



Dear Readers,

First of all we wish you all health, prosperity and success for the year 2003.

Many of you have responded to the Meura newsletter created recently and we want to thank you sincerely for your comments and your words of encouragement.

We would like to take the opportunity in our second issue of meur@news to bring you our good news. Our business is expanding, as our customers choose Meura's expertise more and more often. In order to meet our customers' requirements, it has become essential to invest in new production techniques and also to move to new premises to accommodate increased production. Therefore our major shareholders, the Boccard family, have decided to build a new plant in the industrial area of Péruwelz, near Tournai in Belgium. Moving should occur at the end of the year and we hope to have the pleasure of welcoming you in our new office soon.

In the meantime, enjoy your Newsletter!

Yours,

Michel Genart  
Managing Director

Patrick Boccard  
Chairman

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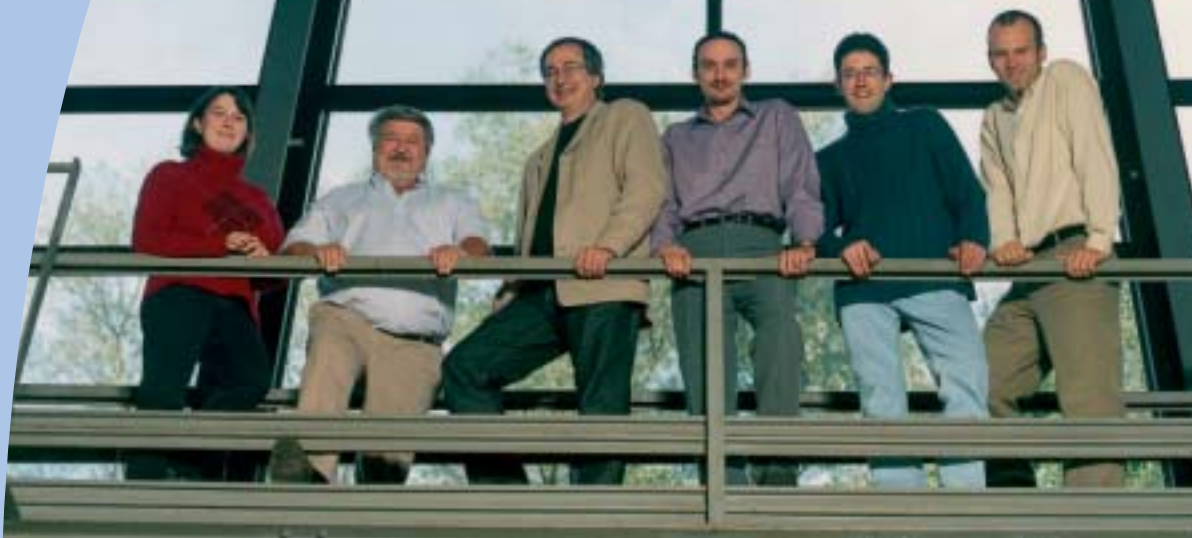
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# Meura

**A real partner**



▲ From left to right : Frédérique Harmegnies, Jacques Blocqueau, Rafael Tigel Gil, David Chauvier, Laurent Marlé, Bruno Bonacchelli.

Pioneer by tradition, MEURA have always put their faith in the spirit of innovation. So the management of MEURA thought when they decided in 1997 to install the R&D Division in the heart of the University-city of Louvain-la-Neuve (Belgium), near the Unit for Brewing and Food Processing Industries. MEURA TECHNOLOGIES is not only a R&D Centre, but much more : it is a real partner for the players of the Food and Beverage industry. Let's discover it.

The dynamic team of MEURA TECHNOLOGIES is composed of 6 people: 4 process engineers (brewers and chemists), 1 technician and 1 designer, and is headed by Ir. Rafael Tigel Gil, who was a member of the original team that has developed the MEURA 2001 mash filter in the 1980's.

## ► R&D Activity, and more...

Together with the university, they work on advanced technologies to reach and anticipate the needs of the Customers, with a particular emphasis these last years on continuous brewing process.

