	320-400	340-440	380-510	430-570	500-640
	stph:	175-230	220-285	375-355	320-410	355-440	375-485	420-560	475-630	550-705

Crusher Chamber Selection

Model:	Cavity:	Short Head		Standard	
		Minimum Setting CSS mm (in)	Maximum Feed Opening mm (in)	Minimum Setting CSS mm (in)	Maximum Feed Opening mm (in)
Raptor 250	Fine:	6mm (1/4")	175mm (6 7/8")	13mm (1/2")	180mm (7 1/16")
	Medium:	8mm (5/16")	195mm (7 2/3")	16mm (5/8")	200mm (7 7/8")
	Coarse:	10mm (3/8")	200mm (7 7/8")	19 mm (3/4")	235mm (9 1/4")
Raptor 350	Fine:	6mm (1/4")	175mm (6 7/8")	13mm (1/2")	225mm (8 7/8")
	Medium:	8mm (5/16")	195mm (7 2/3")	16mm (5/8")	235mm (9 1/4")
	Coarse:	10mm (3/8")	220mm (8 2/3")	19 mm (3/4")	240mm (9 3/8")
Raptor 450	Fine:	8mm (5/16")	195mm (7 2/3")	16mm (5/8")	265mm (10 7/16")
	Medium:	10mm (3/8")	230mm (9 1/16")	19 mm (3/4")	300mm (11 3/4")
	Coarse:	13mm (1/2")	255mm (10 1/16")	22mm (0.87")	335mm (13 3/16")

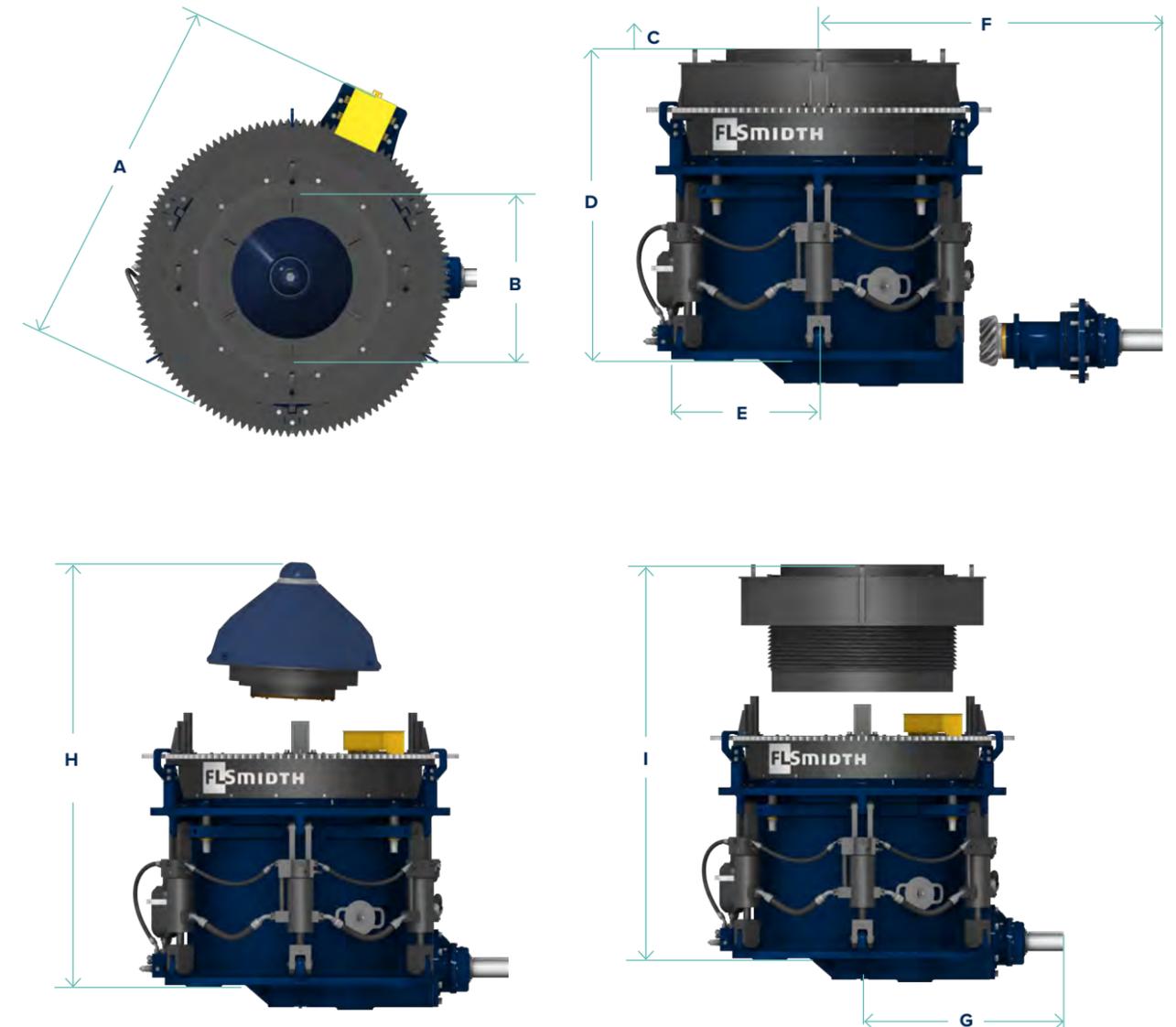
Major dimensions for Raptor® cone crushers: R250, R350 and R450

mm [in]	A Adjustment ring max diameter	B Inside diameter of feed hopper	C Clearing stroke travel
Raptor R250	2020 [79 1/2]	953 [37 1/2]	100 [4]
Raptor R350	2460 [96 7/8]	1080 [42 1/2]	120 [4 3/4]
Raptor R450	2750 [108 1/4]	1308 [51 1/2]	120 [4 3/4]

