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# Re-Working & Utilizing waste Flour Tortilla

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# Agenda

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- What is reprocessing and why it matters
- Basic rules and limitations
- Flour-tortilla process and rework points
- Problems + solutions
- Corn-tortilla considerations
- Conclusions & recommendations

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# Flour tortilla

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# Basics

## What is reprocessing?

Reprocessing involves the reuse of safe, non-compliant products, such as those with shape or size defects, that cannot be sold but are still suitable for use.

Examples include:

- Raw scrap
- Die-cut trimmings
- Unused dough
- Start-up material

**Objective:** Reduce waste while maintaining safety and quality.

# Basics

## What is reprocessing?

A well-optimized production line achieves approximately 98% yield, resulting in 2% waste.

Production rate: 6 doughs per hour ( $\approx 175$  kg of dough)

Waste rate: 2%

Estimated waste generation:

- 21 kg of waste per hour
- 460 kg of waste per day (based on 22 hours of operation)
- 11,960 kg of waste per month
- 143,520 kg of waste per year, per line



# Basics

## What is reprocessing?

### **Cost Savings**

Reprocessing minimizes material losses and transforms by-products into valuable input, resulting in measurable annual savings and improved cost efficiency.

### **Sustainability**

Reprocessing practices contribute to corporate environmental goals by reducing overall waste, optimizing resource utilization, and supporting long-term sustainability strategies.

### **Process Efficiency**

By reducing waste and maintaining consistent dough quality, reprocessing enhances production stability, increases yield, and decreases unplanned stoppages.

## Potential Risks in Reprocessing

- **Microbial Contamination**

Risk of bacterial growth due to warm dough, improper handling, or contaminated bins.

- **Foreign Material Inclusion**

Possible introduction of unwanted materials such as bolts, stones, or packaging fragments.

- **Texture and Structural Deterioration**

Repeated processing may weaken dough strength, elasticity, or overall product consistency.

- **Labeling and Allergen Cross-Contact**

Risk of mislabeling or cross-contamination between doughs containing different allergens.

- **Traceability Loss**

Inadequate recordkeeping can compromise product tracking and food safety compliance.

# Basics

## Rules for dough

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- Fresh dough should be reprocessed within 1 hour of production.
- Die-cut trimmings must be clean and free of contaminants.
- Start-up material from divider/rounder may be reused only if sanitary conditions are verified.
- Side-shoot material can be included only when equipment has been thoroughly cleaned and inspected.
- All reprocessed dough must remain uncontaminated and stored under hygienic conditions to ensure product safety.

## Basics

### Rules for dough

- Dough with oil/fats added post-mix
- Older than 1 h
- Off smell / fermented aroma
- Dough around rounder piston
- Dough after hot-press but unbaked

# Basics

## Rules for finished product

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- Cold, clean tortillas
- Packaging / sorting rejects (size, fold, holes)
- Avoid stacking when hot to prevent condensation.
- Cool to  **$\pm 1$  °C of room temperature** before packaging.
- Must be handled sanitarily in dry conditions

# Basics

## Rules for finished product

The following products must not be reprocessed under any circumstances:

- **Burnt or over-colored products**

Indicate process deviations and compromise product quality.

- **Oil-contaminated or visibly dirty products**

Pose hygiene and safety risks during reintroduction.

- **Products in contact with the floor or unsanitary surfaces**

Must be immediately discarded to prevent contamination.

