PROC-X

MANUPACTURING GROUP

COCONUT SHELL

PROCESSING & ADVANCED MILLING SYSTEMS

From Raw Coconut Shell
to Engineered Powder

ENGINEERED
PROCESS SOLUTIONS

PRECISION
PARTICLE CONTROL

MAXIMUM
VALUE CREATION

SUSTAINABLE
FUTURE

Proc-Xion | DP | AIS | Fu-Xion | EmuXion | QuantuX

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TURNING WASTE INTO VALUE

Coconut shells are a renewable, abundant and sustainable resource with extraordinary potential.

With the right process, they can become high-value materials for:

- ✓ Activated Carbon
- ✓ Biochar & Soil Amendments
- ✓ Composites & Bioplastics
- ✓ Industrial Abrasives
- ✓ Filtration & Adsorption
- ✓ Construction Materials
- ✓ Renewable & Circular Products

ABUNDANT
GLOBAL SUPPLY

LOW-COST
RAW MATERIAL

HIGH-VALUE
APPLICATIONS

SUSTAINABLE
FUTURE

Proc-X designs complete process systems that transform coconut shell into consistently **engineered, high-value** products.

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SHOULD COCONUT SHELL BE DRIED BEFORE GRINDING?

In many applications, **YES** – but not automatically.

Drying depends on the incoming moisture and the performance required from the grinding process.

Excess moisture can cause:

- Reduced Grinding Efficiency
- Higher Energy Consumption
- Equipment Buildup & Smearing
- Poor Particle Size Control
- Agglomeration & Caking
- Difficult Handling & Conveying
- Increased Dryer Demand (if dried after mechanical)

Drying before fine grinding is typically more efficient and more controllable.

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- Increased Dryer Demand
  (if dried after micronization)

Drying before fine grinding is typically more efficient and more controllable.

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WHY DRY BEFORE FINE GRINDING?

IMPROVED GRINDING EFFICIENCY
Better fracture, lower load

BETTER PARTICLE SIZE CONTROL
Consistent, stable PSD

IMPROVED POWDER FLOW
Easier conveying & storage

CLEANER OPERATION
Less buildup, less downtime

MORE EFFICIENT DRYING
Coarse material dries easier

BETTER PROCESS STABILITY
One less variable in the mill

Condition first. Grind second.
The foundation of a successful process.

ProcXion DP AIS FuXion EmuuXion QuantumX

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WHAT ABOUT THE OIL?

Coconut meat is rich in oil.

Coconut shell is a lignocellulosic structural material.

If residual coconut meat remains, oils and organics can cause:

- ✔ Smearing & Coating
- ✔ Agglomeration
- ✔ Reduced Mill Efficiency
- ✔ Higher Product Temperature
- ✔ Contamination of Powder
- ✔ Odor Development
- ✔ Difficult Cleaning

Proc-X evaluates incoming material and recommends meat removal — not oil extraction — **unless oil recovery is economically justified**.

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SHOULD THE OIL BE RECOVERED?

