# A Novel Universal Dough Analyzer for Flour Millers

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# A Novel Universal Dough Analyzer for Flour Millers – Mixolab 2

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# Wheat, flour quality

- WHEAT KERNEL QUALITY
- MILLING and FLOUR QUALITY
- *PHYSICAL DOUGH (Rheological) PROPERTIES*
- BAKING QUALITY

# Why do we measure rheology of flour, dough?

How to assess the quality of the flours?

- Physicochemical compositions!
- Rheological properties!
- Direct performance in the final product!

# Why do we measure rheology of flour, dough?

Rheological measurements on bread dough have long been used as a method to define its physical properties, the main aims of which are:

- ✓ To obtain a quantitative description of its mechanical properties,
- ✓ To characterize and predict its performance during processing and end-use,
- ✓ To obtain information related to its molecular structure and composition.

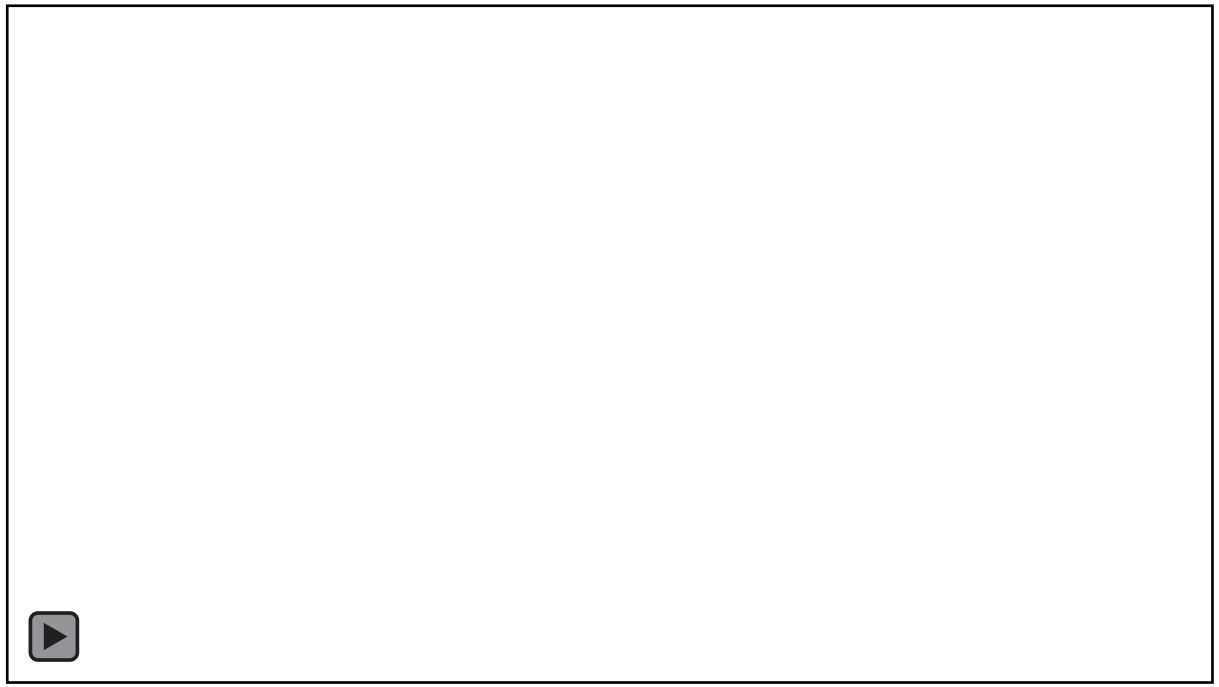
(Dobraszczyk, 2016; 2020)

# What do we measure?

Functional & Rheological
Mixolab 2 - Dough Analysis

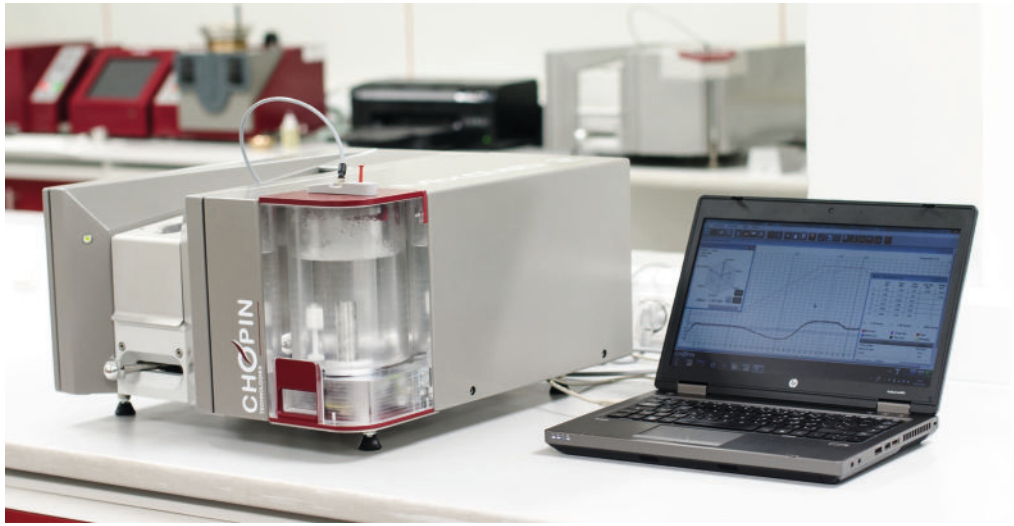
The Mixolab is a recording mixer specifically developed to measure rheological dough properties during mixing and heating.

- We measure the torque produced by a dough between two blades at constant mixing speed during successive phases at distinct temperatures.
- This can be related to the evolution of the dough consistency during mixing, baking and cooling !



# What is the test concept?

Functional & Rheological
Mixolab 2 - Dough Analysis




**Compliant with**

ICC 173/1 ; AACC 54-60-01 ; NF V03-765 ; ISO 17718:2013 ; GOST R 54498-2011

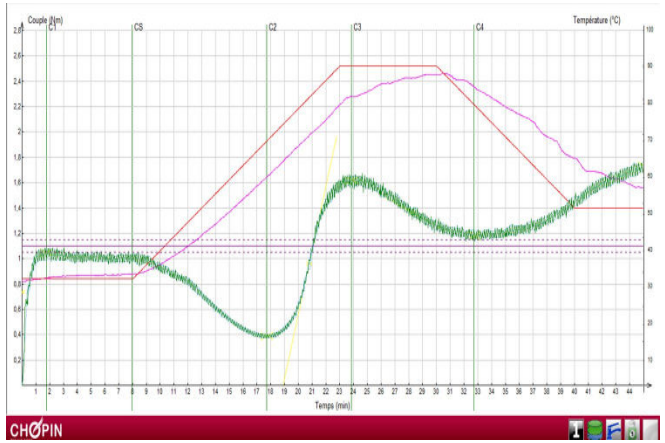
- To get access to a maximum of data :
  - Protein behavior
  - Starch behavior
  - Enzyme impact
  - Combinations…
  - Works on dough but not on a batter
- In one fully automated test,
- With only 50g sample,
- Using a standardized, internationally recognized method !

