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Since 1962

AIR CLASSIFYING MILL SYSTEMS

Grind. Classify. Control.

Precision particle size reduction with integrated dynamic classification.

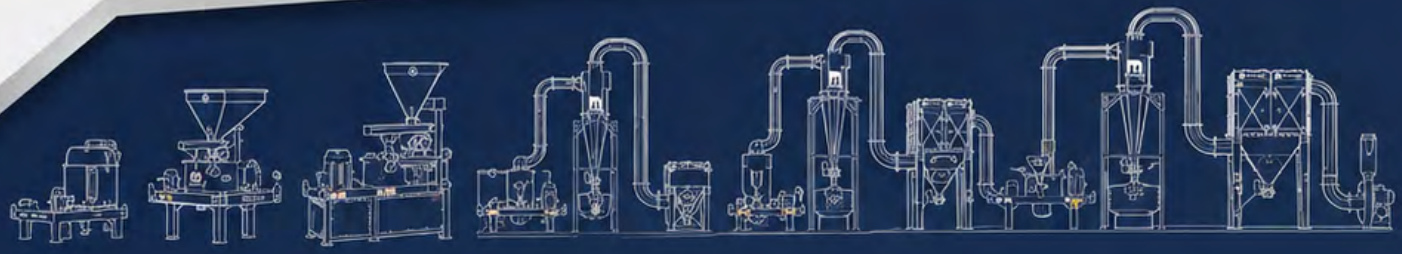
From laboratory development to high-capacity continuous production.

10–150 µm
Engineered Particle Size Range

11
Models

Integrated Classification

Turnkey Systems



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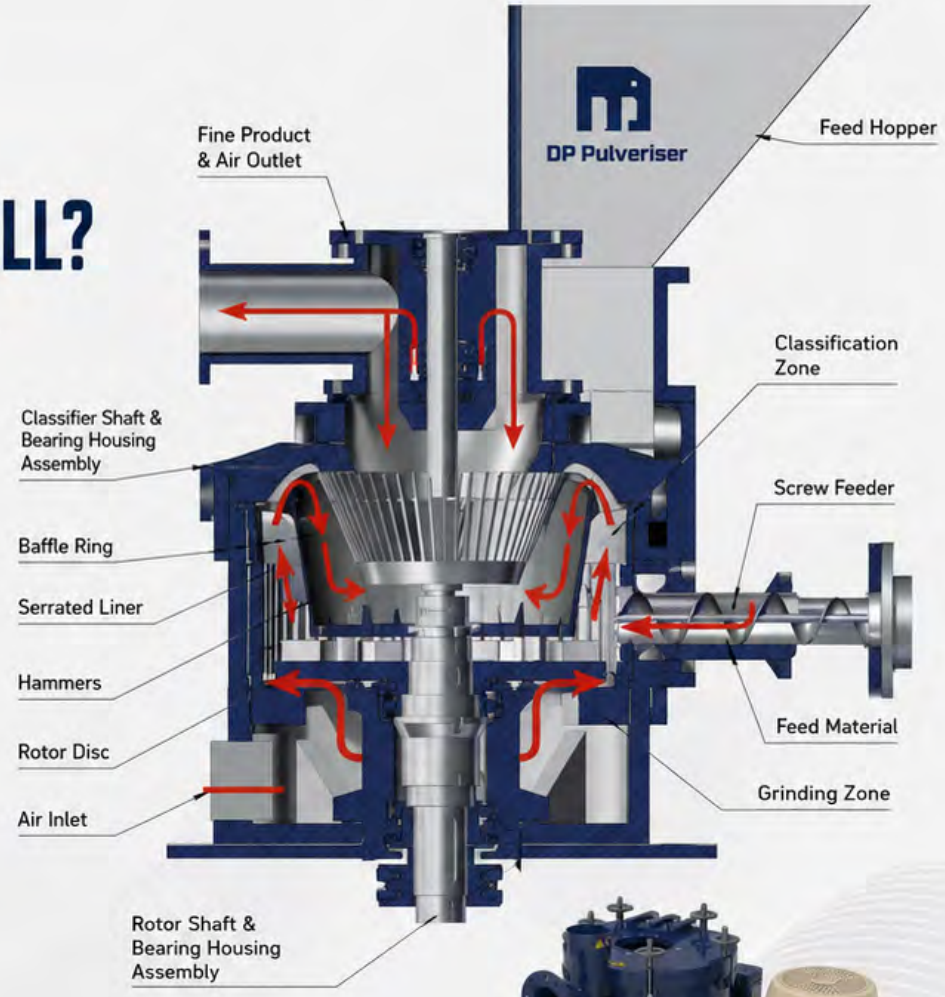
WHAT IS AN AIR CLASSIFYING MILL?