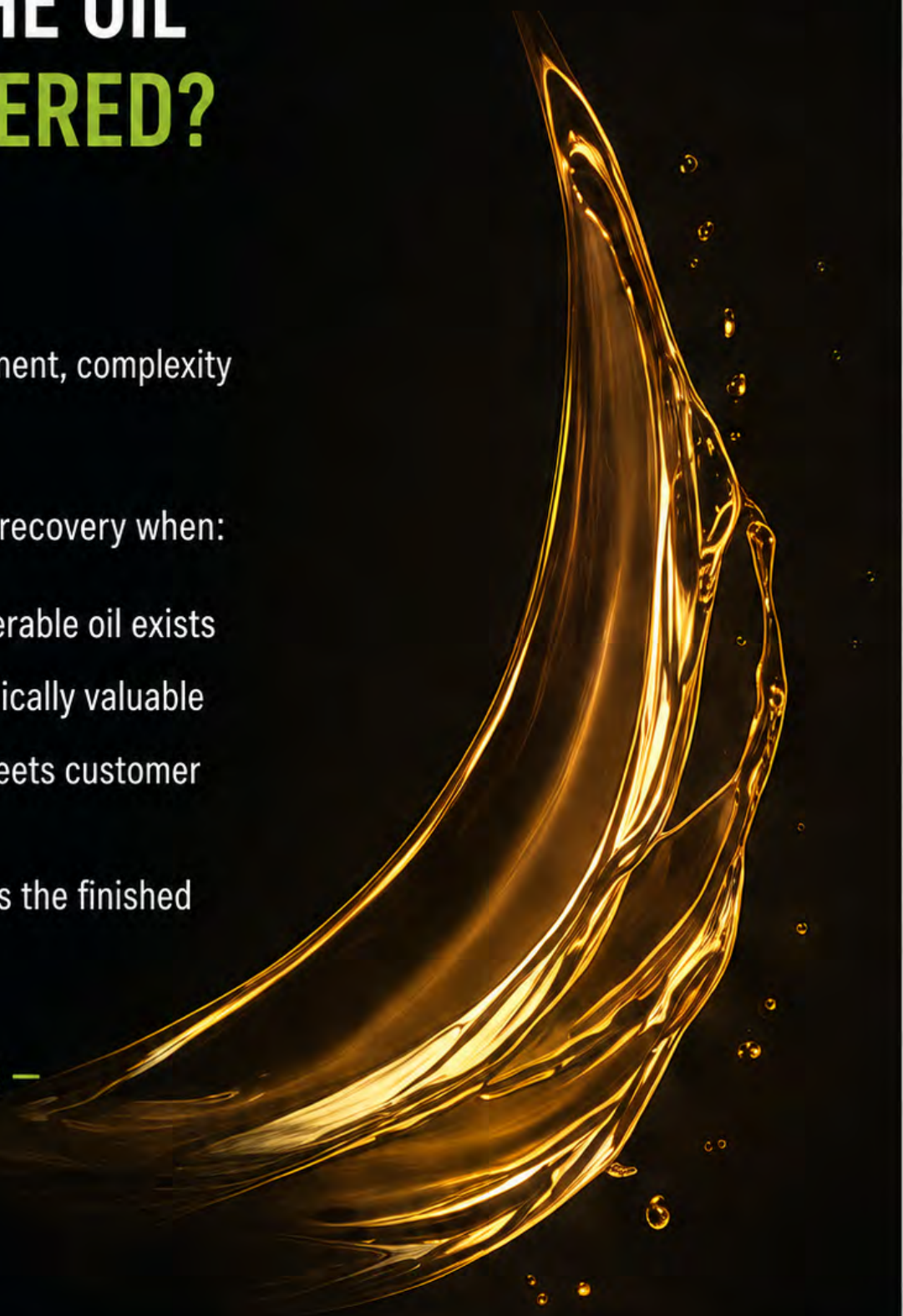
Not necessarily.

Oil recovery adds equipment, complexity and operating cost.

We only recommend oil recovery when:

- ✔ A meaningful recoverable oil exists
- ✔ Recovery is economically valuable
- ✔ The recovered oil meets customer objectives
- ✔ Oil removal improves the finished shell product

We engineer for value — not for complexity.



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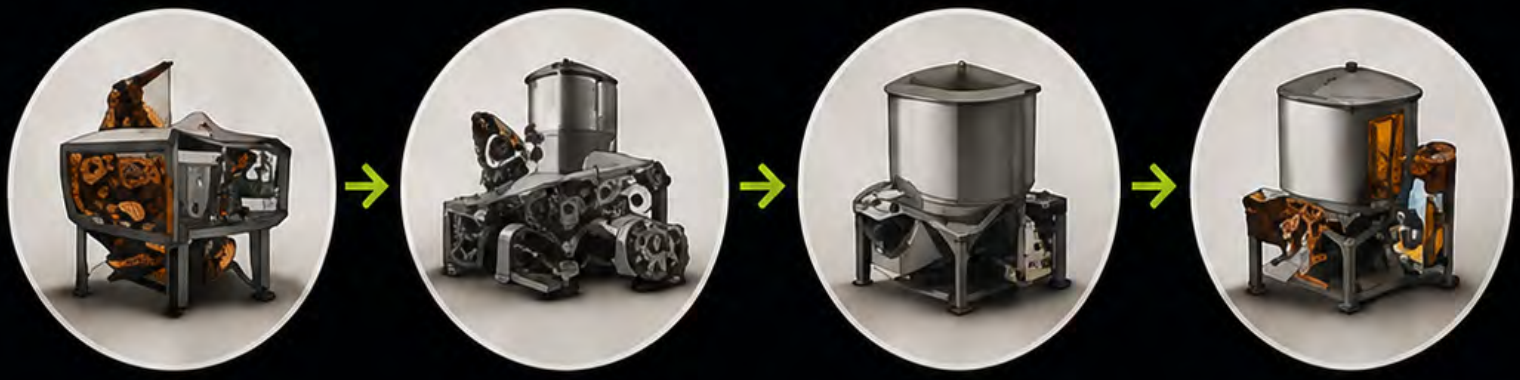
PROC-X APPROACH

