



ENSURING QUALITY AND SAFETY

LalBrew® PREMIUM
BREWING YEAST



**WE BREW
WITH YOU.™**

AT THE SERVICE OF BREWERS AND BREWERIES

AS A WORLD-LEADING EXPERT IN YEAST AND BACTERIA, LALLEMAND BREWING WORKS TO DEVELOP SOLUTIONS THAT ENSURE THE CONTROL OF BREWING PROCESSES AND OPTIMIZE THE QUALITY OF BEERS ACCORDING TO DESIRED SENSORY PROFILES.



01 RESEARCH & DEVELOPMENT

The R&D scientists at Lallemand Brewing draw on the inspiration of brewers and partners worldwide. As brewers aspire to push the industry forward with innovation, Lallemand works to provide those tools. Lallemand Brewing continually tests the potential of various yeast for their ability to consistently ferment and contribute desired sensory flavors and aromas. In terms of R&D, Lallemand calls upon the best international experts for the selection and characterization of its yeasts. These research projects are also often conducted with input from leading research institutes and global technical partners. The Lallemand Brewing R&D team is heavily involved in supporting the quality of our products by setting up proper product specifications for each product. The team is also always on the lookout to find and evaluate new methods that could eventually be implemented as part of the QC procedure.



02 QUALITY & CONSISTENCY

Lallemand Brewing has its own dedicated R&D team committed to manage and drive research projects, optimize production processes specific to yeast and to provide technical product information that will guide brewers on their fermentation journey. Quality is of the utmost importance here at Lallemand, provided here is an overview of the steps we take to ensure it.





03 A GLOBAL NETWORK OF EXPERTS

Supported by decades of long-standing industry experience, an extensive support network, and strong technical expertise, Lallemand Brewing is perfectly positioned today to help breweries achieve their most ambitious growth and quality goals.

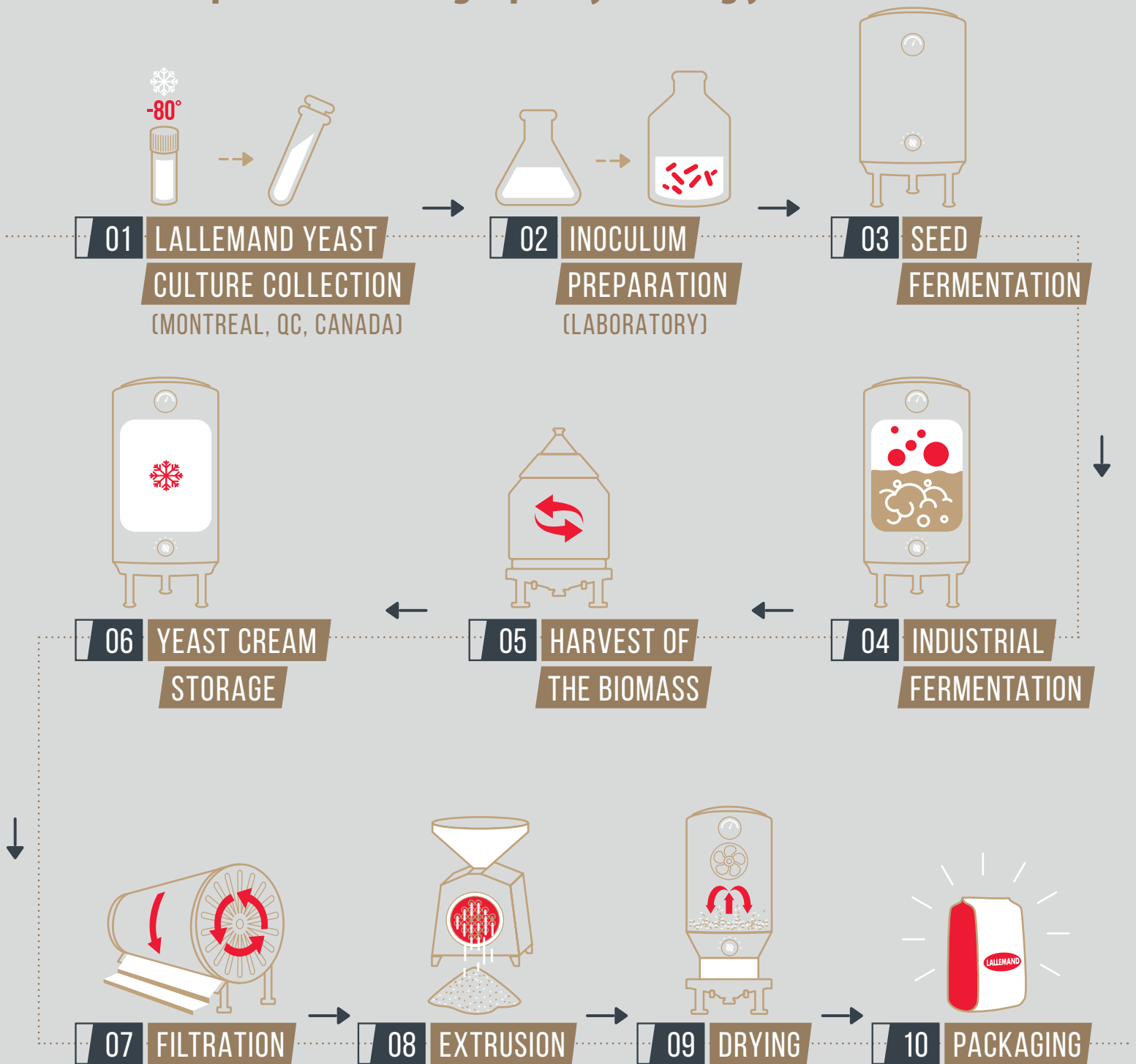
In terms of R&D, Lallemand calls upon the best international experts for the selection and characterization of its yeasts. These research projects are mainly conducted with beer research institutes, technical partners and breweries.