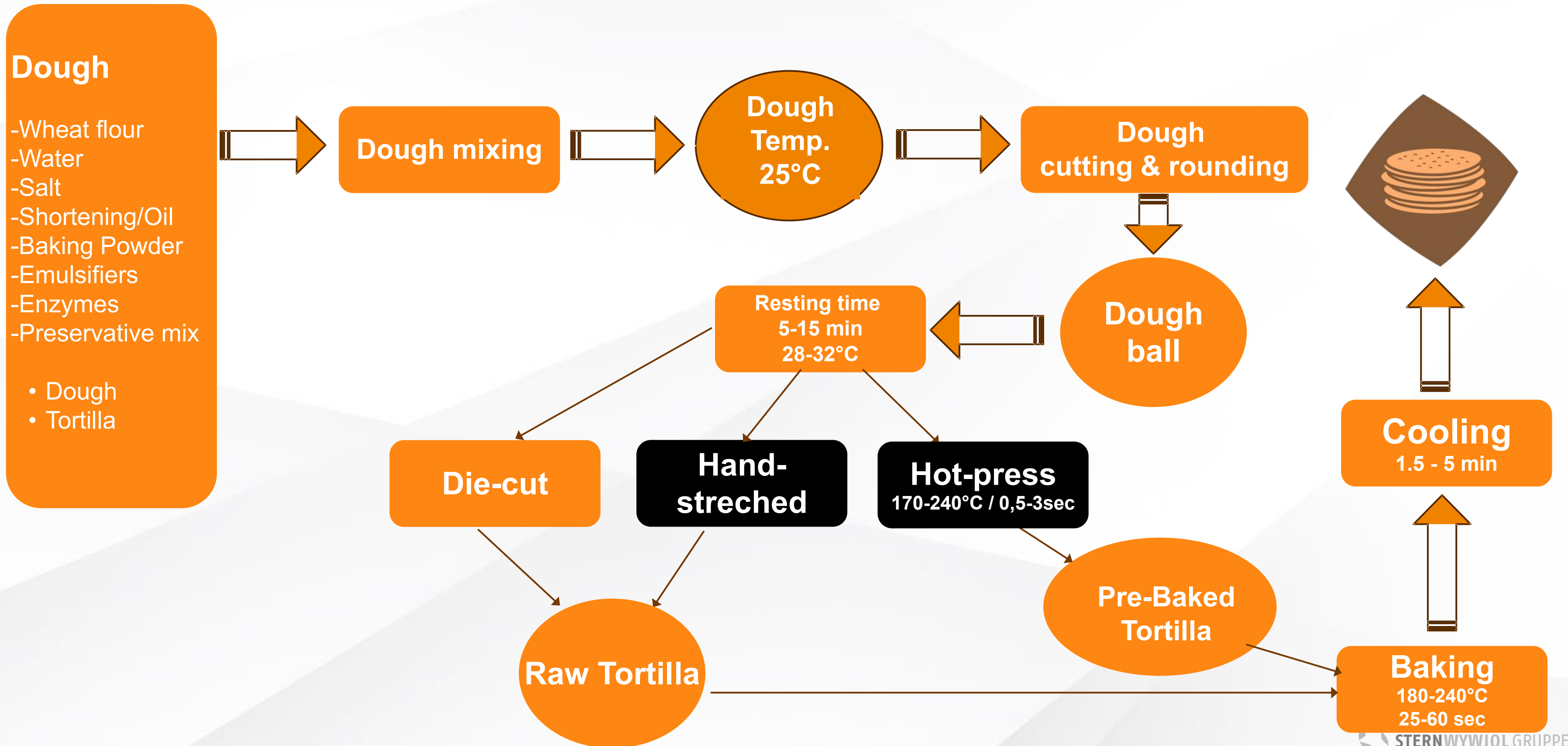
- **Partially eaten or tested samples**

Should never be reused due to cross-contamination risk.