CONDITION FIRST. GRIND SECOND.

RAW SHELL RECEIVING → CLEANING & MEAT REMOVAL → PRIMARY SIZE REDUCTION → MOISTURE CONDITIONING



PRECISION MILLING → DYNAMIC CLASSIFICATION → POWDER COLLECTION → FINISHED PRODUCT TO MARKET

One integrated process. One partner. One responsibility.

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HOW DRY SHOULD THE SHELL BE?

There is no universal answer.
We test to find the optimal balance between grinding performance, product quality and energy use.

Typical test conditions:

- AS RECEIVED
- 8% MOISTURE
- 5% MOISTURE

Based on data.
Not assumptions.

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TEMPERATURE CONTROLLED GRINDING OPTIONS

Choose the **right level** of temperature control for your process.

LEVEL 1
AMBIENT GRINDING

For materials that **grind efficiently** at normal operating temperatures.

Lowest complexity & cost.

LEVEL 2
CHILLED AIR GRINDING

Precise **air cooling** removes heat and improves stability without cryogenics.

Best balance of performance & cost.

LEVEL 3
CRYOGENIC GRINDING

Liquid nitrogen for maximum cooling and difficult fine grinding applications.

Use when it **solves** a real problem.

Proc-X does not default to liquid nitrogen.
We choose the **smartest solution** for your bottom line.

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POWDER COLLECTION & MATERIAL HANDLING

Clean. Efficient. Contained.

Efficient separation and handling of fine powders ensures product quality, operator safety, and maximum system performance.

- High-efficiency cyclones for primary separation
- Pulse-jet dust collectors for fine particle capture
- HEPA filtration (optional) for critical applications
- Vacuum & pneumatic conveying for closed transfer
- Surge hoppers & day bins for process stability
- Bulk bag & tote handling systems
- Automatic packaging interfaces

CLEANER PLANT HIGHER RECOVERY LOWER COST

Engineered for performance and profitability.

HIGH RECOVERY
Maximize product yield

CLEAN PROCESS AIR
Protect equipment and product

SAFE & CONTAINED
Reduce dust exposure and risk

LOWER COST
Less product loss, more efficiency

KEY PARAMETERS MONITORED

- Feed rate & level
- Mill load (amps)
- Product temperature
- Moisture (in/out)
- Classifier speed
- Differential pressure
- Airflow
- Filter condition
- Nitrogen / chilled air
- Hopper levels
- Conveyor status
- And more...

BUILT FOR PERFORMANCE. DESIGNED FOR YOUR SUCCESS.

CYCLONES
High-efficiency design for optimal separation and minimal pressure drop.

PULSE-JET COLLECTORS
Advanced filtration with automatic cleaning for continuous operation and long filter life.

VACUUM & PNEUMATIC CONVEYING
Closed transfer protects product purity and reduces loss.

HOPPERS & DAY BINS
Engineered for mass flow, stability, and easy level control.

BULK BAG & TOTE HANDLING
Safe, efficient loading, conditioning, and discharge.

PACKAGING INTERFACES
Seamless integration with bagging, filling, or downstream processes.

ONE SYSTEM. MANY BENEFITS.