In Canada (Montreal), a Lallemand team based at the National Research Council (NRC) optimizes production processes specific to each of our applications. Yeast selection is a multi-year process in which yeasts undergo a series of developmental tests and checks to ensure stability and performance, and that the recipe for production is perfected for the specific strain. The strain undergoes a characterization process that includes genetic and sensory characterization work. Once ready, the yeast is sent throughout our extensive global network of technical representatives where it undergoes commercial sized trials to ensure consistency with lab results.



LALLEMAND BREWING EXPERT IN PRODUCTION

10 steps to obtain a high quality brewing yeast



QUALITY & SAFETY

QUALITY MANAGEMENT SYSTEM	YES	NO
ISO 9001 CERTIFIED FACILITIES	✓	
HACCP PROGRAM	✓	
GFSI CERTIFIED FACILITIES	✓	
GOOD MANUFACTURING PRACTICES (GMP)	✓	
COMPLIANCE TO ENVIRONMENT REGULATION	✓	
BUSINESS ETHICS POLICY	✓	
COMPLIANCE TO LABOR LAWS	✓	

What support programs are in place to ensure quality and food safety targets of our products?

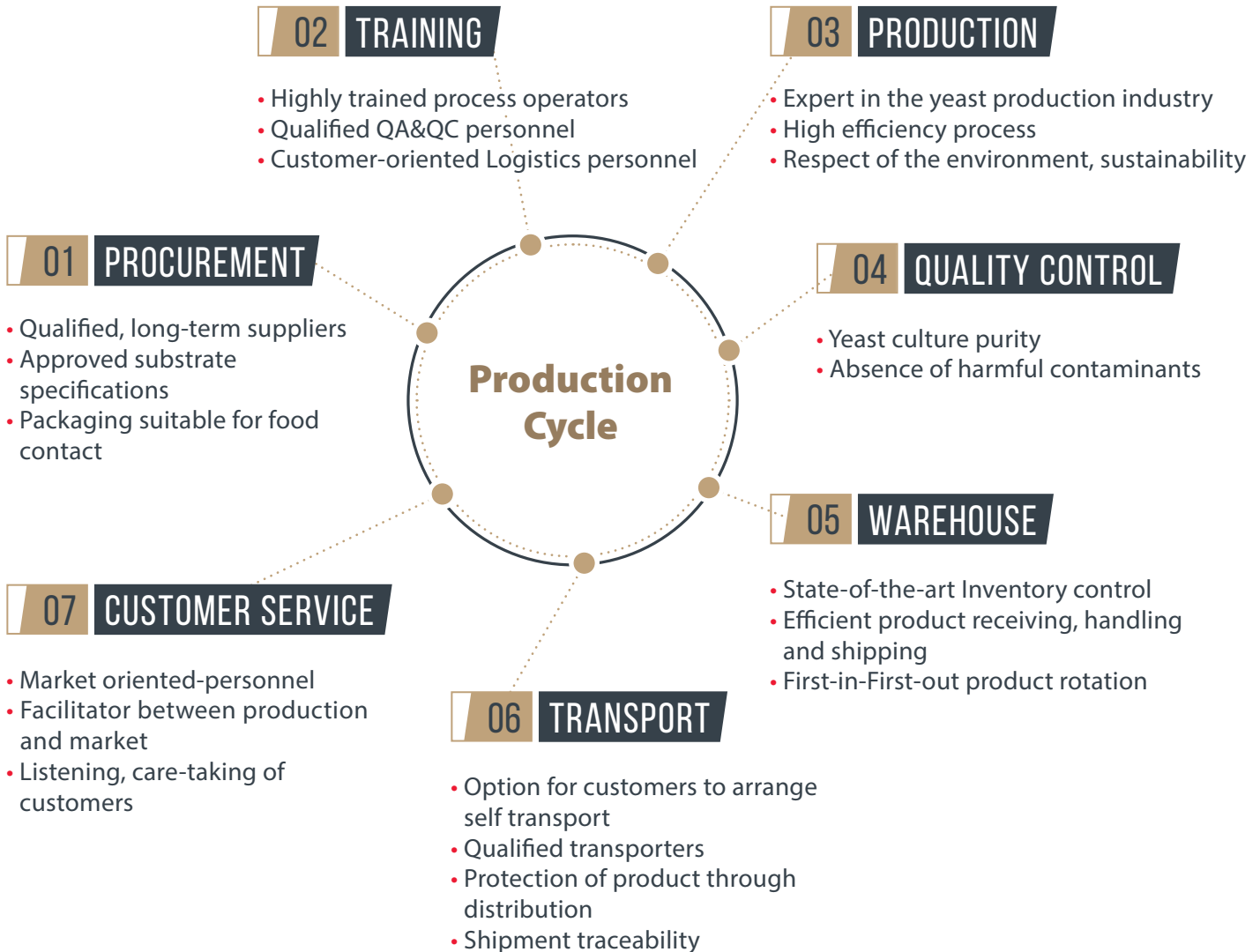
- ✓ Documented Quality Policy
- ✓ Documented Quality System
- ✓ Food Safety Plan
- ✓ Hygiene and Sanitation (GMP)
- ✓ Hazard Analysis Program (including allergen control)