Grinding is only half the process.

An Air Classifying Mill (ACM) combines mechanical impact grinding and dynamic air classification inside one integrated machine. Rather than simply grinding material and hoping for a suitable particle size distribution, an ACM continuously separates finished particles from oversize material during processing.



1 Controlled Feeding
Material enters the mill through a controlled feed system to maintain a stable process load.

2 High-Speed Impact Grinding
A high-Speed rotor reduces particle size through impact, shear and attrition.

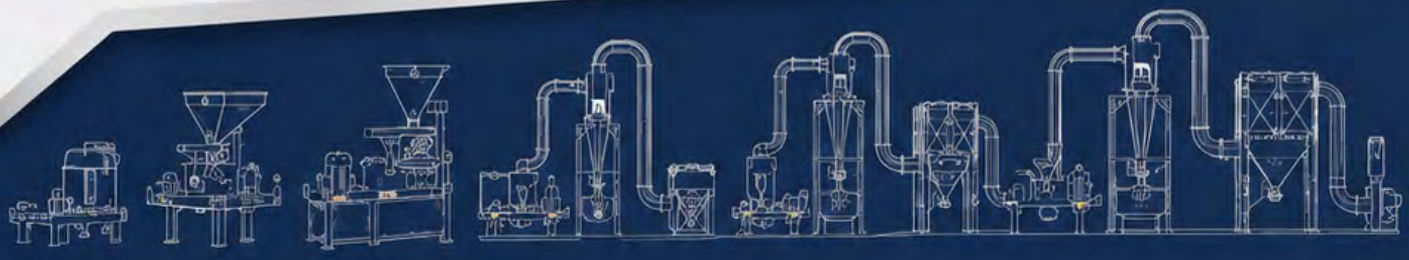
3 Engineered Airflow
Process air transports reduced particles toward the classification zone and acts as an important control variable.

4 Dynamic Classification
Fine particles pass through the classifier. Oversize particles are rejected and returned to the grinding zone.

5 Continuous Size Control
Grinding and classification occur simultaneously for a controlled, repeatable particle size distribution.

ONE MACHINE. TWO PROCESSES. ONE CONTROLLED RESULT.

GRIND → CLASSIFY → REGRIND OVERSIZE → DISCHARGE ON-SIZE PRODUCT



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WHY AIR CLASSIFYING MILLS?

Control the Particle. Control the Process.

Conventional impact mills break particles. An Air Classifying Mill goes further by controlling which particles are allowed to leave the process. The internal classifier creates a continuously adjustable particle-size gate that improves process control, efficiency, and consistency.

KEY BENEFITS

Tighter Particle Size Distribution
Dynamic classification removes finished particles while retaining oversize material for additional grinding.

Reduced Over-Grinding
Correctly sized particles can leave the process instead of remaining in the grinding chamber unnecessarily.

High Throughput
Mechanical impact grinding delivers strong production capacity across a wide range of materials.

Adjustable Product Size
Classifier speed, rotor speed, airflow and feed rate can be optimized around the product target.

Simplified Process Flow
Grinding and classification occur in one integrated system.

Improved Process Consistency
Independent control of key variables supports repeatable operating recipes.

NOT JUST FINER POWDER. BETTER CONTROLLED POWDER.

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WHY DP AIR CLASSIFYING MILL SYSTEMS

Engineered around the material. Not a standard machine.