12
ONE SYSTEM
Full visibility

ONE INTERFACE
Easy to operate

ONE TEAM
End-to-end support

ONE GOAL
Your success

PROC-X DELIVERS COMPLETE SYSTEMS

From powder collection to packaging, every component is engineered, integrated, and tested to work as one—delivering reliability, safety, and unmatched performance.

LEARN MORE

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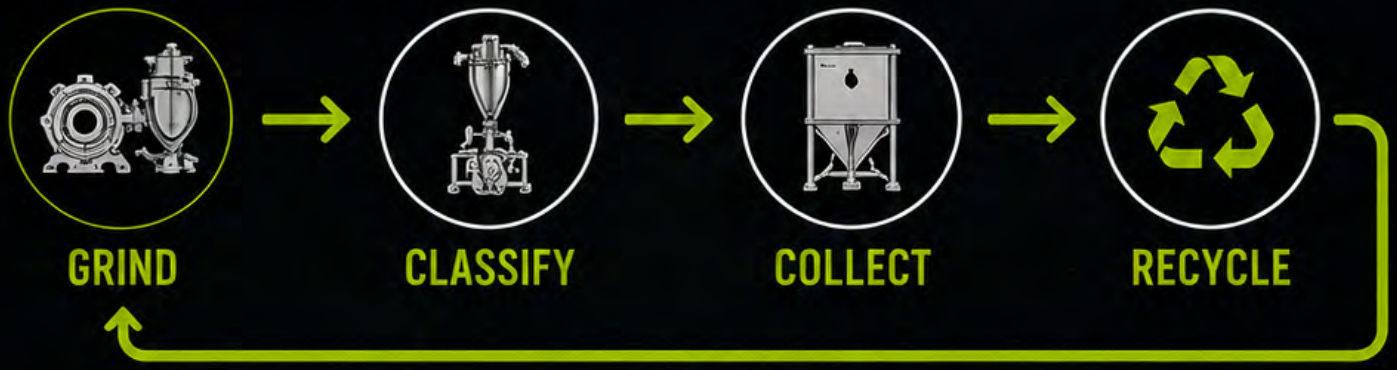
DYNAMIC CLASSIFICATION & CLOSED-LOOP CONTROL

Precise particle size is critical. Our advanced classification systems ensure consistent, repeatable results.



- ✓ High-efficiency air classifiers
- ✓ Vibratory or rotary screening
- ✓ Oversize recycle to mill
- ✓ Consistent PSD (Particle Size Distribution)
- ✓ Higher yield, lower energy use
- ✓ Automated set point control

BENEFITS

- Tighter specifications
- Less waste
- Lower operating cost
- Better downstream performance

Particle size becomes a **controlled outcome,** not a variable.