Mixolab 1; 2005 – Mixolab 2; 2014

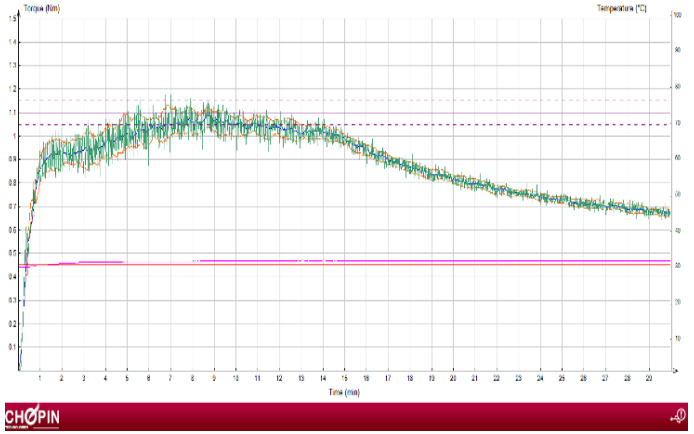
# The Mixolab 2 – Dough analysis

## The Mixolab System

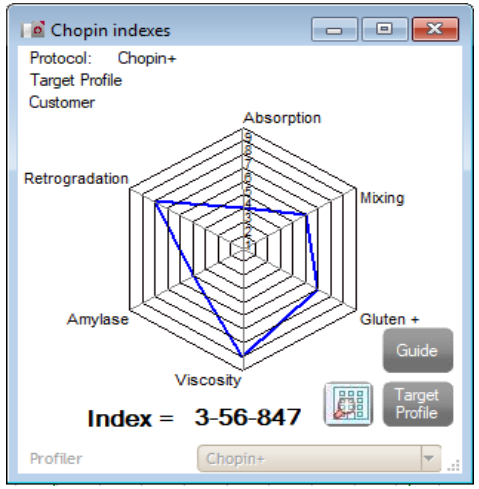

**Mixolab standard**




**Mixolab Simulator**




**Mixolab Profiler**



# The Mixolab 2 – Dough analysis: Standard protocol Chopin +

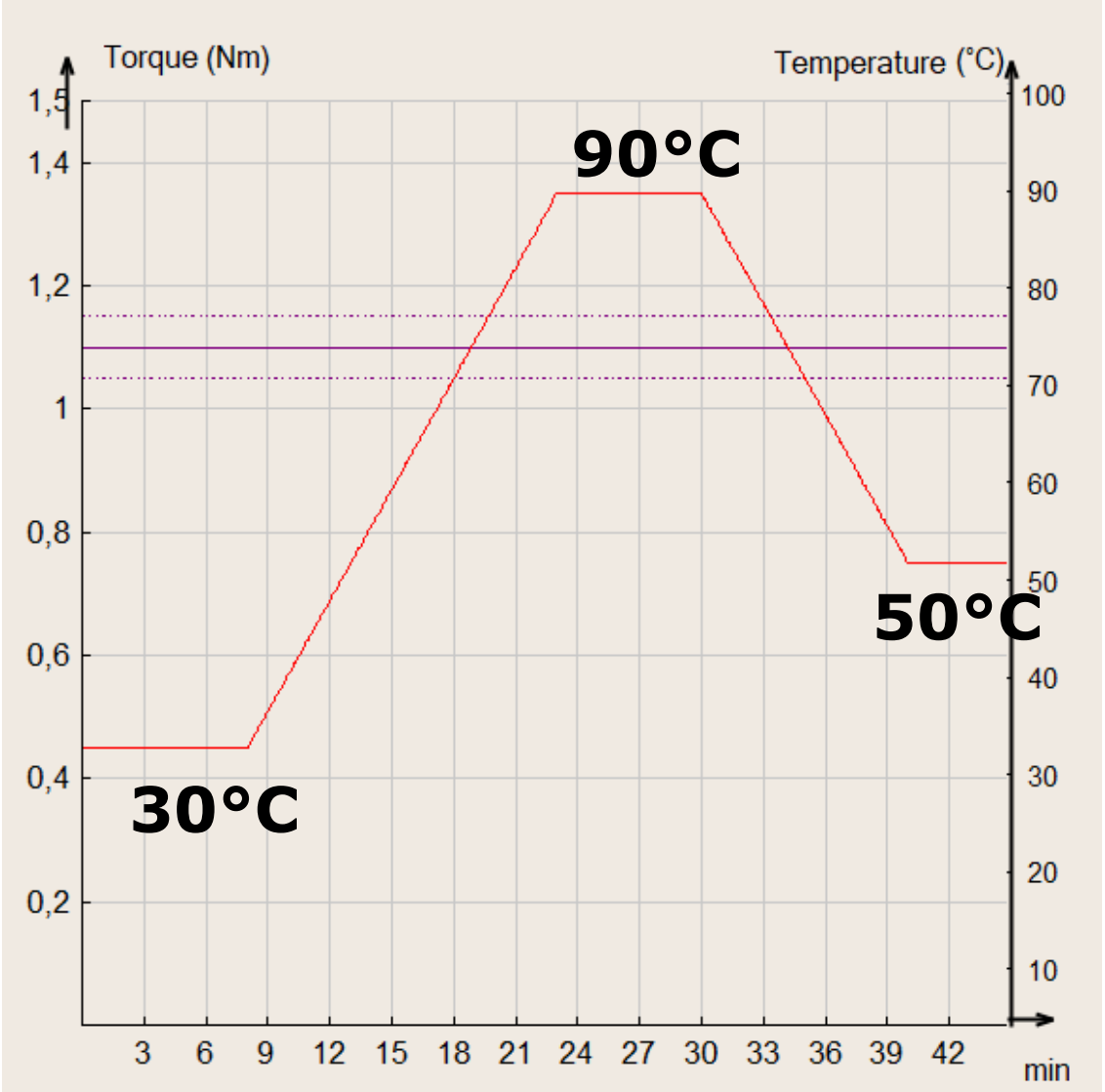
Functional & Rheological
Mixolab 2 - Dough Analysis

**Standard Protocol Chopin +**

Protocol at variable temperature defined in the standards.

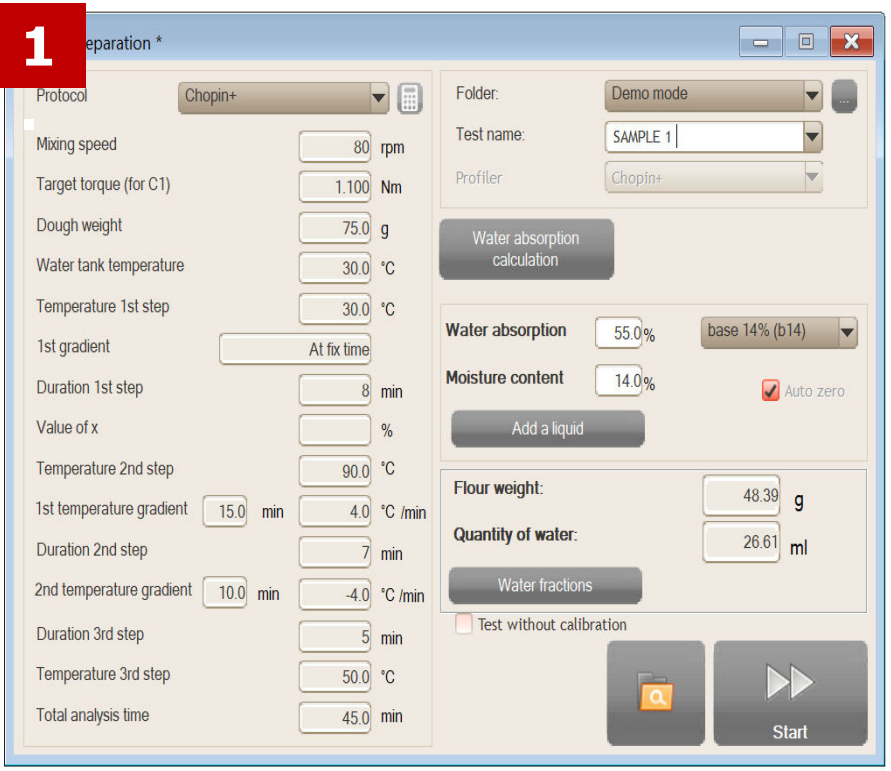
Mixing speed, 80rpm.

Possibility to create customized testing protocols for various cereals or different applications.



