



DP Pulveriser®
since 1962



DP PULVERISERS

MILL SELECTION GUIDE

DP PULVERIZERS MILL SELECTION GUIDE

Jet Mill vs Air Classifying Mill vs Cryogenic Grinding

Choosing the Right Technology
for Precision Particle Engineering

THE WRONG MILL COSTS MORE THAN THE RIGHT ONE

In particle size reduction, selecting the wrong technology doesn't just impact performance—it impacts:

- Product quality
- Throughput
- Energy consumption
- Maintenance costs
- Process stability

Each milling technology serves a specific purpose.

Understanding when to use Jet Milling, Air Classifying Milling (ACM), or Cryogenic Grinding is critical to achieving optimal results.

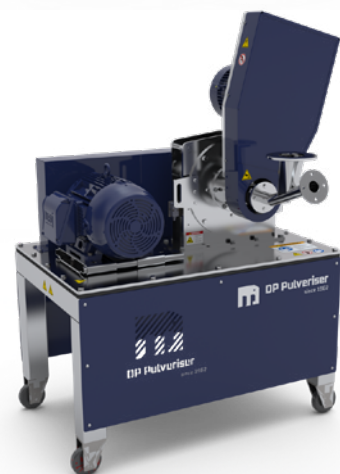
At DP Pulverizers, we guide customers to the right process—not just the nearest machine.



• DP Pulverizer Jet Mill



• DP Pulverizer Air Classifier Mill



• DP Pulverizer Cryogenic Mill



THE THREE CORE TECHNOLOGIES

JET MILLING (FLUID ENERGY GRINDING)

Best For:

- Ultra-fine particle sizes
- Heat-sensitive materials
- Contamination-sensitive applications

How It Works:

- High-velocity air or steam accelerates particles
- Particle-on-particle collision causes size reduction
- No moving parts in grinding zone

Key Advantages:

- No heat generation
- Zero contamination risk
- Extremely narrow PSD
- Capable of sub-10 micron sizes



AIR CLASSIFYING MILL (ACM)

Best For:

- Controlled particle size in mid-range micron sizes
- Continuous, high-throughput processing
- Applications requiring tight PSD without ultra-fine grinding

How It Works:

- Impact grinding + dynamic air classification
- Fine particles exit, coarse particles recirculate

Key Advantages:

- Adjustable PSD in real time
- High efficiency
- Reduced over-grinding
- Integrated system (grinding + classification)



CRYOGENIC GRINDING

Best For:

- Sticky, greasy, elastic, or heat-sensitive materials
- Polymers, rubber, spices, high-fat products

How It Works:

- Material is cooled with liquid nitrogen
- Becomes brittle
- Fractures cleanly under impact

Key Advantages:

- Prevents smearing and clogging
- Preserves volatile compounds
- Enables grinding of otherwise impossible materials
- Improves flowability



SIDE-BY-SIDE COMPARISON

Parameter	Jet Mill	ACM	Cryogenic Grinding
Particle Size Range	1–15 microns	10–150 microns	10–500 microns
Heat Generation	None	Moderate (controlled)	None
Contamination Risk	None	Low	Low
Sticky Materials	Poor	Moderate	Excellent
PSD Control	Ultra-tight	Adjustable	Moderate
Throughput	Moderate	High	Moderate
Energy Efficiency	Moderate	High	Optimized (LN ₂ dependent)
Best Use Case	Ultra-fine powders	Controlled milling	Difficult materials

WHEN TO USE EACH TECHNOLOGY

USE A JET MILL WHEN:

- You need ultrafine particles (<10 microns)
- Product purity is critical
- Heat cannot be introduced
- Contamination must be eliminated

Typical industries:

Pharma, battery materials, advanced chemicals



USE AN ACM WHEN:

- You need controlled particle size (10–150 microns)
- Throughput is critical
- You want a single-step grinding + classification system

Typical industries:

Chemicals, food, minerals, agrochemicals



USE CRYOGENIC MILLING WHEN:

- Material is sticky, greasy, elastic, or heat-sensitive
- Product smears or clogs at ambient conditions
- You need to preserve flavor, aroma, or chemical integrity

Typical industries:

Spices, polymers, rubber, nutraceuticals



REAL-WORLD SCENARIOS

API Micronization

Goal: Sub-10 micron, no contamination
Result: Jet Mill

Chemical Powder at 75 Microns

Goal: Tight PSD, high throughput
Result: ACM

Grinding Polypropylene

Goal: Fine powder without melting
ACM / Jet → Not viable
Result: Cryogenic Grinding

Spice Processing

Goal: Preserve aroma and oils
Ambient grinding → destroys product
Result: Cryogenic Grinding

Battery Material Processing

Goal: Tight PSD, ultra-fine
Result: Jet Mill (or ACM depending on target size)

COMMON MISTAKES IN MILL SELECTION

Using ACM for Ultra-Fine Applications

Results: broad PSD, inefficient grinding

Using Jet Mill for Sticky Materials

Results: poor flow, process instability

Using Ambient Grinding for Polymers

Results: melting, smearing, failure

Ignoring Temperature Effects

Results: degraded product and inconsistent output

THE DP ENGINEERING APPROACH

At DP Pulverizers, we don't start with equipment.

We start with:

- Material behavior
- Target particle size
- Process conditions
- Throughput requirements

Then we engineer:

- The right mill
- The right system
- The right process



BEYOND INDIVIDUAL MACHINES

Most processes require more than one step.

DP integrates:

Jet Milling

ACM Systems

Cryogenic Grinding

Mixing

Conveying

Classification

One partner. One system. One optimized process.

THERE IS NO “BEST MILL.”

THERE IS ONLY THE RIGHT MILL FOR THE APPLICATION.

Choosing correctly means:

- Higher product quality
- Lower operating costs
- Greater process stability

Choosing incorrectly means:

- Constant problems
- Increased cost
- Lost production



Our Global Footprint

Australia	Bahrain	Bangladesh	Bhutan	Canada	China	Estonia
Bremen	Ghana	Hongkong	Iran	Indonesia	Kenya	Mauritius
Mexico	Malaysia	Newzealand	Nepal	Nigeria	Oman	Philippines
	Saudi Arabia	South Africa	Singapore	Sri Lanka	Tanzania	
	Qatar	U.A.E	Guatemala	Zambia	Uruguay	



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