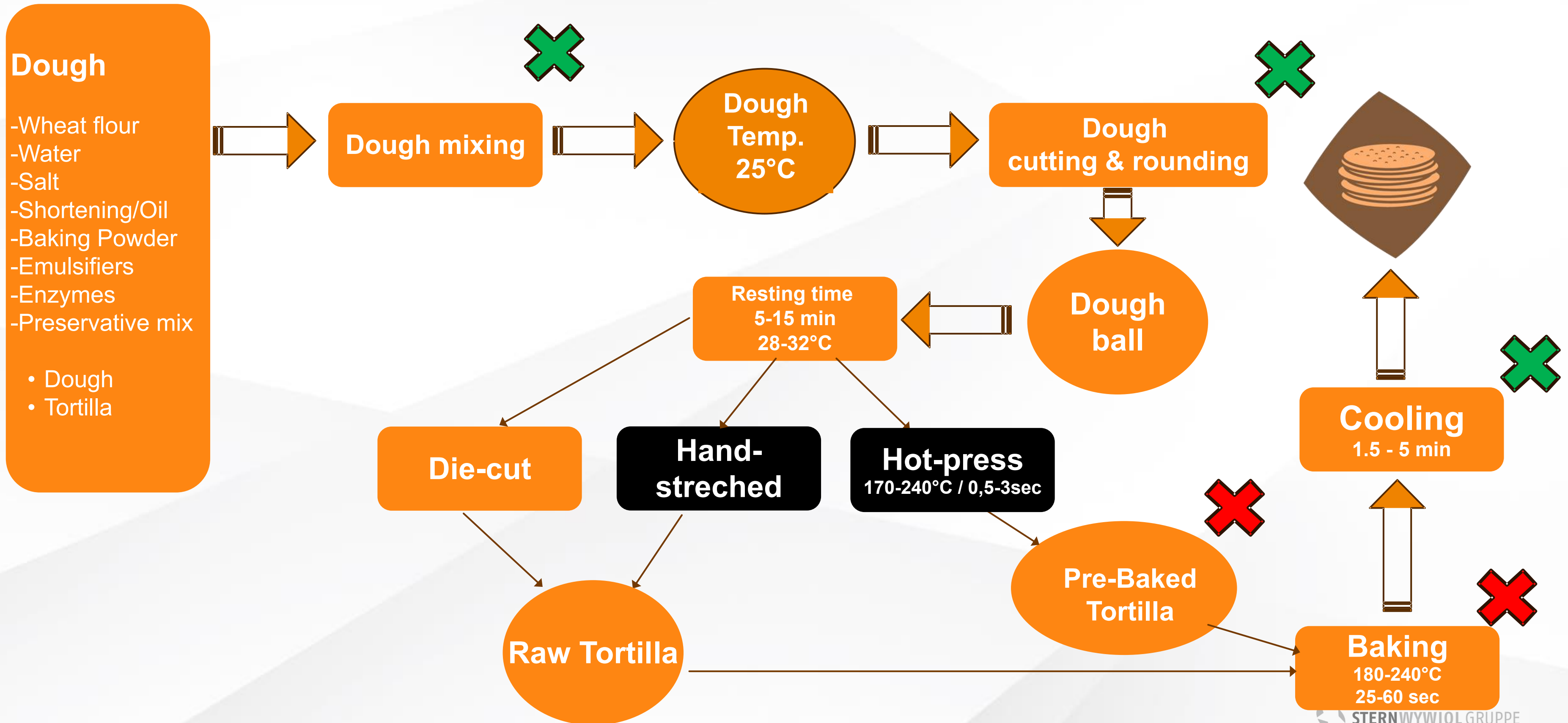
- **Dried-out or stale products**

Affect dough consistency and final product performance.

# Steps of tortilla processing



# Steps of tortilla processing



# Basics

## Limits

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### Finished-goods rework

- $\leq 24$  h if stored cleanly and developed for shelf life
- Shredded or in full
- 8% max on flour volume

### Storage

- covered labeled containers to prevent drying and contamination
- Clean and dry place

The recommended inclusion rate for reprocessed dough is approximately 5–8% of the total flour weight.

- Exceeding this range can negatively impact dough properties
- Higher ratios may cause operational or quality issues, including:
  - Poor extrusion or rounding performance
  - Irregular pressing behavior
  - Increased stickiness during handling
  - Development of off-flavors or undesirable texture in the final product

- Traceability and Control Requirements
- Label every rework batch with complete production details:
  - date, shift, batch number, product origin, and operator identification.
- Record all data in the plant's local or digital tracking system to ensure full traceability across production stages.
- Apply FIFO rotation (First In, First Out) to guarantee product freshness and minimize holding time before reuse.

# Basics

## Limits

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Step	Rule	Reason
Collection	Closed boxes	Avoid contamination
Storage	Clean, dry storage	Microbial control
Mixing	≤ 8 % rework	Maintain texture
Record keeping	System log	Traceability

## Shredding / Milling + Water Slurry

### Description:

- Shredded tortillas are mixed with water to create a uniform slurry before being reintroduced into the dough mixer.

- Application:

Ideal for high-speed mixers or when precise moisture adjustment is required to maintain dough consistency.

- Advantages:

- Ensures even dispersion of reprocessed material.
- Facilitates smoother dough development.
- Reduces risk of lumps or uneven hydration during mixing.

## Milling

- Description:

Tortillas are milled into fine, uniform particles and combined with flour and other dry ingredients during dough preparation.

- Application:

Recommended for medium-scale production lines where controlled reprocessing is integrated into the dry mix stage.

- Advantages:

- Enables precise dosage and uniform blending.
- Simplifies handling and reduces moisture variation.
- Suitable for facilities with limited water-mixing capacity or where slurry processing is not practical.

## Whole tortilla

- Description:  
Intact tortillas are added directly into the mixer and dry-blended with the rest of the ingredients.
- Application:  
Suitable only for small rework percentages ( $\leq 5\%$ ), where limited material needs to be reincorporated.
- Considerations:
  - Mechanical mixing must be strong enough to break the tortillas uniformly during blending.
  - Inadequate mixing can lead to uneven dough texture or processing inconsistencies.
  - Not recommended for large-scale or high-speed production lines.

