Cone Crushers

HP Series Cone Crushers
High Performance for Higher Profitability

HP (High Performance) Series cone crushers feature a unique combination of crusher speed, throw, and cavity design. This combination has proved revolutionary in providing higher capacity and superior product quality, and in providing a wider range of application suitability. From limestone to taconite, from ballast production to manufactured sand, and from small portable plants, HP cone crushers provide unbeatable performance in secondary, tertiary, and quaternary applications.

A history of quality
HP cone crushers are built on the success of our 70+ years of Symons cone experience, and 20+ years of Omnicone experience. The Symons cone is well known for its rugged construction and application versatility. The Symons cone has set the standard in the mining industry, where 24-hour, high-reduction applications can destroy all but the most ruggedly built machine.

The Omnicone introduced many new innovations to reduce maintenance and operating costs, and to provide designed-in modern features such as hydraulic setting adjustment, tramp release, and cavity clearing.

The field-proven HP series combines the best of these technologies to provide the highest capacity, the best product shape, the highest on-spec yield, easy automation, and the greatest possible reliability and flexibility. All to help you achieve the highest possible levels of profitability.
Reach New Heights with Metso

Higher capacity
Thanks to the patented combination of higher speed and throw, which increases the machine’s power rating and throughput capability, HP Series cone crushers have the highest capacities for their size in the industry.

HP technology allows you to use either fewer or smaller units to get the highest possible production out of the smallest possible space. Metso pioneered the HP technology, having developed it in 1989 through extensive pilot and full-size prototype testing. Metso has been awarded patents for these innovative efforts.

Higher quality
The unique interparticle crushing action of HP Series cone crushers creates a higher value for your product by providing a more consistent gradation and a superior product shape (cubicity). The ability to operate at a fixed mechanical setting – instead of the head floating on a column of hydraulic oil – creates less setting drift and provides more stability throughout the circuit. The proven benefit of a threaded rotating bowl maintains a consistent setting around the entire circumference of the crushing chamber. Also, the use of a tramp release system with a fixed return point makes sure that the crusher setting is instantaneously maintained even after passing a piece of tramp iron. HP Series cone crushers also enable you to produce a finer product with fewer crushing stages, lowering your capital costs and saving energy.

Higher yield
By operating the HP cone crusher on the lower end of its speed range, the product gradation can be shifted to produce fewer fines and a higher percentage of on-spec product. The HP cone crusher creates a higher value product with less waste.

Mobile: The NW300HP is a highly mobile, closed-circuit crushing and screening plant. Ideal for contractors, it can transform your feed stock into three finished fractions.

Stationary: One HP500, one HP300, two HP200 crushing “Amphibolite”.

HP800 Cone Crusher.
Features and Benefits

**Features & Benefits**

**Less downtime**

Dual-acting hydraulic tramp release cylinders mean the HP cone crushers can pass tramp iron that would stall many competitors’ crushers. The large clearing stroke independent of liner wear reduces the effort required to clear a stalled crusher, reducing downtime and increasing operator confidence.

Hydraulic motors rotate the bowl for fine control setting adjustments that also rotate the bowl completely out of the adjustment ring threads for liner changeout, greatly simplifying liner change.

Advanced liner retention technology increase reliability: Bowl retaining wedges engage a self-tightening helix on the upper section of the bowl liner, while a self-tightening lock-bolt retains the mantle.

**Easy to maintain**

Bronze bushings used throughout provide superior load capability in the high-shock, dusty crushing environment. They’re low-cost, and easy to replace in the field with normal tools. HP cone crushers are easy to disassemble. All components are accessible from the top or the side. The head and bowl can be removed without upsetting a bolted interference fit.

**Low maintenance costs**

High performance non-contacting labyrinth seals provide high reliability by keeping out dust without wearing out. Their simple design means fewer moving parts come into contact with the rock and dust.

Excellent wear protection of all crusher components – including replaceable head ball, mainframe seat liners, mainframe pin bushings, countershaft box frame ring, counterweight guard, mainframe liners, and the dead-bed feed hopper – keep maintenance costs to a minimum.

**Application flexibility**

HP cone crushers can be converted from the finest to the coarsest cavity simply by replacing the mantle, bowl liner, adapter ring, and wedge bolts.