They are behind key-equipment proposed by MEURA such as :

- The HYDROMILL®, designed for the fine grinding of malt in water;
- The CARBOMILL, a new dry grinding unit enabling the production of non-oxidized finely ground malt;
- The MEURA mechanical pre-masher;
- The AFLOSJET, a new mash heating system using clean steam injection;
- The YEAST MANAGEMENT systems : yeast propagation and pre-oxygenation.

Further to their R&D activity, MEURA TECHNOLOGIES offer real assistance to their customers. If you have a project in mind, or wish to develop a new product, to check compatibility between MEURA systems and your particular process or

to materialize an idea... then MEURA TECHNOLOGIES is the ideal partner to help you in **total confidentiality**, including :

- technical feasibility study ;
- pilot testing of your own raw materials ;
- performance improvement ;
- increase in productivity ;
- rental of pilot equipment.

## ► A working Environment in Accordance to the Sector

To provide these services, the working environment of MEURA TECHNOLOGIES is nothing other than yours : a brewery... but at a pilot scale. There you have all the MEURA advanced techniques at disposal for pilot tests.

Thanks to their expertise and experience of understanding and processing customer wishes, the R&D team is able to provide corresponding individual solutions. More than a service supplier, MEURA TECHNOLOGIES is a real partner.

# Technologies

### 1 Milling :

#### Disc mill pilot installation

designed for dry grinding and milling in water  
capacity : 800 kg/hour  
Power : 32 kW

### 2 Brew house :

Mashing-in vessel  
capacity : +/- 12 hl  
Heating by direct steam injection (AFLOSJET System)

#### Continuous Brewing Skid

1 vessel for proteolyse (heating up to 45°C)  
Capacity : +/- 3.6 hl  
1 vessel for the liquefaction (heating up to 63°C)  
Capacity : +/- 3.6 hl  
1 vessel for saccharification (heating up to 72°C)  
Capacity : 4 hl

#### Double Meura 2001 pilot mash filter

Each half filter can be equipped with 5 filtration chambers  
Filtration surface : 3.5m<sup>2</sup>/half filter  
Throw : +/- 100 kg malt equivalent per half filter.

#### Continuous Wort Boiling / Settling Skid

1 closed stirred tank  
1 cylindro-conical settling tank

#### Wort Stripping pilot installation

Flow : up to 4 hl wort/hour

#### Wort Evaporation pilot installation

for the production of malt extracts (up to 78°P)

### 3 Fermentation :

Wort aeration using ceramic membranes  
4 Fermenting vessels, capacity : up to 25 hl each  
2 of them are equipped with a *data acquisition system* to follow-up the fermenting process

### 4 Yeast Pre-oxygenation Unit :

Unit equipped with 7 aluminium oxide membranes in a loop configuration  
Membrane design :  
diameter : 25 mm,  
length : 900 mm  
channels : 19 (Ø 2.5 mm, pore size 0.01 µm)

### 5 Beer Filtration :

2 Beer filtration units (filtration on candles)  
Filtration area : 0.93 m<sup>2</sup> per filter  
The 2 beer filters can be installed in line: one providing the rough filtration and the other one the clarification and the stabilisation.