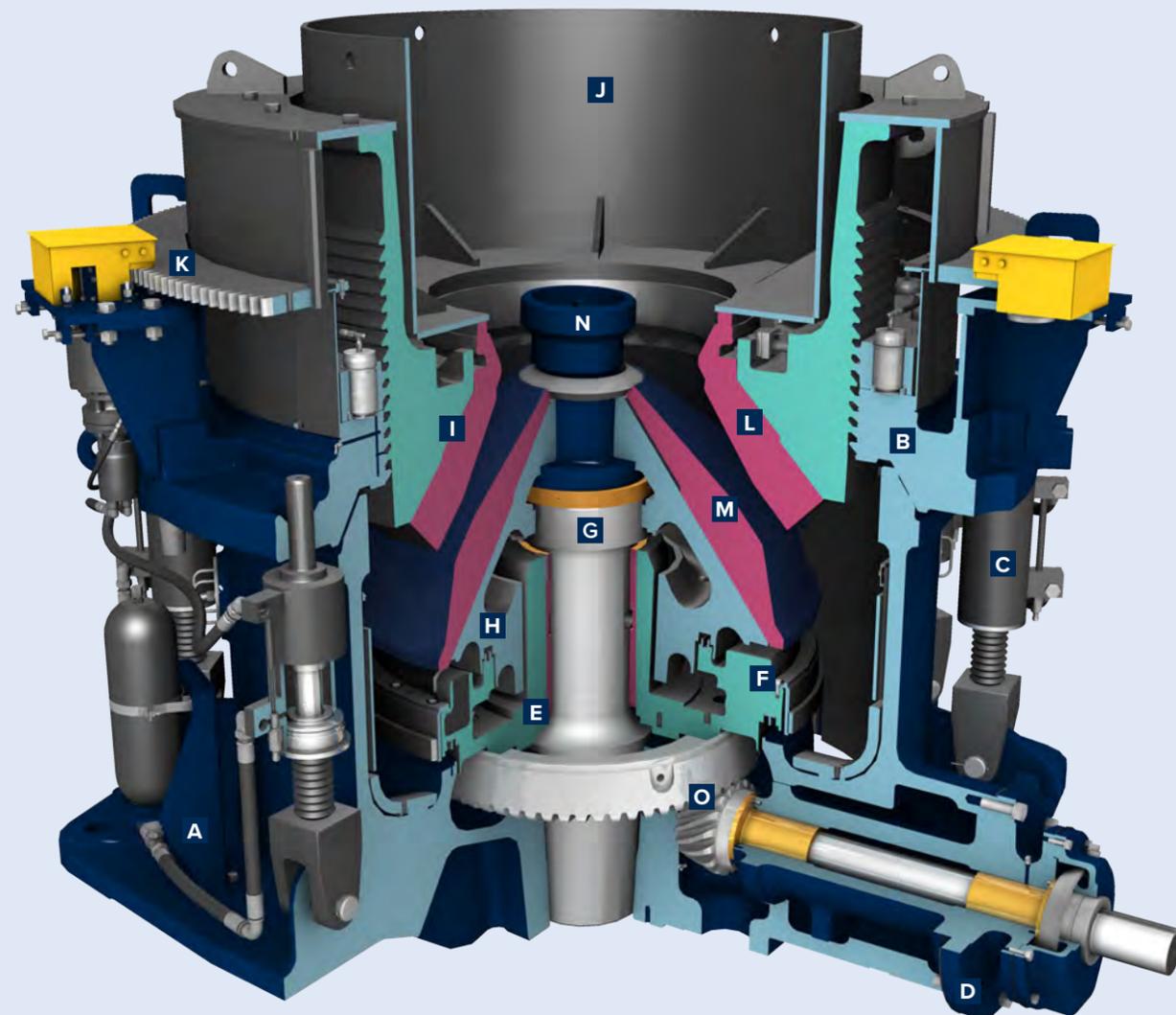
mm [in]	D Height from base to top of feed hopper	E Crusher centerlines to mainframe flange	F Clearance to remove countershaft assembly
Raptor R250	1590 [62 5/8]	770 [30 1/3]	1800 [7/8]
Raptor R350	1862 [73 5/16]	950 [37 3/8]	2050 [80 5/8]
Raptor R450	2035 [80 1/8]	1130 [44 1/2]	2445 [96 1/4]

mm [in]	G Crusher centerline to end of countershaft	H Clearance required to remove head assembly	I Clearance required to remove bowl assembly
Raptor R250	1184 [46 5/8]	2400 [94 1/2]	2320 [91 1/3]
Raptor R350	1345 [53]	2810 [110 5/8]	2775 [109 1/4]
Raptor R450	1640 [64 9/16]	3060 [120 1/2]	2900 [114 1/8]

	Crusher Power kW [hp]	Crusher Weight kg [lbs]	Heaviest Lift for Maintenance kg [lbs]
Raptor R250	190 [250]	8917 [19659]	1710 [3770]
Raptor R350	260 [350]	16089 [35470]	3590 [7915]
Raptor R450	340 [450]	24470 [53947]	5266 [11610]



Raptor® cone crushers: R500, R650 and R900



- A** Main frame assembly
- B** Adjustment ring assembly
- C** Tramp release assembly
- D** Countershaft box assembly
- E** Eccentric sub-assembly
- F** Counterweight sub-assembly
- G** Socket assembly
- H** Head assembly
- I** Bowl assembly
- J** Hopper assembly
- K** Adjustment mechanism assembly
- L** Bowl liner
- M** Mantle
- N** Feed plate assembly
- O** Gear & Pinion

Raptor® 500

Our R500 is a heavy-duty option that was designed and built for true mining duty. Its solid construction is evident because it weighs 30% more than other crushers in its class, making it ready for the hardest ores. This machine is an ideal pebble crusher and it is capable of secondary and tertiary duties. The R500 gives you the reliability you need with less maintenance and a lower operating cost.

Raptor® 650

The R650 shares many features with the R500 but with the added benefit that a direct drive option is available.

This is also a true pebble crusher that is designed to cope with the hardest ores and can be used for secondary and tertiary duties. When replacing an existing cone crusher, our R650 gives you the same capacity as a classic Symons 7' but with the reliability and cost savings that you can expect from our cone crushers. Low operating costs and reduced service intervals.

