

Agitation Vat Working Principle and Flotation Conditioning Guide



EQUIPMENT DATA

	Equipment Type	Vertical Agitation Vat
	Model Range	XB-750 to XB-3500
	Tank Internal Diameter	750–3,500 mm
	Tank Depth	750–3,500 mm
	Effective Volume	0.26–30 m ³
	Agitator Diameter	240–850 mm
	Agitator Speed	200–530 r/min
	Installed Motor Power	1.1–22 kW
	Equipment Weight	228–7,110 kg
	Main Duty	Ore-pulp mixing and flotation conditioning



PRODUCT DEFINITION

An agitation vat circulates mineral slurry, disperses flotation reagents and maintains solids suspension before the flotation stage.



TECHNICAL NOTE

Published parameters are intended for preliminary comparison. Final selection must consider slurry flow, conditioning time, solids concentration, slurry density, particle size and verified plant conditions.

XB Agitation Vat Technical Parameters

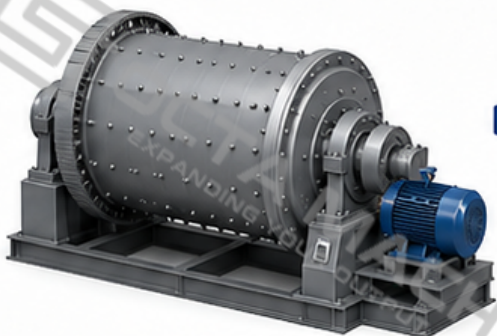
Model	Tank Diameter (mm)	Tank Depth (mm)	Effective Volume (m³)	Agitator Diameter (mm)	Speed (r/min)	Motor Model	Power (kW)	Weight (kg)
XB-750	750	750	0.26	240	530	Y90S-4	1.1	228
XB-1000	1,000	1,000	0.58	240	530	Y90L-4	1.5	436
XB-1200	1,200	1,200	1.14	400	320	Y100L2-4	3	765
XB-1500	1,500	1,500	2.20	400	320	Y100L2-4	3	1,083
XB-2000	2,000	2,000	5.46	550	230	Y132M2-6	5.5	1,671
XB-2500	2,500	2,500	11.20	650	200	Y160L-6	11	3,438
XB-3000	3,000	3,000	19.10	700	210	Y225S-8	18.5	4,613
XB-3500	3,500	3,500	30.00	850	230	Y225M-8	22	7,110



TECHNICAL NOTE: Nominal equipment data do not independently determine slurry capacity or conditioning performance. Final selection must be based on actual process conditions.

Position and Functions in the Flotation Circuit

1. GRINDING



Grinding mill reduces ore to target particle size.

2. CLASSIFICATION



Classifier separates and returns coarse particles.

3. AGITATION VAT



Agitation vat conditions and prepares the slurry.

4. FLOTATION MACHINE



Flotation machine introduces air and performs mineral separation.



1. ORE-PULP HOMOGENIZATION

Reduces concentration differences and improves slurry consistency.



2. SOLIDS SUSPENSION

Limits mineral-particle settlement and tank-floor buildup.



3. REAGENT DISPERSION

Distributes collectors, depressants, activators and pH modifiers.



4. FLOTATION CONDITIONING

Provides controlled contact before slurry enters flotation cells.



5. PROCESS BUFFERING

Reduces the effect of short-term upstream slurry fluctuations.



6. CONTINUOUS SLURRY TRANSFER

Maintains stable flow toward downstream flotation equipment.



PROCESS NOTE

The agitation vat prepares the slurry.

The flotation machine introduces air and performs mineral separation.

Agitation Vat Components and Working Principle

The agitator circulates mineral slurry, disperses reagents and maintains solids suspension before the slurry enters flotation.

1 Drive Motor

Provides power for the agitator.

2 Transmission Assembly

Transfers and adjusts motor output for selected speed.

3 Vertical Agitator Shaft

Transfers torque from the transmission to the impeller.

4 Cylindrical Steel Tank

Provides effective volume for ore-pulp conditioning.

5 Feed Connection

Slurry and reagents enter the tank.

6 Impeller

Generates circulation, disperses reagents and keeps solids suspended.

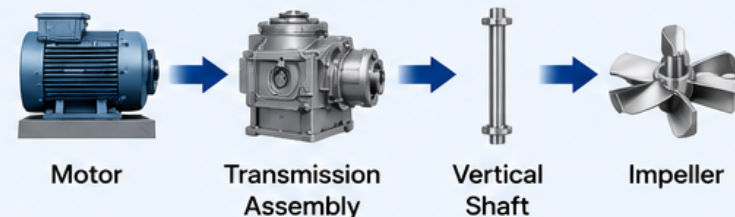
7 Discharge Connection

Conditioned slurry flows to the flotation circuit.