- ✓ Training programs
- ✓ Supplier approval, raw material specifications
- ✓ Production/Process control
- ✓ Equipment maintenance and calibration
- ✓ Quality Control
- ✓ Management of non-conforming product
- ✓ Customer Complaints procedure
- ✓ Crisis Management
- ✓ Product Traceability and Recall
- ✓ Food Defense Program
- ✓ Pest Control

RAW MATERIAL AND PRODUCT CONFORMANCE	YES	NO
APPROVED SUPPLIERS	✓	
RAW MATERIAL SPECIFICATIONS & SAMPLING PLAN	✓	
SAMPLING AND TEST PLAN	✓	

PRODUCT SPECIFICATIONS	YES	NO
PRODUCT QUALITY SPECIFICATIONS	✓	
PRODUCT COMPLIANCE TO APPLICATION REGULATIONS	✓	
CONTROL OF NON-CONFORMING PRODUCT	✓	
ALLERGEN FREE	✓	
GENETICALLY MODIFIED ORGANISM (GMO)		✓
NANOTECHNOLOGIES		✓
IRRADIATION		✓
SEWAGE SLUDGE		✓
PRESERVATIVES		✓
ANIMAL BY-PRODUCT		✓
ANIMAL TESTING		✓
MATERIAL SECURELY PACKAGED	✓	
SAFETY DATA SHEET (SDS)	✓	
CERTIFICATES OF ANALYSIS (COA)	✓	
KOSHER CERTIFICATE	✓	

TRACEABILITY	YES	NO
PRODUCT TRACEABILITY	✓	
PRODUCT RECALL	✓	
PRODUCTION BATCH RECORD	✓	
UNIQUE LOT NUMBER?	✓	

YEAST PRODUCTION CYCLE



Quality Control at every stage

From the production facilities to the logistics platform, the required quality level is consistently very high. In addition to strictly following standards and certifications in place, regular monitoring and external audits reinforce the control system.