Raptor® 900

Our R900 gives you many of the same benefits as the R650 with the direct drive option and a higher eccentric throw than the R650.

This cone crusher can be used to replace the classic Symons 7' crusher, and it gives you a 50% increase in capacity.

With the R900 you will get a very reliable crusher with reduced service intervals and low operating costs.

FLS has designed key maintenance advantages like a raised head for liner contact and inverted tramp/clamping cylinders.

Closed Side Settings (CSS)

Model:		10mm (3/8")	13mm (1/2")	16mm (5/8")	19mm (3/4")	22mm (7/8")	25mm (1")	32mm (1 1/4")	38mm (1 1/2")	45mm (1 3/4")
Raptor 500	mtph:	195-260	255-320	310-380	355-435	375-455	410-495	455-555	510-640	581-730
	stph:	215-285	280-355	342-420	390-480	415-500	450-545	500-610	560-705	640-805
Raptor 650	mtph:	220-300	290-345	350-420	400-480	450-510	480-540	510-600	560-700	650-800
	stph:	245-330	320-380	385-465	440-530	495-560	530-595	560-660	615-770	715-880
Raptor 900	mtph:	272-349	325-450	400-550	440-599	499-676	522-771	599-898	649-1043	780-1243
	stph:	300-385	360-495	440-605	485-660	550-745	575-850	660-990	715-1150	860-1370

Crusher Chamber Selection

Model:	Cavity:	Short Head		Standard	
		Minimum Setting CSS mm (in)	Maximum Feed Opening mm (in)	Minimum Setting CSS mm (in)	Maximum Feed Opening mm (in)
Raptor 500	Fine:	10mm (3/8")	215mm (8 3/8")	19mm (3/4")	280mm (11")
	Medium:	12mm (1/2")	220mm (8 2/3")	22mm (7/8")	315mm (12 3/8")
	Coarse:	19mm (3/4")	270mm (10 5/8")	32mm (1 1/4")	330mm (13")
Raptor 650	Fine:	10mm (3/8")	215mm (8 3/8")	16mm (5/8")	345mm (13 9/16")
	Medium:	12mm (1/2")	275mm (10 13/16")	25mm (1")	360mm (14 3/16")
	Coarse:	14mm (9/16")	290mm (11 3/8")	30mm (1 3/16")	380mm (14 15/16")
Raptor 900	Fine:	10mm (3/8")	135 (5 3/8")	17mm (5/8")	295 (11 5/8")
	Medium:	12mm (1/2")	200 (8")	25mm (1")	325 (12 3/4")
	Coarse:	14mm (9/16")	225 (9")	30mm (1 3/16")	345 (13 1/2")

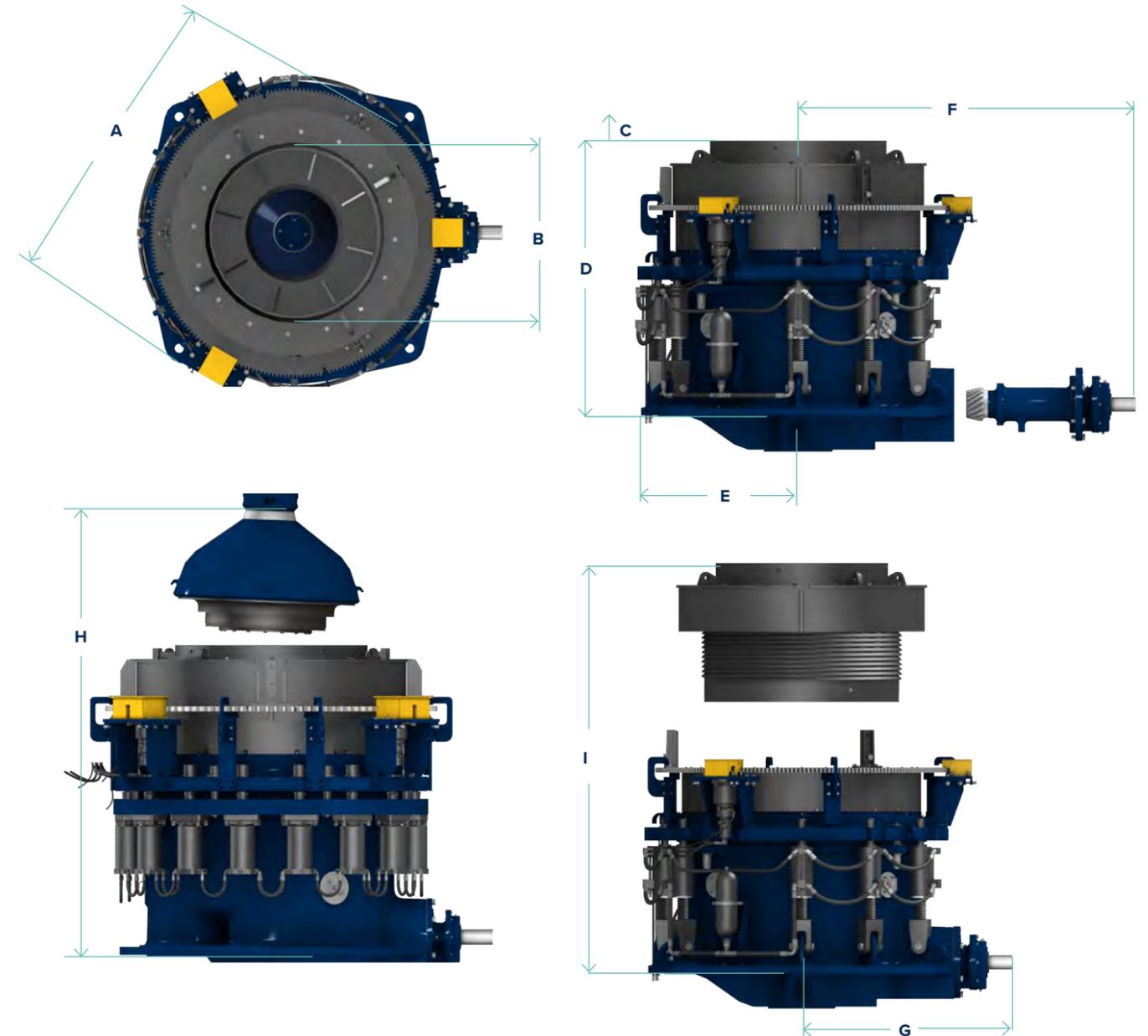
Major dimensions for Raptor® cone crushers: R500, R650 and R900

mm [in]	A Adjustment ring max diameter	B Inside diameter of feed hopper	C Clearing stroke travel
Raptor R500	3757 [147 7/8]	1740 [68 1/2]	165 [6 1/2]
Raptor R650	3484 [137 1/8]	1800 [70 7/8]	110 [4 1/3]
Raptor R900	3484 [137 1/8]	1833 [72 1/8]	150 [6]