# The Mixolab 2 – Dough analysis: How to prepare a test

**1**

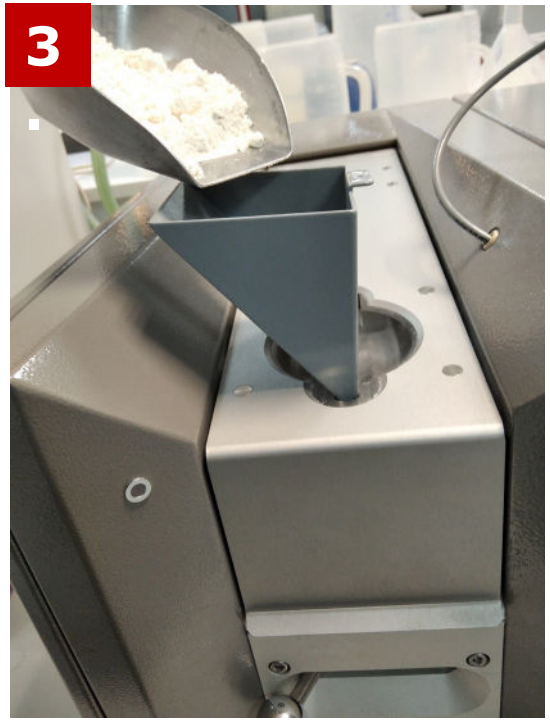



**Configure the test**

**2**


**Weight the indicated amount of flour**

**3**



**Incorporate the flour in the mixer bowl**

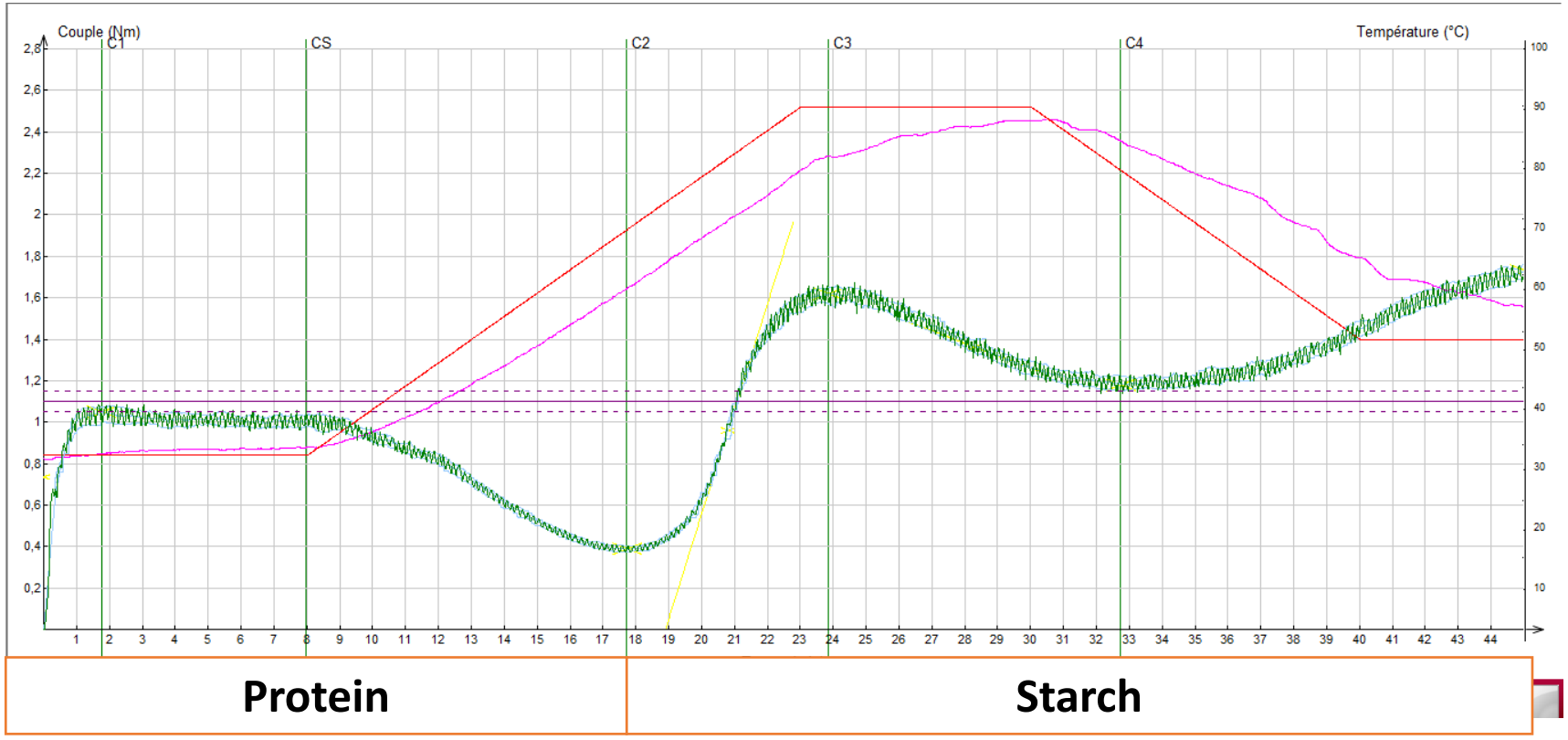
**4**

**Place the nozzle**

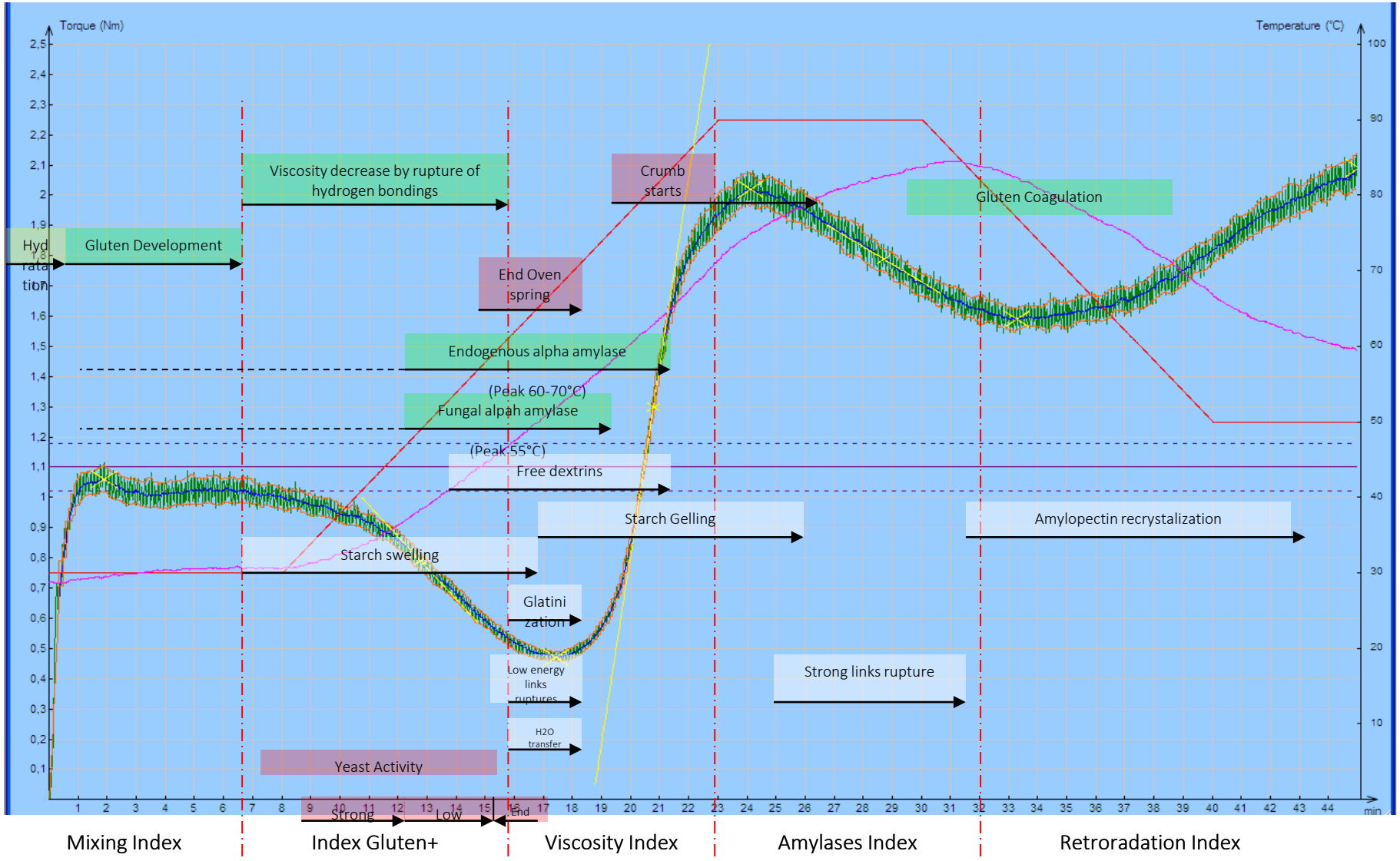
*Test time:* ***45 min*** */ Operator time:* ***5 min***