# Processing Method

Method	Description	When to Use
<b>1. Shredding / Milling + Water Slurry</b>	Tortillas are shredded or milled, then mixed with water to form a uniform slurry before adding to mixer.	Best for <b>high-speed mixers</b> or when moisture adjustment is required.
<b>2. Milling (Dry) + Add with Flour</b>	Tortillas are milled into fine particles and added with the flour and other dry ingredients.	Recommended for <b>precise control</b> of hydration and even distribution.
<b>3. Whole Tortilla Pieces + Dry Mixing</b>	Intact or roughly cut tortillas are added directly with the flour before hydration begins.	Acceptable for <b>small rework percentages (≤5%)</b> where mechanical mixing can break pieces uniformly.

# Processing

## Mixing

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- Add rework at the start of mixing, together with flour and other dry ingredients.
- Do not add rework after hydration, as it will not integrate evenly.
- Adjust mixing time slightly to ensure full hydration and proper dough development.
- Target dough temperature: approximately 25–26 °C, depending on formulation.
- Rework proportion: maintain at  $\leq 8$  % of total dough weight.

# Processing

## Divider rounding

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- Typical rest: **5–15 minutes** after rounding
- Higher rework = **less elastic dough**, slower relaxation.
- Monitor dough temperature and plasticity.
- Prevent dry fermentation
- Monitor for stickiness and softening over time

# Processing

## Press and sheeters

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- Press and Sheeters

### Die-Cut Tortillas

- Rework can alter dough sheetability and elasticity.
- Regularly check dough thickness uniformity during operation.
- Monitor sheeting performance to detect gradual changes over time.

### Hot-Press Tortillas

- May require slight press adjustments to compensate for changes in dough behavior.
- Apply slightly higher pressure or longer dwell time if elasticity decreases.
- Continuously verify press settings to maintain consistent diameter and surface texture.

# Processing

## Baking

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- Common effects:  
**less pillowing, uneven color, more translucent spots, rougher edges**
- Adjust oven temperature
- Maintain target **exit moisture** ( $\approx 30-34\%$ ).
- Monitor uniformity across lines.

# Processing Quality

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- Lower softness and flexibility.
- Harder bite, reduced rollability.
- Frayed edges if hydration insufficient
- More translucency
- Less pillowing
- Thicker Tortillas



Corn



## Basics

### Rules for dough

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- Reuse dough while it is still fresh to maintain optimal texture and performance.
- Continuous die-cut systems can automatically reintegrate trim scrap into the process, reducing manual handling.
- Maintain a clean, closed-loop system at all times to prevent contamination and ensure consistent product quality.

## Basics

### Rules for dough

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#### Unacceptable Dough Conditions

The following dough types must not be reprocessed under any circumstances:

- Dough containing oils or fats, as it affects texture and shelf stability.
- Dried or aged dough, which compromises hydration and elasticity.
- Dough contaminated with foreign material, such as packaging, metal fragments, or dust.
- Dough with off-smell or fermented aroma, indicating microbial activity or spoilage.

## Basics

### Rules for finished product

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- Cold, clean tortillas
- Packaging / sorting rejects
- Avoid stacking when hot to prevent condensation.
- Cool to  **$\pm 1$  °C of room temperature** before packaging.
- Must be handled sanitarily in dry conditions