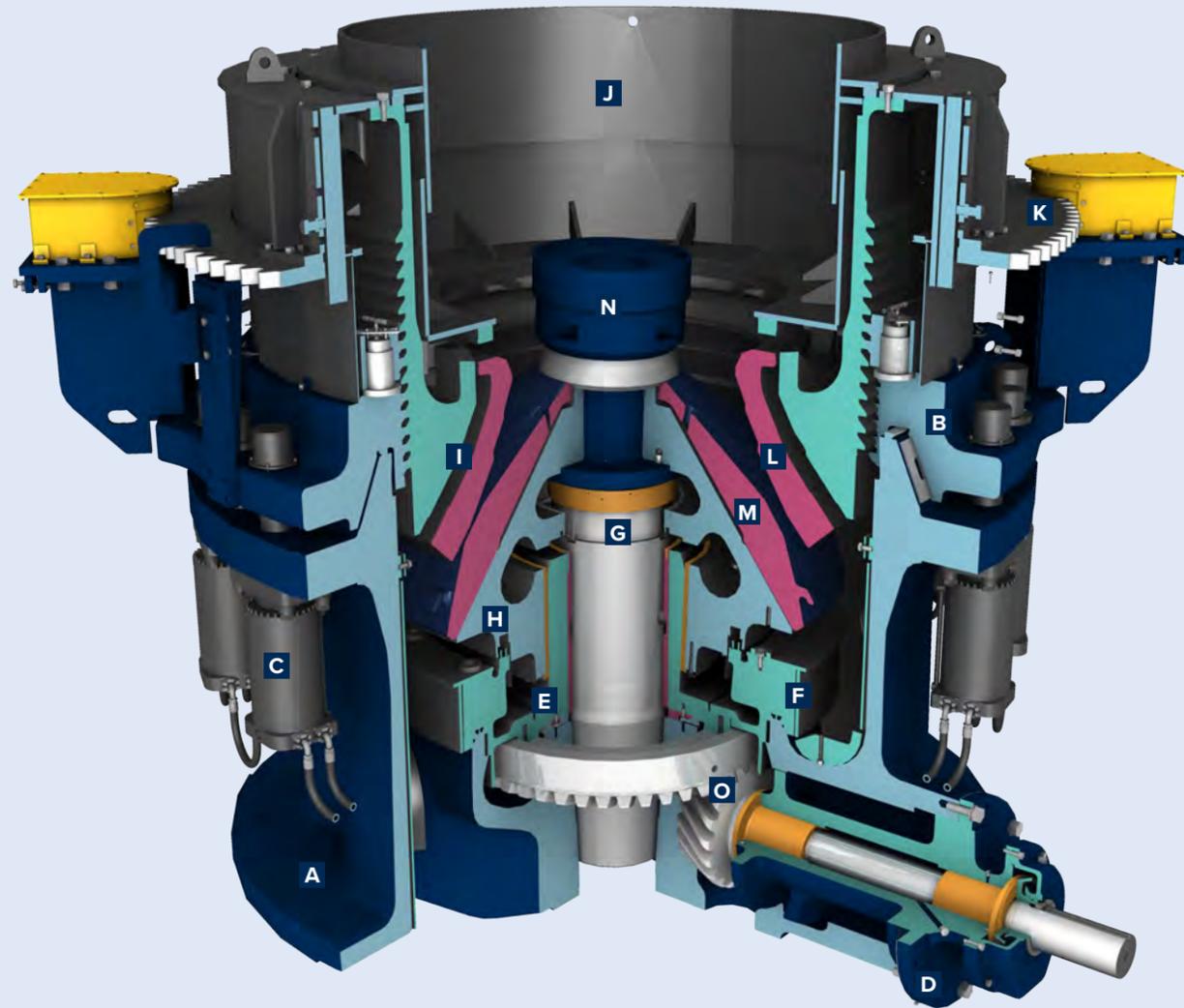
mm [in]	D Height from base to top of feed hopper	E Crusher centerlines to mainframe flange	F Clearance to remove countershaft assembly
Raptor R500	2806 [110 1/2]	1400 [55 1/8]	3100 [122 1/16]
Raptor R650	2873 [113 1/8]	1655 [65 1/8]	3430 [135 1/16]
Raptor R900	3506 [138]	1655 [64 3/8]	3505 [138]

mm [in]	G Crusher centerline to end of countershaft	H Clearance required to remove head assembly	I Clearance required to remove bowl assembly
Raptor R500	1750 [68 7/8]	4245 [167 1/8]	4475 [176 3/16]
Raptor R650	2240 [88 3/16]	4320 [170 1/8]	4070 [160 1/4]
Raptor R900	2244 [88 3/8]	4755 [187 1/4]	4910 [937 3/8]

	Crusher Power kW [hp]	Crusher Weight kg [lbs]	Heaviest Lift for Maintenance kg [lbs]
Raptor R500	370 [500]	5113 [112685]	11645 [25673]
Raptor R650	450 [600]	65522 [144451]	16649 [36705]
Raptor R900	670 [900]	71648 [157957]	15908 [35071]



Raptor® cone crushers: R1100, R1300 and R2500



- A** Main frame assembly
- B** Adjustment ring assembly
- C** Tramp release assembly
- D** Countershaft box assembly
- E** Eccentric sub-assembly
- F** Counterweight sub-assembly
- G** Socket assembly
- H** Head assembly
- I** Bowl assembly
- J** Hopper assembly
- K** Adjustment mechanism assembly
- L** Bowl liner
- M** Mantle
- N** Feed plate assembly
- O** Gear & Pinion

Raptor® 1100

The R1100 crusher has a high capacity and can reduce the number of machines needed for your process. It easily replaces old crushers for existing plants and it has the capacity to process 75% more than the classic Symons 7' crusher. Direct drive is an available option. As with the other cone crushers in this series, the R1100 holds up against the hardest ores and can be used for pebble, secondary, and tertiary duties. It gives you the same reliable service with less maintenance and lower operating costs as do our other Raptor crushers.

