# Jaw and Gyratory Crusher Capacity

Capacity of a jaw or gyratory crusher from width or mantle diameter, open-side setting, throw, nip angle, speed and material constant, with Taggart's rule.

**Method:** Wills and Finch; Wills' Mineral Processing Technology; ...

## Input parameters

Unit system: SI

| Parameter | Value | Unit |
|---|---|---|
| Crusher | Jaw crusher | |
| Inner width of the jaw crusher | 1.2000 | m |
| Head mantle diameter at discharge (gyratory) | 1.5000 | m |
| Open-side setting | 150.00 | mm |
| Throw | 35.000 | mm |
| Angle of nip | 20.000 | ° |
| Speed | 220.00 | rpm |
| Material constant (jaw 1.5–2, gyratory 2–3) | 1.7500 | |
| Bulk density of the product | 1.6000 | g/cm³ |
| Gape (feed opening) | 0.90000 | m |

## Calculated results

| Parameter | Value | Unit |
|---|---|---|
| Volumetric capacity | 399.84 | m³/h |
| Mass capacity | 639.74 | t/h |
| Taggart's limit (jaw below, gyratory above) | 130.98 | t/h |

**Notes for this case**

- A first estimate: maker's capacity tables, which include the feed size distribution and choke feeding, govern. Taggart (1945): below 161.7 × gape² t/h use a jaw crusher, above it a gyratory.
- The duty is above Taggart's limit for this gape: a gyratory crusher is usually preferred.

## Formula and method

$$Q_{jaw} = BSs\cot\alpha\, k\, 60n, \quad Q_{gyr} = (D-S)\pi Ss\cot\alpha\, k\, 60n \quad (\mathrm{m^3/h})$$

### Variables

| | | |
|---|---|---|
| $\mathrm{type}$ | Crusher | - |
| $B$ | Inner width of the jaw crusher | m |
| $D$ | Head mantle diameter at discharge (gyratory) | m |
| $S$ | Open-side setting | m |
| $s$ | Throw | m |
| $\alpha$ | Angle of nip | rad |
| $n$ | Speed | 1/s |
| $k$ | Material constant (jaw 1.5–2, gyratory 2–3) | - |
| $\rho_b$ | Bulk density of the product | kg/m³ |
| $G$ | Gape (feed opening) | m |
| $Q$ | Volumetric capacity | m³/s |
| $\dot{m}$ | Mass capacity | kg/s |

| | | |
|---|---|---|
| $161.7G^2$ | Taggart's limit (jaw below, gyratory above) | kg/s |

### Method and standards

Broman's volumetric capacity model.

### Assumptions and limits

- Choke-fed crusher; dry, free-flowing feed.

### References

- Wills and Finch
- Wills' Mineral Processing Technology
- 8th ed. (Butterworth-Heinemann, 2016)
- ch. 6
- eqs. 6.1-6.2 (Broman, 1984) and Taggart's rule (1945)

## Report details

| | |
|---|---|
| Report reference | FCC-WZX0-DCEY (the same inputs always give the same reference) |
| Generated | 17 November 2026, 19:50 UTC |
| Calculator | Jaw and Gyratory Crusher Capacity |
| Method last reviewed | 17 November 2026 |
| Software release | FireCAD Calc, release of 17 November 2026 |
| Release checks | 3 reference cases of this calculator, computed independently, are checked on every release |

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

### This calculator online

https://calc.firecad.com/civil/mining-minerals/jaw-gyratory-crusher-capacity

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.