# The Mixolab 2: Characteristic curve and results


Standard Mixolab Curve

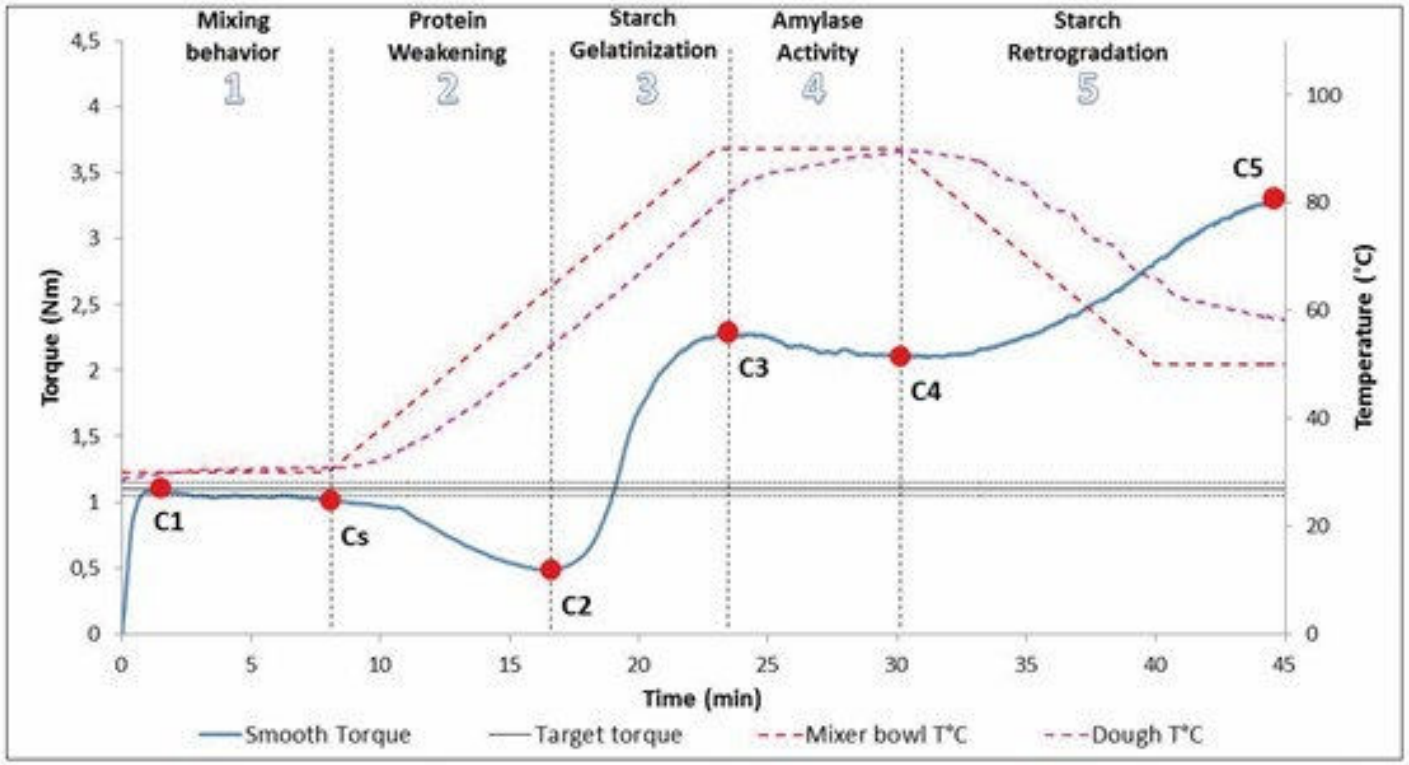


# The Mixolab 2: Characteristic curve and results - A Gold Mine of Information



# The Mixolab 2: Characteristic curve and results

1. Mixing Behavior
2. Protein Weakening
3. Starch Gelatinization
4. Amylase Activity
5. Starch Retrogradation



# The Mixolab 2: Simulator: What is it?

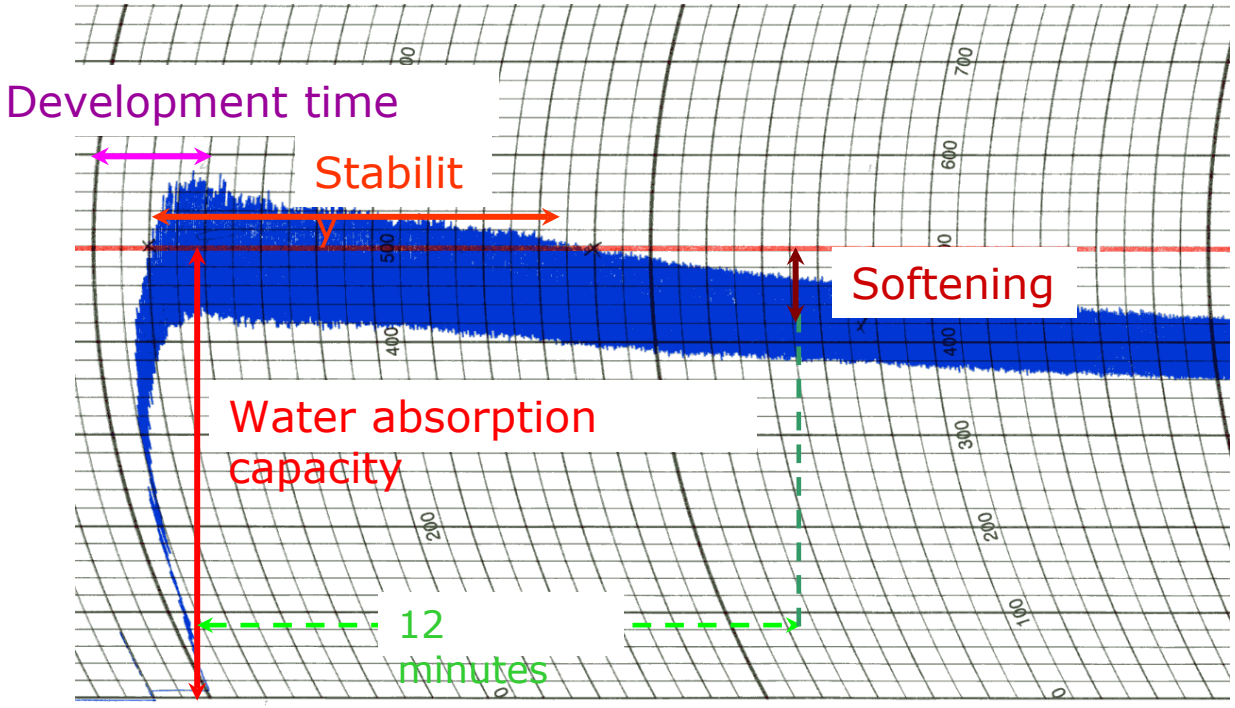
The Mixolab 2 has been equipped with the Simulator, a specific tool that allows you to obtain data in all points equivalent (values and units) to the Farinograph®. This allows you to compare the data with partners or to have a first assessment of the wheat quality with a small sample size.

This Simulator consists of a specific protocol (Chopin S) and calculation algorithms (calibrations) that convert the Mixolab 2 curve into Farinograph® curves and values, in 30 minutes:

Water Absorption (%), Development time (min), Stability (min), Weakening (FU), Development time (min), Mixing Tolerance Index (FU)

Compliant with NF V 03-765

# The Mixolab 2: Simulator: What is it?




| | Farinograph - Bipea limits |
|---|---|
| WA | 0,02*WA-0,2 |
| DDT | 0,35*DDT |
| STAB | 0,85*STAB |
| SOFT | 25 |

With “Chopin S calibration” option in the Mixolab 2 software, it is possible to adjust the Simulator in order to obtain the closest results to an existing Farinograph® unit.

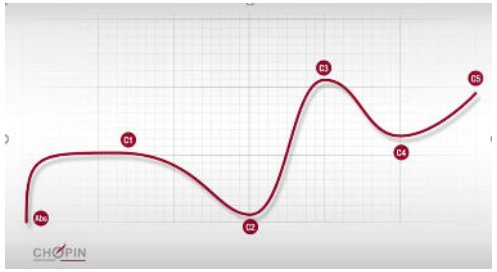
# The Mixolab 2: Profiler

## Functional & Rheological
## Mixolab 2 - Dough Analysis

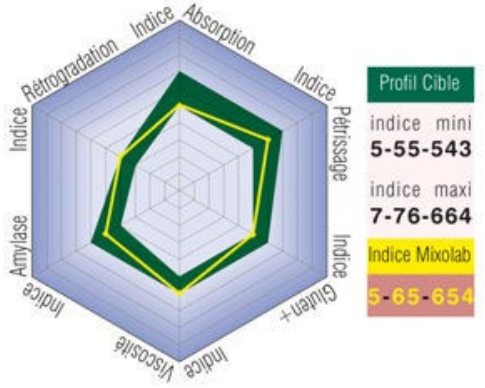
The ‘‘Profiler’’ system allows products to be simply classified based on six quality criteria: water absorption, mixing, gluten, viscosity, amylase, and retrogradation.

**It is a perfect tool and a new approach for the quality control of raw materials.** It offers the possibility to create specific target profiles based on finished products quality to **help better screen flours and detect under-performing flours.**