Raptor® 2500

This R2500 is our largest and highest capacity Raptor cone crusher. Customers who buy this size find that they can operate with fewer crushers because it is designed specifically for high capacity throughput operations. This machine is designed for secondary and tertiary duties and a direct drive with VFD comes standard. As with our other cone crushers, you can count on this machine to reliably cope with the hardest ores and decrease both your maintenance and costs.

Raptor® 1300

Our high capacity R1300 cone crusher allows you to use fewer crushers in your plant. Its mainframe is the same size as the R1100 and it offers all of the same benefits with a larger eccentric throw and a higher power-handling capacity. The R1300 is the largest of our cone crushers that can be used to replace a Symons 7' crusher, and it gives you double the capacity.

Cone crusher sizes 900–2500 all come standard with one operating lubrication pump, one standby lubrication pump, and a duplex filter system.

Closed Side Settings (CSS)

Model:		10mm (3/8")	13mm (1/2")	16mm (5/8")	19mm (3/4")	22mm (7/8")	25mm (1")	32mm (1 1/4")	38mm (1 1/2")	45mm (1 3/4")
Raptor 1100	mtph:	-----	549-798	617-871	699-948	789-1197	894-1293	1148-1424	1270-1696	1572-1971
	stph:	-----	605-880	680-960	770-1045	870-1320	985-1425	1265-1570	1400-1870	1733-2173
Raptor 1300	mtph:	-----	685-1000	775-1085	875-1190	985-1500	1120-1620	1440-1750	1547-1946	1796-1955
	stph:	-----	755-1100	855-1195	965-1310	1085-1655	1235-1785	1585-1930	1705-2145	1980-2155
Raptor 2500	mtph:	-----	1030-1751	1166-1902	1315-2087	1479-2626	1678-2835	2159-3066	2200-3171	2440-3502
	stph:	-----	1135-1930	1285-2095	1450-2300	1630-2835	1850-3125	2380-3380	2425-3495	2690-3860

Crusher Chamber Selection

Model:	Cavity:	Short Head		Standard	
		Minimum Setting CSS mm (in)	Maximum Feed Opening mm (in)	Minimum Setting CSS mm (in)	Maximum Feed Opening mm (in)
Raptor 1100	Fine:	13mm (1/2")	225 (8 7/8")	17mm (5/8")	355 (14")
	Medium:	16mm (5/8")	240 (9.5")	22mm (7/8")	385 (15 1/8")
	Coarse:	25mm (1")	260 (10 1/4")	30mm (1.2")	415 (16 3/8")
Raptor 1300	Fine:	13mm (1/2")	225 (8 7/8")	25mm (1")	355 (14")
	Medium:	16mm (5/8")	240 (9.5")	30mm (1.2")	385 (15 1/8")
	Coarse:	25mm (1")	260 (10 1/4")	45mm (1.8")	415 (16 3/8")
Raptor 2500	Fine:	13mm (1/2")	225 (8 7/8")	25mm (1")	385 (15 1/8")
	Medium:	16mm (5/8")	250 (9 7/8")	32mm (1-1/4")	420 (16 1/2")
	Coarse:	25mm (1")	280 (11")	38mm (1-1/2")	450 (17 3/4")

