WHITE SNUS MANUFACTURING

Precision Powder Conditioning for Nicotine Pouch Production

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Precision Powder Conditioning for Nicotine Pouch Production

Consistency is not an accident. It is engineered.

White snus (nicotine pouches) may look simple at the consumer level, but manufacturers know better. Behind every stable, consistent pouch is a powder-conditioning process that must control dispersion, moisture, flavor delivery, and safety—simultaneously.

This brochure explains **how white snus is really made**, the technical challenges that define success or failure, and why PerMix has become a preferred partner for manufacturers who refuse to accept variability.

WHITE SNUS IS NOT A SIMPLE POWDER BLEND

White snus formulations combine material behaviors that actively resist uniformity:

- Ultra-low bulk density fibrous carriers (dusty, electrostatic)
- Hygroscopic salts and buffers (time-dependent caking)
- Viscous humectants (localized overwetting risk)
- Volatile flavor systems (adsorption and loss)
- Nicotine (toxic, inhalation hazard requiring containment)

A batch can appear visually uniform while still hiding:

- Potency hot spots
- Moisture gradients
- Agglomerates that re-form during pouching
- Sensory drift hours after production

The difference between success and chronic rework is not "mix time."

It is process design.

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THE REAL PROCESS:
POWDER CONDITIONING, NOT MIXING

White snus manufacturing is best understood as a sequence of engineered unit operations.

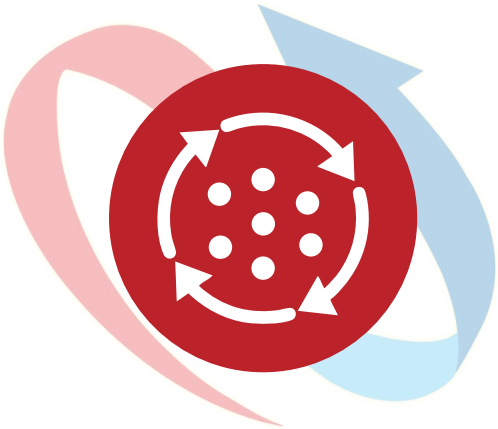
1. Raw Material Control

Consistency starts before mixing:

- Controlled moisture and PSD of incoming powders
- Stable storage humidity and temperature
- Defined handling procedures for nicotine

Variability introduced here is rarely correctable later.

2. Dry Pre-Blending: Dispersion Before Cohesion



Dry pre-blending is the single most underestimated step in white snus production. Once liquids enter the batch, the powder bed becomes cohesive. Redistribution slows dramatically. Any micro-ingredient that is not already well dispersed tends to stay localized.

Best Practice:
Create uniformity first. Condition the matrix second.

This step defines:

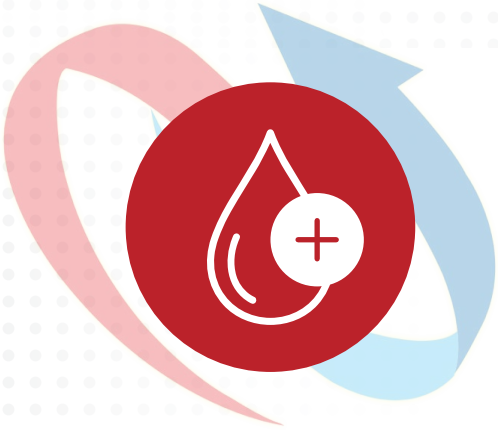
- Potency uniformity
- pH consistency
- Downstream stability

3. Liquid Addition: Where Most Systems Fail

Liquid incorporation is not about adding liquid. It is about distributing liquid into a porous, low-density solid without creating local wet zones.

Typical failure modes:

- Snowball agglomerates
- Wall smearing from viscous humectants
- Nicotine concentration gradients
- Flavor loss through uncontrolled vaporization



PerMix treats liquid addition as an engineered subsystem, not an accessory.

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ADVANCED FLAVOR & LIQUID DELIVERY: ENGINEERED, NOT SPRAY-AND-PRAY

Flavor systems are often the most sensitive and least forgiving part of white snus manufacturing.

