Impact Hammer Crusher Model Selection and Operating Guide

A practical reference for matching PC-series models to material behavior, feed limits, product requirements and operating interfaces.

What this guide is designed to prevent

A PC impact hammer crusher performs well only when the feed fractures readily under repeated hammer impact and the grate can evacuate the reduced material without persistent blockage. Model selection must therefore consider the material, feed, rotor load, grate condition and downstream discharge as one operating system.

Five selection gates

1. **Suitability** — Brittle, medium-hard feed with controlled abrasivity and tramp metal.
2. **Feed** — Largest regular lump, feed grading and feeder consistency.
3. **Product** — Required discharge size, allowable fines and grate condition.
4. **Duty** — Continuous tonnes per hour, not a short peak or catalogue maximum.
5. **Interfaces** — Motor supply, conveyor capacity, maintenance access and spares.

Confirmed catalogue envelope

Model and Capacity

PC400 x 300 to PC1200 x 1200
Nominal capacity: 5-200 t/h
Motor power: 7.5-240 kW

Feed and Product

Maximum catalogue feed: 100-250 mm
Published discharge range: 10-19 mm
Final grading depends on hammer and grate condition.

Best-Fit Duty

Secondary or fine crushing of limestone, coal, gypsum, coke, coal gangue and selected cement materials. Review silica, moisture and metal contamination before selection.

Selection boundary

A standard PC hammer crusher is normally not the first choice for granite, basalt, quartzite or highly abrasive ore, where wear cost and rotor stability may outweigh its structural simplicity.

PC Series Technical Parameters

Use the catalogue values for preliminary screening, then verify the selected model against actual material and continuous operating duty.

Model	Max Feed (mm)	Discharge (mm)	Capacity (t/h)	Motor (kW)	Weight (t)
PC400 x 300	<= 100	<= 10	5-10	7.5	0.8
PC600 x 400	<= 120	<= 15	10-25	18.5	1.5
PC800 x 600	<= 120	<= 15	20-35	55	3.1
PC1000 x 800	<= 200	<= 13	20-40	115	7.9
PC1000 x 1000	<= 200	<= 15	30-80	132	8.7
PC1200 x 1200	<= 250	<= 19	80-200	240	13.6

Important data note

The maximum feed size is an inlet limit, not a recommended average. Actual throughput can be lower when the product must be finer, the grate is partly covered, the hammers are worn, or the discharge conveyor cannot receive the full flow.

How to Read the Catalogue Data

The correct model is selected from the complete duty, not by choosing the largest motor or highest capacity figure.

Feed Limit Is Not a Target

Allow margin below the published maximum for irregular lump shape, feed surges and occasional oversize. Routine operation should not depend on repeated impact overload.

Capacity Is System-Limited

Actual output is capped by reduction duty, effective grate area, feeder stability and downstream evacuation. The lowest-capacity interface controls plant output.

Finer Is Not Always Better

A smaller grate opening can increase residence time, fines, motor load and blockage risk. Confirm that the downstream process genuinely requires the finer product.

Wear Changes the Result

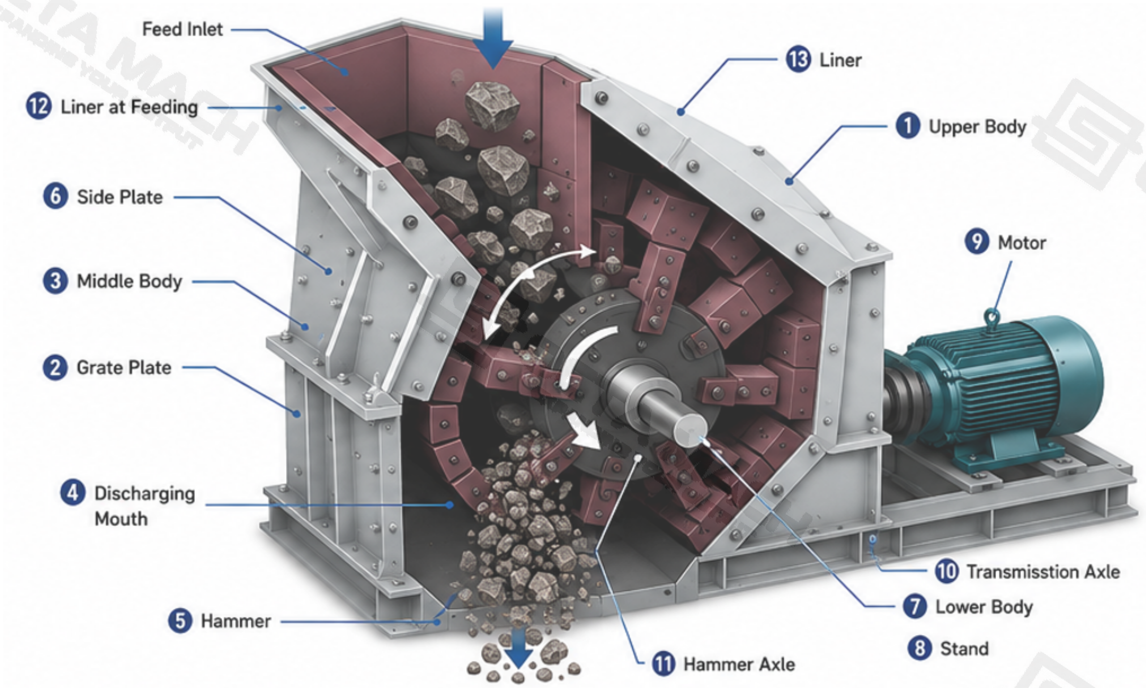
Hammer-tip wear reduces impact intensity, while grate wear enlarges local openings. Either condition can make the product coarser without a change to the nominal setting.