An ACM is only as effective as the engineering behind its rotor, classifier, airflow system, feed system, collection system, and controls. DP approaches Air Classifying Milling as a complete particle-engineering process, not simply the sale of a mill.

Precision Classification Control
Independent classifier operation helps adjust the separation point around the target particle size distribution.

Application-Specific Rotor Engineering
Rotor geometry, impact elements, speed, and internal components are selected around material behavior and reduction targets.

Engineered Airflow
Air volume, velocity, pressure balance, and internal flow paths are treated as process variables—not just utilities.

Material-Specific Construction
Available in industrial, sanitary, abrasive-duty, and high-purity configurations.

Complete System Integration
Feeding, cyclone separation, pulse-jet dust collection, fans, controls, and automation can be engineered as one solution.

Lab-to-Production Scale-Up
The DP-ACM family spans development through high-capacity production.

Available construction options can include carbon steel, 304 stainless steel contact parts, all-304 stainless steel, hardened wear components, ceramic protection, and application-specific liners.

DP DOESN'T START WITH A MODEL NUMBER.
WE START WITH YOUR MATERIAL.

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The classifier is the difference.

Producing fine powder is relatively easy. Producing the right particle size distribution repeatedly and efficiently is the real engineering challenge. DP ACM systems use multiple controllable process variables to influence the final product.

FIVE PRIMARY CONTROL VARIABLES

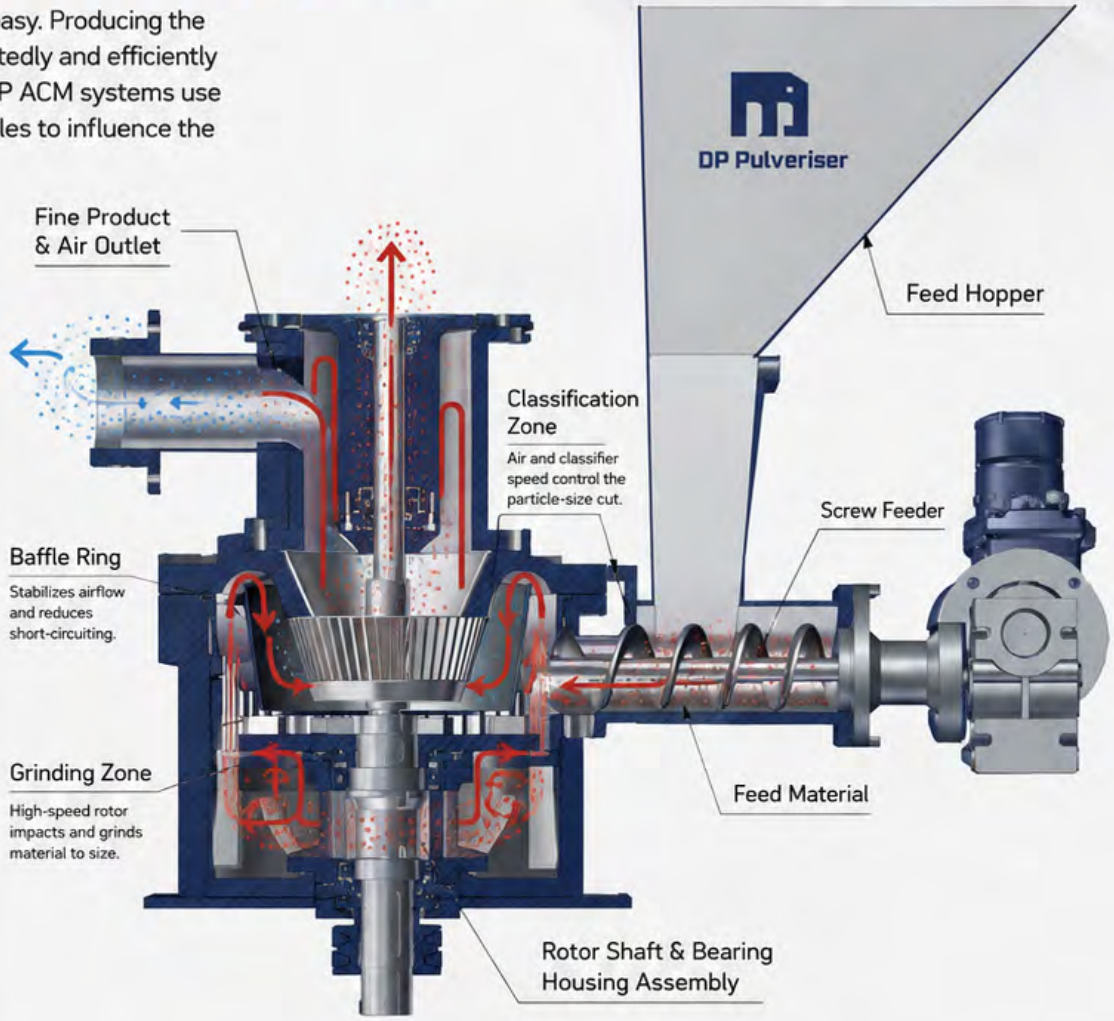
Rotor Speed
Influences impact energy, breakage intensity, throughput, and particle reduction rate.