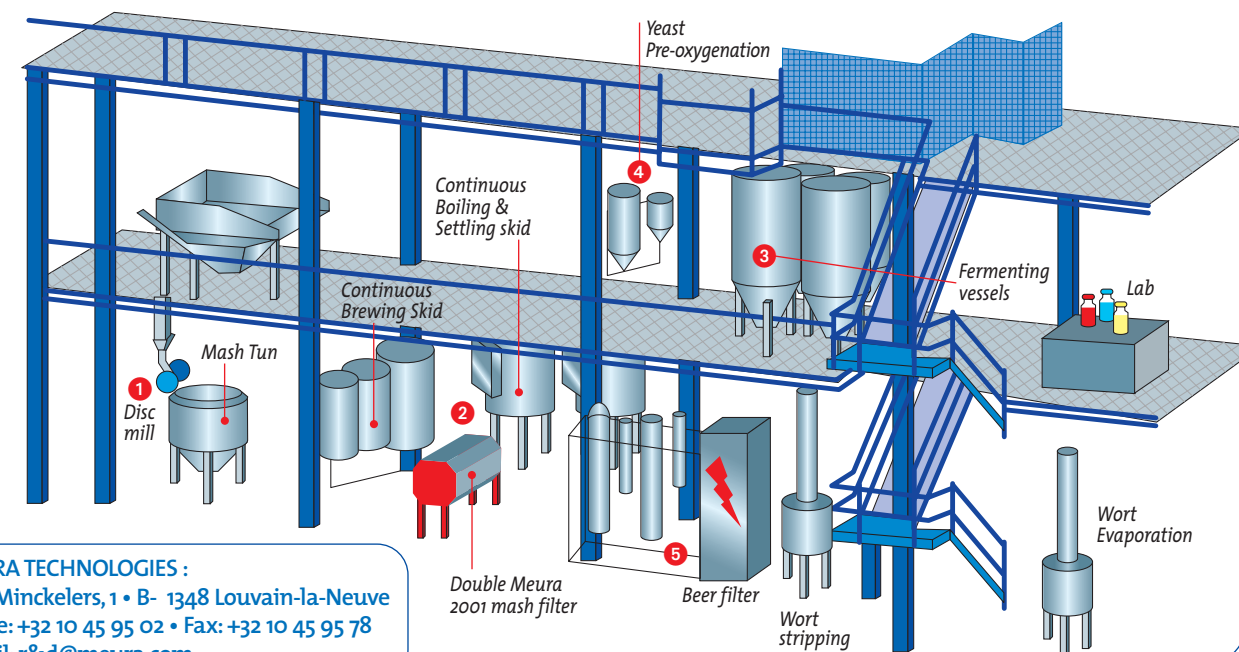


▲ Brewhouse : general view

▲ Wort evaporator

▲ Fermenting vessels

▲ Beer filter



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## ► Yeast Vitalization Theory

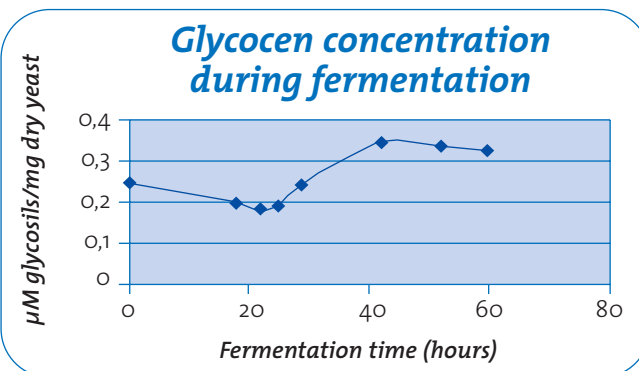
Oxygen is an essential component not only for growth, as mentioned above, but also for yeast vitalization. It is a necessary building block for the biosynthesis of essential membrane lipids. An adequate cellular oxygen supply is critical for yeast growth, fermentation performance and beer flavour.

To obtain active and regular fermentation it is common practice to aerate the cold wort. Drawbacks of conventional wort aeration technology are:

- oxidation of wort constituents with undesirable colour and flavour changes,
- low solubility of oxygen in high gravity worts,
- poor oxygen transfer due to foam formation,
- risk of over-aeration resulting in excessive yeast growth,
- risk of under-aeration resulting in a poor attenuation.

It has been shown that these problems may be overcome by oxygenating, during the yeast harvesting period, the sterol depleted yeast crop (Masschelein et al., E.B.C. Congress 1995, Brussels, pp. 377-386).

At the end of the fermentation process the yeast growth rate is going down due to the decrease of several growth compounds such as amino acids. The yeast cells shall transform the excess of fermentable sugars mainly in glycogen. Figure 2 shows the increase of glycogen concentration at the end of fermentation (Ryder & Masschelein, E.B.C. Congress 1993, Oslo, pp. 241-250).



▲ Figure 2 : Glycogen concentration during fermentation

This carbon source formed by the glycogen can be used by the yeast to rebuild sterol in the presence of oxygen. Therefore a sufficient quantity of oxygen has to be provided in order to meet the metabolic demands of the yeast used for re-pitching.