**Mixolab Standard**



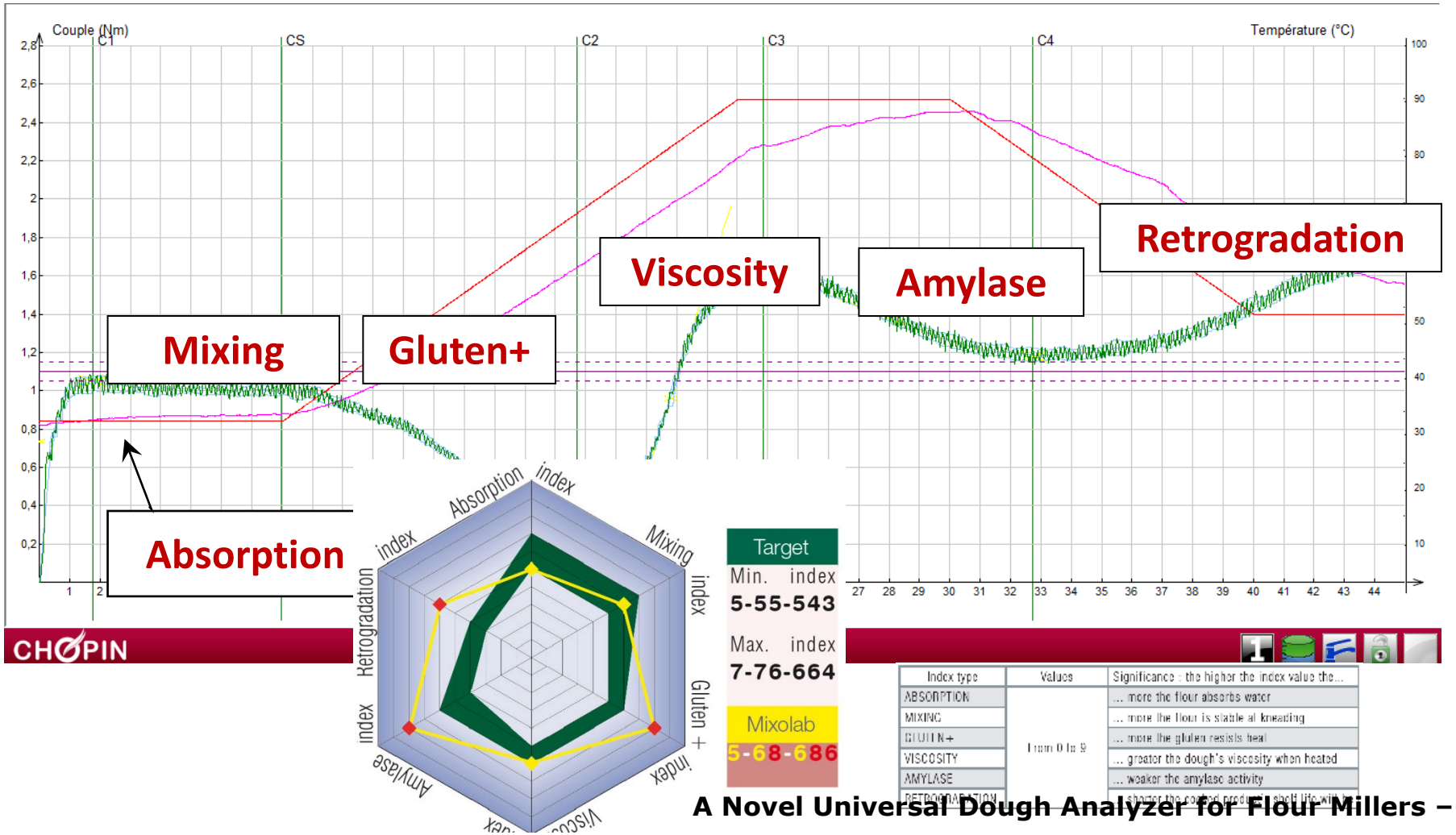

**Mixolab Profiler**



# The Mixolab 2: Profiler: What is it?

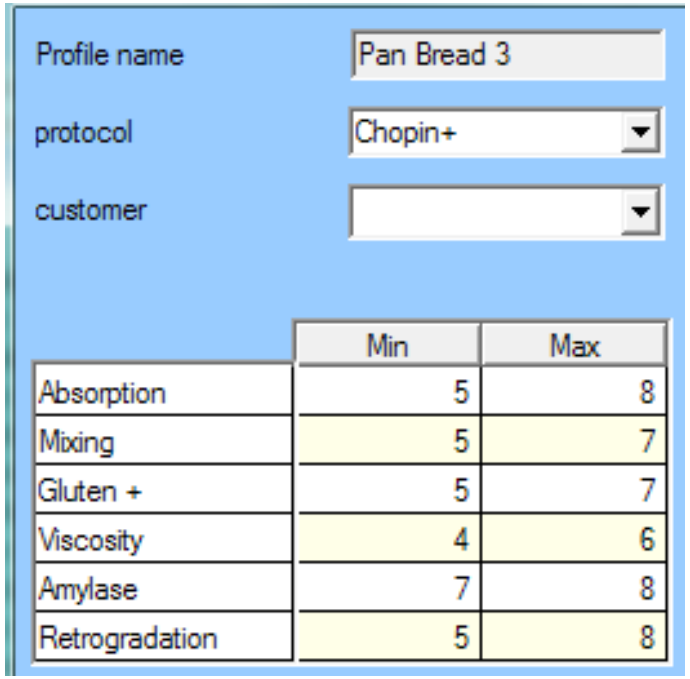
## Mixolab Profiler

The profile is a "curve translator"



# The Mixolab 2: Profiler: What is it?

## 3 EASY steps to create a profile




| | Min | Max |
|---|---|---|
| Absorption | 5 | 8 |
| Mixing | 5 | 7 |
| Gluten + | 5 | 7 |
| Viscosity | 4 | 6 |
| Amylase | 7 | 8 |
| Retrogradation | 5 | 8 |

- It all starts with observing the BEHAVIOR of the dough on the manufacturing line of YOUR customers.

1) Select all the flours that are giving perfect results

2) Analyze the flour in the Mixolab (minimum of 20 samples)

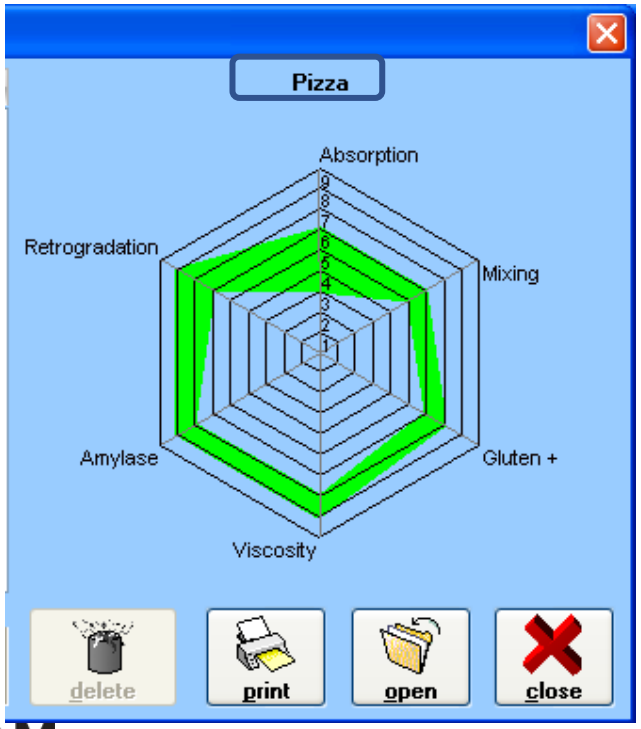
3) Use the integrated software to determine the minimum/maximum values (target profile)

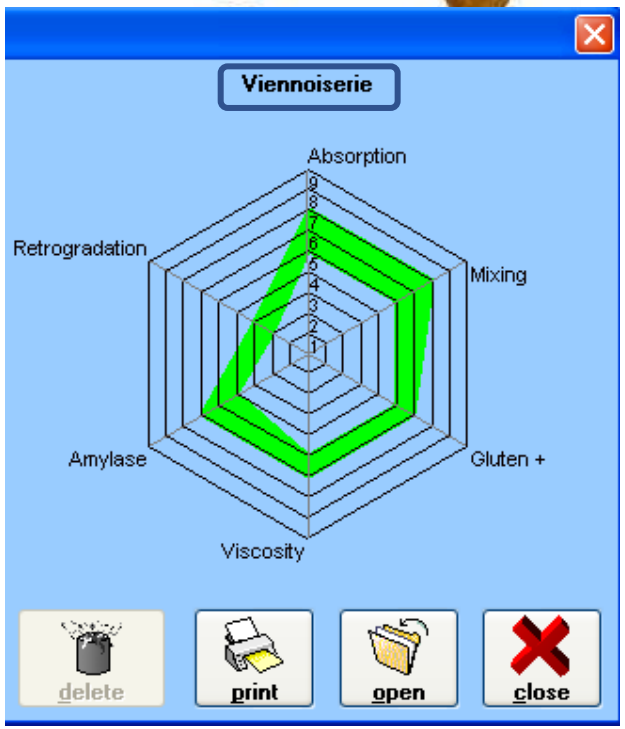
You can create as many target profiles as you need (per product, per line...).

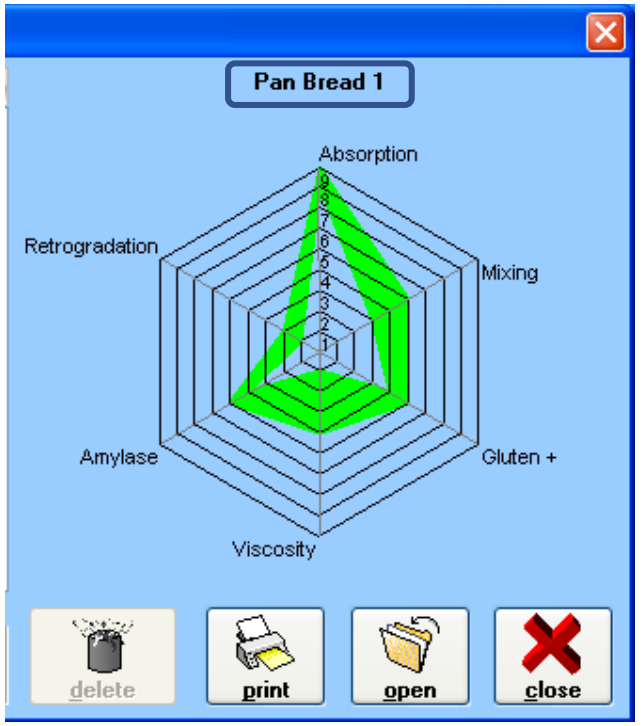
**Easy and objective flour/baker communication is key!**

# The Mixolab 2: Profiler: A world of possibilities

Different baked products need different types of flours for best quality!

