Ball Mill Structure, Grinding Circuit and Operating Control Guide

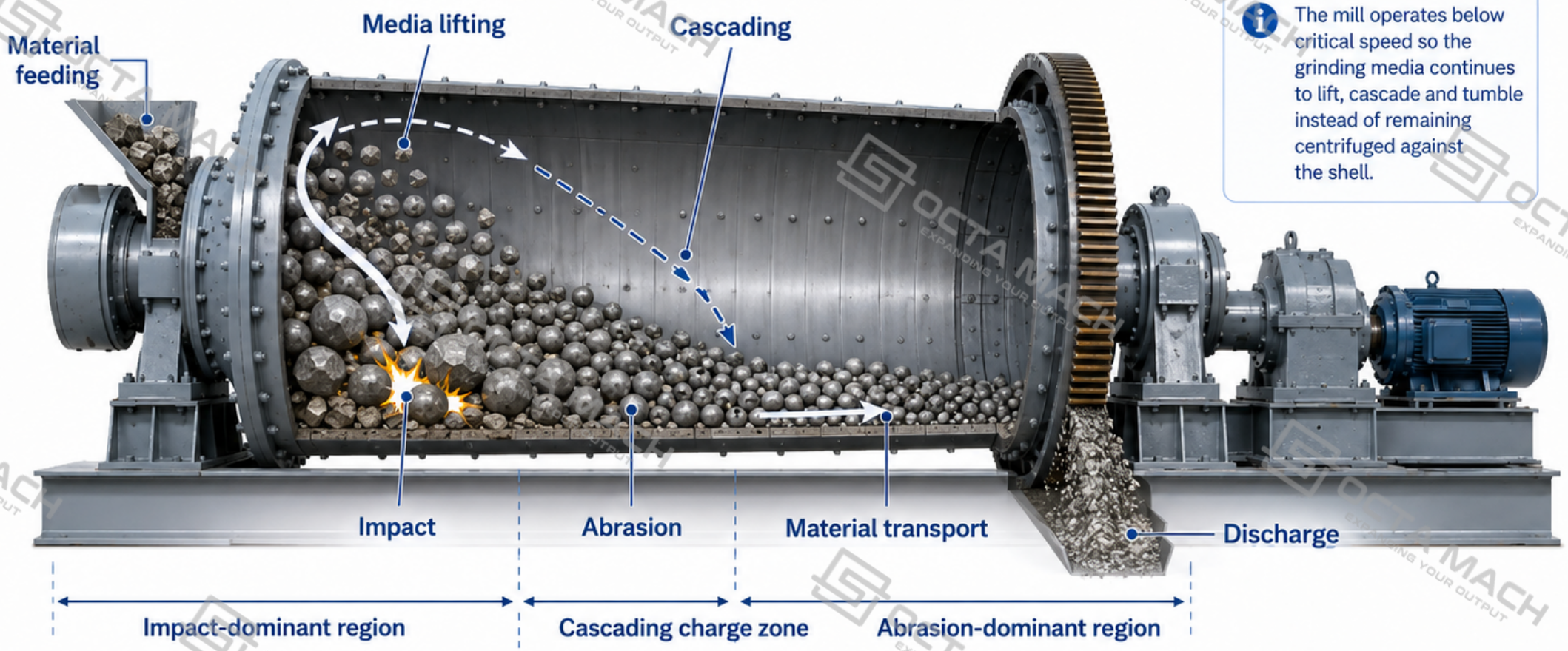
Wet or Dry Grinding

Overflow or Grate Discharge

Impact and Abrasion

Closed-Circuit Operation

Grinding Principle

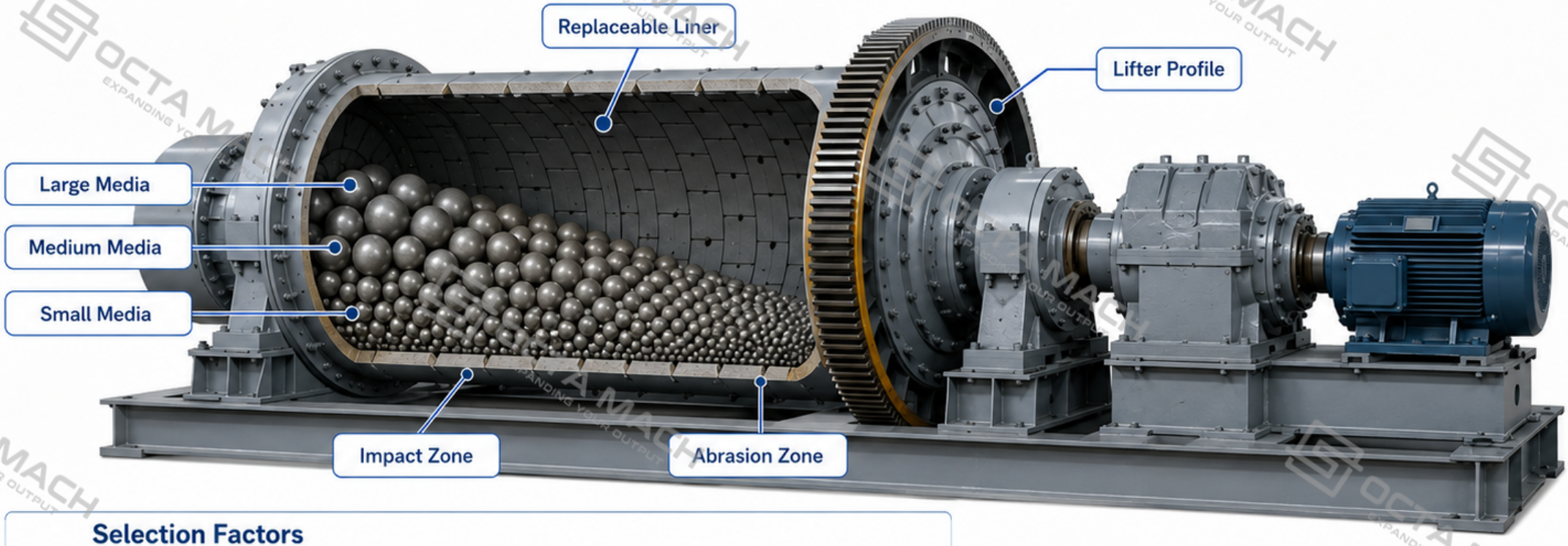


The mill operates below critical speed so the grinding media continues to lift, cascade and tumble instead of remaining centrifuged against the shell.

Operating control point

- Stable feed improves grinding efficiency.
- Charge motion must maintain cascading action.
