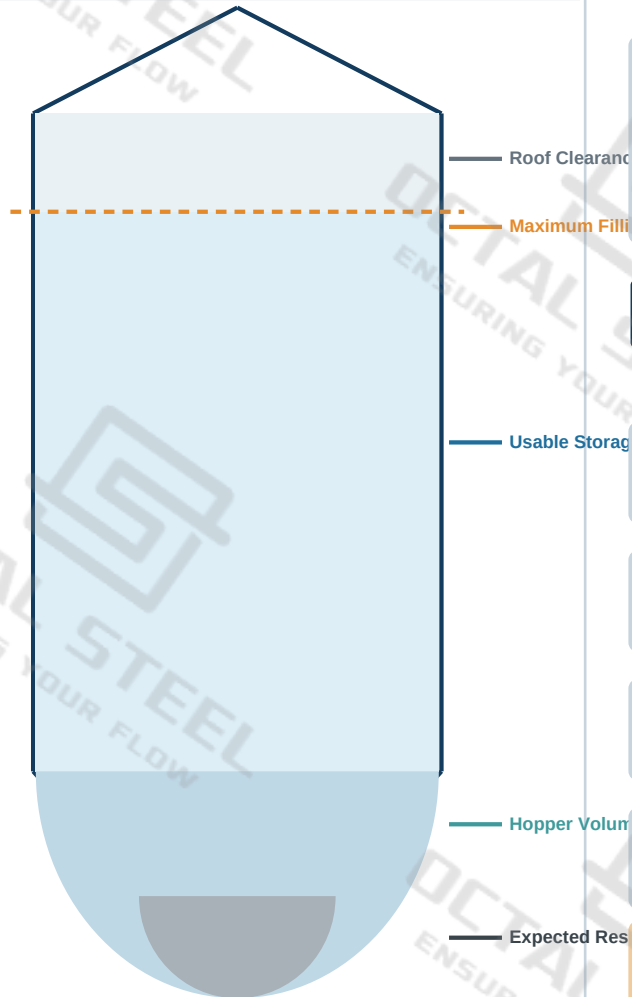


Design Basis and Capacity Definitions

Separate geometric volume, usable volume and working storage before selecting a silo.

01

CAPACITY ZONES - CONCEPTUAL SECTION



Concept only. Final usable volume depends on geometry, operating levels and verified residual inventory.

CORE RELATIONSHIP

Working Storage Capacity

$$= \text{Usable Internal Volume} \times \text{Actual Coal Bulk Density}$$

DEFINITIONS THAT MUST NOT BE INTERCHANGED

Gross Internal Volume Total enclosed geometric volume within the selected calculation boundaries.

Usable Internal Volume Volume between operating limits after deducting clearance, residual zones and exclusions.

Working Storage Capacity Recoverable coal mass available for normal operation, based on actual bulk density.

Operating Reserve Inventory or freeboard deliberately withheld for process continuity and control.

DESIGN CAUTIONS

Geometric volume is not usable capacity. Do not select capacity from diameter and shell height alone. Use project coal-sample bulk density. Deduct roof clearance, expected residual material and operating reserve.

Representative Coal Silo Specifications

02

Data-control sheet: confirmed values only; unverified fields remain project-specific.

DATA STATUS RULE

No dimensional or throughput value is inferred here. Populate only from the approved article, client data sheet or confirmed design calculation.