Classifier Speed
A primary variable for adjusting the particle-size cut. Higher classifier speed generally favors finer product; lower speed permits larger particles to pass.

Airflow
Influences particle transport, residence behavior, classification dynamics, temperature, and system capacity.

Feed Rate
Stable material loading is critical for consistent grinding and classification.

Internal Geometry
Rotor design, impact elements, liners, classifier configuration, and flow path all influence performance.



10–150 MICRONS

Typical DP ACM applications target approximately 10–150 microns.

Actual achievable particle size, distribution, throughput, and efficiency depend on feed size, hardness, friability, density, moisture, temperature sensitivity, abrasiveness, feed rate, rotor speed, classifier speed, and airflow.

More Than Microns.

Successful milling is not defined by particle size alone. The complete process must balance particle size, throughput, yield, temperature, wear, cleanability, and operating cost.

1. Target PSD
Produce the required particle-size distribution rather than simply reducing average particle size.

2. Product Yield
Remove correctly sized particles efficiently and reduce unnecessary generation of excessive fines.

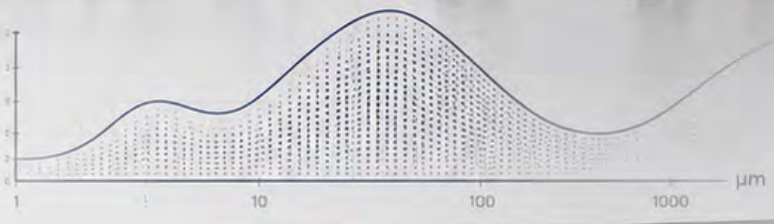
3. Throughput
Balance grinding intensity, classification efficiency, airflow, and feed rate to maximize useful production.

4. Thermal Management
Continuous airflow helps remove heat generated during mechanical grinding.

5. Wear Control
Abrasive products require engineered wear surfaces, impact elements, liners, and construction materials.

6. Cleanability
Sanitary and high-purity systems can be designed around accessible product-contact areas and suitable materials of construction.

7. Process Repeatability
Recipes can establish repeatable combinations of feed rate, rotor speed, classifier speed, airflow, and auxiliary equipment settings.



THE GOAL IS NOT MAXIMUM GRINDING.
THE GOAL IS MAXIMUM USEFUL PRODUCT.

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APPLICATIONS WE SERVE

One technology. Thousands of materials.

Air Classifying Mills are used when manufacturers need the throughput of mechanical grinding combined with more precise particle-size control.

Chemicals & Fine Chemicals
Consistent PSD, high production capability, configurable materials of construction.

Pigments & Coatings
Controlled particle size for better dispersion, color performance, and repeatable powder characteristics.

Pharmaceutical & Nutraceutical
Controlled PSD, sanitary handling, cleanability, and repeatability from development through production.

Food & Ingredients
Consistent fine powders with hygienic design and scalable production capacity.

Battery & Advanced Materials
Controlled particle size and repeatable material characteristics for demanding downstream performance.