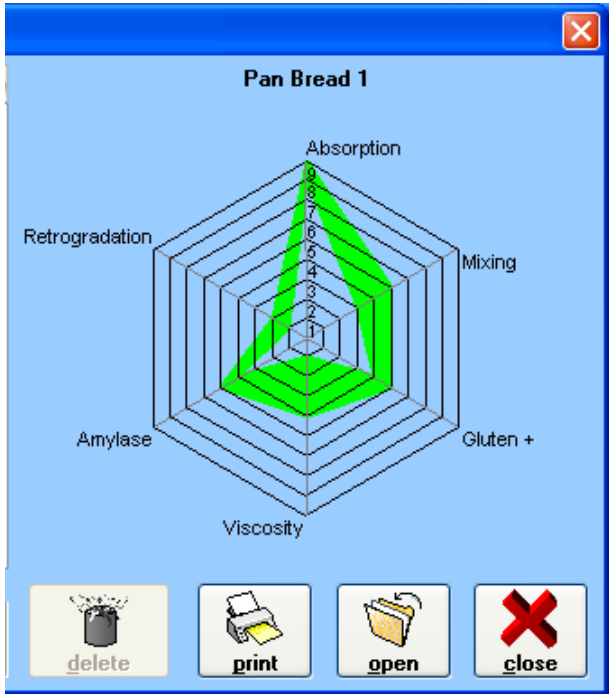


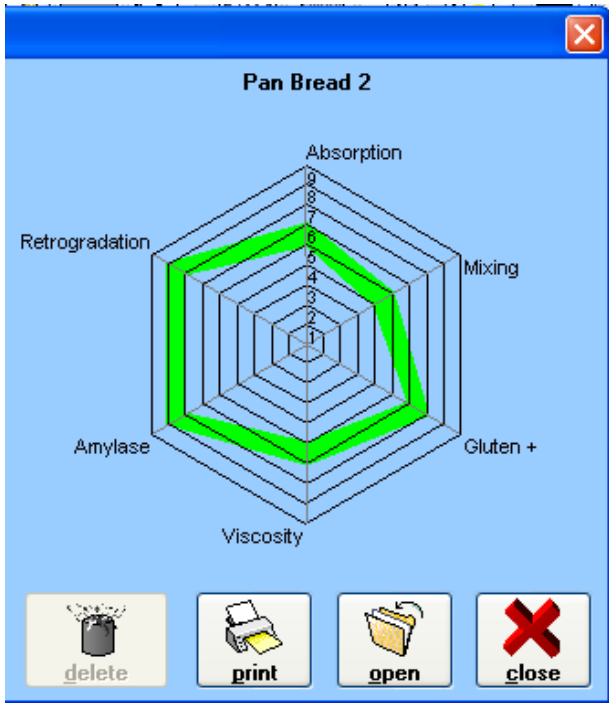



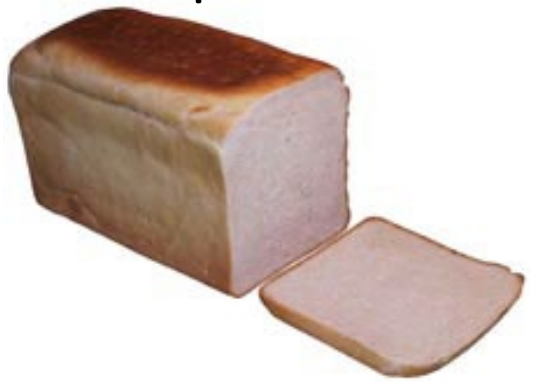



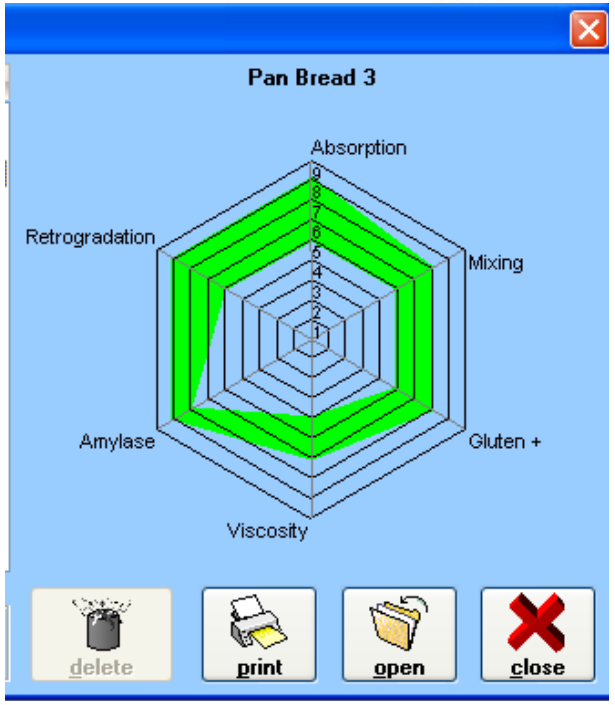
# The Mixolab 2: Profiler: A world of possibilities

Flour can be optimized for different baking process even for the same product!





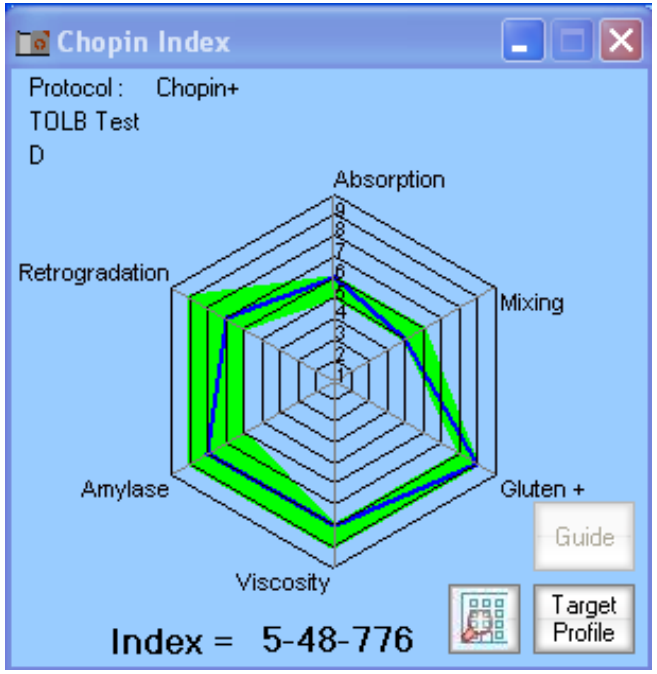
# The Mixolab 2: Profiler:
# Toll  to help better screen flours and detect under-performing flours

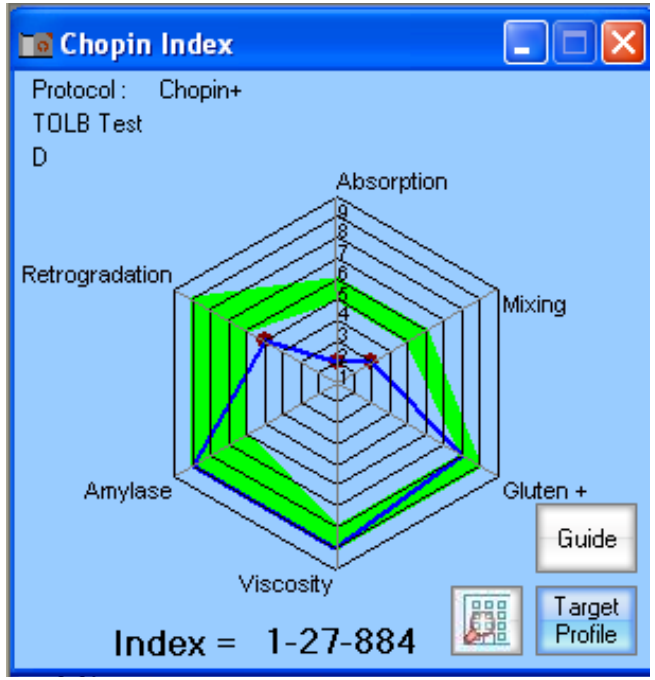
Functional & Rheological
Mixolab 2 - Dough Analysis

## Mixolab Profiler: The Target Profile
## Finally : You're IN or You're OUT

**You are IN :**
**Your flour has the requested qualities for your final product**

**You can receive or deliver the flour ….**

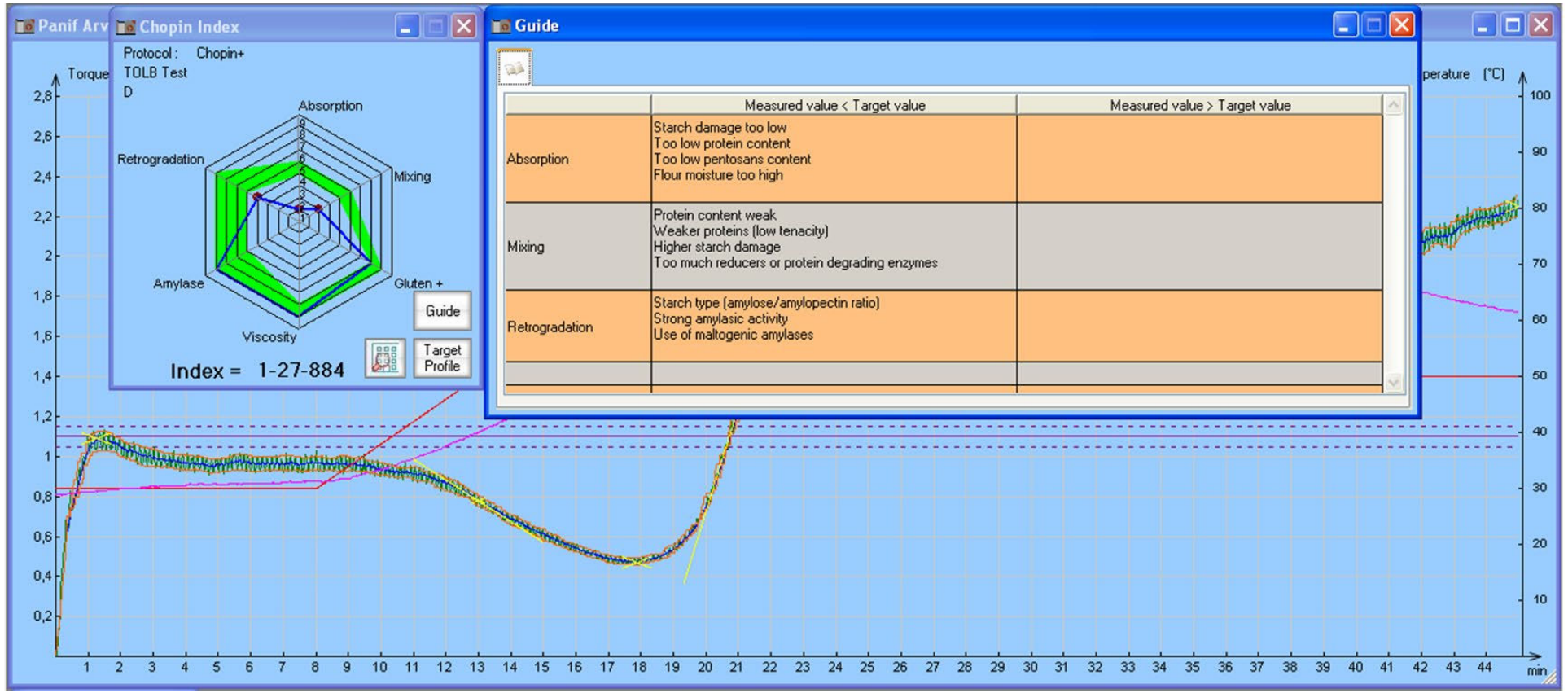



**You are OUT :**
**The Mixolab Guide will help you how to improve the profile**

# Profiler Guide

Profiler guide help identify potential root cause of out of spec issues
Great tool for QC managers to improve flour selection practice