In order to have sufficient glycogen for a pre-oxygenation cycle, the yeast may not be stored longer than 20 hours. Nevertheless, if the yeast strain has to be stored longer, a low concentration of wort is added to the yeast. This process is called "yeast vitalization".

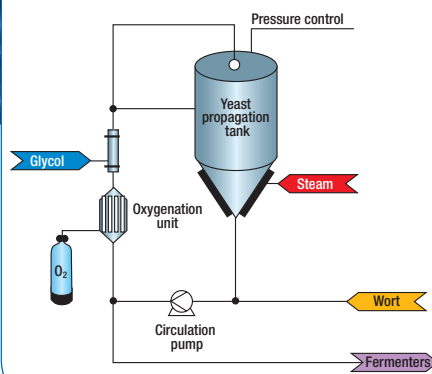
Masschelein et al. have shown that excellent oxygen transfer efficiency is possible by using a membrane sparger in a loop configuration. A flow of oxygen is forced through the sintered aluminium oxide membrane in the upward flow of the yeast suspension. Mixing and oxygenation are achieved by circulation through the internal channels of the sparger.

The external circulation loop also allows an easy temperature control and leads to the homogeneity of the yeast suspension.

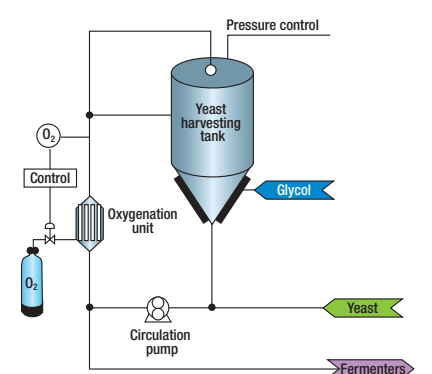
## ► A Combined Propagation and Vitalization Plant.

The plant delivered by MEURA to Coopers Brewery is a combined propagation and vitalization plant. It allows weekly production of one batch of 60 hl propagated yeast as well as three vitalization batches for pitching the beer before bottling.

### Yeast propagation system



### Yeast vitalization system



Fermentation tests were conducted at Coopers Brewery: two batches pitched with yeast from the MEURA propagation system were compared with two batches pitched following the standard method used by the brewery.

The results are conclusive! It has been shown that sugar consumption time is reduced by nearly half when the wort is pitched with the yeast obtained with the MEURA propagation system.

It is clear that this difference is due to the fact that the yeast is in an optimal physiological condition when growing in the MEURA propagation system.

Regarding the secondary fermentation in bottles, the MEURA vitalization system has allowed better production efficiency, and to improve the flavour profile of the final beer.



MEURA is renowned worldwide for its 2001 mash filter and nowadays more than 140 units are in operation. Its success is no coincidence, but is due to targeted research and continuous updating in order to satisfy our customer requirements.



### The MEURA 2001 Mash Filter in brief:

**Type :** Filter press designed for the mash separation

**Performance :** The advantage of the MEURA 2001 mash filter is that unlike other lautering equipment, it is able to produce SIMULTANEOUS achievement of :

- High productivity (at least 12 brews per day)
- AND
- High extract yields (practical yield equal to lab yield)
- AND
- Low solids content : < 5ml/l
- AND
- High gravity wort: up to 15°P before boiling

### Main Assets :

- Very well adapted to high gravity brewing (first wort: up to 30°P) resulting in shorter boiling time and energy savings
- High extract yield resulting in a decrease in malt consumption
- Great tolerance via raw materials : the MEURA 2001 mash filter accepts any kind of raw material (malted or unmalted) and high proportion of adjuncts can be used with satisfactory results
- Can work with worts of high viscosity
- Low oxidation of the filtered wort
- Lower consumption of sparging water (less than 2.5 hl/100 kg malt instead of 4 hl for a classical lauter tun) and CIP (only one cleaning per week required)
- Dryer spent grains (+/- 27% dry substance content) reducing the cost of post-drying and conditioning
- Easy and limited maintenance (no complicated mechanical parts)
- Ideal for the revamping of existing brew houses (due to the small space required by the mash filter compared to the diameter of a lauter tun)

### Application Fields :

- Brewing industry
- Production of Malt extract
- Distilling industry

## From the very beginning...

The first filter press developed by MEURA for the brewing industry dates back to the end of the nineteenth century. Back then, Philippe MEURA, the son of the founder had realised that mash separation using a lauter tun was slow and irregular, reducing brewhouse production. Therefore, to improve the lautering process, he decided to develop a mash filter that he exhibited at the World Fair in Brussels in 1910.