Minerals & Industrial Powders
High throughput, abrasive-duty options, and continuous-duty operation.

Agrochemicals
Uniform powder characteristics and reliable production performance.

Complete ACM System
Engineered for continuous operation, precise classification, and high throughput.

Hopper-Fed ACM Mill
Compact, efficient, and ideal for flexible feed and material testing.

From sanitary applications to abrasive-duty industrial service, DP configures ACM systems around the process.

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FROM LAB TO FULL-SCALE PRODUCTION

Develop the process. Then scale the process.

The right production ACM should be selected using more than a horsepower chart. DP evaluates how the material actually behaves, then develops a scalable process around the application.

LAB SCALE

Development & Testing

PILOT SCALE

Process Development

PRODUCTION SCALE

Full-Scale Production

1 – Material Review

Evaluate material properties, feed size, target particle size, target PSD, throughput, temperature limits, moisture, abrasiveness, contamination requirements, and cleaning requirements.

2 – Testing

Material trials establish the relationship between rotor speed, classifier speed, airflow, feed rate, product size, throughput, and product recovery.

3 – Process Optimization

Operating conditions are refined to balance particle size, capacity, yield, and energy consumption.

4 – Scale-Up

Test data and application experience are used to select and configure the appropriate production system.

5 – Production Engineering

DP integrates feeding, separation, dust collection, air handling, conveying, controls, instrumentation, and safety systems.

6 – Factory Testing & Support

Complete-system engineering allows critical components to be evaluated together before installation.

WHAT CUSTOMERS GAIN

- Reduced scale-up risk
- Faster process development
- One integrated system
- One point of process responsibility

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SYSTEM CONFIGURATIONS

From 7.5 HP to 100 HP.

Laboratory, development, and mid-scale production models.

DP-ACM Series
Bench-Top Model

DP-ACM Series
Sanitary Model

DP-ACM Series
Hopper-Fed Model

MODEL	ROTOR / CLASSIFIER	MAX AIRFLOW	APPLICATION
DP-ACM-5	Rotor / Classifier: 7.5 / 1.5 HP	Max Airflow: 320 CFM	Entry / Laboratory Model
DP-ACM-10	Rotor / Classifier: 10 / 3 HP	Max Airflow: 640 CFM	Hygienic Model
DP-ACM-15	Rotor / Classifier: 15 / 3 HP	Max Airflow: 795 CFM	Small-Batch Production
DP-ACM-25	Rotor / Classifier: 25 / 5 HP	Max Airflow: 1,325 CFM	Compact Production
DP-ACM-50	Rotor / Classifier: 50 / 10 HP	Max Airflow: 2,650 CFM	Mid Production
DP-ACM-75	Rotor / Classifier: 75 / 15 HP	Max Airflow: 3,975 CFM	Mid-Large Production
DP-ACM-100	Rotor / Classifier: 100 / 20 HP	Max Airflow: 5,300 CFM	High-Capacity Production

Available in industrial-duty, sanitary SS304, and application-specific configurations.

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HIGH-CAPACITY ACM SYSTEMS

Engineered for industrial scale.

Large production models for continuous-duty, high-throughput processing.

DP-ACM-200

Rotor / Classifier: 215 / 50 HP
Max Airflow: **10,600 CFM**

High-capacity grinding and classification system with integrated ARV-760 air classifier.

DP-ACM-300

Rotor / Classifier: 300 / 60 HP
Max Airflow: **15,900 CFM**

Large continuous-production platform for minerals and industrial materials.

DP-ACM-400

Rotor / Classifier: 400 / 75 HP
Max Airflow: **21,200 CFM**

Large-scale production ACM for sustained high-throughput processing.

DP-ACM-600

Rotor / Classifier: 600 / 110 HP
Max Airflow: **34,160 CFM**

Flagship high-tonnage production system.

ONE ACM FAMILY. LABORATORY TO HEAVY-DUTY PRODUCTION.