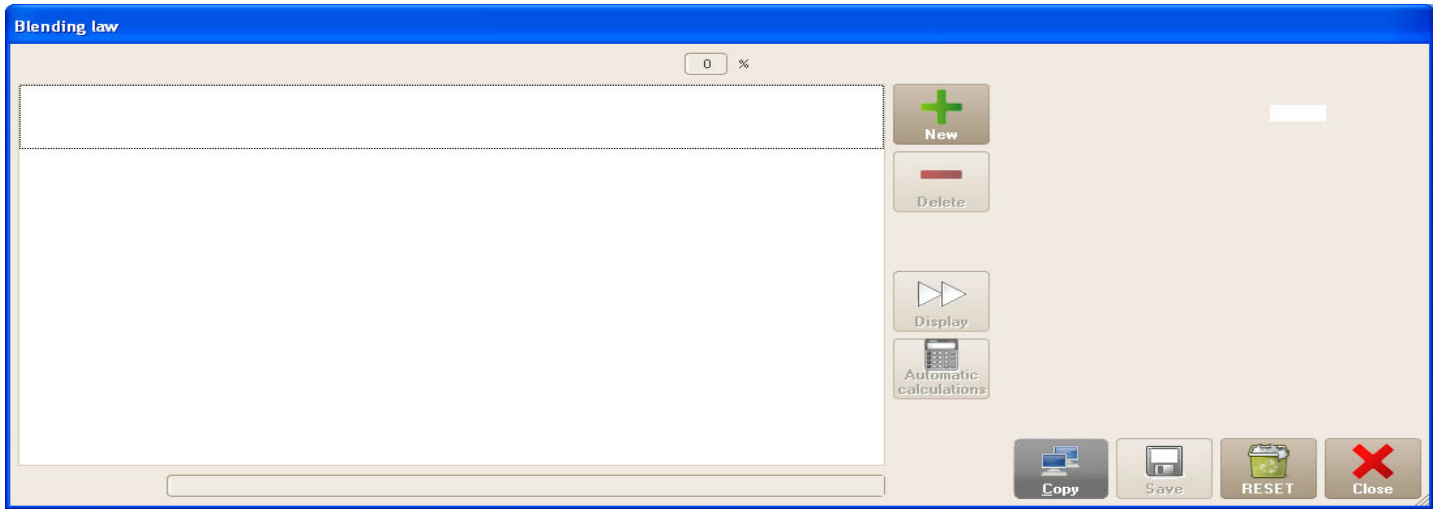


# The Mixolab 2: Profiler:
# Toll  to help better screen flours and detect under-performing flours

## Blending Law

‘‘Blending law’’ function to create and save theoretical curves corresponding to blends of prior results.
This function allows mixing different tests and obtaining the result curve of this blend.

From the "MIXOLAB CHOPIN Technologies" general window, click on icon:

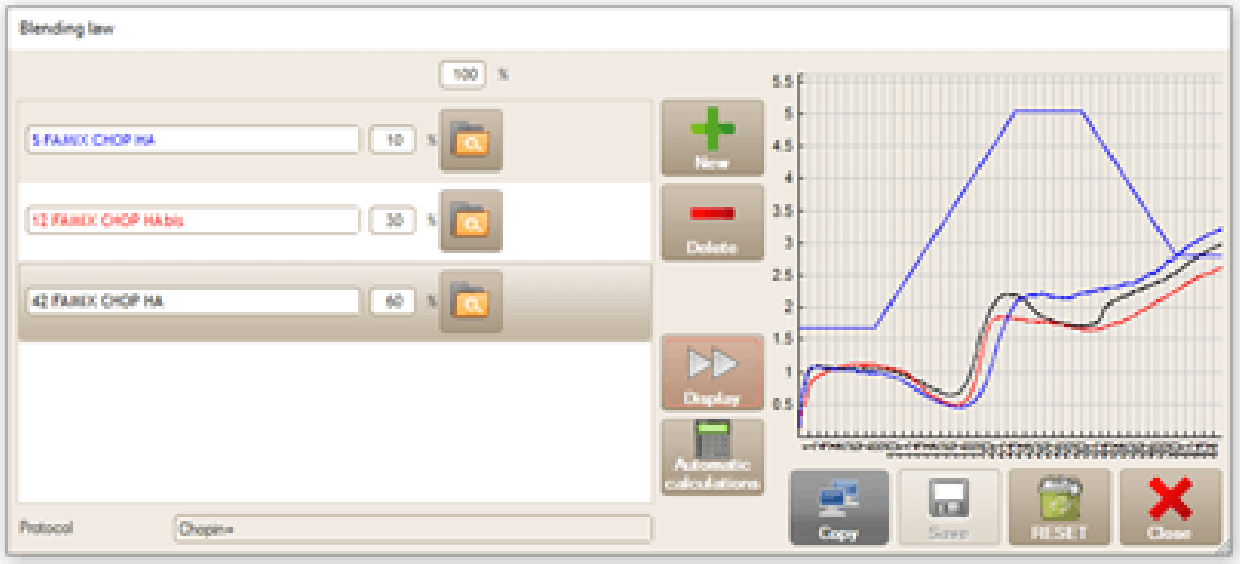



[Blending law]

# The Mixolab 2: Profiler:
# Toll  to help better screen flours and detect under-performing flours

## Blending Law

- To create a blend, choose the different test by pressing button [New].
- Choose the different tests to be blended in the list and click on [Open]. Several tests can be selected at the same time.




Enter the percentage for the different tests .

*The total percentage must be equal to 100%.*

# The Mixolab 2: Profiler:
# Toll  to help better screen flours and detect under-performing flours

## Blending Law

- To see the different individual test curves, press button [Display].
- To run the blend calculation, press button [Automatic calculations].
- A loading bar shows the calculation progress. The resulting curve  is then displayed.


Save the blend results!

It can now be used like any other test results via the menu of Managing tests.

It is identified by the symbol:

# Novel Universal Dough Analyzer for Flour Millers – Mixolab 2

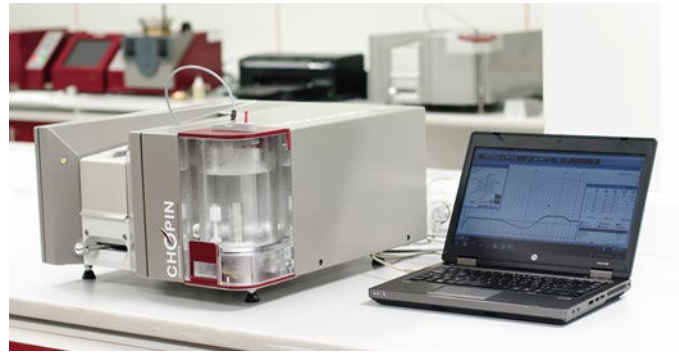
## Functional & Rheological
## Mixolab 2 - Dough Analysis

<u>Benefits</u>

- Provides a clear overview of the entire flour quality and the dough properties
- Design specifications according to your specific process
- Analyze doughs with various ingredients as well as complete formulas
- Understand the dough behavior at the lab and at line
- Improves operators' productivity, repeatability and control thanks to the automated test and the comprehensive, and intuitive software
- Use proven, industry-standard analysis for your testing procedures

# Novel Universal Dough Analyzer for Flour Millers – Mixolab 2: Aplications






- Bakers
- Millers
- Breeders
- Additive manufacturers
- Gluten manufacturers
- Storage facilities
- Research institutes/ Universities/schools