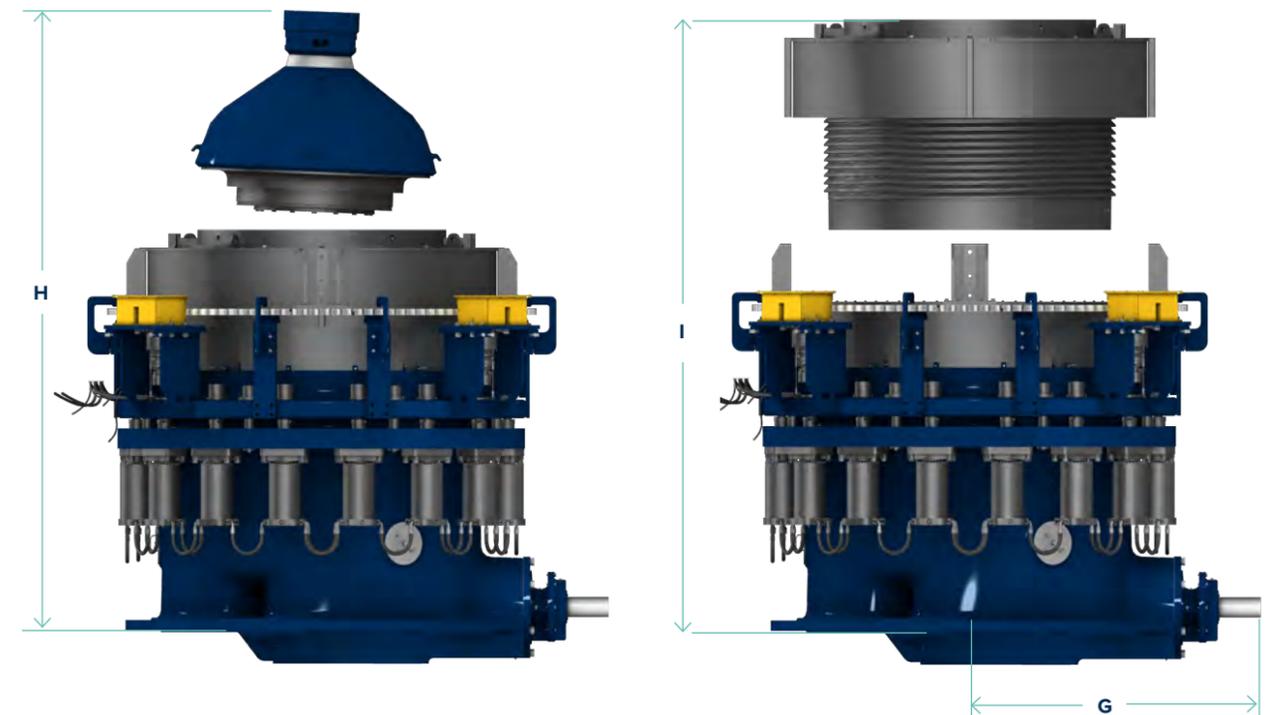
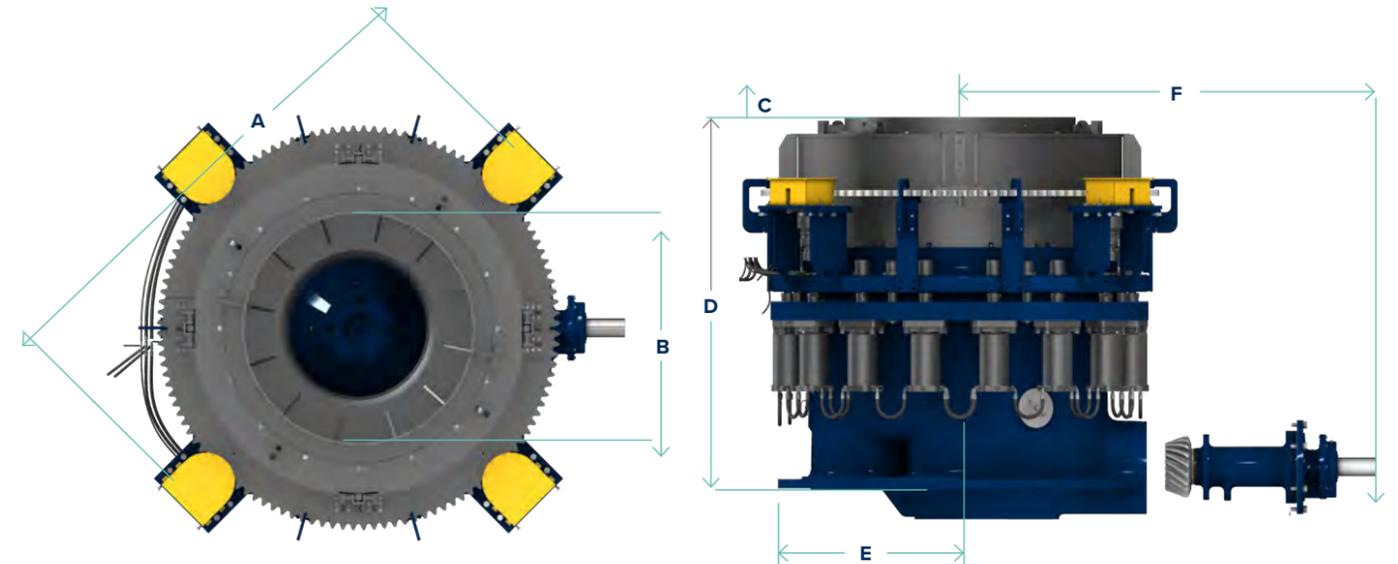
Major dimensions for Raptor® cone crushers: R1100, R1300 and R2500

mm [in]	A Adjustment ring max diameter	B Inside diameter of feed hopper	C Clearing stroke travel
Raptor R1100	5464 [215 1/8]	2550 [100 3/8]	150 [6]
Raptor R1300	5464 [215 1/8]	2550 [100 3/8]	150 [6]
Raptor R2500	6785 [267 1/8]	3050 [120]	180 [7]

mm [in]	D Height from base to top of feed hopper	E Crusher centerlines to mainframe flange	F Clearance to remove countershaft assembly
Raptor R1100	3894 [153 3/8]	1950 [76 3/4]	4365 [171 7/8]
Raptor R1300	3977 [156 1/2]	1950 [76 3/4]	4365 [171 7/8]
Raptor R2500	5402 [212 5/8]	2625 [103 3/8]	5313 [209 1/8]