**Easy to operate**

Using the hydraulic motor setting adjustment with the adjustment under load capability makes it easy to balance the crushing circuit and optimize crusher productivity. The addition of a hydraulic motor position transducer system to keep track of crusher setting is all that’s required to connect the crusher to a plant DCS system for full automation applications.
1 - Locking bolt
2 - Feed bowl hopper
3 - Bowl
4 - Adjustment ring
5 - Head bowl
6 - Main frame
7 - Socket liner
8 - Upper head bushing
9 - Countershaft
10 - Countershaft bushings
11 - Gear and pinion
12 - Main shaft
13 - Eccentric thrust bearing
14 - Counterweight guard
15 - Tramp Release assembly
16 - Eccentric bushing
17 - Eccentric
18 - Lower head bushing
19 - Head
20 - Mantle
21 - Bowl liner
22 - Hydraulic adjustment motor
23 - Clamping cylinders
24 - Torch ring
25 - Cone feed plate
Crusher Cavity Selection

<table>
<thead>
<tr>
<th>Size</th>
<th>Standard</th>
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<th>Short head</th>
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<td>Feed Opening</td>
<td>Minimum Setting &quot;A&quot;</td>
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<td></td>
<td></td>
<td></td>
<td>&quot;B&quot;1</td>
<td></td>
<td>&quot;B&quot;2</td>
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<tr>
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<td>74 mm (2.91&quot;)</td>
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<td>299 mm (11.77&quot;)</td>
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<td>Extra Fine</td>
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<td>297 mm (11.69&quot;)</td>
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<td>353 mm (13.90&quot;)</td>
<td>13 mm (0.51&quot;)</td>
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<tr>
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<td>HP800</td>
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<td>267 mm (10.1&quot;)</td>
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<tr>
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<td>Extra Coarse</td>
<td>36 mm (1.42&quot;)</td>
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</tbody>
</table>

1 The minimum setting is that at which the crusher will operate without causing ring bounce. Depending on the crusher characteristics of the rock, this setting can charge.

2 Feed opening "B" is at a minimum setting "A".

3 Maximum feed size vary from 80 to 100% of "B" depending on machine size and material.

Weights - Complete Crusher and Assemblies

<table>
<thead>
<tr>
<th>Size</th>
<th>HP100</th>
<th>HP200</th>
<th>HP300</th>
<th>HP400</th>
<th>HP500</th>
<th>HP800</th>
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<tbody>
<tr>
<td>Crusher Complete</td>
<td>5 400 kg</td>
<td>10 400 kg</td>
<td>15 810 kg</td>
<td>23 000 kg</td>
<td>33 150 kg</td>
<td>68 650 kg</td>
</tr>
<tr>
<td></td>
<td>11 900 Lbs</td>
<td>22 960 Lbs</td>
<td>33 490 Lbs</td>
<td>50 600 Lbs</td>
<td>73 000 Lbs</td>
<td>151 200 Lbs</td>
</tr>
<tr>
<td>Bowl, Bowl Liner, Adj.</td>
<td>1 320 kg</td>
<td>2 680 kg</td>
<td>3 525 kg</td>
<td>4 800 kg</td>
<td>7 200 kg</td>
<td>17 350 kg</td>
</tr>
<tr>
<td>Cap, Hopper</td>
<td>2 910 Lbs</td>
<td>5 915 Lbs</td>
<td>7 765 Lbs</td>
<td>10 575 Lbs</td>
<td>15 800 Lbs</td>
<td>38 220 Lbs</td>
</tr>
<tr>
<td>Head Mantle and Feed Plate</td>
<td>600 kg</td>
<td>1 200 kg</td>
<td>2 060 kg</td>
<td>3 240 kg</td>
<td>5 120 kg</td>
<td>10 800 kg</td>
</tr>
<tr>
<td></td>
<td>1 325 Lbs</td>
<td>2 650 Lbs</td>
<td>4 550 Lbs</td>
<td>7 130 Lbs</td>
<td>11 280 Lbs</td>
<td>23 790 Lbs</td>
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<tr>
<td>Maximum recommended</td>
<td>90 kW</td>
<td>132 kW</td>
<td>200 kW</td>
<td>315 kW</td>
<td>355 kW</td>
<td>600 kW</td>
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<tr>
<td>Power</td>
<td>125 HP</td>
<td>200 HP</td>
<td>300 HP</td>
<td>400 HP</td>
<td>500 HP</td>
<td>800 HP</td>
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<td>Countershaft Speed-rpm</td>
<td>750-1200</td>
<td>750-1200</td>
<td>700-1200</td>
<td>700-1000</td>
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Clearance dimensions

