Dear Readers,

MEURA this year celebrates the 15th anniversary of its R&D centre, MEURA Technologies, which is at the origin of many technological innovations in the last few years such as the HYDROMILL, the MECHAMASHER, the AFLOSJETS, the MEURA 2001 HYBRID and, last but not least, the MEURABREW!

We highlight the various missions of MEURA Technologies in this MeuraNews 17.

MEURA will also be present at the Craft Brewers Conference in San Diego in May this year. It will be an opportunity to share our ideas with all the passionate brewers looking for the best performing technologies to accompany their impressive growth. Among those technologies, the MEURA 2001 MICRO mash filter especially developed for craft brewers worldwide.

They are all welcome at our stand #809.

I wish you a pleasant and instructive reading and look forward to seeing you in San Diego.

Christian De Brackeleire
Chief Executive Officer
In 1902 the Compañía Cervecerías Unidas S.A. (CCU) was founded, formed from the joint venture between three local breweries. It gave rise to the company that would later become a leader in the beer business in Chile. Today CCU is a diversified beverage company operating principally in Chile and Argentina. CCU is the largest Chilean brewer, the second-largest Argentine brewer, the second-largest Chilean soft drink producer, the second-largest Chilean wine producer, the largest Chilean mineral water producer, and one of the largest pisco producers; it also participates in the rum and confectionery industries in Chile.

The biggest brewery of the group is the Quilicura Santiago brewery located on the outskirts of Santiago. Starting from the construction of the brewery, the lauter tun was the only mash filtration technology used in its three brewhouses. Due to the increasing demand from the market, in 2010 CCU had to invest in the brewhouse area.

CCU carefully studied the options for their future expansion and finally they decided to equip one of the three brewhouses with the Meura 2001 solution as the best option where wort quality, yield and OPEX are concerned, and thus the choice that provided the best TCO (total cost of ownership).

The final target of the up-graded brewhouse was to achieve 14 brews/day and a high gravity wort. Thanks to the increase in capacity, the brewhline equipped with the Meura 2001 is able to provide the brewery’s total required volume during the low season months. The other two brewhlines can then be stopped, which drastically reduces the operating costs.
THE PROJECT

Meura has combined the following equipment to modernize one brewhouse:

- Hammermill, Classicmill (CLM4 PCV) with 13 T/h capacity
- Mechanical mashing-in device, Mechamasher processing 70 tons grist per hour
- Double Meura 2001 Hybrid, equipped with 2 x 80 chambers (= 14 T malt throw) extendable to 2 x 100 chambers (= 17.5 T malt throw).
- Ilobox (automatic parameter modification software) including a Performance Service Level Agreement.
- Complete CIP station for the Meura 2001 filter.
- Meuraclean, the automatic rinsing device for the Meura 2001 filter.

RESULTS

The modernized brewhouse has been in full production since November 2011 and the brewery is satisfied with its new state-of-the-art equipment. As you can read from the interview, CCU is happy with the performance, yield and productivity provided by the Meura 2001 Hybrid filter.

The Meura-CCU cooperation was excellent, and we would like to thank CCU for their trust in our technology and our team.

Interview by Raul Martinez (Meura’s Area Sales Manager Latin America) with Mr Claudio Fehrenberg (Brewing Manager CCU).

Why did you decide to change to the Meura mash filter technology after so many years of working with lauter tuns?

Indeed, as we had only lauter tuns in the Santiago brewery, at first we considered that technology. But the size of a new lauter tun would have been enormous. The lauter tun could never achieve 14 brews/day at an acceptable yield, and to reach a capacity of 17.5 T equal to that with the Meura 2001 we would have needed a lauter tun for a 24-25 T throw. So for that reason we started looking at the Meura 2001 filter, and of course the additional important benefits of yield and high gravity wort led us to decide in favour of that technology.

Are you also satisfied with the wort quality?

Today on the new Meura brewline we’ve got a lower wort turbidity compared with our other two Lauter tun brewlines. The final beer quality meets our specifications. We are more than satisfied.

Are you happy with the new equipment?

We are really pleased with this new technology – it is simple to operate, efficient, and fulfils all our expectations. It was a very positive learning experience as we improved our knowledge regarding the new brewing equipment industry.
A pioneer by tradition, Meura has always promoted innovation. Fifteen years ago, in 1997, in order to offer its customers the best technological solutions, Meura decided to create Meura Technologies, its R&D division, in the heart of the university city of Louvain-La-Neuve and near its famous brewing school.