Parameter	Unit / Format	Status in This Issue	Engineering Note
Silo Diameter	m	Project-specific / To be confirmed	Use approved internal diameter and stated calculation boundary.
Cylindrical Shell Height	m	Project-specific / To be confirmed	Separate cylindrical height from roof and hopper geometry.
Nominal Internal Volume	m3	Project-specific / To be confirmed	State whether roof and hopper zones are included.
Usable Volume	m3	Calculated from operating limits	Exclude unusable zones and agreed allowances.
Reference Bulk Density	t/m3	Coal-sample value required	Use as-received project basis; record moisture condition.
Estimated Working Capacity	t	Calculated, not assumed	Usable volume x actual bulk density.
Inlet Throughput	t/h	Project-specific / To be confirmed	Check conveyor duty and peak filling rate.
Discharge Throughput	t/h	Project-specific / To be confirmed	Coordinate outlet, feeder and downstream conveyor.
Bottom Configuration	Type	Hopper or flat bottom	Confirm reclaim concept and expected residual inventory.
Shell Construction	Type	Spiral-formed steel shell	Final plate/strip and stiffening design are project-specific.
Discharge Equipment	Type / duty	Project-specific / To be confirmed	Feeder type and effective withdrawal coverage must be defined.

RELEASE GATE

Working capacity may be published only when usable volume, density basis and all volume deductions are traceable. Nominal volume alone is insufficient.

Capacity Calculation Examples

Illustrative calculation paths - replace assumptions with approved project inputs.

03

A. KNOWN USABLE VOLUME -> WORKING TONNAGE

Usable internal volume	5,000 m3
Actual bulk density	0.80 t/m3
Calculated working capacity	4,000 t

$$5,000 \text{ m}^3 \times 0.80 \text{ t/m}^3 = 4,000 \text{ t}$$

B. REQUIRED TONNAGE -> USABLE VOLUME

Required working tonnage	4,000 t
Actual bulk density	0.80 t/m3
Required usable volume	5,000 m3

$$4,000 \text{ t} / 0.80 \text{ t/m}^3 = 5,000 \text{ m}^3$$

C. STORAGE DUTY -> SELECTED NOMINAL VOLUME

Coal handling rate	100 t/h
Required storage time	36 h
Required working tonnage	3,600 t
Actual bulk density	0.80 t/m3
Required usable volume	4,500 m3
Operating volume allowance	10% = 450 m3
Minimum volume before other deductions	4,950 m3

$$(100 \text{ t/h} \times 36 \text{ h}) / 0.80 \text{ t/m}^3 \times 1.10 = 4,950 \text{ m}^3$$

BULK-DENSITY SENSITIVITY - SAME 5,000 m3 USABLE VOLUME

Actual Bulk Density	Working Capacity	Change vs 0.80 t/m3	Interpretation
0.70 t/m3	3,500 t	-500 t	Lower-density coal reduces stored mass at the same volume.
0.80 t/m3	4,000 t	Baseline	Reference case for illustration only.
0.90 t/m3	4,500 t	+500 t	Higher-density coal increases mass and structural load.

IMPORTANT: Values on this page are illustrative assumptions, not project specifications. Moisture and sampling basis must accompany the density value.

Capacity Verification Checklist

Minimum project inputs required before working capacity is confirmed.

04

Input	Required Record	Why It Matters	Verified
As-received coal bulk density	t/m3, test method, sample condition	Converts usable volume to stored mass and influences design load.	[]
Moisture range	Minimum / normal / maximum, %	Changes density, cohesion, buildup and reclaim behavior.	[]
Particle-size distribution	Top size and fines distribution	Affects packing, flow, segregation and outlet assessment.	[]
Required storage duration	Normal and contingency, h or days	Defines working inventory from process demand.	[]
Filling rate	Normal and peak, t/h	Sets inlet, venting and conveying duty.	[]
Reclaim rate	Minimum / normal / peak, t/h	Sets feeder and downstream conveyor duty.	[]
Operating levels	Maximum and minimum level setpoints	Defines the vertical boundaries of usable inventory.	[]
Expected residual material	Volume or mass after normal reclaim	Must be excluded from recoverable working capacity.	[]
Required operating reserve	Mass, volume or percentage with basis	Protects continuity but is not freely available working inventory.	[]
Filling / discharge cycles	Cycles per day and operating sequence	Checks whether instantaneous rates and control logic are realistic.	[]

CAPACITY CONFIRMATION SEQUENCE

TECHNICAL HOLD POINT Do not state a final working capacity until the input basis, deductions and calculation boundary are documented and reviewed together.