- Product discharge should match target fineness.

Grinding Media and Liner Configuration

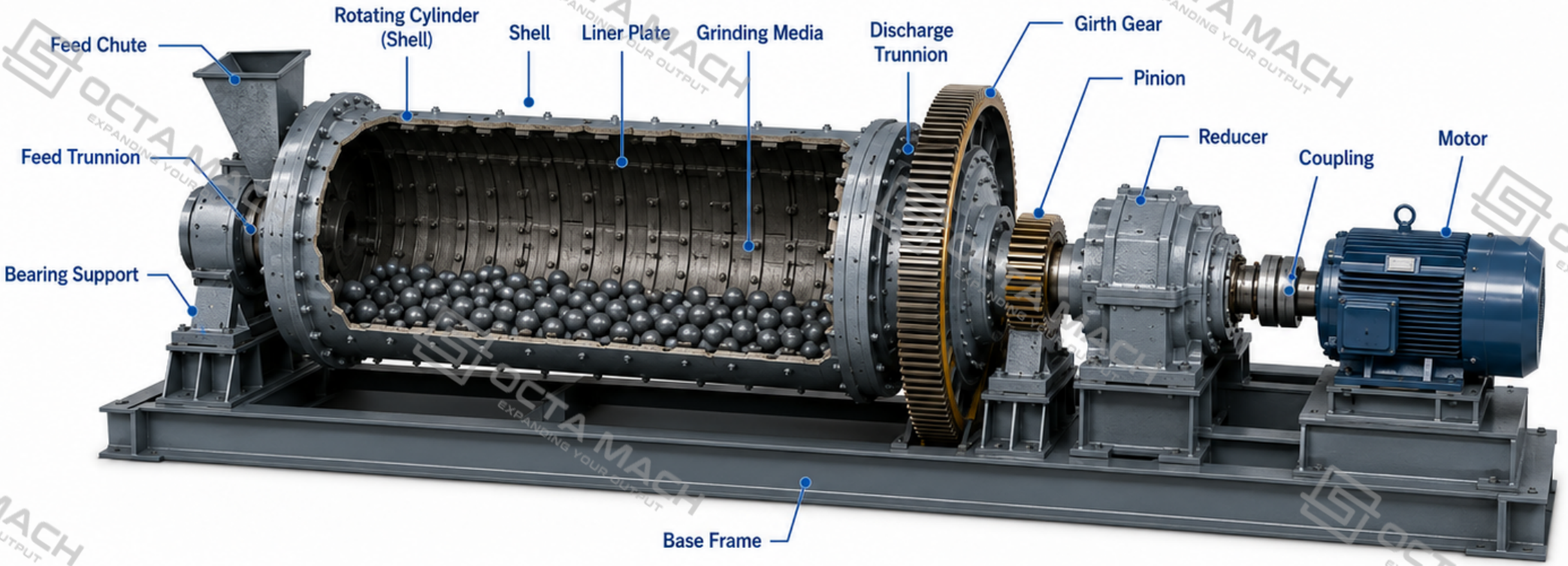


Selection Factors

Item	Main Effect
Ball Diameter and Grading	Controls impact force and contact area.
Ball Material and Hardness	Affects wear rate and contamination.
Filling Ratio	Influences power draw and media movement.
Liner Material and Profile	Controls lifting action and shell protection.
Slurry Concentration	Affects transport and grinding efficiency.
Media Wear Condition	Changes effective charge and product-size distribution.