Besides the development of technological innovation, the mission of Meura Technologies is also to partner with brewers that intend to make important process changes (brew diagram, changing raw materials, etc.) on their Meura industrial equipment and would first like to perform small scale trials.

During the last 15 years Meura Technologies has made several innovations, some of which can be considered revolutionary for the brewing industry. The recent major innovation is certainly the Meurabrew, a continuous brewhouse. In its early beginnings Meura Technologies started this development with the installation of a 4 hl/h capacity continuous brewhouse prototype. After four years of validation trials the first positive results were published at the EBC Conventions in 2001 and 2003. The process was fully approved in the year 2005 (seven years after the project started) and the first industrial Meurabrew of 200 hl/h at 20°P cold wort was ordered in 2006 by the Martens brewery (Belgium). In the meantime three Meurabrews have been ordered, and Meura Technologies regularly carries out campaigns with potential customers to demonstrate the advantages of the technology for their products. As usual in the brewing industry, it takes time before major technological changes are accepted, but Meura is confident that the Meurabrew will achieve its position in the industry.

Other technologies developed and patented thanks to the R&D pilot plant are for example the Hydromill and the Aflosjet technologies. The Hydromill features a fine milling technology under water for special applications such as the milling of green malt or of roasted barley/malt. The Aflosjet is a direct steam diffusion technology for mash heating. It replaces the traditional double jacket heating.

The major focus the last three to five years has been on the further improvement of the Meura 2001 technology, with as a final result the industrial introduction of the Meura 2001 Hybrid, an important modification leading to a reduced sparging water to grist ratio and thus...
producing a higher gravity wort, shorter cycle times and an improved wort quality.

The pilot plant can also make batch brews of up to 20 hl/brew through to the final beer. **Meura Technologies** thus has a complete brewery except for bottling facilities. The brewhouse is equipped with a double **Meura 2001** mash filter, allowing high flexibility for representative tests, up to 175 kg for batch capacity and 87 kg for filtrations in parallel in the continuous brewing process.

Hot wort treatment can be performed traditionally with an internal boiler or with the three-stage concept of boiling: “Formation – clarification – stripping”. The pilot **Ecostripper** is often used to validate the impact of Meura’s de-intensified boiling concept on the organoleptic quality of the wort. A falling film evaporator is also part of the pilot brewhouse equipment for extract production (up to 65-70 brix) as Meura’s customers also include malt extract companies.

The Meura laboratory is equipped for grist size distribution analysis (Pfungstad), lab brews (EBC or industrial recipe), and a mash filtration unit (“Bomb” filter). The “Bomb” filter is developed in-house and enables the determination of mash filterability with the industrial brewing recipe as well as extraction yield and malt equivalent evaluation of raw materials. This equipment is very useful for testing the feasibility of new projects using unknown raw materials or for trouble shooting. For more analytical analyses samples can be taken and sent to external brewing labs of Universities in Belgium.

**Meura Technologies** also owns pilot equipment dedicated to trials on site in breweries. A pilot mash filter with a capacity varying between 8 kg and 80 kg malt equivalent can be rented for campaigns of tests on site with the assistance of one of the R&D engineers for the start-up. A yeast pre-oxygenation unit can also be placed in breweries for trials enabling an immediate evaluation of performances on the industrial product.

Besides innovation for the brewing industry, new process or process fine tuning for the grain extract industry, distilling industry, kvass production (Russian rye-based soft drink), etc. have also been developed in the R&D centre and have led to **Meura** obtaining major orders for industrial applications.

**Meura Technologies** is not only a R&D centre for Meura’s developments but also a real partner for the players of the Food and Beverage Industry.

In addition to its own R&D activities, **Meura Technologies** offers its customers valuable technological assistance in total confidentiality. Prior to supplying equipment, **Meura Technologies** acts as a partner that helps and advises the customer:

- Technical feasibility trials for new recipes, products, projects.
- Performance improvement.
- Technological support to our customers.
- Training for customers, brewing schools.
- Rental of pilot equipment.