## The MEURA 2001 Mash Filter : Development of a new Technology

Since then, the mash filter has undergone many changes. In 1983 began a research programme to develop an efficient lautering technology, which had to fulfil the objectives of the brewers :

- an extract yield equal to the laboratory extract yield (fine EBC),
- the production of high gravity wort,
- an increased productivity,
- the production of a bright wort,
- dry spent grains (25-28% of dry matter),
- the possibility to install the filter in an existing brew house,
- the possibility to automate the process,
- a maximal working flexibility.

This programme led to the development of the MEURA 2001 mash filter, the first installation of which was installed in 1988 at Interbrew brewery in Jupille (Belgium). This technology quickly convinced the larger breweries as well as the independents.

## A confirmed Satisfaction

The MEURA 2001 mash filter is mainly used in the brewing industry. Nevertheless it is also the ideal partner for the production of malt extracts due to the high extract recovery yield it allows.

The MEURA 2001 has recently entered the whisky market with a filter installed in England in a UDV Distillery. ①

According to a survey conducted in June 2001, confidence in the filter was confirmed by our customers. The great majority are satisfied with the filter performance: regarding productivity nearly 90% stated that they are realising extract targets and required wort clarity.

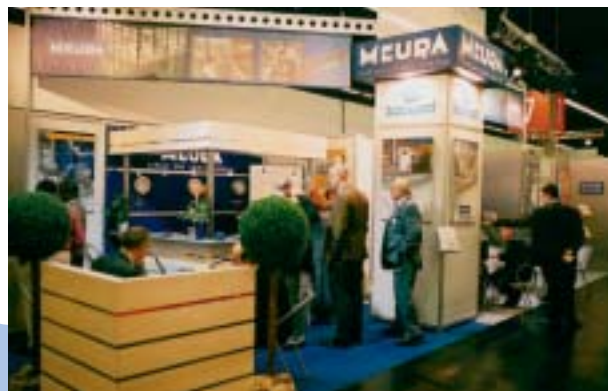
Over 90% of our customers confirmed that the MEURA 2001 mash filter is by far the best equipment for producing high gravity wort.

① The subject will be developed in a further issue.

# Current News

## BRAU BEVIALE 2002

► We would like to take this opportunity to extend our thanks to all of you who visited our stand at Brau Beviale 2002 in Nuremberg.



Volkovsky E.P., General Director of TAPI Brewery (Russia) and his family ► on the Meura stand with Alexander Tronnikov



## MEURA MOSCOW

► In order to answer the numerous customer enquiries from the Russian market, Meura established an office in Moscow which began operations in September 2002. The office is under the direction of Alexander Tronnikov, who is at your disposal for any information.



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## Meura Technological Seminar

► From November 7th to 8th, MEURA have organised a Technological Seminar for Brewers from the Russian Federation and CIS. We thank all the breweries that have taken part in this seminar for your interest in our products.

## China Brew & Beverage 2002

► This was the fourth time that CHANGCHUN MEURA (CCM) have exhibited at the biennial Fair China Brew & Beverage 2002 which took place in Beijing from September 2nd to 6th. On this occasion LI Zheng, CCM Sales Manager, and Robert Braekeleirs, MEURA Sales & Marketing Manager gave two lectures: one on "Mash Filterability" and another on "Yeast Management".



◀ From right to left :  
LI Zheng, CCM Sales Manager,  
Robert BRAEKELEIRS, MEURA Sales & Marketing Manager,  
Guy DEPRAETERE, CCM General Manager and Fanny WANG, CCM Assistant, in front of the MEURA booth.