320 → 34,160 CFM

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DP PULVERISER MILL SELECTION GUIDE

Jet Mill vs. Air Classifying Mill vs. Cryogenic Grinding

THE WRONG MILL COSTS MORE THAN THE RIGHT ONE

Not every particle size reduction challenge is the same. Selecting the right milling technology has a direct impact on product quality, operational efficiency, and total cost of ownership. The wrong choice can lead to poor performance, high energy use, frequent downtime, and costly rework.

Choosing the right solution affects every part of your process—from raw material to final product.

Product Quality
Achieve consistent particle size distribution and material performance.

Throughput
Maximize output and meet production targets with confidence.

Energy Consumption
Optimize energy use and reduce operating costs.

Maintenance Cost
Extend equipment life and minimize repairs and downtime.

Process Stability
Maintain reliable performance and repeatable results.

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

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

DP Pulveriser Jet Mill

DP Pulveriser Air Classifying Mill

DP Pulveriser Cryogenic Mill

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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 the 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 plus dynamic air classification
- Fine particles exit while coarse particles recirculate

Key Advantages:
- Adjustable PSD in real time
- High efficiency
- Reduced over-grinding
- Integrated system: grinding plus classification

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CRYOGENIC GRINDING

Low temperature. High performance.

DP Pulveriser's Cryogenic Grinding System is designed for materials that soften, smear, or degrade at ambient temperatures. By using liquid nitrogen to brittle the product, it enables clean, efficient size reduction of even the most difficult materials.

Best For:

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

How It Works:

- Material is cooled with liquid nitrogen
- The product becomes brittle
- It 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 (LN2 dependent)
Best Use Case	Ultra-fine powders	Controlled milling	Difficult materials

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WHEN TO USE EACH TECHNOLOGY

The right technology for the right material. Every time.

1 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

2 USE AN ACM WHEN:

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

Typical industries:
Chemicals, food, minerals, agrochemicals

3 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

1 API Micronization

Goal: Sub-10 micron, no contamination

Result: Jet Mill

2 Chemical Powder at 75 Microns

Goal: Tight PSD, high throughput

Result: ACM

3 Grinding Polypropylene

Goal: Fine powder without melting

Result: Cryogenic Grinding

4 Spice Processing

Goal: Preserve aroma and oils

Result: Cryogenic Grinding

5 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 Pulveriser, we do not start with equipment. We start with the process.

We start with:

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

Then we engineer:

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

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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.

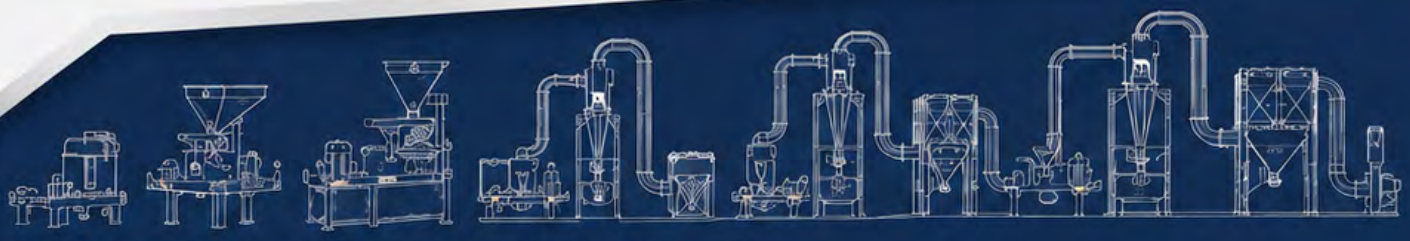
Every material, goal, and constraint is different.
DP helps you select and engineer the right integrated solution—optimized for your product, process, and performance targets.

Choosing correctly means:

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

Choosing incorrectly means:

- Constant problems
- Increased cost
- Lost production



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OUR GLOBAL FOOTPRINT

Australia
Bahrain
Bangladesh
Bhutan
Bremen
Canada

China
Estonia
Ghana
Hongkong
Iran
Indonesia

Kenya
Mauritius
Mexico
Nepal
Newzealand
Nigeria

Oman
Malaysia
Philippines
Qatar
Saudi Arabia
Singapore

South Africa
Sri Lanka
Tanzania
U.A.E
Uruguay
Zambia

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