The problem with conventional liquid addition

Many systems rely on:

- Single-point injection
- Large droplets
- Fast dosing rates

This creates localized overwetting, uneven adsorption, and flavor variability that shows up later in pouch performance.

THE PERMIX APPROACH CONTROLLED ATOMIZATION + TURNOVER

PerMix liquid integration systems are designed around three physical truths:

1. Droplet size matters

Smaller droplets dramatically reduce localized wetting demand and accelerate adsorption into fibrous carriers.

2. Injection location matters

Liquids must be introduced into high-turnover zones, not stagnant regions or along vessel walls.

3. Time matters

Flavor adsorption into cellulose is not instantaneous. Conditioning must allow equilibrium to occur.

PERMIX ATOMIZED LIQUID DELIVERY SYSTEM (CONCEPTUAL)

Key design elements:

- Closed, metered liquid dosing (mass-based preferred)
- Multi-point injection manifolds
- Atomizing nozzles sized for absorption kinetics and volatility
- Controlled dosing ramps matched to mixer turnover
- Optional intermittent de-agglomeration during dosing
- Sealed venting to protect volatile flavors

Result:

Uniform flavor perception, reduced carryover risk, and repeatable sensory performance batch after batch.

CONDITIONING: WHERE CONSISTENCY IS LOCKED IN

Even after mixing stops, the process is not finished.

Moisture migration and flavor adsorption continue as liquids equilibrate within the fibrous matrix. Without a defined conditioning hold, batches that pass initial QC often drift later.

PerMix systems are designed to support:

- Controlled conditioning holds
- Gentle turnover to prevent stratification
- Stable moisture and flavor equilibrium

This directly improves:

- Pouch weight consistency
- Compressibility behavior
- Shelf-life stability

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TWO TECHNOLOGIES.
ONE PROCESS PHILOSOPHY.

PerMix does not force one mixer to solve every problem. We match mixing physics to process objectives.

PerMix Fluidized Zone Mixers

Best for dispersion-dominated steps

Fluidized Zone Mixers mechanically lift and suspend the powder bed, creating:

- Continuous particle re-orientation
- Statistical homogeneity (not cosmetic mixing)
- Early breakup of soft agglomerates

Ideal for:

- Dry pre-blending
- Low-dose ingredient dispersion
- Extremely light or cohesive powders

PerMix Vertical Paddle Mixers

Best for liquid incorporation and conditioning

Vertical Paddle Mixers deliver:

- Strong three-dimensional convective turnover
- Continuous renewal of wall material
- Controlled shear without excessive heat

Ideal for:

- Atomized humectant and flavor dosing
- Nicotine solution integration
- Conditioning holds without stratification

Technology selection is not about preference.

It's about what dominates your formulation.

PerMix engineers help determine:

- Where dispersion ends and conditioning begins
- Which unit operation needs which physics
- How to scale without increasing risk

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SAFETY IS ENGINEERED INTO THE PROCESS

White snus manufacturing must address:

- Nicotine inhalation exposure
- Fine powder handling
- Combustible dust risk
- Ignition source control

PerMix systems are designed as contained unit operations, not open machines:

- Sealed charging and liquid ports
- Controlled venting and dust collection interfaces
- Grounding and static control
- Integration into NFPA / DHA-driven plant designs

Safety is not optional. It is built in.

WHY MANUFACTURERS CHOOSE PERMIX

Because consistency at scale is not luck.

PerMix delivers:

- Physics-driven process design
- Engineered liquid atomization systems
- Mixing technologies matched to real material behavior
- Repeatable results validated through FAT, SAT, and PQ
- Equipment designed to integrate with modern EHS expectations

When white snus is treated as a powder-conditioning science, performance stabilizes.

When it is treated as simple blending, problems never stop showing up downstream.

LET'S ENGINEER IT RIGHT

Whether you are launching a new nicotine pouch line or stabilizing an existing process, PerMix brings process engineering first, equipment second.

That's how consistency is built—and defended.