Selection takeaway

Use model size only after confirming the complete duty. The selected crusher must accept the largest regular lump, produce the required grading, sustain the continuous tonnes per hour, and discharge through the grate and conveyor without persistent buildup.

Crushing Mechanism and Material Path

High-speed hammer impact creates breakage; the grate retains oversize until particles are small enough to leave the chamber.



Feed | Hammer impact | Liner collision | Repeated reduction | Grate discharge

Breakage sequence

1. Hammers strike and accelerate the incoming feed.
2. Particles collide with liners and other particles.
3. Oversize remains above the grate for further reduction.
4. Material leaves only after it can pass the open area.

Engineering implication

Grate spacing is only one control. Hammer-tip condition determines whether particles reach the grate with enough reduction, while effective open area determines whether the product can leave without excessive recirculation.

Primary monitoring points

- [ ] Hammer profile and weight balance
- [ ] Grate spacing and open area
- [ ] Motor current and bearing temperature
- [ ] Feed continuity and discharge flow

Main Components and Their Operating Effect

Wear-part condition changes both product size and machine stability. Inspection priorities should follow the load path from rotor to grate.

Component	Engineering role	Operating effect when worn or loose
Rotor assembly	Carries the hammer system and generates impact energy.	Imbalance raises vibration and bearing load.
Hammer head	Transfers kinetic energy to the feed.	Wear reduces impact intensity and makes the product coarser.
Hammer disc and pin	Locate swinging hammers and preserve balanced spacing.	Uneven mass or pin damage creates unstable rotation.
Liner plate	Protects the housing and provides a secondary impact surface.	Wear changes collision geometry and chamber protection.
Grate bars	Retain oversize and define the main discharge-size limit.	Wear enlarges local openings; buildup reduces effective open area.
Bearing housing	Supports shaft alignment and rotor load.	Poor lubrication or misalignment raises temperature and resistance.

Inspection principle

Do not replace wear parts only by operating hours. Use hammer profile, weight difference, vibration, product-size drift, local grate wear and bearing-temperature trends to decide when the rotor set requires service.

Discharge Size, Wear and Stable Operation

Use grading, vibration, motor load and bearing-temperature trends together. A single symptom rarely identifies the root cause.

Condition	First change	Expected effect	Priority check
Hammer-tip wear	Impact intensity and effective clearance	Coarser product and lower effective capacity	Profile, mass loss and balance between hammer groups
Grate wear or deformation	Local opening size	Oversize leakage and unstable grading	Spacing, bending, broken bars and fastening
Sticky fines on grate	Effective open area	Capacity loss, motor-load rise and unstable discharge	Moisture, clay, grate coverage and cleaning access
Uneven feeding	Rotor loading across machine width	Vibration, local wear and fluctuating current	Feeder continuity and distribution
Rotor imbalance	Dynamic bearing load	High vibration and accelerated bearing wear	Hammer arrangement, pins, buildup and rotor condition
Restricted discharge	Material evacuation	Chamber buildup and high current	Chute, conveyor and downstream receiving capacity

Three corrective-action rules

1. Coarser product

Check hammer-tip wear and local grate enlargement before reducing the nominal grate spacing.

2. Lower capacity

Restore effective grate area and downstream evacuation before increasing feeder output.