8 Support Structure

Supports the drive assembly and maintains alignment.

Drive Relationship



Slurry Homogenization

Reduces concentration differences and improves slurry consistency.



Solids Suspension

Limits particle settlement and prevents floor buildup.



Reagent Dispersion

Distributes collectors, depressants, activators and pH modifiers throughout the slurry.



Technical Note

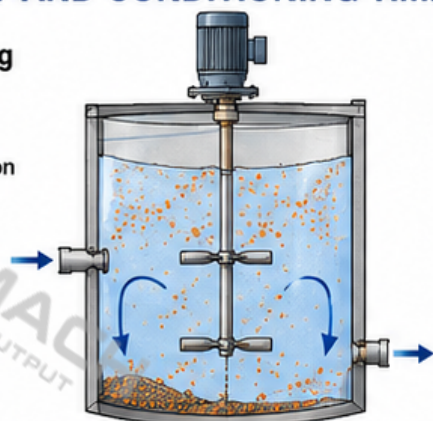
The operating objective is controlled circulation, not maximum rotational speed. Excessive agitation may increase power demand, equipment wear and unwanted air entrainment.

Mixing Duty, Selection Inputs and Operating Checklist

1 MIXING DUTY AND CONDITIONING TIME

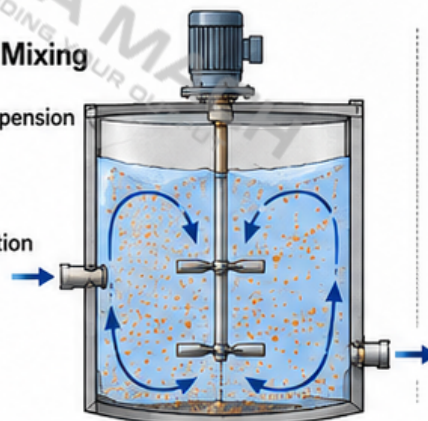
A Insufficient Mixing

- Solids settling
- Uneven reagent distribution
- Weak circulation



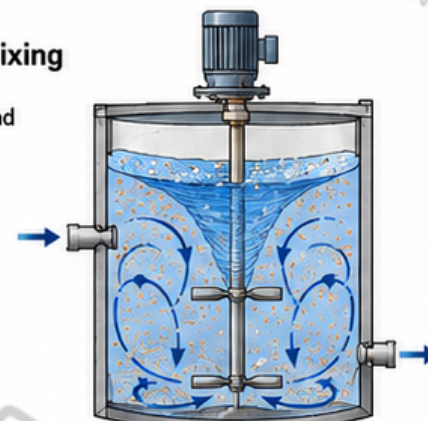
B Controlled Mixing

- Stable particle suspension
- Uniform reagent dispersion
- Controlled circulation



C Excessive Mixing

- Higher power demand
- Increased wear
- Unwanted air entrainment



$$\text{Required Effective Volume} = \text{Slurry Flow} \times \text{Conditioning Time}$$

Use consistent units and include an operating allowance for process-flow variation.

2 SELECTION INPUTS

- | | |
|--|--|
| ☒ Slurry Flow Rate | ☒ Reagent Addition Points |
| ☒ Required Conditioning Time | ☒ Upstream Flow Variation |
| ☒ Solids Concentration | ☒ Downstream Flotation Interface |
| ☒ Slurry Density | ☒ Feed and Discharge Elevation |
| ☒ Particle-Size Distribution | ☒ Power Supply |
| ☒ Settling Tendency | ☒ Installation and Maintenance Space |
| ☒ Reagent Type and Dosage | |

i Do not recommend a specific model without process calculations.

3 OPERATING CONDITIONS

- | | | |
|--|--|---|
| Uniform Slurry Movement ☐ | No Persistent Floor Buildup ☐ | Stable Operating Level ☐ |
| Consistent Discharge Flow ☐ | No Excessive Vortexing ☐ | Stable Motor Load ☐ |
| No Abnormal Vibration ☐ | Correct Shaft Alignment ☐ | Correct Impeller Clearance ☐ |



Agitation Vat ≠ Vat Leaching

Agitation vats mechanically mix fine pumpable slurry.

Traditional vat leaching retains coarser solids while solution moves through or around the material.



Final model selection should be confirmed using actual slurry data, required conditioning time, solids-settling characteristics and verified plant operating conditions.