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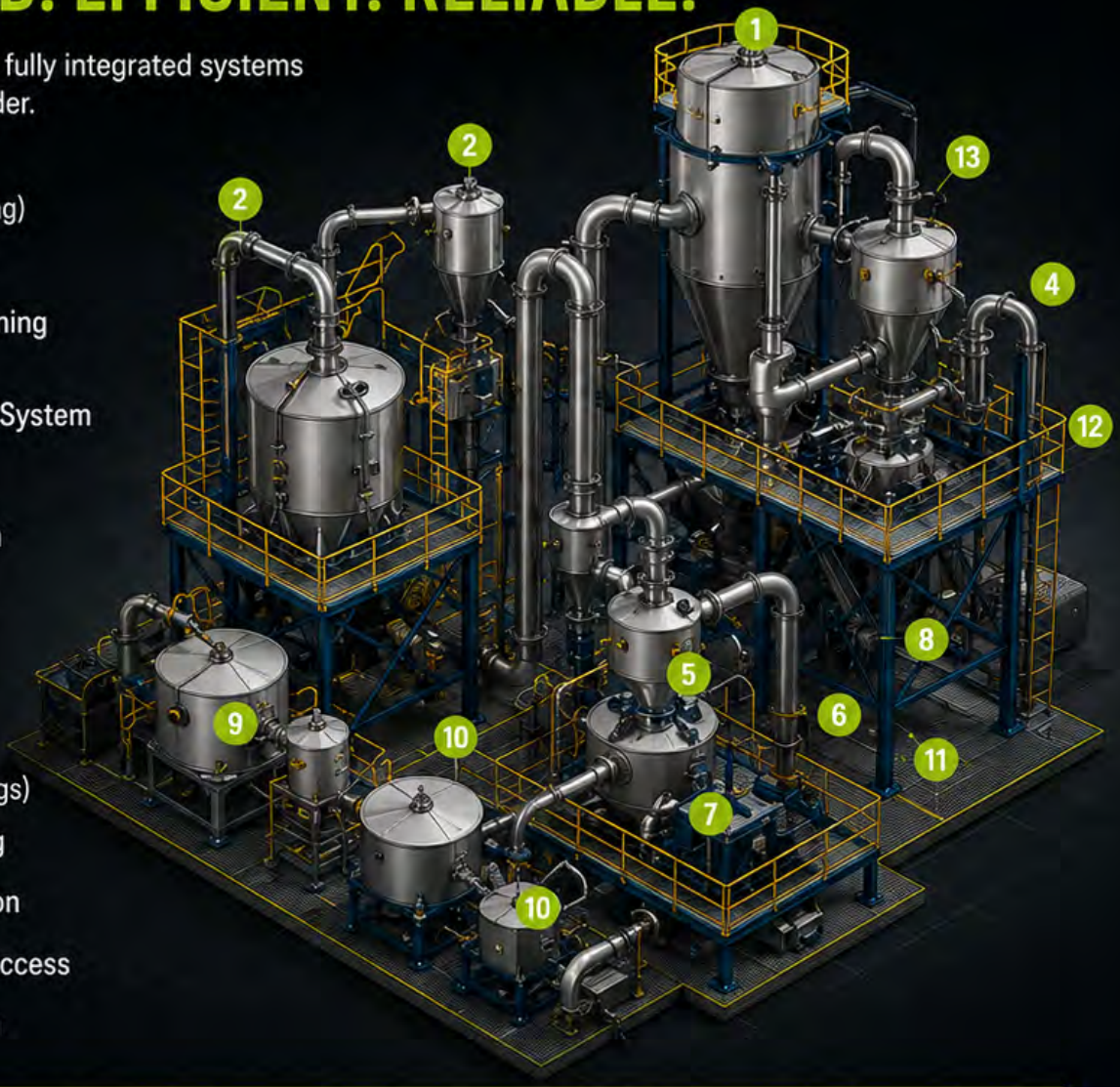
COMPLETE SYSTEM ARCHITECTURE

INTEGRATED. EFFICIENT. RELIABLE.

Proc-X designs and builds fully integrated systems from feed to finished powder.

1. Feed Receiving (Drum, Tote or Bulk Bag)
2. Material Conveying
3. Pre-Cleaning / Screening (Optional)
4. Dryer / Conditioning System
5. Grinding Mill
6. Classification System
7. Cyclone Separation
8. Dust Collection (Pulse-Jet or HEPA)
9. Powder Collection (Bins, Silos or Bulk Bags)
10. Pneumatic Conveying
11. Controls & Automation
12. System Platform & Access
13. Exhaust / Ventilation



SYSTEM HIGHLIGHTS

COMPACT FOOTPRINT
Engineered for maximum performance in minimum space.

HIGH EFFICIENCY
Optimized flow paths and advanced equipment reduce energy use.

LOW ENERGY CONSUMPTION
Smart system design delivers more output using less power.

EASY ACCESS & MAINTENANCE
Ergonomic layout simplifies service and minimizes downtime.

SCALABLE FOR FUTURE GROWTH
Modular design adapts as your production needs evolve.

ONE SOURCE. ONE SYSTEM. ONE RESPONSIBILITY.