3. Higher vibration

Stop and verify balanced hammer arrangement, pin condition and internal buildup before continued operation.

Model Selection Logic

Choose the smallest PC model that can sustain the required duty with stable feed, acceptable motor load and sufficient grate and downstream capacity.

Selection input	Information to confirm	Why it matters
Material behavior	Brittleness, hardness, abrasivity and tramp-metal risk	Confirms whether repeated hammer impact is technically and economically suitable.
Largest regular lump	Maximum normal feed, not a rare oversize event	Defines inlet size and rotor working-zone requirement.
Required product	Target size, allowable fines and downstream duty	Determines grate configuration and acceptable residence time.
Continuous capacity	Required net tonnes per hour across the full shift	Determines model, motor, feeder and discharge interfaces.
Moisture, wear and interfaces	Sticky fines, expected wear, feeder stability and discharge capacity	Predicts blockage risk, operating cost and whether catalogue output is achievable.

Final model rule

The selected model must accept the largest regular lump without repeated overload, maintain the required net capacity under continuous feed, and evacuate the product through the grate and downstream conveyor without sustained buildup. A larger motor cannot compensate for unsuitable material, blocked grate area or an undersized discharge system.

Material Matching and Application Boundaries

Impact hammer crushing is most effective on brittle, relatively low- to medium-abrasion feed. Material behavior matters more than the industry label.

Material / duty	Fit	Main review point	Typical process position
Limestone and cement raw material	Good	Silica content, maximum lump and required fines	Secondary or fine crushing before screening or grinding
Coal and coke	Good	Moisture, dust and grate coverage	Preparation before screening or combustion
Gypsum	Good with review	Moisture and clay contamination	Fine preparation before grinding or blending
Coal gangue	Conditional	Abrasivity, metal contamination and hammer wear	Reduction before screening, blending or reuse
Selected brittle slag	Conditional	Metal inclusions and liner / grate wear	Crushing before recovery or reuse
Granite, basalt and quartzite	Normally poor	High abrasivity and rapid wear	Usually better suited to compression crushing

Material acceptance check

Confirm hardness, brittleness, abrasivity, moisture, clay and tramp-metal risk before relying on the catalogue capacity. Highly abrasive material can remain crushable but still be uneconomic because hammer, liner and grate consumption rises sharply.

Operating Diagnosis and Final Commissioning Check

Create a stable baseline during commissioning by recording vibration, bearing temperature, motor current, feed rate and product grading under steady load.

Symptom	Likely causes	First inspection
Product becomes coarser	Hammer wear, local grate wear, excessive feed or shortened residence time	Hammer tips, grate spacing and feed rate
Capacity falls	Covered grate area, sticky feed, worn hammers or restricted discharge	Grate openness, moisture, chute and conveyor
Vibration rises	Unbalanced hammer sets, buildup, damaged pin or rotor fault	Hammer weights, pins, rotor and internal buildup
Bearing temperature rises	Lubrication issue, alignment error, imbalance or overload	Lubricant, housing, shaft alignment and motor current
Abnormal metallic noise	Loose wear part, broken grate bar or tramp metal	Stop, isolate and inspect the chamber before restart

Diagnostic rule

Treat trend changes as evidence. Compare the current product grading, vibration, bearing temperature and motor current with the stable commissioning baseline before changing the grate setting or feed rate. This separates normal wear from blockage, imbalance or mechanical damage.

Final Commissioning Checklist

Complete the checks under no-load and stable-load conditions, then retain the recorded values as the operating baseline for future diagnosis.

Crusher and feed

- [ ] Material type and largest normal lump confirmed
- [ ] Required net capacity and target product confirmed
- [ ] Feeder distributes material continuously across the inlet
- [ ] Grate opening and effective open area verified
- [ ] Hammer sets installed in balanced weight groups
- [ ] Pins, liners, grate bars and fasteners inspected
- [ ] Inspection doors and guards secured before operation

Drive, discharge and records

- [ ] Motor voltage, frequency and starting method confirmed
- [ ] Discharge chute and conveyor can receive full output
- [ ] Bearing lubrication and rotation direction checked
- [ ] No-load vibration and motor current recorded
- [ ] Loaded vibration, temperature and current recorded
- [ ] Product sample and discharge grading documented
- [ ] Initial spare hammers, pins and grate bars available

Release record

Record the final grate opening, hammer installation status, feed rate, motor current, bearing temperature, vibration and product grading. These values provide the reference needed to identify later wear, blockage or imbalance.