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TECHNICAL GUIDES

Dewatering Screen Optimization: Achieve 12% Moisture in Final Sand Product

Optimize dewatering screen performance for lowest moisture sand. Deck angle, spray bar positioning, and panel selection for efficient dewatering.

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Dewatering screen performance directly determines product moisture content and fines loss—two factors that significantly impact product value and operating costs. A properly optimized dewatering screen achieves 12-15% moisture content while recovering 85-90% of feed solids. This guide provides the technical framework for optimizing screen performance through equipment setup and operating parameter adjustment.

Dewatering Screen Fundamentals

How Dewatering Works

Dewatering screens use high-frequency vibration and drainage to remove free water from sand slurry. The process involves:

- **Drainage zone:** Free water drains through screen media (first 30-40% of deck)

- **Compaction zone:** Vibration compacts solids, expelling interstitial water (middle 30%)
- **Discharge zone:** Final moisture reduction before discharge (final 30%)

Target Performance Parameters

PARAMETER	STANDARD PERFORMANCE	OPTIMIZED PERFORMANCE
Product moisture	15-20%	12-15%
Solids recovery	75-85%	85-92%
Screen efficiency	70-80%	85-95%
Fines loss (<75µm)	15-25%	8-15%

Key Operating Parameters

PARAMETER	EFFECT OF INCREASE	OPTIMAL RANGE
Feed rate	Wetter product, higher recovery	80-90% of rated capacity
Feed solids %	Lower throughput, drier product	40-60% solids by weight
Screen angle	Faster travel, wetter product	5-15° uphill
Vibration frequency	Better drainage, more fines loss	1200-1800 RPM
Stroke amplitude	Better drainage and conveying	3-6mm

Screen Media Selection

MEDIA TYPE	APERTURE RANGE	OPEN AREA	BEST FOR
Polyurethane wedge wire	0.25-1.0mm	30-45%	Fine sand, abrasive material
Polyurethane panels	0.3-2.0mm	25-35%	General dewatering
Stainless wedge wire	0.15-0.5mm	40-55%	Ultra-fine recovery

MEDIA TYPE	APERTURE RANGE	OPEN AREA	BEST FOR
Woven wire cloth	0.2-1.0mm	45-60%	Non-abrasive, low volume

Aperture Sizing Rule

Aperture = 50-70% of D85 of desired product

This ensures most solids are retained while allowing water drainage.

Optimization Procedure

Step 1: Establish Baseline

1. Measure current product moisture (oven dry method)
2. Calculate solids recovery from feed and underflow analysis
3. Document current operating parameters

Step 2: Feed Optimization

- Increase feed solids concentration if possible (reduces water load)
- Ensure consistent feed rate (avoid surges)
- Center feed across full deck width

Step 3: Parameter Adjustment

PROBLEM	ADJUSTMENT	EXPECTED RESULT
Product too wet	Reduce feed rate or increase angle	1-3% moisture reduction
Excessive fines loss	Reduce frequency, increase solids %	5-10% better recovery
Low capacity	Increase angle, reduce stroke	10-20% capacity gain
Inconsistent moisture	Stabilize feed rate	Reduced variance

Spray System Optimization

If equipped with spray bars for final rinsing:

PARAMETER	OPTIMAL SETTING	EFFECT
Spray location	First 20% of deck only	Minimizes moisture carryover
Spray rate	Minimum effective	Balances washing vs. moisture
Nozzle type	Flat fan, low pressure	Even coverage without flooding

Troubleshooting

PROBLEM	CAUSE	SOLUTION
Blinded screen	Fine particles lodged in apertures	Increase frequency, clean media
Uneven discharge	Off-center feed or worn media	Center feed, inspect media
Excessive vibration	Unbalanced weights, worn bearings	Check balance, inspect bearings
Poor drainage	Overfeeding or wrong aperture	Reduce rate, change media

Conclusion

Dewatering screen optimization balances moisture reduction against solids recovery. Start with proper feed conditions, select appropriate media, and adjust operating parameters systematically. Document changes and results to build understanding of your specific installation. The 12-15% moisture target is achievable with consistent operation and attention to the factors detailed in this guide.

Topics: #Dewatering Screen #Moisture Control #sand washing

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