PRODUCTION & PACKAGING - YEAST

	LALLEMAND GMBH	ISO 9001-2015 IFS	KOSHER ORGANIC
Vienna, AUSTRIA Dedicated plant for brewing yeast			

PRODUCTION - YEAST

	LALLEMAND WIENGER	IFS	KOSHER ORGANIC
Passau, GERMANY			

LOGISTICS

	DANSTAR FERMENT A.G.
Zug, SWITZERLAND	

DISTRIBUTION

	LALLEMAND GMBH	IFS
Guntramsdorf, AUSTRIA		

PACKAGING - YEAST

	LALLEMAND DENMARK	ISO 9001-2015 KOSHER	ORGANIC BRC
Fredericia, DENMARK			

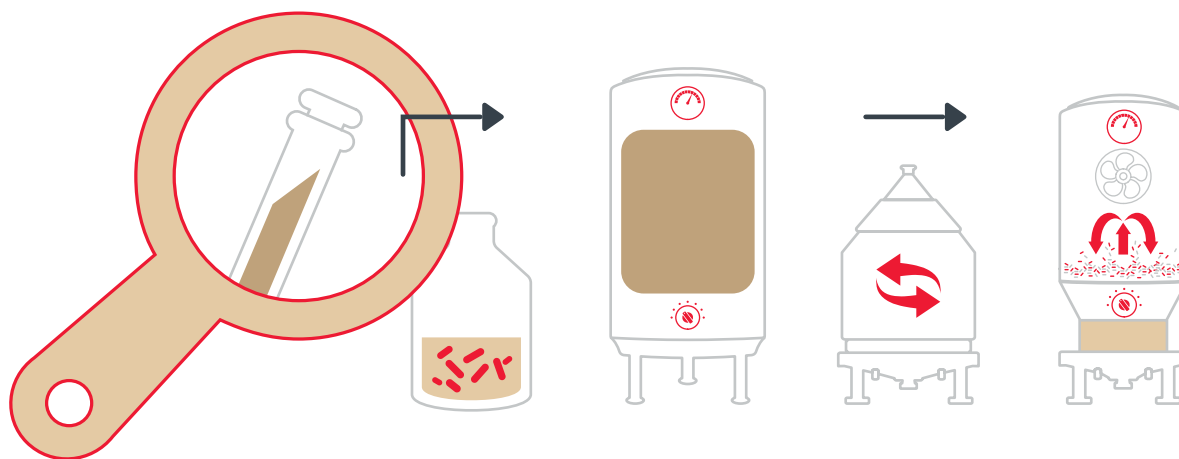
R&D LABORATORIES

	LALLEMAND INC.
Montreal, Quebec, CANADA	

24 TESTING STEPS

THE STABILITY OF DRIED YEAST ALLOWS TIME TO GO THROUGH EACH OF THE FOLLOWING 24 TESTS WITH EVERY PRODUCTION.

In addition, retention samples of every production and packaging operation are kept in the lab at both 4°C (39°F) and room temperature. These samples can be re-analyzed when required to assist troubleshooting potential QC issues at the brewery.



01 STRAIN IDENTITY DNA TEST

[PCR DNA] Polymerase Chain Reaction testing is our standard DNA test performed on each batch of yeast produced to confirm that the correct strain was propagated and that the yeast is free of mutations.

02 VIABILITY

Plating on culture media to measure the number of viable cells per gram of dry yeast. Microscopy tests using viability stains such as methylene blue do not work well for dry yeast samples due to the nature of the dried cell wall. Plating methods take longer, but are more accurate.

03 NON SACCHAROMYCES WILD YEAST

This is done on a media that has lysine as the only nitrogen source. Most non-*Saccharomyces* yeast are able to use lysine, and can grow on this media, whereas *Saccharomyces* yeast are not able to grow easily.

04 DIASTATICUS YEAST

PCR TEST

Sample is tested by PCR for the presence of the STA1 gene.

05 DIASTATICUS YEAST

ACTIVITY TEST

Glucoamylase enzyme activity is assessed using a Durham tube test.

06 FERMENTATION KINETICS

Lag phase time and total fermentation time are assessed by test fermentation in EBC-tubes using a standard wort.

07 ATTENUATION LIMIT

Total attenuation is assessed by test fermentation in EBC-tubes using a standard wort.

08 BACTERIA

The media used for these tests are Universal Beer Agar (UBA) and Lin's Multi Differential Media (LMDA), which are incubated in both aerobic and anaerobic conditions.

09 COLIFORMS

A selected media is used for the specific growth of coliforms and *E. coli*.

10 VITALITY

Measures the time it takes for 5g of yeast to consume 5g of sugar.

11 COLOR

Depending on the strain and production process, variations may occur that do not affect quality.