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Why White Snus "Looks Mixed" When It Isn't

Low-density fibrous powders can show dramatic surface motion even when micro-ingredients are poorly distributed. This creates a dangerous illusion: visible activity ≠ effective mixing.

In white snus formulations:

- Fibers entrain easily and circulate at the surface
- Heavier or hygroscopic components lag behind
- Liquids later "lock in" any existing gradients

True uniformity requires three-dimensional convective turnover, not just apparent motion. This is why mixer geometry and turnover paths matter more than speed or horsepower.

The Wetting Window: Where Most Batches Are Won or Lost

Every white snus formulation has a finite wetting window — a narrow range where liquid addition produces uniform conditioning instead of agglomeration.

Outside that window:

- Too dry → hot spots, poor adsorption
- Too wet → snowballs, wall smearing, rework

Key factors that define the wetting window:

- Droplet size
- Injection location
- Liquid viscosity
- Powder absorption kinetics
- Mixer turnover rate

PerMix systems are designed to widen the usable wetting window through atomization, multi-point injection, and controlled turnover — making the process more forgiving and repeatable.

Why Atomization Changes Everything

Adding liquids as a stream or coarse spray concentrates wetting demand in a small volume of powder.

Atomization changes the physics:

- Smaller droplets = larger surface area
- Faster absorption into fibrous matrices
- Reduced local saturation
- Fewer persistent agglomerates

For flavors and nicotine solutions, atomization also:

- Improves adsorption efficiency
- Reduces volatilization losses
- Improves batch-to-batch sensory consistency

This is why PerMix treats atomized liquid delivery as a core process element, not an add-on.

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Flavor Adsorption Is Time-Dependent: Plan for it

Flavor perception in white snus does not stabilize at "mix end."

Why?

- Fibrous carriers adsorb liquids and volatiles gradually
- Moisture migration continues post-mix
- Temperature and humidity influence equilibrium

Without a defined conditioning period:

- Flavor intensity drifts
- Pouch firmness changes
- Shelf-life variability increases

PerMix designs mixing systems to support intentional conditioning holds, allowing adsorption and moisture equilibrium to complete before discharge.

Why Conditioning Prevents Downstream "Mystery Problems"

Many pouching issues are blamed on:

- Fillers
- Packaging machines
- Raw materials

In reality, they originate upstream.

Insufficient conditioning leads to:

- Moisture gradients
- Variable compressibility
- Inconsistent pouch weight and firmness

A defined conditioning step stabilizes the material before it reaches pouching — where corrections are no longer possible.

Nicotine Handling: A Process Design Issue, Not Just PPE

Nicotine introduces more than formulation complexity — it introduces process responsibility.

Key considerations:

- Inhalation exposure during charging and dosing
- Aerosol formation during liquid addition
- Residual contamination during cleaning

Effective control starts with equipment design:

- Sealed liquid dosing and injection
- Contained powder charging
- Controlled venting and filtration
- Reduced need for manual intervention

PPE is the last layer of defense — not the first.

Fluidized vs Paddle Mixing It's About the Dominant Physics

There is no "best mixer."

There is only the best physics for the step.

- Dispersion-dominated steps → fluidization excels
- Liquid incorporation and conditioning → convective turnover excels

PerMix uses:

- **Fluidized Zone Mixers** to achieve statistical homogeneity in difficult powders
- **Vertical Paddle Mixers** to condition, wet, and stabilize cohesive blends

Treating these as complementary tools — not competitors — is how advanced white snus lines are engineered.

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Why Rework Is a Process Smell

When white snus requires frequent rework, it is usually a sign of:

- Over-aggressive liquid addition
- Poor injection geometry
- Inadequate turnover during wetting
- Missing conditioning time

Rework increases:

- Exposure risk
- Product variability
- Cost per batch

PerMix systems are designed to reduce the need for rework by design, not by operator skill.

Sampling Can Lie If You Let It

In cohesive, low-density blends:

- Top samples often look better than bottom samples
- Wall samples differ from core samples
- Moisture changes during sampling can skew results

A good process deserves a good sampling plan:

- Multiple locations
- Consistent technique
- Immediate sealing and testing
- Post-conditioning comparisons

If sampling isn't engineered, data becomes noise.