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<th>HP200</th>
<th>HP300</th>
<th>HP400</th>
<th>HP500</th>
<th>HP800</th>
</tr>
</thead>
<tbody>
<tr>
<td>A - To bottom of oil piping</td>
<td>293 mm (11-9/16&quot;)</td>
<td>297 mm (11-11/16&quot;)</td>
<td>328 mm (12-15/16&quot;)</td>
<td>240 mm (9-1/2&quot;)</td>
<td>425 mm (16-3/4&quot;)</td>
<td>722 mm (28-7/16&quot;)</td>
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<tr>
<td>B - Adjustment ring maximum diameters</td>
<td>1 505 mm (59-1/4&quot;)</td>
<td>1 952 mm (76-7/8&quot;)</td>
<td>2 207 mm (86-7/8&quot;)</td>
<td>2 370 mm (93-3/8&quot;)</td>
<td>2 730 mm (107-1/2&quot;)</td>
<td>3 702 mm (145-3/4&quot;)</td>
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<tr>
<td>C - Clearance required for removing countershaft assembly</td>
<td>1 560 mm (61-7/16&quot;)</td>
<td>1 840 mm (72-7/16&quot;)</td>
<td>2 020 mm (79-1/2&quot;)</td>
<td>2 470 mm (97-1/4&quot;)</td>
<td>2 650 mm (104-3/8&quot;)</td>
<td>3 450 mm (135-13/16&quot;)</td>
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<tr>
<td>D - To end of countershaft</td>
<td>950 mm (37-3/8&quot;)</td>
<td>1 630 mm (64-3/4&quot;)</td>
<td>1 865 mm (73-7/16&quot;)</td>
<td>2 055 mm (80-7/8&quot;)</td>
<td>2 290 mm (90-1/8&quot;)</td>
<td>3 538 mm (139-1/4&quot;)</td>
</tr>
<tr>
<td>E - Maximum height to top</td>
<td>1 290 mm (50-13/16&quot;)</td>
<td>1 630 mm (64-3/4&quot;)</td>
<td>1 865 mm (73-7/16&quot;)</td>
<td>2 055 mm (80-7/8&quot;)</td>
<td>2 290 mm (90-1/8&quot;)</td>
<td>3 538 mm (139-1/4&quot;)</td>
</tr>
<tr>
<td>F - Inside diameter of feed hopper</td>
<td>694 mm (27-5/16&quot;)</td>
<td>914 mm (36&quot;)</td>
<td>1 078 mm (42-7/16&quot;)</td>
<td>1 308 mm (51-1/2&quot;)</td>
<td>1 535 mm (60-1/2&quot;)</td>
<td>1 863 mm (73-3/8&quot;)</td>
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<tr>
<td>Clearance required for removing bowl assembly</td>
<td>1 725 mm (67-1/16&quot;)</td>
<td>2 140 mm (84-1/4&quot;)</td>
<td>2 470 mm (97-1/4&quot;)</td>
<td>2 650 mm (104-3/8&quot;)</td>
<td>3 300 mm (129-7/16&quot;)</td>
<td>4 854 mm (191-1/8&quot;)</td>
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<tr>
<td>Clearance required for removing head assembly</td>
<td>1 700 mm (66-1/16&quot;)</td>
<td>2 165 mm (84-1/4&quot;)</td>
<td>2 455 mm (96-5/8&quot;)</td>
<td>2 715 mm (106-3/8&quot;)</td>
<td>3 165 mm (124-5/8&quot;)</td>
<td>4 634 mm (171-3/4&quot;)</td>
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<tr>
<td>J - Additional upward travel of feed hopper during clearing stroke</td>
<td>65 mm (2-9/16&quot;)</td>
<td>70 mm (2-3/4&quot;)</td>
<td>85 mm (3-3/8&quot;)</td>
<td>150 mm (4-1/8&quot;)</td>
<td>125 mm (4-15/16&quot;)</td>
<td>159 mm (6-1/4&quot;)</td>
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<tr>
<td>K - Mounting hole location</td>
<td>NA</td>
<td>545 mm (21-1/2&quot;)</td>
<td>660 mm (26&quot;)</td>
<td>830 mm (32-11/16&quot;)</td>
<td>882 mm (34-3/4&quot;)</td>
<td>1 130 mm (44-1/2&quot;)</td>
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<tr>
<td>Main frame discharge opening diameter</td>
<td>970 mm (38-3/16&quot;)</td>
<td>1 240 mm (48-13/16&quot;)</td>
<td>1 470 mm (57-7/8&quot;)</td>
<td>1 726 mm (68&quot;)</td>
<td>2 040 mm (80-1/2&quot;)</td>
<td>2 420 mm (95-1/4&quot;)</td>
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</table>