Thanks to its expertise and experience in brewing technologies, the R&D team is able to create solutions that keep Meura’s customers ahead of the competition. More than just an equipment supplier, **Meura** is a leading technical and technological partner.
In 1901, Mr. Philippe Meura from Tournai, Belgium developed the first mash filter application for the brewing industry. More than 1,000 Meura filters have been installed worldwide since that date.

In 1989 the Meura 2001 filter, a thin bed filter equipped with membranes, was developed. Today about 25% of the world's beer volume is produced with a Meura 2001 filter!

More than 20 years ago when the industrial introduction of the Meura 2001 filter took place, only one filter size, called the Meura 2001 Senior (from 4 to 30 metric T throw), was available, mainly sized for large lager brewers. The end of the 1990s, as a consequence of an increasing demand by medium-sized breweries, Meura introduced the Meura 2001 Junior filter (from 0.5 to 4 metric T throw). In 2012 at the Craft Brewing Convention in San Diego, supported by an increasing demand from the U.S. Craft Brewing market, Meura decided to introduce the Meura 2001 Micro.

**DESIGN**

The Meura 2001 Micro can take a throw of up to 1000 lbs. (500 kg) of malt. Meura has sized its mash filters to fit the needs of the typical brewhouse sizes in existence.

<table>
<thead>
<tr>
<th>Brewsize at 12°P</th>
<th>µ10</th>
<th>µ15</th>
<th>µ20</th>
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<tbody>
<tr>
<td>10 bbl (12 hl)</td>
<td>450</td>
<td>650</td>
<td>1000</td>
</tr>
<tr>
<td>15 bbl (17.5 hl)</td>
<td>200</td>
<td>300</td>
<td>400</td>
</tr>
<tr>
<td>20 bbl (23.5 hl)</td>
<td>18</td>
<td>26</td>
<td>36</td>
</tr>
<tr>
<td>Number of chambers</td>
<td>18</td>
<td>26</td>
<td>36</td>
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</table>
Like the other mash filters in the Meura 2001 family, the MircoMeura 2001 achieves the same unique process performances.

**PERFORMANCES**

The **Meura 2001 Micro** offers numerous advantages, which can be summarized as follows:

1) The **Meura 2001 Micro** saves raw materials. The extract yield is at least equal to the E.B.C. laboratory yield (fine grist). It is common for extract losses of Craft breweries to be between 5 and 10%.

2) It opens up the possibility of brewing with a wide variety of raw materials in any amount. It is Belgian technology especially designed for Belgian beer styles! As a matter of interest, nearly 90% of the beer volume produced in Belgium is produced with the Meura 2001 technology.

3) It provides increased productivity thanks to a total cycle time of < 100 minutes. As a consequence, a brewhouse with a mash tun, a Meura 2001 mash filter and wort kettle can produce three brews in a 10-12 hour time period. This represents significant savings in manpower compared to lauter tun brewhouses.

4) It yields dry spent grains of 26-30% dry matter (lauter tun at 20% D.M.). This means cleaner operation with essentially dry matter handling versus liquid/matter removal of spent grains.

5) It leads to water savings. The recovery of more wort and no false bottom rinsing represents a general savings of between 0.25 and 0.50 gal/gal (l/l).

6) It enables High Gravity brewing. Thanks to a thick mash at mashing in and reduced sparging (<2.3 l/kg or 0.28 gal/lbs) of the wort before boiling and without adding sugar it will be > 16°P without extract losses. This represents a saving in energy and space and makes an ideal set-up for brewing speciality beers.

7) It creates a very high quality wort, thanks to a brighter wort (<5ml/l Imhoff solids) than with a lauter tun. A reduced sparging water ratio with less leaching out of unwanted components is also achieved with the **Meura 2001 Micro** mash filter.

8) A hot trub volume that is approximately 30-50% lower is achieved because of the bright wort.

9) There is lower hop consumption (ca. 5-15%) with a better yield due to the lower hot trub content.

10) The modular system allows an expansion of the system for additional capacity in the future. Intermediate plates allow almost any size brew to be produced, whether for production or low volume trials.

**CASE EXAMPLE**

The high productivity of the **Meura 2001 Micro** ensures a high yearly throughput of the brewhouse compared with lauter tun brewhouses of the same size.

Let us consider the following factors. The brewmaster produces wort during four days a week. He/she can use the fifth working day to contact suppliers, check fermentation etc. During a working day three brews are produced. With a brewhouse where the milling can start automatically this is not a problem.