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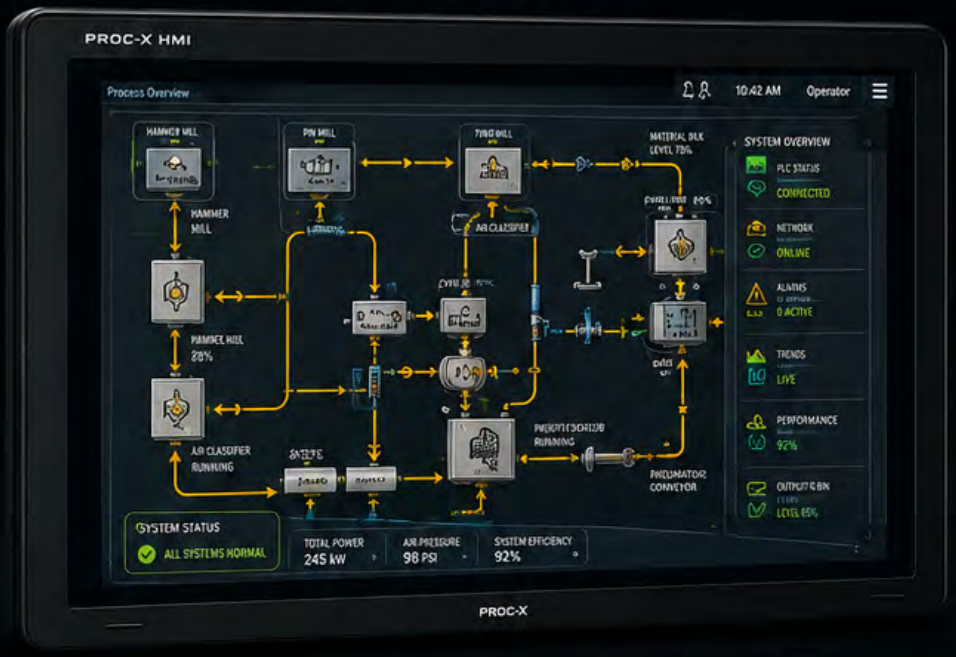
AUTOMATION & CONTROLS

INTELLIGENT. CONNECTED. SIMPLE.

Our systems are controlled by advanced PLC / HMI platforms for complete visibility and operational confidence.



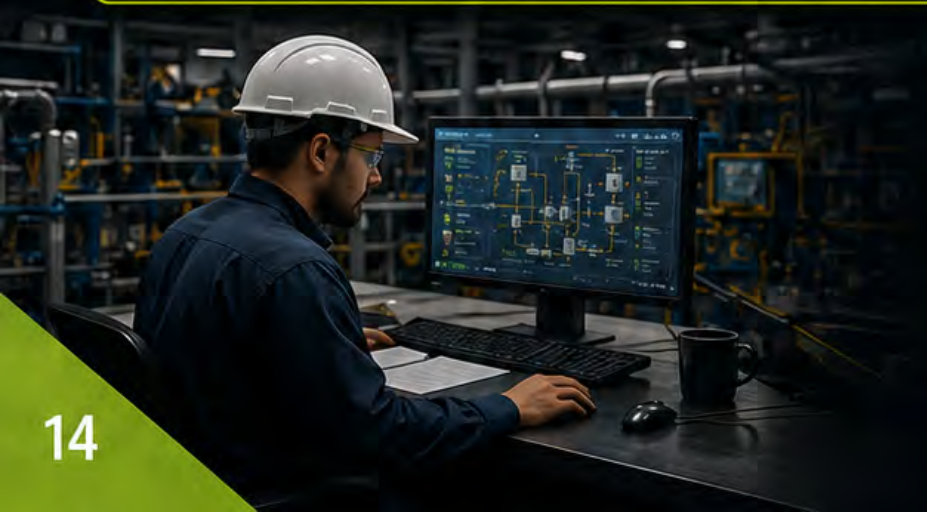
- PLC / HMI Control
- Real-Time Monitoring
- Recipe Management
- Data Logging & Trending
- Remote Access Capability
- Alarm & Interlock Systems
- Performance Analytics

TOTAL VISIBILITY
Monitor every parameter in real time.

ACTIONABLE DATA
Make informed decisions and optimize performance.

EASY TO USE
Intuitive interface reduces training and errors.

REMOTE READY
Support from anywhere, anytime.



One system. Full control.

Designed to keep your operation running and your data working for you.