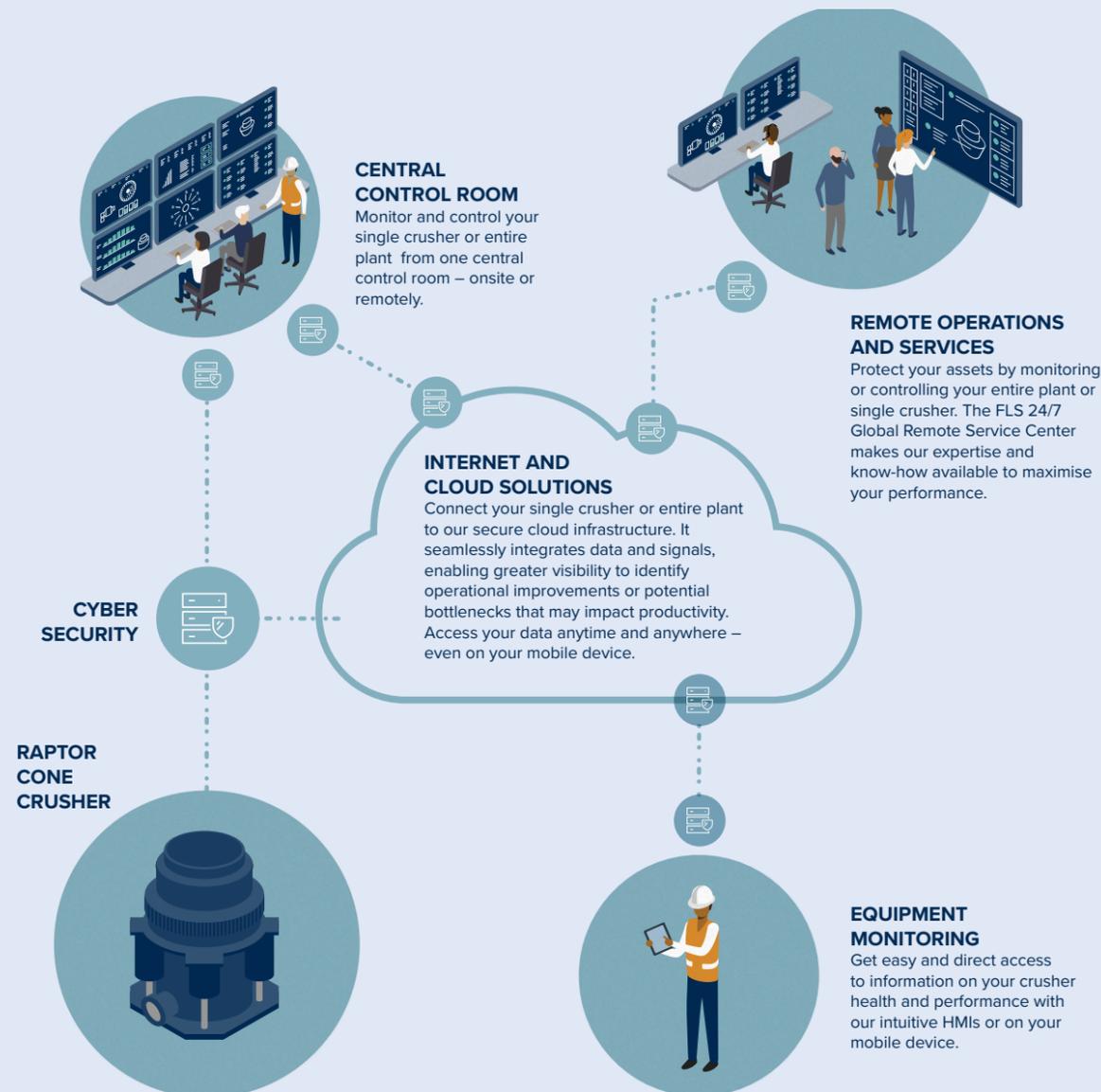
mm [in]	G Crusher centerline to end of countershaft	H Clearance required to remove head assembly	I Clearance required to remove bowl assembly
Raptor R1100	2845 [112]	5720 [225 1/8]	5920 [233]
Raptor R1300	2845 [112]	5720 [225 1/8]	5920 [233]
Raptor R2500	3425 [134 7/8]	7685 [302 1/2]	7715 [303 3/4]

	Crusher Power kW [hp]	Crusher Weight kg [lbs]	Heaviest Lift for Maintenance kg [lbs]
Raptor R1100	820 [1100]	151848 [334768]	32884 [72497]
Raptor R1300	970 [1300]	151955 [335003]	30344 [66897]
Raptor R2500	1860 [2500]	401089 [884250]	73105 [161169]



Digitalizing the crushing circuit

To increase productivity in your mine, we provide a strong portfolio of digital solutions and services that connect, monitor and optimise performance of your assets. This is the smart way to increase your output, reduce operational costs and reduce energy usage.



CONNECTIVITY

Monitor, control and optimise remotely

Connecting your crusher to the internet via our secure infrastructure is the prerequisite for harvesting the benefits of digitalisation.

ECS/Product Control

Integrated product control enables faster commissioning, fewer programming errors and better overall performance. We have embedded our extensive knowledge of how best to operate and control the crusher into our state-of-the-art control system. The integrated controls also provide you with the “ecosystem” for plug and play future upgrades and services.

SiteConnect™

Real-time data on your mobile device. Instant notifications in case of unexpected events and live access to performance data.

24/7 Global Remote Service Center

Reduce unplanned downtime through insightful analytics and 24/7 monitoring by crushing experts.

Cyber Security

Keep your connected IT updated, safe and unbreachable. Cyber security is an integrated and fundamental capability of our digital portfolio.



CRUSHER HEALTH

Maximise the availability of your crusher

Online condition monitoring of equipment and wear parts protects your crusher and mitigates risks to ensure optimal crusher reliability.

Crusher Sensors

Multiple sensor types monitor changes in the crusher conditions.

Life Tracker

Enables you to analyse oil, mantle and concave conditions, plotting trends and helping you make the best decisions for greater productivity.

Augmented Field Engineer

Allows our engineers to remotely assist with your operational issues. A hands-free remote collaboration tool enables you to share vision of your equipment with our field service technicians. Results in faster resolution of incidents, reduced cost of service delivery and increased availability.

Online Condition Monitoring Services

We use secure and advanced cloud analytics, coupled with our local and global experts, to provide you with actionable insights to avoid losses associated with unexpected downtime and breakdowns.

ECS/UptimeGo™

Get insights to identify causes of equipment failure and eliminate downtime root causes.



PERFORMANCE OPTIMISATION

Boost your productivity

Our digital solutions uses data intelligence to optimise your crusher performance, boost your productivity and reduce your energy usage.

Wear Compensation

Maintain product consistency and quality even as your liners wear. Your operators never again have to guess when to adjust your OSS setting. The wear compensation option enables the crusher to automatically adjust the OSS as the liners wear.

Auto Lower

Protect your crusher and your throughput with our quick-reacting auto lower feature. When you run into harder ore or changing ore bodies your crusher will adjust automatically based on your configured power and pressure settings.

Particle Size Direct Measurement

Use direct measurement of your crusher output to further optimise your crusher performance.

ECS/PlantDataManagement

Transform process and quality data into real-time operations and get the most out of your plant and equipment.