Product Gradation Table (% passing through square mesh depending on the setting)

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<th>8 (5/16&quot;)</th>
<th>10 (3/8&quot;)</th>
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<th>19 (3/4&quot;)</th>
<th>22 (7/8&quot;)</th>
<th>25 (1&quot;)</th>
<th>28 (1-1/8&quot;)</th>
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Cone crusher capacity charts are developed for use as an application tool to properly utilize the HP crusher’s capabilities. The capacity figures shown apply to material weighing 100 pounds per cubic foot or 1600 kg per cubic meter. The crusher is one component of the circuit. As such, its performance is in part dependent on the proper selection and operation of feeders, conveyors, screens, supporting structure, electric motors, drive component and surge bins. Where used, attention to the following factors will enhance crusher capacity and performance.

1. Proper selection of crushing chamber for material to be crushed.
2. A feed grading containing proper distribution of the particle size.
3. Controlled feed rate.
4. Proper feed distribution 360° around crushing chamber.
5. Discharge conveyor sized to carry maximum crusher capacity.
6. Properly sized scalping and closed circuit screens.
7. Automation controls.
8. Adequate crusher discharge area.

The following factors will detract from crusher capacity and performance.

1. Sticky material in crusher feed.
2. Fines in crusher feed (smaller than crusher setting) exceeding 10% of crusher capacity.
3. Excessive feed moisture.
4. Feed segregation in crusher cavity.
5. Improper feed distribution around circumference of crusher cavity.
6. Lack of feed control.
7. Inefficient use of recommended connected horsepower.
8. Insufficient conveyor capacity.
9. Insufficient scalper and closed circuit screen capacities.
10. Insufficient crusher discharge area.
11. Extremely hard or tough material.
12. Operation of crusher at less than recommended full load countershaft speed.

For individual conditions, consult Metso.

Gradation Curves*

% passing through a square mesh depending on the setting

* The gradation and capacities shown are dependent on the feed gradation, the crushing chamber, the material density, the material cleanliness, its moisture and its crushability.
A world of difference

Before, during and after the sale, you can count on the experts at Metso to provide the best service and support in the world – all over the world. Whether you’re installing an entire customized system, a complete circuit, or simply replacing or updating a single piece of equipment, you can count on us to help you make sure it’s the right equipment for your precise needs.

In the design stage, we look at variables such as ore characteristics and properties, physical space limitations, size of ore body – even your financial situation – just to name a few. Once you make your purchase, you’ll be linked to Metso’s on-line computerized parts availability system, giving you immediate access to the right parts, in stock, and delivered promptly. If you have questions, a trained service analyst is always standing by – over the phone or in person – ready to analyze your needs and recommend a complete, long-term, cost-effective solution.

We even offer training schools to help you get the most out of your system. Over the years, thousands of crushing professionals like you have benefited from the wide variety of seminars we offer. Do you have special training needs? Tell us – and we’ll create a unique training session just for your company.

HP Series cone crushers. A world of difference in technology, quality, performance, reliability, and support. To find out more, contact your nearest Metso office.
Metso’s Mining and Construction crushing and screening equipment

Product families:
Unit crushers
- C series jaw crushers
- Primary gyratory crushers
- GP series cone crushers
- HP series cone crushers
- MP series cone crushers
- NP series horizontal impact crushers
- Barmac series vertical impact crushers

Unit screens
- DF series screens
- CVB series screens
- FS series screens
- TS series screens
- MF series screens
- RF series screens

Unit feeders
- TK series feeders
- VF series feeders
- LH.G series feeders
- VG series feeders
- PF series feeders
- HRBM series feeders

Mobile crushing and screening plants
- Lokotrack LT series track-mounted crushing plants
- Lokotrack ST series track-mounted screening plants
- Lokotrack CT and CW series track- and wheel-mounted conveyors
- NW series wheel-mounted crushing plants

Stationary crushing plants
- Complete plants for aggregate production
- Complete plants for recycling applications

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