12 DRY WEIGHT

Higher dry weights are associated with longer shelf life. Lallemand Brewing aims for 93-96% solids.

13 SHELF LIFE TEST

Yeast protein content is measured to ensure proper activity and shelf life in each batch.

14 ACTIVITY TEST

Phosphate is necessary for cell division, high yeast activity and the regulation of the metabolic process.

15 SENSORY ANALYSIS

Beer from fermentation of standard wort in EBC-tubes is tasted by a trained sensory panel to determine whether the flavor is consistent with the profile for that strain and to detect potential off flavors that would indicate a QC problem.

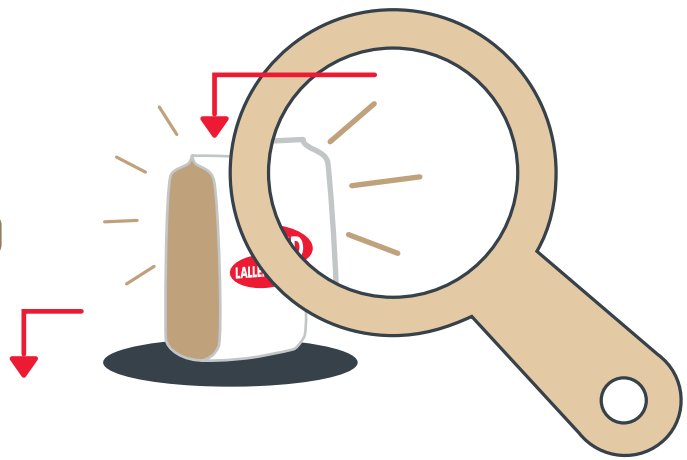
16 LACTIC ACID ANALYSIS

For lactic acid producing strains the level of lactic acid produced from fermentation of standard wort is assessed by HPLC analysis.

17 BOTTLE CONDITIONING TEST

For bottle conditioning strains (CBC-1), the ability to completely consume dextrose and produce CO₂ is assessed by a bottle conditioning experiment and an HPLC analysis.

THE FOLLOWING TESTS ARE REPEATED TO ENSURE QUALITY OF PRODUCT AFTER PACKAGING



18 VIABILITY

19 FERMENTATION KINETICS (EBC TUBES)

20 ATTENUATION LIMIT

21 NON-SACCHAROMYCES WILD YEAST CONTAMINATION (LYSINE)

22 DIASTATICUS YEAST PCR TEST

Sample is tested by PCR for the presence of the STA1 gene.

23 DIASTATICUS YEAST ACTIVITY TEST

Glucoamylase enzyme activity is assessed using a Durham tube test.

24 SENSORY ANALYSIS

In addition to these tests, yeast sachets are checked after packaging to ensure vacuum seals remain intact.

LALBREW® PREMIUM SERIES



> PHYSICAL PROPERTIES

	ALE YEASTS	LAGER YEASTS	CBC-1
APPEARANCE	Tan to beige granular powder		
TASTE & ODOR	Characteristic of normal yeast		
SOLIDS	93 - 96%		
INGREDIENTS	Yeast, emulsifier E491 (≈ 1%)		



> MICROBIOLOGICAL PROPERTIES

	ALE YEASTS	LAGER YEASTS	CBC-1
VIABLE YEAST CELLS	1x10 ⁹ - 5x10 ⁹ CFU/g of dry yeast (strain dependent)	5 x 10 ⁹ CFU/g of dry yeast	1 x 10 ¹⁰ CFU per gram of dry yeast
BACTERIA	< 1 / 10 ⁶ cells		
WILD YEAST (LYSINE METHOD)	< 1 / 10 ⁶ cells		
COLIFORMS	< 100 / g		
<i>E. COLI</i>	< 10 / g		
<i>S. AUREUS</i>	Negative in 1g		
<i>SALMONELLA</i>	Negative in 25g		
BEER FERMENTATION	Can generally be completed within 4 days at 20°C in standard wort*	Can be completed within 7 days at 12°C in standard wort	-
DIASTATICUS	Undetectable**		

* Strain specific exceptions apply, please check individual strain specification sheets. ** With the exception of LalBrew Belle Saison™