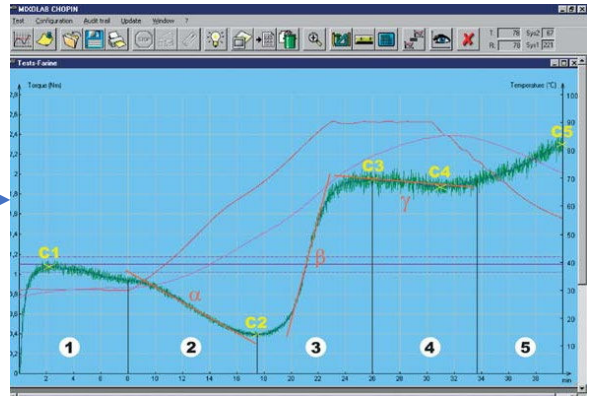
To…

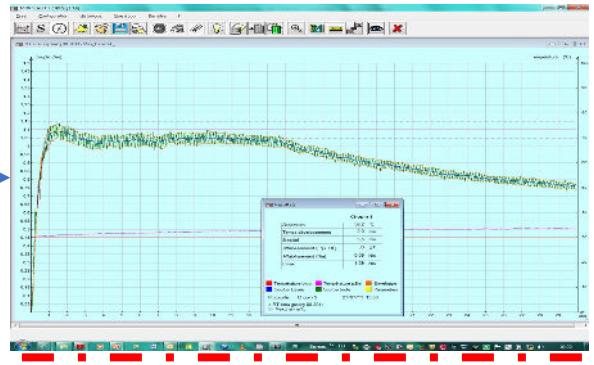
- Seeds or **grain selection**
- Establishing specification sheets
- **Inspect grain or flour**
- **Blending wheat and flour**
- **Adapting flour quality**
- **Dosing additives**
- Developing new recipes
- Process control & optimization

# CONCLUSION

# CONCLUSION

## 3 Main Potential Uses:

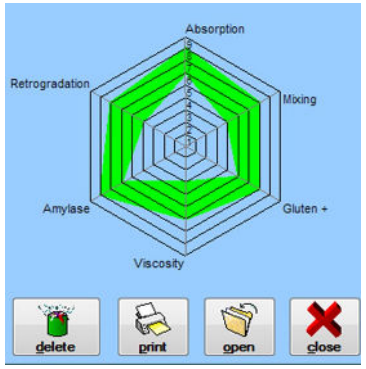



**UNIQUE**

Flour characterization system

(Specifications)




**KEEP TRACK**

With your historical data

(Providers)

**MEASURE**

What happens at line

(Objective control)

# CONCLUSION

- The Mixolab analyses flour performance throughout the entire breadmaking process, including the mixing, heating and cooling phases.

- These extra stages thus have the potential to tie research into industry, because the instrument can generate curves to compare differences both between flours and among industrial baking conditions.

(Rosentrater and Evers, 2018)

# CONCLUSION

- As flour quality fluctuates in dough plants, monitoring rheology and making corrections to dough to maintain consistent product quality takes on added importance!

- Dough rheology measurements are key for adjusting and smoothening processing of dough in plants!

- Specifications should include key physical and rheological parameters in addition to the chemical parameters!

# KPM Analytics
# Company Overview

# KPM Analytics Introduction

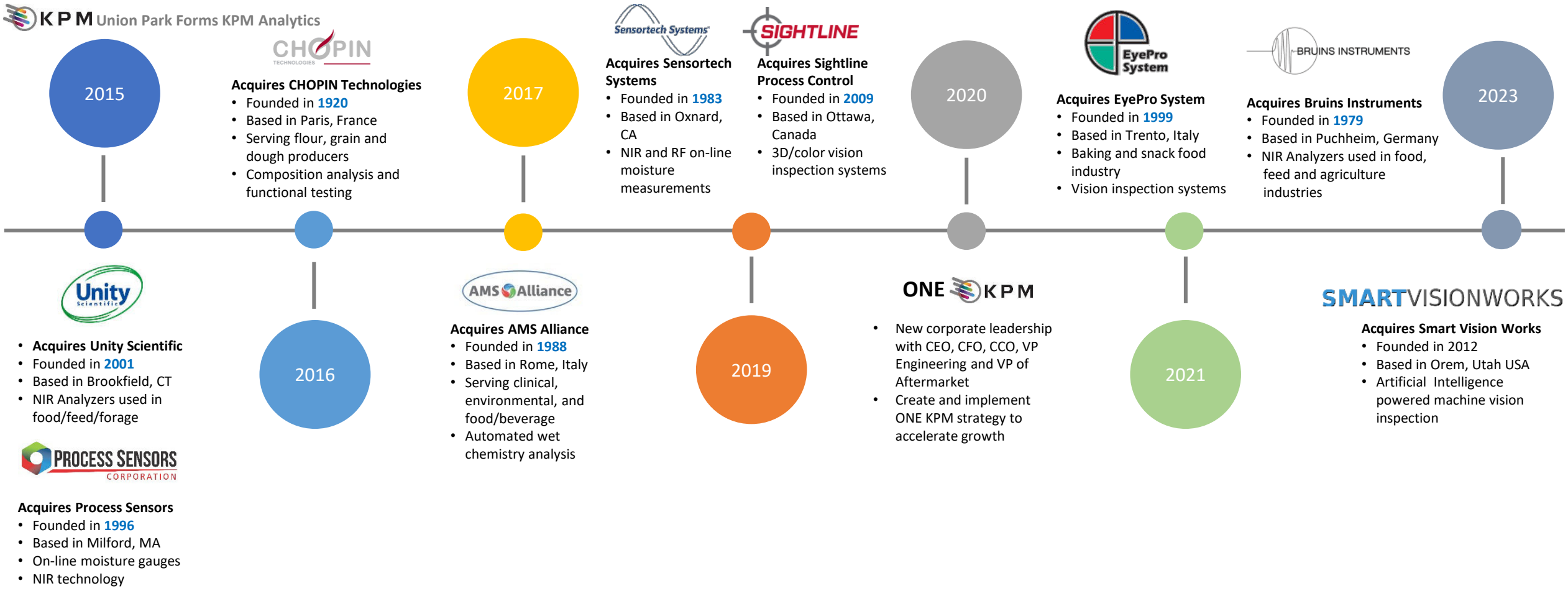
# Our Mission

**We craft assurance.**

**For our partners. For their customers.**

# Timeline and Progression of KPM Analytics

**KPM Analytics brands have long and successful histories servicing customers worldwide**



# Industries We Serve

KPM's main focus is serving food producers, helping them ensure quality and protect their brand.

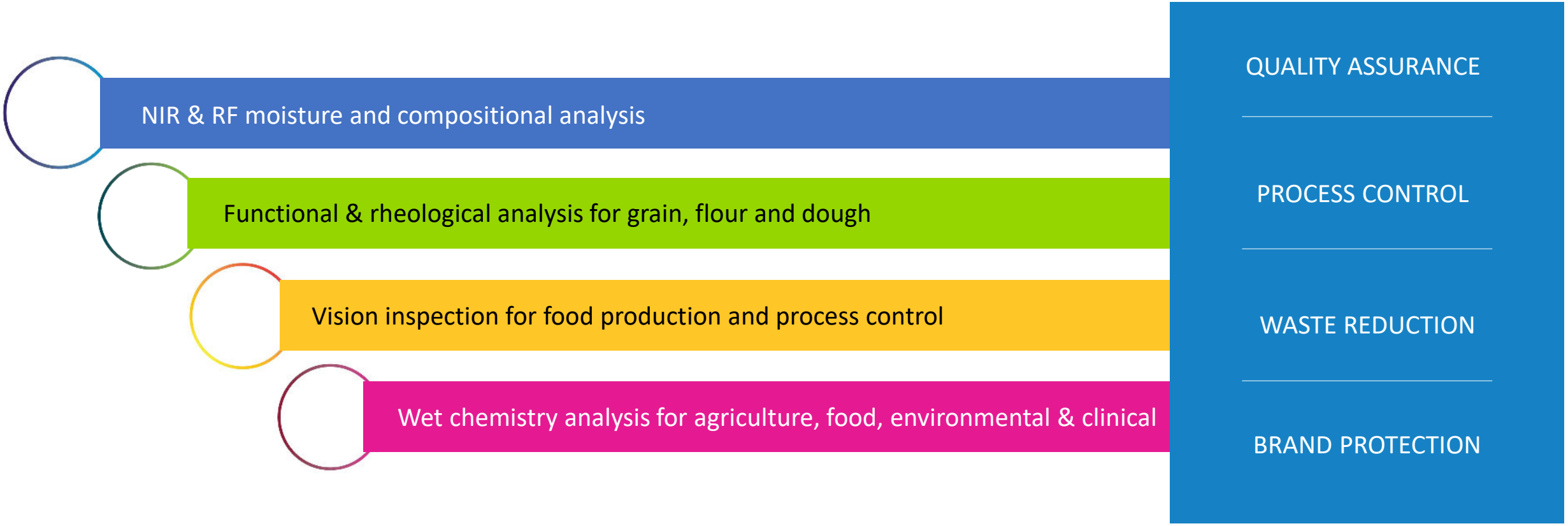
KPM is leading the industry for quality solutions at all stages of production.

Food Production  Agriculture  Feed & Forage  Environmental  Industrial

Our product lines are also widely used in agriculture and feed and forage to measure critical quality parameters.

Environmental, chemistry and industrial industries benefit from our accurate lab and sensing technologies.

# Solutions for Every Stage of Production



# A Global Team

KPM customers are supported by our global sales, service and authorized distribution network.

**9**
9 product brands based in 5 countries and growing.

**200 +**
Over 200 distributors worldwide.

**15,000 +**
Over 15,000 installations around the world.


**U.S.A. (Boston)**
+1 (774) 462-6700

**Canada (Ottawa)**
+1 (800) 768-6821

**U.K. (London)**
+44 1536 408066

**France (Paris)**
+33 01 41 47 71 38

**Poland (Warsaw)**
+48 22 6739526

**Germany (Frankfurt)**
+49 (6721) 988 6720

**Italy (Rome)**
+39 0774 354441

**China (Beijing)**
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# Thank you!

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