Key benefits of a connected crusher

- On demand information in the control room or on your mobile
- Expedite remote support
- Enable faster decisions and actions
- Real-time insights available to top management
- Increase uptime and availability by decreasing unplanned breakdowns
- Maximise productivity and reliability
- Reduce environmental impact
- Cut operating costs
- Control and optimise operations

Taking asset health to the next level with online condition monitoring services

Our online condition monitoring services combine digital technologies with process expertise. It's like having a team of specialists onsite whose sole focus is optimising your crusher's performance. Condition monitoring sensors automatically send data to our experts who then analyse it and propose action plans – this could be anything from reacting to an alarm within the system, to identifying energy saving opportunities.

Service packages can be tailored to your needs in line with your process goals, such as reducing downtime or improving efficiency.

Remote troubleshooting

With experts on hand via video, telephone, email and even our Augmented Field Engineer (a hands-free tablet class wearable computer for service personnel) remote troubleshooting can be carried out as a one-off service or as a package covering one or multiple assets.

ECS/UptimeGo™ includes the capability to:

- Document what occurred in the lead up to stoppages
- Perform Pareto analysis
- Track maintenance KPIs
- Provide automatic downtime reports
- Quantify the cost of the stoppage on a plant and department level

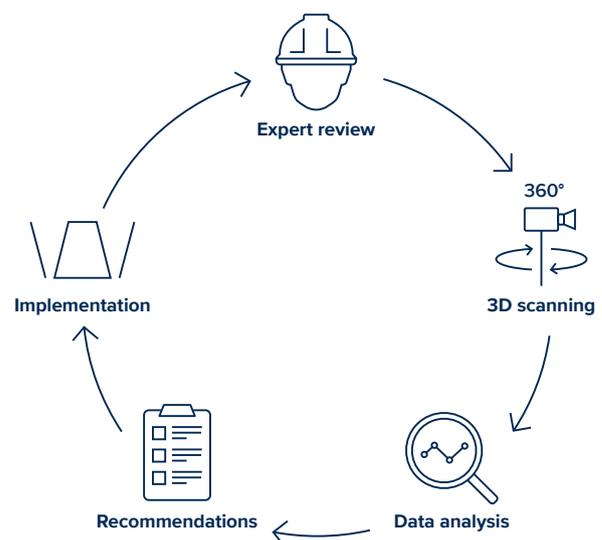
This enhanced visibility of downtime metrics enables you to eliminate root causes of downtime and increase equipment availability.

Downtime analysis software

When stoppages happen, it's vital to know what went wrong. Finding out what caused your plant and equipment to fail is the first step to preventing the same thing happening again in the future. Our downtime analysis software, ECS/UptimeGo, gives you the insight you need to identify what causes the equipment to fail and improve your processes for the future.

3D liner scanning and optimisation

Maximise your crusher liner performance with our 3D liner scanning and optimisation service. Our chamber scanner uses laser technology that is capable of recording up to 50 million data points of the liner profile at accuracy levels physical measurements cannot achieve. It can easily be performed within planned maintenance and inspection schedules. Our experts compile, analyse and interpret the raw scanned data, then discuss wear life estimations, shutdown planning, and opportunities for improved operating procedures with you.





"Unplanned downtime costs the mining industry billions of dollars each year"

Predictive maintenance can result in up to 75% reduction in breakdowns.

You don't need more data – you need insights

Our condition monitoring service combines data, technology and expertise to deliver you reduced downtime, greater reliability, better margins and more sustainable operations. We offer you two levels of online condition monitoring services:

Level I package EXISTING SIGNALS

Key benefits

- Plug and play – no need for additional sensors
- Proactive notifications on critical failures
- Severity assessment and monitoring
- Reduced probability of unplanned breakdowns
- Priority in quotation for add-on services

Level II package ADDED SENSORS

Key benefits

- 'Level I package' +
- Significant, additional coverage to predict failures on critical components such as bearings, gears and more.

Results in further reduced risk of downtime



DO NOT STACK
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5

DO NOT STACK
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6

Selective Pallet Racking
Safe Working Load
Operation & Maintenance

EMERSON
Process Management

LUDWIG

Adding value by maximising performance

Using our knowledge as an Original Equipment Manufacturer (OEM), we ensure that the supplied parts are correct for your equipment and application. We offer cone crusher liners tailored to your needs and manufactured to increase your productivity.

Genuine partnership in wear and spare parts

It is unavoidable that over time, parts will need to be replaced. We have certified replacement spare and wear parts on-hand to keep your Raptor running at peak performance.

- Mantle and bowl liners
- Liner accessories
- Arm guards and frame liners
- Major assemblies and components

Mantle and bowl liners

Add value and maximise performance of your new Raptor Cone Crusher with our cone crusher performance liners. They're specifically designed to perform in the most demanding applications. To meet the increasing challenges of harder materials, resource scarcity and increasingly stringent product requirements – all of which lead to rising production costs – these liners address all the challenges.

For harder materials, which increase component stress throughout the machine, the performance liners reduce the peak forces transmitted into the crusher during operation. The crusher's internal components experience less stress, helping increase reliability.

The demand for equipment to help reduce the amount of waste material is growing. Our performance liners feature a more aggressive crushing chamber profile to meet this need. This allows the material to be nipped more quickly and efficiently.

As product requirements become more stringent, you can trust that our performance liners handle the requirements of size and shape with ease. By minimising slippage during processing and increasing the number of impacts, the liners will help you achieve additional productivity.

Ease of installation

The Raptor Cone Crushers R250, R350 and R450 are easy to install. The unit (crusher, lubricant and hydraulic skids) arrives onsite at your project's location on a structural frame that can be mounted to a concrete foundation or mobile unit. With the FLS machine control system it is ready to go or it can easily be connected to the plant's central control system.

After-sales service

You receive the benefits of our supply chain and 100 percent integrated unit of supplied components.

You know that we will be on board with you all the way with options including:

Typical applications	Mantles	Bowls
Low-abrasion feed	SM330	SM330
Medium-abrasion feed	HM830	HM830
High-abrasion feed	XM1130*	XM1130*

*Care needs to be used with presence of steel.

Choose from three standard grades of cone crusher liners, which allow you to quickly address changing ore characteristics. Our SM330 material performs well for average abrasive ore type, while more abrasive ores typically benefit from HM830 or XM1130 wear materials.

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