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SAFETY IS PART OF PROCESS ENGINEERING

Fine organic powders like coconut shell can present combustible dust hazards. Proc-X engineers safety into every system.

WE CONSIDER EVERY RISK

- Dust Hazard Analysis
- Equipment Grounding
- Explosion Protection (Containment & Venting)
- Spark Detection & Isolation
- Temperature Monitoring
- Differential Pressure Monitoring
- Proper Electrical Classifications
- Training & Documentation

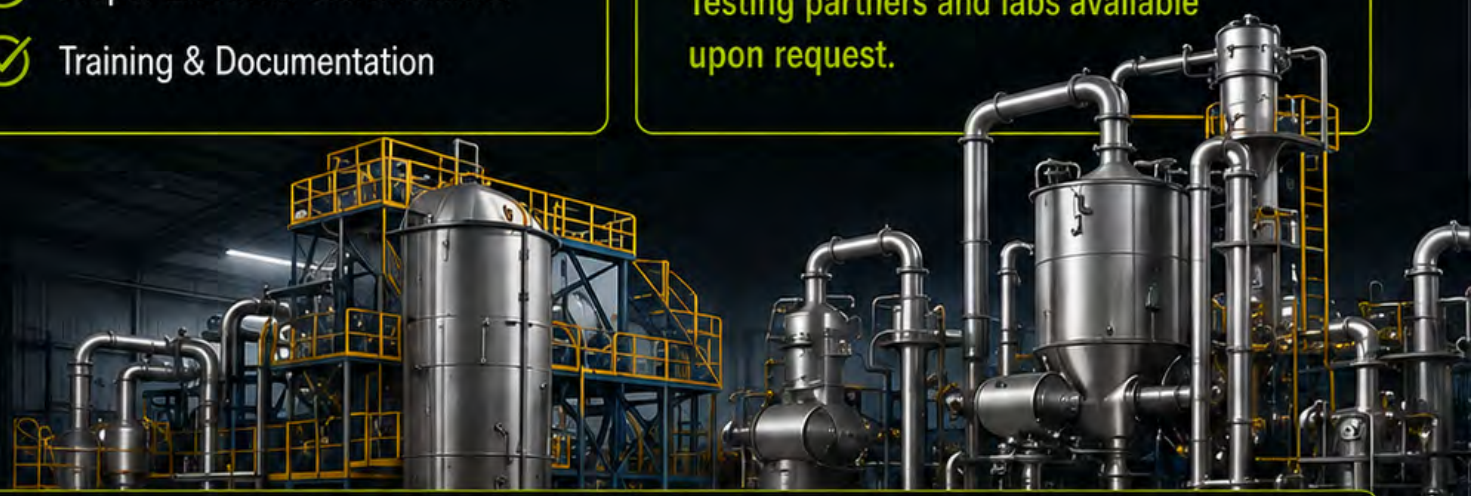
COMBUSTIBLE DUST TESTING

We can assist with testing your material or work with your data.

Typical tests include:

- Kst (Dust Deflagration Index)
- Pmax (Maximum Explosion Pressure)
- MIE (Minimum Ignition Energy)
- MEC (Minimum Explosible Concentration)
- MIT (Minimum Ignition Temperature)

Testing partners and labs available upon request.



ENGINEERED FOR SAFETY. BUILT FOR RELIABILITY.

Protecting people, equipment, and your bottom line.

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TURNING COCONUT SHELL INTO HIGH-VALUE POWDER.

ENGINEERED SYSTEMS. PROVEN RESULTS.

From raw coconut shell to precisely milled powder, Proc-X delivers complete processing and material handling systems that are efficient, safe, and built to perform.

PROCESS EXPERTISE	ENGINEERED SOLUTIONS	PROVEN PERFORMANCE	CUSTOMER SUCCESS

LET'S CREATE VALUE FROM EVERY SHELL.

Contact Proc-X today to start your process journey.

SCAN TO LEARN MORE

PROC-X MANUFACTURING GROUP

Engineered Solutions. Integrated Systems. Lasting Value.

proc-x.com

sales@proc-x.com

+1 855-PROC-X-0