<table>
<thead>
<tr>
<th>Brewsize at 12°P (no sugar)</th>
<th>µ10</th>
<th>µ15</th>
<th>µ20</th>
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<tbody>
<tr>
<td>10 bbl (12 hl)</td>
<td></td>
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<tr>
<td>15 bbl (17.5 hl)</td>
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<tr>
<td>20 bbl (23.5 hl)</td>
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<table>
<thead>
<tr>
<th>Daily production 3 brews/day</th>
<th>µ10</th>
<th>µ15</th>
<th>µ20</th>
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<tbody>
<tr>
<td>30 bbl (35 hl)</td>
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<tr>
<td>45 bbl (52.5 hl)</td>
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<td>60 bbl (70 hl)</td>
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<tr>
<th>Weekly production 4 days/week</th>
<th>µ10</th>
<th>µ15</th>
<th>µ20</th>
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<tbody>
<tr>
<td>120 bbl (140 hl)</td>
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<tr>
<td>180 bbl (210 hl)</td>
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<tr>
<td>240 bbl (280 hl)</td>
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<tr>
<th>Yearly production 50 weeks/year</th>
<th>µ10</th>
<th>µ15</th>
<th>µ20</th>
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<tbody>
<tr>
<td>6,000 bbl (7,000 hl)</td>
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<tr>
<td>9,000 bbl (10,500 hl)</td>
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<td></td>
</tr>
<tr>
<td>12,000 bbl (14,000 hl)</td>
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The **Meura 2001 Micro** makes it possible to produce 12,000 bbl (14,000 hl) or more of beer per year.

**CONCLUSION**

As the result of a strong demand from the market, the Meura 2001 technology is available for Craft breweries of all sizes.

Meura’s long and extensive experience since 1845 together with its Belgian brewing roots provide Craft brewers with the best technological and technical support in the development of their business.
Meura’s projects

The most recent orders:
1. Sobraga, Gabon: Meura will supply a complete brewhouse
2. Heineken Craiova, Romania: ordered a cereal cooker
3. Centralcer, Portugal: Meura will be in charge of the brewhouses upgrade
4. Guinness, Nigeria: a Mechamasher 70t/h will be installed
5. Consolidated Breweries, Nigeria: a Meura 2001 Hybrid equipped with 94 chambers has been ordered
6. Compañía Cervecerías Unidas S.A. (CCU), Chile: a Meuraclean will be supplied
7. Brasseries du Cameroun, Koumassi: ordered a Meura 2001 Hybrid equipped with 100 to 124 chambers

8. Brasseries du Cameroun, Bafoussam: Meura will supply a Classicmill and a Meura 2001 Hybrid equipped with 84 to 100 chambers
9. Brasseries du Cameroun, Yaoundé: ordered a second Carbomill
10. BB Lome, Togo: A Classicmill CLM2 and a Mechamasher 25 tons per hour will be supplied, as well as a Meura 2001 Hybrid equipped with 62 to 86 chambers

Major projects being carried out:
1. Sobegra Brewery, Benin: Meura is working on the brewhouse revamping
2. Béni Brewery, RD Congo: Meura is supplying a complete new brewhouse
3. Brarudi Brewery, Burundi: Meura is working on the brewhouse revamping
4. Carlsberg Northampton, U.K: A Mechamasher 80 t/h and a Meura 2001 equipped with 168 chambers are being installed

Major projects recently commissioned:
1. ATE (Lima), Peru: Brewhouse revamping
2. Al Ahram, Egypt: A classicmill, a Meura 2001 Hybrid and an external cooker
3. Chimay Brewery, Belgium: a whirlpool and a wort cooler
4. Brasserie du Congo (Pointe Noire), Congo Brazzaville: a complete new brewhouse and malt handling plant
5. Bralima Brewery, RD Congo: 2 hammer mills, a Mechamasher, a Meura 2001 Hybrid, a mash tun and a cereal cooker
6. VBL Danang, Vietnam: a new brewhouse

Meura is on the move all over the world. Here is a brief overview of Meura’s current projects:

5. Malteuco, Chile: Meura is erecting a Classicmill CLM3 and a Mash tun
6. Heineken Craiova, Romania: Meura is installing a Cereal cooker

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Traditionally pioneers since 1845

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