Common industrial ball diameters may include approximately 40, 60, 80, 100 and 120 mm, but final grading is project-specific.

Ball Mill Main Structure



Component Function

Component	Function	Component	Function
Feed Chute	Directs material into the mill.	Girth Gear	Transfers drive torque to the shell.
Feed Trunnion	Supports the feed end and provides material entry.	Pinion	Drives the girth gear.
Bearing Support	Carries the rotating load.	Reducer	Reduces speed and increases torque.
Rotating Cylinder / Shell	Contains the grinding charge and ore.	Motor	Supplies the driving power.
Liner Plate	Protects the shell and lifts media.	Coupling	Connects drive components.
Grinding Media	Produces impact and abrasion.	Base Frame	Supports alignment and installation.
Discharge Trunnion	Releases ground product.		

Wet, Dry, Overflow and Grate Configurations

1 Grinding Method

Wet

- Supports slurry-based separation
- Water added to form pumpable slurry
- Suitable for wet beneficiation circuits

Dry

- Supports dry powder production
- No process water in the mill
- Suitable for dry mineral grinding

2 Discharge Arrangement

Overflow

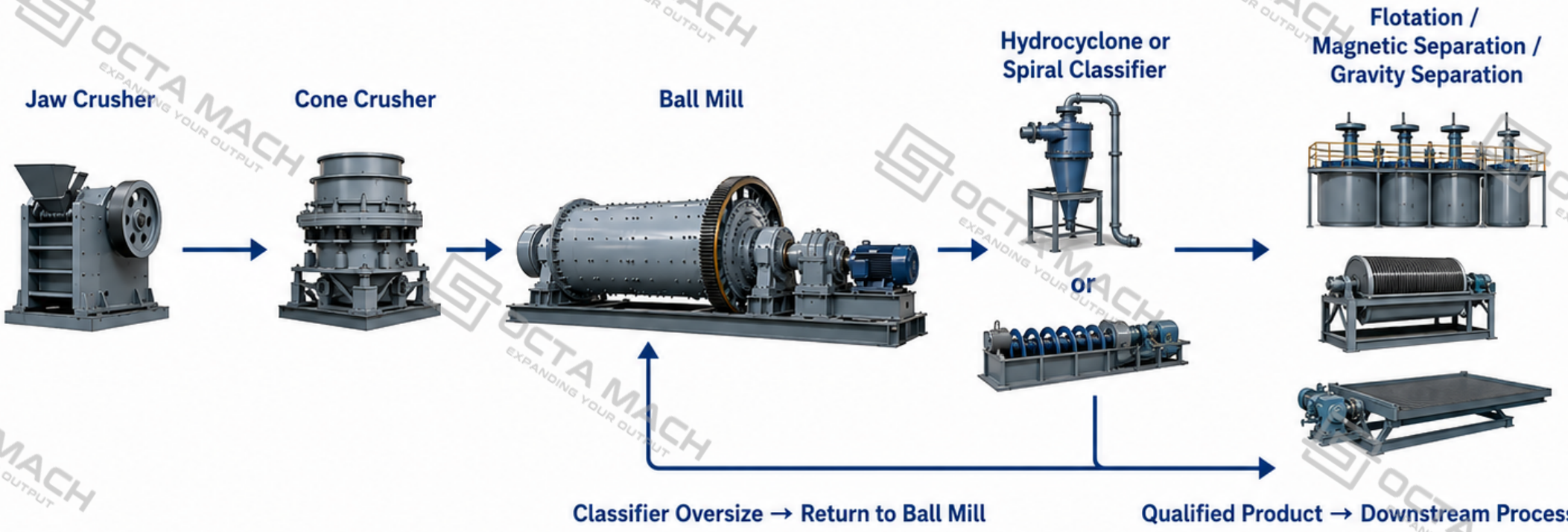
- Longer residence time
- Relatively finer product
- Useful for fine grinding

Grate

- Faster discharge
- Reduced unnecessary retention
- Useful for higher-throughput duty

! The final configuration depends on material condition, target particle size, slurry density, overgrinding risk and downstream classifier arrangement.

Closed-Circuit Grinding System



Operational checkpoints

- Feed-size stability
- Ball-charge condition
- Slurry concentration
- Classifier pressure or operating condition
- Circulating load
- Product-size monitoring
- Liner wear