# Basics

## Rules for finished product

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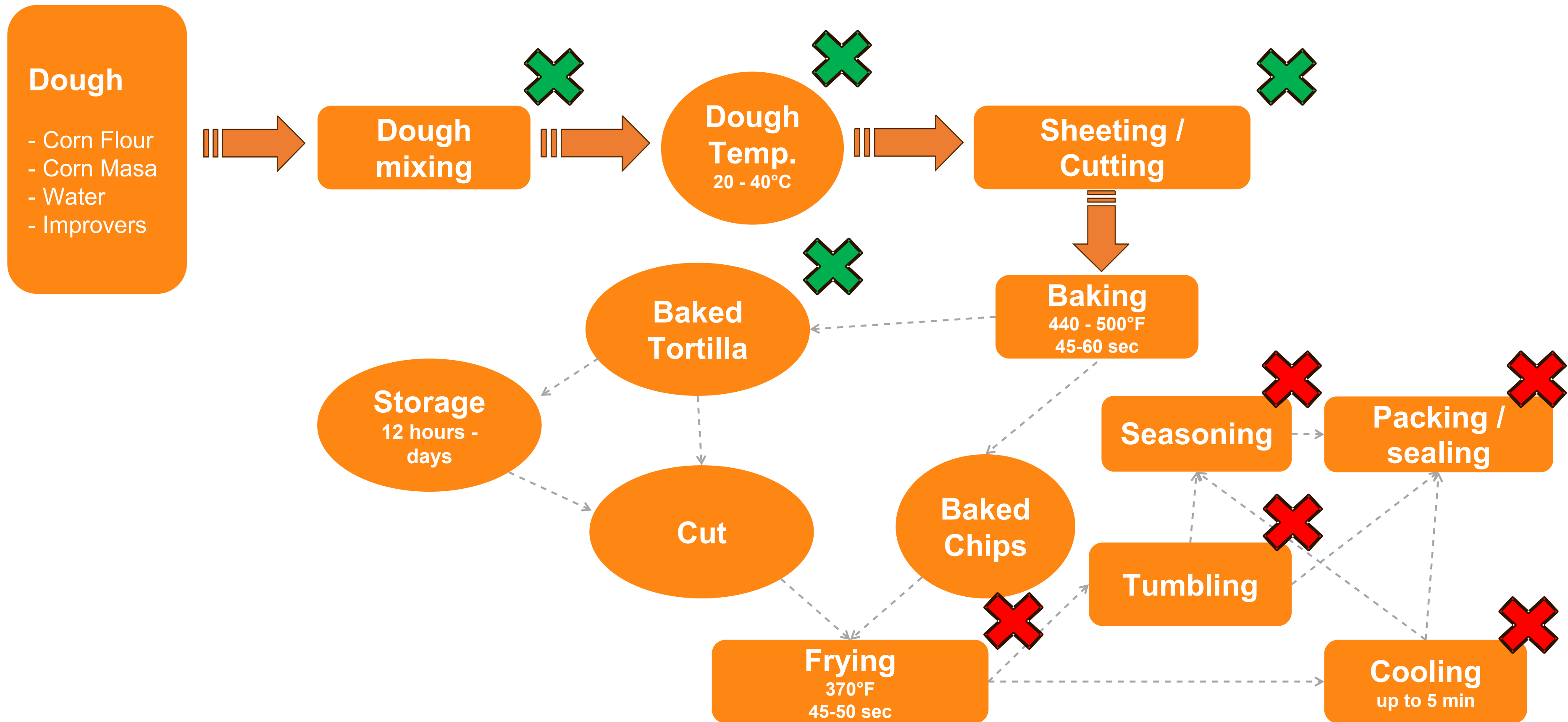
- Burnt / over-colored
- Oil-contaminated or dirty
- Contact with floor / unsanitary surface
- Partly eaten / tested samples

# Basics

## Rules for finished product

Scale	Rework Practice	Acceptability
Small / Artisan	Mix old tortillas into masa	Limited use, cold and soft only
Industrial	No rework	Standard food-safety policy

# Steps of Corn Chip processing





# Summary



# Key Recommendations

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- Rework only fresh, safe material.
- Keep below recommended limits.
- Maintain strict GMP & traceability.
- Standardize rework procedures across lines.
- Evaluate impact on texture & quality.



# Key Recommendations

## Flour Tortilla

### Eligible Rework Materials

- Fresh dough (< 1 hour)
- Clean die-cut trimmings
- Cold, uncontaminated tortillas from sorting or size rejects

### Non-Eligible Materials

- Dough older than 1 hour or with oil/fat added post-mix
- Contaminated, oily, or pressed-but-unbaked product
- Any material with off odor or visible defects



# Key Recommendations

## Flour Tortilla

- Add rework **at start of mixing** with flour and dry ingredients
- Maintain total inclusion  $\leq 8$  % of dough weight
- Use **color-coded, labeled bins** for each rework type
- Record date, shift, batch, and operator in tracking log
- Apply strict **FIFO rotation**



# Key Recommendations

## Corn Tortilla

- Only **fresh masa** (pre-bake material) may be reused
- Continuous die-cut systems can automatically recycle fresh trimmings

### In Chips

- **fresh masa** (pre-bake material) may be reused
- Baked and reworked Tortilla may be used in low amounts
- Continuous die-cut systems can automatically recycle fresh trimmings



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**Thank you very much for your attention**  
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