What "Prcess-Driven" Really Means at PerMix

At PerMix, equipment selection follows answers to questions like:

- Where does cohesion begin in this formulation?
- Which step dominates variability — dispersion or conditioning?
- How narrow is the wetting window?
- What must be contained, and when?

Only then do we talk about mixer models. That's why our systems behave like unit operations, not machines.

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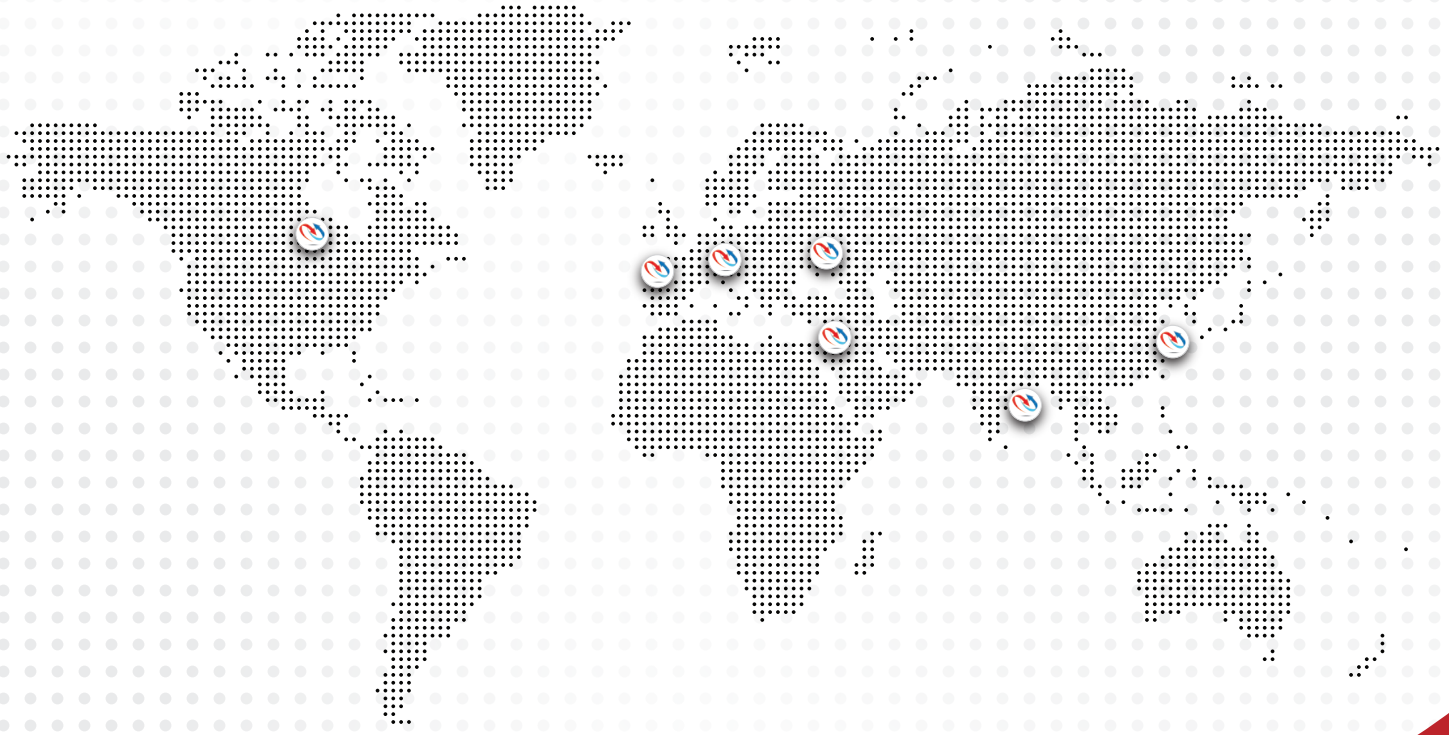

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