> HEAVY METAL ANALYSIS*

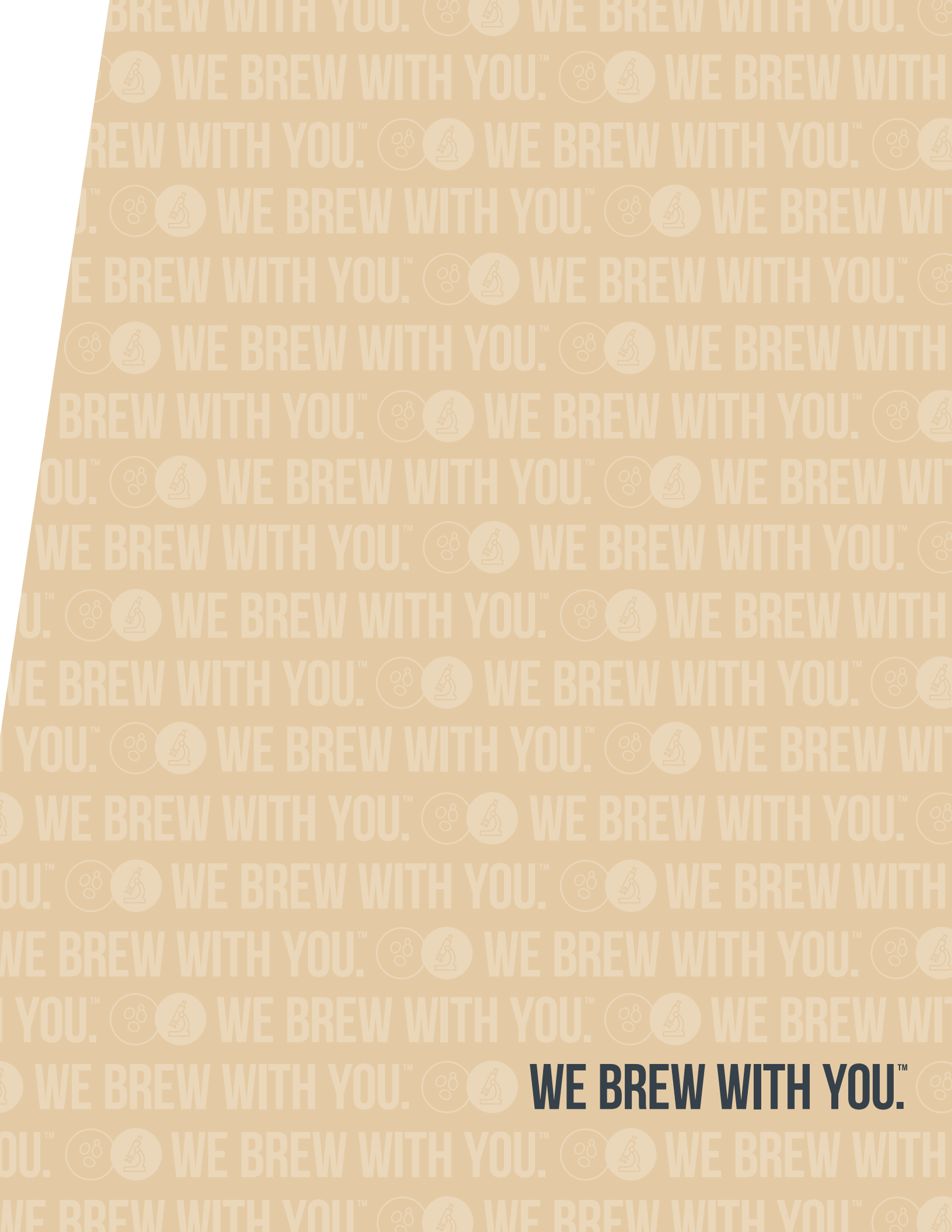
	ALE YEASTS	LAGER YEASTS	CBC-1
LEAD	< 5 ppm		
MERCURY	< 5 ppm		
ARSENIC	< 5 ppm		
CADMIUM	< 5 ppm		

* Neither the raw materials used nor production process pose a risk of heavy metal contamination. Random lots for each yeast are selected to undergo testing for heavy metals.



> PACKAGING, STORAGE & SHELF-LIFE

	ALE YEASTS	LAGER YEASTS	CBC-1
PACKAGING	<ul style="list-style-type: none"> • 500g vacuum-packed sachets • 11g vacuum-packed sachets Bulk Packaging is available upon request.		
STORAGE	Should be stored dry and below 4°C.		
SHELF LIFE	2-3 years	2 years	5 years



WE BREW WITH YOU.



For more information, you can reach us via email at brewing@lallemand.com

www.lallemandbrewing.com

